

CLIMATE CHANGE AND THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

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INTRODUCTION

Anthropogenically-induced climate change¹ is probably the largest environmental threat facing California. Already it is impacting the state's environment, and scientists predict that if unchecked, it will cut water supplies, intensify heat waves, accelerate coastal erosion, degrade air quality, increase wildfires, and reduce wildlife habitat-among other impacts.² Similarly major environmental effects will occur worldwide.³ Those impacts threaten major ecological and economic costs,⁴ and while climate change will affect almost all people, the burdens for low-income or otherwise vulnerable communities will be particularly heavy.⁵ For all of these reasons, climate change is a problem California must address.

This paper describes one legal method for assessing and limiting California's contributions to climate change. The California Environmental Quality Act (CEQA)⁶ requires government agencies to identify and, if feasible, mitigate or avoid the significant adverse environmental impacts of projects they propose or approve.⁷ As discussed below in more detail, many government-sponsored or government-approved projects add to the greenhouse gas (GHG) emissions that cause climate change, and climate change already is causing significant adverse environmental impacts, and will continue to do so. Feasible methods exist, however, for fully mitigating or avoiding those agencies' contributions to climate change. CEQA therefore requires state or local agencies to identify their projects' potential contributions to climate change, and to adopt feasible measures to mitigate or avoid such contributions.

BACKGROUND

I. Climate Change Overview

Carbon dioxide (CO₂) creates what scientists call a "greenhouse effect."⁸ While it lets light energy into the earth's atmosphere, it reduces the amount of reflected heat released.⁹ Other gases create similar effects, and some, like methane, have greenhouse properties substantially more intense than carbon dioxide.¹⁰ Consequently, scientists long ago predicted that if atmospheric levels of carbon dioxide and other greenhouse gases (GHGs) rose above natural background levels, the earth's climate would become unnaturally warm. Those predictions have proven accurate. Primarily because of fossil fuel combustion, atmospheric carbon dioxide levels have risen dramatically in recent decades, and are continuing to rise.¹¹ Global average temperatures also have been increasing for several decades, and while warming earlier in the twentieth century was probably due to non-anthropogenic forcing, human activity all but certainly caused the more recent rise.¹² There is no real scientific doubt that anthropogenic emissions will warm our climate even more if they continue unabated into the future.¹³ The projected changes are substantial, with the Intergovernmental Panel on Climate Change predicting worldwide average temperature increases ranging from 1.1 to 6.4 degrees Fahrenheit - with the lower figure assuming efforts to minimize GHG emissions-by the end of the 21st century.¹⁴

Temperature increases of that magnitude will cause many major environmental changes, most of them undesirable.¹⁵ Sea levels will continue to rise, permanently flooding low-lying coastal areas and drastically increasing coastal regions' vulnerability to Hurricane Katrina-like storms.¹⁶ Extreme weather events, including droughts and floods, will almost certainly occur more frequently.¹⁷ In combination with the loss of glaciers and summer snowpacks in mountain regions, those droughts will increase water shortages, disrupting both natural systems and human economies.¹⁸ Rising temperatures will shift climate zones to higher latitudes or farther uphill, extinguishing species that are unable to migrate, while facilitating the movement of others—crop pests and disease vectors, for example—that most people would prefer not to face.¹⁹ Rising temperatures also will “very likely,”²⁰ increase the frequency of extreme heat events.²¹ Not all of the changes will be negative, but in general, a combination of changing environmental norms and increased variability will have substantial adverse impacts.²²

Because changes already are occurring, total prevention of anthropogenic climate change no longer is possible.²³ Climate change and the resulting negative impacts are not all-or-nothing phenomena, however; they can occur to greater or lesser degrees, and the damage therefore still may be limited.²⁴ Taking steps to limit GHG emissions, thus minimizing climate change and its secondary effects, therefore is extremely important, and incremental solutions that slow or reduce climate change offer far greater environmental benefits than no solutions at all.²⁵

II. Climate Change and California

While it derives from the aggregate effects of many local sources, climate change is a global problem. Unlike many localized pollution problems, the location of greenhouse gas emissions matters little. A ton of CO₂ emitted in California is no more or less harmful to California than a ton of CO₂ emitted in Shanghai.²⁶ The secondary environmental effects are similarly global; while some locations will feel climate change's impacts more than others, few areas are likely to be unaffected.²⁷ Because the sources of climate change are dispersed throughout the world - no one country contributes a majority share of global GHG emissions - comprehensive solutions will likely require international cooperation.²⁸ Nevertheless, some areas in particular will contribute substantially to climate change, in some areas the effects will be especially pronounced, and some areas can achieve multiple benefits from climate change prevention. California fits within each of those categories. It bears a large share of responsibility for the significant environmental impacts of climate change, but it is capable of taking substantial steps to help resolve the problem, and will benefit in multiple ways from doing so.

A. California's Contributions to Climate Change

California is a major contributor to global climate change. If it were an independent nation, California would rank (depending upon the metric used) as the tenth- to sixteenth-highest GHG-emitting nation in the world.²⁹ Indonesia, with a population of nearly 250 million people (California has under 40,000,000),³⁰ emits similar GHG amounts, and California's emissions are on a par with those of France.³¹ California's emissions exceed-by a wide margin-those of any other state except Texas.³² And California's emissions have been growing. “From 1990 to 2004,” according to the California Energy Commission, “total gross GHG emissions rose 14.3%.”³³

Those emissions derive from a variety of sources. Transportation produces approximately 41% of California's total GHG emissions, with gasoline engines contributing the lion's share.³⁴ Electricity generation also contributes heavily, and out-of-state power, which more commonly derives from coal, disproportionately produces carbon dioxide emissions.³⁵ Industrial operations also contribute a large share, as do agriculture and forestry practices.³⁶ Fossil fuel combustion creates most of California's GHG emissions, but agricultural and landfill methane emissions and industrial releases of nitrous oxide and "high global warming potential" gases also add to the total output.³⁷ Some agricultural activities and natural processes partly compensate for those emissions by removing GHGs from the atmosphere, but in the aggregate California's contributions far outweigh its sinks.³⁸

B. Climate Change's Effects Upon California

As a large and growing number of state-sponsored studies have concluded, California also will be harmed substantially by climate change. Those harms are not unique; other areas will face similar threats, and in some places—particularly low-lying nations, regions already more vulnerable to drought or flooding, or poorer and less stable countries where adaptation will likely prove more difficult—the consequences will be even more severe.³⁹ The difficulties facing California thus exemplify the worldwide threats posed by climate change, and are by no means outlying worst-case scenarios. But even if California alone were threatened, the likely adverse impacts still would be significant, and California's self-interest alone ought to prompt a vigorous response.

Temperatures already are rising, and the state is likely to experience a significant additional rise in average temperatures, particularly in its inland areas.⁴⁰ Those increases threaten a long list of adverse consequences.⁴¹ Air quality, which already is poor in much of California, will get worse.⁴² Some precipitation that now falls as snow will in the future be rain, increasing winter flooding and reducing snowpacks and water supplies in summer, when California needs water most badly.⁴³ Pests and pathogens will migrate to new regions, damaging the state's agricultural economy and threatening human health.⁴⁴ Forest fires will occur more frequently.⁴⁵ Rising temperatures will degrade many terrestrial and aquatic ecosystems. Heat waves will become more frequent, and extreme temperatures will be higher.⁴⁶ Rising sea levels also will affect California, increasing flooding on the coast and in the Sacramento-San Joaquin Delta, accelerating erosion, and leaving coastal construction increasingly vulnerable to storm damage.⁴⁷ Those changes in turn will create major consequences not only for the state's environmental quality, but also for its economy; many of the state's most important industries are likely to be harmed.⁴⁸

Those environmental problems would strike a state already struggling to cope with existing conditions. According to the California Climate Change Center,⁴⁹ "[t]he state's vital resources and natural landscapes are already under stress due to California's rapidly growing population, which is expected to grow from 35 million today to 55 million by 2050."⁵⁰ Californians currently experience the nation's worst air quality, with much of the state's population living in areas that violate federal and state air quality standards.⁵¹ Water allocation is chronically contentious. The state's forests face elevated fire risk. Other natural ecosystems are similarly strained, with dozens of plant and animal species threatened or endangered even under existing conditions. Even without rising sea levels, key areas of coastal California and the Sacramento-

San Joaquin Bay-Delta already are vulnerable to flooding. All of those environmental problems create institutional, economic, and political strains in addition to environmental and health costs; in California, litigious natural resource battles already are ubiquitous.

While most Californians will be affected, the impacts of climate change are likely to be particularly harsh for the state's poorest and most vulnerable people, many of whom are people of color.⁵² In part, those disproportionate impacts will arise because adjusting to environmental change generally requires money and insurance, and poorer people lack the former and are less likely to own the latter.⁵³ Geography will also exacerbate distributional disparities. Some of the earliest and largest temperature changes are expected in California's Central Valley,⁵⁴ which contains some of California's poorest areas, and poverty could increase as climate change disrupts the region's agricultural economy.⁵⁵ The Central Valley is already one of California's hottest regions, and that heat contributes to some of the nation's worst air quality problems.⁵⁶ Consequently, some of the harshest impacts will fall upon California's most vulnerable people.

Climate change and its secondary environmental impacts thus pose significant threats to California. With consequences likely to strike across much of California's landscape and throughout many sectors of California's economy, and with harsh potential impacts upon those Californians already vulnerable to economic and environmental risk, climate change presents a large and urgent threat.

C. California's Role in Climate Change Solutions

While California presently is a major contributor to climate change, it also can be a major contributor to, and beneficiary of, climate change solutions.

California has a longstanding tradition of pushing the frontiers of environmental protection. California's pioneering regulation of automobile emissions led to national adoption of more protective standards, and California's innovations in energy efficiency have created improvements well beyond the state's borders. California now can play that role again. No other state has been as proactive in responding to climate change,⁵⁷ and California's innovative measures will likely provide examples and lessons for regulatory approaches worldwide. California has begun to embrace that leadership role; the state legislature recently passed the Global Warming Solutions Act of 2006 (more commonly known, and referred to herein, as AB 32), which declares:

[t]he program established by this division will continue this tradition of environmental leadership by placing California at the forefront of national and international efforts to Reduce emissions of greenhouse gases... action taken by California to reduce emissions of greenhouse gases will have far-reaching effects by encouraging other states, the federal government, and other countries to act.⁵⁸

Notwithstanding common arguments that responding to climate change will require society-wide economic sacrifices, California's responses actually could boost the state economy. According to the California Legislature, "[b]y exercising its global leadership role, California will also position its economy, technology centers, financial institutions, and businesses to benefit from national and international efforts to reduce emissions of greenhouse gases."⁵⁹ Governor

Schwarzenegger has acknowledged those potential benefits, asserting that “technologies that reduce greenhouse gas emissions are increasingly in demand in the worldwide marketplace, and California companies investing in these technologies are well-positioned to profit from this demand, thereby boosting California’s economy, creating more jobs and providing increased tax revenue.”⁶⁰ California’s Environmental Protection Agency similarly has concluded that implementing climate change prevention strategies could “increase jobs and income by an additional 83,000 and \$4 billion, respectively.”⁶¹ Independent studies back those predictions; according to a recent California Climate Change Center report:

[g]lobally, increasing GHG emissions are assumed to be essential to a growing economy. This is not true in California. The state can take an historic step by demonstrating that reducing emissions of GHG can accelerate economic growth and bring new jobs.... California can gain a competitive advantage by acting early in the new technologies and industries that will come into existence worldwide around the common goal of reducing GHG emissions.⁶²

III. Existing Regulatory Responses to Climate Change

Despite the threats posed by climate change, and despite the potential benefits of preventive regulation, the state and federal governments have taken only preliminary steps to limit the greenhouse gas emissions that drive global warming.

Federal action has been almost totally absent. The United States has neither ratified the Kyoto Protocol nor proposed any substitute international regulatory structure. Congress has not passed any legislation addressing climate change. EPA long declined to address carbon dioxide emissions, insisting, until corrected by the United States Supreme Court, that it had neither the obligation nor even the power to do so.⁶³ Although the Bush Administration now acknowledges the reality of anthropogenically-caused climate change, it has placed its faith almost entirely in voluntary responses.⁶⁴

Unlike the federal government, California’s leaders have recognized climate change as a problem requiring a vigorous response, but the state’s response still is in its nascent stages. The Governor and the California Legislature have taken several major steps, including the passage of legislation setting automotive emissions standards for greenhouse gases.⁶⁵ In 2005, Governor Schwarzenegger pointedly declared the debate over climate change to be “over,” and issued an executive order targeting ambitious reductions in the state’s carbon emissions.⁶⁶ In accordance with Schwarzenegger Administration policy, many of California’s administrative agencies are studying ways in which those agencies may respond to climate change.⁶⁷ The state attorney general’s office has repeatedly attempted to compel responses to climate change, most notably by joining lawsuits seeking to impose nuisance liability on the electric power and automotive industries, to compel EPA to regulate automotive GHG emissions, and to force consideration of higher federal fuel economy standards.⁶⁸ Those efforts build upon earlier achievements. Because of past energy shortages and stringent air quality protections, California has implemented many measures designed to improve energy efficiency. Partly because of those measures, Californians’ per capita GHG emissions now are lower than those of most Americans, even though their aggregate emissions are high and growing.⁶⁹

Adding significantly to those achievements, in 2006 the California Legislature passed and Governor Schwarzenegger signed into law AB 32, also known as the California Global Warming Solutions Act of 2006, a landmark statute designed to cap California's greenhouse gas emissions.⁷⁰ AB 32 requires the California Air Resources Board (CARB) to cap statewide emissions at 1990 levels.⁷¹ It empowers CARB to use a variety of regulatory mechanisms to achieve compliance with that cap by 2020, if not sooner.⁷² AB 32 also requires establishment of a monitoring and enforcement system for tracking and regulating GHG emissions, and empowers CARB to take immediate steps to limit high-emitting sources.⁷³ The Legislature left most other details to the agency's discretion; while CARB must avoid environmental injustice in implementing its measures, its program will take shape primarily through rulemaking processes.⁷⁴

Passing AB 32 was a major step. No other state has a law like it, and the federal government has until recently shown no inclination toward passing anything nearly so ambitious. Nevertheless, its passage is only a start. Even if fully achieved, AB 32's emission reductions, while important, won't eliminate California's contribution to the overall problem. Full implementation of the statute would reduce emissions only by approximately 25%, but many experts estimate that an 80 to 90% reduction ultimately will be necessary to fully eliminate anthropogenic climate change.⁷⁵ Nor should full implementation automatically be assumed. The regulatory program developed by CARB also may have gaps, which other laws and regulatory approaches can help fill.⁷⁶ And AB 32 places heavy responsibility upon CARB. If CARB is unable to meet its responsibilities, other statutory mechanisms may be necessary to spur change. AB 32 does not purport to occupy the regulatory field,⁷⁷ and both the need and the opportunity for other regulatory approaches therefore remain.

CEQA AND CLIMATE CHANGE

CEQA provides such a complementary approach. Though CEQA's substantive and procedural requirements have yet to be fully applied to projects contributing to climate change, the Act's core provisions require state and local public agencies to avoid or mitigate the significant adverse climate change impacts of any project they sponsor or approve. Multiple methods—many affordable, and some capable of creating significant collateral benefits—of avoiding or mitigating GHG emissions already are available.⁷⁸ And those mandates are readily enforceable; both government agencies and community groups have long-established traditions of using CEQA to create effective environmental change.⁷⁹

I. The Requirements of CEQA

CEQA mandates that state and local agencies “[d]evelop and maintain a high quality environment now and in the future, and take all action necessary to protect, rehabilitate, and enhance the environmental quality of the state;” “take all coordinated actions necessary to prevent [critical environmental] thresholds being reached;” and “[e]nsure that the long-term protection of the environment, consistent with the provision of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions.”⁸⁰

Those broad purposes have informed legal principles. “In enacting CEQA,” the California Supreme Court has written, “the Legislature declared its intention that all public agencies responsible for regulating activities affecting the environment give prime consideration to

preventing environmental damage when carrying out their duties.”⁸¹ The state’s high court has repeatedly directed that “CEQA is to be interpreted ‘to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.’”⁸²

CEQA fulfills those protective purposes primarily through a few basic requirements. Any time a state or local public agency makes a discretionary decision⁸³ to approve or carry out a project with potentially significant environmental impacts—even if the project will be implemented by private parties⁸⁴—the agency must consider and disclose the potential environmental consequences of its decision.⁸⁵ It also must identify, discuss, and, if feasible, adopt measures capable of avoiding or reducing a proposed project’s significant adverse environmental impacts.⁸⁶ The discussion below explains these requirements in more detail.

A. Disclosure of Significant Adverse Environmental Impacts

If a proposed project⁸⁷ may cause significant adverse impacts upon the environment, CEQA requires the lead agency⁸⁸ either to: (a) adopt or require project changes that will avoid or fully mitigate potentially significant impacts; or (b) prepare an “environmental impact report” (EIR) before approving or carrying out the project.⁸⁹ The EIR, if prepared, must identify and discuss the project’s potentially significant adverse environmental impacts. That discussion should inform both decision-makers and the public of the environmental consequences of the agency’s proposed action, allowing assessment of whether the project really is worth its potential environmental cost.⁹⁰

CEQA defines “significant impacts” broadly and inclusively. Its definition includes—and agencies therefore must discuss—not only the direct environmental consequences of implementing the project, but also indirect effects that may follow from the project’s direct physical consequences.⁹¹ That discussion need not address speculative effects,⁹² but where an indirect consequence is foreseeable, the existence of a causal chain between project and impact—even an attenuated one—does not excuse the agency from discussing that impact in an EIR.⁹³

A lead agency also must address significant “cumulative” environmental impacts—that is, contributions, even if small, to larger environmental problems. CEQA defines a “significant effect on the environment” as including

possible effects of a project (that) are individually limited but cumulatively considerable. As used in this paragraph, ‘cumulatively considerable’ means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.⁹⁴

The presence of such cumulatively significant effects can trigger the obligation to prepare an EIR, for an agency must prepare an EIR if its “project has possible environmental effects that are individually limited but cumulatively considerable.”⁹⁵ The EIR then must disclose those cumulative impacts; agencies are obligated to “discuss cumulative impacts of a project when the project’s incremental effect is cumulatively considerable.”⁹⁶

Judicial decisions have carefully enforced those requirements. California's courts have emphasized the importance of cumulative impacts analyses, cautioning that "[o]ne of the most important environmental lessons is that environmental damage often occurs incrementally from a variety of small sources. These sources appear insignificant when considered individually, but assume threatening dimensions when considered collectively with other sources with which they interact."⁹⁷ The courts therefore have required agencies to treat as significant projects' contributions to larger environmental problems, even where the individual project contribution would seem small in isolation.⁹⁸ They also have rejected a de minimis exemption from that general rule, reasoning that such an exemption would contravene the core purposes of a cumulative impacts analysis.⁹⁹ Some debate remains about where exactly the lower bound of a cumulatively significant contribution lies; though the rejection of a de minimis exception indicates that even tiny contributions often matter, commentators have argued against a "one-molecule" standard for air pollution.¹⁰⁰ But past decisions leave little doubt that CEQA's full suite of obligations can be triggered even by a seemingly small contribution to a larger problem.

CEQA's definition of significant impacts also extends to impacts occurring outside California. While CEQA governs only decisions made and conduct occurring within California, nothing in its definition of significant impact excludes impacts outside state lines. Instead, "CEQA requires a public agency to mitigate or avoid its projects' significant effects not just on the agency's own property but 'on the environment,' with 'environment' defined for these purposes as 'the physical conditions which exist within the area which will be affected by a proposed project.'"¹⁰¹ That functional definition invokes no political boundaries; if an area is affected, it is part of the relevant physical environment, regardless of the governmental authority exercising local jurisdiction.

CEQA, its implementing regulations, and judicial decisions thus compel agencies to disclose, in an EIR, their projects' contributions to any significant environmental problem, even if those contributions are indirect, even if project-specific contributions, if viewed in isolation, would seem small, and even if those impacts will occur partly outside California.

B. Identification of Alternatives and Mitigation Measures

In addition to requiring identification of significant environmental impacts, CEQA also requires agencies to discuss ways in which those impacts can be avoided or reduced. Agencies must "systematically identif[y]... feasible alternatives or feasible mitigation measures which will avoid or substantially lessen [a project's] significant effects."¹⁰² That discussion of alternatives and mitigation measures forms the "core" of an EIR.¹⁰³

CEQA's alternatives requirement compels agencies to consider whether different versions of the project, or even different projects, could accomplish most project purposes while reducing environmental costs.¹⁰⁴ Courts have repeatedly stated that agencies "must describe all reasonable alternatives to the project including those capable of reducing or eliminating environmental effects."¹⁰⁵ No universally-applicable list sets forth the alternatives agencies must consider—the scope of the analysis instead is governed by project-specific circumstances, the standards set forth in the statute and the CEQA Guidelines, and a "rule of reason"¹⁰⁶—but agencies often consider building in alternative locations,¹⁰⁷ using different infrastructure to accomplish project purposes,¹⁰⁸ or scaling back a project's scope.¹⁰⁹

CEQA also “requires that an EIR indicate the ways in which a project’s significant effects can be mitigated, by setting forth ‘mitigation measures proposed to minimize significant effects on the environment.’”¹¹⁰ The CEQA Guidelines describe several categories of mitigation measures, including “avoiding the impact altogether by not taking a certain action or parts of an action;” restoring the environment impacted by the action; altering project operations to minimize the impact; or “[c]ompensating for the impact by replacing or providing substitute resources or environments.”¹¹¹ They also specify that “where relevant,” EIRs must describe measures capable of reducing “inefficient and unnecessary consumption of energy.”¹¹²

C. Adoption, if Feasible, of Alternatives or Mitigation Measures Capable of Avoiding Significant Environmental Impacts

While discussion of impacts and alternatives is central to CEQA compliance, the statute requires more than just disclosure. CEQA also includes a “substantive mandate that public agencies refrain from approving projects for which there are feasible alternatives or mitigation measures.”¹¹³ “[N]o public agency shall approve or carry out a project” if “one or more significant effects on the environment [] would occur if the project is approved or carried out,” unless the public agency determines either: (a) that the impacts will be mitigated to a less-than-significant level; or (b) that full mitigation is infeasible, but project benefits still justify proceeding.¹¹⁴ The CEQA Guidelines repeat that mandate, stating that the “basic purposes of CEQA” include “[p]revent[ing] significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.”¹¹⁵ Thus, if mitigation or avoidance of a project’s significant adverse impacts is feasible, an agency cannot approve the project without adoption of those mitigation or avoidance measures.

Those provisions require mitigation of cumulatively significant impacts. A cumulatively significant impact is, by definition, a significant project impact,¹¹⁶ and CEQA requires mitigation, if feasible, of all significant impacts.¹¹⁷ That does not mean agencies must fully resolve environmental problems that their projects only partially cause; instead, an agency may satisfy its CEQA obligations by mitigating its proportional contribution.¹¹⁸ The agency also may accomplish its share of mitigation in a variety of ways, including participation in regional mitigation programs.¹¹⁹ But an agency cannot simply ignore its project’s share of a larger impact. If a project’s contribution is incrementally important yet can be avoided or mitigated, the project cannot proceed without such mitigation.

CEQA thus creates both powerful incentives and clear mandates for agencies to refrain from contributing to larger environmental problems. Such contributions can trigger the obligation to prepare an EIR, and agencies wishing to avoid that obligation must fully mitigate their projects’ potential contributions. If the agency does not adopt such mitigation measures at the outset, its EIR must disclose potential contributions to that larger problem, and those disclosures may raise questions about the wisdom of proceeding with the project. Finally, if a project’s contributions to a significant impact can feasibly be avoided or mitigated, the agency cannot proceed without such avoidance or mitigation measures in place.

II. Applying CEQA’s Requirements to Climate Change

The core CEQA provisions described above constrain state or local public agencies' contributions to climate change. Many public projects directly or indirectly cause GHG emissions,¹²⁰ and all of those projects collectively add major contributions to significant environmental impacts.¹²¹ But multiple methods exist for feasibly mitigating or avoiding those projects' contributions to climate change.¹²² Consequently, and as explained in more detail below, CEQA requires that California state and local agencies refrain from approving projects that contribute to climate change or implement full mitigation.

A. Climate Change Contributions and State and Local Government Projects

The threshold trigger for CEQA is a discretionary state or local government action with potential environmental consequences, and government-implemented or approved projects that lead, directly or indirectly, to GHG emissions clearly cross that threshold.¹²³ In fact, much of California's GHG emissions derive at least partly from discretionary government decisions.

A listing of all public agency projects contributing to climate change would fill a book, but a partial sampling illustrates the extent to which GHG emissions intertwine with discretionary government action. Public agencies build transportation systems,¹²⁴ control land use planning and consequent automobile use, and regulate the location of new residential, commercial, industrial, agricultural, and power-generating facilities.¹²⁵ Timber harvests, which release some of the carbon previously stored in forests and reduce their sequestration potential, are regulated by California's Board of Forestry.¹²⁶ Methane-generating agricultural or industrial practices, like construction of major dairies, typically are subject to local land use authority, and require authorization from local governments. Government decisions also affect power demand; every subdivision, industrial project, or water project¹²⁷ that public agencies approve necessitates electricity. Public agencies also are major power consumers. The single largest power user in the state is California's State Water Project, which utilizes an extraordinary amount of energy every year delivering water to users in southern California.¹²⁸ Perhaps the most telling statistics are the numbers of project decisions issued by California agencies. In an average year, those agencies file thousands of documents notifying the public that a CEQA process has been completed, and many, if not most, of those projects may in some way affect GHG emissions.¹²⁹

B. GHG-Emitting Projects and Significant Environmental Impacts

Not all discretionary public agency decisions trigger CEQA's requirements; instead, the second major trigger for CEQA's information-disclosure and mitigation obligations is a potentially significant environmental impact.¹³⁰ Projects causing increased GHG emissions create that potential. Each project's individual contribution exacerbates climate change and leaves California further from achieving the state's declared emissions-reduction goals, and the collective result of those contributions, in combination with other emissions worldwide, is a classic example-perhaps the quintessential example-of the oft-repeated CEQA maxim "that environmental damage often occurs incrementally from a variety of small sources."¹³¹

Individual GHG-emitting projects clearly contribute to climate change. While no individual project can claim more than a relatively small share of responsibility for the overall consequences, every GHG-emitting project does increase the problem; there is no inconsequential time or location for GHG emissions to occur.¹³² Although those individual contributions might seem inconsequential if isolated and unique, CEQA precludes agencies from dismissing them as *de minimis*. The California courts have specifically rejected a *de minimis*

exemption to CEQA's cumulative impact requirements, instead cautioning that "the greater the existing environmental problems are, the lower the threshold should be for treating a project's contribution to cumulative impacts as significant."¹³³ While emissions of conventional air pollutants may be treated as insignificant where those emissions comply with applicable plans for attaining regional air quality goals,¹³⁴ no such plans presently exist for greenhouse gases, and California has established no safe threshold for greenhouse gas emissions.¹³⁵ Instead, California's acknowledged and urgent need for drastic reductions in GHG emissions vitiates any argument that an incremental increase, unless tiny enough to be essentially immeasurable,¹³⁶ is insignificant. Even seemingly small increases are fundamentally inconsistent with the need, repeatedly acknowledged by both the Legislature and the Governor, to cut emissions; and by pushing California further from its stated goals, every increase necessitates increased cuts in other GHG-emitting activities.¹³⁷

The aggregate environmental effects of greenhouse gas emissions clearly are significant. Greenhouse gases pose an extraordinary environmental threat, with the potential to harm multiple ecosystems, badly damage resource-dependant economies, and diminish the health and safety of millions of people in California and elsewhere.¹³⁸ The California Legislature and Governor have repeatedly acknowledged the severity of the danger, describing climate change as "a serious threat to the economic well-being, public health, natural resources, and the environment of California."¹³⁹ And while California may face particularly acute threats, its likely burdens are by no means unique.¹⁴⁰ Both within and outside California's borders, climate change will create highly significant environmental impacts.¹⁴¹

CEQA decisions addressing analogous environmental threats support treating contributions to GHG emissions as significant impacts. In *Kings County Farm Bureau v. City of Hanford*, a seminal cumulative impacts case, the respondent city had approved a power plant project that would emit ozone precursors.¹⁴² That plant's contributions would have had little effect in isolation, and represented only a small percentage of regional emissions, and the project proponent argued that those emissions therefore could not be significant.¹⁴³ The court disagreed. Noting that the small contribution would affect an area already suffering from excess air pollution, the court required the city to assess whether, given that regional context, the project's increased emissions would contribute to a significant environmental impact.¹⁴⁴ "The relevant question to be addressed in the EIR," it held, "is not the relative amount of precursors emitted by the project when compared with preexisting emissions, but whether any additional amount of precursor emissions should be considered significant in light of the serious nature of the ozone problems in this air basin."¹⁴⁵ That reasoning is similarly applicable to climate change. Much as regional air quality problems derive from the small contributions of a large number of sources—none of which in isolation would seem important, and most of which would seem small in comparison to the overall scope of the problem—climate change derives from the individually minor contributions of thousands of projects and actions worldwide, all of which collectively create major consequences.

In addition to being legally mandated, discussing contributions to climate change should prove manageable. Attributing ultimate environmental outcomes solely to a specific project's emissions generally will be impossible, but the basic premise of a cumulative impacts analysis is that collective, not individual, effects matter,¹⁴⁶ and describing individual emissions and

collective effects is a straightforward task. Ample guidance already exists for projecting an individual project's GHG emissions.¹⁴⁷ Likewise, ample and reliable documentation of collective effects already exists.¹⁴⁸ Numerous studies, both from California state agencies and from international scientific bodies, describe the anticipated consequences of global GHG emissions, and those studies can easily be quoted or summarized in CEQA-required reports.¹⁴⁹

C. GHG Emissions and Avoidance or Mitigation

Because government projects and decisions measurably contribute to the GHG emissions that drive climate change, and because those emissions' cumulative environmental impacts are significant, any CEQA study must also discuss ways to avoid or mitigate the project's contributions to those impacts. Unless those measures are infeasible, no CEQA-regulated project may be approved without such avoidance or mitigation measures.¹⁵⁰ For many CEQA-regulated projects, measures feasibly capable of reducing or eliminating GHG emissions likely exist, and those measures may be both affordable and capable of generating collateral environmental and economic benefits.

1. Project Alternatives

For many proposed projects, functionally similar alternatives can vastly reduce GHG emissions. Renewable power sources, for example, provide alternatives to constructing fossil fuel power plants. Constructing transit systems often provides a lower-emissions alternative to constructing new roads. Rather than building new water delivery projects, which tend to consume huge amounts of energy, project proponents could implement water use efficiency programs, either within their own supply areas or in areas sharing common water sources.¹⁵¹ Instead of breaking new ground and building new housing in undeveloped areas, local governments could limit their land use approvals to infill development projects, which tend to require substantially less energy-intensive infrastructure and result in fewer indirect GHG emissions.¹⁵² Such alternatives won't always be feasible—some projects may unavoidably need to be located in a particular place—and often environmentally-beneficial alternatives will still create some GHG emissions, but alternatives capable of substantially reducing GHG emissions will fairly often be available.

2. On-Site Mitigation

Even if no alternative is capable of avoiding a project's emissions, on-site measures often are capable of substantially mitigating greenhouse gas emissions. For example, developers can use green-building technology and renewable power systems, and build housing with ready transit access and internal or nearby options for grocery shopping and recreation, reducing their projects' energy footprint.¹⁵³ A variety of measures, ranging from reliance on recycled water for outdoor irrigation to utilization of water-conserving technologies and tiered pricing, can significantly reduce the amount of energy required to transport, distribute, heat, and dispose of water.¹⁵⁴ Highways, if necessary, can include HOV lanes. Dairy farms and landfills can be constructed with methane-recovery technologies.¹⁵⁵ These examples provide only a partial sampling, and as efforts toward GHG management intensify, an increasing variety of mitigation measures will likely become available.

3. Off-Site Mitigation

Sometimes neither project alternatives nor on-site mitigation measures will be capable of fully avoiding GHG emissions.¹⁵⁶ But even for those projects, off-site mitigation should allow projects

to avoid contributing to GHG emissions. The primary available method is generally known as emissions trading.

The concept behind emissions trading is fairly straightforward. To compensate for increased emissions resulting from its project, a project proponent can either reduce its own emissions elsewhere; pay some other entity to commensurately reduce emissions; or undertake or fund actions that will permanently sequester an equivalent amount of carbon.¹⁵⁷ For example, a municipality approving a housing development that unavoidably will contribute tons of carbon each year might implement a city-wide energy efficiency program creating equivalent reductions in carbon emissions. The compensation need not be exactly in kind; for example, the emissions deriving from a new transportation project might be offset by funding the conversion of abandoned agricultural land to a permanent forest.¹⁵⁸

If well-designed and transparent, emissions trades can fulfill CEQA's mitigation requirements. Using offsets-purchasing conservation easements as partial mitigation for conversion of farmlands or habitat, for example, or constructing new wetlands to compensate for wetlands destroyed-already is a common mitigation practice, and agencies often mitigate project impacts by contributing fees to regional mitigation programs.¹⁵⁹ Likewise, in some areas with deficient air quality new projects must offset emissions by purchasing reduction credits from existing sources.¹⁶⁰ Such approaches have legal limitations; a "commitment to pay fees without any evidence that mitigation will actually occur is inadequate" under CEQA, and fictitious or non-verifiable offsets therefore cannot constitute proper mitigation.¹⁶¹ But so long as the reality of reductions or sequestration is rigorously verifiable, emissions trades should pass legal muster. Emissions trades also can facilitate mitigation that otherwise would not occur. While CEQA lead agencies sometimes may plausibly assert that off-site alternatives or on-site measures simply aren't capable of fully mitigating a project's emissions, purchasing offsets generally will be feasible; such offsets already are available.¹⁶² Similarly, while project proponents might often argue that projects' climate change contributions are too small to justify full-scale environmental review or to necessitate alternatives or on-site mitigation methods, trading creates a correspondingly non-intrusive method for mitigating minor emissions. If a project's emissions contributions really are small, so too will be the cost of offsets, and de minimis arguments should provide no policy rationale for avoiding the mitigation measures that established CEQA rules require.¹⁶³ Trades thus can facilitate emissions reductions that agencies otherwise might not implement.

CONCLUSION

In coming years, local, state, and national governments will likely take many steps to regulate GHG emissions and reduce climate change. Those actions are indispensable; if we are to address this challenge, we have no choice but to develop new legal regimes and regulatory approaches. But the mandates of existing law also can help. The core principles of CEQA already require California's public agencies to evaluate and take steps toward addressing climate change. Compliance with those mandates can move the state-and, potentially, the nation and the world-toward resolving one of the most pressing environmental problems of our era.

¹ This memorandum refers to anthropogenic climate change, which encompasses both warming temperatures and changed storm and precipitation patterns, rather than using the narrower term "global warming." In most popular discussions, however, the terms are used interchangeably and refer to the same phenomenon.

¹ CALIFORNIA CLIMATE CHANGE CENTER, OUR CHANGING CLIMATE: ASSESSING THE RISKS TO CALIFORNIA 2 (2006) (hereinafter “OUR CHANGING CLIMATE”); CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, CLIMATE ACTION TEAM REPORT TO GOVERNOR SCHWARZENEGGER AND THE LEGISLATURE (2006).

¹ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS SUMMARY FOR POLICYMAKERS 12 (2007) (hereinafter IPCC, THE PHYSICAL SCIENCE BASIS) (describing some of the expected changes); INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: CLIMATE CHANGE IMPACTS, ADAPTATION AND VULNERABILITY (2007) (hereinafter IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY); Mass. v. EPA, 127 S. Ct. 1438, 1455 (2007) (“The harms associated with climate change are serious and well recognized.”).

¹ IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2; see Cal. Health and Safety Code § 38501(a), (b); Anthony C. Fisher et al., The Most Expensive Thing We Can Do Is Nothing: An Open Letter From California Economists, August, 2006 (“California’s economy is vulnerable to climate change impacts, including changes in water availability, agricultural productivity, electricity demand, health stresses, environmental hazards, and sea level.”).

¹ REDEFINING PROGRESS, CLIMATE CHANGE IN CALIFORNIA: HEALTH, ECONOMIC AND EQUITY IMPACTS (2006); IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2, at 19 (observing that factors like poverty can limit adaptive capacity).

¹ Cal. Public Resources Code §§ 21000-21177.

¹ See Cal. Public Resources Code § 21002. CEQA applies not only to government-sponsored projects, but also to private projects that require discretionary approvals from government agencies. Friends of Mammoth v. Board of Supervisors, 8 Cal.3d 247 (1972).

¹ See James E. Hansen, et al., Climate Impact of Increasing Atmospheric Carbon Dioxide, 213 SCIENCE 957-66 (1981).

¹ See PEW CENTER FOR GLOBAL CLIMATE CHANGE, THE CAUSES OF GLOBAL CLIMATE CHANGE (2006).

¹ See THE CALIFORNIA CLIMATE CHANGE CENTER AT UC BERKELEY, MANAGING GREENHOUSE GAS EMISSIONS IN CALIFORNIA I-7 (2006) (hereinafter “MANAGING GREENHOUSE GAS EMISSIONS”) (describing the impacts of other GHGs).

¹ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 2 (“Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed preindustrial values...”).

¹ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3 (explaining the causes of climate change); PEW CENTER FOR GLOBAL CLIMATE CHANGE, supra note 9, at 1, 2-5 (“During the twentieth century, the earth’s surface warmed by about 1.4°F.... Recent decades have seen record-high average global surface temperatures.”); Mass. v. EPA, 127 S. Ct. 1438, 1446 (2007) (“Respected scientists believe the two trends are related.”).

¹ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3; Naomi Oreskes, Beyond the Ivory Tower: The Scientific Consensus on Climate Change, 306 SCIENCE 1686 (2004) (“Politicians, economists, journalists, and others may have the impression of confusion, disagreement, or discord among climate scientists, but that impression is incorrect.”); DAN CAYAN ET AL. (CALIFORNIA CLIMATE CHANGE CENTER), CLIMATE SCENARIOS FOR CALIFORNIA 3 (2006) (“the winter and spring warming that has occurred in the California region over the last few decades is very unlikely to have been caused only by natural climate variations”).

¹ IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 11.

¹ See IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2.

¹ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 11 (projecting sea level rises. The IPCC’s projections do not include the potential effects of changing ice flow in Greenland or Antarctica); IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2, at 9.

¹ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 12 (“It is very likely that hot extremes, heat waves, and heavy precipitation events will continue to become more frequent.... It is likely that future tropical cyclones (typhoons and hurricanes) will become more intense.... There is less confidence in projections of a global decrease in numbers of tropical cyclones.”) (emphasis in original).

¹ IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2, at 7-8.

¹ IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2, at 8 (“Approximately 20-30% of animal and plant species assessed so far are likely to be at increased risk of extinction if increases in global temperatures exceed 1.5 to 2.5°C.”), 9.

¹ The IPCC assigns precise numeric values to terms like “very likely;” a “very likely” event is an event that in the judgment of the IPCC authors has at least a 90% probability of occurrence. IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 4 n.6.

¹ See id. at 12.

¹ See IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2 (describing both positive and negative impacts; the set of negative impacts is much larger).

¹ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 4-9; AMY LYND LUERS AND SUSANNE C. MOSER, PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA: OPPORTUNITIES AND CONSTRAINTS FOR ADAPTATION 3 (2006) (“climate change is demonstrably underway”); id. at 5 (table summarizing observed trends), 6; CLIMATE SCENARIOS FOR CALIFORNIA, supra note 13, at 1-2 (describing observed trends).

¹ See CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, supra note 2, at 38 (table showing degrees of impact).

¹ See generally *Mass. v. EPA*, 127 S. Ct. 1438, 1457 (2007) (explaining the significance of incremental steps: “Agencies [] do not generally resolve massive problems in one fell regulatory swoop. They instead whittle away at them over time”) (internal citation omitted).

¹ See CALIFORNIA ENERGY COMMISSION, INVENTORY OF CALIFORNIA GREENHOUSE GAS EMISSIONS AND SINKS iii (2006) (hereinafter “INVENTORY”) (“GHGs affect the entire planet, not just the location where they are emitted”) (this report is labeled “draft staff report,” but it represents the most current inventory, and this paper therefore relies upon it); IPCC, CLIMATE CHANGE 2001: THE PHYSICAL SCIENCE BASIS § 6.1.2, available at http://www.grida.no/climate/ipcc_tar/wg1/215.htm (explaining several of the primary GHGs, including carbon dioxide and methane, are “well-mixed gases,” meaning that their long lifespan ensures homogenous mixing throughout the atmosphere).

¹ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 12; IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2 (describing worldwide and regional impacts).

¹ See INVENTORY, supra note 26, at 20 (2006) (showing worldwide emissions).

¹ The differences in emissions among the 10th through 19th-ranked nations are slight, and different reports rank California differently. Compare id. at i, 20 (ranking California sixteenth; this report, while publicly available, is labeled a “draft staff report”) with MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-6 (“Only nine nations have greater total emissions than the state.”). The CEC’s report’s ranking of California’s is also affected by its treatment of Texas, which emits more GHGs than California, as a nation. See INVENTORY, supra note 26, at 20.

¹ See quickfacts.census.gov/qfd/states/06000.html.

¹ INVENTORY, supra note 26, at 20.

¹ Id. at i, 14.

¹ Id. at 8 (“California’s GHG emissions are large and growing... they are expected to continue to increase in the future under ‘business-as-usual’ unless California implements programs to reduce emissions”).

¹ Id. at ii, 9-10; see MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-7, I-10.

¹ INVENTORY, supra note 26 at ii-iii, 10, 11-12. INVENTORY, supra note 26 at ii-iii, 10, 11-12.

¹ Id. at ii, 10-11; see MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-7.

¹ INVENTORY, supra note 26, at 6. The emitted amounts of these other GHGs are much smaller than the amount of CO₂ emitted, but these gases have far more powerful heat-trapping effects. See MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-7 (describing the greenhouse potential of sulfur hexafluoride).

¹ See MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-10. A “sink” is a process, like forest growth, that removes carbon dioxide from the atmosphere.

¹ See IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2.

¹ OUR CHANGING CLIMATE, supra note 2, at 2 (“The latest projections, based on state-of-the-art climate models, indicate that if global heat-trapping emissions proceed at a medium to high rate, temperatures in California are expected to rise 4.7 to 10.5 degrees Fahrenheit by the end of the century.”).

¹ Id. (“These temperature increases would have widespread consequences including substantial loss of snowpack, increased risk of large wildfires, and reductions in the quality and quantity of certain agricultural products.”); see Katherine Hayhoe et al., Emissions Pathways, Climate Change, and Impacts on California, 101 PNAS 12422, 12425-26 (2004); Cal. Health & Safety Code § 38501(a).

¹ OUR CHANGING CLIMATE, supra note 2, at 5. The report states:

High temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, if temperatures rise to the medium warming range, there will be a

75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions.

¹ Id. at 6-7; Hayhoe et al., supra note 41, at 12425-26; DEPT. OF WATER RESOURCES, supra note 11, at 2-6, 2-22 to 2-31, 4-1 ("Planning and design of the Central Valley Project [] and State Water Project has, for the most part, assumed an unchanging climate... and a changing climate may threaten to destabilize the infrastructure and operations dependent on that assumption."); CALIFORNIA DEPARTMENT OF WATER RESOURCES, CALIFORNIA WATER PLAN UPDATE 2005 4-32 to 4-36 (2006) ("Predictions include increased temperature, reductions to Sierra snowpack, earlier snowmelt, and a rise in sea level, although the extent and timing of the changes remain uncertain. The changes could have major implications for water supply, flood management, and ecosystem health.").

¹ OUR CHANGING CLIMATE, supra note 2, at 9.

¹ Id. at 10-11.

¹ OUR CHANGING CLIMATE, supra note 2, at 5; see REDEFINING PROGRESS, supra note 5, at 19-26; Hayhoe et al., supra note 41, at 12424-45.

¹ DEPT. OF WATER RESOURCES, supra note 11, at 2-31 to 2-52.

¹ See Cal. Health & Safety Code § 38501(b) ("Global warming will have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry.")

¹ The California Climate Change Center is an academic research unit based primarily at the University of California's Berkeley and San Diego campuses. Several of its reports have been sponsored by California state agencies. See OUR CHANGING CLIMATE, supra note 2, at 2.

¹ OUR CHANGING CLIMATE, supra note 2, at 2; see AMY LYND LUERS AND SUSANNE C. MOSER, PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA: OPPORTUNITIES AND CONSTRAINTS FOR ADAPTATION v (2006).

¹ OUR CHANGING CLIMATE, supra note 2, at 5.

¹ See REDEFINING PROGRESS, supra note 5.

¹ See id. at 16-19, 36-37, 57-58, 63-64.

¹ Id. at 9-10; see Hayhoe et al., supra note 41, at 12424 (showing maps of projected temperature increases).

¹ See REDEFINING PROGRESS, supra note 5, at 3-4, 41-50 ("agriculture... is a significant source of employment for low-income groups and people of color. Shocks experienced by the industry could disproportionately affect these communities."); OUR CHANGING CLIMATE, supra note 2, at 8-9 (describing impacts to agriculture); Hayhoe et al., supra note 41, at 12426-27 (describing impacts to dairy and wine grape production).

¹ See REDEFINING PROGRESS, supra note 5, at 19-26 (describing disparities in vulnerability to heat waves), 26-35 (describing threats posed by increasing ozone (smog) pollution); Hayhoe et al., supra note 41 at 12425 ("Individuals most likely to be affected (by increases in extreme heat) include elderly, children, the economically disadvantaged, and those who are already ill.").

¹ See infra Part III.

¹ Cal. Health and Safety Code § 38501(d); see Executive Dept., State of California, Executive Order S-3-05 (June 1, 2005) (touting California's "leadership role in reducing greenhouse gas emissions").

¹ Cal. Health & Safety Code § 38501(e).

¹ Executive Order S-3-05, supra note 58.

¹ CAL. ENVTL. PROT. AGENCY, supra note 2, at 65.

¹ MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at E-6.

¹ See Mass. v. EPA, 127 S. Ct. 1438 (2007).

¹ See MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at ES-4 ("While helpful, there is no evidence that voluntary measures provide sufficient incentives to attain the Governor's targets.").

¹ See Cal Health & Safety Code § 43018.5. The automotive industry almost immediately challenged that legislation. See Cent. Valley Chrysler-Jeep Inc. v. Witherspoon, 2005 U.S. Dist. LEXIS 26536 (E.D. Cal. 2005) (allowing environmental groups to intervene in the automakers' lawsuit).

¹ See Bill Blakemore, Schwarzenator v. Bush: Global Warming Debate Heats Up, ABC NEWS, August 30, 2006, at <http://abcnews.go.com/US/GlobalWarming/story?id=2374968&page=1>; Executive Order S-3-05, supra note 58. The order states, in part: "the following greenhouse gas emission reduction targets are hereby established for California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80% below 1990 levels...."

¹ E.g., DEPT. OF WATER RESOURCES, supra note 11.

¹ *Conn. v. Am. Elec. Power Co.*, 406 F. Supp. 2d 265 (S.D.N.Y. 2005) (dismissing the nuisance case); *Mass. v. EPA*, 127 S. Ct.1438 (2007); Nick Bunkley, *California Sues 6 Automakers Over Global Warming*, NEW YORK TIMES, September 21, 2006.

¹ See INVENTORY, supra note 26 at i, 12 (“California’s ability to slow the rate of growth of GHG emissions is largely due to the success of its energy efficiency and renewable energy programs and a commitment to clean air and clean energy.... Although California’s total GHG emissions are larger than every state but Texas, California has relatively low carbon emission intensity. In 2001, California ranked fourth lowest of the 50 states in carbon dioxide emissions per capita from fossil fuel consumption and fifth lowest of the 50 states in carbon dioxide emissions per unit of gross state product.”).

¹ California Climate Change Solutions Act of 2006, A.B. 32, 2005-06 Sess., codified at Cal. Health & Safety Code §§ 38500-99.

¹ Id. §§ 38550-38551.

¹ Id. §§ 38560-38565.

¹ Id. § 38530.

¹ See id. §§ 38560-38574.

¹ See MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-4; Executive Order S-3-05, supra note 58; Thomas Wigley, *The Kyoto Protocol: CO₂, CH₄, and Climate Implications*, 25 GEOPHYSICAL RESEARCH LETTERS 2285 (1998) (concluding that compliance with the Kyoto Protocol’s modest targets would fall well short of removing the human footprint from the global climate).

¹ For example, AB 32 implies that CARB should focus primarily on a subset of sources, see Cal. Health & Safety Code §§ 38530(b)(1), and for reasons of practicality and administrative efficiency the agency is likely to follow that directive. That means, however, that many smaller or more diffuse sources may escape regulation under AB 32, at least immediately and perhaps indefinitely, even though the aggregate effect of those smaller sources could be quite large.

¹ Cal. Health and Safety Code §§ 38592(a) (“All state agencies shall consider and implement strategies to reduce their greenhouse gas emissions.”), 38592(b) (“Nothing in this division shall relieve any person, entity, or public agency of compliance with other applicable federal, state, or local laws or regulations, including state air and water quality requirements, and other requirements for protecting public health or the environment.”), 38598 (“Nothing in this division shall limit the existing authority of a state entity to adopt and implement greenhouse gas emissions reduction measures. [] Nothing in this division shall relieve any state entity of its legal obligations to comply with existing law or regulation.”).

¹ See supra Part I.C.

¹ See PLANNING AND CONSERVATION LEAGUE, EVERYDAY HEROES PROTECT THE AIR WE BREATHE, THE WATER WE DRINK, AND THE NATURAL AREAS WE PRIZE: THIRTY-FIVE YEARS OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (2005) at http://www.pcl.org/pcl_files/full_report.pdf.

¹ Cal. Pub. Res. Code §§ 21000(d), 21001(a), (d).

¹ *Mountain Lion Foundation v. Fish and Game Commission*, 16 Cal.4th 105, 112 (1997); see *City of Marina v. Board of Trustees of the California State University*, 39 Cal.4th 341, 348 (2006).

¹ *Mountain Lion Foundation*, 16 Cal.4th at 112 (quoting *Friends of Mammoth v. Board of Supervisors*, 8 Cal. 3d 247, 259 (1972)); *Laurel Heights Improvement Ass’n v. Regents of the Univ. of Cal.*, 47 Cal.3d 376, 390 (1988).

¹ See Cal. Pub. Res. Code § 21080(a); *Friends of Westwood v. City of Los Angeles*, 191 Cal. App. 3d 259, 267 (1987) (holding that the existence of any discretion in an approval process triggers CEQA’s applicability).

¹ See *Friends of Mammoth*, 8 Cal.3d 247 (holding that CEQA applies to private projects receiving governmental approvals).

¹ CEQA does set forth certain classes of projects that are categorically exempt from statutory requirements. E.g., Cal. Pub. Res. Code §§ 21080(b), 21080.14 (creating an exemption for “affordable housing projects in urbanized areas”).

¹ *Sierra Club v. State Bd. of Forestry*, 7 Cal.4th 1215, 1233 (1994).

¹ See 14 Cal. Code Regs. § 15002(b) (explaining the types of actions to which CEQA applies).

¹ CEQA defines a “lead agency” as “the public agency which has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment.” Cal. Pub. Resources Code § 21067.

¹ See *Friends of Davis v. City of Davis*, 83 Cal. App. 4th 1004, 1016-67 (2000) (“An EIR is required whenever it can be ‘fairly argued on the basis of substantial evidence that the project may have significant environmental impact.’”) (citations omitted); 14 Cal. Code Regs. §§ 15064, 15065(b)(1).

¹ See *Sierra Club*, 7 Cal. 4th at 1229 (describing an EIR as “an environmental alarm bell” and a “document of accountability”).

¹ See 14 Cal. Code Regs. § 15064(d)(2); see also 14 Cal. Code Regs. § 15358.

¹ See *Planning & Conservation League v. Department of Water Resources*, 83 Cal. App. 4th 892, 919 (2000) (“We need not venture into speculation. But CEQA does compel reasonable forecasting.”).

¹ See 14 Cal. Code Regs. § 15064(d)(2).

¹ Public Resources Code § 21083(b)(2). The CEQA Guidelines similarly state that “[c]umulative impacts’ refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” 14 Cal. Code Regs. § 15355. “While Section 21083 governs the situations in which an agency must prepare an EIR, its provisions have also been applied to the contents of an EIR once it is determined an EIR must be prepared.” *Los Angeles Unified School Dist.*, 58 Cal. App. 4th at 1024 n.6 (citing *Laurel Heights Improvement Ass’n*, 47 Cal.3d at 394).

¹ 14 Cal. Code Regs. § 15065 (a)(3).

¹ *Id.* § 15130(a); see *Los Angeles Unified School Dist.*, 58 Cal. App. 4th at 1024-26 (1997); *San Franciscans for Reasonable Growth v. City & County of San Francisco*, 151 Cal. App. 3d 61, 73 (1984) (“Part of [CEQA’s] vital informational function is performed by a cumulative impact analysis.”).

¹ *Communities for a Better Environment v. California Resources Agency*, 103 Cal. App. 4th 98, 114 (2002); see *Bakersfield Citizens for Local Control v. City of Bakersfield*, 124 Cal. App. 4th 1184, 1214 (2005) (quoting *Communities for a Better Environment*); *Los Angeles Unified School Dist.*, 58 Cal. App. 4th at 1025; *San Joaquin Raptor/Wildlife Rescue Ctr. v. County of Stanislaus*, 27 Cal. App. 4th 713, 739 (1996); *Las Virgenes Homeowners Federation, Inc. v. County of Los Angeles*, 177 Cal. App. 3d 300, 306 (1986); *Whitman v. Board of Supervisors*, 88 Cal. App. 3d 397, 408 (1979).

¹ E.g., *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, 718-24 (1990) (rejecting an EIR that failed to consider whether project emissions, in combination with emissions from other sources throughout the San Joaquin Valley, would create a significant impact); *Los Angeles Unified School Dist.*, 58 Cal. App. 4th at 1025 (“the relevant issue to be addressed in the EIR on the plan is not the relative amount of traffic noise resulting from the project when compared to existing traffic noise, but whether any additional amount of traffic noise should be considered significant in light of the serious nature of the traffic noise problem already existing around the schools”).

¹ *Communities for a Better Environment*, 103 Cal. App. 4th at 116-21 (following *Kings County*, which it described as “[t]he seminal decision,” and *Los Angeles Unified School District*).

¹ See, e.g., MICHAEL H. REMY ET AL., *GUIDE TO THE CALIFORNIA ENVIRONMENTAL QUALITY*.

¹ *American Canyon Community United for Responsible Growth v. City of American Canyon*, 145 Cal. App. 4th 1062, 1082 (2006) (italics removed; quoting Cal. Pub. Res. Code § 21002.1(b) and *City of Marina v. Board of Trustees of California State University*, 39 Cal. 4th 341, 359-60 (2006)); 14 Cal. Code Regs. § 15360.

¹ Cal. Pub. Res. Code § 21002; see Cal. Pub. Resources Code § 21061 (stating that an EIR must “list ways in which the significant effects of such a project might be minimized” and “indicate alternatives to such a project.”).

¹ *Citizens of Goleta Valley v. Board of Supervisors*, 52 Cal.3d 553, 564 (1990).

¹ See 14 Cal. Code Regs. § 15126.6.

¹ *County of Inyo v. City of Los Angeles*, 71 Cal. App. 3d 185, 203 (1977); see *Wildlife Alive v. Chickering*, 18 Cal.3d 190, 197 (1976); *Laurel Heights Improvement Assoc. v. Regents of Univ. of Calif.*, 47 Cal. 3d 376, 400 (1988); 14 Cal. Code Regs. § 15126.6.

¹ See 14 Cal. Code Regs. § 15126.6; *Citizens of Goleta Valley*, 52 Cal.3d at 565.

¹ E.g., *Citizens of Goleta Valley*, 52 Cal.3d at 570-75 (concluding that evaluation of a single off-site alternative was adequate); *San Bernardino Valley Audubon Society, Inc. v. County of San Bernardino*, 155 Cal.App.3d 738, 751 (1984) (rejecting an EIR that considered too narrow a range of site alternatives).

¹ E.g., *County of Inyo*, 71 Cal. App. 3d 185, 203 (1977) (rejecting an EIR for a water-delivery project that failed to consider conservation as an alternative to increased pumping); *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, 730-37 (1990) (rejecting an EIR that considered a natural gas-burning alternative to a coal-fired power plant, but did not provide enough quantitative data to facilitate an effective comparative analysis).

¹ E.g., *Village of Laguna Beach v. Board of Supervisors*, 134 Cal. App. 3d 1022, 1028-32 (1982) (upholding an EIR that considered a range of sizes for a proposed residential development).

¹ *Save Our Peninsula Committee v. Monterey County Bd. of Supervisors*, 87 Cal. App. 4th 99, 139 (2001) (citing Cal. Public Resources Code §§ 21100, 21002.1, and 21061); see 14 Cal. Code Regs. § 15002(a)(2) (stating that one of CEQA’s “basic purposes” is to “[i]dentify ways that environmental damage can be avoided or significantly reduced”).

¹ 14 Cal. Code Regs. § 15370. At the margins, the difference between an alternative and a mitigation measure may be fuzzy, but generally speaking, mitigation measures involve revisions within the same project, while alternatives

involve fundamentally different versions of the project. See *Laurel Heights*, 47 Cal.3d at 403 (“alternatives are a type of mitigation”).

¹ 14 Cal. Code Regs. § 15126.4.

¹ *Mountain Lion Foundation v. Fish and Game Commission*, 16 Cal.4th 105, 134 (1997); see *Sierra Club v. State Bd. of Forestry*, 7 Cal.4th 1215, 1233 (1994) (“CEQA compels government first to identify the [significant] environmental effects of projects, and then to mitigate those adverse effects through the imposition of feasible mitigation measures or through the selection of feasible alternatives.”); *Sierra Club v. Gilroy City Council*, 222 Cal.App.3d 30, 41 (1990) (CEQA “requires public agencies to deny approval of a project with significant adverse effects when feasible alternatives or feasible mitigation measures can substantially lessen such effects.”)

¹ Cal. Pub. Res. Code § 21081.

¹ 14 Cal. Code Regs. §§ 15002(a)(3), (h), 15021.

¹ See 14 Cal. Code Regs. § 15065(a)(3) (stating that “a lead agency shall find that a project may have a significant impact on the environment” if the project “has possible environmental effects that are individually limited but cumulatively considerable.”).

¹ Cal. Pub. Res. Code 21081.

¹ 14 Cal. Code Regs. § 15130(a)(3) (“An EIR may determine that a project’s contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project’s contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.”); 14 Cal. Code Regs. § 15064(h)(2) (same).

¹ *Save Our Peninsula Committee*, 7 Cal. App. 4th at 139-40. The *Save Our Peninsula* court also warned, however, that “a commitment to pay fees without any evidence that mitigation will actually occur is inadequate.” *Id.* at 140; *City of Marina*, 39 Cal.4th at 365.

¹ See *infra* Part II.A.

¹ See *infra* Part II.B.

¹ See *infra* Parts II.C, II.D.

¹ See *Friends of Mammoth v. Board of Supervisors*, 8 Cal. 3d 247 (1972).

¹ See, e.g., California Department of Transportation, About Caltrans, at <http://www.dot.ca.gov/aboutcaltrans.htm> (last checked September 15, 2007) (describing Caltrans’ role in building state transportation infrastructure).

¹ See, e.g., *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692 (1990) (considering the environmental consequences of constructing a new power plant); California Energy Commission, Welcome to the California Energy Commission, at <http://www.energy.ca.gov/commission/index.html> (explaining the CEC’s role, which includes “[l]icensing thermal power plants 50 megawatts or larger”).

¹ See *Big Creek Lumber Co. v. County of Santa Cruz*, 38 Cal. 4th 1139, 1146-47 (2006). That state regulatory power does not extend to the national forest system’s extensive holdings within California.

¹ See NATURAL RESOURCES DEFENSE COUNCIL AND PACIFIC INSTITUTE, *ENERGY DOWN THE DRAIN: THE HIDDEN COSTS OF CALIFORNIA’S WATER SUPPLY* (2004) (“According to the Association of California Water Agencies, water agencies account for 7 percent of California’s energy consumption and 5 percent of summer peak demand.”).

¹ See *ENERGY DOWN THE DRAIN*, *supra* note 127, at 2 (“The California Energy Commission reports that SWP energy use accounts for 2 to 3 percent of all electricity consumed in California.”).

¹ See Office of Planning and Research, Environmental Document Filings with the State Clearinghouse, 1999 through 2005, at http://www.opr.ca.gov/clearinghouse/PDFs/1999-2005_All_Document_Filings.pdf.

¹ 14 Cal. Code Regs. § 15130(b)(5). Subsection 15130(e), however, states that for certain types of projects, an EIR need not address impacts previously addressed in a prior EIR.

¹ *Communities for a Better Environment v. California Resources Agency*, 103 Cal. App. 4th 98, 114 (2002); see *id.* at 120 (observing that to exempt small contributions to big problems “contravenes the very concept of cumulative impacts”).

¹ See *supra* note 26; see also *Mass. v. EPA*, 127 S. Ct. 1438, 1457-58 (2007) (rejecting EPA’s argument that its contributions to climate change are insufficient to confer standing).

¹ See *Communities for a Better Environment*, 103 Cal. App. 4th at 116-21.

¹ See 14 Cal. Code Regs. § 15064(h)(3).

¹ In a recent white paper discussing methods for addressing climate change in CEQA review, the Association of Environmental Planners suggests that “[i]t can easily be argued that proposed projects that implement all appropriate actions listed in the emissions reductions strategies relevant to the proposed project would have a less than significant impact to global climate change;” the planners argue against a no-net-emissions increase approach. MICHAEL HENDRIX ET AL., *RECOMMENDATIONS BY THE ASSOCIATION OF ENVIRONMENTAL*

PLANNERS (AEP) ON HOW TO ANALYZE GREENHOUSE GAS EMISSIONS AND GLOBAL CLIMATE CHANGE IN CEQA DOCUMENTS 9-10 (2007) (referring to recommended actions in CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, *supra* note 2). The California EPA report does contain many useful ideas for reducing projects' GHG emissions, and is a useful resource for agencies or activists seeking ways to reduce carbon footprints. But the planners' proposed approach cannot pass legal muster, for the California EPA report provides a set of possible, and often partially-formed or vaguely described, approaches to emissions reductions, not specific design or performance standards against which performance might feasibly be measured. In addition, the report does not assert, and could not assert, that implementing all of its proposed measures will reduce California's levels to insignificant levels; instead, it projects that those emissions could be reduced to levels consistent with the Governor's 2020 targets, yet experts project that far greater reductions are necessary. See *supra* note 73 and accompanying text.

¹ Communities for a Better Environment, 103 Cal. App 4th at 120 ("the 'one-[additional]-molecule' rule is not the law") (brackets in original; quoting REMY ET AL., *supra* note 100, at 476-78). Neither Kings County Farm Bureau nor Communities for a Better Environment explains how exactly an agency should draw the line between a project contributing one molecule to a larger problem - which contribution presumably would not constitute a significant impact - and a project contributing a cumulatively considerable amount. However, Communities for a Better Environment's rejection of a *de minimis* exception, along with the basic CEQA principle that the act should be interpreted to maximize environmental protection, suggests that the threshold is extremely low, particularly where the emission exacerbates non-compliance with emissions-reduction goals and the ultimate problem is vast.

¹ Executive Order S-3-05, *supra* note 58; Cal. Health and Safety Code §§ 38592(a).

¹ See OUR CHANGING CLIMATE, *supra* note 2.

¹ Cal. Health and Safety Code § 38501.

¹ See IPCC, THE PHYSICAL SCIENCE BASIS, *supra* note 3, at 12-13.

¹ *Id.*

¹ Kings County Farm Bureau v. Hanford, 221 Cal. App. 3d 692, 718-24 (1990).

¹ *Id.* at 718 ("The DEIR concludes the project's contributions to ozone levels in the area would be immeasurable and, therefore, insignificant because the plant would emit relatively minor amounts of precursors compared to the total volume of precursors emitted in Kings County."); *id.* at 719.

¹ *Id.* at 722 ("We find the analysis used in the EIR and urged by GWF avoids analyzing the severity of the problem and allows the approval of projects which, when taken in isolation, appear insignificant, but when viewed together, appear startling.... the standard for a cumulative impacts analysis is defined by the use of the term 'collectively significant'").

¹ *Id.* at 718.

¹ See *id.* at 722; see also National Steel Corp. v. Gorsuch, 700 F.2d 314, 323-24 (6th Cir. 1983) (observing, in a case addressing conventional air pollutants' contributions to non-attainment of air quality standards, that "[t]he fact that there is insufficient technical knowledge to determine the precise degree to which each source contributes to nonattainment does not require that the EPA be prohibited from acting with regard to all sources.") In accordance with those principles, a legally adequate discussion of a project's potential climate change contributions could simply discuss (1) the project's projected GHG emissions; (2) the predicted environmental consequences of those emissions in combination with other similar emission worldwide (a discussion that could be largely adopted from reports issued by the IPCC, the California Climate Change Center, and others); and (3) ways of avoiding or mitigating those project-specific emissions. Describing exactly how much sea level rise or how many storms would be attributable to the specific project would be neither feasible nor useful, and CEQA does not require such discussion.

¹ See U.S. Env'tl. Prot. Agency, State Inventory Guidance, at http://www.epa.gov/climatechange/emissions/state_guidance.html (describing various resources for estimating GHG emissions) (last checked February 20, 2007); U.S. Env'tl. Prot. Agency, Personal Emissions Calculator, at http://www.epa.gov/climatechange/emissions/ind_calculator.html (providing on-line calculator for individual impacts) (last checked September 15, 2007); see also Planning and Conservation League v. Dept. of Water Resources, 83 Cal. App. 4th 892, 919 (2000) ("CEQA does compel reasonable forecasting"). Compliance demonstrations for the Clean Air Act are based largely on emissions budgets that state and local agencies develop by predicting the likely emissions from individual projects. See 42 U.S.C. § 7502(c)(4).

¹ Compare 14 Cal. Code Regs. §§ 15144-45 (stating that agencies need not "foresee[] the unforeseeable or address matters "too speculative for evaluation"). As described in detail in the numerous reports cited herein, the connections between GHG emissions and climate change are no longer unforeseeable or speculative.

¹ See, e.g., OUR CHANGING CLIMATE, supra note 2; IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3; CAL. ENVTL. PROT. AGENCY, supra note 2.

¹ If mitigation is not available, and significant impacts remain, the lead agency must provide a statement explaining why “overriding... benefits” justify proceeding with the project. See Cal. Pub. Res. Code § 21081(b).

¹ See, e.g., ENERGY DOWN THE DRAIN, supra note 127, at 34 (describing the costs and benefits of alternative methods of boosting San Diego’s water supplies).

¹ Many air pollution control districts already publish guidelines for development patterns that minimize emissions of other pollutants, and the same principles can help minimize GHG emissions. See, e.g., San Luis Obispo County Air Pollution Control District, Residential Design Considerations, available at <http://www.slocleanair.org/business/pdf/residential%20flyer.pdf> (last checked September 15, 2007); SOLANO TRANSPORTATION AUTH. ET AL., TRANSPORTATION AND LAND USE TOOLKIT (2003), available at <http://www.yaqmd.org/planning-info.php>.

¹ See San Luis Obispo County Air Pollution Control District, supra note 152; SOLANO TRANSPORTATION AUTH. ET AL., supra note 152.

¹ See ENERGY DOWN THE DRAIN, supra note 127 (describing measures capable of reducing water use, and explaining their benefits).

¹ See United States Environmental Protection Agency, Methane, at <http://www.epa.gov/methane/projections.html> (last checked September 15, 2007).

¹ Even projects widely viewed as otherwise socially and environmentally desirable—installing infill or low income housing, for example, or operating water-recycling facilities, or developing transit systems—still create GHG emissions, unless those projects are able to purchase their energy from sustainable sources. On-site mitigation measures can and should be used to reduce those emissions, but rarely will those measures eliminate emissions entirely.

¹ See The Climate Trust, About Offsets, at http://www.climatetrust.org/about_offsets.php (last checked September 15, 2007).

¹ See, e.g., id.

¹ See 14 Cal. Code Regs. § 15130(a)(3) (allowing this practice).

¹ E.g., Berkeley Keep Jets over the Bay Com. v. Board of Port Commissioners, 91 Cal. App. 4th 1344, 1365 (2001) (referring to this technique); Kings County Farm Bureau v. City of Hanford, 221 Cal. App. 3d 692, 713 (1990) (same).

¹ City of Marina v. Board of Trustees of California State University, 39 Cal. 4th 341, 365 (2006). For a critique of offsets, and an explanation of the transparency and verifiability problems poorly-designed offset programs can present, see TONY DUTZIK AND ROB SARGENT, STOPPING GLOBAL WARMING BEGINS AT HOME: THE CASE AGAINST THE USE OF OFFSETS IN A REGIONAL POWER SECTOR CAP-AND-TRADE PROGRAM 9-11 (2004). See also Fiona Harvey and Stephen Fidler, Industry Caught in Carbon ‘Smokescreen,’ FINANCIAL TIMES, April 25, 2007, at <http://www.ft.com/cms/s/48e334ce-f355-11db-9845-000b5df10621.html>.

¹ See, e.g., The Climate Trust, at <http://www.climatetrust.org/index.php> (last checked September 15, 2007); The Climate Exchange, The Carbon Counter, at www.carboncounter.org; A New Approach to Global Warming, THE ECONOMIST, Oct. 17, 2002 (describing the Chicago Climate Exchange); Jeff Goodell, Capital Pollution Solution?, NEW YORK TIMES, July 30, 2006 (discussing the Chicago Climate Exchange, and also describing the reservations of some of its critics).

¹ See Communities for a Better Environment v. California Resources Agency, 103 Cal. App. 4th 98, 116-21 (2002) (rejecting a de minimis exception to CEQA’s cumulative impacts requirements). Offsets thus could allow agencies pursuing low-emissions projects to avoid the expense of preparing an EIR. Rather than arguing, probably unsuccessfully, that their emissions are insignificant, those agencies could offset their contribution and thus proceed under a mitigated negative declaration.

¹ This memorandum refers to anthropogenic climate change, which encompasses both warming temperatures and changed storm and precipitation patterns, rather than using the narrower term “global warming.” In most popular discussions, however, the terms are used interchangeably and refer to the same phenomenon.

² CALIFORNIA CLIMATE CHANGE CENTER, OUR CHANGING CLIMATE: ASSESSING THE RISKS TO CALIFORNIA 2 (2006) (hereinafter “OUR CHANGING CLIMATE”); CALIFORNIA ENVIRONMENTAL

PROTECTION AGENCY, CLIMATE ACTION TEAM REPORT TO GOVERNOR SCHWARZENEGGER AND THE LEGISLATURE (2006).

³ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS SUMMARY FOR POLICYMAKERS 12 (2007) (hereinafter IPCC, THE PHYSICAL SCIENCE BASIS) (describing some of the expected changes); INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: CLIMATE CHANGE IMPACTS, ADAPTATION AND VULNERABILITY (2007) (hereinafter IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY); *Mass. v. EPA*, 127 S. Ct. 1438, 1455 (2007) (“The harms associated with climate change are serious and well recognized.”).

⁴ IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 2; see Cal. Health and Safety Code § 38501(a), (b); Anthony C. Fisher et al., *The Most Expensive Thing We Can Do Is Nothing: An Open Letter From California Economists*, August, 2006 (“California’s economy is vulnerable to climate change impacts, including changes in water availability, agricultural productivity, electricity demand, health stresses, environmental hazards, and sea level.”).

⁵ REDEFINING PROGRESS, CLIMATE CHANGE IN CALIFORNIA: HEALTH, ECONOMIC AND EQUITY IMPACTS (2006); IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 2, at 19 (observing that factors like poverty can limit adaptive capacity).

⁶ Cal. Public Resources Code §§ 21000-21177.

⁷ See Cal. Public Resources Code § 21002. CEQA applies not only to government-sponsored projects, but also to private projects that require discretionary approvals from government agencies. *Friends of Mammoth v. Board of Supervisors*, 8 Cal.3d 247 (1972).

⁸ See James E. Hansen, et al., *Climate Impact of Increasing Atmospheric Carbon Dioxide*, 213 *SCIENCE* 957-66 (1981).

⁹ See PEW CENTER FOR GLOBAL CLIMATE CHANGE, *THE CAUSES OF GLOBAL CLIMATE CHANGE* (2006).

¹⁰ See THE CALIFORNIA CLIMATE CHANGE CENTER AT UC BERKELEY, *MANAGING GREENHOUSE GAS EMISSIONS IN CALIFORNIA I-7* (2006) (hereinafter “MANAGING GREENHOUSE GAS EMISSIONS”) (describing the impacts of other GHGs).

¹¹ See IPCC, THE PHYSICAL SCIENCE BASIS, *supra* note 3, at 2 (“Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed preindustrial values...”).

¹² See IPCC, THE PHYSICAL SCIENCE BASIS, *supra* note 3 (explaining the causes of climate change); PEW CENTER FOR GLOBAL CLIMATE CHANGE, *supra* note 9, at 1, 2-5 (“During the twentieth century, the earth’s surface warmed by about 1.4°F.... Recent decades have seen record-high average global surface temperatures.”); *Mass. v. EPA*, 127 S. Ct. 1438, 1446 (2007) (“Respected scientists believe the two trends are related.”).

¹³ See IPCC, THE PHYSICAL SCIENCE BASIS, *supra* note 3; Naomi Oreskes, *Beyond the Ivory Tower: The Scientific Consensus on Climate Change*, 306 *SCIENCE* 1686 (2004) (“Politicians, economists, journalists, and others may have the impression of confusion, disagreement, or discord among climate scientists, but that impression is incorrect.”); DAN CAYAN ET AL. (CALIFORNIA CLIMATE CHANGE CENTER), *CLIMATE SCENARIOS FOR CALIFORNIA 3* (2006) (“the winter and spring warming that has occurred in the California region over the last few decades is very unlikely to have been caused only by natural climate variations”).

¹⁴ IPCC, THE PHYSICAL SCIENCE BASIS, *supra* note 3, at 11.

¹⁵ See IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 2.

¹⁶ See IPCC, THE PHYSICAL SCIENCE BASIS, *supra* note 3, at 11 (projecting sea level rises. The IPCC’s projections do not include the potential effects of changing ice flow in Greenland or Antarctica); IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 2, at 9.

¹⁷ See IPCC, THE PHYSICAL SCIENCE BASIS, *supra* note 3, at 12 (“It is very likely that hot extremes, heat waves, and heavy precipitation events will continue to become more frequent.... It is likely that future tropical cyclones (typhoons and hurricanes) will become more intense.... There is less confidence in projections of a global decrease in numbers of tropical cyclones.”) (emphasis in original).

¹⁸ IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 2, at 7-8.

¹⁹ IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 2, at 8 (“Approximately 20-30% of animal and plant species assessed so far are likely to be at increased risk of extinction if increases in global temperatures exceed 1.5 to 2.5°C.”), 9.

²⁰ The IPCC assigns precise numeric values to terms like “very likely;” a “very likely” event is an event that in the judgment of the IPCC authors has at least a 90% probability of occurrence. IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 4 n.6.

²¹ See id. at 12.

²² See IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2 (describing both positive and negative impacts; the set of negative impacts is much larger).

²³ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 4-9; AMY LYND LUERS AND SUSANNE C. MOSER, PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA: OPPORTUNITIES AND CONSTRAINTS FOR ADAPTATION 3 (2006) (“climate change is demonstrably underway”); id. at 5 (table summarizing observed trends), 6; CLIMATE SCENARIOS FOR CALIFORNIA, supra note 13, at 1-2 (describing observed trends).

²⁴ See CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, supra note 2, at 38 (table showing degrees of impact).

²⁵ See generally *Mass. v. EPA*, 127 S. Ct. 1438, 1457 (2007) (explaining the significance of incremental steps: “Agencies [] do not generally resolve massive problems in one fell regulatory swoop. They instead whittle away at them over time”) (internal citation omitted).

²⁶ See CALIFORNIA ENERGY COMMISSION, INVENTORY OF CALIFORNIA GREENHOUSE GAS EMISSIONS AND SINKS iii (2006) (hereinafter “INVENTORY”) (“GHGs affect the entire planet, not just the location where they are emitted”) (this report is labeled “draft staff report,” but it represents the most current inventory, and this paper therefore relies upon it); IPCC, CLIMATE CHANGE 2001: THE PHYSICAL SCIENCE BASIS § 6.1.2, available at http://www.grida.no/climate/ipcc_tar/wg1/215.htm (explaining several of the primary GHGs, including carbon dioxide and methane, are “well-mixed gases,” meaning that their long lifespan ensures homogenous mixing throughout the atmosphere).

²⁷ See IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3, at 12; IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2 (describing worldwide and regional impacts).

²⁸ See INVENTORY, supra note 26, at 20 (2006) (showing worldwide emissions).

²⁹ The differences in emissions among the 10th through 19th-ranked nations are slight, and different reports rank California differently. Compare id. at i, 20 (ranking California sixteenth; this report, while publicly available, is labeled a “draft staff report”) with MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-6 (“Only nine nations have greater total emissions than the state.”). The CEC’s report’s ranking of California’s is also affected by its treatment of Texas, which emits more GHGs than California, as a nation. See INVENTORY, supra note 26, at 20.

³⁰ See quickfacts.census.gov/qfd/states/06000.html.

³¹ INVENTORY, supra note 26, at 20.

³² Id. at i, 14.

³³ Id. at 8 (“California’s GHG emissions are large and growing... they are expected to continue to increase in the future under ‘business-as-usual’ unless California implements programs to reduce emissions”).

³⁴ Id. at ii, 9-10; see MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-7, I-10.

³⁵ INVENTORY, supra note 26 at ii-iii, 10, 11-12. INVENTORY, supra note 26 at ii-iii, 10, 11-12.

³⁶ Id. at ii, 10-11; see MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-7.

³⁷ INVENTORY, supra note 26, at 6. The emitted amounts of these other GHGs are much smaller than the amount of CO₂ emitted, but these gases have far more powerful heat-trapping effects. See MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-7 (describing the greenhouse potential of sulfur hexafluoride).

³⁸ See MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at I-10. A “sink” is a process, like forest growth, that removes carbon dioxide from the atmosphere.

³⁹ See IPCC, IMPACTS, ADAPTATION, AND VULNERABILITY, supra note 2.

⁴⁰ OUR CHANGING CLIMATE, supra note 2, at 2 (“The latest projections, based on state-of-the-art climate models, indicate that if global heat-trapping emissions proceed at a medium to high rate, temperatures in California are expected to rise 4.7 to 10.5 degrees Fahrenheit by the end of the century.”).

⁴¹ Id. (“These temperature increases would have widespread consequences including substantial loss of snowpack, increased risk of large wildfires, and reductions in the quality and quantity of certain agricultural products.”); see Katherine Hayhoe et al., Emissions Pathways, Climate Change, and Impacts on California, 101 PNAS 12422, 12425-26 (2004); Cal. Health & Safety Code § 38501(a).

⁴² OUR CHANGING CLIMATE, supra note 2, at 5. The report states:

High temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, if temperatures rise to the medium warming range, there will be a 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions.

⁴³ Id. at 6-7; Hayhoe et al., supra note 41, at 12425-26; DEPT. OF WATER RESOURCES, supra note 11, at 2-6, 2-22 to 2-31, 4-1 ("Planning and design of the Central Valley Project [] and State Water Project has, for the most part, assumed an unchanging climate... and a changing climate may threaten to destabilize the infrastructure and operations dependent on that assumption."); CALIFORNIA DEPARTMENT OF WATER RESOURCES, CALIFORNIA WATER PLAN UPDATE 2005 4-32 to 4-36 (2006) ("Predictions include increased temperature, reductions to Sierra snowpack, earlier snowmelt, and a rise in sea level, although the extent and timing of the changes remain uncertain. The changes could have major implications for water supply, flood management, and ecosystem health.").

⁴⁴ OUR CHANGING CLIMATE, supra note 2, at 9.

⁴⁵ Id. at 10-11.

⁴⁶ OUR CHANGING CLIMATE, supra note 2, at 5; see REDEFINING PROGRESS, supra note 5, at 19-26; Hayhoe et al., supra note 41, at 12424-45.

⁴⁷ DEPT. OF WATER RESOURCES, supra note 11, at 2-31 to 2-52.

⁴⁸ See Cal. Health & Safety Code § 38501(b) ("Global warming will have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry.")

⁴⁹ The California Climate Change Center is an academic research unit based primarily at the University of California's Berkeley and San Diego campuses. Several of its reports have been sponsored by California state agencies. See OUR CHANGING CLIMATE, supra note 2, at 2.

⁵⁰ OUR CHANGING CLIMATE, supra note 2, at 2; see AMY LYND LUERS AND SUSANNE C. MOSER, PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA: OPPORTUNITIES AND CONSTRAINTS FOR ADAPTATION v (2006).

⁵¹ OUR CHANGING CLIMATE, supra note 2, at 5.

⁵² See REDEFINING PROGRESS, supra note 5.

⁵³ See id. at 16-19, 36-37, 57-58, 63-64.

⁵⁴ Id. at 9-10; see Hayhoe et al., supra note 41, at 12424 (showing maps of projected temperature increases).

⁵⁵ See REDEFINING PROGRESS, supra note 5, at 3-4, 41-50 ("agriculture... is a significant source of employment for low-income groups and people of color. Shocks experienced by the industry could disproportionately affect these communities."); OUR CHANGING CLIMATE, supra note 2, at 8-9 (describing impacts to agriculture); Hayhoe et al., supra note 41, at 12426-27 (describing impacts to dairy and wine grape production).

⁵⁶ See REDEFINING PROGRESS, supra note 5, at 19-26 (describing disparities in vulnerability to heat waves), 26-35 (describing threats posed by increasing ozone (smog) pollution); Hayhoe et al., supra note 41 at 12425 ("Individuals most likely to be affected (by increases in extreme heat) include elderly, children, the economically disadvantaged, and those who are already ill.").

⁵⁷ See infra Part III.

⁵⁸ Cal. Health and Safety Code § 38501(d); see Executive Dept., State of California, Executive Order S-3-05 (June 1, 2005) (touting California's "leadership role in reducing greenhouse gas emissions").

⁵⁹ Cal. Health & Safety Code § 38501(e).

⁶⁰ Executive Order S-3-05, supra note 58.

⁶¹ CAL. ENVTL. PROT. AGENCY, supra note 2, at 65.

⁶² MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at E-6.

⁶³ See *Mass. v. EPA*, 127 S. Ct. 1438 (2007).

⁶⁴ See MANAGING GREENHOUSE GAS EMISSIONS, supra note 10, at ES-4 ("While helpful, there is no evidence that voluntary measures provide sufficient incentives to attain the Governor's targets.").

⁶⁵ See Cal Health & Safety Code § 43018.5. The automotive industry almost immediately challenged that legislation. See *Cent. Valley Chrysler-Jeep Inc. v. Witherspoon*, 2005 U.S. Dist. LEXIS 26536 (E.D. Cal. 2005) (allowing environmental groups to intervene in the automakers' lawsuit).

⁶⁶ See Bill Blakemore, *Schwarzenator v. Bush: Global Warming Debate Heats Up*, ABC NEWS, August 30, 2006, at <http://abcnews.go.com/US/GlobalWarming/story?id=2374968&page=1>; Executive Order S-3-05, supra note 58. The order states, in part: "the following greenhouse gas emission reduction targets are hereby established for

California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80% below 1990 levels....”

⁶⁷ E.g., DEPT. OF WATER RESOURCES, *supra* note 11.

⁶⁸ *Conn. v. Am. Elec. Power Co.*, 406 F. Supp. 2d 265 (S.D.N.Y. 2005) (dismissing the nuisance case); *Mass. v. EPA*, 127 S. Ct.1438 (2007); Nick Bunkley, California Sues 6 Automakers Over Global Warming, *NEW YORK TIMES*, September 21, 2006.

⁶⁹ See *INVENTORY*, *supra* note 26 at i, 12 (“California’s ability to slow the rate of growth of GHG emissions is largely due to the success of its energy efficiency and renewable energy programs and a commitment to clean air and clean energy.... Although California’s total GHG emissions are larger than every state but Texas, California has relatively low carbon emission intensity. In 2001, California ranked fourth lowest of the 50 states in carbon dioxide emissions per capita from fossil fuel consumption and fifth lowest of the 50 states in carbon dioxide emissions per unit of gross state product.”).

⁷⁰ California Climate Change Solutions Act of 2006, A.B. 32, 2005-06 Sess., codified at Cal. Health & Safety Code §§ 38500-99.

⁷¹ *Id.* §§ 38550-38551.

⁷² *Id.* §§ 38560-38565.

⁷³ *Id.* § 38530.

⁷⁴ See *id.* §§ 38560-38574.

⁷⁵ See *MANAGING GREENHOUSE GAS EMISSIONS*, *supra* note 10, at I-4; Executive Order S-3-05, *supra* note 58; Thomas Wigley, *The Kyoto Protocol: CO₂, CH₄, and Climate Implications*, 25 *GEOPHYSICAL RESEARCH LETTERS* 2285 (1998) (concluding that compliance with the Kyoto Protocol’s modest targets would fall well short of removing the human footprint from the global climate).

⁷⁶ For example, AB 32 implies that CARB should focus primarily on a subset of sources, see Cal. Health & Safety Code §§ 38530(b)(1), and for reasons of practicality and administrative efficiency the agency is likely to follow that directive. That means, however, that many smaller or more diffuse sources may escape regulation under AB 32, at least immediately and perhaps indefinitely, even though the aggregate effect of those smaller sources could be quite large.

⁷⁷ Cal. Health and Safety Code §§ 38592(a) (“All state agencies shall consider and implement strategies to reduce their greenhouse gas emissions.”), 38592(b) (“Nothing in this division shall relieve any person, entity, or public agency of compliance with other applicable federal, state, or local laws or regulations, including state air and water quality requirements, and other requirements for protecting public health or the environment.”), 38598 (“Nothing in this division shall limit the existing authority of a state entity to adopt and implement greenhouse gas emissions reduction measures. [] Nothing in this division shall relieve any state entity of its legal obligations to comply with existing law or regulation.”).

⁷⁸ See *supra* Part I.C.

⁷⁹ See *PLANNING AND CONSERVATION LEAGUE, EVERYDAY HEROES PROTECT THE AIR WE BREATHE, THE WATER WE DRINK, AND THE NATURAL AREAS WE PRIZE: THIRTY-FIVE YEARS OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT* (2005) at http://www.pcl.org/pcl_files/full_report.pdf.

⁸⁰ Cal. Pub. Res. Code §§ 21000(d), 21001(a), (d).

⁸¹ *Mountain Lion Foundation v. Fish and Game Commission*, 16 Cal.4th 105, 112 (1997); see *City of Marina v. Board of Trustees of the California State University*, 39 Cal.4th 341, 348 (2006).

⁸² *Mountain Lion Foundation*, 16 Cal.4th at 112 (quoting *Friends of Mammoth v. Board of Supervisors*, 8 Cal. 3d 247, 259 (1972)); *Laurel Heights Improvement Ass’n v. Regents of the Univ. of Cal.*, 47 Cal.3d 376, 390 (1988).

⁸³ See Cal. Pub. Res. Code § 21080(a); *Friends of Westwood v. City of Los Angeles*, 191 Cal. App. 3d 259, 267 (1987) (holding that the existence of any discretion in an approval process triggers CEQA’s applicability).

⁸⁴ See *Friends of Mammoth*, 8 Cal.3d 247 (holding that CEQA applies to private projects receiving governmental approvals).

⁸⁵ CEQA does set forth certain classes of projects that are categorically exempt from statutory requirements. E.g., Cal. Pub. Res. Code §§ 21080(b), 21080.14 (creating an exemption for “affordable housing projects in urbanized areas”).

⁸⁶ *Sierra Club v. State Bd. of Forestry*, 7 Cal.4th 1215, 1233 (1994).

⁸⁷ See 14 Cal. Code Regs. § 15002(b) (explaining the types of actions to which CEQA applies).

⁸⁸ CEQA defines a “lead agency” as “the public agency which has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment.” Cal. Pub. Resources Code § 21067.

⁸⁹ See *Friends of Davis v. City of Davis*, 83 Cal. App. 4th 1004, 1016-67 (2000) (“An EIR is required whenever it can be ‘fairly argued on the basis of substantial evidence that the project may have significant environmental impact.’”) (citations omitted); 14 Cal. Code Regs. §§ 15064, 15065(b)(1).

⁹⁰ See *Sierra Club*, 7 Cal. 4th at 1229 (describing an EIR as “an environmental alarm bell” and a “document of accountability”).

⁹¹ See 14 Cal. Code Regs. § 15064(d)(2); see also 14 Cal. Code Regs. § 15358.

⁹² See *Planning & Conservation League v. Department of Water Resources*, 83 Cal. App. 4th 892, 919 (2000) (“We need not venture into speculation. But CEQA does compel reasonable forecasting.”).

⁹³ See 14 Cal. Code Regs. § 15064(d)(2).

⁹⁴ Public Resources Code § 21083(b)(2). The CEQA Guidelines similarly state that “[c]umulative impacts’ refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” 14 Cal. Code Regs. § 15355. “While Section 21083 governs the situations in which an agency must prepare an EIR, its provisions have also been applied to the contents of an EIR once it is determined an EIR must be prepared.” *Los Angeles Unified School Dist.*, 58 Cal. App. 4th at 1024 n.6 (citing *Laurel Heights Improvement Ass’n*, 47 Cal.3d at 394).

⁹⁵ 14 Cal. Code Regs. § 15065 (a)(3).

⁹⁶ *Id.* § 15130(a); see *Los Angeles Unified School Dist.*, 58 Cal. App. 4th at 1024-26 (1997); *San Franciscans for Reasonable Growth v. City & County of San Francisco*, 151 Cal. App. 3d 61, 73 (1984) (“Part of [CEQA’s] vital informational function is performed by a cumulative impact analysis.”).

⁹⁷ *Communities for a Better Environment v. California Resources Agency*, 103 Cal. App. 4th 98, 114 (2002); see *Bakersfield Citizens for Local Control v. City of Bakersfield*, 124 Cal. App. 4th 1184, 1214 (2005) (quoting *Communities for a Better Environment*); *Los Angeles Unified School Dist.*, 58 Cal. App. 4th at 1025; *San Joaquin Raptor/Wildlife Rescue Ctr. v. County of Stanislaus*, 27 Cal. App. 4th 713, 739 (1996); *Las Virgenes Homeowners Federation, Inc. v. County of Los Angeles*, 177 Cal. App. 3d 300, 306 (1986); *Whitman v. Board of Supervisors*, 88 Cal. App. 3d 397, 408 (1979).

⁹⁸ E.g., *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, 718-24 (1990) (rejecting an EIR that failed to consider whether project emissions, in combination with emissions from other sources throughout the San Joaquin Valley, would create a significant impact); *Los Angeles Unified School Dist.*, 58 Cal.App.4th at 1025 (“the relevant issue to be addressed in the EIR on the plan is not the relative amount of traffic noise resulting from the project when compared to existing traffic noise, but whether any additional amount of traffic noise should be considered significant in light of the serious nature of the traffic noise problem already existing around the schools”).

⁹⁹ *Communities for a Better Environment*, 103 Cal. App. 4th at 116-21 (following *Kings County*, which it described as “[t]he seminal decision,” and *Los Angeles Unified School District*).

¹⁰⁰ See, e.g., MICHAEL H. REMY ET AL., *GUIDE TO THE CALIFORNIA ENVIRONMENTAL QUALITY*.

¹⁰¹ *American Canyon Community United for Responsible Growth v. City of American Canyon*, 145 Cal. App. 4th 1062, 1082 (2006) (italics removed; quoting Cal. Pub. Res. Code § 21002.1(b) and *City of Marina v. Board of Trustees of California State University*, 39 Cal. 4th 341, 359-60 (2006)); 14 Cal. Code Regs. § 15360.

¹⁰² Cal. Pub. Res. Code § 21002; see Cal. Pub. Resources Code § 21061 (stating that an EIR must “list ways in which the significant effects of such a project might be minimized” and “indicate alternatives to such a project.”).

¹⁰³ *Citizens of Goleta Valley v. Board of Supervisors*, 52 Cal.3d 553, 564 (1990).

¹⁰⁴ See 14 Cal. Code Regs. § 15126.6.

¹⁰⁵ *County of Inyo v. City of Los Angeles*, 71 Cal. App. 3d 185, 203 (1977); see *Wildlife Alive v. Chickering*, 18 Cal.3d 190, 197 (1976); *Laurel Heights Improvement Assoc. v. Regents of Univ. of Calif.*, 47 Cal. 3d 376, 400 (1988); 14 Cal. Code Regs. § 15126.6.

¹⁰⁶ See 14 Cal. Code Regs. § 15126.6; *Citizens of Goleta Valley*, 52 Cal.3d at 565.

¹⁰⁷ E.g., *Citizens of Goleta Valley*, 52 Cal.3d at 570-75 (concluding that evaluation of a single off-site alternative was adequate); *San Bernardino Valley Audubon Society, Inc. v. County of San Bernardino*, 155 Cal.App.3d 738, 751 (1984) (rejecting an EIR that considered too narrow a range of site alternatives).

¹⁰⁸ E.g., *County of Inyo*, 71 Cal. App. 3d 185, 203 (1977) (rejecting an EIR for a water-delivery project that failed to consider conservation as an alternative to increased pumping); *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, 730-37 (1990) (rejecting an EIR that considered a natural gas-burning alternative to a coal-fired power plant, but did not provide enough quantitative data to facilitate an effective comparative analysis).

¹⁰⁹ E.g., *Village of Laguna Beach v. Board of Supervisors*, 134 Cal. App. 3d 1022, 1028-32 (1982) (upholding an EIR that considered a range of sizes for a proposed residential development).

¹¹⁰ *Save Our Peninsula Committee v. Monterey County Bd. of Supervisors*, 87 Cal. App. 4th 99, 139 (2001) (citing Cal. Public Resources Code §§ 21100, 21002.1, and 21061); see 14 Cal. Code Regs. § 15002(a)(2) (stating that one of CEQA’s “basic purposes” is to “[i]dentify ways that environmental damage can be avoided or significantly reduced”).

¹¹¹ 14 Cal. Code Regs. § 15370. At the margins, the difference between an alternative and a mitigation measure may be fuzzy, but generally speaking, mitigation measures involve revisions within the same project, while alternatives involve fundamentally different versions of the project. See *Laurel Heights*, 47 Cal.3d at 403 (“alternatives are a type of mitigation”).

¹¹² 14 Cal. Code Regs. § 15126.4.

¹¹³ *Mountain Lion Foundation v. Fish and Game Commission*, 16 Cal.4th 105, 134 (1997); see *Sierra Club v. State Bd. of Forestry*, 7 Cal.4th 1215, 1233 (1994) (“CEQA compels government first to identify the [significant] environmental effects of projects, and then to mitigate those adverse effects through the imposition of feasible mitigation measures or through the selection of feasible alternatives.”); *Sierra Club v. Gilroy City Council*, 222 Cal.App.3d 30, 41 (1990) (CEQA “requires public agencies to deny approval of a project with significant adverse effects when feasible alternatives or feasible mitigation measures can substantially lessen such effects.”)

¹¹⁴ Cal. Pub. Res. Code § 21081.

¹¹⁵ 14 Cal. Code Regs. §§ 15002(a)(3), (h), 15021.

¹¹⁶ See 14 Cal. Code Regs. § 15065(a)(3) (stating that “a lead agency shall find that a project may have a significant impact on the environment” if the project “has possible environmental effects that are individually limited but cumulatively considerable.”).

¹¹⁷ Cal. Pub. Res. Code 21081.

¹¹⁸ 14 Cal. Code Regs. § 15130(a)(3) (“An EIR may determine that a project’s contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project’s contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.”); 14 Cal. Code Regs. § 15064(h)(2) (same).

¹¹⁹ *Save Our Peninsula Committee*, 7 Cal. App. 4th at 139-40. The *Save Our Peninsula* court also warned, however, that “a commitment to pay fees without any evidence that mitigation will actually occur is inadequate.” *Id.* at 140; *City of Marina*, 39 Cal.4th at 365.

¹²⁰ See *infra* Part II.A.

¹²¹ See *infra* Part II.B.

¹²² See *infra* Parts II.C, II.D.

¹²³ See *Friends of Mammoth v. Board of Supervisors*, 8 Cal. 3d 247 (1972).

¹²⁴ See, e.g., California Department of Transportation, About Caltrans, at <http://www.dot.ca.gov/aboutcaltrans.htm> (last checked September 15, 2007) (describing Caltrans’ role in building state transportation infrastructure).

¹²⁵ See, e.g., *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692 (1990) (considering the environmental consequences of constructing a new power plant); California Energy Commission, Welcome to the California Energy Commission, at <http://www.energy.ca.gov/commission/index.html> (explaining the CEC’s role, which includes “[l]icensing thermal power plants 50 megawatts or larger”).

¹²⁶ See *Big Creek Lumber Co. v. County of Santa Cruz*, 38 Cal. 4th 1139, 1146-47 (2006). That state regulatory power does not extend to the national forest system’s extensive holdings within California.

¹²⁷ See NATURAL RESOURCES DEFENSE COUNCIL AND PACIFIC INSTITUTE, *ENERGY DOWN THE DRAIN: THE HIDDEN COSTS OF CALIFORNIA’S WATER SUPPLY* (2004) (“According to the Association of California Water Agencies, water agencies account for 7 percent of California’s energy consumption and 5 percent of summer peak demand.”).

¹²⁸ See *ENERGY DOWN THE DRAIN*, *supra* note 127, at 2 (“The California Energy Commission reports that SWP energy use accounts for 2 to 3 percent of all electricity consumed in California.”).

¹²⁹ See Office of Planning and Research, Environmental Document Filings with the State Clearinghouse, 1999 through 2005, at http://www.opr.ca.gov/clearinghouse/PDFs/1999-2005_All_Document_Filings.pdf.

¹³⁰ 14 Cal. Code Regs. § 15130(b)(5). Subsection 15130(e), however, states that for certain types of projects, an EIR need not address impacts previously addressed in a prior EIR.

¹³¹ *Communities for a Better Environment v. California Resources Agency*, 103 Cal. App. 4th 98, 114 (2002); see *id.* at 120 (observing that to exempt small contributions to big problems “contravenes the very concept of cumulative impacts”).

¹³² See supra note 26; see also *Mass. v. EPA*, 127 S. Ct. 1438, 1457-58 (2007) (rejecting EPA’s argument that its contributions to climate change are insufficient to confer standing).

¹³³ See *Communities for a Better Environment*, 103 Cal. App 4th at 116-21.

¹³⁴ See 14 Cal. Code Regs. § 15064(h)(3).

¹³⁵ In a recent white paper discussing methods for addressing climate change in CEQA review, the Association of Environmental Planners suggests that “[i]t can easily be argued that proposed projects that implement all appropriate actions listed in the emissions reductions strategies relevant to the proposed project would have a less than significant impact to global climate change;” the planners argue against a no-net-emissions increase approach. MICHAEL HENDRIX ET AL., RECOMMENDATIONS BY THE ASSOCIATION OF ENVIRONMENTAL PLANNERS (AEP) ON HOW TO ANALYZE GREENHOUSE GAS EMISSIONS AND GLOBAL CLIMATE CHANGE IN CEQA DOCUMENTS 9-10 (2007) (referring to recommended actions in CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, supra note 2). The California EPA report does contain many useful ideas for reducing projects’ GHG emissions, and is a useful resource for agencies or activists seeking ways to reduce carbon footprints. But the planners’ proposed approach cannot pass legal muster, for the California EPA report provides a set of possible, and often partially-formed or vaguely described, approaches to emissions reductions, not specific design or performance standards against which performance might feasibly be measured. In addition, the report does not assert, and could not assert, that implementing all of its proposed measures will reduce California’s levels to insignificant levels; instead, it projects that those emissions could be reduced to levels consistent with the Governor’s 2020 targets, yet experts project that far greater reductions are necessary. See supra note 73 and accompanying text.

¹³⁶ *Communities for a Better Environment*, 103 Cal. App 4th at 120 (“the ‘one-[additional]-molecule’ rule is not the law”) (brackets in original; quoting *REMY ET AL.*, supra note 100, at 476-78). Neither *Kings County Farm Bureau* nor *Communities for a Better Environment* explains how exactly an agency should draw the line between a project contributing one molecule to a larger problem - which contribution presumably would not constitute a significant impact - and a project contributing a cumulatively considerable amount. However, *Communities for a Better Environment*’s rejection of a de minimis exception, along with the basic CEQA principle that the act should be interpreted to maximize environmental protection, suggests that the threshold is extremely low, particularly where the emission exacerbates non-compliance with emissions-reduction goals and the ultimate problem is vast.

¹³⁷ Executive Order S-3-05, supra note 58; Cal. Health and Safety Code §§ 38592(a).

¹³⁸ See *OUR CHANGING CLIMATE*, supra note 2.

¹³⁹ Cal. Health and Safety Code § 38501.

¹⁴⁰ See IPCC, *THE PHYSICAL SCIENCE BASIS*, supra note 3, at 12-13.

¹⁴¹ *Id.*

¹⁴² *Kings County Farm Bureau v. Hanford*, 221 Cal. App. 3d 692, 718-24 (1990).

¹⁴³ *Id.* at 718 (“The DEIR concludes the project’s contributions to ozone levels in the area would be immeasurable and, therefore, insignificant because the plant would emit relatively minor amounts of precursors compared to the total volume of precursors emitted in Kings County.”); *id.* at 719.

¹⁴⁴ *Id.* at 722 (“We find the analysis used in the EIR and urged by GWF avoids analyzing the severity of the problem and allows the approval of projects which, when taken in isolation, appear insignificant, but when viewed together, appear startling.... the standard for a cumulative impacts analysis is defined by the use of the term ‘collectively significant’”).

¹⁴⁵ *Id.* at 718.

¹⁴⁶ See *id.* at 722; see also *National Steel Corp. v. Gorsuch*, 700 F.2d 314, 323-24 (6th Cir. 1983) (observing, in a case addressing conventional air pollutants’ contributions to non-attainment of air quality standards, that “[t]he fact that there is insufficient technical knowledge to determine the precise degree to which each source contributes to nonattainment does not require that the EPA be prohibited from acting with regard to all sources.”) In accordance with those principles, a legally adequate discussion of a project’s potential climate change contributions could simply discuss (1) the project’s projected GHG emissions; (2) the predicted environmental consequences of those emissions in combination with other similar emission worldwide (a discussion that could be largely adopted from reports issued by the IPCC, the California Climate Change Center, and others); and (3) ways of avoiding or mitigating those project-specific emissions. Describing exactly how much sea level rise or how many storms would be attributable to the specific project would be neither feasible nor useful, and CEQA does not require such discussion.

¹⁴⁷ See U.S. Evtl. Prot. Agency, *State Inventory Guidance*, at http://www.epa.gov/climatechange/emissions/state_guidance.html (describing various resources for estimating GHG

emissions) (last checked February 20, 2007); U.S. Env'tl. Prot. Agency, Personal Emissions Calculator, at http://www.epa.gov/climatechange/emissions/ind_calculator.html (providing on-line calculator for individual impacts) (last checked September 15, 2007); see also *Planning and Conservation League v. Dept. of Water Resources*, 83 Cal. App. 4th 892, 919 (2000) (“CEQA does compel reasonable forecasting”). Compliance demonstrations for the Clean Air Act are based largely on emissions budgets that state and local agencies develop by predicting the likely emissions from individual projects. See 42 U.S.C. § 7502(c)(4).

¹⁴⁸ Compare 14 Cal. Code Regs. §§ 15144-45 (stating that agencies need not “foresee[] the unforeseeable or address matters “too speculative for evaluation”). As described in detail in the numerous reports cited herein, the connections between GHG emissions and climate change are no longer unforeseeable or speculative.

¹⁴⁹ See, e.g., OUR CHANGING CLIMATE, supra note 2; IPCC, THE PHYSICAL SCIENCE BASIS, supra note 3; CAL. ENVTL. PROT. AGENCY, supra note 2.

¹⁵⁰ If mitigation is not available, and significant impacts remain, the lead agency must provide a statement explaining why “overriding... benefits” justify proceeding with the project. See Cal. Pub. Res. Code § 21081(b).

¹⁵¹ See, e.g., ENERGY DOWN THE DRAIN, supra note 127, at 34 (describing the costs and benefits of alternative methods of boosting San Diego’s water supplies).

¹⁵² Many air pollution control districts already publish guidelines for development patterns that minimize emissions of other pollutants, and the same principles can help minimize GHG emissions. See, e.g., San Luis Obispo County Air Pollution Control District, Residential Design Considerations, available at <http://www.slocleanair.org/business/pdf/residential%20flyer.pdf> (last checked September 15, 2007); SOLANO TRANSPORTATION AUTH. ET AL., TRANSPORTATION AND LAND USE TOOLKIT (2003), available at <http://www.ysaqmd.org/planning-info.php>.

¹⁵³ See San Luis Obispo County Air Pollution Control District, supra note 152; SOLANO TRANSPORTATION AUTH. ET AL., supra note 152.

¹⁵⁴ See ENERGY DOWN THE DRAIN, supra note 127 (describing measures capable of reducing water use, and explaining their benefits).

¹⁵⁵ See United States Environmental Protection Agency, Methane, at <http://www.epa.gov/methane/projections.html> (last checked September 15, 2007).

¹⁵⁶ Even projects widely viewed as otherwise socially and environmentally desirable—installing infill or low income housing, for example, or operating water-recycling facilities, or developing transit systems—still create GHG emissions, unless those projects are able to purchase their energy from sustainable sources. On-site mitigation measures can and should be used to reduce those emissions, but rarely will those measures eliminate emissions entirely.

¹⁵⁷ See The Climate Trust, About Offsets, at http://www.climatetrust.org/about_offsets.php (last checked September 15, 2007).

¹⁵⁸ See, e.g., id.

¹⁵⁹ See 14 Cal. Code Regs. § 15130(a)(3) (allowing this practice).

¹⁶⁰ E.g., *Berkeley Keep Jets over the Bay Com. v. Board of Port Commissioners*, 91 Cal. App. 4th 1344, 1365 (2001) (referring to this technique); *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, 713 (1990) (same).

¹⁶¹ *City of Marina v. Board of Trustees of California State University*, 39 Cal. 4th 341, 365 (2006). For a critique of offsets, and an explanation of the transparency and verifiability problems poorly-designed offset programs can present, see TONY DUTZIK AND ROB SARGENT, STOPPING GLOBAL WARMING BEGINS AT HOME: THE CASE AGAINST THE USE OF OFFSETS IN A REGIONAL POWER SECTOR CAP-AND-TRADE PROGRAM 9-11 (2004). See also Fiona Harvey and Stephen Fidler, Industry Caught in Carbon ‘Smokescreen,’ FINANCIAL TIMES, April 25, 2007, at <http://www.ft.com/cms/s/48e334ce-f355-11db-9845-000b5df10621.html>.

¹⁶² See, e.g., The Climate Trust, at <http://www.climatetrust.org/index.php> (last checked September 15, 2007); The Climate Exchange, The Carbon Counter, at www.carboncounter.org; A New Approach to Global Warming, THE ECONOMIST, Oct. 17, 2002 (describing the Chicago Climate Exchange); Jeff Goodell, Capital Pollution Solution?, NEW YORK TIMES, July 30, 2006 (discussing the Chicago Climate Exchange, and also describing the reservations of some of its critics).

¹⁶³ See *Communities for a Better Environment v. California Resources Agency*, 103 Cal. App. 4th 98, 116-21 (2002) (rejecting a de minimis exception to CEQA’s cumulative impacts requirements). Offsets thus could allow agencies pursuing low-emissions projects to avoid the expense of preparing an EIR. Rather than arguing, probably unsuccessfully, that their emissions are insignificant, those agencies could offset their contribution and thus proceed under a mitigated negative declaration.