

1 **V. FACTUAL BACKGROUND**

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

3 44. The Earth is warming at a rate unprecedented in human history.

4 45. Atmospheric and ocean temperatures have both increased substantially since the
5 beginning of the global industrial revolution, and the rate of warming has also dramatically
6 increased since the end of World War II.

7 46. In the geological short term, ocean and land surface temperatures have increased at
8 a rapid pace during the late 20th and early 21st centuries:

9 a. 2016 was the hottest year on record by globally averaged surface
10 temperatures, exceeding mid-20th century mean ocean and land surface
11 temperatures by approximately 1.69–1.78° F.²⁰ Eight of the twelve months
12 in 2016 were hotter by globally averaged surface temperatures than those
13 respective months in any previous year. October, November, and December
14 2016 showed the second hottest average surface temperatures for those
15 months, second only to temperatures recorded in 2015.²¹

16 b. The Earth’s hottest month ever recorded was February 2016, followed
17 immediately by the second hottest month on record, March 2016.²²

18 c. The second hottest year on record by globally averaged surface
19 temperatures was 2015, and the third hottest was 2014.²³

24 ²⁰ NOAA, Global Summary Information – December 2016, [https://www.ncdc.noaa.gov/sotc/summary-](https://www.ncdc.noaa.gov/sotc/summary-info/global/201612)
25 [info/global/201612](https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally); NASA, NASA, NOAA Data Show 2016 Warmest Year on Record Globally (January 18, 2017),
<https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally>.

26 ²¹ NASA, NASA, NOAA Data Show 2016 Warmest Year on Record Globally (January 18, 2017),
<https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally>.

27 ²² Jugal K. Patel, How 2016 Became Earth’s Hottest Year on Record, N.Y. Times (January 18, 2017),
<https://www.nytimes.com/interactive/2017/01/18/science/earth/2016-hottest-year-on-record.html>.

28 ²³ NASA, NASA, NOAA Data Show 2016 Warmest Year on Record Globally (January 18, 2017),
<https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally>.

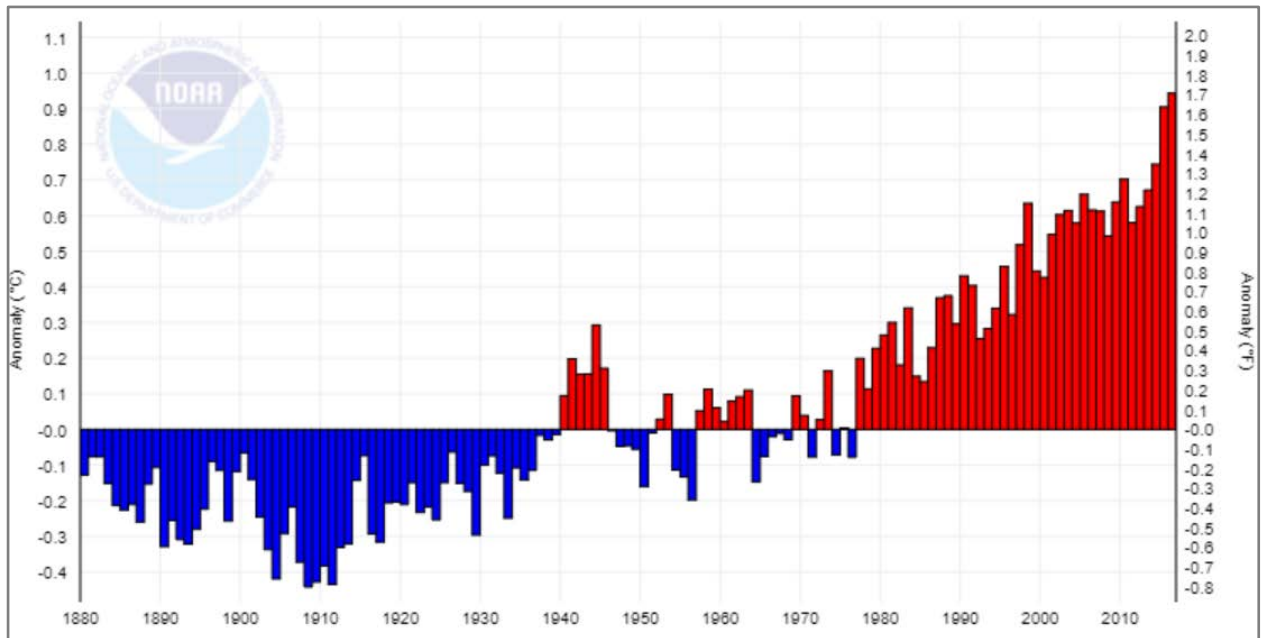
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- d. The ten hottest years on record by globally averaged surface temperature have all occurred since 1998, and sixteen of the seventeen hottest years have occurred since 2001.²⁴
- e. Each of the past three decades has been warmer by average surface temperature than any preceding decade on record.²⁵
- f. The period between 1983 and 2012 was likely the warmest 30-year period in the Northern Hemisphere since approximately 700 AD.²⁶

47. 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 1880.²⁷ The increase in hotter temperatures and more frequent positive anomalies during the Great Acceleration is occurring both globally and locally, including in Imperial Beach. The graph below shows the increase in global land and ocean temperature anomalies since 1880, as measured against the 1910–2000 global average temperature.²⁸

²⁴ Id.
²⁵ IPCC, 2014: Climate Change 2014: Synthesis Report, supra (2014), <https://www.ipcc.ch/report/ar5/syr/>.
²⁶ Id.
²⁷ 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.
²⁸ Id.

Global Land and Ocean Temperature Anomalies, January - December



48. 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.²⁹

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

50. Greenhouse gases are largely byproducts of humans' burning fossil fuels to produce energy, and using fossil fuels to create petrochemical products.

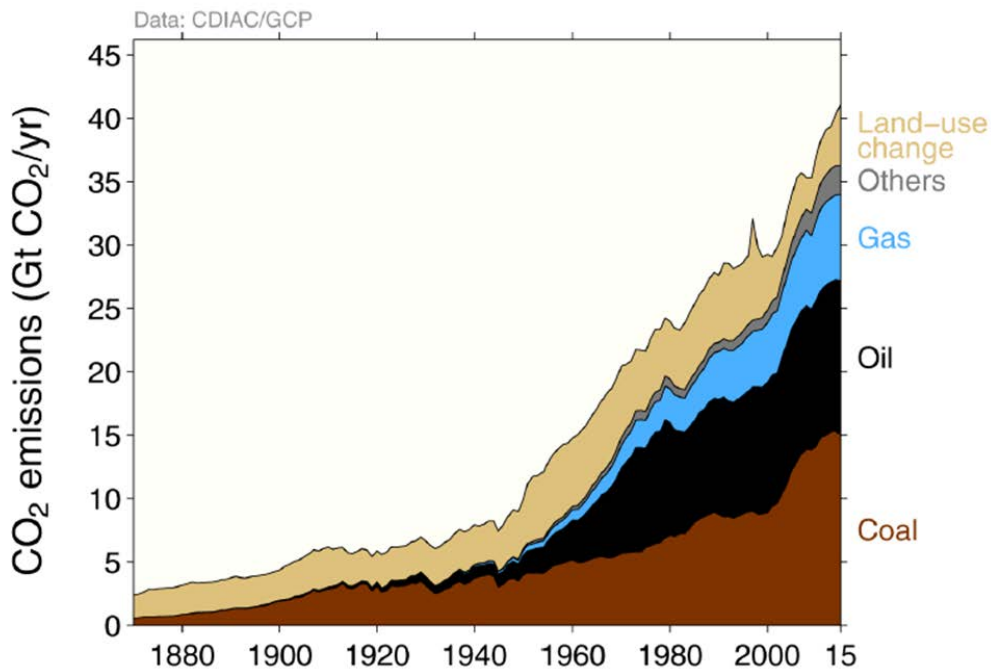
51. Human activity, particularly greenhouse gas emissions, is the primary cause of global warming and its associated effects on Earth's climate.

52. 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 human CO₂ emissions have increased enormously following the advent of major

²⁹ IPCC, 2014: *Climate Change 2014: Synthesis Report*, *supra*, page 4 (2014), <https://www.ipcc.ch/report/ar5/syr/>.

1 uses of oil, gas, and coal. The graph below shows that while CO₂ emissions attributable to forestry
2 and other land-use change have remained relatively constant, total emissions attributable to fossil
3 fuels have increased dramatically since the 1950s.³⁰

4 **Total Annual Carbon Dioxide Emissions by Source, 1860-2015:**



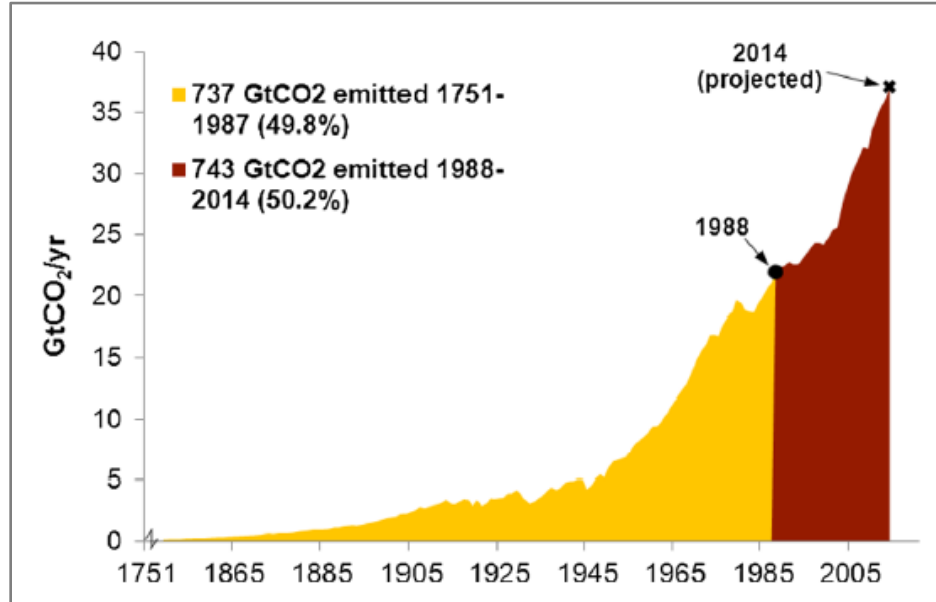
17 53. As human reliance on fossil fuels for industrial and mechanical processes has
18 increased, so too have greenhouse gas emissions, especially of CO₂. The Great Acceleration is
19 marked by a massive increase in the annual rate of fossil fuel emissions: more than half of all
20 cumulative CO₂ emissions have occurred since 1988.³¹ The rate of CO₂ emissions from fossil fuels
21 and industry, moreover, has increased threefold since the 1960s, and by more than 60% since
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24 ³⁰ Global Carbon Project, Global Carbon Budget 2016 (November 14, 2016),
25 www.globalcarbonproject.org/carbonbudget/16/files/GCP_CarbonBudget_2016.pdf, citing CDIAC; R.A. Houghton
26 et al., Carbon emissions from land use and land-cover change (2012),
<http://www.biogeosciences.net/9/5125/2012/bg-9-5125-2012.html>; Louis Giglio et al., Analysis of daily, monthly,
and annual burned area using the fourth-generation global fire emissions database (2013),
<http://onlinelibrary.wiley.com/doi/10.1002/jgrg.20042/abstract>; C. Le Quéré et al., Global Carbon Budget 2016,
27 *Earth Syst. Sci. Data* 8 (2016), <http://www.earth-syst-sci-data.net/8/605/2016/>.

28 ³¹ R. J. Andres et al., A synthesis of carbon dioxide emissions from fossil-fuel combustion, *Biogeosciences*, 9, 1851
(2012), <http://www.biogeosciences.net/9/1845/2012/>.

1 1990.³² The graph below illustrates the increasing rate of global CO₂ emissions since the industrial
2 era began.³³

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



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15 54. Because of the increased use of fossil fuel products, concentrations of greenhouse
16 gases in the atmosphere are now at a level unprecedented in at least 800,000 years.³⁴ The graph
17 below illustrates the nearly 30% increase in atmospheric CO₂ concentration above pre-Industrial
18 levels since 1960.³⁵

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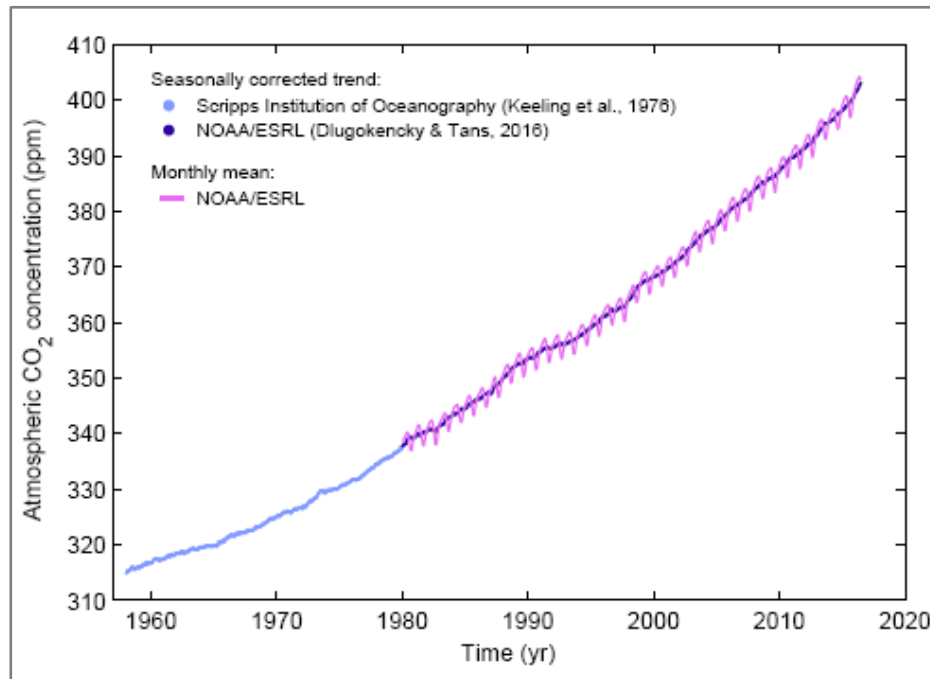
25 ³² C. Le Quéré et al., Global Carbon Budget 2016, Earth Syst. Sci. Data 8, 625, 630 (2016), <http://www.earth-syst-sci-data.net/8/605/2016/> (“Global CO₂ emissions from fossil fuels and industry have increased every decade from an average of 3.1±0.2 GtC/yr in the 1960s to an average of 9.3±0.5 GtC/yr during 2006–2015”).

26 ³³ Peter Frumhoff, et al. The Climate Responsibilities of Industrial Carbon Producers, Climatic Change 132:157-171, 164 (2015).

27 ³⁴ IPCC, 2014: Climate Change 2014: Synthesis Report, supra, page 4 (2014), <https://www.ipcc.ch/report/ar5/syr/>.

28 ³⁵ C. Le Quéré et al., Global Carbon Budget 2016, Earth Syst. Sci. Data 8, 608 (2016), <http://www.earth-syst-sci-data.net/8/605/2016/>.

1 **Atmospheric Carbon Dioxide Concentration in Parts Per Million, 1960-2015:**



13 **B. Sea Level Rise—Known Causes and Observed Effects**

14 55. Sea level rise is the physical consequence of (a) the thermal expansion of ocean
15 waters as they warm; (b) increased mass loss from land-based glaciers that are melting as ambient
16 air temperature increases; and (c) the shrinking of land-based ice sheets due to increasing ocean
17 and air temperature.³⁶

18 56. Of the increase in energy that has accumulated in the Earth’s atmosphere between
19 1971 and 2010, more than 90% is stored in the oceans.³⁷

20 57. Anthropogenic forcing, in the form of greenhouse gas pollution largely from the
21 production, use and combustion of fossil fuel products, is the dominant cause of global mean sea
22 level rise since 1970, explaining at least 70% of the sea level rise observed between 1970 and
23 2000.³⁸ Natural radiative forcing—that is, causes of climate change not related to human activity—
24 “makes essentially zero contribution [to observed sea level rise] over the twentieth century (2%

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26 ³⁶ NOAA, Is sea level rising, Ocean Facts <http://oceanservice.noaa.gov/facts/sealevel.html>.

27 ³⁷ IPCC, 2014: Climate Change 2014: Synthesis Report, *supra*, page 4 (2014), <https://www.ipcc.ch/report/ar5/syr/>.

28 ³⁸ Slangen et al., Anthropogenic Forcing Dominates Global Mean Sea-Level Rise Since 1970, *Nature Climate Change*, Vol. 6, 701 (2016).

1 over the period 1900–2005).”³⁹

2 58. Anthropogenic greenhouse gas pollution is the dominant factor in each of the
3 independent causes of sea level rise, including the increase in ocean thermal expansion,⁴⁰ in glacier
4 mass loss, and in more negative surface mass balance from the ice sheets.⁴¹

5 59. There is a well-defined relation between cumulative emissions of CO₂ and
6 committed global mean sea level. This relation, moreover, holds proportionately for committed
7 regional sea level rise.⁴²

8 60. Nearly 100% of the sea level rise from any projected greenhouse gas emissions
9 scenario will persist for at least 10,000 years.⁴³ This owes to the long residence time of CO₂ in the
10 atmosphere that sustains temperature increases, and inertia in the climate system.⁴⁴

11 61. Anthropogenic greenhouse gas pollution caused the increased frequency and
12 severity of extreme sea level events (temporary sea level height increases due to storm surges or
13 extreme tides, exacerbated by elevated baseline sea level) observed during the Great
14 Acceleration.⁴⁵ The incidence and magnitude of extreme sea level events has increased globally
15 since 1970.⁴⁶ The impacts of such events, which generally occur with large storms, high tidal
16 events, offshore low-pressure systems associated with high winds, or the confluence of any of
17 these factors,⁴⁷ are exacerbated with higher average sea level, which functionally raises the
18 baseline for the destructive impact of extreme weather and tidal events. Indeed, the magnitude and
19 frequency of extreme sea level events can occur in the absence of increased intensity of storm
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21 ³⁹ Id.

22 ⁴⁰ Id.

23 ⁴¹ Id.

24 ⁴² Peter U. Clark et al., Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level Change, Nature Climate Change Vol. 6, 365 (2016).

25 ⁴³ Peter U. Clark et al., Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level Change, Nature Climate Change Vol. 6, 361 (2016).

26 ⁴⁴ Peter U. Clark et al., Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level Change, Nature Climate Change Vol. 6, 360 (2016).

27 ⁴⁵ IPCC, 2013: Summary for Policymakers, page 7, Table SPM.1 (2013), https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIAR5_SPM_brochure_en.pdf.

28 ⁴⁶ 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/WG1AR5_ALL_FINAL.pdf.

⁴⁷ Id.

1 events, given the increased average elevation from which flooding and inundation events begin.
2 These effects, and others, significantly and adversely affect Plaintiffs, with increased severity in
3 the future.

4 62. Historical greenhouse gas emissions alone through 2000 will cause a global mean
5 sea level rise of at least 7.4 feet.⁴⁸ Additional greenhouse gas emissions from 2001–2015 have
6 caused approximately 10 additional feet of committed sea level rise. Even immediate and
7 permanent cessation of all additional anthropogenic greenhouse gas emissions would not prevent
8 the eventual inundation of land at elevations between current average mean sea level and 17.4 feet
9 of elevation in the absence of adaptive measures.

10 63. The relationship between anthropogenic CO₂ emissions and committed sea level
11 rise is nearly linear and always positive. For emissions, including future emissions, from the year
12 2001, the relation is approximately 0.25 inches of committed sea level rise per 1 GtCO₂ released.
13 For the period 1965 to 2000, the relation is approximately 0.05 inches of committed sea level rose
14 per 1 GtCO₂ released. For the period 1965 to 2015, normal use of Defendants’ fossil fuel products
15 caused a substantial portion of committed sea level rise. Each and every additional unit of CO₂
16 emitted from the use of Defendants’ fossil fuel products will add to the sea level rise already
17 committed to the geophysical system.

18 64. Projected onshore impacts associated with rising sea temperature and water level
19 include increases in flooding and erosion; increases in the occurrence, persistence, and severity of
20 storm surges; infrastructure inundation; public and private property damage; and pollution
21 associated with damaged control and waste infrastructure, and the lack thereof. All of these effects
22 significantly and adversely affect Plaintiffs.

23 65. Sea level rise has already taken grave tolls on inhabited coastlines. For instance, the
24 U.S. National Oceanic and Atmospheric Administration (“NOAA”) estimates that nuisance
25 flooding occurs from 300% to 900% more frequently within U.S. coastal communities today than
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27 ⁴⁸ Peter U. Clark et al., Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level
28 Change, Nature Climate Change Vol. 6, 365 (2016).

1 just 50 years ago.⁴⁹

2 66. Nationwide, more than three quarters (76%) of flood days caused by high water
3 levels from sea level rise between 2005 and 2014 (2,505 of the 3,291 flood days) would not have
4 happened but for human-caused climate change. More than two-thirds (67%) of flood days since
5 1950 would not have happened without the sea level rise caused by increasing greenhouse
6 gas emissions.⁵⁰

7 67. Regional expressions of sea level rise will differ from the global mean, and are
8 especially influenced by changes in ocean and atmospheric dynamics, as well as the gravitational,
9 deformational, and rotational effects of the loss of glaciers and ice sheets.⁵¹ Due to these effects,
10 Imperial Beach will experience significantly greater absolute committed sea level rise than the
11 global mean.⁵²

12 68. The City is particularly vulnerable to sea level rise because its topography,
13 geography, adjacent oceanography, and land use patterns make it particularly susceptible to
14 injuries from sea level rise; and because Imperial Beach is projected, due to its geophysical
15 characteristics, to experience a higher rate of sea level rise and a greater absolute amount of sea
16 level rise than the global mean.⁵³

17 69. Given an emissions scenario in which the current rate of greenhouse gas pollution
18 continues unabated, sea level in the San Diego Area, including Imperial Beach, will rise
19 significantly and dangerously by the year 2100.⁵⁴

20 70. Imperial Beach's sea level rise vulnerability analyses anticipate extreme sea level
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22 ⁴⁹ NOAA, Is sea level rising, Ocean Facts, <http://oceanservice.noaa.gov/facts/sealevel.html>.

23 ⁵⁰ Climate Central, Sea Level Rise Upping Ante on 'Sunny Day' Floods (October 17, 2016),
<http://www.climatecentral.org/news/climate-change-increases-sunny-day-floods-20784>.

24 ⁵¹ Peter U. Clark et al., Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level
Change, Nature Climate Change Vol. 6, 364, (2016).

25 ⁵² See id., Figure 3(c).

26 ⁵³ Global sea level rise is projected to be 82.7 cm (32.6 inches) above 2000 levels by 2100. See National Research
Council, Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past Present and Future (2012) at
page 107 at Table 5.2; page 117 at Table 5.3. The San Francisco Bay Area sea level rise is projected to be 91.9 cm
(36.2 inches) over 2000 by 2100. Id.

27 ⁵⁴ Gary Griggs et al., Rising Seas in California: An Update on Sea-Level Rise Science, California Ocean Science
Trust, p. 26, Table 1(b) (April 2017), [http://www.opc.ca.gov/webmaster/ftp/pdf/docs/rising-seas-in-california-an-
update-on-sea-level-rise-science.pdf](http://www.opc.ca.gov/webmaster/ftp/pdf/docs/rising-seas-in-california-an-update-on-sea-level-rise-science.pdf).

1 rise events equivalent to a 1% annual-chance storm wave event.⁵⁵ Such an event, compounded by
2 anticipated increases in mean sea level height along the City, would likely turn the entire area of
3 the City bounded by the Pacific Ocean, the San Diego Bay, the Tijuana Estuary, and 8th Street,
4 into an island surrounded on all sides by water.⁵⁶

5 71. Without Defendants’ fossil fuel-related greenhouse gas pollution, current sea level
6 rise would have been far less than the observed sea level rise to date.⁵⁷ Similarly, committed sea
7 level rise that will occur in the future would also be far less.⁵⁸

8 **C. Attribution**

9 72. “Carbon factors” analysis, devised by the International Panel on Climate Change
10 (IPCC), the United Nations International Energy Agency, and the U.S. Environmental Protection
11 Agency, quantifies the amount of CO₂ emissions attributable to a unit of raw fossil fuel extracted
12 from the Earth.⁵⁹ Emissions factors for oil, coal, liquid natural gas, and natural gas are different
13 for each material but are nevertheless known and quantifiable for each.⁶⁰ This analysis accounts
14 for the use of Defendants’ fossil fuel products, including non-combustion purposes that sequester
15 CO₂ rather than emit it (e.g., production of asphalt).

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

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24 ⁵⁵ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016) p. 4-1.

⁵⁶ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016) p. 2-2.

⁵⁷ Robert E. Kopp et al., Temperature-driven Global Sea-level Variability in the Common Era, Proceedings of the
25 National Academy of Sciences, Vol. 113, No. 11, E1434-E1441, E1438 (2016),
<http://www.pnas.org/content/113/11/E1434.full>.

⁵⁸ Peter U. Clark et al., Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level
26 Change, Nature Climate Change Vol. 6, 365 (2016).

⁵⁹ See Richard Heede, Tracing Anthropogenic Carbon Dioxide and Methane Emissions to Fossil Fuel and Cement
27 Producers, 1854-2010, Climatic Change 122, 232-33 (2014), <https://link.springer.com/article/10.1007/s10584-013-0986-y>.

⁶⁰ See, e.g., id.

1 74. While it is possible to distinguish CO₂ derived from fossil fuels from other sources,
2 it is not possible to determine the source of any particular individual molecule of CO₂ in the
3 atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not
4 bear markers that permit tracing them to their source, and because greenhouse gasses quickly
5 diffuse and comingle in the atmosphere. However, cumulative carbon analysis allows an accurate
6 calculation of net annual CO₂ and methane emissions attributable to each Defendant by quantifying
7 the amount and type of fossil fuels products each Defendant extracted and placed into the stream
8 of commerce, and multiplying those quantities by each fossil fuel product's carbon factor..

9 75. Defendants, through their extraction, promotion, marketing, and sale of their fossil
10 fuel products, caused approximately 20% of global fossil fuel product-related CO₂ between 1965
11 and 2015, with contributions currently continuing unabated. This constitutes a substantial portion
12 of all such emissions in history, and the attendant historical, projected, and committed sea level
13 rise associated therewith.

14 76. Total cumulative emissions increased from 470 GtC in 2000 to 600 GtC gigatons
15 through 2015, representing an almost 30% increase in total emissions in only sixteen years.⁶¹

16 77. By quantifying CO₂ and methane pollution attributable to Defendants by and
17 through their fossil fuel products, ambient air and ocean temperature and sea level responses to
18 those emissions are also calculable, and can be attributed to Defendants on an individual and
19 aggregate basis. Individually and collectively, Defendants' extraction, sale, and promotion of their
20 fossil fuel products are responsible for substantial increases in ambient (surface) temperature,
21 ocean temperature, sea level, extreme storm events, and other adverse impacts on Plaintiffs
22 described herein.

23 78. Anthropogenic CO₂ emissions through 2015 have caused approximately 17.4 feet
24 of committed mean global sea level rise.⁶² Defendants, through their extraction, promotion,
25 marketing, and sale of their fossil fuel products, caused a substantial portion of both those

27 ⁶¹ See C. Le Quéré et al., Global Carbon Budget 2016, Earth Syst. Sci. Data 8, 633, table 10 (2016),
<http://www.earth-syst-sci-data.net/8/605/2016/>.

28 ⁶² Peter U. Clark et al., Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level
Change, Nature Climate Change Vol. 6, 365 (2016).

1 emissions and the attendant historical, projected, and committed sea level rise.

2 79. As explained above, this analysis considers only the volume of raw material
3 actually extracted from the Earth by these Defendants. Many of these Defendants actually are
4 responsible for far greater volumes of emissions because they also refine, manufacture, produce,
5 market, promote, and sell more fossil fuel derivatives than they extract themselves by purchasing
6 fossil fuel products extracted by independent third parties.

7 80. In addition, considering the Defendants' lead role in promoting, marketing, and
8 selling their fossil fuels products between 1965 and 2015; their efforts to conceal the hazards of
9 those products from consumers; their promotion of their fossil fuel products despite knowing the
10 dangers associate with those products; their dogged campaign against regulation of those products
11 based on falsehoods, omissions, and deceptions; and their failure to pursue less hazardous
12 alternatives available to them, Defendants, individually and together, have substantially and
13 measurably contributed to the Plaintiffs' sea level rise-related injuries.

14 **D. Defendants Went to Great Lengths to Understand the Hazards Associated**
15 **with and Knew or Should Have Known of the Dangers Associated with the**
16 **Extraction, Promotion and Sale of Their Fossil Fuel Products.**

17 81. By 1965, concern about the risks of anthropogenic greenhouse gas emissions
18 reached the highest level of the United States' scientific community. In that year, President Lyndon
19 B. Johnson's Science Advisory Committee Panel on Environmental Pollution reported that by the
20 year 2000, anthropogenic CO₂ emissions would "modify the heat balance of the atmosphere to
21 such an extent that marked changes in climate . . . could occur."⁶³ President Johnson announced
22 in a special message to Congress that "[t]his generation has altered the composition of the
23 atmosphere on a global scale through . . . a steady increase in carbon dioxide from the burning of
24 fossil fuels."⁶⁴

25 82. These statements from the Johnson Administration, at a minimum, put Defendants
26 on notice of the potentially substantial dangers to people, communities, and the planet associated

27 ⁶³ President's Science Advisory Committee, Restoring the Quality of Our Environment: Report of the
Environmental Pollution Panel, page 9 (November 1965), <https://hdl.handle.net/2027/uc1.b4315678>.

28 ⁶⁴ President Lyndon B. Johnson, Special Message to Congress on Conservation and Restoration of Natural Beauty
(February 8, 1965), <http://acsc.lib.udel.edu/items/show/292>.

1 with unabated use of their fossil fuel products. Moreover, Defendants had amassed a considerable
2 body of knowledge on the subject through their own independent efforts.

3 83. In 1968, a Stanford Research Institute (SRI) report commissioned by the American
4 Petroleum Institute (“API”) and made available to all of its members, concluded, among other
5 things:

6 If the Earth’s temperature increases significantly, a number of events might be
7 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. . . .

8 It is clear that we are unsure as to what our long-lived pollutants are doing to our
9 environment; however, there seems to be no doubt that the potential damage to our
10 environment could be severe. . . . [T]he prospect for the future must be of serious
concern.⁶⁵

11 84. In 1969, Shell memorialized an on-going 18-month project to collect ocean data
12 from oil platforms to develop and calibrate environmental forecasting theories related to predicting
13 wave, wind, storm, sea level, and current changes and trends.⁶⁶ Several Defendants and/or their
14 predecessors in interest participated in the project, including Esso Production Research Company
15 (ExxonMobil), Mobil Research and Development Company (ExxonMobil), Pan American
16 Petroleum Corporation (BP), Gulf Oil Corporation (Chevron), Texaco Inc. (Chevron), and the
17 Chevron Oil Field Research Company.

18 85. In 1972, API members, including Defendants, received a status report on all
19 environmental research projects funded by API. The report summarized the 1968 SRI report
20 describing the impact of Defendants’ fossil fuel products on the environment, including global
21 warming and sea level rise. Industry participants who received this report include: American
22 Standard of Indiana (BP), Asiatic (Shell), Ashland (Marathon), Atlantic Richfield (BP), British
23 Petroleum (BP), Chevron Standard of California (Chevron), Cities Service (Citgo), Continental
24 (ConocoPhillips), Dupont (former owner of Conoco), Esso Research (ExxonMobil), Ethyl
25 (formerly affiliated with Esso, which was subsumed by ExxonMobil), Getty

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27 ⁶⁵ Elmer Robinson and R.C. Robbins, Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants, Stanford
Research Institute (February 1968), <https://www.smokeandfumes.org/documents/document16>.

28 ⁶⁶ 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>.

1 (Lukoil/ExxonMobil), Gulf (Chevron, among others), Humble Standard of New Jersey
2 (ExxonMobil/Chevron/BP), Marathon, Mobil (ExxonMobil), Pan American (BP), Phillips
3 (ConocoPhillips), Shell, Standard of Ohio (BP), Texaco (Chevron), Union (Chevron), Edison
4 Electric Institute (representing electric utilities), Bituminous Coal Research (coal industry research
5 group), Mid-Continent Oil & Gas Association (presently the U.S. Oil & Gas Association, a
6 national trade association), Western Oil & Gas Association, National Petroleum Refiners
7 Association (presently the American Fuel and Petrochemical Manufacturers Association, a
8 national trade association), Champlin (Anadarko), Skelly (Lukoil/ExxonMobil), Colonial Pipeline
9 (ownership has included BP, Citgo, ExxonMobil, ConocoPhillips, Chevron entities, among others)
10 and Caltex (Chevron), among others.⁶⁷

11 86. In a 1977 presentation and again in a 1978 briefing, Exxon scientists warned the
12 Exxon Corporation Management Committee that CO₂ concentrations were building in the Earth's
13 atmosphere at an increasing rate, that CO₂ emissions attributable to fossil fuels were retained in
14 the atmosphere, and that CO₂ was contributing to global warming.⁶⁸ The report stated:

15 There is general scientific agreement that the most likely manner in which mankind
16 is influencing the global climate is through carbon dioxide release from the burning
17 of fossil fuels . . . [and that] Man has a time window of five to ten years before the
18 need for hard decisions regarding changes in energy strategies might become
19 critical.⁶⁹

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

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26 ⁶⁷ American Petroleum Institute, Environmental Research, A Status Report, Committee for Air and Water
Conservation (January 1972), <http://files.eric.ed.gov/fulltext/ED066339.pdf>.

27 ⁶⁸ 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/](http://www.climatefiles.com/exxonmobil/1978-exxon-memo-on-greenhouse-effect-for-exxon-corporation-management-committee/).

28 ⁶⁹ Id.

1 88. Exxon scientists made the case internally for using company resources to build
2 corporate knowledge about the impacts of the promotion, marketing, and consumption of
3 Defendants' fossil fuel products. Exxon climate researcher Henry Shaw wrote in 1978: "The
4 rationale for Exxon's involvement and commitment of funds and personnel is based on our need
5 to assess the possible impact of the greenhouse effect on Exxon business. Exxon must develop a
6 credible scientific team that can critically evaluate the information generated on the subject and be
7 able to carry bad news, if any, to the corporation."⁷⁰ Moreover, Shaw emphasized the need to
8 collaborate with universities and government to more completely understand what he called the
9 "CO₂ problem."⁷¹

10 89. In 1979, API and its members, including Defendants, convened a Task Force to
11 monitor and share cutting edge climate research among the oil industry. The group was initially
12 called the CO₂ and Climate Task Force, but changed its name to the Climate and Energy Task
13 Force in 1980 (hereinafter referred to as "API CO₂ Task Force"). Membership included senior
14 scientists and engineers from nearly every major U.S. and multinational oil and gas company,
15 including Exxon, Mobil (ExxonMobil), Amoco (BP), Phillips (ConocoPhillips), Texaco
16 (Chevron), Shell, Sunoco, Sohio (BP) as well as Standard Oil of California (BP) and Gulf Oil
17 (Chevron, among others). The Task Force was charged with assessing the implications of emerging
18 science on the petroleum and gas industries and identifying where reductions in greenhouse gas
19 emissions from Defendants' fossil fuel products could be made.⁷²

20 90. In 1979, API sent its members a background memo related to the API CO₂ and
21 Climate Task Force's efforts, stating that CO₂ concentrations were rising steadily in the
22 atmosphere, and predicting when the first clear effects of climate change might be felt.⁷³

24 _____
25 ⁷⁰Henry Shaw, Memo to Edward David Jr. on the "Greenhouse Effect", Exxon Research and Engineering Company
(December 7, 1978).

26 ⁷¹Id.

27 ⁷²American Petroleum Institute, AQ-9 Task Force Meeting Minutes (March 18, 1980),
[http://insideclimatenews.org/sites/default/files/documents/AQ-](http://insideclimatenews.org/sites/default/files/documents/AQ-9%20Task%20Force%20Meeting%20%281980%29.pdf)

28 ⁷³Neela Banerjee, Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too, Inside Climate

News (December 22, 2015), [https://insideclimatenews.org/news/22122015/exxon-mobil-oil-industry-peers-knew-](https://insideclimatenews.org/news/22122015/exxon-mobil-oil-industry-peers-knew-about-climate-change-dangers-1970s-american-petroleum-institute-api-shell-chevron-texaco)
[about-climate-change-dangers-1970s-american-petroleum-institute-api-shell-chevron-texaco.](https://insideclimatenews.org/news/22122015/exxon-mobil-oil-industry-peers-knew-about-climate-change-dangers-1970s-american-petroleum-institute-api-shell-chevron-texaco)

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

4 "We should determine how Exxon can best participate in all these [atmospheric
5 science research] areas and influence possible legislation on environmental
6 controls. It is important to begin to anticipate the strong intervention of
7 environmental groups and be prepared to respond with reliable and credible data. It
8 behooves [Exxon] to start a very aggressive defensive program in the indicated
9 areas of atmospheric science and climate because there is a good probability that
10 legislation affecting our business will be passed. Clearly, it is in our interest for
11 such legislation to be based on hard scientific data. The data obtained from research
12 on the global damage from pollution, e.g., from coal combustion, will give us the
13 needed focus for further research to avoid or control such pollutants."⁷⁴

14 92. That same year, Exxon Research and Engineering reported that: "The most widely
15 held theory [about increasing CO₂ concentration] is that the increase is due to fossil fuel
16 combustion, increasing CO₂ concentration will cause a warming of the earth's surface, and the
17 present trend of fossil fuel consumption will cause dramatic environmental effects before the year
18 2050."⁷⁵ Further, the report stated that unless fossil fuel use was constrained, there would be
19 "noticeable temperature changes" associated with an increase in atmospheric CO₂ from about 280
20 parts per million before the Industrial Revolution to 400 parts per million by the year 2010.⁷⁶ Those
21 projections proved remarkably accurate—atmospheric CO₂ concentrations surpassed 400 parts per
22 million in May 2013, for the first time in millions of years.⁷⁷ In 2015, the annual average CO₂
23 concentration rose above 400 parts per million, and in 2016 the annual low surpassed 400 parts
24 per million, meaning atmospheric CO₂ concentration remained above that threshold all year.⁷⁸

24 ⁷⁴ Henry Shaw, Exxon Memo to H.N. Weinberg about "Research in Atmospheric Science", Exxon Inter-Office
25 Correspondence (November 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).

26 ⁷⁵ W.L. Ferrall, Exxon Memo to R.L. Hirsch about "Controlling Atmospheric CO₂", Exxon Research and
27 Engineering Company (October 16 1979),

<http://insideclimatenews.org/sites/default/files/documents/CO2%20and%20Fuel%20Use%20Projections.pdf>.

28 ⁷⁶ Id.

⁷⁷ 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>.

⁷⁸ Id.

1 93. In 1980, API’s CO₂ Task Force members discussed the oil industry’s responsibility
2 to reduce CO₂ emissions by changing refining processes and developing fuels that emit less CO₂.
3 The minutes from the Task Force’s February 29, 1980, meeting included a summary of a
4 presentation on “The CO₂ Problem” given by Dr. John Laurmann, which identified the “scientific
5 consensus on the potential for large future climatic response to increased CO₂ levels” as a reason
6 for API members to have concern with the “CO₂ problem” and informed attendees that there was
7 “strong empirical evidence that rise [in CO₂ concentration was] caused by anthropogenic release
8 of CO₂, mainly from fossil fuel combustion.”⁷⁹ Moreover, Dr. Laurmann warned that the amount
9 of CO₂ in the atmosphere could double by 2038, which he said would likely lead to a 2.5° C (4.5° F)
10 rise in global average temperatures with “major economic consequences.” He then told the Task
11 Force that models showed a 5° C (9° F) rise by 2067, with “globally catastrophic effects.”⁸⁰ A
12 taskforce member and representative of Texaco leadership present at the meeting posited that the
13 API CO₂ Task Force should develop ground rules for energy release of fuels and the cleanup of
14 fuels as they relate to CO₂ creation.

15 94. In 1980, the API CO₂ Task Force also discussed a potential area for investigation:
16 alternative energy sources as a means of mitigating CO₂ emissions from Defendants’ fossil fuel
17 products. These efforts called for research and development to “Investigate the Market Penetration
18 Requirements of Introducing a New Energy Source into World Wide Use.” Such investigation was
19 to include the technical implications of energy source changeover, research timing,
20 and requirements.⁸¹

21 95. By 1980, Exxon’s senior leadership had become intimately familiar with the
22 greenhouse effect and the role of CO₂ in the atmosphere. In that year, Exxon Senior Vice President
23 and Board member George Piercy questioned Exxon researchers on the minutiae of the ocean’s
24 role in absorbing atmospheric CO₂, including whether there was a net CO₂ flux out of the ocean

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26 ⁷⁹ American Petroleum Institute, AQ-9 Task Force Meeting Minutes (March 18, 1980),
[http://insideclimatenews.org/sites/default/files/documents/AQ-](http://insideclimatenews.org/sites/default/files/documents/AQ-9%20Task%20Force%20Meeting%20%281980%29.pdf)

27 [9%20Task%20Force%20Meeting%20%281980%29.pdf](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).

28 ⁸⁰ Id.

⁸¹ Id.

1 into the atmosphere in certain zones where upwelling of cold water to the surface occurs, because
2 Piercy evidently believed that the oceans could absorb and retain higher concentrations of CO₂
3 than the atmosphere.⁸² This inquiry aligns with Exxon supertanker research into whether the ocean
4 would act as a significant CO₂ sink that would sequester atmospheric CO₂ long enough to allow
5 unabated emissions without triggering dire climatic consequences. As described below, Exxon
6 eventually scrapped this research before it produced enough data from which to derive
7 a conclusion.⁸³

8 96. Also in 1980, Imperial Oil (ExxonMobil) reported to Esso and Exxon managers
9 and environmental staff that increases in fossil fuel usage aggravates CO₂ in the atmosphere.
10 Noting that the United Nations was encouraging research into the carbon cycle, Imperial reported
11 that “[t]echnology exists to remove CO₂ from [fossil fuel power plant] stack gases but removal of
12 only 50% of the CO₂ would double the cost of power generation.” Imperial also reported that its
13 coordination department had been internally evaluating its and Exxon’s products to determine
14 whether disclosure of a human health hazard was necessary. The report notes that Section (8e) of
15 Toxic Substances Control Act, 55 U.S.C. §§ 1601 et seq., requires that anyone who discovers that
16 a material or substance in commercial use is or may be a significant risk to human health must
17 report such findings to the Environmental Protection Agency within 15 days. Although greenhouse
18 gases are human health hazards (because they have serious consequences in terms of global food
19 production, disease virulence, and sanitation infrastructure, among other impacts), neither
20 Imperial, Exxon, nor any other Defendant has ever filed a disclosure with the U.S. Environmental
21 Protection Agency pursuant to the Toxic Substances Control Act. Exxon scientist Roger Cohen
22 warned his colleagues in a 1981 internal memorandum that “future developments in global data
23 gathering and analysis, along with advances in climate modeling, may provide strong evidence for
24

25 ⁸² Neela Banerjee, More Exxon Documents Show How Much It Knew About Climate 35 Years Ago, Inside Climate
26 News (Dec. 1, 2015), <https://insideclimatenews.org/news/01122015/documents-exxons-early-co2-position-senior-executives-engage-and-warming-forecast>.

27 ⁸³ Neela Banerjee et al., Exxon Believed Deep Dive Into Climate Research Would Protect Its Business, Inside
28 Climate News (Sept. 17, 2015), <https://insideclimatenews.org/news/16092015/exxon-believed-deep-dive-into-climate-research-would-protect-its-business>.

1 a delayed CO₂ effect of a truly substantial magnitude,” and that under certain circumstances it
2 would be “very likely that we will unambiguously recognize the threat by the year 2000.”⁸⁴ Cohen
3 had expressed concern that the memorandum mischaracterized potential effects of unabated CO₂
4 emissions from Defendants’ fossil fuel products: “. . . it is distinctly possible that the . . . [Exxon
5 Planning Division’s] scenario will produce effects which will indeed be catastrophic (at least for
6 a substantial fraction of the world’s population).”⁸⁵

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

- 10 • “Atmospheric CO₂ will double in 100 years if fossil fuels grow at 1.4%/ a².
- 11 • 3°C global average temperature rise and 10°C at poles if CO₂ doubles.
 - 12 ○ Major shifts in rainfall/agriculture
 - 13 ○ Polar ice may melt”⁸⁶

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

24 ⁸⁴ Roger W. Cohen, Exxon Memo to W. Glass about possible “catastrophic” effect of CO₂, Exxon Inter-Office
25 Correspondence (Aug. 18, 1981), <http://www.climatefiles.com/exxonmobil/1981-exxon-memo-on-possible-emission-consequences-of-fossil-fuel-consumption/>.

26 ⁸⁵ Id.

27 ⁸⁶ Henry Shaw, Exxon Memo to E. E. David, Jr. about “CO₂Position Statement”, Exxon Inter-Office
28 Correspondence (May 15, 1981), <https://insideclimatenews.org/sites/default/files/documents/Exxon%20Position%20on%20CO2%20%281981%29.pdf>
f.

1 considerably and the world food supply can be affected.”⁸⁷ Exxon’s own modeling research
2 confirmed this, and the company’s results were later published in at least three peer-reviewed
3 scientific papers.⁸⁸

4 99. Also in 1982, Exxon’s Environmental Affairs Manager distributed a primer on
5 climate change to a “wide circulation [of] Exxon management . . . intended to familiarize Exxon
6 personnel with the subject.”⁸⁹ The primer also was “restricted to Exxon personnel and not to be
7 distributed externally.”⁹⁰ The primer compiled science on climate change available at the time,
8 and confirmed fossil fuel combustion as a primary anthropogenic contributor to global warming.
9 The report estimated a CO₂ doubling around 2090 based on Exxon’s long-range modeled outlook.
10 The author warned that the melting of the Antarctic ice sheet could result in global sea level rise
11 of five feet which would “cause flooding on much of the U.S. East Coast, including the State of
12 Florida and Washington, D.C.”⁹¹ Indeed, it warned that “there are some potentially catastrophic
13 events that must be considered,” including sea level rise from melting polar ice sheets. It noted
14 that some scientific groups were concerned “that once the effects are measurable, they might not
15 be reversible.”⁹²

16 100. In a summary of Exxon’s climate modeling research from 1982, Director of
17 Exxon’s Theoretical and Mathematical Sciences Laboratory Roger Cohen wrote that “the time
18 required for doubling of atmospheric CO₂ depends on future world consumption of fossil fuels.”
19 Cohen concluded that Exxon’s own results were “consistent with the published predictions of more
20

21 ⁸⁷ American Petroleum Institute, Climate Models and CO₂ Warming: A Selective Review and Summary, Lamont-
22 Doherty Geological Observatory (Columbia University) (March 1982),
<https://assets.documentcloud.org/documents/2805626/1982-API-Climate-Models-and-CO2-Warming-a.pdf>.

23 ⁸⁸ See Roger W. Cohen, Exxon Memo summarizing findings of research in climate modeling, Exxon Research and
24 Engineering Company (September 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).

25 ⁸⁹ M. B. Glaser, Exxon Memo to Management about “CO₂ ‘Greenhouse’ Effect”, Exxon Research and Engineering
26 Company (November 12, 1982),
<http://insideclimatenews.org/sites/default/files/documents/1982%20Exxon%20Primer%20on%20CO2%20Greenhouse%20Effect.pdf>.

27 ⁹⁰ Id.

28 ⁹¹ Id.

⁹² Id.

1 complex climate models” and “in accord with the scientific consensus on the effect of increased
2 atmospheric CO₂ on climate.”⁹³

3 101. At the fourth biennial Maurice Ewing Symposium at the Lamont-Doherty
4 Geophysical Observatory in October 1982, attended by members of API, Exxon Research and
5 Engineering Company president E.E. David delivered a speech titled: “Inventing the Future:
6 Energy and the CO₂ ‘Greenhouse Effect.’”⁹⁴ His remarks included the following statement: “[F]ew
7 people doubt that the world has entered an energy transition away from dependence upon fossil
8 fuels and toward some mix of renewable resources that will not pose problems of CO₂
9 accumulation.” He went on, discussing the human opportunity to address anthropogenic climate
10 change before the point of no return:

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

14 102. Throughout the early 1980s, at Exxon’s direction, Exxon climate scientist Henry
15 Shaw forecasted emissions of CO₂ from fossil fuel use. Those estimates were incorporated into
16 Exxon’s 21st century energy projections and were distributed among Exxon’s various divisions.
17 Shaw’s conclusions included an expectation that atmospheric CO₂ concentrations would double in
18 2090 per the Exxon model, with an attendant 2.3–5.6° F average global temperature increase. Shaw
19 compared his model results to those of the U.S. EPA, the National Academy of Sciences, and the
20 Massachusetts Institute of Technology, indicating that the Exxon model predicted a longer delay
21 than any of the other models, although its temperature increase prediction was in the mid-range of
22 the four projections.⁹⁵

24 ⁹³ Roger W. Cohen, Exxon Memo summarizing findings of research in climate modeling, Exxon Research and
25 Engineering Company (September 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).

26 ⁹⁴ 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>.

27 ⁹⁵ Neela Banerjee, More Exxon Documents Show How Much It Knew About Climate 35 Years Ago, Inside Climate
28 News (Dec. 1, 2015), <https://insideclimatenews.org/news/01122015/documents-exxons-early-co2-position-senior-executives-engage-and-warming-forecast>.

1 103. During the 1980s, many Defendants formed their own research units focused on
2 climate modeling. The API, including the API CO₂ Task Force, provided a forum for Defendants
3 to share their research efforts and corroborate their findings related to anthropogenic greenhouse
4 gas emissions.⁹⁶

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

10 [H]umanity, which has created the industrial system that has transformed civilities,
11 is also responsible for the environment, which sometimes is at risk because of
12 unintended consequences of industrialization. . . . Maintaining the health of this
life-support system is emerging as one of the highest priorities. . . . [W]e must all
be environmentalists.

13 The environmental covenant requires action on many fronts . . . the low-
14 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.

15 Prevention means engineering a new generation of fuels, lubricants and chemical
16 products. . . . Prevention means designing catalysts and processes that minimize
17 or eliminate the production of unwanted byproducts. . . . Prevention on a global
18 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
19 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.⁹⁷

20 105. In 1989, Esso Resources Canada (ExxonMobil) commissioned a report on the
21 impacts of climate change on existing and proposed natural gas facilities in the Mackenzie River
22 Valley and Delta, including extraction facilities on the Beaufort Sea and a pipeline crossing
23 Canada’s Northwest Territory.⁹⁸ It reported that “large zones of the Mackenzie Valley could be

25 ⁹⁶ Neela Banerjee, Exxon’s Oil Industry Peers Knew About Climate Dangers in the 1970s, Too, Inside Climate
26 News (December 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](https://insideclimatenews.org/news/22122015/exxon-mobil-oil-industry-peers-knew-about-climate-change-dangers-1970s-american-petroleum-institute-api-shell-chevron-texaco).

27 ⁹⁷ Richard E. Tucker, High Tech Frontiers in the Energy Industry: The Challenge Ahead, AIChE National Meeting
(November 30, 1988), <https://hdl.handle.net/2027/pur1.32754074119482?urlappend=%3Bseq=522>.

28 ⁹⁸ Stephen Lonergan and Kathy Young, An Assessment of the Effects of Climate Warming on Energy Developments
in the Mackenzie River Valley and Delta, Canadian Arctic, Energy Exploration & Exploitation, Vol. 7, Issue 5 (Oct.
1, 1989), <http://journals.sagepub.com/doi/abs/10.1177/014459878900700508>.

1 affected dramatically by climatic change” and that “the greatest concern in Norman Wells [oil
2 town in North West Territories, Canada] should be the changes in permafrost that are likely to
3 occur under conditions of climate warming.” The report concluded that, in light of climate models
4 showing a “general tendency towards warmer and wetter climate,” operation of those facilities
5 would be compromised by increased precipitation, increase in air temperature, changes in
6 permafrost conditions, and significantly, sea level rise and erosion damage.⁹⁹ The authors
7 recommended factoring these eventualities into future development planning and also warned that
8 “a rise in sea level could cause increased flooding and erosion damage on Richards Island.”

9 106. In 1991, Shell produced a film called “Climate of Concern.” The film advises that
10 while “no two [climate change projection] scenarios fully agree, . . . [they] have each prompted
11 the same serious warning. A warning endorsed by a uniquely broad consensus of scientists in their
12 report to the UN at the end of 1990.” The warning was an increasing frequency of abnormal
13 weather, and of sea level rise of about one meter over the coming century. Shell specifically
14 described the impacts of anthropogenic sea level rise on tropical islands, “barely afloat even now,
15 . . . [f]irst made uninhabitable and then obliterated beneath the waves. Wetland habitats destroyed
16 by intruding salt. Coastal lowlands suffering pollution of precious groundwater.” It warned of
17 “greenhouse refugees,” people who abandoned homelands inundated by the sea, or displaced
18 because of catastrophic changes to the environment. The video concludes with a stark admonition:
19 “Global warming is not yet certain, but many think that the wait for final proof would be
20 irresponsible. Action now is seen as the only safe insurance.”¹⁰⁰

21 107. In the mid-1990s, ExxonMobil, Shell and Imperial Oil (ExxonMobil) jointly
22 undertook the Sable Offshore Energy Project in Nova Scotia. The project’s own Environmental
23 Impact Statement declared: “The impact of a global warming sea-level rise may be particularly
24 significant in Nova Scotia. The long-term tide gauge records at a number of locations along the
25

26 ⁹⁹ Id.

27 ¹⁰⁰ Jelmer Mommers, Shell made a film about climate change in 1991 (then neglected to heed its own warning), de
28 Correspondent (Feb. 27, 2017), <https://thecorrespondent.com/6285/shell-made-a-film-about-climate-change-in-1991-then-neglected-to-heed-its-own-warning/692663565-875331f6>.

1 N.S. coast have shown sea level has been rising over the past century. . . . For the design of coastal
2 and offshore structures, an estimated rise in water level, due to global warming, of 0.5 m [1.64
3 feet] may be assumed for the proposed project life (25 years).”¹⁰¹

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

10 109. Despite the overwhelming information about the threats to people and the planet
11 posed by continued unabated use of their fossil fuel products, Defendants failed to act as they
12 reasonably should have to mitigate or avoid those dire adverse impacts. Defendants instead
13 adopted the position, as described below, that the absence of meaningful regulations on the
14 consumption of their fossil fuel products was the equivalent of a social license to continue the
15 unfettered pursuit of profits from those products. This position was an abdication of Defendants’
16 responsibility to consumers and the public, including Plaintiffs, to act on their unique knowledge
17 of the reasonably foreseeable hazards of unabated production and consumption of their fossil
18 fuel products.

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

23 110. By 1988, Defendants had amassed a compelling body of knowledge about the role
24 of anthropogenic greenhouse gases, and specifically those emitted from the normal use of
25 Defendants’ fossil fuel products, in causing global warming and sea level rise and the attendant
26 consequences for human communities and the environment. On notice that their products were
27 causing global climate change and dire effects on the planet, Defendants were faced with the

28 ¹⁰¹ ExxonMobil, Sable Project, Development Plan, Volume 3 – Environmental Impact Statement
<http://soep.com/about-the-project/development-plan-application/>.

1 decision of whether to take steps to limit the damages their fossil fuel products were causing and
2 would continue to cause for virtually every one of Earth’s inhabitants, including the People of the
3 State of California, and the City of Imperial Beach and its citizens.

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

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

15 a. In 1988, National Aeronautics and Space Administration (NASA) scientists
16 confirmed that human activities were actually contributing to global
17 warming.¹⁰² On June 23 of that year, NASA scientist James Hansen’s
18 presentation of this information to Congress engendered significant news
19 coverage and publicity for the announcement, including coverage on the
20 front page of the New York Times.

21 b. On July 28, 1988, Senator Robert Stafford and four bipartisan co-sponsors
22 introduced S. 2666, “The Global Environmental Protection Act,” to regulate
23 CO₂ and other greenhouse gases. Four more bipartisan bills to significantly
24 reduce CO₂ pollution were introduced over the following ten weeks, and in
25 August, U.S. Presidential candidate George H.W. Bush pledged that his
26

27 ¹⁰² See Peter C. Frumhoff et al., The Climate Responsibilities of Industrial Carbon Producers, Climatic Change, Vol.
28 132, 161 (2015).

1 presidency would “combat the greenhouse effect with the White House
2 effect.”¹⁰³ Political will in the United States to reduce anthropogenic
3 greenhouse gas emissions and mitigate the harms associated with
4 Defendants’ fossil fuel products was gaining momentum.

5 c. In December 1988, the United Nations formed the Intergovernmental Panel
6 on Climate Change (IPCC), a scientific panel dedicated to providing the
7 world’s governments with an objective, scientific analysis of climate
8 change and its environmental, political, and economic impacts.

9 d. In 1990, the IPCC published its First Assessment Report on anthropogenic
10 climate change,¹⁰⁴ in which it concluded that (1) “there is a natural
11 greenhouse effect which already keeps the Earth warmer than it would
12 otherwise be,” and (2) that

13 emissions resulting from human activities are substantially
14 increasing the atmospheric concentrations of the greenhouse
15 gases carbon dioxide, methane, chlorofluorocarbons (CFCs) and
16 nitrous oxide. These increases will enhance the greenhouse
17 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.¹⁰⁵

18 The IPCC reconfirmed these conclusions in a 1992 supplement to
19 the First Assessment report.¹⁰⁶

20 e. The United Nations began preparation for the 1992 Earth Summit in Rio de
21 Janeiro, Brazil, a major, newsworthy gathering of 172 world governments,
22 of which 116 sent their heads of state. The Summit resulted in the United
23 Nations Framework Convention on Climate Change (UNFCCC), an
24

25 ¹⁰³ New York 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>.

26 ¹⁰⁴ See IPCC, Reports, http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml.

¹⁰⁵ IPCC, Climate Change: The IPCC Scientific Assessment, Policymakers Summary (1990),

http://www.ipcc.ch/ipccreports/far/wg_I/ipcc_far_wg_I_spm.pdf.

27 ¹⁰⁶ IPCC, 1992 IPCC Supplement to the First Assessment Report (1992),

http://www.ipcc.ch/publications_and_data/publications_ipcc_90_92_assessments_far.shtml.

1 international environmental treaty providing protocols for future
2 negotiations aimed at “stabiliz[ing] greenhouse gas concentrations in the
3 atmosphere at a level that would prevent dangerous anthropogenic
4 interference with the climate system.”¹⁰⁷

5 113. These world events marked a shift in public discussion of climate change, and the
6 initiation of international efforts to curb anthropogenic greenhouse emissions – developments that
7 had stark implications for, and would have diminished the profitability of, Defendants’ fossil fuel
8 products.

9 114. But rather than collaborating with the international community by acting to
10 forestall, or at least decrease, their fossil fuel products’ contributions to global warming, sea level
11 rise, and injuries to Imperial Beach and other coastal communities, Defendants embarked on a
12 decades-long campaign designed to maximize continued dependence on their products and
13 undermine national and international efforts like the Kyoto Protocol to rein in greenhouse gas
14 emissions.

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

23 116. Defendants took affirmative steps to conceal, from Plaintiffs and the general public,
24 the foreseeable impacts of the use of their fossil fuel products on the Earth’s climate and associated
25 harms to people and communities. Defendants embarked on a concerted public relations campaign
26 to cast doubt on the science connecting global climate change to fossil fuel products and
27

28 ¹⁰⁷ United Nations, United Nations Framework Convention on Climate Change, Article 2 (1992),
<https://unfccc.int/resource/docs/convkp/conveng.pdf>.

1 greenhouse gas emissions, in order to influence public perception of the existence of anthropogenic
2 global warming and sea level rise. The effort included promoting their hazardous products through
3 advertising campaigns and the initiation and funding of climate change denialist organizations,
4 designed to influence consumers to continue using Defendants' fossil fuel products irrespective of
5 those products' damage to communities and the environment.

6 117. For example, in 1988, Joseph Carlson, an Exxon public affairs manager, described
7 the "Exxon Position," which included among others, two important messaging tenets: (1)
8 "[e]mphasize the uncertainty in scientific conclusions regarding the potential enhanced
9 Greenhouse Effect;" and (2) "[r]esist the overstatement and sensationalization [sic] of potential
10 greenhouse effect which could lead to noneconomic development of non-fossil fuel resources."¹⁰⁸

11 118. In 1991, for example, the Information Council for the Environment ("ICE"), whose
12 members included affiliates, predecessors and/or subsidiaries of Defendants, including Peabody,
13 Ohio Valley Coal Company (Murray Energy), Pittsburg and Midway Coal Mining (Chevron), and
14 Island Creek Coal Company (Occidental), launched a national climate change science denial
15 campaign with full-page newspaper ads, radio commercials, a public relations tour schedule,
16 "mailers," and research tools to measure campaign success. Included among the campaign
17 strategies was to "reposition global warming as theory (not fact)." Its target audience included
18 older less-educated males who are "predisposed to favor the ICE agenda, and likely to be even
19 more supportive of that agenda following exposure to new info" as well as younger, lower-income
20 women likely to be "green" consumers but who "are also most likely to soften their support for
21 federal legislation after hearing new information on global warming."¹⁰⁹ The effort focused on a
22 few select cities for their test marketing; these cities were selected on the basis that the majority of
23 their electricity came from coal, they were home to members of the U.S. House of Representatives
24 Energy and Commerce or Ways and Means committees, and they had low media costs.¹¹⁰

25
26 ¹⁰⁸Joseph M. Carlson, Exxon Memo on "The Greenhouse Effect" (August 3, 1988),

27 <https://assets.documentcloud.org/documents/3024180/1998-Exxon-Memo-on-the-Greenhouse-Effect.pdf>.

28 ¹⁰⁹ 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.

¹¹⁰ Id.

1 119. An implicit goal of ICE’s advertising campaign was to change public opinion and
 2 avoid regulation. A memo from Richard Lawson, president of the National Coal Association asked
 3 members to contribute to the ICE campaign with the justification that “policymakers are prepared
 4 to act [on global warming]. Public opinion polls reveal that 60% of the American people already
 5 believe global warming is a serious environmental problem. Our industry cannot sit on the
 6 sidelines in this debate.”¹¹¹

7 120. The following images are examples of ICE-funded print advertisements
 8 challenging the validity of climate science and intended to obscure the scientific consensus on
 9 anthropogenic climate change and induce political inertia to address it.¹¹²



20 121. In 1996, Exxon released a publication called “Global Warming: Who’s Right?
 21 Facts about a debate that’s turned up more questions than answers.” In the publication’s preface,
 22 Exxon CEO Lee Raymond stated that “taking drastic action immediately is unnecessary since
 23 many scientists agree there’s ample time to better understand the climate system.” The subsequent
 24 article described the greenhouse effect as “unquestionably real and definitely a good thing,” while

26 ¹¹¹ Naomi Oreskes, My Facts Are Better Than Your Facts: Spreading Good News about Global Warming (2010), in
 27 Peter Howlett et al., How Well Do Facts Travel?: The Dissemination of Reliable Knowledge, 136-166. Cambridge
 University Press. doi:10.1017/CBO9780511762154.008.8.

28 ¹¹² Union of Concerned Scientists, Deception Dossier #5: Coal’s “Information Council on the Environment” Sham,
 page 47-49 (1991), http://www.ucsusa.org/sites/default/files/attach/2015/07/Climate-Deception-Dossier-5_ICE.pdf.

1 ignoring the severe consequences that would result from the influence of the increased CO₂
2 concentration on the Earth's climate. Instead, it characterized the greenhouse effect as simply
3 "what makes the earth's atmosphere livable." Directly contradicting their own internal reports and
4 peer-reviewed science, the article ascribed the rise in temperature since the late 19th century to
5 "natural fluctuations that occur over long periods of time" rather than to the anthropogenic
6 emissions that Exxon and other scientists had confirmed were responsible. The article also falsely
7 challenged the computer models that projected the future impacts of unabated fossil fuel product
8 consumption, including those developed by Exxon's own employees, as having been "proved to
9 be inaccurate." The article contradicted the numerous reports circulated among Exxon's staff, and
10 by the API, by stating that "the indications are that a warmer world would be far more benign than
11 many imagine . . . moderate warming would reduce mortality rates in the US, so a slightly warmer
12 climate would be more healthful." Raymond concluded his preface by attacking advocates for
13 limiting the use of his company's fossil fuel products as "drawing on bad science, faulty logic, or
14 unrealistic assumptions" – despite the important role that Exxon's own scientists had played in
15 compiling those same scientific underpinnings.¹¹³

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

20
21 Some people who argue that we should drastically curtail our use of fossil fuels
22 for environmental reasons . . . my belief [is] that such proposals are neither prudent
23 nor practical. With no readily available economic alternatives on the horizon,
24 fossil fuels will continue to supply most of the world's and this region's energy
25 for the foreseeable future.

26
27 Governments also need to provide a stable investment climate...They should
28 avoid the temptation to intervene in energy markets in ways that give advantage
to one competitor over another or one fuel over another.

¹¹³ Exxon Corp., Global warming: who's right?, (1996), <https://www.documentcloud.org/documents/2805542-Exxon-Global-Warming-Whos-Right.html>.

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

4 Let's agree there's a lot we really don't know about how climate will change in
5 the 21st century and beyond . . . It is highly unlikely that the temperature in the
6 middle of the next century will be significantly affected whether policies are
7 enacted now or 20 years from now. It's bad public policy to impose very costly
8 regulations and restrictions when their need has yet to be proven.¹¹⁴

8 123. Imperial Oil (ExxonMobil) CEO Robert Peterson falsely denied the established
9 connection between Defendants' fossil fuel products and anthropogenic climate change in the
10 Summer 1998 Imperial Oil Review, "A Cleaner Canada":

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

14 There is absolutely no agreement among climatologists on whether or not the planet
15 is getting warmer, or, if it is, on whether the warming is the result of man-made
16 factors or natural variations in the climate. . . I feel very safe in saying that the view
17 that burning fossil fuels will result in global climate change remains an unproved
18 hypothesis.¹¹⁵

18 124. Mobil (ExxonMobil) paid for a series of "advertorials," advertisements located in
19 the editorial section of the New York Times and meant to look like editorials rather than paid ads.
20 These ads discussed various aspects of the public discussion of climate change and sought to
21 undermine the justifications for tackling greenhouse gas emissions as unsettled science. The 1997
22 advertorial below¹¹⁶ argued that economic analysis of emissions restrictions was faulty and
23 inconclusive and therefore a justification for delaying action on climate change.

25 _____
26 ¹¹⁴ Lee R. Raymond, Energy – Key to growth and a better environment for Asia-Pacific nations, World Petroleum
27 Congress (October 13, 1997), <https://assets.documentcloud.org/documents/2840902/1997-Lee-Raymond-Speech-at-China-World-Petroleum.pdf>.

27 ¹¹⁵ Robert Peterson, A Cleaner Canada in Imperial Oil Review (Summer 1998),
28 <http://www.documentcloud.org/documents/2827818-1998-Imperial-Oil-Robert-Peterson-A-Cleaner-Canada.html>

28 ¹¹⁶ Mobil, When Facts Don't Square with the Theory, Throw Out the Facts (1997) New York Times, A31 (August
14, 1997), <https://www.documentcloud.org/documents/705550-mob-nyt-1997-aug-14-whenfactsdonsquare.html>.

like race, But when we no longer allow those choices, both civility and common sense will have been diminished. who was dragged from his sister's car by police officers and shot in the face at point-blank range. The cops who have the power to do something about those officers, but choose not to.

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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-1996), 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.

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1 125. In 1998, API, on behalf of Defendants, among other fossil fuel companies and
2 organizations supported by fossil fuel corporate grants, developed a Global Climate Science
3 Communications Plan that stated that unless “climate change becomes a non-issue . . . there may
4 be no moment when we can declare victory for our efforts.” Rather, API proclaimed that “[v]ictory
5 will be achieved when . . . average citizens ‘understand’ (recognize) uncertainties in climate
6 science; [and when] recognition of uncertainties becomes part of the ‘conventional wisdom.’”¹¹⁷
7 The multi-million-dollar, multi-year proposed budget included public outreach and the
8 dissemination of educational materials to schools to “begin to erect a barrier against further efforts
9 to impose Kyoto-like measures in the future”¹¹⁸ – a blatant attempt to disrupt international efforts,
10 pursuant to the UNFCCC, to negotiate a treaty that curbed greenhouse gas emissions.

11 126. Soon after, API distributed a memo to its members identifying public agreement on
12 fossil fuel products’ role in climate change as its highest priority issue.¹¹⁹ The memorandum
13 illuminates API’s and Defendants’ concern over the potential regulation of Defendants’ fossil fuel
14 products: “Climate is at the center of the industry’s business interests. Policies limiting carbon
15 emissions reduce petroleum product use. That is why it is API’s highest priority issue and defined
16 as ‘strategic.’”¹²⁰ Further, the API memo stresses many of the strategies that Defendants
17 individually and collectively utilized to combat the perception of their fossil fuel products as
18 hazardous. These included:

- 19 a. Influencing the tenor of the climate change “debate” as a means to establish
20 that greenhouse gas reduction policies like the Kyoto Protocol were not
21 necessary to responsibly address climate change;

24 ¹¹⁷ Joe Walker, E-mail to Global Climate Science Team, attaching the Draft Global Science Communications Plan
25 (April 3, 1998), [https://assets.documentcloud.org/documents/784572/api-global-climate-science-communications-
plan.pdf](https://assets.documentcloud.org/documents/784572/api-global-climate-science-communications-plan.pdf).

26 ¹¹⁸ Joe Walker, E-mail to Global Climate Science Team, attaching the Draft Global Science Communications Plan
27 (April 3, 1998), [https://assets.documentcloud.org/documents/784572/api-global-climate-science-communications-
plan.pdf](https://assets.documentcloud.org/documents/784572/api-global-climate-science-communications-plan.pdf).

28 ¹¹⁹ Committee on Oversight and Government Reform, Allegations of Political Interference with Government
Climate Change Science, page 51 (March 19, 2007), [https://ia601904.us.archive.org/25/items/gov.gpo.fdsys.CHRG-
110hhr37415/CHRG-110hhr37415.pdf](https://ia601904.us.archive.org/25/items/gov.gpo.fdsys.CHRG-110hhr37415/CHRG-110hhr37415.pdf).

¹²⁰ Id.

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- 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.

127. 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.”¹²¹

128. 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.¹²² Despite an internal primer stating that various “contrarian theories” [i.e., climate change skepticism] do

¹²¹ Neela Banerjee, Exxon’s Oil Industry Peers Knew About Climate Dangers in the 1970s, Too, Inside Climate News (December 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>.
¹²² Neela Banerjee, Exxon’s Oil Industry Peers Knew About Climate Dangers in the 1970s, Too, Inside Climate News (December 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>.

1 not “offer convincing arguments against the conventional model of greenhouse gas emission-
2 induced climate change,” GCC excluded this section from the public version of the backgrounder
3 and instead funded efforts to promote some of those same contrarian theories over subsequent
4 years.¹²³

5 129. The efforts by the Defendants and other fossil fuel interests to sow uncertainty and
6 prevent regulation have been successful. GCC and its cohorts staved off greenhouse gas regulation
7 in the U.S., as indicated by U.S. Undersecretary of State Paula Dobriansky’s talking points
8 compiled before a 2001 meeting with GCC representatives: “POTUS [President of the United
9 States] rejected Kyoto, in part, based on [GCC’s] input.”¹²⁴ When GCC disbanded later that year,
10 it commemorated the occasion on its website by stating that “the industry voice on climate change
11 has served its purpose by contributing to a new national approach to global warming.”¹²⁵

12 130. A key strategy in Defendants’ efforts to discredit scientific consensus on climate
13 change and the IPCC was to bankroll scientists who, although accredited, held fringe opinions that
14 were even more questionable given the sources of their research funding. These scientists obtained
15 part or all of their research budget from Defendants directly or through Defendant-funded
16 organizations like API,¹²⁶ but they frequently failed to disclose their fossil fuel industry
17 underwriters.¹²⁷

18 131. Creating a false sense of disagreement in the scientific community (despite the
19 consensus that its own scientists, experts, and managers had previously acknowledged) has had an
20 evident impact on public opinion. A 2007 Yale University-Gallup poll found that while 71% of
21

22 ¹²³ Gregory J. Dana, Memo to AIAM Technical Committee Re: Global Climate Coalition (GCC) – Primer on
23 Climate Change Science – Final Draft, Association of International Automobile Manufacturers (January 18, 1996),
<http://www.webcitation.org/6FyqHawb9>.

24 ¹²⁴ Ken Brill, Briefing Memorandum to Under Secretary Dobriansky, Your Meeting with members of the Global
25 Climate Coalition, June 21, 2001, 9:10 – 9:50 a.m., United States Department of State (June 20, 2001),
<http://insideclimatenews.org/sites/default/files/documents/Global%20Climate%20Coalition%20Meeting%20%282001%29.pdf>.

26 ¹²⁵ Global Climate Coalition, A Voice for Business in the Global Warming Debate (April 3, 2001)
<https://web.archive.org/web/20030408231206/http://globalclimate.org/index.htm>.

27 ¹²⁶ Willie Soon and Sallie Baliunas, Proxy Climatic and Environmental Changes of the Past 1000 Years, Climate
Research 23, 88-110 (January 31, 2003), <http://www.int-res.com/articles/cr2003/23/c023p089.pdf>.

28 ¹²⁷ Newsdesk, Smithsonian Statement: Dr. Wei-Hock (Willie) Soon, Smithsonian (February 26, 2015),
<http://newsdesk.si.edu/releases/smithsonian-statement-dr-wei-hock-willie-soon>.

1 Americans personally believed global warming was happening, only 48% believed that there was
2 a consensus among the scientific community, and 40% believed there was a lot of disagreement
3 among scientists over whether global warming was occurring.¹²⁸

4 132. 2007 was the same year the IPCC published its Fourth Assessment Report, in which
5 it concluded that “there is *very high confidence* that the net effect of human activities since 1750
6 has been one of warming.”¹²⁹ The IPCC defined “very high confidence” as at least a 9 out of 10
7 chance.¹³⁰

8 133. Defendants borrowed pages out of the playbook of prior denialist campaigns. A
9 “Global Climate Science Team” (“GCST”) was created that mirrored a front group created by the
10 tobacco industry, known as The Advancement of Sound Science Coalition, whose purpose was to
11 sow uncertainty about the fact that cigarette smoke is carcinogenic. The GCST’s membership
12 included Steve Milloy (a key player on the tobacco industry’s front group), Exxon’s senior
13 environmental lobbyist; an API public relations representative; and representatives from Chevron
14 and Southern Company that drafted API’s 1998 Communications Plan. There were no scientists
15 on the “Global Climate Science Team.” GCST developed a strategy to spend millions of dollars
16 manufacturing climate change uncertainty. Between 2000 and 2004, Exxon donated \$110,000 to
17 Milloy’s efforts and another organization, the Free Enterprise Education Institute and \$50,000 to
18 the Free Enterprise Action Institute, both registered to Milloy’s home address.¹³¹

19 134. Defendants by and through their trade association memberships, worked directly,
20 and often in a deliberately obscured manner, to evade regulation of the emissions resulting from
21 use of their fossil fuel products. For instance, the American Coalition for Clean Coal Electricity
22

23
24 ¹²⁸ 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/>.

25 ¹²⁹ IPCC, 2007: Summary for Policymakers, page 3 (emphasis in original), 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>.

26 ¹³⁰ Id.

27 ¹³¹ 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 (January 2007),
28 http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/exxon_report.pdf.

1 (ACCCE), on behalf of Defendants, hired a lobbying firm, which posed as various nonprofits and
2 sent letters to persuade members of Congress to vote against the American Clean Energy and
3 Security Act of 2009, which would have imposed a carbon cap and trade program in the U.S.¹³²
4 Instead, the letters falsely and misleadingly purported to come from groups representing local
5 minority communities, including a local NAACP chapter and a Latino advocacy group.¹³³

6 135. The same year, in 2009, a leaked email revealed a campaign by API to organize
7 “grass roots” rallies of “energy citizens” to coincide with the United States Congress’s August
8 recess, to oppose the Clean Energy and Security Act, the climate change bill that had just passed
9 the House and was headed to the Senate for debate.¹³⁴ Ostensibly intended to “allow people to
10 voice their concerns” and opposing the need for concerted efforts to combat climate change, emails
11 from API to its members state that “it’s important our views be heard,” and that “success for these
12 events will be the diversity of the participants expressing the same message,” which was ultimately
13 misleading and contrary to the acknowledged scientific consensus.¹³⁵ The purpose of the events
14 was to “put a human face” on the industry’s misleading and unsupported position regarding the
15 cause of changes to the climate and to reinforce that misleading position in the minds of the public.
16 The same emails to API members stated that “our messages on [similar] legislation work extremely
17 well and are very persuasive with the general public and policy influentials.” Moreover, the email
18 stated that API would “provide the up-front resources to ensure logistical issues do not become a
19 problem,” but insisted that member companies “provide significant attendance.”¹³⁶

20 136. Emails between American Fuel & Petrochemical Manufacturers (“AFPM”), a
21 national lobbying group, and the office of then-Oklahoma Attorney General Scott Pruitt evidence
22

23 ¹³² Union of Concerned Scientists, Deception Dossier #4: American Coalition for Clean Coal Electricity Forged
24 Letters (2009) [http://www.ucsusa.org/sites/default/files/attach/2015/07/Climate-Deception-Dossier-4_ACCCE-](http://www.ucsusa.org/sites/default/files/attach/2015/07/Climate-Deception-Dossier-4_ACCCE-forged-letters.pdf)
[forged-letters.pdf](http://www.ucsusa.org/sites/default/files/attach/2015/07/Climate-Deception-Dossier-4_ACCCE-forged-letters.pdf).

25 ¹³³ Brian McNeill, Lobbying letters to Perriello found to be fakes, Richmond Times-Dispatch (Aug. 1, 2009)
[http://www.richmond.com/news/lobbying-letters-to-perriello-found-to-be-fakes/article_3f8f5a2b-cf38-54d9-98f7-](http://www.richmond.com/news/lobbying-letters-to-perriello-found-to-be-fakes/article_3f8f5a2b-cf38-54d9-98f7-ba21c4eb51fe.html)
[ba21c4eb51fe.html](http://www.richmond.com/news/lobbying-letters-to-perriello-found-to-be-fakes/article_3f8f5a2b-cf38-54d9-98f7-ba21c4eb51fe.html).

26 ¹³⁴ Alex Kaplun, ‘Energy Citizens’ Take Aim at Climate Legislation, N.Y. Times (Aug. 12, 2009)
<http://www.nytimes.com/gwire/2009/08/12/gwire-energy-citizens-take-aim-at-climate-legislation-54732.html>.

27 ¹³⁵ Phil Radford, Letter to Jack Gerard, President & CEO of API, Greenpeace (August 2009)
<https://www.desmogblog.com/sites/beta.desmogblog.com/files/GP%20API%20letter%20August%202009-1.pdf>.

28 ¹³⁶ Id.

1 an effort to influence EPA regulations that would have mitigated reliance on Defendants' fossil
2 fuel products by requiring renewable fuel production.¹³⁷ BP Petrochemicals, BP Products North
3 America, Chevron U.S.A. Inc., CITGO Petroleum Corporation, Exxon Mobil Corporation,
4 Occidental Chemical Corporation, Phillips 66, Shell Chemical Company, Total Petrochemicals &
5 Refining USA, Inc., are among AFPM's members.

6 137. A 2014 presentation revealed that the Western States Petroleum Association, on
7 behalf of Defendants, among other fossil fuel companies, funded dozens of supposedly grassroots
8 organizations to block progressive energy regulation.¹³⁸ This practice is called "astroturfing":
9 astroturf is meant to look like grass, but it is fake. Similarly, large companies and corporate
10 organizations like WSPA fund fake grassroots movements in an effort to gain credibility from the
11 public, who does not know the true source of the propaganda.

12 138. Beyond direct interference, Defendants have funded dozens of think tanks, front
13 groups, lobbyists, and dark money foundations pushing climate change denial. These include the
14 Competitive Enterprise Institute, the Heartland Institute, Frontiers for Freedom, Committee for a
15 Constructive Tomorrow, and Heritage Foundation. From 1998 to 2014 ExxonMobil spent almost
16 \$31 million funding numerous organizations misrepresenting the scientific consensus that
17 Defendants' fossil fuel products were causing climate change, sea level rise, and injuries to
18 Imperial Beach, among other coastal communities.¹³⁹ Several Defendants have been linked to
19 other groups that undermine the scientific basis linking Defendants' fossil fuel products to climate
20 change and sea level rise, including the Energy & Environment Legal Institute (Arch Coal¹⁴⁰) and
21 the Frontiers of Freedom Institute, the George C. Marshall Institute, and the Center for the Study
22 of Carbon Dioxide and Global Change (Peabody Energy).¹⁴¹

24 ¹³⁷ Email chain from Moskowitz to Eubanks, Renewable Fuel Standard -Background Information (July 13, 2013)
25 <https://www.documentcloud.org/documents/3472961-2013-Pruitt-and-American-Fuel-and-Petrochemical.html>.

26 ¹³⁸ WSPA Priority Issues, Western States Petroleum Association (November 11, 2014)
27 https://www.indybay.org/uploads/2014/12/12/washington_research_council_-_cathy_reheis-boyd.pdf.

28 ¹³⁹ ExxonSecrets.org, ExxonMobil Climate Denial Funding 1998-2014 <http://exxonsecrets.org/html/index.php>.

¹⁴⁰ 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 (January 2007),
http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/exxon_report.pdf.

¹⁴¹ In re: Peabody Energy Corporation, et al., (E.D. Mo.), Certificate of Service, Doc. Number 602, 140 (May 27,
2016), <https://www.documentcloud.org/documents/2859772>.

1 139. Exxon acknowledged its own previous success in sowing uncertainty and slowing
2 mitigation through funding of climate denial groups. In its 2007 Corporate Citizenship Report,
3 Exxon declared: “In 2008, we will discontinue contributions to several public policy research
4 groups whose position on climate change could divert attention from the important discussion on
5 how the world will secure the energy required for economic growth in an environmentally
6 responsible manner.”¹⁴² Despite this pronouncement, Exxon remained financially associated with
7 several such groups after the report’s publication.

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

14 141. As a result of Defendants’ tortious, false and misleading conduct, reasonable
15 consumers of Defendants’ fossil fuel products and policy-makers, have been deliberately and
16 unnecessarily deceived about: the role of fossil fuel products in causing global warming and sea
17 level rise; the acceleration of global warming since the mid-20th century and the continuation
18 thereof; and about the fact that the continued increase in fossil fuel product consumption that
19 creates severe environmental threats and significant economic costs for coastal communities,
20 including Imperial Beach. Reasonable consumers and policy makers have also been deceived
21 about the depth and breadth of the state of the scientific evidence on anthropogenic climate change,
22 and in particular, on the strength of the scientific consensus demonstrating the role of fossil fuels
23 in causing both climate change and a wide range of potentially destructive impacts, including sea
24 level rise.

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¹⁴² ExxonMobil, 2007 Corporate Citizenship Report (December 31, 2007).

1 **F. In Contrast to their Public Statements, Defendants' Internal Actions**
2 **Demonstrate their Awareness of and Intent to Profit from the Unabated Use**
3 **of Fossil Fuel Products.**

4 142. In contrast to their public-facing efforts challenging the validity of the scientific
5 consensus about anthropogenic climate change, Defendants' acts and omissions evidence their
6 internal acknowledgement of the reality of sea level rise and its likely consequences. These actions
7 include, but are not limited to, making multi-billion-dollar infrastructure investments for their own
8 operations that acknowledge the reality of coming anthropogenic climate-related change. These
9 investments included (among others), raising offshore oil platforms to protect against sea level
10 rise; reinforcing offshore oil platforms to withstand increased wave strength and storm severity;
11 and developing and patenting designs for equipment intended to extract crude oil and/or natural
12 gas in areas previously unreachable because of the presence of polar ice sheets.¹⁴³

13 143. For example, in 1973 Exxon obtained a patent for a cargo ship capable of breaking
14 through sea ice¹⁴⁴ and for an oil tanker¹⁴⁵ designed specifically for use in previously unreachable
15 areas of the Arctic.

16 144. In 1974, Chevron obtained a patent for a mobile arctic drilling platform designed
17 to withstand significant interference from lateral ice masses,¹⁴⁶ allowing for drilling in areas with
18 increased ice floe movement due to elevated temperature.

19 145. That same year, Texaco (Chevron) worked toward obtaining a patent for a method
20 and apparatus for reducing ice forces on a marine structure prone to being frozen in ice through
21 natural weather conditions,¹⁴⁷ allowing for drilling in previously unreachable Arctic areas that
22 would become seasonally accessible.

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24 ¹⁴³ Amy Lieberman and Suzanne Rust, Big Oil braced for global warming while it fought regulations, L.A. Times
(December 31, 2015) <http://graphics.latimes.com/oil-operations/>.

25 ¹⁴⁴ Patents, Icebreaking cargo vessel, Exxon Research Engineering Co. (April 17, 1973)
<https://www.google.com/patents/US3727571>.

26 ¹⁴⁵ Patents, Tanker vessel, Exxon Research Engineering Co. (July 17, 1973)
<https://www.google.com/patents/US3745960>.

27 ¹⁴⁶ Patents, Arctic offshore platform, Chevron Res (August 27, 1974) <https://www.google.com/patents/US3831385>.

28 ¹⁴⁷ Patents, Mobile, arctic drilling and production platform, Texaco Inc. (February 26, 1974)
<https://www.google.com/patents/US3793840>.

1 146. Shell obtained a patent similar to Texaco’s (Chevron) in 1984.¹⁴⁸

2 147. In 1989, Norske Shell, Royal Dutch Shell’s Norwegian subsidiary, altered designs
3 for a natural gas platform planned for construction in the North Sea to account for anticipated sea
4 level rise. Those design changes were ultimately carried out by Shell’s contractors, adding
5 substantial costs to the project.¹⁴⁹

6 a. The Troll field, off the Norwegian coast in the North Sea, was proven to
7 contain large natural oil and gas deposits in 1979, shortly after Norske Shell
8 was approved by Norwegian oil and gas regulators to operate a portion of
9 the field.

10 b. In 1986, the Norwegian parliament granted Norske Shell authority to
11 complete the first development phase of the Troll field gas deposits, and
12 Norske Shell began designing the “Troll A” gas platform, with the intent to
13 begin operation of the platform in approximately 1995. Based on the very
14 large size of the gas deposits in the Troll field, the Troll A platform was
15 projected to operate for approximately 70 years.

16 c. The platform was originally designed to stand approximately 100 feet above
17 sea level—the amount necessary to stay above waves in a once-in-a-century
18 strength storm.

19 d. In 1989, Shell engineers revised their plans to increase the above-water
20 height of the platform by 3–6 feet, specifically to account for higher
21 anticipated average sea levels and increased storm intensity due to global
22 warming over the platform’s 70-year operational life.¹⁵⁰

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26 ¹⁴⁸ Patents, Arctic offshore platform, Shell Oil Company (January 24, 1984)
<https://www.google.com/patents/US4427320>.

27 ¹⁴⁹ Greenhouse Effect: Shell Anticipates A Sea Change, N.Y. Times (December 20, 1989)
<http://www.nytimes.com/1989/12/20/business/greenhouse-effect-shell-anticipates-a-sea-change.html>.

28 ¹⁵⁰ Id.; Amy Lieberman and Suzanne Rust, Big Oil braced for global warming while it fought regulations, L.A.
Times (December 31, 2015), <http://graphics.latimes.com/oil-operations/>.

1 e. Shell projected that the additional 3–6 feet of above-water construction
2 would increase the cost of the Troll A platform by as much as \$40 million.

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

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

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

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

23 151. The consequences of delayed action on climate change, exacerbated by Defendants’
24 actions, has already drastically increased the cost of mitigating further harm. Had concerted action
25 begun even as late as 2005, an annual 3.5% reduction in CO₂ emissions to lower atmospheric CO₂
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1 to 350 ppm by the year 2100 would have restored earth's energy balance¹⁵¹ and halted future global
2 warming, although such efforts would not forestall committed sea level rise already locked in.¹⁵²
3 If efforts do not begin until 2020, however, a 15% annual reduction will be required to restore the
4 Earth's energy balance by the end of the century.¹⁵³ Earlier steps to reduce emissions would have
5 led to smaller – and less disruptive – measures needed to mitigate the impacts of fossil fuel
6 production.

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

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

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

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

19 The prediction of the IPCC is that over the next century temperatures might rise by
20 a further 1 to 3.5 degrees centigrade [1.8° – 6.3° F], and that sea levels might rise
21 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. . . .

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23 ¹⁵¹ "Climate equilibrium" is the balance between Earth's absorption of solar energy and its own energy radiation.
24 Earth is currently out of equilibrium due to the influence of anthropogenic greenhouse gases, which prevent
25 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 (December 3, 2013), <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648>.

26 ¹⁵² 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, 10 (December 3, 2013),
27 <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648>.

28 ¹⁵³ 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, 10 (December 3, 2013),
<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648>.

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[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.”¹⁵⁴

153. 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) obtained multiple patents on technologies for fuel

¹⁵⁴ John Browne, BP Climate Change Speech to Stanford, Climate Files (May 19, 1997), <http://www.climatefiles.com/bp/bp-climate-change-speech-to-stanford/>.

1 cells, including on the design of a fuel cell and necessary electrodes,¹⁵⁵ and
2 on a process for increasing the oxidation of a fuel, specifically methanol, to
3 produce electricity in a fuel cell.¹⁵⁶

- 4 b. In 1970, Esso (ExxonMobil) obtained a patent for a “low-polluting engine
5 and drive system” that used an interburner and air compressor to reduce
6 pollutant emissions, including CO₂ emissions, from gasoline combustion
7 engines (the system also increased the efficiency of the fossil fuel products
8 used in such engines, thereby lowering the amount of fossil fuel product
9 necessary to operate engines equipped with this technology).¹⁵⁷

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

- 15 a. The first patent for enhanced oil recovery technology, a process by which
16 CO₂ is captured and reinjected into oil deposits, was granted to an ARCO
17 (BP) subsidiary in 1952.¹⁵⁸ This technology could have been further
18 developed as a carbon capture and sequestration technique;
- 19 b. Phillips Petroleum Company (ConocoPhillips) obtained a patent in 1966 for
20 a “Method for recovering a purified component from a gas” outlining a
21 process to remove carbon from natural gas and gasoline streams;¹⁵⁹ and
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23 ¹⁵⁵ Patents, Fuel cell and fuel cell electrodes, Exxon Research Engineering Co. (December 31, 1963)
<https://www.google.com/patents/US3116169>.

24 ¹⁵⁶ Patents, Direct production of electrical energy from liquid fuels, Exxon Research Engineering Co. (December 3,
1963) <https://www.google.com/patents/US3113049>.

25 ¹⁵⁷ Patents, Low-polluting engine and drive system, Exxon Research Engineering Co. (May 16, 1970)
<https://www.google.com/patents/US3513929>.

26 ¹⁵⁸ 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-](http://www.api.org/~media/Files/EHS/climate-change/Summary-carbon-dioxide-enhanced-oil-recovery-well-tech.pdf)
27 [dioxide-enhanced-oil-recovery-well-tech.pdf](http://www.api.org/~media/Files/EHS/climate-change/Summary-carbon-dioxide-enhanced-oil-recovery-well-tech.pdf).

28 ¹⁵⁹ Patents, Method for recovering a purified component from a gas, Phillips Petroleum Co (January 11, 1966)
<https://www.google.com/patents/US3228874>.

1 c. In 1973, Shell was granted a patent for a process to remove acidic gases,
2 including CO₂, from gaseous mixtures.

3 155. Despite this knowledge, Defendants' later forays into the alternative energy sector
4 were largely pretenses. For instance, in 2001, Chevron developed and shared a sophisticated
5 information management system to gather greenhouse gas emissions data from its explorations
6 and production to help regulate and set reduction goals.¹⁶⁰ Beyond this technological
7 breakthrough, Chevron touted "profitable renewable energy" as part of its business plan for several
8 years and launched a 2010 advertising campaign promoting the company's move towards
9 renewable energy. Despite all this, Chevron rolled back its renewable and alternative energy
10 projects in 2014.¹⁶¹

11 156. Similarly, ConocoPhillips' 2012 Sustainable Development report declared
12 developing renewable energy a priority in keeping with their position on sustainable development
13 and climate change.¹⁶² Their 10-K filing from the same year told a different story: "As an
14 independent E&P company, we are solely focused on our core business of exploring for,
15 developing and producing crude oil and natural gas globally."¹⁶³

16 157. Likewise, while Shell orchestrated an entire public relations campaign around
17 energy transitions towards net zero emissions, a fine-print disclaimer in its 2016 net-zero pathways
18 report reads: "We have no immediate plans to move to a net-zero emissions portfolio over our
19 investment horizon of 10–20 years."¹⁶⁴

20 158. BP, appearing to abide by the representations Lord Browne made in his speech
21 described in paragraph 152, above, engaged in a rebranding campaign to convey an air of
22

23 ¹⁶⁰ Chevron, Chevron Press Release – Chevron Introduces New System to Manage Energy Use (September 25,
24 2001) <https://www.chevron.com/stories/chevron-introduces-new-system-to-manage-energy-use>.

25 ¹⁶¹ 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>.

26 ¹⁶² ConocoPhillips, Sustainable Development (2013) [http://www.conocophillips.com/sustainable-
development/Documents/2013.11.7%201200%20Our%20Approach%20Section%20Final.pdf](http://www.conocophillips.com/sustainable-development/Documents/2013.11.7%201200%20Our%20Approach%20Section%20Final.pdf).

27 ¹⁶³ ConocoPhillips Form 10-K, U.S. Securities and Exchange Commission Webpage (December 31, 2012)
<https://www.sec.gov/Archives/edgar/data/1163165/000119312513065426/d452384d10k.htm>.

28 ¹⁶⁴ Energy Transitions Towards Net Zero Emissions (NZE), Shell (2016),
https://drive.google.com/file/d/0B_L1nw8WLu0Bbi1QWnJRcHIZblE/view.

1 environmental stewardship and renewable energy to its consumers. This included renouncing its
2 membership in the GCC in 2007, changing its name from “British Petroleum” to “BP” while
3 adopting the slogan “Beyond Petroleum,” and adopting a conspicuously green corporate logo.
4 However, BP’s self-touted “alternative energy” investments during this turnaround included
5 investments in natural gas, a fossil fuel, and in 2007 the company reinvested in Canadian tar sands,
6 a particularly high-carbon source of oil.¹⁶⁵ The company ultimately abandoned its wind and solar
7 assets in 2011 and 2013, respectively, and even the “Beyond Petroleum” moniker in 2013.¹⁶⁶

8 159. After posting a \$10 billion quarterly profit, Exxon in 2005 stated that “We’re an oil
9 and gas company. In times past, when we tried to get into other businesses, we didn’t do it well.
10 We’d rather re-invest in what we know.”¹⁶⁷

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

- 18 a. Accepting scientific evidence on the validity of anthropogenic climate
19 change and the damages it will cause people and communities, including
20 Plaintiffs, and the environment. Mere acceptance of that information would
21 have altered the debate from *whether* to combat climate change and sea
22 level rise to *how* to combat it; and avoided much of the public confusion
23 that has ensued over nearly 30 years, since at least 1988;

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26 ¹⁶⁵ Fred Pearce, Greenwash: BP and the Myth of a World ‘Beyond Petroleum.’ The Guardian, (November 20, 2008)
<https://www.theguardian.com/environment/2008/nov/20/fossilfuels-energy>.

27 ¹⁶⁶ Javier E. David, ‘Beyond Petroleum’ No More? BP Goes Back to Basics, CNBC (April 20, 2013)
<http://www.cnb.com/id/100647034>.

28 ¹⁶⁷ James R. Healy, Alternate Energy Not in Cards at ExxonMobil (October 28, 2005)
https://usatoday30.usatoday.com/money/industries/energy/2005-10-27-oil-invest-usat_x.htm.

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- b. Forthrightly communicating with Defendants’ shareholders, banks, insurers, the public, regulators and Plaintiffs 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 that 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 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.

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

6 **H. Defendants Caused Plaintiffs' Injuries**

7 162. Defendants individually and collectively extracted a substantial percentage of all
8 raw fossil fuels extracted globally since 1965.

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

12 164. Defendants' individual and collective conduct, including, but not limited to, their
13 extraction, refining, and/or formulation of fossil fuel products; their introduction of fossil fuel
14 products into the stream of commerce; their wrongful promotion of their fossil fuel products and
15 concealment of known hazards associated with use of those products; and their failure to pursue
16 less hazardous alternatives available to them; is a substantial factor in causing the increase in global
17 mean temperature and consequent increase in global mean sea surface height since 1965.

18 165. Defendants have actually and proximately caused the sea levels to rise, increased
19 the destructive impacts of storm surges, increased coastal erosion, exacerbated the onshore impact
20 of regular tidal ebb and flow, caused saltwater intrusion, and caused consequent social and
21 economic injuries associated with the aforementioned physical and environmental impacts, among
22 other impacts, resulting in inundation, destruction, and/or other interference with Plaintiffs'
23 property and citizenry.

24 166. Plaintiffs have already incurred, and will foreseeably continue to incur, injuries and
25 damages because of sea level rise caused by Defendants' conduct.

26 167. But for Defendants' conduct, Plaintiffs would have suffered no or far less injuries
27 and damages than they have, and will foreseeably endure, due to expected anthropogenic sea level
28 rise.

1 168. The San Diego area, including Imperial Beach, has experienced significant sea level
2 rise over the last half century attributable to Defendants’ conduct.¹⁶⁸ Imperial Beach will
3 experience additional, significant, and dangerous sea level rise within the next eighty years given
4 unabated greenhouse gas emissions,¹⁶⁹ and the increases will continue and accelerate.
5 Additionally, Imperial Beach will experience greater committed sea level rise due to the “locked
6 in” greenhouse gases already emitted.¹⁷⁰ The City will suffer greater overall sea level rise than the
7 global average.¹⁷¹

8 169. Imperial Beach finalized its Sea Level Rise Vulnerability Analysis on October 5,
9 2016.¹⁷² The Assessment is the City’s first analysis of its overall vulnerability to sea level rise and
10 its impacts from permanent inundation, temporary flooding caused by storm events, erosion, and
11 saltwater intrusion. The Assessment identifies actual risks to the City with various sea level rise
12 projections and the consequences associated with taking no action to prevent or mitigate the
13 expected impacts.¹⁷³

14 170. Land use impacts to the City associated are likely to include, but are not limited to:

- 15 a. Coastal erosive forces compromising 683 residential, commercial and open
16 space parcels within the City. Economic vulnerability associated with
17 erosion’s impact on real property is valued at over \$106 million. Coastal
18 flooding will impact 1,538 parcels, and cause over \$38 million in damages,
19 primarily to residential and commercial buildings. Regular tidal inundation
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23 ¹⁶⁸ Griggs, et al. (CA Ocean Protection Council Science Advisory Team Working Group), Rising Seas in California: An Update on Sea-Level Rise Science, California Ocean Science Trust (April 2017) p. 23, box 2, figure 2.

24 ¹⁶⁹ Griggs, et al. (CA Ocean Protection Council Science Advisory Team Working Group), Rising Seas in California: An Update on Sea-Level Rise Science, California Ocean Science Trust (April 2017) p. 27, table 1(c).

25 ¹⁷⁰ Peter U. Clark et al., Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level Change, Nature Climate Change Vol. 6, 363-65 (2016).

26 ¹⁷¹ Global sea level rise is projected to be 82.7 cm (32.6 inches) above 2000 levels by 2100. See National Research Council, Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past Present and Future (2012) at page 107 at Table 5.2; page 117 at Table 5.3. The San Francisco Bay Area sea level rise is projected to be 91.9 cm (36.2 inches) over 2000 by 2100. Id.

27 ¹⁷² Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016).

28 ¹⁷³ See Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016) p. 1-3, table 1-1.

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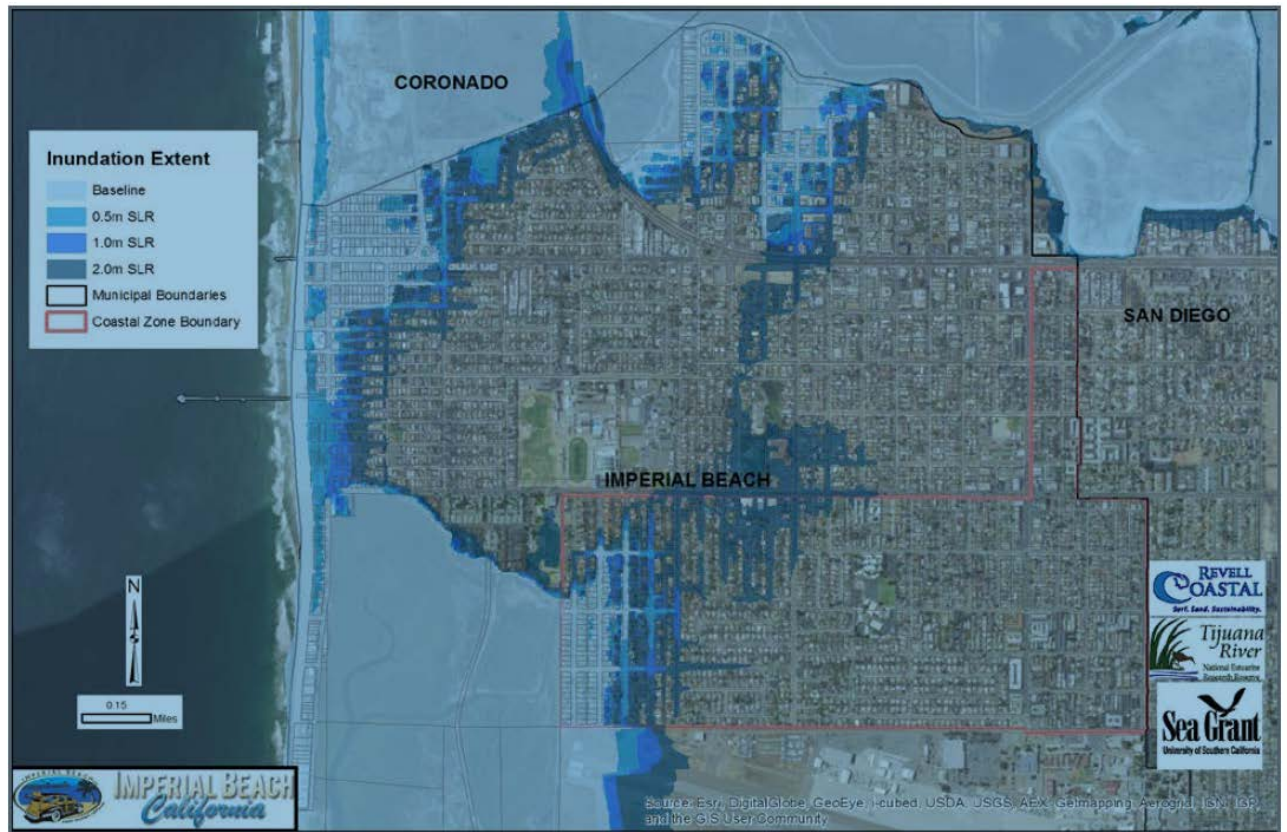
will damage 447 parcels including two elementary schools, and cost over \$34 million.¹⁷⁴

- b. Flooding of as much as 29.6 miles – approximately 40% – of the City’s roads, as well as erosive damage to 5.4 miles and regular tidal inundation of 4.3 miles of roads.¹⁷⁵
- c. Flooding of critical public transportation infrastructure, including 9 bus stops, 3.9 miles of bus route, and 3.8 miles of bicycle pathway. This infrastructure will also be compromised by erosion and regular tidal inundation.¹⁷⁶
- d. Damages to over 81,000 feet of wastewater transmission pipe, 9 pump stations, and 311 manholes within the City. Over 24,000 feet of stormwater pipes and 42 outlets will be impacted as well.¹⁷⁷
- e. Bayside and West View Elementary Schools will be impacted by regular tidal inundation and coastal flooding, necessitating relocation of those school sites. Six buildings at Bayside Elementary are already exposed during storm events and will become routinely exposed by tidal flooding with 1.6 feet of sea level rise.¹⁷⁸
- f. Coastal flooding and tidal inundation will compromise known hazardous materials sites within the City, including five businesses and two underground storage tank sites.¹⁷⁹

171. The following figure describes the extent of coastal flooding hazards in Imperial Beach due to sea level rise to different elevations. As the image shows, much of the City, including

¹⁷⁴ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016), Appendix A, p. A-2.
¹⁷⁵ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016), Appendix A, p. A-6.
¹⁷⁶ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016), Appendix A, p. A-8.
¹⁷⁷ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016), Appendix A, p. A-10-12.
¹⁷⁸ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016), Appendix A, p. A-14
¹⁷⁹ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016), Appendix A, p. A-16.

1 some of its most critical infrastructure and valuable Ocean-, Bay-, and Estuary-front property, will
2 be inundated with expected sea level increases.¹⁸⁰



17 172. As a direct and proximate result of the acts and omissions of the Defendants’
18 alleged herein, Plaintiff has incurred significant expenses related to planning for and predicting
19 future sea level rise injuries to its real property, improvements thereon, civil infrastructure, and
20 citizens, in order to preemptively mitigate and/or prevent such injuries. This includes performing
21 a Sea Level Vulnerability Assessment in 2016 at significant expense to the City that describes the
22 extent of mitigation and adaptation measures the City must undertake in order to prevent
23 significantly more expensive sea-level rise related injuries.

24 173. As a direct and proximate result of Defendants’ acts and omissions alleged herein,
25 Plaintiffs have incurred sea level rise-related injuries and damages. These include infrastructural
26 repair and reinforcement of roads and beach access.

28 ¹⁸⁰ Revell Coastal, 2016 City of Imperial Beach Sea Level Rise Assessment (September 2016), p. 4-5, figure 4-2.