Republicans for Environmental Protection's

Policy on Global Climate Change,

our greatest environmental challenge

This paper was written by REP Director Jim DiPeso.

Part I: A Call to Action

Global climate change is the pre-eminent environmental issue that America and the rest of the world will face in the 21st century. The evidence is becoming increasingly clear that human activity is causing an artificial warming of the Earth's atmosphere. Scientists believe that a warmer world could result in costly, harmful consequences: coastal flooding, increasingly erratic and severe weather, loss of farm production, greater stress on forests, reduction in fresh water supplies, and spread of infectious tropical diseases to temperate regions.

The findings of science cannot be dismissed cavalierly. The research has been carried out by experts with impeccable credentials. While many uncertainties remain and more research is necessary to fully understand global warming, the risks of deferring all action while studies proceed are high. It is the conservative course of action to err on the side of caution when the stakes are so great. A careful homeowner buys insurance, even in the knowledge that a fire or other disaster may never occur. A prudent investor manages risk through diversification. A wise doctor counsels patients to prevent the onset of illness instead of risking an expensive hospital stay, or worse.

There is no need for the gloomy pessimism heard from some quarters that fighting global warming will harm the economy. That is the paralysis of inside-the-box, deer-caught-in-the-headlights thinking. America can do better than that. We can fix this problem if there is bold leadership in the spirit of Theodore Roosevelt. The right signals will catalyze a burst of business investments that will wring energy waste out of our economy, and create advanced clean energy technology industries rivaling information technology in economic importance.

America has done it before. Between 1973 and 1986, the U.S. economy grew 35 percent, while

energy consumption did not grow at all. That was with yesterday's technology and yesterday's economy. Imagine the possibilities in today's digital world, where astonishing advances in information technology have transformed our economy. By itself, the new information technology is creating new opportunities for more efficient use of capital and resources. Moreover, the revolution wrought by the microprocessor presents an intriguing template for an energy technology revolution similar in scope and consequences. As John Palmisano of Enron once observed, "there are several Microsofts waiting to come forth in the clean energy business, and we'll all wish we'd have invested in them in the late 1990s when they were still tiny."

Authoritative research backs this up. A conservative study by five national laboratories (Argonne, Oak Ridge, Lawrence Berkeley, Pacific Northwest, and the National Renewable Energy Laboratory) concluded in 1997 that reducing U.S. carbon emissions to 1990 levels by 2010 could be accomplished at no net economic cost, and could result in lower energy bills for American consumers and industry. In 1999, the American Council for an Energy-Efficient Economy estimated that a program of stronger efficiency standards, labeling, voluntary programs, and economic incentives could reduce U.S. carbon emissions 40 percent from 1997 levels by 2020 and result in half a trillion dollars in net economic benefits.

The private sector is poised to bring solutions to market. Many business leaders understand both the significance of global warming and the opportunities presented by fighting it. At this year's annual World Economic Forum in Davos, Switzerland, for example, the world's most prominent business decision-makers selected climate change as the most pressing challenge the world faces in the 21st century. Significantly, the business leaders also selected climate change as the foremost area that business could take a leadership role in resolving. The largest American companies are ready to move ahead. In a joint statement issued by the Business Environmental Leadership Council, prominent corporations as diverse as Boeing, United Technologies, Baxter, and Whirlpool agreed that "enough is known about the science and environmental impacts of climate change for us to take actions to address its consequences."

This is more than idle talk. World-class companies are taking steps to reduce emissions of global warming gases from their operations. DuPont, for example, has announced it will reduce its greenhouse gas emissions nearly two-thirds by 2010 and meet 10 percent of its energy needs from renewable resources by that date.

World-class companies are developing advanced clean energy technologies that promise to reduce greenhouse gas emissions, improve business efficiency, and create new industries. Leading automakers plan to commercialize cars powered by pollution-free fuel cells in the next decade. Leading oil companies are investing hundreds of millions of dollars in solar energy. Wind energy is the fastest growing energy source in the world.

Companies are acting because they see climate change as a business opportunity. As John Browne, CEO of BP Amoco noted in a 1998 speech: "Business is about finding practical solutions to complex problems in which not all the facts are known. That is the business of business."

But business cannot do it all unaided. The buildup of greenhouse gases must be halted and reversed before irreversible global warming sets in. Federal leadership is needed to move away market barriers and provide the incentives that will turbocharge a clean energy revolution sooner rather than later. It's time to move beyond debating whether global warming is occurring. It's time for the kind of leadership that Theodore Roosevelt would recognize: a careful, but determined course of action in which America leads a global effort to create a clean, stable, prosperous economy for the 21st century. The science shows why this must be done.

Part II: The Science

In 1995, the Intergovernmental Panel on Climate Change (IPCC) concluded that "the balance of the evidence suggests a discernible human influence on global climate." Couched in the careful language of science, that statement was a sweeping observation that shined a bright spotlight on a stunning fact. The human species has become a force of nature. The human race is conducting a giant, uncontrolled experiment on the only atmosphere we have.

Simple physics explains global warming. Here are incontrovertible facts: The sun shines, warming the Earth. Carbon dioxide (CO_2) and other "greenhouse" gases prevent the escape of some of that solar heat back into space. So far, so good. The presence of greenhouse gases makes the Earth a warm and hospitable planet for life. Without these gases, Earth would be a frozen wasteland.

But you can have too much of a good thing. The natural balance of heat-trapping gases is finely tuned. The artificially rapid increase of carbon dioxide in the past century has tipped the atmosphere out of balance. The combustion of fossil fuels and removal of forest cover that absorbs CO_2 have resulted in an observed 30 percent increase in CO_2 concentrations since the mid-19th century. Today, global average CO_2 emissions equal one ton per person each year. But the U.S. rate is 5 tons per person each year, more than any other nation.

Under the IPCC's auspices, some 2,000 of the world's most eminent climate scientists have studied global warming for more than a decade. The IPCC's 1995 report was the most thoroughly reviewed climate change assessment ever prepared. In November 1999, IPCC Chairman Robert Watson stated that "it is not a question of whether the Earth's climate will change, but rather when, where and by how much."

How do the IPCC scientists know this? Their conclusions are based on vast amounts of data collected and analyzed by IPCC scientists and colleagues associated with government research institutions and prominent universities. For example, data on CO_2 has been collected continuously atop Mauna Loa, Hawaii, since the 1950s by the Scripps Institute of Oceanography and the National Oceanic and Atmospheric Administration (NOAA). Measurement of CO_2 from earlier years is based on analysis of air molecules trapped in ice cores. While projections by various climate models differ in degree, none of the climate models that researchers employ project no change or a cooler world, according to Dr. Richard Gammon, professor of chemistry and atmospheric science at the University of Washington.

CO_2 levels and temperatures have always fluctuated up and down in lockstep naturally. But scientists have documented that the recent increase has taken place at a much faster rate than has occurred anytime in the past 150,000 years.

More recent studies reinforce IPCC's conclusions. In January 2000, for example, the National Research Council released a study showing that planetary warming is "undoubtedly real," and that the Earth's surface temperatures have risen over the past 20 years at a rate substantially greater than the past 100 years. NOAA's paleoclimate research program (which relies on nature's records founds in tree rings and ice cores to analyze past climates) has shown that the 1990s warming is the greatest warming seen in the past 600 years. Moreover, NOAA concluded that the recent warming is unlike warming trends in past centuries in that it is global in extent and cannot be explained fully by natural mechanisms.

IPCC studies show that global average daytime temperatures have risen by 1 degree F in the past century and are projected to rise 2 to 6.5 degrees F in the next century. While 2 to 6.5 degrees of warming doesn't sound like much on a day-to-day basis, it means a great deal on a global average basis. It took only a 1-degree global temperature shift to bring on the Little Ice Age nearly half a millennium ago, when the Thames River froze over. A 3.8-degree rise in global average temperatures would create conditions the human species has not experienced at any time during the past 10,000 years, Irving Mintzer, co-author of the IPCC's Synthesis Panel report, told a 1998 public health conference in Atlanta.

CO2 emissions are expected to continue increasing as energy demand grows. Between 1990 and 1997, total U.S. greenhouse gas emissions rose 11 percent. The International Energy Agency estimates that global CO2 emissions will rise 50 percent during the 1990-2010 period. Scientists project CO2 levels will be at twice pre-industrial levels by 2040. Under a business-as-usual scenario, CO2 levels could rise to four times the pre-industrial levels. Under those conditions, the average summer daytime temperature in Washington D.C. would be an unbearable 110 degrees.

Uncertainties remain to be resolved through research. Among the unknowns are the share of warming that can be attributed to human activity versus natural causes, and the amount of warming that will occur in the future. According to NOAA, the best estimate today is that half the temperature increase is artificial in origin.

What are potential consequences of a warmer world? It's important to remember that global warming does not mean that every place on the world will warm up at the same rate. What it means is that the addition of heat energy to the atmosphere is likely to result in changed weather patterns.

Greater variability and extreme weather may be more common, a phenomenon that has caught the attention of the insurance industry. According to the Reinsurance Association of America, four times as many natural disasters occurred in the 1990s compared to the 1960s, and insured losses, even after adjusting for inflation, were 15 times higher. The insurance industry is building climate change risks into its catastrophe models and advocating for increased climate research.

Some areas may experience longer, hotter droughts that would pose public health problems and cause fresh water shortages. Others may experience increased precipitation that could create favorable conditions for the spread of infectious disease. In low-lying coastal areas, sea level rise caused by the thermal expansion of water will result in increased flooding and saltwater contamination of drinking water. It is even possible that some areas may become colder. Researchers project, for example, that CO2 levels 2 to 4 times higher than pre-industrial levels could result in short-circuiting of the Gulf Stream. Loss of that ocean current's warmth would cause Europe to become much colder.

Potential public health consequences include increased deaths from heat stress. Even today, evidence suggests that more than 1,000 people die from heat stress in an average summer, according to Laurence Kalkstein, a professor at the University of Delaware's Center for Climatic Research. The people most at risk are isolated senior citizens, as was exemplified by the deadly Chicago heat wave of 1995. Further, increased heat results in increased low-lying ozone, a respiratory hazard. The public health risks of climate change make preventive action a wise course now, according to Harold Franklin, chair of environmental and occupational health at Emory University's School of Public Health.

Warmer, wetter conditions could result in the spread of diseases such as dengue fever and St. Louis encephalitis. The mosquito that spreads encephalitis would have a greater range and a

higher reproduction rate in a warmer, wetter climate, according to Dr. Robert Shope, professor of pathology at the Center for Tropical Diseases at the University of Texas.

Impacts on agriculture will depend on the extent and speed of warming, ability of farmers to adapt, and the importance of countervailing factors: increased CO2 would have a fertilizing effect, but greater heat could result in increased soil dryness and spread of disease pathogens. Plants grown under conditions of increased CO2 have less nutritional value, according to James Teeri, director of the Global Change Project at the University of Michigan. Effects are likely to be highly variable among regions, according to Richard Adams, professor of agriculture at Oregon State University.

Regional effects of global warming would vary substantially. Four examples are described below:

Southeast

Low-lying areas in the Southeast could be the first to feel the impacts of a changing climate. A study by ICF Consulting, for example, estimated that a 6-inch to 12-inch rise in sea level would result in more coastal flooding, stronger storm surges and greater beach erosion in south Florida. The ICF study estimated that a storm similar in power to Hurricane Georges would cause 35 percent to 60 percent more damage in south Florida if sea levels were 1 foot higher than today's level. Studies by EPA and others project that a 1-foot sea level rise along the Gulf and Atlantic coasts is likely by 2050. Another risk is saltwater contamination of drinking water, according to Jim Titus, a sea level specialist at EPA.

Midwest

In the Midwest, most areas would be expected to see declines in rainwater runoff, which would affect the availability of drinking and irrigation water, and affect the levels of the Great Lakes, according to John Magnuson of the University of Wisconsin-Madison. Northland forests in Minnesota and Michigan may die back under warmer temperatures, although CO2 fertilization may mitigate the dieoff somewhat. Tree species diversity in northland forests may diminish, according to EPA's National Health and Environmental Effects Research Laboratory.

New England

New England could face significant changes. If temperatures continue rising at their current rate, the area's deciduous forests could be transformed into the kind of savanna typically seen today in the southern Plains, according to Steven Hamburg of Brown University. A 3.6-degree temperature rise, together with higher nighttime temperatures, could severely damage the region's famed maple syrup industry. New England's billion-dollar sport fishing industry could be at risk as rising temperatures eliminate trout habitat. Warmer temperatures could shorten ski seasons and result in dieoff of the red maples and oaks whose brilliant fall colors attract tourists from all over the U.S.

Northwest

University of Washington studies document that the Northwest's temperatures and precipitation have risen over the past century, consistent with climate models analyzing the impacts of increased CO2 levels. With more precipitation falling as rain rather than snow, UW studies project that continued warming will result in a thinner mountain snowpack, which the region depends on as a water storage reservoir for hydroelectric power plants and for water supplies during the low-rainfall summer months. Reduced stream flows and warmer water temperatures during the summer would put even more stress on weak salmon runs. Forests, especially the dry pine forests east of the Cascades, will face increased risk of fire and pest infestation.

Can these scenarios be averted, or at least reduced in magnitude? Actions being taken today by businesses nationwide are pointing the way toward the answer.

Part III: Business Initiatives

Energy production and use is the leading cause of greenhouse gas emissions. Eighty percent of all emissions result from burning of fossil fuels. Energy efficiency and a switch to advanced, low-carbon and carbon-free clean energy technologies must be part of the solution for attacking global warming. Fortunately, energy efficiency is a "no regrets" strategy. Even if global warming were not a factor, reducing energy waste has significant economic benefits for business and consumers.

Below are three examples of how companies are taking the initiative to improve their competitiveness, reduce costs, and become better businesses through energy efficiency.

Bristol-Myers Squibb's beauty products facility in Stamford, Conn., is implementing an array of lighting and industrial process upgrades that are expected to reduce energy costs by $190,000 in the 1998-2000 period, and as a result, reduce CO2 emissions by nearly 1,100 metric tons per year.

Miller Brewing Co's Milwaukee facility implemented an aggressive energy management system that is expected to reduce costs by more than $1.8 million per year and reduce greenhouse gas emissions by more than 18,000 metric tons.

TXI, the largest producer of cement in Texas, developed a production process that has reduced CO2 emissions by 220,000 tons since 1994. Through the patented process, other efficiency upgrades and use of waste-derived fuel, TXI expected to save more than $6.8 million last year.

Information technologies will help businesses improve energy efficiency, and even avoid energy use altogether, while still creating value. According to a 1999 paper by Dr. Joseph Romm, a former assistant Energy secretary, information technology is helping companies to make more effective use of their capital investments and manage their supply chains more efficiently, getting more productivity bang for their bucks. A related trend is "dematerialization," the production of greater value with fewer physical materials that require energy to produce. For example, storing information on electronic media instead of office paper avoids 3.8 metric tons of carbon dioxide for each ton of paper saved, Romm's paper estimated. E-commerce raises the possibility of web sites replacing energy-consuming buildings and energy-consuming production of building materials, resulting in annual reductions of energy intensity (energy used per dollar of product) of perhaps 1.5 to 2 percent per year through 2007.

Using energy more efficiently does not always require fancy technology. Simple measures such as planting trees and using light colors for building surfaces can reduce air conditioning loads in warm weather cities. In Los Angeles, for example, such measures could cut daytime temperatures by 5 degrees, Romm has estimated.

While efficient use of energy is important, it is not a complete solution. The next step is to diversify our energy menu through reduction and then replacement of carbon-intensive energy sources (coal and oil) with carbon-light or carbon-free sources: natural gas and renewables.

Because of dependence on coal and oil, the generation of electricity is responsible for 30 percent of greenhouse gas emissions in the U.S., while transportation accounts for 25 percent. Fortunately, technologies are being developed that promise to greatly reduce greenhouse gas emissions from power production and transportation. These technologies can provide America with clean, practical energy and transportation services with greatly reduced greenhouse gas emissions.

In the transportation sector, one of the most promising long-term solutions is the fuel cell, which can efficiently produce pollution-free electricity from a variety of fuels containing hydrogen. Ford plans to market a commercial fuel-cell vehicle by 2004. General Motors says up to 10 percent of the cars it will be selling in 2010 will be powered by fuel cells. DaimlerChrysler and Toyota also are developing fuel cell cars. In the near-term, gasoline-electric hybrids offer practical transportation with much greater fuel efficiency. Honda is offering a hybrid for sale to U.S. customers today, and Toyota will follow suit later in 2000.

Fuel cells, along with microturbines, also could emerge as small-scale power sources for factories, schools, hospitals, small businesses, and even private homes. In Omaha, a bank installed a fuel cell to be assured of access to uninterrupted power, vital for carrying out its business. In a suburb of Chicago, a McDonald's restaurant is one of several Chicago-area businesses testing AlliedSignal microturbine generators. Ed Fox, vice president of Arizona Public Service, predicts that the price of electricity from gas-fired turbines will fall from $400-$800 to $250 per kilowatt by 2005, equal to the price peg microturbines should be able to meet by the same year.

This year in the Northwest, the Bonneville Power Administration plans to begin field testing home fuel cells that will extract hydrogen from propane or natural gas to produce electricity. The units should become commercially available in 2002.

Wind and solar energy are about to come into their own. Royal/Dutch Shell believes that renewables could become fully cost-competitive with fossil fuels by 2020 and produce more than half the world's energy by 2050. Shell is investing $500 million per year over the next five years on wind, solar and biomass energy. BP Amoco is nurturing what it hopes will be a $1 billion solar industry.

While solar power is still too expensive for bulk power production, the price of solar cells has fallen 60 percent since 1984, and technological advances are expected to continue pushing costs down. The Utility Photovoltaic Group, a utility consortium, has projected that another 25 percent cost cut would create an annual U.S. market for 9,000 megawatts of solar cells. In the meantime, says Arizona Public Service's Fox, "niche" applications can boost the market for solar and drive down its cost to the point that it is competitive for bulk power production. International markets are a huge opportunity for scaling up production of solar cells that could provide clean power to 2 billion people overseas still living by candlelight. Another is providing power during peaks in demand, such as a summer afternoon in Phoenix. At those times, the cost of power is much higher than average, and at those costs, solar is competitive today.

Wind energy grew 28 percent between 1996 and 1997. Wind energy projects are burgeoning in the U.S., especially in Iowa and Minnesota. Between mid-1998 and the end of last year, nearly 1,100 megawatts of wind energy plants, enough to power a city the size of Seattle, were built in the U.S.

Given half a chance, "green" power can compete. Many Americans, as documented in surveys of buying habits, will give purchasing preference to "green" products. More states are offering consumers choice in buying energy. In Pennsylvania, one of the first states to open the electricity market, companies selling cleanly generated power are making strong inroads.

These initiatives are encouraging news, but left to their own devices, markets may not bring about the clean energy transformation fast enough to prevent an irreversible buildup of CO2 in the atmosphere. The federal government must provide leadership to eliminate market barriers and speed up the clean energy transformation. We conclude with a set of recommendations for the next president of the United States.

Part IV: Recommendations

America is ready to meet the challenges posed by global warming. America has the best scientists. America's businesses lead the world in developing and marketing innovative technologies that transform lives. All that remains is leadership that will channel the unrivaled power and creativity of markets toward developing the solutions we need soon to protect our atmosphere, strenghten America's economy, and bring clean prosperity to the world's developing nations.

There is nothing new or unusual about government channeling market forces toward desirable public ends. From local zoning plans to billion-dollar federal research budgets, governments use a variety of tools to influence the private sector's activities, and have since the founding of the Republic. Many technologies, notably the Internet, originated from government research labs. Abraham Lincoln, the first and greatest Republican, said it best: "The legitimate object of government is to do for a community of people, whatever they need to have done, but cannot do at all, or cannot so well do for themselves, in their separate and individual capacities."

The trick is to guide intelligently, not with heavy-handed regulation that stifles innovation, but with information, incentives and policies that catalyze creativity and development of new business opportunities.

Why can't the government let markets solve global warming on their own? In a perfect world, that would be ideal. In the real world, markets are effective tools, but they are as imperfect as the humans who create and use them. Markets don't take much notice of future costs, or of assets that are difficult to put a price tag on: such as a stable atmosphere. Equipment that is cheaper on the shelf but costlier to operate over time is likely to be chosen over equipment with a relatively high price tag but will save money over time. Information gaps abound. Outdated, inefficient "rules of thumb" persist in the design of new buildings and equipment because "we've always done it this way." Managers overlook the huge returns that energy efficiency can add to the bottom line because they may not be immediately obvious.

Government is not blameless either. Rigid procurement procedures stifle creative ways of buying services that would save taxpayers' money, channel business to creative companies, and do good for the environment. Inflexible regulatory policies steer businesses toward doing only what they must to meet emissions limits, not what they could do to prevent emissions altogether. Unfair regulatory treatment gives a leg up to old and dirty facilities.

In those imperfections lie the business opportunities that a dose of smart leadership can help turn into new savings, new profits, new businesses, and real climate solutions.

Here is what must be done:

1. Expand federal funding of basic research into the causes and consequences of global climate change. Expand public education through web sites, publications and regular regional conferences exploring the causes, consequences and remedies.

2. Expand voluntary labeling programs such as Energy Star. Aggressively market voluntary partnership programs such as Green Lights, Climate Wise, and WasteWise.

3. Regularly update appliance and vehicle fuel efficiency standards. Require light trucks and sport utility vehicles to meet fuel efficiency standards.

4. Level the Clean Air Act playing field by eliminating the "grandfather" exemption for aged, coal-fired power plants.

5. Reform the federal "gas guzzler tax" by directing proceeds toward "feebates" to purchasers of energy-efficient vehicles or vehicles powered by alternative fuels.

6. Provide tax credits for purchase of energy-efficient buildings and manufacturing equipment

7. Include a renewables portfolio standard in federal electric utility restructuring legislation.

8. Lead by example. Provide stable, continuing budgets for investments that will make federal facilities more energy-efficient. Accelerate conversion of federal fleets to alternative fuels. Jump-start the solar market through mass purchase of photovoltaic cells for federal buildings and U.S. military facilities worldwide.

9. Eliminate subsidies for mature energy technologies. Redirect federal technology research funds toward emerging efficiency, renewable energy, and alternative vehicle fuel technologies.

10. Emulate the success of the sulfur dioxide emissions trading program by negotiating the establishment of a flexible, international carbon emissions trading system that will encourage businesses to innovate and drive down costs.

Parting Shot

"I believe, if as a society, we can get away from the blame and denial and debate the issue in a spirit of radical openness, we will find the answers to challenges such as global warming."

—John Browne, CEO of BP Amoco, Oct. 20, 1999

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