



Security
Opportunity
Stewardship

PCAP

PRESIDENTIAL CLIMATE ACTION PROJECT



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Wingspread Principles on the U.S. Response to Global Warming

Great nations rise to great challenges. Today, no challenge is more critical than global climate change. It reaches to the core of humanity's relationship with the Earth. It tests our capacity to make intelligent changes in our economy, policies and behaviors in the interest of all people and all generations.

We believe that the United States must take immediate, comprehensive action against global warming, guided by these principles:

- **Urgency:** Global warming is real, and it is happening now. Every year that we delay action to reduce emissions makes the problem more painful and more expensive – and makes the unavoidable consequences more severe. Leaders in government, business, labor, religion and the other elements of civil society must rally the American people to action.
- **Effective Action:** The United States must set enforceable limits on greenhouse gas emissions to significantly reduce them within the next 10 years and should work with other nations to achieve a global reduction in absolute greenhouse gas emissions of 60-80% below 1990 levels by mid-century. Experience proves that voluntary measures alone cannot solve the problem. Aggressive government action, including mandates based on sound science, is imperative and must be implemented now.
- **Consistency and Continuity of Purpose:** Climate stabilization requires sustained action over several decades to achieve deep cuts in greenhouse gas emissions throughout the economy. With its frequent changes of leadership and priorities, however, the American political system does not lend itself to long-term commitments. Leaders in both government and civil society must shape policies and institutions that ensure sustained climate protection.
- **Opportunity:** Mitigating and adapting to global warming offer the opportunity to create a new energy economy that is cleaner, cheaper, healthier and more secure. We must awaken America's entrepreneurial spirit to capture this opportunity.
- **Predictability:** Measures that signal investors, corporate decision makers and consumers of the certainty of future reductions are essential to change the economy.
- **Flexibility:** Deep cuts in greenhouse gas emissions demand and will drive innovation. Our economy will innovate most efficiently if it is given the flexibility to achieve ambitious goals through a variety of means, including market-based incentives and/or trading.

- **Everyone Plays:** Measures to stabilize the climate must change the behaviors of business, industry, agriculture, government, workers and consumers. All sectors and the public must be engaged in changing both infrastructure and social norms.
- **Multiple Benefits:** Actions to stabilize, mitigate or adapt to global warming should be considered alongside other environmental, economic and social imperatives that can act synergistically to produce multiple benefits – for example, “smart growth” practices that conserve forests and farmland while reducing the use of transportation fuels. Many actions to stabilize climate offer local, regional and national, as well as global, benefits.
- **Accurate Market Signals:** The true and full societal costs of greenhouse gas emissions, now often externalized, should be reflected in the price of goods and services to help consumers make more informed choices and to drive business innovation. Policymakers should eliminate perverse incentives that distort market signals and exacerbate global warming.
- **Prudent Preparation:** Mounting climatic changes already are adversely affecting public health and safety as well as America’s forests, water resources, and fish and wildlife habitat. As the nation works to prevent the most extreme impacts of global warming, we also must adapt to the changes already under way and prepare for more.
- **International Solutions:** U.S. government and civil society must act now to reduce their own greenhouse gas emissions, regardless of the actions of other nations. Because greenhouse gas emissions and the effects of climate change are global, however, the ultimate solutions also must be global. The United States must reengage constructively in the international process.
- **Fairness:** We must strive for solutions that are fair among people, nations and generations.

The Wingspread Principles were developed during a national leadership summit at the Johnson Foundation’s Wingspread Conference Center in June 2006. Their purpose is to help the many people and organizations concerned about global warming to begin speaking with one voice on what the U.S. response should be. To see who has signed them, visit www.summits.ncat.org/energy_climate/statement.php.

Executive Summary

“Carbon dioxide is being added to the Earth’s atmosphere by the burning of coal, oil and natural gas... This will modify the heat balance of the atmosphere to such an extent that marked changes in climate, not controllable through local or even national efforts, could occur. Possibilities of bringing about countervailing changes by deliberately modifying other processes that affect climate may then be very important.”¹ – President’s Science Advisory Panel, November 1965

“It’s not too late to stabilize climate.” – James Hansen, NASA, 2007²

The Presidential Climate Action Plan (PCAP) is the result of nearly a year of research and collaboration led by the University of Colorado Denver School of Public Affairs and advised by some of America’s leading experts in climate science and policy.

As its name implies, PCAP is a plan for the next President of the United States to take decisive action on global warming, with an emphasis on the first 100 days in office. Work will continue throughout the 2008 election season to improve and update the plan based on emerging science, policy ideas, new research, and action by the Administration and Congress. In addition, the PCAP team will solicit comments in a national dialogue on climate change. We will issue the final plan in September 2008.

To begin this dialogue, PCAP offers more than 300 recommendations across more than a dozen economic sectors and issue areas, including carbon pricing and caps, energy policy, economic impacts, national security, transportation, buildings, public health, agriculture, ocean ecology, natural resource stewardship, and assistance to communities and states. For example, the PCAP recommends that the next President:

- **Rally the nation to build a new economy that will allow this and future generations to prosper in the 21st century, based on security, opportunity and stewardship.**
- **Put America on the path to reduce its greenhouse gas emissions 30% below current levels by 2020 and 90% below current levels by 2050.**
- **Set aggressive national goals to make the necessary transition to clean and sustainable energy resources. By 2020, cut our petroleum consumption in half, achieve an average fleet efficiency of 50 miles per gallon for passenger vehicles, and obtain at least 20% of our electricity from renewable resources.**

¹ President’s Science Advisory Panel, Restoring the Quality of Our Environment: Report of the Environmental Pollution Panel (Washington, D.C., 1965), 9.

² James Hansen, e-mail quoted by the Associated Press, Sept. 23, 2007, <http://www.wtop.com/?nid=220&sid=1254769>.

- **Permit the construction of only those electric generation plants that emit no greenhouse gas emissions or are able to capture and permanently store them.**
- **Initiate an economic boom that will create an estimated 40 million new jobs in the energy-efficiency and renewable energy industries by 2030.**
- **End federal subsidies of mature energy industries – including the oil, gas, coal and nuclear industries – and redirect the funds to an ambitious program to develop and deploy clean energy technologies.**
- **Create a powerful new federal-state-local partnership with \$1 billion annually in grants to states and communities to implement climate action plans, reform utility rates to encourage energy efficiency, and adapt to climate changes that are underway.**
- **Trigger a rural renaissance in which farms and rural communities become the nation’s principal energy suppliers.**
- **Offer \$1 billion in incentive awards for breakthrough technologies that reduce America’s greenhouse gas emissions.**
- **Merge the Department of Energy’s energy-efficiency and supply programs with the Small Business Administration to create a dynamic new multibillion-dollar agency that develops the technologies America needs and commercializes them by creating new jobs and businesses.**
- **Make the nation’s largest energy consumer – the federal government – climate neutral and use its purchasing power to create new markets for low-carbon products made in America.**
- **Assert executive authority to move the nation forward when rapid action is necessary for the public interest.**

These are not consensus recommendations. Because national policy must be bold – and because consensus often is the enemy of boldness – the PCAP team did not ask its advisers or other organizations to endorse the plan. We did ask our advisers and our team, however, to move beyond the debate over the nuances of climate science and to focus instead on action. We believe that’s what the country must do. Our intention is to push the envelope for the electorate, the candidates and the 44th President of the United States.

Introduction

Building the 21st-Century Economy

“There is nothing so difficult in human affairs than to change the established order of things because those who will be hurt by the change are quite certain of their loss while those who will benefit are uncertain of their gain.”

– Machiavelli

In our personal lives and in the lives of nations, change usually involves three forces: push, pull and inertia. That’s the case now as the United States confronts the end of the industrial era and the next step in the relationship between economy and ecology.

The looming prospect of disastrous changes in the Earth’s climate and increasing tensions with the geopolitics of oil are pushing us toward change. The force that pulls us forward is the vision of a vibrant new economy that brings security, opportunity and stewardship. It is our next frontier and an enormous entrepreneurial opportunity.

Holding us back is the collection of barriers we must overcome. They are technical, structural, political and economic. But the principal barrier is attitude. Record heat, violent weather, unprecedented wildfires, dying pine forests, chronic drought – these are like the hacking coughs of a longtime smoker. We know what they mean. The signs are too many and too persistent to ignore. The question is not if we should change. It’s whether we have the will.

Global climate change is not a partisan issue. Republicans, Democrats and political agnostics all are interested in prosperity and our collective well-being. Climate change is not a political issue, either. Public policy must be based not on what is politically expedient, but on sound science. We must insist that our leaders be as bold as science tells us we must be.

Global warming cannot be narrowly defined as an environmental issue. Climate affects our wealth, our industries, our public health, our national security and our children. It affects our rights and freedoms. As Governor Mark Sanford, the Republican from South Carolina, has written: “The real inconvenient truth about climate change is that some people are losing their rights and freedoms because of the actions of others – in either the quality of the air they breathe, the geography they hold dear, the insurance costs they bear or the future environment of the children they love.” ¹

Climate change is not a problem we can put off to the future. It is happening now. Our job is to keep it from getting worse. We have the tools we need. What we lack so far is a sufficient sense of urgency to use them. That’s not to say the job will be easy – but as President John F. Kennedy said when he launched the Apollo project to put Americans on the moon, hard jobs bring out the best in the American people. ²

Climate change will not be solved by new technologies alone. To put it bluntly, smart technologies can accommodate stupid behavior, but only to a point. The solution will involve not only new hardware, but also the choices we make as consumers. That’s good news. It means that each of us can make a difference.

Finally, we should recognize the enormity of the opportunity. The need to build a new economy is the largest market opportunity ever, the engine for new industries and jobs, the next challenge for America’s genius, the chance for an unprecedented public-private partnership, the opportunity to help the people of other nations achieve a decent standard of living, the moment for America to exert constructive international leadership and the chance to leave our children a world better than the one that was left to us.

¹ M. Sanford, “A Conservative Conservationist? – Why the Right Needs to Get Invested in the Search for Climate Change Solutions,” *Washington Post*, Feb.23, 2007.

² Kennedy’s exact words were: “We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win” (speech, Rice University, Sept. 1962).

Mobilizing communities, businesses, households and institutions to clear the barriers and seize these opportunities will require bold leadership at every level of society, including Congress and the White House. We have come to an historic passage as a nation and as a global community. The need for action is so urgent and the opportunity so large that the next President and Congress will be among the most important in history.

The Next President

To take bold action, the next President will need the support of the American people, and that relationship begins during the campaign. To win their trust, the candidates should pledge allegiance to some old American values that will serve us well in our new challenges.

The candidates should promise a government as it should be: open, accountable, value-driven, forward-looking, principled, unifying, just and inclusive. The new Administration must reignite the nation's genius for innovation and its sense of moral obligation to the nation's future. It must bust barriers, invent incentives, set goals, and nurture the technologies and industries that are emerging to power a sustainable economy.

The President should cut red tape, practice the paradoxical principle of making government leaner to make it more effective, bring out the best in career civil servants by appointing America's best people to lead them, and keep the bureaucracy attentive to the nation's needs and nimble enough to respond.

The President must be the champion of equity and social justice as well as the CEOs' CEO. He or she must be uncommonly courageous, loyal to principle over politics, and committed to seeking wise counsel outside as well as inside the White House.

The President must have a strong spine and a good compass, thick skin and sensitivity to the people. He or she must be the leader not only of those who vote, but of those who are disengaged, disenchanting or disenfranchised. He or she must guard the keys of government from special interests and make a commitment to breaking the grip of powerful lobbies that would hold the nation back.

The President must be bullish on the future and skilled behind the bully pulpit. He or she must be a patriot and a citizen of the world, unafraid to ask a lot of the American people and willing for the American people to ask a lot of the President. He or she must be an evangelist for a revival of the American spirit. If we are to remain a great, secure and prosperous nation, this is the kind of leadership we need.

The Presidential Climate Action Plan

From the moment the 44th President of the United States takes office on January 20, 2009, the American people, the financial markets and the world community will be watching for an indication of how he or she will address global warming.

Since January 2007, a team at the University of Colorado Denver, assisted by top climate and policy experts, has been developing a plan to help the President take decisive leadership during his or her first 100 days in office. This document is the first edition. The Presidential Climate Action Plan (PCAP) will continue evolving as the 2008 election cycle continues to reflect original research, emerging science and policy developments. The final edition will be issued in September 2008.

PCAP is Based on These Assumptions:

- **Global climate change and national energy security are interconnected. Both are complex challenges that must be addressed simultaneously with comprehensive and creative solutions.**
- **Both are global problems that require international collaboration. To establish credibility in the international arena, however, the United States must implement a solid domestic action plan.**

- **Job No. 1 is to unleash American innovation and enterprise to provide our nation and the rest of the world with solutions. Market mechanisms, private initiatives and public-private partnerships are essential. But some government regulation also will be needed to harmonize the policies being created around the nation and to coordinate all sectors for fast and effective results. Toward those ends, PCAP will emphasize the use of performance standards rather than prescriptive standards; policies that will help the marketplace function more efficiently; public incentives to spur private invention; and investments in the new industries and jobs that will build the new economy.**

Our unifying national objective is that new economy – one designed to work in the realities of the 21st century and to create a healthy relationship between economy and ecology. We need security, opportunity and stewardship. Sustainable energy and climate stability are two essential components of that future.

Section 1: The Climate Economy

“Climate change represents a unique challenge for economics: It is the greatest and widest-ranging market failure ever seen.” – Sir Nicholas Stern

“Creating the low-carbon economy will lead to the greatest economic boom in the United States since we mobilized for World War II.” – Former President Bill Clinton

Sir Nicholas Stern and Bill Clinton both have it right. Global climate change has been our greatest market failure. Now, it’s our greatest market opportunity.

The economy is a key issue in every Presidential election, but as 2008 approaches, the nation’s economic health has taken on a new dimension. The climate crisis demonstrates with unprecedented clarity that economies and ecosystems are interdependent. The scientific consensus that global warming is caused primarily by the burning of fossil fuels means we must make rapid and fundamental change in how the world’s economies are powered.

Responding in a smart way will unleash enormous economic opportunity. Reducing greenhouse gas emissions requires a crash program to improve energy efficiency. That will cut costs and improve America’s competitiveness; spur the use of clean energy technologies that already are available and cost-competitive; and lead to the development of next-generation technologies for virtually every sector of the economy. When we embrace the need to create a new energy economy, the entrepreneurial opportunities will be unprecedented. For example:

- **Researchers at Lawrence Berkeley National Laboratory estimate that an investment of more than \$300 billion will be needed worldwide over the next 20 years to provide low-emission electric power and equipment to 1 billion people who now do not have**

access to electricity.¹ Those investments will create 10 times the jobs that a comparable investment in conventional power would produce.² In fact, this market already is proving profitable. Clean technology has become the fastest growing sector in venture capital and private equity investment, with a 2005 market valuation of \$50 billion, the amount of global energy sector investment into renewables reached 10%. A survey that year of 19 venture capitalists investing in 57 European clean tech firms showed average annual returns since 1999 of almost 87%.³

- **New low-emission fuels are needed to replace the 85 million barrels of petroleum the world consumes each day, the 385 million gallons of gasoline burned daily in the United States⁴ and the much higher fuel consumption projected for the future. Production of biofuels grew globally by 95% between 2000 and 2005 and should account for 5% of transport fuels by 2020. By 2015 this should create more than 200,000 new U.S jobs in ethanol production alone.⁵**
- **According to the World Business Council on Sustainable Development, there were 700 million light-duty vehicles worldwide in 2000. That number is expected to increase to 1.3 billion in 2030 and to more than 2 billion by 2050.⁶ New applications of urban design, mass transit and vehicle efficiency are needed to prevent massive increases in transportation-related greenhouse gas emissions.**
- **About 6 billion square feet of buildings are constructed each year⁷ in the United States. Buildings are the No. 1 cause of U.S. greenhouse gas emissions. In the next few decades, there will be a demand for the designs, materials and equipment to create zero-emission/zero-energy buildings (see PCAP Section 6 on buildings). Climate-neutral buildings will provide benefits to the economy beyond new industries and jobs.**

¹ W. Fulkerson et al., "Sustainable, Efficient Electricity Service for One Billion People," in *Energy for Sustainable Development* 9, no. 2 (June 2005): 26–34. The International Energy Agency estimates that 1.6 billion people worldwide now have no access to electric service.

² R. Sanders, "Investment in Renewable Energy Better for Jobs as Well as Environment," news release, University of California, Berkeley, April 13, 2004, www.berkeley.edu/news/media/releases/2004/04/13_kamm.shtml.

³ The Climate Group, *In the Black: The Growth of the Low Carbon Economy*, August 2007, <http://theclimategroup.org/resources/publications/>.

⁴ U.S. Energy Information Administration, www.eia.doe.gov/quickfacts/quickoil.html.

⁵ The Climate Group, *In the Black*.

⁶ World Business Council on Sustainable Development, *Mobility 2030: Meeting the Challenges to Sustainability* (Geneva, Switzerland: WBCSD, 2004).

⁷ Alliance to Save Energy, untitled study commissioned by PCAP, 2007.

They will reduce health care costs and increase labor productivity. The current estimated decrease in productivity from sick-building syndrome is about 2% nationwide, resulting in an annual cost of approximately \$60 billion.⁸ Better indoor air quality, an important benefit of energy-efficient buildings, has been shown to improve worker productivity by 0.5% to 5%, with estimated savings of \$20 to \$200 billion.⁹

- The energy efficiency and renewable energy industries created 8.5 million jobs in 2006 and could create more than 40 million jobs by 2030.¹⁰

In the past, the United States led the world in the development of green technologies. Solar electric cells and wind turbines were developed here. Today, countries such as Japan, Germany and Denmark have taken the lead in solar and wind power due to progressive government policies. Renewables now create more new jobs in Germany than any other industry.¹¹ Denmark aims to get 60% of its energy from renewables by 2010. Japan was first-to-market with hybrid vehicles. Toyota, which this year surpassed General Motors as the world's largest car company, expects hybrid vehicles to rise from 6% of its U.S. vehicle sales in 2005 to 20% by 2012.¹² It is time for the United States to become the world leader once again in developing the goods and services needed for low-greenhouse gas economic development worldwide.

The good news is that the transformation of the U.S. economy already has begun.

⁸ S. Kumar and W. J. Fisk, "Health and Productivity Gains from Better Indoor Environments," in *The Role of Emerging Energy-Efficient Technology in Promoting Workplace Productivity and Health* (Berkeley, Calif.: Lawrence Berkeley National Laboratory, 2002).

⁹ W. J. Fisk, "How IEQ Affects Health, Productivity," *ASHRAE Journal* (May 2002); B. Olsen, "Indoor Environment – Health, Comfort and Productivity," in *Clima 2005* (Lausanne, Switzerland: 8th REHVA World Congress, 2005).

¹⁰ Economic and Jobs Impacts of the Renewable Energy and Energy Efficiency Industries: U.S. and Ohio, SOLAR 2007, Cleveland, Ohio, July 2007.

¹¹ The Climate Group, *In the Black*, 4.

¹² *Ibid.*, 11.

The Quiet Revolution

A persistent mythology surrounds climate action and green technology. Skeptics argue that renewable energy technology is fine for the future, but it's not ready today. Renewable technologies are assumed to be prohibitively priced. Some critics of active efforts to reduce greenhouse gas emissions argue that mitigation will break the economy and force Americans to abandon comfort and convenience. Those myths are being disproved in every sector of the economy today.

Energy Sector: Solar photovoltaic (PV) systems are the fastest-growing source of new electric power in the United States. PV power grew 60% between 2004-2005 and is expected to contribute 9 gigawatts (GW) of electricity by 2010, roughly the equivalent of nine large nuclear power plants. Wind power is the second fastest-growing source of new energy in the United States. More than 15 GW of new wind capacity was constructed in 2006, bringing the world total to nearly 60 GW.

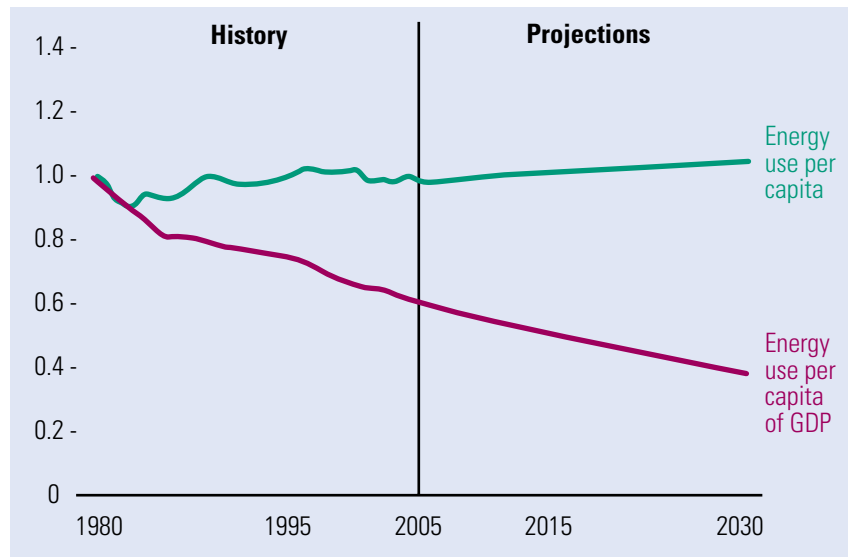
Renewable electricity represents only 6% of the nation's electric supply today. With an aggressive push, renewable energy can provide 20% of our power by 2020 and create 350,000 new jobs.¹³

The nation's energy intensity (energy use per dollar of GDP) has improved steadily since the 1970s, but enormous opportunities remain. Eliminating wasted energy would save the United States more than \$300 billion a year.¹⁴

¹³ Ibid., 4.

¹⁴ A. B. Lovins and L. H. Lovins, *Climate: Making Sense and Making Money* (Snowmass, Colo.: Rocky Mountain Institute, 1997), www.natcapsolutions.org/publications_files/climate_sense.pdf.

Figure 1. Energy use per capita and per dollar of Gross Domestic Product, 1980-2030 (index, 1980 = 1)



Source: EIA Annual Energy Outlook 2007

Industry: More than 43,000 companies are manufacturing and assembling renewable energy technologies in the United States today. Some of the nation's biggest corporations are making changes in their plants, operations and policies to profit from energy efficiency and greenhouse gas emission reductions. DuPont, for example, estimates it is saving \$6 for every ton of carbon it displaces. Its success in cutting its global emissions by 67% has saved the company more than \$3 billion. Boeing cut its energy costs by 90% and achieved a two-year payback with improvements in lighting. Interface Inc. of Atlanta, one of the world's largest carpet manufacturers, has increased its profits while reducing its greenhouse emissions by 90%.¹⁵ Wal-Mart is cutting costs by working with its suppliers to reduce their climate footprints.

DuPont, General Electric, Alcoa, Caterpillar and Lehman Brothers are among the companies calling for a national cap on greenhouse gas emissions as members

¹⁵ For a full account of the remarkable Interface story, see the paper by CEO Ray Anderson at www.climateactionproject.com/docs/Essay_Sustain_R_Anderson.pdf.

of the U.S. Climate Action Partnership, stating, “In our view, the climate change challenge will create more economic opportunities than risks for the U.S. economy.”

Since 2002, the Carbon Disclosure Project (CDP) in Great Britain has surveyed Fortune 500 companies on climate issues. In September 2007, the CDP reported that nearly 80% of the latest survey’s respondents consider climate change a commercial risk, and 82% regard climate action as a commercial opportunity for products and investments.

Insurance: Climate change now is recognized as a significant risk by the world’s largest insurers. By one estimate, \$3.7 trillion of America’s \$10-trillion-a-year economy is susceptible to weather-related losses.¹⁶ Claims from weather-related disasters are rising twice as fast as those from all other losses¹⁷, and the world’s second-largest reinsurance firm, Swiss Re, has announced it may deny coverage to companies and their officers who aren’t doing enough to reduce greenhouse gas emissions. Insurance premiums for homeowners in parts of the United States have gone up 20%-40%. In Florida, Louisiana, Mississippi, New York, Massachusetts, Rhode Island and South Carolina, insurers no longer offer coverage to hundreds of thousands of homeowners.¹⁸ The federal government and several state governments offer flood insurance to property owners because the private sector won’t. But rapidly rising damages from severe weather threaten the solvency of these programs.¹⁹

Investment Capital and Financial Markets: A group of 28 leading institutional investors from the United States and Europe who manage more than \$3 trillion

¹⁶ This estimate was made three years ago by John Dutton, dean emeritus of Pennsylvania State University’s College of Earth and Mineral Sciences and was reported in E. Linden, “Cloudy with a Chance of Chaos,” *Fortune*, Jan. 17, 2006.

¹⁷ D. Miedema, “Climate Change Means Big Business for Reinsurers,” Reuters, Nov. 14, 2006, www.reuters.com/article/companyNewsAndPR/idUSL0657557320061113.

¹⁸ E. Mills and E. Lecomte, *From Risk to Opportunity: How Insurers Can Proactively and Profitably Manage Climate Change* (Boston: Ceres, 2006), 2.

¹⁹ *Ibid.*, 4, 27. According to the Government Accountability Office, the exposure of the Federal Flood Insurance Program quadrupled between 1980 and 2005, approaching \$1 trillion.

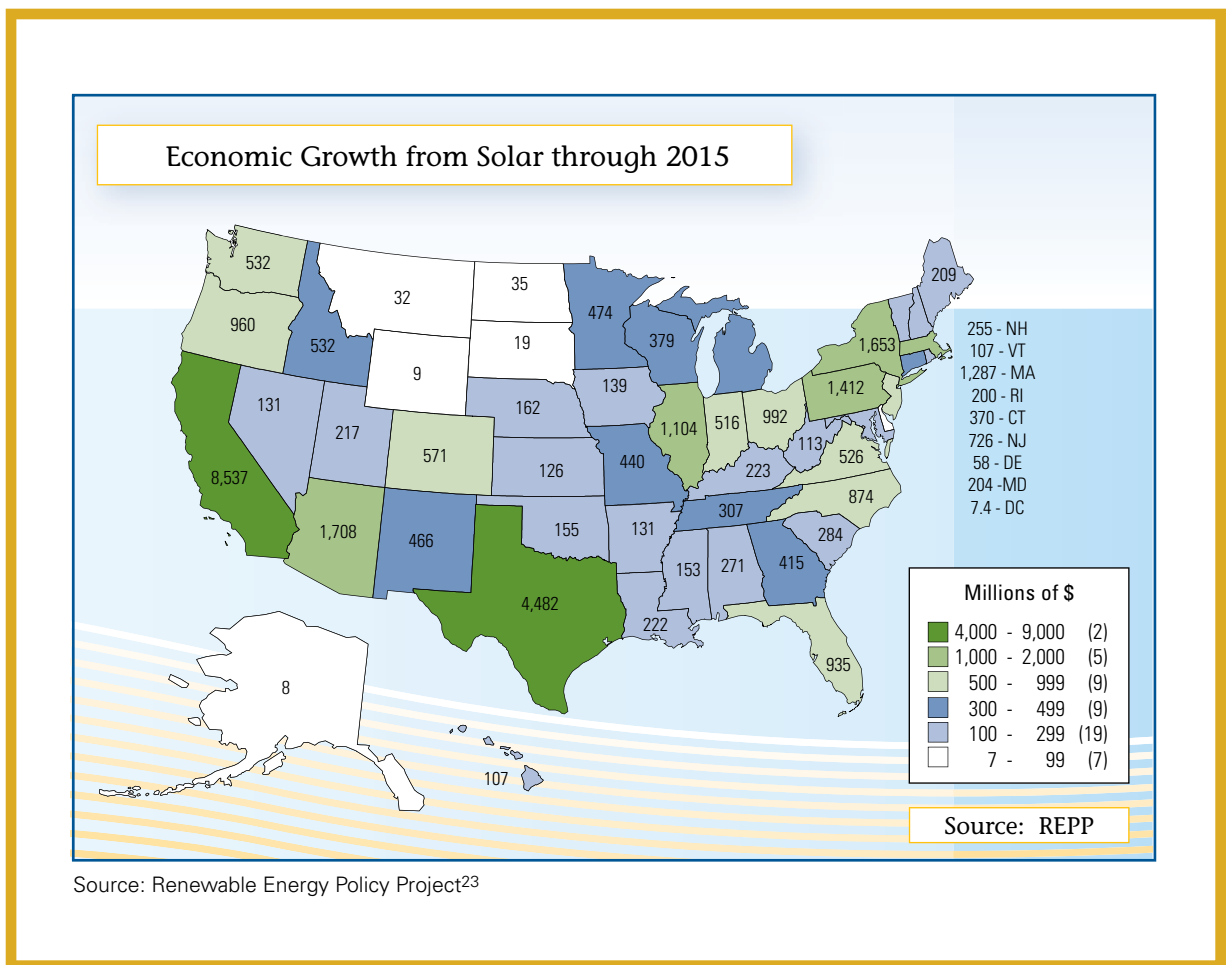
in assets has called on U.S. companies to disclose their financial risks associated with climate change.²⁰ The group pledged to invest \$1 billion in business ventures to reduce greenhouse gas emissions. In 2007, JP Morgan Chase and Innovest created the JPMorgan Environmental Index – Carbon Beta, the first high-grade corporate bond index designed to address the risks of global warming by tracking corporate climate footprints. Goldman Sachs invested \$1 billion in clean energy projects in 2006, and Citigroup committed \$50 billion to finance renewable energy industries in 2007. Lehman Brothers estimates that the greenhouse gas-trading market in the United States, triggered by national legislation, will be \$100 billion by 2020.²¹ “Wall Street is waking up to climate change risks and opportunities,” says James Cameron, chairman of the Carbon Disclosure Project.

States: At the beginning of 2007, 47 states were engaged in state or regional energy planning; 41 had established standards to allow rooftop solar systems and other distributed generation technologies to connect to the electric grid; 10 had created energy-efficiency portfolio standards; 24 had instituted renewable energy portfolio standards; and 16 had implemented public benefit funds to support clean energy programs. Because of its early commitment to energy efficiency and renewable energy, California expects to develop nearly 95,600 new jobs and \$21 billion in investments to manufacture the components of renewable energy systems.²² The manufacturers and assemblers of renewable energy technologies such as solar photovoltaics and wind turbines are locating their plants in many other states, too, from Colorado to Pennsylvania and North Dakota. The Renewable Energy Policy Project predicts that solar energy technologies alone will produce millions of dollars of economic growth in every state by 2015.

²⁰ Institutional Investor Summit on Climate Risk, Summit Highlights, www.incr.com/NETCOMMUNITY/Document.Doc?id=238.

²¹ See www.lehman.com/who/intcapital/.

²² Mayors for Climate Protection. *First to Market on Climate Action: The Winners*. Retrieved No. 26, 2007 from http://climateconversation.com/docs/marketing_climate_action.pdf.



Source: Renewable Energy Policy Project²³

Local Governments: At the C40 Large Cities Climate Summit in New York, a group of investors committed \$1 billion to finance energy-saving measures in municipal buildings in the world’s largest cities, including New York, Los Angeles, Chicago and Houston. By the fall of 2007, more than 700 cities had pledged to cut their greenhouse gas emissions a minimum of 7% by 2012, the reductions called for in the Kyoto Protocol.²⁴ Some cities see value in going much further. Salt Lake City has reduced the CO₂ emissions from its municipal operations by 31%, compared with 2001. St. Paul is saving nearly \$60 million annually in energy costs through energy-efficiency retrofits in municipal buildings, along with recycling and waste reduction. San Francisco is using readily available energy-efficiency technologies such as solar, biodiesel fuels and methane capture at landfills. Berkeley, California, believed its program to use LED traffic signals would save it \$56,000 a year. It actually saved \$89,000. In December 2006, Mayor Michael Bloomberg announced a remarkable plan – PLANYC 2030 – to create affordable and sustainable homes

²³ www.seia.org/Year_in_Solar_2006.pdf

²⁴ For a current listing of cities that have signed the Mayors Climate Protection Agreement, go to <http://usmayors.org/climateprotection/ClimateChange.asp>.

for nearly 1 million more New Yorkers, ensure that all residents live within a 10-minute walk of parks, add public transit capacity for millions more commuters, upgrade energy infrastructure and achieve “the cleanest air of any big city in America” – all while reducing the city’s greenhouse gas emissions by 30%.

Universities: More than 300 university presidents have signed the American College and University Presidents Climate Commitment – a pledge to achieve climate neutrality on campuses, help America achieve energy independence and integrate sustainability into curricula. At several universities, students have volunteered to pay more in activity fees to finance green initiatives. Students at St. Mary’s College in Maryland, for example, voted overwhelmingly to raise their fees \$25 annually to purchase \$45,000 in renewable energy each year.²⁵

Bringing the Revolution Home

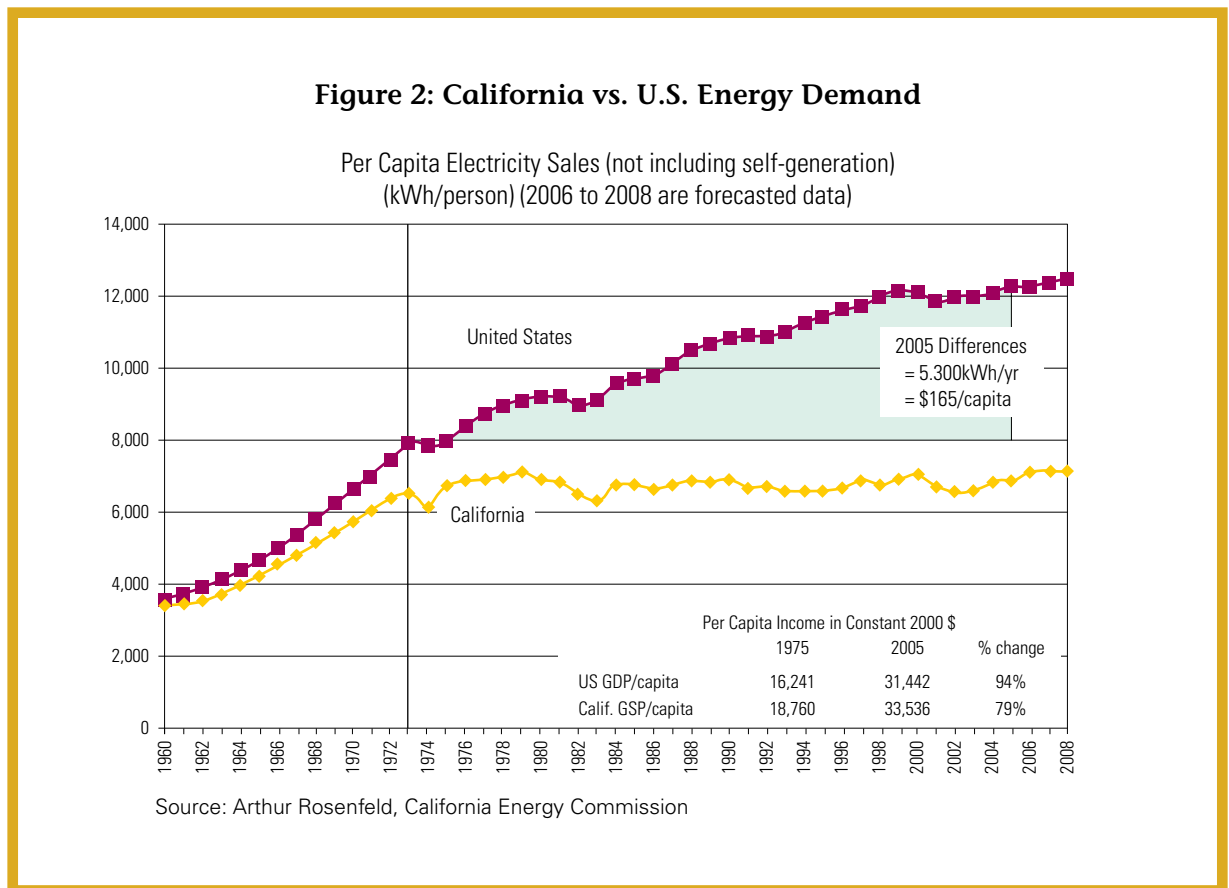
Another myth is that pricing greenhouse gases – raising the price of high-emission fuels to incorporate some of the costs of climate change – will break the budgets of individual Americans and their households. The truth is that energy efficiency and conservation, along with cost-effective renewable energy technologies and designs, can produce savings that more than offset higher fossil fuel bills.

The world’s sixth largest economy – the State of California – provides an example. Since 1974, Californians have held their energy consumption to zero growth while national per capita energy consumption grew 50% (Figure 2). The state’s per capita greenhouse gas emissions have dropped 30% since 1975 (Figure 3). By one estimate, the average family in California is paying about \$800 less for energy each year than it would have had the state not actively pursued energy efficiency.²⁶ California’s mild climate is part of the reason the state’s energy consumption is relatively low. But progressive policies, creative energy-efficiency programs and

²⁵ Many more examples of how companies, local governments and individuals are saving money with low-carbon technologies can be found at www.climateactionproject.com.

²⁶ Greg Kats of Capital E, quoted in *The Washington Post*, Feb. 17, 2007.

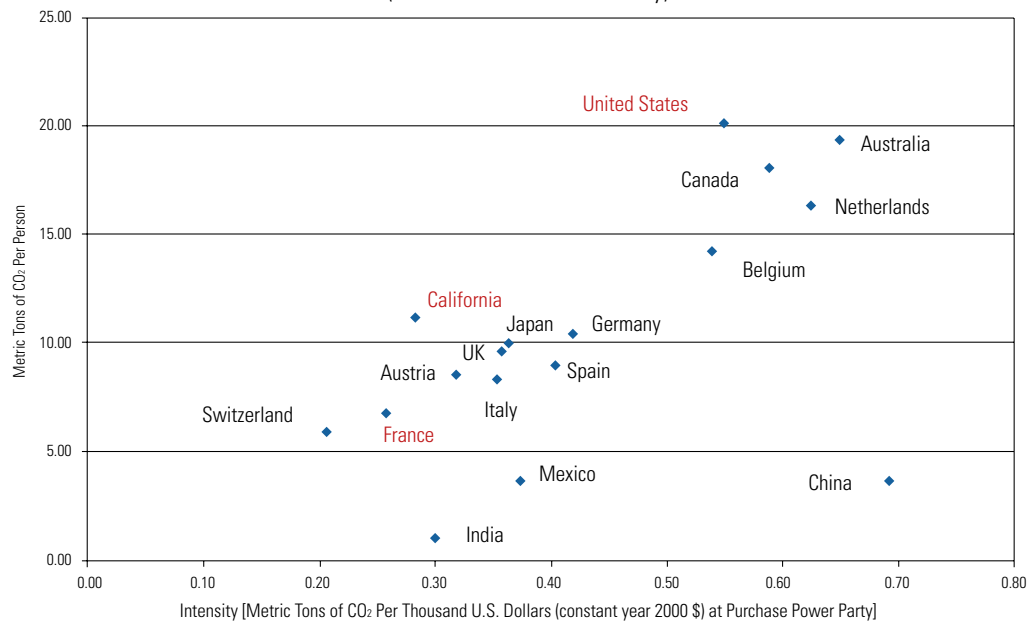
higher per unit energy rates have played an important role in reducing overall energy costs for the state's consumers. In 2004, California ranked 12th in the nation in energy prices but only 45th in energy costs per person.²⁷



²⁷ EIA, *State Energy Data 2004*.

Figure 3: California and U.S. CO₂ Intensity

Carbon Dioxide Intensity and Per Capita CO₂ Emissions – 2004
(Fossil Fuel Combustion Only)



Source: Arthur Rosenfeld, California Energy Commission

New York City's PLANYC 2030 creates a portfolio of energy efficiency and renewable energy initiatives funded by a surcharge of \$2.50 each month on the average household's energy bill. The result will be a savings of \$230 each year for the average household by 2015.²⁸ In addition to cutting the city's greenhouse gas emissions by a third, New York's overall power and heating bill will drop \$2 billion to \$3 billion annually, according to city officials.

After the oil embargoes of the 1970s, the nation went on an energy conservation crusade and proved that the economy can continue growing while energy consumption drops. Corporations, cities and citizens are proving it again today, motivated in large part by the desire to reduce their contributions to global warming and to make their own transitions to a resource-efficient, low-emission economy.

²⁸ New York City energy plan, http://nyc.gov/html/planyc2030/downloads/pdf/report_energy.pdf.

The Climate-Friendly Economy

Two of the industries most important to reducing greenhouse gas emissions – the energy efficiency and renewable energy industries – already are having a considerable impact on the U.S. economy. The American Solar Energy Society (ASES) and Management Information Services of Washington, D.C., report that the two industries created nearly 3.7 million direct jobs in 2006; were indirectly responsible for another 4.8 million jobs that year; and created more than \$100 billion in profits and \$150 billion in new federal, state and local government tax revenues. Gross revenues for energy-efficiency companies alone were \$933 billion in 2006, more than the combined sales of the three largest U.S. corporations – Wal-Mart, ExxonMobil and General Motors – according to ASES.²⁹

While other analyses vary in their predictions of job and wealth creation in the future, they agree that climate stabilization will be an engine for new jobs, industries and economic activity. For example:

- **The World Resources Institute predicts that “a well-designed climate policy framework will create huge opportunities for innovative companies to flourish as new markets are created and demand shifts to more efficient, more advanced and higher-value-added products and services.”³⁰**
- **Researchers at the University of California, Berkeley have concluded that in the United States, “All states of the Union stand to gain in terms of net employment from the implementation of a portfolio of clean energy policies at the federal level.”³¹**
- **The Apollo Project, a coalition of environmental, business and labor organizations, estimates that a federal investment of \$300 billion for low-emission energy, infrastructure and urban development practices in the United States would add more**

²⁹ R. H. Bezdek, “Economic and Jobs Impacts of the Renewable Energy and Energy Efficiency Industries: U.S. and Ohio” (presentation at SOLAR 2007, Cleveland, Ohio, July 2007), www.ases.org/jobs_report.pdf.

³⁰ F. Wellington et al., *Scaling Up: Global Technology Deployment to Stabilize Emissions* (Washington, D.C.: World Resources Institute, 2007), 14.

³¹ Sanders, “Investment in Renewable Energy.”

than 3.3 million jobs to the economy, stimulate \$1.4 trillion in new GDP, save \$284 billion in net energy costs and repay taxpayers in 10 years.³²

- **ASES's modeling predicts that an aggressive and sustained effort to grow the energy efficiency and renewable energy industries in the United States would produce \$4.5 trillion in revenues (in 2006 dollars) and more than 40 million new jobs in 2030³³ (see Figures 5-6).**

“This is a hugely important message to policymakers everywhere, not least those in the United States Congress,” The New York Times editorialized in May 2007. “Many of them have been paralyzed by fears... that a full-scale attack on climate change could cripple the economy.”³⁴

Equity Issues

It is widely recognized that global warming will have the greatest negative impact on those who can least afford to cope with the crisis or with its solutions. For example, low-income households spend a higher portion of their budgets on energy than other income classes do. The Center on Budget and Policy Priorities estimates that a greenhouse gas pricing policy designed to reduce the nation's emissions just 15% below projected levels could cause energy bills to increase more than \$900 annually for households in the poorest fifth of the U.S. population.³⁵ Businesses, workers and communities dependent upon fossil-energy industries may also experience dislocation.

National policy should be designed to help disadvantaged families and communities adapt to climate change and to climate policy. But more importantly, the government and the private sector both must involve disadvantaged populations in the solutions – for example, by training disadvantaged or dislocated young people to help build the new economy, from assembling solar collectors to weatherizing buildings.

³² The Alliance's estimates are based on an input/output modeling exercise by the nonpartisan Perryman Group in Waco, Texas.

³³ Bezdek, “Economic and Jobs Impacts of the Renewable Energy and Energy Efficiency Industries.”

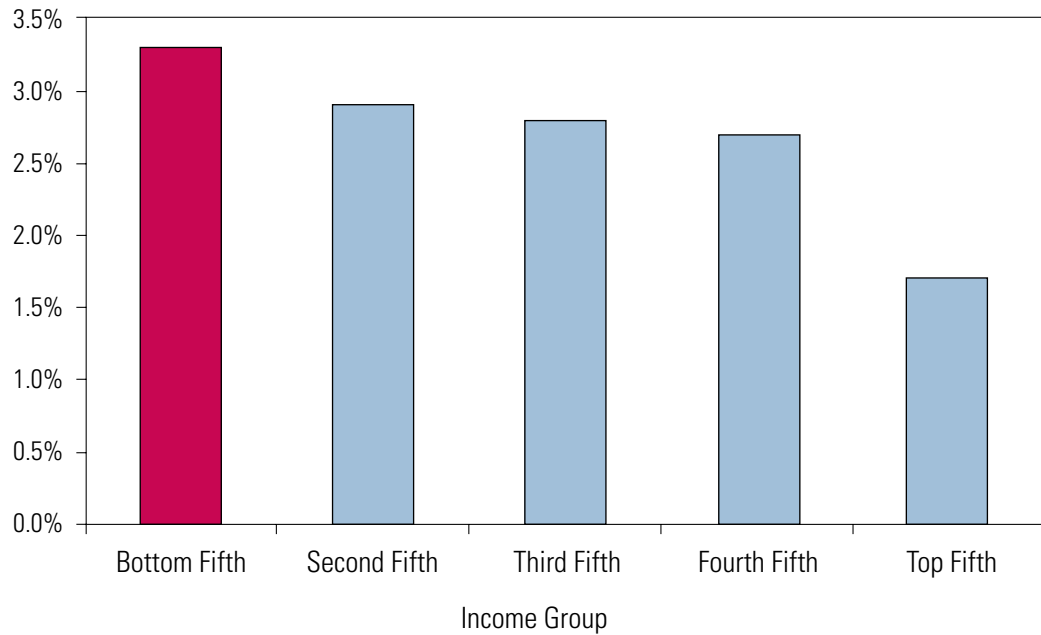
³⁴ “The Warming Challenge,” *New York Times*, May 5, 2007.

³⁵ R. Greenstein et al., *Designing Climate-Change Legislation That Shields Low-Income Households from Increased Poverty and Hardship* (Washington, D.C.: Center on Budget and Policy Priorities, October 25, 2007).

Figure 4

POOR FAMILIES HIT HARDEST BY ENERGY COST INCREASES

Increase in Household Costs (as a Share of Income)
Due to a 15 Percent Cut in CO₂ Emissions



Source: Congressional Budget Office

“The moral challenge of the century is this: We need to ensure that there’s equal protection for everyone in the face of the perils of this new period, and equal access to the opportunities of this new period,” says Van Jones, founder and executive director of the Ella Baker Center for Human Rights.³⁶ “We’ve got to start talking now and creating action that brings us closer together, across these racial lines, across these class lines, so that if things do get rougher, there’s a bit more social

³⁶ Interview by D. Roberts, “A Van With a Plan,” *Grist*, March 20, 2007, www.grist.org/news/maindish/2007/03/20/vanjoness/.

connectivity and a bit more of a spirit of cooperation. That will create the shock absorbers we're going to need... We have an obligation to recognize that we've entered a new period of real limits and real consequences. We need to be part of a conversation about how to limit the harm and spread out the hope."

Jones and his colleagues are advocates of a vision in which climbing out of the old energy economy is an experience that not only protects those who are now financially secure but also lifts those who are not, as the nation develops the new skills and workforce it needs.

Figure 5: Economic Impact of Efficiency and Renewables – 2030

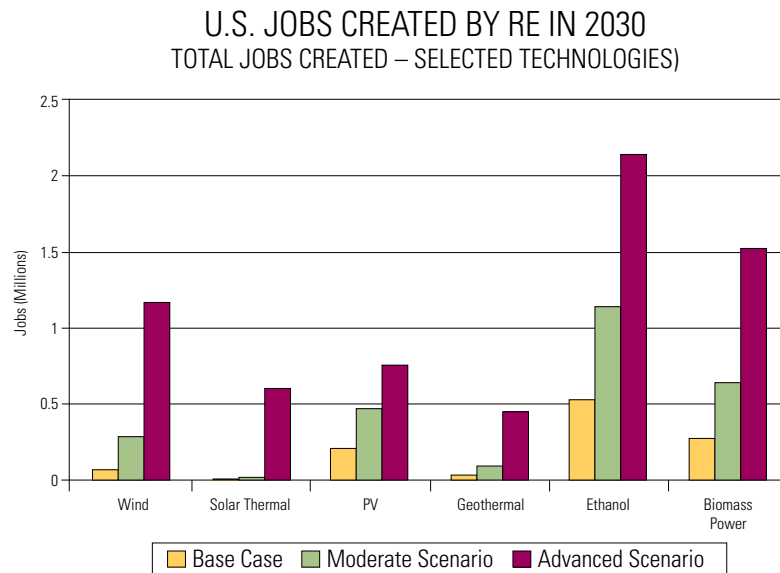
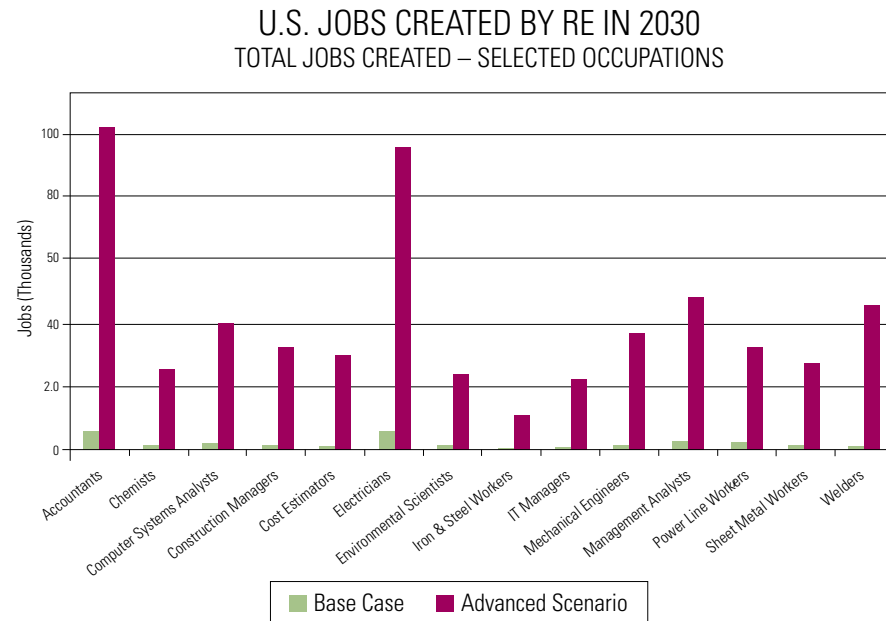


Figure 6: Economic Impact of Efficiency and Renewables – 2030



Source: American Solar Energy Society and Management Information Services Inc.

“In developing climate policies, the incoming President has to be conscious of the need and clearly explain that the policies must be equitable,” says Theodore Roosevelt IV, chairman of the Global Council on Climate Change at Lehman Brothers. “They should not impose an undue burden on the poor to the advantage of the affluent. The American public needs to be convinced that climate policies are fair.”

The Value of Intellectual Capital

Finally, it is important not to underestimate the creativity and intelligence of the American people as they shape the future. The technology toolbox available to the nation is filled with options that save money, create jobs and make us more secure. Building a new economy will require as much intellectual capital as financial capital – smart designs, common-sense efficiencies, informed choices, sound policies and true leaders. Money spent to deal with climate change is not wasted.

Such investments will pay immediate and long-term dividends at every level of the economy, from the household to the factory floor and farm, and from rural villages to the nation's biggest cities. Innovation, guts and constructive collaboration will find a way for all nations to build healthy economies while conserving healthy ecologies.

Presidential Actions

The PCAP includes recommendations important for national economic security in virtually every section. For example, PCAP Section 2 outlines greenhouse gas pricing through a cap-and-trade regime. Section 3 proposes a redirection of federal programs to create a rural renaissance based on new energy resources. Section 8 recommends that the federal government use its purchasing power more effectively to help shape clean energy markets, and Section 11 proposes a Green Job Corps for young Americans. Additional recommendations include the following:

1. Reform federal subsidies

Federal subsidies are paying corporations, industries and consumers to emit the greenhouse gases responsible for global warming, while other subsidies are paying to reduce them. Remarkably, no individual or group has compiled a comprehensive inventory of the federal subsidies that have the effect of increasing the nation's greenhouse gas emissions.³⁷ According to Doug Koplw, a nationally recognized expert on the subject, it is "hard to say for certain how numerous they are, how much money they involve, which parties they help or harm, and even whether they are internally coherent."³⁸

We do know that the subsidies are pervasive and diverse, "scattered throughout the tax code, various government lending and insurance programs, government-owned

³⁷ J. A. Leggett, Congressional Research Service, correspondence to U.S. Rep. D. DeGette, May 25, 2007.

³⁸ D. Koplw and J. Dernbach, "Federal Fossil Fuel Subsidies and Greenhouse Gas Emissions: A Case Study of Increasing Transparency for Fiscal Policy," 2001.

enterprises such as federal power administrations and to some extent in regulatory exemptions.”³⁹

Estimates of the total value of subsidies vary, depending in part on how subsidies are defined. By Koplow’s count, federal subsidies for energy alone totaled nearly \$64 billion in 2003, mostly supporting the fossil and nuclear energy industries. The Congressional Budget Office reports that energy subsidies are growing by \$2-\$3 billion each year under the provisions of the Energy Policy Act of 2005. The Congressional Joint Committee on Taxation estimates that federal tax expenditures for energy technologies will total \$16.1 billion between 2005 and 2009, with 86% dedicated to fossil energy.

Direct subsidies of energy technologies and resources are only a fraction of the federal government’s intervention in the marketplace. Farm policy, transportation policy, assistance for housing, urban development and infrastructure, and many other federal programs affect energy use and greenhouse gas emissions.

Meaningful climate policy must include reform of perverse subsidies that encourage greenhouse gas emissions. PCAP recommends the following actions:

- **Transparency.** The U.S. Environmental Protection Agency should create a public registry listing all subsidies that cause or contribute to greenhouse gas emissions, along with their costs and which agency administers them.
- **Reform.** The President should propose an immediate termination of subsidies to mature energy industries – a practice often called corporate welfare. Federal funding for research and development would be reserved for emerging industries. Mature industries would have continued access to federal services and research facilities but on a fee-for-service, full-cost-recovery basis.⁴⁰ Immediate exemptions would be granted for those few fossil energy subsidies critical to national security and climate

³⁹ Ibid.

⁴⁰ The Energy Information Administration contends that because energy subsidies are small compared with the size of total sales in U.S. markets, they don’t have much impact on overall energy prices or consumption (J. A. Leggett to U.S. Rep. D. DeGette). The reverse, then, also should be true: Repeal of energy subsidies should not significantly increase the price of energy or products.

stabilization, including the development of carbon dioxide capture and sequestration (with a 75% industry cost share), maintenance of the Strategic Petroleum Reserve and defense of Persian Gulf shipping lanes.

- In addition, the President should convene a Presidential Subsidy Reform Commission and charge it with producing recommendations on additional subsidy reforms within one year. The Commission would consider the following reforms, among others:
 - **National Climate Protection Subsidy Standard.** The Commission should devise a minimum performance standard that requires high net energy and economic performance, and low net greenhouse gas emissions over the life cycle of the product or resource being subsidized.
 - **Economic and Environmental Security Exceptions.** The Commission should recommend the circumstances under which a federal subsidy would be permitted for a product, resource or activity that does not meet the performance standard – for example, in cases where the President determines a subsidy is vital to economic or environmental security.
 - **Gradation.** Subsidy levels would decline every five years to spur research and encourage early market penetration. Incentives for consumers to purchase low greenhouse gas technologies would be provided on a sliding scale to reward best-performing products.
 - **Duration.** Some critical subsidies have been made ineffective by short-term expiration dates imposed by Congress. For example, the reauthorization that Congress has required every two years for the Renewable Energy Production Tax Credit has caused boom-bust cycles in renewable energy industries. Because of the time the government requires for implementation, some consumer subsidies in the Energy Policy Act of 2005 became available only a few months before they expired. The Commission should consult with affected industries to determine how long subsidies should remain in place to provide a stable environment for private investment in new technologies and to allow new products to adequately penetrate the market.

- **Problem switching.** No subsidies should be given to technologies and resources that have a negative impact on either energy security or climate stability.
- **Revenue neutrality.** Federal funds now spent to subsidize greenhouse gas emissions should be redirected to substantially increase the government's research and development budget for energy efficiency and renewable energy and to expand programs that accelerate the market penetration of low-emission products and practices.⁴¹

2. Partner with small business to transform the economy.

Small businesses are the nation's most productive source of new jobs and patents (see box on Page 23). The President can marry technology development with job development by creating a U.S. Innovation and Economic Development Administration (IEDA) – an independent agency with Cabinet status.

The agency would be formed by merging the U.S. Small Business Administration (SBA) with the several offices related to technology development and commercialization at the U.S. Department of Energy.⁴² The IEDA's mission would be to facilitate innovation, spur the creation of transformational low-emission technologies and transfer the technologies to the marketplace with the help of the small-business sector.⁴³ The agency would consist of four branches: a Division of Innovation, a Division of Economic Development, a Division of State and Local Assistance and an Office of Advocacy.

- **Division of Innovation:** Funding for the Division of Innovation would include the budgets of the transferred DOE offices and programs – approximately \$7.2 billion in the Bush Administration's Fiscal Year 2008 budget. In addition, most of the new

⁴¹ John Holdren, President of the American Association for the Advancement of Science, has recommended a tripling of federal research and development on clean energy technologies, to about \$3 billion. Others have proposed technology development funding as high as \$150 billion. Available funding will depend on the number and size of subsidies that are redirected.

⁴² These include the Offices of Energy Efficiency and Renewable Energy, Fossil Energy, Electricity Delivery, Energy Reliability and Science, and the non-weapons functions of the Office of Nuclear Energy.

⁴³ Small businesses are defined by the SBA as companies with fewer than 500 employees.

functions proposed in the PCAP for DOE and the Secretary of Energy would be assumed by this Division, including administration of a \$1 billion State Energy Conservation Program (see PCAP Section 3 on Energy Policy).

An agile new Advanced Energy Research Projects Program (AERP) would be created within the Division to spearhead transformational research. Modeled on the DARPA program created by President Eisenhower to spur technology development after the Soviet Union launched Sputnik, AERP would be staffed by a small number of experts detailed for short periods from universities and private industries and would have the authority to start and stop R&D quickly to respond to changing needs.⁴⁴

The current Small Business Innovation Research program would be assigned to the Division of Innovation. The President should propose that the small business set-aside in the Small Business Innovation Research Act be doubled from 2.5% to 5%, with green technology designated as the program's top priority.⁴⁵

The Division of Innovation would administer research at the National Renewable Energy Laboratory and the non-defense research of the other eight national laboratories. The President would direct the IEDA Administrator to ensure that sufficient resources are allocated to the national laboratories to attract and retain the world's top scientists and engineers and to maintain state-of-the-art equipment and laboratories.

Finally, the President should propose that Congress appropriate \$1 billion over five years to offer Platinum Carrot awards for the private sector to develop breakthrough technologies that substantially advance the nation's energy and climate security. The Division of Innovation and the national laboratories would administer the awards.

⁴⁴ The AERP would be based on SB 2197 in the 100th Congress, which proposed the creation of a small new agency to oversee the nation's energy research, based in turn on a proposal by the U.S. National Academies to help the U.S. compete in the 21st century.

⁴⁵ Under SBIR, federal agencies that spent more than \$100 million on externally funded R&D in the prior year must set aside 2.5% of their external R&D budget in the current year for the funding of small-business technology development from design to prototype to commercialization. Funding amounts to about \$2.5 billion annually.

- **Division of Economic Development:** This Division would continue the programs and functions of the SBA, including its loan guarantees for small businesses, its international trade program and its business-development assistance to women, minorities and veterans. The loan guarantee programs would be expanded to help small companies finance investments that reduce their greenhouse gas emissions and adapt to the impacts of climate change.

The Division would train existing Small Business Development Centers nationwide⁴⁶ to help companies adopt low-emission technologies in their plants and operations; set standards for their suppliers; conduct risk assessment and mitigation related to climate change⁴⁷; and help small businesses in the fossil energy sector transition to manufacturing and services related to renewable energy, energy efficiency and climate change adaptation. In addition, the Division would administer the ENERGY STAR Small Business Program established by the Energy Policy Act of 2005 to help small companies improve their energy efficiency.

The Division of Economic Development would give priority attention to small business development in communities adversely affected by climate change and by transformation to a low-emission economy.

The division would assume the functions of DOE's Office of Loan Guarantees established to facilitate the commercialization of new, clean energy technologies. Under the Bush Administration's FY 2008 budget, the loan volume for this program would be raised from \$4 billion to \$9 billion, leveraged by a program budget of \$8.4 million. Combined with the FY 2008 budget request for SBA, the division's funding would be \$472 million.

⁴⁶ For information about SBDCs, see www.sba.gov/aboutsba/sbaprograms/sbdc/sbdclocator/index.html.

⁴⁷ SBDCs can help small companies use the "Climate Change Governance Checklist" now used by Ceres to assess company action on climate risk in five areas: oversight, management performance, public disclosure, greenhouse gas emissions accounting and strategic planning.

In addition, the President should propose that Congress establish and assign to this division a Transferable R&D Tax Credit that encourages small businesses to partner with existing firms to commercialize new greenhouse gas-cutting technologies.⁴⁸

- **Division of State and Local Assistance:** This division would administer the State Energy Program (see PCAP Section 3, Action Item 4), the Weatherization Assistance Program (see PCAP Section 11, Action Item 9) and the other programs now administered by the U.S. Department of Energy to assist state and local governments.
- **Office of Advocacy:** The SBA currently operates an Office of Advocacy authorized by statute to lobby Congress on behalf of small businesses. The office is staffed by attorneys and economists who analyze key issues of concern to small companies. In the new IEDA, the Office of Advocacy would take on the function of barrier-busting, analyzing and proposing reforms to such barriers as capital misallocation, regulatory failures, information gaps and perverse incentives.⁴⁹

America's Small Business

- Represent 99.7% of all employer firms
- Employ nearly 60 million workers, about half of all private employees
- Pay more than 45% of total U.S. private payroll
- Have generated 60%-80% of net new jobs annually over the last decade
- Create more than half of non-farm private gross domestic product
- Supplied 22.8% of the total value of federal prime contracts in FY 2006
- Hire 40% of high-tech workers (such as scientists, engineers and computer workers)
- Made up 97% of all identified exporters and produced 28.6% of the known export value in FY 2004.
- Produce 13 times more patents per employee than large patenting firms

Source: U.S. Small Business Administration Office of Advocacy

⁴⁸ Under this proposal, a green entrepreneur with a new technology would approach a profitable firm that possesses the resources needed to commercialize the technology. If the entrepreneur was able to strike a strategic alliance or obtain an investment, he or she could assign the tax credit to the firm and/or investor that commercialized the technology.

⁴⁹ Lovins, and Lovins, *Climate: Making Sense and Making Money*.

3. Adopt full-cost accounting in government policy and investments.

The federal government should demonstrate and set a national example of full-cost accounting in its purchases and policies. Net-energy, net-greenhouse gas, net-environmental and net-economic impacts should be considered in federal cost-benefit analysis. Weighing net energy and net-greenhouse gas benefits would “save trillions in bad investments in energy technologies that are not real energy sources at all, but which appear to be viable due to hidden external costs, subsidies and other forms of political support.”⁵⁰

Where adequate data exist, full-cost analysis also should include important externalities such as public health and national defense. For example, the Environmental and Energy Study Institute (EESI) estimates that:

- **Defending oil shipments through the Persian Gulf costs between \$4 and \$10 per barrel of oil.**
- **Filling and maintaining the Strategic Petroleum Reserve costs about \$1 billion annually.**
- **Environmental damages and public health problems attributed to fossil-fueled power plants cost from 1 cent to 8 cents per kilowatt hour, depending on the fuel.**
- **Treating asthma in children younger than 18 years old in the United States costs an estimated \$3.2 billion annually, with an undetermined part of that to treat asthma caused by pollution from fossil power plants.**⁵¹

Because delay makes climate stabilization costlier and more difficult, opportunity costs should be included in full-cost calculations. According to the global

⁵⁰ R. Costanza, University of Vermont professor of ecological economics, correspondence with author.

⁵¹ Much of the information about subsidies is drawn from “Subsidies: Historic, Current and the Skewing of Market Signals,” a presentation by Carol Werner, executive director of the Environmental and Energy Study Institute in Washington, D.C.

reinsurance company Munich Re, annual losses from climate change, driven mainly by burning fossil fuels, are projected to be in the range of \$300 billion, with losses of \$68 billion in the United States alone. Opportunity costs may dictate that the federal government's support for new technologies should give higher priority to those that can be developed and deployed most quickly.

Federal agencies should submit full-cost assessments in their annual budget requests to the Office of Management and Budget, and OMB should calculate full costs and benefits where appropriate in the President's annual budget submission to Congress.

4. Anticipate the economic impact of future energy supplies.

The President can direct the IEDA to assess another important factor in federal energy investments: the likely long-term costs to the economy of the energy from the technologies we are researching today. Generally, the cost of fossil energy will rise because supplies are finite and more costly to extract, global competition is increasing and greenhouse gas pricing will be in effect. The U.S. Department of Energy predicts that electricity from advanced coal technology will be substantially more expensive than electricity today, while prices will fall for power from solar, wind and several other renewable technologies.⁵² Given these factors, we should know whether we are investing time and treasure in technologies that won't be cost competitive when they are ready for commercial use.

5. Develop a Genuine Progress Indicator or equivalent system.

From the 1986 Netherlands Green Plan through the 1992 Earth Summit, to the President's Council on Sustainable Development, there has been broad recognition that indicators must play a key role in guiding the United States toward sustainable development. Through many unsuccessful fits and starts, there is still a lack of

⁵² General Accountability Office, *Key Challenges Remain for Developing and Deploying Advanced Energy Technologies to Meet Future Needs* (Washington, D.C.: GAO, December 2006), 15–19, www.gao.gov/new.items/d07106.pdf.

clarity about what a national system of sustainability indicators would look like, how it would work and why earlier attempts have not gained as much traction as the GDP and other economic indicators.

The next Administration should convene a broad, consensus-building process to address these questions. One historical analogy is the Bretton Woods conference that was held following the Great Depression and World War II to build the consensus that led to the current set of economic indicators, such as the GDP, and institutions, including the World Bank.

The President should:

- **Direct the White House Council on Environmental Quality (CEQ), in consultation with the nation's leading experts on environmental and economic indicators, to develop recommendations on what the nation's principal sustainability goals should be; what indicators should be used to measure national progress toward those goals; and how the indicators will be administered – what data will be used, how often progress will be measured, etc.**
- **Then, convene a conference in which national, regional, state and local leaders of economic, social and environmental activity meet to reach consensus on the recommendations.**
- **Following the conference, direct the CEQ to determine the methods, institutions, laws, procedures and cultural anchors necessary to make and measure progress toward the sustainability goals.**

In addition, the Administration should participate actively in international efforts to develop similar goals and indicators, and to quantify and create markets for ecosystem services, providing economic rewards for environmentally sustainable economic activities.⁵³

⁵³The United Nations Development Program sponsors one such effort; see www.undp.org/biodiversity/biodiversitycd/key5.htm.

6. Address equity in national climate policy.

In 2002, the Economic Policy Institute (EPI) published a package of policy proposals that it said would promote the development of new energy efficiency and renewable energy technologies, reduce U.S. greenhouse gas emissions by 50%, create 1.4 million jobs, eliminate oil imports from OPEC and save money for every American household, all by 2020.⁵⁴ At the same time, EPI predicted that these policies would result in layoffs in the coal, utility, rail transportation and other business related to fossil fuels. To address these impacts, the Institute proposed that:

- a) Every worker who loses his or her job in an energy-producing or energy-intensive industry should be provided with compensation equal to two years of full income, including health and retirement benefits;
- b) Affected workers should be provided up to four years of college education or other professional training, and up to two additional years of full income support for those who take more than two years of education or training;
- c) Older workers should be provided the option of benefits that create a bridge to retirement.
- d) Heavily affected communities would receive economic development assistance of \$10,000 per lost job.
- e) To protect U.S. companies that must compete against products from nations that do not price greenhouse gases, a border adjustment could rebate any taxes paid by producers as their products leave the United States for foreign markets, and would impose an equivalent tax on foreign products as they enter the United States.

⁵⁴ J. P. Barrett and J. A. Hoerner, *Clean Energy and Jobs – A Comprehensive Approach to Climate Change and Energy Policy* (Washington, D.C.: Economic Policy Institute, 2002). The Institute claims this is the first study in the United States to conduct an integrated analysis that includes programs to address equity issues for workers, industries and communities. The analysis used a 92-sector macroeconomic model (LIFT) built and operated by the University of Maryland.

The Center on Budget and Policy Priorities estimates that 14% of the value of emissions allowances under a cap-and-trade system would be sufficient to protect the poorest fifth of U.S. households from higher energy prices and to partially offset the costs for those with “modestly higher incomes.”⁵⁵ Other proposals to help cushion low-income families from greenhouse gas pricing range from changes in tax law to “dividends” for every American from the auction of emission permits. The President should consult with the groups likely to be most adversely affected by climate change and by efforts to mitigate it, convening them in a White House conference shortly after taking office. A significant portion of revenues from national greenhouse gas pricing should be dedicated to addressing the equity issues identified by these groups.

7. Engage the insurance industry in climate change mitigation and adaptation.

As Ceres notes in a 2006 report, “it is in the (insurance) industry’s best interests ... to seize this moment to act on what is likely to become the greatest risk the industry has ever faced.”⁵⁶ Ceres identified hundreds of examples of new products and services that insurers worldwide are offering to mitigate losses related to climate change. Yet, most insurers have not adopted these innovative policies.

The President should call upon the National Association of Insurance Commissioners, groups such as Ceres and the Climate Project, and progressive leaders in the insurance industry to speed the adoption of innovative insurance instruments and programs – for example, the education of customers on what they can do to reduce greenhouse gas emissions; rate incentives for building practices that reduce weather-related

⁵⁵ R. Greenstein, “Designing Climate-Change Legislation That Shields Low-Income Households from Increased Poverty and Hardship,” testimony before the House Budget Committee during the Hearing on the Fiscal Impacts of Controlling Carbon Emissions, Nov. 1, 2007.

⁵⁶ Ceres (pronounced “series”) is a national network of investors, environmental organizations and public-interest groups working with companies and investors to address sustainability challenges, including global warming.

losses; public-private partnerships to spread risk and to collaborate on data collection; and incentives for urban development practices that reduce greenhouse gas emissions.

8. Consult business leaders in barrier-busting and national climate policymaking.

In 1942, President Franklin Roosevelt established a War Production Board “for the purpose of assuring the most effective prosecution of war procurement and production” during World War II. During its three years of existence, the Board supervised the production of weapons and supplies worth \$185 billion. While controversial, the Board illustrated what can be accomplished by a high-priority partnership between business and government.

The urgency of economic transformation – including the need to avoid the economic disruption that would be created by the most severe consequences of global warming – should put the nation on the equivalent of a wartime footing.

The President should create an Energy Security and Climate Stabilization Board consisting of the nation’s top corporate and financial leaders in the field of climate action to recommend market mechanisms, regulatory reforms, trade policies and other barrier-busting measures to mobilize the nation to create a 21st century economy.

Section 2: National Climate Policy

“Politics is the art of compromise. Unfortunately, the atmosphere is no longer negotiating.”

– William Becker, Presidential Climate Action Project

The consensus among the world’s climate scientists is that:

- **Global climate change is real.**
- **It is underway.**
- **It is caused mostly by human activities.**
- **If allowed to go much further, it will have disastrous consequences for our economy, health, security and ecosystem.**
- **We have the tools to prevent this.**
- **We don’t have much time.**

Because of the daunting variables that affect the atmosphere, there is less consensus on the precise point at which greenhouse gas emissions will push us across the threshold of dangerous climate change. The limit cited most often is 450 parts per million (ppm) of carbon dioxide (CO₂).¹ Today, CO₂ concentrations are 383 ppm and increasing by 2 ppm each year. At this rate, we will reach the 450 ppm threshold by the time today’s babies turn 40.

While the many variables involved in climate science produce minor differences in recommendations from the technical community, there is universal acceptance of this fact: Each year that greenhouse gas emissions go unabated, it becomes harder and more expensive to stabilize the climate², and climate change becomes a greater threat to national security.³

¹ In testimony before Congress on April 26, 2007, the head of NASA’s Goddard Space Institute, James Hansen, said, “The dangerous level of CO₂ is at most 450 ppm and it is probably less.” In 2005, scientists convened in conference by British Prime Minister Tony Blair concluded that 450 ppm is the “highest prudent limit.”

² N. Stern, *The Economics of Climate Change: The Stern Review*, analysis prepared for the British government, Oct. 30, 2006. Stern, former chief economist for the World Bank, estimated that unless we invest approximately 1% of global gross domestic production to mitigate climate change immediately, climate impacts will shrink the global economy by as much as 20%.

³ See PCAP Section 4, National Security, for further discussion. The classification of climate change as a national security “threat multiplier” was made in April 2007, by 11 retired admirals and generals convened to study the issue. See “National Security and the Threat of Climate Change,” CAN Corporation, April 2007. The panel consisted of Gen. Gordon Sullivan, Adm. Frank Bowman; Lt. Gen. Lawrence Farrell Jr.; Vice Adm. Paul Gaffney II; Gen. Paul J. Kern; Adm. T. Joseph Lopez; Adm. Donald Pilling; Adm. Joseph Prueher; Vice Adm. Richard Truly; Gen. Charles Wald; and Gen. Anthony Zinni.

Dr. James Hansen of NASA's Goddard Institute for Space Studies has developed a succinct, three-part strategy for addressing global warming.⁴ The Presidential Climate Action Plan is consistent with his formulation. To paraphrase it:

- **Aggressively pursue the ability to capture and store carbon. At the same time, place a moratorium on construction of coal-fired power plants that are not equipped with this capability.**
- **Put a price on greenhouse gas emissions and gradually increase it, reflecting costs to the environment with mechanisms that are economically sound. As a first step, eliminate subsidies of fossil fuels.**
- **Create a public-private partnership to develop the technologies America needs to reduce and reverse greenhouse gas emissions and to adapt to the effects of climate change that are underway. At the same time, remove barriers to major advances in energy efficiency and conservation and to the use of low- and no-emission energy resources.**

Presidential Actions

1. Establish the atmospheric commons.

The President should issue a declaration that the atmosphere is a global commons whose benefits and obligations for stewardship extend to all Americans, present and future. Under this principle, all people hold common ownership of the atmosphere in equal shares. Each American would benefit from sound

⁴ See Hansen's wording and his explanation at www.columbia.edu/~jeh1/lowa_70805.pdf.

management of the atmosphere in the form of a tax reduction and/or a dividend. While a declaration of the commons would not have the force of law, it would establish and make visible a principle that should govern domestic and international policy in the years ahead – the recognition of our obligation to protect the resources on which all people depend.

2. Establish aggressive goals for reducing greenhouse gas emissions.

PCAP recommends greenhouse gas reduction goals along the lines of those framed by the Nicholas Institute at Duke University.⁵ The United States and other developed nations should begin cutting greenhouse gas emissions immediately to achieve reductions of 80%-90% by 2050. From 2011 to 2020, greenhouse gas emission reductions in the United States should average 3% annually, compared with 2010 levels.⁶ Those reductions should be achieved by harvesting the economy's low-hanging fruit – large gains in energy efficiency and the deployment of currently available low-emission energy supply technologies. This would reduce national greenhouse gas emissions 30% by 2020.

From 2021 to 2050, the United States should reduce emissions an average of 2% annually, taking advantage of improved technologies. Emission reductions would total 50% by 2030 and 90% below 2010 levels by mid-century.⁷

In international negotiations, the U.S. should propose that the five largest developing nations begin reducing their greenhouse gas emissions by an average

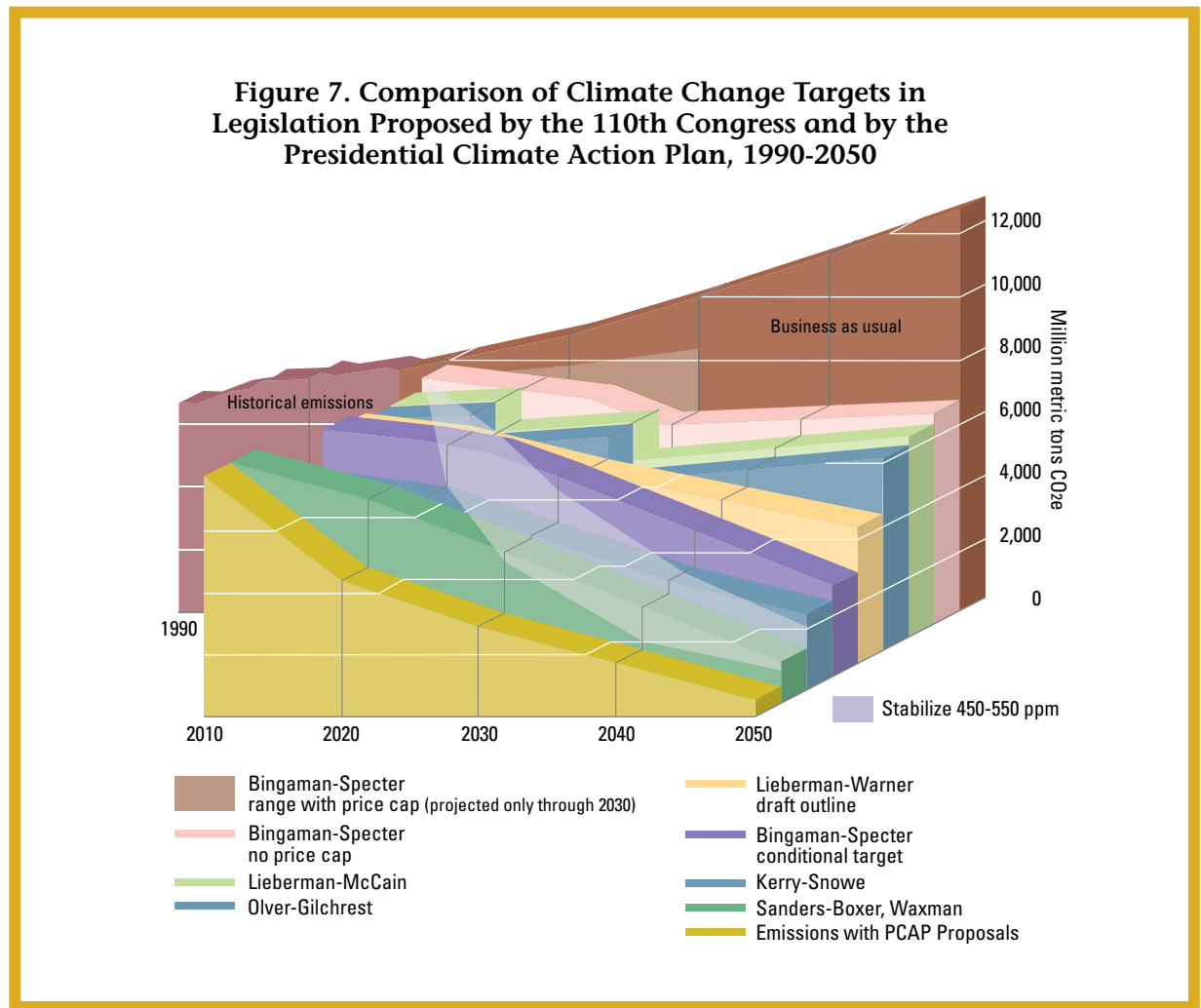
⁵ P. Kasibhatla and W. Chameides, "G8 Leadership Is Critical to Curbing Energy-Related CO₂ Emissions," policy brief prepared for the Nicholas Institute for Environmental Policy Solutions, Duke University, September 2007, www.env.duke.edu/institute/g8plus5.pdf.

⁶ For comparison: In May 2007, the Energy Information Administration reported that United States CO₂ emissions dropped 1.3% in 2006, while the economy grew 3.3%.

⁷ These reductions, all against the 2010 base year, are roughly the equivalent of the European Union's targets: 20% reductions below 1990 levels by 2020 and 80% by 2050.

of 2% annually in 2021, against 2020 levels. Remaining nations would begin stabilizing or reducing emissions at mid-century.

Duke's analysis projects that this pattern of reductions would stabilize atmospheric concentrations of CO₂ below 450 ppm.



3. Cap and auction greenhouse gases.⁸

To mobilize the marketplace to reduce greenhouse gas emissions, the President should support greenhouse gas pricing – a mechanism that adds a cost for greenhouse gas emissions onto the price of fossil fuels. If a pricing mechanism has not become law during the 110th Congress, the President should advocate that the 111th Congress approve an “upstream” cap-and-auction system that regulates the points at which fossil fuels enter the economy – the refinery gate in the case of petroleum, the first distribution point for natural gas, at the mine shipping terminus in the case of coal and at the port in the case of imports.

By regulating only 1,500-2,000 upstream entities, this approach reduces administrative complexity, minimizes opportunities to cheat the system and helps ensure that greenhouse gas pricing is economywide.

In the event that Congress fails to pass a cap-and-auction regime, or to act on the issue in a timely manner, the President should direct the Environmental Protection Agency to implement a cap-and-auction regime with these characteristics:⁹

- **Greenhouse gas emissions would be capped to achieve the national reduction goals proposed above.**
- **The regime should cover all six greenhouse gases, adjusted for their global warming potential. This feature is more likely to make the United States system compatible with international greenhouse gas trading programs.**
- **The emissions cap should be absolute, defined in carbon dioxide-equivalent tons per year rather than in greenhouse gas intensity (emissions per dollar of GDP). Absolute caps are more transparent and will make it easier for all parties to track actual reductions.**
- **The regime should ensure that carbon pricing is economywide while keeping the administration as simple and transparent as possible.¹⁰**

⁸To produce these recommendations, the Presidential Climate Plan has drawn from, and gratefully acknowledges, proposals by Yale economist Robert Repetto (www.climateactionproject.com/docs/Repetto.pdf), Peter Barnes of the Tomales Bay Institute, and the Milken Institute (“A Cap-and-Trade Program Design for Greenhouse Gases,” policy brief, February 2007).

⁹The Bush Administration demonstrated the authority of the Executive Branch to establish cap-and-trade regimes for pollutants in 2005 when it established such a mechanism for mercury emissions from power plants.

¹⁰Under the Clean Air Act, without new statutory language, it appears that a cap-and-auction regime ordered by the President would have to move downstream to regulate entities that actually emit greenhouse gases, rather than those that bring fossil fuels into the economy.

- **Banking would be allowed, but not off-ramps, safety valves or the substitution of greenhouse gas offsets for permits. Allowances would be made to reward early adopters.**
- **The regime should extend at least until 2050 to provide stability in the marketplace. Its performance should be reviewed regularly to ensure that it is meeting greenhouse gas reduction goals.**
- **Auction revenues should be distributed to consumers in tax reductions and dividends to every American, and to states to assist individuals, families, businesses and communities most adversely affected by higher energy prices.**
- **The system would be designed to link U.S. greenhouse gas trading with emission-reduction regimes in other nations.**

The Administration should closely monitor the effectiveness of this system and adjust it as necessary to achieve national targets for emission reductions.

4. Use the Clean Air Act to produce early results.

Because there are no comparable greenhouse gas trading systems in place, experts are unsure of how successful the architecture will be or how soon its effects will appear in the marketplace. Some estimate that it will take a decade or more; others predict faster results. To ensure near-term emission reductions and to provide a safety net for the atmosphere, the President should order the EPA to expedite its determination that all greenhouse gas emissions meet the criteria for regulation under the Clean Air Act.¹¹

Using the familiar process now in place for other regulated air pollutants, EPA would require states to develop creditable State Implementation Plans (SIPs) that show how they will achieve required emission reductions. As the cap-and-trade mechanism takes effect, compliance with regulation will become easier and eventually moot.

¹¹Title I, Section 103(g) of the Act recognizes carbon dioxide as an "air pollutant"; Title II has been interpreted by the U.S. Supreme Court in *Commonwealth of Massachusetts v. EPA* as allowing EPA to regulate greenhouse gases from "moving sources"; Title VI grants EPA the authority to regulate greenhouse gases that deplete the stratospheric ozone layer. To implement regulation under the Clean Air Act, EPA must make a determination that greenhouse gases not currently regulated "cause or contribute significantly to air pollution, which may reasonably be anticipated to endanger public health or welfare" (Section 110b1A). There is more than ample scientific evidence for EPA to make that determination without delay.

5. Restore the role of science in federal policy.

The President should issue an executive order that emphasizes the critical role that science will play in informing and directing federal policy on climate, earth sciences, natural resource stewardship, energy and other critical policy areas. The order should prohibit Administration officials from undue interference, including editing and censorship of technical documents and reports, in federal scientific inquiry. This order should rescind Executive Order 13422, which established a process of political oversight of federal science.

The President should reestablish the position of Assistant to the President for Science and Technology as a direct report to the chief executive and should encourage Congress to fund the Office of Technology Assessment, particularly to advise Congress on the complex and evolving science and technology issues related to global warming.

6. Make greenhouse gases visible and climate action personal.

Greenhouse gas emissions should become a more visible factor for policymakers and consumers. The President should:

- **Require federal agencies to include climate impact statements in their annual budget submissions and performance evaluations.**
- **Direct agencies to address climate impacts in relevant reports to Congress and to the American public.**

- **Direct the White House Council on Environmental Quality to develop performance indicators to measure the nation’s progress on reducing greenhouse gas emissions. Indicators should include macro-measures – for example, average annual temperatures, rainfall patterns, isotherm migration, major wildfires, extreme weather events, increases or decreases in disease vectors, coastal water levels, loss of native plant and animal species, insurance liabilities and other factors that scientists have concluded are, or will be, affected by global warming – as well as micro-measures important to individual consumers and families, including energy prices and per capita greenhouse gas emissions. The CEQ should publish these indicators in an annual State of the Climate report released in conjunction with the President’s State of the Union address.**
- **Request that Congress authorize federal agencies to include a greenhouse gas emissions indicator on the Energy Guide labels for new appliances and the fuel-economy window stickers for new vehicles. Direct the Department of Transportation to cooperate with states to produce a special green license plate for low-emission vehicles.**
- **Strongly encourage and if necessary propose that Congress mandate that the Securities and Exchange Commission require corporations to include their greenhouse gas emissions profiles in annual reports to shareholders and on each company’s Form 10-K, a report filed with the SEC on earnings and risks.**
- **Urge Congress to reestablish the Office of Technology Assessment for expert analysis of the climate impact of current and proposed legislation.**
- **Challenge Americans to reduce their per capita energy consumption by half, roughly the per capita consumption in Western Europe and Japan. Consumers can measure their performance with greenhouse gas calculators available on the Internet.**

7. Develop a coordinated national policy on climate change.

The Global Change Protection Act of 1987 (Public Law 95-367) makes the President responsible for “developing and proposing to Congress a coordinated national policy on global climate change.” The President-elect’s transition team should

incorporate the proposals contained in the PCAP into a national climate policy plan the President announces during the State of the Union address and introduces as part of the Administration's first legislative package.

8. Create standards for greenhouse gas offset programs.

In the fall of 2007, the Federal Trade Commission agreed to review consumer protection issues in the emerging greenhouse gas offset industry. The President should direct the Administration to work with the industry to develop universal voluntary standards and an approved third-party certification process for greenhouse gas offset programs. The standards, which could be based on EPA's criteria for crediting air pollution mitigation measures under the Clean Air Act, would protect the integrity of the industry by ensuring that its offset programs produce real greenhouse gas reductions, do not double-count reductions, and are well managed and transparent.

Section 3: Energy Policy

**“I’d put my money on the sun and solar energy. What a source of power!
I hope we don’t have to wait until oil and coal run out before we tackle that.”**

– Thomas Edison, 1931

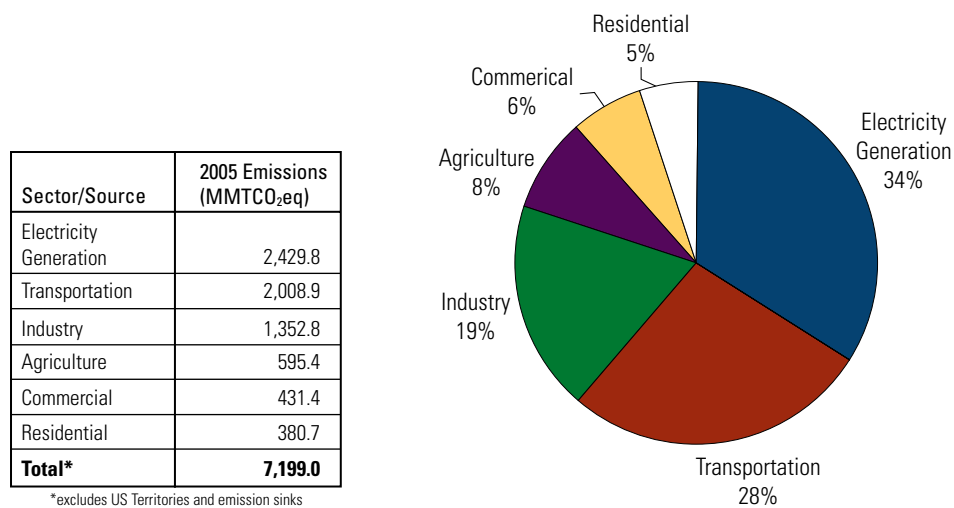
**“Incrementalism is innovation’s worst enemy! We don’t want continuous improvement,
we want radical change.”** – Sam Walton, on a plaque at Wal-Mart headquarters

Good climate policy requires good energy policy. The principal anthropogenic cause of global warming is the burning of fossil fuels. The principal solution will be a rapid worldwide transformation from carbon-rich to carbon-free energy resources.

Radical change is needed to deal with three overlapping issues of national security.

The first is our continuing and growing dependence on greenhouse gases. Coal, oil, petroleum and natural gas are the stored carbon from plants and animals that died hundreds of millions of years ago. For the past 200 years, we have been extracting that carbon, burning it and releasing carbon dioxide into the atmosphere. Today, fossil fuels are responsible for 90% of the nation’s greenhouse

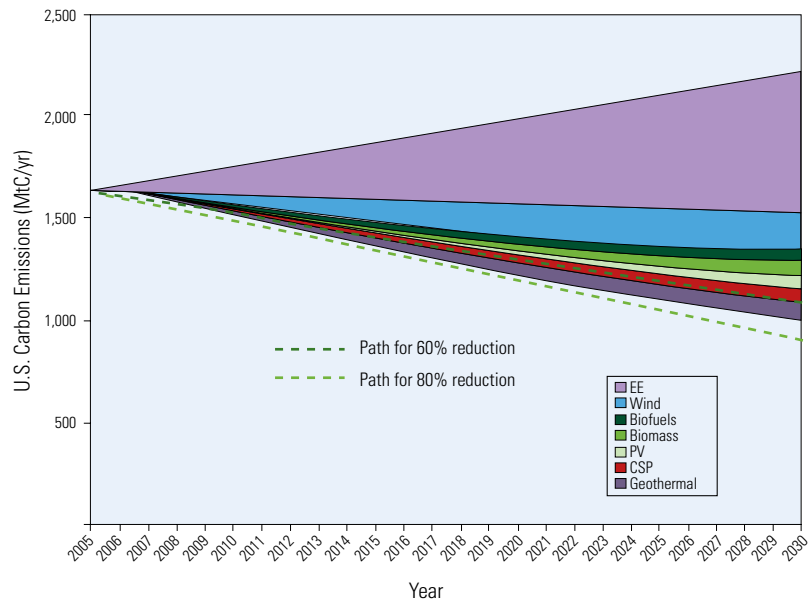
Figure 8: Direct U.S. Greenhouse Gas Emissions by Economic Sector (2005)



MMTCO₂eq = Million Metric Tons Carbon Dioxide Equivalents

Source: US Environmental Protection Agency, The US Inventory of Greenhouse Gas Emissions and Sinks (2005), April 2007

Figure 9: Potential Contributions of Clean Energy Strategies Toward Achieving GHG Reduction Goals



Source: ASES "Tackling Climate Change"

gas emissions. The Energy Information Administration (EIA) predicts that on our present path, U.S. greenhouse gas emissions will grow nearly 34% between 2005 and 2030, the opposite direction that we must go to avoid the worst consequences of global warming.

The second issue is the adverse impact of imported oil. In addition to security concerns noted in PCAP Section 4, the U.S. economy exports trillions of dollars of wealth each year to the Middle East and other regions.

The third issue is our dependence on finite resources in general. Nature isn't making oil, natural gas or coal fast enough to replenish the planet's supplies. Only 6% of America's energy comes from renewable resources such as sunlight, wind, water, biological materials or geothermal energy. Most renewable energy resources are domestic, pollution free, inexhaustible and exempt from price spikes because the source energy is free. Yet they provide no more of our energy mix

today than they did decades ago. The EIA's business-as-usual case predicts that U.S. energy consumption will climb 30% between 2005 and 2030, nearly 90% of it from fossil energy. Instead, clean and renewable energy technologies should provide 20%-30% of the nation's electricity by 2020.

This goal is well within reach. Bold efforts to increase energy efficiency and to develop sources of renewable energy will enable the economy to grow and prosper at the same time old carbon-dependent technologies are retired. Researchers for the American Solar Energy Society found that "there is really no place in the country that doesn't have access to some form of renewable energy" and that by exploiting wind, biomass and solar technologies, it will be possible to "de-carbonize the U.S. electric grid."¹ Nuclear power and purchasing emission credits from other countries will not be necessary to achieve a zero-CO₂ U.S. economy within 30 to 50 years.²

The principal mission of a national energy policy must be to create a solid foundation on which America will remain prosperous and secure for generations to come. The cornerstones of that foundation must be a dramatic improvement in the nation's energy efficiency – the fastest, cheapest and most effective ways to reduce greenhouse gases – and a shift to low- and no-emission renewable energy resources.

¹ C. F. Kutscher, ed., *Tackling Climate Change in the U.S.: Potential Carbon Emissions Reductions from Energy Efficiency and Renewable Energy by 2030* (Boulder, Colo.: ASES, January 2007), 171.

² A. Makhijani, *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy*, report, Nuclear Policy Research Institute and the Institute for Energy and Environmental Research, July 2007; executive summary available at www.ieer.org/carbonfree/summary.pdf.

Presidential Actions

1. Recalibrate the national energy policy.

The President should establish the following goals, milestones and performance indicators for national energy policy:

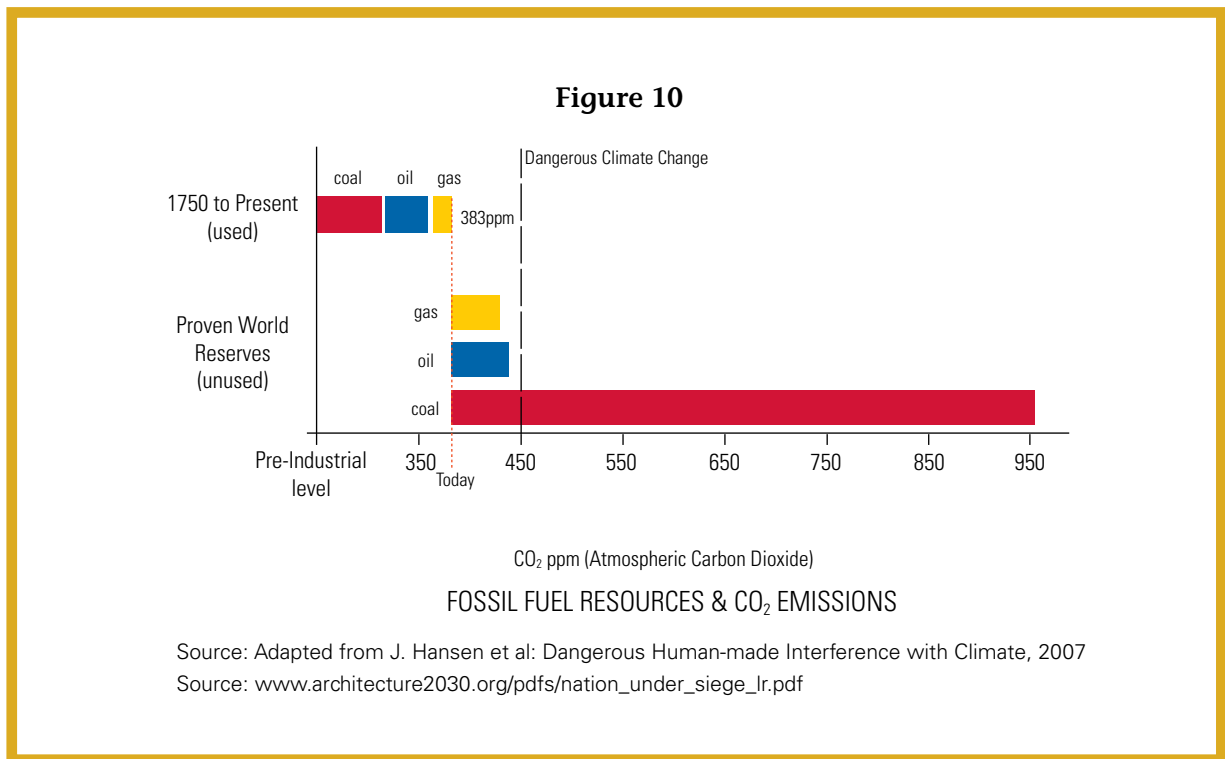
- **New load-serving electric generation must be carbon neutral or equipped to capture and store all greenhouse gas emissions. In addition, the production and consumption of the energy resources used in electric generation should comply with the nation's highest environmental standards without exception and should meet the performance standard for life cycle net-energy and net-carbon attributes used to qualify energy resources for federal subsidies (see PCAP Section 1). The President should call for an immediate moratorium on the construction of power plants whose operation and fuels do not meet these requirements.³**
- **From 2010 to 2050: Economywide energy demand will be reduced at least 2.5% annually, leading to reductions of at least 25% by 2020 and 50% by 2030. The savings will involve all sectors – buildings, industry, transportation and energy supply.⁴**

³ This provision is meant to place a moratorium on the construction of coal plants that cannot fully capture and sequester carbon emissions and/or rely on coal produced from mountaintop removal and other extraction and production techniques with adverse consequences for forests (which sequester carbon), waterways, wildlife habitat and other critical natural resources. During 2007, the American Solar Energy Society, the Nuclear Policy Institute and the Institute for Energy and Environmental Research issued studies concluding that, in the decades ahead, U.S. electric demand can be met with a combination of energy efficiency and renewable energy technologies, and without new nuclear or coal power plants. (See www.ieer.org/carbonfree/summary.pdf and www.ases.org/climatechange/climate_change.pdf.) Some analysts consider a moratorium on conventional coal power plants to be the single most important action necessary to slow and reverse carbon emissions because each new plant locks in decades more of emissions. Of 151 coal plants on the drawing boards, only 15 have been built since 2002. At this writing (October 2007), 121 planned plants are considered viable, but the completion of 76 of them is uncertain, according to the U.S. Department of Energy. See www.netl.doe.gov/coal/refshelf/ncp.pdf.

⁴ United Nations Foundation, July 2007. In an eight-month exercise sponsored by the United Nations Foundation, a team of international energy experts proposed that the G8 nations each achieve a 2.5% annual gain in energy efficiency – double the historic rate. After 2050, the rate of efficiency improvement would decline linearly to 1% in 2100. By 2030, these gains would save 20% of the energy used by the G8, equivalent to the output of 2,000 power plants. These data do not count the contribution of renewable energy technologies in meeting world energy demands.

- **By 2020:** About 20%-30% of the nation’s electricity will be generated from renewable resources; the energy efficiency of passenger vehicles and light trucks will reach 50 miles per gallon; petroleum consumption will be reduced by 50%, effectively offsetting imports from the Persian Gulf and OPEC; and net greenhouse gas emissions will be 30% lower than they were in 2010.
- **By 2030:** Energy efficiency improvements in buildings and industry will hold maximum consumption to 2007 levels; renewable energy technologies will provide at least 40% of the remaining electric demand; and all new and substantially remodeled residential and commercial buildings will achieve net-zero-energy consumption.
- **By 2050:** At least 50% of the nation’s electricity will come from renewable resources. Greenhouse gas emissions will be reduced to 90% below 2010 levels.⁵

Where Congress has not delegated the Administration sufficient authority to take the actions needed to achieve these goals, the President should seek it. One example: The President should propose that Congress delegate authority to the Department of Transportation (DOT) to adjust CAFE standards for passenger vehicles, as DOT now does for other types of vehicles.



⁵ Policies and programs to achieve these goals are proposed throughout the PCAP.

2. Establish a floor on the price of oil.

The President should work with Congress to establish a floor on the price of domestic and imported petroleum at \$45 per barrel. The minimum price will help maintain a stable U.S. market for energy-efficient vehicles, alternative fuels and other technologies and resources that reduce petroleum consumption.

3. Institute a Renewable Energy and Energy Efficiency Portfolio Standard.

The President should champion Congressional approval of a national portfolio standard that codifies the energy efficiency and renewable energy goals listed above, requiring electric power providers to obtain at least 20% of their electricity from renewable resources by 2020. Starting in 2010, electric utilities would be required to reduce their baseline electric sales by 0.6% annually through efficiency. Natural gas utilities would be required to reduce baseline gas sales annually by 0.3%.

The President should direct the U.S. Environmental Protection Agency to work with the Chicago Climate Exchange to design a program that would permit utilities to trade efficiency credits – similar to cap-and-trade regimes proposed for greenhouse gas emissions – with the objective of helping utilities reduce energy demand at the lowest cost.

4. Create a dynamic partnership with states and localities to achieve national goals.

The President should propose that \$1 billion annually be appropriated for the State Energy Program (SEP), up from \$45.5 million requested by the current

Administration for Fiscal Year 2008.⁶ To qualify for funds, each state would develop and implement an Energy Security and Climate Stabilization Plan (ESCS) that details the state's contribution to accomplishing national climate and energy security goals. These would replace the energy plans now required for states to receive SEP funding. Specifically, each state's ESCS plan would contain:

- **A statewide climate action strategy to reduce greenhouse gas emissions in line with national targets; create emissions inventories; establish annual emissions reporting; and monitor and evaluate progress.**
- **Policies and programs that will result in meeting or exceeding the national Renewable Energy and Energy Efficiency Portfolio Standard.**
- **Adoption of the latest and most progressive model national building codes, and sufficient training for local code officials, designers and builders (see more on building codes in PCAP Section 6, Low-Carbon Buildings).**
- **An assessment of the state's full potential for electric generation from renewable resources; energy-efficiency improvements in the building, transportation and industrial sectors; new transmission infrastructure to capture stranded renewable energy resources; and distributed electric generation.**
- **Reforms in utility regulations to allow utilities to earn reasonable rates of return from energy-efficiency activities; to integrate energy efficiency into electric and natural gas utility plans; to encourage the use of policies such as feed-in tariffs that accelerate renewable energy development; to create statewide interconnection standards and net metering policies to promote distributed energy generation; and to require utilities to demonstrate how they are actively contributing to implementation of the state plan as a condition to receiving rate adjustments or permits to build new generating capacity.**

⁶These funds would supplement the new block grant program proposed for communities in S1419 and H3221, if passed by Congress. The bills propose grants of \$2 billion annually for five years for local energy and environmental activities. Most of the money – 70% – would go to “entitlement” communities currently eligible for the Community Development Block Grant program. One-third would go to states and other communities.

- Policies such as tailpipe emission standards, well-to-wheels fuel standards and “feebates” to reduce petroleum consumption and greenhouse gas emissions from the transportation sector.⁷
- Grants, technical assistance and barrier-busting measures to help regions and communities substantially reduce vehicle miles traveled;⁸ develop smart grids and distributed energy systems; promote the development of light rail for intercity travel; engage in whole community development that integrates urban planning with energy and transportation systems; earn LEED ratings for buildings and neighborhoods; and achieve carbon neutrality in municipal buildings and operations.

States should be allowed to use the SEP funds for planning, technical assistance, impact and performance analysis, and staffing expenses. The President should propose that Congress modify the Energy Policy and Conservation Act⁹ to reflect this proposal.¹⁰

5. Reshape farm and rural development programs.

Because the nation’s oil and gas production peaked in the 1970s, we will grow rather than drill our way to energy independence. Rural America is the nation’s principal provider of renewable energy. The Administration can help trigger a rural

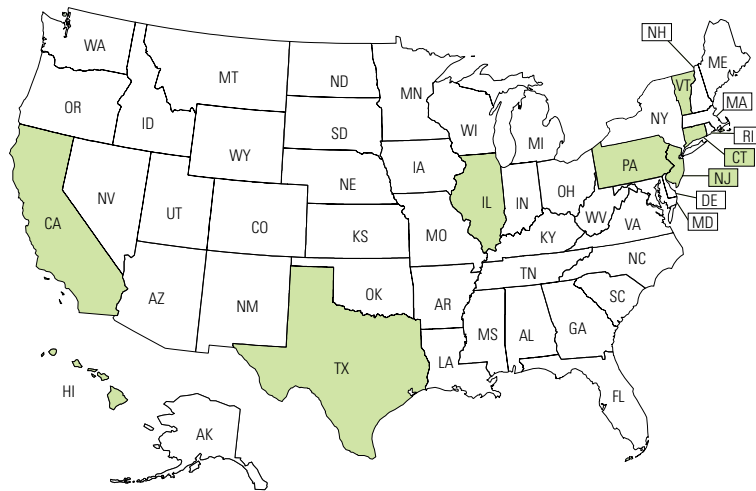
⁷ Feebate programs charge fees at the point of purchase for inefficient vehicles and pay rebates for efficient vehicles; see A. Lovins and E. K. Datta, *Winning the Oil Endgame: Innovation for Profits, Jobs, and Security* (Snowmass, Colo.: Rocky Mountain Institute, 2004), www.oilendgame.com/ReadTheBook.html.

⁸ For specific recommendations on reducing VMT, see PCAP Section 7 on Mobility.

⁹ SECP was created by the Energy Policy and Conservation Act, 42 USCA 6201. The Act should be modified to have ESCS plans replace State Energy Conservation Plans; to reward states that are early adopters of the ESCS plan and that make rapid progress on implementation; to update the Act’s requirements for the topics that states must address; to modify the formula for allocating grants among states to include each state’s greenhouse gas emissions; and to minimize paperwork and duplication by allowing states to incorporate State Implementation Plans under the Clean Air Act as part of their ESCS plans. (See the proposal for State Implementation Plan in PCAP Section 1.)

¹⁰ For a “scorecard” on energy policies by states, see 2007 report by M. Eldrige et al. at <http://aceee.org/pubs/e075.pdf?CFID=109429&CFTOKEN=50588284>.

States with Energy Efficiency Portfolio Standards (EEPS) Information current as of 01/01/07

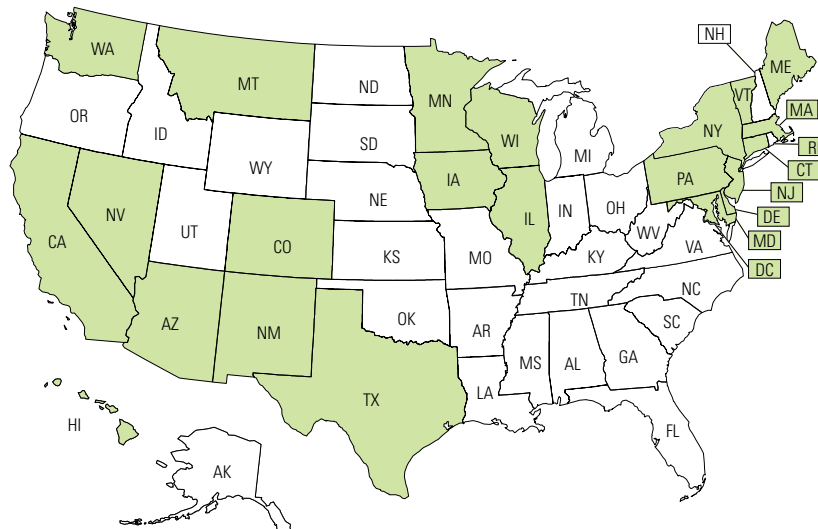


Completed* (10)
CA, CO, CT, HI, IL, NV, NJ, PA, TX, VT

*Hawaii, Nevada and Pennsylvania have indirect EEPS as part of their RPS (Renewable Portfolio Standard)/AEPS (Alternative Energy Portfolio Standard). Illinois' EEPS is a goal (not a requirement) under the state's Sustainable Energy Plan. Colorado's EEPS is part of a utility/PUC settlement agreement; Vermont's EEPS is incorporated into statewide contracts for energy efficiency.

Sources: Compiled by U.S. EPA

States with Renewable Portfolio Standards (RPS) Information current as of 01/01/07



Completed* (24)
AZ, CA, CO, CT, DE, DC, HI, IL, IA, ME, MD, MA, MN, MT, NV, NJ, NM,
NY, PA, RI, TX, VT, WA, WI

*Minnesota's RPS is applicable only to the state's largest utility; the other utilities are required to show a "good faith effort." Illinois' Sustainable Energy Plan has an RPS goal, but it is not mandatory.

renaissance by helping farmers, ranchers and rural communities become the nation's major source of clean energy for the 21st century economy.

- **The Department of Agriculture Rural Utility Service should redirect its low-interest loan program for rural electric cooperatives from funding coal-fired power plants to capitalizing projects that help rural America become the nation's primary source of renewable energy feedstocks and production. Eligible activities should include the development of rural wind farms; solar farms; methane-to-electricity systems at feedlots and municipal landfills; forestation and reforestation projects that increase carbon sequestration; conversion of rural energy systems and agricultural equipment to biofuels; rural biorefineries powered by renewable fuels; extension of transmission to stranded rural renewable energy resources; and economic development activities related to the manufacture or assembly of renewable energy equipment (i.e., wind turbines, turbine blades, photovoltaic panels, equipment for concentrating solar power).**
- **The President should propose that Congress extend the renewable energy Production Tax Credit to 2025 consistent with subsidy reforms, and provide the equivalent of a production tax credit for wind and other renewable energy development on tribal lands – lands in the Plains States that contain much of the world's best wind resource.**
- **The President should direct the Agricultural and Engineering Extension Services to provide technical assistance to rural communities and businesses to support sustainable economic development and to assist farmers in adopting land and forest management practices that sequester carbon and create revenue from offsets.**

See PCAP Section 5 for additional recommendations on how the Farm Bill and federal programs should be modified to support renewable energy production and carbon sequestration practices in agriculture.

6. Create industry greenhouse gas prevention roadmaps.

The U.S. Innovation and Economic Development Administration (see Section 1) should work with the nation's most emission- and energy-intensive industries to create technology roadmaps that define the research needed to prevent greenhouse gas emissions. The President should direct the Environmental Protection Agency to accelerate national efforts to capture methane – a greenhouse gas 23 times more potent than carbon dioxide in trapping heat in the atmosphere – for energy production from the nation's 1,650 landfills.

7. Eliminate the U.S. Department of Energy.

With the creation of the U.S. Innovation and Economic Development Administration (see PCAP Section 1), the DOE's major technology functions will be gone. DOE should be disbanded and its remaining programs reassigned to other agencies. For example, the nonproliferation activities of the Office of Fossil Energy and the functions of the Offices of Civilian Radioactive Waste Management; Environmental Management; Health, Safety and Security; and Legacy Management could be consolidated into an independent National Nuclear Security Administration. The Energy Information Administration would be transferred to the U.S. Department of Commerce. The President should direct the Office of Personnel Management to devise a plan for reorganization, including how existing functions and staff will be redistributed or terminated, and submit the plan for approval by Congress.

Section 4: National Security

“If we learned that al Qaeda was secretly developing a new terrorist technique that could disrupt water supplies around the globe, force tens of millions from their homes and potentially endanger our entire planet, we would be aroused into a frenzy and deploy every possible asset to neutralize the threat. Yet that is precisely the threat that we’re creating ourselves with our greenhouse gases.”

– Nicholas D. Kristof, *New York Times*, Aug. 16, 2007

America’s dependence on finite resources from volatile or unfriendly regions of the world is a national security issue. So is global warming. National policy must deal with both at the same time.

On the climate front, the Intergovernmental Panel on Climate Change predicts a future in which people from areas plagued by drought or rising seas become refugees. Dwindling food and water supplies and the other predicted impacts of climate change will create instability.¹ In April 2007, 11 retired admirals and generals issued a report that established the climate-security connection without qualification. “Climate change can act as a threat multiplier for instability in some of the most volatile regions of the world and it presents significant national security challenges for the United States,” the officers concluded. “The increasing risks from climate change should be addressed now because they will almost certainly get worse if we delay.”²

On the natural resources front, some experts predict that fast-growing economies, combined with peak oil, water shortages and other resource constraints caused by global warming, will increase international tensions in the years ahead.³

¹ “National Security and the Threat of Climate Change,” CNA Corporation, April 2007.

² Ibid.

³ When global oil production will peak is a topic of continuing debate – most of it useless, according to Dr. John Holdren, president of the American Association for the Advancement of Science. “The economic and security perils of the world’s current and growing dependence on oil tell us that we need to move smartly to reduce that dependence, no matter whether peak oil is close or far away,” Holdren says. “And the looming danger of unmanageable climate change tells us that we must choose ways to do this that reduce rather than increase the energy sector’s emissions of CO₂.”

Despite the shock of the Arab oil embargoes of the 1970s, the United States imports more than 60% of its oil today, triple the level of imports during the embargoes. About 40% of our imports come from the Organization of Petroleum Exporting Countries (OPEC), including 16% from the Persian Gulf. Oil imports transfer some \$6 trillion of the nation's wealth each year to oil-producing nations, including those that support terrorist organizations.⁴

As we have learned in Iraq, a superior military force no longer guarantees that we can maintain access to foreign oil fields and shipping lanes. And too often, the foreign policy ideals of the United States and other democratic nations are sacrificed for oil. As the Aspen Institute has noted, "Many countries that are rich in energy resources are prone to corruption, are autocratic and repress political dissent in the name of stability. If the United States associates with these countries to obtain energy supplies, it risks alienating the oppressed population and undermining its credibility on other foreign policy goals, such as the promotion of democracy and human rights."

If present trends continue, America's oil vulnerability will grow significantly worse. The Energy Information Administration predicts we will import nearly 70% of our oil by 2030.

"Oil dependence and climate change pose enormous risks to the U.S. economy and national security," says former U.S. Sen. Tim Wirth, now head of the United Nations Foundation. "They are ticking time bombs and each will take a long time to address – which makes it all the more urgent to begin."

⁴ G. Eyring, *Energy: The New Normal?* (Aspen, Colo.: Aspen Institute, 2006): "Inevitably, some of the petrodollars flowing to governments in the Middle East make their way into the hands of radical Islamic groups such as al Qaeda ... Other oil and gas revenues fund other undesirable actions ... Countries that have energy but believe they need more weapons and countries that have weapons but not enough energy have business to discuss" (19). The Eyring report is from an Energy Policy Forum sponsored by the Institute June 30–July 4, 2006. Among the session's 70 participants were former Secretary of State Madeleine Albright, former EPA Administrator Carol Browner, Phil Sharp of Resources for the Future and former CIA Director James Woolsey.

Searching for Security

There are no consensus solutions to the national security problems associated with oil imports and climate change. Amory Lovins of the Rocky Mountain Institute argues that the United States can end oil imports by 2040 with improvements in end-use efficiency and with substitute fuels.⁵ A study issued by the Nuclear Policy Research Institute and the Institute for Energy and Environmental Research in July 2007 concludes that net U.S. oil imports can be eliminated in 25 years.⁶ In a study commissioned by PCAP, the Center for Neighborhood Technologies (CNT) concludes that the United States could eliminate oil consumption equal to current imports from the Gulf by 2025 and 90% of oil imports by 2050.⁷

Other experts disagree. A task force sponsored by the Council on Foreign Relations concluded that energy independence is “unachievable over the foreseeable future.”⁸ In 2004, the National Commission on Energy Policy rejected the idea that energy independence can be “readily achieved through conservation measures and renewable energy resources alone.”

There is another problem with the goal of national energy independence: Because oil is traded in a global market, an oil shock anywhere may be felt here at home. Six of America’s top 10 trading partners are net oil importers. The United States could cease all oil imports today and still not be immune from price and supply shocks, policy manipulation or conflict.

⁵ A. Lovins and E. K. Datta, *Winning the Oil Endgame: Innovation for Profits, Jobs, and Security* (Snowmass, Colo.: Rocky Mountain Institute, 2004). Lovins and Datta contend the United States could save as much oil as it imports from the Persian Gulf by 2015 and could eliminate all imports by 2040. They note that from 1978 to 1985, after the Arab oil embargoes, the United States cut its oil imports in half and its Persian Gulf imports by 87%.

⁶ A. Makhijani, *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy*, report, Nuclear Policy Research Institute and the Institute for Energy and Environmental Research, July 2007.

⁷ See www.climateactionproject.com.

⁸ *National Security Consequences of U.S. Oil Dependency*, report of an independent task force sponsored by the Council on Foreign Relations, 2006.

A final barrier to energy independence is political will. “The United States has been unwilling to adopt and to sustain policy measures that would slow the trend and begin the long process of a transition to a post-petroleum economy,” says John Deutsch, former director of the Central Intelligence Agency. “Our citizens and their elected representatives do not wish to sacrifice, in the short-run, the convenience and economic benefits of low-cost energy.” Before long, petroleum may no longer qualify as low-cost energy. In the meantime, the public will to change is an issue of leadership.

Presidential Actions

1. Reduce domestic oil consumption 50% by 2020.

This reduction exceeds the amount of petroleum the U.S. imports from the Persian Gulf and from OPEC. However, the way petroleum is handled in the world oil market makes it difficult to ensure that the United States is no longer consuming oil from the Persian Gulf. The President should convene a Presidential Commission on Energy Independence to develop a strategy for: 1) achieving the 50% reduction target, 2) reducing or ending the flow of American dollars to the Gulf, and 3) eliminating oil imports by mid-century. The Commission should build upon the work already done on these goals by other groups, including the National Commission on Energy Policy. The President should set these parameters:

- **The reduction in imports should be achieved with greater vehicle efficiency, reduced vehicle miles traveled and alternative fuels, not by increasing domestic oil production.**

⁹ Presidential candidate Gov. Bill Richardson has proposed a reduction in petroleum consumption of up to 50% by 2020, based on the following steps: increase the fuel efficiency of cars and trucks to 50 mpg; provide large incentives for development and market penetration of plug-in hybrid vehicles; reduce vehicle miles traveled; increase the use of biodiesel and cellulosic ethanol fuels; create incentives for fuel reductions in planes, trains, trucks and ships; increase the use of electric trains and other non-petroleum forms of intercity transit; reduce the demand for heating oil through efficiency gains; and account for decreased petroleum demand due to higher prices. Many of these steps are explained in detail in PCAP Section 7 on Mobility.

U.S. oil and gas production peaked in the early 1970s, and the easy supplies are gone. More exploration and production means more incursions into environmentally sensitive areas.

- **Alternative fuels must meet a strict well-to-wheels performance standard that requires high net energy and low net greenhouse gas values over the life cycle of the fuel.**
- **National subsidies should be reshaped to promote greater transit-oriented urban design, greater use of mass transit and light rail, the development of high-speed rail for intercity travel and other measures identified in the CNT study.**

2. Reduce the danger of shocks in the global oil market.

The President should propose creation of an international Organization of Petroleum Importing Countries (OPIC) to collaborate on the following:

- **Joint research and policy development to produce low-emission fuels and to improve the end-use efficiency of vehicles and other petroleum-consuming equipment and industries;**
- **Joint agreements to reform subsidies that encourage oil consumption; and**
- **A global network of strategic petroleum reserves to reduce the threat of oil emergencies during the transition to petroleum-free economies.**

3. While reducing imports, make the protection of oil shipments a collaborative responsibility.

By one estimate, the United States spent as much as \$26.7 billion in 2003 to protect Persian Gulf shipping lanes.¹¹ Former U.S. Senator and current national security

¹⁰ "The international effort to protect the global climate, especially efforts to reduce GHG emissions from transportation, provides a unique opportunity for the United States to work cooperatively with other countries to reduce worldwide demand for oil" (D. L. Greene and A. Schafer, *Reducing Greenhouse Gas Emissions from U.S. Transportation*, report prepared for the Pew Center on Global Climate Change, 2003).

¹¹ Memorandum to the National Commission on Energy Policy from Doug Koplow, July 30, 2004. Koplow notes that the structure of the defense budget makes it difficult to obtain a precise cost for defending Persian Gulf oil shipments.

expert Gary Hart has proposed that these expenses be shared by all nations that import oil from the Gulf. Hart suggests that the United Nations declare the Gulf to be a “zone of international interest” protected by an international peacekeeping force that guarantees the free flow of oil.¹²

4. Order a National Intelligence Estimate (NIE) on the risks associated with energy policy choices.

The National Intelligence Council reportedly is compiling a National Intelligence Estimate on climate change and security, due to be issued in the spring of 2008. The President should direct agencies with relevant responsibilities to prepare recommendations on consequence management and other security issues raised by the NIE, including how the United States, both domestically and internationally, should adapt to climate change that is underway or inevitable in the decades ahead.

If the coming NIE does not cover related issues of energy security, the President should request an assessment of the security implications of planned increases in the nation’s reliance on imported finite fuels, including liquefied natural gas (LNG) and uranium.¹³ See Figure 11.

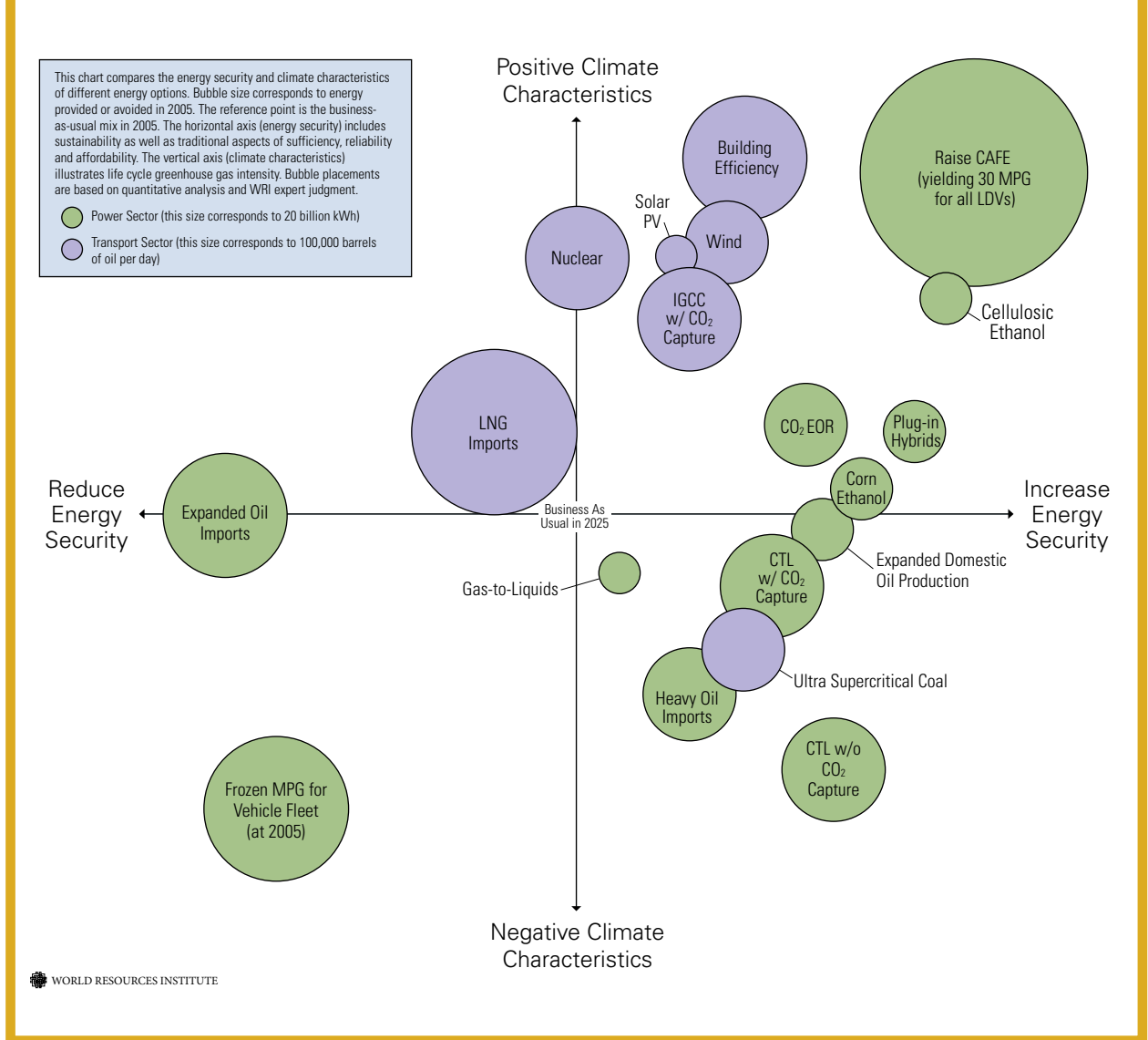
5. Reduce the vulnerability of the nation’s energy infrastructure to disruption by natural or man-made disasters.

In a videotape released in December 2005, al Qaeda leader Ayman al-Zawahiri encouraged followers to attack America’s energy infrastructure. That infrastructure includes more than 160,000 miles of crude oil pipelines, 4,000 offshore platforms, 10,400 power plants and 160,000 miles of transmission lines, much of it impossible to protect from terrorists or saboteurs.

¹² G. Hart, *The Shield and the Cloak: The Security of the Commons* (New York: Oxford University Press, 2006), 143.

¹³ Some rapidly developing nations reportedly are attempting to obtain control of international energy resources to ensure that they have adequate supplies. For example, China, India and Russia reportedly are attempting to corner uranium supplies from America’s traditional foreign sources. See “China Nuclear Ambitions Pose Uranium Supply Questions,” Dow Jones Commodities Service, April 19, 2007, www.uofaweb.ualberta.ca/chinainstitute/nav03.cfm?nav03=59974&nav02=59973&nav01=57272.

Figure 11: Example of Energy-Climate Security Assessment¹⁴
**A Snapshot of Selected U.S. Energy Options Today:
 Climate Change and Energy Security Impacts and Trade-offs in 2025**



The President should direct the U.S. Department of Energy to develop a registry of energy technologies that should be given highest priority in national energy policy because they reduce vulnerability to terrorist attack. The President should propose to Congress that it give special consideration in appropriations to technologies on the registry.

¹⁴ This assessment, prepared by the World Resources Institute, is an example of the type of analysis the new Administration could conduct to determine the energy and climate security implications of policy choices. For background on WRI's analysis of each of the policies shown in the chart, see www.wri.org/climate/topic_content.cfm?cid=4368. The PCAP team does not concur with all of the judgments illustrated here, but assessments of this kind are critical to making good policy choices. The PCAP position is that only those options positioned in the upper-right quarter of the chart – indicating positive benefits for both energy security and climate – should be backed with federal resources.

Section 5: Agriculture and Rural America

“A nation that destroys its soils destroys itself.”

– Franklin Delano Roosevelt

As the United States begins the necessary transition to a sustainable energy economy, it will launch a rural renaissance. We will not drill our way out of our dependence on foreign oil; we will grow our way out, harvesting energy not only from the soil and from woodlands, but also from the wind and sun. Rural America will capture new jobs, industries and tax revenues.

As the PCAP proposes, by 2020, the United States should cut its oil consumption in half, increase the average fuel efficiency of new cars to 50 miles per gallon, reduce greenhouse gas emissions by 30% and produce 30% of its electricity from renewable resources. Rural America will be the key to achieving these goals.

Rural biorefineries will turn farm-grown feed stocks into ethanol, biodiesel and an array of consumer products now made from petroleum. Feedlots and landfills will convert methane to electricity. Open lands will host solar arrays and wind farms, harvesting free energy to be sold as electric power. Farmers will earn cash by using production techniques that keep carbon stored in plants and soils and by selling greenhouse gas offsets. Home-grown biofuels will power farm equipment.

Rural lands will provide energy crops and carbon storage, as well as wildlife habitat, food, fiber and building materials. By some estimates, farm income from renewable energy projects will increase by \$37 billion by 2025, and 5.1 million new jobs – mostly in rural areas – will be created.¹ The chief challenge in rural America

¹ Renewable Energy Roadmap: Rural American Can Prosper, Report from the University of Tennessee, December 2006. www.renewableenergyaccess.com/rea/news/story?id=46961.

will no longer be dealing with economic depression and the out-migration of young people. It will be to balance the competing demands on land, water and forests in ways that sustain rather than deplete natural resources.

Climate change will bring other challenges, too. The agricultural industry will have to adapt to the effects of global warming. The impacts will be different by region. Some will have too much rain while others have too little. Temperatures will shift, altering what farms can grow. Livestock will need protection from heat. Rangeland and forage grasses may change. New pests will appear and old pests no longer will be controlled by cold temperatures or the natural predators that have moved north. Competition between farms and cities for water supplies will intensify where rainfall declines. And insofar as they rely on fossil fuels, farmers will contend with higher energy prices.

Meeting all these demands will require us to revisit the way we farm, the way food comes to our tables, the way farmland is used – and the way federal policies relate to agriculture, forestry and rural development. As in other sectors of the economy, policy should help rural America reduce its greenhouse gas emissions while adapting to the climate changes already underway.

Reducing greenhouse gas emissions: Agriculture accounts for 6% of America's greenhouse gas emissions. While carbon dioxide is the most familiar and longest-lasting of the gases that cause global warming, agriculture is responsible for only 1% of America's CO₂ emissions, primarily from fossil fuels used in production and transportation.² Most of agriculture's emissions are methane (CH₄) and nitrous oxide (N₂O). Methane's heat-trapping properties in the atmosphere are 23 times more potent than those of CO₂. One ton of N₂O has the warming equivalent of 310 tons of CO₂, and 74% of national N₂O emissions come from agriculture.

Reducing these emissions will require switching to nonpetroleum fuels for farm equipment and nonpetroleum fertilizers, adopting more fuel-efficient tillage and harvesting methods and capturing methane from animal wastes for fuel. We will want to find more efficient ways to move food from field to table and less need to move it long distances.

² S. Greenhalgh and A. Sauer, "Awakening the Dead Zone: An Investment for Agriculture, Water Quality, and Climate Change," issue brief, World Resources Institute, 2003.

Another way to reduce emissions is to sequester greenhouse gases. Healthy plant communities, forests, virgin soils and untilled fields all have the ability to store greenhouse gases so they do not enter the atmosphere. Conventional farming techniques release gases by disturbing or destroying these natural sinks. The nation's agricultural soils have lost, on average, one-third of the carbon they contained before wide-scale cultivation began in the 1800s. Among the practices that will increase carbon sequestration are conservation tillage and residue management (49%), improved cropping systems (25%), land restoration (13%), land use change (7%) and irrigation and water management (6%). If moderate incentives were available, farmland could sequester up to 70 million metric tons of carbon.³

Adaptation: Climate change is expected to influence crop and livestock production, hydrologic balances, input supplies and other components of agricultural systems; the types, frequencies, and intensities of various crop and livestock pests; the availability and timing of irrigation water supplies; and the severity of soil erosion.⁴ Some of these changes are underway and will require that agriculture and rural communities adapt.

Strategies for Public Policy

Public policy should help rural communities and agriculture and forest managers address each of these challenges and opportunities. It should:

- **Focus on reducing emissions of the two most prominent agricultural greenhouse gases – methane and nitrous oxide – through improved efficiency in fertilizer use, anaerobic digestion, better manure management and high-quality pasture rotation.**
- **Maintain and intensify carbon sequestration in soils and in living plant material, including commercial forests, with widespread use of low-till and no-till cultivation. The agricultural industry should set a goal to contribute 20% to the nation's total reduction in greenhouse gas emissions,⁵ more than triple its contribution today.**

³ R. Lal et al., *The Potential of U.S. Cropland to Sequester Carbon and Mitigate the Greenhouse Effect* (Chelsea, Mich.: Ann Arbor Press, 1998).

⁴ R. Adams et al., "Effects of Global Climate Change on Agriculture: An Interpretative View," *Climate Research* 11 (1998):19-30.

⁵ This goal was among recommendations developed by 40 national experts in agricultural and natural resource stewardship at the National Leadership Summit for a Sustainable America, held in December 2006, at the Johnson Foundation's Wingspread Conference Center in Racine, Wis.

- **Participate in market- and incentive-based approaches to climate stabilization, including greenhouse gas offsets.**
- **Ensure that farmers, ranchers and rural communities have adequate information, capital and flexibility to innovate and adapt.**
- **Build upon existing policies and programs to elevate the profile of climate change.**
- **Encourage greater collaboration between state and federal agencies, university extension offices and rural farming cooperatives, farms and urban development. Stakeholders should share resources to help rural communities cope with, adapt to and capture the opportunities presented by changes in the climate and the marketplace.**

Presidential Actions

1. **Raise the visibility of rural America’s crucial role in energy and climate security.**

The President should issue a proclamation recognizing the significant contribution agriculture and rural America can make to national security. The President should encourage agricultural and rural leaders to become the driving force behind the nation’s goals for renewable energy and energy independence and pledge the Administration’s support. The President should keep attention focused on rural America’s crucial role by participating in agricultural conferences and similar events.

2. **Invest in the new rural energy economy.**

Federal programs should help capitalize the plants, equipment and infrastructure needed for rural America’s contribution to energy and climate security and promote local ownership of these projects. The President should:

- **Direct that the low-interest loans offered by the U.S. Department of Agriculture’s Rural Utility Service be redirected from the construction of coal-fired power plants to investments that equip rural America to be the nation’s principal supplier of green energy (see PCAP Section 3). Encourage the nation’s rural electric cooperatives, which**

reportedly plan to invest nearly \$30 billion in new coal plants over the next decade, to invest instead in efficiency programs, renewable electric generation and infrastructure that help meet the nation's climate and energy security objectives.

- **Champion USDA's proposal to invest \$50 million over 10 years to encourage new private markets to supplement existing conservation and forestry programs.**
 - **Propose an investment tax credit of 50% to encourage climate-related conservation improvements by farmers, ranchers and forest landowners.**
3. **Help agriculture sequester greenhouse gases.**
- **Increase funds appropriated to the U.S. Forest Service's State and Private Forestry Program.**
 - **Remove financial barriers that prevent farmers from converting marginal agriculture lands to permanent grassland or forest.**
 - **Repeal or retool incentive programs that subsidize inefficient land uses.**
 - **Extend existing tax credits for permanent easements beyond 2008 to keep forested land in forests.**
 - **Modify forestry programs to promote management practices that improve carbon sequestration. Practices such as thinning, increasing harvesting rotation periods and reforestation are potentially lucrative avenues for increasing carbon sequestration.**
 - **Direct USDA and DOE to quantify the contributions that reducing urban sprawl can make to sustaining forested lands, grasslands and pastures as a carbon sequestration measure.**

4. Encourage agricultural participation in emissions offset and trading programs.

The President should direct USDA and the Environmental Protection Agency to develop criteria for agricultural and forestry practices that are legitimate, verifiable and productive opportunities for funding from carbon offset programs. The agencies would work with agricultural organizations to:

- **Develop standardized metrics for issuing greenhouse gas credits to agriculture.**
- **Promote partnerships between agricultural operations and potential greenhouse gas credit purchasers.**
- **Educate farmers and rural landowners on the opportunities and risks in emerging carbon markets.**
- **Direct USDA to establish clear and rigorous inventory and reporting mechanisms for carbon storage.**
- **Require more specific reporting for National Resource Inventory and tie it to management strategies that improve the inventory's modeling capabilities.⁶**

5. Strengthen connections between agricultural practices, water quality and greenhouse gas emissions.

Direct EPA to quantify the connections between water quality and greenhouse gas emissions. The agency should identify emissions that degrade water quality and practices that sequester carbon and improve water quality, such as grass buffer strips or improved tillage practices. It should:

- **Make recommendations based upon its pilot projects that allow polluting industries to purchase nutrient credits from farmers who implement practices to reduce nutrient runoff on their farms, and give priority to practices that simultaneously sequester carbon.**
- **Integrate greenhouse gas language into water-quality regulations (for example, reducing nitrous oxide emissions as a side benefit of reducing nutrient runoff).**
- **Consider No Net Loss wetland policy when calculating land conversion options.**

⁶ Ibid.

- **Include offsets from functional wetland creation or restoration in standards for greenhouse gas offset programs.**
- **Extend compliance requirements for receipt of commodity payments to include nutrient management requirements in Total Maximum Daily Load (TMDL) non-attainment watersheds. Create a pilot project for the Chesapeake Bay or the Upper Mississippi River Watershed, with joint USDA/EPA jurisdiction.⁷**
- **Tie payments for voluntary programs to standardized quantitative measures of environmental performance⁸, and fund a pilot program to better tie these measures to payment allocations. Such measures can reveal changes in soil erosion, nutrient losses, greenhouse gas emissions and water usage.**

6. Manage the evolution of ethanol fuels.

Direct USDA to focus research, development and education programs on mitigating the environmental damage from grain ethanol production and improving its net-energy and net-greenhouse gas profile, while facilitating a transition to cellulosic ethanol.

- **Fund pilot projects to demonstrate new production technologies that improve the emission and energy performance of grain ethanol production, including the use of renewable energy for power and heat.⁹**
- **Through incentive programs, nutrient management plan requirements and farmer outreach, promote precision management of nitrogen fertilizer use (including conservation tillage) in corn production.¹⁰**

⁷ E. Marshall, "Thirst for Corn: The Imminent Environmental Impacts of Corn Production to Meet Burgeoning Ethanol Demand," World Resources Institute Policy Note, Energy and Biofuels, no. 2 (2007); see www.wri.org/publication/thirst-for-corn#.

⁸ Greenhalgh and Sauer, "Awakening the Dead Zone."

⁹ Corn ethanol now reduces greenhouse gas emissions by 15-20%. One facility in Canada has linked an ethanol plant with a large feedlot and anaerobic digester, which supplies heat and power for the plant. The digester captures and burns methane, while the ethanol plant closes the loop by providing distilled dry grains to the feedlot, creating an operation that is essentially GHG neutral. USDA should research similar positive examples and disseminate them to agricultural operators and ethanol producers.

¹⁰ E. Marshall and S. Greenhalgh, "Beyond the RFS: The Environmental and Economic Impacts of Increased Grain Ethanol Production in the U.S.," World Resources Institute Policy Note, Energy and Biofuels, no. 1 (2007), see www.wri.org/publication/beyond-rfs-environmental-and-economic-impacts-increased-grain-ethanol-production-u-#.

- **Direct USDA not to allow farmers penalty-free early outs from their Conservation Reserve Program (CRP) contracts to meet ethanol demand.**
 - **Develop standards for growing, harvesting and processing energy crops to ensure that biofuels retain their green attributes.**
 - **Instruct USDA and DOE to make sure that farm and energy policies are coordinated at both the state and federal levels to provide incentives for the production, harvest and delivery of a variety of feedstock to biorefineries.¹¹**
 - **Increase funding for R&D to better support research into cellulosic ethanol production.**
 - **Work with Congress to fund existing grant programs for biomass development in the Healthy Forests Restoration and the Energy Policy Acts, including full appropriation of loan guarantees for cellulosic refineries and the biorefinery grant program under the Energy Policy Act of 2005.**
 - **Encourage Congress to expand Section 9010 of the 2002 Farm Bill to create a pilot transition assistance program for farmers, ranchers and forest landowners to produce biomass feedstocks for cellulosic ethanol plants.¹² Create incentives for the next generation of bioenergy crops. Offer long-term contracts for following sustainability guidelines in the production and harvest of perennial, native, cellulosic feedstocks on agricultural lands.**
 - **Expand the Conservation Security Program, fund it fully and extend eligibility to all U.S. farmers. Add enhancements that shift existing row-crop acreage to sustainable bioenergy feedstocks and encourage the cellulosic feedstock production in a targeted region to entice new bioenergy plants.**
7. Help rural America reduce the nation's greenhouse gas emissions.
- **Expand renewable energy portfolio standards to include thermal process energy systems for biorefineries.**

¹¹ J. Hettenhaus, *Achieving Sustainable Production of Agricultural Biomass for Biorefinery and Feedstock* (Washington, D.C.: Biotechnology Industry Organization, 2006), www.bio.org/ind/biofuel/SustainableBiomassReport.pdf.

¹² See "Charting America's Energy Future," a summary of the 25x'25 Action Plan, February 2007, www.25x25.org/index.php?option=com_content&task=view&id=58&Itemid=148.

- **Promote local ownership of energy production facilities by helping communities with planning and financial assistance and by establishing purchasing, grant, licensing and loan preferences for locally produced bio-based energy and products.**
 - **Conduct regular, systematic assessments of marginal agricultural land to quantify the potential for wind and solar power development.**
 - **Expand the availability of anemometers to rural landowners to measure wind.**
 - **Provide sufficient funding to the National Renewable Energy Laboratory (NREL) to regularly update its resource data to reflect changes in rural renewable energy production due to climate change. Funding should allow NREL to develop resource maps in enough detail to assist farmers, forest managers, investors and others in adapting to climate change.**
 - **Give high priority to promoting the reduction of nitrous oxide from farm fertilizer use.**
8. **Anticipate and manage the budget impacts of climate change on the Federal Crop Insurance Program.**

Since 1980, the taxpayers' exposure under the Federal Crop Insurance Program (FCIP) has increased 26-fold to \$44 billion.¹³ Crop losses due to drought, excessive precipitation or pests are among the predicted effects of climate change. The President should direct USDA to:

- **Estimate future exposure levels for the FCIP based on assessments of the Climate Change Science Program, the Intergovernmental Panel on Climate Change and other highly regarded assessments of climate impacts.**
- **Analyze implications for the federal budget, insurance rates and the continued availability of insurance.**
- **Assess and prioritize climate adaptation measures based on their potential to reduce insured crop losses.¹⁴**

¹³ Climate Change: *Financial Risks to Federal and Private Insurers in Coming Decades Are Potentially Significant* (Washington, D.C.: U.S. Government Accountability Office, March 2007).

¹⁴ Ibid.

9. Increase the profile of Climate Change in the Farm Bill¹⁵.

Direct USDA to review congressional action on the 2007 Farm Bill and work with Congress on legislation to add any of the following features not yet incorporated into law:

- **List greenhouse gases explicitly as a resource of concern for air quality.**¹⁶
- **Identify CH₄ and N₂O as emission-reduction priorities for agriculture.**
- **Identify and reward carbon sequestration opportunities and perennial biofuel production in incentive programs.**
- **Require that environmental trade-offs be assessed when evaluating applications for payment through farm bill programs. Establish protocols to standardize these assessments.**¹⁷
- **In the Conservation Title, make carbon sequestration and greenhouse gas reductions a priority in allocating resources, establish a clear link between conservation programs and private carbon markets and recognize the critical role played by forests in the carbon cycle.**
- **In the Energy Title, factor in life-cycle greenhouse gas benefits when providing incentives; encourage the development of bioenergy, with an emphasis on cellulosic ethanol; and significantly increase funding for energy efficiency and renewable energy projects by farmers, ranchers and forest landowners.**¹⁸
- **In the Research Title, quantify the environmental service benefits of proposed activities, analyze the impacts of potential changes to subsidy programs and allocate funds to appropriate adaptation measures and to study the resiliency of farms to climate change.**
- **In the Commodity Title, expand the conservation compliance provisions to include greenhouse gases.**¹⁹
- **Strengthen and fully fund the Environmental Quality Incentives Program (EQIP), Conservation Security Program (CSP) and Conservation Reserve Program (CRP).**

¹⁵ Ibid, Wingspread.

¹⁶ E. Branosky and S. Greenhalgh, "Agriculture and Climate Change: Greenhouse Gas Mitigation Opportunities and the 2007 Farm Bill," World Resources Institute Policy Note, Climate and Agriculture, no. 1 (2006), www.wri.org/publication/agriculture-and-climate-change-2007-farm-bill#.

¹⁷ Ibid.

¹⁸ The 25x'25 campaign has proposed that funding for the Energy Title be increased by \$1 billion.

¹⁹ All of the Title recommendations come from Wingspread.

- **Create a Biofuels Reserve Program²⁰ and/or a new Working Lands Conservation Reserve Program to offer a high enough premium to encourage farmers to enroll outgoing CRP acres in sustainable biomass production rather than planting them into corn or other monoculture crops.**
- **Shift agriculture export subsidies away from traditional commodities to bioenergy in the form of regulatory and financial incentives.²¹**
- **Support state bioenergy policy innovation and coordination.²²**

10. Support research on agriculture and climate change.

- **Ensure that USDA and the National Science Foundation have ample funds to study agriculture's ability to mitigate and adapt to climate change. (For example, the GRACENet program conducted by the Agricultural Research Service is conducting double-blind trials of alternative farm management practices and, based on results, is advising farmers on how to reduce their carbon footprints.)**
- **Provide the National Oceanic and Atmospheric Administration with sufficient funding to develop more accurate regional six-month to one-year climate forecasts to help farmers plan which crops to plant and when and where to plant them.**
- **Ensure that adequate funds are included in the federal Climate Change Science Program to increase the understanding of climate impacts at the local scale so that farm and forest operators are better able to plan adaptation. (See PCAP Section 11)**
- **Increase R&D funding for research into biochar²³ and other low-cost technologies that simultaneously reduce greenhouse gas emissions and contribute to sequestration.**

²⁰ The National Wildlife Federation has proposed that the CRP be amended to allow lands coming out of the program to be re-enrolled into a modified Working Lands Conservation Reserve Program, which would allow limited harvests of biomass feedstock crops that meet minimum sustainability standards while still enhancing wildlife habits. This program would provide long-term contracts to farmers for sustainable production of perennial, native bioenergy crops.

²¹ See publications from the Energy Futures Coalition, www.worldwatch.org/node/1442.

²² States can help lead the way in effective policies and programs for sustainable bioenergy production. Legislation introduced in Minnesota in 2007 provides an array of mechanisms to promote a sustainable bioenergy sector. Other states are working on similar policies. Federal policy should support these types of state-based innovations and learn from their successes and failures.

²³ J. Lehmann, "A Handful of Carbon," *Nature* 447, no. 7141 (2007): 143-144.

11. Mobilize the USDA Cooperative Extension services for technical assistance.

Direct USDA, through the Cooperative Extension System, to:

- **Help farmers balance bioenergy feedstock production with sequestration.**
- **Teach sequestration-related production techniques to agricultural operators.**
- **Identify and provide information as needed to promote the production of nonfood farm crops that serve as feedstocks for products now made from petroleum.**
- **Identify drought-tolerant, disease-tolerant and pest-tolerant native species for forestation.**
- **Help rural leaders with infrastructure, workforce, programs, technology and resource development.²⁴**
- **Equip the Cooperative Extension Service to educate rural landowners on the potentials for and legal/business dimensions of leasing land for wind power and solar electric farms.**

²⁴ G. Crosby and D. Hamernik, *Exploring New Opportunities for Extension* (Washington, D.C.: CSREES, 2002).

Section 6: Low-Carbon Buildings¹

“Design is the first signal of human intention.” – William McDonough

We used to think of a building’s footprint as the area defined by its foundation. Today, the term means something different: the amount of greenhouse gases each structure emits into the atmosphere. Buildings have a greenhouse gas footprint, and it’s huge.

In the United States, residential and commercial buildings use nearly 40% of our energy and emit 38.5% of our greenhouse gas emissions. That makes our 116 million homes and nearly 5 million commercial buildings the nation’s number one energy consumers and contributors to global warming.² As architect William McDonough might say, the design of today’s buildings signals that we intend to cause climate change and all of its potentially disastrous consequences – surely an outcome we do not want.

Making the sector’s footprint smaller isn’t easy. Once a building is built, its footprint is locked in for decades. The majority of buildings that exist today still will be in use by mid-century. Only about 2-3% of the existing buildings in any given year are newly built. Unless a building undergoes significant remodeling, its enduring footprint affects not only the occupant’s energy bills, but the power grid, fuel supplies, air quality, public health and the climate.

¹ This chapter draws extensively, with permission, from documents of the Alliance to Save Energy, including J. Loper et al., *Reducing Carbon Dioxide Emissions Through Improved Energy Efficiency in Buildings*, October 2007; J. Loper et al., *Building on Success: Policies to Reduce Energy Waste in Buildings*, July 2005, www.ase.org/content/article/detail/2329; and fact sheets issued in 2007, as cited.

² The estimate on the number of buildings in the United States comes from the Energy Information Administration’s (EIA) *Annual Energy Outlook 2007* report, www.eia.doe.gov/oiaf/aeo/index.html. EIA counts 116.34 million residential units, including single family, multifamily and mobile homes. Residents account for 21% of national energy consumption. EIA’s *Commercial Buildings Energy Consumption Survey* from 2003 counted 4.9 million commercial buildings in the United States larger than 1,000 square feet. These buildings account for 18% of national energy use, not including commercial buildings of less than 1,000 square feet.

The good news is that in the United States, buildings and the equipment inside them are becoming more efficient and less polluting. The power demand for commercial lighting has been cut in half in recent years³; a home built in 2001 uses 12% less energy per square foot than one built in 1908⁴; and new refrigerators consume one-fourth the energy of those sold 20 years ago.⁵ Central air conditioners are available today that are 50% more efficient than the current standard,⁶ and modern “low-e” windows are at least 25% more efficient than the double-pane windows that comprise the majority of sales.⁷

But overall energy consumption and greenhouse gas emissions from buildings are rising because the number of buildings, their size and their plug loads all are growing. New homes in 2005 were 26% larger on average than the existing stock⁸; air conditioning has become common; clothes washers and dishwashers are standard appliances in most households; and the use of personal electronics has increased sharply. As a result, residential energy use has increased by one-third since 1980. The U.S. Energy Information Administration (EIA) projects that residential sector electric demand will grow 1.3% every year between 2005 and 2030 due primarily to an increase in the number of households, but also due to larger homes, digital televisions and more electronic devices.⁹

We have the tools to improve, and an array of studies suggest that using them could make rapid and substantial improvements in building efficiency and greenhouse gas reductions:

³ M. Heizer, “Saving Energy in Office Buildings,” *Heating, Piping and Air Conditioning Engineering* (May 2003), cited in Loper et al., *Building on Success*, 68n2.

⁴ Energy Information Administration, *Residential Energy Consumption Survey 2001*, table CE1-6.2u, www.eia.doe.gov/emeu/recs/recs2001/ce_pdf/enduse/ce1-62u_sqft_useind2001.pdf; EIA, *Residential Energy Consumption Survey 2004*, table 1.2.5, cited in Loper et al., *Building on Success*, 68n3.

⁵ “Issues: Oil & Energy; Efficient Appliances Save Energy—and Money,” issue brief, National Resources Defense Council, August 31, 2004, www.nrdc.org/air/energy/fappl.asp.

⁶ EIA, *Annual Energy Outlook 2004*, 72, cited in Loper et al., *Building on Success*, 68n15.

⁷ According to the EIA’s 2004 *Buildings Energy Data Book*, table 7.3.5, a typical single-family home still has single-pane windows. Low-e windows market share data comes from AAMA-WDMA, 2003 Industry Market Studies, 2003 AAMA-WDMA National Statistical Review and Forecast, 5, cited in Loper et al., *Building on Success*, 68n16.

⁸ EIA, *Annual Energy Outlook 2004*, 71, cited in Loper et al., *Building on Success* 68n10.

⁹ EIA, *Annual Energy Outlook 2007 with Projections to 2030*, www.eia.doe.gov/oiaf/aeo/demand.html.

- In a study commissioned by PCAP, analysts at the Alliance to Save Energy project that CO₂ emissions from buildings will increase a staggering 86% from today's levels if trends continue. But with aggressive use of energy efficiency measures that are available and cost-effective today, building emissions could be reduced by about 40% – even without major national greenhouse gas-pricing policies.¹⁰
- Recent studies of several states suggest that overall building energy efficiency could be improved by 10% to 30% in the next decade with technologies already known to be feasible and cost-effective.¹¹
- A 2006 report by the McKinsey Global Institute concluded that we could reduce energy use in new and existing buildings by more than 25% by 2020 with measures that pay for themselves in less than 10 years.¹²
- An analysis sponsored by the American Solar Energy Society¹³ predicts that the growth in greenhouse gas emissions from buildings can be held to less than 7% between 2002 and 2025 with the serious application of seven policies and programs: the Federal Energy Management Program, ENERGY STAR, better building codes, up-to-date appliance and equipment efficiency standards, utility-based financial incentives and low-income weatherization assistance.

The Zero-Energy Building

Today, it is possible to build a home that uses no net energy and produces no net greenhouse gas emissions – in other words, a home that generates as much or more energy than it consumes over the course of each year. Zero-energy buildings

¹⁰ Loper et al., *Reducing Carbon Dioxide Emissions*.

¹¹ See S. Nadel et al., *The Technical, Economic and Achievable Potential for Energy Efficiency in the U.S.: A Meta-Analysis of Recent Studies* (Washington, D.C.: ACEEE, 2004), 5-6, cited in Loper et al., *Building on Success*, 68n17. The authors reviewed studies for the United States, California, Massachusetts, New York, Oregon, Southwestern states, Vermont and Washington.

¹² "Improving Building Energy Codes," Alliance to Save Energy fact sheet, May 2007.

¹³ *Tackling Climate Change in the U.S.: Potential Carbon Emissions Reductions from Energy Efficiency and Renewable Energy by 2030* (Boulder, Colo.: ASES, January 2007).

are being demonstrated around the United States. The American Solar Energy Society predicts that net-zero-energy buildings will become cost-competitive alternatives in the marketplace by 2020.¹⁴ A prestigious coalition of associations representing building designers and engineers is advocating that all new and renovated buildings in the United States meet a zero-emissions standard by 2030 (see box).

On the Horizon: Homes as Power Plants

By the time today's children buy their own homes, there will be no utility bills as we know them now. That's the vision of a coalition that includes the American Institute of Architects; the American Society of Heating, Refrigerating and Air-Conditioning Engineers; Architecture 2030; the Illuminating Engineering Society of North America; and the U.S. Green Building Council.

By 2030, they say, new homes and commercial buildings will be selling power to electric utilities rather than buying it. New homes and commercial buildings will be super-efficient and will generate their own energy with solar and other renewable energy systems. The money that tomorrow's families and businesses save in zero-net-energy buildings will be the equivalent of new, tax-free income.

Carbon-neutral buildings will make another vision plausible: zero-emission neighborhoods where smart urban design, clean mass transit, urban forests and other sustainable development practices dramatically reduce the greenhouse gas footprint of the built environment. In June 2007, 40 national leaders meeting to discuss sustainability agreed that technology is not the problem.¹⁵ Good policies and strong leadership are the keys.

The technologies necessary to build and operate carbon-neutral communities largely exist. What's needed are a national leadership commitment; a set of systemic regulatory and market reforms reflecting the true value of energy

¹⁴ Ibid., 59.

¹⁵ The meeting was the third in a series of four National Leadership Summits for a Sustainable America, organized by PCAP Executive Director William Becker and hosted by the Johnson Foundation at its Wingspread Conference Center in Racine, WI.

efficiency and renewable energy resources; extensive consumer education and effective community design; and management tools for public and private development practitioners and our elected officials.¹⁶

Presidential Actions

1. Implement the building-related provisions of HR 3221, the energy efficiency legislation introduced in the 110th Congress.¹⁷

The Alliance to Save Energy estimates that full implementation of the building-related provisions of HR 3221 would reduce the projected energy consumption in the buildings sector 20% by 2030 and would cut CO₂ by 18%.¹⁸ By 2050, energy use and greenhouse gas emissions would be reduced 25% below EIA's business-as-usual projections. The provisions include:

- **Efficiency standards for several new appliances and equipment types and updates for several appliances already covered.**
- **An energy efficiency standard calling for a 20% savings in residential building efficiency by 2010 and a 50% savings by 2020.**
- **A stronger building code for manufactured housing.**
- **A renewable energy and energy efficiency portfolio standard requiring electric utilities to meet 15% of their demand with renewable resources, 4% of which can be from energy efficiency programs.**
- **Extension of tax credits for energy-efficient appliances and energy efficiency improvements to commercial buildings.**

¹⁶ The National Leadership Summit for a Sustainable America: Summit 3, at the Johnson Foundation's Wingspread Conference Center June 4-6, 2007. For more information, see www.summits.ncat.org.

¹⁷ As the PCAP was being written in the fall of 2007, the Senate and House both had passed new energy bills and were preparing to resolve differences in conference. PCAP recommends that if the provisions of HR 3221 are not approved by the 110th Congress and signed by President Bush, the next President and Congress should work to pass and implement them.

¹⁸ These estimates, based on EIA projections, refer to "source energy" – energy consumed directly at the building site as well as the energy consumed by power plants to generate electricity. See the Alliance study referenced in Footnote #4, p. 2.

2. Limit the home-mortgage interest deduction.

Although homes and appliances have become more efficient in recent decades, per capita residential energy use has remained about the same because people have built bigger houses and used more energy-intensive equipment.¹⁹ The average home's floor area more than doubled between 1950 and 2000, as did floor area per capita; both have increased by more than half since the 1980s (see Figure 12).

Insofar as the home-mortgage interest deduction encourages people to build bigger homes, it is one of the ways that federal policy encourages greenhouse gas emissions. (See PCAP Chapter 1 for a discussion of subsidy reform.)

One solution has been proposed by Representative John Dingell in the 110th Congress: a reduced deduction for homes of 3,000 square feet and larger starting in 2010, with an exemption for large homes that obtain LEED certification.²⁰ For example, homes of 3,000-3,199 square feet could deduct 85% of mortgage interest, homes of 3,200 to 3,399 square feet could deduct 70% and so on. Homes of more than 4,200 square feet would receive no deduction.²¹

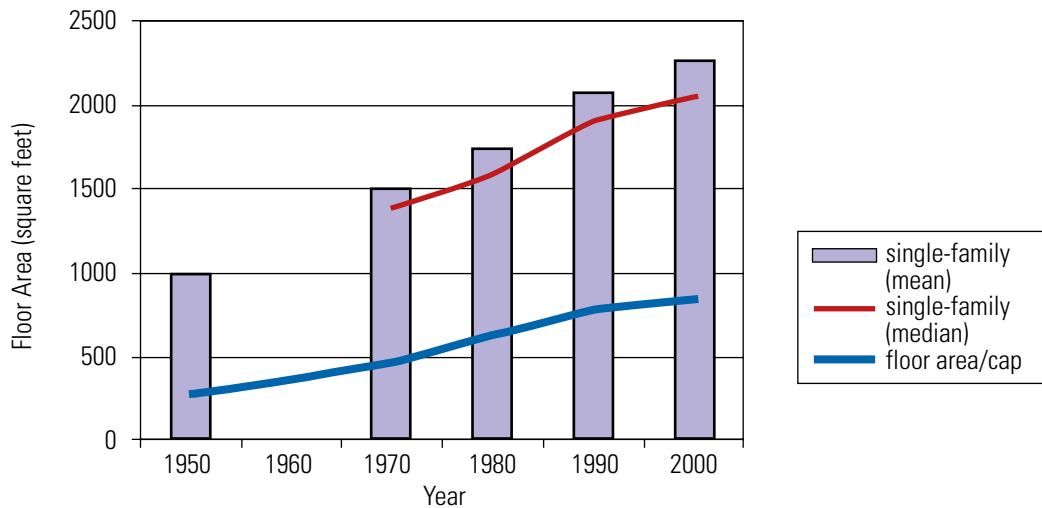
The President should support this change, along with the elimination of mortgage interest deductions for second or vacation homes. While the federal income tax deduction for home mortgage interest is one of the tax code's sacred cows and was originally intended to promote home ownership, it is one of the areas in which the President should ask the people of the United States to help reduce the nation's greenhouse gas emissions. Nationwide, the current deduction amounts to \$64 billion each year. Any additional federal revenue from a reform of the deduction should be returned to homeowners in the form of a tax credit for the cost of LEED certification and an expansion and extension of income-tax deductions for residential energy efficiency improvements, residential renewable energy systems and energy-efficient household equipment.

¹⁹ EIA, *Annual Energy Outlook 2007*.

²⁰ LEED is a green-building rating system administered by the U.S. Green Building Council.

²¹ See www.house.gov/dingell/summary_detail.shtml for the deduction schedule that would be established in the Dingell bill.

Figure 12: U.S. House Size (floor area) Mean and Median 1950-2000²²



National Association of Home Builders (NAHB), 2003. "Housing Facts: Figures and Trends 2003." Washington, D.C.

Source: NAHB 2003

3. Expand and expedite federal action on appliance efficiency standards.

Minimum energy efficiency standards for appliances and equipment have been a cornerstone of U.S. energy policy for nearly two decades. Today, national standards cover some 25 residential and commercial products that account for more than 50% of all building energy consumption.²³

By 2020, the standards in force today will save the equivalent of the energy used by 27 million American households.²⁴

But the savings would be much larger if the U.S. Department of Energy was complying with the schedules Congress has created for developing and issuing new appliance standards.

²² As appears in J. Harris et al., *Don't Supersize Me! Toward a Policy of Consumption-Based Energy Efficiency* (Washington, D.C.: ACEEE, Environmental Energy Technologies Division, 2006), 7-107.

²³ EIA, *Annual Energy Outlook 2007*, Tables A2, A4 and A5, pp. 138-139 and 142-145.

²⁴ *Leading the Way: Continued Opportunities for New State Appliance and Equipment Efficiency Standards*, Appliance Standards Awareness Project, March 2006, www.standardsasap.org/documents/a062.pdf.

Tax-Free Income

The American Council for an Energy Efficient Economy estimates that if less efficient products were removed from the marketplace, consumers could save an estimated \$186 billion in energy costs or about \$1,750 per household by 2030.

In January 2007, the Government Accountability Office (GAO) reported that DOE had missed all 34 deadlines set by Congress.²⁵ Some standards authorized in 1992 are still awaiting final rulemaking. The GAO estimated that the failure to update efficiency standards had resulted in consumers paying tens of billions of dollars more for energy than they would have, had the deadlines been met.

Bills being considered by the 110th Congress (HR 3221 and HR 6) designate a number of new standards already supported by manufacturers and efficiency advocates, including residential clothes washers, dishwashers and incandescent reflector lamps, walk-in freezers and metal halide lamps, among others. The President should:

- **Direct the U.S. Department of Energy (DOE) to identify the barriers that inhibit timely action on appliance efficiency standards, including staffing and funding needs and unnecessary requirements imposed by Congress – for example, requirements in the Energy Policy Act of 2005 (EPACT 2005) that DOE conduct a lengthy rulemaking process after consensus already had been reached by consumer groups and manufacturers. Champion the necessary appropriations and procedural reforms by Congress.**

²⁵ *Energy Efficiency: Long-standing Problems with DOE's Program for Setting Efficiency Standards Continue to Result in Forgone Energy Savings* (Washington, D.C.: General Accountability Office, January 2007), www.gao.gov/docsearch/abstract.php?rptno=GAO-07-42.

- **Require DOE to review and update each existing standard on a regular timetable.²⁶**
- **Direct DOE to set the maximum cost-effective efficiency level for appliance and equipment standards.**
- **Propose that Congress give DOE the authority to set regional standards for heating and cooling equipment to reflect differences in climate. (Under current law, all standards must be uniform nationwide. Regional standards for space-conditioning equipment would produce greater efficiency gains.)**
- **Propose that standby power (the power that certain appliances use while turned off) be incorporated into federal standards. Standby power represents 5% of residential electricity use in the United States.²⁷**
- **Support legislation to set an efficiency standard for lightbulbs, sufficient to phase out incandescent bulbs by 2012 and to increase the standard in 2020. The American Council for an Energy Efficient Economy (ACEEE) estimates that by 2030, the standards could save more energy than all previous appliance standards combined and could avoid the emission of more than 100 million metric tons (MMT) of CO₂.**

4. Extend energy-efficiency and renewable energy tax incentives.

EPACT 2005 established the first comprehensive set of tax incentives for highly efficient commercial buildings, new homes, home improvements, heating and cooling equipment, appliances, fuel cells, and hybrid and advanced diesel vehicles. ACEEE estimates that for a 10-year cost to the U.S. Treasury of about \$2.1 billion, tax incentives can reduce peak electric demand by the equivalent of about twenty 300-megawatt power plants, reduce consumer energy bills by \$27 billion and prevent more than 51 MMT of CO₂ emissions.

However, the tax credits in EPACT 2005 were set to expire at the end of 2007 and 2008, too short a time for most taxpayers to use them. EPACT did not become law until August 2005, and the IRS did not issue several of its guidelines for the

²⁶ For a recommended timetable, see Loper et al., *Reducing Carbon Dioxide Emissions*, 12.

²⁷ P. Bertoldi et al., *Standby Power Use: How Big Is the Problem? What Policies and Technical Solutions Can Address It?* (Berkeley, Calif.: Lawrence Berkeley National Laboratory, 2002).

credits until 2006 or later. PCAP Section 1 recommends that a Presidential Climate Protection Subsidy commission work with industry to determine the ideal duration of federal subsidies. In addition, the President should propose that Congress extend and increase the several energy efficiency tax incentives established by EPACT 2005 to avoid 35 MMT of CO₂ emissions by 2030.²⁸

5. Upgrade the quality and enforcement of building energy codes to reach zero-energy buildings by 2030.

Building energy codes, which set minimum energy efficiency standards for new residential and commercial buildings, are a highly effective policy tool when they are enforced and regularly updated to reflect advances in building technologies and practices. They help ensure that energy efficiency products are installed when each building is constructed – far less expensive than retrofitting buildings later. Cumulatively, consumers have saved an estimated \$8 billion on their energy bills because of building codes since 1991.²⁹

To help states and localities adopt sound building codes, model codes are developed and updated every few years by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) and the International Code Council (ICC). States are required to adopt the ASHRAE model for commercial buildings, but not the ICC model for residential buildings.

At least 42 states have adopted some type of building energy code, but in many cases the codes follow outdated models (see following maps).

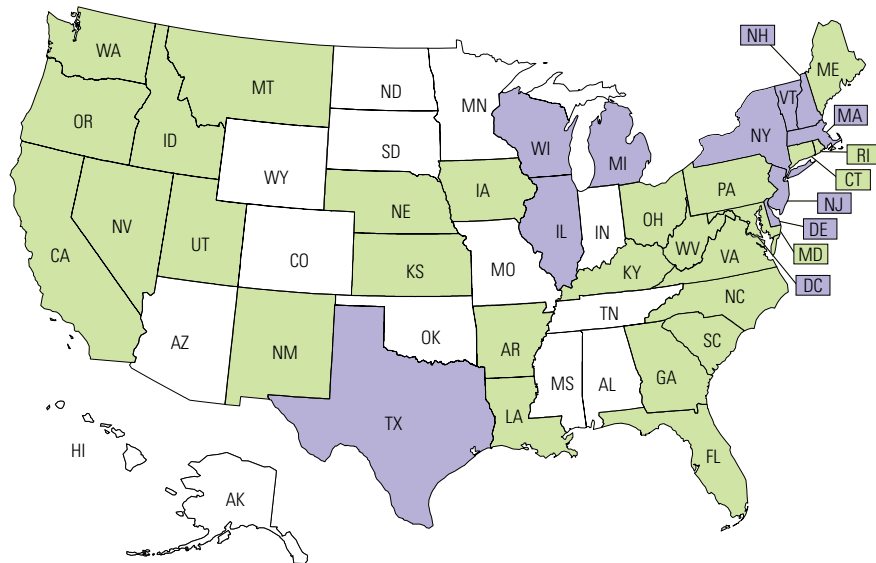
The potential of building codes to reduce the sector's greenhouse gas emissions significantly is constrained by a number of barriers: Authority is scattered among thousands of state and local governments; code agencies often are understaffed;

²⁸ See ACEEE's assessment of potential energy and carbon savings at www.aceee.org/energy/national/SenateBillSavings.pdf. Specific proposals for extensions and increases in EPACT's tax credits can be found in Loper et al., *Reducing Carbon Dioxide Emissions*, 27-28.

²⁹ Based on 2004 correspondence between the Alliance to Save Energy and Karen Mueller, Pacific Northwest National Laboratory.

State Building Codes for Energy Efficiency – Commercial

Information current as of 01/01/07



- Completed 2 – Goes Beyond ECPA (26)**
 AR, CA, CT, FL, GA, ID, IA, KS, KY, LA, ME, MD, MT, NE, NV, NM, NC, OH,
 OR, PA, RI, SC, UT, VA, WA, WV

- Completed 1 – Meets ECPA (11)**
 DE, DC, IL, MA, MI, NH, NJ, NY, TX, VT, WI

Some states have laws that limit their ability to impose building requirements on municipalities. In these “home rule” states, local governments can adopt their own codes. This is the case in AZ, CO, HI, IL (home rule for residential only), MO, NV, OK (home rule for commercial only), TX, SD and WY.

The Energy Conservation and Production Act (ECPA) of 1975 requires states to adopt commercial building codes and to consider adopting residential codes. To meet ECPA, states must either adopt the U.S. DOE-determined “model code” as written, modify it to meet their needs or develop their own equal or better code. DOE has determined that the 2000 Supplement to the IECC and 1999 version of ASHRAE Standard 90.1 improve energy efficiency in residential and commercial buildings, respectively.

The Alliance to Save Energy estimates that aggressive nationwide development and enforcement of building codes could reduce energy use by 12 quads by 2050 – more than half of residential energy consumption in 2007 – and cut CO₂ emissions by 0.7 gigatons (Gt), savings equivalent to removing 125 million passenger cars and light trucks from the road for a year, according to the U.S. Climate Technology Cooperation Gateway.³¹

³¹ See the CTC’s greenhouse gas equivalencies calculator, www.usctcgateway.net/tool/.

DOE should work with ASHRAE and ICC to develop new national model building codes for residential and commercial structures. The model codes would:

- **Require that in 2010 all new buildings and major renovations meet or exceed a 50% reduction in the annual operating energy consumption (fossil fuel consumption per gross square foot) of the regional average for each building type.**
- **Increase the reduction in annual fossil energy consumption for new buildings to 60% by 2013, 70% by 2017, 80% by 2021, 90% by 2025 and 100% (or carbon neutral) by 2030 through a combination of energy efficiency, on-site renewable energy generation and/or certified renewable energy credits.**

The President should propose an increase in funding for states to sponsor training for code officials, builders and designers (see PCAP Section 3's proposal for funding under the State Energy Program)³² and \$200 million annually for DOE's Energy Efficient Commercial Buildings Initiative to achieve net-zero-energy performance for new commercial buildings by 2030.³³

5. Increase the nation's efforts to weatherize the homes of low-income families.

The federal Weatherization Assistance Program (WAP) provides funds to states for basic energy efficiency improvements to the homes of low-income families. The improvements are performed by local crews in each community. Unlike the Low-Income Home Energy Assistance Program administered by the Department of Health and Human Services, WAP prevents rather than responds to the emergencies that develop when low-income families cannot pay their energy bills – a concern that will increase as greenhouse gas pricing raises the cost of

³² These recommendations are based on the "2030 Challenge" of Architecture 2030 and its coalition partners; see http://architecture2030.org/2030_challenge/index.html.

³³ The commercial sector's buildings would achieve zero-net-energy with substantial cuts in energy use through building codes, equipment standards, advanced technologies and practices, on-site renewable energy generation and renewable energy and energy efficiency credits.

fossil fuels. The President should champion congressional reauthorization of WAP and an appropriation of \$1.4 billion annually from 2008-2012, up from \$144 million in the Administration's fiscal year 2008 budget request. Two percent of the budget should be allocated to pilot projects involving materials, equipment and technologies not covered by the current program.

7. Promote smart growth and smart grids.

According to EPA, urban sprawl continues in the United States despite evidence that smart growth policies can reduce vehicle miles traveled by nearly 60%, the loss of farmland by nearly 30%, the loss of open space by 43% and the loss of environmentally sensitive areas by 80% – at the same time preventing air pollution, fuel waste and lost productivity due to traffic congestion, and saving money on urban services and infrastructure.³⁴

Smart growth – which typically involves denser, transit-oriented urban design – creates new opportunities for energy efficiency and renewable energy. Commercial or industrial buildings in denser development open opportunities for district energy systems, including on-site solar electric arrays or combined heat and power systems. More compact development creates opportunities for electric grids at the neighborhood, city or regional scale that provide backup power for low-emission distributed technologies such as rooftop photovoltaics or urban wind turbines, while reducing strain on traditional transmission and distribution systems.

In recent decades, the concept of whole building design – in which buildings are treated as systems of interrelated parts – has become common in the building industry. Several major U.S. homebuilders participating in DOE's Building America program have found that the whole-building approach saves construction materials, reduces wastes, cuts costs and produces homes that are more comfortable, less expensive to heat and cool and competitively priced.

³⁴ See the EPA's "Basic Information on Smart Growth," www.epa.gov/smartgrowth/basic_info.htm.

Some pioneering organizations now are applying a similar concept in whole community development, seeking to integrate buildings, urban form, infrastructure, transportation patterns and advanced energy technologies. The National Energy Center for Sustainable Communities (NECSC) at San Diego State University is applying this approach to greenfield and brownfield development in Chula Vista, Calif. The U.S. Green Building Council has added a LEED standard (LEED-ND) for neighborhood development to its portfolio of rating systems.

The evolving vision for America's urban and peri-urban areas includes: zero-emission buildings, rooftop gardens, open space, bike lanes and walking paths, public transport and congestion control. They will be powered by a smart, clean, robust, resilient and self-healing electric grid with on-site, regional and central power generation, improved storage, cogeneration and computer-derived identification of critical loads within buildings and cities, which will help them adapt to heat waves, storms and grid interruptions. The result will be fewer vehicle miles traveled, better local air quality, cooler inner-city areas, fewer greenhouse gas emissions and a boost for local and regional economic growth as energy dollars are retained in their economies.

The President should:

- **Direct DOE to provide technical and financial support to these research projects to determine how whole community design, advanced energy technologies and smart grids can be integrated in new urban development.**
- **Direct EPA to develop a methodology for crediting urban smart-growth initiatives in State Implementation Plans under the Clean Air Act.**

8. Use federal loan and loan-guarantee programs to support sustainability.

The President should direct federal agencies to develop these proposals to support low-emission development:

- **Federally insured loan programs. Offer incentives for low-emission housing through the Federal Housing Administration, the Department of Veterans Affairs and other agencies that provide federally insured loans. Incentives might include rate reductions to purchasers of green homes; bonus credits for Fannie Mae and Freddie Mac toward meeting their affordability goals for purchasing energy-efficient mortgages; green**

mortgages that reach beyond energy efficiency and recognize the cost savings of a home that is durable, healthy and in close proximity to mass transit; and bonus funding for rural housing constructed to green building standards.

- **Create Connie Mae:** Former Vice President Al Gore has proposed a Carbon-Neutral Mortgage Association that specializes in mortgage loans for low- and zero-emission buildings.
- **Collaboration between federal and private lending programs:** Explore whether and how federal loan and loan guarantee programs can support private sector initiatives such as the William J. Clinton Foundation's program in which banks are providing billions of dollars in loans to cities and to private landlords to upgrade heating, cooling and lighting systems in older buildings.
- **Green disaster recovery:** Make information on sustainable reconstruction available to disaster victims at the Federal Emergency Management Agency's disaster assistance centers in stricken communities³⁵ and provide information on green building and climate-adaptation practices to disaster victims who apply for the U.S. Small Business Administration's low-interest loans to rebuild homes and commercial buildings. SBA should explore lower interest rates or higher loan eligibility for buildings that incorporate advanced energy efficiency, greenhouse gas-reduction and adaptation features.
- **Brownfield redevelopment:** Provide bonus funding in federal loan programs for brownfield redevelopment projects constructed to green building and LEED-ND standards.
- **Expanded tax incentives:** Broaden the existing commercial and residential energy efficiency tax incentives, including those authorized in the EPACK 2005, to encourage superior performance in other environmental categories: reducing greenhouse gas emissions, conserving and recycling water, using building materials and furnishings with recycled content and adapting buildings to the effects of climate change.

³⁵ Under James Lee Witt during the Clinton Administration, FEMA did this by setting up "sustainability desks" at disaster assistance centers.

Section 7: Low-Carbon Mobility

“We have a serious problem. America is addicted to oil, which is often imported from unstable parts of the world.”
– President George W. Bush, 2006 State of the Union address

Transportation is responsible for one-third of the nation’s greenhouse gas emissions – the combined pollution from cars, motorcycles, light-duty trucks, heavy-duty trucks, buses, airplanes, boats, ships and locomotives, as well as the infrastructure to move, fuel and service them. The sector ranks second only behind electric power generation as the largest source of U.S. greenhouse gas emissions.

Reducing the transportation sector’s oil consumption will increase both climate stability and national security, as noted in Section 2. A study performed for the PCAP by the Center for Neighborhood Technology¹ leads to four important conclusions:

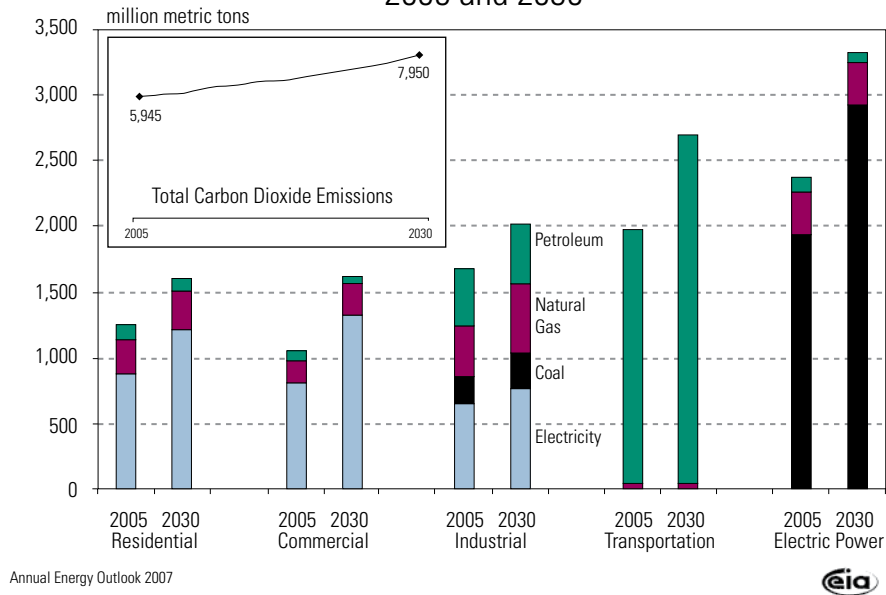
1. We have at hand or well within reach the technologies and knowledge to dramatically reduce greenhouse gas emissions from the transportation sector and the nation’s dependence on foreign oil.
2. Achieving these results will require a substantial commitment from the American public, industry and political leaders. We will need to change how we move around, how we build our cities, how we design vehicles and where we get our fuels.
3. If we wish to avoid the most severe consequences of global climate change as well as economic disruptions caused by the supply and price fluctuations for oil, we must make these changes quickly.
4. Unless we do, the United States will have neither a credible climate stabilization program nor reasonable assurance of military or economic security.²

¹This chapter draws heavily on “Transportation: Presidential Climate Action Plan,” Center for Neighborhood Technology, prepared for the PCAP by the Center for Neighborhood Technology, www.climateactionproject.com/docs/cnt2007.pdf. We wish to acknowledge the authors, Nicole Friedman and Catherine Bendowitz, and the Center for Clean Air Policy for their contributions to the study.

² For a more complete discussion of the national security dimensions of oil imports, see PCAP Section 4, “National Security.”

Figure 13: Energy Information Administration projections for greenhouse gas emissions through 2030 by sector.

Carbon Dioxide Emissions by Sector and Fuel, 2005 and 2030

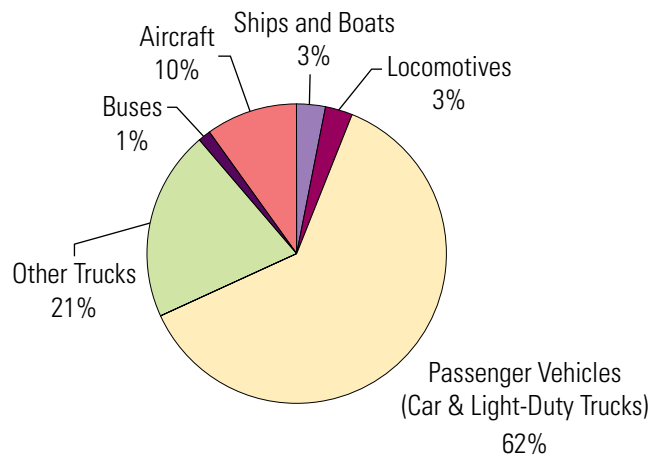


The challenge is considerable. Reducing transportation greenhouse gas emissions to 80% below 1990 levels – the reduction recommended by PCAP for the U.S. economy as a whole – means that transportation-related greenhouse gas emissions must be capped at about one-sixth of 2005 levels.³ Yet, the trend is decidedly in the opposite direction. The sector’s emissions grew 29% from 1990 to 2004 due to increased travel and the stagnation of fuel efficiency across the U.S. vehicle fleet. Emissions are continuing to grow an average of 1.5% each year.

³ Calculated using data from *Trends in U.S. Greenhouse Gas Emissions*, Draft Inventory, Environmental Protection Agency, February 2007. In fact, from 1990 to 2005 the emissions from automobiles and light trucks, for example, grew 25% – largely a result of growing travel demand that “outweigh[s] a small increase in overall fleet fuel economy.”

Figure 14: U.S. CO₂ Transportation Emissions by Mode

Data from the EPA's 2007 Draft Greenhouse Gas Inventory Report



As the Center for Neighborhood Technology study shows, savings of 1,861-1,971 million metric tons of CO₂ per year by 2050 are possible by implementing the many strategies mentioned here for vehicles, fuels, miles traveled, and more efficiency in freight and intercity passenger travel. Greenhouse gas reductions beyond these levels may be possible with more aggressive approaches, along with research and development of additional CO₂ reduction strategies.

Presidential Actions

1. Increase the efficiency of the nation's vehicle fleet.

The federal Clean Air Act allows California to set its own standards for greenhouse gas emissions from vehicles and permits other states to adopt the same standards if a waiver is granted by the Environmental Protection Agency. California adopted its own standards in 2002, and in 2005 asked the EPA to grant the waiver. Under the

California standard, emissions from cars and light trucks must be cut 25% from 2005 levels by 2012, and 30% by 2016. Reductions of 18% are required for bigger trucks and SUVs.

Automakers sued, but in September, 2007, a federal judge ruled that California's action was proper. Thirteen other states have said they intend to adopt California's standards. The EPA has said it will make a decision on whether to grant the required waiver by the end of 2007.

If the EPA has not granted the California waiver by the time the next President takes office, he or she should direct the agency to do so.

In addition, the President should propose an increase in the Corporate Average Fuel Efficiency Standard (CAFE) for passenger vehicles and light trucks to at least 50 miles per gallon by 2020, and to increase the standard incrementally to 200 mpg by 2050. Advancements in nonpetroleum vehicles by 2050 will make this goal possible on a fleet-wide basis.

The President should direct the U.S. Department of Energy to work with automakers to determine whether and to what extent additional federal assistance is needed and justified to fully accomplish the objective of the Partnership for New Generation Vehicles (PNGV), a program in which the "Big Three" and their suppliers were allocated about \$1.5 billion in federal funds over a 10-year period to produce an 80-mile-per-gallon vehicle by 2002.⁴

2. Promote low-carbon transportation fuels.

The President should direct the U.S. Environmental Protection Agency, under the authority of the Clean Air Act, to create and enforce a well-to-wheels standard for passenger-vehicle fuels sold in the United States, following the California model. In that state, fuel providers will be required to reduce the life-cycle greenhouse gas

⁴ PNGV was canceled by the Bush Administration and replaced with its Freedom Car initiative to develop hydrogen vehicles and fuels.

emissions from their fuels 10% by 2020. The EPA should be directed to recommend additional national goals for this type of low-carbon fuel standard (LCFS) for the years 2030, 2040 and 2050. The President should direct the EPA and all other relevant agencies to work with stakeholders on the development of both CAFE and LCFS standards such that alternative-fueled vehicles and the related fueling infrastructure are deployed simultaneously and can be a significant part of the success of the goals under the two policies.

3. Increase the national investment in public transit.

As part of the Transportation Omnibus Reauthorization legislation scheduled to be considered by Congress in 2009, the President should direct the Federal Transit Administration to propose greater emphasis on public transit in the New Starts Program and a greenhouse gas emissions performance standard for Surface Transportation Program (STP) funds. In its fiscal year 2010 budget request, the Administration should propose that a percentage of any new funds for energy programs be dedicated to public transportation and that funding be doubled for noncar choices.

4. Expand incentives for commuters.

The President should propose that Congress require the Internal Revenue Service, which manages the commuter benefits program and related tax credits, to equalize transit and parking benefits. In addition, the President should seek statutory language that requires federal agencies to offer parking cash-out benefits to employees and that includes the number of area employers offering commuter benefits as one of the criteria for awarding Congestion Mitigation and Air Quality (CMAQ) or STP funds.

5. Help communities engage in denser, mixed-use and transit-oriented development.

The greatest potential for reducing greenhouse gas emissions and imported petroleum is to reduce vehicle miles traveled – the miles Americans drive each year. The President should establish a national goal to reduce vehicle miles traveled 20% by 2020 and 50% by 2050; propose that Congress increase funding of the EPA's Smart Growth Program, including grants to states, localities and nongovernment organizations to study and implement smart-growth strategies; and direct the General Services Administration to develop a budget proposal that would provide federal incentives to educational institutions to expand the use of tele-education, and state and local agencies to expand the use of online services that reduce the need for citizens to travel to state offices for driver's licenses, etc.

The President should direct federal agencies to incorporate location efficiency criteria when deciding where to lease or build offices and propose in the 2010 budget that support for transit-oriented development be added to the Transportation Enhancements Program. The Department of Transportation (DOT) should tie funding from the New Starts Program to the development of statewide transit-oriented development plans that mandate county or city plans. DOT should provide financial incentives for states and cities to institute a climate screen to evaluate the climate impacts of proposed development projects and make approvals contingent upon compliance with local greenhouse gas-reduction goals.

6. Create demand for travel alternatives through congestion pricing and car sharing.

The President should propose that Congress increase funding for the Urban Partnership Program; direct DOT to provide incentives to those states that implement congestion-pricing strategies; and direct DOT to require, under the

Urban Partnership Program, that some form of congestion pricing be implemented in all new highway projects built in urban areas.⁵

7. Reduce emissions from shipping freight.

The President should direct the EPA to quantify CO₂ reductions from anti-idling programs through the SmartWay Transport Program and set a target for CO₂ reductions from implementation of anti-idling technology. The EPA's funding should be increased for deploying anti-idling technologies at public truck stops. DOE and the EPA should require that tires for heavy-duty trucks are replaced with wide-base tires, and direct the agencies to collaborate with the American Truck Association to determine appropriate incentives to increase the use of these tires. DOT should develop a Freight Task Force to propose incentives for making greenhouse gas-reduction technologies readily available to freight movement providers, to add CO₂ reduction as an eligible activity to qualify for incentives through the EPA's Voluntary Diesel Retrofit Program, and to draft a plan to change grade and signaling-system requirements so that railways can safely accommodate lighter trains that use less fuel.

8. Create lower emission options for intercity travel.

The President should direct that federal funding for high-speed rail projects be allocated through the Congestion Mitigation and Air Quality Improvement Program (CMAQ) and propose additional dollars for the program in the fiscal year 2010 budget submission to Congress. DOT, Department of Aviation and the Federal Rail Administration should investigate current rail safety requirements and analyze if current regulations are relevant when using high-speed rail technology. DOT should reconvene the Climate VISION Program, a partnership of 14 major industrial sectors working with federal agencies to develop a strategy for private

⁵ U.S. Congress, Joint Economic Committee, *Congestion Pricing for Highways*, testimony from D. Holtz-Eakin, director of the Congressional Budget Office, May 6, 2003, www.cbo.gov/ftpdocs/cfm?index=4197&type=0&sequence=0.

support of high-speed rail. The President should propose funding to create an Intermodal Connections Program that would provide financial assistance to projects that eliminate congestion and make intermodal connections.⁶ The National Laboratory System should conduct collaborative international research to develop low-carbon fuels for aviation.

Figure 15

Results Are Savings from Combined Strategies in MMT CO ₂	2010	2030	2050
Passenger Vehicles	54	1006	1389
Freight	24	233	475
Air – Intercity Passengers	16	63	106
High-Speed Rail – Intercity Passengers		2	0.4
TOTAL CO₂ Savings	94	2030	2050
% CO ₂ Savings from Business as Usual	5%	48%	67%
% CO ₂ Savings from 1990 levels	(34%)*	0%	31%

*There are no savings from 1990 levels in 2010.

⁶ For information about a similar program in Europe, see http://ec.europa.eu/ten/transport/projects/doc/2005_ten_t_en.pdf.

Section 8: Managing Federal Emissions

“This is not a new function we’re seeking. It’s a substitution. It’s not like NASA sending a man to the moon. It’s like finding a new way to send a man to the moon when Southwest Airlines is already flying there every hour handing out peanuts.”

– Caltech Prof. Nathan S. Lewis, commenting on the challenge of shifting to low-emission energy resources

When the next President assumes office, he or she will take charge of the single largest energy consumer in the world – the United States government. The federal government is responsible for nearly 2% of all the energy consumed in the United States and nearly 2% of the nation’s greenhouse gas emissions. With aggressive leadership, the world’s largest energy consumer could become carbon-neutral – an important example of leadership domestically and worldwide.

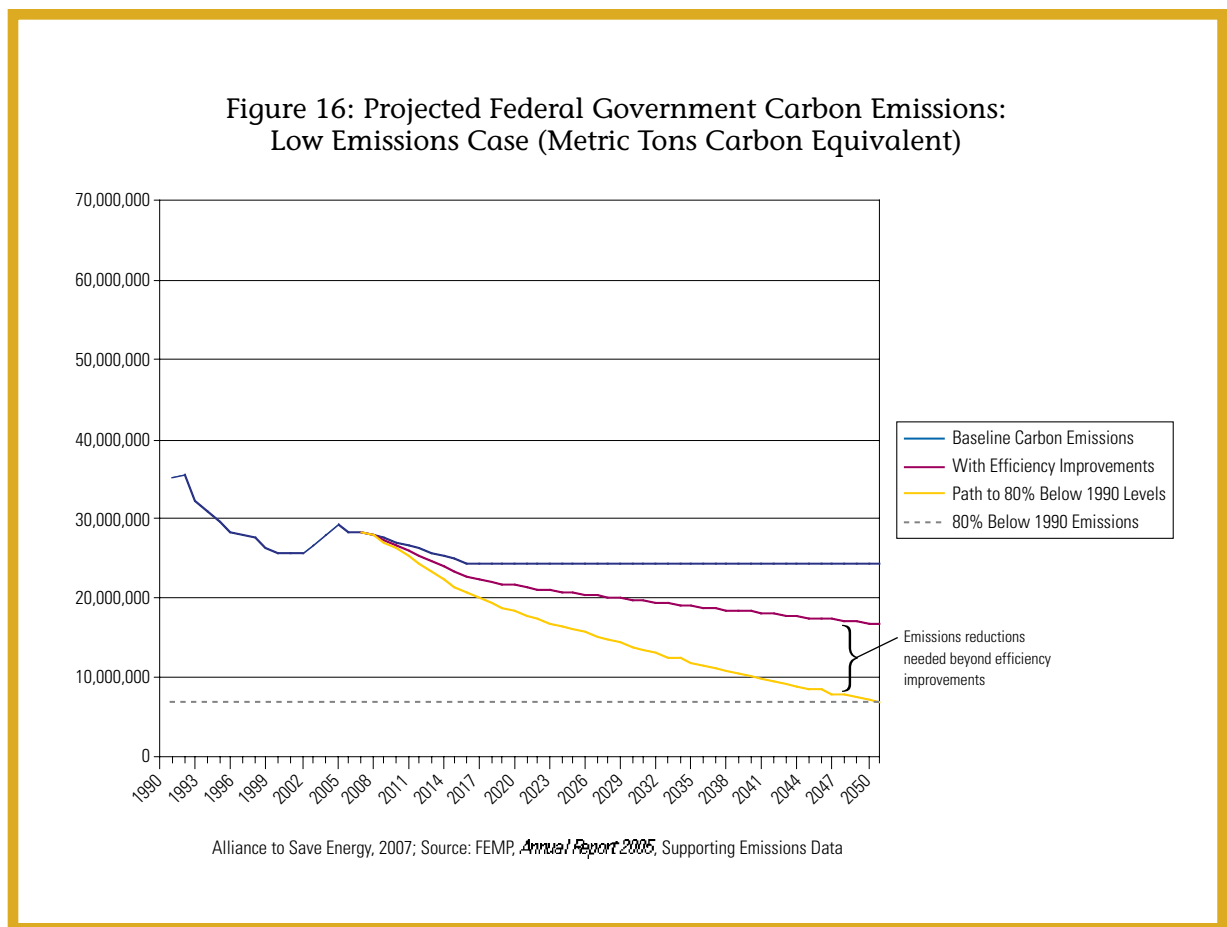
At the same time, the federal government’s enormous purchasing power – some \$14.5 billion in energy costs and \$10 billion in energy-using products each year – can be used to create new market opportunities for low-emission resources and products.

The government’s energy consumption falls into two categories. About half heats, cools and powers more than 500,000 federal buildings. The other half fuels vehicles and equipment, primarily military planes, ships and land vehicles.

Under a series of legislative actions and executive orders – the latest of them Executive Order 13243 issued by President Bush in January 2007 – agencies have made significant progress on energy efficiency and the use of renewable energy technologies in recent years. Federal greenhouse gas emissions declined 22% between 1990 and 2005. Current goals are aggressive, requiring agencies to reduce their energy use per square foot in buildings and facilities by 3% each year through 2015. That would save \$1.5 billion and 4 million metric tons of carbon dioxide emissions annually by 2015. Cumulative savings would be 19 million metric tons of CO₂ and \$6 billion.

The goals have loopholes, however. They do not apply to all of the government's vehicles, aircraft and other mobility activities; they do not extend beyond 2015; and they do not set targets in terms of greenhouse gas emissions.

An analysis conducted for PCAP by the Alliance to Save Energy concludes that if current energy intensity targets were applied to all federal activities; if federal agencies were directed to reduce their energy use 2% annually from 2015 through 2050; and if efficiency improvements were supplemented by the substantial use of low- and no-greenhouse gas energy resources, the government could cut its greenhouse gas emissions 80% below 1990 levels by 2050, which is in line with the target endorsed by PCAP for the nation as a whole.¹



¹ J. Loper et al., *Reducing Greenhouse Gas Emissions in Federal Buildings, Facilities and Vehicles* (Washington D.C.: Alliance to Save Energy, 2007).

The government would avoid nearly 33 million metric tons of greenhouse gas emissions annually by 2050 – the equivalent of taking more than 23 million cars off the road, approximately 10% of all vehicles in America in 2003. Its remaining emissions could be offset by high-quality greenhouse gas credits – certified clean energy projects in developing nations – costing about 1% of the U.S. foreign aid appropriation for 2007.

Presidential Actions

The PCAP and the Alliance to Save Energy have identified nearly 50 specific steps to put the government on the path to carbon neutrality. Most of the steps can be implemented by presidential executive order. Major recommendations are highlighted here.²

1. Establish a zero-net-emissions goal for federal buildings.

The Energy Policy Act of 2005 requires that new federal buildings be 30% more energy efficient than the standard in current model energy codes. While this is a major step forward for the government, the goal falls short of the aggressive long-term targets emerging in the private sector. The American Institute of Architects, the U.S. Green Building Council, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the U.S. Council of Mayors have endorsed targets to reduce energy use and greenhouse gas emissions 30-50% for new buildings by 2010 and 100% – or net-zero emissions – by 2030.

The President should direct agencies to apply the same targets to new federal buildings, major renovations, build-to-lease federal facilities and privatized military housing, and require that new or renewed federal leases in existing buildings give preference to buildings that meet ENERGY STAR rating requirements. In addition, the President should direct agencies to take full advantage of the provision in

² A more complete explanation of actions is located in the original Alliance study at www.climateactionproject.com/docs/Reducing_GreenHouse_Emissions_June_22_2007.pdf.

current law that allows government agencies to assign tax benefits for new commercial properties to the buildings' designers or to energy-efficient equipment.³ Congress should extend this tax provision beyond its current sunset date of 2008.

2. Increase renewable energy goals.

Executive Order 13423 requires agencies to obtain at least 7.5% of their electricity from renewable energy resources in 2013 and thereafter. In 2005, federal agencies reported that renewable energy resources were providing 7% of their electricity needs. However, three-fourths of that amount came from agency purchases of renewable energy credits (RECs) rather than from self-generation of power. In 2006, the U.S. Department of Energy allowed agencies to use RECs toward meeting their energy efficiency targets – a decision that made efficiency requirements far less stringent.

The President should direct DOE to develop a road map that puts agencies on the trajectory to receive 70% of their electricity from renewable resources by 2050. To assure that federal RECs result in actual increases in the use of renewable energy, the President should direct that they be certified as meeting the criteria of the Green-e Renewable Electricity Certification System. To create stable, long-term markets for renewable energy technologies, the President should propose legislation that authorizes agencies to enter into 20-year Power Purchase Agreements for low- and no-emission electricity.

3. Restore specific goals for cutting greenhouse gases.

In Executive Order 13423, President Bush rescinded a requirement that agencies reduce their facilities' greenhouse gas emissions by 30% below 1990 levels by 2010. The order made energy use per square foot rather than greenhouse gas emissions the operative federal metric. However, reductions in energy intensity do not necessarily equate to reductions in greenhouse gas emissions. Greenhouse

³ *Energy Policy Act of 2005*, Public Law 109-58, section 1331.

gas emissions should be reinstated government-wide as a specific performance measure so that federal agency progress is transparent and accountable.

4. Expand greenhouse gas reduction goals to all federal transportation activities.

Current energy-efficiency targets for federal agencies focus heavily on building and facility energy use but neglect the majority of fuel used in federal vehicles. Executive Order 13423 requires nonmilitary federal fleets to reduce their fuel use by 2% annually – an important goal, given that fuel consumption by nonmilitary vehicles increased 12% from 1990 to 2005. But those vehicles represent less than 10% of the transportation energy used across the government. The government's largest consumer of transportation energy and emitter of associated greenhouse gases is the military, led by emissions from jet fuel for military aircraft and ship bunker fuel.

The President should direct the Department of Defense to propose specific performance targets for reducing the use of greenhouse gas intensive fuels in 2015, 2020 and beyond. In addition, the President should direct DOD to report on its efforts to improve the efficiency of aircraft, ships and field equipment including fossil-fueled generators and to determine the cost-effectiveness of additional efficiency investments based on the full cost of delivering the fuel to the point of use.⁴

The President should:

- **Direct that the fully burdened cost of fuels be used in all agency procurement requests and in the acquisition of fuel-consuming equipment.**

⁴ In a 2002 study, the Defense Science Board reported that DOD prices fuel based on its wholesale refinery price. However, because fuel must be delivered to remote and difficult-to-reach locations, it often costs many times that price. The failure to count full costs of delivered fuel "masks energy efficiency benefits and distorts platform design choices," the Board concluded.

- **Seek authority from Congress to conduct pilot projects that use Energy Savings Performance Contracts for purchasing federal mobility systems, including systems for the military.**
- **Establish an aggressive renewable fuels portfolio standard for federal agencies including DOD, plus performance standards related to greenhouse gas emissions.**
- **Direct agencies to adopt California's tough greenhouse gas emissions standards for light- and medium-duty passenger vehicles, vans and trucks.**
- **Require the use of high-efficiency, ultra-low-emission fleet vehicles in short-distance environments such as military bases and federal office and hospital complexes.**

5. Hold agencies accountable for meeting targets.

At least nine agencies did not meet their 2005 targets for reducing building energy use. Three of them had not even achieved their 1995 goals by 2005. The President should tighten oversight and enforcement by defining penalties and enforcement procedures, directing the U.S. Department of Energy to ensure that agencies are not improperly excluding certain buildings and facilities from required efficiency improvements. The President should require agencies to apply the energy efficiency and greenhouse gas reduction goals to source rather than site energy.⁵

6. Enforce requirements for buying energy-efficient products.

Various presidential orders require agencies to purchase products with efficiency levels in the top 25% of their type. However, there is no effective central tracking of purchases and anecdotal evidence indicates lax enforcement. The President should direct the General Services Administration and the Defense Logistics Agency to

⁵ Site energy involves only the energy consumed at a building or facility. Source energy counts the energy used by power plants and other facilities to serve federal buildings. Applying energy intensity and emission requirements to source energy is more difficult, but also more likely to result in lower power-plant emissions, which are the single largest source of greenhouse gases in the United States.

comply immediately with energy efficiency purchase requirements; include energy efficiency requirements in specifications for purchases; direct inspectors general to conduct periodic audits of large solicitations for energy-consuming products; and create a mechanism for vendors to report federal procurement solicitations that do not comply with energy efficiency requirements.

7. Equip agencies to identify energy- and emission-saving opportunities.

The President should direct agencies to conduct energy, emissions and water audits of at least 10% of their facility square footage each year – a requirement not specifically contained in Executive Order 13423 – and to implement all energy efficiency and emission-reduction measures that have a simple payback of less than 12 years. In addition, the President should seek full congressional funding of the Federal Energy Management Program’s (FEMP) SavEnergy audit program; direct agencies to meter all energy use and report annually to DOE on how metering data are being used; and direct agencies to hire Resource Efficiency Managers where potential energy-cost savings are sufficient to pay their salaries.

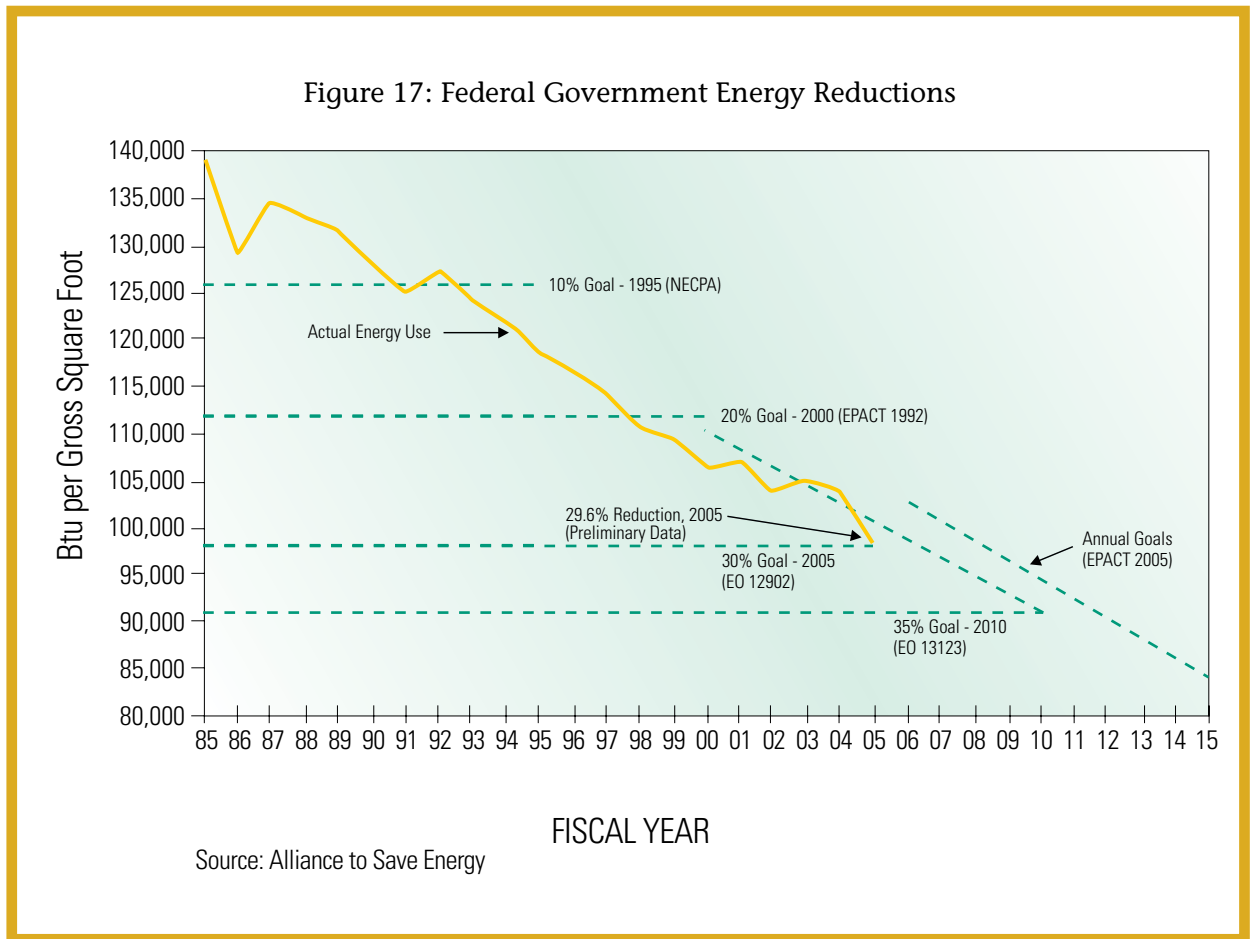
8. Champion sufficient federal investment to meet efficiency and emission goals.

To meet current energy efficiency targets, the federal government will have to invest nearly \$1.5 billion each year through 2015. Recent appropriations have ranged from only \$100 million to \$300 million.

The President should direct agencies to submit annual budget requests sufficient to meet the new energy efficiency and emission reduction targets proposed here. The President should seek permanent authorization from Congress for agencies to utilize Energy Savings Performance Contracts (ESPCs) – agreements in which energy service companies perform efficiency improvements, pay capital costs and

repay themselves by sharing savings with the government ⁶ – plus legislation to establish contract terms of up to 25 years based on life-cycle cost-effectiveness criteria. The President also should seek authority for agencies to mix appropriations with ESPC funds.

The President should request congressional authorization and funding to reopen DOE's six regional offices,⁷ which provided technical support on the use of ESPCs to federal agencies around the nation before they were closed in 2006.⁸



⁶ Congress allowed authority for agencies to use ESPCs to lapse in 2003 and reinstated it in 2004. The authority is currently in place until 2016, but the interruption was followed by a drop-off in agency use of this mechanism. Usage has not recovered to its previous levels.

⁷ These offices would report to the new Innovation and Economic Development Agency proposed in PCAP Section 1 to replace the technology development and deployment programs now housed at DOE.

⁸ DOE's regional offices, reduced from ten to six in 1996, were the federal government's only field network dedicated to speeding the market penetration of energy efficiency and renewable energy technologies.

9. Use federal buying power to open green markets.

The government should exert its purchasing power upstream by creating goals and incentives for its suppliers to improve their energy and emissions profiles, and downstream by linking energy and emissions goals to financial assistance. The government should use its role as a consumer to become a leading technology innovator.

The President should direct the Office of Management and Budget to develop a pilot program to influence the efficiency and emissions profiles of the federal supply chain, to measure results within three years and to report results in terms of reductions in fossil energy use and greenhouse gas emissions reductions.

The President should request that the Government Accountability Office conduct an independent review of the full range of federal financial assistance programs to identify opportunities to leverage energy efficiency improvements, renewable energy use and greenhouse gas reductions by the recipients of the assistance.

The President should direct the General Services Administration (GSA) to propose a program of advance purchase commitments by the federal government for energy efficiency equipment, low-carbon fuels and ultra-low-emission or no-emission vehicles, designed to provide industries with long-term and sizeable markets for these green products. Among other initiatives, GSA should propose federally sponsored competitions to spur innovation with cash awards or advance purchase

contracts. For example, GSA might award an advance purchase commitment to the first manufacturer who can deliver a plug-in hybrid passenger vehicle that is comparable to today's conventional vehicles in cost, performance and safety.

10. Reduce vehicle travel for government customers and employees.

The President should direct the GSA to establish location efficiency criteria for each new or expanded federal facility of more than 50,000 square feet or employing more than 500 people. These criteria would require agencies to seek locations that are close to mass transit and other forms of mobility that don't require the use of personal automobiles.

In addition, the President should direct agencies to increase the use of telecommuting and alternative work schedules that reduce the number of days employees must commute to work and direct GSA to create telework centers in cities with large numbers of federal employees. The President should direct agencies to maximize the use of E-government, which gives citizens online access to federal services.

11. Offset remaining greenhouse gas emissions with clean energy projects in developing nations.

The government can offset its remaining emissions by funding clean energy and greenhouse gas mitigation and sequestration projects in developing nations. Offsets should comply with clear criteria such as those used by the U.S. Environmental Protection Agency to credit state and local emission reduction programs under the Clean Air Act. For example:

- **Projects must result in emission reductions beyond those that result from existing foreign assistance programs.**
- **Reductions must be measurable with a reasonable degree of certainty.**

⁹ EPA has classified telecommuting as a greenhouse gas emissions reduction strategy. The Office of Personnel Management estimates that only one in five eligible federal employees telecommuted in 2004.

- **Reductions must be beyond those required by regulations or international agreements.**
- **Reductions must be verifiable and accessible to inspection.**
- **Reductions must be permanent and irreversible. Their lifespan must be established and commensurate with the credit given.**

If the government achieved an 80% reduction in its greenhouse gas emissions below 1990 levels in 2050, estimated remaining emissions would total 7,018,609 metric tons carbon equivalent (MTCE). At a cost of \$31.69 per ton (the trading price of carbon equivalent on the European Climate Exchange on June 20, 2007) greenhouse gas offsets would cost \$221 million, about 1% of the foreign aid budget approved by Congress for fiscal year 2007.

Section 9: Natural Resources Stewardship

“The nations of the world must make common cause in defense of our environment. And I promise you this: This nation, the United States of America, will take the lead internationally ...

— President George H.W. Bush, Sept. 9, 1989

Policymakers will differ about how to address climate change. Some will argue for incentives over regulations; others will want to use the power as well as the leverage of federal government. But it is beyond dispute that the security and wealth of nations depend on the health of their natural resources and ecosystems.

Ecosystems offer a broad array of services of enormous importance, including many with substantial economic value. The Millennium Ecosystem Assessment defines four types of ecosystem services:

1. Natural systems provide food, fiber, raw materials, medicines, genetic materials and countless other products;
2. The global ecosystem regulates the conditions essential to human health, including temperature, water supplies and the prevention of diseases through temperature and natural predators;
3. Ecosystems provide cultural services ranging from recreation to education; and,
4. Natural systems support human activity by producing oxygen, forming soils, cycling nutrients, filtering and storing water, pollinating plants, controlling floods, sustaining wildlife vital to recreation and sequestering carbon.

These benefits often are not counted because most of us take them for granted and because it is difficult to put a dollar value on them. By one estimate, the economic

¹ Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being: Synthesis* (Washington, D.C.: Island Press, 2005).

value of ecosystem services averages \$33 trillion each year – nearly twice the global Gross Domestic Product.² Clearly, if the environment goes bankrupt, so do we.

These natural systems are under enormous stress. It began long before climate change became a visible issue. It is the result of the human footprint – the impact

Stewardship: The TransPartisan Issue

“The supreme reality of our time is ... the vulnerability of our planet.”

– President John F. Kennedy, June 28, 1963

“Restoring nature to its natural state is a cause beyond party and beyond factions. It has become a common cause of all the people of this country. It is a cause of particular concern to young Americans, because they more than we will reap the grim consequences of our failure to act on programs which are needed now if we are to prevent disaster later.”

– President Richard Nixon, State of the Union Address, 1970

“[There is an] absolute necessity of waging all-out war against the debauching of the environment.”

– Gov. Ronald Reagan, First Earth Day, 1970

“The group that I believe is the future of the American conservative movement, and indeed the future of American politics, are those who favor a green conservatism ...”

– Former Speaker of the House Newt Gingrich, 2007

“There has never been a nation destroyed by terrorism alone and it’s not about to start now. But I think this climate change has the capacity to change the way all of us live on Earth.”

– Former President Bill Clinton, May 16, 2006

“The issue of climate change respects no border. Its effects cannot be reined in by an army nor advanced by any ideology. Climate change, with its potential to impact every corner of the world, is an issue that must be addressed by the world.”

– President George W. Bush, June 11, 2001

of rapidly growing populations on land, water, air and species. When the first members of the baby boom generation were born 60 years ago, the world

²The estimate comes from R. Costanza et al., “The Value of the World’s Ecosystem Services and Natural Capital,” *Nature* 387 (May 15, 1997): 253–260, www.nature.com/nature/journal/v387/n6630/abs/387253a0.html.

population was 2.3 billion. It took more than 10,000 generations to reach that point. Within one lifetime, the population nearly tripled to its current level – 6.5 billion. By mid-century, the world population is expected to exceed 9 billion people.

The Intergovernmental Panel on Climate Change reports that the “resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate-change-associated disturbances (including) flooding, drought, wildfire, insects, ocean acidification and other global change drivers (e.g., land use changes, pollution, overexploitation of resources).”³ Hundreds of thousands of species could be threatened by global warming, from massive predators to tiny insects. With them will disappear the services they performed in the global ecosystem – their genetic information, food, medicine, natural beauty and ecological resilience.⁴

Given the scope and urgency of climate change’s impact on ecosystem services and their economic benefits, as well as their spiritual and aesthetic benefits, a wide variety of tools will be needed – from incentives to intelligent regulations like those that have been responsible for the significant improvements in America’s natural resources since the 1970s.

Many of the recommendations throughout the PCAP will help conserve, restore and prevent further degradation of natural resources. The following additional recommendations focus specifically on action items related to environmental stewardship.

Presidential Actions

1. Require federal agencies to protect natural resources as a public trust.

³ M. L. Parry et al., “Summary for Policymakers,” in *Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007), www.ipcc.ch/ipccreports/ar4-wg2.htm.

⁴ “Saving Species Threatened by Global Warming,” fact sheet, Earthjustice, www.earthjustice.org/library/policy_factsheets/species-global-warming.pdf.

Section 2 proposes that the President declare the atmosphere to be a commons that all have a right to use and an obligation to protect. Legal scholar Mary Christina Wood suggests that, given the scope and urgency of ecosystem degradation, the concept of public commons must go further. “Our new leaders can and must reframe government’s discretion to destroy nature into an obligation to protect nature and to ensure natural resource stewardship,” she contends.⁵

The President should issue these directives:

- **The White House Council on Environmental Quality (CEQ) should examine the enforceable obligation of government agencies to protect the public commons under current law and the U.S. Constitution.**
- **CEQ should investigate and report to the President on the legal basis for creating an ecological trust that formally establishes the principle of stewardship in U.S. and international law.**
- **The President should establish the policy that all elected and agency officials are trustees of resources owned by the American public. The President should direct agency officials to approach climate security as a national security priority and to use their authorities and resources to protect the ecological trust.**
- **Agencies must implement the precautionary approach in natural resource and environmental management and emphasize the prevention of pollution through regulation.**

⁵ In 1892, the Supreme Court said, “The state can no more abdicate its trust over property in which the whole people are interested ... than it can abdicate its police powers in the administration of government” (*Ill. Cent. R.R. Co. v. Illinois*, 146 U.S. 387, 453 [1892]); see also *Geer v. Connecticut*, 161 U.S. 519, 525–529 (1896), which details ancient principles of sovereign trust ownership of air, water, sea, shores and wildlife, and which states: “[T]he power or control pledged in the State, resulting from this common ownership, is to be exercised, like all other powers of government, as a trust for the benefit of the people.” In court cases, these legal principles have been bundled together as the “public trust doctrine.” For commentary, see J. G. Laitos et al., *Natural Resources Law*, chapter 8.11 (West Publishing, 2006); J. L. Sax, “The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention,” *Mich. L. Rev.* 68 (1970): 471, 558–566; C. F. Wilkinson, “The Headwaters of the Public Trust: Some of the Traditional Doctrine,” *Envtl. L. Rev.* 19 (1989): 425, 431; M. C. Wood, “Nature’s Trust: A Legal, Political and Moral Frame for Global Warming,” *Boston College Env’tl. Aff. L. Rev.* 34 (May 2007): 577. M. C. Wood, “Nature’s Trust: Reclaiming an Environmental Discourse,” *Virginia L. J.* 25 (May 2007): 243; G. Torres, “Who Owns the Sky?” *Pace Env’tl. L. Rev.* 19 (2001): 515; P. Barnes, *Who Owns the Sky? Our Common Assets and the Future of Capitalism* (Washington, D.C.: Island Press, 2001).

2. Quantify and take steps to reduce environmental stresses.

Reducing other human-caused stresses on the natural environment – pollution, overharvesting, habitat loss and disruption – will strengthen ecosystems and species experiencing the significant changes imposed by global warming. The first step is to more carefully quantify and prioritize critical natural resources and stresses. The President should issue the following directives and requests.

The **Departments of Agriculture and Interior** should collaborate to:

- **Inventory ecosystem services provided by natural systems in the United States and identify those most critical to human and ecosystem health and well-being.**
- **Assess existing and potential ecological transition corridors (including those that will enable wildlife, as it moves northward, to pass through urban and developed areas) between major forest and grassland ecosystems in the United States, and land ownership patterns within these corridors.**
- **Identify key programs that protect watersheds, water quality, soil and forest health; increase program budgets in the 2010 budget to expand institutional capacity for public stewardship.**

The **Bureau of Land Management (BLM) and the U.S. Forest Service** should identify native species of trees for each region of the U.S., including those that are disease-tolerant, able to thrive in current and anticipated climate conditions and effective at carbon sequestration, and promote the use of these species in public and private reforestation.

The **U.S. Fish and Wildlife Service** should identify highly endangered species under U.S. jurisdiction, including those on the World Conservation Union red list, and develop ark projects and other responsive strategies through partnerships between agencies, research institutions and private partners (such as the international effort focused on amphibian conservation).

BLM, which has been criticized in recent years for expediting permits rather than evaluating the impacts of energy production on public lands, should dedicate

sufficient staff time to thoroughly assess the impacts of energy production on private lands, potential wilderness and other environmental factors before granting leases.

The **Environmental Protection Agency (EPA)** should review the requirements in current law for Environmental Impact Statements (EIS) and recommend revisions to ensure that EISs adequately address stresses on ecosystems and species being affected by climate change – for example, newly threatened species and habitat, and diminishing water resources. For the Fiscal Year 2010 budget submission, EPA should identify resources necessary to expand its ability to enforce programs that will be critical to natural resources affected by global warming.

The **CEQ** should assess the adequacy of its procedures to quantify the impact of federal programs and policies on ecosystem services. If current methods are not adequate, CEQ should lead an interagency effort to improve them. For example, CEQ should organize a Presidential Commission on Biodiversity to recommend how endangered species policy can be strengthened to better address whole habitats and threatened ecosystems.

Congress: The President should propose that Congress extend tax credits beyond 2008 for permanent easements to keep forested land forested; to create incentives for landowners who protect and manage habitat for native species; and to amend tax laws to encourage protection of biodiversity.

3. Revise national stewardship policies in the context of climate change.

Nearly all federal natural resource management strategies were designed and drafted before global warming was widely acknowledged or its implications known. Sound and adaptive management requires new approaches, given the expected scale of environmental change. Long-term management strategies, such as timber harvest cycles, water resource management, national park and forest management, restoration plans for major ecosystems such as the Everglades, Chesapeake Bay and, the Great Lakes need to be reconsidered in the context of the anticipated ecosystem impacts of climate change. The President should direct that:

- **The Secretaries of Interior and Agriculture and the Administrator of the National Oceanic and Atmospheric Administration review major environmental management statutes and recommend revisions to incorporate global warming impacts.**
- **All federal agencies engaged in land management and biodiversity activities should protect, maintain, restore and value biodiversity and wildlife habitat, while incorporating climate change mitigation and adaptation activities into management and planning.**
- **The CEQ should expedite the interagency effort to develop national indicators of ecosystem health, to implement the indicators and to report on national progress every two years.**

4. Develop a national water resources conservation strategy.

Predicted shortages of water supply in some areas of the United States require a comprehensive strategy for water management and conservation, adapted to regional needs. Aggressive water conservation programs and watershed management and restoration programs (including wetland restoration) must be part of this mix. The President should propose that Congress:

- **Establish a national competitive grants program, open to states and local governments, to analyze water conservation and water supply system operational changes needed to increase the resilience of public water supply systems.**
- **Revise federal water and sewer infrastructure funding to give priority to those projects that achieve the highest practical levels of water conservation.**
- **Phase out federal irrigation subsidies that promote unsustainable water use, particularly in the Western United States.**
- **Require that the U.S. Army Corps of Engineers give priority to projects that protect public safety and restore critical, degraded coastal and river ecosystems.**

The President should convene a high-profile summit of key stakeholders to propose agency and program reforms that will: 1) help avoid further destruction of wetlands

and riparian areas, 2) promote large-scale river and wetland restoration, and 3) create innovative options for financing public/private restoration projects.

The President should issue these directives to federal agencies:

- **The Department of Energy should give priority to the development, demonstration and deployment of fuels and energy technologies that minimize water use and to technologies that simultaneously reduce CO₂ emissions and conserve water.**
- **The General Services Administration should advance incentives in federal construction for the use of permeable pavements, green roofs and other green building approaches that contribute to water and energy conservation.**
- **The U.S. Geological Service should work with state water surveys to define high-risk flooding locations.**

5. Improve environmental education.

President Kennedy's program to reach the moon inspired a generation of Americans to pursue careers in science and engineering. Today, the United States has fallen behind other nations in environmental and science education – skills needed for the nation to cope with climate change.

The President should convene a Presidential Commission on Science Education to identify ways to improve the teaching of environmental and earth sciences and to encourage young Americans to enroll in those disciplines. Examples might include a national Eco-Literacy and Earth Sciences Program to develop skills necessary for new generations of Americans to maintain ecosystem services and natural resources in light of climate change; transdisciplinary curricula; and a No Child Left Inside program to engage pre- and primary-school children in environmental awareness and education. The President should call upon the philanthropic community to provide scholarships, fellowships and endowments to the nation's colleges and universities to support research and education in environmental and related social sciences.

6. Restore respect and resources for earth and climate sciences in the federal government.

The President-elect's transition team should work with federal agencies to identify appointed positions that are critical to climate and environmental policy and should identify highly qualified experts to fill those positions.⁶ To attract world-class candidates, the President-elect should issue a public commitment to appoint highly qualified experts in natural resource science and management and to forbid political employees from interfering with their work or conclusions. Upon taking office, the President should issue a directive to that effect.

7. Propose a landmark Natural Heritage and Environmental Security Act.

In the first State of the Union address, the President should propose that the Administration and Congress create a Natural Heritage and Environmental Security Act to update the requirements of the Clean Air Act, the Clean Water Act, the National Environmental Policy Act and related environmental laws to address natural resource stewardship in the context of global climate change. The nation's body of environmental legislation should reflect emerging knowledge about climate-related environmental degradation.

The purpose of the act would be to minimize the impacts of climate change on biodiversity, natural resources and natural systems through prevention, restoration, adaptation and mitigation. In addition to the proposals listed elsewhere in this section of PCAP, it would contain these provisions:

⁶To assist in this task, PCAP has identified a number of the most climate-sensitive positions in the Administration and has created a "Who's Who in Climate Action," a listing of many of the nation's top experts in climate science, policy and communications. See www.climateactionproject.com.

- **Institute a National Science Foundation program for ecosystem services research and assessment.**
- **Establish an ecosystem reserve program.**
- **Create economic incentives and financial instruments for preservation and restoration of key habitats on private lands.**
- **Institute mitigation/sequestration banking and create a national protocol, including standards and policy, for Transferable Development Rights.**
- **Allocate a minimum of \$3.5 billion annually to protect natural heritage from the effects of climate change. To fund this amount, collect full royalties from energy development on public lands and in public waters; allocate a portion of revenues from greenhouse gas permits; and redirect revenues from federal subsidies for fossil and nuclear energy.**

Section 10: Ocean Ecology

“Nature shows us only surfaces, but she is a million fathoms deep.” – Ralph Waldo Emerson

Oceans are as critical to the species on land as they are to the flora and fauna that live within them. Those flora and fauna feed 3.5 billion people. Ocean plants produce more oxygen than all of Earth’s forests combined, and ocean waters are vast storehouses of heat and carbon from the atmosphere.

Like other parts of the ecosystem, oceans already are under stress from human activity, including overfishing, pollution and coastal development. Now, rising temperatures and concentrations of carbon dioxide in the atmosphere are changing them in even more ways, with serious consequences for people and communities.

- **Sea levels are rising**, threatening human settlement patterns. One of every 10 people on Earth lives on a river delta, an island or in a low-lying coastal area that faces probable inundation. Rising sea levels are expected to create millions of climate refugees as coastal areas are lost; ecologically important coastal wetlands drown; and drinking-water supplies are compromised.
- **Ocean temperatures are increasing**. The rising temperatures are threatening the world’s coral reefs and the ocean food chain, including the plant life that helps store carbon from the atmosphere and produce oxygen. In addition, the National Oceanic and Atmospheric Administration anticipates stronger hurricanes as a result of warmer water temperatures and more intense rainfalls as a result of increased evaporation.
- **Oceans are becoming less saline and more acidic**. This change of chemistry also threatens life in the ocean. Salinity is decreasing from the infusion of fresh water from

melting glaciers and ice sheets. As greenhouse gas emissions increase and are absorbed by the ocean, seawater is becoming more acidic, decreasing the chemicals that form coral and the shells of shellfish.

Two independent commissions on U.S. ocean policy – the Pew Oceans Commission in 2003 and the U.S. Commission on Ocean Policy in 2004 – have concluded that a major overhaul is needed in how we govern the human activities that affect ocean health.¹

Presidential Actions

1. Create a single oceans agency in the U.S. government to redesign ocean governance.

The President should propose that Congress authorize the creation of a cabinet-level Department of Oceans to better coordinate federal action on ocean and coastal issues. The department would be a NASA of the oceans, combining elements of the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, the Department of Interior and other agencies.

By executive order, the President should create a President's Council of Advisors on Ocean Policy to review and prioritize the recommendations of the Pew and U.S. commissions in the context of emerging climate science and the observed effects of climate change. The Council should identify opportunities to improve ocean and coastal governance through recommendations such as those from the Joint Oceans Commissions Initiative.

¹ For a summary of the recommendations from these commissions and subsequent action by the Administration and Congress, see Congressional Research Service, *Ocean Commissions: Ocean Policy Review and Outlook*, report prepared by H. F. Upton et al. for the 110th Congress, 1st session, Feb. 1, 2007, <http://cnie.org/nle/crsreports/07March/RL33603.pdf>.

2. Accede to the Law of the Sea.

The United States should accede to the United Nations Convention on the Law of the Sea to give us a voice in international negotiations on open access, mineral rights and boundary disputes. The ability to influence international access to ocean resources and the preservation of ocean ecology is becoming particularly critical with nations beginning to vie for oil and gas deposits exposed as ice sheets melt in the Arctic.

3. Help coastal populations and ecosystems adapt to the effects of climate change.

The President should direct that the government's Climate Change Science Program assess the likely impacts of global warming on coastal communities and ecosystems to help the Federal Emergency Management Agency and state and local governments plan adaptation and disaster-prevention programs. FEMA should evaluate the potential to relocate vulnerable communities; move threatened coastal infrastructure; and prevent the interruption of human services, drinking-water supplies and emergency services.

4. Create and maintain an ocean warning and monitoring system.

The President should direct the new Department of Oceans to design improved monitoring and warning systems using satellite systems that measure ocean temperature, waves, winds and sea levels. The Department should collaborate with the National Science Foundation to propose and seek funding for new research to better understand the impact of climate change on ocean habitat and ecology.

5. Reduce ocean stresses.

The President should direct relevant federal agencies to propose a national strategy to reduce ocean pollution, overfishing, sensitive coastal development and damage to marine habitat, so that oceans and coastal areas are better able to adapt to climate change.

More specifically, the President should direct the Department of Oceans to identify potential conservation and withdrawal zones, where development should be prevented or existing development removed to protect and restore wetlands, estuaries and critical habitat. The Department should recommend an expansion of protections for National Marine Sanctuaries, propose sufficient budget to remove ghost gear from all coral reefs in U.S. waters; and ban bottom trawling in areas near tropical or cold-water corals.

The President should direct the U.S. Coral Reef Task Force and the U.S. Department of Agriculture to collaborate on steps to eliminate runoff from soils and other land-based sources of ocean pollution.

6. Plan for the loss of ocean ecosystems and habitats, while maximizing efforts to prevent extinctions.

By executive order, the President should create an Ice-Dependent Species Preservation Team in the Department of Oceans and direct it to work with the U.S. Fish and Wildlife Service to develop a comprehensive conservation strategy for the full range of species threatened by the loss of polar sea ice. The Administration should create a similar team to develop a conservation strategy for coral reefs and mangroves, building upon the work of the Coral Reef Task Force.

7. Direct the Department of Oceans to assess threats to oceans, as well as their potential ecosystem services in light of emerging science about climate change.

Among other things, the department should study the economic and food security consequences of acidification; ways to reduce the pH of the oceans while not harming them; and the potential for ecologically safe harvesting of ocean energy, including offshore wind generation and tidal power.

Section 11: Local Climate Mitigation and Adaptation

“Global warming is now local warming.” – Terry Tempest Williams

While a great deal of attention has been paid to the effects of global warming on the Arctic, the Antarctic and Greenland, those effects also are being felt in the United States. Because we are continuing to release substantial quantities of greenhouse gases into the atmosphere, the effects are likely to get more intense and disruptive. That makes adaptation a critical part of the nation’s climate strategy.

There is a reason why the science community does not jump to the conclusion that record-breaking weather events are a result of climate change. There is a difference between weather and climate. Weather is an event; climate is a pattern. Weather is to climate as a pixel is to a picture. So, when we experience a record hurricane on the Gulf Coast, a raging wildfire in Montana, a devastating infestation of pine-bark beetles in the Northwest, a water crisis in the South or floods in the Midwest, scientists tell us that they cannot, with certainty, attribute these events to global warming.

But when we take a step back, a pattern emerges. The average annual temperature in the contiguous United States was the highest on record in 2006; for most of the world’s population, 2005 was the hottest year since 1880, when credible measurements began; 19 of the 20 hottest years on record have occurred since 1980; the nation experienced more than 96,000 wild-land fires that burned nearly 10 million acres in 2006, a record; in 2007, for the first time since records began, the Atlantic basin produced two Category 5 hurricanes in one season; and insured weather-related losses totaled \$80 billion worldwide in 2005, sending tremors through the insurance industry.

Concluding that we now are confronting the effects of global warming is not hysteria. It is the result of the human brain’s ability to put two and two together.

It means that in addition to reducing our greenhouse gas emissions, we must be ready to deal with natural disasters and other serious climate impacts.

Presidential Actions

1. Close the gap between climate science and local action.

While scientists are able to predict with increasing confidence the impacts that climate change will have on a large scale, their predictions are less certain for smaller geographic regions, including states and localities. To give state and local leaders the information they need to anticipate and adapt to climate impacts, we need a better understanding of the effects on a small geographic scale. More knowledge and more communication between government leaders at all levels are the keys to closing the gap between science and local action.

In September 2007, the National Research Council (NRC)¹ issued the first results of an evaluation of the U.S. Climate Change Science Program (CCSP), which oversees federal research on climate mitigation and adaptation. The evaluation concluded that science's ability to predict future climate changes has improved, but our understanding of the impacts on society is "relatively immature." The NRC concluded the following:

- **More funds are needed to research climate change's impact on human behavior, political institutions and economies. Progress has been slow because only \$25 million to \$30 million of the CCSP's \$1.7 billion annual budget is used to study those topics.**
- **The social dimensions of climate change are not emphasized because few social scientists are in leadership positions at federal agencies participating in the CCSP.**
- **The CCSP should more closely study the impact of climate change on regional and local scales.**

¹The study was requested and sponsored by the CCSP – this is the first evaluation of its progress since the CCSP was established in 2002.

- Federal agencies involved in climate mitigation and adaptation should engage state and local officials, non-governmental organizations, industry and the climate technology community in defining the information and assistance they need.
- The greatest single threat to the success of federal climate research is the degradation of the nation's satellite capabilities. Satellite missions have been canceled or delayed, and existing satellites are aging.

The President should declare that improving the dissemination of climate impact information to states and localities is a top priority for the CCSP program. He or she should direct agencies involved in the CCSP to correct the deficiencies identified by the NRC, to allocate a greater portion of the CCSP budget to the economic and human dimensions of climate change and to restore funding for the earth sciences program at NASA, including its satellite capabilities.²

Meanwhile, the President should encourage states and localities to adopt a no-regrets approach to adaptation by taking actions that are beneficial regardless of climate impacts – for example, energy-efficiency campaigns that reduce consumer utility bills and keep money in the local economy as well as preventing greenhouse gas emissions. In addition, the President should encourage localities to adopt a do-no-harm approach to development – practices that do not increase the vulnerability of other properties, communities or populations to weather events.³

2. Restore the government's earth sciences mission.

In February 2006, top officials at NASA changed the agency's mission statement to remove a passage that stated NASA should not only "explore the universe and search for life," but also "understand and protect our home planet." The next

² As noted elsewhere in PCAP, NASA funds for earth sciences have been cut as the agency's priority has shifted to the Bush Administration's mission to Mars program.

³ For more information on do-no-harm policies, see L. Larson and D. Plasencia, "No Adverse Impact: A New Direction in Floodplain Management Policy," *Natural Hazards Review* (Nov. 2001), www.floods.org/NoAdverseImpact/NAIjournal.pdf.

President should restore the deleted passage and what it symbolizes: the federal government's commitment to better understand the Earth's ecosystems, how to protect them and how they now are changing.

In addition, a study released in January 2007 by the National Academy of Sciences' National Research Council found that NASA's earth sciences budget had declined 30% since 2000 and was likely to drop further.⁴ NASA officials have reported that the budget cuts, in part to fund the Bush Administration's mission to Mars program, are leading to a substantial reduction in the agency's capability, including its satellite capabilities. The President should restore full funding, capacity and prestige for NASA's earth sciences program.⁵

3. Free the GoreSat.

One satellite deserves special attention. A climate-sensing satellite that the U.S. Academy of Sciences has called a "strong and vital"⁶ contribution to our understanding of climate change is sitting idle in a warehouse in Maryland.

The \$100 million satellite is known formally as the Deep Space Climate Observatory – or DSCOVR. But because it was proposed in 1998 by then-Vice President Al Gore, critics in Congress have nicknamed it "GoreSat." Although it was completed, Congress put the satellite in mothballs – or more specifically, in a box at the Goddard Space Flight Center – and NASA canceled the program in January 2006.

⁴ books.nap.edu/openbook.php?record_id=11820&page=R1.

⁵ See the American Association for the Advancement of Science's recommendations on the earth sciences program at www.aaas.org/spp/cstc/docs/07_04_28board_eos_statement.pdf

⁶ The satellite, originally known as Triana, also was judged to be reasonable in cost, and NASA recommended that it be deployed. See <http://earthobservatory.nasa.gov/Newsroom/MediaAlerts/2000/200003081676.html>

If deployed, DSCOVR would provide a continuous view of the Earth by holding a position in space that would allow it to photograph the sunlit side of the planet. The image would be available on the Internet, a potentially important educational tool. More importantly, it would provide scientists with their first direct measurements of the amount of solar energy reaching the Earth and how much is reflected. It would also allow the monitoring of weather systems, vegetation and other indicators of climate change.

The President should direct NASA to resurrect the DSCOVR program and include funds in the CCSP budget to launch and operate it.

4. Create a “Climate Action Green Room.”

To improve communication between federal agencies, state and local officials, non-governmental organizations, industry and the climate technology community, the President should direct the U.S. Environmental Protection Agency to create and host a Climate Action Green Room – an operations center staffed by experts detailed from federal agencies to provide a one-stop information center for states and localities.

Information should include what is known about the implications of global warming for each region and tips on federal assistance available to help communities with mitigation and adaptation. In addition, the Green Room would be assigned to gather important insights on the information and assistance that local leaders need to create and accomplish climate-action plans. The Green Room should be a physical information center housed at EPA to promote greater interaction between agencies. Staff should include experts from the Departments of Agriculture, Energy, Housing and Urban Development, Homeland Security, Transportation and Interior, as well as the National Centers for Disease Control, the Federal Emergency Management Agency (FEMA) and EPA. EPA should provide monthly reports to the Council on Environmental Quality on the information it gathers about the types of assistance most needed by states and localities and should evaluate the performance of the Green Room after its first year of operation and recommend whether it should be continued.

5. Strengthen the FEMA.

It is difficult to determine whether FEMA's poor performance in recent years has been the result of inadequate leadership, insufficient resources or a confusing chain of command since it became part of the Department of Homeland Security. What is apparent is that the agency operated much more effectively when it was independent and more competently led. The President should propose to Congress that FEMA be made an independent federal agency again and give its director Cabinet-level status.

The President should direct FEMA to work closely and often with professional organizations such as the National Emergency Management Association and the Association of State Floodplain Managers to improve intergovernmental

collaboration on disaster prevention and to determine whether unfolding climate impacts require modifications in federal disaster assistance.⁷ Among the improvements should be a consensus protocol to identify federal/state/local authorities in disaster response and recovery operations.⁸

6. Increase federal emphasis on disaster prevention.

The new FEMA especially needs to emphasize disaster prevention to reduce the loss of life and property, the impact on communities and the cost to taxpayers from extreme weather events, flooding and other disasters. The President should assign the director of FEMA to chair an interagency task force that would identify, coordinate and strengthen federal programs that help communities prepare for and prevent the effects of natural disasters. The task force should address:

- **How federal programs can better restore natural systems that prevent or reduce the impacts of natural disasters – including watersheds, river meander, and riverine and coastal wetlands.**
- **Changes in national model building codes and urban development patterns to increase the ability of communities, buildings and infrastructure to withstand extreme weather events while simultaneously improving other features of local sustainability.**
- **How floodplain mapping and land use can be made more adaptive to adjust to improved understanding of climate-related changes in natural hazards.**

In addition, the President should propose legislation that authorizes the Administration to develop a floodplain/coastal reserve program through which private owners could sell lands or development rights back to public ownership through fee title or easements.

⁷ A proposed new plan for handling natural disasters was released by the Bush Administration in September 2007 but has been criticized for lacking detail and for a lack of participation by state and local officials.

⁸ Scores of additional ideas for improving federal, state and local disaster prevention, response and recovery programs are contained in *National Flood Programs and Policies in Review 2007* (Madison, Wis.: Association of State Floodplain Managers, 2007), www.floods.org.

7. Anticipate and mitigate the federal budget impacts of climate change on the National Flood Insurance Program (NFIP).

The federal government operates the National Flood Insurance Program. Since 1980, the NFIP's exposure has quadrupled, nearing \$1 trillion in 2005.⁹ The NFIP borrowed more than \$17 billion from the U.S. Treasury to pay claims following Katrina, Rita and Wilma. It has been unable to repay this debt as it did over the past 20 years, so taxpayers will likely be required to foot the bill. Growing federal expenditures to compensate property owners for flood losses (more than \$150 billion in taxpayer-funded disaster costs after Katrina) could affect the government's ability to fund other vital activities.

In anticipation of rising exposure and its potential impact on the federal budget, the President should direct FEMA to analyze the potential long-term implications of climate change for the NFIP, using assessments from the Climate Change Science Program, the Intergovernmental Panel on Climate Change and other widely regarded analyses of climate impacts as the basis for anticipating future liabilities. The assessment should include:

- **Estimates of future exposure levels.**
- **Implications for rates, the federal budget and the continued availability of insurance.**
- **Identification of prevention measures that mitigate or adapt to the existing and predicted impact of climate change on flooding.¹⁰**
- **Whether and by how much insurance rates should be increased for second homes and structures that experience repetitive losses.**

⁹ *Climate Change: Financial Risks to Federal and Private Insurers in Coming Decades Are Potentially Significant* (Washington, D.C.: U.S. Government Accountability Office, March 2007).

¹⁰ *Ibid.*

- **Whether nonstructural measures to reduce flood damages – such as relocation of properties – should receive a higher share of federal disaster assistance.**
- **Whether NFIP guidelines should require structures to be protected against 500-year rather than 100-year floods – especially critical infrastructure and facilities such as hospitals, water supplies, and police and fire stations.**

8. Work with states and localities to discourage development in hazard areas.

For commercial and aesthetic reasons, land near water always has attracted development. More than half the U.S. population lives along the nation’s coastlines.¹¹ But when development occurs in areas vulnerable to natural disasters, it puts lives, property, businesses and the nation’s taxpayers at risk. That risk will increase as a result of climate change.

The NFIP’s guidelines restrict development in riverine floodways (the central portion of the floodplain where water flows are greatest) but allow development across the rest of floodplains and in coastal storm-surge areas if buildings and critical infrastructure are raised above the level of the 100-year flood or are protected by levees rated to withstand a 100-year event.¹²

However, flood-proofing and flood control structures create a false sense of security, leading to more development in natural hazard areas. When structures fail or disasters exceed the structures’ design levels, the loss of life and property is greater than might otherwise have occurred.¹³ As the National Academy of Sciences has concluded, “it is short-sighted and foolish to regard even the most reliable levee system as fail-safe.”¹⁴

¹¹ National Oceanic and Atmospheric Agency, *Population Trends Along the Coastal United States: 1980–2008*, Coastal Trends Report Series (Washington, D.C.: NOAA, 2005), www.oceanservice.noaa.gov/programs/mb/supp_cstl_population.html.

¹² A 100-year event is a disaster with a 1% chance of occurring in any given year. However, nature often defies those odds, causing 100-year floods much more often.

¹³ N. Pinter, “One Step Forward, Two Steps Back on U.S. Floodplains,” *Science* 308, no. 5719 (April 8, 2005), 207–208, www.sciencemag.org/cgi/content/full/308/5719/207. For example, in May 2007, *The New York Times* reported that 28,000 homes have been built and more than 6,000 acres of commercial and industrial space have been developed on land that was underwater during the Great Flood of 1993 in the Missouri and Mississippi River valleys. The new development is estimated to be worth more than \$2 billion, some of it subsidized by state incentives for builders. Developers claim that improved levees will protect these areas – but history provides many examples of structural failures with tragic consequences.

¹⁴ National Research Council, Committee on a Levee Policy for the National Flood Insurance Program, *Levee Policy for the National Flood Insurance Program* (Washington, D.C.: National Academy Press, 1982).

The President should direct FEMA to work with the national Association of State Floodplain Managers to recommend reforms in federal, state and local policies and programs to prevent the development of buildings and critical infrastructure in flood risk areas, including those protected by flood control structures.

9. Encourage companies to disclose climate risks.

To help all sectors of the economy prepare for and adapt to climate change, the President should recommend to the Securities and Exchange Commission that it require publicly held companies to disclose weather-related risks to coastal infrastructure, supply chains and transportation systems, based on best available data about the current and likely future impacts of global climate change. If the SEC does not comply voluntarily, the President should propose legislation.

10. Increase adaptation funding for states, localities and non-government organizations.

The President should direct the EPA, FEMA and other relevant agencies to prepare a plan to designate “Climate Adaptation Zones” in those areas of the nation that modeling and direct observation make clear are most vulnerable to adverse climate impacts. Agencies with community development, housing, public health, natural resource conservation, agricultural, water and related programs should give the zones priority for technical and financial assistance that improves their ability to respond and adapt. For example:

- **Local adaptation measures should be eligible for funding under the State Energy Conservation Program (see Action 4 in PCAP Section 3). Funds should be used to build local capacity to respond to climate change and to provide resources to organizations**

such as the International Center for Local Environmental Initiatives (ICLEI), that are equipped to advise communities on adaptation.

- **Funding for the Urban & Community Forestry program should be increased to help municipalities plant urban forests to shade and cool metro areas while capturing carbon.**
- **With its loan guarantee and technical assistance programs, the U.S. Small Business Administration should target businesses in Climate Adaptation Zones that provide goods and services related to climate adaptation and mitigation.**
- **FEMA should target communities in the zones for priority assistance on disaster preparedness and response.**

11. Incorporate adaptation and mitigation into the nation's infrastructure.

According to the American Society of Civil Engineers, there are 3,500 unsafe dams in the United States; many of the nation's 16,000 wastewater treatment systems need improvement and repair; poor road conditions are costing motorists \$54 billion each year in maintenance and repairs; and the electric transmission system is in urgent need of modernization. Estimates are that \$10 billion should be invested in the next 12 years to repair non-federal dams; \$390 billion is needed over the next two decades to replace and build new wastewater systems; \$94 billion is needed each year to improve transportation infrastructure; and \$4 billion is needed each year to upgrade electric transmission.

The President should direct federal agencies that fund infrastructure development to require that infrastructure be hardened against climate change, designed when appropriate to maximize energy efficiency and specified to use materials with low levels of imbedded greenhouse gases.

12. Create a Green Job Corps.

The President should champion the “Green for All” campaign organized by Ella Baker Center for Human Rights and Majora Carter’s Sustainable South Bronx project, appropriating \$125 million to train 35,000 underprivileged young people annually in green-collar jobs. This project will help ensure that America’s labor force has the skills needed to implement a new energy economy.

In addition, the President should propose the creation of a Green Job Corps under the umbrella of the AmeriCorps program. The Green Job Corps would be aimed at the 1.5 million Americans between the ages of 18 and 24 who are neither employed nor in school.¹⁵ In addition to Green for All training, the Corps would link its participants to service assignments under the direction of local officials to help communities with climate adaptation and mitigation, including wetland and watershed restoration for flood prevention; reforestation of areas where trees have been destroyed by pests and fire; disaster prevention, response and recovery as part of a rapid-response capability; development of wildlife corridors through urban areas; and energy-efficiency improvements to the homes of low-income families. Service would be voluntary. Participants would be paid a stipend while working with the Corps, plus \$5,000 for each year of service to be spent on education, the purchase of a home or the creation of a small business.

¹⁵The Green Job Corps idea was originated by Van Jones of the Ella Baker Center. Jones’ proposal was introduced in the 110th Congress as the “Green Jobs Act of 2007” (HR 2847). Additional elements of this PCAP action were drawn from R. Stengel, “A Time to Serve: The Case for National Service,” *Time*, Aug. 30, 2007, 67.

Section 12: Public Health and Safety

“How fearsome must the headlines be about tomorrow before people change their ways today?” – Nancy Gibbs, TIME

Global warming is described in the language of the yardstick: degrees Celsius, meters of sea-level rise, tons of emissions and atmospheric concentrations of greenhouse gases. The impersonal metrics make climate change seem abstract, but the reality is that global warming is very personal. It already has begun to affect the lives and health of people throughout the world.

Without careful planning and intervention to adapt to the climate changes already under way and to prepare for those to come, the toll on human health and productivity could be staggering. Indeed, many measures that improve adaptation – healthy urban growth, green buildings, open space and congestion control – also improve public health, stimulate industries and jobs, and further technologies for climate mitigation.

In a 2004 report on ecological health and climate change, the Consultative Group on Biological Diversity (CGBD) concludes: “Climate change is increasingly understood as a major public health challenge for this generation. It will be an even greater one for future generations. Simply put, what is disruptive to the Earth’s climatic systems is harmful to many of Earth’s inhabitants as well. The forces *driving* climate change are already causing adverse health effects on humans, wildlife and ecosystems. The complex *system upheavals* caused by climate change represent even more profound threats to health.”¹

¹ K. Sessions and A. Ushijima, “Climate Change and Ecological Health,” Consultative Group on Biological Diversity, 2004, www.cgbd.org/viewpdf.php?a=visitors&file=ClimateandHealth. Major portions of this chapter are drawn from this article, and special acknowledgement is due its authors.

In a comprehensive approach to climate action, it will be important for the Administration and Congress to understand the health impacts of other climate mitigation and adaptation initiatives. For example, a smart, clean, robust, resilient and self-healing grid, with on-site, regional and central power generation, improved storage, co-generation and computer-derived identification of critical load areas within buildings and cities, will improve air quality and public health, while enhancing energy security and reducing greenhouse gas emissions. Smart growth of urban and peri-urban areas, with green buildings, rooftop gardens, open space, bike lanes and walking paths, public transport and congestion control, will reduce vehicle miles traveled and our dependence on imported oil, prevent air emissions including greenhouse gases, reduce the heat island effect and – with the proper economic incentives – stimulate local and regional economic growth.

Health Effects

The U.S. Centers for Disease Control and Prevention and the U.S. Environmental Protection Agency are among the organizations that warn of significant public health issues associated with climate change. “Although scientific understanding of the effects of climate change is still emerging, there is a pressing need to prepare for potential health risks,” the CDC says. “This public health preparedness approach is applied to other threats in the absence of complete data, such as terrorism and pandemic influenza. A wide variety of organizations (federal, state, local, multilateral, private and nongovernmental) is working to address the implications of global climate change. Despite this breadth of activity, the public health effects of climate change remain largely unaddressed.”²

² See the CDC’s comments at www.cdc.gov/nceh/climatechange/. EPA’s information on climate change and public health can be found at www.epa.gov/climatechange/effects/health.html.

Many of the health problems predicted as a result of global warming are already evident in the United States and worldwide. Among them:

Heat Waves and Increased Temperature Variability: Heat waves, classified by the CGBD as the “largest natural-caused killer in the world,” increased by 88% in the United States during the period 1949-1995.³ Some 52,000 deaths were linked to the 2003 European heat wave⁴ and more than 200 people died when three summer heat waves scorched much of the U.S. and Canada in the summer of 2006.⁵ A recent study by Environment Maryland predicts that heat-related deaths will more than double in the United States within 50 years.⁶

Air Pollution, Irritants and Allergens: Heat contributes to ozone, a pollutant that can cause wheezing, coughing and painful breathing during exercise; lung irritation; increased susceptibility to respiratory illnesses like pneumonia and bronchitis; reduced lung capacity; and permanent damage to lungs with repeated exposure.⁷ Intense pollution events are particularly stressful on the elderly, young children and those with respiratory or heart disease. Ragweed pollen is boosted

³ Ibid. Original citation: “Heat Waves and Climate Change Fact Sheet,” Center for Health and the Global Environment of Harvard Medical School, 2006, <http://chge.med.harvard.edu/publications/bulletin/documents/heatfact06.pdf>.

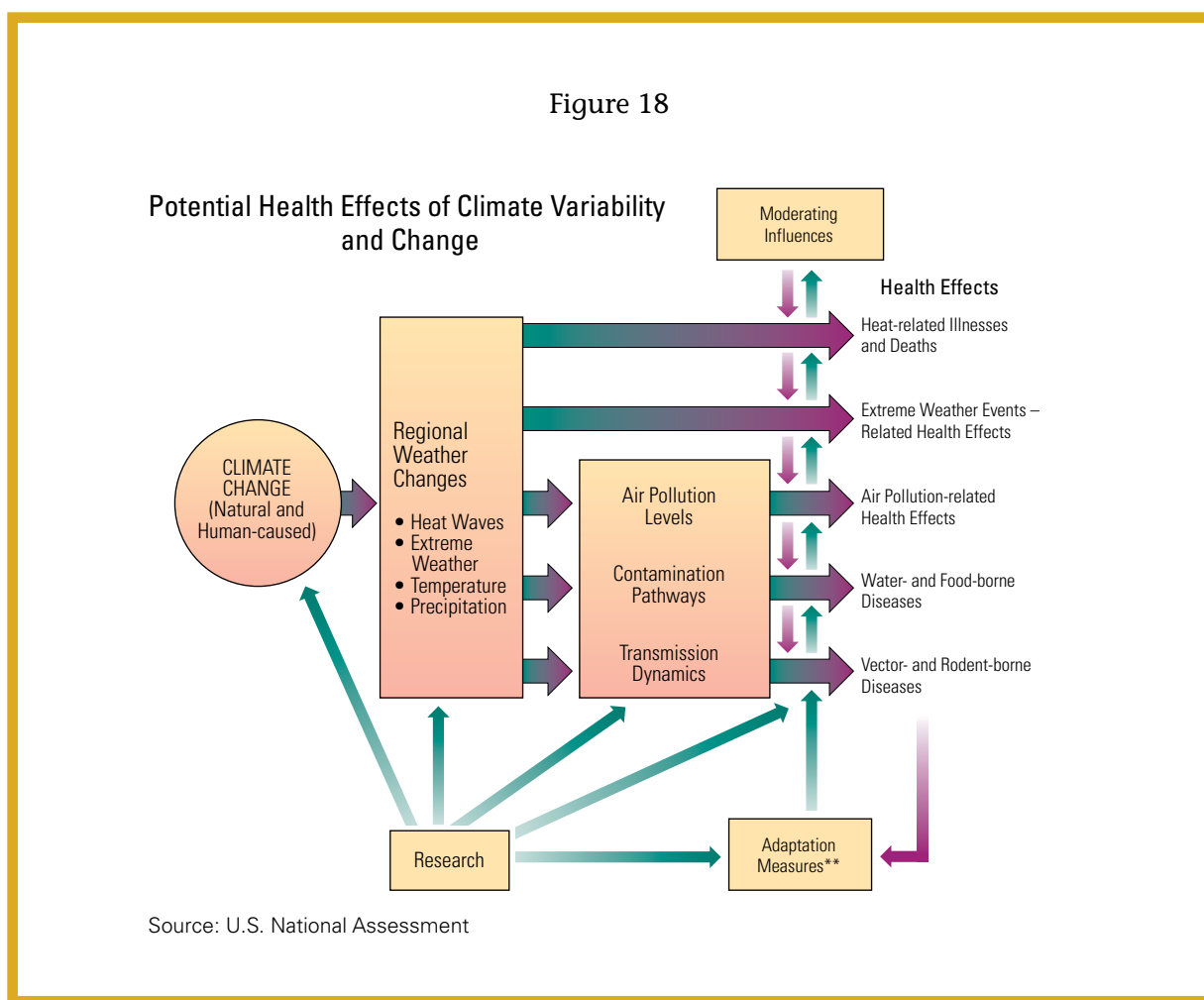
⁴ J. Larsen, “Setting the Record Straight: More than 52,000 Europeans Died from Heat in Summer of 2003,” issue brief, Earth Policy Institute, July 28, 2006, www.earth-policy.org/Updates/2006/Update56.htm.

⁵ “Natural Capitalism Solutions,” in *Climate Protection Manual for Cities*, 2007, www.climatemanual.org/Cities/Chapter2/index.htm.

⁶ “Global Warming to Increase Heat-Related Deaths in Baltimore,” news release, Environment Maryland, Sept. 5, 2007, www.environmentmaryland.org/newsroom/global-warming/global-warming-campaign-news/global-warming-to-increase-heat-related-deaths-in-baltimore.

⁷ U.S. Environmental Protection Agency, “Ground-level Ozone: Health Effects,” www.epa.gov/air/ozonepollution/health.html (accessed May 14, 2007).

Figure 18



disproportionately to the growth of the plant when grown under elevated levels of CO₂⁸ and diesel particles help deliver the pollen deep into the lungs and increase the irritation and immune response.⁹ Ozone also can aggravate asthma and has been shown to initiate new cases of asthma in children.¹⁰ Asthma is one of the

⁸ C. A. Rogers et al., "Interaction of the Onset and Elevated Atmospheric CO₂ on Ragweed (*Ambrosia artemisiifolia* L.) Pollen Production," *Environmental Health Perspectives* 114, no. 6 (2006): 865–869; L. H. Ziska and F. A. Caulfield, "Rising CO₂ and Pollen Production of Common Ragweed (*Ambrosia artemisiifolia*), A Known Allergy-inducing Species: Implications for Public Health," *Aus. J. Plant Physiol.* 27 (2000): 1–6.

⁹ R. Knox et al., "Major Grass Pollen Allergen Lol p 1 Binds to Diesel Exhaust Particles: Implications for Asthma and Air Pollution," *Clin. Exp. Allergy* 27, no. 3 (1997): 246–251; H. Ormstad et al., "Airborne House Dust Particles and Diesel Exhaust Particles as Allergen Carriers," *Clin. Exp. Allergy* 28, no. 6 (1998): 702–708.

¹⁰ R. McConnell et al., "Asthma in Exercising Children Exposed to Ozone: A Cohort Study," *Lancet* 359 (2002): 386–391.

most debilitating lung diseases, with enormous costs for health care, medications, work and school absences¹¹ – and asthma rates quadrupled in the United States between 1980 and 2000 (AAAAI 2000).¹²

Extreme Weather Events and Weather-related Disasters: Natural disasters such as Hurricane Katrina and the F5-force tornado that struck Greensburg, Kan., in 2007, have put a vivid face on the term “extreme weather.” Global warming creates conditions that make these events more likely and more damaging. Tropical cyclones, floods, intense thunderstorms (such as those that give rise to hail and tornados), nor’easters and other violent or intense weather are likely to become more common as the climate changes. Casualties occur not only as the direct result of extreme weather – drowning, traumatic injury, exposure or starvation – but also as a result of secondary factors such as the contamination of water from the flooding of sewage treatment plants leading to infections, viruses and even cancer.¹³ Many communities still handle sewage and storm water together, and following heavy rainfall, combined sewage overflow events already occur across much of the United States. While chlorination and high-quality filtration can prevent some health effects from contaminated water, many nations lack the water treatment infrastructure and resources of the United States. Even in the United States, drinking water treatment systems do not offer 100% protection, as Milwaukee’s 1993 experience with deaths and illnesses from cryptosporidium demonstrated. Approximately two-thirds of reported waterborne disease outbreaks in the United States have been preceded by heavy rainfall in relevant watersheds (Curriero, Patz, et al. 2001). In general, extreme events can precipitate clusters of water-, mosquito- and rodent-borne diseases (Epstein 1999).

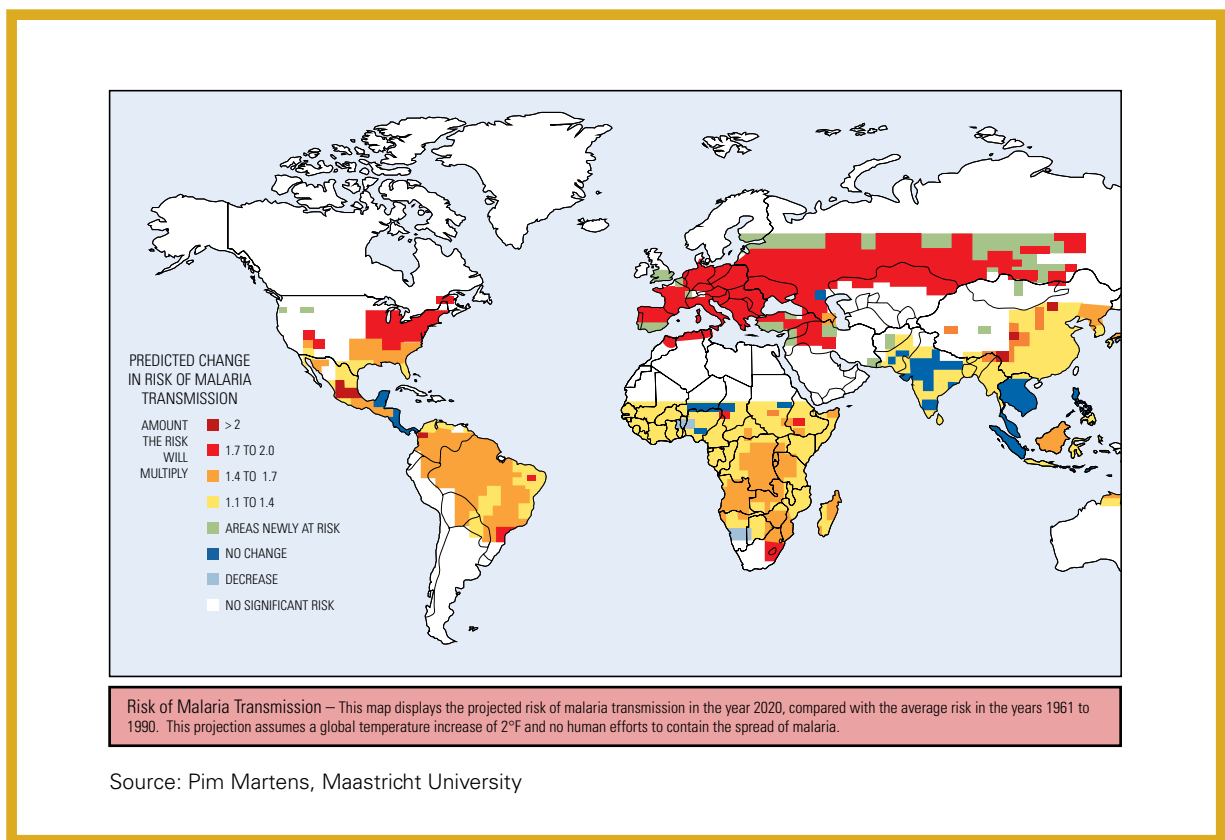
Additionally, an increase in winter weather anomalies – such as ice storms and large snowfalls – carries implications for health and safety.

¹¹ Epstein and Mills, 2005.

¹² P. R. Epstein and E. Mills, “Climate Change Is Hazardous to Your Health,” *Forbes* 16 (November 2005), www.forbes.com/2005/11/15/energy-pollution-oil_cx_1116energy_epstein_mills.html.

¹³ R. S. Koacts et al., *Climate Change and Human Health: Impact and Adaptation* (Copenhagen: World Health Organization, 2000), 16, quoted in Sessions and Ushijima, “Climate Change and Ecological Health.”

New Vectors and Wider Ranges for Infectious Diseases: Temperature, humidity, rainfall and rising sea levels can influence the transmission of infectious diseases – especially water-borne illnesses, viruses and other diseases carried by insects. These include diseases carried by mosquitoes (malaria, dengue fever); ticks (Lyme disease, tick-borne encephalitis); rodents (leptospirosis, hantaviruses, plague) and other invertebrates (leishmaniasis, schistosomiasis, Chagas’ disease).¹⁴ Malaria currently kills 3,000 African children a day, and West Nile virus cost the United States \$500 million in 1999 alone. Lyme disease, the most widespread vector-borne disease, is currently increasing in North America as winters warm and ticks proliferate.¹⁵ Outbreaks of vector-borne diseases in tropical nations can also affect tourism.



Coastal and Shoreline Health Risks: With rising temperatures, warmer near-shore waters are becoming hosts for concentrations of unwelcome organisms that threaten human health, from the tropics to northern coasts and inland lakes. While warmer water temperatures aren’t the only factor in these outbreaks, they

¹⁴ Sessions and Ushijima, “Climate Change and Ecological Health,” 12.

¹⁵ P. Epstein and E. Mills, eds., *Climate Change Futures: Health, Ecological and Economic Dimensions* (Boston, Mass.: Center for Health and the Global Environment, 2005), <http://chge.med.harvard.edu/programs/ccf/index.html>.

combine with other factors such as nutrient pollution to create conditions that produce unhealthy water. Cholera outbreaks in Bangladesh have been associated with warmer water surface temperatures.¹⁶ In northern climates, from European beach resorts to the inland lakes of the United States and Canada, a form of blue-green algae (cyanobacteria) is staking out new territory in areas once too cold to support it. In the United States, blue-green algae blooms (known colloquially as “stinking algae” in the Great Lakes region) have fouled waters and prompted health officials to close beaches during outbreaks along the shores of Lake Champlain, the Great Lakes and countless inland lakes. The algae contain microcystin, which can irritate the skin and the eyes through contact such as might occur while swimming. If swallowed, it can cause headaches, fever, diarrhea, abdominal pain, nausea and vomiting.¹⁷

Food and Water Supplies: In the tropical regions, which include large portions of Africa, Asia and Latin America, many staple food crops on which people depend already are near their thermal limits, which means they won’t thrive and produce well as temperatures rise. Their yields may decrease by as much as one-third with climate change, leading to increased hunger and malnutrition.¹⁸ Drought poses additional concerns. The 2007 IPCC report projects that yields from rain-fed agriculture in Africa, which accounts for more than 99% of African cropland, may be reduced by up to 50% by 2020.¹⁹ In other areas, excessive rainfall from increased precipitation is likely to decrease crop productivity because of flooding and saturated soils. Global warming also is increasing the range and distribution of insect pests and diseases that thrive in warm conditions²⁰ and undermining the complex predator-prey relationships that have provided natural controls for many crop and forage pests.²¹

¹⁶ R. R. Colwell, “Global Climate and Infectious Disease: The Cholera Paradigm,” *Science* 274:2025–2031, quoted in J. M. Balbus and M. L. Wilson, *Human Health and Global Climate Change*, report prepared for the Pew Center on Global Climate Change, 2000, http://pewclimate.org/docUploads/human_health.pdf.

¹⁷ C. Cornacchia, “Profusion of Toxic Algae Linked to Global Warming,” *Montreal Gazette*, September 29, 2006, www.canada.com/montrealgazette/news/story.html?id=e19ce359-93d2-4230-b5a0-c3783b3af23e.

¹⁸ “Climate Change: Billions Across the Tropics Face Hunger and Starvation as Big Drop in Crop Yields Forecast,” news release, United Nations Environmental Programme, November 2001, quoted in Sessions and Ushijima, “Climate Change and Ecological Health,” 12.

¹⁹ C. Davis, IPCC Forecasts Alarming Consequences of Global Warming, news release, World Resources Institute, April 9, 2007, www.earthtrends.wri.org/updates/node/181.

²⁰ *Ibid.*

²¹ “Global Warming’s Impact on Birds,” fact sheet, American Bird Conservancy, www.birdday.org/resources/factsheetabcglobalwarmingbirds.pdf; “Global Warming and New Mexico,” fact sheet, National Wildlife Federation, www.nwf.org/globalwarming/pdfs/NewMexico.pdf.

Vulnerable Populations: The health impacts of climate change will fall unevenly on different populations. For thermal stress, the elderly, children, the poor and urban residents may be most at risk – especially if they have limited access to clean, fresh water or housing that can provide shade and cooling. Rising sea levels and coastal flooding will hit coastal and island communities hardest. The 2007 IPCC report states: “many millions more people are projected to be flooded every year due to sea-level rise.”²² Many of the most vulnerable areas have the least capacity to respond to the health and social costs of global warming (Patz et. al. 2005). As such, without the assistance of international programs and assistance, the human health impacts will be disproportionately severe for those with the fewest options.

In addition, as Hurricane Katrina in 2005 and the European summer heat wave of 2003 demonstrate – along with the reduced return times between extreme events – no nation is immune to the impacts of climate change.

Psychological Impacts: As early as 1993, a study for the United Nations Environment Program noted that the psychological stresses of climate change may “lead to dysfunctional responses” such as denial, cynicism and aggression.²³ Psychological stress may be especially difficult for children, as the *Washington Post* reported in April 2007:

²² IPCC, 2007: *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 976pp. www.ipcc.ch/ipccreports/ar4-wg2.htm.

²³ Information Unit on Climate Change, “Climate Change Scenarios: The Possible Cultural and Psychological Impacts,” www.cs.ntu.edu.au/homepages/jmitroy/sid101/uncc/fs118.html (accessed Nov. 4, 2007; last revised May 1, 1993).

For many children and young adults, global warming is the atomic bomb of today. Fears of an environmental crisis are defining their generation in ways that the Depression, World War II, Vietnam and the Cold War's lingering "War Games" etched souls in the 20th century. Parents say they're searching for "productive" outlets for their 8-year-olds' obsessions with dying polar bears. Teachers say enrollment in high school and college environmental studies classes is doubling year after year. And psychologists say they're seeing an increasing number of young patients preoccupied by a climactic Armageddon.²⁴

In Arctic nations, the strains on mental health are already evident. In Alaska, for example, as tundra melts and sea water consumes the land, coastal communities are losing the very foundations on which they live as well. Some are preparing to move. The toll in terms of alcoholism, domestic violence and suicides is addressed in the Arctic Climate Impact Assessment (ACIA; 2005).

Presidential Actions

1. Strengthen the health care infrastructure.

The nation's health care infrastructure must be improved to deal with existing and anticipated health impacts of global warming. The President should:

- **Direct the secretary of Health and Human Services (HSS) to assess the nation's capacity to monitor and treat diseases related to climate change, including infectious diseases, heat-related illness and respiratory illness. This could augment the current Environmental Health Tracking Program.**

²⁴ D. Johnson, "Climate Change Scenarios Scare, and Motivate, Kids," *Washington Post*, April 16, 2007, A01, www.washingtonpost.com/wp-dyn/content/article/2007/04/15/AR2007041501164_pf.html.

- **Direct the administrator of the EPA to assess contamination risks to U.S. drinking water supplies from saltwater intrusion, stormwater contamination, floodwater contamination and other climate- and weather-related events.**
 - **Based on these assessments, direct appropriate agencies to work with Congress to develop reforms and improvements to the U.S. health care system that improve its ability to prevent and treat the range of public health problems associated with climate change.**
 - **Direct the National Institutes of Health (NIH), HHS, Department of Homeland Security (DHS) and CDC to coordinate their programs and plans for mitigating and adapting to climate-related health problems.**
2. **Strengthen local and community infrastructure, preparedness and response capacity.**

Localities are the first responders to climate-related health emergencies and are in the best position to prevent them, but the federal government must be better prepared to help. The President should:

- **Direct the CDC and the DHS to meet annually with representatives of local governments and professional organizations to assess their needs for assistance in adapting to health- and weather-related emergencies. Reflect local priorities and needs in budget requests and program plans.**
- **Direct the CDC, HHS and DHS to provide communities with information on how to prepare for and address public health emergencies related to climate change, including preparation for heat waves, storms and winter weather anomalies; the use of air-conditioned facilities as emergency shelters during heat events; the provision of back-up energy supplies for hospitals and other critical facilities. (See PCAP Section 11 for more recommendations on local adaptation.)**
- **Revive the federal government’s Cool Communities program, providing grants to cities to reduce the urban heat island effect and resulting heat-related illnesses and deaths with the use of green roofs, urban forests, light-colored surfacing and other strategies.**

- **Direct the CDC and the Building Codes and Standards Program, now at the U.S. Department of Energy, to work with the Department of Housing and Urban Development (HUD), FEMA and other agencies to incorporate disaster resilience, cooling strategies and other critical design features into model national building codes. Pay particular attention to standards for schools and public buildings that affect large populations, factoring in energy efficiency and other green building advantages.**
- **Direct the secretaries of HHS and DHS to develop a national response plan for heat wave emergencies with the participation of local governments.**

3. Plan for regional impacts.

Many of the impacts of climate change – including drought and saltwater intrusion – are regional in scale and require regional responses.

- **Revive the regional water basin commissions with a new mission not only to coordinate federal programs, but to develop long-term water conservation and water management strategies to support human and environmental needs in the nation's major river basins and watersheds.**
- **Direct the United States Department of Agriculture (USDA), EPA, FEMA, the U.S. Forest Service and other relevant agencies to advance watershed restoration activities that reduce erosion and flooding. This would include reforestation, conservation tillage, restoration of wetlands and natural river courses, and riverbed clean-up (see Section 9).**

4. Reduce other sources of pollution.

Federal agencies should continue working with states and localities to address existing air and water quality problems that aggravate health problems related to global warming.

- **Direct the EPA administrator to identify priority enforcement and watershed management strategies that will reduce nutrient loading on coastal waters that cause toxic algae outbreaks and pathogen pollution.**

- **Direct the EPA administrator to develop regulatory recommendations to rapidly curtail ozone pollution events.**
- **Direct EPA to review existing science on the impact of E85 fuels (85% alcohol) on the emission of volatile compounds that increase ground-level ozone – a respiratory irritant and a greenhouse gas (Jacobson 2007).**
- **Direct EPA, CDC and NIH to collaborate on incorporating public health impacts into life-cycle analyses of federal policies, including investments in energy technologies (see PCAP Section 1 on proposed federal subsidy reforms).²⁵**

²⁵ For example, conventional coal-fired power plants produce local pollution (soot, NO_x , SO_x , mercury and CO_2) and affect ozone levels in communities downwind. A low-carbon performance standard for power plants, such as that proposed in PCAP Section 3, will have public-health and related economic benefits.

Section 13: International Policy

“Unless the United States decides that it wants to be a major and committed leadership player ... much of the rest of the world is effectively going to hide behind the skirts of the United States and not do anything.”
– Timothy Wirth, United Nations Foundation

The United States should be the global leader in reducing greenhouse gases for a host of reasons: The United States has the technical resources, the entrepreneurial tradition, a humanitarian spirit and an ethical responsibility as the country most responsible for climate change. There’s also an economic reason: The need for low-emission technologies and products in the developing world may be the largest market opportunity ever to present itself to industries and entrepreneurs.

One-quarter of the world’s population – 1.6 billion people – lack electric power, and 2.4 billion people still rely on wood, dung and agricultural residues for cooking and heating. The International Energy Agency estimates that an investment of \$4.2 trillion will be needed in new power generation worldwide between 2000 and 2030.

The global population is projected to increase from 6.1 billion in 2000 to more than 9 billion by 2050, with most of the increase in developing nations. Today, cities are the source of 75% of the world’s greenhouse gas emissions, and cities are growing rapidly. According to the World Urban Forum, the migration to urban areas in the world’s poorest countries will mean building the equivalent of a new city of more than 1 million people each week for the next 45 years.¹

The growing demand for energy in the developing world is being met almost entirely with conventional technologies and resources. Without major changes in

¹ “Coming to Grips with Global Urbanization,” www.wuf3-fum3.ca/en/about_global_urbanization.shtml.

direction, fossil fuels will account for 80% of the energy consumed worldwide by 2030, leading (as other sections of this plan have noted) to unacceptable increases in greenhouse gas emissions and to heightened potential for resource conflicts.

Two-thirds of the growth in world energy demand during the next 25 years will occur in developing countries. To avoid disastrous climate change, the annual global greenhouse gas emissions budget should be a third of today's emissions or less. The magnificent opportunity awaiting U.S. industries and international development programs is to improve the standard of living for the billions of inhabitants of the developing world by investing those trillions of dollars in low-emission urban design, equipment, buildings, appliances, vehicles, industrial facilities, power production, mass transit systems and agriculture.

Climate-friendly, sustainable energy technologies should become the engine of growth in the global economy, and American companies should drive the engine. But the U.S. approach to international trade and investment is giving others the opportunity to take the controls. On one hand, U.S. leaders have urged developing countries to reduce their greenhouse gas emissions. On the other, our trade and investment policies are subsidizing climate change by funding the old energy paradigm. For example:

International Development Banks invest in high-emission energy: Much of the U.S. international development program is carried out through the World Bank, the Inter-American Development Bank, the European Bank for Reconstruction and Development, the African Development Bank, the Asian Development Bank, the Overseas Private Investment Corp. (OPIC) and the U.S. Export-Import Bank (Ex-Im). For decades, these banks have funded projects designed to create fossil fuel sectors in the developing world to satisfy the growing needs of industrialized nations.

Beginning in 1992 at the Rio Earth Summit and for the next several years, the World Bank's directors approved an average of two projects each month to develop fossil fuel infrastructure. The total approved from 1992 to 2004 was \$28.5 billion. The estimated lifetime emissions of the projects are 43.4 billion tons of CO₂.

The ratio of Bank financing for renewables and energy efficiency remains low. Using the World Bank's own figures for fiscal year 2005, new renewables and energy efficiency made up only 10% of the Bank's lending portfolio. At the International Finance Corp., the private sector lending arm of the World Bank, renewables and energy efficiency only comprised 2% of the energy portfolio. Even these figures are artificially inflated, since more than half of them involve large hydropower projects, which in tropical countries can produce as many greenhouse gas emissions from methane as fossil fuel power plants.²

Recent studies show the World Bank Group's investments in fossil fuels rose by 93% between 2005 and 2006. During the same period, its investments in renewables (including large hydropower) and energy efficiency rose by 46%.³

International Fossil Energy Projects			
BANK	AMOUNT	CO2 EMISSIONS	PERIOD
European Bank	\$1.2 billion	6.5 billion tons	1992-1997
Inter-American	\$6.3 billion	3 billion tons	1992-2004
World Bank	\$13.6 billion	36 billion tons	1992-1998

Source: "OPIC, Ex-Im and Climate Change: Business as Usual? An Analysis of Fossil Fueled Development Abroad, 1992-1998"

The investment in fossil energy reaches far beyond the specific projects the World Bank finances. The Bank sets a standard for all other fossil fuel financiers: regional development banks, export credit agencies and private banks. More than 90% of

² Institute for Policy Studies et al., *How the World Bank's Energy Investment Framework Sells the Climate and Poor People Short*, September 2006, www.seen.org/PDFs/Energy_Framework_CS0.pdf.

³ "World Bank Group Financing for Extractive Industries Development," prepared by Heike Mainhardt-Gibbs for the Bank Information Center, 2006, www.bicusa.org/proxy/Document.10301.aspx.

private banks that provide project financing in the developing world have signed the Equator Principles,⁴ which essentially means they follow the World Bank's environmental and social guidelines. Consequently, a meaningful commitment to clean energy projects at the World Bank could affect 90% of all private-sector project financing in emerging markets, as well as influencing the investment practices of public banks.

The next administration can redirect U.S. development aid from carbon-intensive to carbon-free energy projects.

Development policies encourage energy-intensive exports: U.S. policies promote a global system of export-oriented development. Exporting requires more energy than serving domestic markets, as products are packaged and shipped long distances, components are shipped back and forth during the manufacturing process and manufacturing plants are scaled larger than needed for local markets.

International trade policy trumps climate policy. The United Nations Framework Convention on Climate Change and the Kyoto Protocol stipulate that nations must conform to world trade rules. Policies to promote clean energy and stabilize greenhouse gas emissions often are viewed as illegal barriers to trade, punishable under World Trade Organization rules. Policies vulnerable to dispute include stronger energy-efficiency standards, renewable-energy portfolio standards, subsidies for alternative energy, carbon taxes and stronger standards for fuel efficiency. In effect, world trade policies backed by the United States are designed to reduce the role of government, which can inhibit federal action to increase the nation's energy and climate security.

Carbon trading is clashing with clean energy finance. Since 2002, about \$8 billion worth of carbon trading transactions have occurred under the Clean Development Mechanism (CDM) in the Kyoto Protocol. More than two-thirds of CDM trades have had nothing to do with clean energy development or the capture

⁴The Equator Principles: Banks have signed on to a set of social and environmental guidelines developed by the World Bank Group for their project financing; see www.equator-principles.com.

of CO₂. Methane capture from coal mines, a popular activity under the CDM, provides a perverse incentive for coal companies to continue to mine and CDM credits for turning fly ash into cinder blocks to support coal combustion. The World Bank Group, which plays a leading role in facilitating carbon trade under the Kyoto Protocol, counts the direct on-site emissions of its projects but not their life cycle greenhouse gas emissions.

Presidential Actions

1. Create an International Renewable Energy Agency.

The President should champion an international grand deal to redirect the subsidies that distort world markets in favor of carbon-intensive fuels and that hide the true costs of energy projects. The deal should include common definitions of subsidies and methods for assessing them, clear targets and timetables for phasing them out and equitable solutions for those adversely affected by subsidy reform.

The President should propose the creation of a new specialized international agency – the International Renewable Energy Agency (IREA) – to administer the shift of global energy subsidies from fossil and nuclear energy projects (now between \$150 billion and \$250 billion annually) to renewable energy investments (now about \$10 billion). By one estimate, the basic electricity needs of a billion people could be provided with 56 gigawatts of generation at a cost of \$100 billion.⁵ An additional \$50 billion annually would help developing nations – including those least able to cope with climate change – carry out adaptation initiatives. In addition to shifting subsidies from carbon-intensive to clean energy and climate adaptation projects, funds could be generated through a share of cap-and-auction regimes, border carbon fees, taxes on international currency transactions, arms trades or oil trades, or debt relief.

⁵ See W. Fulkerson et al., “Sustainable, Efficient Electricity Service for One Billion People,” *Energy for Sustainable Development* 9, Number 2 (June 2005): 26–34.

The IREA would be charged with two additional responsibilities: technical assistance and small-scale financing.

Technical assistance: The IREA would establish a worldwide network of technical experts in energy efficiency and renewable energy technologies; create links between nations to share information and expedite market penetration of renewables and efficiency; and implement an oil, gas and coal depletion protocol to encourage all countries to accurately assess their fossil fuel reserves and their exports and imports, and to manage their reserves transparently to avoid economic shocks due to peaking and collapse of these markets.

Financing: A Clean Energy Bank within the IREA would provide micro-loans and grants for local and regional sustainable energy projects as well as technical assistance to help ensure that the projects it funds succeed and repay their loans. The bank also would support technology transfer to technology developers to speed market penetration. Among the bank's priorities would be projects that provide the basic energy needs of women and children whose work is dominated by the task of gathering wood and dung for fuel. Small-scale energy systems free them to engage in education, income opportunities and other empowering activities.⁶ Studies suggest that women's empowerment is a factor in population control – a topic not otherwise addressed in this plan, although the projected rapid growth in the world's population is a profound challenge in controlling global greenhouse gas emissions.

2. Implement a Carbon Debit Mechanism.

Greenhouse gas trading regimes should include not only credits but also debits. Emission debits would count the greenhouse gas emissions created by projects funded by development banks, when those projects would not otherwise have been

⁶The World Health Organization estimates that 2.5 million women and young children in developing countries die prematurely each year as a result of breathing the fumes from indoor biomass stoves. The Greenbelt Movement of Kenya, the Self-Employed Women's Association of India and the Grameen Bank of Bangladesh provide models of empowerment programs.

done. Based on a methodology developed by the National Academy of Sciences and approved by the Intergovernmental Panel on Climate Change, investors would be required prior to project approval to assess the emission impacts of their lending. The investor could claim and profit from a credit only when the bank's investment portfolio shows net greenhouse gas credits on an annual basis. The objective of the debit mechanism will be to facilitate a global energy transition by honestly assessing the net impact that investments and trading schemes are having on the climate.

3. Assess the impact of greenhouse gas emissions in the developing world.

There is no credible system in place to assess the full impact of greenhouse gas emissions in the developing world – ranging from wood and dung fires, to methane from rice paddies, to deforestation. This assessment is needed if we are to create a global climate action regime. However, the assessment should make a distinction between luxury and survival emissions that result from basic needs such as cooking and heating.

4. Champion Clean Energy Sovereignty.

Where international trade agreements inhibit nations' efforts to reduce greenhouse gas emissions, climate should trump trade. The President should take the position that all governments must retain their authority to internalize costs, protect climate-friendly products from unfair imports and encourage activities that reduce greenhouse gas emissions. The President should advocate that the authority for domestic regulation and standard-setting cannot be transferred to international trade organizations; that specific subsidies for renewable energy programs and practices must be permitted; that nations have the right to determine the country of origin, scale of production and environmental impact of their energy imports to protect climate stability; and that trade measures vital to multilateral environmental agreements will be exempt from WTO challenges.

5. Work for a carbon-free, nuclear-free global energy economy.

While many energy analysts do not believe the United States or the world community can provide growing energy needs without fossil and nuclear powers, others have produced studies that chart a path to a fossil-free and nuclear-free economy. For example, U.S.-based scientist Dr. Arjun Makhijani released a report in June 2007 that proposes an ambitious agenda for the United States to eliminate the use of fossil fuels – reducing U.S. emissions by upward of 90% – and nuclear power by 2050.⁷ Road maps that make aggressive use of energy efficiency to reduce energy demand and use renewable energy technologies to meet the demand that remains must be taken seriously, not only in the United States but globally. They are the path to a safe and sustainable future for developed and developing nations.

⁷ A. Makhijani, *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy*, report, Nuclear Policy Research Institute and the Institute for Energy and Environmental Research, July 2007; executive summary available at www.ieer.org/carbonfree/summary.pdf.

Section 14: Climate Leadership

“We have too much Pluribus and too little Unum.” – Documentarian Ken Burns

The next President’s leadership on global climate change should not begin on Jan. 20, 2009. It should begin with the candidates explaining their positions on the issue and providing education, ideas and vision to create a public mandate for national action.

The Transition

Prior to the last change in Administrations, the Heritage Foundation gathered a group of veterans from past White Houses, transition teams and the press corps to identify the factors that make a presidential transition successful. The panelists included more than 60 journalists, presidential counselors and agency officials from nine Administrations spanning nearly 50 years.¹ Among their recommendations:

1. It is never too early for a candidate to begin transition planning. It should start before the election and run well into the first year in office.
2. During the 10 weeks between Election Day and Inauguration Day, the President-elect’s personnel decisions should be the members of his or her inner circle, then members of the Cabinet. It is important to get the White House team in place as soon as possible.
3. Past campaigns have found it helpful well before the party conventions to compile a list of people who could serve with distinction in key appointed jobs. The list can be constructed without interviews and without informing the people whose names are on it. It identifies a talent pool of potential appointees.²
4. Because the clearance and confirmation processes for key political appointees take so long, the transition team should submit the names of potential appointees to the FBI well before inauguration and even before the President-elect makes decisions on who will be appointed. To avoid false starts and political embarrassment, the President should never announce an appointment before clearance is complete.

¹ Among the panelists were Ted Sorensen, Michael Barone, Bob Franken, Michael Novak, Sander Vanocur, Leon Panetta, Edwin Meese III, Caspar Weinberger, Zbigniew Brzezinski, Michael Deaver, Tony Blankley, Martin Anderson, Jack Watson, C. Boyden Gray and Jack Valenti.

² To help with the appointment process, PCAP has developed a list of experts in climate science, policy and communications; see www.climateactionproject.com.

5. During the transition, the President-elect should ask the sitting President to impose a freeze on federal branch employment actions, including new appointments and burrow-ins – political employees who move into career positions before the departing President leaves office. The outgoing President is not required to comply.
6. The President-elect and transition team should identify the Administration's principal goals – no more than two or three – so they can be articulated consistently, starting with the inaugural address and in all speeches that follow.
7. The transition team should establish a cordial relationship with the incumbent White House staff to learn as much as possible about agency issues and dynamics.
8. Prospective White House staff and Cabinet officials should learn about their jobs before inauguration. Once in office, there will not be time to study or consult.
9. Transition teams should be sent into all critical departments and agencies but not to be a conquering army or to harass the people who were there. Rather, envoys from the team should gather information about the organization of the agencies, their staff, appointments that should be made early and problems the new Administration will encounter in the first 100 days. Members of the transition team should work with each agency's senior careerists to identify programs and policies that should be restored, strengthened or eliminated in the President-elect's first budget request and legislative package.
10. The transition team should develop a strategic plan for the first 180 days of the presidency – the six months between inauguration and the middle of August, when Congress traditionally takes its summer recess. This is the honeymoon period, usually the best time for the President to move a program through Congress. The plan should contain an outline of what must be done during those first months, including policy recommendations, a schedule for appointments to key positions, milestones and deadlines, as well as the President's early travel and speech schedule. In effect, this is a plan for the President-elect's post-election campaign to reinforce public and Congressional support for his or her agenda.³

³ Additional information on presidential transitions is available from the U.S. Senate Committee on Governmental Affairs at www.senate.gov/~gov_affairs/transitions/pta_page2.htm and from www.progressivegovernment.org.

11. The transition team should lay the groundwork for the President to call on all sectors of the economy to join the White House in 100 Days of Climate Action. The transition team should meet with major U.S. suppliers of energy-efficiency products and encourage them to offer specials on compact fluorescent bulbs, ENERGY STAR appliances, programmable thermostats and similar products during the 100-day period. Americans who have led climate action as governors, mayors, CEOs, volunteers and non-government organizations should be invited well in advance to attend the State of the Union Address.

Post-Inauguration

In the State of the Union Address, the President should include a State of the Climate report and announce plans for climate action during the first 100 days of the Administration, including the President's legislative package.

The President should call on the nation's businesses, state and local governments, and families to declare their own 100 Days of Climate Action, joining the White House in taking substantive actions to reduce greenhouse gas emissions. The White House website should feature a list of action items for each sector.

In addition:

1. The President's congressional liaison should meet with Senate leaders to gain their cooperation in expediting confirmation of key appointees.
2. The President should immediately implement the post-inauguration campaign plan to build support for his or her agenda. This should include a series of public appearances and events outside government, and events inside government at which the President clearly states the Administration's priorities to political and career federal employees.
3. The President should establish an early pattern of convening White House councils and regular meetings with Cabinet secretaries to keep them focused on the agenda and to ensure good interagency coordination.

4. Within 30 days of inauguration, the President should convene a White House Conference of the governors, mayors, corporate executives and civil leaders that have been the nation's champions of climate action in recent years. The President should ask the leaders to offer their recommendations on how the federal government can support and empower their climate action commitments.
5. International leaders will be watching for early indications of the new President's positions and leadership style. During the first 100 days, the President and Secretary of State should consult with key foreign leaders on climate policy and make the Administration's goals clear.

Use of Presidential Authority: The Two Roosevelts

In recent years, the federal government's system of checks and balances has been more like checks and checkmates. The Executive and Legislative Branches both have been responsible, but adequate and timely action seems a particular problem for Congress. Congress was designed for deliberation, and public policy usually should not be made in haste. But Congress is burdened by factors that often do not serve the best interests of the people. Members are preoccupied with fundraising for reelection and, with campaign financing such a high priority, special interests have too much power. The seniority system gives extraordinary status to long-time members, so that a single Senator or Congressperson can block legislation that serves the public interest.

To move the nation forward, some of America's past presidents have been willing to enter a gray area between Executive and Legislative authorities. For example, Republican President Theodore Roosevelt and Democratic President Franklin Roosevelt both believed they were stewards of the people who should use the power of the presidency assertively for the common good. Teddy Roosevelt established the bully pulpit and went directly to the American people to gain support for his agenda. He believed he could expand his executive authority as far as he needed, except where the Constitution or the law specifically prohibited action.

Franklin Roosevelt was considered one of the boldest practitioners of presidential power. In his Labor Day Address to Congress in 1942, Roosevelt declared: "In the event that Congress should fail to act, and act adequately, I shall accept the responsibility and I will act."⁴ However, FDR never was forced into confrontation

⁴ Labor Day address to 88th Congress, 2nd session, Sept. 7, 1942.

with Congress over the balance of powers because he sought, and Congress gave him, tremendous discretionary authority to lead the nation through the Great Depression and World War II. Congress and the public understood that it was a time of crisis.

Global warming is a more insidious emergency. Unlike a stock market crash or the bombing of Pearl Harbor, it is manifest in scattered events that seem aberrant and unrelated. Few people know what a part-per-million is or think that a 2-degree increase in temperature or a 2-foot rise in sea levels can be serious. Climate forces seem too big to grasp or to change. There is so much talk about the future that it seems like an issue that other generations will have to address. And the prospect of higher energy costs seems more inconvenient than that of higher temperatures. For these reasons, global warming has been called the perfect problem.

Polls show that issues such as the Iraq war and the cost of health care are more immediate and personal to the majority of voters. That makes global warming an issue on which the candidates must lead rather than follow public opinion.

The candidates can take comfort in the fact that many governors, mayors, civic leaders, federal agencies and corporate executives are laying the foundation of the new economy. The President can build on their leadership, empower it and put the weight and resources of the federal government behind it.

But on climate, as on so many other issues, the person with the most potential to lead will be the President of the United States. To expedite progress, the 44th President should use executive authority to implement those policies and programs that do not require legislation. Then, because executive orders and directives are impermanent, the President should work with Congress to codify in legislation those directives he or she feels are most important.

Following the FDR model, the President should work with Congress to obtain the new delegations of authority he or she will need to deal adequately with the growing impacts of global warming and to prevent them from becoming worse by rapidly reducing the nation's greenhouse gas emissions and engaging the international community to do the same.

Presidential and Candidate Actions

1. Prepare for early action on global warming.

All candidates for the Presidency and Congress should state their positions and intentions on global warming and begin building public support for strong White House leadership.

Each candidate should create an advisory team to begin preparing for early action on climate change – including beginning the process of identifying key appointed positions and qualified candidates.

2. Propose that Congress delegate explicit authorities and flexibility for the Administration to address emerging climate issues.

Even the scientific community has not anticipated the speed or diversity of climate impacts that now are underway, including “positive feedback loops” and the speed of melting in Greenland and the Arctic. Because impacts may unfold at rates and in ways that no one can predict, and because a faster federal response may be needed than Congress is equipped to deliver, the President should request that Congress delegate sufficient authorities for the Executive Branch to be flexible and adaptive. These authorities will help avoid conflicts between the three branches of government and the protracted delays that conflicts would cause. For example:

- **The President should seek the authority to adjust carbon caps and other provisions of a congressionally approved carbon pricing regime without going back to Congress, when necessary to meet the nation’s goals (see PCAP Section 1).**
- **The President should ask Congress to renew the procedure originally contained in the Executive Reorganization Act (5USC 901-012), in which a joint resolution by Congress was sufficient to approve proposed reorganizations of the Administrative Branch. (Proposed reorganizations now must be approved by statute.)**
- **Following the FDR model, the President should work with Congress to specify the Administration’s emergency authorities related to global climate change and the circumstances under which those authorities will take effect.**

3. Practice open government.

The President should issue a directive to all federal agencies to create a culture of open and accountable government. The directive should require that agencies conduct their transactions and meetings publicly and transparently; that they provide ample time and opportunity for public comment on proposed policies and regulations; that they consult key stakeholders in shaping policies and regulations; that they neither edit nor censure the findings and recommendations of qualified scientists in federal service; and that federal records be open and available to the media and the public, except in cases where records are specifically closed by law or are legitimately classified for national security reasons.

4. Create policy that is both pragmatic and principled.

Polls show the majority of Americans accept that climate change is a genuine and serious issue, but there are wide differences of philosophy and opinion about the proper government response. Should the federal government intervene or get out of the way? Should it create regulations or incentives? Is a carbon trading regime or a carbon tax the most effective approach? Is either sufficient? PCAP recommends that the President accept these assumptions as the basis of federal action:

- **Climate change is a challenge that does not have a single solution. It will require a comprehensive array of responses and leadership in all sectors of the American economy and society.**
- **Federal policy should prevent lock-ins – technologies and practices that commit the nation to decades of additional greenhouse gas emissions.**
- **Problem-solving is better than problem-switching. We should exhaust problem-free solutions before accepting those that trade greenhouse gas emissions for other serious problems.**
- **The federal government should spark innovation in the public sector by removing barriers and creating incentives.**

- The federal government should abide by the precautionary principle and take action that is beneficial to the nation, even in those areas where climate science is not clear.
- Market mechanisms and intelligent regulation both will be needed. Climate change is sufficiently serious and urgent that all of the tools in the toolbox will be needed. The challenge is to select the right tool for each job.
- When possible, the federal government should build upon existing laws and programs, rather than creating new ones, and should favor small, agile agencies over large, centralized bureaucracies.
- Federal responses to climate change should be revenue neutral. Increased funding for state and local action, weatherization assistance, research and other initiatives contained in PCAP should be offset by decreased funding in other areas – i.e., fossil and nuclear energy subsidies.
- When it's necessary to assure success, redundancy is not a sin. Because rapid action is required on climate change, there is little room for failure. Federal policy should allow for flexibility and adaptation, and should create fallback options in case unproven approaches don't work.
- In its own operations and expenditures, the federal government should set an example of action for other levels of government and for the private sector.
- The marketplace should be liberated from federal subsidies that discourage competition, distort prices or pay people to produce greenhouse gas emissions.
- Because federal funds are limited, federal research resources should be reserved for the emerging technologies that are critical to the nation but not yet viable.
- Climate change cannot be solved by any nation acting alone. The United States must engage constructively with other nations to develop goals and commitments that are effective and equitable. But before the United States has sufficient credibility to influence international negotiations, we must have a substantive domestic policy.

PCAP Resources

During the 2008 election season, the PCAP team will track developments in climate science, policy and Congressional action, and issue a final presidential action plan in September 2008. PCAP has produced the following resources to date:

1. A website (www.climateactionproject.com) designed for political candidates and their policy advisers. The site contains a variety of issue and background papers to help the campaigns develop informed positions.
2. A searchable database of more than 1,000 existing and proposed climate policies and programs. It can be accessed through the website. (<http://cees.colorado.edu/pcap/>)
3. A “Who’s Who in Climate Action” listing many of the nation’s top climate scientists, policy experts and communicators. This list, also available on the website, is meant to help the candidates locate experts who can advise them on policy. (www.climateactionproject.com/action/index.php?title=view)
4. A feature on what past presidents have said about energy security and climate change, going back to President Nixon. (www.climateactionproject.com/pres_quotes.php)
5. A white paper by Yale economist Robert Repetto on the architecture of cap and trade. (www.climateactionproject.com/docs/Repetto.pdf)
6. A white paper by Daphne Wysham, a Fellow and board member of the Institute for Policy Studies, on how U.S. international lending policies should be reformed to reduce greenhouse gas emissions.
7. A study by the Alliance to Save Energy on the steps necessary for the federal government to become carbon neutral.
8. A study by the Center for Neighborhood Technologies on the variety of policies, urban designs and technologies needed to reduce the nation’s reliance on imported petroleum. (www.climateactionproject.com/docs/CNT_petroleum_final_report.pdf)
9. An analysis by the Alliance to Save Energy on policies and programs to reduce greenhouse gas emissions from buildings.
10. A “Full Cost Carbon Calculator” developed by ecologist Robert Costanza and colleagues to help policymakers calculate the economic, environmental and climate costs of different policy options. (www.earthinc.net/pcap/index.php)

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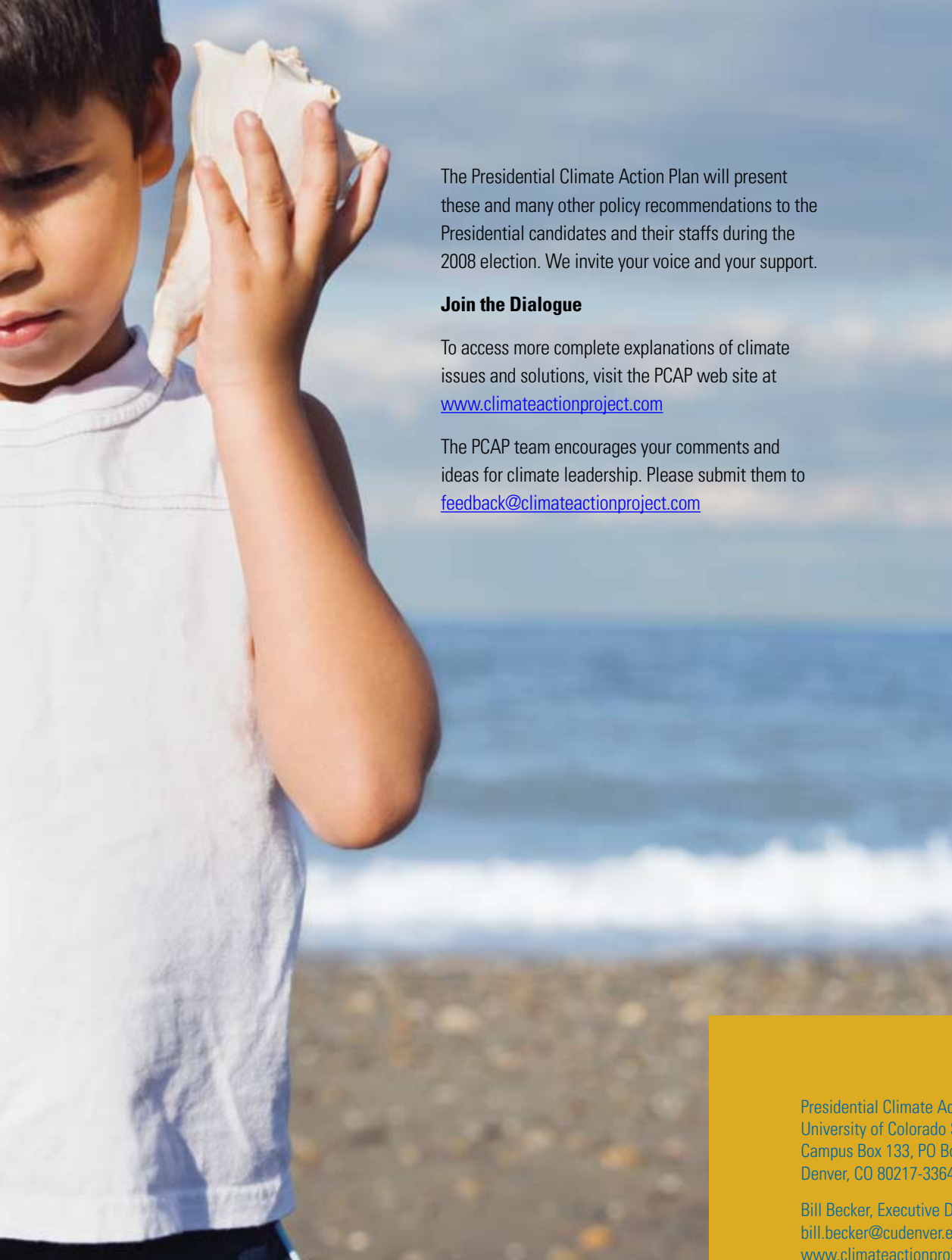
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The Presidential Climate Action Plan will present these and many other policy recommendations to the Presidential candidates and their staffs during the 2008 election. We invite your voice and your support.

Join the Dialogue

To access more complete explanations of climate issues and solutions, visit the PCAP web site at www.climateactionproject.com

The PCAP team encourages your comments and ideas for climate leadership. Please submit them to feedback@climateactionproject.com

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