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FIRST CIRCUIT
1CCV-20-0000380
12-SEP-2022
05:54 PM
Dkt. 748 ANCMP

PART I OF DEFENDANTS CHEVRON
CORPORATION AND CHEVRON U.S.A.
INC.'S ANSWER TO THE FIRST AMENDED
COMPLAINT; CERTIFICATE OF SERVICE
(PAGES 1-71)

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CHEVRON CORPORATION and CHEVRON U.S.A., INC.

IN THE CIRCUIT COURT OF THE FIRST CIRCUIT

STATE OF HAWAII

CITY AND COUNTY OF HONOLULU,
AND HONOLULU BOARD OF WATER
SUPPLY,

Plaintiffs,

vs.

SUNOCO LP; ALOHA PETROLEUM,
LTD.; ALOHA PETROLEUM LLC;
EXXON MOBIL CORP.; EXXONMOBIL
OIL CORPORATION; ROYAL DUTCH
SHELL PLC; SHELL OIL COMPANY;
SHELL OIL PRODUCTS COMPANY LLC;
CHEVRON CORP; CHEVRON USA INC.;
BHP GROUP LIMITED; BHP GROUP PLC;
BHP HAWAII INC.; BP PLC; BP
AMERICA INC.; MARATHON
PETROLEUM CORP.; CONOCOPHILLIPS;
CONOCOPHILLIPS COMPANY; PHILLIPS
66; PHILLIPS 66 COMPANY; AND DOES
1 through 100, inclusive,

Defendants.

CIVIL NO. 1CCV-20-0000380 (LWC)
(Other Non-Vehicle Tort)

**DEFENDANTS CHEVRON
CORPORATION AND CHEVRON U.S.A.
INC.'S ANSWER TO THE FIRST
AMENDED COMPLAINT;
CERTIFICATE OF SERVICE**

Trial date: None

Judge: Honorable Lisa W. Cataldo

**DEFENDANTS CHEVRON CORPORATION AND
CHEVRON U.S.A. INC.'S ANSWER TO THE FIRST AMENDED COMPLAINT**

Defendants Chevron Corporation and Chevron U.S.A., Inc. (together, the “Chevron Defendants”), through their undersigned attorneys, hereby answer (the “Answer”) Plaintiffs’ First Amended Complaint (the “Complaint”), Dkt. No. 45, by (A) providing a statement in support of their Separate Defenses, (B) providing their Separate Defenses, and (C) responding to the allegations contained in the numbered Paragraphs stated in the Complaint.

The Chevron Defendants deny all allegations in the Complaint not expressly admitted herein. Furthermore, the Chevron Defendants deny all allegations contained in the Complaint to

the extent that they assert or suggest, individually or collectively, that the Chevron Defendants engaged in any actionable conduct or are otherwise liable to Plaintiffs. By submitting this Answer, the Chevron Defendants do not admit the accuracy of the characterization or quoting of any documents cited or referenced in Complaint, or the authenticity or admissibility of any of those documents, and reserve all rights and objections with respect to those documents. Headings in the Complaint are not allegations and therefore do not require a response. By submitting this Answer, the Chevron Defendants do not waive, and hereby expressly preserve, all defenses, including as to subject matter and personal jurisdiction.

The Chevron Defendants submit this Answer based on the facts and information that are currently known to them. Additional facts that are currently unknown to the Chevron Defendants may be revealed through the course of discovery and/or further investigation. The Chevron Defendants reserve the right to supplement or amend this Answer, including its Separate Defenses, based on newly discovered facts or information.

A. STATEMENT IN SUPPORT OF SEPARATE DEFENSES

For many decades, scientists around the world have studied the link between greenhouse gases and climate change. And although scientific, governmental, and public knowledge about climate change has increased substantially over time, it is undisputed that the potential climate risks of fossil fuels, due to the greenhouse gas emissions they release when combusted, have been widely recognized and reported on for decades. Policymakers in the United States, Hawai'i, and around the world have long been aware of voluminous scientific research on these important issues and have considered the difficult public policy questions relating to energy security, economic growth, and environmental protection that arise from these long-recognized risks. The difficulty of these complex balancing decisions has been starkly demonstrated by rising energy prices in

recent years, exacerbated by the war in Ukraine. These pressures have led the Biden Administration to call on energy companies, including Defendants here, to expand production of fossil fuels, urge OPEC nations to produce and release more oil, and take executive action to release millions of barrels of oil from the Strategic Petroleum Reserve, despite its recognition and concerns regarding global climate change and its stated goal of reducing carbon emissions.

Plaintiffs' Complaint tries to construct a narrative that oil and gas companies had some unique knowledge about climate science and withheld it or misrepresented it in some way that impacted policy responses and consumer choices. That narrative is false. It does a disservice to the scientists around the world who have been researching climate change since the nineteenth century, to the well-documented and massive public record of the research studies produced by those scientists over many decades and the resulting extensive public and media commentary and debate on this topic, and to governments that have been grappling with the policy implications of climate change since at least the 1960s. Attempting to "fix blame" on a handful of energy companies for a widely discussed phenomenon that is inherent to modern industrial society and the economic foundations of modern life is fundamentally misleading and improper and, more importantly, does nothing to address the problem of climate change. The Chevron Defendants recognize and acknowledge that climate change is a serious issue that warrants serious and meaningful national and international action. Indeed, the Chevron Defendants support and are actively working towards today's energy transition, while recognizing that oil and gas remain essential for people and economies around the world. Litigation funded and fueled by activists and special interests, however, is not a useful or proper way to address the problem. Global action by governments, market participants, and consumers around the world is necessary to address these important issues and develop meaningful and workable solutions.

Any allegation that the Chevron Defendants deceived or misled federal, state, or international regulators or the public at large about the potential impacts of increased greenhouse gases on the climate is belied by a historical record replete with *public* information, including scientific reporting, international, federal, and local policy discussions and lawmaking, and national and local media coverage. The vast and comprehensive study and discussion of climate change, as detailed below, clearly refutes Plaintiffs’ allegations that the oil-and-gas industry had “secret” knowledge about the link between the combustion of fossil fuels and its impact on the global climate.

Beginning more than two centuries ago, greenhouse gases and the potential impacts of increased concentrations of carbon dioxide on the climate have been the subject of intensive independent and public scientific study. Decades of climate study and analysis have resulted in a robust public discourse on the potential impacts of greenhouse gases on the climate. Every President since Eisenhower has “debated the merits of acting on climate policy.”¹ The U.S. Congress has also extensively focused on this issue, holding 246 Congressional hearings on climate change involving 1,595 congressional testimonies between 1976 and 2007 alone.² By the 1990s, the United States was actively involved in international discussions and policy-making related to the impact of greenhouse gases on global climate. The U.S. government has also been one of the main driving forces behind climate science research, with the Office of Management

¹ Nathaniel Rich, *Losing Earth: The Decade We Almost Stopped Climate Change*, N.Y. Times Magazine, Aug. 1, 2018, <https://www.nytimes.com/interactive/2018/08/01/magazine/climate-change-losing-earth.html>.

² Hyung Sam Park, Xinsheng Liu, and Arnold Vedlitz, *Framing Climate Policy Debates: Science, Network, and U.S. Congress, 1976-2007*, 5 (2010), https://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1041&context=pnconfs_2010.

and Budget finding that, “[s]ince 1993, the federal government has reported over \$154 billion in funding for activities to understand and address climate change.”³

These highly public efforts to understand and address climate change through legislation and public policy were hardly limited to the national level—they were also occupying center stage at all governmental levels in Hawai‘i. Indeed, as the historical record amply demonstrates, the impact of fossil fuel combustion on climate has been recognized by Hawai‘i and Honolulu elected officials and legislators for decades, dating as far back as 1968 and continuing to the present day. By way of example, in 1984, Hawai‘i state lawmakers requested “a study of the worldwide greenhouse effect on Hawaii’s coastal developments” and noted that “the greenhouse effect” “has long been a concern to scientists.”⁴ In 1988, more than thirty years ago, Hawai‘i Senators Daniel Inouye and Spark Matsunaga co-sponsored the National Energy Policy Act aimed at combating global warming, including reducing carbon dioxide emissions 20% by 2000.⁵ In 2001, Honolulu Mayor Jeremy Harris published an editorial acknowledging global warming and criticizing President Bush for ignoring its threat, stating: “Anyone living on an island or low-lying area ought to be worrying about global warming Add global warming’s catastrophic impact on agricultural production and public health, and the magnitude of this environment threat starts to become chillingly clear. Make no mistake, global warming has begun.”⁶ In the decades that followed, highly public climate change efforts in Hawai‘i persisted. Put simply, information about

³ U.S. Government Accountability Office, *Climate Change: Analysis of Reported Federal Funding*, 33 (GAO-18-223) (2018), <https://www.gao.gov/assets/gao-18-223.pdf>.

⁴ Requesting a Study of the Worldwide Greenhouse Effect on Hawaii’s Coastal Environments, S. Res. 137 (HI. 1984).

⁵ S. 2667, 100th Cong. (1988).

⁶ Jeremy Harris, *Global Warming Is Coming Our Way*, Honolulu Advertiser, May 4, 2001.

climate change and the potential impact of fossil fuel combustion on climate change was and continues to be pervasive among all governmental levels in Hawai‘i.

Climate change has not only been broadly and publicly discussed by scientists and government officials. For more than six decades, the issue of climate change has been extensively reported to the public in national and Hawai‘i newspapers and magazines, on television shows, in documentaries, and in movies.⁷ National media coverage of climate change dates back to at least the 1930s, with *Time* magazine publishing an article in 1939 noting, “[w]eather men have no doubt that the world at least for the time being is growing warmer,”⁸ and local media coverage of climate change in Hawai‘i dates back to at least 1955, when the *Honolulu Advertiser* covered a scientific speech about the impacts of carbon dioxide on climate.⁹ In the subsequent decades, comprehensive coverage of climate change—including scientific analyses, proposed responses, and policy negotiations—has been prevalent in both news coverage and popular movies and television.

Despite this widespread knowledge of potential adverse climate impacts related to increased carbon dioxide in the atmosphere, the United States—like the rest of the world—has continued to rely on and promote oil and gas for its energy supply. From the 1990s, domestic consumption of oil and gas has increased by 20% and 57%, respectively, through 2018.¹⁰ In 2018, the United States consumed more energy than ever before, with fossil fuels accounting for 80% of this record-breaking consumption.¹¹ Despite this increase in consumption, the U.S. Energy

⁷ Rich, *supra* note 1.

⁸ *Science: Warmer World*, *Time*, Jan. 2, 1939, <http://content.time.com/time/subscriber/article/0,33009,760573,00.html>.

⁹ *Warming Up the World*, *Honolulu Advertiser*, September 29, 1955, at 4.

¹⁰ *Id.*; see also U.S. Energy Info. Admin., *Today in Energy* (Apr. 16, 2019) <https://www.eia.gov/todayinenergy/detail.php?id=39092>.

¹¹ Hannah Ritchie & Max Roser, *Fossil Fuels*, *Our World in Data*, <https://ourworldindata.org/fossil-fuels> (last visited Sept. 12, 2022).

Information Agency has recognized that the switch from coal to natural gas “has helped reduce overall U.S. CO₂ emissions growth because [natural gas] is the least carbon-intensive of the fossil fuels used in electricity generation.”¹²

Like the federal government, Hawai‘i has continued to encourage fossil fuel use. Indeed, Hawai‘i continues to be the nation’s *most petroleum-dependent state*, with more than four-fifths of its energy consumption coming from petroleum.¹³

The fact is that the United States, Hawai‘i, and countries across the world continue to promote and use fossil fuels despite the vast, longstanding, and widespread publicly available information that exists regarding the effects of greenhouse gases on the climate. They do so because even though the world is attempting to transition to alternative energy sources, fossil fuels have been, and continue to be, essential to the safety, well-being, and advancement of modern society. Countless individuals and entities, including Plaintiffs themselves, use and depend on fossil fuels to heat their homes; power their hospitals, schools, and vehicles; produce and transport their food supplies; engage in commerce; and manufacture innumerable indispensable and essential products. As President Obama explained, “the bottom line is this: given our energy needs, in order to sustain economic growth, produce jobs, and keep our businesses competitive, we’re going to need to harness traditional sources of fuel even as we ramp up production of new sources of renewable, homegrown energy.”¹⁴

¹² U.S. Energy Info. Admin., *U.S. Energy-Related Carbon Dioxide Emissions*, 2019, at 10, https://www.eia.gov/environment/emissions/carbon/archive/2019/pdf/2019_co2analysis.pdf.

¹³ U.S. Energy Info. Admin., *Hawaii State Energy Profile*, <https://www.eia.gov/state/analysis.php?sid=HI> (last updated Feb. 17, 2022).

¹⁴ President Barack Obama, Remarks on Energy at Andrews Air Force Base, Maryland, (Mar. 31, 2010), <https://obamawhitehouse.archives.gov/the-press-office/remarks-president-energy-security-andrews-air-force-base-3312010>.

This Statement is organized in five parts. **Part I** provides a history of climate change science and the study of the greenhouse effect. **Part II** describes how federal, Hawai‘i, and Honolulu officials and legislators have known of the threat of climate change and the potential link to fossil fuel emissions for decades. **Part III** describes national and Hawai‘i media coverage of climate change over the course of many decades. **Part IV** provides a description of popular sources of entertainment that reflect and illustrate the widespread public understanding of climate change dating back decades. And **Part V** explains that federal and Hawai‘i officials have recognized that oil and gas are essential to modern life and continue to promote and encourage the use of these fuels despite widespread knowledge of climate change.¹⁵

I. History of Climate Change Science and the Study of the Greenhouse Effect

1. Scientific research into the greenhouse effect and the potential impacts of increased concentrations of carbon dioxide on the climate has been ongoing for approximately 200 years. The historical record of climate change science research unequivocally establishes that climate change was the subject of thorough, independent, and *public* scientific study and analysis. This record undermines any allegation that the Chevron Defendants in any way deceived or misled federal, state, or international regulators or the public at large.

2. The world has known for decades that the combustion of oil and gas releases greenhouse gases into the atmosphere, which may contribute to global warming and climate change. Scientists have reported these effects since the early nineteenth century. In the 1820s, the mathematical physicist Joseph Fourier attempted to formulate a comprehensive theory of planetary temperatures and conducted experiments that compared the influence of the atmosphere to the

¹⁵ The sources cited herein include examples of scientific, governmental, and other forms of public knowledge and action related to climate change over time. These sources are not exhaustive and are intended to provide representative examples. In referencing these sources in this Separate Statement and Answer, the Chevron Defendants neither admit nor deny the truth or falsity of their contents. The Chevron Defendants may identify and rely on additional sources and materials at later stages of the litigation in support of their defenses or for any other purpose.

heating of a closed space beneath a pane of glass.¹⁶ In 1859, John Tyndall measured energy absorption by different gases, and his data showed that carbonic acid, the hydrated version of carbon dioxide, absorbs energy 150 times more than regular air.¹⁷

3. In 1896, Svante Arrhenius published an article in *Philosophical Magazine and Journal of Science*, stating “the augmentation of the temperature will increase nearly in arithmetic progression” such that an increase of carbonic acid would increase global temperatures while a decrease would reduce global temperatures by a similar amount. He noted that the effect was due to a strong absorption of long wave radiation by carbonic acid and water vapor molecules.¹⁸

4. In the early 1900s, T.C. Chamberlin, a professor of geology at the University of Chicago and president of the Chicago Academy of Sciences, initially followed Arrhenius’ research, stating that increases of carbon dioxide could warm the earth’s surface, leading to higher concentrations of water vapor in the air.¹⁹

5. But Arrhenius’ findings were largely disputed throughout the first half of the twentieth century. In 1900, Swedish scientist Knut Ångström published conclusions from flawed experiments suggesting that an increase in carbon dioxide would have an insignificant impact on radiation absorption, refuting Arrhenius’ conclusions.²⁰ And Ångström’s conclusions were largely accepted by the scientific community.²¹

¹⁶ James Fleming & Joseph Fourier, The “Greenhouse Effect,” and the Quest for a Universal Theory of Terrestrial Temperatures, *Endeavour* 23: 72–75 (1999). See also Hervé Le Treut, et al., Historical Overview of Climate Change, in *Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 93–127 (S. Solomon et al. eds., 2007).

¹⁷ J. Tyndall, The Bakerian Lecture: On the Absorption and Radiation of Heat by Gases and Vapours, and on the Physical Connexion of Radiation, Absorption, and Conduction, 151 *Phil. Transactions of the Royal Society of London* 1–36 (1861).

¹⁸ Svante Arrhenius, *On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground*, 41 *Phil. Mag. & J. Sci.* 237, 239 (1896), https://www.rsc.org/images/Arrhenius1896_tcm18-173546.pdf.

¹⁹ J.R. Fleming, *Historical Perspectives on Climate Change* 78 (1998).

²⁰ Ångström, Knut, Über die Bedeutung des Wasserdampfes und der Kohlensäures bei der Absorption der Erdatmosphäre, *Annalen der Physik* 4(3): 720–32 (1900).

²¹ See, e.g., Knut Angstrom on Atmospheric Absorption, *Monthly Weather Review*, 268 (1901).

6. Disfavor of Arrhenius' research was so great that even Chamberlin ultimately regretted his acceptance of Arrhenius' findings, stating that "I greatly regret that I was among the early victims of Arrhenius' error."²²

7. In 1920, W.J. Humphreys, relying on Ångström's conclusions, argued that, contrary to Arrhenius' earlier conclusions, an increase or decrease in carbon dioxide would make no difference in the amount of infrared radiation absorbed by the atmosphere and would not noticeably change the Earth's temperature.²³

8. In a 1938 publication, G.S. Callendar, a scientist at the British Electrical and Allied Industries Research Association, estimated a rise in global temperatures of 0.003°C per year due to the artificial injection of carbon dioxide that had taken place to date,²⁴ and asserted that humankind was "throwing some 9,000 tons of carbon dioxide into the air each minute."²⁵ Callendar concluded his study by stating that the combustion of fossil fuel "is likely to prove beneficial to mankind in several ways, besides the provision of heat and power. For instance the above mentioned small increases of mean temperature would be important at the northern margin of cultivation, and the growth of favourably situated plants is directly proportional to the carbon dioxide pressure. In any case the return of the deadly glaciers should be delayed indefinitely."²⁶

9. In 1953, Gilbert Plass demonstrated that water vapor and carbon dioxide absorbed and emitted energy at different wavelengths, and therefore should have separate effects on climate.²⁷ Plass' calculations indicated that a doubling in atmospheric carbon dioxide concentrations may result in a rise in Earth's average temperatures of 3.6°C.²⁸

²² Letter from Chamberlin to Charles Schuchert, T.C. Chamberlin Papers, Univ. of Chicago Lib. (Oct. 27, 1913).

²³ W.J. Humphreys, *Physics of the Air* (1920).

²⁴ J.R. Fleming, *The Callendar Effect: The life and work of Guy Stewart Callendar (1898-1964)* (2007). See also G.S. Callendar, *The Artificial Production of Carbon Dioxide and Its Influence on Temperature*, 64 Q.J. Royal Meteorological Soc'y 223 (Apr. 1938).

²⁵ Fleming, *supra* note 24. See also G.S. Callendar, *The Composition of the Atmosphere through the Ages*, 74 Meteorological Mag. 38 (Mar. 1939).

²⁶ Callendar, *supra* note 24, at 236.

²⁷ G.N. Plass, *The Carbon Dioxide Theory of Climatic Change*, Trans. Amer. Geophysical Union 34, 332 (1953).

²⁸ *Id.*

10. In 1955, the U.S. government established the first major climate modeling center, the Geophysical Fluid Dynamics Laboratory, under the National Oceanic and Atmospheric Administration (“NOAA”), now at Princeton University.²⁹ Several other centers opened shortly thereafter.

11. In 1957, Roger Revelle and Hans Suess, scientists at the Scripps Institution of Oceanography, proposed that the majority of anthropogenic carbon dioxide released to date was most likely absorbed by the ocean, but the percent remaining in the atmosphere may “become significant during future decades if industrial fuel combustion continues to rise exponentially.”³⁰

12. The State of Hawai‘i has played a significant role in the world’s understanding of climate change. One of the earliest, foundational studies measuring carbon dioxide in the atmosphere was conducted by Charles Keeling at the Mauna Loa Observatory starting in 1958.³¹ Keeling’s goal was to understand the extent to which concentrations of carbon dioxide were actually changing in the atmosphere and how that change might affect the climate.³² Keeling later identified a small, but persistent increase in global carbon dioxide concentration, which he attributed primarily to fossil fuel combustion.³³ This research produced the well-known “Keeling Curve,” showing the increase in atmospheric carbon dioxide over time.³⁴ The University of Hawai‘i—the State’s flagship public university—proudly notes that “[t]he new Mauna Loa Slope

²⁹ *About GFDL*, Geophysical Fluid Dynamics Laboratory (Feb. 13, 2022), <https://www.gfdl.noaa.gov/about/>.

³⁰ Fleming, *supra* note 19, at 125 (citing R. Revelle & H. E. Suess, Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO₂ During the Past Decades, 9 *Tellus* 18–27, (1957)).

³¹ See, e.g., Charles D. Keeling, *The Influence of Mauna Loa Observatory on the Development of Atmospheric CO₂ Research*, Mauna Loa Observatory: A 20th Anniversary Report 36–54 (John Miller ed., 1978).

³² Charles D. Keeling, The Concentration and Isotopic Abundances of Carbon Dioxide in the Atmosphere, 12 *Tellus* 200–203 (1960).

³³ Jack C. Pales & Charles D. Keeling, *The concentration of atmospheric carbon dioxide in Hawaii*, 70 *J. Geophysical Res.* 6053, 6076 (1965).

³⁴ See Scripps Inst. of Oceanography, *Charles David Keeling Biography*, Scripps CO₂ Program (Aug. 19, 2021), https://scrippsco2.ucsd.edu/history_legacy/charles_david_keeling_biography.html (“The Mauna Loa record, or ‘Keeling Curve’, as it is sometimes called, has become a standard icon symbolizing the impact of humans on the planet.”).

Observatory was opened in time for . . . [when] Charles Keeling began his famous Carbon Dioxide sampling program.”³⁵

13. In the 1960s, Syukuro Manabe and Richard Wetherald, scientists at Princeton University’s Geophysical Fluid Dynamics Laboratory, developed a climate model that could simulate, among other things, the way air and moisture conveyed heat from the Earth’s surface into the upper atmosphere.³⁶ Using this model, in 1967, they estimated that a doubling of the CO₂ level in the atmosphere could lead to raising the temperature of the atmosphere by about 2.3°C.³⁷ For this and other contributions to the field of climate modeling, Mr. Manabe was awarded the Nobel Prize in 2021.³⁸

14. In 1965, the National Science Foundation’s Special Commission on Weather Modification published a report titled *Weather and Climate Modification*, which estimated that CO₂ increased by 10-15% in the 20th Century, resulting in significant changes to Earth’s heat balance.³⁹

15. In 1969, Keeling’s measurements showed that at least 40 percent of the carbon dioxide produced from fossil fuel combustion remained in the atmosphere instead of being absorbed by the ocean, plants, or other natural carbon sinks.⁴⁰

16. In 1970, *Inadvertent Climate Modification: Report of the Study of Man’s Impact on Climate* was published by the Massachusetts Institute of Technology with the stated goal to “raise the level of informed public and scientific discussion and action on global and regional

³⁵ Univ. of Hawaii, *History of the Department, 1956-2006*, Department of Atmospheric Sciences (Aug. 19, 2021), <http://www.soest.hawaii.edu/atmo/index.php/history-of-the-department-revised>.

³⁶ Spencer Weart, *The Discovery of Global Warming* 96 (2008).

³⁷ Syukuro Manabe and Richard T. Wetherald, *Thermal Equilibrium of the Atmosphere with a Given Distribution of Relative Humidity*, 24 J. Atmospheric Sci. 241-259 (1967).

³⁸ Cade Metz, et al., *Nobel Prize in Physics Awarded for Study of Humanity’s Role in Changing Climate*, N.Y. Times, Oct. 5, 2021, <https://www.nytimes.com/2021/10/05/science/nobel-prize-physics-manabe-klaus-parisi.html>.

³⁹ National Science Foundation, *Weather and Climate Modification: Report of the Special Commission on Weather Modification*, 42, NSF 66-3 (1965).

⁴⁰ Charles D. Keeling, *Is Carbon Dioxide from Fossil Fuel Changing Man’s Environment?*, 114 Proc. Am. Philo. Soc’y 10, 13 (1970), available at www.jstor.org/stable/985720.

climate problems.”⁴¹ The report concluded that it was “well known that the CO₂ content of the global atmosphere has been rising due to the burning of fossil fuels—coal, petroleum, and natural gas—and it will go up by about another 20 percent by 2000.”⁴² The report was the result of “a 3-week intensive examination of the present and potential climatic effects of man's activities by 30 of the world's leading atmospheric scientists from 14 countries.”⁴³

17. In 1971, J. Murray Mitchell, a research scientist at the National Oceanic and Atmospheric Administration, published a study that estimated the effect on the earth's temperature of increasing aerosol particle concentrations.⁴⁴

18. In 1975, having constructed one of the first computer-based three dimensional Global Climate Models, Manabe and Wetherald estimated that a doubling of CO₂ would lead to an average warming of 3.5°C.⁴⁵ Manabe and Wetherald's 1975 model relied on simplified assumptions, including fixed cloudiness, idealized geography, and no seasonal variation.⁴⁶ Because of these assumptions, the authors concluded their study by stating: “it is not advisable to take too seriously the quantitative aspect of the results obtained in this study. Nevertheless, it is hoped that this study not only emphasizes some of the important mechanisms which control the response of the climate to the change of carbon dioxide, but also identifies the various requirements that have to be satisfied for the study of climate sensitivity with a general circulation model.”⁴⁷

⁴¹ *Inadvertent Climate Modification: Report of the Study of Man's Impact on Climate*, Stockholm (Carroll L. Wilson & William H. Matthews, eds., 1971), available at <https://archive.org/details/inadvertentclima0000stud>.

⁴² *Id.* at 3.

⁴³ *Inadvertent Climate Modification*, *supra* note 41.

⁴⁴ J. Murray Mitchell, The Effect of Atmospheric Aerosols on Climate with Special Reference to Temperature near the Earth's Surface, 10(4) *J. Applied Meteorology & Climatology* 703,712 (1971).

⁴⁵ Weart, *supra* note 36, at 97.

⁴⁶ Syukuro Manabe and Richard T. Wetherald, The Effects of Doubling the CO₂ Concentration on the Climate of a General Circulation Model, 32 *J. Atmospheric Sci.* 3, 13 (1975).

⁴⁷ *Id.* at 13-14.

19. Furthermore, as of 1976, Keeling had estimated that, on average, atmospheric concentrations of carbon dioxide were increasing at the rate of approximately one ppm (parts per million of dry air).⁴⁸

20. In 1977, the National Academy of Sciences published a report entitled *Energy and Climate* that expressed a concern about “highly adverse consequences” that may follow due to the increased use of fossil fuels for energy, with the panel of experts projecting that a global warming of 10 degrees Fahrenheit may result by the later part of the 22nd century.⁴⁹ “The panel’s report, announced at a press conference during the hottest July the nation had experienced since the drought years of the 1930s, was widely noted in the press.”⁵⁰

21. In 1979, the U.S. National Research Council published *Carbon Dioxide and Climate: A Scientific Assessment*. The report, which came to be known as the “Charney Report” after the report’s chair, meteorologist Jule Charney, concluded that the composition of our atmosphere was indeed changing and, based on the results of five available climate models, that “the equilibrium surface global warming due to doubled CO₂ will be in the range 1.5 °C to 4.5 °C, with the most probable value near 3 °C.”⁵¹

22. In 1980, the U.S. Environmental Protection Agency (“EPA”) published the Environmental Outlook 1980, which noted that carbon dioxide is known to have increased over the past 100 years, and that carbon dioxide pollution, specifically, the “increasing combustion of fossil fuels,” will result in a “predicted increase in global mean temperature from a ‘greenhouse effect’” which “could impact agriculture and regional hydrology worldwide.”⁵²

⁴⁸ Charles D. Keeling et al., Atmospheric Carbon Dioxide Variations at Mauna Loa Observatory, Hawaii, 28(6) Tellus 538(1976).

⁴⁹ National Academy of Sciences, *Energy and Climate* (1977).

⁵⁰ Weart, *supra* note 36, at 97; *see also* Walter Sullivan, *Scientists Fear Heavy Use of Coal May Bring Adverse Shift in Climate*, N.Y. Times, Jul. 25, 1977, <https://www.nytimes.com/1977/07/25/archives/scientists-fear-heavy-use-of-coal-may-bring-adverse-shift-in.html>.

⁵¹ National Research Council, *Carbon Dioxide and Climate: A Scientific Assessment* 16 (1979).

⁵² Environmental Protection Agency, Executive Summary: Draft Environmental Outlook 1980, 5 (1979).

23. In 1982, the U.S. National Research Council published a follow-up report, *Carbon Dioxide and Climate: A Second Assessment*, chaired by NOAA climate modeler Joseph Smagorinsky. The “Smagorinsky Report” (parts of which were reproduced in the 1983 National Academy of Sciences report, *Changing Climate: Report of the Carbon Dioxide Assessment Committee*, chaired by Scripps Institution of Oceanography oceanographer William Nierenberg) concluded that the increase of atmospheric carbon dioxide was primarily due to combustion of fossil fuels, the rate of which would drive the atmospheric accumulation of carbon dioxide in the future.⁵³

24. At the request of Congress (as reflected in the Energy Security Act of 1980), the 1983 National Academy of Science report, which came to be known as the “Nierenberg Report,” was prepared and sought to provide, among other things: “a comprehensive assessment of CO₂ release and impacts of CO₂ increase.”⁵⁴ The report noted that “[t]he current increase [in CO₂] is primarily attributable to burning of coal, oil, and gas; future increases will similarly be determined primarily by fossil fuel combustion.”⁵⁵ It, however, cautioned that “estimates of effects of increasing CO₂ on climate also embody significant uncertainties, stemming from fundamental gaps in our understanding of physical processes, notably the processes that determine cloudiness and the long-term interactions between atmosphere and ocean.”⁵⁶

25. In 1986, the United Nations Environment Programme (“UNEP”) and the U.S. EPA held an International Conference on the Health and Environmental Effects of Ozone Modification and Climate Change.⁵⁷ Over three hundred researchers and policy makers from approximately twenty nations were in attendance.⁵⁸ EPA published a four-volume report of the 73 papers that

⁵³ National Research Council, *Carbon Dioxide and Climate: A Second Assessment* (1982), as cited in National Research Council, *Changing Climate: Report of the Carbon Dioxide Assessment Committee*, 266–77 (1983), <https://www.nap.edu/download/18714>.

⁵⁴ *Id.* at x.

⁵⁵ *Id.* at 1.

⁵⁶ *Id.*

⁵⁷ James G. Titus & Stephen Seidel, *Overview of the Effects of Changing the Atmosphere*, Effects of Changes in Stratospheric Ozone and Global Climate – Volume 2: Stratospheric Ozone 3, EPA (1986).

⁵⁸ *Id.*

were delivered at the conference by over eighty speakers, including two U.S. Senators, top officials from UNEP and EPA, some of the leading scientists investigating the implications of atmospheric change, and representatives from industry and environmental groups.⁵⁹ The papers discussed impacts on water resources, agriculture, sea level rise, and human health, including the need to act regardless of scientific uncertainty.⁶⁰

26. In 1988, The UNEP and the World Meteorological Organization established the Intergovernmental Panel on Climate Change (the “IPCC”) with the objective of “provid[ing] policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.”⁶¹ The IPCC is an “international body for assessing the science related to climate change,”⁶² and “it quickly established itself as the principal source of advice to policy makers.”⁶³

27. The IPCC’s First Assessment Report, released in 1990, documented the increase of greenhouse gas concentrations since preindustrial levels.⁶⁴ At the same time, the IPCC observed that “it is not possible at this time to attribute all or even a large part of the observed global warming to the enhanced greenhouse effect on the basis of observational data currently available.”⁶⁵ The IPCC further noted that “[t]here are many uncertainties in our predictions particularly with regard to the timing, magnitude and regional patterns of climate change,” which was due to their then incomplete understanding of various issues, like the sources of greenhouse gases, clouds, oceans, and polar ice sheets.⁶⁶ Furthermore, the IPCC explained that “[t]he size of this warming is broadly consistent with predictions of climate models, but it is also of the same magnitude as natural

⁵⁹ *Id.*

⁶⁰ *Id.* at 4-18.

⁶¹ IPCC, *IPCC Fact Sheet – What is the IPCC?*, https://www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_What_is_IPCC.pdf (last visited Sept. 12, 2022).

⁶² *Id.*

⁶³ Weart, *supra* note 36, at 155.

⁶⁴ IPCC, *Climate Change: The IPCC Scientific Assessment. Contribution of Working Group I to the First Assessment Report of the Intergovernmental Panel on Climate Change*, xvi (J.T. Houghton et al. eds., 1990).

⁶⁵ *Id.* at 254.

⁶⁶ *Id.* at xii.

climate variability. Thus the observed increase could be largely due to this natural variability; alternatively this variability and other human factors could have offset a still larger human-induced greenhouse warming. The unequivocal detection of the enhanced greenhouse effect from observations is not likely for a decade or more.”⁶⁷

28. In a report to Congress in 1991 titled “U.S. Efforts to Address Global Climate Change,” the U.S. Department of State and EPA, like the IPCC, recognized the risk of climate change, but noted that significant scientific uncertainties remained: “The possibility of global climate change has become an issue of great concern in the international community and within the United States. Much is unknown, however, about whether or not such changes have been detected, when and how they might occur, or what can be done about it. . . . [M]any scientific and economic uncertainties remain about possible climate change, its impacts, and societal responses. Much remains to be known about the magnitude and extent of a possible climate change.”⁶⁸

29. Similarly, also in 1991 and at the request of Congress, the National Academy of Sciences released a report titled “Policy Implications of Greenhouse Warming,” which was prepared pursuant to Congress’s HUD-Independent Agencies Appropriations Act of 1988 that called for “[a] study . . . establish[ing] the scientific consensus on the rate and magnitude of climate change, estimat[ing] the projected impacts, and evaluat[ing] policy options for mitigating and responding to such changes.”⁶⁹ The report “listed no fewer than fifty-eight policies that could mitigate greenhouse warming.”⁷⁰

30. In 1995, the IPCC released its Second Assessment Report, which reflected an evolution of confidence in scientific understanding in the role of major factors in climate change. In the Second Assessment Report, confidence in the warming effect of carbon dioxide emissions

⁶⁷ *Id.* .

⁶⁸ Environmental Protection Agency, *U.S. Efforts to Address Global Climate Change: Report to Congress*, 1–2 (1991), <https://nepis.epa.gov/Exe/ZyPDF.cgi/9101OZWK.PDF?Dockey=9101OZWK.PDF>.

⁶⁹ National Academy of Sciences: Committee on Science, Engineering and Public Policy, *Policy Implications of Greenhouse Warming: Mitigation, Adaptation, and the Science Base*, ix (1992).

⁷⁰ Weart, *supra* note 36, at 157.

on the atmosphere was categorized as “high,” while the scientific understanding of aerosols, which constitute a large source of uncertainty in climate models, was viewed as “very low.”⁷¹ The IPCC concluded that “[its] ability to quantify the human influence on global climate is currently limited because the expected signal is still emerging from the noise of natural variability, and because there are uncertainties in key factors. . . . Nevertheless, the balance of evidence suggests that there is a discernible human influence on global climate.”⁷²

31. It was not until 2001 that the IPCC stated that new evidence indicated that human activity was “likely” (meaning 66–90% probability) responsible for “most” of the warming observed: “There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities . . . There is a longer and more closely scrutinized temperature record and new model estimates of variability. The warming over the past 100 years is very unlikely to be due to internal variability alone. Reconstructions of climate data for the past 1,000 years . . . also indicate this warming was unusual and is unlikely to be entirely natural in origin.”⁷³

32. In 2001, the National Academy of Sciences cautioned that the conclusions in the IPCC’s 2001 report should not be overstated: “Climate projections will always be far from perfect. Confidence limits and probabilistic information, with their basis, should always be considered as an integral part of the information that climate scientists provide to policy and decision makers. Without them, the IPCC [2001 report] could give an impression that the science of global warming is ‘settled,’ even though many uncertainties still remain.”⁷⁴

33. The IPCC’s Fourth Assessment Report, released in 2007, expressed a much stronger certainty regarding the link between global warming and human activities, reporting that

⁷¹ IPCC, *Climate Change 1995: The Science of Climate Change – Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change*, 17-18 (J.T. Houghton et al., eds., 1995).

⁷² *Id.* at 5.

⁷³ IPCC, *Climate Change 2001: The Scientific Basis – Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, 10 (J.T. Houghton et al., eds., 2001).

⁷⁴ National Research Council, *Climate Change Science: An Analysis of Some Key Questions* 22 (2001), <https://www.nap.edu/catalog/10139/climate-change-science-an-analysis-of-some-key-questions>.

“[m]ost of the observed increase in global average temperatures since the mid-20th century is *very likely* [greater than 90% chance] due to the observed increase in anthropogenic greenhouse gas concentrations . . . Discernible human influences now extend to other aspects of climate, including ocean warming, continental-average temperatures, temperature extremes and wind patterns.”⁷⁵

34. And, as of the Fifth Assessment Report, released in 2013, scientific confidence in understanding the warming effect of greenhouse gases was characterized as “very high,” as was confidence in understanding the direct effects of aerosols on climate. Understanding of the indirect effect of aerosols, such as the mechanisms by which aerosols create and interact with clouds, was still reported as “low.”⁷⁶ As a result, the IPCC concluded that “[i]t is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century,”⁷⁷ while acknowledging that “[g]lobally, economic and population growth continued to be the most important drivers of increases in CO₂ emissions from fossil fuel combustion.”⁷⁸

35. Finally, in its recently released Sixth Assessment Report, the IPCC reported that it views the “[h]uman influence on the climate system [to be] an established fact.”⁷⁹ According to the IPCC, “[i]t is unequivocal that the increase of CO₂, methane (CH₄) and nitrous oxide (N₂O) in the atmosphere over the industrial era is the result of human activities and that human influence is the principal driver of many changes observed across the atmosphere, ocean, cryosphere and biosphere.”⁸⁰

36. The greenhouse effect, climate change, and global warming have been a focus of intense scientific interest and study since the early part of the 20th century, and these topics

⁷⁵ IPCC, Climate Change 2007: The Physical Science Basis – Working Group I Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 10 (2007).

⁷⁶ IPCC, Climate Change 2013: The Physical Science Basis – Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 82 (2013).

⁷⁷ *Id.* at 17.

⁷⁸ IPCC, Climate Change 2014: Synthesis Report – Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 5 (2014).

⁷⁹ IPCC, Climate Change 2021: The Physical Science Basis – Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Technical Summary, TS-8 (2021).

⁸⁰ *Id.*

continue to be a major subject of scientific research and policy debates. Between 1980 and 2014 alone, more than 222,000 scientific papers were published on climate change,⁸¹ and the growth in scientific publication regarding climate change has been exponential (Figure 1).⁸²

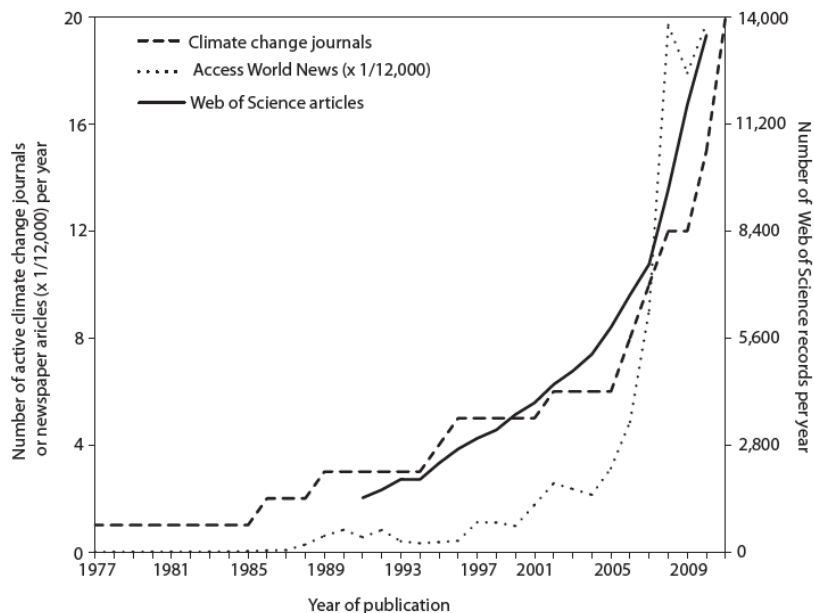


Figure 1: Growing Footprint of Climate Change in Scientific Research and the Media

37. As further discussed below in Section II(A), the U.S. federal government has been one of the main driving forces behind climate science research, with the Office of Management and Budget finding that, “[s]ince 1993, the federal government has reported over \$154 billion in funding for activities to understand and address climate change.”⁸³

II. Federal, Hawai‘i and Honolulu Officials and Legislators Have Known of the Threat of Climate Change and the Link to Fossil Fuel Emissions for Decades

38. The historical record shows that the issue of climate change has been known and discussed by federal, Hawai‘i, and Honolulu elected officials and legislators for decades, refuting

⁸¹ Robin Haunschild et al., *Climate Change Research in View of Bibliometrics*, 11(7) PLoS ONE 5, <https://doi.org/10.1371/journal.pone.0160393>.

⁸² Michael L. Grieneisen and Minghua Zhang, *The Current Status of Climate Change Research*, 1 *Nature of Climate Change* 72–73 (2011); see also G. Stanhill, *The Growth of Climate Change Science: A Scientometric Study*, 48 *Climatic Change* 515–524 (2001).

⁸³ U.S. Government Accountability Office, *Climate Change: Analysis of Reported Federal Funding*, 31 (GAO-18-223) (2018) 1, <https://www.gao.gov/assets/gao-18-223.pdf>.

the claim that the oil-and-gas industry had any secret knowledge about the link between combusting fossil fuels and global warming.

A. Discussion of Climate Change at the Federal Government Level

39. The U.S. government was well aware of the potential link between fossil fuel use and global climate change since at least the 1950s. Every President from John F. Kennedy onwards has “debated the merits of acting on climate policy.”⁸⁴

40. Testimony by Dr. Roger Revelle, a leading U.S. scientist known, among other things, for his pioneering work in the studies of carbon dioxide and climate change, revealed before Congress in 1956 that “[b]ased on figures given out by the United Nations . . . by the year 2010, we will have added something like 70 percent of the present atmospheric carbon dioxide to the atmosphere. This is an enormous quantity. . . . [I]t may, in fact, cause a remarkable change in climate.”⁸⁵

41. Also in 1956, a study funded by the Office of Naval Research found that “[t]he extra CO₂ released into the atmosphere by industrial processes and other human activities may have caused the temperature rise during the present century” and predicted “that this warming trend will continue, at least for several centuries.”⁸⁶

42. In 1957, Dr. Revelle again testified before the U.S. House Appropriations Subcommittee, and observed as follows: “More or less, in spite of ourselves, we are adding carbon dioxide to the atmosphere in large quantities. . . . Most of this carbon dioxide will probably go into the ocean. . . . The question is, [h]ow much will go into the ocean . . . and how much will it increase the CO₂ content of the air and increase the greenhouse effect[?]”⁸⁷ He testified before the same

⁸⁴ Nathaniel Rich, *Losing Earth: The Decade We Almost Stopped Climate Change*, N.Y. Times Magazine, Aug. 1, 2018, <https://www.nytimes.com/interactive/2018/08/01/magazine/climate-change-losing-earth.html>.

⁸⁵ Second Supplemental Appropriation Bill: Hearing on H. Doc. 330 Before the Subcomm. of the Comm. on Appropriations, 84th Cong. 472–73 (1956).

⁸⁶ Gilbert N. Plass, *The Carbon Dioxide Theory of Climatic Change*, 8 Tellus 140 (1956), http://nsdl.library.cornell.edu/websites/wiki/index.php/PALE_ClassicArticles/archives/classic_articles/issue1_global_warming/n7._Plass__1956corrected.pdf.

⁸⁷ National Science Foundation: Review of the First Eleven Months of the International Geophysical Year: Hearings before the Subcomm. of the Comm. on Appropriations, 85th Cong. 75 (1958).

committee in 1959, urging it to continue financial support for the study of climate science,⁸⁸ and ultimately became a formal advisor to the federal government when he was appointed to act as a science adviser to the Secretary of the Interior in 1961.⁸⁹

43. In 1965, more than twenty years before Plaintiffs allege Defendants began their purported “campaign of deception,” President Lyndon B. Johnson’s Science Advisory Committee reported that “[b]y the year 2000 the increase in atmospheric CO₂ will be close to 25%. This may be sufficient to produce measurable and perhaps marked changes in climate, and will almost certainly cause significant changes in the temperature and other properties of the stratosphere.”⁹⁰ According to Plaintiffs’ Complaint, the Science Advisory Committee found that “a 25% increase in carbon dioxide concentrations could occur by the year 2000, that such an increase could cause significant global warming, that melting of the Antarctic ice cap and rapid sea level rise could result, and that fossil fuels were the clearest source of the pollution.” Compl. ¶ 53.

44. The same year, President Johnson told Congress that his generation had “altered the composition of the atmosphere on a global scale” in part from “a steady increase in carbon dioxide from the burning of fossil fuels.”⁹¹

45. In 1969, President Nixon’s administration further recognized and understood the potential impacts of climate change, even as it worked assiduously to increase oil and gas production from federal lands. As former Harvard professor and future U.S. Senator Daniel Patrick Moynihan put it at the time: “It is now pretty clearly agreed that the CO₂ content will rise 25% by 2000. This could increase the average temperature near the Earth’s surface by 7 degrees

⁸⁸ National Science Foundation, National Academy of Sciences: Report on the International Geophysical Year before the Subcomm. of the Comm. on Appropriations, 86th Cong. p. 75. (1959).

⁸⁹ *Science Adviser Named: Revelle of Scripps Institution to Be Aide to Udall*, N.Y. Times, July 13, 1961, at 32, <https://timesmachine.nytimes.com/timesmachine/1961/07/13/97241640.html?pageNumber=32>.

⁹⁰ The White House, Restoring the Quality of Our Environment: Report of the Environmental Pollution Panel, President’s Sci. Advisory Comm., 9, 12, 123 (1965).

⁹¹ President Lyndon Baines Johnson, *Special Message to the Congress on Conservation and Restoration of Natural Beauty*, February 8, 1965, 1 Pub. Papers of the Presidents of the United States: Lyndon B. Johnson 155–65 (1966), <http://www.lbjlibrary.net/collections/selected-speeches/1965/02-08-1965.html>.

Fahrenheit. This in turn could raise the level of the sea by 10 feet. Goodbye New York. Goodbye Washington, for that matter.”⁹²

46. Also in 1969, during a hearing relating to the National Aeronautics and Space Administration’s (“NASA”) budget for the 1970 fiscal year, NASA chief scientist Dr. John Naugle stated: “We know that man, through industrial revolution and an increasing population, is not only polluting the atmosphere but may be changing its very nature. We have testified in previous years that the amount of carbon dioxide in the atmosphere has changed by a significant amount in the past 50 years. We also know there have been major climatic changes in the past, but we do not understand the reasons for those changes.”⁹³

47. The same year, Congress enacted the National Environmental Policy Act (“NEPA”) of 1969, which established a national policy for the environment and provided for the establishment of a Council on Environmental Quality.⁹⁴ The stated purpose of the NEPA was “[t]o declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.”⁹⁵

48. In 1975, the United States Committee for the Global Atmospheric Research Program, National Research Council, issued a report titled *Understanding Climate Change: a Program for Action*, including data on rising carbon dioxide and curves of glacial cycles for the last 900,000 years.⁹⁶

⁹² The White House, *Memorandum from Daniel P. Moynihan for John Ehrlichman* (Sept. 17, 1969), <https://www.nixonlibrary.gov/sites/default/files/virtuallibrary/documents/jul10/56.pdf>.

⁹³ NASA authorization for fiscal year 1970: Hearing on S. B. 1941 before the Senate Comm. on Aeronautical and Space Sci., 91st Cong. 560–61 (1969).

⁹⁴ National Environmental Policy Act of 1969, Pub. L. 91-190, 83 Stat. 852 (1970).

⁹⁵ *Id.*

⁹⁶ United States Committee for the Global Atmospheric Research Program, National Research Council, *Understanding Climate Change: A Program for Action* (1975).

49. President Carter’s administration also paid close attention to, and, indeed, heavily funded, climate science. A report requested by the Director of the Office of Science and Technology Policy and published in 1979 concluded that “[w]e now have incontrovertible evidence that the atmosphere is indeed changing and that we ourselves contribute to that change. Atmospheric concentrations of carbon dioxide are steadily increasing, and these changes are linked with man’s use of fossil fuels and exploitation of the land.”⁹⁷ The report also found that as “[c]arbon dioxide continues to increase, the study group finds no reason to doubt that climate change will result and no reason to believe that these changes will be negligible.”⁹⁸

50. The U.S. Supreme Court has found that the federal government began devoting particularly serious attention to climate change policy in the “late 1970’s.”⁹⁹

51. In 1977, NOAA held a “Workshop on The Global Effects of Carbon Dioxide from Fossil Fuels” attended by “75 scientists . . . assembled to discuss the current knowledge of the CO₂ cycle and the consequences of increases in CO₂ content.”¹⁰⁰

52. Congress was also focused on the potential risks of climate change, passing, in 1978, the National Climate Program Act to “assist the Nation and the world to understand and respond to natural and man-induced climate processes and their implications.”¹⁰¹

53. Between 1976 and 2007, there were 246 Congressional hearings on climate change and 1,595 testimonies.¹⁰² For example, in 1981, Congress held a public hearing on carbon dioxide

⁹⁷ National Academy of Sciences, *Carbon Dioxide and Climate: A Scientific Assessment – Report of an Ad Hoc Study Group on Carbon Dioxide and Climate*, vii (1979), https://www.bnl.gov/envsci/schwartz/charney_report1979.pdf.

⁹⁸ *Id.* at viii.

⁹⁹ *Massachusetts v. E.P.A.*, 549 U.S. 497, 507 (2007).

¹⁰⁰ U.S. Dept. of Energy, *Workshop on the Global Effects of Carbon Dioxide from Fossil Fuels*, v (William P. Elliott and Lester Machta, eds., 1997).

¹⁰¹ H.R. 6669: An Act to Establish a Comprehensive and Coordinated National Climate Policy and Program, and for Other Purposes, 95th Cong. (1978), <https://www.congress.gov/bill/95th-congress/house-bill/6669>.

¹⁰² Hyung Sam Park, Xinsheng Liu, and Arnold Vedlitz, *Framing Climate Policy Debates: Science, Network, and U.S. Congress, 1976-2007*, 5 (2010), https://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1041&context=pnconfs_2010.

and the greenhouse effect.¹⁰³ New York Representative James Sheuer opened the session by stating: “For years the scientific community has expressed concern that the increased carbon dioxide may trap solar radiation, which can lead to a general global warming.”¹⁰⁴ Then Tennessee Representative Al Gore stated: “The connection then between the burning of fossil fuels by our industrial society and the increasing concentration of carbon dioxide in the upper atmosphere would seem to be quite obvious.”¹⁰⁵

54. A year earlier, in 1980, the U.S. State Department and the President’s Council on Environmental Quality jointly released the Global 2000 Report to the President, which stated that an “environmental problem related to the combustion of fossil fuels (and perhaps also to the global loss of forests and soil humus) is the increasing concentration of carbon dioxide in the earth’s atmosphere. Rising CO₂ concentrations are of concern because of their potential for causing a warming of the earth. Scientific opinion differs on the possible consequences, but a widely held view is that highly disruptive effects on world agriculture could occur before the middle of the twenty-first century.”¹⁰⁶ A year later, in 1981, the Congressional Subcommittee on International Economics held a hearing to discuss the Global 2000 Report to the President’s findings.¹⁰⁷

55. In 1982, in a congressional subcommittee hearing, N. Douglas Pewitt, the Acting Director of Energy Research for the Department of Energy, discussed the Department’s research agenda and current challenges of fully understanding the potential impacts of CO₂ accumulation on climate: “Research efforts have expanded in an attempt to estimate regional and global changes in temperatures and precipitation. These efforts are also aimed at identifying which climate changes over a several year period result from the effects of CO₂ as differentiated from the many

¹⁰³ Carbon Dioxide and Climate, The Greenhouse Effect: Hearing Before the Subcomm. on Natural Resources, Agriculture Research, and Env’t and the Subcomm. on Investigations and Oversight of the Comm. on Sci. and Tech., 97th Cong. 1 (1981), <https://hdl.handle.net/2027/mdp.39015082344238>.

¹⁰⁴ *Id.* at 1.

¹⁰⁵ *Id.* at 5.

¹⁰⁶ Gerald Barney, The Global 2000 Report to the President 36 (1980).

¹⁰⁷ *The Global 2000 Report: Hearing Before the Senate Subcomm. on Int’l Econ. of the Joint Econ. Comm.*, 96th Cong. (1980), [https://www.jec.senate.gov/reports/96th%20Congress/The%20Global%202000%20Report%20\(998\).pdf](https://www.jec.senate.gov/reports/96th%20Congress/The%20Global%202000%20Report%20(998).pdf).

other factors that could have been involved. The modeling effort in this area is aimed at understanding how the atmosphere and CO₂ effects on climate relate to the non-atmospheric components of the climate systems such as oceans, land and the cryosphere. These relationships are not yet well understood.”¹⁰⁸

56. In 1983, an EPA report titled *Can We Delay A Greenhouse Warming?* concluded that “[e]vidence continues to accumulate that increases in atmospheric carbon dioxide (CO₂) and other ‘greenhouse’ gases will substantially raise global temperature. While considerable uncertainty exists concerning the rate and ultimate magnitude of such a temperature rise, current estimates suggest that a 2°C (3.6°F) increase could occur by the middle of the next century, and a 5°C (9°F) increase by 2100.”¹⁰⁹ The report stated that its findings “support the conclusion that a global greenhouse warming is neither trivial nor just a long-term problem” and “call for an expeditious response.”¹¹⁰ That report evaluated various policy options available to curb CO₂ emissions, concluding: “Of the various energy policies designed to slow the rate of atmospheric warming over the next century that were examined in this analysis, only two have been demonstrated to effectively delay the timing of 2°C rise in temperature. Both involve a ban on the use of coal which becomes fully effective in 2000.”¹¹¹

57. A 1983 report from the Carbon Dioxide Assessment Committee, a committee within the National Research Council, concluded that the “increase [in atmospheric CO₂] is primarily attributable to burning of coal, oil, and gas.”¹¹²

¹⁰⁸ Carbon Dioxide and Climate, The Greenhouse Effect: Hearing Before the Subcomm. on Natural Resources, Agriculture Research, and Env’t and the Subcomm. on Investigations and Oversight of the Comm. on Sci. and Tech., 97th Cong. 1, 102 (1981) (statement of N. Douglas Pewitt), <https://hdl.handle.net/2027/mdp.39015082344238>.

¹⁰⁹ Stephen Seidel, Dale Keyes, Environmental Protection Agency, *Can We Delay A Greenhouse Warming?: The Effectiveness and Feasibility of Options to Slow a Build-up of Carbon Dioxide in the Atmosphere*, ii (1983).

¹¹⁰ *Id.* at 7-7.

¹¹¹ *Id.* at 4-41.

¹¹² National Research Council, *Changing Climate: Report of the Carbon Dioxide Assessment Committee*, 1 (1983), https://download.nap.edu/cart/download.cgi?record_id=18714.

58. In 1985, the Senate subcommittee on Toxic Substances and Environmental Oversight held a hearing on the issue of the greenhouse effect and climate change.¹¹³ At the outset of the hearing, Senator David Durenberger said: “As one scientist after another has made clear, we are now conducting the ultimate environmental experiment with our atmosphere. Depending upon whom you ask, the consequences could be disaster of biblical proportions, or just maybe nothing. Unfortunately, more and more of the bets are on biblical, and fewer and fewer on nothing.”¹¹⁴ Scientists at the hearing urged policymakers to act in order to avert potentially catastrophic consequences of the buildup of greenhouse gases in the atmosphere.¹¹⁵ Cornell astronomer Carl Sagan urged elective officials not to delay, but to take decisive action, saying: “There is a tendency to say that they are not our problem . . . not on my term of office, it’s something for the next century . . . but the problem is . . . if you don’t worry about it now, it’s too late later on. . . . We are passing on extremely grave problems for our children when the time to solve the problems . . . is now.”¹¹⁶ Senator Al Gore stated that “there’s one thing on which virtually all scientists agree. The effect is real. We can’t wish it away, we can’t pretend that it doesn’t exist. It is real, it can be proven scientifically. The magnitude of its impact is, and the timeframe during which the impact will be felt, are both cloaked in uncertainty, partly because of a lack of scientific knowledge due to the fact that we haven’t concentrated a research effort in these areas. . . . Such efforts should be the object of intensive research.”¹¹⁷

59. During one of the 1986 Environmental Pollution Subcommittee hearings specifically concerning climate change, Chairman John H. Chafee emphasized the need to prevent

¹¹³ The Greenhouse Effect: Hearing Before the Senate Env’t and Pub. Works Subcomm. on Hazardous Wastes and Toxic Substances, 99th Cong. (1985), <https://www.c-span.org/video/?125856-1/greenhouse-effect>.

¹¹⁴ *Id.* at 00:00:53 time stamp.

¹¹⁵ *Action is Required to Avert Global Climate Shift*, Sect. A, N.Y. Times, Dec. 11, 1985, at 18, <https://www.nytimes.com/1985/12/11/us/action-is-urged-to-avert-global-climate-shift.html>.

¹¹⁶ The Greenhouse Effect: Hearing Before the Senate Env’t and Pub Works Subcomm., *supra* note 113, at 00:21:15.

¹¹⁷ *Id.*, at 00:17:05.

climate change “because the consequences of this continuing are nothing short of catastrophic for the human race and other living species.”¹¹⁸

60. In 1987, then-Senator Joe Biden introduced the Global Climate Protection Act of 1987, which acknowledged that “[t]here exists evidence that manmade pollution—the release of carbon dioxide, chlorofluorocarbons, methane, and other trace gases into the atmosphere—may be producing a long-term and substantial increase in the average temperature on Earth.”¹¹⁹ The Act did not pass on its own, but the language of the Act was included as a part of the Foreign Relations Authorization Act signed into law on December 12, 1987.¹²⁰

61. In 1988, James Hansen of NASA testified before the Senate that “[g]lobal warming is now large enough that we can ascribe with a high degree of confidence a cause and effect relationship to the greenhouse effect.”¹²¹

62. Also in 1988, the Global Warming Prevention Act of 1988 was proposed as a bill in the House.¹²² The bill proposed setting as a national goal “that the amount of carbon dioxide in the atmosphere be reduced from 1987 levels by at least 20 percent by the year 2005.”¹²³ The bill never reached the House floor for a vote.¹²⁴

63. In 1989, Congress introduced the Global Warming Prevention Act of 1989. It likewise never came to the floor for a vote.¹²⁵

¹¹⁸ See Philip Shabecoff, *Aide Sees Need to Head Off Global Warming*, N.Y. Times, June 12, 1986, at B8, <https://www.nytimes.com/1986/06/12/us/aide-sees-need-to-head-off-global-warming.html>.

¹¹⁹ Global Climate Protection Act of 1987, Pub. L. No. 100-204, 101 Stat. 1331, 1407–09 (1987), <https://uscode.house.gov/statviewer.htm?volume=101&page=1407#>.

¹²⁰ H.R. 1777: Foreign Relations Authorization Act, Fiscal Years 1988 and 1989, Pub. L. No. 100-204, 101 Stat. 1331 (1987), <https://www.congress.gov/bill/100th-congress/house-bill/1777>.

¹²¹ *Greenhouse Effect and Global Climate Change: Hearing Before the Comm. on Energy and Natural Resources*, 100th Cong. 39 (testimony of Dr. James Hansen) (1988), https://www.sealevel.info/Hansen.0623-1988_oral.pdf.

¹²² H.R. 5460: Global Warming Prevention Act of 1988, 100th Cong. (1988), <https://www.congress.gov/bill/100th-congress/house-bill/5460>.

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ H.R. 1078: Global Warming Prevention Act of 1989, 101st Cong. (1989), <https://www.congress.gov/bill/101st-congress/house-bill/1078>.

64. Also in 1989, EPA released a multi-volume report, *The Potential Effects of Global Climate Change on the United States: Report to Congress*, that discussed in depth the state of scientific knowledge of climate change, including its impacts on agriculture, sea level rise, air quality, and human health. In it, EPA noted that “[a]lthough there is consensus that increased greenhouse gas concentrations will change global climate, the rate and magnitude of change are not certain. . . . Uncertainties about climate feedbacks from clouds, vegetation, and other factors make it difficult to predict the exact amount of warming that a given level of greenhouse gases, such as doubled carbon dioxide (CO₂) concentrations, would cause. How quickly climate may change also is not known, because scientists are uncertain both about how rapidly heat will be taken up by the oceans and about some climate feedback processes. Generally, scientists assume that current trends in emissions will continue and that climate will change gradually over the next century, although at a much faster pace than historically.”¹²⁶

65. In 1990, Congress extended its funding and support for climate research programs by passing the Global Change Research Act of 1990, which established the United States Global Change Research Program with the aim of “understanding and responding to global change, including the cumulative effects of human activities and natural processes on the environment.”¹²⁷

66. In December of 1990, an EPA report to Congress titled *Policy Options for Stabilizing Global Climate* noted that “[a]lthough the specific rate and magnitude of future climate change are hard to predict, in the absence of policy responses the observed trends and projected increases in the atmospheric concentrations of greenhouse gases are likely to significantly alter the global climate during the next century.”¹²⁸ The report went on to state that “[t]he rate of greenhouse gas buildup during the next century will depend heavily on future patterns of economic and technological development, which are, in turn, influenced by policies of local, state, national, and

¹²⁶ Environmental Protection Agency, *The Potential Effects of Global Climate Change on the United States: Report to Congress*, xxv (1989), <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=50000WXR.txt>.

¹²⁷ S.B. 169, Global Change Research Act of 1990, Pub. L. No. 101-606, 104 Stat. 3096, <https://www.congress.gov/bill/101st-congress/senate-bill/169/text>.

¹²⁸ Environmental Protection Agency, *Policy Options for Stabilizing Global Climate: Report to Congress, Executive Summary*, 2 (1990), <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=91020OGO.txt>.

international institutions.”¹²⁹ The EPA report to Congress was clear that “[s]tabilizing emissions of greenhouse gases at current levels will not stabilize concentrations” and that “[d]rastic cuts in emissions would be required to stabilize atmospheric composition.”¹³⁰ The report concludes that “[i]f limiting U.S. and global emissions of greenhouse gases is desired, government action will be necessary” and that “Government policies, if applied globally, could significantly increase or decrease future warming.”¹³¹

67. In 1991, a report for the U.S. Navy noted: “Two of the principle effects of climate change - sea level rise and thermal heating of the oceans and atmosphere - present the possibility of significant effects on the facilities, infrastructures and operations of the Navy.”¹³²

68. Also in 1991, EPA and the State Department issued a report to Congress, titled *U.S. Efforts to Address Global Climate Change*, that described “[t]he current international scientific understanding and potential impacts of climate change and potential response strategies.” This report noted: “Because of the uncertainties associated with climate models and with future emissions, there is little consensus as to the magnitude of global warming or when or how rapidly it will take place.”¹³³

69. In 1992, the Energy Policy Act of 1992 passed and called for investigation into “the feasibility of reducing the generation of greenhouse gases” and the “stabilization and eventual reduction in the generation of greenhouse gases.”¹³⁴ The Act called for “a reduction in the Nation’s oil consumption from the 1990 level of approximately 40 percent of total energy use to 35 percent by the year 2005” as part of a least-cost energy strategy.¹³⁵

¹²⁹ Id.

¹³⁰ Id. at 7-8 (emphases in original).

¹³¹ Id. at 41 (emphases in original).

¹³² Terry P. Kelley, *Global Climate Change Implications for the United States Navy*, The U.S. Naval War College ii (1990), <http://documents.theblackvault.com/documents/weather/climatechange/globalclimatechange-navy.pdf>.

¹³³ Environmental Protection Agency, *U.S. Efforts to Address Global Climate Change: Report to Congress* (1991), <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=9101OZWK.txt>.

¹³⁴ H.R. 776: Energy Policy Act of 1992, 102nd Cong. (1992), <https://www.congress.gov/bill/102nd-congress/house-bill/776>.

¹³⁵ Id.

70. Also, in 1992, the Emergency Climate Stabilization and Earth Regeneration Act of 1992 was proposed, but did not pass into law.¹³⁶ The proposed bill stated: “In 1969 Congress recognized both the seriousness of climate change [in enacting NEPA],” and that “*Congress recognizes that basic information on climate change was developed in 1975 by the United States Committee for the Global Atmospheric Program.*”¹³⁷

71. Another bill addressing climate change was the 1992 Global Climate Protection Act, introduced in the U.S. House with a bipartisan coalition of 146 co-sponsors, but it, too, failed to become a law.¹³⁸ The bill proposed actions that would “achieve stabilization of CO₂ emissions by January 1, 2000.”¹³⁹ The motivation behind such a requirement was that “(1) man-made emissions of carbon dioxide (CO₂) are dramatically increasing the natural concentrations of this greenhouse gas in the Earth’s atmosphere; (2) the world’s leading scientific experts, including the Intergovernmental Panel on Climate Change and the United States National Academy of Sciences, have concluded that continued emissions of CO₂ and other greenhouse gases will lead to a warming of the global climate; [and] (3) such a change in global climate could increase the frequency and severity of hurricanes and droughts, have disastrous impacts on the planet’s agricultural productivity, flood coastal areas and wetlands, inundate drinking water supplies with salt water, devastate many of the planet’s natural ecosystems, cause serious human health impacts, and threaten the habitability of the Earth.”¹⁴⁰

72. The 1993 White House National Security Report noted, “[d]eforestation, climate change, air and water pollution, and depletion of water supplies have far-reaching effects on the capacity of countries to sustain economic growth and ensure a healthy environment for their

¹³⁶ H.R. 4154: Emergency Climate Stabilization and Earth Regeneration Act of 1992, 102nd Cong. (1992), <https://www.congress.gov/bill/102nd-congress/house-bill/4154>.

¹³⁷ Id.

¹³⁸ Global Climate Protection Act, H.R. 4750: 102nd Cong. (1992), <https://www.congress.gov/bill/102nd-congress/house-bill/4750>.

¹³⁹ Id.

¹⁴⁰ Id.

citizens. . . . Some problems, such as ozone depletion and climate change, can have a global impact.”¹⁴¹

73. On Earth Day in 1993, at Vice President Al Gore’s urging, President Bill Clinton committed the United States “to reducing our emissions of greenhouse gases to their 1990 levels by the year 2000.”¹⁴² Clinton stated: “We also must take the lead in addressing the challenge of global warming that could make our planet and its climate less hospitable and more hostile to human life.”¹⁴³

74. A 1996 White House National Security Report mentioned that “[t]he President developed a Climate Change Action Plan to help reduce greenhouse emissions at home and launched the U.S. Initiative on Joint Implementation to help reduce emissions abroad.”¹⁴⁴

75. The 1997, 1998, and 1999 National Security Strategies stated: “Environmental threats such as climate change, ozone depletion and the transnational movement of dangerous chemicals directly threaten the health of U.S. citizens.”¹⁴⁵ In 1997, EPA’s website included a page discussing climate change, noting “[t]he earth’s climate is predicted to change because human activities are altering the chemical composition of the atmosphere through the buildup of greenhouse gases—primarily carbon dioxide, methane, and nitrous oxide. The heat-trapping property of these gases is undisputed. Although uncertainty exists about exactly how earth’s climate responds to these gases, global temperatures are rising.”¹⁴⁶

¹⁴¹ The White House, *The National Security Strategy of the United States*, 11–12 (1993).

¹⁴² Richard Berke, *Clinton Declares New U.S. Policies for Environment*, N.Y. Times, April 22, 1993, at A1, A10, <https://www.nytimes.com/1993/04/22/world/clinton-declares-new-us-policies-for-environment.html>.

¹⁴³ President William Clinton, *Remarks on Earth Day*, Administration of William J. Clinton (April 21, 1993 in Weekly Compilation of Presidential Documents, 1993/Apr. 21, 1993 (1993)), <https://www.govinfo.gov/content/pkg/WCPD-1993-04-26/pdf/WCPD-1993-04-26-Pg630.pdf>.

¹⁴⁴ The White House, *A National Security Strategy of Engagement and Enlargement*, 7 (1996).

¹⁴⁵ The White House, *A National Security Strategy for a New Century*, 13 (May 1997); The White House, *A National Security Strategy for a New Century*, 13 (Oct. 1998); and The White House, *A National Security Strategy for a New Century*, 13 (Dec. 1999).

¹⁴⁶ Environmental Protection Agency, *The Climate System*, EPA.gov, <https://web.archive.org/web/19971114004552/http://www.epa.gov:80/globalwarming/climate/index.html>.

76. In 1997, a United Nations Framework Convention on Climate Change (“UNFCCC”) meeting took place in Kyoto, Japan, during which the Kyoto Protocol was adopted.¹⁴⁷ The UNFCCC meeting committed industrialized countries to limit their greenhouse gas emissions.¹⁴⁸ The Kyoto Protocol’s emissions mandate did not apply to developing countries, such as China, which, in 1997, was the 2nd largest emitter of greenhouse gasses globally, India, then the 4th largest emitter, and South Korea, then the 8th largest emitter.¹⁴⁹

77. In July 1997, however, the U.S. Senate unanimously passed (95-0) the Byrd-Hagel Resolution, which stated that the United States should not be a signatory to any UNFCCC agreement that did not mandate “new specific scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country Parties.”¹⁵⁰ As a result, the U.S. Congress never ratified the Kyoto Protocol.¹⁵¹

78. Before voting on the Byrd-Hagel resolution, Senator Byrd (D-WV) said that “any effort to avoid the effects of global climate change will be doomed to failure from the start without the participation of the developing world, particularly those nations that are rapidly developing and will rapidly increase their carbon dioxide and other greenhouse gas emissions. . . . If the treaty does not commit the developing nations like China to binding commitments, there will be no incentive for China and the other nations of the developing world to make responsible and environmentally sound choices as they develop.”¹⁵²

¹⁴⁷ UNFCCC, *What is the Kyoto Protocol?*, United Nations Climate Change, https://unfccc.int/kyoto_protocol.

¹⁴⁸ *Id.*

¹⁴⁹ CAIT Climate Data Explorer, *Global Historical Emissions*, World Resources Institute, <https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters>. This ranking is excluding LUCF, a measure of greenhouse gas emissions attributable to forest and land-use change activities. Due to a lack of LUCF data prior to 1990, historical analyses mainly exclude LUCF in order to have comparable analyses. See Johannes Friedrich and Thomas Damassa, *The History of Carbon Dioxide Emissions*, World Resources Institute (2014), <https://www.wri.org/insights/history-carbon-dioxide-emissions>.

¹⁵⁰ S. Res. 98, 105th Cong. (1997–1998), <https://www.congress.gov/bill/105th-congress/senate-resolution/98>.

¹⁵¹ Paul Reynolds, *Kyoto: Why did the US pull out?*, BBC News, Mar. 30, 2001, <http://news.bbc.co.uk/2/hi/americas/1248757.stm>.

¹⁵² *Expressing Sense of Senate Regarding U.N. Framework Convention on Climate Change*, Congressional Record Vol. 143, No. 107, S8117 (1997), <https://www.congress.gov/congressional-record/1997/07/25/senate-section/article/S8113-6>.

79. In March 1998, Dr. Janet Yellen testified before the Senate Committee on Agriculture, Nutrition, and Forestry on the economics of the Kyoto Protocol.¹⁵³ Dr. Yellen discussed the costs of emissions reductions to meet the Kyoto Protocol targets on the average American household as estimated to result in “an increase in energy prices between 2008 and 2012 at the household level of between 3 and 5 percent, an increase in fuel oil prices of about 5 to 9 percent, natural gas prices of 3 to 5 percent, gasoline prices of 3 to 4 percent (or around 4 to 6 cents per gallon), and electricity prices of 3 to 4 percent. This increase in energy prices at the household level would raise the average household’s energy bill in ten years by between \$70 and \$110 per year.”¹⁵⁴

80. Each of the Clinton, George W. Bush, and Obama administrations declined to submit the Kyoto Protocol to the Senate for ratification.¹⁵⁵

81. In September of 1998, EPA issued a report titled “Climate Change And Hawaii” that described the threat of climate change to Hawai‘i’s ecosystem, agriculture, water resources, coastal areas (including sea level rise), and resident health. That report notes that “[a]lthough there is uncertainty about how and when the earth[’]s climate will respond to enhanced concentrations of greenhouse gases, observations indicate that detectable changes are underway.”¹⁵⁶

82. In 2001, the National Energy Policy Development Group, which was established in 2001 by the President Bush and included a group of cabinet-level and other senior administration officials, chaired by Vice President Cheney,¹⁵⁷ issued a report finding that “[e]nergy-related activities are the primary sources of U.S. man-made greenhouse gas emissions, representing about

¹⁵³ Janet Yellen, *Statement on the Economics of the Kyoto Protocol before the Committee on Agriculture, Nutrition, and Forestry*, U.S. Senate, March 5, 1998, https://1997-2001.state.gov/policy_remarks/1998/980305_yellen_climate.html.

¹⁵⁴ Id.

¹⁵⁵ William Nordhaus and Joseph Boyer, *Requiem for Kyoto: An Economic Analysis of the Kyoto Protocol*, Cowles Foundation for Research in Economics at Yale University (Oct. 22, 1998), <https://cowles.yale.edu/sites/default/files/files/pub/d12/d1201.pdf>.

¹⁵⁶ Environmental Protection Agency, *Climate Change Hawaii* (1998) <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=40000PR6.txt>.

¹⁵⁷ U.S. General Accounting Office, *Energy Task Force: Process Used to Develop the National Energy Policy* (Aug. 2003), <https://www.gao.gov/assets/gao-03-894.pdf>.

85% of the U.S. man-made total carbon equivalent emissions in 1998.”¹⁵⁸ The report further noted that “[t]he United States recognizes the seriousness of this global issue as scientists attempt to learn more about climate change,”¹⁵⁹ and that “[t]he President is committed to addressing the issue of global climate change in a manner that protects our environment and economy.”¹⁶⁰ The report recommended “that the President direct federal agencies to support continued research into global climate change . . . and cooperate with allies . . . to address the issue of global climate change.”¹⁶¹ Also in debating the resolution, then-Senator John Kerry (D-MA), who is now President Biden’s Chief Special Envoy for Climate, said: “The notion that China or India or other enormously rapidly developing countries . . . are going to somehow later negotiate their participation I think is contrary to common sense. . . . As a matter of global and national environmental protection, the global warming issue is not going to be able to be addressed effectively if any major emitting nation or group of nations stays outside the agreement.”¹⁶²

83. Later, in 2001, a resolution called for Congress to acknowledge that “the United States should develop, promote, and implement, at the earliest possible time, policies to reduce domestic emissions of fossil fuel generated carbon dioxide and other greenhouse gases,” and specifically referenced that the IPCC “has found that most of the observed warming over the last fifty years is attributable to human activities, including fossil-fuel generated carbon dioxide emissions.”¹⁶³ The resolution had 66 co-sponsors and never came to the floor for a vote.¹⁶⁴

¹⁵⁸ National Energy Policy Development Group, National Energy Policy: Report of the National Energy Policy Development Group, 3–10 (May 2001).

¹⁵⁹ *Id.* at 3–11.

¹⁶⁰ *Id.* at 8–15.

¹⁶¹ *Id.* at 8–16.

¹⁶² *Expressing Sense of Senate Regarding U.N. Framework Convention on Climate Change*, Congressional Record Vol. 143, No. 107, S8120 (1997), <https://www.congress.gov/congressional-record/1997/07/25/senate-section/article/S8113-6>.

¹⁶³ *Expressing the Sense of Congress that the United States Should Develop, Promote, and Implement Policies to Reduce Emissions of Fossil Fuel Generated Carbon Dioxide with the Goal of Achieving Stabilization of Greenhouse Gas Emissions in the United States at the 1990 Level by the Year 2010*, H. R. Res. 117107th Cong. (2001), <https://www.congress.gov/bill/107th-congress/house-resolution/117>.

¹⁶⁴ *Id.*

84. In 2002, the National Greenhouse Gas Emissions Inventory Act was proposed to “amend the Clean Air Act to establish an inventory, registry, and information system of United States greenhouse gas emissions to inform the public and private sectors concerning, and encourage voluntary reductions in, greenhouse gas emissions.”¹⁶⁵ A nearly identical bill was introduced the following year.¹⁶⁶ Neither bill ever came to the floor for a vote.¹⁶⁷

85. In 2002, EPA issued its “Guide to Climate Change,” stating that “[o]ne of the most important environmental issues facing the world today is climate change. The Earth’s surface is becoming warmer, and evidence is mounting that human activities are likely contributing to the warming trend. Still, uncertainties exist about exactly how much of the warming is due to human activities, whether recent temperature trends are truly outside the range of natural climate variability, and the effect that warming could have on our climate, lives, and habitat.” It went on to note that “[i]mportant scientific questions remain about how much warming will occur, how fast it will occur, and the degree to which humans and ecosystems will be affected by its potential effects. Further progress in resolving these issues poses a number of scientific challenges.”¹⁶⁸

86. In 2003, the Climate Stewardship Act of 2003 proposed to limit the amount of greenhouse gas emissions from the electricity generation, transportation, industrial, and commercial economic sectors to 2000 levels.¹⁶⁹ It was co-sponsored by Senator John McCain (R-AZ) and Senator Joseph Lieberman (D-CT).¹⁷⁰ The Act was defeated in the U.S. Senate by a vote of 55 to 43, which included ten Democrats voting against.¹⁷¹

¹⁶⁵ National Greenhouse Gas Emissions Inventory Act of 2002, H.R. 4611 107th Cong. (2002), <https://www.congress.gov/bill/107th-congress/house-bill/4611>.

¹⁶⁶ National Greenhouse Gas Emissions Inventory Act of 2003, H.R. 1245 108th Cong., (2003), <https://www.congress.gov/bill/108th-congress/house-bill/1245>.

¹⁶⁷ *Supra* notes 165 and 166.

¹⁶⁸ Environmental Protection Agency, EPA’s Guide to Climate Change: Answers to Commonly Asked Questions – What Individuals Can do to Help Reduce Risk (2002), <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00000LZJ.txt>.

¹⁶⁹ Climate Stewardship Act of 2003, S. 139, 108th Cong. (2003), <https://www.congress.gov/bill/108th-congress/senate-bill/139>.

¹⁷⁰ *Id.*

¹⁷¹ *Id.*

87. The Safe Climate Act of 2007 was proposed in Congress to direct the EPA to set “targets for a 2% reduction in greenhouse gas emissions each year from 2010-2050,” as well as introduce regulations to meet such targets, including “setting caps on emissions of sources and sector . . . and authorizing trading of emission allowances.”¹⁷² The proposed legislation had 155 co-sponsors, but never came to the floor for a vote.¹⁷³

88. In 2010, the *Quadrennial Defense Review Report* of 2010 contained a section on Crafting a Strategic Approach to Climate and Energy.¹⁷⁴ The report warned that “climate change will shape the operating environment, roles, and mission that we undertake.”¹⁷⁵ The report noted that “climate-related changes are already being observed in every region of the world, including the United States and its coastal waters. Among these physical changes are increases in heavy downpours, rising temperature and sea level, rapidly retreating glaciers, thawing permafrost, lengthening growing seasons, lengthening ice-free seasons in the oceans and on lakes and rivers, earlier snowmelt, and alterations in river flows.”¹⁷⁶ The report warned that “climate change could have significant geopolitical impacts around the world, contributing to poverty, environmental degradation, and the further weakening of fragile governments. Climate change will contribute to food and water scarcity, will increase the spread of disease, and may spur or exacerbate mass migration.”¹⁷⁷ The Department of Defense also announced early steps to enhance energy efficiency, reduce fossil fuel usage, and develop greener alternatives while balancing the need for energy security.¹⁷⁸

89. As late as 2012, the “Climate Change – Science” page of EPA’s website indicated: “As with any field of scientific study, there are uncertainties associated with the science of climate

¹⁷² Safe Climate Act of 2007, H.R. 1590, 110th Cong. (2007), <https://www.congress.gov/bill/110th-congress/house-bill/1590>.

¹⁷³ *Id.*

¹⁷⁴ U.S. Department of Defense, *Quadrennial Defense Review Report*, 84 (Feb. 2010).

¹⁷⁵ *Id.*

¹⁷⁶ *Id.*

¹⁷⁷ *Id.* at 85.

¹⁷⁸ *Id.* at 87–88.

change. This does not imply that scientists do not have confidence in many aspects of climate science. Some aspects of the science are known with virtual certainty, because they are based on well-known physical laws and documented trends. Current understanding of many other aspects of climate change ranges from ‘very likely’ to ‘uncertain.’”¹⁷⁹ That same page went on to note that “[s]cientists know with virtual certainty that: Human activities are changing the composition of Earth’s atmosphere” and “[t]he atmospheric buildup of CO₂ and other greenhouse gases is largely the result of human activities such as the burning of fossil fuels.”¹⁸⁰ Nonetheless, EPA noted that “[i]mportant scientific questions remain about how much warming will occur, how fast it will occur, and how the warming will affect the rest of the climate system including precipitation patterns and storms.”¹⁸¹

90. In 2015, under the Obama administration, the United States agreed to the Paris Agreement, which aimed to limit global temperature increase to 1.5 to 2 °C above preindustrial levels.¹⁸² The United States played a key role in the negotiations, “cajoling reluctant countries to adopt more ambitious goals, shaping the architecture of a new agreement and trumpeting its own ambitious commitments as an example of climate responsibility.”¹⁸³ The agreement was, however, non-binding as to the United States, as it lacked Senate ratification.¹⁸⁴ During the 2016 presidential campaign, Donald Trump promised to “cancel” the Paris Agreement if elected.¹⁸⁵ In 2019, the

¹⁷⁹ Environmental Protection Agency, *Climate Change – Science*, EPA.GOV, <https://web.archive.org/web/20120514212814/http://www.epa.gov/climatechange/science/stateofknowledge.html>.

¹⁸⁰ *Id.*

¹⁸¹ *Id.*

¹⁸² UNFCCC, *The Paris Agreement*, United Nations Climate Change, <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.

¹⁸³ Bob Sussman, *The U.S. finds its voice on climate change after two decades of failed diplomacy*, Brookings (Nov. 24, 2015), <https://www.brookings.edu/blog/planetpolicy/2015/11/24/the-u-s-finds-its-voice-on-climate-change-after-two-decades-of-failed-diplomacy/>.

¹⁸⁴ Jessica Durney, *Defining the Paris Agreement: A Study of Executive Power and Political Commitments*, 11(3) Carbon & Climate L. Rev. 234–42 (2017).

¹⁸⁵ Benjy Sarlin, *Donald Trump Pledges to Rip Up Paris Climate Agreement in Energy Speech*, NBC News (May 26, 2016), <https://www.nbcnews.com/politics/2016-election/donald-trump-pledges-rip-paris-climate-agreement-energy-speech-n581236>.

Trump administration formally notified the United Nations of its intention to withdraw from the agreement.¹⁸⁶ In 2021, the Biden administration rejoined the Paris Agreement.¹⁸⁷

B. The Federal Government Has Spent More than \$154 Billion for Activities to Analyze and Understand Climate Change

91. The federal government has been at the forefront of efforts and funding to analyze and understand climate change and its potential impacts. Contrary to any suggestion that the Chevron Defendants undertook “immense internal investment in research” (Compl. ¶7) and that “the fossil fuel industry was at the forefront of carbon dioxide research for much of the latter half of the 20th Century” (*id.* ¶84), any private investments into climate research represent, at most, a tiny fraction of the aggregate spending on climate study and research by the federal government.

92. The federal government has funded the study of climate change since the 1950s, when the U.S. Weather Bureau managed federal funding for climate research as part of its program focused on “inadvertent climate modification.”¹⁸⁸ Funds associated with that initiative helped establish Charles Keeling’s program of carbon dioxide measurements at the Mauna Loa observatory in 1958.¹⁸⁹

93. By the mid-1960s, “a variety of government agencies together spent roughly \$50 million a year for all aspects of meteorological research,” which included a “few percent” for climate change studies.¹⁹⁰

94. Federal spending on climate change grew rapidly in the 1970s. The budget for the “global monitoring of climate change,” which included research into the greenhouse effect,

¹⁸⁶ *Paris Climate Accords: US Notifies UN of Intention to Withdraw*, BBC News (Nov. 5, 2019), <https://www.bbc.com/news/world-us-canada-50297029>.

¹⁸⁷ Press Release, Anthony Blinken, *The United States Officially Rejoins the Paris Agreement*, U.S. Dep’t of State (Feb. 19, 2021), <https://www.state.gov/the-united-states-officially-rejoins-the-paris-agreement/>.

¹⁸⁸ Spencer Weart, *Money for Keeling: Monitoring CO2 Levels*, 37 *Historical Studies in the Physical and Biological Sciences* 435, 445 (2007), <https://library.ucsd.edu/scilib/hist/weart%20money%20for%20keeling.pdf>.

¹⁸⁹ Peter Shulman, *Linking Energy and Climate (before 1974)*, 1 *WIREs Climate Change* 773, 780 (2010), <https://onlinelibrary.wiley.com/doi/epdf/10.1002/wcc.78>.

¹⁹⁰ Weart, *supra* note 188, at 443.

increased by 400 percent between 1971 and 1975.¹⁹¹ The passage of the 1978 National Climate Program Act included a \$50 million annual budget for climate-related research projects.¹⁹² By the late 1970s, funding for climate research had transitioned from meteorology into a well-funded initiative of the U.S. Department of Energy under its “Carbon Dioxide Research and Assessment Program.”¹⁹³

95. Federal funding for climate science research increased under the Reagan administration (1981–1989).¹⁹⁴ In 1989, Reagan “proposed \$190.5 million for 1990 research on global warming and depletion of Earth’s ozone layer – up more than 30 percent from this year [1989].”¹⁹⁵ In 1990, the U.S. Global Change Research Program (“USGCRP”) was created to coordinate interagency research into global climate change.¹⁹⁶ The USGCRP budget surpassed \$1 billion during its first year.¹⁹⁷

96. Under the George H. W. Bush administration (1989–1993), the USGCRP consistently received an annual budget of over \$1.5 billion. In his 1990 remarks to the IPCC, President George H. W. Bush highlighted that his 1991 budget proposal included an increase in USGCRP funding “by nearly 60 percent.”¹⁹⁸

¹⁹¹ *Id.*

¹⁹² Myanna H. Lahsen and Paul N. Edwards, *Chapter 6: Climate Science and Politics in the United States*, 12 (University of Michigan Press, Feb. 2014), <http://pne.people.si.umich.edu/PDF/PMNPC/USA.pdf>.

¹⁹³ *Id.* at 13.

¹⁹⁴ Henry Lambright, *The Rise and Fall of Interagency Cooperation: The U. S. Global Change Research Program*, 57 *Pub. Admin. Rev.* 36–44 (1997).

¹⁹⁵ George Lobsenz, *Reagan Calls for Expanded Research on Climate Change*, UPI, Jan. 9, 1989, <https://www.upi.com/Archives/1989/01/09/Reagan-calls-for-expanded-research-on-climate-change/3118600325200/>.

¹⁹⁶ Lambright, *supra* note 194. See also Climate Change Science Program, *Our Changing Planet: The Fiscal Year 1996 U.S. Global Change Research Program and Climate Change Research Initiative – A Report by the Climate Change Science Program and the Subcommittee on Global Change Research* (1996), <https://downloads.globalchange.gov/ocp/ocp2003/ocp2003.pdf>.

¹⁹⁷ Lambright, *supra* note 194.

¹⁹⁸ President George H.W. Bush, *Remarks to the Intergovernmental Panel on Climate Change*, The American Presidency Project, (Feb. 5, 1990), <https://www.presidency.ucsb.edu/documents/remarks-the-intergovernmental-panel-climate-change>.

97. The USGCRP budget increased under President Clinton as well (1993–2001).¹⁹⁹ President Clinton’s Climate Change Action Plan included \$1.9 billion in new and redirected federal funding from 1994 to 2000 and promised to leverage over \$60 billion in private investment for environmental technologies.²⁰⁰

98. In July 2001, President Bush (2001–2009) proposed “to provide the National Aeronautics and Space Administration (NASA) with \$US120 million over three years to upgrade its ability to carry out state-of-the-art climate change research.”²⁰¹

99. In total, according to a 2018 Office of Management and Budget Report to Congress, “[s]ince 1993, the federal government has reported over \$154 billion in funding for activities to understand and address climate change,” a figure which includes funding for clean energy technology, science, and international assistance (Figure 2).²⁰² The U.S. Government Accountability Office (“GAO”), using reports published by the Office of Management and Budget, estimated that “federal climate change funding in nominal dollars increased from about \$2.4 billion across 10 agencies in fiscal year 1993 to about \$13.2 billion across 19 agencies in proposed budget authority for fiscal year 2017.”²⁰³

¹⁹⁹ Roger Pielke Jr., Policy History of the US Global Change Research Program: Part I. Administrative development, 1 *Global Environmental Change* 10, 9-25 (2000).

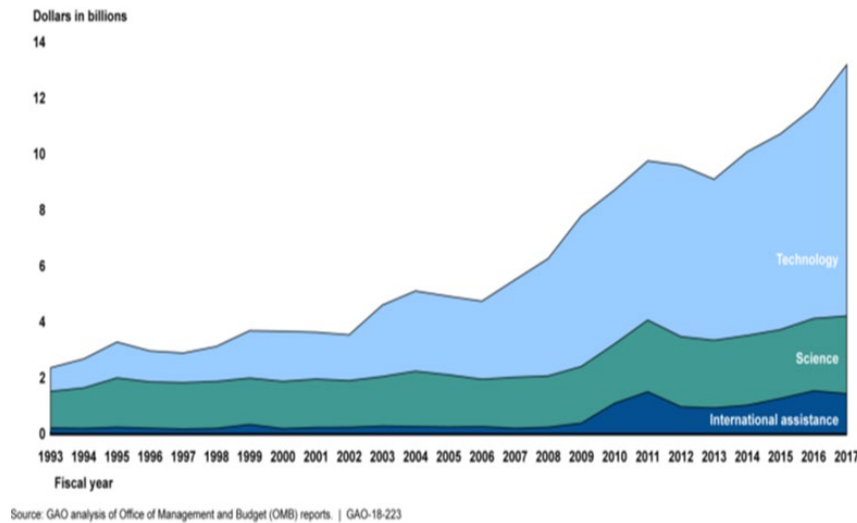
²⁰⁰ Sharon Tisher, *A Climate Chronology* 35 (2020), <https://umaine.edu/soe/wpcontent/uploads/sites/199/2020/03/Climate-Chronology-January-2020.pdf>.

²⁰¹ Maurie Cohen & Anne Egelston, *The Bush Administration and Climate Change: Prospects for an Effective Policy Response*, 5 *J. of Env'tl. Pol'y and Plan.* 322 (Dec. 2013), <https://researchwith.njit.edu/en/publications/the-bush-administration-and-climate-change-prospects-for-an-effec>.

²⁰² U.S. Government Accountability Office, *Climate Change: Analysis of Reported Federal Funding*, 31 (GAO-18-223) (2018), <https://www.gao.gov/assets/gao-18-223.pdf> (emphasis added).

²⁰³ *Id.* at 58.

Figure 2: Federal Climate Change Funding by Category Fiscal Years 1993-2017



C. Hawai‘i and Honolulu Officials Have Known of and Studied the Topic of Climate Change and the Link to Fossil Fuel Emissions for Decades

100. Any suggestion that the Chevron Defendants attempted to suppress awareness of climate change is also belied by Hawai‘i’s own long history of climate initiatives and public statements by elected Hawai‘i officials and legislators.

101. In 1968, Hawai‘i Senator Spark Matsunaga acknowledged the potential damages associated with global warming and the need for more research on the topic:

In a broader view, nations, continents, or even the entire planet, may be considered to be a large and complex ecosystem in which man and his activities play an important role. On a planetary scale, there are a number of disturbing theories concerning the effects of man’s activities on the ecology of the Earth. For example, there are theories that large-scale emission of carbon dioxide is *warming the climate, or, conversely, that the emission of exhaust gases from jet airplanes into the upper atmosphere is cooling the climate*. . . . None of these theories has been proven to be either true or false, but the mere fact that these possibilities exist serves to underline our ignorance in the field of ecology and our need for more knowledge and more study in this relatively neglected science.²⁰⁴

102. Hawai‘i studied the link between fossil fuels and climate change itself in the 1980s. In 1984, Hawai‘i lawmakers requested “a study of the worldwide greenhouse effect on Hawaii’s

²⁰⁴ Environmental Quality: Hearing on H.R. 14605 Before the S. Comm. on Science, Research, & Dev. of the Comm. on Science & Astronautics, 90th Cong. 430–33 (1968) (statement of Sen. Spark M. Matsunaga, Member, Hawai‘i).

coastal developments” and noted “the greenhouse effect” “has long been a concern to scientists.”²⁰⁵ The 1985 report prepared in response to that request specifically noted a “shift[]” over the prior two decades “from questioning the possibility that the ‘Greenhouse Effect’ would occur to whether the effect will be mild or severe and the timeframe for its imminent occurrence.”²⁰⁶ That report further stated that “[t]he situation continues to be aggravated by the use of fossil fuels for energy generation.”²⁰⁷ As noted below in Section III(B), that report was featured on the front page of the *Hawaii Tribune-Herald* on January 29, 1985 under the headline “‘Greenhouse Effect’ may flood Honolulu.”²⁰⁸

103. That the State of Hawai‘i has long known about the issue of climate change is confirmed in a 2020 design study funded by the State of Hawai‘i Office of Planning & University of Hawai‘i Community Design Center.²⁰⁹ The two-year study, which was focused on proposing sustainable planning and climate-resilient design along the south shore of the urban center of Honolulu, notes that the State of Hawai‘i had prepared a report on sea level rise issues as early as 1985, “followed by national and local policy guidance reports related to projected sea level rise, coastal hazards, and land use and adaptation planning.”²¹⁰ The report recognizes that the State of Hawai‘i and local jurisdictions failed to act for many years despite this early knowledge: “*why did we not initiate adaptation planning for climate change in the 1980s if we knew about sea level rise then? Local trends in climate change-related policy and planning appear to have followed international trends of inaction.*”²¹¹

²⁰⁵ Requesting a Study of the Worldwide Greenhouse Effect on Hawaii’s Coastal Environments, S. Res. 137 (HI. 1984).

²⁰⁶ Hawaii Coastal Zone Mgmt. Program, Dep’t of Planning & Econ. Dev., *Effects on Hawaii of a Worldwide Rise in Sea Level Induced by the ‘Greenhouse Effect,’* 2 (Jan. 1985), <http://planning.hawaii.gov/wp-content/uploads/2013/04/Sea-Level-Rise-Effects-on-Hawaii-1985.pdf>.

²⁰⁷ *Id.* at 4.

²⁰⁸ ‘Greenhouse Effect’ May Flood Honolulu, *Hawaii Tribune-Herald*, January 29, 1985, at 1.

²⁰⁹ State of Hawai‘i Office of Planning & University of Hawai‘i Community Design Center, *The South Shore Promenade and Coastal Open Space Network Study: Resilience and Connectivity by Design* (Nov. 2020), https://drive.google.com/file/d/1gwMjBHapfiMjHI5k_3CbJ44ruCI6JO2r/view.

²¹⁰ *Id.* at 12.

²¹¹ *Id.* (emphasis added).

104. In 1988, Hawai‘i Senators Daniel Inouye and Spark Matsunaga co-sponsored the National Energy Policy Act of 1988 aimed at combating global warming, including reducing carbon dioxide emissions 20% by 2000.²¹² The bill was not enacted.

105. In 1990, Roger Ulveling, Director of Hawai‘i’s Department of Business and Economic Development and the State’s energy resource coordinator stated: “By continuing our efforts to reduce the state’s dependency on fossil fuels for generating electrical power, Hawai‘i will become a national leader in reducing its contribution to the problem of global warming.”²¹³ Also in 1990, Governor John Waihee developed a ten-point energy initiative outlining Hawai‘i’s need to take advantage of its wealth of non-fossil fuel technologies, observing that “[w]orld conditions ranging from global warming to war in the Middle East compel us to do far more to cut our dependency on oil by developing indigenous energy sources.”²¹⁴

106. In 1992, Senator Daniel Akaka made multiple statements regarding global warming and expressed his concerns for the safety of many Pacific islands: “Unless we implement a strategy to combat the threat of global warming, the only solution for many Pacific islands will be to start handing out snorkels. . . . As members of a global community, we have a special responsibility to acknowledge the harmful effects of our actions on the Earth’s atmosphere. . . . Global warming knows no borders, it impacts the planet as a whole, and no nation can claim immunity.”²¹⁵ He also emphasized that, “[w]ithout question, global climate change will be a paramount environmental concern for the balance of this decade and throughout the 21st century.”²¹⁶

107. The State of Hawai‘i, led by State of Hawai‘i Department of Business, Economic Development & Tourism’s Energy, Resources and Technology Division and the Department of Health’s Clean Air Branch, “initiated its Hawaii Climate Change Action Program in 1996, in

²¹² See *First 2 ‘Greenhouse’ Bills Propose Major Shifts in U.S. Energy Sources*, Honolulu Advertiser, July 29, 1988. See also National Energy Policy Act of 1988, H.R. 5380, 100th Cong. (1988), <https://www.govtrack.us/congress/bills/100/hr5380>.

²¹³ Dave Harada-Stone, *Criticism and Praise for State Energy Policies*, Hawaii Tribune-Herald, Jun. 6, 1990.

²¹⁴ Jim Berg, *Hussein may send Isles alternative-energy boom*, Honolulu Advertiser, Aug. 19, 1990.

²¹⁵ Akaka Warns Of Isle Harm From Global Warming Trend, Hawaii Tribune-Herald, May 10, 1992.

²¹⁶ Peter Wagner, *Senate Applies Heat On Climate*, Honolulu Star-Tribune, May 27, 1992.

recognition of the fact that Hawaii faces many potential consequences from global warming and climate change.”²¹⁷ Thereafter, a Climate Change Action Plan Workshop was hosted in 1997 “to obtain citizen input on Hawaii’s goals and suggestion for emission reduction measures,” and the State announced its Climate Change Action Plan in 1998.²¹⁸ The 1998 Action Plan stated: “*Hawaii faces many potential negative consequences from global warming and climate change. Higher temperatures could make Hawaii less of a paradise, not only due to the greater heat, but also due to potential effects on climate. Greater heat may cause more heat-related mortality. Concentrations of ground-level ozone could increase, causing respiratory illnesses. Warmer seas could enhance growth of toxic algae and bacterial contamination of coastal waters. Warmer weather could expand the habitat of disease-carrying insects to Hawaii. Sea level rise is occurring and could lead to coastal flooding, erosion of beaches, and saltwater contamination of drinking water. During storms, additional areas will become vulnerable to waves and storm surge. In addition, Hawaii can expect negative effects on its water resources, agriculture, forests, and ecosystems.*”²¹⁹

108. In 2001, Honolulu Mayor Jeremy Harris published an editorial acknowledging global warming and criticizing President Bush for ignoring its threat: “Anyone living on an island or low-lying area ought to be worrying about global warming Add global warming’s catastrophic impact on agricultural production and public health, and the magnitude of this environment threat starts to become chillingly clear. Make no mistake, global warming has begun.”²²⁰

109. In 2001, in a Senate speech relating to President Bush’s decision not to institute mandatory caps on the emission of carbon dioxide from power plants, Hawai‘i Senator Daniel

²¹⁷ State of Hawai‘i, *Hawaii Energy Strategy 2000*, at 1–4 (Jan. 2000), <http://www.hawaiicleanenergyinitiative.org/storage/hes2000.pdf>.

²¹⁸ State of Hawai‘i, *Hawaii Climate Change Action Plan* (Nov. 1998), <https://planning.hawaii.gov/wp-content/uploads/2016/06/HawaiiActionPlan1998.pdf>.

²¹⁹ *Id.* (emphasis added).

²²⁰ Jeremy Harris, *Global Warming Is Coming Our Way*, Honolulu Advertiser, May 4, 2001.

Akaka stated that “the expected rise in the sea level could cause flooding of low lying property, loss of coastal wetlands, beach erosion, saltwater contamination of drinking water, and damage to coastal roads and bridges.”²²¹ He further noted that “the effects of major global climate change on the U.S. and the rest of the world will be devastating. . . . As an island state with limited land mass, [Hawai‘i] [is] very sensitive to global climate changes. The worldwide problem of greenhouse gases threatens Hawaii. Honolulu’s average temperature has increased by 4.4 degrees over the last century. By 2100, average temperatures in Hawaii could increase by three to five degrees Fahrenheit in all seasons and slightly more in the fall. Rainfall has decreased by about 20 percent over the past 90 years.”²²²

110. In 2003, Mayor Harris joined over 150 other mayors urging the federal government to support efforts to reduce global warming: “Honolulu is one of many cities across the country embracing sustainable practices aimed at reducing greenhouse gas emissions—a primary cause of global warming. . . . By joining forces with other mayors to encourage state and national governments to address the challenge of global warming, we hope to increase public awareness of an issue critical to the survival of our planet.”²²³

111. Also in 2003, in co-sponsoring the federal Climate Stewardship Act of 2003, which would have capped 2010 carbon dioxide emissions at the 2000 level, Hawai‘i Senator Daniel Akaka argued for action on global climate change: “We must take this first, critical step to stabilize greenhouse gas emissions in the United States. If we fail to address the issue of climate change now, the U.S. may have to face catastrophic and expensive consequences. A relatively small investment today is far wiser than spending vast amounts in the future to replace destroyed homes and infrastructure, restore altered ecosystems, and reinvest in collapsed agriculture economies. . . .

²²¹ 147 Cong. Rec. S4413-S4414 (May 7, 2021) (statement of Senator Akaka), <https://www.govinfo.gov/content/pkg/CREC-2001-05-07/html/CREC-2001-05-07-pt1-PgS4413-2.htm>; *see also*, Mark Schrope, *Bush U-Turns on Pledge for Carbon Dioxide Emissions*, *Nature* 410, Mar. 22, 2001, <https://www.nature.com/articles/35068695>.

²²² 147 Cong. Rec. S4413-S4414 (May 7, 2021) (statement of Senator Akaka), <https://www.govinfo.gov/content/pkg/CREC-2001-05-07/html/CREC-2001-05-07-pt1-PgS4413-2.htm>

²²³ *155 Mayors in United Stand*, *Honolulu Advertiser*, Oct. 30, 2003.

The United States has the technological capabilities and intellectual resources to lead the world in an effort to reduce future greenhouse gas emissions.”²²⁴

112. In 2005, Honolulu Mayor Mufi Hannemann became one of the first mayors to sign the U.S. Mayors Climate Protection Agreement, pledging to cut emissions of greenhouse gases.²²⁵ Later, in 2007, Mayor Hannemann unveiled a comprehensive, ten-year sustainability plan with the goal of making Honolulu more self-sufficient and sustainable.²²⁶ The plan included an Energy and Sustainability Task Force created “to coordinate, set goals, collaborate and work together as a team on sustainable operations on an ongoing basis.”²²⁷ Also in 2007, Senators Daniel Inouye and Daniel Akaka co-sponsored the Global Warming Pollution Reduction Act, which was not enacted. The bill directed EPA to set out targets and requirements to reduce U.S. pollution emissions.²²⁸

113. In 2007, acknowledging that “climate change poses a serious threat to the economic well-being, public health, natural resources, and the environment of Hawaii,” the Hawai‘i State legislature passed the Global Warming Solutions Act, capping greenhouse gas emissions to the 1990 level by 2020.²²⁹ Section 1 of the enacted legislation states: “The legislature finds that Earth’s atmosphere is now warming at the fastest rate in recorded history, a trend that is projected to cause extensive damage to forests, marine ecosystems, and agriculture. Human communities are also threatened by climate change as seas rise, storms become more intense, and episodes of drought and flooding increase. The scientific evidence is now compelling that recent climate change is caused at least in part by human activities, especially the burning of fossil fuels, which has driven atmospheric carbon dioxide concentrations to their highest levels in four hundred

²²⁴ Cong. Rec., S. 13484 (Oct. 29, 2003), <https://www.congress.gov/crec/2003/10/29/CREC-2003-10-29-pt1-PgS13484-2.pdf>. See also Climate Stewardship Act of 2003, S. 139, 108th Cong. (2003–2004), <https://www.congress.gov/bill/108th-congress/senate-bill/139/cosponsors?searchResultViewType=expanded&KWICView=false>.

²²⁵ Mufi Hannemann, *Mayor’s Message: 21st-Century Vision Includes Alternative Fuels, Recycling*, Honolulu Star-Tribune, Sept. 16, 2007, <http://archives.starbulletin.com/2007/09/16/editorial/commentary3.html>.

²²⁶ *Id.*

²²⁷ *Id.*

²²⁸ See Global Warming Pollution Reduction Act, S. 309, 110th Cong. (2007–2008).

²²⁹ State of Hawai‘i Office of Planning and Sustainable Development, *Adapting to Climate Change*, <https://planning.hawaii.gov/czm/initiatives/adapting-to-climate-change-2/>.

twenty thousand years [C]limate change poses a serious threat to the economic well-being, public health, natural resources, and the environment of Hawaii. The potential adverse effects of global warming include a rise in sea levels resulting in the displacement of businesses and residences and the inundation of Hawaii’s freshwater aquifers, damage to marine ecosystems and the natural environment, extended drought and loss of soil moisture, an increase in the spread of infectious diseases, and an increase in the severity of storms and extreme weather events.”²³⁰

114. In 2008, Mayor Hannemann noted that “[f]or Honolulu the impact of global warming could be disastrous, and our existing dependency on fossil fuels is unacceptable.”²³¹ In 2009, Hawai‘i’s state legislature established a Climate Change Task Force within the Hawai‘i Office of Planning to assess the impacts of global warming and climate change in the state. The bill establishing the Task Force recited as follows: “The legislature finds that global warming poses a serious threat to the economic well-being, public health, natural resources, and environment of Hawai‘i. The potential adverse effects of climate change include a rise in sea levels, resulting in the displacement of businesses and residences and the inundation of Hawai‘i’s freshwater aquifers, damage to marine ecosystems and the natural environment, extended drought and loss of soil moisture, an increase in the spread of infectious diseases, and an increase in the severity of storms and extreme weather events.”²³²

115. The Task Force delivered a report to the legislature in December 2009, which attached a report entitled *A Framework for Climate Change Adaptation in Hawaii*, which noted that: “Impacts from global climate change are far reaching and will affect the health and well being of Hawaii’s people, natural resources, economy, and future. Many scientists and climate policy experts contend that that [sic] we are just beginning to experience the climate change impacts. In Hawaii, we already experience periodic hazard events such as high storm surges and

²³⁰ Relating to Greenhouse Gas Emissions, H.B. 266, 24th Leg. (HI. 2007), https://health.hawaii.gov/cab/files/2014/07/GM1005_.pdf.

²³¹ Mufi Hannemann, *Mayor’s Message: U.S. Mayors Lead Effort In Climate Protection*, Honolulu Star-Bulletin, Jan. 31, 2008, <http://archives.starbulletin.com/2008/01/31/editorial/commentary.html>.

²³² Climate Change Task Force, S.B. 266, 25th Leg. (HI. 2009), https://www.capitol.hawaii.gov/session2009/Bills/SB266_CD1_.HTM.

hurricanes and associated coastal erosion. The urgency to act now to prepare and plan ahead for the impacts of climate change cannot be overstated.”²³³

116. In 2011, the Hawai‘i Office of Planning held joint planning meetings “to develop a climate change policy that would help Hawaii adjust to climate change”²³⁴ and delivered its final report relating to global warming, pursuant to the 2009 legislation.²³⁵

117. In 2016, the Honolulu city charter was amended to establish the Office of Climate Change, Sustainability and Resiliency, as well as the City & County of Honolulu Climate Change Commission. The Commission’s role is to “gather[] the latest science and information on climate impacts to Hawai‘i” and “provide advice and recommendations to the mayor, City Council, and executive departments as they look to draft policy and engage in planning for future climate scenarios.”²³⁶

118. In December 2017, the Hawai‘i Climate Change Mitigation and Adaptation Commission released a 304-page report detailing the expected effects and costs of climate change in the State of Hawai‘i. The report’s executive summary states that “rapid warming of the atmosphere and oceans, caused by two centuries of unabated carbon emissions, is causing increasing rates of sea level rise, unprecedented in human history, that threatens natural environments and development on low-lying coasts.”²³⁷ The report also notes that “the risks posed by climate change and sea level rise to Hawai‘i were *recognized as early as 1984* by State Senate Resolution 137 that requested a study [sic] the worldwide greenhouse effect on Hawaii’s coastal development.”²³⁸

²³³ Hawaii Dep’t of Bus., Econ. Dev. & Tourism, *Rep. to the Legis. in Response to Act 20 Special Session 2009 Relating to Global Warming* (Dec. 2009), <http://files.hawaii.gov/dbedt/annuals/2009/2009-op-global-warming.pdf>.

²³⁴ Adapting to Climate Change, *supra* note 229.

²³⁵ Hawaii Dep’t of Bus., Econ. Dev. & Tourism, *Final Rep. Related to Global Warming to the Governor and Legis., 2009 Haw. Sp. Sess. Laws Act 20* (Dec. 2011), <http://files.hawaii.gov/dbedt/annuals/2011/2011-global-warming.pdf>.

²³⁶ City & Cnty. of Honolulu, Office of Climate Change, Sustainability & Resiliency, *About the Commission*, <https://www.resilientoahu.org/about-the-commission> (last visited Sept. 12, 2022).

²³⁷ *Hawai‘i Sea Level Rise Vulnerability And Adaptation Report*, iv (2017), https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report_Dec2017.pdf.

²³⁸ *Id.* at 4.

III. National and Hawaiian Media Has Covered Climate Change for Many Decades

119. The issue of climate change was not discussed only in academic journals and by scientists and government and policy officials. For more than six decades, the issue of climate change has been extensively reported to the public in national and Hawai‘i newspapers, in magazines, on television shows, in documentaries, and in movies.²³⁹

A. National Newspaper and Magazine Coverage

120. National media coverage of climate change dates back to the 1930s, with *Time* magazine publishing an article in 1939 noting, “[w]eather men have no doubt that the world at least for the time being is growing warmer.”²⁴⁰

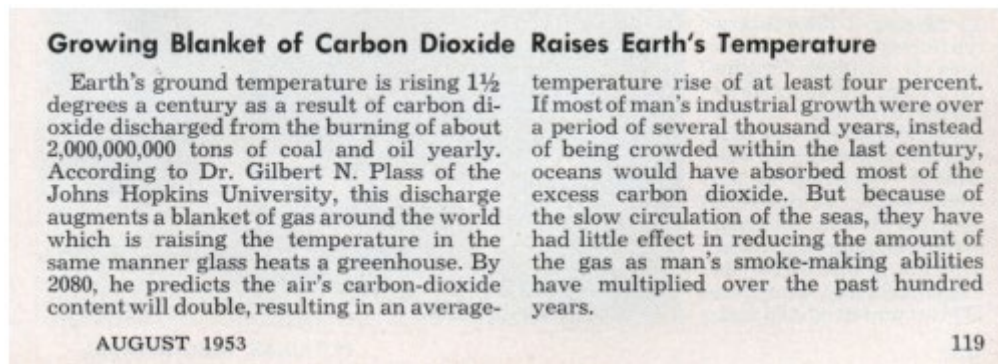
121. By 1953, the potential link between the use of fossil fuels such as oil and gas and climate change had been publicly reported in national publications such as the *New York Times*, the *Washington Post*, *Popular Mechanics*, and *Time* magazine, with one publication reporting that “Earth’s ground temperature is rising 1½ degrees a century as a result of carbon dioxide discharged from the burning of about 2,000,000 tons of coal and oil yearly” (Figure 3).²⁴¹

²³⁹ Nathaniel Rich, *Losing Earth: The Decade We Almost Stopped Climate Change*, N.Y. Times Magazine, Aug. 1, 2018, <https://www.nytimes.com/interactive/2018/08/01/magazine/climate-change-losing-earth.html>.

²⁴⁰ *Science: Warmer World*, Time, Jan. 2, 1939, <http://content.time.com/time/subscriber/article/0,33009,760573,00.html>.

²⁴¹ Growing Blanket of Carbon Dioxide Raises Earth’s Temperature, *Popular Mechanics* (Aug. 1953). See also W.K., How Industry May Change Climate, N.Y. Times, May 24, 1953; Invisible Blanket, Time, May 25, 1953; Industrial Gases Warming Up Earth, *Physicist Notes Here*, Wash. Post, May 5, 1953.

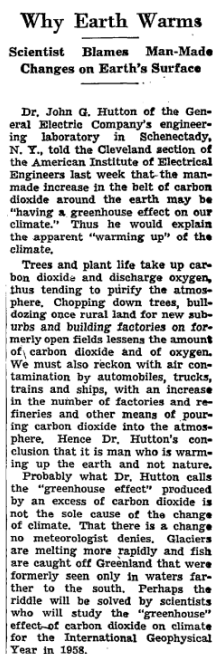
Figure 3: “Growing Blanket of Carbon Dioxide Raises Earth’s Temperature” in Popular Mechanics from 1953



122. In September 1955, the *New York Times* reported on a speech given by Dr. John Hutton of GE's engineering laboratory in Schenectady, New York to the Cleveland section of the American Institute of Electrical Engineers, in which he commented that “the manmade increase in the belt of carbon dioxide around the earth may be ‘having a greenhouse effect on our climate.’”²⁴²

²⁴² *Why Earth Warms; Scientist Blames Man-Made Changes on Earth's Surface*, N.Y. Times, Sept. 25, 1955, at E11, <https://www.nytimes.com/1955/09/25/archives/why-earth-warms-scientist-blames-manmade-changes-on-earths-surface.html>.

Figure 4: “Why Earth Warms” from the New York Times from 1955

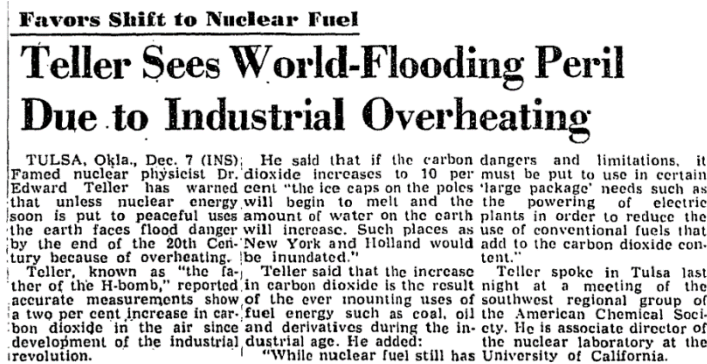


123. The specific risk of potential sea level rise from global warming was also reported by major national newspapers as early as the 1950s. In 1957, the *Washington Post* ran a front-page article entitled “Teller Sees World-Flooding Peril Due to Industrial Overheating,” reporting that prominent nuclear physicist Edward Teller had noted that “increase[s] in carbon dioxide [are] the result of the ever mounting uses of fuel energy such as coal, oil and derivatives during the industrial age” (Figure 5).²⁴³ As reported, Teller concluded that, as a result, “the ice caps on the poles will begin to melt and the amount of water on the earth will increase . . . [and] ‘[s]uch places as New York and Holland would be inundated.’”²⁴⁴

²⁴³ Teller Sees World-Flooding Peril Due to Industrial Overheating, Wash. Post, Dec. 8, 1957, at A1.

²⁴⁴ *Id.* (internal quotation marks omitted).

Figure 5: “Teller Sees World Flooding Peril Due to Industrial Overheating” from the Washington Post from 1957



124. Also in 1956, the *New York Times* reported, in a section of its newspaper called “Science in Review” on the work of the scientist Gilbert Plass, who predicted a doubling of carbon dioxide in the atmosphere leading to a four percent rise in temperatures by 2080, and another predicting a 30 percent increase in carbon dioxide each century that would lead to a 1.1°C temperature rise.²⁴⁵

125. Throughout the 1960s, national and local newspapers included reports on rising atmospheric concentrations of carbon dioxide, citing to the work led by Charles Keeling at the Mauna Loa Observatory in Hawai‘i.²⁴⁶

126. In the late 1960s, multiple *New York Times* articles linked climate change to automobile exhaust and other man-made sources.²⁴⁷

127. A summary of the findings of the UN Study of Man’s Impact on Climate appeared on the front page of the *New York Times* in 1971 (Figure 6). The article attributed climate change

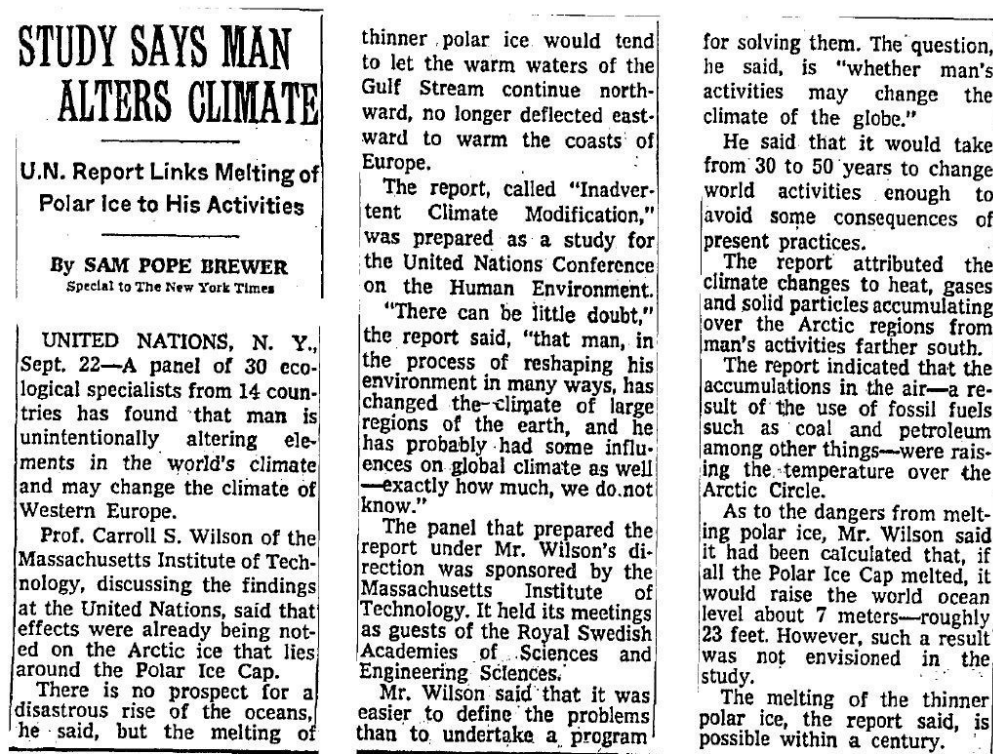
²⁴⁵ Waldemar, *Science in Review: Warmer Climate on the Earth May Be Due To More Carbon Dioxide in the Air*, N.Y. Times, Oct. 28, 1956, at E11, <https://www.nytimes.com/1956/10/28/archives/science-in-review-warmer-climate-on-the-earth-may-be-due-to-more.html>.

²⁴⁶ Walter Sullivan, *Air Found Gaining in Carbon Dioxide; Increase, Noted at Hawaiian Observatory, Is Laid to Fumes From Industry; Variation is Seasonal; New Data Support Theory That Meteor Showers Influence Rainfall*, N.Y. Times, Sept. 11, 1961, at 29, <https://www.nytimes.com/1961/09/11/archives/air-found-gaining-in-carbon-dioxide-increase-noted-at-hawaiian.html>.

²⁴⁷ *Exhausts of Autos Linked By Scientist to Climate Change*, N.Y. Times, Dec. 23, 1966, at 13, <https://www.nytimes.com/1966/12/23/archives/exhausts-of-autos-linked-by-scientist-to-climate-change.html>; *Scientists Caution on Changes in Climate as Result of Pollution*, N.Y. Times, Dec. 21, 1969, at 46, <https://www.nytimes.com/1969/12/21/archives/scientists-caution-on-changes-in-climate-as-result-of-pollution.html>.

to “heat, gases and solid particles accumulating over the Arctic regions from man’s activities farther south . . . [as] a result of the use of fossil fuels such as coal and petroleum among other things.”²⁴⁸ Interviewed scientists noted that “it was easier to define the problems than to undertake a program for solving them” and that “we do not know” “exactly how much” influence human activity has had on global climate.²⁴⁹

Figure 6: “Study Says Man Alters Climate” in New York Times Coverage from 1971



128. In 1972, the *New York Times* ran two articles on climate change prior to the United Nations Conference on the Human Environment. A front-page article noted the conference’s goal of an “‘action plan’ for international measures against pollution” (Figure 7).²⁵⁰ A second article

²⁴⁸ Sam Pope Brewer, *Study Says Man Alters Climate*, N.Y. Times, Sept. 23, 1971, at 22, <https://www.nytimes.com/1971/09/23/archives/study-says-man-alters-climate-un-report-links-melting-of-polar-ice.html>.

²⁴⁹ *Id.*

²⁵⁰ Walter Sullivan, *Balancing of Cycles that Support Life is Issue for Parley*, N.Y. Times, June 5, 1972, at 24, <https://www.nytimes.com/1972/06/05/archives/balancing-of-cycles-that-support-life-is-issue-for-parley.html>.

summarized and illustrated four “cycles that sustain life on Earth,” two of which were “not in balance” due to the burning of fossil fuels and increased carbon dioxide levels (Figure 8).²⁵¹

Figure 7: “Balancing of Cycles That Support Life” in the New York Times from 1972

Balancing of Cycles That Support Life Is Issue for Parley

By WALTER SULLIVAN
As told to The New York Times

STOCKHOLM, June 4 — The winds and seas current recognize no national boundaries and the inhabitants of the earth are woven into a fragile web of interdependence. The thin veneer of air, soil and water known as the biosphere that coats this planet is kept habitable by a series of closed, self-replenishing cycles, each of which is subject to disruption by man.

The disruption of these cycles and how to bring them into balance will confront the 1,200 delegates to the environment conference that opens June 5 tomorrow. Following is a discussion of the main cycles.

The Carbon-Oxygen Cycle
 All higher forms of life are dependent on the role of plants in performing photosynthesis. In this extremely complex chemical process the plants absorb the energy of sunlight to make carbohydrates from water and atmospheric carbon dioxide. A hydrocarbon is oxygen.

Plants “breathe in” carbon dioxide and “breathe out” oxygen—exactly the opposite process from that of respiration in man and animals.

The solar energy used in this process becomes locked into the carbohydrate molecules and is released from storage through oxidation—chemical reactions with oxygen.

This reaction is the opposite of photosynthesis. It may occur within the body, providing energy and releasing the inhalation of oxygen. Or it may occur more rapidly, chemically speaking, in flame or an explosion.

The photosynthesis that stored energy in gasoline, coal, gas or oil, took place in plants that lived millions of years ago. They died, decayed, were buried and, in favorable circumstances, formed deposits accessible to man.

Within a few centuries these reserves of ancient solar energy will have been depleted. But the increasing rate of their consumption is pouring additional carbon dioxide into the atmosphere.

About half of this gas remains in the air. The other half is thought to be absorbed by the seas and by plants. The oceans contain some 40 times as much carbon dioxide as the atmosphere and could probably hold much more, but the surface waters quickly become saturated and the oceans “turn over” time is so slow that it cannot cope with the current industrial outpourings.

Measurements made since 1958 in Sweden, Antarctica, Alaska and Hawaii all show roughly the same rate of increase in atmospheric carbon dioxide: 0.2 per cent a year. Since the gas is a minor constituent of the air, the gross increase is not large. Between now and the end of the century it is expected to rise from 320 parts per million to 360 parts per million.

Thus, on the other hand, has an atmosphere of almost pure carbon dioxide which ac-

demands that they be spread. In fact, if it were possible within the bounds of climate and water availability, to increase forest acreage this could help compensate for today's excessive production of carbon dioxide.

By the same token serious damage to the plants of land or sea could be doubly harmful, cutting off the oxygen replenishment as well as the purging of carbon dioxide from the air. On the earth plants do the job.

The Energy Cycle
 An important role of carbon dioxide in the air is its influence on the energy cycle. Virtually all the energy that drives the wind, energizes the waves and supplies the plants reaches earth in the form of radiation.

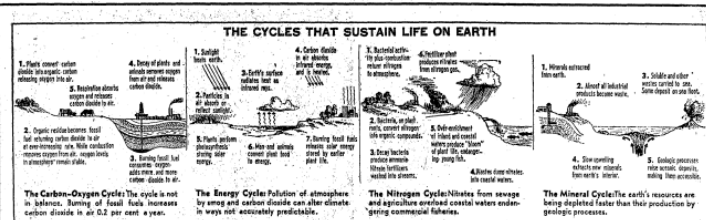
As it passes through the atmosphere it is absorbed in various forms of absorption, reflection and scattering. On its journey down through the atmosphere a beam of sunlight is lost about 3 per cent by absorption in the ozone layer, 13 to 20 miles above earth.

This energy is then radiated upward in the form of infrared rays, almost none of which travel directly into space. They are absorbed by water vapor, carbon dioxide and come in the atmosphere, as well as by clouds. Being heated, these components themselves then radiate infrared, both upward and down.

Thus, through a complex sequence of events, more of the solar energy escapes into space, and part of it remains—for a limited time—as heat in the atmosphere. Where the solar energy falls on sea, particularly in the tropics, it evaporates vast quantities of water whose vapor then rises the winds that also are driven by solar heating.

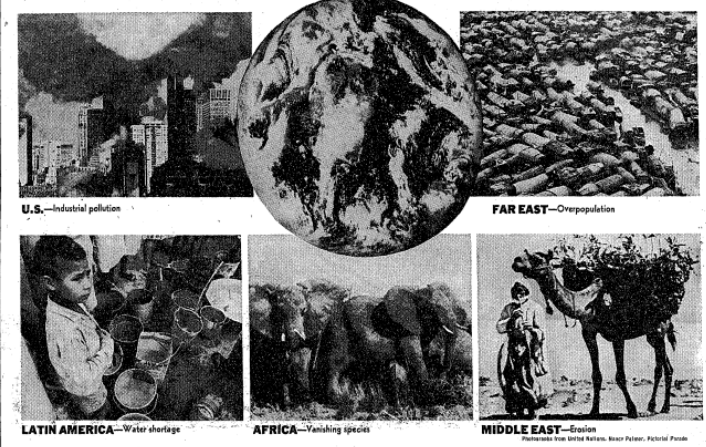
Just as the plants carry moved solar energy, so does the water vapor, in the form of latent heat that was required to evaporate water from the sea. When the water condenses into clouds and rain, that heat is released. Thus the vapor carries solar energy stored at the equator to the farthest reaches of the earth. And it drives the tropical winds of a hurricane.

Fortunately for mankind, this dynamic and complex energy machine has, until now, been stable. The earth ultimately radiates into space as much energy as it receives. Its overall temperature therefore remains the same, within small margins. Since carbon dioxide absorbs infrared radiation, like the greenhouse glass that allows sunlight in but bars the escape of infrared energy, an increase in the amount of the gas in the air should make the world warmer. However, the global climate in recent years has



Environmental Problems That Challenge Man

The conference that begins today will be the first worldwide attack on ecological problems. Six areas will be covered: pollution, human settlements, natural resources, national development, environmental education, organization. Some typical local problems are illustrated below.



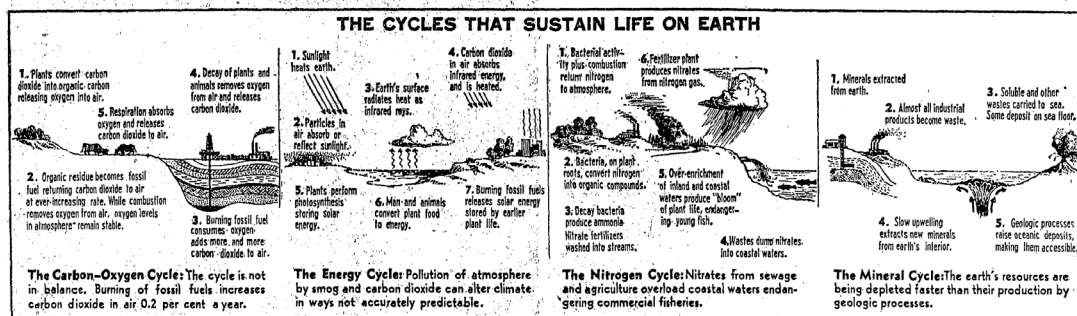
compounds that figure in life's chemistry. The job is done by certain bacteria that cling to the roots of various plants, which is why farmers use clover to enrich their soil. It can be done in a fertilizer factory with considerable expenditure of energy. And in some instances there are nitrate de-

breeding areas that support commercial fisheries and help feed the world. Nitrogen reaches the atmosphere through combustion—not in stoves, incinerators and forest fires—and also through the activity of certain bacteria that break down ammonia into its constituent hydrogen and nitrogen.

thought to have formed initially in this way, but some claim 100 million years elapsed before they were thrown up onto the continents. Meanwhile the world is dotted with plants turning out an estimated million different products, most of which end up as waste. Some of this material is absorbed by bacteria and

²⁵¹ Gladwin Hill, *I, 200 Gather in Stockholm for Parley on Environment*, N.Y. Times, June 5, 1972, at 1, 24, <https://nyti.ms/3jNcdFz>; Gladwin Hill, *U.N. Parley Ends By Adopting Guide to Pollution War*, N.Y. Times, June 17, 1972, at 1, 2, <https://www.nytimes.com/1972/06/17/archives/un-parley-ends-by-adopting-guide-to-pollution-war-muchdebated-plan.html>.

Figure 8: The “Carbon-Oxygen Cycle” in 1972 *New York Times* Coverage of the United Nations Conference on the Human Environment



129. In July 1977, the National Academy of Sciences' *Energy and Climate* report was covered by the national newspapers. The *Los Angeles Times* noted that "[t]he possibility of a worldwide warming trend arises chiefly from the immense volumes of carbon dioxide released by the burning of coal and other hydrocarbons."²⁵² Similarly, the *New York Times* highlighted that "[i]n recent months several scientists have warned of the consequences of increasing, long-term dependence on fossil fuels, notably coal, as the chief energy source because of what could be disastrous effects on climate" (Figure 9).²⁵³ The *New York Times* continued coverage of the discussion of this report one week later in an article titled "Coal, Carbon Dioxide and Climate," which stated: "The National Academy of Sciences flashed a warning light this week at plans to rely on coal as a major energy source in coming centuries. Not that oil or natural gas, for which coal is being substituted, are much better for the environment. But those fuels are becoming scarcer and more expensive, and the Carter Administration is encouraging the conversion of major industries to coal. If the industrialized nations continue to burn significant amounts of any fossil fuel for the next 200 years, the consequences could be catastrophic."²⁵⁴ The *New York Times*'

²⁵² Robert Gillette, *Drastic Warming of Climate Feared; Study Warns of Reliance on Coal*, L.A. Times, July 25, 1977, Part I, at 1, 22.

²⁵³ Walter Sullivan, *Scientists Fear Heavy Use of Coal May Bring Adverse Shift in Climate*, N.Y. Times, July 25, 1977, at 1, <https://www.nytimes.com/1977/07/25/archives/scientists-fear-heavy-use-of-coal-may-bring-adverse-shift-in.html>.

²⁵⁴ *Coal, Carbon Dioxide and Climate*, N.Y. Times, July 28, 1977, at 18, <https://www.nytimes.com/1977/07/28/archives/coal-carbon-dioxide-and-climate.html>.

headlines related to climate change from the late 1970s included: “House Panel Warned on Dangers of Climate Change,” “Climatologists Are Warned North Pole Might Melt,” and “Increase of Carbon Dioxide in Air Alarms Scientists.” These articles also contained phrases such as “Scientists Fear,” “Carbon Dioxide Peril,” “gloomy reports,” and “changes might play havoc.”²⁵⁵

Figure 9: *New York Times* Front Page July 25, 1977



130. The First World Climate Conference, held in Stockholm in 1979, was covered by the *New York Times* with a headline that read, “A Vast ‘Interdisciplinary Effort’ To Predict Climate

²⁵⁵ Ben A. Franklin, *House Panel Warned on Dangers of Coal*, N.Y. Times, June 10, 1977, at A28, <https://www.nytimes.com/1977/06/10/archives/house-panel-warned-on-dangers-of-coal-heavy-use-would-disrupt.html>; Philip Shabecoff, *Increase of Carbon Dioxide in Air Alarms Scientists*, N.Y. Times, June 9, 1979, at A12, <https://www.nytimes.com/1979/06/09/archives/increase-of-carbon-dioxide-in-air-alarms-scientists-concerned-for.html>; Walter Sullivan, *Climatologists Are Warned North Pole Might Melt*, N.Y. Times, Feb. 14, 1979, at A21, <https://www.nytimes.com/1979/02/14/archives/climatologists-are-warned-north-pole-might-melt-another-projection.html>; Philip Shabecoff, *Scientists Warn U.S. Of Carbon Dioxide Peril*, N.Y. Times, July 11, 1979, at D7, <https://www.nytimes.com/1979/07/11/archives/scientists-warn-us-of-carbon-dioxide-peril-advice-on-energy.htm>.

Change Urged.” The article stated that “the people who know more about climate than anyone else in the world have concluded that climate’s future trends can be predicted in a meaningful way only after ‘an interdisciplinary effort of unprecedented scope.’” “However,” the article continued, “the declaration issued at today’s close of the World Climate Conference also cites fears that human activity, notably intensified burning of fossil fuels, may alter the climate sufficiently to require radical changes in world agriculture and the production of energy.”²⁵⁶

131. In 1981, the *New York Times* again gave front-page coverage to the issue of climate change (Figure 10).²⁵⁷ An article, “Study Finds Warming Trend That Could Raise Sea Levels,” covered a NASA report on climate change.²⁵⁸ It was accompanied by a graph of global mean temperatures that depicted an overall warming trend over the past century (Figure 11).²⁵⁹ The article also quoted a scientist from the National Center for Atmospheric Research who said, “the conclusions about the extent of warming and how quickly it will occur would be reasonable if the assumptions on which they are based prove valid, but that many can be challenged.”²⁶⁰ Other scientific studies on climate change received additional press coverage.²⁶¹

²⁵⁶ Walter Sullivan, *A Vast ‘Interdisciplinary Effort’ To Predict Climate Change Urged*, N.Y. Times, Feb. 24, 1979, at 44, <https://www.nytimes.com/1979/02/24/archives/a-vast-interdisciplinary-effort-to-predict-climate-trend-urged.html>.

²⁵⁷ Walter Sullivan, *Study Finds Warming Trend That Could Raise Sea Levels*, N.Y. Times, Aug. 22, 1981, Section 1, at 1, 13, <https://www.nytimes.com/1981/08/22/us/study-finds-warming-trend-that-could-raise-sea-levels.html>.

²⁵⁸ *Id.*

²⁵⁹ *Id.*

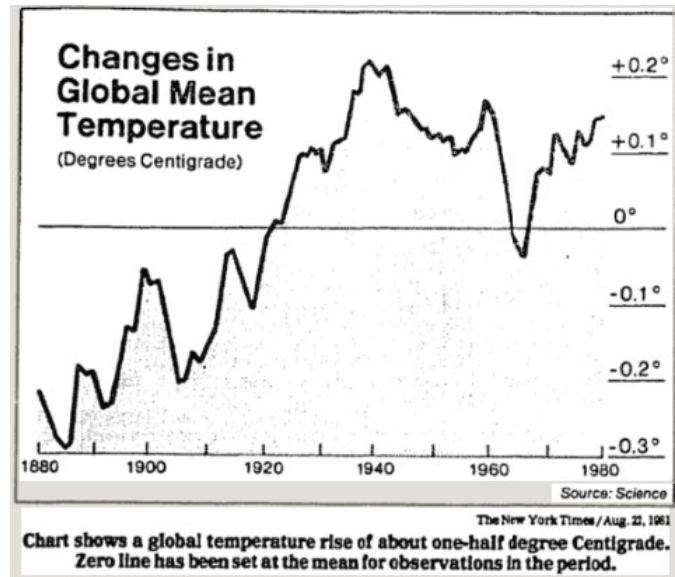
²⁶⁰ *Id.*

²⁶¹ Philip Shabecoff, *U.S. Study Warns Of Extensive Problems From Carbon Dioxide Pollution*, N.Y. Times, Jan. 14, 1981, at 1, <https://www.nytimes.com/1981/01/14/us/us-study-warns-of-extensive-problems-from-carbon-dioxide-pollution.html>; Philip Shabecoff, *Scientists Warn of Earlier Rise in Sea Levels*, N.Y. Times, Nov. 3, 1985, Section 1, at 23, <https://www.nytimes.com/1985/11/03/us/scientists-warn-of-earlier-rise-in-sea-levels.html>.

Figure 10: *New York Times* Front Page, August 22, 1981



Figure 11: Figure Accompanying *New York Times* Coverage of NASA Climate Change Report, August 22, 1981



132. In 1983, an EPA report titled *Can We Delay a Greenhouse Warming* received front-page coverage in the *Los Angeles Times* (Figure 12).²⁶² The article reported that “[t]he federal

²⁶² Marlene Cimonis, *Earth to Get Warmer Soon, U.S. Warns*, L.A. Times, Oct. 19, 1983, at 1, 9.

government warned Tuesday that a dramatic warming of the Earth's climate because of the so-called 'greenhouse-effect' could begin in the 1990s, with potentially serious consequences for global food production, changes in rainfall and water availability and a probable rise in coastal waters."²⁶³

Figure 12: *Los Angeles Times* Front Page October 19, 1983



133. In October 1983, on the day the Nierenberg Report (discussed above in ¶ 24) was released, the *New York Times* devoted two articles to its coverage. The first ran on the front page and was titled “Haste on Global Warming Trend Is Opposed” (Figure 13).²⁶⁴ It repeated the Nierenberg Report’s message “that the coming warming of the earth caused by a buildup of carbon dioxide in the atmosphere is ‘cause for concern’ but that there is sufficient time to prepare for its impact.”²⁶⁵ The article recounted that President Reagan’s science adviser, George Keyworth,

²⁶³ *Id.*

²⁶⁴ Philip Shabecoff, *Haste on Global Warming Trend Is Opposed*, N.Y. Times, Oct. 21, 1983, at A1, B5, <https://www.nytimes.com/1983/10/21/us/haste-of-global-warming-trend-opposed.html>.

²⁶⁵ *Id.*

criticized the EPA report as “unwarranted and unnecessarily alarmist” and praised the Nierenberg Report, which he said “emphasized that, at this time, there are no actions recommended other than continued research on this issue.”²⁶⁶ The second article was composed entirely of excerpts of the Nierenberg Report, *Changing Climate: Report of the Carbon Dioxide Assessment*.²⁶⁷ Other articles published during this period included a discussion of ongoing disagreement within the scientific community about the nature and timeline of climate change.²⁶⁸

Figure 13: New York Times Front Page, October 21, 1983



²⁶⁶ *Id.*

²⁶⁷ *Excerpts from the Climate Report*, N.Y. Times, Oct. 21, 1983, at B5, <https://www.nytimes.com/1983/10/21/us/excerpts-from-the-climate-report.html>.

²⁶⁸ *Experts Tell How Antarctic's Ice Could Cause Widespread Floods*, N.Y. Times, Jan. 8, 1979, at A19, <https://www.nytimes.com/1979/01/08/archives/experts-tell-how-antarctics-ice-could-cause-widespread-floods-mushy.html>; *Heating Up the Atmosphere*, N.Y. Times, Aug. 29, 1981, at 22, <https://www.nytimes.com/1981/08/29/opinion/heating-up-the-atmosphere.html>; Walter Sullivan, *Some Polar Ice Melting Linked to Global Heating*, N.Y. Times, Jan. 8, 1982, at B5, <https://www.nytimes.com/1982/01/08/us/some-polar-ice-melting-linked-to-global-heating.html>; Philip Shabecoff, *U.S. Goes to Ecology Parley Under Cloud of Doubt*, N.Y. Times, May 5, 1982, at A2, <https://www.nytimes.com/1982/05/05/world/us-goes-to-ecology-parley-under-cloud-of-doubt.html>; *Waiting for the Greenhouse Effect*, N.Y. Times, Aug. 3, 1982, at A20, <https://www.nytimes.com/1982/08/03/opinion/waiting-for-the-greenhouse-effect.html>; Walter Sullivan, *So Far, Greenhouse Effect Heats Only Debate*, N.Y. Times, Oct. 23, 1983, at E20, <https://www.nytimes.com/1983/10/23/weekinreview/so-far-greenhouse-effect-heats-only-debate.html>; Walter Sullivan, *Experts Question Sea-Rise Theory*, N.Y. Times, April 15, 1984, at 15, <https://www.nytimes.com/1984/04/15/us/experts-question-sea-rise-theory.html>.

134. In December 1985, the *New York Times* covered a congressional hearing where a group of senators and scientists called for concerted action “to prevent a predicted warming of the earth’s climate resulting from a buildup of carbon dioxide and other man-made gases in the atmosphere.”²⁶⁹ According to the reporting, Senator Al Gore called for “national and international action.”²⁷⁰ The article references the findings of world scientists in Villach, Austria earlier that year, who reached a consensus that the impact of climate change “would be felt sooner rather than later.”²⁷¹ In the subsequent years, other national media featured scientists’ warnings related to climate change—for example, a *Time* magazine cover story on October 19, 1987, a *Newsweek* cover on July 11, 1988, and “Endangered Earth” featured as *Time* magazine’s “Planet of the Year” on January 2, 1989 (Figure 14).²⁷² The greenhouse effect and its potential consequences also appeared in the popular *Calvin and Hobbes* comic strip in 1987 (Figure 15).²⁷³

²⁶⁹ *Action Is Urged to Avert Global Climate Shift*, N.Y. Times, Dec. 11, 1985, at A18, <https://www.nytimes.com/1985/12/11/us/action-is-urged-to-avert-global-climate-shift.html>.

²⁷⁰ *Id.*

²⁷¹ *Id.*

²⁷² *Greenhouse Effect*, Time, Oct. 19, 1987, <http://content.time.com/time/covers/0,16641,19871019,00.html>; *Newsweek July 11, 1988*, backissues.com, <https://backissues.com/issue/Newsweek-July-11-1988>; *Endangered Earth, Planet of the Year*, Time, Jan. 2, 1989, <http://content.time.com/time/covers/0,16641,19890102,00.html>.

²⁷³ Bill Watterson, *Calvin and Hobbes* by Bill Watterson for July 23, 1987, GoComics, <https://www.gocomics.com/calvinandhobbes/1987/07/23>.

Figure 14: Magazine Covers from Late 1980s



October 19, 1987

July 11, 1988

January 2, 1989

Figure 15: *Calvin and Hobbes* July 23, 1987



135. In 1988, NASA scientist James Hansen warned Congress about the consequences of climate change. The *New York Times* featured a summary of his testimony and a figure depicting global mean temperature in a story above the fold on the front page (Figure 16).²⁷⁴ In relevant part, the article states: “Until now, scientists have been cautious about attributing rising global temperatures of recent years to the predicted global warming caused by pollutants in the atmosphere, known as the ‘greenhouse effect.’ But today Dr. James E. Hansen of the National Aeronautics and Space Administration told a Congressional committee that it was 99 percent

²⁷⁴ Philip Shabecoff, *Global Warming Has Begun, Expert Tells Senate*, N.Y. Times, June 24, 1988, at A1, <https://www.nytimes.com/1988/06/24/us/global-warming-has-begun-expert-tells-senate.html>.

certain that the warming trend was not a natural variation but was caused by a buildup of carbon dioxide and other artificial gases in the atmosphere . . . If Dr. Hansen and other scientists are correct, then humans, by burning of fossil fuels and other activities, have altered the global climate in a manner that will affect life on earth for centuries to come.”²⁷⁵

Figure 16: *New York Times* Front Page June 24, 1988

"All the News That's Fit to Print"

The New York Times

VOL. CXXXVII, No. 47,546 Copyright © 1988 The New York Times NEW YORK, FRIDAY, JUNE 24, 1988 30 CENTS

Global Warming Has Begun, Expert Tells Senate

By PHILIP SHABECOFF
Special to The New York Times

WASHINGTON, June 23 — The earth has been warmer in the first five months of this year than in any comparable period since measurements began 130 years ago, and the higher temperatures can now be attributed to a long-expected global warming trend linked to pollution, a space agency scientist reported today.

Until now, scientists have been cautious about attributing rising global temperatures of recent years to the predicted global warming caused by pollutants in the atmosphere, known as the "greenhouse effect." But today Dr. James E. Hansen of the National Aeronautics and Space Administration told a Congressional committee that it was 99 percent certain that the warming trend was not a natural variation but was caused by a buildup of carbon dioxide and other artificial gases in the atmosphere.

Sharp Cut in Burning of Fossil Fuels Is Urged to Battle Shift in Climate

Dr. Hansen, a leading expert on climate change, said in an interview that there was no "magic number" that showed when the greenhouse effect was actually starting to cause changes in climate and weather. But he added, "It is time to stop waffling so much and say that the evidence is pretty strong that the greenhouse effect is here."

If Dr. Hansen and other scientists are correct, then humans, by burning of fossil fuels and other activities, have altered the global climate in a manner that will affect life on earth for centuries to come.

Dr. Hansen, director of NASA's Institute for Space Studies in Manhattan, testified before the Senate Energy and Natural Resources Committee.

Some Dispute Link

He and other scientists testifying before the Senate panel today said that projections of the climate change that is now apparently occurring come from the Southeastern and Midwestern sections of the United States will be subject to frequent episodes of very high temperatures and drought in the next decade and beyond. But they cautioned that it was not possible to attribute a specific heat wave to the greenhouse effect, given the still limited state of

Global Warming: Greenhouse Effect?

Average global temperatures through the first five months of 1988. As a baseline, scientists use the global average from 1950 to 1980.

Source: James E. Hansen and George Leland

Drought Raising Food Prices; Inflation Effect Seems Minor

By ROBERT D. MERSHEV Jr.
Special to The New York Times

WASHINGTON, June 23 — The severe drought gripping the farm belt has begun to raise the supermarket price of such items as corn, soybeans and spaghetti, and the list of affected products will inevitably broaden to include such items as pickles and canned peas in coming weeks, according to industry officials and Government and private analysts.

At this stage, however, it appears that crop shortages will not raise food prices enough to have a major effect on family budgets or the nation's inflation rate, which seems likely to be about 4 1/2 percent this year. Unlike other agricultural disasters, such as citrus freezes, the effect of poor grain harvests are cushioned by stockpiles and move relatively slowly through the processing and distribution chain.

Washington's Projection

Still, the Agriculture Department estimated this week that the drought would raise the retail price of food by as extra 1 percent this year — a figure some analysts call conservative.

Utilities Are Feeling Strain

Electric utilities are feeling the strain as the water level of the Mississippi River falls. Page A14.

Immigration Law Is Failing to Cut Flow from Mexico

ECONOMIC FACTORS CITED

Illegal Entries Are on the Rise as More Come From Large Cities and Stay Longer

By LARRY ROITER
Special to The New York Times

TIJUANA, Mexico, June 19 — The 1986 immigration law is failing to stem the illegal flow of Mexicans into the United States and may be creating new problems on both sides of the border by disrupting traditional immigration patterns, Mexican and American researchers say.

Studies by immigration specialists at the College of the Northern Border in Tijuana and the Center for United States-Mexican Studies at the University of California, San Diego, indicate that the number of Mexicans illegally seeking work in the United States has actually increased in recent months.

The data also show that these illegal immigrants are staying in the United States longer, are increasingly arriving in family groups and are coming in growing numbers from parts of Mexico that have not sent many migrants in the past.

No Effect on Flow Seen

"There is no immigration law that has had any impact on the flow," said Wayne Corcoran, director of the Center for United States-Mexican Studies at the University of California, San Diego, offered a similar picture.

"Clearly, we have reached the end of the period of fear, uncertainty and confusion about the 1986 law among workers still based in Mexico," he said. "Those who delayed migration to the U.S. during 1987 are now coming, having observed that work is still available even for new arrivals lacking papers."

Enforcement Stopped Up

The 1986 immigration law is intended to discourage illegal immigration while providing amnesty to undocumented foreign workers able to demonstrate they entered the United States

High Court Getting Unusual Plea Not to Reverse Key Rights Ruling

By STUART TAYLOR Jr.
Special to The New York Times

WASHINGTON, June 23 — In an extraordinary showing of political and legal prestige, 69 senators, 68 state attorneys general, 68 members of Congress, prominent historians and more than 100 civil rights, religious and ethnic groups will urge the Supreme Court not to overrule a major 1976 civil rights decision.

But the Justices will not be receiving advice from the Reagan Administration. Solicitor General Charles Fried said today that his office would take no position on the issue, one of the most important and highly visible issues that the Court will face in its next term.

His decision attracted criticism from some people on both sides, but especially angered conservatives. They had hoped for a strong argument from the Reagan Administration for overruling the 1976 decision to offer the unusually broad shield of support for it by the legal and political establishment. Some conservatives have called for Mr. Fried's removal from office.

The case involves a Reconstruction-era law providing that all people have the same right "to make and enforce contracts" as "is enjoyed by white citizens." The Court's 1976 decision turned the little-used statute into a potent weapon, permitting its use by private plaintiffs to sue discriminatory private employers and to seek damages for racial discrimination in private business dealings generally.

The current activity is the result of

Cañon Zapata in Tijuana, Mexico, the busiest illegal crossing point.

136. *New York Times* coverage of the 1988 Toronto Conference reported that “[g]overnment officials, scientists and environmentalists from 48 countries called today for immediate action to halt degradation of the earth’s atmosphere and set targets for global reductions in the burning of fossil fuels . . . to slow and then roll back pollution that, they agreed, is rapidly warming the earth’s surface in a process that will produce profound climate change.”²⁷⁶

137. A *New York Times* article published in November 1989 reviewed recent national trends related to climate change. “Until recently,” it stated, “politicians who wanted to avoid the

²⁷⁵ *Id.* at A1, A14.

²⁷⁶ Philip Shabecoff, *Parley Urges Quick Action to Protect Atmosphere*, N.Y. Times, July 1, 1988, at A3, <https://www.nytimes.com/1988/07/01/world/parley-urges-quick-action-to-protect-atmosphere.html>.

issue of global warming could duck behind the scientific uncertainties. Now, with soaring public concern for the environment and wide scientific agreement about the nature if not the timing of the problem, the debate has shifted. The question is no longer whether the threat is real, but rather how fast it needs to be countered and at what expense.”²⁷⁷

138. A 1989 front-page *New York Times* article discussed the costs of climate change policies as follows: “In the near term, most economists conclude, a major effort to limit carbon effluent makes little economic sense unless it can be justified on grounds of energy security or tax revenue. . . . Economists also agree that the benefits of reducing carbon dioxide are sure to vary greatly from place to place. That will make it difficult for countries to develop a consensus for a collective response to the problem. . . . [A]ll recent studies, including those carried out by environmentalists, implicitly share one conclusion: unless it proves remarkably easy to adapt technologies that drastically cut the need for oil, natural gas and coal, the price of correcting the carbon dioxide problem will run to trillions of dollars through the next century.”²⁷⁸ The continuation of the article further described some of the costs associated with potential policy actions, asking “[c]ould the cure be worse than the disease?” (Figure 17).²⁷⁹

²⁷⁷ Allan R. Gold, *Ideas & Trends; Global Warming Means New Global Politics*, N.Y. Times, Nov. 12, 1989, at E5, <https://www.nytimes.com/1989/11/12/weekinreview/ideas-trends-global-warming-means-new-global-politics.html>.

²⁷⁸ Peter Passell, *Economic Watch; Curing the Greenhouse Effect Could Run Into the Trillions*, N.Y. Times, Nov. 19, 1989, at 1, 18.

²⁷⁹ *Id.*

Figure 17: New York Times Coverage of the Costs of Policies to Reduce Carbon Dioxide Emissions, November 19, 1989.

Steep Cost Seen on Curbing Earth's Warming

Continued From Page 1

bons, are also byproducts of modern civilization, and are being speeded out faster than the biosphere can neutralize their effects. It is now generally if not universally believed that a resulting warming effect is overwhelming natural processes that tend to cool the atmosphere.

How fast the greenhouse gases are heating the air is not known. Neither the heating effect nor the accumulation of carbon dioxide in the air is thought to have direct effects on human health. But there is at least a chance that another century or perhaps less of unchecked accumulation would melt polar ice and alter weather patterns, leading to coastal flooding and radical changes in land fertility patterns.

For many environmental advocates, those who believe in the ethical obligation to pass on the biosphere intact to future generations, the policy message is clear and simple: move quickly to reduce the production of carbon dioxide, which accounts for about half the greenhouse effect.

Using Fear to Get Action

The cause has drawn support from diverse interests. To share what David Harrison of the National Economic Research Associates consulting firm, calls "the Christmas tree view." These groups hope to use greenhouse worries as a lever for everything from promoting nuclear power to tightening automobile mileage regulations.

This month, all 65 nations taking part in a high-level conference in the Netherlands agreed that carbon dioxide emissions would have to be stabilized.

Only objections from the United States, the Soviet Union and Japan prevented the conference from endorsing a goal of cutting emissions to 1988 levels by the year 2000. But William Nitze, a State Department official coordinating Bush Administration policy, acknowledges there is now heavy diplomatic pressure for an accord next year.

Simulations by Computer

Greenhouse policies have yet to be influenced by sober economic analysis, however. And while environmental groups would generally be inclined to draw different lessons from a new utility-financed simulation by Alan Manne of Stanford University and Richard Richels of the Electric Power Research Institute, almost everyone agrees that the computer model does illustrate the potential cost dimensions of carbon-dioxide containment.

The Manne-Richels model compares a hypothetical future of unconstrained carbon dioxide output with one in which carbon emissions are limited to the 1980 rate through 2020 and then gradually cut by 20 percent. Even if no technological adaptation

Could the cure be worse than the disease?

to break the link between energy production and fossil fuels proved possible, consumers could muddle through for a while by switching to natural gas, which delivers 70 percent more energy per pound of carbon effluent. But the carbon limit begins to bite deeply around the year 2010.

With cheap supplies of gas exhausted, the model estimates that a twenty-fold increase in the price of coal would be needed to force sufficient changes toward energy conservation. Annual losses in output would reach about 5 percent of national income, or about \$500 billion, in the year 2030.

Optimists, including the economist Irving Mintzer of the World Resources Institute, argue that technological innovations might sharply cut these costs. And the computer model bears him out. Some reasonably priced way of trapping smokestack carbon would reduce the economic impact by one-tenth.

A low-cost source of electricity from non-carbon fuels, providing solar, nuclear or geothermal energy, would trim it further. Technical change that increased the efficiency of energy use for the entire economy by 1 percent each year at low cost would do yet more.

Drop in American Incomes

But even the happy circumstance of technological victories on every front would still permanently reduce American incomes by about 1 percent, according to the Manne-Richels model. And 1 percent in a \$3 trillion economy

is a whopping \$50 billion a year.

Other studies suggest that this most optimistic Manne-Richels scenario is too optimistic. William Nordhaus, an economist at Yale University, pegs the cost of containing carbon emissions to 1990 levels at 1 percent to 2 percent of national income by the middle of the next century. A study in progress by the Congressional Budget Office is reportedly yielding numbers in the same range.

High cost alone need not rule out action, of course, if the alternative is catastrophe. The mere possibility that the greenhouse effect could lead to greater climatic changes in the next 100 years than those experienced in the previous 10,000 might be expected to give even the most detached bean-counters cause to lose sleep.

But according to Thomas Schelling, an economist at the Kennedy School of Government at Harvard, such projections can be misleading. While climate has not changed rapidly in the last century, both the will and technological ability to adapt to radically different weather obviously has. In 1850, he says, 2 percent of Americans lived outside temperate or subtropical zones. By 1980, the percentage had increased to 22 percent.

Adjusting to Climate Changes

While changes in rainfall, temperature and sea level could be dramatic, there is yet no reason to believe that the process would be completed too quickly to allow evolutionary responses — expanding irrigation, for example, or building dikes. The cost of growing food might conceivably rise by 20 percent, Mr. Schelling speculates. But this loss or gain, he argues, is certain to be overwhelmed by a century's worth of improvements in seed strains and growing techniques.

By the same logic, Mr. Schelling says, the appealing idea of bequeathing the biosphere intact seems arbitrary. The quality of life in 100 years, he sus-

Curbing Pollution: Three Price Tags

Projections of the cost of limiting carbon emissions through the year 2100 as a cumulative lump sum, or present-value figure.

Scenario I (Pessimistic) \$3.5 trillion
No practical way to shift to clean energy technologies; no automatic increase in economy-wide energy efficiency.

Scenario II \$1.8 trillion
Automatic energy-efficient adjustment of 1 percent per year.

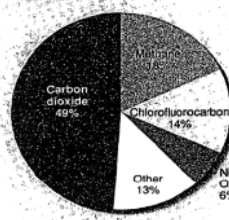
Scenario III \$800 billion (Optimistic)
Cost-effective substitutes for fossil fuel energy available; 1 percent automatic energy-efficiency adjustment per year.

Source: "CO₂ Emission Limits: An Economic Analysis for the U.S.A.," Alan S. Manne, Stanford University and Richard G. Richels, Electric Power Research Institute

Sources of the Smothering Gases

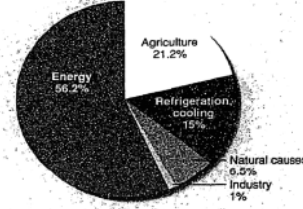
Figures for 1989.

The Gases Creating the Greenhouse Effect



Where They Come From

Percent of gases contributing to the greenhouse effect from each economic activity.



Source: "CO₂ Emission Limits: An Economic Analysis for the U.S.A.," Alan S. Manne, Stanford University and Richard G. Richels, Electric Power Research Institute (gases); "The Economics of the Greenhouse Effect," William D. Nordhaus, Yale University, through the M.I.T. Center for Energy Policy Research (economic activity)

Trillions of dollars may have to be spent.

pects, will depend as much or more on the endowment of technology and capital as on the percentage of carbon dioxide in the air. And if money to contain carbon emissions comes out of other investment, future civilizations could be the losers.

This hardly means that the greenhouse effect can be safely ignored. But it does imply that it should be viewed as a problem in balancing costs against benefits. And here, crude initial estimates suggest that for the next half-century or more it may be cheapest to deal with the effects of global warming rather than the causes.

For example, according to the Environmental Protection Agency, the cost of protecting America's coastal cities against a three-foot rise in sea level would be \$73 billion to \$111 billion, a lot of money but not so much compared with the likely cost of prevention.

A doubling of atmospheric carbon dioxide, likely to occur by the middle of the next century if output is not constrained, would dramatically reduce yields for some crops in some regions. But according to a 1989 study by three Agriculture Department economists, the net losses would be less than one-tenth of 1 percent of income in industrial countries. Argentina and Australia would actually be economic winners, since the likely fall in yields would be smaller than the increases in world prices.

Nations Most at Risk

This illustrates a looming problem in prevention strategies. The benefits from controlling greenhouse gases would be far greater in some countries than in others. Bangladesh, India and the Netherlands are at great risk from coastal flooding. But many countries would be able to expand farming into regions that are now too cold or too dry to support it. And a few, like Saudi Ara-

bia, would lose much of their national income in a successful attempt to curb the use of fossil fuels.

The costs of carbon conservation would vary enormously. China, for example, is counting on its rich supplies of coal to develop with limited dependence on imported energy and capital. Yet without a broad, enforceable agreement on containing carbon, expenditures by individual countries would not pay off. Lester Lave, an economist at Carnegie-Mellon University, argues that an early commitment by the United States to tough carbon standards could lead to the worst of both worlds. "We pay attention to treaties," he says. But big carbon emitters like China and the Soviet Union might ignore their obligations, undermining the whole logic of collective action.

Such considerations lead many economists, including Mr. Lave, to counsel waiting until more is known before trying to devise preventative measures. Dan Dudek, an economist for the Environmental Defense Fund, draws a different conclusion. He wants to buy a modest amount of insurance against the small possibility of a true greenhouse effect disaster, some as yet undiscovered ecological effect that is impossible to reverse.

This is the time, he argues, to experiment with flexible "emissions-trading" systems that "improve the menu of options" for slowing global warming.

Virtually all economists seem to agree on the need to get beyond what Mr. Lave calls the "Earth Day come back" syndrome. The symbol of greenhouse effect, they argue, cannot be allowed to obscure the dimensions of the perplexing, high-stakes problem that lies beneath.

gases and says measures should also be taken to increase efficiency in energy production and energy use.”²⁸²

140. The *New York Times* coverage of the Second World Climate Conference in 1990 reported on scientists’ calls for “all nations to take immediate steps to control global warming” and scientists’ claims that “the technology already exists to make substantial cuts in the emission of harmful gases without jeopardizing economic growth.”²⁸³ According to the *New York Times*, the United States was depicted as the “great polluter” at the conference, an outlier among all the other industrial nations that proposed “freshly set targets to slow down or to reverse their output of carbon dioxide.”²⁸⁴

141. In 1992, just before the 1992 Earth Summit, the editorial board of *Newsweek* published an article that questioned reports of “a scientific consensus that the earth will warm.”²⁸⁵ The article reported that “[w]hen news reports say there is a scientific consensus that the earth will warm, what they mean is there is agreement that computers predict a warming. This is different from saying that experts believe global warming will happen. On the question of what will happen, the only scientific consensus is that the sky will remain blue” and that for as “much as the greenhouse effect exists in the popular imagination, there is little evidence it has manifested in the ‘laboratory of nature.’”²⁸⁶ As a political issue, according to the *Newsweek* editors, “global warming can engender such polar positions because the actuality of the subject is so pleasingly nebulous.”²⁸⁷

142. The 1992 United Nations Conference on Environment and Development, also known as the Rio Earth Summit, convened 172 nations in Rio de Janeiro, Brazil. The *New York*

²⁸² *Greenpeace Faults U.N. Panel*, N.Y. Times, Aug. 28, 1990, at C10, <https://www.nytimes.com/1990/08/28/science/greenpeace-faults-un-panel.html>.

²⁸³ Marlise Simons, *Scientists Urging Gas Emission Cuts*, N.Y. Times, Nov. 5, 1990, at A5, <https://www.nytimes.com/1990/11/05/world/scientists-urging-gas-emission-cuts.html>.

²⁸⁴ Marlise Simons, *Conference on Climate Singles Out U.S. as Wastrel of Energy*, N.Y. Times, Nov. 7, 1990, at A14, <https://www.nytimes.com/1990/11/07/world/conference-on-climate-singles-out-us-as-wastrel-of-energy.html>.

²⁸⁵ Newsweek Staff, *A House Of Cards*, Newsweek, May 31, 1992, <https://www.newsweek.com/house-cards-198780>.

²⁸⁶ *Id.*

²⁸⁷ *Id.*

Times ran a front-page article (Figure 18) covering President Bush's signing of the United Nations Framework Convention for Climate Change, stating "the world's nations have embarked on the lengthy and uncertain road of trying to avert the feared warming of the globe from the continued buildup of heat-trapping gases."²⁸⁸

Figure 18: *New York Times* Front Page, June 13, 1992



143. In 1993, President Clinton's Earth Day received front-page *New York Times* coverage for "[r]epudiating two major Bush Administration environmental policies."²⁸⁹ Quoting the President, the article said the United States would now "follow a specific timetable to reduce the threat of global warming."²⁹⁰ President Clinton also said that the United States must "take the

²⁸⁸ William Stevens, *With Climate Treaty Signed, All Say They'll Do Even More*, N.Y. Times, June 13, 1992, at 1, 4, <https://www.nytimes.com/1992/06/13/world/the-earth-summit-with-climate-treaty-signed-all-say-they-ll-do-even-more.html>.

²⁸⁹ Richard L. Berke, *Clinton Declares New U.S. Policies for Environment*, N.Y. Times, April 22, 1993, at A1, A10, <https://www.nytimes.com/1993/04/22/world/clinton-declares-new-us-policies-for-environment.html>.

²⁹⁰ *Id.*

lead in addressing the challenge of global warming that could make our planet and its climate less hospitable and more hostile to human life.”²⁹¹

144. In 1995, the *New York Times* highlighted the warning in the IPCC Second Assessment Report that “[d]elaying action to rein in emissions of heat-trapping atmospheric gases like carbon dioxide could increase the rate and magnitude of future climatic changes and make the world more vulnerable to costly and possibly irreversible damages.”²⁹²

145. In October 1997, before the summit in Kyoto, the *New York Times* ran an article which stated that “[t]he future severity of climate change is uncertain enough, and its future physical impact on particular countries and regions is more so. The uncertainty multiplies yet again when people try to calculate the costs and benefits of taking action to reduce greenhouse emissions.”²⁹³ The article also argued that “[h]owever things turn out, flesh-and-blood political realities are likely to overshadow uncertain science and economics in the diplomatic endgame at Kyoto.”²⁹⁴

146. On December 11, 1997, the Kyoto Protocol garnered two front-page articles in the *New York Times* titled “Meeting Reaches Accord to Reduce Greenhouse Gases” and “Warm Globe, Hot Politics” (Figure 19).²⁹⁵ The latter focused on domestic politics surrounding the deal. A *Time* magazine article titled “Climate Change Summit: A Treaty Meets a Sour Congress” included coverage of the Senate’s views on the treaty: “Senate majority leader Trent Lott, still stung by the pelting he got from his own party for helping President Clinton pass a chemical-weapons treaty earlier this year, didn’t bother to wait for negotiators in Japan to finish their work

²⁹¹ *Id.*

²⁹² William K. Stevens, *U.N. Warns Against Delay in Cutting Carbon Dioxide Emissions*, N.Y. Times, Oct. 25, 1995, at A13, <https://www.nytimes.com/1995/10/25/world/un-warns-against-delay-in-cutting-carbon-dioxide-emissions.html>.

²⁹³ William Stevens, *Doubts on Cost Are Bedeviling Climate Policy*, N.Y. Times, Oct. 6, 1997, <https://www.nytimes.com/1997/10/06/us/doubts-on-cost-are-bedeviling-climate-policy.html>.

²⁹⁴ *Id.*

²⁹⁵ William K. Stevens, *Meeting Reaches Accord to Reduce Greenhouse Gases*, N.Y. Times, Dec. 11, 1997, at A1, A10, <https://www.nytimes.com/1997/12/11/world/meeting-reaches-accord-to-reduce-greenhouse-gases.html>; James Bennet, *Warm Globe, Hot Politics*, N.Y. Times, Dec. 11, 1997, at A1, A10, <https://www.nytimes.com/1997/12/11/world/warm-globe-hot-politics.html>.

last week before declaring the deal dead. ‘If they come back and think we’re going to go along with what they’re doing in Kyoto, they’ve got another thin[g] coming,’ Lott said.”²⁹⁶

Figure 19: *New York Times* Front Page December 11, 1997



147. The media later heavily covered the United States’ withdrawal from the Kyoto Protocol and featured statements by scientists about the need for such an agreement. An article on the front page of the *New York Times* (Figure 20) stated “11 leading atmospheric scientists, including previous skeptics about global warming, reaffirmed the mainstream scientific view that the earth’s atmosphere was getting warmer and that human activity was largely responsible.”²⁹⁷

²⁹⁶ Karen Tumulty, *Climate Change Summit: A Treaty Meets a Sour Congress*, Time, Dec. 22, 1997, <http://content.time.com/time/subscriber/article/0,33009,987565,00.html>.

²⁹⁷ Katharine Q. Seelye and Andrew C. Revkin, *Panel Tells Bush Global Warming is Getting Worse*, N.Y. Times, June 7, 2001, at A1, A27, <https://timesmachine.nytimes.com/timesmachine/2001/06/07/686107.html?pageNumber=1>.