

**Charging Big Oil with Climate Homicide –
Preliminary Prosecution Memo for July 2023 Heat Wave**

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Executive Summary

This preliminary “prosecution memorandum” draws from publicly available material to assess potential criminal charges that local or state prosecutors could bring against major fossil fuel companies (“FFCs”) for lives lost in a climate disaster. To ground this assessment in real-world analysis, it focuses on one specific factual scenario: the lethal heat wave that struck the American Southwest in July 2023, causing hundreds of deaths in Maricopa County.

Though this memo asks a particular question—how officials in Maricopa County could pursue reckless manslaughter or second degree murder prosecutions for deaths caused by the July 2023 wave—its analysis is relevant in most jurisdictions where prosecutors might seek justice for climate victims. Some jurisdictions define homicide or their causation requirements slightly differently, but the charges discussed and reasoning employed in this memorandum could be investigated in practically any jurisdiction that has experienced climate-related deaths. Indeed, the authors hope this public memo can serve as a starting point for any prosecutor who wants to build a case to protect their constituents from the lethal climate disasters that are threatening public safety in communities across the country.

Introduction

In July 2023 a lethal heat wave which would have been “virtually impossible” but for human-caused climate change broke temperature records across the American Southwest.¹ Communities like Phoenix, Arizona experienced a historic 31 days in a row with temperatures above 110 degrees.² Hundreds of people across the region were killed, with Maricopa County alone recording 403 heat-related deaths in July 2023³—far more than all the murders the county experienced that year.⁴ These victims were diverse in their backgrounds and circumstances. Some were homeless, like the man who died after breaking both legs jumping over a fence in a desperate attempt to find shade outside an elementary school; others were well off, like the

¹ Mariam Zachariah et. al., *Extreme heat in North America, Europe, and China in July 2023 made much more likely by climate change*, GRANTHAM INSTITUTE FOR CLIMATE CHANGE 1, 2 (Jul. 25, 2023), <https://spiral.imperial.ac.uk/bitstream/10044/1/105549/8/Scientific%20Report%20-%20Northern%20Hemisphere%20Heat.pdf>.

² Anita Snow & Drew Costley, *Phoenix has ended 31-day streak of highs at or above 110 degrees as rains ease a Southwest heat wave*, THE ASSOCIATED PRESS (Jul. 31, 2023), <https://apnews.com/article/heat-warming-climate-environment-temperature-phoenix-arizona-d7db7d44effcdab554b6a742288eb2be>.

³ *2023 Heat Related Deaths Report*, MARICOPA COUNTY DEPARTMENT OF PUBLIC HEALTH, 8 (Apr. 2024), <https://www.maricopa.gov/ArchiveCenter/ViewFile/Item/5820>.

⁴ Stephen Lemons, *Maricopa County is filled with victims who aren't getting the Preston Lord treatment*, ARIZONA MIRROR (Mar 22, 2024), <https://azmirror.com/2024/03/22/maricopa-county-is-filled-with-victims-who-arent-getting-the-preston-lord-treatment/>.

woman who died in her \$1 million home in Scottsdale.⁵ Some were older and had health conditions, like David Hom, a 73-year-old with diabetes who fell while hanging his laundry and was found with lower body burns and a core body temperature of 107 degrees.⁶ Others were young and fit, like Nathan Perkins, a 33-year-old man described as “a bright engineer who talked a lot about his family, fiancée and future of being a husband and dad,” who died from heat stroke while out on a Sunday morning hike.⁷

This memorandum considers whether prosecutors in Arizona could charge FFCs with reckless manslaughter or second degree murder for deaths caused by climate disasters like the July 2023 heat wave. It provides an overview of the publicly available evidence that (1) FFCs’ conduct in generating a substantial portion of all global greenhouse gas emissions and deceiving the public about the dangers of those emissions legally caused the heat deaths of Hom, Perkins, and potentially hundreds of other individuals, and (2) FFCs engaged in this conduct with the culpable mental state required for a reckless manslaughter or second degree murder offense. The memo also considers several defenses that FFC defendants may attempt to assert if charged with these crimes, with a particular focus on arguments related to causation, and discusses why none provides a complete defense to the charges. Ultimately, it concludes that the case for prosecuting FFCs for climate-related deaths is strong enough to merit the initiation of investigations by state and local prosecutors.

Summary

This memo proceeds in four parts.

I. Defendants

Part I briefly describes appropriate defendants for a climate homicide prosecution, focusing on eight of the world’s largest investor-owned fossil fuel companies and a national oil and gas trade association that are collectively responsible for a substantial portion of all global greenhouse gas emissions and that actively participated in a conspiracy to spread climate disinformation.

⁵ Anita Snow, *Last year’s deadly heat wave in metro Phoenix didn’t discriminate*, THE ASSOCIATED PRESS (May 28, 2024), <https://apnews.com/article/deadly-heat-summer-victims-phoenix-arizona-maricopa-dcb8c01e3566d1737acbd60b462e5ddf>.

⁶ Seth Borenstein, Mary Katherine Wildeman & Anita Snow, *AP analysis finds 2023 set record for US heat deaths, killing in areas that used to handle the heat*, THE ASSOCIATED PRESS (May 31, 2024), <https://apnews.com/article/record-heat-deadly-climate-change-humidity-south-11de21a526e1cbe7e306c47c2f12438d>.

⁷ See Snow, *supra* note 5.

II. Offenses

Part II lays out the elements of the crimes of reckless manslaughter and second degree murder, the two Arizona state criminal offenses under consideration.

III. Prosecution’s Case

This section discusses the prosecution’s case, starting in Part III.A with relevant facts about the July 2023 heat wave and its victims in Maricopa County.

Part III.B summarizes the argument that FFCs legally caused the deaths of these victims. It discusses each link in the causal chain between FFCs’ conduct and victims’ loss of life. First, it describes how local health department records and other reports show that the deaths of particular victims were caused by the heat wave. Next, it explains how climate attribution studies show that the July 2023 heat wave would have been “virtually impossible” but for human-caused climate change. Finally, it discusses the substantial role that FFCs have played in causing climate change, detailing both how they directly generated a substantial portion of all the greenhouse gas emissions that have caused the planet to heat up and, relatedly, how they deceived the public about the dangers of greenhouse gas emissions in ways that led to additional emissions and worse global warming.

Part III.C analyzes the FFCs’ mental states, summarizing the publicly available evidence showing that they were aware of and consciously disregarded the risk that the conduct described in Part III.B would cause deaths. It shows that FFCs were predicting several decades ago that their actions would cause dangerous climate disasters like the July 2023 heat wave, and that they were so confident in this science that they based business decisions on their climate predictions.

IV. Assessing Potential Defenses

This section assesses likely defenses that FFCs may assert, starting in Part IV.A with arguments relating to causation.

First, FFCs may argue that their contributions to climate change are insufficient for causation to attach because they are not exclusively responsible for climate change, because of other causes such as underlying health conditions of victims, or because of actions or inactions by other individuals in response to the health emergencies that arose. These arguments are undercut by the legal reality that a “defendant’s conduct need not be the only cause”⁸ of a death and a particular defendant cannot “avoid liability for his causative act by claiming that the conduct of some other

⁸ *State v. Brown*, No. 1 CA–CR 10–0429 (memorandum decision filed March 15, 2011), quoting *Markiewicz v. Salt River Valley Water Users’ Ass’n*, 118 Ariz. 329, 338 n. 6, 576 P.2d 517 (App.1978).

person was also a contributing cause.”⁹ The eight FFCs named in this memo are responsible for at least 15.37% of all global greenhouse gas emissions generated by humanity, and that proportion rises to 44.17% if one factors in the emissions generated by each company’s joint venture partners.¹⁰ This is many times more than the 6% of global emissions that the U.S. Supreme Court considered satisfactory for the causation prong of a constitutional standing inquiry in *Massachusetts v. EPA*,¹¹ or the 2.5% that was approved in *Connecticut v. Am. Elec. Power Co. Inc.*¹² In addition, causation in this prosecution also does not rest solely on the FFCs’ greenhouse gas contributions, but also other unlawful actions, including deceptions that operated to forestall a transition away from their lethal products. FFCs’ emissions and climate deception constitute substantial factors in contributing to the deaths of the victims of the July 2023 heat wave.

Second, FFCs may claim that their climate disinformation did not causally contribute to climate change. The memo addresses this argument by reviewing the substantial evidence available through polling and sociological studies that FFCs’ creation of a false perception of disagreement in the scientific community on climate change had a significant impact on the public’s perception of climate change in ways that helped block or delay the transition away from fossil fuels.

Third, FFCs may assert that prosecutors cannot precisely pinpoint responsibility for climate harms within each corporation. But it is possible to show that high-level directors at these companies were aware of and controlled FFCs’ causative acts through company-wide decisions regarding the quantity and extent of fossil fuel production and the communications strategies they utilized concerning climate change and the link between fossil fuel use and climate harms.

Fourth, FFCs will attempt to blame regular people for climate change, essentially arguing that consumers’ end-stage emissions break the chain of causation connecting FFCs’ conduct to climate impacts. But to shield an actor from liability, an intervening cause must have been unforeseeable. FFCs clearly foresaw that their fossil fuel products would be used precisely as intended, and indeed they even worked to deceive consumers to perpetuate the use of their products instead of safe alternatives.

Part IV.B assesses potential affirmative defenses FFCs may invoke. First, FFCs may assert a necessity defense, arguing that shifting away from fossil fuels would have caused so much damage that maintaining their business model at all costs was necessary for the greater good. But

⁹ *Ontiveros v. Borak*, 136 Ariz. 500, 505, 667 P.2d 200 (1983) (superseded by statute on other grounds).

¹⁰ *The Carbon Majors Dataset*, CARBON MAJORS (Apr. 2024), full dataset available at <https://carbonmajors.org/Downloads>. For the calculations used to determine these numbers, see <https://docs.google.com/spreadsheets/d/1Ft9E0nWNNRlmbpRZA-wRMeGD-HZY1SMV-euSpPkFmdU/edit?usp=s> haring.

¹¹ 549 U.S. 497, 524 (2007).

¹² 582 F.3d 309, 347 (2d Cir. 2009).

a necessity defense requires an imminent threat and an absence of legal alternatives. While it is true that an overnight shutdown of all fossil fuel production would be extremely damaging, this was never an imminent threat. The only “threats” that FFCs sought to avoid by selling as much of their product as possible and engaging in campaigns of climate deception were lower profits and a gradual transition to clean energy sources, undercutting any reasonable claim of necessity.

Second, FFCs may argue that it would be unfair to prosecute them because fossil fuels are legal. This is essentially an entrapment defense (*i.e.*, they were induced by government incentives to produce and sell fossil fuels) or a mistake-of-law defense (*i.e.*, they believed that regulation of fossil fuels authorized their behavior and its outcomes). But the forbidden conduct in a manslaughter or second degree murder prosecution is causing death with a reckless mental state, meaning a defendant cannot escape liability simply because the activity they engaged in with a culpable mental state that resulted in death was licensed or regulated. For example, driving is authorized, subsidized, and regulated by federal and state governments, but driving in a manner that negligently or recklessly causes death is still a crime.

Third, FFCs will claim that federal regulations preempt enforcement of state criminal laws against them for acts committed while engaging in federally regulated behavior. But states’ ability to prosecute homicides within their borders is a core state police power around which federal courts tread very lightly; indeed, we have not found a single case in which preemption of a generally applicable criminal law, let alone a homicide statute, was ever raised.

Finally, Part IV.C addresses the likely attempt by FFCs to frame prosecution as a conspiracy to use the criminal legal system to further political goals. But pursuing justice for victims and their bereaved families is the most fundamental function of a prosecutor. The basic facts of this case—that victims are dead, that they were killed in a heat wave that was caused to a large degree by climate change, and that FFCs substantially and knowingly contributed to climate change—should prove effective in undercutting FFCs’ attempts to change the subject.

Acknowledgements

The analysis in this memo owes a great deal to the research and legal theorization articulated in the civil climate accountability lawsuits that have been filed against FFCs in recent years.¹³ In particular, much of the information described in Part III was synthesized from these various complaints. Part III.B.3.b of this memo relies heavily on “Denial, Disinformation, and Doublespeak: Big Oil’s Evolving Efforts to Avoid Accountability for Climate Change,” a Joint Staff Report of the House Committee on Oversight and Accountability and the Senate Budget Committee.¹⁴

¹³ See *Climate Accountability Lawsuits*, CENTER FOR CLIMATE INTEGRITY, <https://climateintegrity.org/cases>.

¹⁴ *Denial, Disinformation, and Doublespeak: Big Oil’s Evolving Efforts to Avoid Accountability for Climate Change*, Joint Staff Report of House Committee on Oversight and Accountability and Senate Budget Committee 22 (Apr. 30, 2024), <https://oversightdemocrats.house.gov/news/press-releases/new-joint-bicameral-staff-report-reveals-big-oils-campaign-climate-denial>.

I. Defendants

The defendants in a prosecution for deaths caused by the July 2023 heat wave would include some of the world's largest investor-owned fossil fuel companies and a national oil and gas trade association: ExxonMobil, Chevron, Shell, BP, ConocoPhillips, Occidental, BHP, Peabody, and the American Petroleum Institute ("API"). These defendants have generated a substantial proportion of all global greenhouse gas emissions: the emissions they have directly generated since 1965 (when the fossil fuel industry became unquestionably aware that its products were causing climate change¹⁵) amount to 15.37% of all the fossil fuel emissions that humanity has generated since the start of the industrial revolution. These companies have also engaged in joint ventures with additional carbon majors whose post-1965 emissions represent 44.17% of all global emissions.¹⁶ Each of these entities were also active members of the Global Climate Coalition ("GCC"),¹⁷ an organization that played a key role in devising, funding, and executing the fossil fuel industry's campaign of climate deception.¹⁸

ExxonMobil: Exxon Mobil Corporation (ExxonMobil) is a multinational, vertically integrated energy and chemical company that has been consistently ranked the world's second largest oil company by revenue.¹⁹ ExxonMobil is active in oil and gas exploration and production, refining, transport, distribution and marketing, petrochemicals, plastics, power generation, and trading.²⁰ ExxonMobil's post-1965 emissions represent 3.15% of all global CO₂ and methane emissions since the start of the industrial revolution.²¹ ExxonMobil also has engaged in joint ventures with another carbon major, Petrobras,²² which is responsible for 0.75% of all global emissions in that same period,²³ and with CNOOC,²⁴ which is responsible for 0.29% of all emissions.²⁵ And

¹⁵ See Ikard, *Meeting the Challenges of 1966*, in Proceedings of the American Petroleum Institute, 13 (1965), <https://www.documentcloud.org/documents/5348130-1965-API-Proceedings>.

¹⁶ See Carbon Majors, *supra* note 10.

¹⁷ *Global Climate Coalition Membership*, GLOBAL CLIMATE COALITION, (Nov. 16, 1989), <https://www.climatefiles.com/denial-groups/global-climate-coalition-collection/1989-membership/>; *Progress Report on U.S. Industry Voluntary Actions to Curb Greenhouse Gas Emissions: Report to the Global Climate Coalition*, GLOBAL CLIMATE COALITION, (Mar. 1996), <https://www.documentcloud.org/documents/5628940-GCC-1996-Report-on-Carbon-Emission-Actions-From.html>.

¹⁸ See Peter Jacques, Riley Dunlap & Mark Freeman, *The organisation of denial: Conservative think tanks and environmental scepticism*, ENVIRONMENTAL POLITICS 17 (3), 349–385 (2008), <https://www.tandfonline.com/doi/full/10.1080/09644010802055576>. See also note 117.

¹⁹ *Global 500*, FORTUNE 500, <https://fortune.com/fortune500/2022/>.

²⁰ *Exxon Mobil Corp: Overview*, GLOBALDATA, <https://www.globaldata.com/company-profile/exxon-mobil-corp/>.

²¹ See Carbon Majors, *supra* note 10.

²² See *Petrobras and ExxonMobil Form Strategic Alliance*, EXXONMOBIL (Dec. 14, 2017), https://corporate.exxonmobil.com/news/news-releases/2017/1214_petrobras-and-exxonmobil-form-strategic-alliance.

²³ See Carbon Majors, *supra* note 10.

²⁴ See Sabrina Valle, *Exxon Pours Billions Into Joint Venture With China National Offshore Oil Corporation*, REUTERS (Jan. 18, 2023), <https://gcaplain.com/exxon-pours-billions-into-joint-venture-with-china-national-offshore-oil-corporation/>.

²⁵ See Carbon Majors, *supra* note 10.

ExxonMobil recently purchased Pioneer Natural Resources,²⁶ which is responsible for 0.06% of all emissions in that period.²⁷ In sum, the post-1965 emissions of ExxonMobil and its joint venture affiliates represent 3.96% of all global emissions.

Chevron: Chevron Corporation (Chevron) is a multinational, vertically integrated energy and chemicals company. Chevron operates through a web of subsidiaries at all levels of the fossil fuel supply chain. Chevron and its subsidiaries' operations include, but are not limited to: exploration, development, production, storage, transportation, and marketing of crude oil and natural gas; refining crude oil into petroleum products and marketing those products; and manufacturing and marketing commodity petrochemicals, plastics for industrial uses, and fuel and lubricant additives.²⁸ Chevron's post-1965 emissions represent 3.27% of all global greenhouse gas emissions since the beginning of the industrial revolution.²⁹ Chevron also partners with other carbon majors worldwide. It has joint ventures with PDVSA,³⁰ which is responsible for 1.17% of all emissions;³¹ with Eni, Sonangol, and TotalEnergies,³² which are respectively responsible for 0.62%, 0.23%, and 1.08% of all emissions;³³ and with Nigerian National Petroleum,³⁴ which is responsible for 0.72% of all emissions.³⁵ In addition, in 2023 Chevron acquired Hess Oil,³⁶ which is responsible for 0.20% of all emissions.³⁷ In sum, the post-1965 emissions of Chevron and its joint venture affiliates represent 7.30% of all global emissions.

Shell: Shell plc (Shell) is a vertically integrated multinational energy and petrochemical company. Shell is the ultimate parent company of numerous divisions, subsidiaries, and affiliates that engage in all aspects of fossil fuel production, including exploration, development, extraction, manufacturing and energy production, transport, trading, marketing, and sales.³⁸ Shell's post-1965 emissions represent 2.42% of all global greenhouse gas emissions since the

²⁶ *ExxonMobil announces merger with Pioneer Natural Resources in an all-stock transaction*, EXXONMOBIL (Oct. 11, 2023),

https://corporate.exxonmobil.com/news/news-releases/2023/1011_exxonmobil-announces-merger-with-pioneer-natural-resources-in-an-all-stock-transaction.

²⁷ See Carbon Majors, *supra* note 10.

²⁸ *Chevron Corp: Overview*, GLOBALDATA, <https://www.globaldata.com/company-profile/chevron-corp/>.

²⁹ See Carbon Majors, *supra* note 10.

³⁰ See *Venezuela*, CHEVRON, <https://www.chevron.com/worldwide/venezuela>.

³¹ See Carbon Majors, *supra* note 10.

³² See *EU clears Angolan LNG joint venture by BP, Chevron, Eni, Sonangol and Total*, NS ENERGY (May 16, 2012), <https://www.nsenergybusiness.com/news/newseu-clears-angolan-lng-joint-venture-by-bp-chevron-enisonangol-and-total-170512/>.

³³ See Carbon Majors, *supra* note 10.

³⁴ See *Nigeria*, CHEVRON, <https://www.chevron.com/worldwide/nigeria>.

³⁵ See Carbon Majors, *supra* note 10.

³⁶ *Chevron Announces Agreement to Acquire Hess*, CHEVRON, <https://www.chevron.com/newsroom/2023/q4/chevron-announces-agreement-to-acquire-hess>.

³⁷ See Carbon Majors, *supra* note 10.

³⁸ *Shell plc: Overview*, GLOBALDATA, <https://www.globaldata.com/company-profile/royal-dutch-shell-plc/>.

beginning of the industrial revolution.³⁹ Shell also has joint ventures with Gazprom,⁴⁰ which is responsible for 3.57% of all emissions;⁴¹ National Iranian Oil Company,⁴² which is responsible for 2.92% of all emissions;⁴³ China Petroleum,⁴⁴ which is responsible for 1.33% of all emissions;⁴⁵ Pemex,⁴⁶ which is responsible for 1.74% of all emissions;⁴⁷ Abu Dhabi National Oil Company,⁴⁸ which is responsible for 1.22% of all emissions;⁴⁹ Kuwait National Petroleum Corporation,⁵⁰ which is responsible for 1.10% of all emissions;⁵¹ and Saudi Aramco,⁵² which is responsible for 4.82% of all emissions.⁵³ In sum, the post-1965 emissions of Shell and its joint venture affiliates represent 19.13% of all global emissions.

BP: BP p.l.c. (BP) is a multinational, vertically integrated energy and petrochemical public limited company. BP is the parent company of numerous subsidiaries which explore for and extract oil and gas worldwide; refine oil into fossil fuel products such as gasoline; and market and sell oil, fuel, other refined petroleum products, and natural gas worldwide.⁵⁴ BP's post-1965 emissions represent 2.57% of all global greenhouse gas emissions since the beginning of the industrial revolution.⁵⁵ BP also has joint ventures with the Iraq National Oil Company,⁵⁶ which is responsible for 1.06% of all emissions,⁵⁷ and with Sonatrach,⁵⁸ which is responsible for 1.05% of

³⁹ See Carbon Majors, *supra* note 10.

⁴⁰ See *Gazprom and Shell Review Progress of Joint Projects*, GAZPROM (Mar. 16, 2018), <http://www.gazprom.com/press/news/2018/march/article412883/>.

⁴¹ See Carbon Majors, *supra* note 10.

⁴² See Jackie Northam, *Energy Giant Shell Inks Oil Deal With Iran*, NPR (Dec. 7, 2016), <https://www.npr.org/sections/thetwo-way/2016/12/07/504729570/energy-giant-shell-inks-oil-deal-with-iran>.

⁴³ See Carbon Majors, *supra* note 10.

⁴⁴ See *Shell, CNPC Form Well Manufacturing JV (The Netherlands)*, OFFSHORE ENERGY (Jun. 20, 2011), <https://www.lngworldnews.com/shell-cnpc-form-well-manufacturing-jv-the-netherlands/>.

⁴⁵ See Carbon Majors, *supra* note 10.

⁴⁶ See *Pemex to Acquire Interest in Shell Texas Refinery*, OIL & GAS JOURNAL (Aug. 31, 1992), <https://www.ogj.com/home/article/17218678/pemex-to-acquire-interest-in-shell-texas-refinery>; *Shell and Pemex to coordinate a responsible handover of operations*, SHELL (May. 24, 2021), <https://www.shell.us/about-us/projects-and-locations/deer-park-manufacturing-site/shell-deer-park-news/shell-and-pemex-to-coordinate-a-responsible-handover-of-operations.html>.

⁴⁷ See Carbon Majors, *supra* note 10.

⁴⁸ See *ADNOC Gas Processing*, SHELL, <https://www.shell.ae/business-customers/adnoc-gas-processing.html>.

⁴⁹ See Carbon Majors, *supra* note 10.

⁵⁰ See *Kuwait Petroleum and Shell Sign Agreement for Long-Term Supply of LNG to Meet Domestic Energy Needs*, YAHOO! FINANCE (Dec. 27, 2017), <https://ca.finance.yahoo.com/news/wired-news-kuwait-petroleum-shell-123000989.html>.

⁵¹ See Carbon Majors, *supra* note 10.

⁵² See EdCrooks, *Royal Dutch Shell and Saudi Aramco unwind US joint venture*, FINANCIAL TIMES (Mar. 17, 2016), <https://www.ft.com/content/4e3f5764-ec01-11e5-9fca-fb0f946fd1f0>.

⁵³ See Carbon Majors, *supra* note 10.

⁵⁴ *BP Plc: Overview*, GLOBALDATA, <https://www.globaldata.com/company-profile/bp-plc/>.

⁵⁵ See Carbon Majors, *supra* note 10.

⁵⁶ See *Reviving one of the world's super-giant oilfields*, BP, <https://www.bp.com/en/global/corporate/what-we-do/bp-worldwide/bp-in-iraq.html>.

⁵⁷ See Carbon Majors, *supra* note 10.

⁵⁸ See *BP Has a Long History of Working in Algeria*, BP, <https://www.bp.com/en/global/corporate/what-we-do/bpworldwide/bp-in-algeria.html>.

all emissions.⁵⁹ In addition, until 2022 BP had a 19.75% stake in Rosneft,⁶⁰ which is responsible for 1.01% of all emissions.⁶¹ In sum, the post-1965 emissions of BP and its joint venture affiliates represent 5.69% of all global emissions.

ConocoPhillips: ConocoPhillips is a multinational energy company that does fossil fuel exploration, extraction, production, manufacture, transport, and marketing.⁶² ConocoPhillips' post-1965 emissions represent 1.17% of all global greenhouse gas emissions since the beginning of the industrial revolution.⁶³ ConocoPhillips also has joint ventures with QatarEnergy,⁶⁴ which is responsible for 0.59% of all emissions.⁶⁵ In sum, the post-1965 emissions of ConocoPhillips and its joint venture affiliates represent 1.76% of all global emissions.

Occidental: Occidental Petroleum (Occidental) is a petroleum and natural gas exploration company that engages in fossil fuel gathering, processing, treating, and transportation. The company also participates in the hard minerals business through its ownership of non-operated joint ventures and royalty arrangements.⁶⁶ Occidental's post-1965 emissions represent 0.83% of all global greenhouse gas emissions since the start of the industrial revolution.⁶⁷ Occidental also has joint ventures with Ecopetrol,⁶⁸ which is responsible for 0.22% of all emissions.⁶⁹ In sum, the post-1965 emissions of Occidental and its joint venture affiliates represent 1.05% of all global emissions.

BHP: BHP Group (BHP) is a multinational metals and petroleum company that is ranked as the world's largest mining company based on market capitalization.⁷⁰ BHP's post-1965 emissions represent 0.77% of all global greenhouse gas emissions since the beginning of the industrial

⁵⁹ See Carbon Majors, *supra* note 10.

⁶⁰ See Ron Bousso & Dmitri Zhdannikov, *BP quits Russia in up to \$25 billion hit after Ukraine invasion*, REUTERS (Feb. 28, 2022),

<https://www.reuters.com/business/energy/britains-bp-says-exit-stake-russian-oil-giant-rosneft-2022-02-27/>.

⁶¹ See Carbon Majors, *supra* note 10.

⁶² *ConocoPhillips: Overview*, GLOBALDATA, <https://www.globaldata.com/company-profile/conocophillips/>.

⁶³ See Carbon Majors, *supra* note 10.

⁶⁴ See Nishant Ugal, *ConocoPhillips to take a slice of QatarEnergy's massive North Field LNG project*, UPSTREAM (Jun. 22, 2022),

<https://www.upstreamonline.com/lng/conocophillips-to-take-a-slice-of-qatarenergy-s-massive-north-field-lng-project/2-1-1241987>.

⁶⁵ See Carbon Majors, *supra* note 10.

⁶⁶ *Occidental Petroleum Corp: Overview*, GLOBALDATA, <https://www.globaldata.com/company-profile/occidental-petroleum-corp/>.

⁶⁷ See Carbon Majors, *supra* note 10.

⁶⁸ See *Ecopetrol and Occidental Form Strategic Partnership to Develop Acreage in Midland Basin*, PR NEWswire (Jul. 31, 2019),

<https://www.prnewswire.com/news-releases/ecopetrol-and-occidental-form-strategic-partnership-to-develop-acreage-in-midland-basin-300894469.html>.

⁶⁹ See Carbon Majors, *supra* note 10.

⁷⁰ *BHP Group Ltd: Overview*, GLOBALDATA, <https://www.globaldata.com/company-profile/bhp/>.

revolution.⁷¹ BHP also has joint ventures with Anglo American,⁷² which is responsible for 0.52% of all emissions,⁷³ and with Glencore,⁷⁴ which is responsible for 0.44% of all emissions.⁷⁵ In sum, the post-1965 emissions of BHP and its joint venture affiliates represent 1.73% of all global emissions.

Peabody: Peabody Energy Corporation (Peabody) is a multinational energy company and the world's largest coal extractor by volume whose primary business consists of the mining, sale and distribution of coal.⁷⁶ Peabody's post-1965 emissions represent 1.19% of all global greenhouse gas emissions from 1965 to 2022.⁷⁷ Peabody also has joint ventures with Coal India,⁷⁸ which is responsible for 2.07% of all emissions.⁷⁹ In sum, the post-1965 emissions of Peabody and its joint venture affiliates represent 3.26% of all global emissions.

American Petroleum Institute: API is a nonprofit corporation created in 1919 to represent the American oil and gas industry. With more than 600 members, API is the country's largest oil trade association.⁸⁰ API's purpose is to advance its members' collective business interests, which includes increasing consumer consumption of oil and gas for the financial profit of member FFCs. Among other functions, API coordinates FFCs' collective activities, gathers information of interest to the industry, and disseminates that information to its members.⁸¹ Acting on behalf of and under the supervision and control of the FFCs listed above, API has, since at least 1988, participated in and led several coalitions, front groups, and organizations that have promoted disinformation about the climate impacts of fossil fuel products to consumers.

⁷¹ See Carbon Majors, *supra* note 10.

⁷² See Clara Denina, *Glencore snaps up BHP, Anglo stakes in Colombian coal mine*, REUTERS (Jun. 28, 2021), <https://www.reuters.com/business/energy/glencore-buy-out-jv-partners-bhp-anglo-colombian-coal-mine-2021-06-28>

⁷³ See Carbon Majors, *supra* note 10.

⁷⁴ See Clara Denina, *supra* note 72.

⁷⁵ See Carbon Majors, *supra* note 10.

⁷⁶ *Peabody Energy Corp: Overview*, GLOBALDATA, <https://www.globaldata.com/company-profile/Peabody-Energy-Corp/>. Peabody has been voluntarily dismissed from civil climate accountability lawsuits in which it was initially named as a defendant because its liability was discharged in bankruptcy, but this would not apply to a criminal prosecution under the Bankruptcy Code's police powers exemption. 11 U.S.C. § 362(b)(4).

⁷⁷ See Carbon Majors, *supra* note 10.

⁷⁸ See Mineweb, *Coal India to ink joint venture with Peabody*, MINING.COM (May 18, 2011), <https://www.mining.com/coal-india-to-ink-joint-venture-with-peabody/>.

⁷⁹ See Carbon Majors, *supra* note 10.

⁸⁰ *Membership*, AMERICAN PETROLEUM INSTITUTE, <https://www.api.org/membership>.

⁸¹ *About*, AMERICAN PETROLEUM INSTITUTE, <https://www.api.org/about>.

II. Offenses

A. Reckless manslaughter (A.R.S. § 13-1103)⁸²

Reckless manslaughter is defined as “recklessly causing the death of another person,” meaning a defendant was “aware of a substantial and unjustifiable risk that his conduct w[ould] cause another’s death and consciously disregard[ed] the risk.”⁸³ To prosecute this offense, the State must prove the following elements beyond a reasonable doubt:

1. The defendant caused the victim’s death; and
2. The defendant’s conduct was reckless.

B. Second degree murder (A.R.S. § 13-1104)⁸⁴

Second degree murder is defined as recklessly causing the death of another person by creating a “grave risk of death” under circumstances “manifesting extreme indifference to human life.”⁸⁵ To prosecute this offense, the State must prove the following elements beyond a reasonable doubt:

1. The defendant caused the victim’s death; and
2. The defendant’s conduct was reckless; and
3. The defendant’s conduct created a grave risk of death; and
4. The defendant acted under circumstances manifesting extreme indifference to human life.

III. Prosecution’s Case

A. Factual scenario

In July 2023 a lethal heat wave hit the American Southwest. Phoenix, Arizona experienced a record-breaking 31 days with temperatures above 110 degrees,⁸⁶ and the National Weather Service issued excessive heat warnings every day from July 1 to July 29.⁸⁷ In Maricopa County,

⁸² Most states have an analogous reckless homicide offense with similar elements. *See, e.g.*, California Penal Code § 192(b), *Involuntary manslaughter*; M.G.L. c. 265 § 13, *Involuntary manslaughter*; ORS 163.125, *Manslaughter in the second degree*; 18 Pa.C.S.A. § 2504, *Involuntary manslaughter*; Tex. Penal Code § 19.04, *Involuntary manslaughter*.

⁸³ *State v. Nieto*, 186 Ariz. 449, 456 (App.1996).

⁸⁴ Most states have an analogous offense of reckless homicide under circumstances manifesting extreme indifference to human life. *See, e.g.*, California Penal Code § 189(b), *Second degree murder*; M.G.L. c. 265 § 1, *Second degree murder*; ORS 163.118, *Manslaughter in the first degree*; 18 Pa.C.S.A. § 2502(c), *Third degree murder*; Tex. Penal Code § 19.04, *Murder*.

⁸⁵ A.R.S. § 13-1104(3).

⁸⁶ *See Snow & Costley, supra* note 2.

⁸⁷ *See Maricopa County Department of Public Health, supra* note 3, at 8.

an average of 13 heat-related deaths occurred each day of that month, with fully 303 deaths occurring in just two weeks, from July 10 to July 25.⁸⁸ Victims included David Hom, a 73-year-old who fell while hanging his laundry outside and died at the hospital, his lower body burned and his core body temperature at 107 degrees,⁸⁹ and Nathan Perkins, a 33-year-old described as “a bright engineer who talked a lot about his family, fiancée and future of being a husband and dad,” who died from heat stroke while out on a Sunday morning hike.⁹⁰

B. Causation

Reckless manslaughter and second-degree murder share the same causation requirement—that the defendant’s acts must have caused the death of another person. The causal chain between FFCs and a climate-related death must be shown at three stages: first, an event—typically a climate related weather disaster—caused the victim’s death; second, climate change caused the event; and third, FFCs caused climate change.

1. The July 2023 heat wave caused deaths.

It should not be difficult to prove that the July 2023 heat wave caused numerous deaths in Maricopa County. Extreme heat can damage the human body in many different ways, but death from hyperthermia occurs through three processes: (1) the heart pumping faster to send more blood to the skin as a cooling mechanism, causing a heart attack; (2) fluid loss through sweating, causing kidney failure; and (3) low oxygen in the gut, causing widespread inflammation and clotting that can lead to multiple organ failure.⁹¹ The Maricopa County Office of the Medical Examiner and the Maricopa County Department of Public Health work together to identify and designate heat-related deaths based on information regarding how deaths occurred and the circumstances of each death.⁹² During the July 2023 heat wave, Maricopa County recorded 403 heat-related deaths,⁹³ and 59% of its 2023 heat-related deaths were “heat caused,” meaning that environmental heat was the direct cause of death, rather than only a contributing factor.⁹⁴

It is also worth noting that, although a victim’s predisposing susceptibility to an injury does not generally relieve a culpable actor of responsibility for whatever injuries their conduct precipitates,⁹⁵ fully half of Maricopa County’s heat wave victims had no preexisting medical

⁸⁸ *Id.*

⁸⁹ See Borenstein, Wildeman & Snow, *supra* note 6.

⁹⁰ See Snow, *supra* note 5.

⁹¹ See Maria Godoy, *How heat kills: What happens to the body in extreme temperatures*, NPR (Jul. 23, 2023), <https://www.npr.org/sections/health-shots/2023/07/23/1189506023/heres-what-happens-to-the-body-in-extreme-temperatures-and-how-heat-becomes-dead>.

⁹² See Maricopa County Department of Public Health, *supra* note 3, at 19.

⁹³ *Id.* at 8.

⁹⁴ *Id.* at 7.

⁹⁵ *Gasiorowski v. Hose*, 182 Ariz. 376, 382, 897 P.2d 678 (App.1994). It is unclear if this principle has been applied to criminal homicide cases in Arizona, but it has in many other jurisdictions. See, e.g., *People v. Brackett*, 117 Ill. 2d

history of physical or mental health conditions prior to their heat death.⁹⁶ These residents were also not new to the heat. Among Maricopa County victims for whom length of residency is known, nearly 75% had lived in Arizona for twenty years or more, meaning they were not ignorant about how to behave during a heat wave.⁹⁷ The problem—for these and other unfortunate victims—was that this was an extraordinarily lethal heat event.

2. Climate change caused the July 2023 heat wave.

Following the July 2023 heat wave, an extreme event attribution study determined that the occurrence of such heat in the American Southwest would have been “virtually impossible” but for human-caused climate change,⁹⁸ with lead author Mariam Zachariah, a climate scientist at Imperial College of London, saying, “Had there been no climate change, such an event would almost never have occurred.”⁹⁹

Extreme event attribution refers to scientific analysis quantifying how changes in the global climate system affect the frequency, magnitude, and other characteristics of extreme weather events. There are many such studies linking specific weather phenomena to human-induced climate change.¹⁰⁰ In the case of the July 2023 heat wave, the attribution is based both on the thermodynamic impact of increasing mean temperatures and the dynamic impact of climate

170, 109 Ill. Dec. 809, 510 N.E.2d 877 (1987) (evidence was sufficient to demonstrate defendants committed homicide by setting in motion a chain of events culminating in the victim’s death from the preexisting health condition of an enlarged heart, though external injuries from the defendants alone would not have caused the death); *People v. Lapan*, 289 A.D.2d 698, 734 N.Y.S.2d 648 (3d Dep’t 2001) (burglary of a frail 91-year-old victim by her home health aide, resulting in the victim’s death from a hemorrhage the next morning, constituted homicide).

⁹⁶ See Maricopa County Department of Public Health, *supra* note 3, at 4.

⁹⁷ *Id.* at 11.

⁹⁸ See Zachariah, *supra* note 1.

⁹⁹ Seth Borenstein, *Climate change leaves fingerprints on July heat waves around the globe, study says*, THE ASSOCIATED PRESS (Jul. 25, 2023),

<https://apnews.com/article/heat-wave-deadly-climate-change-europe-america-4c361736afa70766049acdb189ccfd64>.

¹⁰⁰ See, e.g., *Climate change, not El Niño, main driver of exceptional drought in highly vulnerable Amazon River Basin*, WORLD WEATHER ATTRIBUTION (Jan. 24, 2024),

<https://www.worldweatherattribution.org/climate-change-not-el-nino-main-driver-of-exceptional-drought-in-highly-vulnerable-amazon-river-basin/>; *Dangerous humid heat in southern West Africa about 4°C hotter due to climate change*, WORLD WEATHER ATTRIBUTION (Mar. 22, 2024),

<https://www.worldweatherattribution.org/dangerous-humid-heat-in-southern-west-africa-about-4c-hotter-due-to-climate-change/>; Karthik Balaguru et al., *Increased U.S. Coastal Hurricane Risk under Climate Change*, SCIENCE ADVANCES (Apr. 2023),

<https://climateattribution.org/resources/increased-u-s-coastal-hurricane-risk-under-climate-change/>; Allison Michaelis et al., *Atmospheric River Precipitation Enhanced by Climate Change: A Case Study of the Storm That Contributed to California’s Oroville Dam Crisis*, EARTH’S FUTURE (Feb. 2022),

<https://climateattribution.org/resources/atmospheric-river-precipitation-enhanced-by-climate-change-a-case-study-of-the-storm-that-contributed-to-californias-oroville-dam-crisis/>.

change in making the atmospheric circulation patterns that led to this heat event stronger or more likely.¹⁰¹

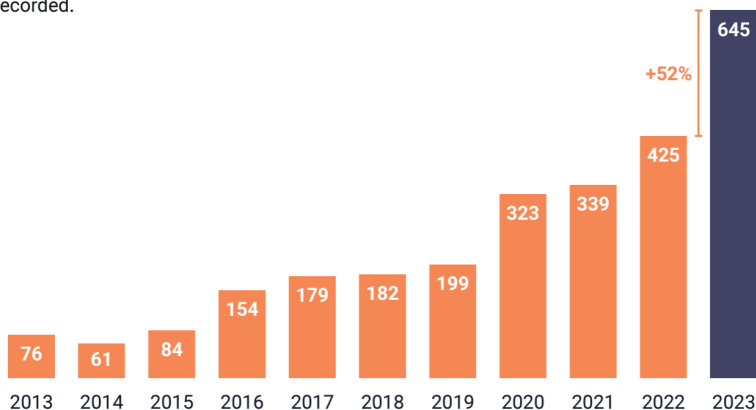
Climate change’s role in the lethality of the 2023 heat wave can also be seen in the increase in heat-related deaths in the region over time, as illustrated by this data from the Maricopa County Department of Public Health:

Heat Related Deaths Over Time

Deaths by Year

Maricopa County identified a total of 645 heat related deaths occurring in 2023.

This represents a 52 percent increase from last year and the most heat related deaths ever recorded.



3. FFCs caused climate change.

FFCs engaged in conduct that causally contributed to climate change: they produced, marketed, and sold fossil fuels that are responsible for a substantial portion of all the greenhouse gas emissions that have caused the planet to heat up. Relatedly, they deceived the public about the dangers of greenhouse gas emissions so that they could continue to produce, market, and sell fossil fuels, reinforcing—and thus being part and parcel of—the activity that caused deaths in this case.

a. Emissions causing climate change

It is possible to calculate net annual CO₂ and methane emissions attributable to specific companies by quantifying the amount and type of fossil fuel products a company extracts and places into the stream of commerce and multiplying those quantities by each fossil fuel product’s

¹⁰¹ In the context of climate modeling, “dynamic” impact concerns modifications of the convection strength resulting from climate change-induced adjustments of atmospheric stability, whereas “thermodynamic” impacts involve effects of the increased water vapor that the warmer atmosphere can hold.

carbon factor.¹⁰² Analyses using these calculations have shown that a relatively small number of major FFCs are responsible for the majority of all greenhouse gas emissions generated by humanity. Just 100 companies are responsible for 71% of all global greenhouse gas emissions generated since 1854,¹⁰³ and just 57 companies are responsible for 80% of the emissions generated since 2016 (when the Paris Agreement was signed).¹⁰⁴

Since 1965, when the fossil fuel industry was definitively put on notice that its products were causing climate change,¹⁰⁵ just five modern-day investor-owned companies—ExxonMobil, Shell, BP, Chevron, and ConocoPhillips—have generated 12.58% of all the global CO₂ emissions that humanity has produced since the start of the industrial revolution.¹⁰⁶ Several other members of the GCC—Occidental, BHP, and Peabody¹⁰⁷—have collectively contributed 2.79% of all global emissions.¹⁰⁸ Together, these eight companies are directly responsible for 15.37% of all global emissions. Each of these FFCs have also engaged in many joint ventures with additional carbon majors, which, if counted, would bring their total contribution to global greenhouse gas emissions to 44.17%.¹⁰⁹

b. Deception about deadliness of emissions

FFCs deceived the public about the deadliness of greenhouse gas emissions through a long-running campaign of climate disinformation designed to block or delay the development of clean energy competitors so that FFCs could continue to produce, market, and sell fossil fuels. This campaign included (1) funding and distributing climate disinformation; (2) “greenwashing” efforts to dupe consumers into believing that FFCs are committed to addressing climate change and investing in low carbon energy, when in fact they are marketing and selling fossil fuels at record levels; and (3) deceiving the public on the climate benefits of natural gas.

i. Funding and distributing climate disinformation

¹⁰² See Richard Heede, *Tracing Anthropogenic Carbon Dioxide and Methane Emissions to Fossil Fuel and Cement Producers, 1854–2010*, 122 *CLIMATIC CHANGE* 229-241 (2014), <https://link.springer.com/content/pdf/10.1007/s10584-013-0986-y.pdf>.

¹⁰³ Tess Riley, *Just 100 companies responsible for 71% of global emissions, study says*, *THE GUARDIAN* (Jul. 10, 2017), <https://www.theguardian.com/sustainable-business/2017/jul/10/100-fossil-fuel-companies-investors-responsible-71-global-emissions-cdp-study-climate-change>.

¹⁰⁴ Jonathan Watts, *Just 57 companies linked to 80% of greenhouse gas emissions since 2016*, *THE GUARDIAN* (Apr. 3, 2024), <https://www.theguardian.com/environment/2024/apr/04/just-57-companies-linked-to-80-of-greenhouse-gas-emissions-since-2016>.

¹⁰⁵ See Ikard, *supra* note 15.

¹⁰⁶ See Carbon Majors, *supra* note 10.

¹⁰⁷ See Global Climate Coalition, *supra* note 17.

¹⁰⁸ See Carbon Majors, *supra* note 10.

¹⁰⁹ *Id.*

As an initial matter, FFCs spread overt climate disinformation throughout the 1990s and 2000s. One early example of their knowledge of the harm caused by fossil fuels and their intention to deceive others regarding that harm is a 1988 internal memorandum entitled “The Greenhouse Effect.” The memorandum, from Joseph Carlson, an Exxon Public Affairs Manager, articulated the company’s corporate strategy regarding fossil fuels’ role in causing climate change.¹¹⁰ The memorandum stated that Exxon is “providing leadership through API in developing the petroleum industry position” on climate change.¹¹¹ It began by setting out the scientific consensus found by the company’s previous research, stating that “[t]he Greenhouse effect may be one of the most significant environmental issues for the 1990s” and acknowledging that “[t]he principal Greenhouse gases are by-products of fossil fuel combustion.”¹¹² It then highlighted climate models that “predict a 1.50°C to 4.50°C global temperature increase—depending on the projected growth of fossil fuels.”¹¹³ Despite reiterating this scientific consensus, the memorandum concluded by announcing Exxon’s “Position” on climate change: “Emphasize the uncertainty in scientific conclusions regarding the potential enhanced greenhouse effect” and “[r]esist the overstatement and sensationalization of potential greenhouse effect which could lead to noneconomic development of nonfossil fuel resources.”¹¹⁴

Exxon and other FFCs executed this strategy in two ways. First, they used front groups to spread climate disinformation, including:

- API;¹¹⁵

¹¹⁰ Joseph M. Carlson, *The Greenhouse Effect*, EXXONMOBIL (Aug. 3, 1988), <http://www.climatefiles.com/exxonmobil/566>.

¹¹¹ *Id.* at 6.

¹¹² *Id.* at 1.

¹¹³ *Id.* at 2.

¹¹⁴ *Id.* at 8.

¹¹⁵ In 1998 members of API developed a memorandum titled the “Global Climate Science Communication Team Action Plan” (“Action Plan”). See Email from Joe Walker to Global Climate Science Team, GLOBAL CLIMATE SCIENCE COMMUNICATIONS ACTION PLAN (Apr. 3, 1998), <https://insideclimatenews.org/wp-content/uploads/2015/12/Global-Climate-Science-Communications-Plan-1998.pdf>. The Action Plan issued a stark warning to API’s members: “Unless ‘climate change’ becomes a non-issue, [. . .] there may be no moment when we can declare victory for our efforts.” *Id.* at 2. It then detailed a scheme on how its FFC members would win “Victory” by achieving goals such as: “Average citizens ‘understand’ (recognize) uncertainties in climate science; recognition of uncertainties becomes part of the ‘conventional wisdom’”; “[m]edia ‘understands’ (recognizes) uncertainties in climate science”; “[m]edia coverage reflects balance on climate science and recognition of the validity of viewpoints that challenge the current ‘conventional wisdom’”; and “[t]hose promoting the Kyoto treaty on the basis of extant science appear to be out of touch with reality.” *Id.* The Action Plan then laid out a series of “Strategies and Tactics” to accomplish these objectives, like a \$5 million “Global Climate Science Data Center” that would “rais[e] questions about and undercut[] the ‘prevailing scientific wisdom’” that combustion of fossil fuels causes climate change, and a \$2 million fund to disburse to organizations that cast doubt on climate science, including the American Legislative Exchange Council and the Competitive Enterprise Institute. *Id.* at 6–7.

In another memo distributed to its members, API stressed: “Climate is at the center of the industry’s business interests. Policies limiting carbon emissions reduce petroleum product use. That is why it is API’s highest priority issue and defined as ‘strategic.’” *Allegations of Political Interference with Government Climate Change*

- the Information Council for the Environment (“ICE”);¹¹⁶ and
- the Global Climate Coalition (“GCC”).¹¹⁷

Second, FFCs spread disinformation directly, beginning at least as early as 1989. From 1989 to 2004, Mobil (Exxon) ran a series of advertorials (paid advertisements styled as editorials) in *The New York Times* to present its position on climate. For example, in 1997 alone Mobil paid for advertorials claiming:

- “[w]e still don’t know what role man-made greenhouse gases might play in warming the planet”;¹¹⁸
- “[w]e don’t know enough about the factors that affect global warming and the degree to which—if any—that man-made emissions (namely, carbon dioxide) contribute to increases in Earth’s temperature”;¹¹⁹

Science, Hearing Before the Comm. on Oversight and Government Reform, 110th Cong. 324 (Mar. 19, 2007), <https://www.govinfo.gov/content/pkg/CHRG-110hhrg37415/html/CHRG-110hhrg37415.htm>.

¹¹⁶ A group of coal companies, including Chevron-owned Midway Coal Mining, formed ICE in 1991. That year, a report laid out ICE’s “Strategies,” the very first of which was to “Reposition global warming as theory (not fact).” ICE conducted polling that found that 80% of respondents thought that the problem of climate change was “somewhat serious” and 45% thought it was “very serious.” ICE sought to dismantle this consensus through a campaign that included full-page newspaper advertisements, radio commercials, a public relations tour, and mailers. It targeted its advertisements at “older, less educated males,” among others, on the theory that members of this group are “not typically active information-seekers.” *Climate Deception Dossier #5: Coal’s ‘Information Council on the Environment’ Sham*, UNION OF CONCERNED SCIENTISTS, https://www.ucsusa.org/sites/default/files/attach/2015/07/Climate-Deception-Dossier-5_ICE.pdf.

One print advertisement prepared for the ICE campaign showed a sailing ship about to drop off the edge of a flat world into the jaws of a waiting dragon, with the headline, “Some say the earth is warming. Some also said the earth was flat.” Another ad was targeted at Minneapolis readers and asked, “If the earth is getting warmer, why is Minneapolis getting colder?” Kathy Mulvey & Seth Shulman, *The Climate Deception Dossier Internal Fossil Fuel Industry Memos Reveal Decades of Corporate Disinformation*, UNION OF CONCERNED SCIENTISTS (July 2015), <https://www.ucsusa.org/sites/default/files/attach/2015/07/The-Climate-Deception-Dossiers.pdf>.

¹¹⁷ On December 22, 1992, GCC Executive Director John Schlaes wrote an Opinion Letter in *The New York Times* titled, “What Global Warming?” Directly contradicting GCC members’ scientific findings, Schlaes claimed: “There is considerable debate on whether or not man-made greenhouse gases (produced primarily by burning fossil fuels) are triggering a dangerous ‘global warming’ trend. [. . .] We know that climate change over the last 100 years is well within the planet’s natural variation (the global climate has never been ‘stable’).” John Schlaes, *What Global Warming?*, NEW YORK TIMES (Dec. 22, 1992), <https://www.nytimes.com/1992/12/22/opinion/l-what-global-warming-250692.html>.

In 1994, the GCC produced a report entitled “Issues & Options: Potential Global Climate Change,” which asserted that “observations have not yet confirmed evidence of global warming that can be attributed to human activities.” *Issues and Options: Potential Global Climate Change*, GLOBAL CLIMATE COALITION, 4 (1994), <https://www.documentcloud.org/documents/5628164-Potential-Global-Climate-Change-Issues-and-Options>.

In 1995, the GCC published “Climate Change: Your Passport to the Facts,” a pamphlet which falsely claimed that “there remains no scientific evidence that such a dangerous warming will actually occur.” *Climate Change: Your Passport to the Facts*, GLOBAL CLIMATE COALITION, 2 (1995), <https://www.documentcloud.org/documents/5628109-Climate-Change-Your-Passport-to-the-Facts>.

¹¹⁸ Geoffrey Supran & Naomi Oreskes, *What Exxon Mobil didn’t say about climate change*, THE NEW YORK TIMES (Aug. 22, 2017), <https://www.nytimes.com/2017/08/22/opinion/exxon-climate-change-.html>.

¹¹⁹ Mobil, *Climate Change: A Prudent Approach*, THE NEW YORK TIMES (Nov. 13, 1997), <https://www.documentcloud.org/documents/705548-mob-nyt-1997-11-13-climateprudentapproach.html>.

- “climatologists are still uncertain how—or even if—the buildup of man-made greenhouse gases is linked to global warming”;¹²⁰ and
- “there is a high degree of uncertainty over the timing and magnitude of potential impacts that man-made emissions of greenhouse gas emissions have on climate.”¹²¹

Two Harvard University scholars found that 81% of Exxon’s and Mobil’s advertorials from 1989 through 2004 expressed doubt that climate change is real and caused by human activities.¹²² By comparison, they found that 80% of the companies’ internal documents recognized the link between climate change and human activities. Based on “this discrepancy,” they concluded that “ExxonMobil misled the public.”¹²³

Martin Hoffert, a New York University physicist who served as a consultant to Exxon in the 1980s, expressed regret over Exxon’s “climate science denial program campaign” in sworn testimony before Congress in 2019. As he put it:

The advertisements that Exxon ran in major newspapers raising doubt about climate change were contradicted by the scientific work we had done and continue to do. Exxon was publicly promoting views that its own scientists knew were wrong, and we knew that because we were the major group working on this.¹²⁴

These tactics continued into the 2000s. For example, in 2006, ExxonMobil published “Tomorrow’s Energy: A Perspective on Energy Trends, Greenhouse Gas Emissions and Future Energy Options,” a report that cast doubt on the link between greenhouse gas emissions and climate change, claiming:

[A] causal linkage between the buildup of greenhouse gases in the atmosphere and the observed climate changes during the 20th century cannot be unequivocally established.¹²⁵

¹²⁰ Benjamin Franta, *Weaponizing economics: Big Oil, economic consultants, and climate policy delay*, ENVIRONMENTAL POLITICS, 33, 555-575 (Aug. 25, 2021), <https://www.tandfonline.com/doi/full/10.1080/09644016.2021.1947636>.

¹²¹ Mobil, *Climate Change: A Degree of Uncertainty*, THE NEW YORK TIMES (Dec. 4, 1997), <https://www.documentcloud.org/documents/705551-mob-nyt-1997-dec-4-uncertainty>.

¹²² Geoffrey Supran & Naomi Oreskes, *Assessing ExxonMobil’s climate change communications (1977–2014)*, ENVIRONMENTAL RESEARCH LETTERS, 12 (2017), <https://iopscience.iop.org/article/10.1088/1748-9326/aa815f>.

¹²³ *Id.*

¹²⁴ *Examining the Oil Industry’s Efforts to Suppress the Truth About Climate Change*, Hearing Before the Subcomm. on Civil Rights and Civil Liberties of the Comm. on Oversight and Reform, 116th Cong. 7–8 (Oct. 23, 2019) (statement of Martin Hoffert, Former Exxon Consultant, Professor Emeritus, Physics, New York University), <https://www.govinfo.gov/content/pkg/CHRG-116hhrg38304/html/CHRG-116hhrg38304.htm>.

¹²⁵ ExxonMobil, *Tomorrow’s Energy: A Perspective on Energy Trends, Greenhouse Gas Emissions and Future Energy Options* (2006).

More recently FFCs have publicly acknowledged the scientific reality of climate change. ExxonMobil recognized its own previous funding of climate denial groups in its 2007 Corporate Citizenship Report, in which ExxonMobil declared:

In 2008, we will discontinue contributions to several public policy research groups whose position on climate change could divert attention from the important discussion on how the world will secure the energy required for economic growth in an environmentally responsible manner.¹²⁶

Despite this pronouncement, ExxonMobil remained financially associated with several such groups after the report's publication, and contributed over \$13 million to think tanks and advocacy organizations denying climate science in the decade after the pledge, including over \$1.5 million in 2017.¹²⁷

From 1998 to 2014, ExxonMobil gave over \$31 million to think tanks and organizations that published research and ran campaigns denying climate science, such as the Competitive Enterprise Institute, the Heartland Institute, Frontiers for Freedom, Committee for a Constructive Tomorrow, and the Heritage Foundation.¹²⁸

The full extent of FFCs' funding of climate denial groups is difficult to quantify. Two of the most prominent funders of climate denial in the last two decades are DonorsTrust and Donors Capital Fund. Because they are classified as "donor advised funds," they are not required to disclose the source of their funding, meaning many of their funding sources are not known to the public. After ExxonMobil's 2007 announcement that it would stop funding climate denial groups (though, as noted above, it continued to fund climate denial around \$1 million per year), contributions to climate denial groups by DonorsTrust and Donors Capital Fund shot upward. Between 2002 and 2011, DonorsTrust and Donors Capital Fund provided \$146 million to climate denial groups.¹²⁹

In addition to funding research institutions denying climate science, FFCs also funded individual scientists to promote climate misinformation. For example, from 2001 to 2012, ExxonMobil, API, and other industry groups gave \$1.2 million to Harvard-Smithsonian astrophysicist Dr.

¹²⁶ ExxonMobil, *2007 Corporate Citizenship Report* 41 (Dec. 31, 2007),

<http://www.documentcloud.org/documents/2799777-ExxonMobil-2007-Corporate-CitizenshipReport.html>.

¹²⁷ *ExxonMobil Foundation & Corporate Giving to Climate Change Denier & Obstructionist Organizations*, UNION OF CONCERNED SCIENTISTS (2017),

<https://www.ucsusa.org/sites/default/files/attach/2019/ExxonMobil-Worldwide-Giving-1998-2017.pdf>.

¹²⁸ *ExxonMobil Climate Denial Funding 1998–2014*, UNION OF CONCERNED SCIENTISTS,

<https://www.ucsusa.org/sites/default/files/attach/2015/07/ExxonMobil-Climate-Denial-Funding-1998-2014.pdf>.

¹²⁹ Aliya Haq, *REVEALED: Donors Trust is the Secret ATM Machine for Climate Denier*, GREENPEACE (Feb. 15, 2013), <https://www.greenpeace.org/usa/revealed-donors-trust-is-the-secret-atm-machine-for-climate-deniers/>.

Wei-Hock Soon to publish research contending that solar variability is a primary driver of climate change,¹³⁰ a widely discredited theory.¹³¹

FFCs also have continued, even in recent years, to make public and misleading statements about the realities of climate change. For example, as recently as 2020, ConocoPhillips' stated "Climate Change Position" on its website continued to emphasize the "uncertainties" of climate change. While the company acknowledged that human-caused greenhouse gas emissions "can lead to adverse changes in global climate," it also stated that "uncertainties remain."¹³²

ii. "Greenwashing" campaigns

FFCs continue to mislead the public about their conduct and the impact of fossil fuel products on climate change through "greenwashing" advertising campaigns and public statements that falsely and misleadingly portray fossil fuel products as "green" and FFCs as climate-friendly energy companies that are deeply engaged in finding solutions to climate change. In reality, FFCs continue to primarily invest in, develop, promote, and profit from fossil fuel products and heavily market those products to consumers.

For example, in recent years ExxonMobil ran a series of advertorials and advertisements in *The New York Times*, *The Economist*, and on television touting the company's investment in alternative energy biofuels from algae and plant waste. One advertorial in the *Times* falsely promised "A Greener Energy Future. Literally."¹³³ Another television advertisement touted algae's "potential to change our energy future."¹³⁴ This campaign was a sham on multiple levels. First, the biofuels it promoted were a miniscule portion of Exxon's energy portfolio. The company had set a goal of producing 10,000 barrels of biofuels per day by 2025, which, if met, would have amounted to just 0.2% of its total refinery capacity.¹³⁵ But even this never happened, as ExxonMobil ended its investments in algae biofuels in 2023 after having spent nearly \$175

¹³⁰ See Mulvey & Shulman, *supra* note 116.

¹³¹ Zeke Hausfather, *Explain: Why the sun is not responsible for recent climate change*, CARBON BRIEF (Aug. 18, 2017), <https://www.carbonbrief.org/why-the-sun-is-not-responsible-for-recent-climate-change/>.

¹³² *Climate Change Position*, CONOCOPHILLIPS (2020),

<https://web.archive.org/web/20200418203515/https://www.conocophillips.com/sustainability/integrating-sustainability/sustainable-development-governance/policies-positions/climate-change-position/>.

¹³³ ExxonMobil, *The Future of Energy? It May Come from Where You Least Expect It*, NEW YORK TIMES, <https://www.nytimes.com/paidpost/exxonmobil/the-future-of-energy-it-may-come-from-where-you-least-expect.html>.

¹³⁴ T Brand Studio, *Algae May Be Small – But Its Impact Could be Big | Presented by ExxonMobil*, YOUTUBE (Sep. 25, 2018), <https://www.youtube.com/watch?v=pWcfx1LFSWk>.

¹³⁵ InfluenceMap, *Big Oil's Real Agenda on Climate Change*, INFLUENCEMAP, 13 (March 2019), <https://influencemap.org/report/How-Big-Oil-Continues-to-Oppose-the-Paris-Agreement-38212275958aa21196dae3b76220bdc>.

million to advertise its algae program,¹³⁶ while only spending \$350 million on the research and development of algae technology.¹³⁷ Put differently, Exxon spent nearly half as much on advertising algae as a climate solution as it did on actually researching it. ExxonMobil knew that this technology was unproven, did not yet exist, and wouldn't exist for a long time, if ever.¹³⁸ Despite this, the company prominently publicized its comparatively small investment in algae biofuel to suggest that a nonexistent solution was at hand and boost its reputation as a company working towards climate solutions.

In 2019 BP launched an advertising campaign misleadingly claiming the company was prioritizing clean energy like solar and wind power by investing in “more energy” with “less footprint.”¹³⁹ Yet between 2010 and 2018, just 2.3% of BP's total capital expenditures were invested in low carbon energy sources.¹⁴⁰ While investing negligible sums of money in the clean energy promoted by its advertising, a 2019 estimate placed BP's annual spending on “climate branding”—efforts to draw attention to low carbon sources, position the company as a climate expert, and acknowledge concern about climate change while ignoring the central role of the company's fossil fuels in causing it—at \$30 million.¹⁴¹

In the late 2010s, Shell launched a similar “Make the Future” campaign designed to hold itself out as an environmentally conscious energy company and change perceptions about Shell among “Energy Engaged Millennials.”¹⁴² A paid video advertisement in *The New York Times* titled “Reimagining the Future of Transportation” suggested that Shell is committed to a cleaner energy future by, among other things, running trucks on hydrogen fuel cells and airplanes on biofuels.¹⁴³ Shell produced a similar advertorial in the *Times* positing “A Path to Net-Zero Emissions by 2070” by “changing how tomorrow's transport is fueled.”¹⁴⁴ Yet between 2010 and

¹³⁶ Adam Lowenstein, *Congressional Investigation Reveals New Evidence of Big Oil's Decades-Long Campaign to Deny Climate Science*, DESMOG (May 1, 2024), <https://www.desmog.com/2024/05/01/congressional-investigation-sheldon-whitehouse-fossil-fuel-industry-report-carbon-emissions-contribute-to-climate-change-senate-budget-committee-jamie-raskin/>.

¹³⁷ Amy Westervelt, *Big oil firms touted algae as climate solution. Now all have pulled funding*, THE GUARDIAN (Mar. 17, 2023) <https://www.theguardian.com/environment/2023/mar/17/big-oil-algae-biofuel-funding-cut-exxonmobil>.

¹³⁸ Nick Cunningham, *Internal Documents Show Big Oil PR Messages Still 'Mislead' Public on Climate*, DESMOG (Sep. 16, 2022), <https://www.desmog.com/2022/09/16/shell-exxon-oil-pr-mismatch-carbon-capture-algae/>.

¹³⁹ *Possibilities Everywhere, More Energy with Less Footprint*, BP AMERICA (Mar. 6, 2019) <https://www.facebook.com/watch/?v=804651883212210>.

¹⁴⁰ *Low-carbon investment of the leading oil companies worldwide between 2010 and 2018 (as a share of total capital expenditure)*, STATISTA (Dec. 20, 2023), <https://www.statista.com/statistics/1085091/low-carbon-investment-oil-companies-worldwide/>.

¹⁴¹ See InfluenceMap at 12, *supra* note 135.

¹⁴² *Shell: Make the Future*, MEDIA.COM (Dec. 16, 2016), <https://www.mediacom.com/uk/article/index?id=make-the-future>.

¹⁴³ Shell, *Video: Reimagining the Future of Transportation*, NEW YORK TIMES, <https://www.nytimes.com/paidpost/shell/reimagining-the-future-of-transportation.html#100000006395029>.

¹⁴⁴ Shell, *Moving Forward: A Path to Net-Zero Emissions by 2070*, NEW YORK TIMES, <https://www.nytimes.com/paidpost/shell/ul/moving-forward-a-path-to-net-zero-emissions-by-2070.html>.

2018, Shell dedicated just 1% of its capital spending to low carbon energy sources.¹⁴⁵ In 2021, Shell told investors that \$2.4 billion out of its total \$19.7 billion capital expenditure (about 12%) was dedicated to “renewables and energy solutions.”¹⁴⁶ In reality, most of the company’s purportedly renewable investments were actually in fossil gas projects—projects that lock in decades of future carbon and methane emissions and are certainly not renewable, or true “energy solutions.”¹⁴⁷ When the company’s investments in wind and solar were tallied, Shell was investing only 1.5% of its 2021 expenditures in renewable energy.¹⁴⁸ Shell planned to spend four times more money on new oil and gas development than on renewable technology in 2022.¹⁴⁹ Independent analysis of Shell’s spending plans shows that the company will be emitting more greenhouse gases by 2030 than it currently emits.¹⁵⁰ While Shell’s commitment to low carbon energy remains minimal, its investment in greenwashing campaigns has been significant. A 2019 estimate placed its annual spending on climate branding at \$55 million.¹⁵¹

In 2010, Chevron launched an advertising campaign with the slogan “We Agree,” highlighting the company’s commitment to sustainable energy investments and environmental stewardship. The advertisements announced Chevron’s agreement with statements like “It’s time oil companies get behind the development of renewable energy” and “Protecting the Planet is Everyone’s job.”¹⁵² Yet from 2010 to 2018, the eight years after the launch of the “We Agree” campaign, it expended just 0.29% of its total capital on low carbon energy.¹⁵³ In 2022, after acquiring Renewable Energy Group (REG), Chevron called itself a “leading US renewable fuel company” and said the company would grow production capacity of renewable fuels.¹⁵⁴ But in a 2023 interview with the *Houston Chronicle* editorial board, Chevron CEO Mike Wirth admitted that Chevron was not a leader in renewables like wind and solar, in part because of undesirable profit margins:

¹⁴⁵ Anjali Raval & Leslie Hook, *Oil and gas advertising spree signals industry’s dilemma*, FINANCIAL TIMES (Mar. 6, 2019), <https://www.ft.com/content/5ab7edb2-3366-11e9-bd3a-8b2a211d90d5>.

¹⁴⁶ *Shell Faces Groundbreaking Complaint for Misleading US Authorities and Investors on Its Energy Transition Efforts*, GLOBAL WITNESS (Feb. 1, 2023), <https://www.globalwitness.org/en/campaigns/fossil-gas/shell-faces-groundbreaking-complaint-misleading-us-authorities-and-investors-its-energy-transition-efforts/>; see, e.g., Hiroko Tabuchi, *Leaks Can Make Natural Gas as Bad for the Climate as Coal, a Study Says*, NEW YORK TIMES (Jul. 13, 2023), <https://www.nytimes.com/2023/07/13/climate/natural-gasleaks-coal-climate-change.html>.

¹⁴⁷ *Id.*

¹⁴⁸ *Id.*

¹⁴⁹ Simon Jack, *Oil Giant Shell Says It Needs Oil to Pay for Green Shift*, BBC NEWS (Nov. 3, 2021), <https://www.bbc.com/news/business-59154930>.

¹⁵⁰ *Id.*

¹⁵¹ See InfluenceMap, *supra* note 135.

¹⁵² Elizabeth Douglass, *Exxon’s Gamble: 25 Years of Rejecting Shareholder Concerns on Climate Change*, INSIDE CLIMATE NEWS (Nov. 16, 2015), <https://insideclimateneeds.org/news/16112015/exxons-gamble-25-years-rejecting-shareholder-concerns-climate-change/>.

¹⁵³ See Statista, *supra* note 140.

¹⁵⁴ *Chevron Is a Top US Renewable Fuel Company*, CHEVRON (Jun. 13, 2022), <https://www.chevron.com/newsroom/2022/q2/with-reg-acquisition-chevron-becomes-leading-us-renewable-fuel-company>.

[W]e don't have particular expertise in wind and solar and a lot of the intellectual property in the turbines or in the panels. Our business generates typically double-digit kinds of returns on invested capital; wind and solar tend to be single-digit returns. And so in a competitive business world, you also have to look at that.¹⁵⁵

Chevron plans to increase its total oil production by 11% from 2019 to 2030, according to an analysis of data from energy consultant Rystad Energy.¹⁵⁶

API also engages in greenwashing on behalf of itself and its members. API's 2021 Climate Action Framework portrays the organization as a partner in moving towards a climate solution, stating:

Our industry is essential to supplying energy that makes life modern, healthier and better while doing so in ways that tackle the climate challenge: lowering emissions, increasing efficiency, advancing technological innovation, building modern infrastructure and more.¹⁵⁷

But the primary climate "solution" API advocates for is shifting to heavier reliance on natural gas as a "clean fuel"—indeed, an internal API email shows that its Climate Action Framework was in fact organized around the purpose of "continued promotion of natural gas in a carbon constrained economy."¹⁵⁸

In contrast to the message conveyed by their greenwashing efforts, FFCs are actually ramping up fossil fuel production. ExxonMobil is projected to increase oil production by more than 35% by 2030—a sharper rise than over the previous 12 years.¹⁵⁹ BP is projected to increase production of oil and gas by 20% by 2030.¹⁶⁰ Shell is forecast to increase output by 38% by 2030.¹⁶¹ Chevron set an oil production record in 2018 of 2.93 million barrels per day,¹⁶² and a 2019 investor report

¹⁵⁵ *Chevron's Future Isn't Wind and Solar. CEO Explains Why*, HOUSTON CHRONICLE (Mar. 9, 2023), <https://www.houstonchronicle.com/opinion/editorials/article/chevron-ceo-wirth-wind-solar-ceraweek-17827049.php>.

¹⁵⁶ *Big Oil Reality Check*, OIL CHANGE INTERNATIONAL (Sept. 2020), <http://priceofoil.org/content/uploads/2020/09/OCI-Big-Oil-Reality-Check-vF.pdf>.

¹⁵⁷ *Climate Action Framework*, AMERICAN PETROLEUM INSTITUTE, <https://www.api.org/climate>.

¹⁵⁸ Email from Jeffrey Stein, AMERICAN PETROLEUM INSTITUTE (Mar. 25, 2021), <https://www.documentcloud.org/documents/23573083-api-hcor-climate-action-framework>.

¹⁵⁹ Jonathan Watts, Jillian Ambrose & Adam Vaughan, *Oil Firms To Pour Extra 7m Barrels Per Day Into Markets, Data Shows*, THE GUARDIAN (Oct. 10, 2019), <https://www.theguardian.com/environment/2019/oct/10/oil-firms-barrels-markets>.

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² Kevin Crowley & Eric Roston, *Chevron Aligns Strategy with Paris Deal But Won't Cap Output*, BLOOMBERG (Feb. 7, 2019), <https://www.bloomberg.com/news/articles/2019-0207/chevron-pledges-alignment-with-paris-accord-but-won-t-cap-output>.

touted Chevron’s “significant reserve additions” as well as significant capital projects involving construction of refineries worldwide.¹⁶³

iii. Natural gas disinformation

Burning natural gas emits less carbon than burning coal.¹⁶⁴ But the largest component of natural gas, a fossil fuel energy source, is methane,¹⁶⁵ and methane leaks are rife in natural gas production and distribution.¹⁶⁶ Methane, in turn, is a “powerful greenhouse gas, about 84 times more potent than carbon dioxide measured over a 20-year period.”¹⁶⁷ Recent studies have shown that global methane emissions are significantly higher than estimated previously¹⁶⁸—and that, due to methane leaks, the climate harm from natural gas may rival that of coal.¹⁶⁹

Company and trade association documents demonstrate that the fossil fuel industry knew that natural gas was no better for the climate than other fossil fuels. Yet FFCs promote natural gas as “clean” without acknowledging the environmental harm of methane. For example, API developed a 2016 draft print ad showing people engaging in outdoor activities like skydiving, soaring on a playground swing, and playing basketball that states: “Natural gas doesn’t just cook dinner. Thanks to natural gas the air up here is cleaner than it’s been in 25 years.”¹⁷⁰

A March 2018 draft presentation marked “Confidential” identifies the “challenge” facing BP, noting extensive press pieces reporting that natural gas is a fossil fuel that contributes to climate change, including 15 articles from late 2016 to late 2017 that describe the risks of methane emissions associated with natural gas.¹⁷¹ The slides are titled “Gas doesn’t support climate goals when you take methane emissions into account.”¹⁷² The presentation describes a forthcoming BP communications campaign to “advance and protect the role of gas—and BP—in the energy transition.”¹⁷³ One key pillar of the campaign strategy was to “‘Harness excitement’ around renewables by positioning gas as the perfect partner,” even though methane and carbon dioxide emissions from producing, transporting, and burning natural gas present significant risks.¹⁷⁴ The

¹⁶³ *Chevron 2019 Investor Presentation*, CHEVRON (Feb. 2019), <https://chevroncorp.gcsweb.com/static-files/c3815b42-4deb-4604-8c51-bde9026f6e45>.

¹⁶⁴ See Tabuchi, *supra* note 146.

¹⁶⁵ *Natural Gas Explained*, U.S. ENERGY INFORMATION ADMINISTRATION, <http://www.eia.gov/energyexplained/natural-gas>.

¹⁶⁶ See Tabuchi, *supra* note 146.

¹⁶⁷ *Is Natural Gas Really the Bridge Fuel the World Needs?*, UNITED NATIONS ENVIRONMENT PROGRAMME (Jan. 12, 2023), <http://www.unep.org/news-and-stories/story/natural-gas-really-bridge-fuel-world-needs>.

¹⁶⁸ *International Methane Emissions Observatory (IMEO)*, UNITED NATIONS ENVIRONMENT PROGRAMME, www.unep.org/topics/energy/methane/international-methane-emissions-observatory-imeo.

¹⁶⁹ See Tabuchi, *supra* note 146.

¹⁷⁰ See Joint Staff Report of House Committee on Oversight and Accountability and Senate Budget Committee at 22, *supra* note 14.

¹⁷¹ *Id.*

¹⁷² *Id.*

¹⁷³ *Id.* at 23.

¹⁷⁴ *Id.*

document recommends funding white papers by research institutions like Princeton University and Imperial College “highlighting [the] role of gas as a friend to renewables;” hosting global stakeholder events with influential leaders; and highlighting “hero projects” to demonstrate the benefits of gas and offer anecdotal evidence of methane management.¹⁷⁵ BP estimated spending \$1.1 million in the first year of the campaign alone.¹⁷⁶

A 2017 BP email asserted that “promoting and protecting the role of gas as an increasing part of our energy mix is a paramount priority. We need to be ready to speak to this wherever there is a credible effort to dis-incentivize gas.”¹⁷⁷ BP asserted that natural gas:

play[s] a key role in meeting the dual challenge of providing more energy with fewer emissions. It is cleaner than other fossil fuels when burnt in power generation or used in industrial processes and offers numerous health, climate and economic benefits.¹⁷⁸

The industry publicly promoted natural gas while acknowledging internally that the risks of methane were problematic. Comments on a draft outline for a 2017 speech by BP’s then-CEO Robert Dudley acknowledged explicitly that internal modeling suggested that widespread carbon capture technologies would be necessary to even come close to aligning natural gas emissions with the Paris Agreement goals:

You don’t say anything about concerns about [. . .] the idea that, once built, gas locks in future emissions above a level consistent with 2 degrees, at least without CCUS. All the models with a continuing role for gas see wide CCUS deployment.¹⁷⁹

In December 2019, a lobbyist sent BP’s then-Vice President and Head of U.S. Policy and Regulatory Affairs an article highlighting that methane emissions from natural gas offset the climate benefits, adding “This is an issue that will not go away.”¹⁸⁰ The BP executive forwarded the article to colleagues, noting: “Curious whether any [of] you are familiar with or have insight into this study. It is quite concerning to us as another blow against natural gas, and in this case associated with MIT.”¹⁸¹

FFCs also used academic institutions to lend credibility to their natural gas claims. For example, Shell’s Global Methane Communications Plan describes an academic-industry partnership at the Imperial College London as providing “thought leadership and research into technology that

¹⁷⁵ *Id.*

¹⁷⁶ *Id.*

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ *Id.*

¹⁸⁰ *Id.*

¹⁸¹ *Id.* at 24.

could underpin role for gas.”¹⁸² A 2017 email notes that the program is “focused on supporting fundamental research and develop [sic] innovative technology solutions to support the ongoing energy transition,” including on “new end-uses for natural gas.”¹⁸³ In the same email, an official described Shell’s plan to “‘embed’ Shell scientists” at the University of California, Berkeley, where Shell funded the Energy Biosciences Institute to the tune of \$25 million over five years.¹⁸⁴

In short, the FFCs engaged in a long-term marketing program specifically aimed at buying them more time and freedom to push a business model they knew would result in the emission of more greenhouse gasses into the atmosphere. And the lucrative buildup of those emissions, which would have been considerably harder to accomplish without these deceptive marketing campaigns, caused the 2023 heat wave that killed multiple people in Arizona.

C. Culpable mental state

Reckless manslaughter requires proof that the defendants acted recklessly, meaning they were aware of and consciously disregarded a substantial and unjustifiable risk that their conduct would cause another person’s death.¹⁸⁵ Second degree murder is defined by an even more culpable mental state, requiring proof that the defendant recklessly created a “grave risk of death” under circumstances “manifesting extreme indifference to human life.”¹⁸⁶

As detailed below, voluminous evidence exists showing that FFCs knew their conduct—both in continuing to produce, market, and sell fossil fuels, and in promoting climate disinformation to delay the transition away from fossil fuels—would contribute to, in their own words, “globally catastrophic”¹⁸⁷ climate harms that “would cause flooding on much of the U.S. East Coast,”¹⁸⁸ “submerge New York,”¹⁸⁹ do “great irreversible harm to our planet,”¹⁹⁰ and “have serious consequences for man’s comfort and survival.”¹⁹¹ In fact, FFCs were so confident in their climate

¹⁸² *Id.* at 46.

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *State v. Nieto*, 186 Ariz. 449, 456 (App.1996).

¹⁸⁶ A.R.S. § 13-1104(3).

¹⁸⁷ Jimmie Nelson, *The CO2 Problem; Addressing Research Agenda Development*, American Petroleum Institute, CLIMATE INVESTIGATIONS CENTER, 13 (Mar. 18, 1980), <https://www.industrydocuments.ucsf.edu/docs/gffl0228>.

¹⁸⁸ Letter from Roger Cohen to A.M. Natkin (Sept. 2, 1982),

<https://insideclimatenews.org/wp-content/uploads/2021/02/Consensus-on-CO2-Impacts-1982.pdf>.

¹⁸⁹ Edward Teller et. al., *Energy Patterns of the Future*, Energy and Man: A Symposium, 53, 58 (New York, Appleton-Century-Crofts, Nov. 1959).

¹⁹⁰ Memo from M.B. Glaser to Exxon Management, *CO2 Greenhouse Effect* (Nov. 12, 1982),

<https://www.climatefiles.com/exxonmobil/1982-memo-to-exxon-management-about-co2-greenhouse-effect/>.

¹⁹¹ Alan Oppenheis & William I. Donn, *Climate Models and CO2 Warming*, LAMONT-DOHERTY GEOPHYSICAL OBSERVATORY, COLUMBIA UNIVERSITY, 4–5 (Mar. 16, 1982),

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

predictions that they used them to make major business decisions, such as raising the height of offshore drilling platforms to account for expected sea level rise.¹⁹²

Given this knowledge, a reasonable person would have been aware that their actions created a substantial—and likely a grave—risk of causing another person’s death. And the profound scope of the dangers that FFCs discussed internally and knew they were creating provides prosecutors with strong ammunition to argue that these companies acted with extreme indifference to human life.

1. Knowledge of danger

From the late 1950s through the late 1980s, scientists funded by or working directly for FFCs studied fossil fuels’ impacts on the climate. Those scientists—again, the FFCs’ own experts—issued dire warnings to the companies about the future of Earth’s climate and the role of emissions in changing that future for the worse.

FFCs also formed and participated in committees and task forces within API, their largest trade association, which generated numerous reports confirming the same conclusion: Unabated consumption of fossil fuels posed an enormous danger to the planet and human life.

In 1959, physicist Edward Teller provided—directly to top leaders of the petroleum industry—an explicit description of the dangers of global warming at an API-organized symposium at Columbia University titled *Energy and Man*.¹⁹³ At this conference, dozens of industry executives, including Robert Dunlop, future Chairman of the Board of API, heard Teller issue a stark warning about the need to find non-fossil fuel energy sources to avert potentially catastrophic climate consequences. In his address to the crowd, Teller said:

Whenever you burn conventional fuel, you create carbon dioxide. [. . .] Carbon dioxide has a strange property. It transmits visible light but it absorbs the infrared radiation which is emitted from the earth. Its presence in the atmosphere causes a greenhouse effect [. . .] It has been calculated that a temperature rise corresponding to a 10 percent increase in carbon dioxide will be sufficient to melt the ice caps and submerge New York. All the coastal cities would be covered [. . .] At present the carbon dioxide in the atmosphere has risen by 2 percent over normal. By 1970, it will be perhaps 4 percent, by 1980, 8 percent, by 1990, 16 percent, if we keep on with our exponential rise in the use of purely conventional fuels. By that time, there will be a serious additional impediment for the radiation

¹⁹² Amy Lieberman & Susanne Rust, *Big Oil braced for global warming while it fought regulations*, L.A. TIMES (Dec. 31, 2015), <http://graphics.latimes.com/oil-operations/>.

¹⁹³ Benjamin Franta, *On its 100th Birthday in 1959, Edward Teller Warned the Oil Industry About Global Warming*, THE GUARDIAN (Jan. 1, 2018), <https://www.theguardian.com/environment/climate-consensus-97-per-cent/2018/jan/01/on-its-hundredth-birthday-in-1959-edward-teller-warned-the-oil-industry-about-global-warming>.

leaving the earth. Our planet will get a little warmer. It is hard to say whether it will be 2 degrees Fahrenheit or only one or 5. But when the temperature does rise by a few degrees over the whole globe, there is a possibility that the ice caps will start melting and the level of the oceans will begin to rise.¹⁹⁴

It should be noted that Teller, a well-known member of the Manhattan Project (he was played by Benny Safdie in the film *Oppenheimer*¹⁹⁵), was a scientific figure of significant stature. As such, it can be safely assumed that his speech was noted by conference attendees and that his analysis was considered at the very least to be worthy of serious consideration.

Several years later, the fossil fuel industry received a warning from an even more official source. In 1965, President Lyndon Johnson's Science Advisory Committee issued a report cautioning that increased concentrations of atmospheric CO₂ caused by the combustion of fossil fuels could lead to global warming and sea level rise by the end of the century.¹⁹⁶ Fossil fuel executives were undoubtedly aware of this warning because Frank Ikard, the president of API at the time, discussed the report's findings with API's members at the trade organization's annual meeting later that year, saying:

One of the most important predictions of the report is that carbon dioxide is being added to the earth's atmosphere by the burning of coal, oil, and natural gas at such a rate that by the year 2000 the heat balance will be so modified as possibly to cause marked changes in climate beyond local or even national efforts.¹⁹⁷

Ikard also quoted the report's finding that "the pollution from internal combustion engines is so serious, and is growing so fast, that an alternative nonpolluting means of powering automobiles, buses, and trucks is likely to become a national necessity."¹⁹⁸ Finally, he summarized that "[t]he substance of the report is that there is still time to save the world's peoples from the catastrophic consequence of pollution, but time is running out."¹⁹⁹

In 1968, API commissioned a report from the Stanford Research Institute ("SRI") that examined "Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants."²⁰⁰ The report warned that

¹⁹⁴ *Id.*

¹⁹⁵ Katey Rich, *Benny Safdie's 'Oppenheimer' Character Edward Teller and His Long, Complicated Life*, VANITY FAIR (Jul. 21, 2023), <https://www.vanityfair.com/hollywood/2023/07/oppenheimer-benny-safdie-edward-teller>.

¹⁹⁶ President's Science Advisory Committee, Report of the Environmental Pollution Panel President's Science Advisory Committee, The White House (1965), <https://nsarchive.gwu.edu/document/31937-document-2-white-house-report-restoring-quality-our-environment-report-environmental>.

¹⁹⁷ See Ikard, *supra* note 15.

¹⁹⁸ *Id.*

¹⁹⁹ *Id.*

²⁰⁰ Elmer Robinson & R.C. Robbins, *Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants*, THE STANFORD RESEARCH INSTITUTE, 108–09 (Feb. 1968), <https://www.smokeandfumes.org/documents/document16>. See also David Hasemyer, et al., *CO₂'s Role in Global Warming Has Been on the Oil Industry's Radar Since the 1960s*, INSIDE CLIMATE NEWS (Apr. 13, 2016),

the global concentration of atmospheric CO₂ was already on the rise, and that a doubling in atmospheric CO₂ would lead to warming of the Earth's surface temperature of anywhere from 3° to 21° Fahrenheit.²⁰¹ The assessment stated: "Significant temperature changes are almost certain to occur by the year 2000, and [. . .] there seems to be no doubt that the potential damage to our environment could be severe."²⁰² This damage included "the melting of the Antarctic ice cap, a rise in sea levels, [and] warming of the oceans."²⁰³ It then attributed these harms to fossil fuels directly, explaining that "[a]lthough there are other possible sources for the additional CO₂ now being observed in the atmosphere, none seem to fit the presently observed situation as well as the fossil fuel emanation theory."²⁰⁴ The report concluded by calling on API's members to act. "Past and present studies [. . .] explain adequately the present state of CO₂ in the atmosphere. What is lacking, however, is an application of these atmospheric CO₂ data to air pollution technology and work toward systems in which CO₂ emissions would be brought under control."²⁰⁵

In 1969, API asked SRI to supplement its report with a more detailed assessment of carbon dioxide's impact on climate. The report confirmed that atmospheric concentrations of CO₂ were steadily increasing and that 90% of this increase could be attributed to fossil fuel combustion, finding it "unlikely that the observed rise in atmospheric CO₂ has been due to changes in the biosphere."²⁰⁶ It also made extremely precise predictions about future climate harms based on projected fossil fuel use. It predicted that atmospheric CO₂ concentrations would reach 370 ppm by 2000, leading to global temperature increases of 0.5° Celsius.²⁰⁷ In fact, in 2000 atmospheric CO₂ reached 369.64 ppm,²⁰⁸ and global temperature had increased by an average of 0.5° Celsius.²⁰⁹ The report also explained that these outcomes were only the beginning of much more dangerous climate consequences to come. It estimated that if atmospheric CO₂ reached 600 ppm, temperatures would rise by more than 2° Celsius, while also recognizing that combustion of all fossil fuels then recoverable would raise atmospheric CO₂ to 850 ppm.²¹⁰

<https://insideclimatenews.org/news/13042016/climate-change-global-warming-oil-industry-radar-1960s-exxon-api-co2-fossil-fuels/>.

²⁰¹ *Id.*,

²⁰² *Id.* at 108–110.

²⁰³ *Id.*

²⁰⁴ *Id.*

²⁰⁵ *Id.* at 112.

²⁰⁶ Robinson & Robbins, *Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants Supplement*, THE STANFORD RESEARCH INSTITUTE, 119 (Jun. 1969).

²⁰⁷ *Id.* at 103.

²⁰⁸ *Global Mean CO₂ Mixing Ratios (ppm): Observations*, NASA GODDARD INSTITUTE FOR SPACE STUDIES, <https://data.giss.nasa.gov/modelforce/ghgases/fig1a.ext.txt>.

²⁰⁹ See Michael Carlowicz, *Global Temperatures*, NASA EARTH OBSERVATORY, <https://earthobservatory.nasa.gov/world-of-change/global-temperatures>.

²¹⁰ See Robinson & Robbins, *supra* note 206.

In January 1972, API distributed summaries of extensive research on the environmental impacts of fossil fuels to its members, including the 1968 and 1969 SRI reports.²¹¹ Current FFCs and their predecessors in interest that produced this summary report as members of various API Committees included: American Standard of Indiana (BP), Asiatic (Shell), Atlantic Richfield (BP), British Petroleum (BP), Chevron Standard of California (Chevron), Continental (ConocoPhillips), Dupont (former owner of Conoco), Esso Research (ExxonMobil), Ethyl (formerly affiliated with Esso, which was subsumed by ExxonMobil), Getty (ExxonMobil), Gulf (Chevron, among others), Humble Standard of New Jersey (ExxonMobil/Chevron/BP), Mobil (ExxonMobil), Pan American (BP), Phillips (ConocoPhillips), Shell, Standard of Ohio (BP), Texaco (Chevron), Union (Chevron), Skelly (ExxonMobil), and Caltex (Chevron).²¹²

By the late 1970s, a significant scientific consensus had solidified around the notion of anthropogenic climate change, driven primarily by CO₂ emissions from the burning of fossil fuels. As Exxon scientist Ed Garvey explained, given that atmospheric CO₂ from fossil fuel emissions has a unique chemical signature that distinguishes it from non-fossil derived CO₂, “[b]y the late 1970s, global warming was no longer speculative. There was direct evidence it was not the same type of carbon that was in the atmosphere a hundred years ago.”²¹³

In July 1977, Exxon scientist James Black gave a presentation to Exxon’s Corporate Management Committee on the “Greenhouse Effect” that provided further clarity regarding the threats to climate caused by fossil fuels. During the presentation, which was memorialized in an internal memorandum the following year, Black explained that atmospheric CO₂ had already increased by 10–15%, and that slightly more than half of CO₂ from fossil fuel combustion remains in the atmosphere.²¹⁴ He then shared the “best presently available climate model,” which predicted that a doubling of CO₂ in the atmosphere would produce warming of 2° to 3° Celsius “over most of the earth” and temperature increases near the poles of “two to three times this value.”²¹⁵ He explained that such increases could lead to sea level rise of up to seven meters and, he was “fairly certain,” would increase precipitation, affecting agriculture and industry worldwide.²¹⁶

Black directly told Exxon leadership that the company’s fossil fuels were driving these climatic changes, warning that “current scientific opinion overwhelmingly favors attributing atmospheric

²¹¹ *Environmental Research, A Status Report*, AMERICAN PETROLEUM INSTITUTE (Jan. 1972), <http://files.eric.ed.gov/fulltext/ED066339.pdf>.

²¹² *Id.* at 136–46.

²¹³ James Osborne, *Interview: Former Exxon scientist on oil giant’s 1970s climate change research*, DALLAS NEWS (Oct. 2, 2015), <https://www.dallasnews.com/business/2015/10/02/interview-former-exxon-scientist-on-oil-giant-s-1970s-climate-change-research/>.

²¹⁴ J.F. Black, *The Greenhouse Effect*, EXXON RESEARCH AND ENGINEERING COMPANY, 1 (June 6, 1978), <https://insideclimatenews.org/documents/james-black-1977-presentation>.

²¹⁵ *Id.*

²¹⁶ *Id.* at 7.

carbon dioxide increase to fossil fuel combustion”²¹⁷ and that “there is a general scientific agreement that the most likely manner in which mankind is influencing the global climate is through carbon dioxide release from the burning of fossil fuels.”²¹⁸ Based on this data, Black told Exxon’s Corporate Management Committee that “man has a time window of five to ten years before the need for hard decisions regarding changes in energy strategies might become critical.”²¹⁹

In the late 1970s, following Black’s warnings, Exxon launched an ambitious research program to study the environmental effects of the company’s marketing and sale of fossil fuels. Morrel Cohen, a senior scientist at Exxon during this time period, explained that “Exxon was trying to become a research power in the energy industry the way the Bell labs was in the communications industry.”²²⁰ A 1978 letter from Exxon research scientist Henry Shaw explains that “Exxon’s involvement and commitment of funds and personnel is based on our need to assess the possible impact of the greenhouse effect on Exxon business. Exxon must develop a credible scientific team that can critically evaluate the information generated on the subject and be able to carry bad news, if any, to the corporation.”²²¹

A 1979 Exxon inter-office correspondence from Shaw revealed a potentially more antisocial purpose behind its climate research—to combat actions to address the harmful effects of fossil fuels:

It behooves us to start a very aggressive defensive program in the indicated areas of atmospheric science and climate because there is a good probability that legislation affecting our business will be passed.²²²

Exxon’s research continued to show that combustion of fossil fuels was likely to lead to devastating climate impacts. In 1979, an internal Exxon memorandum from Exxon’s Research and Engineering Division reiterated the “most widely held theory” that the increase in atmospheric CO₂ “is due to fossil fuel combustion”; “[i]ncreasing CO₂ concentration will cause a warming of the earth’s surface”; and “[t]he present trend of fossil fuel consumption will cause dramatic environmental effects before the year 2050.”²²³ The memorandum also warned Exxon

²¹⁷ *Id.* at 4, Vugraph 7.

²¹⁸ *Id.* at 10.

²¹⁹ *Id.* at 2.

²²⁰ Amy Westervelt, *Drilled: A True Crime Podcast about Climate Change*, at 06:21 (Nov. 14, 2018), <https://www.criticalfrequency.org/drilled>.

²²¹ See *Exxon’s Own Research Confirmed Fossil Fuels’ Role in Global Warming Decades Ago*, INSIDE CLIMATE NEWS, 3 (Nov. 15, 2015), <http://www.riversimulator.org/Resources/Press/CompleteSeriesExxonsResearchConfirmedFossilFuelsRoleGlobalWarmingDecadesAgo.pdf>.

²²² *Id.* at 17.

²²³ WL Ferrall, *Controlling the CO₂ Concentration in the Atmosphere, Exxon Research and Engineering Company*, CLIMATE INVESTIGATIONS CENTER, 1 (Oct. 16, 1979), <https://www.industrydocuments.ucsf.edu/docs/mqwl0228>.

of the “possibility” that “an atmospheric CO₂ buildup will cause adverse environmental effects in enough areas of the world to consider limiting the future use of fossil fuels as major energy sources.”²²⁴ Meanwhile, “the rate of CO₂ release from anthropogenic sources appears to be doubling every 15 years,” a rate that would double atmospheric CO₂ by 2050.²²⁵

Also in 1979, API and industry scientists formed the “CO₂ and Climate Task Force” to monitor and share climate research.²²⁶ Membership on the API task force included senior scientists and engineers from nearly every major U.S. and multinational oil and gas company, including Exxon, Mobil (ExxonMobil), Amoco (BP), Gulf Oil (Chevron), Phillips (ConocoPhillips), Texaco (Chevron), Shell, Sunoco, Sohio (BP), and Standard Oil of California (BP), among others.²²⁷ The Task Force held a meeting in March 1980 at which Dr. John Laurman, an “expert on CO₂ and climate,” delivered a presentation to industry leaders—including executives from API, Exxon, SOHIO (BP), and Texaco (Chevron), among others—that laid out in the clearest possible terms fossil fuels’ role in causing catastrophic climate change.²²⁸ The minutes of the meeting list “reasons for increased concern with the CO₂ problem,” including “its correlation with global industrial CO₂ emissions, mostly from fossil fuel combustion” and “scientific consensus on the potential for large future climatic response to increased CO₂ levels.”²²⁹ The industry executives attending the meeting were informed that “likely impacts” of the continued burning of their fossil fuel products included 1° Celsius global temperature increases by 2005, 2.5° Celsius of warming by 2038 that would cause “major economic consequences,” and 5° Celsius of warming by 2067 that would cause “globally catastrophic effects.”²³⁰ The meeting concluded with the following warning: “At a 3% per annum growth rate of CO₂, a 2.5°C rise brings world economic growth to a halt in about 2025.”²³¹

In 1981, Exxon scientist Henry Shaw wrote an internal memorandum to Exxon’s President of Research and Engineering outlining Exxon’s “Preliminary Statement of Exxon’s Position on the Growth of Atmospheric Carbon Dioxide.”²³² The memorandum concurred with the company’s and API’s findings that a doubling in atmospheric CO₂, which was likely to occur within 100 years, would result in “3°C global average temperature rise and 10°C at poles,” causing “[m]ajor shifts in rainfall/agriculture” and the potential that “[p]olar ice may melt.”²³³ That same year,

²²⁴ *Id.*

²²⁵ *Id.*

²²⁶ Neela Banerjee, *Exxon’s Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, INSIDE CLIMATE NEWS (Dec. 22, 2015), <https://insideclimatenews.org/news/22122015/exxon-mobil-oil-industry-peers-knew-about-climate-change-dangers-1970s-american-petroleum-institute-api-shell-chevron-texaco/>.

²²⁷ *Id.*

²²⁸ See Jimmie Nelson, *supra* note 187.

²²⁹ *Id.* at 9.

²³⁰ *Id.* at 13.

²³¹ *Id.* at 16.

²³² Memo from Henry Shaw to Dr. E.E. David, Jr., *re CO₂ Position Statement*, Exxon Inter-Office Correspondence (May 15, 1981), <https://insideclimatenews.org/documents/exxon-position-co2-1981/>.

²³³ *Id.*

having digested these findings, Exxon’s research manager Roger Cohen distributed an internal memorandum cautioning executives that calling the impacts of climate change “well short of catastrophic [. . .] may be too reassuring” because “it is distinctly possible that [Exxon’s projected emissions] scenario will later produce effects which will indeed be catastrophic (at least for a substantial fraction of the earth’s population).”²³⁴

Cohen built on this warning in a 1982 internal letter to Exxon’s Office of Science and Technology summarizing the findings of Exxon’s research in climate modeling. In this memorandum, Cohen wrote that

over the past several years a clear scientific consensus has emerged regarding the expected climatic effects of increased atmospheric CO₂. The consensus is that a doubling of atmospheric CO₂ from its pre-industrial revolution value would result in an average global temperature rise of (3.0 ± 1.5) °C.²³⁵

He reiterated that there was “unanimous agreement in the scientific community that a temperature increase of this magnitude would bring about significant changes in the earth’s climate,” and that “[t]he time required for doubling of atmospheric CO₂ depends on future world consumption of fossil fuels.”²³⁶ Cohen also urged Exxon to “permit the publication of our research in scientific literature” because “to do otherwise would be a breach of Exxon’s public position and ethical credo on honesty and integrity.”²³⁷

But Exxon did not abide by this “ethical credo” to be transparent about the known dangers of fossil fuels. In November 1982, shortly after Cohen urged Exxon to share its research findings publicly, M.B. Glaser, Exxon’s Environmental Affairs Program Manager, issued a report titled “CO₂ ‘Greenhouse’ Effect.” Though the report was “given wide circulation to Exxon management [. . .] to familiarize Exxon personnel with the subject,” Glaser warned that it “should be restricted to Exxon personnel and not distributed externally.”²³⁸ Glaser’s report discussed

potentially catastrophic events that must be considered. For example, if the Antarctic ice sheet which is anchored on land should melt, then this could cause a rise in sea level on the order of five meters. Such a rise would cause flooding on much of the U.S. East Coast.²³⁹

²³⁴ Memo from Roger Cohen to W. Glass, 1 (Aug. 18, 1981), <https://insideclimatenews.org/wp-content/uploads/2021/02/Catastrophic-Effects-Letter-1981.pdf>.

²³⁵ See Letter from Roger Cohen at 1, *supra* note 188.

²³⁶ *Id.*

²³⁷ *Id.* at 3.

²³⁸ See Memo from M.B. Glaser at 1, *supra* note 190.

²³⁹ *Id.* at 11.

The report also highlighted a study from the Massachusetts Institute of Technology urging that “vigorous development of nonfossil fuel energy sources be initiated as soon as possible” in light of the potential for “great irreversible harm to our planet.”²⁴⁰

Also in 1982, the Lamont Doherty Geological Observatory at Columbia University prepared a report for API titled “Climate Models and CO₂ Warming.” The report explained that atmospheric CO₂ had already risen from 290 ppm at the start of the industrial revolution to 340 ppm in 1981.²⁴¹ While acknowledging some variability among climate models, it reported to API that “all predict some kind of increase in temperature within a global mean range of 4°C” based on the “assumption that atmospheric CO₂ will double,” an outcome “expected some time in the next century.”²⁴² It warned that “[s]uch a warming can have serious consequences for man’s comfort and survival since patterns of aridity and rainfall can change [and] the height of sea level can increase considerably.”²⁴³

In 1982, Dr. E.E. David Jr., President of the Exxon Research and Engineering Company, delivered a speech at the Fourth Annual Ewing Symposium, a gathering of fossil fuel industry leaders, titled “Inventing the Future Energy and the CO₂ ‘Greenhouse’ Effect.”²⁴⁴ His speech concerned how the industry would evolve in light of the scientific consensus that CO₂ buildup in the atmosphere was bound to harm the planet. He concluded that a transition away from dependence on fossil fuels was necessary, saying, “Few people doubt that the world has entered an energy transition away from dependence on fossil fuels and toward some mix of renewable resources that will not pose problems of CO₂ accumulation.”²⁴⁵

In 1983, Mobil Oil (ExxonMobil) issued similarly stark warnings about the potentially catastrophic impacts of climate change in a newsletter entitled “Atmospheric Greenhouse Effect: Is Burning of Fossil Fuels Affecting World Climate?”²⁴⁶ As the newsletter explained, “Based on future world energy demand, many scientists believe that carbon dioxide levels could double within the next century,” a result which scientists predict could lead to “melting of the arctic ice packs,” causing “sea levels [to] rise 15 to 20 feet.”²⁴⁷ The newsletter also noted the need for urgent action “because of the extremely long lead time for any conceivable corrective actions.”²⁴⁸

²⁴⁰ *Id.* at 12–13, 18.

²⁴¹ See Oppenheis & Donn at 4–5, *supra* note 191.

²⁴² *Id.*

²⁴³ *Id.*

²⁴⁴ E.E. David Jr., *Inventing the Future: Energy and the CO₂ ‘Greenhouse’ Effect*, EXXON RESEARCH AND ENGINEERING COMPANY, 3 (Oct. 26, 1982),

<http://www.documentcloud.org/documents/4412833-Inventing-theFuture-ER-and-EC-1982.html>.

²⁴⁵ *Id.*

²⁴⁶ *Atmospheric Greenhouse Effect: Is Burning Fossil fuels Affecting World Climate?*, MOBIL OIL CORP., Status Report Environmental & Toxicology Issue No. 83-2, 2–3 (June 1, 1983).

²⁴⁷ *Id.*

²⁴⁸ *Id.*

In 1988, Shell issued an internal “Confidential” report on “The Greenhouse Effect” to the Shell Environmental Conservation Committee.²⁴⁹ The report reached analogously alarming conclusions as those circulated internally by API, Exxon, and Mobil. The report projected that atmospheric concentrations of CO₂ would double in the 21st century, causing an increase in global temperatures that

could create significant changes in sea level, ocean currents, precipitation patterns, regional temperature, and weather. These changes could be larger than any that have occurred over the last 12,000 years. Such relatively fast and dramatic changes would impact on the human environment, future living standards and food supplies, and could have major social, economic, and political consequences.²⁵⁰

The report also informed Shell of the “reasonable scientific agreement that increased levels of greenhouse gases would cause global warming” and confirmed that fossil fuel combustion was “the major source of CO₂ in the atmosphere.”²⁵¹ Although the report noted that global warming was not yet detectable, it warned that “by the time the global warming becomes detectable it could be too late to take effective countermeasures to reduce the effects or even to stabilise the situation,” and urged that the energy industry needs to consider how it should “play its part.”²⁵²

Throughout the 1980s, many other FFCs formed their own research units focused on climate modeling.²⁵³ API also provided a forum for FFCs to share their research efforts and corroborate their findings through the CO₂ and Climate Task Force and other internal committees.²⁵⁴

2. Protecting company infrastructure

FFCs were not only on notice that their fossil fuel products would cause dangerous climate change—they demonstrated their understanding of and belief in these scientific conclusions by designing and making modifications to their own infrastructure, often at significant expense, in order to prepare for the coming reality of melting ice caps, worsening storms, and rising sea levels.

²⁴⁹ *The Greenhouse Effect*, SHELL INTERNATIONALE PETROLEUM, 1 (May 1988), <https://www.documentcloud.org/documents/4411090-Document3.html#document/p9/a411239>.

²⁵⁰ *Id.* at 1.

²⁵¹ *Id.*

²⁵² *Id.*

²⁵³ See Banerjee, *supra* note 226.

²⁵⁴ *Id.*

In 1973, Esso Research and Engineering Company (Exxon) obtained a patent for a cargo ship capable of breaking through sea ice²⁵⁵ and another for an oil tanker²⁵⁶ designed for use in areas of the Arctic that would not be reachable until climate change had intensified. In 1974, Chevron obtained a patent for a mobile arctic drilling platform designed to withstand significant interference from lateral ice masses, allowing for drilling in areas with increased ice flow movement due to elevated temperatures.²⁵⁷ That same year, Texaco (Chevron) obtained a patent for a mobile arctic drilling and production platform that allowed for drilling in previously unreachable areas of the Arctic that would become seasonally accessible due to polar ice melt.²⁵⁸ And in 1984, Shell obtained a patent for an Arctic offshore drilling platform similar to Chevron's.²⁵⁹

In 1989, Shell initiated a \$3 billion redesign of an offshore natural gas platform in the North Sea.²⁶⁰ Shell initially planned to construct the platform to reach a height of 30 meters above sea level, the standard height for platforms of this type.²⁶¹ Shell was concerned, however, that this height would not be sufficient to make the platform operable at the end of its lifespan in 2065.²⁶² Engineers found that anticipated sea level rise, caused by increases in atmospheric CO₂ from combustion of fossil fuels—like the natural gas extracted at the platform—could lead the platform to be inundated during a bad storm.²⁶³ Accordingly, the engineers revised the plan to add one to two meters of height to the platform.²⁶⁴

Also in 1989, Esso Resources Canada (Exxon) commissioned a study on the impact of climate change on existing and proposed natural gas facilities in the Mackenzie River Valley and Delta, including extraction facilities on the Beaufort Sea and a pipeline crossing Canada's Northwest Territory.²⁶⁵ The study found that "all climate scenarios indicate that significant increases in both temperature and precipitation will be experienced by the Mackenzie Valley," meaning "large zones of the Mackenzie Valley could be affected dramatically by climatic change."²⁶⁶ The study

²⁵⁵ U.S. Patent No. 3,727,571, *Icebreaking Cargo Vessel*, ESSO RESEARCH AND ENGINEERING CO. (filed Apr. 17, 1973), <https://patentimages.storage.googleapis.com/aa/05/5c/ba8a0dc55c08ef/US3727571.pdf>.

²⁵⁶ U.S. Patent No. 3,745,960, *Tanker Vessel*, ESSO RESEARCH AND ENGINEERING CO. (filed July 17, 1973), <https://patentimages.storage.googleapis.com/b9/7c/62/fc64d5de1f7192/US3745960.pdf>.

²⁵⁷ U.S. Patent No. 3,831,385, *Arctic Offshore Platform*, CHEVRON RESEARCH CO. (filed Aug. 27, 1974), <https://patentimages.storage.googleapis.com/87/5d/03/83f5da92318d67/US3831385.pdf>.

²⁵⁸ U.S. Patent No. 3,793,840, *Mobile Arctic Drilling and Production Platform*, TEXACO INC. (filed Feb. 26, 1974), <https://patentimages.storage.googleapis.com/52/d6/b3/9f23a65402d3a4/US3793840.pdf>.

²⁵⁹ U.S. Patent No. 4,427,320, *Arctic Offshore Platform*, SHELL OIL CO. (filed Jan. 24, 1984), <https://patentimages.storage.googleapis.com/a5/67/da/9c7d06b9e89d1c/US4427320.pdf>.

²⁶⁰ See Lieberman & Rust, *supra* note 192.

²⁶¹ *Id.*

²⁶² *Id.*

²⁶³ *Id.*

²⁶⁴ *Id.*

²⁶⁵ Stephen Lonergan & Kathy Young, *An Assessment of the Effects of Climate Warming on Energy Developments in the Mackenzie River Valley and Delta, Canadian Arctic*, SHELL ENERGY EXPLORATION & EXPLOITATION 7 5, 359–81 (Oct. 1, 1989).

²⁶⁶ *Id.* at 369, 377.

concluded that increasing temperatures, greater precipitation, melting permafrost, rising sea levels, and erosion could all threaten the company's infrastructure in the region and recommended that the company factor these climatic changes into its future development plans.²⁶⁷

In 1994, the prospect of rising sea levels and increasingly severe storms played a major role in the construction of Europipe, a natural gas pipeline leading from a North Sea offshore platform to the German Coast. A joint venture of Shell, Exxon, and ConocoPhillips, among other FFCs, the project's engineers noted that sea levels had risen over the last century and that there could be a "considerable increase of the frequency of storms as a result of climate change."²⁶⁸ They concluded that the pipeline design needed to include protections against these future climate impacts.²⁶⁹

In 1996, Mobil, Shell, and Imperial Oil (Exxon) took the likelihood of rising temperatures and sea levels into account in the design of their Sable gas field project off the coast of Nova Scotia, Canada.²⁷⁰ Mobil engineers wrote in design specifications that "[a]n estimated rise in water level, due to global warming, of 0.5 meters may be assumed" for the project's 25-year lifespan.²⁷¹

By acting on the conclusions of their internal climate research to protect their own infrastructure, FFCs demonstrated that they were not simply negligently ignoring or failing to take seriously the warnings that their research departments provided to the highest levels of corporate leadership over the course of multiple decades. These companies understood that continued fossil fuel combustion had enough of a "substantial" or even "grave" risk of causing climate harms that they were willing to invest millions of dollars to protect their own infrastructure from those anticipated effects.

In short, the evidence would show beyond any reasonable doubt that the companies knew their business practices threatened serious changes to the climate—changes that clearly threatened human life. Despite that knowledge, they took one lucrative opportunity after another to grow their business and put real people's lives at risk.

IV. Assessing Potential Defenses

The potential defenses FFCs may assert fall into three general categories: (1) challenging causation; (2) affirmative defenses; (3) and alleging political conspiracy.

²⁶⁷ *Id.* at 375–377.

²⁶⁸ *See* Lieberman & Rust, *supra* note 192.

²⁶⁹ *Id.*

²⁷⁰ *Id.*

²⁷¹ *Id.*

A. Assessing challenges to causation

To constitute manslaughter or second degree murder, a defendant’s conduct must have caused a victim’s death. Prosecutors must show the conduct was both the cause-in-fact, meaning that “[b]ut for the conduct the result in question would not have occurred,”²⁷² and the proximate cause, meaning it produced the death “in a natural and continuous sequence, unbroken by any efficient intervening cause.”²⁷³

The causal chain between FFCs and a climate-related death has three links: first, FFCs caused climate change; second, climate change caused a particular disaster or extreme weather event; and third, the extreme weather event caused the death. In the case of the July 2023 heat wave, the latter two causal inquiries are relatively straightforward. First, the heat wave can be easily shown to have caused a victim’s deadly heat stroke based on the Maricopa County Department of Public Health’s recordings—as discussed earlier, Maricopa County recorded 403 heat-related deaths in July 2023,²⁷⁴ 59% of which were “heat caused,” meaning that environmental heat was the direct cause of death.²⁷⁵ Second, climate attribution studies show that this heat wave would have been “virtually impossible” but for human-caused climate change.²⁷⁶ The primary challenge, then, is the first stage: showing that fossil fuel companies should be held legally responsible for causing climate change.

Focusing on this first link, FFCs will likely argue that their conduct did not cause the victims’ deaths because: (1) their contributions to climate change are insufficiently significant for causation to attach; (2) climate disinformation did not causally contribute to climate change; (3) prosecutors cannot precisely pinpoint responsibility for climate harms; and (4) the causal chain is interrupted by end-stage emitters.

1. Assessing Defense 1: Insufficient contributions to climate change

FFCs will likely argue that they cannot be held legally responsible for the effects of the climate crisis because there are many actors beyond them that have contributed to climate change, including state-owned oil and gas companies and the agricultural sector, and because their specific contributions are not significant enough to attribute criminal liability.

The first portion of this argument may be relatively easy to rebut at trial, with appropriate legal instructions to the jury, given that a “defendant’s conduct need not be the only cause or play a large role in the final result; ‘but for’ causal culpability exists even if the defendant contributes

²⁷² A.R.S. § 13-203(A)(1).

²⁷³ *Torres v. JAI Dining Servs. (Phx.) Inc.*, 252 Ariz. 28, 31, 497 P.3d 481 (2021).

²⁷⁴ See Maricopa County Department of Public Health, *supra* note 3, at 8.

²⁷⁵ *Id.* at 7.

²⁷⁶ See Zachariah, *supra* note 1.

‘only a little’ to the result.”²⁷⁷ In addition, “more than one person may be liable for causing an injury” and a particular defendant cannot “avoid liability for his causative act by claiming that the conduct of some other person was also a contributing cause.”²⁷⁸ Relatedly, if a defendant’s course of conduct “actively continues up to the time the injury is sustained, then any outside force which is also a substantial factor in bringing about the injury is a concurrent cause of the injury and never an ‘intervening’ force,” meaning the acts of those other parties do “not protect the [defendant] from liability.”²⁷⁹

While FFCs’ actions were not the sole or exclusive cause of the July 2023 heat wave, expert testimony from climate attribution scientists can demonstrate that they did contribute concurrently to the disaster and their conduct remained causally significant through the moment of the victims’ deaths.²⁸⁰

Regarding the sufficiency of defendants’ contributions to climate change, there is no current case law delineating the level of greenhouse gas emissions necessary to demonstrate criminal causation for climate-related injuries. However, there are relevant civil precedents that, while not directly on-point for an analysis of criminal causation, are informative and may be persuasive. In *Massachusetts v. EPA*, the U.S. Supreme Court articulated that, in cases alleging climate-related harms, a causal connection exists where the emissions “make a meaningful contribution to greenhouse gas contributions and hence [. . .] to global warming.”²⁸¹ The Court went on to rule that vehicle emissions from the U.S. transportation sector, which accounted for approximately 6% of global emissions, constituted a meaningful contribution and thus satisfied causation for standing purposes.²⁸² And in *Connecticut v. Am. Elec. Power Co. Inc.*, the Court held that the argument “that many others contribute to global warming in a variety of ways [. . .] does not defeat the causation requirement” and found that 2.5% of global emissions was satisfactory for the causation prong of a constitutional standing inquiry.²⁸³ This is many times lower than the 15.37% of global emissions directly generated by the eight potential defendant FFCs in the years after they were put on notice that their products were causing climate change, to say nothing of the even greater contributions associated with their joint venture partners, as detailed earlier in this memo.²⁸⁴

²⁷⁷ *State v. Brown*, No. 1 CA–CR 10–0429 (memorandum decision filed March 15, 2011), quoting *Markiewicz v. Salt River Valley Water Users’ Ass’n*, 118 Ariz. 329, 338 n. 6, 576 P.2d 517 (App.1978). While *Markiewicz* discussed a tort action, *State v. Brown* directly applied this analysis to a case of criminal homicide and aggravated assault.

²⁷⁸ *Ontiveros v. Borak*, 136 Ariz. 500, 505, 667 P.2d 200 (1983) (superseded by statute on other grounds).

²⁷⁹ *State v. Aragón*, 505 P.3d 657, 661 (Ariz. 2022).

²⁸⁰ See, e.g., Zachariah, *supra* note 1.

²⁸¹ *Massachusetts v. EPA*, 549 U.S. 497, 524 (2007).

²⁸² *Id.* at 524–525.

²⁸³ *Connecticut v. Am. Elec. Power Co. Inc.* (“AEP”), 582 F.3d 309, 347 (2d Cir.2009); *American Electric Power Co. v. Connecticut*, 564 U.S. 410 (2011).

²⁸⁴ The emissions percentages cited throughout this memo are based on FFCs’ self-reported data on their production of fossil fuels. There are different ways one could calculate their contributions to global emissions, such as FFCs’ total sales. For example, according to unpublished research from Richard Heede, Shell has sold approximately three

Juries can understand the idea that a defendant may be one of several contributors to a given harm; accordingly, FFCs may use this argument as part of a pretrial motion challenging the validity of the indictment, but this argument regarding causation is an issue of fact for the jury to determine.

The prosecution's case that FFCs recklessly caused deaths does not rest solely on defendants' greenhouse gas contribution. It also includes their climate deception, which operated to block the public's transition away from fossil fuels, so that FFCs could continue doing business as usual, as discussed in the next section. Taken together, FFCs' emissions and climate deception enabling continued emissions constitute substantial factors in contributing to the deaths of the victims of the July 2023 heat wave.

2. Assessing Defense 2: Climate disinformation did not causally contribute to climate change

FFCs will deny the causal impact of their campaigns of climate deception and argue that the disinformation they spread and continue to spread did not materially contribute to global warming. But prosecutors can point to substantial evidence that FFCs' creation of a false perception of disagreement in the scientific community on climate change had a significant impact on the public's perception of climate change in ways that helped block or delay the transition away from fossil fuels, allowing FFCs to continue operating, making profits, and therefore creating emissions.

First, it is clear that this was precisely the effect FFCs were aiming to achieve through their deceptive conduct. FFCs noted in 1991 that opinion polls revealed that 60% of Americans believed global warming was a serious environmental problem and that "our industry cannot sit on the sidelines in this debate."²⁸⁵ In response, the GCC Action Plan discussed how public opinion on climate could be swayed with disinformation:

Charlton Research's survey of 1,100 "informed Americans" suggests that while Americans currently perceive climate change to be a great threat, public opinion is open to change on climate science. When informed that "some scientists believe there is not enough evidence to suggest that what is called global climate

times the amount of oil and gas it has directly produced, because it acquires, refines, and sells fossil fuels originally produced by different companies.

²⁸⁵ Naomi Oreskes, *My Facts Are Better Than Your Facts: Spreading Good News about Global Warming*, in Peter Howlett et al., *How Well Do Facts Travel? The Dissemination of Reliable Knowledge*, CAMBRIDGE UNIVERSITY PRESS (2011), at 136–66,

<https://www.cambridge.org/core/books/abs/how-well-do-facts-travel/my-facts-are-better-than-your-facts-spreading-good-news-about-global-warming/34195E5230016EF7BB989AE7B0629E9B>.

change is a long-term change due to human behavior and activities,” 58 percent of those surveyed said they were more likely to oppose the Kyoto treaty.²⁸⁶

Second, there is concrete evidence that these disinformation efforts have been successful. A 2007 Yale University-Gallup poll found that only 48% of Americans believed there was a consensus among the scientific community regarding global warming, and 40% believed, falsely, that there was substantial disagreement among scientists over whether global warming was occurring.²⁸⁷ Eight years later, a 2015 Yale-George Mason University poll found that “[o]nly about one in ten Americans understands that nearly all climate scientists (over 90%) are convinced that human-caused global warming is happening, and just half [. . .] believe a majority do.”²⁸⁸ It also found that 33% of Americans believe that climate change is mostly due to natural changes in the environment, in stark contrast to the more than 99.9% of peer-reviewed climate science papers that acknowledge that global warming is happening and is human-caused.²⁸⁹ In another study, researchers from Yale, Cambridge, and George Mason University found that increasing public perceptions of the scientific consensus is significantly and causally associated with an increase in the belief that climate change is happening, human-caused, and a worrisome threat.²⁹⁰ The researchers also found that belief in the scientific consensus functions as an initial “gateway” to changes in key beliefs about climate change, which in turn, influence support for public action. They concluded that, “when in doubt about scientific facts, people are likely to use consensus among domain experts as a heuristic to guide their beliefs and behavior.”²⁹¹

Finally, there is evidence that this lack of progress, and indeed regression, in the public’s understanding of climate science has had major consequences for our transition away from fossil fuels and, therefore, FCCs’ continued profitability. For example, the Intergovernmental Panel on Climate Change (“IPCC”) noted the role of climate misinformation in limiting climate action. In its sixth assessment report, the IPCC condemned “vested economic and political interests for organising and financing misinformation and ‘contrarian’ climate change communication.”²⁹² It noted that the “rhetoric and misinformation on climate change and the deliberate undermining of science have contributed to misperceptions of the scientific consensus, uncertainty, disregarded

²⁸⁶ See Email from Joe Walker, *supra* note 115.

²⁸⁷ *American Opinions on Global Warming: A Yale/Gallup/Clearvision Poll*, YALE PROGRAM ON CLIMATE CHANGE COMMUNICATION (Jul. 31, 2007), <https://climatecommunication.yale.edu/publications/american-opinions-on-global-warming/>.

²⁸⁸ Anthony Leiserowitz et al., *Climate Change in the American Mind*, YALE PROGRAM ON CLIMATE CHANGE COMMUNICATION & GEORGE MASON UNIVERSITY CENTER FOR CLIMATE CHANGE COMMUNICATION (Oct. 2015), <https://climatecommunication.yale.edu/publications/global-warming-ccam-march-2015/>.

²⁸⁹ Mark Lynas et al, *Greater than 99% consensus on human caused climate change in the peer-reviewed scientific literature*, ENVIRONMENTAL RESEARCH LETTERS 16, 11 (Oct. 19, 2021), <https://iopscience.iop.org/article/10.1088/1748-9326/ac2966>.

²⁹⁰ Sander van der Linden, et al., *The scientific consensus on climate change as a gateway belief: Experimental evidence*, PLOS ONE 10 2 (Feb. 25, 2015), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0118489>.

²⁹¹ *Id.*

²⁹² *IPCC WGII Sixth Assessment Report*, IPCC 14–14, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_Chapter14.pdf.

risk and urgency, and dissent.”²⁹³ Most importantly, it discussed how “misinformation and politicization of climate change science has created polarization in public and policy domains in North America, particularly in the US, limiting climate action.”²⁹⁴ The resultant public misperception of climate risks is “delaying urgent adaptation planning and implementation.”²⁹⁵ This, in turn, “inflates climate risks.”²⁹⁶

3. Assessing Defense 3: Inability to pinpoint precise responsibility

FFCs may argue that they cannot be held criminally liable for climate impacts because the prosecution cannot pinpoint exactly who is responsible for climate harms, either between various FFCs or within each company, given that many—though certainly not all—of the decisions at issue were made years ago, before each company’s current corporate leadership was in place.

Of course, the defendants in this prosecution are the FFCs themselves, not individuals. Corporations can be held criminally liable for conduct “engaged in, authorized, solicited, commanded or recklessly tolerated by the directors of the enterprise in any manner or by a high managerial agent acting within the scope of employment.”²⁹⁷

The actions and decisions described in this memo were all made and committed by the officers, directors, agents, employees, and representatives of the defendant FFCs while they were engaged in the operation or control of the affairs of the company and were acting within the scope of their employment. Prosecutors may need to seek additional information about these individuals’ decisions—regarding the quantity and extent of fossil fuel production and sales; the marketing and advertising of their fossil fuel products; and the communications strategies they utilized concerning climate change and the link between fossil fuel use and climate harms—through the use of criminal investigative techniques. Prosecutors may also seek guidance from other corporate prosecutions, where this type of “too-high-up-on-the-food-chain-to-know” defense is common.

²⁹³ *Id.*

²⁹⁴ *Id.* at 14–3. One example of misinformation limiting climate action was described in a PBS Frontline interview with Senator Chuck Hagel (R-NE), who co-sponsored the Byrd-Hagel Resolution that prohibited the United States from ratifying the Kyoto Protocol. Hagel agreed that the fossil fuel industry’s deception substantially influenced the public’s perception of the issue of climate change, as well as his own, stating: “I was misled. Others were misled. When they had evidence in their own institutions that countered what they were saying publicly—I mean, they lied. [. . .] It would have changed everything [had FFCs told the truth]. I think it would have changed the average citizen’s appreciation of climate change. [. . .] And mine, of course. It would have put the United States and the world on a whole different track, and today we would have been so much further ahead than we are. It’s cost this country, and it cost the world.” Frontline, *The Power of Big Oil, Part Two: Doubt*, PBS (Apr. 26, 2022), <https://www.youtube.com/watch?v=qMe-BYUIPLU>.

²⁹⁵ *Id.* at 14–14.

²⁹⁶ *Id.* at 14–75.

²⁹⁷ A.R.S. § 13-305.

4. Assessing Defense 4: Blaming consumers as intervening cause

FFCs frequently claim that it is the consumers of fossil fuel products that are responsible for climate change. ExxonMobil CEO Darren Woods recently argued that “[t]he people who are generating those emissions need to be aware of and pay the price for generating those emissions.”²⁹⁸ Another FFC executive claimed, “Blaming the producers of oil and gas for climate change is like blaming farmers for obesity. It’s our societal consumption that is the issue.”²⁹⁹ Another typical FFC claim is that “a distinction must be made between emissions resulting directly from our activities and those which arise from the use of the products which we make available to our customers and which we do not control.”³⁰⁰ But experienced prosecutors will know that blaming the victim, even in a corporate prosecution, is no defense at all.³⁰¹

As a legal matter, these claims amount to an argument that consumers’ end-stage emissions constitute an intervening cause that breaks the chain of causation connecting FFCs’ conduct to climate impacts. But to absolve a defendant of criminal liability, the intervening conduct of a third party must be so “unforeseeable by a reasonable person in the position of the original actor” as to appear “extraordinary.”³⁰² It is unlikely that FFCs will persuade a judge or jury that they did not foresee that their fossil fuel products would be used precisely as intended—indeed, one can imagine this implication that regular people are ultimately to blame for climate change might rankle some jurors. And this argument is made even more difficult by the fact that FFCs deliberately engaged in a campaign to keep the public misinformed about the risks of their products.³⁰³

B. Assessing possible affirmative defenses

²⁹⁸ Dharna Noor & Oliver Milman, *Fury after Exxon chief says public to blame for climate failures*, THE GUARDIAN (Mar. 4, 2024), <https://www.theguardian.com/us-news/2024/mar/04/exxon-chief-public-climate-failures>.

²⁹⁹ Sam Merideth, *Oil CEO says blaming the energy industry for the climate crisis ‘like blaming farmers for obesity’*, CNBC (Dec. 5, 2023),

<https://www.cnbc.com/2023/12/05/oil-ceo-rejects-fossil-fuel-industry-to-blame-for-the-climate-crisis.html>.

³⁰⁰ Matthew Taylor, *Climate emergency: what the oil, coal, and gas giants say*, THE GUARDIAN (Oct. 10, 2019), <https://www.theguardian.com/environment/2019/oct/09/climate-emergency-what-oil-gas-giants-say>.

³⁰¹ See, e.g. *U.S. v. Hamilton*, 182 F. Supp. 548, 550 (D.D.C. 1960) (chain of causation not broken when assault victim removed breathing tubes); *People v. Lewis*, 57 P. 470, 471 (Cal. 1899) (chain of causation not broken when gunshot victim cut his own throat); *Ford v. State*, 521 N.E.2d 1309, 1310 (Ind. 1988) (chain of causation not broken when gunshot victim refused blood transfusion); *Stephenson v. State*, 179 N.E. 633, 635 (Ind. 1932) (chain of causation not broken when rape and assault victim poisoned self while held captive); *People v. Webb*, 415 N.W.2d 9 (Mich. App. 1987) (chain of causation not broken when bar-room-brawl victim initially refused help from paramedics); *People v. Velez*, 602 N.Y.S.2d 758, 759 (N.Y. Sup. 1993) (chain of causation not broken when gunshot victim had a nurse remove a feeding tube and refused nourishment); *State v. Pelham*, 746 A.2d 557, 559 (N.J. Super. L. Div. 1998) (chain of causation not broken when victim had life support removed according to family wishes and his living will),

³⁰² *Torres v. JAI Dining Servs. (Phx.) Inc.*, 252 Ariz. 28, 31, 497 P.3d 481 (2021).

³⁰³ When a party misleads or deceives another into taking some further harmful action, the deceived party is not viewed as breaking the chain of causation. See H.L.A. Hart & Tony Honore, *Causation in the Law* 326 (1985).

FFCs may invoke a range of affirmative defenses to escape criminal liability, including: (1) necessity; (2) entrapment or reliance; and (3) preemption. None of these provide an effective defense.

1. Assessing Affirmative Defense 1: Necessity

FFCs might argue that, although they were aware of the risks associated with their products, there were no reasonable alternatives, and so a shift away from fossil fuels would have caused so much damage that maintaining their business model at all costs was necessary for the greater good—essentially, a necessity defense. To establish a necessity defense, a defendant must show they were “compelled to engage in the proscribed conduct” and that they had “no reasonable alternative to avoid imminent public or private injury greater than the injury that might reasonably result from” the criminal conduct.³⁰⁴ FFCs cannot credibly argue that their circumstances meet these conditions. While it is certainly true that an overnight shutdown of all fossil fuel production would cause extremely negative consequences, that was never an imminent threat—indeed, it was never a situation that had any chance at all of occurring.

Moreover, reasonable alternatives to their criminal conduct were always available. As a result, even if FFCs were to present necessity less as a formal defense at trial, and more as a part of the “theory” of the defense case, prosecutors may point to all the other, less harmful options FFCs could have and should have explored. Renewable energy technologies have existed for centuries and, without FFCs’ climate disinformation, would likely have begun dramatically expanding their market share decades ago. Indeed, the entire motivation behind FFCs’ climate deception campaigns was to block and constrain the development and spread of these competitors to their fossil fuel products. In reality, then, the choice FFCs faced was between, on the one hand, a gradual transition to clean energy sources that could have begun many years ago, and, on the other hand, their ferocious and fraudulent efforts to block any and all attempts to begin that transition. As such, FFCs have no compelling case for invoking a necessity defense.

2. Assessing Affirmative Defense 2: Entrapment or reliance

FFCs may also raise objections, or present evidence at trial, centering on government actions related to fossil fuels, including regulation, subsidization, and related policies at the federal and state levels, arguing that these government actions should shield FFCs’ conduct from prosecution. FFCs might, for example, claim that government actions induced them to produce, market, and sell fossil fuels, such that subsequent prosecution would amount to entrapment.³⁰⁵

³⁰⁴ A.R.S. § 13-417(A).

³⁰⁵ An entrapment defense is a claim that a defendant committed acts that would otherwise constitute a criminal offense because they were induced to do so by law enforcement, meaning the idea of committing the offense started with law enforcement and the defendant was not predisposed to commit the offense before law enforcement induced them to do so. A.R.S. § 13-206.

A claim of entrapment by FFCs would be a reach. First, it is implausible that law enforcement agents encouraged FFCs to commit manslaughter or second degree murder, let alone provided encouragement for the purpose of subsequent prosecution. It is also implausible that FFCs were not predisposed to the conduct they engaged in, or that in the absence of government enticements, FFCs would have given up the core of their business: the production, marketing, and sale of fossil fuels. And law enforcement certainly did not encourage the FFCs' extensive disinformation campaigns.

More compellingly, FFCs might argue that it is unfair to prosecute their lethal conduct because they relied on government regulation, grants, and rulings authorizing the criminal conduct in question—basically a mistake-of-law or entrapment by estoppel defense. But this should also fail. The forbidden conduct in a manslaughter or second degree murder prosecution is causing death with a reckless mental state. Thus, to successfully raise a mistake-of-law via reliance defense, FFCs would have to show that a government agent of apparent authority assured FFCs that it was not a crime to cause death in the ways described in this memo.³⁰⁶ If the defense were not constructed in this way—if all a defendant needed to prevail was to demonstrate that they caused death by engaging in conduct that they believed would not be a crime had they not had a culpable mental state and death had not resulted from it—the result would be that any actor engaging in a licensed or regulated activity that negligently, recklessly, or illegally caused death would be able to claim the defense. For example, driving is authorized, subsidized, and regulated by federal and state governments, but driving in a manner that negligently or recklessly causes death is still a crime.

In investigating their case, prosecutors should seek to pinpoint any communications between FFCs and government agents in this area, in order to prepare to respond to this theory of the defense case at trial.³⁰⁷

Reliance is thus unavailable to FFCs as a defense.

3. Assessing Affirmative Defense 3: Preemption

FFCs might also claim that federal regulations preempt enforcement of state criminal laws against them for acts committed while engaging in federally regulated behavior. Preemption

³⁰⁶ See *Raley v. Ohio*, 360 U.S. 423, 425–426 (1959) (prohibiting conviction of a citizen for “exercising a privilege which the State had clearly told him was available to him”).

³⁰⁷ In the extremely unlikely event that FFCs could somehow point to communications by a government authority permitting them to recklessly cause death through their business activities, the seriousness of crimes like manslaughter or second degree murder might still preclude the application of this defense as a matter of law. As the U.S. Supreme Court noted in one of the seminal cases on mistake-of-law, which dealt with a defendant convicted of violating a statute against picketing near a courthouse after receiving permission to do so from the police, “Obviously telling demonstrators how far from the courthouse steps is ‘near’ the courthouse for purposes of a permissible peaceful demonstration is a far cry from allowing one to commit, for example, murder, or robbery.” *Cox v. Louisiana*, 379 U.S. 559, 569 (1965).

occurs when enforcement of a state law either directly conflicts with federal law or impinges on a field that Congress intended to exclusively occupy with federal regulation.³⁰⁸ But preemption of general criminal laws is an implausible interpretation of congressional intent. States' ability to prosecute homicides within their borders is a core state police power around which federal courts rightly tread very lightly. Congress may, of course, preempt a state's criminalization of the killing of a federal agent or federal official where Congress intends the federal government to manage all such prosecutions itself. But it has never attempted to preempt general homicide doctrine by passing a more general federal homicide statute, let alone a more modest—and civil rather than even criminal—regulatory statute.

No authority suggests that Congress intended to exert exclusive jurisdiction over general crimes committed by actors engaged in federally regulated conduct like fossil fuel production. It is also difficult to see why Congress would try to bar states from prosecuting all homicides in a regulated field, particularly when state prosecutions of the non-federal crimes do not interfere with federal regulation. To understand why, consider that preemption would presumably apply to all cases in the regulated industries, which would be the equivalent of granting immunity from prosecution to a broad class of actors who have previously been prosecuted for crimes committed in the course of heavily regulated conduct.

Although preemption doctrine is complex and its contours can be difficult to predict, there is no precedent for preemption of any generally applicable criminal law, let alone a homicide statute; indeed, there is no indication in the case law that a defendant has made the argument. It is therefore exceedingly unlikely that a preemption defense would be available in a prosecution under generally applicable homicide law.

C. Assessing the rhetorical defense of political conspiracy

FFCs will likely try to frame any prosecution as part of an illegitimate conspiracy to use the criminal legal system to further political, rather than justice-related, goals. They have already used these talking points extensively in attempts to undermine civil litigation against them. For example, ExxonMobil responded to the first wave of municipal and state climate accountability lawsuits by filing a countersuit for abuse of process, civil conspiracy, and violations of the company's constitutional rights, alleging that

[a] collection of special interests and opportunistic politicians are abusing law enforcement authority and legal process to impose their viewpoint on climate change. This conspiracy emerged out of frustration in New York, Massachusetts, and California with voters in other parts of the country and with the federal

³⁰⁸ A full review of preemption doctrine is a complex inquiry that lies beyond the scope of this memo.

government for failing to adopt their preferred policies on climate change [. . .] ExxonMobil finds itself directly in that conspiracy’s crosshairs.³⁰⁹

A similar argument could be made in a malicious prosecution countersuit.

It should be noted, however, that malicious prosecution is not a legal defense, but rather a tort action that can be brought following a successful defense. A plaintiff alleging malicious prosecution must establish that the criminal action brought against it was brought maliciously, without probable cause, and has been terminated in favor of the plaintiff. That is a much higher bar than exists in a purely civil context—and it can be reached only *after* a successful defense.

Regardless, FFCs may argue that a criminal case against them has nothing to do with prosecuting the actual offenses being charged, and instead is motivated by prosecutors’ desire to “impose their viewpoint on climate change.”

As baseless as these FFC arguments are in the context of civil litigation, they are even weaker in the context of a criminal prosecution for manslaughter or second degree murder, in which prosecutors are pursuing justice for actual victims who have literally been killed in a climate-induced lethal heat wave. That pursuit of justice is the core function of a prosecutor, and a disciplined practice of continuously bringing the jury’s focus back to the facts of the case—that victims are dead, that they were killed in a heat wave that was caused to a large degree by climate change, and that FFCs substantially and knowingly contributed to climate change—could prove effective in undercutting FFCs’ attempts to change the topic.

V. Conclusion

Hundreds of Americans, including 403 residents of Maricopa County, were killed in the heat wave that struck the American Southwest in July 2023.³¹⁰ These deaths didn’t just happen. They had a cause—a cause that traces back to decisions that FFCs made with full knowledge of the risks.

The deaths were caused by an extreme weather event that would have been “virtually impossible” but for human-caused climate change,³¹¹ which in turn has been caused by fossil fuel companies that are responsible for (1) generating a substantial portion of all the greenhouse gas emissions that have caused the planet to heat up and (2) deceiving the public about the dangers of their fossil fuel products so they could continue to generate these emissions. These companies

³⁰⁹ Brittany De Lea, *Exxon blames California, New York in ‘conspiracy’ countersuit*, FOX BUSINESS (Feb. 14, 2018), <https://www.foxbusiness.com/politics/exxon-blames-california-new-york-in-conspiracy-countersuit>.

³¹⁰ See Maricopa County Department of Public Health, *supra* note 3, at 8.

³¹¹ See Zachariah, *supra* note 1.

have made trillions of dollars from their reckless conduct,³¹² while regular people, like the victims of the July 2023 heat wave, pay the price.

These victims deserve justice no less than the victims of street-level homicides. A strong case exists for charging major fossil fuel companies with manslaughter or even second degree murder for these deaths—strong enough, based on the publicly available information discussed in this memorandum, for state and local prosecutors in Arizona to consider initiating criminal investigations.

While the July 2023 heat wave was devastating, it was not a unique occurrence. In recent years climate-fueled heat waves, hurricanes, wildfires, and other disastrous weather events have killed thousands of Americans—have burned children alive in Maui,³¹³ drowned families in Puerto Rico,³¹⁴ killed people by heatstroke in the Pacific Northwest and elsewhere³¹⁵—and this loss of life will continue to accelerate as climate chaos intensifies. The charges described in this memo provide a starting point for similar analyses that could, and should, be undertaken by prosecutors in every jurisdiction that experiences loss of life due to climate disasters.

³¹² See, e.g., Matthew Taylor & Jillian Ambrose, *Revealed: Big Oil's Profits Since 1990 Total Nearly \$2tn*, THE GUARDIAN (Feb. 12, 2020), <https://www.theguardian.com/business/2020/feb/12/revealed-big-oil-profits-since-1990-total-nearly-2tn-bp-shell-chevron-exxon>.

³¹³ Amanda Jackson, *A 7-year-old boy and his relatives are among the dozens killed in the Maui wildfires. Here's what we know about some of the 115 lives lost*, CNN (Aug. 21, 2023), <https://www.cnn.com/2023/08/14/us/maui-wildfires-victims-identified/index.html>.

³¹⁴ *Hurricane Maria's victims*, HURRICANE MARIA'S DEAD, <https://hurricanemariasdead.com>.

³¹⁵ See Sjoukje Philip et. al., *Rapid attribution analysis of the extraordinary heat wave on the Pacific coast of the US and Canada in June 2021*, EARTH SYSTEM DYNAMICS 13, 1689–1713 (Dec. 8, 2022), <https://esd.copernicus.org/articles/13/1689/2022/>; see also *Western North American extreme heat virtually impossible without human-caused climate change*, WORLD WEATHER ATTRIBUTION (Jul. 7, 2021); <https://www.worldweatherattribution.org/western-north-american-extreme-heat-virtually-impossible-without-human-caused-climate-change/>.