

The Road to Copenhagen

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1273 Wood- and coal-burning fires shroud English towns in smoke. Local regulations attempt to control the problem but fail. Atmospheric concentrations of CO₂ are about 280 parts per million (ppm).

Circa 1750 Industrial Revolution begins in Manchester, England. Coal powers the mills.

1827 French mathematician Jean-Baptiste Fourier suggests that the earth's atmosphere traps heat produced by the sun.

1859 Irish physicist John Tyndall confirms Fourier's theory that atmospheric gases like carbon dioxide trap heat. First oil well in United States is drilled in Pennsylvania.

1880s Various European inventors create experimental gasoline-powered automobiles.

1890 Standard Oil Trust controls 88 percent of US oil refining. By 1904 Standard Oil controls 91 percent of production and 85 percent of final sales.

1896 Swedish chemist Svante Arrhenius is the first to calculate that continued burning of coal and other fossil fuels will lead to a hotter earth; later wins a Nobel Prize.

1899 America's first environmental law is passed. The Rivers and Harbors Act makes it a misdemeanor to dump refuse into navigable waters without a permit.

1903 Henry Ford begins selling the gas-powered Model A automobile.

1904 America's first solar-powered electrical plant is built in St. Louis by the Willsie Sun Power Company. Soon another plant is built, in the Mojave Desert at Needles, California. But within a few years Willsie is driven out of business by cheaper coal/gas facilities.

1906 City of Pittsburgh creates a smoke inspector's office and passes ordinances to regulate local air pollution. Air improves.

1920 There are 7.5 million gas-powered cars in the United States.

1937 The term "greenhouse effect" is coined by Glenn Thomas Trewartha, a professor whose obscure textbook on weather describes how water vapor, CO₂ and other gases act like glass in a greenhouse.

1948 Smog chokes the small industrial town of Donora, Pennsylvania. In five days twenty people die, and 6,000 are sick or hospitalized. Air pollution becomes a national political issue.

1952 London smog, the product of a thermal inversion, kills 4,000 people in two weeks. Four years later, England's Clean Air Act becomes law.

1958 Atmospheric CO₂ concentrations reach 315 ppm. In Hawaii, Dr. Charles Keeling begins the first continuous long-term study of atmospheric CO₂ levels. He discovers that levels are rising and that the rate at which they are rising is increasing. This is known as the Keeling Curve.

1962 Rachel Carson's book *Silent Spring* starts to give environmentalism mass appeal.

1963 First Clean Air Act in the US is passed into law. American smokestacks are

subjected to pollution controls.

1965 At a meeting on causes of climate change in Boulder, Colorado, scientists note the chaotic nature of the climate system and the possibility of sudden shifts.

1969 "Earthrise," the first photograph of our planet taken from space, is published.

1970 First Earth Day, one of the largest demonstrations in US history, is held.

1969-73 Tricky Dick Nixon the Green? The National Environmental Policy Act, the Clean Water Act and the Endangered Species Act all become law. The Environmental Protection Agency is created.

1971 First international conference on climate change is held in Sweden. Scientists from fourteen nations debate: are greenhouse gases warming the world? Or is particulate pollution, like coal soot, shielding and thus cooling it? Some predict that global warming will become self-reinforcing if polar ice melts, reducing the earth's reflection of sunlight.

1972 First UN conference on the environment is held. The United Nations Environment Program is created. It will be the framework for international cooperation on environmental issues.

1973 Arab oil embargo begins in retaliation for the Yom Kippur War. Oil prices quadruple; gasoline is rationed in some states with the even/odd license plate number system.

1977 Wearing a wool cardigan, President Carter gives the first in a series of energy speeches. He asks Americans to turn down their thermostats and drive less.

1978 Fuel-economy regulations are introduced in the United States for passenger vehicles. New cars must now get at least eighteen miles per gallon.

Deng Xiaoping begins China's market reforms; a year later he introduces the one-child policy.

1979 Revolution in Iran sends oil prices surging, prompts "second oil crisis." Carter installs a solar-powered water heater on the White House roof; again urges energy conservation and admonishes that too many Americans "worship self-indulgence and consumption." This becomes the infamous "malaise speech."

1981 Election of Ronald Reagan brings environmental backlash. Interior Secretary James Watt says, "I do not know how many future generations we can count on before the Lord returns." Federal grants for solar energy are slashed. The solar water heater on the White House is junked. America's nascent alternative energy industry collapses.

1985 Hole in the ozone layer is discovered over Antarctica. Too much dangerous ultraviolet light is reaching earth. The hole is growing exponentially. Calls mount for international action to ban industrial use of ozone-depleting chlorofluorocarbons and hydrofluorocarbons.

Major International Climate Conference at Villach, Austria, warns that greenhouse gases will, "in the first half of the next century, cause a rise of global mean temperature which is greater than any in man's history." Scientists warn this could cause sea levels to rise by one meter.

1986 Atmospheric concentrations of CO₂ reach 350 ppm.

1987 Montreal Protocol is signed. The phaseout of ozone-depleting chemicals begins. By chance, these chemicals are also powerful greenhouse gases.

1988 Senator Al Gore holds hearings on climate change. NASA climate scientist James Hansen predicts rising sea levels and dangerous extreme weather by the end of the next century if fossil fuel consumption is not drastically reduced.

UN's Intergovernmental Panel on Climate Change is created to act as a clearinghouse on climate science. Its findings are constrained by the need for the world's governments to approve them before publication.

1989 Global Climate Coalition, a front group funded by the oil, coal, auto and electric industries to promote the phony science of "climate skeptics," is created. Millions will be spent on this over the next decade, with Exxon one of the biggest spenders.

1990 First IPCC Assessment Report is published, becoming the basis for the UN Framework Convention on Climate Change (UNFCCC).

1992 At Rio Earth Summit, UN member states, including the United States, sign the UNFCCC, still the governing treaty on climate change. Its decisive sentence is the promise to stabilize greenhouse gas emissions in time "to prevent dangerous anthropogenic climate change." But there are no specific targets for emission reductions.

1993 Historical evidence of abrupt climate change becomes clear after analysis of Greenland's ice sheet. The new data show that in the past, dramatic climate shifts happened rapidly--over the course of years, not centuries.

1995 Second IPCC Assessment Report reveals mounting evidence of accelerated rate of warming.

1997 Kyoto Protocol is negotiated. Industrialized countries agree to reduce their collective greenhouse gas emissions to 5.2 percent below 1990 levels by 2012. US Senate refuses to ratify Kyoto.

1999 World's population reaches 6 billion and is projected to reach 7 billion by 2011.

2001 President George W. Bush renounces the Kyoto Protocol as bad for the US economy. Other nations carry on without the United States and continue their ratifications of the treaty.

Third IPCC Assessment Report describes as "very likely" a rapid and disruptive global warming unprecedented since the end of the last Ice Age.

2003 Lethal heat wave hits Europe. Hottest summer in 500 years kills 30,000-70,000 people; year of extreme weather costs an estimated \$60 billion.

2005 Kyoto treaty comes into effect and is eventually ratified by all major industrial nations except the United States. Work to reduce emissions accelerates in Japan, Western Europe and even among some US state and local governments.

Hurricanes Katrina, Rita and Wilma pound the Gulf Coast. Debate over the impact of global warming becomes more urgent in the United States.

2006 British government's Stern Report on the economic impacts of climate change says climate change will wreak havoc on the global economy if left unchecked. The report recommends keeping atmospheric concentrations of CO₂ below 450-550 ppm range. Environmentalists and scientists later counter that 350 ppm is the real limit, after which dangerous climate change is inevitable. Stern has since described 450 ppm as unsafe.

2007 IMF estimates cost of stabilizing greenhouse gases at \$1.8 trillion. IPCC calls for governments to begin planning adaptive measures. Its Fourth Assessment Report sees

possibility of abrupt and irreversible climate change.

At a UN conference in Bali, governments agree to a timetable for negotiating a successor agreement to the Kyoto Protocol. Negotiations will conclude in Copenhagen, December 2009.

Al Gore and IPCC share Nobel Peace Prize.

In a victory over the Bush administration, the Supreme Court rules, in *Massachusetts v. EPA*, that the Environmental Protection Agency has the authority to regulate CO₂ emissions.

Government of Australia's climate-denying right-wing Prime Minister John Howard falls as his country suffers a 1-in-1,000-year drought. The Labor Party challenger pledges strong action on climate change.

2008 Barack Obama is elected president of the United States; promises climate action. The polar bear is put on the US endangered species list because climate change is destroying its habitat.

Britain passes an ambitious Climate Change Bill mandating 80 percent reductions in emissions by 2050.

Oil exporter Norway plans to be the first country to be "carbon neutral," by 2030.

2009 January: Obama appoints Nobel laureate and renewable energy expert Steven Chu as energy secretary. **July:** At L'Aquila, Italy, the G-8 countries fail to agree on binding and radical greenhouse emission reductions. In reaction, China, India and other developing countries backtrack from earlier commitments. **August:** Meetings in Bonn end without major progress. Yvo de Boer, head of the UN climate secretariat, says, "If we continue at this rate, we're not going to make it." **September:** At "Climate Week" in New York, the UN holds an unprecedented gathering of more than 100 heads of government and state. Secretary General Ban Ki-moon wants to "get leaders moving." China's President Hu Jintao promises to reduce the growth of Chinese emissions "by a notable margin." Obama administration has vastly increased green energy spending but has made little progress on climate legislation. **October:** Talks in Bangkok end with no major agreement and the divide between the global North and South wider than ever. With only five days of negotiations remaining, a strong treaty in Copenhagen seems unlikely. **October 24:** Grassroots group 350.org coordinates a worldwide day of action on climate change, in which tens of thousands of people in 181 countries demand radical action to reduce emissions.

Atmospheric CO₂ concentrations reach 390 ppm.

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