

# CLIMATE CHANGE

## A TIME TO ACT





Dear Californian,

The science is indisputable: Global warming is real, it is happening and the effects are becoming apparent on the planet. And we know the primary cause of global warming: manmade greenhouse gas emissions produced by burning fossil fuels like coal and oil.

Scientists tell us the warming cannot be stopped, but it can be slowed and its effects contained. There is no single thing we can do to stem the tide, there is no silver bullet. But we know that we must reduce our carbon footprint by limiting greenhouse gas pollution, adopting more efficient technologies and expanding renewable energy sources.

In 2007, Congress took the first step to reduce emissions from the transportation sector by enacting landmark legislation—which I authored with Senator Olympia Snowe—to improve the mileage efficiency of our nation’s fleet of vehicles by at least 10 miles per gallon over 10 years. President Obama has incorporated these standards as a key part of his Climate Action Plan, requiring that automakers achieve the equivalent of a fleetwide average of 54.5 miles per gallon by 2025.

But fuel economy alone won’t solve the problem. We also need legislation to:

- Reduce emissions from major industrial sources in a cost-effective manner that promotes green practices.
- Promote stronger investments in clean technology and renewable energy alternatives like wind, solar, hydrogen, and biofuels such as cellulosic ethanol.
- Improve the energy efficiency of our homes and office buildings.

Here’s the bottom line: The challenge we face is real. If we take bold action now, we can make a difference and contain the worst effects of climate change. I urge you to learn more about this issue and encourage your representatives in Congress to join us in this fight.

Sincerely,

A handwritten signature in blue ink that reads "Dianne Feinstein". The signature is fluid and cursive, with the first name "Dianne" being larger and more prominent than the last name "Feinstein".

Dianne Feinstein  
United States Senator

# THE GROWING THREAT OF GLOBAL WARMING

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Preminent scientists—from the National Academy of Sciences, the U.N. Intergovernmental Panel on Climate Change and other leading scientific bodies—have reached a consensus that global warming is real, it's happening more quickly than expected and it is affecting the environment around us.

The facts speak for themselves:

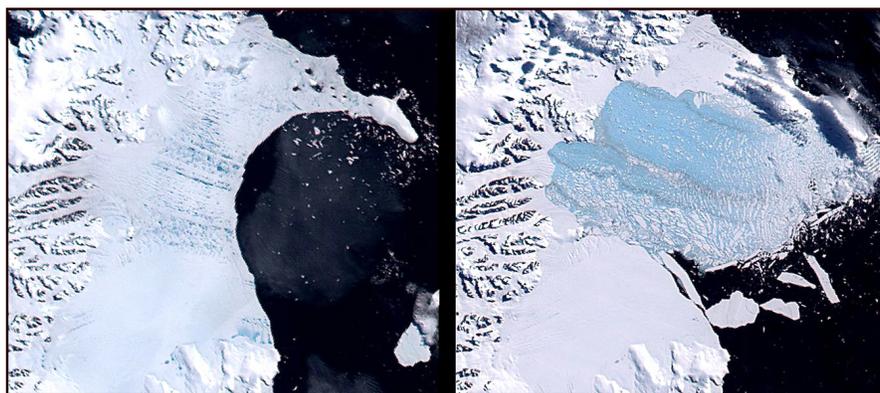
- The earth has already warmed 1.4 degrees Fahrenheit (°F) over the last century.
- Of the 10 warmest years on record, nine of those occurred after the year 2002. 2015 was the warmest year recorded, with 2014 second. 2013 was the fourth-warmest year on record.
- Seas are warming, rising and becoming increasingly acidic due to ocean water absorbing carbon dioxide from the atmosphere.

If no action is taken to curb greenhouse gas emissions, scientists warn the earth's temperature could spike by up to 11.5°F by the end of the century.

The results would be catastrophic and far-reaching:

- Nearly one-third of all plant and animal species are at a higher risk for extinction.
- Melting glaciers and ice caps will cause seas to rise as much as four feet by 2100. This will lead to the flooding of many low-lying, densely-populated regions. As many as 2.6 million homes will be at risk just in the United States.
- Extreme weather patterns—more frequent heat waves, more intense and longer droughts, more frequent tropical storms and heavier rainfall—will become the norm.
- Warming in western mountains will lead to decreased snowpack—the source of water for nearly two-thirds of California—will mean more winter flooding and reduced summer flows.

**If we fail to act, this damage could occur before the end of the century. The urgency is unmistakable.**



*An area larger than Rhode Island has melted from Antarctica's Larsen Ice Shelf into the ocean since 2002.*

# TOP INDICATORS: POLAR ICE CAPS AND ALPINE GLACIERS

**Melting of polar ice caps** – As temperatures warm, the ancient ice sheets that cover the North and South poles are melting. Melting glaciers and ice caps have caused global sea level to rise eight inches since 1870—two of those inches occurred over just the past 20 years.

- Two years are tied for least amount of Arctic ice, known as maximum ice extent: 2011 and 2006. The nine lowest maximum Arctic sea ice extents all fall in the last nine years.
- In 2007, for the first time since monitoring began in 1978, the famed “Northwest Passage” was navigable without an ice breaking ship. The Arctic Circle could be ice free by 2030.
- Since 1979, when satellite records first became available, 30 percent of the Greenland Ice Sheet has melted.
- Average annual arctic sea ice area has decreased by more than 20 percent since 1979.



*Since 1979, the average annual arctic sea ice area has seen significant losses.*

**Melting of alpine glaciers** – Mountain glaciers are shrinking in size and retreating in elevation faster than expected.

- In Montana, Glacier National Park has only 25 named glaciers today, down from 150 in 1850. One study concluded that some of the largest glaciers in the park may disappear completely by 2030.
- The total mass of glaciers in the European Alps has declined by half since 1850. Some lower-elevation alpine ski resorts could soon face winters with no snow.

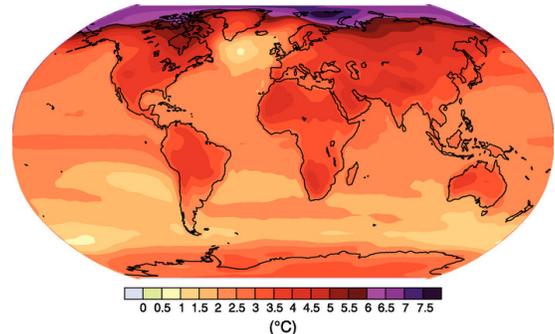


*Since 1979 (left), snow melt on the ice sheet that covers Greenland has increased by 30 percent.*

# TOP INDICATORS: GLOBAL TEMPERATURES

**Higher overall temperatures** – *Climate change is resulting in higher temperatures worldwide.*

- Warming of the climate system is unequivocal. Evidence can be seen in global average air and ocean temperatures, widespread melting of snow and ice and rising sea level.
- The earth's temperature has risen 1.53°F over the past century. There is very high confidence that human activities are the cause of this change.
- If no action is taken, scientists expect worldwide temperatures to rise by as much as 11.5°F by 2100.



*Estimated surface temperature changes for years 2090-2099, relative to years 1980-1999.*

**Heat waves and other extreme temperature events** – *Drastic changes in our global temperature will result in negative effects throughout the environment.*

- Approximately 20 to 30 percent of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 2.7 to 4.5°F.
- By the middle of the century, annual average river runoff and water availability are projected to decrease by 10 to 30 percent over dry regions at mid-latitudes, including California.
- We are already seeing some of these effects. In the summer of 2006, more than 220 people died from an intense heat wave across North America, with more than 160 deaths in California alone.

## The Warmest Years on Record

1. 2015
2. 2014
3. 2010
4. 2013
5. 2005
6. 2009
7. 1998
8. 2012
9. 2007, 2006 and 2003 (tie)

9 of Earth's 10 warmest years on record have occurred since 2002

Source: National Oceanic and Atmospheric Administration



# TOP INDICATORS: WEATHER PATTERNS



*Scientists suggest that we'll see more frequent and intense weather patterns like hurricanes, cyclones and tornadoes.*

**Increased storm activity** – *Global warming is expected to increase the frequency of destructive and deadly storms like the cyclone that hit Burma in 2008 and the tornadoes that have devastated parts of the Midwest.*

- Many scientists have observed that warmer sea surface temperatures correlate to more intense hurricanes and tropical storms. Some projections indicate an 11 percent increase in intensity by 2100.
- In 2005, the devastating Hurricanes Katrina, Wilma and Rita were part of the busiest, most intense Atlantic hurricane season in more than 150 years of record-keeping.
- In 2012, Hurricane Sandy formed in the North Atlantic, the largest hurricane on record. Its winds spanned 1,100 miles. It claimed at least 286 lives in seven countries and amassed more than \$68 billion worth of damage.



*Unpredictable weather patterns could significantly increase the nation's susceptibility to dangerous flooding.*

**Changes in weather patterns and water** – *Global warming is altering precipitation patterns, affecting water supply agriculture, and our health.*

- Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially at low latitudes.
- Health effects of climate change will affect millions of people, particularly those unable to adapt to change. We are likely to see increased deaths, disease and injury due to heat-waves, floods, storms, fires, droughts and declining air quality.
- The West is beginning to face serious water shortages. Scientists at UC San Diego believe there is a 50 percent

chance that Lake Mead – a key source of water for 8 million people in the Southwestern United States – will be dry by 2021.

- Since 1911, the percentage of precipitation in the Lake Tahoe Basin that falls as snow has dropped by 18 percent.

# TOP INDICATORS: OCEANS

**Warming oceans** – *Global warming is causing water temperatures to rise even faster than air temperatures.*

- Arctic waters, including the northern Bering Sea are warming.
- Some fish and whales are moving farther north to follow cold water. Seals and walrus are faced with reduced food sources. And diving eider ducks, a threatened species, are also in trouble.



*Warming oceans reduce food sources for seals and walrus.*

**Rise in sea level** – *As temperatures increase and the poles melt due to global warming, sea level will rise.*

- Melting glaciers and ice caps have caused global sea level to rise by two inches over the past two decades.
- Many ecologically rich regions in the world are low-lying delta areas—such as the Niger delta, much of Bangladesh and the Amazon delta—that will flood first as sea level rises. In addition, even small sea-level rises could have catastrophic effects on Florida and many coastal U.S. cities.
- Within four feet of California’s high-tide mark there are 450,000 people residing, 30 coastal power plants, 3500 miles of roadway, 280 miles of railway, 140 schools and 55 health-care facilities.



*Rising ocean waters imperil the eggs and offspring of the endangered green sea turtle.*

# TOP INDICATORS: ANIMAL KINGDOM AND ECOSYSTEMS

**Species extinctions** - *Rising temperatures threaten species around the world with extinction.*



*The Arctic habitat of the polar bears is literally melting away. This majestic species could face extinction by the end of the century.*

- In May 2008, the Fish and Wildlife Service placed the polar bear on the Endangered Species List, citing the loss of sea ice habitat. Its habitat is literally melting away.
- In Yosemite National Park, 14 of 50 studied animal species can no longer be found in lower-elevation portions of the range they occupied early in the 20th century.
- Scientists have identified at least 279 species of plants and animals that are responding to global warming by shifting their ranges or changing the timing of life events (like hibernation seasons or incubation timing).

**Ecosystem disruption** – Global warming and its effects are leading to serious disruption of ecosystems worldwide.



*The Mountain Pine Beetle has infested millions of acres of forest in British Columbia.*

- Warmer temperatures have allowed the spread of the mountain pine beetle, a voracious predator of lodgepole pine trees. The beetles have infested an area of Canadian forest six times the size of Maryland, and are killing more trees in Canada than logging or wildfires. If this infestation crosses the Rockies, it could be a catastrophe for the forests throughout much of the western United States.
- Because oceans absorb nearly one-quarter of carbon dioxide, seawater is becoming more acidic. This endangers coral reefs and shell-forming organisms.

# THE FEINSTEIN FUEL ECONOMY LAW

**The transportation sector produces more than one-third of global warming gases in the United States.** And the use of motor vehicles accounts for roughly 25 percent of total U.S. emissions. The simplest step we can take is to raise fuel economy standards.

The good news is that in 2007, Congress approved a new law—which I authored with Senator Olympia Snowe—to significantly increase the average fuel economy for all sedans, light trucks and SUVs.

These new Corporate Average Fuel Economy (CAFE) standards mandated by the bill are aggressively increasing fuel economy and reducing oil use and will culminate in a fleetwide average of 54.5 miles per gallon in 2025.

These CAFE standards will cut greenhouse gas emissions from cars and light trucks in half by 2025, reducing emissions by 6 billion metric tons over the life of the program—more than the total amount of carbon dioxide emitted by the United States in 2010.

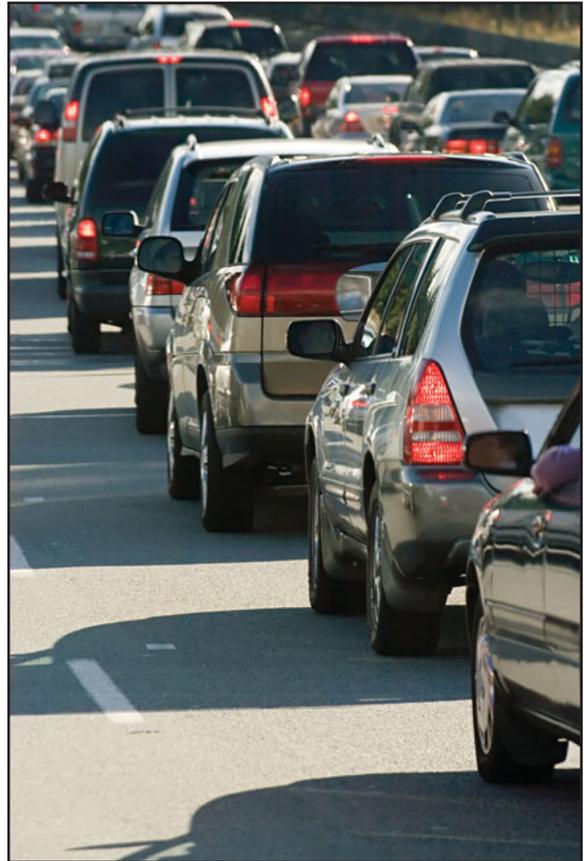
These standards will save American families more than \$1.7 trillion dollars in fuel costs, resulting in an average fuel savings of more than \$8,000 per vehicle.

The legislation also required the establishment of the first-ever fuel economy standards for buses, delivery trucks and long-haul 18 wheelers. These standards apply to trucks and buses built between 2014 through 2018 and will reduce greenhouse gas pollution by approximately 270 million metric tons.

The Obama administration deserves credit for strongly implementing the program and, in doing so, diminishing our carbon footprint.

California has adopted the Low Carbon Fuel Standard (LCFS) since 2009, which is aimed at reducing greenhouse gas emissions from transportation fuels without prescribing the fuel type. It is a life-cycle intensity standard that looks at the whole life cycle of the fuel—producing it, moving it, and using it in a vehicle engine

This law is a major step forward.



*Raising fuel economy standards is the simplest step we can take to lower emissions from motor vehicles.*

# ADDITIONAL BENEFITS OF IMPROVING FUEL EFFICIENCY

## *Improved consumer information:*

- A label will be prominently placed on each vehicle that includes information on the fuel economy of the automobile and the greenhouse gas and other emissions consequences of operating the automobile over its expected life.
- Automakers will also be required to include improved consumer information on tire fuel efficiency, safety, and durability, and increased consumer awareness of flexible fuel automobiles.



*There is no trade-off between fuel economy improvements and passenger safety.*

## *Flexibility for automakers:*

- Standards will be established based on the physical attributes of different types of vehicles, such as size or engine power. That means small cars will be compared to small cars, light trucks to light trucks, etc.
- Manufacturers will be able to trade a limited number of fuel economy credits when the performance of their passenger car or light truck fleets exceeds standards set by the legislation. They can also borrow against future fuel economy gains—up to three years—and to carry forward credits up to five years.

## *Safety standards will be upheld:*

A recent study concluded that no trade-off is required between fuel economy and vehicle safety:

- **“Fuel economy can be dramatically improved without compromising safety. Safety can be bolstered without sacrificing fuel economy.”** – Senator Feinstein
- **“Advanced materials allow vehicles to be both bigger and lighter, providing multiple ways to improve safety and fuel economy without sacrificing functionality.”** – Senator Feinstein

In fact, the technology already exists today to increase safety, without sacrificing fuel economy, including: seat belt reminders, window curtain air bags, lower bumpers, and seatbelts that tighten, if a vehicle were to rollover.

# THE ROLE OF RENEWABLE ENERGY

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One of the most promising tools to combat global warming is clean, renewable energy. Whether in the form of solar, wind, biomass, geothermal or biofuels, clean energy must play a significant role in the United States and the world.

Of course, the benefits of increased development and use of clean energy have more than just environmental benefits. Clean energy technology is a proven job creator and also serves to reduce our nation's dependence on foreign oil.

## *Clean energy in California:*

California's natural resources and sustained support for renewable energy make our state a world leader in clean energy development. California has set ambitious goals of reducing greenhouse gases 80 percent by 2050 and steeply cutting vehicle emissions.

In 2013, nearly 13.5 percent of all electricity in California was generated using renewable resources such as wind, solar, geothermal, biomass and small hydroelectric facilities. Large hydroelectric plants generated an additional 9.6 percent.

At the heart of our energy policy is the state law AB 32, the *Global Warming Solutions Act of 2006*. This law solidified our position as a clean energy innovator and led to a surge in the clean energy industry. Additionally, Governor Brown signed a law in 2011 requiring one-third of the state's electricity to come from renewable sources by 2020

But California's green sector has always been strong. A report by the California Employment Development Department's Labor Market Information Division found that "7.9 percent of California businesses employ workers to produce green products or supply green services...with close to 433,000 individuals performing green work at least part time."

I am dedicated to keeping those numbers high and furthering California's role as a leader in clean energy.



# THE UNITED STATES AND CLIMATE CHANGE

Regulating greenhouse gas emissions is a global responsibility, and the United States, as the biggest producer of CO<sub>2</sub>, needs to play its part.

We're seeing some progress. The Environmental Protection Agency is bound by law to reduce greenhouse gas emissions, and the Supreme Court has even ruled that carbon dioxide endangers human health and therefore must be regulated.

In December 2015, U.S. leadership helped reach a historic agreement to combat climate change in Paris. Nearly 200 countries committed to reduce carbon pollution, and they are incentivized to review emission goals and set more stringent reductions every five years.

## Key Issues for Our Coastlines:

- More spring runoff and warmer coastal waters will increase the seasonal reduction in oxygen resulting from excess nitrogen from agriculture.
- Higher water temperatures and ocean acidification from increased atmospheric carbon dioxide will present major additional stresses to coral reefs, resulting in significant die-offs and limited recovery.

## Key Issues for U.S. Agriculture:

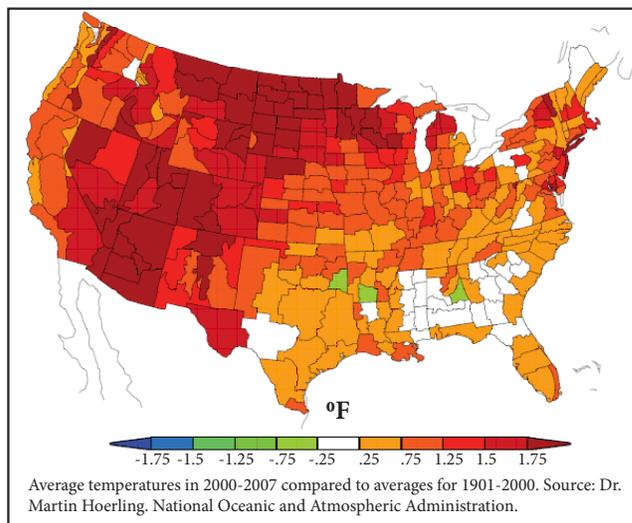
- Forage quality in pastures and rangelands generally declines with increasing carbon dioxide concentration because of the effects on plant nitrogen and protein content, reducing the land's ability to supply adequate livestock feed.
- Increased heat, disease, and weather extremes are likely to reduce livestock productivity.

## Key Issues for Health in the United States:

- Warming is likely to make it more challenging to meet air quality standards.
- Some diseases transmitted by food, water, and insects are likely to increase.
- Rising temperature and carbon dioxide concentration increase pollen production and prolong the pollen season, presenting a health risk.

## Key Issues in U.S. Ecosystems:

- Fires, insect pests, disease pathogens, and invasive weed species are likely to continue their upward trends.
- Deserts and drylands are likely to become hotter and drier, feeding a self-reinforcing cycle of invasive plants, fire, and erosion.
- The habitats of some mountain species and coldwater fish, such as salmon and trout, are very likely to contract.



*In the United States, the West has experienced increases in temperature significantly greater than those in the East.*

# CLIMATE CHANGE AND CALIFORNIA

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I am proud that California is leading the fight against global warming, setting ambitious goals for slashing greenhouse gases 80 percent by mid-century and reducing greenhouse gas emissions from vehicle tailpipes.

But California has good reason to take such strong steps. Global warming is California's more pressing environmental threat.

Temperatures in California have increased 1.26°F over the past four decades. A warmer climate could be particularly devastating to California, where threats from catastrophic wildfire and reduction in water resources will likely make California a desert state.

## *Water Supply*

As the largest agricultural state in the union, we need water to farm and grow our crops. We need water to keep the ecosystem in balance. And we need water for the 37.5 million people in California.

The Sierra Nevada snow pack, which includes Lake Tahoe, is the state's largest source of water. It equals about half the storage capacity of all California's man-made reservoirs. Scientists believe it could drop by as much as 60 to 80 percent by the end of the century, eliminating the source of water for nearly 16 million people. That is equal to the population of the Los Angeles Basin.



*It is estimated that by the end of the century, the shrinking of the Sierra Nevada snowpack would eliminate the source of water for 16 million people.*

## *Dairy Industry*

We are the largest dairy-producing state. Studies indicate that increased temperatures could reduce milk production by anywhere from 5 to 20 percent. This would not only have a drastic impact on California's thriving agriculture industry, but it would also affect other states that rely on California to provide milk and other dairy products.

# CLIMATE CHANGE AND CALIFORNIA

## *California's Efforts to Combat Climate Change*

California has long been ahead of the curve in addressing our planet's number one environmental challenge: the fight against global warming.

In 2005, the state enacted landmark legislation to reduce greenhouse gas emissions (the primary cause of global warming) to 2000 levels by 2010 and to 1990 levels by 2020.

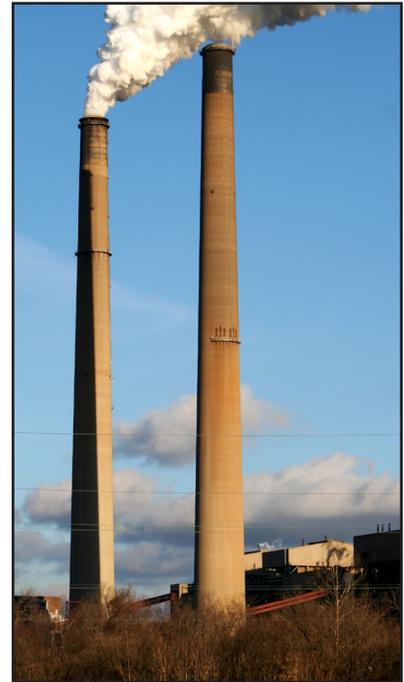
California has also become a leader in developing low-carbon fuels, hybrid and electric vehicles, green building codes and a host of additional environmentally-sound policies. California is dedicated to maintaining its position as a leader in combatting climate change.

But California cannot solve the problem of global warming by itself.

## *Beaches and Coastline*

When most people think of California, they think about our spectacular beaches and coastlines. But over the last century, global warming has caused the sea level to rise up to eight inches.

Continued sea level rising could also be disastrous for the future of the Sacramento-San Joaquin Delta, most of which is already below sea level, and which serves as an important conduit for the State's water supply.



*Carbon dioxide emissions are responsible for more than 60 percent of the "greenhouse effect."*



*Over the past 130 years, global warming has caused sea levels to rise as much as eight inches. If action is not taken, scientists predict seas level could rise as much as 4 feet by the end of the century.*

# OTHER EFFORTS TO COMBAT CLIMATE CHANGE

Cities and states are not waiting for the federal government to act to curb global warming—they are moving forward with their own efforts.

## *Action by Cities*

In 2005, members of the United States Conference of Mayors unanimously passed a resolution that requires their member cities to attempt to meet or exceed emissions standards set by the Kyoto Protocol.

They have also agreed to try to meet or beat the Kyoto targets in various communities around the Nation. They have agreed to urge their state governments and the federal government to enact policies to reduce greenhouse gas emissions.

So far, hundreds of mayors have chosen to participate.

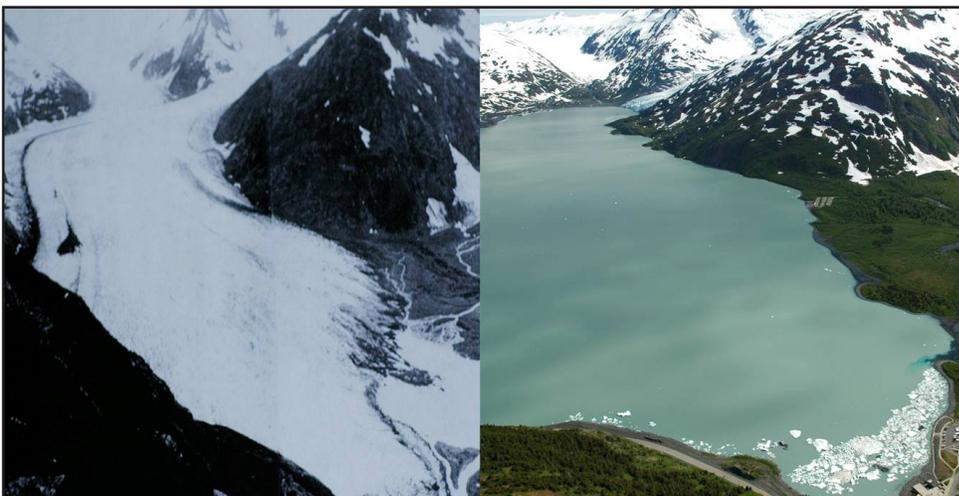
## *Action by States*

To date, more than 30 states have developed their own climate plans. Two-thirds of the United States is moving on its own because the federal government has been so slow to act.

- An emission trading system is emerging in the Northeast that will require large power plants from Maine to Delaware to reduce their carbon emissions.
- Thirty states and the District of Columbia have enacted standards to require that electricity be generated with renewable fuels rather than fossil fuels and seven states have voluntary goals for renewable generation. I am proud to say that California has one of the most aggressive standards in the country.



*In 1996, the melted ice from Greenland was 90 times the water usage for Los Angeles. In 2005, the melted ice from Greenland was 225 times the city's water usage.*



*These NOAA photos show the melting of Alaska's Portage Glacier between 1914 and 2004.*

# WHAT ELSE CAN BE DONE

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## *Energy Efficiency*

In California, electricity consumption per person has not increased since 1979, while national electricity use has skyrocketed.

We should build on California's energy efficiency plans at the national level, including requiring electricity and natural gas distributors to implement efficiency measures to achieve significant savings, as well as strict energy efficiency standards for new federal, commercial and residential buildings.



Individuals can also make a difference. Here are a few suggestions, all of which save energy and reduce carbon dioxide emissions:

- Buy energy efficient appliances and light bulbs
- Take public transportation.
- Carpool with coworkers.
- Turn down the heat and air conditioning.
- Set your water heater to no higher than 120°F.
- Consider fuel economy when purchasing or renting an automobile.

All of these are easy to do and they can make a difference.

I ask you to stand up, be counted and join me in this effort. Talk and write to your representatives in Congress. Urge them to make their voices heard in support of legislation to slow global warming. This is our collective challenge—and I encourage you to do your part.

# FOR MORE INFORMATION

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If you are interested in receiving further information about this important issue, please log on to Senator Feinstein's website (<http://feinstein.senate.gov>) and register to receive e-mail updates. Many of the statistics used in this booklet came from the following sources:

## **Environmental Protection Agency**

Ariel Rios Building

1200 Pennsylvania Avenue, N.W.

Washington, DC 20460

(202) 272-0167

<http://www.epa.gov/>

## **California Environmental Protection Agency**

1001 I Street

P.O. Box 2815

Sacramento, CA 95812-2815

(916) 323-2514

<http://www.calepa.ca.gov/>

## **Intergovernmental Panel on Climate Change**

IPCC Secretariat, C/O World Meteorological Organization

7bis Avenue de la Paix

C.P. 2300

CH- 1211 Geneva 2

Switzerland

(41-22) 730-8208

<http://www.ipcc.ch/>

## **United Nations Framework Convention on Climate Change**

Haus Carstanjen

Martin-Luther-King-Strasse 8

53175 Bonn

Germany

(49-228) 815-1000

<http://unfccc.int/>



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