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Health Endpoint	Estimated Benefit*
Avoided premature deaths	340
Avoided hospitalizations due to respiratory causes	71
Avoided hospitalizations due to cardiovascular causes	130
Avoided asthma-related & other lower respiratory symptoms	9,400
Avoided acute bronchitis	780
Avoided work loss days	57,000
Avoided minor restricted activity days	330,000
<b>Total economic valuation: \$1.5 billion to \$2.4 billion</b>	

\* Uncertainty intervals for each estimated benefit range within 20-70 percent of the mean benefit (presented in this table). For example, the number of premature deaths avoided could be between 93 and 580.

## 7. Societal Impacts Analyses

ARB must consider overall societal benefits in adopting regulations (HSC §38562(b)(6)). ARB is evaluating the potential societal impacts and benefits of the preliminary recommendation. Societal impacts, as described here, include issues such as diversification of energy sources, mobility, regressivity, and job creation. Regressivity, the potential impact on low income households, is discussed in the Economic Analysis section and will be further discussed in the supplemental evaluation. ARB will evaluate energy diversity using the Energy 2020 model to evaluate how the recommendation will make progress toward the goal of reducing petroleum dependence.

In addition, AB 32 directs ARB to identify ways to encourage public and private investment toward disadvantaged communities and smaller institutions, so that they can participate in and benefit from emission reduction co-benefits and new technology. ARB is consulting stakeholders to assist in developing this program.

## 8. Future Regulatory Analyses

ARB must design equitable regulations that encourage early action, do not disproportionately impact low-income communities, ensure that AB 32 programs complement and do not interfere with the attainment and maintenance of ambient air quality standards, consider overall societal benefits (such as diversification of energy sources), minimize the administrative burden, and minimize emission leakage. To the extent feasible and in furtherance of achieving the statewide greenhouse gas emission limit, ARB must consider the potential for direct, indirect and cumulative emission impacts from the market mechanisms, including localized impacts in communities that are already adversely impacted by air pollution, design the program to prevent any increase in emissions, and maximize additional environmental and economic benefits prior to the inclusion of market-based compliance mechanisms in the regulations.

ARB already conducts robust environmental and environmental justice assessments of our regulatory actions. Many of the requirements in AB 32 overlap with ARB's typical evaluations. A good example of how ARB plans to address the regulatory evaluations required by AB 32 is the current Low Carbon Fuel Standard rulemaking. The Low Carbon Fuel Standard (LCFS) is a Discrete Early Action that ARB is pursuing as a regulatory measure. The Board is scheduled to consider this regulation in late 2008 or early 2009. The goal of the LCFS is to reduce lifecycle greenhouse gas emissions from transportation fuel by at least 10 percent. Fuel producers can meet the LCFS requirements by blending lower-carbon fuels, such as biofuels from renewable sources, with gasoline or diesel fuel, or by deploying lower-carbon fuels such as electricity or hydrogen. To ensure that the LCFS regulation actually reduces greenhouse gas emissions and to ensure sustainability, it is critical to understand the full lifecycle greenhouse gas emissions of potential replacement fuel. Sustainable development can be used to describe a pattern of resource use that meets human needs while preserving the natural environment so that needs can be met in the present as well as the indefinite future.

The LCFS is a complex climate change regulation that is likely to incorporate market-based compliance mechanisms, requiring the full range of AB 32 evaluations. ARB is contracting with academic institutions to assist in the development of sustainability provisions for the LCFS. These efforts are aimed at a number of sustainability issues such as direct and indirect land use effects, air quality, water quality, and biodiversity, and social impacts such as environmental justice. In addition, the scope of the sustainability issues cross many jurisdictional boundaries. Therefore it is critical to work on a national and international basis to seek harmonization of sustainability provisions. A summary of the ongoing evaluations is provided below.

**Greenhouse Gas Emissions:** The main purpose of the LCFS is to reduce greenhouse gas emissions through a full lifecycle analysis. Therefore, it is important to consider the direct and indirect land-use effects on greenhouse gas emissions during the regulatory process. To that extent, ARB is conducting a quantitative analysis using publicly available models to assess the global impacts of biofuel production and the direct and indirect impacts of other fuels as well. Based on the results of this evaluation, ARB will then evaluate the need to include land use protections, similar to those in the federal Renewable Fuels Standards (RFS). The RFS land use protections limit renewable biomass to that which is produced on land that was cleared or cultivated prior to the enactment of the RFS requirement.

**Economic Impacts:** ARB will evaluate the potential economic impacts of the LCFS strategy, including impacts on agriculture.

**Other Environmental Impacts:** ARB will evaluate the potential impacts of LCFS on criteria pollutants and air toxics and consider water use and water quality, as well as soil erosion. To the extent feasible, these evaluations will be quantitative for California, and qualitative for impacts outside of California. ARB will ensure that to

the extent feasible, the LCFS complements and does not interfere with achievement and maintenance of federal and state ambient air quality standards.

**Environmental Justice:** To the extent feasible, ARB will quantitatively assess potential impacts on low-income and disproportionately impacted communities in California. This evaluation will include an evaluation of the direct, indirect, and cumulative emission impacts of the proposed regulation on communities that are adversely impacted by air pollution, and to the extent feasible will ensure that LCFS requirements do not disproportionately impact low-income communities. For example, this analysis will include an assessment of the potential impacts of the construction of low-carbon fuel production facilities in California using the Governor's goals for California production of biofuels as a benchmark as described in Executive Order S-06-06.

**Food Prices:** ARB will analyze and present information on the impact of biofuels on food prices as part of the regulatory development process.

**Other Sustainability Issues:** In consideration of the overall societal benefits of the LCFS, ARB will evaluate other environmental and social components including genetically-modified organisms, biodiversity, labor rights, income distribution, working conditions, worker rights, child labor and land rights. Although these issues may be outside of ARB's ability to address, ARB will consider them in the regulatory development and evaluate the need to incorporate recommendations for future study. As part of this effort, ARB will seek to develop guidelines for the sustainable production of fuel in coordination with the University of California, the California Energy Commission, the U.S. Environmental Protection Agency and others.

The LCFS is unusually broad in scope so the analysis that is underway to meet the AB 32 regulation may be atypically complex. However the planned evaluations provide insight into the scope of future regulatory analyses. For simpler regulations, the required analysis may not be as broad and far-reaching.

## 9. Administrative Burden

ARB conducted a preliminary assessment of the administrative burden of implementing the preliminary recommendation (HSC §38562 (b)(7)). The preliminary recommendation calls for ARB to develop a cap-and-trade program – a market-based program to cap and reduce emissions from the Industrial, Electricity, Natural Gas, and Transportation sectors. This program would require stringent monitoring and reporting on the part of the regulated community, and comprehensive enforcement on the part of the ARB. Sources under the cap would also need to analyze the best approach for their company to comply with a cap – assessing the cost of reducing emissions and comparing that to the cost of purchasing emission reductions in a market. Although ARB has not developed this type of market regulation before, there is extensive experience to draw upon both within California, nationally, and internationally. In addition, the regulatory component of the preliminary recommendation would require ARB and other State agencies to adopt a

series of regulations requiring regulatory development, outreach to stakeholders and the public, implementation by industry, and enforcement for numerous measures and programs. ARB is continuing to evaluate the potential administrative burden of the preliminary recommendation.

### **10. De Minimis Threshold**

ARB is evaluating appropriate de minimis thresholds for the Scoping Plan below which emission reduction requirements will not apply (HSC §38561(e)). ARB is considering separate de minimis for combustion carbon dioxide and non-carbon dioxide gases. This is because many high-GWP gases are used in very small quantities. For example, a ten ounce can of pressurized duster (commonly used to clean computer keyboards) can contain 800 pounds of CO<sub>2</sub>E. ARB believes that a de minimis threshold for combustion carbon dioxide should be higher than that for non-carbon dioxide gases, and is soliciting comment on this proposal.





## **IV. IMPLEMENTATION: Putting the Plan into Action**

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Adoption of the Scoping Plan, in whatever final form, will be a groundbreaking step forward for California. But it is only the beginning of a journey that will last for decades, and project the state into a low-carbon, clean energy future. We must be clear: putting the Plan into action is a challenge that will test the mettle of the State, and the political will of all levels of government. ARB is confident that we can – and must – address this most serious threat to the state’s economy and wellbeing. This Plan sets the stage for each of us to personally take on the challenge of climate change, to move beyond good intentions to concerted actions and usher in a bold new chapter for California, and the world.

### **A. Personal Action**

The pollutant reductions required under AB 32 cannot be realized without the active participation of the people of California. While many of the measures in this Plan must be taken by large sources of emissions such as power plants and industrial facilities, it is the voluntary commitment and involvement of millions of individuals and households throughout the state that will truly make this ‘California’s Plan’.

We are all, ultimately, the real agents of change. Shifts in individual choices and attitudes drive changes in the economy and at the institutional level. Examples abound: dolphin-safe tuna, for example, was the product of using the forces of demand to drive changes in the fishing and canning industry. Boycotting lumber from old-growth trees led to a certification process that helps consumers choose their wood and wood products.

When these changes in behavior are linked with supporting incentives, policies or regulations, they can be even more effective. An attitudinal shift against smoking was reinforced by banning smoking in restaurants.

The same dynamic of changing individual behavior will drive California’s pioneering effort to reduce greenhouse gas emissions. As more people choose to drive low-greenhouse gas emitting vehicles, the auto manufacturers will respond with more models and more intensive research. Regulations requiring auto manufacturers to provide these cars will complement the market demand.

This means that thinking about climate change in ways that will reduce our individual and household carbon footprint will become an integral part of our everyday decisions about travel, work, and recreation. Some families may choose to purchase a more efficient vehicle when it comes time to replace the current model. Some may decide to make locally grown food a larger part of their diet as a way to reduce

related emissions from transportation. Many households will choose to lower their thermostat to 68 degrees Fahrenheit during the colder months, and raise it to 78 degrees when air conditioning is required. Some households may choose to swap out incandescent light bulbs for more efficient compact fluorescent lights. Others may choose now to install solar water heaters, or arrays of solar panels on their roofs to take advantage of renewable energy, and lower their household energy bills. Many households may choose to plant trees to shade and cool their homes, and use landscaping and plants that require less water (and so produce less emissions ultimately to transport and treat it). What is crucial is that we all begin making these kinds of changes now.

This Draft Plan recommends measures that will help support many of these individual decisions to improve energy efficiency. Statewide measures and regional efforts will result in programs to promote public transportation or riding in carpools, subsidize the purchase of energy efficient appliances, or provide incentives to better insulate and weatherize older homes. ARB is fully committed to assuring California consumers have the widest possible choice of vehicles that emit fewer greenhouse gases than today's models, including the most advanced technology vehicles produced anywhere in the world. But it will still require individual decisions, and changing individual habits, to make those programs and policies rapidly effective.

Californians have embraced statewide programs to that support positive change in home and business behavior in the past. In less than two decades, separating household waste and recycling at home and work have become commonplace, as has the widespread purchase of appliances with the Energy Star label to save energy. Reducing our carbon footprint by moving towards a cleaner more efficient economy will produce a wide range of benefits to individuals, through lower energy bills, a more sustainable lifestyle, and a cleaner environment for all.

## **B. Public Outreach and Education**

The backbone of an effective climate action plan is public outreach and education. The Draft Plan calls for a robust statewide program designed to generate awareness and involvement in California's climate change efforts.

The Climate Action Team will convene a steering team that includes State agencies along with other public agencies such as the state's air districts and utilities – both public, and investor owned -- which have a strong track record of successful efforts at public education to reduce driving (Spare the Air) or promote energy efficiency and reduce energy demand (Flex Your Power).

The steering committee will develop a coordinated array of messages and draw upon a wide range of messengers to deliver them. These will include regional and local governments whose individual outreach campaigns can reinforce the broader State outreach themes while also delivering more targeted messages directly tied to specific local and regional programs.

In keeping with the critical element of involving all Californians in addressing climate change, California will also support highly localized efforts at public education and outreach at the community and neighborhood level, including service club organizations and existing faith-based communities – churches, mosques and synagogues. Other private sector entities including businesses will be invited to partner in spreading the word.

### **1. Reaching Children through Schools**

Setting California on track to a low-carbon future beyond 2020 is the definition of a multi-generational challenge. This means that climate-related education in schools will be a central element of California's Plan. By 2010, California will develop climate change education components to the State's new K-12 model school curriculum as part of the Education and the Environment Initiative (AB 1548, Pavley, Chapter 665, Statutes of 2003). In the meantime, State outreach will continue through the Cool California web pages ([www.coolcalifornia.org](http://www.coolcalifornia.org)) and the continued support of student educators through the California Climate Champions program. Expanding the knowledge and opportunities of young people to participate in promoting their own and their communities' environmental health will be an important theme for all these efforts..

### **2. Involving the Public and Stakeholders in Measure Development**

In keeping with the requirements of AB 32, and the legacy of four decades of regulatory development at ARB, the process of developing regulations outlined in this Plan will be transparent, and fully involve the public including disadvantaged communities and those with localized concerns, as well as affected industries, at every stage of the process including informal and formal rulemaking activities. Local and community meetings and outreach will be central element of all rulemaking, with State agencies working closely with advocates of disadvantaged communities and the EJAC to understand impacts and sensitive co-pollutant issues surrounding the possible programs. State agencies involved in measure development will continue meeting periodically with communities to assess any implementation challenges or to discover new measures down the road. Stakeholders will be invited to participate in the many workshops, workgroups and seminars that will be held as individual measures are developed.

### **3. Small and Medium-Sized Businesses**

Small and medium-sized businesses may feel particularly uncertain about how they will transition to California's new green economy. One of the Early Action measures ARB is implementing is aimed at helping business during the implementation of AB 32. ARB is developing a small business outreach package including a business-specific calculator to assess energy use and guidance on best practices, case studies about how other businesses have implemented energy efficiency programs, and financing options. ARB will work with other State agencies to develop an outreach plan to provide technical assistance to businesses through a variety of means

including attendance at business events, workshops, working with local economic development agencies. ARB will also work with the Governor's AB 32 Small Business Task Force in the implementation of AB 32.

#### **4. Workforce Readiness**

ARB will work with other agencies, including academia, business, local governments, unions, and community colleges, to identify key steps for building a sustainable economy and expanding career technical training. Many organizations have already benefitted by developing early training for workers and have been able to place them into new, long-term, green technology jobs. In addition, if the Scoping Plan includes programs that generate revenue, these revenues could be used to encourage growth in green technology jobs.

### **C. Tracking Progress**

State agencies, working with the diverse set of greenhouse gas emissions sources, have collaborated in the process of developing the strategies presented in this Plan. To ensure that the emission reduction goal is reached, ARB must monitor the regulations and other actions adopted by both ARB and other State agencies for actual levels of emissions reduced. Should there be shortfalls in emission reductions, the State would implement additional measures to ensure that AB 32 goals were met.

As the proposed measures are developed over the coming years, it is possible some of these strategies will not materialize as originally thought or be deemed to not be technologically feasible or cost-effective at the level given in the Plan. If this happens, new strategies would need to be developed to provide additional reductions if there is a projected shortfall in emissions reductions.

It is equally likely that new technologies and strategies will emerge after the initial adoption schedule required in AB 32 – that is, regulation adoption by January 1, 2011. If promising new tools or strategies emerge, ARB and other affected State agencies will evaluate how to incorporate the new measure into the AB 32 program as soon as possible. In this way, new strategies ensuring that the commitments in the Plan remain whole and that the 2020 goal can be met, will be incorporated into the State strategy.

ARB will update the Plan at least every five years (HSC §38561(h)). These updates allow ARB to evaluate the progress made towards the State's greenhouse gas emission reduction goals and correct the Plan's course where necessary. The Report Cards and audits, along with an evaluation of new technologies – both emerging and those recently incorporated into the Plan – will also provide valuable input into ARB's evaluation for the required updates.

## 1. Mandatory Reporting Regulation

ARB's mandatory reporting rule, adopted in December 2007, will help the State obtain facility level data from the largest sources of greenhouse gas emissions in California. This data will help ARB better understand these sources to develop the proposed emission reduction measures outlined in the Draft Plan.

The regulation requires annual reporting from the largest facilities in the state, accounting for 94 percent of greenhouse gas emissions from industrial and commercial stationary sources in California. There are approximately 800 separate sources that fall under the new reporting rules and include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 tons of carbon dioxide each year from on-site stationary source combustions such as large furnaces. This last category includes a diverse range of facilities such as food processing, glass container manufacturers, oil and gas production and mineral processing.

Affected facilities will begin tracking their emissions in 2008, to be reported beginning in 2009 with a phase-in process to allow facilities to develop reporting systems and train personnel in data collection. Emissions for 2008 may be based on best available emission data. Beginning in 2010, emissions reports will be more rigorous and will be subject to third-party verification. Reported emissions data will allow ARB to improve its facility-based emissions inventory data. Originally, the statewide greenhouse gas inventory was based on aggregated sector data and could not be disaggregated down to the facility level. The facility-level reporting will improve data on greenhouse gas emissions for individual facilities and their emitting processes. This information will also help improve emissions inventories for criteria pollutants, and methods for assessing cumulative emission impacts on a community level.

ARB emissions reporting requirements are expected to be modified over time as AB 32 is implemented.

## 2. Report Card

SB 85 (Chapter 178, Statutes of 2007) required every State agency to prepare an annual "report card," detailing measures the agency has adopted and taken to reduce its greenhouse gas output, and including the actual greenhouse gas emissions reduced as a result of those actions. The information must be submitted to CalEPA, which is then required to compile all the State agency data into a report format, which would be made available on the internet and submitted to the Legislature. The information would then allow comparisons of each agency's projected greenhouse gas reductions with their targets established by the CAT or the Scoping Plan, and what was actually achieved. This would be the State's 'report card' on its greenhouse gas reduction efforts.

Agencies are also required, as funds are available, to have an outside audit of greenhouse gas actions completed every three years to verify actual and projected reductions.

## **D. Enforcement**

Enforcement is a critical component of all of ARB's regulatory programs, both to ensure that emissions are actually reduced and to provide a level playing field for companies that comply with the law. ARB has an extensive and effective enforcement program addressing the myriad sources ARB regulates from heavy-duty vehicle idling to consumer products to fuel standards to off-road equipment. To increase the scope of its enforcement efforts and provide greater assurance of compliance, ARB also partners with local, State and federal agencies to carry out inspections and where necessary prosecute violators. ARB will continue its close working relationship with local air districts in the development and enforcement of regulations to implement the Scoping Plan.

The Draft Plan recommends a mix of market-based programs and regulatory measures. ARB, EPA, and many local agencies have experience with the data collections and analysis necessary to enforce market-based regulations, in addition to the actual testing of emissions at the source. ARB will work closely with the local air districts to take advantage of the expertise of these agencies which have primary responsibility for implementing and enforcing criteria pollutant regulations at stationary sources within their jurisdictions. Local air districts not only are familiar with the individual facilities and their compliance history, their permitting files contain valuable information that can be used to make sure that greenhouse emissions reductions are accurately reported and regulators can track the relationship between greenhouse gases and toxic or criteria air pollutants.

## **E. State and Local Permitting Considerations**

Proposed emission reduction strategies in the Draft Plan may require affected entities to modify or obtain federal, State and/or local environmental or other permits. For example, the installation of new equipment which reduces greenhouse gas emissions may require a modification of an existing air operating permit, under the jurisdiction of a local air district.

There may also be instances where proposed greenhouse gas emission reduction strategies will need to be harmonized with existing environmental, safety or other requirements, or require additional permitting. Local building codes can affect construction or remodeling permitting such as that necessary to install photovoltaic panels or building new alternative fuel infrastructure.

Some projects proposed as emission reduction strategies may require an environmental review under the California Environmental Quality Act (CEQA) or the National Environmental Protection Act (NEPA). If the project proposed to reduce

emissions of greenhouse gases has an adverse effect on another environmental factor, then mitigation may be required for the project to continue.

Many proposed emission reduction strategies require changes to the use or production of energy. In addition to other permitting issues noted here, these changes may require approval by the California Energy Commission or the California Public Utilities Commission.

Permit requirements may affect the viability of certain strategies, or timing of implementation due to the length of time required to complete an extended and comprehensive permitting process. These effects will need to be further evaluated in the subsequent regulatory development processes associated with each proposed emission reduction measure. ARB is committed to working through these potential permitting barriers with our state and local partners to ensure successful implementation of AB 32.

## **F. Program Funding**

Administration, implementation, and enforcement of the proposed emission reduction strategies contained in the Draft Scoping Plan will require a stable continuing source of funding. AB 32 authorizes ARB to collect fees to fund implementation of the statute. Details of how this fee program will be structured will be subject to a public rulemaking that ARB will initiate this summer.

At a minimum, ARB will develop a fee structure to pay for administration of the AB 32 program. Preliminary estimates are that approximately \$55 million per year will be needed on an ongoing basis to fund implementation by ARB and other State agencies. Additional revenues will be needed to repay the loans from State funds that have been used to pay for the startup of the program. If applied to all GHG emissions in California, a fee of \$0.20 per metric ton would provide the needed funding. This would translate to less than \$0.0002 per kilowatt-hour, \$0.002 per gallon of gasoline, and \$0.001 per therm of natural gas.

It would take approximately 18 months from the beginning of the regulatory process until a fee schedule is in place. This includes time for regulatory development and to set up the required billing, collection, accounting, enforcement and other administrative components of the program. Therefore, revenue from fees would be available for expenditure in the 2010-2011 fiscal year.

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## **V. A VISION FOR THE FUTURE**

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A 30 percent reduction in greenhouse gas emissions is well within the capabilities of California. This Draft Scoping Plan proposes solutions to fulfill the requirements of AB 32 while also reducing air pollution, protecting our natural resources and addressing the possible impacts on low-income communities. The task before us now is to determine how best to achieve these essential goals.

We have the know-how, the ingenuity, the research capabilities, and a culture of imaginative and profitable innovation to do it, but achieving the required reductions will not be easy. Many of the proposed programs and measures described in this Draft Plan will require changes in public policy, an investment in political will and a shared understanding of the need to reach viable solutions quickly. Other solutions – more efficient vehicles, low-carbon fuels, increased renewable energy sources – are technology-dependent and will require both the increased use of known solutions and their development into second and third generation iterations. There is little doubt that with a much larger market, and targeted incentives for both production and purchase, we will see improved photovoltaic cells, LED lighting, and highly efficient solar water heaters as essential elements of a typical house.

As the greenhouse gas emissions cap lowers toward the 2020 limit, companies and corporations will support the development of new generations of industrial processes that are more efficient, save money and energy, and produce less waste.

Looking beyond 2020, the subject of new and alternative energy sources becomes more complicated, more important, and less clear. There are many promising technologies that are at present only in the initial stages of research and development: generating electricity from the power of waves, for example. We will need to move forward with feasible solutions to carbon to do capture and sequestration, production of cellulosic-based ethanol, and other promising advances in biological solutions to produce fuels.

As the current generation of children now in school move into their productive adult years – 2020 and beyond – the need for alternate energy sources and ever-increasing requirements of energy efficiency will follow them. In many cases, developing new technology in compressed timeframes will resemble the concept of ‘inventing to schedule’ that allowed the Apollo Program to make such rapid advances in America’s successful effort to put a man on the moon. It is one of the goals of this Draft Scoping Plan to help establish and support long range approaches and institutions that will provide the continual search for new energy solutions, and their rapid development and deployment into the marketplace.

And what will California look like in 2050? It is safe to say that no one can really predict how much technology and the state will have changed forty-two years from now. Looking back forty-two years to 1966, gasoline cost about a quarter a gallon, the state had fewer than 10 million residents, and few could conceive of personal computers, let alone the Internet. It was partly through the innovation and creativity of Californians that computers are common as telephones, and we have the World Wide Web where most people will read this Draft Scoping Plan.

In addition to the implementation of measures discussed in this Draft Plan, other important areas need to be pursued to ensure the broadest goals of addressing climate change are successful. The discussion below highlights several of these ideas that need attention in both the near- and long-term.

## **Collaboration**

### **Working Closely with Key Partners**

Global warming requires all the major emitting nations to work together for a global rescue plan. California and other states are filling a vacuum created by a lack of national leadership by the federal government. California must press for national legislation that will allow the United States to take its place among the developed countries that have agreed to reduce their carbon emissions, and lead a new international effort to promote an agreement to replace the Kyoto agreement that expires in 2012.

Any national climate program must be built on a partnership with state and local governments to ensure that states can continue their role as incubators of climate change policy, and continue to implement effective programs such as vehicle standards, energy efficiency programs, green building codes, and alternative fuel development.

California should work with key federal agencies, including the U.S. Department of Energy and their national labs, the U.S. Environmental Protection Agency and numerous other key agencies, such as the U.S. Bureau of Land Management, U.S. Department of Agriculture, U.S. Department of Transportation, to find shared solutions to climate change.

Through the Western Climate Initiative and in collaboration with other regional voluntary alliances of states, California can promote our own best practices and learn from those of others, in addition to continuing to work on the structure of a regional and ultimately national cap-and-trade program.

California is a charter member of the International Carbon Action Partnership (ICAP), an organization made up of countries and regions that have adopted carbon caps and are actively pursuing the implementation of carbon markets through

mandatory cap-and-trade systems. We should continue our involvement in ICAP to share experiences and knowledge.

We should continue to develop current relations and existing partnership arrangements with China – now the largest contributor of greenhouse gases in the world – and to establish similar relations with India and other countries to share research on both greenhouse gas mitigation and climate change adaptation activities.

With developing nations expected to suffer the most from the effects of climate change, California and others have an obligation to share information and resources on cost-effective technologies and approaches designed to mitigate future impacts, as well as information on effective adaptation as changes in climate and the environment occur.

## Research

### **Unleash the Potential of California's Universities and Private Sector**

Bringing greenhouse gas emissions down to a level that will allow the climate to stabilize will take a generation or longer. Many of the ultimate solutions to achieve stabilization will be developed and implemented well into the future. It is likely that the most innovative solutions are going to come from people who are now in school. The challenges these children will face have never been experienced before and they will need both imagination and creativity to craft solutions. California's respected public and private academic institutions must continue to develop and fund programs based on climate change science that cut across disciplines to address the multi-dimensional aspects of climate change.

### **Public-Private Partnerships**

To most effectively address the climate change dilemma, we must encourage collaborations between academia and the private sector. Industry is well positioned to quickly attack problems. Combining the understanding and knowledge of universities with the innovation, acumen and speed of businesses can unleash a powerful collaborative force to tackle the problems associated with climate change.

Several important programs have already been initiated at California Universities, including Stanford's Global Climate and Energy Project, and the University of California at Berkeley's Energy Biosciences Institute (EBI),<sup>34</sup> a \$500 million, ten year program. The California Public Utilities Commission (CPUC) recently created the California Institute for Climate Solutions (CICS). The CICS is a \$600 million, ten-year public-private collaboration for applied and directed research on reducing GHG emissions in the Electricity and Natural Gas sectors. All these and

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<sup>34</sup> The EBI is being developed in cooperation with Lawrence Berkeley National Laboratory and the University of Illinois at Urbana-Champaign.

other efforts need to be recognized and encouraged, along with others that can link the results of research directly to policy decisions that the State must make.

## **Conclusion**

Climate science and solutions are evolving rapidly, but meanwhile the evidence of harm from levels of greenhouse gases already present in Earth's atmosphere keeps mounting. While we are learning to adjust to live under conditions of global warming we must act without delay to prevent even worse consequences. AB 32 wisely requires the ARB to update its Scoping Plan every 5 years to reflect what we have learned and what we have accomplished. This draft indicates that for the first phase of implementation we have a menu of available and attractive measures from which to choose. We can attack global warming in ways that make our cities healthier, our natural areas safer and our working landscapes more productive; that make our economy more resilient as we reduce our reliance on imported petroleum; and that pave the way for technologies that can make our state both more prosperous and more sustainable. But we must choose, and then act. As this Draft Plan becomes final, it will be made sharper and given more detailed analysis; recommendations may change as a result of better information. The basic outline is here. It's up to you who read it to help fill in the blanks.

## Acknowledgments

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This Draft Scoping Plan was prepared by the Air Resources Board. This document was made possible by the hard work of numerous contributors. Below is a list of advisory committees and State agencies that directly provided input to this Draft Scoping Plan.

### Team Support

Climate Action Team

Climate Action Team Sector Subgroups

- Agriculture
- Cement
- Energy
- Forest
- Green Buildings
- Land Use
- Recycling and Waste Management
- State Fleet
- Water-Energy
- Economics
- Scenarios
- Research

### Advisory Committees

Market Advisory Committee

Environmental Justice Advisory Committee

Economic and Technology Advancement Advisory Committee

### State Agencies

Governor's Office of Planning and Research

California Environmental Protection Agency

Business, Transportation and Housing  
Agency

Resources Agency

State and Consumer Services Agency

California Energy Commission

California Public Utilities Commission

California Transportation Commission

Department of Conservation

Department of Food and Agriculture

Department of Forestry and Fire Protection

Department of General Services

Department of Parks and Recreation

Department of Public Health

Department of Transportation

Department of Water Resources

Housing and Community Development

Integrated Waste Management Board

State Water Resources Control Board