

# SOLUTIONS: MOVING AMERICA FORWARD

WE HAVE THE TECHNOLOGY TODAY TO MOVE AMERICA FORWARD INTO A CLEANER ENERGY FUTURE. CARS THAT GO FARTHER ON A GALLON OF GAS, MORE EFFICIENT BUILDINGS AND HOMES, AND RENEWABLE ENERGY ARE THE SOLUTIONS TO AMERICA'S ENERGY PROBLEMS.

## Energy Efficiency

The most important action we can take to curb global warming is to consume energy more efficiently. Energy efficiency is the cleanest, safest, most economical way to begin to curb global warming. Using less energy for the same task puts money in the pockets of American families and reduces pollution that warms the planet and endangers our children and our communities.

### Cars that Go Farther on a Gallon of Gas



The biggest single step we can take to curb global warming is to raise the fuel economy of our cars and light trucks. Cars and light trucks account for 30 percent of U.S. oil consumption and emit 20 percent of the nation's carbon dioxide pollution, the heat-trapping gas that causes global warming. Each gallon of gasoline burned pumps 28 pounds of carbon dioxide into the atmosphere, with the average car emitting approximately 63 tons of carbon dioxide over its lifetime – and the average SUV or pickup emitting around 82 tons. However, by using advanced technology – like smarter transmissions, and aerodynamic designs – and taking steps towards electrifying our fleet – like designing and producing plug-in hybrid cars – we can cut global warming emissions from automobiles in half.

The Obama administration has helped set us on this path by mandating CAFE standards that require an average fuel economy of 35.5 mpg in 2016 with a fuel economy gain of more than 5 percent per year. This is an enormously important step towards reducing global warming pollution that will save 1.8 billion barrels of oil over the life of the program and reduce approximately 900 million metric tons in greenhouse gas emissions.

But it can't end there. We must continue to push for, and demand, larger increases in fuel economy. The stronger these standards become the less pollution our fleet of vehicles create. These demands will also help spur the design and deployment of a new clean energy era of plug-in hybrid engines with electricity derived from clean energy sources.

### Buildings and Homes that Conserve Energy



We can save energy in our homes and office buildings by installing energy efficient appliances, lighting, heating and cooling equipment, and using better insulation. These responsible steps would keep millions of tons of carbon dioxide pollution out of the atmosphere each year. Buildings like this home outside of Frisco, TX use half the electricity of similar sized building by incorporating current technology and thoughtful design – saving money and reducing its impact on the environment. American industry can also benefit from energy efficiency technology; by installing energy efficient equipment, companies can reduce production costs and become more competitive.

### Clean, Renewable Energy from the Wind and Sun

The technology to produce clean, dependable energy from renewable sources like wind, solar, and geothermal energy is here and ready to power America. The U.S. wind energy industry shattered records in 2008 by installing over 8,500 megawatts (MW) of new generating capacity (enough to serve over two million homes), thus increasing the nation's total wind power generating capacity by 50 percent. This channeled an investment of \$17 billion into the economy while creating approximately 85,000 jobs in the wind industry.

The U.S. also saw an 81 percent growth rate in grid-tied photo-voltaic solar power generation over the 161 MW installed in 2007. In addition, solar manufacturers reported a 60 percent increase in production over 2007 levels, which in turn generated millions of dollars and created thousands of jobs for the American economy.

These technologies will do more than just cut pollution and curb global warming. Investing in clean cars, renewable energy and energy efficiency today will jumpstart our economy by making the U.S. a leader in clean power and making us more competitive in the international economy. A report released by the Center for American Progress<sup>1</sup> showed that 1.7 million jobs could be created by national policies that mandate cleaner cars, energy efficiency, and investments in renewable energy.

Clean energy choices are also vital to making our nation more secure. The United States imports more than half of its oil, making us dependent on foreign nations such as Saudi Arabia, Iraq and Venezuela. Despite the call for domestic oil exploration, there is no way we can drill our way out of this – we only have 3 percent of the world's known oil reserves. Our choice is clear: a clean energy revolution now. What we need is a strong domestic administrative policy with energy efficiency and renewable energy as cornerstones of a clean energy economy.

<sup>1</sup>Robert Pollin, James Heintz, and Heidi Garret-Peluer, "The Economic Benefits of Investing in Green Energy", Center for American Progress, 2008

## IF NOT US, WHO? IF NOT NOW, WHEN?

Despite the scientific consensus that global warming is occurring, the knowledge of the chilling affects that will occur unless we act, and the recent positive investments in renewable energy, the United States continues to be the second leading emitter of greenhouse gases globally. Our consumption of fossil fuels like coal, oil, and natural gas grows every day.

We don't have to keep rushing down this dead end street. The solutions to our energy problems exist today. We can produce energy from clean, renewable sources. We can use current technology to improve energy efficiency and improve our quality of life. We can build cars that go farther on a gallon of gas, as well as cars that use electricity produced from wind and solar power plants. Solutions such as these will not only help to curb greenhouse emissions and global warming, but will also clean our air, create new jobs, and make America safer. We know that global warming is occurring, and is a very serious threat. But we now also have the know-how and the ingenuity to leave behind old technology and adopt new energy solutions. The time to act is now.



**The time for talk is past. It is time for action!**

### TAKE ACTION:

JOIN US IN THE FIGHT TO GIVE AMERICA A BRIGHTER ENERGY FUTURE by using innovative technology in our homes, power plants, and cars. Together, we can give our children a clean and healthy environment while reducing the threat of global warming. Sign up for the Sierra Club's e-mail action alert, the Hotline, at [www.sierraclub.org/globalwarming/newsletter](http://www.sierraclub.org/globalwarming/newsletter)



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## GLOBAL WARMING:

# A TIME for Action



## Cars That Go Further on a Gallon of Gas



## Buildings and Homes That Conserve Energy



## Clean Power From the Wind and Sun



**FOR TOO LONG**, America has failed to take meaningful steps to address the serious problem of global warming, and some in government and industry want to deny the science behind global warming instead of taking responsible action. However, we have the opportunity and the technology to cut our emission of the greenhouse gases which fuel global warming.

**The facts about global warming are in. The time for debate is over. We must act now!**

**Southwest, USA**  
The U.S. Global Change Research Program (USGCRP) has found the average temperature in the American Southwest has increased 1.5 degrees Fahrenheit compared to the baseline period 1960-1979. By the end of the century annual average temperature is projected to rise 4 to 10 degrees.

**Southeast, USA**  
USGCRP has found that high rates of relative sea-level rise have already resulted in the loss of 1,900 square miles of Louisiana's coastal wetlands during the past century, weakening their capacity to absorb the storm surge of hurricanes such as Katrina.

**Gulf of Mexico, USA**  
The Union of Concerned Scientists cites studies that found wind speeds of tropical cyclones have increased 70 percent over the last 30 years in both the Atlantic and Pacific Oceans. In addition, the percentage of hurricanes classified as Category 4 or 5 has increased over the same period.

**Bolivia, South America**  
According to the IPCC, Bolivia's famed Chacaltaya Glacier has lost 80 percent of its surface area since 1982, and Peruvian glaciers have lost more than one-fifth of their mass in the past 35 years.

**Chile, South America**  
The IPCC also found that the O'Higgins Glacier has shrunk 15 km over the last century in what is probably the largest retreat in all of South America.

**Brazil, South America**  
The Brazilian Journal of Coastal Research released a study showing the shore line receded more than (1.8 m) per year between 1915 and 1950, and more than 8 feet (2.4 m) per year between 1985 and 1995. The dramatic land loss was due to a combination of sea-level rise and loss of dirt and sand following dam construction, harbor dredging, and other coastal engineering projects.

**Antarctica**  
NASA images have revealed the extent of the 2002 Larsen B ice shelf collapse – the largest ice shelf to fall into the ocean in 11,000 years

**Arctic**  
The National Snow and Ice Data Center and the National Center for Atmospheric Research, report that in September 2007, Arctic sea ice reached its lowest levels since satellite measurements began in 1979, shattering the 2005 record by 23 percent. This led to the opening of the fabled Northwest Passage in 2007 and 2008 for the first time in human memory.

**Spain**  
*The Guardian* also reports that in Spain, the Pyrenees Mountains have lost over 90 percent of their glacial ice over the past century.

**Italy, Europe**  
The U.K. Newspaper *The Guardian* reports that Italy, which eradicated Malaria in 1970, is now facing new reports of the disease as climate and temperature changes are creating favorable environments for the mosquito vectors that carry it.

**Switzerland, Europe**  
The BBC reports that the national boundaries between Italy and Switzerland – set since 1861 – need to be redrawn due to glacier melt.

**Kenya, Africa**  
According to the IPCC, close to 50 percent of the glaciers on Africa's Rwenzori Mountains, Mount Kenya and Kilimanjaro have disappeared. Mt. Kilimanjaro has lost 80 percent of its glaciers, while Mount Kenya has lost 7 of its 18 glaciers, creating conflict between the 2 million people that depend on them for their livelihoods.

**Somalia, Africa**  
The 2008 United Nations Human Development Report states that if carbon dioxide emissions continue unabated, Tropical Ocean "dead zones" are likely to increase by 50 percent by 2100.

**Zambia, Africa**  
The same report states that 25–40 percent of animal species in national parks in sub-Saharan Africa are expected to become endangered due to climate change.

**Russia**  
According to the IPCC, Western Siberia has warmed faster than almost anywhere else on the planet, with an increase in average temperatures of some 3 degrees Celsius in the last 40 years. Methane released from this region could effectively lead to a 10 percent to 25 percent increase in global warming, which has led some to refer to this potential tipping point as the "methane time bomb."

**India, Asia**  
According to the IPCC, two billion people rely on melt water from the Himalayas, which have lost 21 percent of their glacial mass since 1962. Scientists predict that the Himalayas' smaller glaciers will be gone by 2035 and that many large ones will disappear by century's end, possibly leading to famine in a region whose population continues to soar.

**Bangladesh, Asia**  
The 2008 United Nations Human Development Report found that climatic changes caused by alterations to seasonal monsoon patterns in South Asia during the 2007 season displaced more than 14 million people in India and 7 million in Bangladesh.

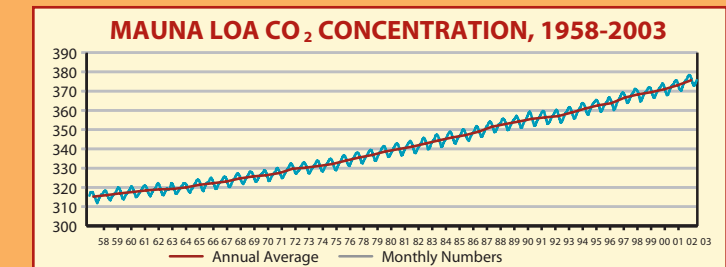
**Australia**  
According to the IPCC, eight mass bleaching events triggered by unusually high sea surface temperatures have occurred on the Great Barrier Reef since 1979. There were no serious events known prior to 1979.

**New Guinea, South Pacific**  
Residents from the Cartaret Islands, and Shishmaref, Alaska, forced to relocate due to melting ice and rising sea levels, are considered to be some of the world's first climate change refugees. Oxfam predicts there will be 75 million climate change refugees in the Pacific region alone by 2050.

**Artic**  
According to the Inter-governmental Panel on Climate Change (IPCC), Arctic Sea ice melt is considered a potential "tipping point" for irreversible climate change. This is due to albedo effects created when white snow, which reflects up to 70 percent of energy back to space, melts and becomes dark water, which reflects only 6 percent of energy back to space, thus rapidly accelerating warming.

## THE HARD FACTS OF GLOBAL WARMING

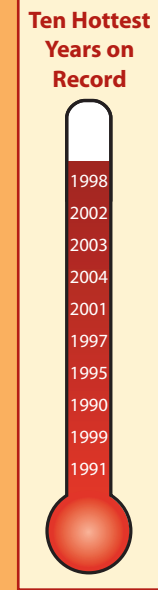
The science behind global warming is conclusive and well documented. For over fifty years, scientists have been measuring the concentrations of carbon dioxide in the atmosphere from the Mauna Loa laboratory in Hawaii. They have found that the concentration of carbon dioxide has been increasing by about one part per million every year – an increase that is caused by the burning of unprecedented amounts of fossil fuels over the last two hundred years of industrialization. Scientists have also been studying ice to tell us about our planet's climate history. Data taken from deep core drilling on the ice sheets near the north and south poles show that historically, higher concentrations of carbon dioxide in the atmosphere have led to global warming. We are already seeing this trend of warming today – the ten hottest years on record have all occurred within the last fifteen years.



**So how much difference can a few degrees make? Plenty.**

Throughout history, major shifts in temperature occurred at a very slow rate – usually changing only a few degrees over thousands of years. However, our emission of greenhouse gas pollution is causing global warming to occur at a much faster rate than ever before. The world's leading climate scientists project that during our children's lifetimes, global warming will raise the average temperature of the planet by 3 to 10 degrees Fahrenheit – a shift that will rival the change in temperature since the last ice age. Unless we slow, and ultimately reverse, the buildup of greenhouse gases in the atmosphere, we will have decades – not millennia – to deal with radical changes in weather patterns, sea levels and threats to human health.

These radical changes are already occurring, and are having disastrous affects. The French Government blames global warming



for a heat wave that killed 10,000 people in 2003. Physicians at the Harvard University and Johns Hopkins medical schools have issued grim assessments that global warming may be causing the spread of infectious diseases like West Nile virus and malaria. Additionally, extreme weather events have become more common – the World Meteorological Organization has concluded that the increase in hurricanes, tornadoes, and flooding can be blamed on global warming, and that the frequency and severity of these events will increase as the planet continues to warm.

These changes are the result of only a **one-degree rise** in temperature over the last century. If temperatures continue to rise as high as scientists are projecting, the changes we are experiencing now will pale by comparison. If we don't begin to act now to curb global warming, our children will live in a world where the climate will be far less hospitable than it is today. The majority of the world's leading climate scientists and researchers have come to the same conclusion – that the dangers of global warming are serious, and that to avoid them, we must curb our emissions of greenhouse gases.

## Natural Cycles and Global Warming Deniers

While the earth periodically warms and cools, it does so over spans of thousands of years. Human activity resulting in the release of greenhouse gases is actually reversing a natural cooling trend, sending us hurtling towards dangerous global warming. Additionally, the current rate of warming is unprecedented in the span of human history and likely to lead to disastrous consequences if left unchecked. During previous periods of global warming, all species, including humans, had longer periods of time to adapt to a changing climate. Human induced global warming is robbing us of this luxury while potentially pushing us past "tipping points" that will lead to irreversible dangerous levels of global warming.

## Industry, Financing, and Global Warming Deniers: MUDDYING THE SCIENCE ON GLOBAL WARMING

The debate over the scientific facts regarding global warming is, and has been, settled for a number of years (in fact the greenhouse gas effect of carbon dioxide was first discovered in the late 1800's by a Swedish scientist). Unfortunately, powerful entrenched interests such as Exxon-Mobil have funneled over \$8 million to groups and think tanks that attempt to, in their own words, "reposition the issue so as to create the illusion that there is still a debate." As long as there is a debate, the press must then show both "sides" of that debate. This buys them time to continue to reap record shattering profits while the world continues to rapidly warm. These interests are contributing to an extremely dangerous delay that could prove disastrous for the planet. The science on global warming is unequivocal, climate change is happening now and we need to act.

## THE BEGINNING OF A RESPONSIBLE ENERGY POLICY

As we produce and use the energy that powers our lives, we release greenhouse gases like carbon dioxide, which form a heat-trapping blanket around the globe. Scientists say that rising temperatures will lead to droughts, extreme weather, and rising sea levels – endangering our safety, economy, and national security. Past inaction on global warming has placed us at odds with the international community. There was,

however, a silver lining during the absence of federal leadership from the Bush Administration: many states and cities took action and moved forward to address greenhouse gas emissions.

Now President Obama, who has made global warming a central issue in his administration, is looking to build upon these efforts. The passage of the American Recovery and Reinvestment Act contains significant support for renewable energy technologies, with billions of dollars in incentives, including an

estimated \$5.5 billion for government procurement of energy efficiency and renewable energy projects. This piece of legislation invests in currently available technology that can reduce the global warming pollution that comes from our factories, homes, and vehicles.

This federal legislation puts us on the path towards an energy efficient future that prioritizes technology and products – like appliances, lights, and heating – in our homes,

buildings, and industries that reduce our energy use while maintaining our quality of life. However, it is just the start. We must build on it to put an end to polluting sources of energy like coal-fired power plants by replacing them with clean and safe renewable sources like wind and solar power. Investing in clean energy will our global warming pollution while increasing our energy security, creating new jobs and saving consumers money on energy bills.