

10 Cool Global Warming Policies¹

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by Iain Murray and H. Sterling Burnett

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with contributions from Eli Lehrer and Greg Conko

Global warming is a reality. But whether it is a serious problem — and whether emissions of carbon dioxide (CO₂) and other greenhouse gases from human fossil fuel use are the principal cause — are uncertain. The current debate over the U. S. response to climate change centers on greenhouse gas emissions reduction policies, which are likely to impose substantially higher costs to society than global warming might.



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Executive Summary

What should be done about the threat of global warming? Unfortunately, many proposals — including mandatory limits on carbon dioxide (CO₂) emissions — would be much more costly to society than the danger it seeks to avert. Fortunately, there are policies that could be adopted that are desirable in their own right and are commendable, even if there were no threat of global warming. These policies would reduce greenhouse gas emissions, increase energy efficiency, reduce harms associated with global warming or increase the world's capabilities to deal with climate-change-associated problems. Here are 10 of them:

No. 1: Eliminate All Subsidies for Fuel Use. Subsidies for energy research and development, as well as the production, transportation, marketing and consumption of energy, encourage greater energy use and raise emissions levels.

No. 2: Reduce Regulatory Barriers to New Nuclear Power Plants. Regulatory delays add substantially to the cost of nuclear power, which is the only proven technology that can provide enough reliable emissions-free energy to significantly reduce greenhouse gas emissions.

No. 3: Reduce Wildfires through Alternative Forest Management Institutions. Local and private forest management would reduce overcrowding and disease in poorly managed national forests, increasing the ability of the trees to absorb carbon and reducing wildfires, which release huge amounts of CO₂.

No. 4: Liberalize Approval of Biotechnology. Through biotechnology we are developing faster growing varieties of trees that can absorb and store large amounts of CO₂ as well as drought-resistant crops that can thrive despite climate change.

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No. 5: Repeal the National Flood Insurance Program. Subsidized flood insurance is responsible for much of the development in coastal areas and in flood plains. Eliminating this subsidy would make us less vulnerable to higher sea levels and increased rainfall.

No. 6: Increase Use of Toll Roads with Congestion Pricing. Toll lanes with rates that vary according to time of day can reduce traffic delays that increase energy use and emissions.

No. 7: Remove Older Cars from the Road. Subsidizing the replacement of older vehicles with newer ones would increase fuel efficiency and reduce emissions.

No. 8: Reform Air Traffic Control Systems. Allowing pilots to fly more direct routes and avoid lengthy holding patterns and runway delays would save fuel and reduce aircraft emissions.

No. 9: Remove Regulatory Barriers to Innovation. Environmental regulations often increase the costs of replacing older, dirtier facilities with newer, cleaner ones.

No. 10: Encourage Breakthroughs in New Technology. An “X” prize-type competition would encourage the development of new transportation and electric power technologies that reduce CO₂ emissions while meeting future energy demands.

About the Authors

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Introduction

Global warming is a reality. But whether it is a serious problem — and whether emissions of carbon dioxide (CO₂) and other greenhouse gases from human fossil fuel use are the principal cause — are uncertain. The current debate over the U.S. response to climate change centers on greenhouse gas emissions reduction policies, which are likely to impose substantially higher costs to society than global warming might. The world will surely regret it if billions of people are mired in poverty because resources are diverted to solve a nonexistent or trivial problem.² On the other hand, the world would regret doing nothing if human-made global warming is a serious problem.

Fortunately, there are “no-regrets” policies that would prove beneficial whether or not human activities are creating a global warming problem. No-regrets policies:

- Reduce the amount of greenhouse gases emitted into the atmosphere, or
- Mitigate, prevent or reduce harms associated with global warming, or
- Increase society’s capability to deal with problems associated with global warming, or
- Reduce the amount of emissions per unit of output or per unit of energy used, and
- Don’t impose significant economic costs.

The policies discussed in this paper should, to some degree, mitigate and/or allow us to adapt

to global warming, or both. These steps would expand energy choices, improve energy efficiency and increase societal resiliency and adaptability.

“‘No-regrets’ policies are beneficial, regardless of global warming.”

Some policies are likely to reduce greenhouse gas emissions absolutely and spur technological innovation. Other policies would reduce *energy intensity* and/or *emissions intensity*. That is, they would reduce energy use per unit of output, or dollar of gross domestic product (GDP), and/or reduce emissions of greenhouse gases per unit of energy used. In fact, the trend in all developed countries has been toward more efficient energy use. And greenhouse gas emissions reductions usually accompany reductions in emissions of regulated pollutants that are known at some level of atmospheric concentration to adversely affect human health and/or impose external costs on society. These include gaseous compounds of nitrogen and sulfur, carbon particulates, ozone (O₃) and carbon monoxide (CO). Although CO₂ is often called a pollutant, it is not: It is an atmospheric trace gas essential to plant life. The consumption of CO₂ allows plants to release oxygen, which is essential to animal life.³

Each of these policies would make it easier to meet emission-reduction goals without sacrificing living standards. On the other hand, if further research reveals that the threat from climate change is minimal and there is little need for emissions reductions, these policies would still be beneficial.

Costly Measures to Combat Climate Change

Conventional approaches to combat climate change could impose considerable costs, with little corresponding benefits. Specifically, the Obama administration plans to implement a cap-and-trade system to reduce greenhouse gas emissions. Under a cap-and-trade system, the government sets a ceiling on total emissions and auctions, or gives away, allowances to the affected industries permitting them to emit CO₂. Companies that continue to exceed their cap can purchase unused allowances from others.

The goal of a cap-and-trade system is to gradually reduce the number of allowances until emissions are cut to the desired level. Europe instituted such a system to meet its goals under the Kyoto Protocol, the international agreement to limit greenhouse gases.⁴ Yet, experience in Europe and elsewhere, and theoretical modeling, suggests that the price required to achieve the emissions reductions through a cap-and-trade system vastly exceed the likely cost of those emissions to society. In fact, Europe has not yet met its goals for emissions reductions. The reason: The number of

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Table I
Effect of Carbon Taxes on Energy Costs

Estimated Social Cost per Ton of Carbon	Additional Cost per Kilowatt Hour of Electricity	Additional Cost per Gallon of Gas	Increased Household Expenditure on Electricity*	Increased Household Expenditure on Gasoline*
\$85	8 ¢	74 ¢	\$853	\$626
\$24	2.5 ¢	20 ¢	\$266	\$229
\$5	.5 ¢	4 ¢	\$53	\$46

*Note: Assumes average household use of 10,600 kWh of electricity and 1,143 gallons of gasoline annually.

Source: Authors' calculations.

Change, an influential British government report, calculated the social cost of carbon emissions at \$85 a ton, much higher than almost any other estimate. But this report found such high social costs because the author, economist Nicholas Stern, set the discount rate for harm from global climate change at almost zero (0.1 percent). Most economic analyses use a much higher discount rate.

allowances has not been cut because of public resistance to energy price increases from interim emissions limits.

The Cost of Cutting Greenhouse Gas Emissions. Various studies have calculated the potential costs of actions to prevent or reduce future global warming. For instance:

- A study by economist Stephen Brown of the Federal Reserve Bank of Dallas estimates that if the United States attempted to cut emissions by the amount required by the Kyoto Protocol, GDP in 2010 would be \$275.2 billion to \$467.8 billion lower than otherwise — representing a loss of \$921 to \$1,565 per person.⁵
- The United Nations has calculated that stabilizing CO₂ levels at 550 parts per million (which

many scientists believe is necessary to prevent the most dire harms from global warming) would cost trillions of dollars.⁶

The Cost of Global Warming. Published economic studies agree that the costs CO₂ emissions impose on society are quite small — including current and future costs, and both private and external harms. In the most comprehensive review of research on the costs of climate change to date, economist Richard Tol analyzed 103 estimates of the marginal damage of CO₂ emissions from 28 published studies. He concluded that with reasonable assumptions about future harms, emission scenarios and technological change, it was very unlikely the social costs would top \$14 per ton and would probably be closer to \$2 per ton.⁷

On the other hand, the *Stern Review of the Economics of Climate*

In contrast to the market, at a discount rate of exactly 0 percent, \$1 billion today is worth only \$1 billion 100 years from now. This would be appropriate if people were indifferent about when they receive and enjoy the benefits of the dollars. It is precisely because people are not indifferent that the market rate of interest is positive — rewarding people who delay consumption.

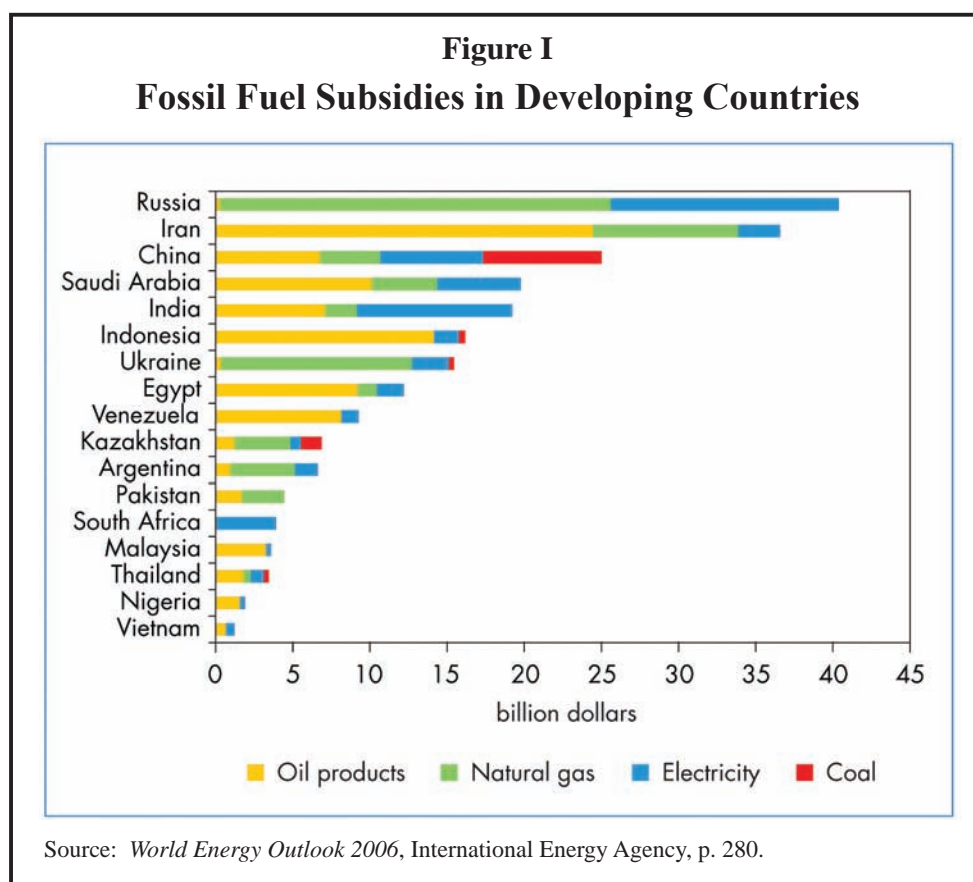
Stern argued that present generations have a moral obligation to protect the interests of future generations, because people who are not yet born cannot express their own future preferences. However, the choice of which discount rate to use is not about the weight to give the well-being of future generations but about opportunity costs. Investments people make today are likely to increase the wealth of their descendants, giving future generations greater resources to exercise their preferences regarding environ-

mental protection. The higher the rate of return earned on a dollar invested today, the more wealth future generations are deprived of if the money is spent now. Thus, Kevin Murphy of the University of Chicago argues that the market interest rate should be used as the discount rate because that is the opportunity cost of spending money on climate mitigation.⁸

Interestingly, Stern's own model assumes that people 200 years from now will have real incomes that are more than 10 times incomes today. This means that if the government taxes people today — either explicitly or through regulations — to reduce climate change in 200 years, the government will be taxing the poor to help the rich.

Environmental interest groups have seized upon Stern's extreme estimates to lobby for substantial, immediate action to cut greenhouse gas emissions. These actions could include a cap-and-trade system or a tax on the carbon content of fossil fuels, including oil, natural gas and coal.⁹ A carbon tax would raise the cost of a gallon of gasoline or a kilowatt-hour (kWh) of electricity generated by coal or natural gas. The rate of the tax could be increased until the estimated costs of climate change are recouped by society or (at what may be a different tax rate) greenhouse gas emissions are reduced to the desired level.

If Stern's estimated \$85 per ton social cost for CO₂ emissions were used to set a carbon tax rate, or a cap-and-trade scheme were im-



posed to limit emissions to the level required to minimize the social cost, how would it affect electricity and gasoline prices?

Assuming the average U.S. household uses 10,600 kWh of electricity and 1,143 gallons of gasoline annually, increasing the cost of energy derived from fossil fuels by \$85 per ton of emissions would result in additional annual energy expenditures per household of just under \$1,500. This would surely discourage some energy use. [See Table I.]

Using more realistic discount rates, the likely cost of those emissions is at most just under \$500 per household annually and quite pos-

sibly under \$100. These figures, if applied globally, would still impose high energy costs on developing countries, severely retarding development in these poor regions.

In contrast to the economic costs that limits on greenhouse gas emissions will impose, this study recommends policies that would bring substantial economic gains to society. Thus, regardless of the threat posed by global warming, these policies should be adopted on their own merits. They will substantially improve energy efficiency, reduce emissions or expand the capability of society to deal with climate change, which are important ancillary benefits.

Table II
Energy Subsidies, Fiscal Years 2007 and 2008

(millions of 2007 dollars)

Beneficiary	Direct Expenditures	Tax Expenditures	Research & Development	Federal Electricity Support	Total
2007 Subsidies					
Coal	\$ -	\$ 290	\$ 574	\$ 69	\$ 932
Refined Coal	-	2,370	-	-	2,370
Natural Gas and Petroleum Liquids	-	2,090	39	20	2,149
Nuclear	-	199	922	146	1,267
Renewables	5	3,970	727	173	4,875
Electricity (Not fuel specific)	-	735	140	360	1,235
End Use	2,290	120	418	-	2,828
Conservation	256	670	-	-	926
Total	\$ 2,550	\$ 10,444	\$ 2,819	\$ 767	\$16,581

Source: "Federal Financial Interventions and Subsidies in Energy Markets 2007," Energy Information Administration, Executive Summary, Table ES1.

No. 1: Eliminate All Subsidies for Fuel Use

While many governments of developed nations argue for a worldwide reduction in fossil fuel use in order to combat climate change, those same governments also subsidize energy use and production.

Subsidies Worldwide. In 2001, the countries of the EU-15 (the "old Europe" nations in the European Union) spent \$16.77 billion (in 2009 dollars) subsidizing coal and \$11.23 billion subsidizing oil and gas.¹⁰

The International Energy Agency (IEA) estimates that developing countries spend around \$220 billion annually on subsidies for energy production and consumption, of which \$170 billion subsidizes fossil fuels [see Figure I].¹¹ Including developed countries, subsidies for energy production and consumption worldwide amount to around \$300 billion, the majority of which are for fossil fuels.¹²

Such subsidies reduce energy prices below what the market would set, encouraging greater use and raising emissions levels. Direct

subsidies include grants to producers and consumers, government investment in research or infrastructure and preferential loans or tax treatment. Indirect subsidies include trade restrictions, price caps and market regulations that guarantee sales volume and restrict competition.

Many signatories to Kyoto subsidize carbon-based fuel use and production. Such subsidies "tilt the playing field," discouraging research expenditures by private energy companies in developing alternative energy sources. Produc-

ers and consumers of other energy sources then demand subsidies to “level the playing field.” Thus, government intervention causes significant distortions in energy markets.

British Petroleum estimates that countries that subsidize transportation fuel use accounted for 96 percent of the increase in oil demand in 2007.¹³ Many of them are less-developed nations that subsidize both production and consumption of fuels. The IEA estimates that removing domestic price subsidies in China, India, Indonesia, Iran, Russia, Kazakhstan, South Africa and Venezuela would reduce global energy use 3.5 percent and reduce global CO₂ emissions 4.6 percent.¹⁴

U.S. Energy Subsidies. The U.S. Energy Information Administration (EIA) calculates that federal energy subsidies amount to \$16 billion annually [see Table II]:¹⁵

- In 2007, the federal government spent approximately \$5.5 billion on subsidies for the coal, oil and natural gas industries— principally tax breaks for investment — including \$3 billion for coal and natural gas, and more than \$2 billion for research and development of clean-coal technology to reduce greenhouse gas emissions from coal.
- The government spent an additional \$1.2 billion for electricity production and use (not fuel specific), and \$2.8 billion to increase the energy efficiency of homes and businesses.

- It spent an additional \$5 billion for renewable energy production and use, mostly in the form of tax breaks.

“Governments subsidize energy use and production.”

- Finally, \$1.2 billion went to the nuclear industry.

The EIA found that subsidies doubled from 1999 to 2007, due mainly to expanded subsidies for renewable energy and clean-coal technology.

Policy Recommendations.

There are a number of neutral energy policies that could be implemented at the national or international level to reduce subsidized production and use:

- International trade talks should include eliminating subsidies for fossil fuel production and consumption.
- National budgets should be reviewed with the goal of eliminating programs that encourage energy use.
- Subsidies and tax breaks, or tax penalties, for specific energy technologies should be eliminated to remove price distortions in energy markets.¹⁶

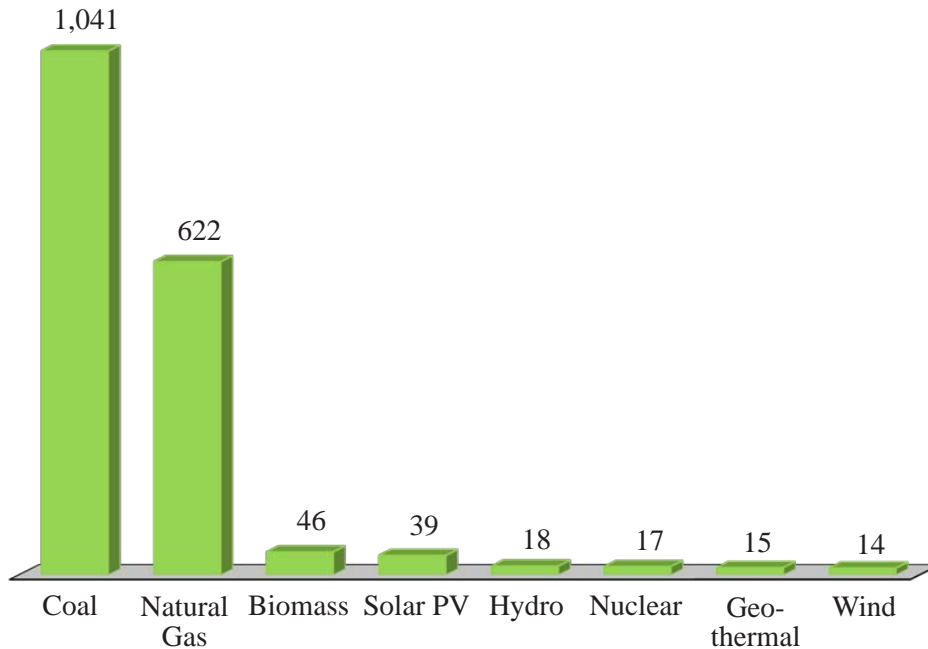
A neutral energy tax policy, for example, would include replacing the federal tax-depreciation

schedule for investment in new capital stock with immediate expensing.¹⁷ New equipment almost always produces fewer emissions per unit of output than older equipment. Changing the depreciation schedule so that new investments could be written off immediately would make it profitable to replace old equipment at a much quicker pace. This simple change could do more to increase energy efficiency throughout the economy than the current complicated expensing regime.

Why Is This a No-Regrets Policy? Subsidies for energy research and development (R &D) cost taxpayers millions of dollars but produce minimal benefits.¹⁸ The Congressional Budget Office and other analysts note that federal R&D money rarely produces commercially viable technologies. In response to consumer demand or in search of efficiencies, the private sector invests in technologies with the potential for marketable innovations. On the other hand, government R&D funding has often been allocated on the basis of political favoritism. For example, taxpayers invested about \$1.5 billion in the Big Three automakers in an effort to develop hybrid engine technology, but privately financed Japanese research rendered the technology obsolete.¹⁹

An international agreement with binding targets to end energy subsidies would arguably reduce emissions to a greater extent and at a lower cost than Kyoto-type agreements. It would combat energy obesity worldwide rather than force

Figure II
Comparison of Life-Cycle Emissions
(Tons of CO₂ Equivalent per GWh)



Note: GWh denotes one billion watt-hours.

Source: "Life-Cycle Assessment of Electricity Generation Systems and Applications for Climate Change Policy Analysis," Paul J. Meier, University of Wisconsin-Madison, August 2002.

an energy starvation diet on developed countries that have the highest costs of avoidance and account for a shrinking share of emissions.

Kyoto and more recent proposals would have almost no effect on overall emissions since they do not include fast-growing developing countries, such as China (now the No. 1 CO₂ emitter). The United Nations projects that these countries will produce the vast majority of future CO₂ emissions. By contrast, an agreement to end energy subsidies that includes developing countries would be less costly because preventing and/or reducing future emissions in developing countries is less expensive than forcing

developed countries to radically alter their energy and transportation infrastructure. Although no such agreement has been proposed, it would make sense as part of the Obama administration's new approach to international energy policy.

No. 2: Reduce Regulatory Barriers to New Nuclear Power Plants

Currently, nuclear power is the only technology capable of providing emissions-free energy on the scale required to significantly reduce carbon emissions. In the United States, almost 700 million metric

tons of CO₂ emissions annually are avoided due to nuclear-generated electricity. Worldwide, nuclear generation reduces emissions by almost 2 billion metric tons below what they otherwise would be.

However, due to environmental antinuclear activism, which began in the 1970s, building a nuclear plant takes a very long time. This raises development and construction costs to the level that nuclear power is not economically competitive with forms of electricity generation that emit greenhouse gases, such as coal and natural gas. According to the Nuclear Energy Institute, building a new nuclear power plant takes 10 years from concept to operation, only four years of which is needed for actual construction. The additional time is consumed by permit application development (two years) and decision making by the Nuclear Regulatory Commission (four years).

The application and approval process has been streamlined over the past decade, but more needs to be done. A potential nuclear power plant builder who has not yet decided to begin construction can file an Early Site Permit application, but it takes an average of 33 months for the Nuclear Regulatory Commission to review it. By contrast, the United Kingdom is introducing a new licensing process under which planning, application and licensing together will take no longer than 18 months.²⁰ This shows there is considerable scope for reducing regulatory delays.

Policy Recommendations.

There are policy changes that can

significantly cut the costs of nuclear power-plant construction and make nuclear power more competitive with other generation technologies.

Put the industry in charge of fuel cycle management. Under the Energy Policy Act of 1982, the federal government was supposed to collect and manage spent nuclear fuel. Despite failing to do so, it continues to collect fees for that purpose. The industry should have the responsibility and ability to decide how to dispose of the fuel safely. Without an effective and agreed-upon approach to the management of nuclear waste, nuclear power is likely to remain too risky an investment.

Remove commodity tariffs. Prices for vital construction materials such as steel and cement are artificially inflated by tariffs. Removing import tariffs would reduce construction costs. For example, large amounts of concrete are used in the construction of nuclear power stations, but thanks to high tariffs, the United States is experiencing a cement shortage. Cement producers such as Mexico have found that it is more profitable to send shipments to China than to the United States because of a 40 percent U.S. import tariff. In 2004, the Portland Cement Association, a trade group representing American and Canadian companies, found that 29 states were experiencing shortages despite the fact that virtually all U.S. cement plants were working around the clock, seven days a week. Lifting or reducing the tariffs would obviously benefit other areas of the economy, such as home building,

making this a wide-reaching no-regrets policy.

Ease immigration requirements for skilled workers. The aging U.S. nuclear industry is losing skilled workers to other careers or retirement. Unfortunately, the employment of highly skilled immigrant workers is severely limited by the highly restrictive H1-B visa process. Reforming this process would greatly increase the labor pool available and lower costs.

Remove regulatory barriers to uranium mining. The industry will need fuel supplies, and various regulatory barriers restrict exploration and mining of domestic uranium on both public and private lands. These barriers must be removed.

“Nuclear power is emissions-free.”

Why Is This a No-Regrets Policy? Over the next 20 years, U.S. electricity demand is expected to increase more than 45 percent. Even the most comprehensive conservation and efficiency efforts would offset less than one-fourth of this increase in demand. Not counting hydropower, the rated capacity of all renewable energy combined is less than 2 percent of total generating capacity. Furthermore, intermittent sources of electric power, such as solar and wind, require redundant

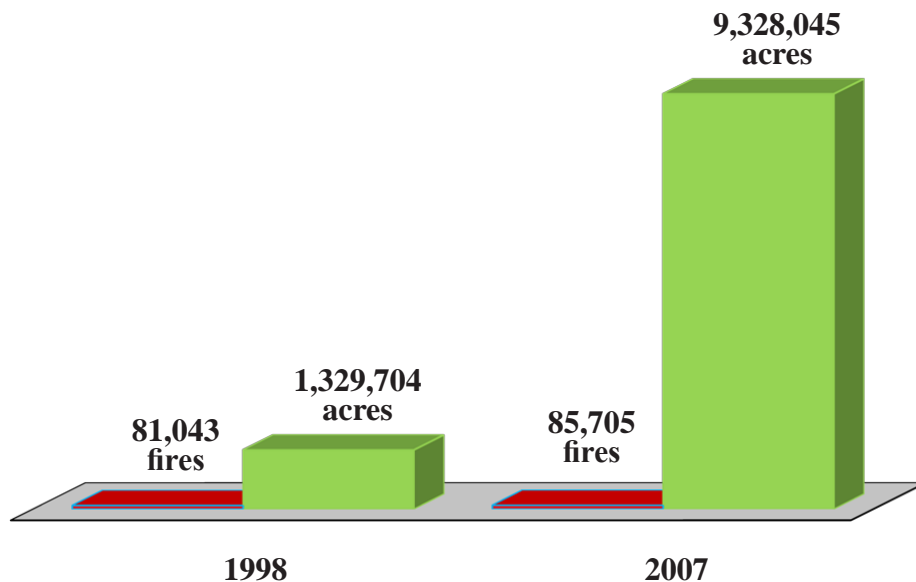
power plants. Power plants fueled by coal, natural gas or nuclear fuel are the only reliable sources for baseload power (required to keep electric power flowing) and peaking power (required to meet daily spikes in demand). Natural gas and coal both emit CO₂ as a byproduct of combustion. [See Figure II.] Absent a significant breakthrough in the capture of carbon, nuclear fuel, which emits no CO₂, is clearly preferable for electric power. Increasing nuclear power generation can supply the energy needed for continued growth while reducing future carbon emissions.

No. 3: Reduce Wildfires through Alternative Forest Management Institutions

Forests are carbon sinks: As trees grow they remove carbon dioxide from the atmosphere and store it in their trunks, limbs and roots. In addition, forest soils, made up of dead organic matter built up over time, store a large amount of carbon. The canopy provided by densely packed tropical and temperate forests slow the decay of fallen leaves and other organic matter, slowing the release of carbon and facilitating its incorporation into the soil.

A 40-year study of African, Asian and South American tropical forests found that each year tropical forests absorb as much as 18 percent of all the CO₂ emitted by burning fossil fuels.²¹ Temperate forests in the United States also absorb and store carbon. In 2004, the Environmental Protection Agency (EPA) estimated that forests sequestered 10.6 percent of the CO₂ released by the combus-

Figure III
National Fire Statistics, 1998 and 2007



Source: National Interagency Fire Service.

tion of fossil fuels, with urban trees absorbing another 1.5 percent.²² Other research indicates that U.S. forests may sequester as much as 40 percent of U.S. human greenhouse gas emissions.²³

Forest Fires Are a Growing Climate Concern. Unfortunately, poor forest management in the United States and other countries contributes to wildfires, which directly add carbon to the atmosphere and reduce the amount of CO₂ absorbed by forests. For instance:

- Wildfires in the United States release about 290 million metric tons of CO₂ into the atmosphere every year — equaling as much as 6 percent of the nation’s annual emissions from burning fossil fuels.²⁴
- Pine beetle infestations have killed so many trees in Western Canada that they have contributed to a rise in large wildfires, turning Canadian forests from a net carbon sink that absorbs 55 million tons of CO₂ per year into a net emitter of up to 245 million tons annually.²⁵
- The Australian government calculated that wildfires in 2003 released more than 190 million tons of CO₂, accounting for one-third of the country’s total emissions, and it found that fires in 2006 and 2007 released an additional 360 million tons of CO₂.²⁶
- In terms of total CO₂ emissions, Indonesia is the third-largest emitter worldwide due largely to its annual wildfires — which emit nearly five times as much as

its energy, agriculture and waste sectors combined.²⁷

How Government Ownership Contributes to Forest Fires.

Large-scale forest fires are primarily the result of poor management of publicly owned forests. Federal mismanagement of U.S. forests has increased the number, size and cost of wildfires over the past decade. [See Figure III.] Historically, the national forests have been logged to provide lumber for commercial activities, to prevent wildfires and to promote forest recreation, species protection and land management. In recent decades, political pressure and lawsuits from environmental lobbyists prevented or delayed both commercial and salvage logging, turning much of our national forests into tinderboxes.

Policy Recommendations.

Changing the management structure of national forests could enhance the quality and value of these lands.

Privatizing the forests. The private sector currently preserves, protects and promotes many historically important properties and manages the majority of the country’s forests and rangelands in ways that promote environmental quality and benefit the owners and the public. The United States can safely and perhaps profitably sell some of the hundreds of millions of acres of national forests for market value, giving the owners of adjacent properties priority for ownership.

Possible buyers include forest product companies, sportsmen’s clubs and environmental groups. While these lands will no longer be

public forests, many and perhaps most will be managed sustainably, in ways that protect their natural character and enhance their environmental and economic value because of the incentives of private ownership. Private companies do not have the general treasury to bail out money-losing operations and therefore seek to maintain the value of their lands. Furthermore, privatizing public lands would increase the tax base in rural areas and reduce the strain on the federal budget.

Public versus Private Management. Private property owners have flexibility in managing their lands, whereas federal forest management is too often hampered by rigidity. For instance, when a wildfire struck near Storrie, Calif., in August 2000, more than 55,000 acres burned, mostly in the Plumas National Forest (28,000 acres) and Lassen National Forest (27,000 acres). About 3,200 acres of private forestland managed by W.M. Beaty and Associates also burned. However, the Forest Service and Beaty’s responses couldn’t have been more different. By 2001, Beaty foresters had:²⁸

- Reduced the chance of a future catastrophic wildfire by removing smaller dead trees and woody material — generating enough clean biomass to fuel 3,600 homes for a year.
- Harvested larger dead trees suitable for lumber processing — amounting to 64.5 million board feet, enough to build 4,300 homes.

- Spent millions of dollars to reforest the burned land, planting nearly one million seedlings of seven different tree species.

By contrast:

- The Forest Service removed dead trees and other fuels from only 1,206 acres and replanted 230 acres in the Lassen National Forest.
- In the Plumas National Forest, the Forest Service was prevented from removing dead trees and reforested only 181 acres.

“Forest fires release CO₂.”

Private forest owners are not hindered by bureaucratic federal rules requiring multiple studies, public hearings, comment periods and court challenges. Thus, they are better able to prevent infestations and respond quickly to disease outbreaks. Promptly removing dead and dying timber can prevent infestations from spreading to other areas and prevent potentially catastrophic fires. Private companies keep the number of trees per acre at an optimal level. This reduces fire hazards and lets sunlight reach the forest floor, which helps regrowth and biodiversity.

Alternatives to Outright Privatization. For political reasons, it may be impossible to sell certain

national forests, but there are various mechanisms or institutional arrangements that would confer many of the benefits of ownership without removing land entirely from public control.

For instance, following a suggestion by economists Richard Stroup and John Baden, Congress could establish Wilderness Endowment Boards to own and manage national forests lands.²⁹ These government-chartered, nonprofit entities, whose board members would be approved by Congress, would have a narrowly defined fiduciary duty to protect and enhance the natural values of the land under their charge. Activities such as oil and gas production, commercial hunting and other resource production could enhance forests without hurting the environment; such is the case with properties managed by the Audubon Society and the Nature Conservancy.

Each individual board would decide how to balance use, recreational access and strict “off-limits” preservation, bound only by their understanding of what is necessary to preserve and enhance the land while generating the revenues necessary to manage it.

Reintroducing Competition. Public lands retained by the federal government could still receive some of the environmental benefits of private ownership if federal, state and local governments competed for control of these lands within the public system.³⁰ For example, teams of experts from federal and state agencies, environmental organizations and the timber industry in Montana and Minnesota compared

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the environmental effects of state and federal forest management practices.³¹ They all concluded that state foresters better protected watersheds and waterways from the impacts of logging and other activities:

- In Minnesota, 90 percent of county lands had the highest compliance rate with “best management practices” for protecting water quality; federal forests had a slightly lower compliance rate at 87 percent.
- In Montana, 99 percent of the watersheds in state forests were protected from all impacts from logging, compared to 92 percent in federal forests.

Congress could allow any state or county that demonstrates superior economic *and* environmental performance to take over the management of the national forests within their state or area. Congress could give fixed but declining block grants during a transition period to the forestry agencies that apply and allow them to retain any revenues generated. The program should be allowed to run for several years so state and county foresters could counteract the effects of federal mismanagement.

At the end of the trial, states and counties that have improved a forest’s economic and environmental performance could be granted the forests outright and federal payments ended. If forests have not improved, they could be returned to federal control and new management experiments implemented. This program would provide Forest Service managers with an incentive

to improve performance or risk losing control over the lands.

Why Is This a No-Regrets Policy? Any of the management regimes suggested above should decrease the size, intensity and frequency of wildfires, meaning less CO₂ will be pumped into the atmosphere each year and more carbon stored. Also, where there are currently more dead or dying trees or in burnt-over areas, trees will be replanted at a more rapid rate, increasing the carbon uptake of the nation’s forests.

*“Well-managed forests
absorb CO₂.”*

When pest infestations and fires do occur, the incentives for the new “owners” will be to help the forest recover as soon as possible in order to help wildlife recover, reduce soil erosion and stream destruction, restart natural ecological cycle and/or make a profit.

What about international forests? Despite the various legal systems and property rights regimes around the world, all forests should benefit from a no-regrets solution suggested in the next section: the widespread adoption of agricultural biotechnological innovations. As mentioned below, scientists are genetically engineering trees that grow faster and can store carbon at

a higher rate than existing varieties. Such trees can be planted in forests where commercial timber producers are operating and in tropical forests previously lost to slash-and-burn agriculture. In addition, the adoption of new biotech crops that increase yields, improve nutrition and/or reduce the need for such inputs as fertilizers should also reduce stress on tropical forests by reducing the need of farmers to move from one forest plot to the next to maintain annual production.

No. 4: Liberalize Approval of Biotechnology

The 1995 introduction of genetically engineered, or biotech, crops in the United States and other countries provided farmers with a valuable tool to increase farm yields while protecting the environment. However, a maze of scientifically indefensible rules governing the testing, development and sale of biotech seeds, plants and the foods derived from them has greatly hindered the use of biotechnology to benefit the environment.

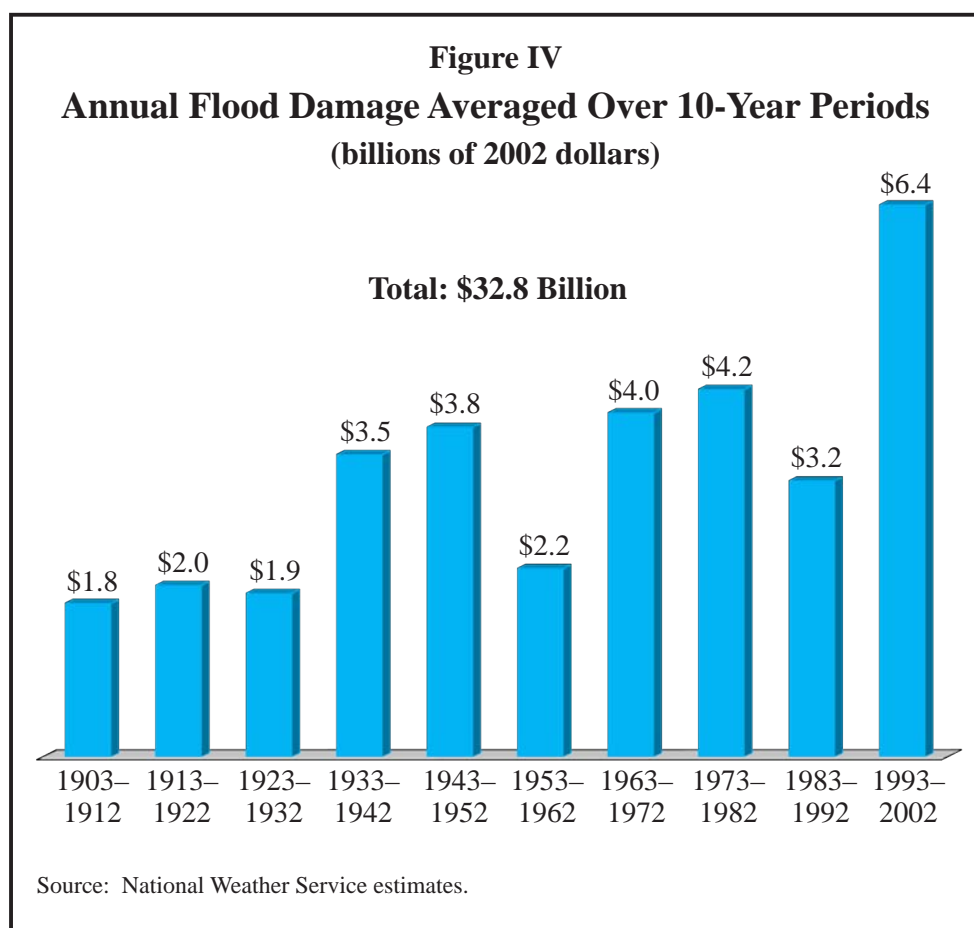
Environmental Benefits of Biotech Crops. Crops have been genetically engineered to grow more robustly with less pesticides and herbicides and to resist several plant diseases that reduce yields. In 2001 alone, biotechnology-derived plants increased U.S. food production by approximately 4 billion pounds, saved \$1.2 billion in production costs and decreased pesticide use by about 46 million pounds.³² They have improved air, soil and water quality as a consequence of reduced tillage, less chemical spraying and

fuel savings, and they have enhanced biodiversity as a consequence of lower insecticide use.³³

Scientists from Louisiana State University and Auburn University found that fewer natural resources are consumed to manufacture and transport pesticides when farmers plant bioengineered pest-resistant cotton. They estimate that biotech cotton saved 3.4 million pounds of raw materials and 1.4 million pounds of fuel oil in 2000 that would otherwise have been consumed in the manufacture and distribution of synthetic insecticides. Additionally, 2.16 million pounds of industrial waste were eliminated. Farmers used 2.4 million gallons less fuel, 93 million gallons less water and saved 410,000 hours of labor.

Genetically engineered herbicide-tolerant crops have encouraged farmers to adopt practices that reduce tillage or eliminate it altogether.³⁴ Low-tillage practices can decrease soil erosion up to 90 percent, compared with conventional cultivation. This saves valuable topsoil, improves soil fertility and dramatically reduces sedimentation in lakes, ponds and waterways.³⁵

Crop varieties — such as corn, wheat and other crops — are being developed that are drought and heat tolerant, have increased soil-nutrient uptake and can grow in salty and acidic soils. They could increase agricultural productivity dramatically.³⁶ Even delaying ripening of fruits and vegetables could substantially enhance food supplies because post-harvest and



end-use losses are estimated to be as high as 47 percent worldwide.³⁷ All of these changes would further reduce energy use and consequent emissions in both food production and transport.

Potential Carbon Sequestration. Plants by their very nature absorb carbon when growing, thereby sequestering it in their bodies and remains. In fact, most fossil fuels today are a result of carbon sequestration by plants during the Carboniferous era. Biotechnology also increases the carbon-sequestration potential of agriculture.³⁸

For example, faster growing varieties of trees that absorb large amounts of CO₂ are being de-

veloped. Such trees can also be logged, thereby saving existing old-growth forest and also, by virtue of their fast growth, take up far less land area than traditional lumber sources.

Adaptation to Climate Change. Biotechnology can also be used to develop crops that are more resistant to climate extremes and thus to problems that global warming might exacerbate. Some researchers have argued that global warming will increase drought, making some currently arable land unsuitable for agriculture and making current drought-prone or arid lands even drier. Thus, developing crops that could be grown on arid lands would

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be a positive adaptation in the face of rising population.

Indeed, scientists are using biotechnology to create varieties of corn, wheat and other crops that can thrive with little water. As the world's population expands and global warming alters weather patterns, water shortages are expected to hinder efforts to grow more food.³⁹ Although people consume only a quart or two of water every day, the plants and meat they eat in a typical day require 2,000 to 3,000 quarts to produce.

Although genetically enhanced varieties of major commodity crops have been introduced in the United States and nearly two dozen other countries, their broader adoption has been hampered by burdensome and scientifically unjustifiable regulatory hurdles and, in many cases, outright bans. In the United States, all new biotech crop varieties are regulated by the U.S. Department of Agriculture (USDA), which treats them as posing a threat of invasiveness or “weediness” until several years’ worth of tightly controlled field testing demonstrates that they will not be “injurious to agriculture.”⁴⁰ The EPA also regulates biotech varieties that are engineered to resist insects and other pests or plant diseases under rules similar to those governing chemical pesticides.⁴¹ Furthermore, the safety of biotech foods is regulated by the Food and Drug Administration (FDA).⁴² Countless scientific bodies — including the U.S. National Academy of Sciences, the American Medical Association and the Institute of Food Technologists — have

found that biotech plants and foods pose no new or unique risks and require no different standards or safety regulations than conventional crops.⁴³ However, these regulations impose vastly higher burdens on biotech varieties, and the expense of complying with these regulations makes it uneconomical to use biotechnology for all but the largest commodity crops.⁴⁴

“Biotech crops can feed a warming world.”

Many countries have effectively banned biotech crops altogether. Despite the favorable recommendation of the relevant scientific committees, members of the European Union and others use a highly politicized regulatory system to reject approval of most biotech varieties.⁴⁵ Consequently, many of the poorest nations in Africa and Asia have been reluctant to approve biotech crop varieties for fear of jeopardizing important export markets. For example, even though several insect-resistant, pathogen-resistant and herbicide-tolerant rice varieties have been developed by Asian, North American and European scientists using biotech methods, none are commercially available in Asia because European commodity shippers have threatened to boycott nations that adopt biotech rice.⁴⁶

Policy Recommendations.

Changing current policies regarding biotechnology can have many positive effects, whether or not global warming imposes significant harms on society.

Eliminate or reduce barriers.

Eliminating or reducing the amount of time needed for biotech crops to be approved would substantially increase food production around the world. It would also allow developing countries to adopt these crops, contributing to the incomes of these agricultural nations. Thus, the increased yield from the adoption of these crops would benefit farmers, consumers and the environment.

Why Is This a No-Regrets Policy? Biotechnology can lower emissions by reducing the amount of energy used to produce food and by providing greater sequestration potential. It also makes it easier to feed vulnerable populations if global warming results in increased drought or threatens the failure of traditional crops.

No. 5: Repeal the National Flood Insurance Program

Sea levels are predicted to rise as a result of thermal expansion and melting glaciers, principally in Greenland and Antarctica.⁴⁷ Much of the concern over the potential harm of global warming to the United States relates to coastal flooding as a result of higher sea levels. However, much of the investment in potentially vulnerable areas is a result of the National Flood Insurance

Program (NFIP). This 41-year-old program has arguably outgrown its original purpose, which was to provide temporary flood insurance to property owners who were unaware they were in flood-prone areas.⁴⁸ Because of full-disclosure mortgage and insurance requirements, nearly all current owners were aware of their area’s flood problems when they purchased or developed their properties. Today, federally subsidized flood insurance encourages people to build homes where they otherwise would not. It encourages lenders to finance mortgages they otherwise would not. Today, NFIP covers almost 5 million homes in more than 20,000 communities. This program offers insurance at subsidized rates for properties that are prone to flooding. Thus, it encourages high-risk development and harms environmentally sensitive areas, including wetlands, floodplains and coastal marshes. The program creates a moral hazard — meaning it encourages people to take greater risks because the government helps bear those risks. Frequently, the result is lost lives, destroyed property, livelihoods and environmental destruction. Thus, ending the program would be a valuable adaptation to a world with rising sea levels, as well as discouraging development that creates problems today.

Flood Insurance Subsidies.

Historically, the NFIP retarded the development of private flood insurance in the United States, because it was created when the private sector was just beginning to offer flood protection. Thus, the NFIP displaced the emerging private market.⁴⁹

The NFIP subsidizes premiums for roughly 20 percent of the covered properties, most of which were developed prior to the program’s beginning in 1968. The other 80 percent of properties pay premiums that actuaries believe will be adequate, over time, for the NFIP to break even. But these premiums are inadequate for two reasons. First, the maps used to determine the risk of flooding and thereby set NFIP premiums are inaccurate and out of date. Second, the premiums don’t reflect the risks associated with some contingencies — such as major catastrophes — that private insurers consider.

“Subsidized flood insurance promotes dangerous coastal development.”

The NFIP guarantees payments of damage claims on insured properties. If the program runs out of money to pay claims, it has the authority to borrow from the U.S. Treasury. Thus, payouts are de facto guaranteed by the federal government. The program has been bailed out by taxpayers twice.

Policy Recommendations. The following reforms would eliminate NFIP subsidies and reduce the potential cost of coastal flooding.

Buy some properties. In some cases, government, private industry or a combination of the two might buy NFIP-insured properties and

convert them to more flood-resistant uses — such as golf courses and parks. Buyouts would be an important component of any “exit strategy” for the NFIP and some parcels of land are particularly suitable for conversion to other uses. However, buyouts alone cannot solve the program’s problems.

Sell the program’s assets. Many NFIP policies have some value on the private market. Estimating their value would be almost impossible today, because there is no market price for the insurance. One way to create a market for the policies would be to divide them into portfolios and sell them at auction. Such sales would greatly reduce the government’s role in flood insurance and would deprive the government of revenues to subsidize the worst flooding risks. Without internal subsidies, some properties would be uninsurable, resulting in significant losses to the owners. However, the question of what to do about these uninsurable risks should not slow reform.

Phase out the program. After selling the bulk of the NFIP’s policies, the program could be phased out with a tax credit or grant program. Insured owners could be given either a one-time grant proportional to the decline in the value of their property resulting from the NFIP’s termination or more modest ongoing subsidies for a limited time.⁵⁰

Why Is This a No-Regrets Policy? Reform of the NFIP would reduce the moral hazard involved in building on vulnerable land, trans-

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ferring the risk from taxpayers to the private sector.

Reduce costs to taxpayers. The NFIP continues to pay claims for homes damaged or destroyed by floods, mudslides and other natural disasters without requiring homeowners to relocate. Homeowners can use the money to rebuild in the same location, and the new home is also eligible for NFIP coverage. According to the Federal Emergency Management Agency (FEMA), repetitive claims are the most significant factor in increasing flood insurance costs.

- NFIP pays claims averaging \$200 million per year for about 40,000 repetitively flooded properties.⁵¹
- Since its creation in 1968, the NFIP has paid out nearly \$1 billion for at least 10,000 properties that have experienced two or more losses, with cumulative claims often exceeding the value of the property.⁵²

Reduce subsidies for development in at-risk areas. The Government Accountability Office reports that 90 percent of all natural disasters involve flooding.⁵³ Although they are called “natural” disasters, many would not be nearly as destructive had people and property not been placed in harm’s way.

- Flood damage costs increased from an average of \$2.6 billion per year (in 2002 dollars) during the first half of the 20th century to more than \$6 billion per

year in the past 10 years.⁵⁴ [See Figure IV.]

- In 2004 alone, FEMA received 1.3 million applications for federal disaster assistance due to hurricanes and tropical storms — far exceeding the number for any comparable past period.⁵⁵

“Developers rebuild on flood-prone properties.”

Reduce the at-risk population. The National Climatic Data Center says that increased population and development of coastal areas are responsible for the increase in losses due to hurricanes.⁵⁶ According to the 2000 U.S. Census, more than half of Americans live within 50 miles of a coast, and by 2025, 75 percent will.⁵⁷ Indeed, the Heinz Center, an environmental research institute, determined that in the absence of insurance and flood control programs, development density in areas at high risk of flooding would be about 25 percent lower than in areas at low risk of flooding.⁵⁸

The private sector will respond more quickly than government if threats from global warming increase, thereby reducing the likely damage. If global warming turns out not to be a problem, the reforms would still produce significant benefits by eliminating the market distortion created by the NFIP.

No. 6: Increase Use of Toll Roads with Congestion Pricing, and No. 7: Remove Older Cars from the Road

Worldwide, road transportation vehicles account for approximately 10 percent of net greenhouse gas emissions.⁵⁹ For developed countries, the percentage is even higher:

- Transportation accounts for 27 percent of the European Union’s CO₂ emissions.
- Road transportation comprises about 80 percent, with automobiles accounting for more than half.⁶⁰
- In the United States, the transportation sector accounts for 33 percent of CO₂ emissions, and 60 percent of the transportation total comes from personal vehicles.⁶¹

Transportation represents a growing portion of CO₂ emissions in developing countries. Growing automobile ownership is one reason why China has surpassed the United States in CO₂ emissions. In March 2009, China’s auto sales exceeded those in the United States for the third straight month.⁶²

In addition to increasing the fuel economy of passenger vehicles, CO₂ emissions per mile of travel could be reduced by relieving traffic congestion and removing older vehicles from the road.

Increasing Traffic Congestion. In the United States, a significant amount of automobile CO₂ emis-

sions result from growing congestion on the nation's roads. Congestion increases travel time, worsens air pollution, increases CO₂ emissions and wastes fuel. According to the Texas Transportation Institute, based on wasted time and fuel, congestion in 437 urban areas cost the nation about \$78.2 billion in 2005.⁶³ In these congested areas:

- The average cost per traveler was \$707 in 2005, up from \$680 in 2004 (using constant dollars).
- Approximately 2.9 billion gallons of fuel were wasted, with 1.7 billion of that total wasted in areas with populations greater than 3 million.
- The amount of wasted fuel per traveler ranged from 38 gallons per year in the largest urban areas to 6 gallons per year in the smaller towns.
- Travel time during peak periods increased by 38 hours a year, on average.

Another source of emissions is older cars, or clunkers. Newer vehicles burn fuel more efficiently; since 1974, domestic new car fuel economy has increased 114 percent — 56 percent for light trucks.⁶⁴ Newer vehicles also have multiple, improved pollution control monitors and mechanisms that reduce emissions. And because the vehicles are newer, these controls work and the engines are tuned. As a result, since the 1970s:

- Air quality has improved dramatically across the board despite increased travel.

- New cars emit 90 percent less air pollution than cars from the 1960s.⁶⁵
- Although driving is increasing by 1 to 3 percent per year, vehicle emissions are dropping 10 percent annually on average.⁶⁶

How bad is this problem? In a study of emissions in Chicago, University of Denver research scientist Donald Stedman found that 8 percent of the cars emitted more than half of all of Chicago's carbon monoxide, with vehicles 5 years or older accounting for 88 percent of the worst polluters.⁶⁷ In addition:

- According to the Brookings Institution, a California study estimates that although cars that are 13 years or older account for only 25 percent of the miles driven, they will produce 75 percent of all pollution from automobiles by 2010.⁶⁸
- Up to 60 percent of the pollutants that form smog are emitted by fewer than 5 percent of the vehicles — almost all of them older vehicles.⁶⁹

“Tollways reduce traffic congestion and vehicle emissions.”

Policy Recommendations. Reducing congestion and the number of older vehicles on the roads should diminish the economic,

personal and environmental costs of driving.

Expand the use of congestion pricing. Traditional toll roads are established to fund the construction and maintenance of the roadway. Congestion pricing is a market mechanism seeking to reduce the personal, economic and environmental costs associated with traffic congestion. Congestion pricing charges varying fees for the use of toll lanes or entrance ramps, with higher fees during peak hours and lower fees during off-peak times.

It is estimated that as many as 25 percent of drivers during rush hour are on discretionary trips. Congestion pricing should encourage drivers to shift their discretionary trips to off-peak periods. Congestion pricing could also encourage people to carpool, use public transit, combine multiple trips, find alternative routes or change their work/living locations to avoid the toll. These behavioral changes should decrease traffic on all roads.

To encourage widespread adoption of congestion pricing and road construction, the federal government could restrict federal funding or devote a share of the gas tax to new roads implementing such systems. Alternatively, states could sell the right to build new roads — with congestion pricing — to private toll companies and collect taxes on generated revenue. Allowing private companies to compete for value-added toll road construction and ownership should speed the pace of construction and reduce the need to increase gasoline taxes.

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There is evidence that congestion pricing improves traffic flow.⁷⁰

- In London, after the adoption of congestion pricing, traffic declined by 15 percent and travel times declined by 30 percent.
- Similarly, bridges and tunnels between New York and New Jersey experienced a decline of 7 percent during the peak morning period and 4 percent in the evening.

The reduction in pollution has been substantial in other countries:⁷¹

- London saw a 37 percent average increase in traffic speed, a 12 percent decline in particulate matter and nitrogen oxides and a 20 percent drop in CO₂.
- In Singapore, there was a 10 m.p.h. increase in average speed, a 45 percent reduction in congestion and 176,400 fewer pounds of CO₂ emissions.
- Stockholm's congestion pricing plan resulted in 15 percent decline in traffic congestion and up to a 14 percent decline in CO₂ emissions.

Retire older vehicles. Approximately 75 million vehicles on the road are 15 years old or older.⁷² Many cars continue to be driven following inspection, despite failing to meet emission requirements. However, advocates for the poor claim that forcing the retirement of older vehicles unfairly penalizes those unable to afford newer vehicles.

To avoid inequity, the government could pay owners to retire their older vehicles. Owners could accept or decline the offer; those

A Regrettable Climate Change Policy: Limiting Air Travel

Airlines are responsible for roughly 5 percent of the total global emissions of CO₂. Some environmental organizations and governments have proposed an international tax or regulatory controls to reduce the volume of air travel. For instance, the European Union is currently considering including aviation in its Emissions Trading Scheme.⁷⁷

It is unlikely the CO₂ emissions from air travel will decline without a proportionate decrease in fuel use. Because fuel consumption is the second largest cost for airlines — an estimated \$10 billion per year, or 15 percent of airlines' operating costs — the industry has already cut fuel consumption by nearly 50 percent per passenger mile since 1977.⁷⁸ Airlines invested in newer, more efficient aircraft and made operational changes that increased efficiency, such as lowering cruising speeds, taxiing with only one engine and shutting down engines when takeoff is delayed by inclement weather.⁷⁹

The signatory nations to the Kyoto Protocol agreed to eventually lower total greenhouse gas emissions to 1990 levels. However, lowering airline emissions by that much would force a dramatic reduction in air travel. Consumers in the United States and Europe will be forced into other modes of travel that are often more expensive and substantially less safe per mile traveled. Barring changes in existing air travel regulations, the imposition of taxes or regulatory controls to meet 1990 emission levels could make it virtually impossible for U.S. airlines to meet the increasing demand for air travel. The Air Transport Association (ATA) estimates that reducing emissions to 1990 levels would result in a 25 percent to 35 percent reduction in air services.

Airline fares and air cargo rates would skyrocket, service to smaller cities would be grounded and industry employment would drop. ATA projections indicate that U.S. airlines would be disproportionately burdened, placing them at a competitive disadvantage with airlines from third-world countries, which would be exempt. Airline deregulation beginning in the late-1970s is estimated to save consumers close to \$20 billion per year. Greenhouse-gas emission controls now threaten to swallow those gains. As in other sectors of the economy, however, adopting deregulatory measures could enable airlines to reduce their per-trip fuel consumption.

accepting would receive compensation and benefit society. A number of programs are being considered in Congress. Under a plan proposed by Sen. Diane Feinstein (D-Calif.), the vehicle being “sold” must be drivable, registered in the United States and have an original fuel economy rating lower than 18 miles per gallon. Sellers must purchase vehicles that are newer than 2004 and have 25 percent better fuel economy than the federal targets for that class of vehicles. This four-year plan is expected to cost as much as \$2 billion per year and retire one million older cars per year.⁷³

Rep. Betty Sutton (D-Ohio) proposes giving drivers of vehicles eight years old or older \$3,000 to \$5,000 per car to buy more fuel efficient cars or use mass transit. Vouchers could only be used for cars getting 27 miles per gallon or more (24 miles per gallon for trucks) — the higher the fuel economy, the better the voucher.

These plans could be improved. For example, the vouchers paid to drivers of older cars (eight years or older) could be varied, according to the fuel economy of the car for its class in its model year. Owners who retired less efficient vehicles would get larger vouchers, ensuring a greater percentage of older vehicles will be retired. Vouchers could be used to purchase any vehicle that meets current clean air emission standards and that gets at least 2 miles per gallon more than the vehicle the driver retired. A modest improvement in fuel economy

across millions of vehicles would certainly improve air quality.

Why Are These No-Regrets Policies? Both policies should result in cleaner air, helping cities comply with federal air pollution standards while reducing fuel use and CO₂ emissions. However, both policies also provide solutions for other problems, including relieving congestion and financing road construction. In addition, drivers can choose when to use roads and what vehicles to drive, depending on their particular need.

“‘Clunkers’ emit most pollution from automobiles.”

No. 8: Reform Air Traffic Control Systems

The increasing demand for air travel means more flights, which means greater fuel use and increased emissions. Yet, the current government-operated air traffic control system, based on a 1930s-era network of radio beacons, hinders innovations that could reduce fuel use and emissions. Specifically, allowing pilots to fly more direct routes between destinations — so-called “free flight” — could save substantial amounts of fuel and reduce aircraft emissions by as much as 17 percent.

Direct Flights. Generally, the shorter the flight, the less fuel is

consumed. Yet neither airlines nor pilots have the freedom to choose the most direct and economical route. This is because the Federal Aviation Administration (FAA) mandates that airlines fly indirect routes. When existing regulations were developed, it was deemed necessary to have a vast amount of space between airplanes. Radar and computer systems were incapable of providing pilots with sufficient information about other air traffic to maintain safe distances and line-of-sight control procedures. The consequent inefficiencies delay planes and waste fuel. Allowing pilots to fly more direct, “free flight” routes would reduce greenhouse gas emissions. Such free flights would allow pilots to choose the most efficient flight path given atmospheric conditions, traffic patterns and the like, rather than having the FAA dictate each plane’s flight pattern.⁷⁴ An aircraft could fly anywhere as long as it maintained a protected zone of airspace and did not impinge upon the protected zone of another aircraft. Naturally, pilot flexibility would be limited in high-traffic areas, such as John F. Kennedy Airport in New York. According to the FAA, free flight is possible only with “new ground- and air-based communications, navigation, and surveillance equipment, avionics and decision support systems.”

The airline industry supports free flight, and the impact on the environment would be tremendous:

- Aircraft CO₂ emissions would be reduced by an estimated 17 percent domestically and 12 percent abroad.

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- A recent report estimated that implementing such a system would reduce U.S. oil consumption by as much as 400,000 barrels daily by 2030.⁷⁵

Green Landings. Even without significant air traffic control (ATC) reform, advanced technology could potentially save significant amounts of fuel by allowing what have been termed “green landings.” Traditional landing approaches involve descending in stages, often involving throttling up the airplane’s engines. Green landings, pioneered by Swedish airline SAS and their partners at Stockholm Airport, involve significant computer interaction between a landing aircraft and its destination airport. This interaction allows the airport to time the landing to the second. As a result the plane can land with a single descent, saving large amounts of fuel. SAS estimates that up to 200 kg (440 lbs.) of fuel, and 300 kg (660 lbs.) of CO₂ emissions can be saved on each flight as a result of more efficient landing.⁷⁶

Unfortunately, the FAA has proven itself incapable of moving to “free flight” in a cost-effective or expeditious fashion. Privatizing the air traffic control system would increase the ability and incentive of the air traffic control system to adopt such reforms and increase overall efficiency within the air travel sector, as well as reducing greenhouse gas emissions from air travel. As the successful experiences with private air traffic control by Canada and New Zealand indicate, a privatized system will be able to act more rapidly in making decisions. It will acquire and implement

new technologies and procedures that increase the efficiency of air travel, thereby reducing greenhouse gas emissions.

Why Is This a No-Regrets Policy? In addition to lowering greenhouse gas emissions, the policy will have significant economic benefits. Delays and wasted fuel cost airlines over \$3 billion a year, according to the FAA’s own estimates. It is much superior to the alternative that has been proposed to reduce greenhouse gas emissions from flight: significant reductions in air travel. [See the side bar: “A Regrettable Climate Change Policy: Limiting Air Travel.”]

No. 9: Remove Regulatory Barriers to Innovation

In competitive markets, companies and entrepreneurs are constantly seeking to reduce production costs in order to achieve the same level of output with less energy and other inputs. This has reduced

“More direct air routes would reduce aircraft emissions.”

energy use and greenhouse gas emissions *per unit of output* in the United States and other market-oriented countries.⁸⁰ [See Figure V.]

- For instance, while Russia produces about \$2 of GDP per kilogram of oil (or equivalent energy)

consumed, the United States produces about \$4.60 for the same amount of energy.

- Germany produces \$6.20 and Italy produces \$8.20 per unit of energy consumed.
- The overall average for the 15 longstanding European Union countries is \$6.60 of GDP per unit of energy.

In fact, the amount of energy consumed per dollar of output has been falling in developed countries for decades. Meanwhile, these countries have continued to grow. For example:

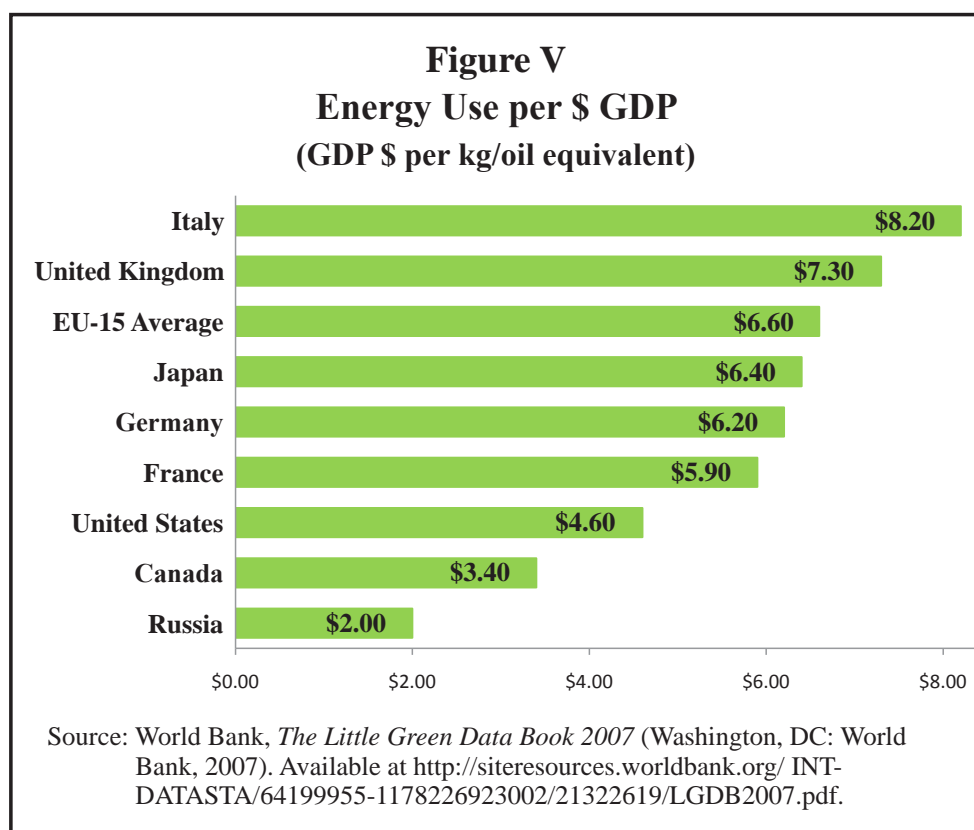
- From 1990 to 2006, while the United Kingdom’s GDP rose 47.8 percent, the energy consumed per unit of output fell by 27 percent.⁸¹
- In the United States, while the economy has grown more than 2,000 percent since 1910, fossil fuel use has increased only 600 percent, while carbon emissions per capita did not even double.⁸²
- Between 2000 and 2006, while U.S. per capita GDP grew from \$34,883 to \$36,122, carbon intensity fell 2 percent each year.⁸³

Regulatory Barriers. Government regulations generally, and environmental regulations in particular, often pose substantial barriers to emissions-reducing innovations. Many efficiency gains require the replacement of existing plant and equipment. A regulatory structure that raises the cost of such capital investments will slow the rate of modernization. The Environmental Law Institute (ELI) concluded that

the current environmental system has created significant barriers to innovation.⁸⁴ By increasing the costs of modifying, enhancing or replacing older, dirtier facilities with newer, cleaner ones, the existing pollution-control regime often works at cross-purposes with the goal of developing less-polluting modes of production.

Analyzing six specific industries in the Great Lakes region, ELI found considerable specific regulatory barriers to environmental innovation. For example, regulations in the baked goods industry aim to reduce ethanol emissions 80 to 95 percent by requiring the installation of Reasonable Available Control Technology (RACT). However, because of these regulations, the ELI found that promising new technologies could not obtain the field testing required to be eligible for RACT permits. As a result, the ELI found, “These barriers combine to provide a monopoly position for the catalytic oxidation technology,” which is the particular technology that performed most effectively when the regulations were introduced. Thus, the regulations prevented the development of potentially better alternatives.

In general, ELI found that pollution emission limits or discharge standards tend to be based on the EPA’s determination of which technology will best achieve the required emissions reductions.⁸⁵ Once a technology is chosen as the preferred pollution control method, there is substantially less incentive to introduce newer technologies or to switch to other energy sources, even if they will improve



environmental performance.⁸⁶ For example, in the 1960s and 1970s, as national clean air laws were developed, the quickest, most effective way to reduce pollution from coal-fired power plants would have been for government to determine the level of pollution it felt was protective of public health and, after setting standards and a timetable, simply to have directed energy companies to meet it.⁸⁷ In the pursuit of profits, companies would have sought out the most efficient, least costly method or technology to meet the required criteria. For most existing power plants, this would have meant switching from high-sulfur, dirty Eastern coal to low-sulfur, cleaner Western coal.

But Congress did not take this path. First, under pressure from the power industry, Congress exempted

existing power plants from the new clean air standards. Second, under pressure from Eastern states’ mining interests, Congress mandated that a particular technology — scrubbers — be used to reduce emissions from new power plants. By scrubbing the post-combustion mix of gases and particulates before emitting them from smokestacks, power plants could continue to use dirtier coal from relatively populous Eastern states with strong mining labor unions. This made the manufacturers of the scrubber technology happy, but because Western mining states have smaller populations, they had fewer legislators in the House of Representatives; thus Eastern interests dominated the debate.⁸⁸

Politicians looked good: They were lauded for cleaning the air while saving jobs. But the envi-

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ronment and the general public suffered. The costs of installing scrubbers was high, and in the early years the scrubbers were prone to failure — which meant a waste of time, manpower, money and resources used to manufacture them. These costs were usually passed on to ratepayers but sometimes to general taxpayers as well. Energy costs rose as a result. In addition, air quality improved at a slower pace than it likely would have had Congress simply set a standard and let industry figure out the best — cheapest and most reliable — way to meet it. Existing power plants were expanded and repaired, in many cases keeping them running decades past their planned useful life in order to avoid building more expensive plants — which would also have been more energy-efficient and cleaner.

Other researchers have also concluded that “technology-based standards provide the weakest incentives for both abatement technology and output technology innovation.”⁸⁹ Indeed, “regulated firms may fear that if they do develop a cleaner technology, the performance standard will be tightened.”⁹⁰ This precludes the normal development and refinement processes most technologies need to achieve their best performance and, in many cases, can limit permissible technologies to a single one.⁹¹

In 1999, a Business Roundtable report identified 21 discrete environmental regulatory or legislative barriers to innovation.⁹² For instance, the federal government raised substantial barriers to the use of cleaner alternative fuels,

including natural gas, hydropower and syngas derived from biosludges. According to the Business Roundtable, these barriers arise from “the multiple layers of permit reviews under the Clean Air Act... [,]the Federal Energy Regulatory Commission’s (FERC) complicated and lengthy hydropower licensing process... [,]and the Resource Conservation Recovery Act’s (RCRA) ‘Derived From’ rules for hazardous wastes.”

“Tax, trade and environmental regulations impede energy-saving innovations.”

In addition, the Business Roundtable noted a variety of regulatory obstacles to the development and deployment of energy-efficient technologies. These included “conflicting federal and state vehicle emissions standards that impede the development of more energy-efficient engine technologies; technology-specific air quality standards that result in increased materials costs, waste and energy consumption; and antiquated building codes that prohibit the use of building designs that would conserve construction materials and reduce heating requirements.”

The Roundtable identified another 17 separate tax and trade policy barriers to innovation. For example, in the tax field: “A U.S. company transferring climate-related or other technology to its

foreign subsidiary must charge the subsidiary an arm’s-length royalty on which it then must pay taxes to the U.S. Treasury — even though the environmental technology transferred represents a cost to the user and does not generate any incremental income.” In other words, the U.S. Treasury uses the tax code to charge companies for the privilege of updating their factories, simply because those factories are located abroad.

In the field of trade, the Roundtable identified significant regulatory restrictions on technology transfer in addition to traditional tariff barriers. It recommended reform of the Export Administration Act to “establish procedures to ensure that controls keep pace with rapidly changing commercial technology and foreign competition” and to ensure “a cost-benefit analysis [is] conducted before any new export control is imposed.”

Procedures required by the Endangered Species Act and National Environmental Policy Act add to these barriers, and politicians and even some government agencies have delayed the siting of solar power collection facilities in the Mojave Desert and other locations.⁹³ If solar power is to have any role in the national energy mix, environmental regulations should not be used to prevent solar power arrays from being sited in the most beneficial locations.

Policy Recommendation. Current regulatory barriers to innovation should be reviewed. Many regulations should be removed entirely. Others should be streamlined considerably. In general,

environmental regulations, the tax code and trade regulations should be amended so as not to provide perverse incentives against environmental and energy innovation. In addition, when examining present regulations and proposing new ones intended to protect the environment or public health, the federal government should undertake a comprehensive review of the available peer-reviewed research, and then simply set the standards to be met and establish a timeline for meeting them. This would allow entrepreneurs to discover the most efficient, effective means of meeting the standard.

Why Is This a No Regrets Policy? Industrial regulation is a potential barrier rather than an incentive to emissions reduction. Freeing the market to allow innovation without penalty will spur technological development and reduce emissions. This technology can then be transferred to other nations through development partnerships allowed through relaxations in trade regulation.

No. 10: Encourage Breakthroughs in New Technology

Energy use is the largest source of human greenhouse gas emissions. In the United States, CO₂ emissions from transportation, electric power, heating, cooking and other energy uses account for 82 percent of emissions.⁹⁴

- Petroleum used in transportation and industrial production accounts for 44 percent of energy-related CO₂ emissions.

- Coal accounts for 36 percent and natural gas for 20 percent.

Thus, every proposal to reduce greenhouse gas emissions, whether international or domestic, primarily aims to restrict energy use through regulations or by imposing higher energy costs through increased taxes. These policies seek to reduce energy use absolutely or to shift energy production from fossil fuels to sources that emit less or no greenhouse gases.

Every credible cost analysis of these proposals shows that consumers will pay more for energy, and that employment, GDP and disposable household income will decline relative to what they would be absent the restrictions. For instance, a recent analysis by Charles River Associates of the Obama Administration's proposal to reduce carbon emissions estimates that if the plan becomes law, by 2025:⁹⁵

- The United States will suffer 3.2 million job losses;
- Household purchasing power will decline an average of \$1,827;
- U.S. GDP will be 0.7 percent lower than expected;
- Motor fuel prices will rise 19 percent;
- Electric power prices will rise 44 percent; and
- Natural gas prices will rise 56 percent.

Other analyses of various climate proposals result in similar cost estimates.⁹⁶

Despite these costs, the impact on atmospheric CO₂ concentrations would be minimal because developing countries are projected to account for 85 percent of emissions

growth in the next two decades. Indeed, China has already surpassed the United States as the world's largest CO₂ emitter.

Current Policy. Responding to environmental concerns, the federal government currently promotes use of alternative fuels, such as corn-based ethanol for transportation and renewable sources of electricity, primarily wind and solar power. It is unclear whether corn-based ethanol as a motor fuel actually reduces net CO₂ emissions.⁹⁷ Certainly, vehicles powered by electricity or hydrogen fuel cells would significantly reduce CO₂ emissions. But these vehicles fail when judged on factors people consider when purchasing vehicles such as costs, reliability, comfort, ability to travel long-distances, towing and/or passenger capacity.

Using wind and solar technologies for electric power production is an intermittent and unreliable answer. In the best locations, solar and wind-powered generators only supply electricity 30 to 40 percent of the time.⁹⁸ Solar cells do not produce power at night and only deliver reduced amounts of electricity on cloudy, rainy or otherwise overcast days. Wind power is subject to wind speed and turbines can malfunction or break. Without storage technology, wind and solar power sources must be backed up by traditional power plants using fossil fuels, which operate on standby to fill any gaps left by wind and/or solar power.

Policy Recommendation. Substantially reducing CO₂ emissions and meeting future energy demands will require a revolution in trans-

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portation and electric power technologies.⁹⁹ One way to encourage the development of these technologies is to introduce competition by establishing an “X” prize-type competition for new technologies in the fields of transportation and energy use.

Past Trials and Successes. Encouraging private innovation and investment through monetary prizes has led to significant advancements in technology. For example:

- In 1996, Dr. Peter Diamandis started a monetary prize — the Ansari X-Prize — and competition to create a private vehicle capable of space flight, with the goal of obtaining new low-cost methods of reaching orbit.
 - In 2004, aerospace engineer Burt Rutan, funded by Microsoft co-founder Paul Allen, beat out 26 other teams for the \$10 million prize.
- Since then, other competitions have been started:
- Another X-Prize Foundation competition aims to create a passenger vehicle that gets the equivalent of 100 miles per gallon of gasoline.
 - Billionaire Richard Branson is offering a \$25 million dollar prize to anyone who can devise a technology that can remove 1 billion tons of CO₂ or other greenhouse gases per year for 10 years.

The Government and the X-Prize Model. The federal government should follow the X-Prize model and support competitions that create various technologies that respond to the twin goals of improving energy

use while reducing greenhouse gas emissions. The contests could aim to create technologies that range from batteries that store power from wind and solar facilities to affordable vehicles powered by hydrogen fuel cells.

“An X-prize competition could spur new technology.”

- Contests such as the X-Prize leverage investment that is often much greater than the amount of the prize awarded. In this case, the federal government would only pay the winners when and if the goal is accomplished.
 - Competition and prizes spur innovation and drive risk-taking by entrepreneurial individuals. Even if only one inventor or team takes the prize, the multiple entries in a contest often result in a number of unexpected and unconventional approaches to the goal, all of which could be developed further after the competition ends.
 - The competitive process often speeds up the adoption of new technologies. As part of the contest, winners could agree to license their innovations to the government for transfer overseas to developing countries. This helps the government satisfy its commitment to “clean development” and reduces emissions.
- Instead of taxes, prizes could be funded out of revenues from new

oil and natural gas production in areas that are currently off-limits to exploration and production. By one recent estimate, oil production on areas that are currently off limits on public lands and on the outer-continental shelf could potentially top 2.03 million barrels a day by 2030, with natural gas production amounting to more than 5.34 billion cubic feet per day. The total revenue from expanded energy production could reach \$1.7 trillion.¹⁰⁰

In addition, new energy production increases America’s domestic reserves of oil and reduces its dependence on foreign oil and gas supplies. It would also create tens of thousands of additional jobs and should reduce energy prices for consumers.

Why Is This a No Regrets Policy? The X-Prize model for new energy technology development will help improve U.S. energy security and increase domestic energy supplies, as new oil and gas fields are brought into production. Revenues from increased production will fund the development of new technologies that will lessen American dependence on fossil fuels.

Conclusion

These 10 policies, taken together, could do a great deal to mitigate the risks of global warming while at the same time promoting economic growth and global development. Moreover, in the current geopolitical climate, they represent the only prospect for genuine global agreement and as such should be examined very carefully by the new administration as an important part of its energy strategy.

Endnotes

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Health Care Policy.

The NCPA is probably best known for developing the concept of Health Savings Accounts (HSAs), previously known as Medical Savings Accounts (MSAs). NCPA President John C. Goodman is widely acknowledged (*Wall Street Journal*, WebMD and the *National Journal*) as the “Father of HSAs.” NCPA research, public education and briefings for members of Congress and the White House staff helped lead Congress to approve a pilot MSA program for small businesses and the self-employed in 1996 and to vote in 1997 to allow Medicare beneficiaries to have MSAs. In 2003, as part of Medicare reform, Congress and the President made HSAs available to all nonseniors, potentially revolutionizing the entire health care industry. HSAs now are potentially available to 250 million nonelderly Americans.

The NCPA outlined the concept of using federal tax credits to encourage private health insurance and helped formulate bipartisan proposals in both the Senate and the House. The NCPA and BlueCross BlueShield of Texas developed a plan to use money that federal, state and local governments now spend on indigent health care to help the poor purchase health insurance. The SPN Medicaid Exchange, an initiative of the NCPA for the State Policy Network, is identifying and sharing the best ideas for health care reform with researchers and policymakers in every state.

**NCPA President
John C. Goodman is called the
“Father of HSAs” by *The Wall
Street Journal*, WebMD and the
National Journal.**

Taxes & Economic Growth.

The NCPA helped shape the pro-growth approach to tax policy during the 1990s. A package of tax cuts designed by the NCPA and the U.S. Chamber of Commerce in 1991 became the core of the Contract with America in 1994. Three of the five proposals (capital gains tax cut, Roth IRA and eliminating the Social Security earnings penalty) became law. A fourth proposal — rolling back the tax on Social Security benefits — passed the House of Representatives in summer 2002. The NCPA’s proposal for an across-the-board tax cut became the centerpiece of President Bush’s tax cut proposals.

NCPA research demonstrates the benefits of shifting the tax burden on work and productive investment to consumption. An NCPA study by Boston University economist Laurence Kotlikoff analyzed three versions of a consumption tax: a flat tax, a value-added tax and a national sales tax. Based on this work, Dr. Goodman wrote a full-page editorial for *Forbes* (“A Kinder, Gentler Flat Tax”) advocating a version of the flat tax that is both progressive and fair.

A major NCPA study, “Wealth, Inheritance and the Estate Tax,” completely undermines the claim by proponents of the estate tax that it prevents the concentration of wealth in the hands of financial dynasties. Actually, the contribution of inheritances to the distribution of wealth in the United States is surprisingly small. Senate Majority Leader Bill Frist (R-TN) and Senator Jon Kyl (R-AZ) distributed a letter to their colleagues about the study. In his letter, Sen. Frist said, “I hope this report will offer you a fresh perspective on the merits of this issue. Now is the time for us to do something about the death tax.”

Retirement Reform.

With a grant from the NCPA, economists at Texas A&M University developed a model to evaluate the future of Social Security and Medicare, working under the direction of Thomas R. Saving, who for years was one of two private-sector trustees of Social Security and Medicare.

The NCPA study, “Ten Steps to Baby Boomer Retirement,” shows that as 77 million baby boomers begin to retire, the nation’s institutions are totally unprepared. Promises made under Social Security, Medicare and Medicaid are completely unfunded. Private sector institutions are not doing better — millions of workers are discovering that their defined benefit pensions are unfunded and that employers are retrenching on post-retirement health care promises.

Pension Reform.

Pension reforms signed into law include ideas to improve 401(k)s developed and proposed by the NCPA and the Brookings Institution. Among the NCPA/Brookings 401(k) reforms are automatic enrollment of employees into companies’ 401(k) plans, automatic contribution rate increases so that workers’ contributions grow with their wages, and better default investment options for workers who do not make an investment choice.

The NCPA's online Social Security calculator allows visitors to discover their expected taxes and benefits and how much they would have accumulated had their taxes been invested privately.

Environment & Energy.

The NCPA's E-Team is one of the largest collections of energy and environmental policy experts and scientists who believe that sound science, economic prosperity and protecting the environment are compatible. The team seeks to correct misinformation and promote sensible solutions to energy and environment problems. A pathbreaking 2001 NCPA study showed that the costs of the Kyoto agreement to reduce carbon emissions in developed countries would far exceed any benefits.

Educating the next generation.

The NCPA's Debate Central is the most comprehensive online site for free information for 400,000 U.S. high school debaters. In 2006, the site drew more than one million hits per month. Debate Central received the prestigious Templeton Freedom Prize for Student Outreach.

Promoting Ideas.

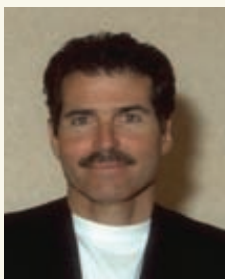
NCPA studies, ideas and experts are quoted frequently in news stories nationwide. Columns written by NCPA scholars appear regularly in national publications such as the *Wall Street Journal*, the *Washington Times*, *USA Today* and many other major-market daily newspapers, as well as on radio talk shows, on television public affairs programs, and in public policy newsletters. According to media figures from Burrelle's, more than 900,000 people daily read or hear about NCPA ideas and activities somewhere in the United States.

What Others Say About the NCPA



"The NCPA generates more analysis per dollar than any think tank in the country. It does an amazingly good job of going out and finding the right things and talking about them in intelligent ways."

Newt Gingrich,
former Speaker of the U.S. House
of Representatives



"We know what works. It's what the NCPA talks about: limited government, economic freedom; things like health savings accounts. These things work, allowing people choices. We've seen how this created America."

John Stossel,
co-anchor ABC-TV's *20/20*



"I don't know of any organization in America that produces better ideas with less money than the NCPA."

Phil Gramm,
former U.S. Senator



"Thank you . . . for advocating such radical causes as balanced budgets, limited government and tax reform, and to be able to try and bring power back to the people."

Tommy Thompson,
former Secretary of Health and
Human Services