

MAYOR AND CITY COUNCIL OF BALTIMORE,
City Hall
100 N. Holliday St.,
Baltimore, MD 21202,

Plaintiff,

vs.

BP P.L.C.,
1 St James's Square
London,
SW1Y 4PD;

BP AMERICA, INC.,
200 E Randolph
Chicago IL 60601;

BP PRODUCTS NORTH AMERICA INC.,
7 St. Paul Street, Suite 820
Baltimore MD 21202;

CROWN CENTRAL PETROLEUM
CORPORATION;
1 North Charles Street
Suite 2100
Baltimore, MD 21201;

CROWN CENTRAL LLC,
1 North Charles Street
Suite 2100
Baltimore, MD 21201;

CROWN CENTRAL NEW HOLDINGS LLC,
1 N Charles St
Ste 2200
Baltimore, MD 21201;

CHEVRON CORP.,
6001 Bollinger Canyon Road
San Ramon, CA 94583;

CHEVRON U.S.A. INC.,
6001 Bollinger Canyon Road
San Ramon, CA 94583;

**IN THE
CIRCUIT COURT
FOR BALTIMORE CITY**

Case Number:

JURY TRIAL DEMANDED

18 JUL 20 8:51
CIVIL DIVISION
COURT CLERK FOR
BALTIMORE CITY

EXXON MOBIL CORP.,
5959 Las Colinas Boulevard
Irving, Texas 75039-2298;

EXXONMOBIL OIL CORPORATION,
5959 Las Colinas Boulevard
Irving, Texas 75039-2298;

ROYAL DUTCH SHELL PLC,
Carel van Bylandtlaan 16,
2596 HR The Hague,
The Netherlands;

SHELL OIL COMPANY,
P.O. Box 2463
Houston, TX 77252-2463;

CITGO PETROLEUM CORP.,
1293 Eldridge Parkway
Houston, TX 77077-1670;

CONOCOPHILLIPS,
600 North Dairy Ashford
Houston, Texas 77079-1175;

CONOCOPHILLIPS COMPANY,
600 North Dairy Ashford
Houston, Texas 77079-1175;

LOUISIANA LAND & EXPLORATION CO.,
909 Poydras Street
New Orleans, LA 70112;

PHILLIPS 66,
2331 CityWest Blvd
Houston, TX 77042;

PHILLIPS 66 COMPANY,
2331 CityWest Blvd
Houston, TX 77042;

MARATHON OIL COMPANY,
5555 San Felipe Street
Houston, TX 77056-2723;

MARATHON OIL CORPORATION,
5555 San Felipe Street
Houston, TX 77056-2723;

MARATHON PETROLEUM CORPORATION,
539 South Main Street
Findlay, OH 45840;

SPEEDWAY LLC,
500 Speedway Dr
Enon, OH 45323-1056;

HESS CORP.,
1209 Orange Street
Wilmington DE 19801;

CNX RESOURCES CORPORATION,
1000 Consol Energy Drive
Canonsburg PA 15317;

CONSOL ENERGY INC.,
1000 Consol Energy Drive
Canonsburg PA 15317;

CONSOL MARINE TERMINALS LLC,
1000 Consol Energy Drive
Canonsburg PA 15317;

Defendants.

PLAINTIFF'S COMPLAINT

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I. INTRODUCTION

1. Defendants, major corporate members of the fossil fuel industry, have known for nearly a half century that unrestricted production and use of their fossil fuel products create greenhouse gas pollution that warms the planet and changes our climate. They have known for decades that those impacts could be catastrophic and that only a narrow window existed to take action before the consequences would be irreversible. They have nevertheless engaged in a coordinated, multi-front effort to conceal and deny their own knowledge of those threats, discredit the growing body of publicly available scientific evidence, and persistently create doubt in the minds of customers, consumers, regulators, the media, journalists, teachers, and the public about the reality and consequences of the impacts of their fossil fuel pollution. At the same time, Defendants have promoted and profited from a massive increase in the extraction and consumption of oil, coal, and natural gas, which has in turn caused an enormous, foreseeable, and avoidable increase in global greenhouse gas pollution and a concordant increase in the concentration of greenhouse gases,¹ particularly carbon dioxide (“CO₂”) and methane, in the Earth’s atmosphere. Those disruptions of the Earth’s otherwise balanced carbon cycle have substantially contributed to a wide range of dire climate-related effects, including, but not limited to, global warming, rising atmospheric and ocean temperatures, ocean acidification, melting polar ice caps and glaciers, more extreme and volatile weather, and sea level rise. Plaintiff, the Mayor and City Council of Baltimore,² along with the Baltimore’s residents, infrastructure, and natural resources, suffer

¹ As used in this Complaint, the term “greenhouse gases” refers collectively to carbon dioxide, methane, and nitrous oxide. Where a cited primary source refers to a specific gas or gases, or when a process relates only to a specific gas or gases, this Complaint refers to each gas by name.

² In this Complaint, the words “City” and “Plaintiff” refer to the Mayor and City Council of Baltimore, unless otherwise stated. The word “Baltimore” refers to Baltimore City’s geographic area, and specifically to non-federal lands within its boundaries, unless otherwise stated.

the consequences.

2. Defendants are vertically integrated extractors, producers, refiners, manufacturers, distributors, promoters, marketers, and sellers of fossil fuel products. Decades of scientific research show that pollution from the production and use of Defendants' fossil fuel products plays a direct and substantial role in the unprecedented rise in emissions of greenhouse gas pollution and increased atmospheric CO₂ concentrations that has occurred since the mid-20th century. This dramatic increase in atmospheric CO₂ and other greenhouse gases is the main driver of the gravely dangerous changes occurring to the global climate.

3. Anthropogenic (human-caused) greenhouse gas pollution, primarily in the form of CO₂, is far and away the dominant cause of global warming resulting in severe impacts, including, but not limited to, sea level rise, disruption to the hydrologic cycle, more frequent and intense extreme precipitation and associated flooding, more frequent and intense heatwaves, and associated consequences of those physical and environmental changes.³ The primary source of this pollution is the extraction, production, and consumption of coal, oil, and natural gas, referred to collectively in this Complaint as "fossil fuel products."⁴

4. The rate at which Defendants have extracted and sold fossil fuel products has exploded since the Second World War, as have emissions from those products. The substantial

³See 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 [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)], IPCC, Geneva, Switzerland (2014) 6. Figure SMP.3, <https://www.ipcc.ch/report/ar5/syr>.

⁴ See C. Le Quéré et al., *Global Carbon Budget 2016*, 8 EARTH SYST. SCI. DATA 632 (2016), <http://www.earth-syst-sci-data.net/8/605/2016>. Cumulative emissions since the beginning of the industrial revolution to 2015 were 413 GtC attributable to fossil fuels, and 190 GtC attributable to land use change. *Id.* Global CO₂ emissions from fossil fuels and industry remained nearly constant at 9.9 GtC in 2015, distributed among coal (41%), oil (34%), gas (19%), cement (5.6%), and gas flaring (0.7%). *Id.* at 629.

majority of all greenhouse gas emissions in history has occurred since the 1950s, a period known as the “Great Acceleration.”⁵ About three quarters of all industrial CO₂ emissions in history have occurred since the 1960s,⁶ and more than half have occurred since the late 1980s.⁷ The annual rate of CO₂ emissions from extraction, production, and consumption of fossil fuels has increased by more than 60 percent since 1990.⁸

5. Defendants have known for nearly 50 years that greenhouse gas pollution from their fossil fuel products has a significant impact on the Earth’s climate and sea levels. Defendants’ awareness of the negative implications of their actions corresponds almost exactly with the Great Acceleration, and with skyrocketing greenhouse gas emissions. With that knowledge, Defendants took steps to protect their own assets from these threats through immense internal investment in research, infrastructure improvements, and plans to exploit new opportunities in a warming world.

6. Instead of working to reduce the use and combustion of fossil fuel products, lower the rate of greenhouse gas emissions, minimize the damage associated with continued high use and combustion of such products, and ease the transition to a lower carbon economy, Defendants concealed the dangers, sought to undermine public support for greenhouse gas regulation, and engaged in massive campaigns to promote the ever-increasing use of their products at ever greater volumes. Thus, each Defendant’s conduct has contributed substantially to the buildup of CO₂ in the environment that drives global warming and its physical, environmental, and socioeconomic consequences.

⁵ Will Steffen et al., *The Trajectory of the Anthropocene: The Great Acceleration*, 2 THE ANTHROPOCENE REVIEW 81, 81 (2015).

⁶ R. J. Andres et al., *A Synthesis of Carbon Dioxide Emissions from Fossil-Fuel Combustion*, 9 BIOGEOSCIENCES 1845, 1851 (2012).

⁷ *Id.*

⁸ C. Le Quéré et al., *Global Carbon Budget 2016*, *supra* note 4, at 630.

7. Defendants' products—based on the volume of oil, gas, and coal these companies extracted from the earth—are directly responsible for at least 151,000 gigatons of CO₂ emissions between 1965 and 2015, representing approximately 15 percent of total emissions of that potent greenhouse gas during that period. Accordingly, Defendants are directly responsible for a substantial portion of past and committed sea level rise (sea level rise that will occur even in the absence of any future emissions), as well as for a substantial portion of changes to the hydrologic cycle, because of the consumption of their fossil fuel products. Defendants, individually and collectively, have made even greater contributions to fossil fuel pollution based on their shares of “downstream” operations, that is, refinery output, as well as wholesale and retail sales of their products. And the Defendants, individually and collectively, have played leadership roles in denialist campaigns to confuse and obscure the role of their products in causing climate change and the associated dire effects on the world, including Baltimore.

8. As a direct and proximate consequence of Defendants' wrongful conduct described in this Complaint, flooding and storms will become more frequent and more severe, and average sea level will rise substantially along Maryland's coast, including in Baltimore. Disruptions to weather cycles, extreme precipitation, heatwaves, and associated consequences—all due to anthropogenic global warming—will increase in Baltimore. Because Baltimore is situated on the eastern seaboard in the Mid-Atlantic region and features over 60 miles of waterfront land, it is particularly vulnerable to sea level rise and flooding, and the City has already spent significant funds to study, mitigate, and adapt to the effects of global warming. Climate change impacts already adversely affect Baltimore and jeopardize City-owned or operated facilities deemed critical for operations, utility services, and risk management, as well as other assets that are essential to community health, safety, and well-being.

9. The City has engaged in several planning processes to prepare for the multitude of impacts from climatic shifts, and has recognized increasingly severe consequences therefrom.

10. Defendants' production, promotion, marketing of fossil fuel products, simultaneous concealment of the known hazards of those products, and their championing of anti-science campaigns, actually and proximately caused Plaintiff's injuries.

11. Accordingly, the City brings a claim against Defendants for Public Nuisance, Strict Liability for Failure to Warn, Strict Liability for Design Defect, Negligent Design Defect, Negligent Failure to Warn, Trespass, and violations of the Maryland Consumer Protection Act, Md. Code Ann., Comm. L. § 13-301.

12. By this Complaint, the City seeks to ensure that the parties who have profited from externalizing the responsibility for sea level rise, extreme precipitation events, heatwaves, other results of the changing hydrologic regime caused by increasing temperatures, and associated consequences of those physical and environmental changes, bear the costs of those impacts on the City, rather than Plaintiff, local taxpayers, residents, or broader segments of the public. The City does not seek to impose liability on Defendants for their direct emissions of greenhouse gases and does not seek to restrain Defendants from engaging in their business operations.

II. PARTIES

A. Plaintiff

13. Plaintiff, the Mayor and City Council of Baltimore, brings this action as an exercise of its police power, which includes, but is not limited to, its power to prevent pollution of the Baltimore's property and waters, to prevent and abate nuisances, and to prevent and abate hazards to public health, safety, welfare, and the environment.

14. Baltimore is already experiencing sea level rise and associated impacts. Baltimore will experience significant additional sea level rise over the coming decades through at least the end of the century.⁹

15. The sea level rise impacts to Baltimore associated with an increase in average mean sea level height adjacent and near to Baltimore include, but are not limited to, increased inundation (permanent) and flooding (temporary) in natural and built environments with higher tides and intensified wave and storm surge events, and aggravated wave impacts, including erosion, damage, and destruction of built structures and infrastructure.

16. In addition, Baltimore is and will continue to be impacted by increased temperatures and disruptions to the hydrologic cycle. Baltimore is already experiencing a climatic and meteorological shift toward winters and springs with more extreme precipitation events contrasted by hotter, dryer, and longer summers. These changes have led to increased property damage, economic injuries, and impacts to public health. The City must spend substantial funds to plan for and respond to these phenomena, and to mitigate their secondary and tertiary impacts.

17. Compounding these environmental impacts are cascading social and economic impacts, which cause injuries to the City that will arise out of localized climate change-related conditions.

B. Defendants

18. Defendants are responsible for a substantial portion of the total greenhouse gases emitted since 1965. Defendants, individually and collectively, are responsible for extracting, refining, processing, producing, promoting, and marketing fossil fuel products, the normal and

⁹ Union of Concerned Scientist. *When Rising Seas Hit Home*, 10–11 (April 2017), <https://www.ucsusa.org/sites/default/files/attach/2017/07/when-rising-seas-hit-home-full-report.pdf>

intended use of which has led to the emission of a substantial percentage of the total volume of greenhouse gases released into the atmosphere since 1965. Indeed, between 1965 and 2015, the named Defendants extracted from the earth enough fossil fuel materials (i.e. crude oil, coal, and natural gas) to account for more than one in every six tons of CO₂ and methane emitted worldwide. Accounting for their wrongful promotion and marketing activities, Defendants bear a dominant responsibility for global warming generally, and for the City's injuries in particular. Defendants' responsibility is even greater considering their production, marketing and promotion activities in the wholesale and retail markets for their products.

19. When reference in this Complaint is made to an act or omission of the Defendants, unless specifically attributed or otherwise stated, such references should be interpreted to mean that the officers, directors, agents, employees, or representatives of the Defendants committed or authorized such an act or omission, or failed to adequately supervise or properly control or direct their employees while engaged in the management, direction, operation or control of the affairs of Defendants, and did so while acting within the scope of their employment or agency.

20. **BP Entities**

a. BP P.L.C. is a multi-national, vertically integrated energy and petrochemical public limited company, registered in England and Wales with its principal place of business in London, England. BP P.L.C. consists of three main operating segments: (1) exploration and production, (2) refining and marketing, and (3) gas power and renewables. BP P.L.C. is the ultimate parent company of numerous subsidiaries, referred to collectively as the "BP Group," which explore for and extract oil and gas worldwide; refine oil into fossil fuel products such as gasoline; and market and sell oil, fuel, other refined petroleum products, and natural gas

worldwide. BP P.L.C.'s subsidiaries explore for oil and natural gas under a wide range of licensing, joint arrangement, and other contractual agreements.

b. BP P.L.C. controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. BP P.L.C. is the ultimate decisionmaker on fundamental decisions about the BP Group's core business, *i.e.*, the level of companywide fossil fuels to produce, including production among BP P.L.C.'s subsidiaries. For instance, BP P.L.C. reported that in 2016-17 it brought online thirteen major exploration and production projects. These contributed to a 12 percent increase in the BP Group's overall fossil fuel product production. These projects were carried out by BP P.L.C.'s subsidiaries. Based on these projects, BP P.L.C. expects the BP Group to deliver to customers 900,000 barrels of new product per day by 2021. BP P.L.C. further reported that in 2017 it sanctioned three new exploration projects in Trinidad, India and the Gulf of Mexico.

c. BP P.L.C. controls and has controlled companywide decisions about the quantity and extent of fossil fuel production, including those of its subsidiaries. BP P.L.C. makes fossil fuel production decisions for the entire BP Group based on factors including climate change. BP P.L.C.'s Board is the highest decision-making body within the company, with direct responsibility for the BP Group's climate change policy. BP P.L.C.'s chief executive is responsible for maintaining the BP Group's system of internal control that governs the BP Group's business conduct. BP P.L.C. reviews climate change risks facing the BP Group through two executive committees—chaired by the Group chief executive, and one working group chaired by the executive vice president and Group chief of staff—as part of BP Group's established management structure, and directs Group-wide strategy and decisions regarding climate change.

d. BP America Inc., is a wholly-owned subsidiary of BP P.L.C. that acts on BP P.L.C.'s behalf and subject to BP P.L.C.'s control. BP America Inc. is a vertically integrated energy and petrochemical company incorporated in the State of Delaware with its headquarters and principal place of business in Houston, Texas. BP America Inc., consists of numerous divisions and affiliates in all aspects of the fossil fuel industry, including exploration for and production of crude oil and natural gas; manufacture of petroleum products; and transportation, marketing, and sale of crude oil, natural gas, and petroleum products. BP America Inc. has been qualified to do business in Maryland. BP America Inc. was formerly known as, did or does business as, and/or is the successor in liability to Amoco Corporation; Amoco Oil Company; ARCO Products Company; Atlantic Richfield Delaware Corporation; Atlantic Richfield Company (a Delaware Corporation); BP Exploration & Oil, Inc.; BP Products North America Inc.; BP Amoco Corporation; BP Amoco Plc; BP Oil, Inc.; BP Oil Company; Sohio Oil Company; Standard Oil of Ohio (SOHIO); Standard Oil (Indiana); The Atlantic Richfield Company (a Pennsylvania corporation) and its division, the Arco Chemical Company.

e. BP Products North America Inc. is a subsidiary of BP P.L.C. that acts on BP P.L.C.'s behalf and subject to BP P.L.C.'s control. BP Products North America Inc. is engaged in fossil fuel exploration, production, refining, and marketing. It is formed under the laws of Maryland and domiciled in Maryland. BP Products North America Inc. maintains its registered offices at 351 West Camden Street, Baltimore, Maryland, 21201.

f. Defendants BP P.L.C., BP America, Inc., and BP Products North America, Inc., are collectively referred to herein as "BP."

g. BP transacts and has transacted substantial fossil fuel-related business in Maryland. A substantial portion of BP's fossil fuel products are or have been extracted, refined,

transported, traded, distributed, marketed, manufactured, promoted, sold, and/or consumed in Maryland, from which BP derives and has derived substantial revenue. For example, BP operates a fossil fuel terminal in Curtis Bay, Maryland, with the capacity to store and distribute approximately 21,840,000 gallons of oil. Additionally, BP markets and/or has promoted and marketed gasoline and other fossil fuel products to consumers, including through at least 180 BP-branded petroleum service stations in Maryland.

21. **Crown Central Entities**

- a. Crown Central Petroleum Corporation has been among the largest independent refiners and marketers of petroleum products in the United States. Crown Central Petroleum Corporation was incorporated in Maryland and had its principal place of business in Baltimore, Maryland. Crown Central Petroleum Corporation was formerly known as, did or does business as, and/or is the predecessor in liability to Crown Central LLC and Crown Central New Holdings, LLC. Crown Central LLC is incorporated in Maryland and has its principal offices in Baltimore, Maryland. Crown Central New Holdings LLC is incorporated in Maryland and has its principal offices in Baltimore, Maryland.
- b. Defendants Crown Central Petroleum Corporation, Crown Central LLC, Crown Central New Holdings LLC, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions are collectively referred to herein as "Crown Central."
- c. Crown Central transacts and/or has transacted substantial fossil fuel-related business in Maryland. A substantial portion of Crown Central's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, manufactured, sold, and/or consumed in Maryland, from which Crown Central derives and has derived substantial revenue. For example, Crown Central marketed or markets gasoline and other fossil fuel products to

consumers in Maryland through over 100 Crown-branded petroleum service stations in Maryland.

22. **Chevron Entities**

a. Chevron Corporation is a multi-national, vertically integrated energy and chemicals company incorporated in the State of Delaware, with its global headquarters and principal place of business in San Ramon, California.

b. Chevron Corporation operates through a web of United States and international subsidiaries at all levels of the fossil fuel supply chain. Chevron Corporation's and its subsidiaries' operations consist of: 1) exploring for, developing, and producing crude oil and natural gas; 2) processing, liquefaction, transportation, and regasification associated with liquefied natural gas; 3) transporting crude oil by major international oil export pipelines; 4) transporting, storage, and marketing of natural gas; 5) refining crude oil into petroleum products; marketing of crude oil and refined products; 6) transporting crude oil and refined products by pipeline, marine vessel, motor equipment, and rail car; 7) basic and applied research in multiple scientific fields including chemistry, geology, and engineering; and 8) manufacturing and marketing of commodity petrochemicals, plastics for industrial uses, and fuel and lubricant additives.

c. Chevron Corporation controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

d. Chevron Corporation controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

e. Chevron U.S.A. Inc. is a Pennsylvania corporation with its principal place of business located in San Ramon, California. Chevron U.S.A. Inc. is qualified to do business in Maryland. Chevron U.S.A. Inc. is a wholly owned subsidiary of Chevron Corporation that acts on

Chevron Corporation's behalf and subject to Chevron Corporation's control. Chevron U.S.A. Inc. was formerly known as, and did or does business as, and/or is the successor in liability to Gulf Oil Corporation, Gulf Oil Corporation of Pennsylvania, Chevron Products Company, and Chevron Chemical Company.

f. "Chevron" as used hereafter, means collectively, Defendants Chevron Corporation and Chevron U.S.A. Inc., and their predecessors, successors, parents, subsidiaries, affiliates, and divisions.

g. Chevron transacts and has transacted substantial fossil fuel-related business in Maryland. A substantial portion of Chevron's fossil fuel products are or have been extracted, refined, transported, traded, distributed, promoted, marketed, manufactured, sold, and/or consumed in Maryland, from which Chevron derives and has derived substantial revenue. For example, Chevron owned and operated a petroleum and asphalt refinery and fossil fuel-product terminal in Baltimore directly and/or through its subsidiaries and predecessors-in-interest for a period spanning at least 1948 to 2003. Additionally, Chevron markets and/or has marketed gasoline and other fossil fuel products to consumers, including through Chevron-branded petroleum services stations in Maryland.

23. **Exxon Mobil Entities**

a. Exxon Mobil Corporation is a multi-national, vertically integrated energy and chemicals company incorporated in the State of New Jersey with its headquarters and principal place of business in Irving, Texas. Exxon Mobil Corporation is among the largest publicly traded international oil and gas companies in the world. Exxon Mobil Corporation was formerly known as, did or does business as, and/or is the successor in liability to ExxonMobil Refining and Supply Company, Exxon Chemical U.S.A., ExxonMobil Chemical Corporation, ExxonMobil Chemical

U.S.A., ExxonMobil Refining & Supply Corporation, Exxon Company, U.S.A., Exxon Corporation, and Mobil Corporation.

b. Exxon Mobil Corporation controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. Exxon Mobil Corporation's 2017 Form 10-K filed with the United States Securities and Exchange Commission represents that its success, including its "ability to mitigate risk and provide attractive returns to shareholders, depends on [its] ability to successfully manage [its] overall portfolio, including diversification among types and locations of our projects."

c. Exxon Mobil Corporation controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. Exxon Mobil Corporation's Board holds the highest level of direct responsibility for climate change policy within the company. Exxon Mobil Corporation's Chairman of the Board and Chief Executive Officer, its President and the other members of its Management Committee are actively engaged in discussions relating to greenhouse gas emissions and the risks of climate change on an ongoing basis. Exxon Mobil Corporation requires its subsidiaries to provide an estimate of greenhouse gas-related emissions costs in their economic projections when seeking funding for capital investments.

d. Exxonmobil Oil Corporation is wholly-owned subsidiary of Exxon Mobil Corporation that acts on Exxon Mobil Corporation's behalf and subject to Exxon Mobil Corporation's control. Exxonmobil Oil Corporation is incorporated in the State of New York with its principal place of business in Irving, Texas. Exxonmobil Oil Corporation is qualified to do business in Maryland. Exxon Mobil Oil Corporation was formerly known as, did or does business as, and/or is the successor in liability to Mobil Oil Corporation.

e. “Exxon” as used hereafter, means collectively Defendants Exxon Mobil Corporation and Exxonmobil Oil Corporation, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions.

f. Exxon consists of numerous divisions and affiliates in all areas of the fossil fuel industry, including exploration for and production of crude oil and natural gas; manufacture of petroleum products; and transportation, promotion, marketing, and sale of crude oil, natural gas, and petroleum products. Exxon is also a major manufacturer and marketer of commodity petrochemical products.

g. Exxon transacts and has transacted substantial fossil fuel-related business in Maryland. A substantial portion of Exxon’s fossil fuel products are or have been extracted, refined, transported, traded, distributed, promoted, marketed, manufactured, sold, and/or consumed in Maryland, from which Exxon derives and has derived substantial revenue. For example, Exxon directly and through its subsidiaries and/or predecessors in interest owned and operated an oil refinery in Baltimore from 1893 to the mid-1950s. In the mid-1950s, the facility was converted to a petroleum storage and marketing facility which Exxon operated until 1998. Additionally, Exxon markets or has marketed gasoline and other fossil fuel products to consumers, including through at least 250 Exxon-branded and at least 40 Mobil-branded petroleum service stations in Maryland. Exxon maintains an interactive website that allows consumers to locate Exxon-branded gas stations in Maryland.

24. **Shell Entities**

a. Royal Dutch Shell PLC is a vertically integrated, multinational energy and petrochemical company. Royal Dutch Shell PLC is incorporated in England and Wales, with its headquarters and principal place of business in the Hague, Netherlands. Royal Dutch Shell PLC

consists of over a thousand divisions, subsidiaries, and affiliates engaged in all aspects of the fossil fuel industry, including exploration, development, extraction, manufacturing, and energy production, transport, trading, marketing, and sales.

b. Royal Dutch Shell PLC controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. Royal Dutch Shell PLC's Board of Directors determines whether and to what extent Shell subsidiary holdings around the globe produce Shell-branded fossil fuel products. For instance, in 2015, a Royal Dutch Shell PLC subsidiary employee admitted in a deposition that Royal Dutch Shell PLC's Board of Directors made the decision whether to drill a particular oil deposit off the coast of Alaska.

c. Royal Dutch Shell PLC controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. Overall accountability for climate change within the Shell group of companies lies with Royal Dutch Shell PLC's Chief Executive Officer and Executive Committee. Additionally, in November 2017, Royal Dutch Shell PLC announced it would reduce the carbon footprint of "its energy products" by "around" half by 2050. Royal Dutch Shell PLC's effort is inclusive of all fossil fuel products produced under the Shell brand, including those of its subsidiaries. Royal Dutch Shell PLC's CEO stated that Royal Dutch Shell PLC would reduce the carbon footprint of its products, including those of its subsidiaries "by reducing the net carbon footprint of the full range of Shell emissions, from our operations and from the consumption of our products." Additionally, at least as early as 1988, Royal Dutch Shell PLC, by and through its subsidiaries, was researching companywide CO₂ emissions and concluded that the Shell group of companies accounted for "4% of the CO₂ emitted worldwide from combustion," and that climatic

changes could compel the Shell group, as controlled by Royal Dutch Shell PLC, to “examine the possibilities of expanding and contracting [its] business accordingly.”¹⁰

d. Shell Oil Company is a wholly owned subsidiary of Royal Dutch Shell PLC that acts on Royal Dutch Shell PLC’s behalf and subject to Royal Dutch Shell PLC’s control. Shell Oil Company is incorporated in Delaware and with its principal place of business in Houston, Texas. Shell Oil Company is qualified to do business in Maryland. Shell Oil Company was formerly known as, did or does business as, and/or is the successor in liability to Deer Park Refining LP, Shell Oil, Shell Oil Products, Shell Chemical, Shell Trading US, Shell Trading (US) Company, Shell Energy Services, Texaco Inc., The Pennzoil Company, Shell Oil Products Company LLC, Shell Oil Products Company, Star Enterprise, LLC, Star Enterprise LLC, and Pennzoil-Quaker State Company.

e. Royal Dutch Shell has purposefully directed, and purposefully directs fossil fuel products into Maryland, and has conducted substantial fossil fuel business in Maryland. In particular, Shell has marketed and continues to market gasoline and other fossil fuel products to consumers through over 200 Shell-branded petroleum service stations. Prior to March 2017, Royal Dutch Shell also solely operated two petroleum storage and distribution terminals in Baltimore in which it owned a 50 percent stake, at which it transferred and stored distillate oils, various grades of gasoline, liquid gasoline additives, and distillate products.

f. Defendants Royal Dutch Shell PLC, Shell Oil Company, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions are collectively referred to as “Shell.”

¹⁰ Shell Internationale Petroleum Maatschappij B.V., *The Greenhouse Effect* at 29 (1988) (prepared for Shell Environmental Conservation Committee).

g. Shell transacts and has transacted substantial fossil fuel-related business in Maryland. A substantial portion of Shell's fossil fuel products are or have been extracted, refined, transported, traded, distributed, promoted marketed, manufactured, sold, and/or consumed in Maryland, from which Shell derives and has derived substantial revenue.

25. **Citgo Petroleum Corporation ("Citgo")**

a. Citgo is a direct, wholly owned subsidiary of PDV America, Incorporated, which is a wholly owned subsidiary of PDV Holding, Incorporated. These organizations' ultimate parent is Petróleos de Venezuela, S.A. ("PDVSA"), an entity wholly owned by the Republic of Venezuela that plans, coordinates, supervises, and controls activities carried out by its subsidiaries. Citgo is incorporated in the State of Delaware and maintains its headquarters in Houston, Texas. Citgo is qualified to do business in Maryland.

b. Citgo controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Citgo controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Citgo and its subsidiaries are engaged in the refining, marketing, and transportation of petroleum products including gasoline, diesel fuel, jet fuel, petrochemicals, lubricants, asphalt, and refined waxes.

e. Citgo transacts and has transacted substantial fossil fuel-related business in Maryland. A substantial portion of Citgo's fossil fuel products are or have been extracted, refined, transported, traded, distributed, promoted, marketed, manufactured, sold, and/or consumed in Maryland, from which Citgo derives and has derived substantial revenue. For instance, the Citgo

Terminal at the Port of Baltimore distributes more than 430 million gallons of gasoline and diesel annually to retail service stations across the northeastern United States, including Maryland. The Citgo Terminal is also a major supplier of ethanol, a gasoline additive, to the mid-Atlantic region, including Maryland. Additionally, Citgo marketed or markets gasoline and other fossil fuel products to consumers in Maryland, including through approximately 160 Citgo-branded petroleum service stations in Maryland.

26. **ConocoPhillips Entities**

a. ConocoPhillips is a multinational energy company incorporated in the State of Delaware and with its principal place of business in Houston, Texas. ConocoPhillips consists of numerous divisions, subsidiaries, and affiliates that carry out ConocoPhillips's fundamental decisions related to all aspects of the fossil fuel industry, including exploration, extraction, production, manufacture, transport, and marketing.

b. ConocoPhillips controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. ConocoPhillips' most recent annual report subsumes the operations of the entire ConocoPhillips group of subsidiaries under its name. Therein, ConocoPhillips represents that its value—for which ConocoPhillips maintains ultimate responsibility—is a function of its decisions to direct subsidiaries to explore for and produce fossil fuels: "Unless we successfully add to our existing proved reserves, our future crude oil, bitumen, natural gas and natural gas liquids production will decline, resulting in an adverse impact to our business." ConocoPhillips optimizes the ConocoPhillips group's oil and gas portfolio to fit ConocoPhillips' strategic plan. For example, in November 2016, ConocoPhillips announced a plan to generate \$5 billion to \$8 billion of proceeds over two years by optimizing its business portfolio, including its fossil fuel product business, to

focus on low cost-of-supply fossil fuel production projects that strategically fit its development plans.

c. ConocoPhillips controls and has controlled companywide decisions related to global warming and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. For instance, ConocoPhillips' Board has the highest level of direct responsibility for climate change policy within the company. ConocoPhillips has developed and implements a corporate Climate Change Action Plan to govern climate change decision-making across all entities in the ConocoPhillips group.

d. ConocoPhillips Company is a wholly owned subsidiary of ConocoPhillips that acts on ConocoPhillips' behalf and subject to ConocoPhillips' control. ConocoPhillips Company is incorporated in Delaware and has its principal office in Bartlesville, Oklahoma. ConocoPhillips Company is qualified to do business in Maryland and has a registered agent for service of process in Maryland.

e. Louisiana Land & Exploration Co. is a wholly owned subsidiary of ConocoPhillips that acts on ConocoPhillips' behalf and subject to ConocoPhillips' control. Louisiana Land & Exploration Co. is incorporated in Maryland and has its principal office in New Orleans, Louisiana. Louisiana Land & Exploration Co. explores for, develops, and produces petroleum natural resources. Louisiana Land & Exploration Co. maintains a registered agent for service of process in Maryland.

f. Phillips 66 is a multinational energy and petrochemical company incorporated in Delaware and with its principal place of business in Houston, Texas. It encompasses downstream fossil fuel processing, refining, transport, and marketing segments that were formerly owned and/or controlled by ConocoPhillips.

g. Phillips 66 Company is a wholly owned subsidiary of Phillips 66 that acts on Phillips 66's behalf and subject to Phillips 66's control. Phillips 66 Company is incorporated in Delaware and has its principal office in Houston, Texas. Phillips 66 Company is qualified to do business in Maryland and has a registered agent for service of process in Maryland. Phillips 66 Company was formerly known as, did or does business as, and/or is the successor in liability to Phillips Petroleum Company, Conoco, Inc., Tosco Corporation, and Tosco Refining Co.

h. Defendants ConocoPhillips, ConocoPhillips Company, Louisiana Land & Exploration Co., Phillips 66, Phillips 66 Company, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions are collectively referred to herein as "ConocoPhillips."

i. ConocoPhillips transacts and has transacted substantial fossil fuel-related business in Maryland. A substantial portion of ConocoPhillips's fossil fuel products are or have been extracted, refined, transported, traded, distributed, promoted, marketed, manufactured, sold, and/or consumed in Maryland, from which ConocoPhillips derives and has derived substantial revenue. For instance, ConocoPhillips marketed or markets gasoline and other fossil fuel products to consumers in Maryland, including through ConocoPhillips- and Phillips 66-branded petroleum service stations located in Maryland.

27. **Marathon Entities**

a. Marathon Oil Company is an energy company incorporated in the State of Ohio with its principal place of business in Houston, Texas. Marathon Oil Company is a corporate ancestor of Marathon Oil Corporation and Marathon Petroleum Company.

b. Marathon Oil Corporation is a multinational energy company incorporated in the State of Delaware and with its principal place of business in Houston, Texas. Marathon Oil Corporation consists of multiple subsidiaries and affiliates involved in the exploration for,

extraction, production, and marketing of fossil fuel products.

c. Marathon Petroleum Corporation is a multinational energy company incorporated in Delaware and with its principal place of business in Findlay, Ohio. Marathon Petroleum Corporation was spun off from the operations of Marathon Oil Corporation in 2011. It consists of multiple subsidiaries and affiliates involved in fossil fuel product refining, marketing, retail, and transport, including both petroleum and natural gas products.

d. Marathon Oil Corporation and Marathon Petroleum Corporation control and have controlled their companywide decisions about the quantity and extent of fossil fuel production and sales, including those of their subsidiaries.

e. Marathon Oil Corporation and Marathon Petroleum Corporation control and have controlled their companywide decisions about the quantity and extent of fossil fuel production, including those of their subsidiaries.

f. Speedway LLC is a wholly owned subsidiary of Marathon Petroleum Corporation that acts on Marathon Petroleum Corporation's behalf and subject to Marathon Petroleum Corporation's control. Speedway LLC is incorporated in the State of Delaware with its principal place of business in Enon, Ohio. Speedway LLC is qualified to do business in Maryland and has a registered agent for service of process in Maryland.

g. Defendants Marathon Oil Company, Marathon Oil Corporation, Marathon Petroleum Corporation, Speedway LLC, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions, are collectively referred to as "Marathon."

h. Marathon transacts and has transacted substantial fossil fuel-related business in Maryland. A substantial portion of Marathon's fossil fuel products are or have been extracted, refined, transported, traded, distributed, promoted, marketed, manufactured, sold, and/or

consumed in Maryland, from which Marathon derives and has derived substantial revenue. For example, Marathon marketed or markets gasoline and other fossil fuel products to consumers in Maryland, including through over 25 Marathon- and Speedway-branded petroleum service stations in Maryland.

28. **Hess Corporation (“Hess”)**

a. Hess is a global, vertically integrated petroleum exploration and extraction company incorporated in the State of Delaware with its headquarters and principal place of business in New York, New York. Hess is qualified to do business in Maryland and has a registered agent for service of process in Maryland. Hess was formerly known as, did or does business as, and/or is the successor in liability to Amerada Hess Corporation, WilcoHess LLC, Hess Oil Virgin Islands Corporation, Hess Energy Trading Company, LLC, and Hartree Partners, LP.

b. Hess is engaged in the exploration, development, production, transportation, purchase, marketing, and sale of crude oil and natural gas. Its oil and gas production operations are located primarily in the United States, Denmark, Equatorial Guinea, Malaysia, Thailand, and Norway. Prior to 2014, Hess also conducted extensive retail operations in its own name and through its subsidiaries.

c. Hess controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

d. Hess controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

e. Hess directs and has directed substantial fossil fuel-related business to Maryland. A substantial portion of Hess’s fossil fuel products are or have been extracted, refined,

transported, traded, distributed, promoted, marketed, manufactured, sold, and/or consumed in Maryland, from which Hess derives and has derived substantial revenue. For example, Hess marketed or markets gasoline and other fossil fuel products to consumers in Maryland, including through petroleum service stations in Maryland.

29. **CONSOL Entities**

a. CNX Resources Corporation is a vertically integrated energy company that is or has been involved in coal mining, oil and natural gas exploration and production, fossil fuel product distribution, and fossil fuel product marketing. CNX Resources Corporation is incorporated in Delaware, with its principal place of business in Canonsburg, Pennsylvania. CNX Resources Corporation was formerly known as CONSOL Energy Inc. CONSOL Energy Inc. and its predecessors in interest mined and sold coal since the 1860s. In 2017, CNX Resources Corporation split its coal mining and related downstream operations into a new entity, also called CONSOL Energy Inc.

b. CONSOL Energy Inc. is incorporated in the state of Delaware, and with its principal place of business in Canonsburg, Pennsylvania. CONSOL Energy Inc. was formerly known as, did or does business as, and/or is the successor in liability to CNX Resources Corporation.

c. CNX Resources Corporation and CONSOL Energy Inc. control and have controlled their companywide decisions about the quantity and extent of fossil fuel production and sales, including those of their subsidiaries.

d. CNX Resources Corporation and CONSOL Energy Inc. control and have controlled their companywide decisions about the quantity and extent of fossil fuel production, including those of their subsidiaries.

e. CONSOL Marine Terminals LLC is a subsidiary of CONSOL Energy Inc. that acts on CONSOL Energy Inc.'s behalf and subject to CONSOL Energy Inc.'s control. CONSOL Marine Terminals LLC is incorporated in the State of Delaware and has its principal place of business in Canonsburg, Pennsylvania. CONSOL Marine Terminals LLC is qualified to do business in Maryland and has a registered agent for service of process in Maryland. Defendants CNX Resources Corporation, CONSOL Energy Inc., CONSOL Marine Terminals LLC, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions are collectively referred to herein as "CONSOL."

f. CONSOL transacts and has transacted substantial fossil fuel-related business in Maryland. A substantial portion of CONSOL's fossil fuel products are or have been extracted, refined, transported, traded, distributed, promoted, marketed, manufactured, sold, and/or consumed in Maryland, from which CONSOL derives and has derived substantial revenue. For instance, CONSOL owns and operates one of the largest coal export terminals on the Eastern Seaboard, located in the Port of Baltimore. In 2017, CONSOL shipped approximately 14.3 million tons of coal from its terminal in Baltimore, 53 percent of which came from CONSOL's own coal mines in Appalachia. From the terminal, CONSOL sells and/or distributes that coal into markets in Brazil, Germany, India, and South Korea, among others.

Relevant Non-Parties: Fossil Fuel Industry Associations

30. As set forth in greater detail below, each Defendant had actual knowledge that its fossil fuel products were hazardous. Defendants obtained knowledge of the hazards of their products independently and through their membership and involvement in trade associations.

31. Each Defendant's fossil fuel promotion and marketing efforts were assisted by the trade associations described below. Acting on behalf of the Defendants, the industry associations

engaged in a long-term course of conduct to misrepresent, omit, and conceal the dangers of Defendants' fossil fuel products.

a. **The American Petroleum Institute (API)**: API is a national trade association representing the oil and gas industry, formed in 1919. The following Defendants and/or their predecessors in interest are and/or have been API members at times relevant to this litigation: BP, Chevron, Crown Central, ExxonMobil, Shell, ConocoPhillips, Marathon, and Hess.¹¹

b. **The Western States Petroleum Association (WSPA)**: WSPA is a trade association representing oil producers in Arizona, California, Nevada, Oregon, and Washington.¹² Membership has included, among other entities: BP, Chevron, Shell, ConocoPhillips, and ExxonMobil.¹³

c. **The American Fuel and Petrochemical Manufacturers (AFPM)** is a national association of petroleum and petrochemical companies, formerly known as the National Petroleum Refiners Association. At relevant times, its members included, but were not limited to, BP, Chevron, Citgo, Exxon Mobil, ConocoPhillips, Marathon, Shell, and Total.¹⁴

d. **U.S. Oil & Gas Association (USOGA)** is a national trade association representing oil and gas producers, formerly known as the Mid-Continent Oil & Gas Association. USOGA's membership has included BP, Chevron, Citgo, Exxon, Shell, Marathon,

¹¹ American Petroleum Institute, *Members* (webpage) (accessed June 18, 2018), <http://www.api.org/membership/members>.

¹² Western States Petroleum Association, *About* (webpage) (accessed June 18, 2018), <https://www.wspa.org/about>.

¹³ Western States Petroleum Association, *Member Companies* (webpage) (accessed June 18, 2018), <https://www.wspa.org/about>.

¹⁴ American Fuel and Petrochemical Manufacturers, *Membership Directory* (webpage) (accessed June 18, 2018), <https://www.afpm.org/membership-directory>.

ConocoPhillips, and Hess.¹⁵

e. **Western Oil & Gas Association** was a California nonprofit trade association representing the oil and gas industries, consisting of over 75 member companies. Its members included companies and individual responsible for more than 65 percent of petroleum production and 90 percent of petroleum refining and marketing in the Western United States.¹⁶ WOGA membership included, but was not limited to, Defendants Chevron, ConocoPhillips, Exxon, and Shell.¹⁷ Other fossil fuel company members of WOGA included, but were not limited to, Champlin Petroleum Company (Anadarko)¹⁸ and Reserve Oil & Gas Company.¹⁹

f. **The Information Council for the Environment (ICE)**: ICE was formed by coal companies and their allies, including Western Fuels Association and the National Coal Association. Associated companies included Pittsburg and Midway Coal Mining (Chevron), and Island Creek Coal Company (Occidental).

g. **The Global Climate Coalition (GCC)**: GCC was an industry group formed to oppose greenhouse gas emission reduction policies and the Kyoto Protocol. It was founded in 1989 shortly after the first Intergovernmental Panel on Climate Change meeting, and disbanded in 2001. Founding members included the National Association of Manufacturers, the National Coal Association, the Edison Electric Institute, and the United States Chamber of Commerce. The GCC's early individual corporate members included Amoco (BP), API, Chevron, Exxon, Ford,

¹⁵ See, e.g., Louisiana Mid-Continent Oil & Gas Association, *Member Companies* (webpage) (accessed June 18, 2018), <http://www.lmoga.com/members/member-companies>.

¹⁶ *Am. Petroleum Inst. v. Knecht*, 456 F. Supp. 889, 894 n.2 (C.D. Cal. 1978), *aff'd*, 609 F.2d 1306 (9th Cir. 1979).

¹⁷ *Id.* at 894 n.3.

¹⁸ Hereinafter, parenthetical references to Defendants indicate corporate ancestry and/or affiliation.

¹⁹ *Am. Petroleum Inst. v. Knecht*, 456 F. Supp. at 894 n.3.

Shell Oil, Texaco (Chevron) and Phillips Petroleum (ConocoPhillips). Over its existence other members and funders included ARCO (BP), and the Western Fuels Association. The coalition also operated for several years out of the National Association of Manufacturers' offices.

III. AGENCY

32. At all times herein mentioned, each of the Defendants was the agent, servant, partner, aider and abettor, co-conspirator, and/or joint venturer of each of the remaining Defendants herein and was at all times operating and acting within the purpose and scope of said agency, service, employment, partnership, conspiracy, and joint venture and rendered substantial assistance and encouragement to the other Defendants, knowing that their conduct was wrongful and/or constituted a breach of duty.

IV. JURISDICTION AND VENUE

33. This Court has subject matter jurisdiction over this matter under § 1-501 of the Courts and Judicial Proceedings Article of the Maryland Code.

34. This Court has personal jurisdiction over Defendants because they either are domiciled in Maryland; were served with process in Maryland; are organized under the laws of Maryland; maintain their principal place of business in Maryland; transact business in Maryland; perform work in Maryland; contract to supply goods, manufactured products, or services in Maryland; caused tortious injury in Maryland; engage in persistent courses of conduct in Maryland; derive substantial revenue from manufactured goods, products, or services used or consumed in Maryland; and/or have interests in, use, or possess real property in Maryland.

35. Venue in this Court is proper because the City's causes of action arose in Baltimore and because at least one defendant conducts business there.

V. **FACTUAL BACKGROUND**

A. **Global Warming—Observed Effects and Known Cause**

36. Warming of the climate system is unequivocal. Since the 1960s, many of the observed changes to the climate system are unprecedented over decades to millennia. Globally, the atmosphere and ocean have warmed, sea level has risen, and the amounts of snow and ice have diminished, thereby altering hydrologic systems.²⁰ As a result, extreme weather events have increased, including, but not limited to, heat waves, droughts, and extreme precipitation events.²¹

37. Ocean and land surface temperatures have increased at a rapid pace during the late 20th and early 21st centuries:

- a. 2016 was the hottest year on record by globally averaged surface temperatures, exceeding mid-20th century mean ocean and land surface temperatures by approximately 1.69°F.²² Eight of the twelve months in 2016 were hotter by globally averaged surface temperatures than those respective months in any previous year. October, November, and December 2016 showed the second hottest average surface temperatures for those months, second only to temperatures recorded in 2015.²³

²⁰ IPCC, *Climate Change 2014: Synthesis Report*, *supra* note 3, at 40.

²¹ *Id.* at 8.

²² NOAA, *Global Climate Report—Annual 2017* (accessed July 5, 2018), <https://www.ncdc.noaa.gov/sotc/global/201713>; NASA, *NASA, NOAA Data Show 2016 Warmest Year on Record Globally* (press release) (Jan. 18, 2017), <https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally>.

²³ *Id.*

- b. The Earth's hottest month ever recorded was February 2016, followed immediately by the second hottest month on record, March 2016.²⁴
 - c. The second hottest year on record by globally averaged surface temperatures was 2015, and the third hottest was 2017.²⁵
 - d. The ten hottest years on record by globally averaged surface temperature have all occurred since 1998,²⁶ and sixteen of the seventeen hottest years have occurred since 2001.²⁷
 - e. Each of the past three decades has been warmer by average surface temperature than any preceding decade on record.²⁸
 - f. The period between 1983 and 2012 was likely the warmest 30-year period in the Northern Hemisphere since approximately 700 AD.²⁹
38. The average global surface and ocean temperature in 2016 was approximately 1.7°F warmer than the 20th century baseline, which is the greatest positive anomaly observed since at least 1880.³⁰ The increase in hotter temperatures and more frequent positive anomalies during the Great Acceleration is occurring both globally and locally, including in Baltimore. The graph below

²⁴ Jugal K. Patel, *How 2016 Became Earth's Hottest Year on Record*, N.Y. TIMES (Jan. 18, 2017), <https://www.nytimes.com/interactive/2017/01/18/science/earth/2016-hottest-year-on-record.html>.

²⁵ NOAA, *Global Climate Report—Annual 2017*, *supra* note 22.

²⁶ *Id.*

²⁷ NASA, *NASA, NOAA Data Show 2016 Warmest Year on Record Globally* (press release) (Jan. 18, 2017), <https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally>.

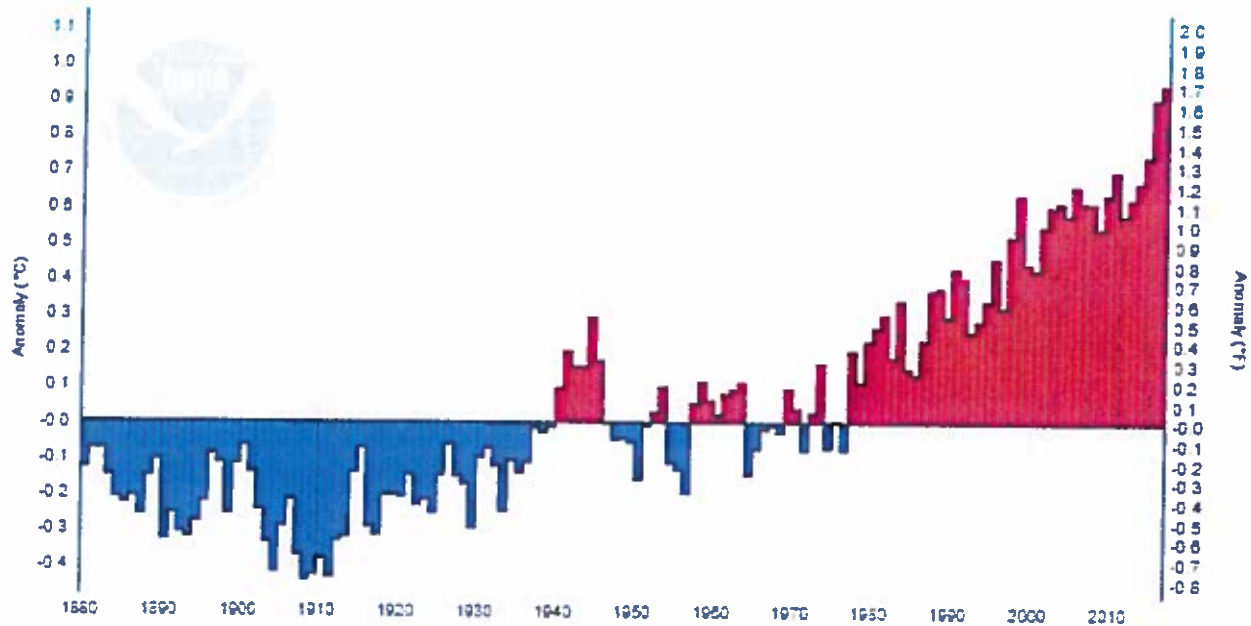
²⁸ IPCC, *IPCC Climate Change 2014: Synthesis Report*, *supra* note 3, at 2.

²⁹ *Id.*

³⁰ NOAA, National Centers for Environmental Information, *Climate at a Glance (Global Time Series)* (June 2017), https://www.ncdc.noaa.gov/cag/time-series/global/globe/land_ocean/ytd/12/1880-2016.

shows the increase in global land and ocean temperature anomalies since 1880, as measured against the 1910–2000 global average temperature.³¹

Fig. 1: Global Land and Ocean Temperature Anomalies, January–December



39. The mechanism by which human activity causes global warming and climate change is well established: ocean and atmospheric warming is overwhelmingly caused by anthropogenic greenhouse gas emissions.³²

40. When emitted, greenhouse gases trap heat within the Earth's atmosphere that would otherwise radiate into space.

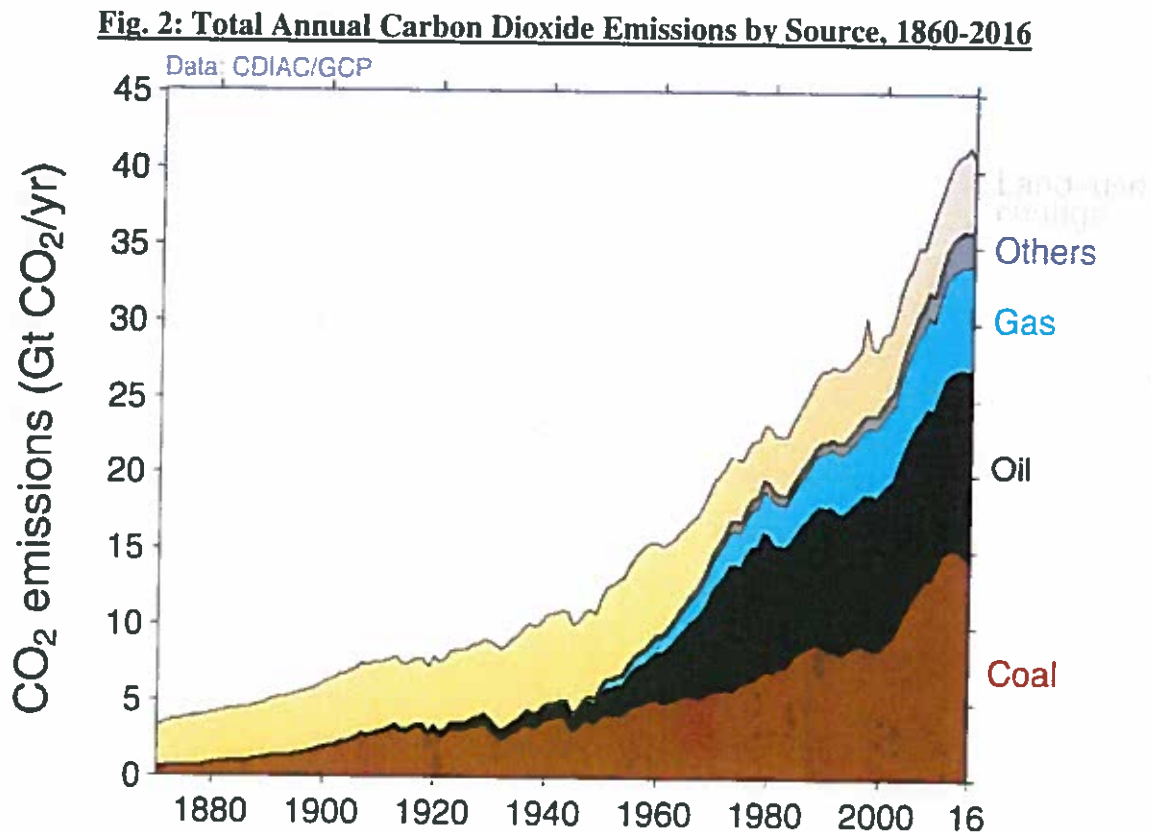
41. Greenhouse gases are largely byproducts of humans combusting fossil fuels to produce energy and using fossil fuels to create petrochemical products.

42. Human activity, particularly greenhouse gas emissions, is the primary cause of global warming and its associated effects on Earth's climate.

³¹ *Id.*

³² IPCC, *Climate Change 2014: Synthesis Report*, *supra* note 3, at 4.

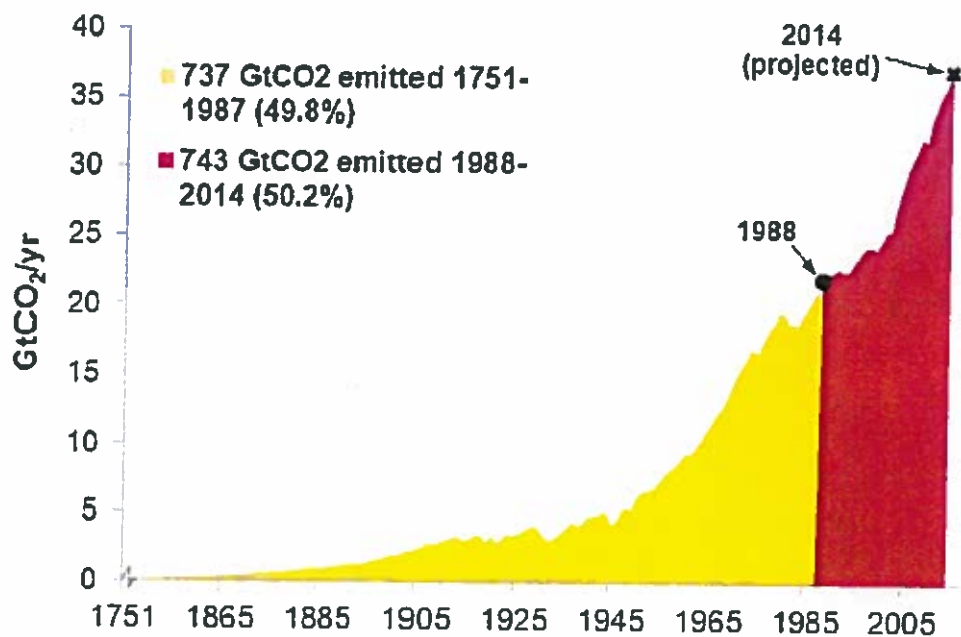
43. Prior to World War II, most anthropogenic CO₂ emissions were caused by land-use practices, such as forestry and agriculture, which altered the ability of the land and global biosphere to absorb CO₂ from the atmosphere; the impacts of such activities on Earth's climate were relatively minor. Since the beginning of the Great Acceleration, however, both the annual rate and total volume of anthropogenic CO₂ emissions have increased enormously following the advent of major uses of oil, gas, and coal. The graph below shows that while CO₂ emissions attributable to forestry and other land-use change have remained relatively constant, total emissions attributable to fossil fuels have increased dramatically since the 1950s.³³



³³ Global Carbon Project, Global Carbon Budget 2017 (Nov. 13, 2017), http://www.globalcarbonproject.org/carbonbudget/17/files/GCP_CarbonBudget_2017.pdf (citing CDIAC; R.A. Houghton & Alexander A. Nassikas, *Global and Regional Fluxes of Carbon from Land Use and Land Cover Change 1850–2015*, 31 GLOBAL BIOCHEMICAL CYCLES 3, 456 (Feb. 2017)).

44. As human reliance on fossil fuels for industrial and mechanical processes has increased, so too have greenhouse gas emissions, especially of CO₂. The Great Acceleration is marked by a massive increase in the annual rate of fossil fuel emissions: more than half of all cumulative CO₂ emissions have occurred since 1988.³⁴ The rate of CO₂ emissions from fossil fuels and industry, moreover, has increased threefold since the 1960s, and by more than 60 percent since 1990.³⁵ The graph below illustrates the increasing rate of global CO₂ emissions since the industrial era began.³⁶

Fig. 3: Cumulative Annual Anthropogenic Carbon Dioxide Emissions, 1751-2014



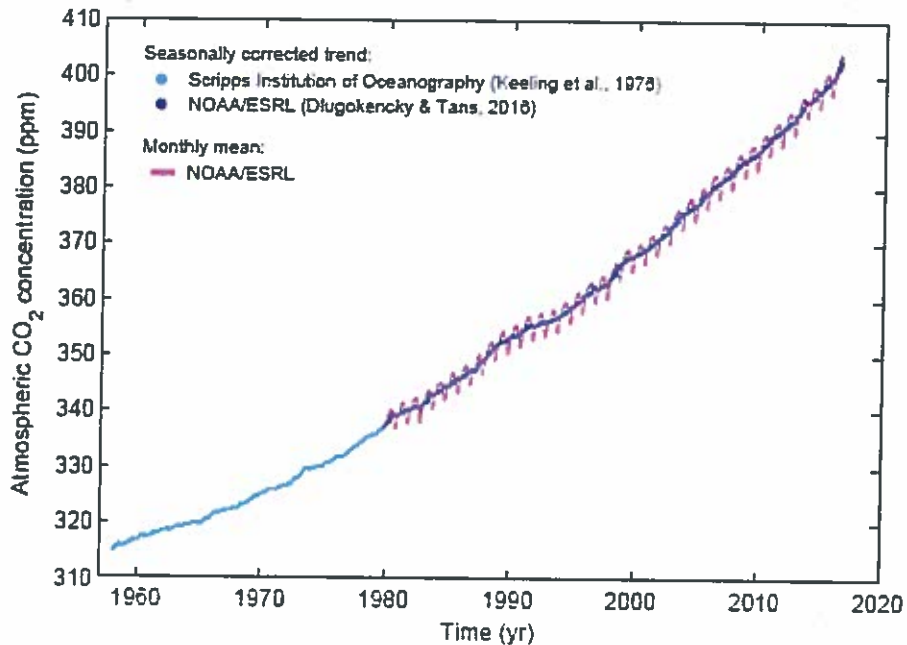
³⁴ R. J. Andres et al., *supra* note 6, at 1851.

³⁵ C. Le Quéré et al., *Global Carbon Budget 2016*, *supra* note 4, at 630 (“Global CO₂ emissions from fossil fuels and industry have increased every decade from an average of 3.1±0.2 GtC/yr in the 1960s to an average of 9.3±0.5 GtC/yr during 2006–2015”).

³⁶ P. Frumhoff et al., *The Climate Responsibilities of Industrial Carbon Producers*, 132 CLIMATIC CHANGE 157, 164 (2015), <https://link.springer.com/article/10.1007/s10584-015-1472-5>.

45. Because of the increased use of fossil fuel products, concentrations of greenhouse gases in the atmosphere are now at a level unprecedented in at least 800,000 years.³⁷ The graph below illustrates the nearly 30 percent increase in atmospheric CO₂ concentration above pre-Industrial levels since 1960.³⁸

Fig. 4: Atmospheric Carbon Dioxide Concentration in Parts Per Million, 1960–2015



B. Sea Level Rise—Known Causes and Observed Effects

46. Sea level rise is the physical consequence of (a) the thermal expansion of ocean waters as they warm; (b) increased mass loss from land-based glaciers that are melting as ambient air temperature increases; and (c) the shrinking of land-based ice sheets due to increasing ocean and air temperature.³⁹

47. Of the increase in energy that has accumulated in the Earth's atmosphere between

³⁷ IPCC, *Climate Change 2014: Synthesis Report*, supra note 3, at 4.

³⁸ C. Le Quéré et al., *Global Carbon Budget 2017*, 10 EARTH SYST. SCI. DATA 405, 408 (2018).

³⁹ NOAA, *Is Sea Level Rising?* (webpage) (last updated June 25, 2018) <http://oceanservice.noaa.gov/facts/sealevel.html>.

1971 and 2010, more than 90 percent is stored in the oceans.⁴⁰

48. Anthropogenic forcing, in the form of greenhouse gas pollution largely from the production, use, and combustion of fossil fuel products, is the dominant cause of global mean sea level rise observed during the twentieth century, particularly since the Great Acceleration.⁴¹

49. Anthropogenic greenhouse gas pollution is the dominant factor in each of the independent causes of sea level rise, including the increase in ocean thermal expansion,⁴² in glacier mass loss, and in more negative surface mass balance from the ice sheets.⁴³

50. There is a well-defined relation between cumulative emissions of CO₂ and committed global mean sea level. This relation, moreover, holds proportionately for committed regional sea level rise.⁴⁴

51. Nearly one hundred percent of the sea level rise from any projected greenhouse gas emissions scenario will persist for at least 10,000 years.⁴⁵ This owes to the long residence time of CO₂ in the atmosphere that sustains temperature increases, and inertia in the climate system.⁴⁶

52. Anthropogenic greenhouse gas pollution caused the increased frequency and severity of extreme sea level events (temporary sea level height increases due to storm surges or extreme tides, exacerbated by elevated baseline sea level) observed during the Great

⁴⁰ IPCC, *Climate Change 2014: Synthesis Report*, *supra* note 3, at 4.

⁴¹ Aimée B. A. Slangen et al., *Anthropogenic Forcing Dominates Global Mean Sea-Level Rise Since 1970*, 6 NATURE CLIMATE CHANGE 701, 701 (2016).

⁴² *Id.*

⁴³ *Id.*

⁴⁴ Peter U. Clark et al., *Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level Change*, 6 NATURE CLIMATE CHANGE 360, 365 (2016).

⁴⁵ *Id.* at 361.

⁴⁶ *Id.* at 360.

Acceleration.⁴⁷ The incidence and magnitude of extreme sea level events has increased globally since 1970.⁴⁸ The impacts of such events, which generally occur with large storms, high tidal events, offshore low-pressure systems associated with high winds, or the confluence of any of these factors,⁴⁹ are exacerbated with higher average sea level, which functionally raises the baseline for the destructive impact of extreme weather and tidal events. Indeed, the magnitude and frequency of extreme sea level events can occur in the absence of increased intensity of storm events, given the increased average elevation from which flooding and inundation events begin. These effects, and others, significantly and adversely affect Plaintiff, with increased severity in the future.

53. Historic greenhouse gas emissions through 2000 alone will cause a global mean sea level rise of at least 7.4 feet.⁵⁰ Additional greenhouse gas emissions from 2001–2015 have caused approximately 10 additional feet of committed sea level rise. Even immediate and permanent cessation of all additional anthropogenic greenhouse gas emissions would not prevent the eventual inundation of land at elevations between current average mean sea level and 17.4 feet of elevation in the absence of adaptive measures.

54. The relationship between anthropogenic CO₂ emissions and committed sea level rise is nearly linear and always positive. For emissions, including future emissions, from the year 2001, the relation is approximately 0.25 inches of committed sea level rise per 1 GtCO₂ released. For the period 1965 to 2000, the relation is approximately 0.05 inches of committed sea level rose

⁴⁷ IPCC, *Climate Change 2013: Summary for Policymakers*, 7, Table SPM.1, (2013), https://www.ipcc.ch/pdf/assessment-report/ar5/wgl/WGIAR5_SPM_brochure_en.pdf.

⁴⁸ IPCC, *Climate Change 2013: The Physical Science Basis*, Contribution of Working Group I to the Fifth Assessment Report of the IPCC, 290 (2013), http://www.climatechange2013.org/images/report/WGIAR5_ALL_FINAL.pdf.

⁴⁹ *Id.*

⁵⁰ Peter U. Clark et al., *supra* note 44, at 365.

per 1 GtCO₂ released. For the period 1965 to 2015, normal use of Defendants' fossil fuel products caused a substantial portion of committed sea level rise. Each and every additional unit of CO₂ emitted from the use of Defendants' fossil fuel products will add to the sea level rise already committed to the geophysical system.

55. Projected onshore impacts associated with rising sea temperature and water level include, but are not limited to, increases in flooding and erosion; increases in the occurrence, persistence, and severity of storm surges; infrastructure inundation; saltwater intrusion in groundwater; public and private property damage; and pollution associated with damaged wastewater infrastructure. All of these effects significantly and adversely affect Plaintiff.

56. Sea level rise has already taken grave tolls on inhabited coastlines. For instance, the U.S. National Oceanic and Atmospheric Administration ("NOAA") estimates that nuisance flooding occurs from 300 percent to 900 percent more frequently within U.S. coastal communities today than just 50 years ago.⁵¹

57. Nationwide, more than three quarters (76%) of flood days caused by high water levels from sea level rise between 2005 and 2014 (2,505 of the 3,291 flood days) would not have happened but for human-caused climate change. More than two-thirds (67%) of flood days since 1950 would not have happened without the sea level rise caused by increasing greenhouse gas emissions.⁵²

58. Regional expressions of sea level rise will differ from the global mean, and are especially influenced by changes in ocean and atmospheric dynamics, as well as the gravitational,

⁵¹ NOAA, *Is Sea Level Rising?*, *supra* note 39.

⁵² Climate Central, *Sea Level Rise Upping Ante on 'Sunny Day' Floods* (Oct. 17, 2016), <http://www.climatecentral.org/news/climate-change-increases-sunny-day-floods-20784>.

deformational, and rotational effects of the loss of glaciers and ice sheets.⁵³ Due to these effects, Baltimore will experience significantly greater absolute committed sea level rise than the global mean.⁵⁴

59. Baltimore features 60 miles of waterfront land within four major watersheds. Relative sea level has risen at a rate of about 0.125 inches per year between 1902 and 2006, which is significantly higher than the global average of 0.08 inches per year.⁵⁵ Sea level in Maryland, including Baltimore, will continue to rise significantly. At the regional level, the State has been subsiding at a rate of approximately 1.5 mm per year.⁵⁶ This subsidence exacerbates the effects of relative sea level rise. By 2050, sea level along Maryland's coast could rise as high as 2.1 feet above sea level in 2000.⁵⁷

60. Without Defendants' fossil fuel-related greenhouse gas pollution, current sea level rise would have been far less than the observed sea level rise to date.⁵⁸ Similarly, committed sea level rise that will occur in the future would also be far less.⁵⁹

⁵³ Peter U. Clark et al., *supra* note 44, at 364.

⁵⁴ *See id.*, Figure 3(c).

⁵⁵ City of Baltimore, *Disaster Preparedness and Planning Project* (Oct. 2013), <http://www.baltimoresustainability.org/plans/disaster-preparedness-plan>.

⁵⁶ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55, at 99.

⁵⁷ Maryland Commission on Climate Change, *2015 Annual Report*, 13. (Dec. 2015), <http://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Publications/MCCC2015Report.pdf>.

⁵⁸ *See, e.g.*, Robert E. Kopp et al., *Temperature-driven Global Sea-level Variability in the Common Era*, 113 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, E1434-E1441, E1438 (2016), <http://www.pnas.org/content/113/11/E1434.full> ("Counterfactual hindcasts with this model indicate is extremely likely (P=0.95) that less than about half of the observed 20th century GSL rise would have occurred in the absence of global warming.")

⁵⁹ Peter U. Clark et al., *supra* note 44, at 365 ("Our modelling suggests that the human carbon footprint of about [470 billion tons] by 2000 . . . has already committed Earth to a [global mean sea level] rise of ~1.7m (range of 1.2 to 2.2 m).").

C. High Temperatures and Heat Waves

61. Heatwaves are prolonged periods with excessive ambient temperatures, often (but not necessarily) defined with reference to historical temperatures at a given locale.

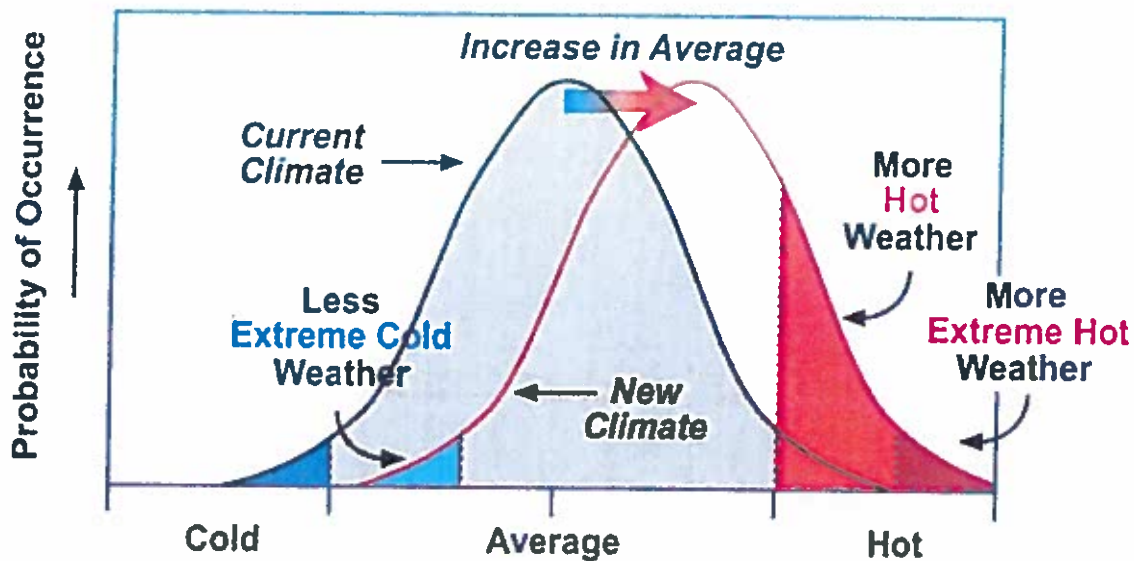
62. Average air temperatures in Maryland have increased by 1.8°F, and all model scenario projections indicate it will continue to rise. The average annual temperatures are projected to increase 3 to 8°F by 2100, and potentially higher in Baltimore.⁶⁰ As the Earth's surface temperature warms, there is not only an overall increase in average temperature but also more frequent periods of extreme heat, corresponding with less frequent periods of extreme cold.

63. The relationship between increased average temperatures and extreme weather is non-linear—even a small increase in average daily temperatures will correlate to a substantially larger number of extremely hot days over the course of each year. Because average daily surface temperatures have risen globally since at least the mid-20th century and are continuing to rise, the IPCC projects it is virtually certain (greater than 99 percent probability) that hot days and nights will become warmer and more frequent, and very likely (greater than 90 percent probability) that heat waves will become more frequent, over most land areas globally through the mid- to late-21st century.⁶¹ The schematic at Figure 5 below, created by the IPCC, illustrates the relationship between increased mean surface temperatures from anthropogenic global warming and the occurrence of extreme temperatures.⁶²

⁶⁰ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55.

⁶¹ IPCC, *Fourth Assessment Report: Climate Change 2007: Synthesis Report*, Table 3.2, https://www.ipcc.ch/publications_and_data/ar4/syr/en/mains3-3-5.html#table-3-2.

⁶² IPCC, *Fourth Assessment Report: Climate Change 2007: Working Group I: The Physical Science Basis*, Box TS.5, Figure 1, https://www.ipcc.ch/publications_and_data/ar4/wg1/en/box-ts-5-figure-1.html.

Fig. 5: Schematic of Mean Temperature on Extreme Temperature Occurrence

64. Since as early as the 1950s, increases in the duration, intensity, and especially the frequency of heatwaves have been detected over many regions,⁶³ including the eastern United States.⁶⁴

65. Record-breaking high temperatures are now outnumbering record lows by an average decadal ratio of 2:1 across the United States.⁶⁵ This represents an increase from approximately 1.09 high temperature records for every one low temperature record in the 1950s, and 1.36 high temperature records for every one low temperature record in the 1990s.⁶⁶

⁶³ S.E. Perkins-Kirkpatrick & P.B. Gibson, *Changes in Regional Heatwave Characteristics as a Function of Increasing Global Temperature*, SCIENTIFIC REPORTS 7:12256, 1 (2017).

⁶⁴ Noah S. Diffenbaugh & Moestasim Ashfaq, *Intensification of Hot Extremes in the United States*, 37 *Geophysical Research Letters* L15701, 2 (2010).

⁶⁵ Gerald A. Meehl et al., *Relative Increase of Record High Maximum Temperatures Compared to Record Low Minimum Temperatures in the U.S.*, 36 *GEOPHYSICAL RESEARCH LETTERS* L23701, at 3 (2009).

⁶⁶ See Climate Signals, *Record High Temps vs. Record Low Temps* (webpage) (accessed June 27, 2018), <http://www.climatesignals.org/data/record-high-temps-vs-record-low-temps>.

66. The frequency of record high temperatures relative to record low temperatures will continue to increase with future anthropogenic global warming. For instance, under even a moderate rising emissions scenario, the ratio of record high maximum to record low minimum temperatures in the United States will continue to increase, reaching ratios of about 20:1 by 2050, and roughly 50:1 by 2100.⁶⁷

67. Baltimore is particularly vulnerable to rising temperatures. Because of Baltimore's urban infrastructure, increased temperatures will add to the heat load of buildings and exacerbate existing urban heat islands adding to the risk of high ambient temperatures. On some summer days, air in urban areas can be up to 10°F warmer than in other areas.⁶⁸

68. Baltimore is expected to experience a threefold increase in the average number of days exceeding 90 degrees by 2050.⁶⁹ By 2100, average annual temperatures in Baltimore are projected to increase by as much as 12°F.⁷⁰ Baltimore has already seen an increase in the number of heat waves, and it is projected that by the end of the century, as many as 95 percent of summer days could reach extreme maximum temperatures.⁷¹ By contrast, an average of 60 percent of Baltimore's summer days met the maximum temperature extremes between the 1950s and 1970s.⁷²

⁶⁷ Gerald A. Meehl et al., *supra* note 65, at 3.

⁶⁸ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55, at 84.

⁶⁹ *Baltimore Climate Action Plan*, 12 (Jan. 15, 2013), <https://www.baltimoresustainability.org/wp-content/uploads/2015/12/BaltimoreClimateActionPlan.pdf>.

⁷⁰ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55, at 36.

⁷¹ *Id.* at 84.

⁷² *Id.*

D. Disruption to the Hydrologic Cycle—Known Causes and Observed Effects

69. The “hydrologic cycle” describes the temporal and spatial movement of water through oceans, land, and the atmosphere.⁷³ “Evapotranspiration” is the process by which water on the Earth’s surface turns to vapor and is absorbed into the atmosphere. The vast majority of evapotranspiration is due to the sun’s energy heating water molecules, resulting in evaporation.⁷⁴ Plants also draw water into the atmosphere from soil through transpiration. Volcanoes, sublimation (the process by which solid water changes to water vapor), and human activity also contribute to atmospheric moisture.⁷⁵ As water vapor rises through the atmosphere and reaches cooler air, it becomes more likely to condense and fall back to Earth as precipitation.

70. Upon reaching Earth’s surface as precipitation, water may take several different paths. It can be reevaporated into the atmosphere; seep into the ground as soil moisture or groundwater; run off into rivers and streams; or stop temporarily as snowpack or ice. It is during these phases, when water is available at or near the Earth’s surface, that water is captured for use by humans.

71. Anthropogenic global warming caused by Defendants’ fossil fuel products is disrupting and will continue to disrupt the hydrologic cycle in Baltimore by changing evapotranspiration patterns.⁷⁶ As the lower atmosphere becomes warmer, evaporation rates have and will continue to increase, resulting in an increase in the amount of moisture circulating throughout the lower atmosphere. One observed consequence of higher water vapor concentrations

⁷³ NASA Earth Observatory, *The Water Cycle* (webpage) (accessed June 27, 2018), <https://earthobservatory.nasa.gov/Features/Water>.

⁷⁴ See USGS, *The Water Cycle: Evaporation* (webpage) (accessed June 27, 2018), <https://water.usgs.gov/edu/watercycleevaporation.html>.

⁷⁵ NASA Earth Observatory, *supra* note 73.

⁷⁶ *Id.*

is a shift toward increased frequency of intense precipitation events, mainly over land areas. Furthermore, because of warmer temperatures, more precipitation is falling as rain rather than snow. These changes affect both the quantity and quality of water resources available to both human and ecological systems, including in Baltimore.

72. Maryland, including Baltimore, will see significant impacts to the hydrologic cycle due to rising temperatures. As the Earth's surface temperature has increased, so has evaporation.⁷⁷ For every 1.8°F of anthropogenic global warming, the atmosphere's capacity to hold water vapor increases by 7 percent.⁷⁸ Thus, anthropogenic global warming has increased substantially the total volume of water vapor in the atmosphere at any given time.⁷⁹ Extreme precipitation events occur when the air is almost completely saturated, so the occurrence of such events generally increase in intensity by 6 to 7 percent with each degree Celsius of increased temperature.⁸⁰

73. The upward trend of heavy precipitation is particularly evident in the northeastern United States, including Maryland. Calculating maximum daily precipitation totals for consecutive five-year blocks from 1901 to 2016 revealed a significant increase over the eastern United States, especially in the Northeast (including Maryland), which saw a 27 percent increase since 1901.⁸¹

74. Because of anthropogenic global warming, Baltimore's hydrologic regime is shifting toward one characterized by more frequent and extreme precipitation events and associated flooding. These impacts will impact all sectors, and low-income communities will be

⁷⁷ NASA Earth Observatory, *supra* note 73.

⁷⁸ IPCC, *Climate Change 2013: The Physical Science Basis*, *supra* note 48.

⁷⁹ NASA Earth Observatory, *supra* note 73.

⁸⁰ U.S. Global Change Research Program, *Climate Science Special Report*, Fourth National Climate Assessment, Vol. I. 210 (2017), https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf.

⁸¹ *Id.* at 212.

particularly affected by flooding, extreme weather, and heat waves exacerbated by climate change.⁸² These individual consequences of changes to the hydrologic regime are described below.

i. Extreme Precipitation and Flooding

75. A consequence of higher water vapor concentrations in the atmosphere is the increased frequency of intense precipitation events.⁸³ Moreover, a larger proportion of precipitation will fall in a shorter amount of time as compared to the historical average.⁸⁴ Extreme precipitation events (the upper 0.1 percent of daily rain events) have increased substantially over the past 100 years in the United States, by about 33 percent.⁸⁵ Extreme precipitation episodes in Maryland will become even more extreme as the climate changes.

76. Over the last century, average precipitation has increased by 10 percent in most of Maryland, and intense precipitation events have increased by 20 percent.⁸⁶ Heavy precipitation events (defined as rainfall equal to or greater than the historical 95th percentile) will significantly increase in frequency at least through the year 2100.⁸⁷

77. Baltimore is vulnerable to tropical storms and hurricanes, which produce wind damage, riverine flooding, and inundation of shorelines and harbors. Although a combination of factors generally cause major hurricanes to weaken upon reaching the Mid-Atlantic coast, severe

⁸² Maryland Commission on Climate Change, *2015 Annual Report*, *supra* note 57, at 18.

⁸³ NASA Earth Observatory, *supra* note 73.

⁸⁴ *Id.*

⁸⁵ Pavel Ya. Groisman et al., *Trends in intense precipitation in the climate record*, 18 JOURNAL OF CLIMATE 1326, 1328 (2005).

⁸⁶ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55, at 36.

⁸⁷ Xiang Gao et al., *21st Century Changes in U.S. Heavy Precipitation Frequency Based on Resolved Atmospheric Patterns*, MIT Joint Program on the Science and Policy of Global Change: Report 302, 15 (2016).

damage can and has occurred from less-than-major category hurricanes.⁸⁸ Flooding and property damage associated with tropical storms has worsened during the second half of the 20th century.⁸⁹

78. Extreme precipitation events, including tropical storms and hurricanes, result in flood events separate from and additional to tidal influenced floods (i.e., storm surges). It is possible to have a storm surge coupled with a precipitation event.⁹⁰ In this way, sea level rise and extreme precipitation can interact to create even more extreme flooding events.

79. Baltimore is subject to flash floods, which occur when water flow from rainfall or snowmelt exceeds the capacity of the City's stormwater drainage system, especially in the vicinity of Jones Falls, Gywnns Falls, and Herring Run.

80. The consequences of increased precipitation and consequent flooding are already affecting Baltimore and the surrounding region. The City of Baltimore, surrounding municipalities in Baltimore County, and municipalities in nearby Howard County all experienced extreme rainfall and flooding during major storms in July 2016, and again in May 2018.

81. On July 30, 2016, nearly unprecedented torrential rain and flash-flooding hit the Baltimore area. During the storm, Howard County's Ellicott City, which borders Baltimore County and sits less than five miles from Baltimore, experienced more than six inches of rain in less than three hours.⁹¹ Substantial portions of Baltimore also experienced more than four inches of rain over the same hours.⁹² The deluge constituted a 1,000-year storm for the region, meaning the calculated likelihood of such a storm recurring in a given year were less than 0.1 percent. The

⁸⁸ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55, at 62–63.

⁸⁹ *Id.* at 36, 60–63.

⁹⁰ *Id.* at 116.

⁹¹ National Weather Service, *Ellicott City Historic Rain and Flash Flood - July 30, 2016* (webpage) (Sept. 1, 2016), <https://www.weather.gov/lwx/EllicottCityFlood2016>.

⁹² *Id.*

catastrophic rain caused severe flooding in Ellicott City's downtown, killing two people and causing an estimated \$22.4 million in damages, including damages to 90 businesses, 107 residences, and approximately 170 automobiles.⁹³ A study commissioned by Howard County completed in June 2017 found that infrastructure improvements needed to prevent or mitigate major damage in future flooding would cost between \$60 million and \$85 million, including \$35 million in immediately necessary measures.⁹⁴

82. Less than two years later, on May 27, 2018, another 1,000-year storm hit the Baltimore area. During the storm, multiple rain gauges in Ellicott City measured approximately eight inches of rainfall in under three hours, Baltimore measured more than 3.5 inches of rain, and the city of Catonsville, which borders Baltimore, measured more than *ten* inches of rain.⁹⁵ The Federal Emergency Management Agency ("FEMA"), with the President's approval, issued a Major Disaster Declaration on July 2, 2018, stating that a major disaster existed in Baltimore and Howard Counties following the extreme rain and related severe flooding.⁹⁶

⁹³ Ava-joye Burnett, *Damage Estimate Near \$22.4M After Flooding In Historic Ellicott City*, CBS BALTIMORE (Aug. 22, 2016), <https://baltimore.cbslocal.com/2016/08/22/damage-estimate-near-22-4m-after-flooding-in-historic-ellicott-city>; Ovetta Wiggins, Mary Hui & John Woodrow Cox, *Two dead after severe flash flood in Maryland*, WASHINGTON POST (July 31, 2016), https://www.washingtonpost.com/local/severe-flash-flood-strikes-ellicott-city-overturning-cars-and-destroying-businesses/2016/07/31/a8e50184-5720-11e6-831d-0324760ca856_story.html.

⁹⁴ See, e.g., Luke Broadwater and Scott Dance, *Making Ellicott City safer would cost tens of millions—and it still might flood. Should the town be rebuilt?*, BALTIMORE SUN (June 1, 2018), <http://www.baltimoresun.com/news/maryland/investigations/bs-md-ellicott-city-flood-next-steps-20180531-story.html>.

⁹⁵ Tom Di Liberto, *Torrential rains bring epic flash floods in Maryland in late May 2018*, NOAA CLIMATE.GOV (May 31, 2018), <https://www.climate.gov/news-features/event-tracker/torrential-rains-bring-epic-flash-floods-maryland-late-may-2018>.

⁹⁶ FEMA, *President Donald J. Trump Approves Major Disaster Declaration for Maryland* (July 2, 2018), <https://www.fema.gov/news-release/2018/07/02/president-donald-j-trump-approves-major-disaster-declaration-maryland>.

83. Anthropogenic climate change will also increase winter precipitation in Baltimore including snow storms, ice storms, and freezing rain events.⁹⁷ Winter precipitation is projected to increase by approximately 40 percent with more precipitation falling as rain rather than snow.⁹⁸

ii. Drought

84. Droughts are extended periods of dry weather caused by a reduction in the amount of precipitation relative to normal conditions over an extended period of time.⁹⁹

85. As a result of anthropogenic global warming, Maryland's hydrologic regime is shifting toward one that is characterized by fluctuations between intense storms and droughts. Under this more episodic cycle, while winter and spring precipitation will likely increase, droughts lasting several weeks are more likely to occur during the summer.¹⁰⁰

E. Public Health Impacts of Changes to the Hydrologic Cycle

86. The City has incurred and will continue to incur expenses in planning and preparing for, and treating, the public health impacts associated with anthropogenic global warming including, but not limited to, impacts associated with extreme weather, extreme heat, decreased air quality, and vector-borne illnesses.

87. Extreme heat-induced public health impacts in Baltimore will result in increased risk of heat-related illnesses (mild heat stress to fatal heat stroke) and the exacerbation of pre-existing conditions in the medically fragile, chronically ill, and otherwise vulnerable. Between 2000 and 2012, exposure to extreme heat events increased Baltimore residents' risk of

⁹⁷ *Baltimore Climate Action Plan*, *supra* note 69, at 64.

⁹⁸ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55, at 36.

⁹⁹ *Id.* at 76.

¹⁰⁰ Maryland Commission on Climate Change, *Global Warming and the Free State: Comprehensive Assessment of Climate Change Impacts in Maryland*, 2 (July 2008), http://www.mde.state.md.us/programs/Air/ClimateChange/Documents/FINAL-Chapt%2020Impacts_web.pdf.

hospitalization for heart attack by 43 percent, compared to only an 11 percent increase for Maryland residents as a whole.¹⁰¹

88. Increased heat also intensifies the photochemical reactions that produce smog, ground-level ozone, and fine particulate matter (PM_{2.5}), which contribute to and exacerbate respiratory disease in children and adults. Increased heat and CO₂ enhance the growth of plants that produce pollen, which are associated with allergies. Also between 2000 and 2012, exposure to extreme heat events in Baltimore increased risk of hospitalization for asthma by 37 percent.¹⁰²

89. In addition, the warming climate system will create disease-related public health impacts in Baltimore, including but not limited to, increased incidence of emerging and vector-borne diseases with migration of animal and insect disease vectors; physical and mental health impacts associated with severe weather events, such as flooding, when they cause population dislocation and infrastructure loss; exacerbation of existing respiratory disease, cardiovascular disease, and stroke as a result of heatwaves and increased average temperature; and respiratory distress, and exacerbation of existing disease.¹⁰³

90. Public health impacts of these climatological changes are likely to be disproportionately borne by communities made vulnerable by their geographic location, and by racial and income disparities.

F. Attribution

91. “Carbon factors” analysis, devised by the International Panel on Climate Change

¹⁰¹ Maryland Institute for Applied Environmental Health, *Maryland Climate and Health Profile Report*, 28 (Apr. 2016), <http://mde.maryland.gov/programs/Air/ClimateChange/MCCC/ARWG/MarylandClimateandHealthProfileReport.pdf>.

¹⁰² *Id.*

¹⁰³ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55.

(IPCC), the United Nations International Energy Agency, and the U.S. Environmental Protection Agency, quantifies the amount of CO₂ emissions attributable to a unit of raw fossil fuel extracted from the Earth.¹⁰⁴ Emissions factors for oil, coal, liquefied natural gas, and natural gas are different for each material but are nevertheless known and quantifiable for each.¹⁰⁵ This analysis accounts for the use of Defendants' fossil fuel products, including non-combustion purposes that sequester CO₂ rather than emit it (e.g., production of asphalt).

92. Defendants' historical and current fossil fuel extraction and production records are publicly available in various fora. These include university and public library collections, company websites, company reports filed with the U.S. Securities and Exchange Commission, company histories, and other sources. The cumulative CO₂ and methane emissions attributable to Defendants' fossil fuel products were calculated by reference to such publicly available documents.

93. Cumulative carbon analysis allows an accurate calculation of net annual CO₂ and methane emissions attributable to each Defendant by quantifying the amount and type of fossil fuels products each Defendant extracted and placed into the stream of commerce, and multiplying those quantities by each fossil fuel product's carbon factor.

94. Defendants, through their extraction, promotion, marketing, and sale of their fossil fuel products, caused approximately 15 percent of global fossil fuel product-related CO₂ between 1965 and 2015, with contributions currently continuing unabated. This constitutes a substantial

¹⁰⁴ See Richard Heede, *Tracing Anthropogenic Carbon Dioxide and Methane Emissions to Fossil Fuel and Cement Producers, 1854-2010*, 122 CLIMATIC CHANGE 229, 232-33 (2014), <https://link.springer.com/article/10.1007/s10584-013-0986-y>.

¹⁰⁵ See, e.g., *id.*

portion of all such emissions in history, and the attendant historical, projected, and committed sea level rise and disruptions to the hydrologic cycle associated therewith.

95. By quantifying CO₂ and methane pollution attributable to Defendants by and through their fossil fuel products, ambient air and ocean temperature, sea level, and hydrologic cycle responses to those emissions are also calculable, and can be attributed to Defendants on an individual and aggregate basis. Individually and collectively, Defendants' extraction, sale, and promotion of their fossil fuel products are responsible for substantial increases in ambient (surface) temperature, ocean temperature, sea level, droughts, extreme precipitation events, heat waves, and other adverse impacts on Plaintiff described herein.

96. Anthropogenic CO₂ emissions from Defendants' products have caused a substantial portion of both observed and committed mean global sea level rise.¹⁰⁶

97. Anthropogenic CO₂ emissions from Defendants' products have caused and will continue to cause increased frequency and severity of droughts.

98. Anthropogenic CO₂ emissions from Defendants' products have caused and will continue to cause increases in daily precipitation extremes over land.¹⁰⁷

99. Anthropogenic CO₂ emissions from Defendants' products have caused and will continue to cause increased frequency and magnitude of maximum temperature extremes relative to the historical baseline.¹⁰⁸

100. Defendants, through their extraction, promotion, marketing, and sale of their fossil fuel products, caused a substantial portion of both those emissions and the attendant historical,

¹⁰⁶ Peter U. Clark et al., *supra* note 44, at 365.

¹⁰⁷ See, e.g., E.M. Fischer & R. Knutti, *Anthropogenic Contribution to Global Occurrence of Heavy-Precipitation and High-Temperature Extremes*, 5 NATURE CLIMATE CHANGE 560, 560–64 (2015).

¹⁰⁸ *Id.*

projected, and committed sea level rise and other consequences of the resulting climatic changes described herein, including increased droughts and extreme weather events.

101. As explained above, this analysis considers only the volume of raw material actually extracted from the Earth by these Defendants. Many of these Defendants actually are responsible for far greater volumes of emissions because they also refine, manufacture, produce, market, promote, and sell—at both wholesale and retail—more fossil fuel products than they derive from the raw materials they extract. In addition to their own exploration and extraction activities, those Defendants purchase, refine, transport, and sell raw materials extracted by others.

102. In addition, considering the Defendants' lead role in promoting, marketing, and selling their fossil fuels products between 1965 and 2015; their efforts to conceal the hazards of those products from consumers; their promotion of their fossil fuel products despite knowing the dangers associated with those products; their dogged campaign against regulation of those products based on falsehoods, omissions, and deceptions; and their failure to pursue less hazardous alternatives available to them. Defendants, individually and together, have substantially and measurably contributed to the City's climate change-related injuries.

G. Defendants Went to Great Lengths to Understand, and Either Knew or Should Have Known About, the Dangers Associated with Extraction, Promotion, and Sale of Their Fossil Fuel Products.

103. By 1965, concern about the risks of anthropogenic greenhouse gas emissions reached the highest level of the United States' scientific community. In that year, President Lyndon B. Johnson's Science Advisory Committee Panel on Environmental Pollution reported that by the year 2000, anthropogenic CO₂ emissions would "modify the heat balance of the atmosphere to

such an extent that marked changes in climate . . . could occur.”¹⁰⁹ President Johnson announced in a special message to Congress that “[t]his generation has altered the composition of the atmosphere on a global scale through . . . a steady increase in carbon dioxide from the burning of fossil fuels.”¹¹⁰

104. These statements from the Johnson Administration, at a minimum, put Defendants on notice of the potentially substantial dangers to people, communities, and the planet associated with unabated use of their fossil fuel products. Moreover, Defendants had amassed a considerable body of knowledge on the subject through their own independent efforts.

105. A 1963 Conservation Foundation report of a conference of scientists referenced in the 1966 World Book Encyclopedia, as well as in presidential panel reports and other sources around that time, described many specific consequences of rising greenhouse gas pollution in the atmosphere. It warned that a doubling of carbon dioxide “could be enough to bring about immense flooding of lower portions of the world’s land surface, resulting from increased melting of glaciers.” The publication also asserted that “a continuing rise in the amount of atmospheric carbon dioxide is likely to be accompanied by a significant warming of the surface of the earth which by melting the polar ice caps would raise sea level and by warming the oceans would change considerably the distributions of marine species including commercial fisheries.” It warned of the potential inundation of “many densely settled coastal areas, including the cities of New York and London” and the possibility of “wiping out the world’s present commercial fisheries.” The report,

¹⁰⁹ President’s Science Advisory Committee, *Restoring the Quality of Our Environment: Report of the Environmental Pollution Panel*, 9 (Nov. 1965), <https://hdl.handle.net/2027/uc1.b4315678>.

¹¹⁰ President Lyndon B. Johnson, *Special Message to Congress on Conservation and Restoration of Natural Beauty* (Feb. 8, 1965), <http://acsc.lib.udel.edu/items/show/292>.

in fact, noted that “the changes in marine life in the North Atlantic which accompanied the temperature change have been very noticeable.”¹¹¹

106. But industry interest in carbon accumulation goes back at least to 1958. A review in that year of the American Petroleum Institute Smoke and Fumes Committee’s Air Pollution Research Program by Charles Jones (the committee secretary and Shell executive) mentions a project focused on analyzing gaseous carbon data to determine the amount of carbon of fossil origin compared to the total amount.¹¹²

107. At that time API’s stance was that “the petroleum industry supplies the fuel used by the automobile, and thus has a sincere interest in the solution to the problem of pollution from automobile exhaust,” according to an API presentation at the 1958 National Conference on Air Pollution. API acknowledged the industry’s responsibility in mitigating some of the negative impacts of its products, stating that the objective of its Smoke and Fumes committee was to “determine the causes and methods of control of objectional atmospheric pollution resulting from the production, manufacture, transportation, sale, and use of petroleum and its products.”¹¹³ In 1968, a Stanford Research Institute (SRI) report commissioned by the American Petroleum Institute (API) and made available to all its members, concluded, among other things:

¹¹¹ The Conservation Foundation, *Implications of Rising Carbon Dioxide Content of the Atmosphere: A statement of trends and implications of carbon dioxide research reviewed at a conference of scientists* (Mar. 1963), <https://babel.hathitrust.org/cgi/pt?id=mdp.39015004619030;view=1up;seq=5>.

¹¹² Charles A. Jones, *A Review of the Air Pollution Research Program of the Smoke and Fumes Committee of the American Petroleum Institute*, *Journal of the Air Pollution Control Association* (1958), <https://www.tandfonline.com/doi/pdf/10.1080/00966665.1958.10467854>.

¹¹³ C.A. Jones, *Sources of Air Pollution—Transportation (Petroleum)*, (Nov. 19, 1958), <https://www.industrydocumentslibrary.ucsf.edu/tobacco/docs/#id=xrcm0047>.

If the Earth's temperature increases significantly, a number of events might be expected to occur including the melting of the Antarctic ice cap, a rise in sea levels, warming of the oceans and an increase in photosynthesis. . . .

It is clear that we are unsure as to what our long-lived pollutants are doing to our environment; however, there seems to be no doubt that the potential damage to our environment could be severe. . . . [T]he prospect for the future must be of serious concern.¹¹⁴

108. In a supplement to the 1968 report prepared for API in 1969, authors Robinson and Robbins projected that based on current fuel usage atmospheric CO₂ concentrations would reach 370 ppm by 2000¹¹⁵—almost exactly what it turned out to be (369.34 ppm, according to data from NASA).¹¹⁶ The report also draws the connection between the rising concentration and the use of fossil fuels stating that “balance between environmental sources and sinks has been disturbed by the emission to the atmosphere of additional CO₂ from the increased combustion of carbonaceous fuels” and that it seemed “unlikely that the observed rise in atmospheric CO₂ has been due to changes in the biosphere.” The authors warn repeatedly of the temptations and consequences of ignoring CO₂ as a problem and pollutant:

CO₂ is so common and such an integral part of all our activities that air pollution regulations typically state that CO₂ emissions are not to be considered as pollutants. This is perhaps fortunate for our present mode of living, centered as it is around carbon combustion. However, this seeming necessity, the CO₂ emission, is the only air pollutant, as we shall see, that has been shown to be of global importance as a factor that could change man's environment on the basis of a long period of scientific investigation.¹¹⁷

¹¹⁴ Elmer Robinson & R.C. Robbins, *Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants*, Stanford Research Institute (Feb. 1968), <https://www.smokeandfumes.org/documents/document16>.

¹¹⁵ Elmer Robinson & R.C. Robbins, *Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants Supplement*, Stanford Research Institute (June 1969).

¹¹⁶ NASA Goddard Institute for Space Studies, *Global Mean CO₂ Mixing Ratios (ppm): Observations*, <https://data.giss.nasa.gov/modelforce/ghgases/Fig1A.ext.txt> (accessed June 16, 2018).

¹¹⁷ Elmer Robinson & R.C. Robbins, *supra* note 115.

109. In 1969, Shell memorialized an on-going 18-month project to collect ocean data from oil platforms to develop and calibrate environmental forecasting theories related to predicting wave, wind, storm, sea level, and current changes and trends.¹¹⁸ Several Defendants and/or their predecessors in interest participated in the project, including Esso Production Research Company (ExxonMobil), Mobil Research and Development Company (ExxonMobil), Pan American Petroleum Corporation (BP), Gulf Oil Corporation (Chevron), Texaco Inc. (Chevron), and the Chevron Oil Field Research Company.

110. In a 1970 report from the Engineering Division of Imperial Oil (Exxon), the author H.R. Holland stated: “Since pollution means disaster to the affected species, the only satisfactory course of action is to prevent it—to maintain the addition of foreign matter at such levels that it can be diluted, assimilated or destroyed by natural processes—to protect man’s environment from man.” He also noted that “a problem of such size, complexity and importance cannot be dealt with on a voluntary basis.” CO₂ was listed as an air pollutant in the document.¹¹⁹

111. In 1972, API members, including Defendants, received a status report on all environmental research projects funded by API. The report summarized the 1968 SRI report describing the impact of fossil fuel products, including Defendants’, on the environment, including global warming and attendant consequences. Defendants and/or their predecessors in interest that received this report include, but were not limited to: American Standard of Indiana (BP), Asiatic (Shell), Ashland (Marathon), Atlantic Richfield (BP), British Petroleum (BP), Chevron Standard of California (Chevron), Cities Service (Citgo), Esso Research (ExxonMobil), Ethyl (formerly

¹¹⁸ M.M. Patterson, *An Ocean Data Gathering Program for the Gulf of Mexico*, Society of Petroleum Engineers (1969), <https://www.onepetro.org/conference-paper/SPE-2638-MS>.

¹¹⁹ H.R. Holland, *Pollution is Everybody's Business*, Imperial Oil (1970), <https://www.desmogblog.com/sites/beta.desmogblog.com/files/DeSmogBlog-Imperial%20Oil%20Archive-Pollution-Everyone-Business-1970.pdf>

affiliated with Esso, which was subsumed by ExxonMobil), Getty (ExxonMobil), Gulf (Chevron, among others), Humble Standard of New Jersey (ExxonMobil/Chevron/BP), Marathon, Mobil (ExxonMobil), Pan American (BP), Shell, Standard of Ohio (BP), Texaco (Chevron), Union (Chevron), Skelly (ExxonMobil), Colonial Pipeline (ownership has included BP, Citgo, ExxonMobil, and Chevron entities, among others), Continental (ConocoPhillips), Dupont (former owner of Conoco), Phillips (ConocoPhillips), and Caltex (Chevron).¹²⁰ Other members of the fossil fuel industry that received the report include, but were not limited to, Sun (Sunoco), Rock Island (Koch Industries), Signal (Honeywell), Great Northern, Edison Electric Institute (representing electric utilities), Bituminous Coal Research (coal industry research group), Mid-Continent Oil & Gas Association (presently the U.S. Oil & Gas Association, a national trade association), Western Oil & Gas Association, National Petroleum Refiners Association (presently the American Fuel and Petrochemical Manufacturers Association, a national trade association), and Champlin (Anadarko), among others.¹²¹

112. In a 1977 presentation and again in a 1978 briefing, Exxon scientists warned the Exxon Corporation Management Committee that CO₂ concentrations were building in the Earth's atmosphere at an increasing rate, that CO₂ emissions attributable to fossil fuels were retained in the atmosphere, and that CO₂ was contributing to global warming.¹²² The report stated:

There is general scientific agreement that the most likely manner in which mankind is influencing the global climate is through carbon dioxide release from the burning of fossil fuels . . . [and that] Man has a time window of five to ten years before the

¹²⁰ American Petroleum Institute, *Environmental Research, A Status Report*, Committee for Air and Water Conservation (Jan. 1972), <http://files.eric.ed.gov/fulltext/ED066339.pdf>.

¹²¹ *Id.*

¹²² Memo from J.F. Black to F.G. Turpin, *The Greenhouse Effect*, Exxon Research and Engineering Company (June 6, 1978), <http://www.climatefiles.com/exxonmobil/1978-exxon-memo-on-greenhouse-effect-for-exxon-corporation-management-committee>.

need for hard decisions regarding changes in energy strategies might become critical.¹²³

One presentation slide read: “Current scientific opinion overwhelmingly favors attributing atmospheric carbon dioxide increase to fossil fuel combustion.”¹²⁴ The report also warned that “a study of past climates suggests that if the earth does become warmer, more rainfall should result. But an increase as large as 2°C would probably also affect the distribution of the rainfall.” Moreover, the report concluded that “doubling in CO₂ could increase average global temperature 1°C to 3°C by 2050 A.D. (10°C predicted at poles).”¹²⁵

113. Thereafter, Exxon engaged in a research program to study the environmental fate of fossil fuel-derived greenhouse gases and their impacts, which included publication of peer-reviewed research by Exxon staff scientists and the conversion of a supertanker into a research vessel to study the greenhouse effect and the role of the oceans in absorbing anthropogenic CO₂. Much of this research was shared in a variety of fora, symposia, and shared papers through trade associations and directly with other Defendants.

114. Exxon scientists made the case internally for using company resources to build corporate knowledge about the impacts of the promotion, marketing, and consumption of Defendants’ fossil fuel products. Exxon climate researcher Henry Shaw wrote in 1978: “The rationale for Exxon’s involvement and commitment of funds and personnel is based on our need to assess the possible impact of the greenhouse effect on Exxon business. Exxon must develop a credible scientific team that can critically evaluate the information generated on the subject and be

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ *Id.*

able to carry bad news, if any, to the corporation.”¹²⁶ Moreover, Shaw emphasized the need to collaborate with universities and government to more completely understand what he called the “CO₂ problem.”¹²⁷

115. In 1979, API and its members, including Defendants, convened a Task Force to monitor and share cutting edge climate research among the oil industry. The group was initially called the CO₂ and Climate Task Force, but changed its name to the Climate and Energy Task Force in 1980 (hereinafter referred to as “API CO₂ Task Force”). Membership included senior scientists and engineers from nearly every major U.S. and multinational oil and gas company, including Exxon, Mobil (ExxonMobil), Amoco (BP), Phillips (ConocoPhillips), Texaco (Chevron), Shell, Sunoco, Sohio (BP), as well as Standard Oil of California (BP) and Gulf Oil (Chevron), among others. The Task Force was charged with assessing the implications of emerging science on the petroleum and gas industries and identifying where reductions in greenhouse gas emissions from Defendants’ fossil fuel products could be made.¹²⁸

116. In 1979, API sent its members a background memo related to the API CO₂ and Climate Task Force’s efforts, stating that CO₂ concentrations were rising steadily in the atmosphere, and predicting when the first clear effects of climate change might be felt.¹²⁹

¹²⁶ Henry Shaw, *Memo to Edward David Jr. on the “Greenhouse Effect”*, Exxon Research and Engineering Company (Dec. 7, 1978), <http://insideclimatenews.org/sites/default/files/documents/Credible%20Scientific%20Team%201978%20Letter.pdf>.

¹²⁷ *Id.*

¹²⁸ American Petroleum Institute, *AQ-9 Task Force Meeting Minutes* (Mar. 18, 1980), <http://insideclimatenews.org/sites/default/files/documents/AQ-9%20Task%20Force%20Meeting%20%281980%29.pdf> (AQ-9 refers to the “CO₂ and Climate” Task Force).

¹²⁹ Neela Banerjee, *Exxon’s Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, INSIDE CLIMATE NEWS (Dec. 22, 2015), <https://insideclimatenews.org/news/22122015/exxon-mobil-oil-industry-peers-knew-about-climate-change-dangers-1970s-american-petroleum-institute-api-shell-chevron-texaco>.

117. Also in 1979, Exxon scientists advocated internally for additional fossil fuel industry-generated atmospheric research in light of the growing consensus that consumption of fossil fuel products was changing the Earth's climate:

We should determine how Exxon can best participate in all these [atmospheric science research] areas and influence possible legislation on environmental controls. It is important to begin to anticipate the strong intervention of environmental groups and be prepared to respond with reliable and credible data. It behooves [Exxon] to start a very aggressive defensive program in the indicated areas of atmospheric science and climate because there is a good probability that legislation affecting our business will be passed. Clearly, it is in our interest for such legislation to be based on hard scientific data. The data obtained from research on the global damage from pollution, e.g., from coal combustion, will give us the needed focus for further research to avoid or control such pollutants.¹³⁰

118. That same year, Exxon Research and Engineering reported that: "The most widely held theory [about increasing CO₂ concentration] is that the increase is due to fossil fuel combustion, increasing CO₂ concentration will cause a warming of the earth's surface, and the present trend of fossil fuel consumption will cause dramatic environmental effects before the year 2050."¹³¹ According to the report, "ecological consequences of increased CO₂" to 500 ppm (1.7 times 1850 levels) could mean: "a global temperature increase of 3°F"; "the southwest states would be hotter, probably by more than 3°F, and drier"; "most of the glaciers in the North Cascades and Glacier National Park would be melted"; "there would be less of a winter snow pack in the Cascades, Sierras, and Rockies, necessitating a major increase in storage reservoirs"; "marine life would be markedly changed"; and "maintaining runs of salmon and steelhead and other subarctic

¹³⁰ Henry Shaw, Exxon, *Memo to H.N. Weinberg about "Research in Atmospheric Science"*, Exxon Inter-Office Correspondence (Nov. 19, 1979), [https://insideclimatenews.org/sites/default/files/documents/Probable%20Legislation%20Memo%20\(1979\).pdf](https://insideclimatenews.org/sites/default/files/documents/Probable%20Legislation%20Memo%20(1979).pdf).

¹³¹ W.L. Ferrall, Exxon, *Memo to R.L. Hirsch about "Controlling Atmospheric CO₂"*, Exxon Research and Engineering Company (Oct. 16, 1979), <http://insideclimatenews.org/sites/default/files/documents/CO2%20and%20Fuel%20Use%20Projections.pdf>.

species in the Columbia River system would become increasingly difficult.”¹³² With a doubling of the 1860 CO₂ concentration, “ocean levels would rise four feet” and “the Arctic Ocean would be ice free for at least six months each year, causing major shifts in weather patterns in the northern hemisphere.”¹³³

119. Further, the report stated that unless fossil fuel use was constrained, there would be “noticeable temperature changes” associated with an increase in atmospheric CO₂ from about 280 parts per million before the Industrial Revolution to 400 parts per million by the year 2010.¹³⁴ Those projections proved remarkably accurate—atmospheric CO₂ concentrations surpassed 400 parts per million in May 2013, for the first time in millions of years.¹³⁵ In 2015, the annual average CO₂ concentration rose above 400 parts per million, and in 2016 the annual low surpassed 400 parts per million, meaning atmospheric CO₂ concentration remained above that threshold all year.¹³⁶

120. In 1980, API’s CO₂ Task Force members discussed the oil industry’s responsibility to reduce CO₂ emissions by changing refining processes and developing fuels that emit less CO₂. The minutes from the Task Force’s February 29, 1980, meeting included a summary of a presentation on “The CO₂ Problem” given by Dr. John Laurmann, which identified the “scientific consensus on the potential for large future climatic response to increased CO₂ levels” as a reason for API members to have concern with the “CO₂ problem” and informed attendees that there was

¹³² *Id.*

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ Nicola Jones, *How the World Passed a Carbon Threshold and Why It Matters*, YALE ENVIRONMENT 360 (Jan. 26, 2017), <http://e360.yale.edu/features/how-the-world-passed-a-carbon-threshold-400ppm-and-why-it-matters>.

¹³⁶ *Id.*

“strong empirical evidence that rise [in CO₂ concentration was] caused by anthropogenic release of CO₂, mainly from fossil fuel combustion.”¹³⁷ Moreover, Dr. Laurmann warned that the amount of CO₂ in the atmosphere could double by 2038, which he said would likely lead to a 2.5°C (4.5°F) rise in global average temperatures with “major economic consequences.” He then told the Task Force that models showed a 5°C (9°F) rise by 2067, with “globally catastrophic effects.”¹³⁸ A taskforce member and representative of Texaco (Chevron) leadership present at the meeting posited that the API CO₂ Task Force should develop ground rules for energy release of fuels and the cleanup of fuels as they relate to CO₂ creation.

121. In 1980, the API CO₂ Task Force also discussed a potential area for investigation: alternative energy sources as a means of mitigating CO₂ emissions from Defendants’ fossil fuel products. These efforts called for research and development to “Investigate the Market Penetration Requirements of Introducing a New Energy Source into World Wide Use.” Such investigation was to include the technical implications of energy source changeover, research timing, and requirements.¹³⁹

122. By 1980, Exxon’s senior leadership had become intimately familiar with the greenhouse effect and the role of CO₂ in the atmosphere. In that year, Exxon Senior Vice President and Board member George Piercy questioned Exxon researchers on the minutiae of the ocean’s role in absorbing atmospheric CO₂, including whether there was a net CO₂ flux out of the ocean into the atmosphere in certain zones where upwelling of cold water to the surface occurs, because Piercy evidently believed that the oceans could absorb and retain higher concentrations of CO₂.

¹³⁷ American Petroleum Institute, *AQ-9 Task Force Meeting Minutes* (Mar. 18, 1980), *supra* note 128.

¹³⁸ *Id.*

¹³⁹ *Id.*

than the atmosphere.¹⁴⁰ This inquiry aligns with Exxon supertanker research into whether the ocean would act as a significant CO₂ sink that would sequester atmospheric CO₂ long enough to allow unabated emissions without triggering dire climatic consequences. As described below, Exxon eventually scrapped this research before it produced enough data from which to derive a conclusion.¹⁴¹

123. Also in 1980, Imperial Oil Limited (a Canadian ExxonMobil subsidiary) reported to managers and environmental staff at multiple affiliated Esso and Exxon companies that increases in fossil fuel usage aggravates CO₂ in the atmosphere. Noting that the United Nations was encouraging research into the carbon cycle, Imperial reported that “[t]echnology exists to remove CO₂ from [fossil fuel power plant] stack gases but removal of only 50 percent of the CO₂ would double the cost of power generation.”

124. Exxon scientist Roger Cohen warned his colleagues in a 1981 internal memorandum that “future developments in global data gathering and analysis, along with advances in climate modeling, may provide strong evidence for a delayed CO₂ effect of a truly substantial magnitude,” and that under certain circumstances it would be “very likely that we will unambiguously recognize the threat by the year 2000.”¹⁴² Cohen had expressed concern that the memorandum mischaracterized potential effects of unabated CO₂ emissions from Defendants’

¹⁴⁰ Neela Banerjee, *More Exxon Documents Show How Much It Knew About Climate 35 Years Ago*, INSIDE CLIMATE NEWS (Dec. 1, 2015), <https://insideclimatenews.org/news/01122015/documents-exxons-early-co2-position-senior-executives-engage-and-warming-forecast>.

¹⁴¹ Neela Banerjee et al., *Exxon Believed Deep Dive into Climate Research Would Protect Its Business*, INSIDE CLIMATE NEWS (Sept. 17, 2015), <https://insideclimatenews.org/news/16092015/exxon-believed-deep-dive-into-climate-research-would-protect-its-business>.

¹⁴² Roger W. Cohen, *Exxon Memo to W. Glass about possible “catastrophic” effect of CO₂*, Exxon Inter-Office Correspondence (Aug. 18, 1981), <http://www.climatefiles.com/exxonmobil/1981-exxon-memo-on-possible-emission-consequences-of-fossil-fuel-consumption>.

fossil fuel products: “. . . it is distinctly possible that the . . . [Exxon Planning Division’s] scenario will produce effects which will indeed be catastrophic (at least for a substantial fraction of the world’s population).”¹⁴³

125. In 1981, Exxon’s Henry Shaw, the company’s lead climate researcher at the time, prepared a summary of Exxon’s current position on the greenhouse effect for Edward David Jr., president of Exxon Research and Engineering, stating in relevant part:

- “Atmospheric CO₂ will double in 100 years if fossil fuels grow at 1.4%/a².
- 3°C global average temperature rise and 10°C at poles if CO₂ doubles.
 - Major shifts in rainfall/agriculture
 - Polar ice may melt”¹⁴⁴

126. In 1982, another report prepared for API by scientists at the Lamont-Doherty Geological Observatory at Columbia University recognized that atmospheric CO₂ concentration had risen significantly compared to the beginning of the industrial revolution from about 290 parts per million to about 340 parts per million in 1981 and acknowledged that despite differences in climate modelers’ predictions, all models indicated a temperature increase caused by anthropogenic CO₂ within a global mean range of 4° C (7.2°F). The report advised that there was scientific consensus that “a doubling of atmospheric CO₂ from [] pre-industrial revolution value would result in an average global temperature rise of (3.0 ± 1.5)°C [5.4 ± 2.7°F].” It went further, warning that “[s]uch a warming can have serious consequences for man’s comfort and survival since patterns of aridity and rainfall can change, the height of the sea level can increase considerably and the world food supply can be affected.”¹⁴⁵ Exxon’s own modeling research

¹⁴³ *Id.*

¹⁴⁴ Henry Shaw, *Exxon Memo to E. E. David, Jr. about “CO₂ Position Statement”*, Exxon Inter-Office Correspondence (May 15, 1981), <https://insideclimatenews.org/sites/default/files/documents/Exxon%20Position%20on%20CO2%20%281981%29.pdf>.

¹⁴⁵ American Petroleum Institute, *Climate Models and CO₂ Warming: A Selective Review and Summary*, Lamont-Doherty Geological Observatory (Columbia University) (Mar. 1982),

confirmed this, and the company's results were later published in at least three peer-reviewed scientific papers.¹⁴⁶

127. Also in 1982, Exxon's Environmental Affairs Manager distributed a primer on climate change to a "wide circulation [of] Exxon management . . . intended to familiarize Exxon personnel with the subject."¹⁴⁷ The primer also was "restricted to Exxon personnel and not to be distributed externally."¹⁴⁸ The primer compiled science on climate change available at the time, and confirmed fossil fuel combustion as a primary anthropogenic contributor to global warming. The report estimated a CO₂ doubling around 2090 based on Exxon's long-range modeled outlook. The author warned that "uneven global distribution of increased rainfall and increased evaporation" were expected to occur, and that "disturbances in the existing global water distribution balance would have dramatic impact on soil moisture, and in turn, on agriculture."¹⁴⁹ Moreover, the melting of the Antarctic ice sheet could result in global sea level rise of five feet which would "cause flooding on much of the U.S. East Coast, including the State of Florida and Washington, D.C."¹⁵⁰ Indeed, it warned that "there are some potentially catastrophic events that must be considered," including sea level rise from melting polar ice sheets. It noted that some

<https://assets.documentcloud.org/documents/2805626/1982-API-Climate-Models-and-CO2-Warming-a.pdf>.

¹⁴⁶ See Roger W. Cohen, *Exxon Memo summarizing findings of research in climate modeling*, Exxon Research and Engineering Company (Sept. 2, 1982), [https://insideclimatenews.org/sites/default/files/documents/%2522Consensus%2522%20on%20CO2%20Impacts%20\(1982\).pdf](https://insideclimatenews.org/sites/default/files/documents/%2522Consensus%2522%20on%20CO2%20Impacts%20(1982).pdf) (discussing research articles).

¹⁴⁷ M. B. Glaser, *Exxon Memo to Management about "CO₂ 'Greenhouse' Effect"*, Exxon Research and Engineering Company (Nov. 12, 1982), <http://insideclimatenews.org/sites/default/files/documents/1982%20Exxon%20Primer%20on%20CO2%20Greenhouse%20Effect.pdf>.

¹⁴⁸ *Id.*

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*

scientific groups were concerned “that once the effects are measurable, they might not be reversible.”¹⁵¹

128. In a summary of Exxon’s climate modeling research from 1982, Director of Exxon’s Theoretical and Mathematical Sciences Laboratory Roger Cohen wrote that “the time required for doubling of atmospheric CO₂ depends on future world consumption of fossil fuels.” Cohen concluded that Exxon’s own results were “consistent with the published predictions of more complex climate models” and “in accord with the scientific consensus on the effect of increased atmospheric CO₂ on climate.”¹⁵²

129. At the fourth biennial Maurice Ewing Symposium at the Lamont-Doherty Geophysical Observatory in October 1982, attended by members of API, Exxon Research and Engineering Company, the Observatory’s president E.E. David delivered a speech titled: “Inventing the Future: Energy and the CO₂ ‘Greenhouse Effect.’”¹⁵³ His remarks included the following statement: “[F]ew people doubt that the world has entered an energy transition away from dependence upon fossil fuels and toward some mix of renewable resources that will not pose problems of CO₂ accumulation.” He went on, discussing the human opportunity to address anthropogenic climate change before the point of no return:

It is ironic that the biggest uncertainties about the CO₂ buildup are not in predicting what the climate will do, but in predicting what people will do. . . . [It] appears we still have time to generate the wealth and knowledge we will need to invent the transition to a stable energy system.

¹⁵¹ *Id.*

¹⁵² Roger W. Cohen, *Exxon Memo summarizing findings of research in climate modeling*, Exxon Research and Engineering Company (Sept. 2, 1982), [https://insideclimatenews.org/sites/default/files/documents/%2522Consensus%2522%20on%20CO2%20Impacts%20\(1982\).pdf](https://insideclimatenews.org/sites/default/files/documents/%2522Consensus%2522%20on%20CO2%20Impacts%20(1982).pdf).

¹⁵³ E. E. David, Jr., *Inventing the Future: Energy and the CO₂ Greenhouse Effect: Remarks at the Fourth Annual Ewing Symposium, Tenafly, NJ* (1982), <http://sites.agu.org/publications/files/2015/09/ch1.pdf>.

130. Throughout the early 1980s, at Exxon's direction, Exxon climate scientist Henry Shaw forecasted emissions of CO₂ from fossil fuel use. Those estimates were incorporated into Exxon's 21st century energy projections and were distributed among Exxon's various divisions. Shaw's conclusions included an expectation that atmospheric CO₂ concentrations would double in 2090 per the Exxon model, with an attendant 2.3–5.6° F average global temperature increase. Shaw compared his model results to those of the EPA, the National Academy of Sciences, and the Massachusetts Institute of Technology, indicating that the Exxon model predicted a longer delay than any of the other models, although its temperature increase prediction was in the mid-range of the four projections.¹⁵⁴

131. During the 1980s, many Defendants formed their own research units focused on climate modeling. The API, including the API CO₂ Task Force, provided a forum for Defendants to share their research efforts and corroborate their findings related to anthropogenic greenhouse gas emissions.¹⁵⁵

132. During this time, Defendants' statements express an understanding of their obligation to consider and mitigate the externalities of unabated promotion, marketing, and sale of their fossil fuel products. For example, in 1988, Richard Tucker, the president of Mobil Oil, presented at the American Institute of Chemical Engineers National Meeting, the premier educational forum for chemical engineers, where he stated:

[H]umanity, which has created the industrial system that has transformed civilities, is also responsible for the environment, which sometimes is at risk because of unintended consequences of industrialization. . . . Maintaining the health of this

¹⁵⁴ Neela Banerjee, *More Exxon Documents Show How Much It Knew About Climate 35 Years Ago*, *supra* note 140.

¹⁵⁵ Neela Banerjee, *Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, *supra* note 129.

life-support system is emerging as one of the highest priorities. . . . [W]e must all be environmentalists.

The environmental covenant requires action on many fronts . . . the low-atmosphere ozone problem, the upper-atmosphere ozone problem and the greenhouse effect, to name a few. . . . Our strategy must be to reduce pollution before it is ever generated—to prevent problems at the source.

Prevention means engineering a new generation of fuels, lubricants and chemical products. . . . Prevention means designing catalysts and processes that minimize or eliminate the production of unwanted byproducts. . . . Prevention on a global scale may even require a dramatic reduction in our dependence on fossil fuels—and a shift towards solar, hydrogen, and safe nuclear power. It may be possible that—just possible—that the energy industry will transform itself so completely that observers will declare it a new industry. . . . Brute force, low-tech responses and money alone won't meet the challenges we face in the energy industry.¹⁵⁶

133. Also in 1988, the Shell Greenhouse Effect Working Group issued a confidential internal report, “The Greenhouse Effect,” which acknowledged global warming’s anthropogenic nature: “Man-made carbon dioxide released into and accumulated in the atmosphere is believed to warm the earth through the so-called greenhouse effect.” The authors also noted the burning of fossil fuels as a primary driver of CO₂ buildup and warned that warming could “create significant changes in sea level, ocean currents, precipitation patterns, regional temperature and weather.” They further pointed to the potential for “direct operational consequences” of sea level rise on “offshore installations, coastal facilities and operations (e.g. platforms, harbours, refineries, depots).”¹⁵⁷

134. Similar to early warnings by Exxon scientists, the Shell report notes that “by the time the global warming becomes detectable it could be too late to take effective countermeasures

¹⁵⁶ Richard E. Tucker, *High Tech Frontiers in the Energy Industry: The Challenge Ahead*, AIChE National Meeting (Nov. 30, 1988), <https://hdl.handle.net/2027/pur1.32754074119482?urlappend=%3Bseq=522>.

¹⁵⁷ Greenhouse effect working group, *The Greenhouse Effect*, Shell Internationale Petroleum (May 1988), <https://www.documentcloud.org/documents/4411090-Document3.html#document/p9/a411239>.

to reduce the effects or even to stabilise the situation.” The authors mention the need to consider policy changes on multiple occasions, noting that “the potential implications for the world are . . . so large that policy options need to be considered much earlier” and that research should be “directed more to the analysis of policy and energy options than to studies of what we will be facing exactly.”

135. In 1989, Esso Resources Canada (ExxonMobil) commissioned a report on the impacts of climate change on existing and proposed natural gas facilities in the Mackenzie River Valley and Delta, including extraction facilities on the Beaufort Sea and a pipeline crossing Canada’s Northwest Territory.¹⁵⁸ It reported that “large zones of the Mackenzie Valley could be affected dramatically by climatic change” and that “the greatest concern in Norman Wells [oil town in North West Territories, Canada] should be the changes in permafrost that are likely to occur under conditions of climate warming.”¹⁵⁹ The report concluded that, in light of climate models showing a “general tendency towards warmer and wetter climate,” operation of those facilities would be compromised by increased precipitation, increase in air temperature, changes in permafrost conditions, and significantly, sea level rise and erosion damage.¹⁶⁰ The authors recommended factoring these eventualities into future development planning and also warned that “a rise in sea level could cause increased flooding and erosion damage on Richards Island.”

136. In 1991, Shell produced a film called “Climate of Concern.” The film advises that while “no two [climate change projection] scenarios fully agree, . . . [they] have each prompted the same serious warning. A warning endorsed by a uniquely broad consensus of scientists in their

¹⁵⁸ See Stephen Lonergan & Kathy Young, *An Assessment of the Effects of Climate Warming on Energy Developments in the Mackenzie River Valley and Delta, Canadian Arctic*, 7 ENERGY EXPLORATION & EXPLOITATION 359–81 (1989).

¹⁵⁹ *Id.* at 369, 376.

¹⁶⁰ *Id.* at 360, 377–78.

report to the UN at the end of 1990.” The warning was an increasing frequency of abnormal weather, and of sea level rise of about one meter over the coming century. Shell specifically described the impacts of anthropogenic sea level rise on tropical islands, “barely afloat even now, . . . [f]irst made uninhabitable and then obliterated beneath the waves. Wetland habitats destroyed by intruding salt. Coastal lowlands suffering pollution of precious groundwater.” It warned of “greenhouse refugees,” people who abandoned homelands inundated by the sea, or displaced because of catastrophic changes to the environment. The video concludes with a stark admonition: “Global warming is not yet certain, but many think that the wait for final proof would be irresponsible. Action now is seen as the only safe insurance.”¹⁶¹

137. The fossil fuel industry was at the forefront of carbon dioxide research for much of the latter half of the 20th century. They developed cutting edge and innovative technology and worked with many of the field’s top researchers to produce exceptionally sophisticated studies and models. For instance, in the mid-nineties Shell began using scenarios to plan how the company could respond to various global forces in the future. In one scenario published in a 1998 internal report, Shell paints an eerily prescient scene:

In 2010, a series of violent storms causes extensive damage to the eastern coast of the U.S. Although it is not clear whether the storms are caused by climate change, people are not willing to take further chances. The insurance industry refuses to accept liability, setting off a fierce debate over who is liable: the insurance industry or the government. After all, two successive IPCC reports since 1993 have reinforced the human connection to climate change... Following the storms, a coalition of environmental NGOs brings a class-action suit against the US government and fossil-fuel companies on the grounds of neglecting what scientists (including their own) have been saying for years: that something must be done. A social reaction to the use of fossil fuels grows, and individuals become ‘vigilante environmentalists’ in the same way, a generation earlier, they had become fiercely

¹⁶¹Jelmer Mommers, *Shell Made a Film About Climate Change in 1991 (Then Neglected To Heed Its Own Warning)*, DE CORRESPONDENT (Feb. 27, 2017), <https://thecorrespondent.com/6285/shell-made-a-film-about-climate-change-in-1991-then-neglected-to-heed-its-own-warning>.

anti-tobacco. Direct-action campaigns against companies escalate. Young consumers, especially, demand action.

138. Fossil fuel companies did not just consider climate change impacts in scenarios. In the mid-1990s, ExxonMobil, Shell, and Imperial Oil (ExxonMobil) jointly undertook the Sable Offshore Energy Project in Nova Scotia. The project's own Environmental Impact Statement declared: "The impact of a global warming sea-level rise may be particularly significant in Nova Scotia. The long-term tide gauge records at a number of locations along the N.S. coast have shown sea level has been rising over the past century. . . . For the design of coastal and offshore structures, an estimated rise in water level, due to global warming, of 0.5 m [1.64 feet] may be assumed for the proposed project life (25 years)."¹⁶²

139. Climate change research conducted by Defendants and their industry associations frequently acknowledged uncertainties in their climate modeling—those uncertainties, however, were merely with respect to the magnitude and timing of climate impacts resulting from fossil fuel consumption, not that significant changes would eventually occur. The Defendants' researchers and the researchers at their industry associations harbored little doubt that climate change was occurring and that fossil fuel products were, and are, the primary cause.

140. Despite the overwhelming information about the threats to people and the planet posed by continued unabated use of their fossil fuel products, Defendants failed to act as they reasonably should have to mitigate or avoid those dire adverse impacts. Defendants instead adopted the position, as described below, that the absence of meaningful regulations on the consumption of their fossil fuel products was the equivalent of a social license to continue the

¹⁶² ExxonMobil, Sable Project, Development Plan, *Volume 3—Environmental Impact Statement* Ch 4: Environmental Setting, 4-77, <http://soep.com/about-the-project/development-plan-application>.

unfettered pursuit of profits from those products. This position was an abdication of Defendants' responsibility to consumers and the public, including Plaintiff, to act on their unique knowledge of the reasonably foreseeable hazards of unabated production and consumption of their fossil fuel products.

H. Defendants Did Not Disclose Known Harms Associated with the Extraction, Promotion, and Consumption of Their Fossil Fuel Products, and Instead Affirmatively Acted to Obscure Those Harms and Engaged in a Concerted Campaign to Evade Regulation.

141. By 1988, Defendants had amassed a compelling body of knowledge about the role of anthropogenic greenhouse gases, and specifically those emitted from the normal use of Defendants' fossil fuel products, in causing global warming, disruptions to the hydrologic cycle, extreme precipitation and drought, heatwaves, and associated consequences for human communities and the environment. On notice that their products were causing global climate change and dire effects on the planet, Defendants were faced with the decision of whether to take steps to limit the damages their fossil fuel products were causing and would continue to cause for virtually every one of Earth's inhabitants, including the people of Maryland, and the City of Baltimore and its inhabitants.

142. Defendants at any time before or thereafter could and reasonably should have taken any number of steps to mitigate the damages caused by their fossil fuel products, and their own comments reveal an awareness of what some of these steps may have been. Defendants should have made reasonable warnings to consumers, the public, and regulators of the dangers known to Defendants of the unabated consumption of their fossil fuel products, and they should have taken reasonable steps to limit the potential greenhouse gas emissions arising out of their fossil fuel products.

143. But several key events during the period 1988–1992 appear to have prompted Defendants to change their tactics from general research and internal discussion on climate change to a public campaign aimed at evading regulation of their fossil fuel products and/or emissions therefrom. These include:

- a. In 1988, National Aeronautics and Space Administration (NASA) scientists confirmed that human activities were actually contributing to global warming.¹⁶³ On June 23 of that year, NASA scientist James Hansen’s presentation of this information to Congress engendered significant news coverage and publicity for the announcement, including coverage on the front page of the New York Times.
- b. On July 28, 1988, Senator Robert Stafford and four bipartisan co-sponsors introduced S. 2666, “The Global Environmental Protection Act,” to regulate CO₂ and other greenhouse gases. Four more bipartisan bills to significantly reduce CO₂ pollution were introduced over the following ten weeks, and in August, U.S. Presidential candidate George H.W. Bush pledged that his presidency would “combat the greenhouse effect with the White House effect.”¹⁶⁴ Political will in the United States to reduce anthropogenic greenhouse gas emissions and mitigate the harms associated with Defendants’ fossil fuel products was gaining momentum.
- c. In December 1988, the United Nations formed the Intergovernmental Panel on Climate Change (IPCC), a scientific panel dedicated to providing the world’s

¹⁶³ See Peter C. Frumhoff et al., *The Climate Responsibilities of Industrial Carbon Producers*, 132 CLIMATIC CHANGE 161 (2015).

¹⁶⁴ N.Y. TIMES, *The White House and the Greenhouse* (May 9, 1998), <http://www.nytimes.com/1989/05/09/opinion/the-white-house-and-the-greenhouse.html>.

governments with an objective, scientific analysis of climate change and its environmental, political, and economic impacts.

- d. In 1990, the IPCC published its First Assessment Report on anthropogenic climate change,¹⁶⁵ in which it concluded that (1) “there is a natural greenhouse effect which already keeps the Earth warmer than it would otherwise be,” and (2) that

emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases carbon dioxide, methane, chlorofluorocarbons (CFCs) and nitrous oxide. These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface. The main greenhouse gas, water vapour, will increase in response to global warming and further enhance it.¹⁶⁶

The IPCC reconfirmed these conclusions in a 1992 supplement to the First Assessment report.¹⁶⁷

- e. The United Nations began preparation for the 1992 Earth Summit in Rio de Janeiro, Brazil, a major, newsworthy gathering of 172 world governments, of which 116 sent their heads of state. The Summit resulted in the United Nations Framework Convention on Climate Change (UNFCCC), an international environmental treaty providing protocols for future negotiations aimed at “stabiliz[ing] greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”¹⁶⁸

¹⁶⁵ See IPCC, *Reports*, http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml.

¹⁶⁶ IPCC, *Climate Change: The IPCC Scientific Assessment*, “Policymakers Summary” (1990), http://www.ipcc.ch/ipccreports/far/wg_I/ipcc_far_wg_I_spm.pdf.

¹⁶⁷ IPCC, *1992 IPCC Supplement to the First Assessment Report* (1992), http://www.ipcc.ch/publications_and_data/publications_ipcc_90_92_assessments_far.shtml.

¹⁶⁸ United Nations, *United Nations Framework Convention on Climate Change*, Article 2 (1992), <https://unfccc.int/resource/docs/convkp/conveng.pdf>.

144. These world events marked a shift in public discussion of climate change, and the initiation of international efforts to curb anthropogenic greenhouse emissions—developments that had stark implications for, and would have diminished the profitability of, Defendants' fossil fuel products.

145. But rather than collaborating with the international community by acting to forestall, or at least decrease, their fossil fuel products' contributions to global warming, sea level rise, disruptions to the hydrologic cycle, and associated consequences to Baltimore and other communities, Defendants embarked on a decades-long campaign designed to maximize continued dependence on their products and undermine national and international efforts to rein in greenhouse gas emissions.

146. Defendants' campaign, which focused on concealing, discrediting, and/or misrepresenting information that tended to support restricting consumption of (and thereby decreasing demand for) Defendants' fossil fuel products, took several forms. The campaign enabled Defendants to accelerate their business practice of exploiting fossil fuel reserves, and concurrently externalize the social and environmental costs of their fossil fuel products. These activities stood in direct contradiction to Defendants' own prior recognition that the science of anthropogenic climate change was clear and that the greatest uncertainties involved responsive human behavior, not scientific understanding of the issue.

147. Defendants took affirmative steps to conceal, from Plaintiff and the general public, the foreseeable impacts of the use of their fossil fuel products on the Earth's climate and associated harms to people and communities. Defendants embarked on a concerted public relations campaign to cast doubt on the science connecting global climate change to fossil fuel products and greenhouse gas emissions, in order to influence public perception of the existence of anthropogenic

global warming and sea level rise, disruptions to weather cycles, extreme precipitation and drought, and associated consequences. The effort included promoting their hazardous products through advertising campaigns and the initiation and funding of climate change denialist organizations, designed to influence consumers to continue using Defendants' fossil fuel products irrespective of those products' damage to communities and the environment.

148. For example, in 1988, Joseph Carlson, an Exxon public affairs manager, described the "Exxon Position," which included among others, two important messaging tenets: (1) "[e]mphasize the uncertainty in scientific conclusions regarding the potential enhanced Greenhouse Effect"; and (2) "[r]esist the overstatement and sensationalization [sic] of potential greenhouse effect which could lead to noneconomic development of non-fossil fuel resources."¹⁶⁹

149. A 1994 Shell report entitled "The Enhanced Greenhouse Effect: A Review of the Scientific Aspects" by Royal Dutch Shell environmental advisor Peter Langcake stands in stark contrast to the company's 1988 report on the same topic. Whereas before, the authors recommended consideration of policy solutions early on, Langcake warned of the potentially dramatic "economic effects of ill-advised policy measures." While the report recognized the IPCC conclusions as the mainstream view, Langcake still emphasized scientific uncertainty, noting, for example, that "the postulated link between any observed temperature rise and human activities has to be seen in relation to natural variability, which is still largely unpredictable." The Group position is stated clearly in the report: "Scientific uncertainty and the evolution of energy systems indicate

¹⁶⁹ Joseph M. Carlson, *Exxon Memo on "The Greenhouse Effect"* (Aug. 3, 1988), <https://assets.documentcloud.org/documents/3024180/1998-Exxon-Memo-on-the-Greenhouse-Effect.pdf>.

that policies to curb greenhouse gas emissions beyond 'no regrets' measures could be premature, divert resources from more pressing needs and further distort markets."¹⁷⁰

150. In 1991, for example, the Information Council for the Environment ("ICE"), whose members included affiliates, predecessors and/or subsidiaries of Defendants, including Pittsburg and Midway Coal Mining (Chevron) and Island Creek Coal Company (Occidental), launched a national climate change science denial campaign with full-page newspaper ads, radio commercials, a public relations tour schedule, "mailers," and research tools to measure campaign success. Included among the campaign strategies was to "reposition global warming as theory (not fact)." Its target audience included older less-educated males who are "predisposed to favor the ICE agenda, and likely to be even more supportive of that agenda following exposure to new info."¹⁷¹

151. An implicit goal of ICE's advertising campaign was to change public opinion and avoid regulation. A memo from Richard Lawson, president of the National Coal Association asked members to contribute to the ICE campaign with the justification that "policymakers are prepared to act [on global warming]. Public opinion polls reveal that 60% of the American people already believe global warming is a serious environmental problem. Our industry cannot sit on the sidelines in this debate."¹⁷²

¹⁷⁰ P. Langcake, *The Enhanced Greenhouse Effect: A review of the Scientific Aspects*, (Dec. 1994), <https://www.documentcloud.org/documents/4411099-Documents11.html#document/p15/a411511>.

¹⁷¹ Union of Concerned Scientists, *Deception Dossier #5: Coal's "Information Council on the Environment" Sham* (1991), http://www.ucsusa.org/sites/default/files/attach/2015/07/Climate-Deception-Dossier-5_ICE.pdf.

¹⁷² Naomi Oreskes, *My Facts Are Better Than Your Facts: Spreading Good News About Global Warming* (2010), in Peter Howlett et al., *How Well Do Facts Travel?: The Dissemination of Reliable Knowledge*, 136–66, Cambridge University Press (2011).

152. The following images are examples of ICE-funded print advertisements challenging the validity of climate science and intended to obscure the scientific consensus on anthropogenic climate change and induce political inertia to address it.¹⁷³

Fig. 6: Information Council for the Environment Advertisements



153. In 1996, Exxon released a publication called “Global Warming: Who’s Right? Facts about a debate that’s turned up more questions than answers.” In the publication’s preface, Exxon CEO Lee Raymond inaccurately stated that “taking drastic action immediately is unnecessary since many scientists agree there’s ample time to better understand the climate system.” The subsequent article described the greenhouse effect as “unquestionably real and definitely a good thing,” while ignoring the severe consequences that would result from the influence of the increased CO₂ concentration on the Earth’s climate. Instead, it characterized the greenhouse effect as simply “what makes the earth’s atmosphere livable.” Directly contradicting their own internal reports and peer-reviewed science, the article ascribed the rise in temperature

¹⁷³ Union of Concerned Scientists, *supra* note 171, at 47–49.

since the late 19th century to “natural fluctuations that occur over long periods of time” rather than to the anthropogenic emissions that Exxon and other scientists had confirmed were responsible. The article also falsely challenged the computer models that projected the future impacts of unabated fossil fuel product consumption, including those developed by Exxon’s own employees, as having been “proved to be inaccurate.” The article contradicted the numerous reports circulated among Exxon’s staff, and by the API, by stating that “the indications are that a warmer world would be far more benign than many imagine . . . moderate warming would reduce mortality rates in the US, so a slightly warmer climate would be more healthful.” Raymond concluded his preface by attacking advocates for limiting the use of his company’s fossil fuel products as “drawing on bad science, faulty logic, or unrealistic assumptions”—despite the important role that Exxon’s own scientists had played in compiling those same scientific underpinnings.¹⁷⁴

154. API published an extensive report in the same year warning against concern over CO₂ buildup and any need to curb consumption or regulate the industry. The introduction stated that “there is no persuasive basis for forcing Americans to dramatically change their lifestyles to use less oil.” The authors discouraged the further development of certain alternative energy sources, writing that “government agencies have advocated the increased use of ethanol and the electric car, without the facts to support the assertion that either is superior to existing fuels and technologies” and that “policies that mandate replacing oil with specific alternative fuel technologies freeze progress at the current level of technology, and reduce the chance that innovation will develop better solutions.” The paper also denied the human connection to climate change, by falsely stating that no “scientific evidence exists that human activities are significantly

¹⁷⁴ Exxon Corp., *Global Warming: Who’s Right?* (1996), <https://www.documentcloud.org/documents/2805542-Exxon-Global-Warming-Whos-Right.html>.

affecting sea levels, rainfall, surface temperatures or the intensity and frequency of storms.” The report’s message was clear: “Facts don’t support the arguments for restraining oil use.”¹⁷⁵

155. In a speech presented at the World Petroleum Congress in Beijing in 1997 at which many of the Defendants were present, Exxon CEO Lee Raymond reiterated these views. This time, he presented a false dichotomy between stable energy markets and abatement of the marketing, promotion, and sale of fossil fuel products known to Defendants to be hazardous. He stated:

Some people who argue that we should drastically curtail our use of fossil fuels for environmental reasons . . . my belief [is] that such proposals are neither prudent nor practical. With no readily available economic alternatives on the horizon, fossil fuels will continue to supply most of the world’s and this region’s energy for the foreseeable future.

Governments also need to provide a stable investment climate...They should avoid the temptation to intervene in energy markets in ways that give advantage to one competitor over another or one fuel over another.

We also have to keep in mind that most of the greenhouse effects comes from natural sources . . . Leaping to radically cut this tiny sliver of the greenhouse pie on the premise that it will affect climate defies common sense and lacks foundation in our current understanding of the climate system.

Let’s agree there’s a lot we really don’t know about how climate will change in the 21st century and beyond . . . It is highly unlikely that the temperature in the middle of the next century will be significantly affected whether policies are enacted now or 20 years from now. It’s bad public policy to impose very costly regulations and restrictions when their need has yet to be proven.¹⁷⁶

156. Imperial Oil (ExxonMobil) CEO Robert Peterson falsely denied the established connection between Defendants’ fossil fuel products and anthropogenic climate change in the Summer 1998 Imperial Oil Review, “A Cleaner Canada:”

¹⁷⁵ Sally Brain Gentile et al., *Reinventing Energy: Making the Right Choices*, American Petroleum Institute (1996), <http://www.climatefiles.com/trade-group/american-petroleum-institute/1996-reinventing-energy>.

¹⁷⁶ Lee R. Raymond, *Energy—Key to growth and a better environment for Asia-Pacific nations*, World Petroleum Congress (Oct. 13, 1997), <https://assets.documentcloud.org/documents/2840902/1997-Lee-Raymond-Speech-at-China-World-Petroleum.pdf>.

[T]his issue [referring to climate change] has absolutely nothing to do with pollution and air quality. Carbon dioxide is not a pollutant but an essential ingredient of life on this planet [T]he question of whether or not the trapping of 'greenhouse gases will result in the planet's getting warmer . . . has no connection whatsoever with our day-to-day weather.

There is absolutely no agreement among climatologists on whether or not the planet is getting warmer, or, if it is, on whether the warming is the result of man-made factors or natural variations in the climate. . . . I feel very safe in saying that the view that burning fossil fuels will result in global climate change remains an unproved hypothesis.¹⁷⁷

157. Mobil (ExxonMobil) paid for a series of "advertorials," advertisements located in the editorial section of the New York Times and meant to look like editorials rather than paid ads. These ads discussed various aspects of the public discussion of climate change and sought to undermine the justifications for tackling greenhouse gas emissions as unsettled science. The 1997 advertorial below¹⁷⁸ argued that economic analysis of emissions restrictions was faulty and inconclusive and therefore a justification for delaying action on climate change.

¹⁷⁷ Robert Peterson, *A Cleaner Canada* in *Imperial Oil Review* (1998), <http://www.documentcloud.org/documents/2827818-1998-Imperial-Oil-Robert-Peterson-A-Cleaner-Canada.html>.

¹⁷⁸ Mobil, *When Facts Don't Square with the Theory, Throw Out the Facts*, N.Y. TIMES, A31 (Aug. 14, 1997), <https://www.documentcloud.org/documents/705550-mob-nyt-1997-aug-14-whenfactsdonsquare.html>.

Fig. 7: 1997 Mobil Editorial

the race.

But when we no longer allow those choices, both civility and common sense will have been diminished. □

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who have the power to do something about those officers, but choose not to. □

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When facts don't square with the theory, throw out the facts



That seems to characterize the administration's attitude on two of its own studies which show that international efforts to curb global warming could spark a big run-up in energy prices.

For months, the administration—playing its cards close to the vest—has promised to provide details of the emission reduction plan it will put on the table at the climate change meeting in Kyoto, Japan, later this year. It also promised to evaluate the economics of that policy and measure its impact. Those results are important because the proposals submitted by other countries thus far would be disruptive and costly to the U.S. economy.

Yet, when the results from its own economic models were finally generated, the administration started distancing itself from the findings and models that produced them. The administration's top economic advisor said that economic models can't provide a "definitive answer" on the impact of controlling emissions. The effort, she said, was "futile." At best, the models can only provide a "range of potential impacts."

Frankly, we're puzzled. The White House has promised to lay the economic facts before the public. Yet, the administration's top advisor said such an analysis won't be based on models and it will "preclude...detailed numbers." If you don't provide numbers and don't rely on models, what kind of rigorous economic examination can Congress and the public expect?

We're also puzzled by ambivalence over models. The administration downplays the utility of economic models to forecast cost impacts 10-15 years from now, yet its negotiators accept as gospel the 50-100 year predictions of global warming that have been generated by climate models—many of which have been criticized as seriously flawed.

The second study conducted by Argonne National Laboratory under a contract with the Energy Department, examined what would

happen if the U.S. had to commit to higher energy prices under the emission reduction plans that several nations had advanced last year. Such increases, the report concluded, would result in "significant reductions in output and employment" in six industries—aluminum, cement, chemical, paper and pulp, petroleum refining and steel.

Hit hardest, the study noted, would be the chemical industry, with estimates that up to 30 percent of U.S. chemical manufacturing capacity would move offshore to developing countries. Job losses could amount to some 200,000 in that industry, with another 100,000 in the steel sector. And despite the substantial loss of U.S. jobs and manufacturing capacity, the net emission reduction could be insignificant since developing countries will not be bound by the emission targets of a global warming treaty.

Downplaying Argonne's findings, the Energy Department noted that the study used outdated energy prices (mid-1995), didn't reflect the gains that would come from international emissions trading and failed to factor in the benefits of accelerated developments in energy efficiency and low-carbon technologies.

What it failed to mention is just what these new technologies are and when we can expect their benefits to kick in. As for emissions trading, many economists have theorized about the role they could play in reducing emissions, but few have grappled with the practicality of implementing and policing such a scheme.

We applaud the goals the U.S. wants to achieve in these upcoming negotiations—namely, that a final agreement must be "flexible, cost-effective, realistic, achievable and ultimately global in scope." But until we see the details of the administration's policy, we are concerned that plans are being developed in the absence of rigorous economic analysis. Too much is at stake to simply ignore facts that don't square with preconceived theories.

Mobil The energy to make a difference.

http://www.mobil.com

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158. In 1998, API, on behalf of Defendants, among other fossil fuel companies and organizations supported by fossil fuel corporate grants, developed a Global Climate Science Communications Plan that stated that unless “climate change becomes a non-issue . . . there may be no moment when we can declare victory for our efforts.” Rather, API proclaimed that “[v]ictory will be achieved when . . . average citizens ‘understand’ (recognize) uncertainties in climate science; [and when] recognition of uncertainties becomes part of the ‘conventional wisdom.’”¹⁷⁹ The multi-million-dollar, multi-year proposed budget included public outreach and the dissemination of educational materials to schools to “begin to erect a barrier against further efforts to impose Kyoto-like measures in the future”¹⁸⁰—a blatant attempt to disrupt international efforts, pursuant to the UNFCCC, to negotiate a treaty that curbed greenhouse gas emissions.

159. Soon after, API distributed a memo to its members identifying public agreement on fossil fuel products’ role in climate change as its highest priority issue.¹⁸¹ The memorandum illuminates API’s and Defendants’ concern over the potential regulation of Defendants’ fossil fuel products: “Climate is at the center of the industry’s business interests. Policies limiting carbon emissions reduce petroleum product use. That is why it is API’s highest priority issue and defined as ‘strategic.’”¹⁸² Further, the API memo stresses many of the strategies that Defendants individually and collectively utilized to combat the perception of their fossil fuel products as hazardous. These included:

¹⁷⁹ Joe Walker, *E-mail to Global Climate Science Team, attaching the Draft Global Science Communications Plan* (Apr. 3, 1998), <https://assets.documentcloud.org/documents/784572/api-global-climate-science-communications-plan.pdf>.

¹⁸⁰ *Id.*

¹⁸¹ Committee on Oversight and Government Reform, *Allegations of Political Interference with Government Climate Change Science*, at 51 (Mar. 19, 2007), <https://ia601904.us.archive.org/25/items/gov.gpo.fdsys.CHRG-110hhr37415/CHRG-110hhr37415.pdf>.

¹⁸² *Id.*

- a. Influencing the tenor of the climate change “debate” as a means to establish that greenhouse gas reduction policies like the Kyoto Protocol were not necessary to responsibly address climate change;
- b. Maintaining strong working relationships between government regulators and communications-oriented organizations like the Global Climate Coalition, the Heartland Institute, and other groups carrying Defendants’ message minimizing the hazards of the unabated use of their fossil fuel products and opposing regulation thereof;
- c. Building the case for (and falsely dichotomizing) Defendants’ positive contributions to a “long-term approach” (ostensibly for regulation of their products) as a reason for society to reject short term fossil fuel emissions regulations, and engaging in climate change science uncertainty research; and
- d. Presenting Defendants’ positions on climate change in domestic and international forums, including by preparing rebuttals to IPCC reports.

160. Additionally, Defendants mounted a campaign against regulation of their business practices in order to continue placing their fossil fuel products into the stream of commerce, despite their own knowledge and the growing national and international scientific consensus about the hazards of doing so. These efforts came despite Defendants’ recent recognition that “risks to nearly every facet of life on Earth . . . could be avoided only if timely steps were taken to address climate change.”¹⁸³

¹⁸³ Neela Banerjee, *Exxon’s Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, *supra* note 129.

161. The Global Climate Coalition (GCC), on behalf of Defendants and other fossil fuel companies, funded advertising campaigns and distributed material to generate public uncertainty around the climate debate, with the specific purpose of preventing U.S. adoption of the Kyoto Protocol, despite the leading role that the U.S. had played in the Protocol negotiations.¹⁸⁴ Despite an internal primer stating that various “contrarian theories” [i.e., climate change skepticism] do not “offer convincing arguments against the conventional model of greenhouse gas emission-induced climate change,” GCC excluded this section from the public version of the backgrounder and instead funded efforts to promote some of those same contrarian theories over subsequent years.¹⁸⁵

162. A key strategy in Defendants’ efforts to discredit scientific consensus on climate change and the IPCC was to bankroll scientists who, although accredited, held fringe opinions that were even more questionable given the sources of their research funding. These scientists obtained part or all of their research budget from Defendants directly or through Defendant-funded organizations like API.¹⁸⁶ but they frequently failed to disclose their fossil fuel industry underwriters.¹⁸⁷

163. Creating a false sense of disagreement in the scientific community (despite the consensus that its own scientists, experts, and managers had previously acknowledged) has had an

¹⁸⁴ *Id.*

¹⁸⁵ Gregory J. Dana, *Memo to AIAM Technical Committee Re: Global Climate Coalition (GCC)—Primer on Climate Change Science—Final Draft*, Association of International Automobile Manufacturers (Jan. 18, 1996), <http://www.webcitation.org/6FyqHawb9>.

¹⁸⁶ E.g., Willie Soon & Sallie Baliunas, *Proxy Climatic and Environmental Changes of the Past 1000 Years*, 23 CLIMATE RESEARCH 88, 105 (Jan. 31, 2003), <http://www.int-res.com/articles/cr2003/23/c023p089.pdf>.

¹⁸⁷ E.g., Newsdesk, *Smithsonian Statement: Dr. Wei-Hock (Willie) Soon*, SMITHSONIAN (Feb. 26, 2015), <http://newsdesk.si.edu/releases/smithsonian-statement-dr-wei-hock-willie-soon>.

evident impact on public opinion. A 2007 Yale University-Gallup poll found that while 71 percent of Americans personally believed global warming was happening, only 48 percent believed that there was a consensus among the scientific community, and 40 percent believed there was a lot of disagreement among scientists over whether global warming was occurring.¹⁸⁸

164. 2007 was the same year the IPCC published its Fourth Assessment Report, in which it concluded that “there is *very high confidence* that the net effect of human activities since 1750 has been one of warming.”¹⁸⁹ The IPCC defined “very high confidence” as at least a 9 out of 10 chance.¹⁹⁰

165. Defendants borrowed pages out of the playbook of prior denialist campaigns. A “Global Climate Science Team” (“GCST”) was created that mirrored a front group created by the tobacco industry, known as The Advancement of Sound Science Coalition, whose purpose was to sow uncertainty about the fact that cigarette smoke is carcinogenic. The GCST’s membership included Steve Milloy (a key player on the tobacco industry’s front group), Exxon’s senior environmental lobbyist; an API public relations representative; and representatives from Chevron and Southern Company that drafted API’s 1998 Communications Plan. There were no scientists on the “Global Climate Science Team.” GCST developed a strategy to spend millions of dollars manufacturing climate change uncertainty. Between 2000 and 2004, Exxon donated \$110,000 to Milloy’s efforts and another organization, the Free Enterprise Education Institute and \$50,000 to

¹⁸⁸ *American Opinions on Global Warming: A Yale/Gallup/Clearvision Poll*, Yale Program on Climate Change Communication (July 31, 2007), <http://climatecommunication.yale.edu/publications/american-opinions-on-global-warming>.

¹⁸⁹ IPCC, *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (2007), <https://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>.

¹⁹⁰ *Id.*

the Free Enterprise Action Institute, both registered to Milloy's home address.¹⁹¹

166. Defendants by and through their trade association memberships, worked directly, and often in a deliberately obscured manner, to evade regulation of the emissions resulting from use of their fossil fuel products.

167. Defendants have funded dozens of think tanks, front groups, and dark money foundations pushing climate change denial. These include the Competitive Enterprise Institute, the Heartland Institute, Frontiers for Freedom, Committee for a Constructive Tomorrow, and Heritage Foundation. From 1998 to 2014 ExxonMobil spent almost \$31 million funding numerous organizations misrepresenting the scientific consensus that Defendants' fossil fuel products were causing climate change, sea level rise, and injuries to Baltimore, among other coastal communities.¹⁹² Several Defendants have been linked to other groups that undermine the scientific basis linking Defendants' fossil fuel products to climate change and sea level rise, including the Frontiers of Freedom Institute and the George C. Marshall Institute.

168. Exxon acknowledged its own previous success in sowing uncertainty and slowing mitigation through funding of climate denial groups. In its 2007 Corporate Citizenship Report, Exxon declared: "In 2008, we will discontinue contributions to several public policy research groups whose position on climate change could divert attention from the important discussion on how the world will secure the energy required for economic growth in an environmentally

¹⁹¹ Seth Shulman et al., *Smoke, Mirrors & Hot Air: How ExxonMobil Uses Big Tobacco's Tactics to Manufacture Uncertainty on Climate Science*, Union of Concerned Scientists, 19 (Jan. 2007), http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/exxon_report.pdf.

¹⁹² ExxonSecrets.org, *ExxonMobil Climate Denial Funding 1998–2014* (accessed June 27, 2018), <http://exxonsecrets.org/html/index.php>.

responsible manner.”¹⁹³ Despite this pronouncement, Exxon remained financially associated with several such groups after the report’s publication.

169. Defendants could have contributed to the global effort to mitigate the impacts of greenhouse gas emissions by, for example delineating practical technical strategies, policy goals, and regulatory structures that would have allowed them to continue their business ventures while reducing greenhouse gas emissions and supporting a transition to a lower carbon future. Instead, Defendants undertook a momentous effort to evade international and national regulation of greenhouse gas emissions to enable them to continue unabated fossil fuel production.

170. As a result of Defendants’ tortious, false and misleading conduct, reasonable consumers of Defendants’ fossil fuel products and policy-makers have been deliberately and unnecessarily deceived about: the role of fossil fuel products in causing global warming, sea level rise, disruptions to the hydrologic cycle, and increased extreme precipitation, heatwaves, and drought; the acceleration of global warming since the mid-20th century and the continuation thereof; and about the fact that the continued increase in fossil fuel product consumption that creates severe environmental threats and significant economic costs for coastal communities, including Baltimore. Reasonable consumers and policy makers have also been deceived about the depth and breadth of the state of the scientific evidence on anthropogenic climate change, and in particular, about the strength of the scientific consensus demonstrating the role of fossil fuels in causing both climate change and a wide range of potentially destructive impacts, including sea level rise, disruptions to the hydrologic cycle, extreme precipitation, heatwaves, drought, and associated consequences.

¹⁹³ ExxonMobil, *2007 Corporate Citizenship Report* (Dec. 31, 2007), <http://www.documentcloud.org/documents/2799777-ExxonMobil-2007-Corporate-Citizenship-Report.html>.

I. In Contrast to Their Public Statements, Defendants' Internal Actions Demonstrate Their Awareness of and Intent to Profit from the Unabated Use of Fossil Fuel Products.

171. In contrast to their public-facing efforts challenging the validity of the scientific consensus about anthropogenic climate change, Defendants' acts and omissions evidence their internal acknowledgement of the reality of climate change and its likely consequences. These actions include, but are not limited to, making multi-billion-dollar infrastructure investments for their own operations that acknowledge the reality of coming anthropogenic climate-related change. These investments included (among others), raising offshore oil platforms to protect against sea level rise; reinforcing offshore oil platforms to withstand increased wave strength and storm severity; and developing and patenting designs for equipment intended to extract crude oil and/or natural gas in areas previously unreachable because of the presence of polar ice sheets.¹⁹⁴

172. For example, in 1973 Exxon obtained a patent for a cargo ship capable of breaking through sea ice¹⁹⁵ and for an oil tanker¹⁹⁶ designed specifically for use in previously unreachable areas of the Arctic.

173. In 1974, Chevron obtained a patent for a mobile arctic drilling platform designed to withstand significant interference from lateral ice masses,¹⁹⁷ allowing for drilling in areas with increased ice flow movement due to elevated temperature.

¹⁹⁴ Amy Lieberman & Suzanne Rust, *Big Oil braced for global warming while it fought regulations*, L.A. TIMES (Dec. 31, 2015), <http://graphics.latimes.com/oil-operations>.

¹⁹⁵ Patents, *Icebreaking cargo vessel*, Exxon Research Engineering Co. (Apr. 17, 1973), <https://www.google.com/patents/US3727571>.

¹⁹⁶ Patents, *Tanker vessel*, Exxon Research Engineering Co. (July 17, 1973), <https://www.google.com/patents/US3745960>.

¹⁹⁷ Patents, *Arctic offshore platform*, Chevron Research & Technology Co. (Aug. 27, 1974), <https://www.google.com/patents/US3831385>.

174. That same year, Texaco (Chevron) worked toward obtaining a patent for a method and apparatus for reducing ice forces on a marine structure prone to being frozen in ice through natural weather conditions,¹⁹⁸ allowing for drilling in previously unreachable Arctic areas that would become seasonally accessible.

175. Shell obtained a patent similar to Texaco's (Chevron) in 1984.¹⁹⁹

176. In 1989, Norske Shell, Royal Dutch Shell's Norwegian subsidiary, altered designs for a natural gas platform planned for construction in the North Sea to account for anticipated sea level rise. Those design changes were ultimately carried out by Shell's contractors, adding substantial costs to the project.²⁰⁰

- a. The Troll field, off the Norwegian coast in the North Sea, was proven to contain large natural oil and gas deposits in 1979, shortly after Norske Shell was approved by Norwegian oil and gas regulators to operate a portion of the field.
- b. In 1986, the Norwegian parliament granted Norske Shell authority to complete the first development phase of the Troll field gas deposits, and Norske Shell began designing the "Troll A" gas platform, with the intent to begin operation of the platform in approximately 1995. Based on the very large size of the gas deposits in the Troll field, the Troll A platform was projected to operate for approximately 70 years.

¹⁹⁸ Patents, *Mobile, arctic drilling and production platform*, Texaco Inc. (Feb. 26, 1974), <https://www.google.com/patents/US3793840>.

¹⁹⁹ Patents, *Arctic offshore platform*, Shell Oil Co. (Jan. 24, 1984), <https://www.google.com/patents/US4427320>.

²⁰⁰ *Greenhouse Effect: Shell Anticipates a Sea Change*, N.Y. TIMES (Dec. 20, 1989), <http://www.nytimes.com/1989/12/20/business/greenhouse-effect-shell-anticipates-a-sea-change.html>.

- c. The platform was originally designed to stand approximately 100 feet above sea level—the amount necessary to stay above waves in a once-in-a-century strength storm.
- d. In 1989, Shell engineers revised their plans to increase the above-water height of the platform by 3–6 feet, specifically to account for higher anticipated average sea levels and increased storm intensity due to global warming over the platform’s 70-year operational life.²⁰¹
- e. Shell projected that the additional 3–6 feet of above-water construction would increase the cost of the Troll A platform by as much as \$40 million.

J. Defendants’ Actions Prevented the Development of Alternatives That Would Have Eased the Transition to a Less Fossil Fuel Dependent Economy.

177. The harms and benefits of Defendants’ conduct can be balanced in part by weighing the social benefit of extracting and burning a unit of fossil fuels against the costs that a unit of fuel imposes on society, known as the “social cost of carbon” or “SCC.”

178. Because climatic responses to atmospheric temperature increases are non-linear, and because greenhouse gas pollution accumulates in the atmosphere, some of which does not dissipate for potentially thousands of years (namely CO₂), there is broad agreement that the SCC increases as emissions rise, and as the climate warms. Relatedly, as atmospheric CO₂ levels and surface temperature increase, the costs of remediating any individual environmental injury—for example infrastructure to mitigate sea level rise, and changes to agricultural processes—also increase. In short, each additional ton of CO₂ emitted into the atmosphere will have a greater net social cost as emissions increase, and each additional ton of CO₂ will have a greater net social cost

²⁰¹ *Id.*; Amy Lieberman & Suzanne Rust, *Big Oil Braced for Global Warming While It Fought Regulations*, *supra* note 194.

as global warming accelerates.

179. A critical corollary of the non-linear relationship between atmospheric CO₂ concentrations and the SCC is that delayed efforts to curb those emissions have increased environmental harms and increased the magnitude and cost to remediate harms that have already occurred or are locked in by previous emissions. Therefore, Defendants' campaign to obscure the science of climate change and to expand the extraction and use of fossil fuels greatly increased and continues to increase the harms and rate of harms suffered by the City and its residents.

180. The consequences of delayed action on climate change, exacerbated by Defendants' actions, already have drastically increased the cost of mitigating further harm. Had concerted action begun even as late as 2005, an annual 3.5 percent reduction in CO₂ emissions to lower atmospheric CO₂ to 350 ppm by the year 2100 would have restored earth's energy balance²⁰² and halted future global warming, although such efforts would not forestall committed sea level rise already locked in.²⁰³ If efforts do not begin until 2020, however, a 15 percent annual reduction will be required to restore the Earth's energy balance by the end of the century.²⁰⁴ Earlier steps to reduce emissions would have led to smaller—and less disruptive—measures needed to mitigate the impacts of fossil fuel production.

²⁰² "Climate equilibrium" is the balance between Earth's absorption of solar energy and its own energy radiation. Earth is currently out of equilibrium due to the influence of anthropogenic greenhouse gases, which prevent radiation of energy into space. Earth therefore warms and move back toward energy balance. Reduction of global CO₂ concentrations to 350 ppm is necessary to re-achieve energy balance, if the aim is to stabilize climate without further global warming and attendant sea level rise. See James Hansen et al., *Assessing "Dangerous Climate Change: Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*, 8 PLOS ONE 1, 4-5 (Dec. 3, 2013), <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648>.

²⁰³ James Hansen et al., *Assessing "Dangerous Climate Change: Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*, *supra* note 202, at 10.

²⁰⁴ *Id.*

181. The costs of inaction and the opportunities to confront anthropogenic climate change and sea level rise caused by normal consumption of their fossil fuel products, were not lost on Defendants. In a 1997 speech by John Browne, Group Executive for BP America, at Stanford University, Browne described Defendants' and the entire fossil fuel industry's responsibility and opportunities to reduce use of fossil fuel products, reduce global CO₂ emissions, and mitigate the harms associated with the use and consumption of such products:

A new age demands a fresh perspective of the nature of society and responsibility.

We need to go beyond analysis and to take action. It is a moment for change and for a rethinking of corporate responsibility. . . .

[T]here is now an effective consensus among the world's leading scientists and serious and well informed people outside the scientific community that there is a discernible human influence on the climate, and a link between the concentration of carbon dioxide and the increase in temperature.

The prediction of the IPCC is that over the next century temperatures might rise by a further 1 to 3.5 degrees centigrade [1.8°—6.3° F], and that sea levels might rise by between 15 and 95 centimetres [5.9 and 37.4 inches]. Some of that impact is probably unavoidable, because it results from current emissions. . . .

[I]t would be unwise and potentially dangerous to ignore the mounting concern.

The time to consider the policy dimensions of climate change is not when the link between greenhouse gases and climate change is conclusively proven . . . but when the possibility cannot be discounted and is taken seriously by the society of which we are part. . . .

We [the fossil fuel industry] have a responsibility to act, and I hope that through our actions we can contribute to the much wider process which is desirable and necessary.

BP accepts that responsibility and we're therefore taking some specific steps.

To control our own emissions.

To fund continuing scientific research.

To take initiatives for joint implementation.

To develop alternative fuels for the long term.

And to contribute to the public policy debate in search of the wider global answers to the problem.²⁰⁵

182. Despite Defendants' knowledge of the foreseeable, measurable harms associated with the unabated consumption and use of their fossil fuel products, and despite the existence and Defendants' knowledge of technologies and practices that could have helped to reduce the foreseeable dangers associated with their fossil fuel products, Defendants continued to market and promote heavy fossil fuel use, dramatically increasing the cost of abatement. At all relevant times, Defendants were deeply familiar with opportunities to reduce the use of their fossil fuel products, reduce global CO₂ emissions associated therewith, and mitigate the harms associated with the use and consumption of such products. Examples of that recognition include, but are not limited to the following:

- a. In 1963, Esso (Exxon Mobil) obtained multiple patents on technologies for fuel cells, including on the design of a fuel cell and necessary electrodes,²⁰⁶ and on a process for increasing the oxidation of a fuel, specifically methanol, to produce electricity in a fuel cell.²⁰⁷
- b. In 1970, Esso (Exxon Mobil) obtained a patent for a "low-polluting engine and drive system" that used an interburner and air compressor to reduce pollutant emissions, including CO₂ emissions, from gasoline combustion engines (the system

²⁰⁵ John Browne, *BP Climate Change Speech to Stanford*, Climate Files (May 19, 1997), <http://www.climatefiles.com/bp/bp-climate-change-speech-to-stanford>.

²⁰⁶ Patents, *Fuel cell and fuel cell electrodes*, Exxon Research Engineering Co. (Dec. 31, 1963), <https://www.google.com/patents/US3116169>.

²⁰⁷ Patents, *Direct production of electrical energy from liquid fuels*, Exxon Research Engineering Co. (Dec. 3, 1963), <https://www.google.com/patents/US3113049>.

also increased the efficiency of the fossil fuel products used in such engines, thereby lowering the amount of fossil fuel product necessary to operate engines equipped with this technology).²⁰⁸

183. Defendants could have made major inroads to mitigate Plaintiff's injuries through technology by developing and employing technologies to capture and sequester greenhouse gases emissions associated with conventional use of their fossil fuel products. Defendants had knowledge dating at least back to the 1960s, and indeed, internally researched and perfected many such technologies. For instance:

- a. The first patent for enhanced oil recovery technology, a process by which CO₂ is captured and reinjected into oil deposits, was granted to an ARCO (BP) subsidiary in 1952.²⁰⁹ This technology could have been further developed as a carbon capture and sequestration technique;
- b. Phillips Petroleum Company (ConocoPhillips) obtained a patent in 1966 for a "Method for recovering a purified component from a gas" outlining a process to remove carbon from natural gas and gasoline streams;²¹⁰ and
- c. In 1973, Shell was granted a patent for a process to remove acidic gases, including CO₂, from gaseous mixtures.

²⁰⁸ Patents, *Low-polluting engine and drive system*, Exxon Research Engineering Co. (May 16, 1970), <https://www.google.com/patents/US3513929>.

²⁰⁹ James P. Meyer, *Summary of Carbon Dioxide Enhanced Oil Recovery (CO₂EOR) Injection Well Technology*, American Petroleum Institute, page 1, <http://www.api.org/~media/Files/EHS/climate-change/Summary-carbon-dioxide-enhanced-oil-recovery-well-tech.pdf>.

²¹⁰ Patents, *Method for recovering a purified component from a gas*, Phillips Petroleum Co (Jan. 11, 1966), <https://www.google.com/patents/US3228874>.

184. Despite this knowledge, Defendants' later forays into the alternative energy sector were largely pretenses. For instance, in 2001, Chevron developed and shared a sophisticated information management system to gather greenhouse gas emissions data from its explorations and production to help regulate and set reduction goals.²¹¹ Beyond this technological breakthrough, Chevron touted "profitable renewable energy" as part of its business plan for several years and launched a 2010 advertising campaign promoting the company's move towards renewable energy. Despite all this, Chevron rolled back its renewable and alternative energy projects in 2014.²¹²

185. Similarly, ConocoPhillips' 2012 Sustainable Development report declared developing renewable energy a priority in keeping with their position on sustainable development and climate change.²¹³ Their 10-K filing from the same year told a different story: "As an independent E&P company, we are solely focused on our core business of exploring for, developing and producing crude oil and natural gas globally."²¹⁴

186. Likewise, while Shell orchestrated an entire public relations campaign around energy transitions towards net zero emissions, a fine-print disclaimer in its 2016 net-zero pathways report reads: "We have no immediate plans to move to a net-zero emissions portfolio over our investment horizon of 10–20 years."²¹⁵

²¹¹ Chevron, *Chevron Introduces New System to Manage Energy Use* (press release) (Sept. 25, 2001), <https://www.chevron.com/stories/chevron-introduces-new-system-to-manage-energy-use>.

²¹² Benjamin Elgin, *Chevron Dims the Lights on Green Power*, BLOOMBERG (May 29, 2014), <https://www.bloomberg.com/news/articles/2014-05-29/chevron-dims-the-lights-on-renewable-energy-projects>.

²¹³ ConocoPhillips, *Sustainable Development* (2013), <http://www.conocophillips.com/sustainable-development/Documents/2013.11.7%201200%20Our%20Approach%20Section%20Final.pdf>.

²¹⁴ ConocoPhillips, Form 10-K, U.S. Securities and Exchange Commission (Dec. 31, 2012), <https://www.sec.gov/Archives/edgar/data/1163165/000119312513065426/d452384d10k.htm>.

²¹⁵ *Energy Transitions Towards Net Zero Emissions* (NZE), Shell (2016).

187. BP, appearing to abide by the representations Lord Browne made in his speech described in paragraph 152, above, engaged in a rebranding campaign to convey an air of environmental stewardship and renewable energy to its consumers. This included renouncing its membership in the GCC in 2007, changing its name from “British Petroleum” to “BP” while adopting the slogan “Beyond Petroleum,” and adopting a conspicuously green corporate logo. However, BP’s self-touted “alternative energy” investments during this turnaround included investments in natural gas, a fossil fuel, and in 2007 the company reinvested in Canadian tar sands, a particularly high-carbon source of oil.²¹⁶ The company ultimately abandoned its wind and solar assets in 2011 and 2013, respectively, and even the “Beyond Petroleum” moniker in 2013.²¹⁷

188. After posting a \$10 billion quarterly profit, Exxon in 2005 stated that “We’re an oil and gas company. In times past, when we tried to get into other businesses, we didn’t do it well. We’d rather re-invest in what we know.”²¹⁸

189. Even if Defendants did not adopt technological or energy source alternatives that would have reduced use of fossil fuel products, reduced global greenhouse gas pollution, and/or mitigated the harms associated with the use and consumption of such products, Defendants could have taken other practical, cost-effective steps to reduce the use of their fossil fuel products, reduce global greenhouse gas pollution associated therewith, and mitigate the harms associated with the use and consumption of such products. These alternatives could have included, among other measures:

²¹⁶ Fred Pearce, *Greenwash: BP and the Myth of a World ‘Beyond Petroleum,’* THE GUARDIAN, (Nov. 20, 2008), <https://www.theguardian.com/environment/2008/nov/20/fossilfuels-energy>.

²¹⁷ Javier E. David, *‘Beyond Petroleum’ No More? BP Goes Back to Basics*, CNBC (Apr. 20, 2013), <http://www.cnbc.com/id/100647034>.

²¹⁸ James R. Healy, *Alternate Energy Not in Cards at ExxonMobil*, USA TODAY (Oct. 28, 2005), https://usatoday30.usatoday.com/money/industries/energy/2005-10-27-oil-invest-usat_x.htm.

- a. Accepting scientific evidence on the validity of anthropogenic climate change and the damages it will cause people, communities, including Plaintiff, and the environment. Mere acceptance of that information would have altered the debate from *whether* to combat climate change and sea level rise to *how* to combat it; and avoided much of the public confusion that has ensued over nearly 30 years, since at least 1988;
- b. Forthrightly communicating with Defendants' shareholders, banks, insurers, the public, regulators and Plaintiff about the global warming and sea level rise hazards of Defendants' fossil fuel products that were known to Defendants, would have enabled those groups to make material, informed decisions about whether and how to address climate change and sea level rise vis-à-vis Defendants' products;
- c. Refraining from affirmative efforts, whether directly, through coalitions, or through front groups, to distort public debate, and to cause many consumers and business and political leaders to think the relevant science was far less certain than it actually was;
- d. Sharing their internal scientific research with the public, and with other scientists and business leaders, so as to increase public understanding of the scientific underpinnings of climate change and its relation to Defendants' fossil fuel products;
- e. Supporting and encouraging policies to avoid dangerous climate change, and demonstrating corporate leadership in addressing the challenges of transitioning to a low-carbon economy;

- f. Prioritizing alternative sources of energy through sustained investment and research on renewable energy sources to replace dependence on Defendants' inherently hazardous fossil fuel products;
- g. Adopting their shareholders' concerns about Defendants' need to protect their businesses from the inevitable consequences of profiting from their fossil fuel products. Over the period of 1990-2015, Defendants' shareholders proposed hundreds of resolutions to change Defendants' policies and business practices regarding climate change. These included increasing renewable energy investment, cutting emissions, and performing carbon risk assessments, among others.

190. Despite their knowledge of the foreseeable harms associated with the consumption of Defendants' fossil fuel products, and despite the existence and fossil fuel industry knowledge of opportunities that would have reduced the foreseeable dangers associated with those products, Defendants wrongfully and falsely promoted, campaigned against regulation of, and concealed the hazards of use of their fossil fuel products.

K. Defendants Caused Plaintiff's Injuries.

191. Defendants individually and collectively extracted a substantial percentage of all raw fossil fuels extracted globally since 1965. Defendants individually and collectively manufactured, promoted, marketed, and sold a substantial percentage of all fossil fuel products ultimately used and combusted. Defendants played a leadership role in campaigns to deny the link between their products and the adverse effects of fossil fuel emissions, avoid regulation, and lessen the carbon footprint affecting the world climate system.

192. CO₂ emissions attributable to fossil fuels that Defendants extracted from the Earth and injected into the market are responsible for a substantial percentage of greenhouse gas pollution since 1965.

193. Defendants' individual and collective conduct, including, but not limited to, their extraction, refining, and/or formulation of fossil fuel products; their introduction of fossil fuel products into the stream of commerce; their wrongful promotion of their fossil fuel products and concealment of known hazards associated with use of those products; and their failure to pursue less hazardous alternatives available to them; is a substantial factor in causing the increase in global mean temperature and consequent increase in global mean sea surface height and disruptions to the hydrologic cycle, including, but not limited to, more frequent and extreme droughts, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes, since 1965.

194. Defendants have actually and proximately caused the sea levels to rise, increased the destructive impacts of storm surges, increased coastal erosion, exacerbated the onshore impact of regular tidal ebb and flow, disrupted the hydrologic cycle, caused increased frequency and severity of drought, caused increased frequency and severity of extreme precipitation events, caused increased frequency and severity of heat waves, and caused consequent social and economic injuries associated with the aforementioned physical and environmental impacts, among other impacts, resulting in inundation, destruction, and/or other interference with Plaintiff's property and citizenry.

195. The City has already incurred, and will foreseeably continue to incur, injuries, and damages due to anthropogenic global warming, including sea level rise and associated impacts, increased frequency and severity of extreme precipitation events, increased frequency and severity of drought, increased frequency and severity of heat waves and extreme temperatures, and

consequent social and economic injuries associated with those physical and environmental changes, all of which have been caused and/or exacerbated by Defendants' conduct.

196. Baltimore has experienced significant sea level rise and associated impacts over the last half century attributable to Defendants' conduct.²¹⁹ Warming-related sea level rise has already increased the likelihood of extreme floods in Baltimore by approximately 20 percent.²²⁰ Even if all carbon emissions were to cease, Baltimore would still experience greater future committed sea level rise due to the "locked in" greenhouse gases already emitted.²²¹ The City will suffer greater overall sea level rise than the global average.²²²

197. Baltimore is particularly vulnerable to the impacts of sea level rise because of its substantial and densely developed coastline and substantial low-lying areas. The port and waterfront are extremely important assets to the City, providing an abundance of jobs as well as some of the City's strongest property tax base. Baltimore's Inner Harbor is a prominent tourist destination attracting more than 20 million visitors each year. Sea level rise will present short- and long-term challenges to the Inner Harbor, along with other waterfront communities. The figure below delineates the extent of flood impacts of 100- and 500-year storms superimposed on 3-foot, 5-foot, and 7-foot sea level rise scenarios.

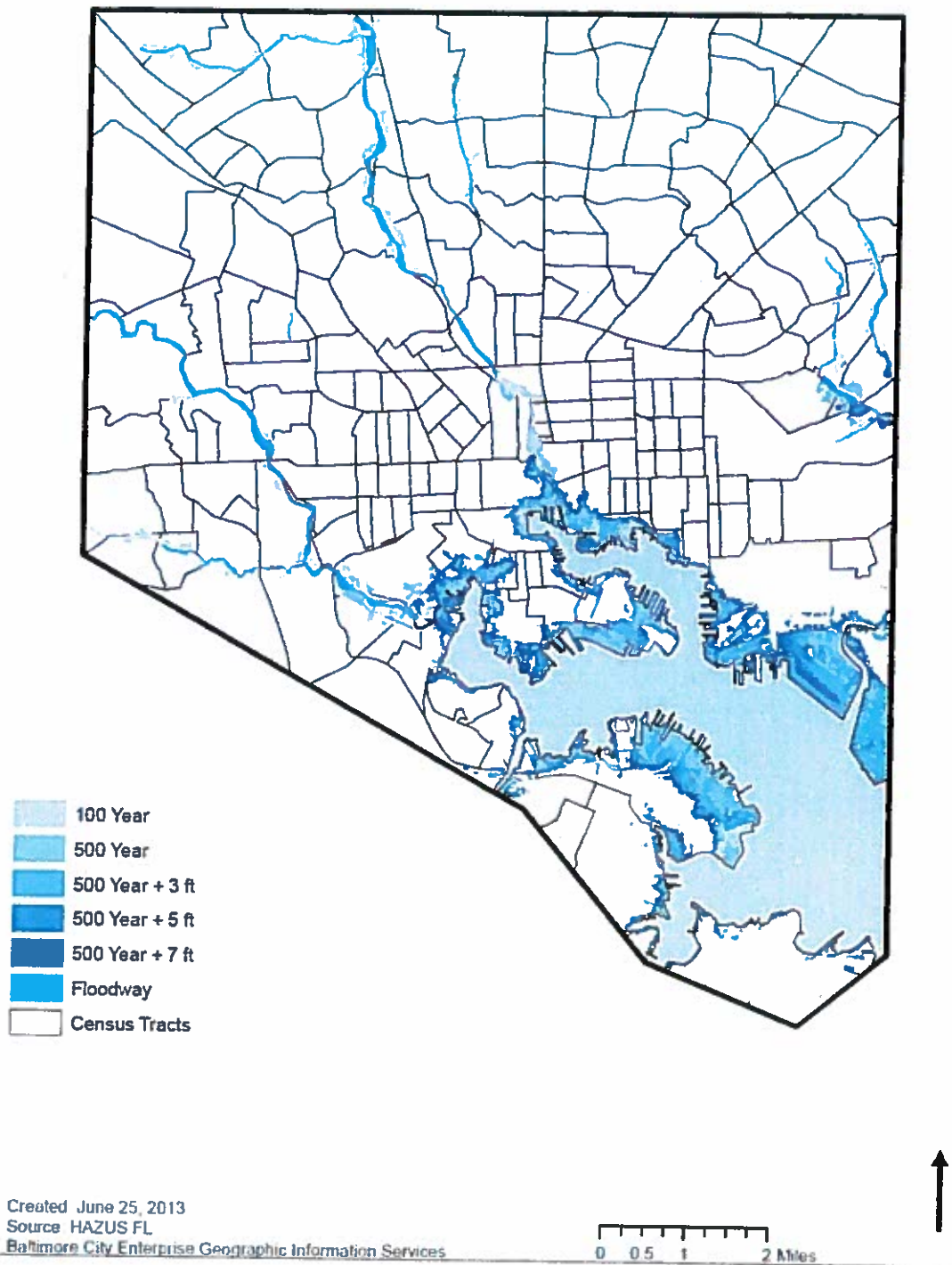
²¹⁹ See City of Baltimore, Disaster Preparedness and Planning Project, *supra* note 55, at 36.

²²⁰ Climate Central, *Maryland and the Surging Sea*, 14 (Sept. 2014), <http://sealevel.climatecentral.org/uploads/ssrf/MD-Report.pdf>.

²²¹ Peter U. Clark et al., *supra* note 44, at 365.

²²² See *id.* at 364.

Fig. 8: Baltimore Storm Inundation Projections



198. Based on NOAA's highest sea level rise scenario, within 80 years, floods breaking today's records would be expected once a year in Baltimore, according to a 2014 analysis by

Climate Central.²²³ There is also a higher than 4 in 5 chance of flooding above nine feet in Baltimore by 2100 under the high sea level rise scenario.²²⁴ The same study also found climate change-related sea level rise has already increased the likelihood of extreme floods in and around Baltimore by at least 20 percent.²²⁵

199. Sea level rise endangers City property and infrastructure, causing coastal flooding of low-lying areas, erosion, and storm surges. Several critical City assets and roadways, including highways, rail lines, emergency response facilities, waste water facilities, and power plants, have suffered and/or will suffer injuries due to sea level rise and associated flooding expected by the end of this century. Federal Emergency Management Agency estimates an additional 36 to 58 percent increase in annual storm damage costs for every one-foot rise in sea level and a 102 to 200 percent increase in damage costs for a three-foot increase.²²⁶

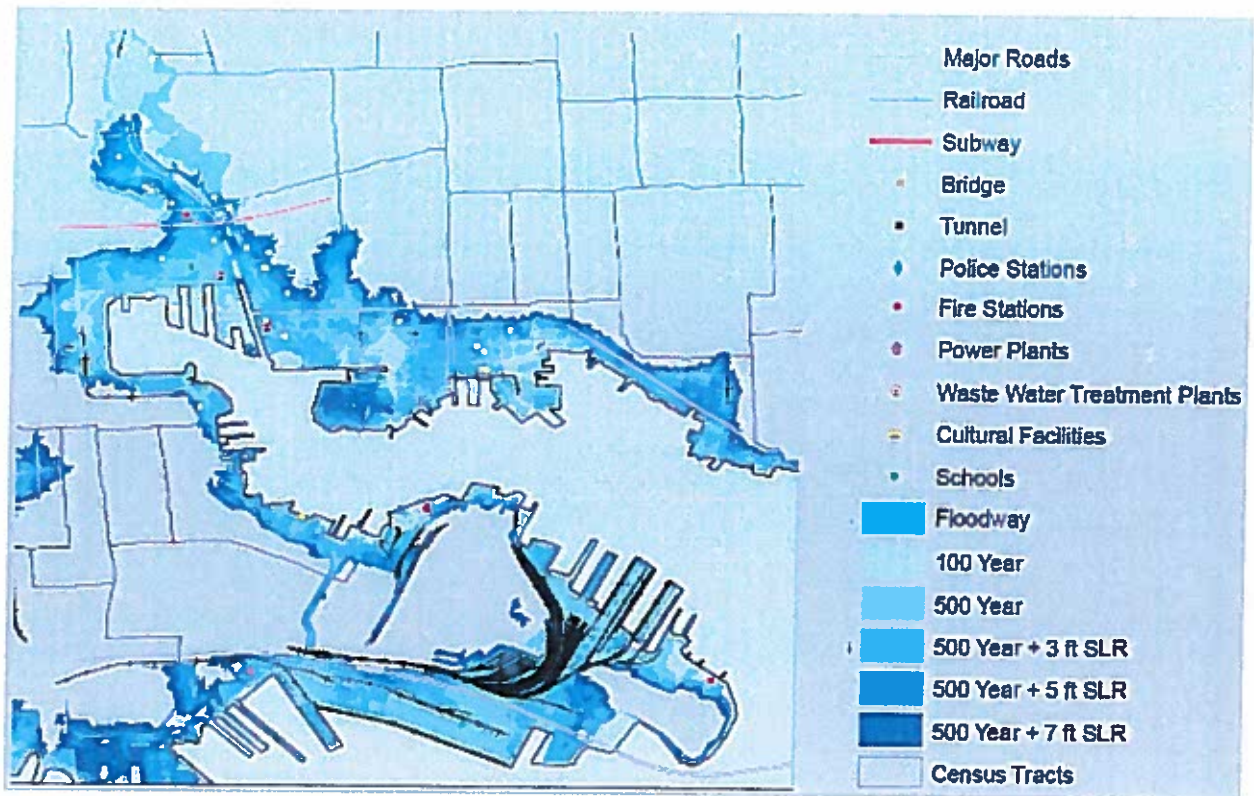
200. The map below depicts critical infrastructure in FEMA flood zones in Baltimore's Fells Point neighborhood and other neighborhoods surrounding the harbor under current conditions. Sea level rise will exacerbate the vulnerability of this critical infrastructure to storm surges and flooding.

²²³ Ben Strauss et al., *Maryland and the Surging Sea*, Climate Central (Sept. 2014), 13, <http://sealevel.climatecentral.org/uploads/ssrf/MD-Report.pdf>.

²²⁴ *Id.*

²²⁵ *Id.* at 14.

²²⁶ Maryland Commission on Climate Change, *2015 Annual Report*, *supra* note 57, at 13.

Fig. 9: Critical Baltimore Infrastructure Threatened by Storm Inundation

201. Furthermore, the City has and will continue to experience injuries due to changes to the hydrologic cycle caused by Defendants' conduct. Changes to the hydrologic cycle, including more frequent and intense precipitation events and associated floods, have caused and will continue to cause the City multiple significant injuries, including, but not limited to, infrastructure damage; disruption to electrical and communications utilities within Baltimore; interference with the use and enjoyment of City-owned public property; and the financial, manpower, and other costs to the City of planning for climatic changes and of responding to acute injuries to assets within Baltimore. For example, increased flooding, higher temperatures, and elevated freeze-thaw cycles will significantly increase the costs of maintaining, replacing and repairing roads.²²⁷

²²⁷ Maryland Commission on Climate Change, *2015 Annual Report*, *supra* note 57, at 13.

202. Several locations within Baltimore are subject to repetitive damage from flood events. Most recently, during and following the severe rains of May 27, 2018, Baltimore experienced a severe flood event that required first responders to rescue 20 people, including several trapped aboard public transit.²²⁸ The flooding damaged City infrastructure, interrupted utility service, and causes local business to evacuate and close. Increased extreme precipitation events will increase flood events in Baltimore.²²⁹ As the torrential rain and associated flooding that struck Baltimore, Baltimore County, and Ellicott City in 2016 and again in 2018 demonstrate, *see* paragraphs 80–82, *supra*, extreme precipitation is a present threat to Baltimore and the surrounding region.

203. Flood-associated damages have been and will be exacerbated by anthropogenic climate change, requiring the City to expend increased resources on retrofitting storm water infrastructure, emergency response, and/or implement policy measures such as managed retreat.

204. Heavy rains can also exceed the capacity of the City's storm water and sewer systems, resulting in overflows that eventually pour into Baltimore's waterways and harbor and pose serious health and environmental risks. Increased extreme participation events from anthropogenic climate change will exacerbate this environmental and health issue, requiring the City to expend additional resources to retrofit its storm water and waste water systems.

205. Winter storms also have caused and will cause substantial injury to infrastructure and properties in Baltimore. Freezing rain and ice can weigh down power lines, cause branches to break, and cause trees to break or become uprooted. Downed trees and power lines may disrupt

²²⁸ Colin Campbell, *Flooding prompts rescues, evacuations through Baltimore region*, BALTIMORE SUN (May 27, 2018), <http://www.baltimoresun.com/news/weather/bs-md-ci-jones-falls-flooding-20180527-story.html>.

²²⁹ City of Baltimore, *Disaster Preparedness and Planning Project*, *supra* note 55, at 44.

traffic, hinder emergency response vehicles, and necessitate costly cleanup and disposal of debris. Damage to power lines or communication towers has the potential to cause electrical and communication disruptions for residents, businesses, and critical facilities. In addition to lost revenues, downed power lines present a threat to personal safety. Furthermore, downed wires have been known to spark fires.²³⁰

206. Over the past decade, Baltimore has experienced several strong winter storms that have disrupted regular activities and caused a number of automobile accidents and power outages.²³¹

207. Climate change also increases Baltimore's risk of summer droughts, resulting in additional injuries to the City. While the City does not anticipate water shortage problems in the short-term, summer droughts have impacted and will impact City services and costs of maintaining City property, for example by interfering with urban greening efforts (tree plantings) and increasing costs of irrigation.

208. Increased extreme temperatures and heat waves put stress on Baltimore's electricity grid, as increased electricity is required for cooling thereby increasing the likelihood of power brownouts and blackouts. Increased temperatures also pose health risks for residents. Baltimore is forecasted to see an increase from an average of eight excessive heat days per summer to 45 such excessive heat days by 2050, resulting in 27 additional deaths per summer without adaptive and preventative measures.²³²

209. Public health impacts associated with anthropogenic climate change have injured and will continue to cause injury to the City. Extreme heat-induced public health impacts in the

²³⁰ *Id.* at 136.

²³¹ *Id.* at 73.

²³² Maryland Commission on Climate Change, *2015 Annual Report*, *supra* note 57, at 17.

City will result in increased risk of heat-related illnesses (mild heat stress to fatal heat stroke) and the exacerbation of pre-existing conditions in the medically fragile, chronically ill, and vulnerable. Increased extreme temperatures and heat waves has and will contribute to and exacerbate, allergies, respiratory disease, and other health issues in children and adults.

210. The City has incurred and will incur expenses in planning and preparing for, treating and responding to, and educating residents about the public health impacts associated with anthropogenic global warming including, but not limited to, impacts associated with extreme weather, extreme heat, vector borne illnesses, and sea level rise.

211. Anthropogenic climate change-related impacts on public, industrial, commercial, and residential assets within Baltimore have caused and will continue to cause injuries to the City, either directly, or through secondary and tertiary impacts that cause the City to expend resources in responding to these impacts, to lose revenue due to decreased economic activity in Baltimore, and to suffer other injuries.

212. The City has and is planning, at significant expense, adaptation strategies to address climate change related impacts, including, but not limited to, development of a Climate Adaptation Plan and Disaster Planning and Preparedness Project.²³³ Additionally, the City has incurred and will incur significant expense in educating and engaging the public on climate change issues, and to promote and implement policies to mitigate and adapt to climate change impacts, including promoting energy and water efficiency and renewable energy.²³⁴ Implementation of these planning and outreach processes will come at a substantial cost to the City.

²³³ Baltimore Office of Sustainability, "Baltimore & Climate Change" (accessed June 6, 2018) <https://www.baltimoresustainability.org/baltimore-climate-change>.

²³⁴ See *Baltimore Climate Adaptation Plan*, 24–25 (Jan. 15, 2013), <https://www.baltimoresustainability.org/wp-content/uploads/2015/12/BaltimoreClimateActionPlan.pdf>.

213. As a direct and proximate result of the acts and omissions of the Defendants' alleged herein, the City has incurred and will incur significant expenses related to planning for and predicting future sea level rise-related and hydrologic cycle change-related injuries to its real property, improvements thereon, municipal infrastructure, and citizens, and other community assets in order to preemptively mitigate and/or prevent injuries to itself and its citizens.

214. As a direct and proximate result of Defendants' acts and omissions alleged herein, Maryland has incurred and will continue to incur sea level rise-related and hydrologic regime change-related injuries and harms. These include, but are not limited to, infrastructural repair, planning costs, and response costs to flooding and other acute incidents.

215. As a direct and proximate result of Defendants' acts and omissions alleged herein, Plaintiff's real property has been and/or will be inundated by sea water, and extreme precipitation, among other climate-change related intrusions, causing injury and damages thereto and to improvements thereon, and preventing free passage on, use of, and normal enjoyment of that real property, or permanently destroying it.

216. But for Defendants' conduct, Plaintiff would have suffered no or far less serious injuries and harms than they have endured, and foreseeably will endure, due to anthropogenic sea level rise, increased temperatures, disruption of the hydrologic cycle, and associated consequences of those physical and environmental changes.

217. Defendants' conduct as described herein is therefore an actual, substantial, and proximate cause of Plaintiff's sea level rise-related and hydrologic regime change-related injuries.

VI. CAUSES OF ACTION

FIRST CAUSE OF ACTION

(Public Nuisance)

(Against All Defendants)

218. Plaintiff Mayor and City Council of Baltimore realleges each and every allegation contained above, as though set forth herein in full.

219. Defendants, individually and in concert with each other, by their affirmative acts and omissions, have created, contributed to, and/or assisted in creating, conditions that significantly interfere with rights general to the public, including the public health, public safety, the public peace, the public comfort, and the public convenience.

220. The nuisance created and contributed to by Defendants is substantial and unreasonable. It has caused, continues to cause, and will continue to cause far into the future, significant harm to the community as alleged herein, and that harm outweighs any offsetting benefit. The health and safety of Baltimoreans is a matter of great public interest and of legitimate concern to the City and the entire state.

221. Defendants specifically created, contributed to, and/or assisted, and/or were a substantial contributing factor in the creation of the public nuisance by, *inter alia*:

- a. Controlling every step of the fossil fuel product supply chain, including the extraction of raw fossil fuel products, including crude oil, coal, and natural gas from the Earth; the refining and marketing of those fossil fuel products, and the placement of those fossil fuel products into the stream of commerce;
- b. Affirmatively and knowingly promoting the sale and use of fossil fuel products which Defendants knew to be hazardous and knew would cause or exacerbate

global warming and related consequences, including, but not limited to, sea level rise, drought, extreme precipitation events, and extreme heat events;

- c. Affirmatively and knowingly concealing the hazards that Defendants knew would result from the normal use of their fossil fuel products by misrepresenting and casting doubt on the integrity of scientific information related to climate change;
- d. Disseminating and funding the dissemination of information intended to mislead customers, consumers, and regulators regarding known and foreseeable risk of climate change and its consequences, which follow from the normal, intended use of Defendants' fossil fuel products;
- e. Affirmatively and knowingly campaigning against the regulation of their fossil fuel products, despite knowing the hazards associated with the normal use of those products, in order to continue profiting from use of those products by externalizing those known costs onto people, the environment, and communities, including the City; and failing to warn the public about the hazards associated with the use of fossil fuel products.

222. Because of their superior knowledge of fossil fuel products, and their position controlling the extraction, refining, development, marketing, and sale of fossil fuel products, Defendants were in the best position to prevent the nuisance, but failed to do so, including by failing to warn customers, retailers, regulators, public officials, or the City of the risks posed by their fossil fuel products, and failing to take any other precautionary measures to prevent or mitigate those known harms.

223. The public nuisance caused, contributed to, maintained, and/or participated in by Defendants has caused and/or imminently threatens to cause special injury to the City. The public

nuisance has also caused and/or imminently threatens to cause substantial injury to real and personal property directly owned by the City for the cultural, historic, and economic benefit of the Baltimore's residents, and for their health, safety, and general welfare.

224. The seriousness of rising sea levels, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes, is extremely grave and outweighs the social utility of Defendants' conduct because, *inter alia*,

- a. interference with the public's rights due to sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes as described above, is expected to become so regular and severe that it will cause material deprivation of and/or interference with the use and enjoyment of public and private property in the City;
- b. the ultimate nature of the harm is the destruction of real and personal property, loss of public cultural, historic, and economic resources, and damage to the public health, safety, and general welfare, rather than mere annoyance;
- c. the interference borne is the loss of property, infrastructure, and public resources within the City, which will actually be borne by the City's citizens as loss of use of public and private property and infrastructure; loss of cultural, historic, and economic resources; damage to the public health, safety, and general welfare; and diversion of tax dollars away from other public services to the mitigation of and/or adaptation to climate change impacts;

- d. Plaintiff's property, which serves myriad uses including residential, infrastructural, commercial, historic, cultural, and ecological, is not suitable for regular inundation, flooding, and/or other physical or environmental consequences of anthropogenic global warming;
- e. the social benefit of placing fossil fuels into the stream of commerce is outweighed by the availability of other sources of energy that could have been placed into the stream of commerce that would not have caused anthropogenic climate change and its physical and environmental consequences as described herein; Defendants, and each of them, knew of the external costs of placing their fossil fuel products into the stream of commerce, and rather than striving to mitigate those externalities, Defendants instead acted affirmatively to obscure them from public consciousness;
- f. the cost to society of each ton of greenhouse gases emitted into the atmosphere increases as total global emissions increase, so that unchecked extraction and consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption; and
- g. it was practical for Defendants, and each of them, considering their extensive knowledge of the hazards of placing fossil fuel products into the stream of commerce and extensive scientific engineering expertise, to develop better technologies and to pursue and adopt known, practical, and available technologies, energy sources, and business practices that would have mitigated greenhouse gas pollution and eased the transition to a lower carbon economy.

225. Defendants' conduct also constitutes a nuisance *per se* because it independently violates other applicable statutes. As set forth below, Defendants' conduct violates the Maryland Consumer Protection Act.

226. Defendants' actions were, at the least, a substantial contributing factor in the unreasonable violation of public rights enjoyed by the City and its residents as set forth above, because Defendants knew or should have known that their conduct would create a continuing problem with long-lasting significant negative effects on the rights of the public, and absent Defendants' conduct the violations of public rights described herein would not have occurred, or would have been less severe.

227. Defendants' wrongful conduct as set forth herein was committed with actual malice. Defendants had actual knowledge that their products were defective and dangerous and were and are causing and contributing to the nuisance complained of, and acted with conscious disregard for the probable dangerous consequences of their conduct's and products' foreseeable impact upon the rights of others, including the City of Baltimore and its residents. Therefore, the City requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

228. Baltimore seeks an order that provides for abatement of the public nuisance Defendants have created, enjoins Defendants from creating future common-law nuisances, and awards Baltimore damages in an amount to be determined at trial. Baltimore pursues these remedies in its sovereign capacity for the benefit of the general public.

SECOND CAUSE OF ACTION

(Private Nuisance)

(Against All Defendants)

229. Plaintiff Mayor and City Council of Baltimore realleges each and every allegation contained above, as though set forth herein in full.

230. Plaintiff owns, occupies, and manages extensive real property within the City of Baltimore's borders, which has been and will continue to be injured rising sea levels, higher sea level, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes.

231. Defendants, and each of them, by their acts and omission, have created and contributed to conditions on Plaintiff's property, and permitted those conditions to persist, which substantially and unreasonably interfere with Plaintiff's use and enjoyment of such property for the public benefit and welfare, and which materially diminishes the value of such property for its public purposes, by increasing sea levels, causing more frequent and extreme drought, causing more frequent and extreme precipitation events, causing increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes.

232. Plaintiff has not consented to Defendants' conduct in creating the unreasonably injurious conditions on its real property or to the associated harms of that conduct.

233. The seriousness of rising sea levels, higher sea level, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and

environmental changes, is extremely grave and outweighs the social utility of Defendants' conduct because, *inter alia*,

- a. interference with the public's rights due to sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes as described above, is expected to become so regular and severe that it will cause material deprivation of and/or interference with the use and enjoyment of public and private property in the City;
- b. the ultimate nature of the harm is the destruction of real and personal property, loss of public cultural, historic, and economic resources, and damage to the public health, safety, and general welfare, rather than mere annoyance;
- c. the interference borne is the loss of property, infrastructure, and public resources within the City, which will actually be borne by the City's citizens as loss of use of public and private property and infrastructure; loss of cultural, historic, and economic resources; damage to the public health, safety, and general welfare; and diversion of tax dollars away from other public services to the mitigation of and/or adaptation to climate change impacts;
- d. Plaintiff's property, which serves myriad uses including residential, infrastructural, commercial, historic, cultural, and ecological, is not suitable for regular inundation, flooding, and/or other physical or environmental consequences of anthropogenic global warming;
- e. the social benefit of placing fossil fuels into the stream of commerce is outweighed by the availability of other sources of energy that could have been placed into the

stream of commerce that would not have caused anthropogenic climate change and its physical and environmental consequences as described herein; Defendants, and each of them, knew of the external costs of placing their fossil fuel products into the stream of commerce, and rather than striving to mitigate those externalities, Defendants instead acted affirmatively to obscure them from public consciousness;

- f. the cost to society of each ton of greenhouse gases emitted into the atmosphere increases as total global emissions increase, so that unchecked extraction and consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption; and
- g. it was practical for Defendants, and each of them, considering their extensive knowledge of the hazards of placing fossil fuel products into the stream of commerce and extensive scientific engineering expertise, to develop better technologies and to pursue and adopt known, practical, and available technologies, energy sources, and business practices that would have mitigated greenhouse gas pollution and eased the transition to a lower carbon economy.

234. Defendants' conduct was a direct and proximate cause of Plaintiff's injuries, and a substantial factor in the harms suffered by Plaintiff as described in this Complaint.

235. Defendants' acts and omissions as alleged herein are indivisible causes of Mayor and City Council of Baltimore's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO₂ in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and commingle in the atmosphere.

236. Wherefore, Plaintiff prays for relief as set forth below.

THIRD CAUSE OF ACTION
(Strict Liability Failure to Warn)
(Against All Defendants)

237. Plaintiff Mayor and City Council of Baltimore realleges each and every allegation contained above, as though set forth herein in full.

238. Defendants, and each of them, at all times had a duty to issue adequate warnings to the City, the public, consumers, and public officials of the reasonably foreseeable or knowable severe risks posed by their fossil fuel products.

239. Defendants knew or should have known, based on information passed to them from their internal research divisions and affiliates and/or from the international scientific community, of the climate effects inherently caused by the normal use and operation of their fossil fuel products, including the likelihood and likely severity of global warming, global and local sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes, including the City's harms and injuries described herein.

240. Defendants knew or should have known, based on information passed to them from their internal research divisions and affiliates and/or from the international scientific community, that the climate effects described herein rendered their fossil fuel products dangerous, or likely to be dangerous, when used as intended or in a reasonably foreseeable manner.

241. Throughout the times at issue, Defendants breached their duty of care by failing to adequately warn any consumers or any other party of the climate effects that inevitably flow from the intended use of their fossil fuel products.

242. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the scientific knowledge generally accepted at the time, advanced pseudo-scientific theories of their own, and developed public relations materials that prevented reasonable consumers from recognizing the risk that fossil fuel products would cause grave climate changes, undermining and rendering ineffective any warnings that Defendants may have also disseminated.

243. Given the grave dangers presented by the climate effects that inevitably flow from the normal use of fossil fuel products, a reasonable extractor, manufacturer, formulator, seller, or other participant responsible for introducing fossil fuel products into the stream of commerce, would have warned of those known, inevitable climate effects.

244. Defendants' conduct was a direct and proximate cause of Plaintiff's injuries and a substantial factor in the harms suffered by Plaintiff as alleged herein.

245. As a direct and proximate result of Defendants' and each of their acts and omissions, Mayor and City Council of Baltimore has sustained and will sustain substantial expenses and damages set forth in this Complaint, including damage to publicly owned infrastructure and real property, and injuries to public resources that interfere with the rights of the City and residents.

246. Defendants' acts and omissions as alleged herein are indivisible causes of Mayor and City Council of Baltimore's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO₂ in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

247. Defendants' wrongful conduct as set forth herein was committed with actual malice. Defendants had actual knowledge that their products were defective and dangerous and that they had not provided reasonable and adequate warnings against those known dangers, and acted with conscious disregard for the probable dangerous consequences of their conduct's and products' foreseeable impact upon the rights of others, including the City of Baltimore. Therefore, the City requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

248. Wherefore, Plaintiff prays for relief as set forth below.

FOURTH CAUSE OF ACTION
(Strict Liability for Design Defect)
(Against All Defendants)

249. Plaintiff Mayor and City Council of Baltimore realleges each and every allegation contained above, as though set forth herein in full.

250. Defendants, and each of them, extracted raw fossil fuel products, including crude oil, coal, and natural gas from the Earth and placed those fossil fuel products into the stream of commerce; and owed a duty to all persons whom Defendants' fossil fuel products might foreseeably harm, including Plaintiff, not to market any product which is unreasonably dangerous for its intended or reasonably foreseeable uses.

251. Defendants, and each of them, extracted, refined, formulated, designed, packaged, distributed, tested, constructed, fabricated, analyzed, recommended, merchandised, advertised, promoted, and/or sold fossil fuel products, which were intended by Defendants, and each of them, to be burned for energy, refined into petrochemicals, and refined and/or incorporated into petrochemical products including but not limited to fuels and plastics.

252. Defendants, and each of them, heavily marketed, promoted, and advertised fossil fuel products and their derivatives, which were sold or used by their respective affiliates and subsidiaries. Defendants' received direct financial benefit from their affiliates' and subsidiaries' sales of fossil fuel products. Defendants' roles as promoters and marketers were integral to their respective businesses and a necessary factor in bringing fossil fuel products and their derivatives to the consumer market, such that Defendants had control over, and a substantial ability to influence, the manufacturing and distribution processes of their affiliates and subsidiaries.

253. Throughout the time at issue, fossil fuel products have not performed as safely as an ordinary consumer would expect them to, and have been unreasonably dangerous for their intended, foreseeable, and ordinary use, because greenhouse gas emissions from their use cause numerous global and local changes to Earth's climate. In particular, ordinary consumers did not expect that:

- a. fossil fuel products are the primary cause of global warming since the dawn of the industrial revolution, and by far the primary cause of global warming acceleration in the 20th and 21st centuries;
- b. fossil fuel products would cause acceleration of sea level rise since the beginning of the 20th century;
- c. normal and/or foreseeable use of fossil fuel products would cause more frequent and extreme drought;
- d. normal and/or foreseeable use of fossil fuel products would cause more frequent and extreme precipitation events;
- e. normal and/or foreseeable use of fossil fuel products would cause increased frequency and severity of heat waves and extreme temperatures;

- f. normal and/or foreseeable use of fossil fuel products would cause other injurious changes to the environment as alleged herein;
- g. by increasing sea level rise and increasing the severity and intensity of droughts, extreme precipitation events, heat waves, and the associated consequences of those physical and environmental changes, fossil fuel products cause damage to publicly and privately-owned infrastructure and buildings, including homes;
- h. the social cost of each ton of CO₂ emitted into the atmosphere increases as total global emissions increase, so that unchecked extraction and consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption; and
- i. for these reasons and others, the unmitigated use of fossil fuel products present significant threats to the environment and human health and welfare.

254. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the scientific knowledge generally accepted at the time, advanced pseudo-scientific theories of their own, and developed public relations materials, among other public messaging efforts, that prevented reasonable consumers from forming an expectation that fossil fuel products would cause grave climate changes, including those described herein.

255. The above-described defects were beyond the knowledge of an ordinary consumer, and neither the City nor any ordinary consumer could have avoided the harm caused by Defendants' defective fossil fuel products by the exercise of reasonable care.

256. Defendants' individual and aggregate fossil fuel products were defective at the time of manufacture, and reached the consumer in a condition substantially unchanged from the time of manufacture; and were used in the manner in which they were intended to be used, or in a

manner foreseeable to Defendants and each of them, by individual and corporate consumers; the result of which was the addition of CO₂ emissions to the global atmosphere with attendant global and local consequences.

257. As a direct and proximate result of Defendants' and each of their acts and omissions, Plaintiff Mayor and City Council of Baltimore has sustained and will sustain substantial expenses and damages set forth in this Complaint, including damage to publicly owned infrastructure and real property, and injuries to public resources that interfere with the rights of the City and residents.

258. Defendants' acts and omissions as alleged herein are indivisible causes of Mayor and City Council of Baltimore's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO₂ in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and commingle in the atmosphere.

259. Defendants' wrongful conduct as set forth herein was committed with actual malice. Defendants had actual knowledge that their products were defective and dangerous when used as intended or in a foreseeable manner, and acted with conscious disregard for the probable dangerous consequences of their conduct's and products' foreseeable impact upon the rights of others, including the City of Baltimore. Therefore, the City requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

260. Wherefore, Plaintiff prays for relief as set forth below.

FIFTH CAUSE OF ACTION

(Negligent Design Defect)

(Against All Defendants)

261. Plaintiff Mayor and City Council of Baltimore realleges each and every allegation contained above, as though set forth herein in full.

262. Defendants knew or should have known of the climate effects inherently caused by the normal use and operation of their fossil fuel products, including the likelihood and likely severity of global and local sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes, and including injuries to Plaintiff, its citizens, and its natural resources, as described herein.

263. Defendants, collectively and individually, had a duty to use due care in developing, designing, testing, inspecting, and distributing their fossil fuel products. That duty obligated Defendants collectively and individually to, *inter alia*, prevent defective products from entering the stream of commerce, and prevent reasonably foreseeable harm that could have resulted from the ordinary and/or reasonably foreseeable use of Defendants' products.

264. Defendants, and each of them, breached their duty of due care by, *inter alia*:

- a. allowing fossil fuel products to enter the stream of commerce, despite knowing them to be defective due to their inevitable propensity to cause sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes;
- b. failing to act on the information and warnings they received from their own internal research staff, as well as from the international scientific community, that the

unabated extraction, promotion, and sale of their fossil fuel products would result in material dangers to the public, including the City of Baltimore and its citizens and natural resources;

c. failing to take actions including, but not limited to, pursuing and adopting known, practical, and available technologies, energy sources, and business practices that would have mitigated greenhouse gas pollution caused by Defendants' fossil fuel products and eased the transition to a lower carbon economy; shifting to non-fossil fuel products, and researching and/or offering technologies to mitigate CO₂ emissions in conjunction with sale and distribution of their fossil fuel products; and pursuing other available alternatives that would have prevented or mitigated the injuries to Plaintiff, its citizens, and its natural resources caused by global warming and associated physical and environmental consequences, that Defendants, and each of them, knew or should have foreseen would inevitably result from use of Defendants' fossil fuel products;

d. engaging in a campaign of disinformation regarding global warming and the climatic effects of fossil fuel products that prevented customers, consumers, regulators, and the general public from taking steps to mitigate the inevitable consequences of fossil fuel consumption, and incorporating those consequences into either short-term decisions or long-term planning.

265. Defendants' individual and collective acts and omissions were actual, substantial causes of sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes, including harms

and injuries set forth herein to Plaintiff, its citizens, and its natural resources, as sea levels would not have risen to the levels that caused those injuries, and prevailing climatic and meteorological regimes would not have been disrupted to a magnitude that caused those injuries, but for Defendants' introduction of their fossil fuel products into the stream of commerce.

266. As a direct and proximate result of Defendants' and each of their acts and omissions, Plaintiff Mayor and City Council of Baltimore has sustained and will sustain substantial expenses and damages set forth in this Complaint, including damage to publicly owned infrastructure and real property, and injuries to public resources that interfere with the rights of the City and residents.

267. Defendants' acts and omissions as alleged herein are indivisible causes of Mayor and City Council of Baltimore's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO₂ in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comeingle in the atmosphere.

268. Defendants' wrongful conduct as set forth herein was committed with actual malice. Defendants had actual knowledge that their products were defective and dangerous when used as intended or in a foreseeable manner, and acted with conscious disregard for the probable dangerous consequences of their conduct's and products' foreseeable impact upon the rights of others, including the City. Therefore, the City requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

269. Wherefore, Plaintiff prays for relief as set forth below.

SIXTH CAUSE OF ACTION

(Negligent Failure to Warn)

(Against All Defendants)

270. Plaintiff Mayor and City Council of Baltimore realleges each and every allegation contained above, as though set forth herein in full.

271. Defendants, and each of them, at all times had a duty to issue adequate warnings to Plaintiff, the public, consumers, and public officials of the reasonably foreseeable or knowable severe risks posed by their fossil fuel products.

272. Defendants knew or should have known, based on information passed to them from their internal research divisions and affiliates and/or from the international scientific community, of the climate effects inherently caused by the normal use and operation of their fossil fuel products, including the likelihood and likely severity of global warming, global and local sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes, including the City's harms and injuries described herein.

273. Defendants knew or should have known, based on information passed to them from their internal research divisions and affiliates and/or from the international scientific community, that the climate effects described herein rendered their fossil fuel products dangerous, or likely to be dangerous, when used as intended or in a reasonably foreseeable manner.

274. Throughout the times at issue, Defendants breached their duty of care by failing to adequately warn any consumers or any other party of the climate effects that inevitably flow from the intended or foreseeable use of their fossil fuel products.

275. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the scientific knowledge generally accepted at the time, advanced pseudo-scientific theories of their own, and developed public relations materials that prevented reasonable consumers from recognizing the risk that fossil fuel products would cause grave climate changes, undermining and rendering ineffective any warnings that Defendants may have also disseminated.

276. Given the grave dangers presented by the climate effects that inevitably flow from the normal or foreseeable use of fossil fuel products, a reasonable extractor, manufacturer, formulator, seller, or other participant responsible for introducing fossil fuel products into the stream of commerce, would have warned of those known, inevitable climate effects.

277. Defendants' conduct was a direct and proximate cause of the City's injuries and a substantial factor in the harms suffered by the City as alleged herein.

278. As a direct and proximate result of Defendants' and each of their acts and omissions, Plaintiff Mayor and City Council of Baltimore has sustained and will sustain substantial expenses and damages set forth in this Complaint, including damage to publicly owned infrastructure and real property, and injuries to public resources that interfere with the rights of the City and its residents.

279. Defendants' acts and omissions as alleged herein are indivisible causes of Mayor and City Council of Baltimore's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO₂ in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comeingle in the atmosphere.

280. Defendants' wrongful conduct as set forth herein was committed with actual malice. Defendants had actual knowledge that their products were defective and dangerous and that they had not provided reasonable and adequate warnings against those known dangers, and acted with conscious disregard for the probable dangerous consequences of their conduct's and products' foreseeable impact upon the rights of others, including the City of Baltimore. Therefore, the City requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

281. Wherefore, Plaintiff prays for relief as set forth below.

SEVENTH CAUSE OF ACTION

(Trespass)

(Against All Defendants)

282. Plaintiff Mayor and City Council of Baltimore realleges each and every allegation contained above, as though set forth herein in full.

283. Plaintiff owns, leases, occupies, and/or controls real property throughout the City.

284. Defendants, and each of them, have intentionally, recklessly, or negligently caused flood waters, extreme precipitation, saltwater, and other materials, to enter the City's real property, by extracting, refining, formulating, designing, packaging, distributing, testing, constructing, fabricating, analyzing, recommending, merchandising, advertising, promoting, marketing, and/or selling fossil fuel products, knowing those products in their normal or foreseeable operation and use would cause global and local sea levels to rise, more frequent and extreme droughts to occur, more frequent and extreme precipitation events to occur, increased frequency and severity of heat waves and extreme temperatures, and the associated consequences of those physical and environmental changes.

285. The Mayor and City Council of Baltimore did not give permission for Defendants, or any of them, to cause floodwaters, extreme precipitation, saltwater, and other materials to enter its property as a result of the use of Defendants' fossil fuel products.

286. The Mayor and City Council of Baltimore has been and continues to be actually injured and continues to suffer damages as a result of Defendants and each of their having caused flood waters, extreme precipitation, saltwater, and other materials, to enter its real property, by *inter alia* submerging real property owned by the City, causing flooding and increased water table which has invaded and threatens to invade real property owned by the City and rendered it unusable, causing storm surges and heightened waves which have invaded and threatened to invade real property owned by the City, and in so doing rendering the City's property unusable.

287. Defendants' and each Defendant's introduction of their fossil fuel products into the stream of commerce was a substantial factor in causing the harms and injuries to City's public and private real property as alleged herein.

288. Defendants' acts and omissions as alleged herein are indivisible causes of Mayor and City Council of Baltimore's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO₂ in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

289. Defendants' wrongful conduct as set forth herein was committed with actual malice. Defendants had actual knowledge that their products were defective and dangerous, and acted with conscious disregard for the probable dangerous consequences of their conduct's and products' foreseeable impact upon the rights of others, including the City of Baltimore. Therefore,

the City requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

290. Wherefore, Plaintiff prays for relief as set forth below.

EIGHTH CAUSE OF ACTION

(Consumer Protection Act)

(Against All Defendants)

291. Plaintiff Mayor and City Council of Baltimore realleges each and every allegation contained above, as though set forth herein in full.

292. Maryland's Consumer Protection Act ("CPA") forbids any business from engaging in "any unfair or deceptive trade practice," including making any "[f]alse, falsely disparaging, or misleading oral or written statement, visual description, or other representation of any kind which has the capacity, tendency, or effect of deceiving or misleading consumers." Md. Comm. L. § 13-301(1). It also prohibits fraud-based deception, including "[d]eception, fraud, false pretense, false premise, misrepresentation, or knowing concealment, suppression, or omission of any material fact with the intent that a consumer rely on the same in connection with" the sale of any consumer goods or services. *Id.* § 13-301(9).

293. The CPA authorizes a private right of action for "any person . . . to recover for injury or loss sustained . . . as a result of" an unfair or deceptive trade practice. Md. Comm. L. § 13-408(a). "Person" is in turn defined to include a "corporation . . . or any other legal or commercial entity." Md. Comm. L. § 13-101(h).

294. All Defendants are "persons" as defined under the CSA, and are required to comply with the provisions of the CSA in their marketing, promotion, sale, and distribution of fossil fuel products.

295. Throughout all times at issue, Defendants and each of them violated the CSA by engaging in the deceptive marketing and promotion of their products both by (1) making false and misleading statements regarding the known severe risks posed by their fossil fuel products that had the capacity, tendency, or effect of misleading consumers and by (2) making false representations and misleading omissions of material fact regarding the known severe risks posed by their fossil fuel with the intent that consumers would rely on those representations. In particular, Defendants engaged in deceptive marketing and promotion of their products by, *inter alia* disseminating misleading marketing materials and publications refuting the scientific knowledge generally accepted at the time, advancing pseudo-scientific theories of their own, and developing public relations materials that prevented reasonable consumers from recognizing the risk that fossil fuel products would cause grave climate changes, undermining and rendering ineffective any warnings that Defendants may have separately disseminated.

296. The various false and misleading material omissions by Defendants rendered even their apparently truthful statements about their fossil fuel products' effects on climate false and misleading, because those statements were materially incomplete. At the time Defendants disseminated their false and misleading statements or caused such statements to be made or disseminated, they knowingly failed to include material facts regarding the risks and benefits of their fossil fuel products, and intended that recipients of their marketing messages would rely upon such omissions.

297. By reason of Defendants' foregoing deception, misrepresentations, and omissions of material fact, Defendants obtained income, profits, and other benefits it would not otherwise have obtained.

298. By reason of that same conduct, the City of Baltimore incurred harm and was damaged in ways it would not otherwise have been, as sort forth herein.

VII. PRAYER FOR RELIEF

The Plaintiff, the **MAYOR AND CITY COUNCIL OF BALTIMORE**, seeks judgment against these Defendants for:

1. Compensatory damages in an amount according to proof;
2. Equitable relief, including abatement of the nuisances complained of herein;
3. Civil penalties for each violation of the Maryland Consumer Protection Act;
4. Reasonable attorneys' fees as permitted by law;
5. Punitive damages;
6. Disgorgement of profits;
7. Costs of suit; and
8. For such and other relief as the court may deem proper.

MAYOR AND CITY COUNCIL OF BALTIMORE

By its Attorneys,

Dated: July 20, 2018

By: Andre M. Davis

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REQUEST FOR JURY TRIAL

Plaintiff hereby demands a jury trial on all causes of action for which a jury is available under the law.

MAYOR AND CITY COUNCIL OF BALTIMORE

By its Attorneys,

Dated: July 20, 2018

By: Andre M. Davis

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