

Proposal for the Formation of an Ad Hoc Advisory Committee on
Divestment from Fossil Fuel Holdings
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Prepared for the University Council Steering Committee
by Fossil Free Penn

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"This is an example of university citizenship at its best."

– President Amy Gutmann, referring to the research and recommendations of the members of SRAC and Students Taking Action Now: Darfur (STAND) regarding divestment from oil companies in Sudan in 2006.

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1| Overview

In accordance with the "Guidelines and Procedures for Consideration by the Trustees of Proposals for Divestment from the University Endowment or Other Holdings Based Upon Social Responsibility Concerns of the Penn Community" ("Trustees Guidelines and Procedures"), Fossil Free Penn chooses to "present [a divestment] proposal to the University Council Steering Committee for consideration."

Specifically, this proposal "document[s] the basis for the presenters' belief that the proposal meets the 'social responsibility' Guidelines," which are discussed in depth below. As mandated by the Trustees Guidelines and Procedures, the "Steering Committee will make a determination as to whether there is a sufficient basis for further consideration of the proposal."

Thus the purpose of this document is to establish a *prima facie* case for fossil fuel divestment, and the question under review is whether there is sufficient evidence to warrant further study by an Ad Hoc Committee.

1.1 Proposal

Fossil Free Penn recommends that the University:

1. Stop new investments in the fossil fuel industry.
2. Remove holdings in the top 200 fossil fuel companies within 5 years.
3. Reinvest a portion of the extricated funds into clean energy assets.

We recommend that the transition of investments from fossil fuels into clean energy be undertaken under the expertise of the Office of Investments and its asset managers.

1.2 Companies Identified for Divestment

The companies targeted for divestment include the top 100 public coal corporations and top 100 public oil and gas corporations globally. These rankings were compiled by Fossil Free Indexes and are based on the amount of coal, oil or gas in these corporations' reserves.

Top 100 Public Coal Corporations	Gigatons of CO ₂	Top 100 Public Oil and Gas Corporations	Gigatons of CO ₂
1. Coal India	57.722	1. Gazprom	43.915
2. China Shenhua	36.807	2. Rosneft	13.224
3. Adani	25.383	3. PetroChina ²	8.591
4. Shanxi Coking	18.445	4. ExxonMobil	8.223
5. Anglo American	13.488	5. Lukoil	6.988

6. BHP Billiton ¹	12.351	6. BP	6.719
7. Yitai Coal	12.223	7. Petrobras	5.432
8. Datang Intl	12.206	8. Royal Dutch Shell	4.544
9. China Coal	12.103	9. Chevron	4.073
10. Peabody Energy	11.484	10. Novatek	3.853
11. Glencore Xstrata	10.698	11. Total	3.802
12. Datong Coal	10.281	12. ConocoPhillips	2.798
13. Yanzhou Coal	9.788	13. Tatneft	2.62
14. Public Power Corp (DEH)	9.339	14. ONGC ²	2.457
15. Exxaro	8.793	15. ENI	2.356
16. Yangquan Coal	7.298	16. Statoil	1.985
17. Mechel	6.739	17. Sinopec ²	1.722
18. Arch Coal	6.513	18. CNOOC	1.548
19. Alpha Natural Resources	5.458	19. Occidental	1.327
20. EVRAZ	4.855	20. BG Group	1.122
21. Mitsubishi	4.738	21. Canadian Natural Resources	0.995
22. Vale	4.401	22. Anadarko Petroleum	0.984
23. Ruspanskaya	4.084	23. Apache	0.969
24. Rio Tinto	3.696	24. Chesapeake Energy	0.909
25. Asia Resource	3.181	25. Inpex	0.908
26. Rusal	3.081	26. Bashneft	0.892
27. Neyveli Lignite	3.035	27. Devon Energy	0.889
28. Pingdingshan	3.023	28. BHP Billiton ¹	0.854
29. Cloud Peak	2.753	29. Repsol	0.823
30. Sasol	2.731	30. Ecopetrol	0.774
31. Tata Steel	2.709	31. EOG Resources	0.772
32. AGL	2.704	32. Suncor Energy	0.715
33. Teck	2.603	33. Marathon Oil	0.683

¹ BHP Billiton Limited is one corporation yet holds reserves in oil, gas and coal that make it both a top 100 oil and gas corporation and top 100 coal corporation.

² Penn decided to divest from Petrochina, ONGC, and Sinopec in 2006 due to their operations in Sudan.

34. Severstal	2.577	34. Hess	0.565
35. Coalspur	2.545	35. Imperial Oil	0.552
36. Kuzbass Fuel	2.504	36. Encana	0.548
37. Polyus Gold	2.294	37. Noble Energy	0.49
38. Energy Ventures (Australia)	2.184	38. BASF	0.483
39. Whitehaven Coal	2.055	39. EQT	0.449
40. Banpu	2.04	40. Range Resources	0.443
41. Bayan	1.957	41. Continental Resources	0.426
42. RWE	1.943	42. OMV	0.42
43. Consol Energy	1.887	43. Antero Resources	0.41
44. WHSP	1.851	44. KazMunaiGas EP	0.4
45. Westmoreland	1.835	45. YPF	0.389
46. Resource Generation	1.818	46. Southwestern Energy	0.38
47. Churchill Mining	1.745	47. Cenovus Energy	0.374
48. NTPC	1.74	48. Linn Energy	0.364
49. Adaro	1.607	49. Woodside Petroleum	0.36
50. Nacco	1.557	50. Husky Energy	0.343
51. Idemitsu Kosan	1.53	51. PTT ³	0.317
52. ARLP	1.468	52. Consol Energy	0.312
53. Huolinhe Opencut	1.387	53. Pioneer Natural Resources	0.302
54. Golden Energy	1.354	54. Cabot Oil & Gas	0.3
55. Mitsui & Co	1.344	55. WPX Energy	0.275
56. Coal of Africa Limited	1.339	56. SK Innovation	0.263
57. NLMK	1.288	57. Whiting Petroleum	0.244
58. Tata Power	1.062	58. Murphy Oil	0.242
59. MMK OJSC	1.046	59. QEP Resources	0.233
60. Wesfarmers	1.011	60. Newfield Exploration	0.223
61. Kazakhmys	0.998	61. Dragon Oil	0.202
62. New World Resources	0.972	62. Sasol	0.201

63. MMC (Mongolian Mining)	0.903	63. Ultra Petroleum	0.2
64. Itochu	0.878	64. Santos	0.195
65. Cockatoo	0.8	65. Concho Resources	0.194
66. Shanxi Meijin Energy	0.784	66. Denbury Resources	0.19
67. Jizhong Energy	0.742	67. Freeport-McMoRan	0.183
68. Bandanna	0.731	68. Maersk Group	0.174
69. Polo Resources	0.726	69. MEG Energy	0.173
70. Allete	0.723	70. SandRidge Energy	0.157
71. CLP Holdings	0.696	71. Crescent Point Energy	0.157
72. Aspire	0.67	72. GDF SUEZ	0.155
73. Marubeni	0.568	73. Pacific Rubiales Energy	0.154
74. China Resources	0.567	74. SM Energy	0.148
75. Walter Energy	0.556	75. JX Holdings	0.146
76. Coal Energy	0.503	76. Cimarex Energy	0.144
77. Indika	0.485	77. Mitsui & Co	0.142
78. Arcelor Mittal	0.464	78. Penn West Petroleum	0.137
79. FirstEnergy	0.458	79. Polish Oil & Gas	0.132
80. Black Hills	0.431	80. MOL	0.131
81. Wescoal	0.43	81. Energen	0.128
82. Grupo Mexico	0.42	82. TAQA	0.123
83. ARM	0.383	83. Oil Search	0.114
84. Shanxi Coal	0.376	84. Oil India	0.113
85. Capital Power	0.367	85. ARC Resources	0.112
86. PTT ³	0.359	86. Genel Energy	0.107
87. Shanxi Lanhua Sci-Tech	0.338	87. Canadian Oil Sands	0.102
88. Fortune Minerals	0.328	88. Energy XXI	0.096
89. Cardero	0.323	89. PDC Energy	0.095
90. Zhengzhou Coal	0.319	90. Oasis Petroleum	0.094
91. SAIL	0.307	91. Tourmaline Oil	0.093

³ PTT Public Company Limited is one corporation yet holds reserves in oil, gas and coal that make it both a top 100 oil and gas corporation and top 100 coal corporation.

92. JSPL	0.301	92. Rosetta Resources	0.093
93. Shougang Fushan	0.299	93. RWE	0.093
94. Jingyuan	0.297	94. National Fuel Gas	0.088
95. Stanmore	0.287	95. Peyto E&D	0.088
96. Prophecy Coal	0.272	96. Xcite Energy	0.088
97. Cliffs Natural Resources	0.247	97. Tullow Oil	0.087
98. James River	0.195	98. Energi Mega Persada	0.085
99. CESC	0.185	99. Breitburn Energy Partners	0.081
100. Alcoa	0.18	100. Enerplus	0.08

1.3 Analysis of Social Responsibility Criteria

According to the Trustees Guidelines and Procedures, there are four criteria of social responsibility required for divestment considerations. Throughout this document, we will demonstrate that fossil fuel divestment meets these criteria, especially in the context of the Darfur divestment precedent in 2006.⁴

Criterion 1. *"There exists a moral evil implicating a core University value that is creating a substantial social injury."*

According to the footnote reference 2, "substantial social injury" is further defined in the Trustees' document "Statement on Responsibility Concerning Endowment Securities."

"With regard to corporate behavior, substantial social injury is defined as the excessive or deliberate injurious impact on employees, consumers, and/or other individuals, or groups resulting directly from specific actions or inactions by a company. Included in this category are actions that violate, subvert, or frustrate the enforcement of rules of domestic or international law intended to protect individuals and/or groups against deprivation of health, safety, basic freedoms or human rights."

First, a precedent on this issue was set by the Trustees in responding to the Darfur divestment proposal by the Social Responsibility Advisory Committee.⁵ During this case, divestment was warranted since the oil companies represented large inputs to the regime's genocide activities, but relatively small inputs to the victim population's benefit. Thus, one

⁴ Holtzman, Phyllis. "Penn to Divest From Sudan in Response to Genocide." Penn News. June 19, 2006.

⁵ Social Responsibility Advisory Committee, University of Pennsylvania. "Report on Investing in the Sudan." March 3, 2006. Accessed September 21, 2015.

sufficient standard for achieving the excessive or deliberate Criterion 1 is when there exist particular populations who suffer from harms (net of benefits) from the companies in question.

Second, another sufficient standard for achieving Criterion 1 is the violation, subversion, or frustration of laws. Note that the phrasing of “included” means that the standard of net harms is independent of the illegality standard.

Criterion 2. *"There must be a specific company or companies identified for divestment, rather than a broad proposal directed at an industry or activity more generally."*

We have provided a specific list of 200 target companies, consisting of the companies holding the top 100 coal reserves and top 100 oil-gas reserves by their greenhouse emission potential.

Criterion 3. *"The company or companies identified for divestment must have a significant, clear, and undeniable nexus to the moral evil."*

As is demonstrated below in Sections 2.6 and Appendix A, the companies which we have identified meet this criterion.

Criterion 4. *"The proposal for divestment must have the support of a broad and sustained consensus of the University community reflected over a sustained period of time."*

Since the inception of the fossil fuel divestment group Divestment at Penn (now Fossil Free Penn) in early 2013, the university community has seen a groundswell of growing support from students, faculty, and alumni, as demonstrated in Appendices C, D, and E. In particular, the spring 2015 Nominations & Elections Committee referendum for fossil fuel divestment saw 87.8% undergraduate support, with more than half of the required student turnout, the details of which can be found in Appendix B.

2| Moral Evils of the Fossil Fuel Industry

2.1 Social Injuries Regarding Local Impacts & Pollution

The negative impacts of fossil fuel extraction and localized pollution constitute a social injury. A sampling of these negative effects include public health risks and ecological destruction in areas near mountaintop removal coal mines, coal power plants, hydraulic fracturing sites and oil extraction sites.

Mountaintop removal coal mining, also known as surface mining, is practiced throughout Appalachia in the United States. According to a 2010 report in the journal *Science*, elevated levels of airborne, hazardous dust have been documented near surface mining sites.⁶ Additionally, the report found that “adult hospitalizations for chronic pulmonary disorders and hypertension are elevated as a function of county-level coal production, as are rates of mortality, lung cancer; and chronic heart, lung, and kidney disease.”⁷ These health problems were common to both women and men, indicating that effects “are not simply a result of direct occupational exposure of predominantly male coal miners.”⁸ A 2011 report by the U.S. Environmental Protection Agency was found that nearby water ecosystems were significantly altered due to mountaintop removal mining, including but not limited to degradation of water quality in local streams, elevated selenium concentrations, and permanent loss of springs and streams due to the removal of mountains and burial of streams under fill.⁹ A 2011 report by researchers at Washington State University and West Virginia University found that in areas of four Appalachian states where mountaintop removal was most common between 1996 and 2003 the rate of birth defects was 235 per 10,000 births as compared with a rate of 144 defects per 10,000 births in non-mining areas controlled for socio-economic and behavioral risks.¹⁰ Further up the supply chain, the negative health impacts of coal power plants have also been documented, with a 2010 report by the Clean Air Task Force finding that the activities of U.S. coal power plants are responsible for an estimated 9,700 hospitalizations each year.¹¹

Adverse public health impacts have been observed in association with hydraulic fracturing for natural gas. A 2014 study supported by the Department of Environmental and Occupational Health at the Colorado School of Public Health that examined associations between maternal residences and natural gas development between 1996 and 2009 in rural Colorado found that births to mothers in the areas most exposed to natural gas development had a 30% greater prevalence for congenital birth defects than those that lived in areas without natural gas development in a 10 mile radius.¹² A 2015 study by researchers at the University of

⁶ Palmer, M. A., E. S. Bernhardt, W. H. Schlesinger, K. N. Eshleman, E. Fofoula-Georgiou, M. S. Hendryx, A. D. Lemly, G. E. Likens, O. L. Loucks, M. E. Power, P. S. White, and P. R. Wilcock. "Mountaintop Mining Consequences." *Science* 327, no. 5692 (2010): 148-49. Accessed October 30, 2015. doi:10.1126/science.1180543.

⁷ Ibid.,

⁸ Ibid.,

⁹ U.S. EPA (Environmental Protection Agency). 2011. “The Effects of Mountaintop Mines and Valley Fills on Aquatic Ecosystems of the Central Appalachian Coalfields”. Office of Research and Development, National Center for Environmental Assessment, Washington, DC. EPA/600/R-09/138F.

¹⁰ Washington State University. "Large numbers of birth defects seen near mountaintop mining operations." *ScienceDaily*. June 23, 2011. Accessed October 30, 2015.

¹¹ "The Toll from Coal." Clean Air Task Force. September 1, 2010. Accessed July 27, 2015.

¹² McKenzie, Lisa, Ruixin Guo, Roxanna Witter, David Savitz, Lee Newman, and John Adgate. "Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado." *Environ Health Perspect* 122, no. 4 (2014): 412-17. Accessed October 30, 2015. doi:10.1289/ehp.1306722.

Pennsylvania found an increased correlation between inpatient hospitalization for cardiology, neurology and wells per square kilometer.¹³

The Niger Delta in Nigeria has been a site of oil production and has seen numerous damaging ecological and health impacts as a result. The United Nations Environmental Programme produced a comprehensive report on such issues in Ogoniland, a 1,000 square kilometer area in the Niger Delta in the south of Nigeria.¹⁴ The area was the site of oil production by Shell Petroleum Company Limited and Nigerian National Petroleum Company from the 1950s until 1993 when a large protest campaign compelled them to cease operations.¹⁵ The report found extensive pollution of soil in land, sediments and swamplands, even after many years of cessation.¹⁶ Two thirds of contaminated land sites near oil production facilities have soil contamination at a rate that exceeds Nigerian national guidelines.¹⁷ Hydrocarbons were found in 28 wells at 10 communities adjacent to production sites with seven wells having hydrocarbon levels at least 1,000 times higher than the Nigerian drinking water standard.¹⁸

2.2 Social Injuries Regarding Climate Change

The fossil fuel industry's practices are socially injurious in a manner that requires a response of divestment from the University of Pennsylvania. These social injuries are imposed on individuals, communities and ecosystems across the globe. While these negative impacts of the fossil fuel industry are not limited to climate change, the burning of a large portion of remaining fossil fuel reserves would result in adverse effects that constitute great social injury. These include, but are not limited to, the following:

1. Agricultural Impacts
2. Human Health Impacts
3. Inundation of Coastal Areas and Rising Sea Levels
4. Increased Stress to Ecosystems
5. Security Impacts

In its Fourth Assessment published in 2007, the Intergovernmental Panel on Climate Change (IPCC) included the following table demonstrating that adverse, socially injurious climate impacts would worsen the more global temperatures rise. The validity of these effects are further demonstrated by the IPCC's Fifth Assessment Report.¹⁹

¹³ Jemielita, Thomas, George L. Gerton, Matthew Neidell, Steven Chillrud, Beizhan Yan, Martin Stute, Marilyn Howarth, Pouné Saberi, Nicholas Fausti, Trevor M. Penning, Jason Roy, Kathleen J. Propert, and Reynold A. Panettieri. "Unconventional Gas and Oil Drilling Is Associated with Increased Hospital Utilization Rates." *PLoS ONE* 10, no. 7 (2015). Accessed October 30, 2015. doi:10.1371/journal.pone.0137371.

¹⁴ *Environmental Assessment of Ogoniland*. Nairobi: United Nations Environment Programme, 2011. 22.

¹⁵ *Ibid.*, 20.

¹⁶ *Ibid.*, 207.

¹⁷ *Ibid.*, 9.

¹⁸ *Ibid.*, 11.

¹⁹ "IPCC Report Graphics." IPCC Report Graphics. Accessed October 30, 2015.

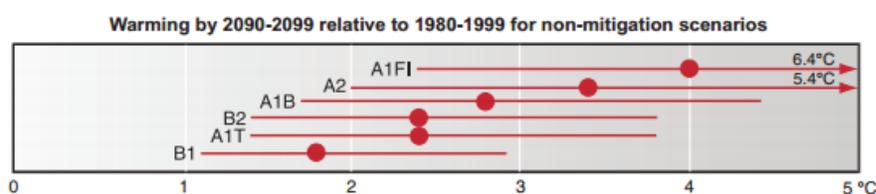
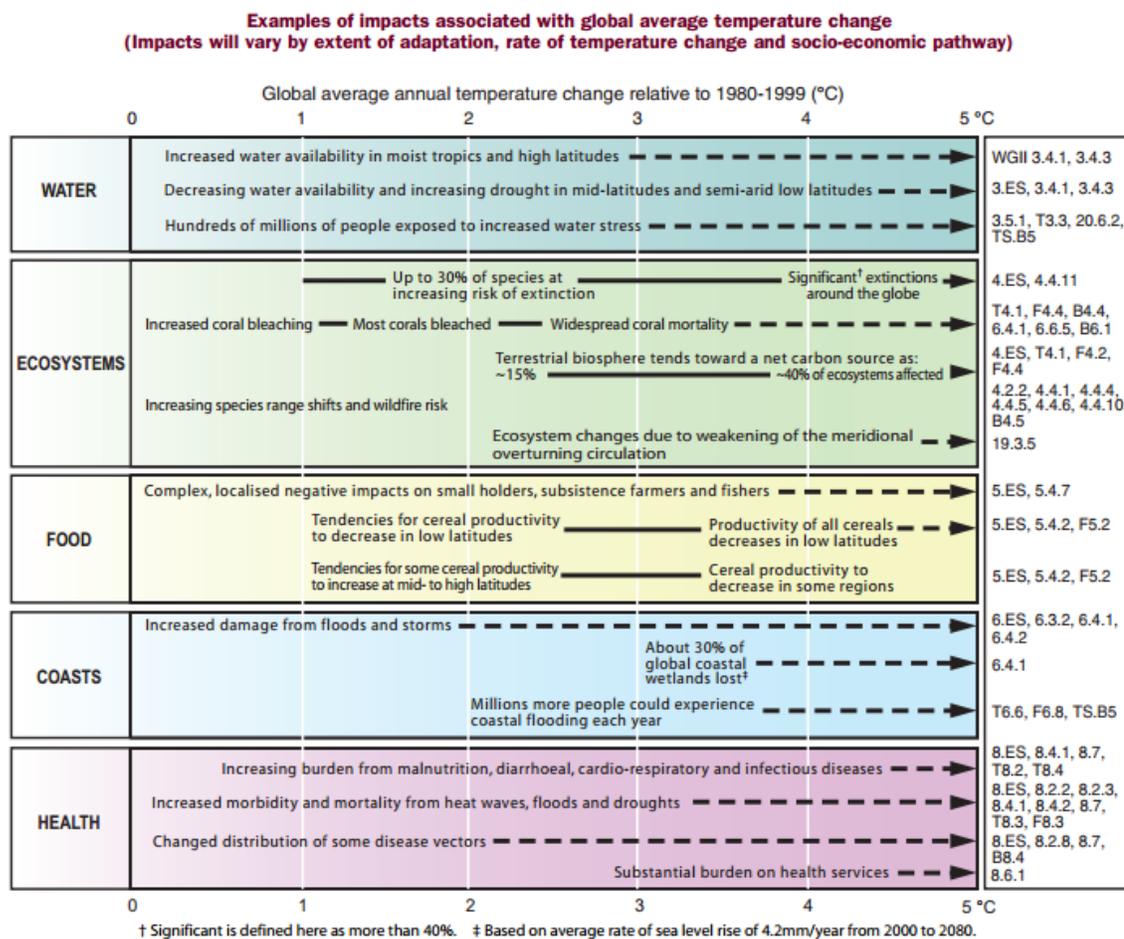


Figure 1: Examples of impacts associated with global average temperature change. Source: IPCC 4th Assessment Report, Synthesis Report, p. 51

These social injuries are distributed in an unjust manner in several different respects. First, the vast majority of those who will feel these effects are not affiliated or responsible for the fossil fuel industry's practices. Those affiliated with the fossil fuel industry's practices include their workers and executives, which constitute a very small fraction of the world's workers and an even smaller fraction of the great mass of humanity that will be affected negatively by climate change. Further, as is stated by the United Nations Development Programme (UNDP), "climate change... already imposes substantial costs, with the brunt of them borne by poor countries and poor communities"²⁰. The UNDP goes on to state that while the disadvantaged feel climate

²⁰ United Nations Development Programme, *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*, p. 34.

change's negative effects most significantly, "climate change and local stresses on natural resources and ecosystems are increasing pressure on the environment in almost all countries, regardless of their stage of development. Unless action is taken urgently, future progress in human development will be threatened."²¹ Causing climate change is socially injurious, especially when the negative results of climate change will be unevenly distributed, and when continuation of such practices over the years will stunt human development as a whole.

Climate change will be increasingly costly for economies at local and global levels. Worldwide climate change costs already constitute close to 1% of global GDP."²² If no action is taken against climate change, these costs are forecast by the Climate Vulnerability Monitor to "double by 2030, lowering world GDP by well over 3 percent." Researchers also stress the importance of climate change mitigation, stating that "both climate change and carbon economy costs grow as emissions expand and are lessened as they are cut."²³

Carbon dioxide emissions are unequivocally a major cause of climate change today. As a result of this causation a number of institutions, organizations and nations have decided to quantify a social cost of carbon. According to U.S. government interagency report that included the Council of Economic Advisers, Department of Energy, and the Environmental Protection Agency, the social cost of carbon is \$40 per metric ton at a 3% discount rate.²⁴

Agricultural Impacts

Climate change has severe effects on food production. In the IPCC's Fourth Assessment it is stated that drops in agricultural production are to be expected in Australia and New Zealand by 2030 and that water scarcity in Latin America will grow significantly.²⁵ The United Nations Human Development Report states that "although low HDI [human development index] countries contribute the least to global climate change, they are likely to endure the greatest loss in annual rainfall and the sharpest increase in its variability, with dire implications for agricultural production and livelihoods."²⁶ The impacts of extreme weather events can also be tremendously detrimental to crop growth. For example, when the Mississippi River flooded in 2008; farmers lost an estimated \$8 billion in the area.²⁷ Despite the conjecture that there is a possibility for climate change to bring positive agricultural impacts, the negative effects easily nullify this impact.²⁸

²¹ United Nations Development Programme, *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*, p. 87

²²McKinnon, Matthew. "Climate Vulnerability Monitor: A Guide to the Cold Calculus of a Hot Planet." *Estudios Gráficos Europeos, SA, Spain* (2012): 331, p. 24.

²³ Ibid.

²⁴ "2013-06-17 Energy Conservation Program: Energy Conservation Standards for Standby Mode and Off Mode for Microwave Ovens; Final Rule." Regulations.gov. June 17, 2013. Accessed October 25, 2015.

²⁵ Intergovernmental Panel on Climate Change, *Fourth Assessment Report: Climate Change 2007*, See: Synthesis report, Table SPM.2. Examples of some projected regional impacts.

²⁶ United Nations Development Programme, *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*, p. 6.

²⁷ Karl, Thomas R. *Global climate change impacts in the United States*. Cambridge University Press, 2009.

²⁸ A study by the Committee on Climate Change finds that, in the UK, the rise of temperatures and longer growing seasons could present conditions for farmers to "increase productivity and so benefit from potential increases in global food prices." Nevertheless, the threats of "water scarcity, loss of soil fertility, or persistent presence of pests and diseases can easily nullify these possibilities."

Furthermore, the International Food Policy Research Institute (IFPRI) found in a recent study that wheat production will be adversely affected by climate change, and that the longer mitigation is delayed, the greater the production will fall. Using a 2000 baseline, they project a decline in yield for rain-fed wheat in the developed world of 1.3 percent by 2030, 4.2 percent by 2050, and 14.3 percent by 2080.²⁹ The IFPRI determines that “[s]tarting the process of slowing emissions growth today is critical to avoiding a calamitous post-2050 future.”³⁰

Human Health Impacts

The worldwide consensus is that human health is being affected by climate change, with the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) concluding such.^{31,32} According to the WHO, global climate change has been causing 140,000 deaths per year since 2004.³³ A more recent study commissioned by 20 governments around the world estimates that this number has grown to approximately 400,000 climate-related deaths per year.³⁴ The WHO stresses that “the health effects of a rapidly changing climate are likely to be overwhelmingly negative, particularly in the poorest communities, which have contributed least to greenhouse gas emissions” and recognizes the ever more damaging impact of an ever-warmer climate on social and environmental health factors such as clean air, water, food, and shelter.³⁵

In addition to people in poorer countries and communities, the elderly, the young, the ill, and those with pre-existing conditions are all particularly vulnerable to the health impacts of climate change.³⁶ The WHO additionally states that major causes of death such as dengue fever, malnutrition, malaria and diarrheal diseases are “highly climate-sensitive and are expected to worsen as the climate changes.”³⁷ Developed countries cannot expect to be shielded from climate change’s health impacts, with mortality expected to rise 1-4 percent in EU countries for each one-degree rise in temperature.³⁸

Inundation of Coastal Areas and Rising Sea Levels

In addition to the damage that climate change is already causing, the social and environmental damage expected to occur in the future as a cause of climate change is enormous. Sea level rise from climate change is expected to cause substantial social and environmental impacts both nationally and globally. In the United States, the entire city of New York, as well as

²⁹ Nelson, Gerald C., Mark W. Rosegrant, Amanda Palazzo, Ian Gray, Christina Ingersoll, Richard Robertson, Simla Tokgoz et al. *Food security, farming, and climate change to 2050: Scenarios, results, policy options*. Vol. 172. Intl Food Policy Res Inst, 2010. p. 85.

³⁰ Ibid.

³¹ World Health Organization. *Global health risks: mortality and burden of disease attributable to selected major risks*. World Health Organization, 2009, p. 44

³² Centers for Disease Control and Prevention. *CDC Policy on Climate Change and Public Health*.

³³ World Health Organization. "Climate and health: Fact sheet," July 2005.

³⁴ DARA, Climate Vulnerable Forum. *Climate Vulnerability Monitor 2nd Edition: A Guide to the Cold Calculus of a Hot Planet*. 2012. Accessed September 21, 2015.

³⁵ *World Health Organization, Climate and health: Fact sheet, July 2005*.

³⁶ "CDC Policy on Climate and Health." Centers for Disease Control and Prevention. December 22, 2014. Accessed October 30, 2015.

³⁷ Ibid.

³⁸ European Union: Commission Staff Working Document, Accompanying document to the White Paper: Adapting to climate change: Towards a European framework for action “Human, Animal and Plant Health Impacts of Climate Change.” 2009. p.4- 5.

entire low-lying states such as Florida, are especially vulnerable. In recognition of this, Congress has passed legislation, such as the Southeast Florida Regional Climate Change Compact, that recognizes the unique vulnerability of the area.³⁹ The U.S. military has also found it necessary to address this vulnerability, as since 2009, the U.S. Army Corps of Engineers has also been incorporating sea level rise into all of its civil works programs.⁴⁰

At the international and inter-continental level, global climate change has already caused the melting of parts of the Greenland and West Antarctic ice sheet (WAIS); much more severe melting is to be expected in the future.⁴¹ The IPCC identifies the threshold for near-total glaciation at 3.2- 6.2°C local warming (1.9- 4.6°C global warming). This is within the range of warming projections generated by several emission scenarios studied by the IPCC, corresponding to the absence of aggressive mitigation action on the part of governments.⁴² However, even for a warming of an additional 1°C, research has concluded that sea levels may rise by an estimated 2.3 meters.⁴³ Sea level rises on this scale would cause significant social injury, as entire nations such as Bangladesh and the Netherlands would be widely inundated, as well as many other densely populated coastal areas such as those in China. Sea level rise also has the potential to be abrupt, heightening the economic and human costs associated. Recent research has concluded that during the last interglacial period, “a critical ice sheet stability threshold was crossed, resulting in the catastrophic collapse of polar ice sheets and substantial sea level rises.”⁴⁴ As with many other climate impacts, the faster sea level rise happens, the more costly and disruptive it will be.

Increased Stress to Ecosystems

Loss in biodiversity in plants and animals has been noted by researchers on a global scale, at rates that do not show signs of decline.⁴⁵ Without mitigation, these losses are expected to increase exponentially, with an expected 56-57% of plants and 34-37% of animals losing approximately 50% of their present range within this century.⁴⁶ Because ecosystems are vital to the survival and prosperity of all of humanity, damage imposed on them is an important form of social injury arising from the activities of fossil fuel companies. As the UN Development Program points out, “ecosystem losses are constraining livelihood opportunities,

³⁹ Broward County, Miami-Dade County, Monroe County, and Palm Beach County, Southeast Florida Regional Climate Change Compact.

⁴⁰ United States Army Corps of Engineers. “US Army Corps response to Sea Level Rise.” 2011.

⁴¹ Change, Intergovernmental Panel On Climate. “Fourth assessment report.” See: “Deglaciation of West Antarctic and Greenland ice sheets.” *IPCC, Ge* (2007).

⁴² Change, Intergovernmental Panel On Climate. “IPCC Third assessment report- Climate Change 2001.” (2001).

⁴³ Levermann, Anders, Peter U. Clark, Ben Marzeion, Glenn A. Milne, David Pollard, Valentina Radic, and Alexander Robinson. “The multimillennial sea-level commitment of global warming.” *Proceedings of the National Academy of Sciences* 110, no. 34 (2013): 13745-13750.

⁴⁴ O’Leary, Michael J., Paul J. Hearty, William G. Thompson, Maureen E. Raymo, Jerry X. Mitrovica, and Jody M. Webster. “Ice sheet collapse following a prolonged period of stable sea level during the last interglacial.” *Nature Geoscience* 6, no. 9 (2013): 796-800. p.1.

⁴⁵ Butchart, Stuart HM, Matt Walpole, Ben Collen, Arco Van Strien, Jörn PW Scharlemann, Rosamunde EA Almond, Jonathan EM Baillie et al. “Global biodiversity: indicators of recent declines.” *Science* 328, no. 5982 (2010): 1164-1168.

⁴⁶ Rockström, Johan, Will Steffen, Kevin Noone, Åsa Persson, F. Stuart Chapin, Eric F. Lambin, Timothy M. Lenton et al. “A safe operating space for humanity.” *Nature* 461, no. 7263 (2009): 472-475.

especially for poor people.”⁴⁷ This is an example of how fossil fuel companies’ actions are exacerbating global inequalities, as it is scientific consensus that the only sure way to maintain the health of terrestrial and aquatic ecosystems is to significantly mitigate the release of GHG emissions into the atmosphere.

Heightened CO₂ concentrations in the atmosphere, directly resulting from fossil fuel combustion, are causing the oceans to become more acidic, with the pH of the oceans decreasing at a rate of 0.02 units per decade according to multiple measures.⁴⁸ A 2010 report from the United Nations Environment Programme (UNEP) concluded that: “[i]f ocean acidification continues, disruptions to food chains and direct and indirect impacts on numerous species are considered likely with consequent risk to food security,” and states the “obvious solution” as cutting down on anthropogenic CO₂ emissions.⁴⁹ Significant damage to coral reefs, as a result of acidification, has already been observed, including the loss of 50.7 percent of initial coral cover in Australia’s Great Barrier Reef.⁵⁰ Ecosystem services provided by coral reefs, including food, jobs, and tourism, have an estimated value of as much as \$375 billion per year.⁵¹ Moreover, as exceptionally rich ecosystems, coral reefs have an importance that goes beyond their inherent biological or monetary value.

A common theme that can be drawn through these observations is that although the damage to ecosystems and associated social impacts are unimaginable given a continuation of today’s actions and warming trends, the damage that is already being done is sufficient to merit immediate action.

Security Impacts

Climate change is already undermining the livelihoods and security of many people around the world, and the number of climate refugees grows every year. As the UN states, “The Norwegian Refugee Council and the UN Office for the Coordination of Humanitarian Affairs (OCHA) have estimated that in 2008 alone, at least 36 million people were newly displaced by sudden natural disasters, including over 20 million displaced by disasters related to the climate.”⁵² A number of major analyses have looked with detail at the likely global security implications of climate change. In 2008, a National Intelligence Assessment was assembled by 16 U.S. intelligence agencies. The chairman stated publicly that climate change could disrupt U.S. access to raw materials, create millions of refugees, and cause water shortages and damage from melting permafrost.⁵³ Moreover, a joint report from the Centre for Strategic and International Studies and the Centre for a New American Security highlights the need for urgent action to reduce emissions, stating. “An effective response to the challenge of

⁴⁷ United Nations Development Programme. Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World. 2013. url: <http://hdr.undp.org/en/2013-report> page 95.

⁴⁸ Doney, Scott C., Victoria J. Fabry, Richard A. Feely, and Joan A. Kleypas. "Ocean acidification: the other CO₂ problem." *Marine Science* 1 (2009).

⁴⁹ United Nations Environment Programme. Environmental Consequences of Ocean Acidification: A Threat to Food Security. 2010.

⁵⁰ De’ath, Glenn et al. “The 27–year decline of coral cover on the Great Barrier Reef and its causes.” In: Proceedings of the National Academy of Sciences (Oct. 2012).

⁵¹ National Oceanic and Atmospheric Administration. “Heat Stress to Caribbean Corals in 2005” *Worston Record*. 2010.

⁵² “Refugees: Next Steps, New Dynamics of Displacement.” United Nations. Accessed October 31, 2015.

⁵³ Craven, Greg. “What’s the Worst That Could Happen?: A Rational Response to the Climate Change Debate.” *Perigee Trade*, 2009.

global warming cannot be spread out across the next century, but rather must be set in place in the next decade, in order to have any chance to meaningfully alter the slope of the curves one sees in the IPCC report.”⁵⁴

In 2012, the U.S. National Academy of Sciences published a report entitled “Climate and Social Stress: Implications for Security Analysis.”⁵⁵ The report describes in great detail the ways in which climate change is a national security issue for the United States, as well as a threat to international peace and security. Summing up the importance of climate change as an utmost security concern, in March 2013, Admiral Samuel J. Locklear III, chief of U.S. naval forces in the Pacific, argued that climate change “is probably the most likely thing that is going to happen... that will cripple the security environment, probably more likely than the other scenarios we all often talk about.”⁵⁶

2.3 Social Injuries Regarding Political Influence and Lobbying

Science Denial by Fossil Fuel Companies

The incontrovertible scientific consensus that anthropogenic climate change exists and is already impacting human and natural systems^{57, 58, 59, 60, 61, 62, 63, 64, 65, 66} is not appropriate for academic debate at any legitimate institution such as Penn. While there may be legitimate discussions about how to best implement solutions to the issue, actively denying the scientific facts is academically dishonest and obstructs the democratic process of creating these solutions. Climate denial thus contradicts Penn’s values as an academically-rigorous university and its reputation as the “Civic Ivy.” There are two implications for social injury impacts: first, in the absence of these activities, stricter regulations would have prevented some of the social injuries that were inflicted; second, the resources spent on false science and lobbying is a direct opportunity cost that could have been spent on improving lives.

⁵⁴ Center for Strategic and International Studies and the Center for a New American Security. “The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change.” 2007.

⁵⁵ “Climate and Social Stress: Implications for Security Analysis.” Climate and Social Stress: Implications for Security Analysis. Accessed October 30, 2015.

⁵⁶ Bender, Bryan. “Chief of US Pacific Forces Calls Climate Biggest Worry.” Boston Globe. March 9, 2013. Accessed October 30, 2015.

⁵⁷ American Association for the Advancement of Science. “AAAS board statement on climate change.” *Washington, DC* (2006).

⁵⁸ American Chemical Society. “Global Climate Change”. 2013.

⁵⁹ American Geophysical Union. “Human-Induced Climate Change Requires Urgent Action”. August 2013.

⁶⁰ American Medical Association. “Global Climate Change and Human Health”. 2013.

⁶¹ American Meteorological Society. “Climate Change: An Information Statement of the American Meteorological Society”. 20 August 2012.

⁶² American Physical Society. “National Policy: Climate Change”. November 18, 2007.

⁶³ The Geological Society of America. “Position Statement: Climate Change”. April 2015.

⁶⁴ Academia Brasileira de Ciencias, Academie des Sciences, Accademia dei Lincei, Royal Society, Royal Society of Canada, Deutsche Akademie der Naturforscher, Science Council of Japan, National Academy of Sciences, Chinese Academy of Sciences, Indian National Science Academy, Russian Academy of Sciences. “Joint science academies’ statement: Global response to climate change”. 2005.

⁶⁵ U.S. Global Change Research Program. “Global Climate Change Impacts in the United States”. 2009.

⁶⁶ Intergovernmental Panel on Climate Change. IPCC Fourth Assessment Report: Climate Change 2007. “Working Group I: The Physical Science Basis”.

Unfortunately, fossil fuel companies have a long and well-documented history of funding the denial of anthropogenic climate change, an activity which they continue to do so today.^{67, 68, 69, 70} According to the Oxford Handbook of Climate Change and Society, “[b]oth individual corporations such as ExxonMobil and Peabody Coal as well as industry associations such as the American Petroleum Institute, Western Fuels Association, and Edison Electric Institute provided funding for individual contrarian scientists, conservative think tanks active in climate change denial, and a host of front groups.”⁷¹ Their promotion of false science is discordant with a university that prides itself on academic excellence. Additionally, fossil fuel companies expend enormous resources on lobbying. In the US alone, lobbying by the oil and gas industry amounted to \$142 million in 2014, and \$97 million in 2015 so far;⁷² lobbying by coal mining industry amounted to \$9.8 million in 2014 and \$6.3 million in 2013 so far.⁷³ From the same source, since 2000, the oil and gas industry has spent \$1.633 billion, and coal mining industry has spent \$153.3 million on lobbying.

Funding for climate denial directly translates to the political obstruction of climate action and the wider democratic system of which Penn is a civic participant. Based on data from the 113th Congress, a climate-denying member of Congress took on average 3.58 times more in fossil fuel industry contributions than a scientifically-literate member of Congress who did not deny anthropogenic climate change (the deniers on average received \$346,975 from fossil fuel companies versus \$96,999 for others).⁷⁴ The problem persists in the current 114th Congress, where climate-denying Senators took 4.01 times as much fossil fuel donations as others, and climate-denying House Representatives took 3.40 times as much as their colleagues.⁷⁵

With these facts, fossil fuel companies have a clear nexus to a “moral evil implicating a core University value that is creating a substantial social injury”. In a counterfactual world without these companies’ anti-science and anti-climate lobbying, stronger climate policies would have been implemented sooner, thereby lessening the accumulation of the above social injuries. Thus, the historical and ongoing lobbying efforts by fossil fuel companies have a direct causal link to creating additional social injuries.

Alternatives to Divestment in the Context of Science Denial

First, committing more resources to academic research on climate science and solutions as well as on-campus sustainability efforts, does not represent a viable alternative, because these actions are not mutually exclusive to divestment. In fact, divestment can improve the risk-

⁶⁷ Newsweek Staff. "Global Warming Deniers Well Funded". Newsweek. 12 August 2007.

⁶⁸ Douglas Fischer, "'Dark Money' Funds Climate Change Denial Effort". *Scientific American*. December 23, 2013

⁶⁹ Justin Gillis, John Schwartz. "Deeper Ties to Corporate Cash for Doubtful Climate Researcher". *New York Times* Feb 21, 2015

⁷⁰ Simon Bowers. "Climate-sceptic US senator given funds by BP political action committee" *The Guardian* 22 March, 2015

⁷¹ John S. Dryzek, Richard B. Norgaard, and David Schlosberg. "Organized Climate Change Denial". Oxford Handbook of Climate Change and Society. Aug 2011. Web. October 20, 2015

⁷² Center for Responsive Politics. "Oil & Gas: Lobbying, 2015." OpenSecrets. Accessed October 25, 2015.

⁷³ Center for Responsive Politics. "Coal Mining: Lobbying, 2015." OpenSecrets. Accessed October 25, 2015.

⁷⁴ Tiffany Germain, Ryan Koronowski. "The Anti-Science Climate Denier Caucus: 113th Congress Edition". *ThinkProgress*. June 26, 2013.

⁷⁵ Tiffany Germain, Kristen Ellingboe, Kiley Kroh. "The Anti-Science Climate Denier Caucus: 114th Congress Edition". *ThinkProgress*. January 8, 2015.

adjusted returns of the endowment and protect its long-term financial value, meaning that divestment would help Penn better conduct more research and sustainability programs. In addition, as long as fossil fuel companies continue to lobby against fundamental science and the implementation of real climate solutions, any positive impact from Penn's own climate actions would be negated. In other words, Penn's laudable contributions to the climate would be annihilated by Penn's financial complicity in fossil fuel companies' stance against science.

Another commonly suggested alternative to divestment is to participate in shareholder engagement, e.g. proxy voting or letters to management. However, these actions have proven insufficient in eliminating anti-science lobbying. For example, Penn's Social Responsibility Advisory Committee consists of faculty, students, alumni, and staff who make rational and informed decisions on proxy voting for resolutions on companies in Penn's portfolio. This committee was founded by the Trustees' Resolution to Establish Procedures for Proxy Voting in 2003, and performs important work. However, if shareholder engagement alone were sufficient, fossil fuel companies would no longer be funding anti-science lobbying.

2.4 Unlawful Practices by the Fossil Fuel Industry

Fossil fuel corporations violate international law. The *Universal Declaration of Human Rights* declares that "everyone has the right to life, liberty and security of person."⁷⁶ The right to life is the basis for all other fundamental human rights. The activities of companies in the fossil fuels industry threaten these rights to life and security for reasons including the increased frequency and severity of extreme weather such as droughts and hurricanes, increased incidence of infectious disease, deprivation from potable water and loss of agricultural productivity.

The resolve of fossil fuel companies to carry out the extraction and combustion of their entire reserves of coal, oil and gas infringes on international agreement, such as the 1989 *Hague Declaration of the Environment*, which makes an explicit link between the right to life and the harmful effects of climate change.⁷⁷ If fossil fuel corporations are allowed to remain operating under business-as-usual conditions and carry out their business plans, much more than 2°C of warming will take place, which, as explained above, would detrimentally impact people everywhere. Scientific consensus indicates that to stay within this 2-degree margin, we must cap carbon dioxide emissions at 394 gigatons between now and 2050.⁷⁸ The fossil fuel industry, however, owns enough coal, oil, and gas reserves to produce 2860 gigatons of carbon dioxide.⁷⁹ Fossil fuels being their primary product, they will not stop emitting massive amounts of greenhouse gases simply of their own volition.

Fossil fuel companies' practices are also at odds with the fundamental purpose of the United Nations Framework Convention on Climate Change (UNFCCC), which was ratified by

⁷⁶ United Nations General Assembly, *The Universal Declaration of Human Rights*.

⁷⁷ Representatives from Australia, Brazil, Canada, Cote d'Ivoire, Egypt, France, Federal Republic of Germany, Hungary, India, Indonesia, Italy, Japan, Jordan, Kenya, Malta, Norway, New Zealand, the Netherlands, Senegal, Spain, Sweden, Tunisia, Venezuela, and Zimbabwe, —Hague Declaration on the Environment!

⁷⁸ Meinshausen, Malte, Nicolai Meinshausen, William Hare, Sarah C. B. Raper, Katja Frieler, Reto Knutti, David J. Frame, and Myles R. Allen. "Greenhouse-gas Emission Targets For Limiting Global Warming To 2 °C." *Nature* 458 (2009): 1158-162. Accessed July 27, 2015. doi:10.1038; "CAIT: WRI's Climate Data Explorer." World Resources Institute. 2014. Accessed July 27, 2015.

⁷⁹ "World Energy Outlook 2012." International Energy Agency. November 12, 2012. Accessed July 27, 2015.

the U.S. and entered into force on March 21, 1994. The UNFCCC upholds the aim of signatories to accomplish the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”⁸⁰

Aside from violating these agreements that have been ratified by the United States, fossil fuel companies are guilty of violating binding international agreements in other countries where they have been ratified, and are therefore, law. Fossil fuel companies have frequently blocked the enforcement of the International Labour Organization’s *Indigenous and Tribal Peoples Convention, 1989*.⁸¹ This convention requires that indigenous populations be “consulted on issues that affect them” and that they be able to “engage in free, prior and informed participation in policy and development processes that affect them.”⁸² In numerous cases oil, gas, and coal extraction has taken place without such consultation or in outright opposition from indigenous groups. Dutch Royal Shell’s conduct in the Niger Delta, described in greater detail below, is a particularly notorious example. Additionally, numerous fossil fuel corporations have been successfully sued in U.S. court for violations of United States law, examples of which can be found in Appendix A.

Case Study: Royal Dutch Shell

Shell represents an ideal case study to illustrate how fossil fuel companies are both morally evil investments and liabilities to shareholders. Shell is responsible for socially injurious behavior as a consequence of company practices that:

1. Violated national and international law, and
2. Disrespected governmental regulations, international health and safety or environmental standards.

These actions do not represent isolated incidents. Rather, their recurrence reveals that the proclivity for systematic law infringement is called for by the extraction-based business models of fossil fuel companies. The proclivity to be involved in lawsuits threatens Shell’s stock value, due to the risk they pose to the company itself and to the attention that they bring to socially conscious investors. Shell’s 2014 Annual Report documents that the company is currently involved in cases of environmental litigation.⁸³

Oil Spills and Environmental Damage

Previous cases where Shell has been found responsible for oil pollution and ordered to pay compensation over the last twenty years include *Bodo vs Shell* and *Niger Delta Farmers vs Shell Oil Company*. In relation to the latter case, *The Economist* argued that “[t]he ruling could open a flood-gate to legal complaints against oil companies.”⁸⁴

The Federal High Court of Nigeria ruled in November 2005 that “continuing to flare gas in the course of their oil exploration and production activities in the applicants’ community is a

⁸⁰ Parties to the United Nations Framework Convention on Climate Change, *United Nations Framework Convention on Climate Change*, p. 4.

⁸¹ International Labour Organization, *Convention No. 169*.

⁸² *Ibid.*

⁸³ Royal Dutch Shell, *Annual Report*, P.140.

⁸⁴ *The Economist, A mixed verdict.*

gross violation of their fundamental right to life (including healthy environment) and dignity of human person as enshrined in the Constitution.”⁸⁵ The court ordered Shell to “take immediate steps to stop the further flaring of gas in the applicant’s community.”

In spite of that court order, Shell has refused to end gas flaring in the Iwherekan community in Nigeria in the years following 2005. Furthermore, Shell has evaded compensation payments totaling \$1.5 billion to the Delta’s Ijaw ethnic group for decades of pollution.⁸⁶ Shell has repeatedly ignored governmental regulation and international health and environmental standards in Nigeria, has additionally been sued for the violation of indigenous people’s rights in Canada, and is currently facing at least ten cases linking it to groundwater contamination.^{87, 88, 89, 90}

Furthermore, the American subsidiaries of Royal Dutch Shell have incurred in alleged violations of the Clean Air Act seven times since 2001, and once in an alleged violation of the Clean Water Act.⁹¹ These cases all resulted in settlements where Shell subsidiaries agreed to pay fines or installing equipment to reduce the illegal emissions. In another case, the U.S. Supreme court stated that Shell Oil Company could be held responsible for spills of the pesticide that it sells, and required it to pay recovery costs to the U.S. Government for the occurrence of a spill.⁹²

Human Rights Abuses

In accordance with the *Torture Victim Protection Act of 1992*, the *Racketeer Influenced and Corrupt Organizations Act (RICO)*, and the *Alien Tort Statute*, the Wiwa family initiated three lawsuits against Royal Dutch Shell, its Nigerian subsidiary, and the CEO of that subsidiary in the United States District Court for the Southern District of New York. These cases were brought in regards to the execution of Saro-Wiwa and eight others, the torture and detention of Owens Wiwa and Michael Tema Vizor, and the shooting of Karololo Kogbara when she nonviolently demonstrated against the clearing of her crops to allow the passage of a Shell pipeline. The plaintiffs alleged that the executions were conducted with Shell’s “knowledge, consent and/or support.”⁹³ They additionally alleged that Shell had made payments to soldiers involved in human rights abuses taking place in the region.⁹⁴ Shell settled legal action out of court with a payout of \$15.5 million.⁹⁵ This payout reveals Shell’s vulnerability and points to the company’s complicity in these activities.

Continued threats to Human Rights, environmental law, and international law

The above information is by no means exhaustive of the litigation involving Shell over the past twenty years. In Shell’s case, the sheer volume of allegations against the company is

⁸⁵ Federal High Court of Nigeria, *Gbemre v Shell Petroleum Development Company Nigeria Limited and Others*.

⁸⁶ Ukala, “Gas Flaring in Nigeria’s Niger Delta: Failed Promises and Reviving Community Voices”.

⁸⁷ CTV Calgary, *First Nation sues Shell*.

⁸⁸ Steiner, *International Standards to Prevent and Control Pipeline Oil Spills, Compared with Shell Practices in Nigeria*.

⁸⁹ Steiner, *Double standard: Shell practices in Nigeria compared with international standards to prevent and control pipeline oil spills and the Deepwater Horizon oil spill*.

⁹⁰ Royal Dutch Shell, *Annual Report*, P.140.

⁹¹ Environmental Protection Agency, *Civil Cases and Settlements*

⁹² *Burlington Northern & Santa Fe Railway Co. et al. v. United States et al.*

⁹³ United Nations Environment Programme, *Environmental Assessment of Ogoniland*, p.27.

⁹⁴ Kearney, *New York trial delayed for Nigerians suing Shell*.

⁹⁵ Mouawad, *Shell to Pay \$15.5 Million to Settle Nigerian Case*.

demonstrative of Shell's history of causing social injury and often refusing to desist even when ordered by courts. Shell's record of being the target of lawsuits raises the question of whether this investment represents the values of the University of Pennsylvania, in addition to being a material risk to the company's profitability going forward.

Divestment from Shell

Shell's reputation for human rights violations and environmental degradation has resulted in the avoidance of Shell stock by socially conscious investors. The Dow Jones Sustainability Index, which incorporates assessment of economic, environmental and social criteria with stress on long-term shareholder value, omitted Shell from the index in both 2010 and 2011 due to trepidations regarding their practices in Nigeria.⁹⁶ Additionally, 28 Right Livelihood Award Laureates including conservation scientists and professionals implored the Norway Government Pension Fund to divest its holdings in Royal Dutch Shell in February 2012.⁹⁷

2.5 Net Harm, Injustice, and Energy Poverty

Fossil fuel production produces net social injuries to society at large. Of course, social injuries per se do not necessarily require divestment, because fossil fuels today also serve as important sources of energy. However, alternative sources of energy do exist, and the pure economic values of fossil fuels over these alternatives are far outweighed by their social injuries. As estimated below, coal, oil, and natural gas inflict at least 2.5, 1.8, and 1.4 times as much harms as they do benefits to society, respectively.⁹⁸ Note that while coal to natural gas fuel-switching does produce relative benefits, natural gas still inherently constitutes net social injuries.

Moreover, the distribution of fossil fuel companies' impacts is highly inequitable: the populations who are suffering the most now, and are most vulnerable to climate collapse, have contributed least to the problem. This inequity inherent in fossil fuel production means that the issue of energy poverty can best be addressed by new, alternative technologies rather than furthering old combustion-based fuels. The combination of net harms and unjust distribution of injuries means that fossil fuel companies' activities constitute substantial social injuries under Criterion 1, thereby justifying divestment.

Total Welfare: Net Harm

This section will explain a rough estimate of fossil fuel companies' net contribution to social welfare. As in the Darfur divestment precedent, divestment is warranted if a population

⁹⁶ Reuters, *Shell to scrap bonus link to sustainability index*.

⁹⁷ Right Livelihood Award Foundation, *Petition for Norway Pension Fund. The Right Livelihood Award*.

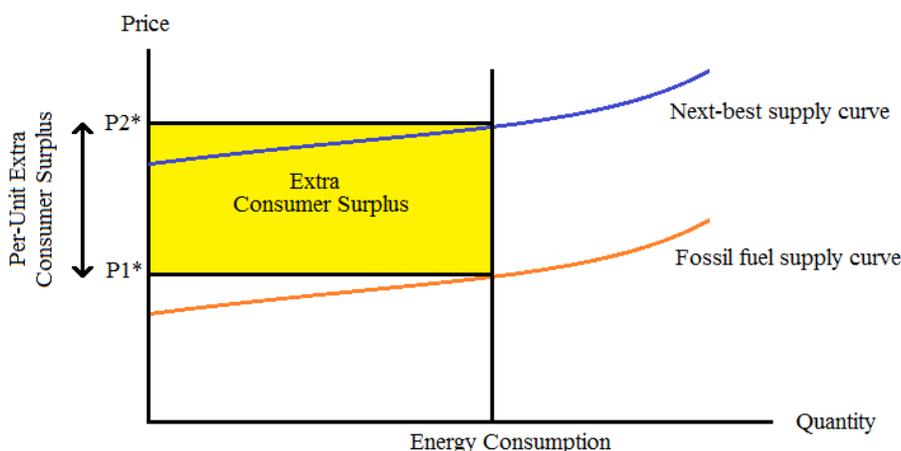
⁹⁸ These values are ignoring the non-climate pollution and local human health impacts outlined above (which are harder to quantify without extensive modeling because the pollutants are non-homogenous), so the harms-to-benefits ratios would be even more severe after factoring in those social injuries.

suffers net harms as a result of companies' actions; if society in general suffers more harms than benefits then that clearly is basis for considering divestment.

We consider whether the net negative externalities of fossil fuels exceed the additional consumer surplus of fossil fuels.⁹⁹ First, if the total net sum of all three categories is negative, then clearly there is an overall net harm to society caused by these companies, warranting divestment. Second, if producer surplus exceeds the net sum of consumer surplus and externalities, this situation is perhaps even more morally abhorrent because Penn as a shareholder would be literally profiting from the net injuries and suffering incurred by the rest of humanity, again warranting divestment.

Social Benefit of Fossil Fuels (Consumer Surplus)

We assume for simplicity that energy demand is completely inelastic.¹⁰⁰ Under this model, as illustrated in the figure below, the additional per-unit consumer surplus compared to a next-best alternative is found by subtracting the alternative next-best price $P2^*$ by the fossil fuel price $P1^*$.



We take a simplifying assumption that coal and natural gas are primarily used for electricity production. We compare the levelized costs of electricity (LCOE) for a marginal unit of electrical energy (one megawatt-hour) with a next-best alternative, onshore wind. From Lazard's LCOE values¹⁰¹, coal power generation costs \$66 / MWh (minimum of estimate range)

⁹⁹ From the perspective of basic economics, fossil fuel products contribute to social welfare in three ways: 1) producer surplus, 2) consumer surplus, and 3) externalities. Producer surplus arises when the market price exceeds the seller's marginal production costs, and consumer surplus arises when the buyer's willingness to pay exceeds the market price - reflecting value from avoiding the opportunity cost of the next-best alternative. Externalities arise when there are damages (or benefits) imposed on individuals who are not involved in the product's transaction at all.

¹⁰⁰ This assumption gives a conservative estimate in fossil fuel's favor because it maximises the area of consumer surplus. Also, under this assumption society would not have to sacrifice any quantity of consumption.

¹⁰¹ Lazard. "Lazard's Levelized Cost of Energy Analysis - Version 8.0." Lazard. September 2014.

and combined cycle natural gas power generation costs \$61 / MWh (minimum of estimate range). From the same source, unsubsidized wind generation costs \$81 / MWh (maximum of estimate range).¹⁰² This gives a consumer surplus of \$15 / MWh for coal and \$20 / MWh for natural gas on an energy-equivalent basis. Using power generation heat rates from the Energy Information Administration, which states that 0.00052 short tons of coal or 0.01010 Mcf of natural gas is needed to generate 1 kilowatt-hour (kWh) of electricity,¹⁰³ the gross social benefit for coal and natural gas is \$28.8 / short ton and \$1.98 / thousand cubic feet respectively.

We take the simplifying assumption that oil is primarily used for transportation, and so we compare the market price of gasoline with the a next-best alternative of ethanol biofuel.¹⁰⁴ The average 2015 price is \$1.95 / gallon for gasoline and \$1.61 / gallon for ethanol.¹⁰⁵ While ethanol is cheaper than gasoline on a volume basis, it has about 74% of the energy density,¹⁰⁶ so ethanol's average price is \$2.17 to provide the same energy as a gallon of gasoline. So the oil's gross social benefit is \$0.22 / gallon.

Social Cost of Fossil Fuels (Externalities)

The United States Government's Interagency Working Group on Social Cost of Carbon¹⁰⁷ calculates in dollar amount the marginal negative externalities from each additional unit of greenhouse gas emissions. It is important to note that the integrated assessment models (IAM) used to find the social cost already incorporate the effect of any *positive* externalities such as the possibility of improved agriculture. In other words the social cost of carbon represents the *net* negative externalities. For 2015, the social cost of carbon¹⁰⁸ is \$40 per metric ton of carbon dioxide.¹⁰⁹

The Energy Information Administration provides energy content values for coal and natural gas, as well as emissions coefficients for bituminous coal (the cleanest coal, giving a

¹⁰² These values are levelized costs and so already include the cost of constructing new alternative power generation plants. We take coal and natural gas's lower range while taking wind's upper range. Moreover, these are totally unsubsidized costs, and therefore do not include any externalities that might already be partially priced in by tax policies. Thus this estimate for a marginal unit of energy is conservative in fossil fuel's favor.

¹⁰³ U.S. Energy Information Administration. "How Much Coal, Natural Gas, or Petroleum Is Used to Generate a Kilowatt-hour of Electricity?" October 13, 2015. Accessed October 26, 2015.

¹⁰⁴ Ethanol is carbon-neutral since the carbon dioxide emitted during its combustion has been originally absorbed from the atmosphere by the plants used to produce the fuel.

¹⁰⁵ U.S. Department of Agriculture, Economic Research Service. "Table 14 - Fuel Ethanol, Corn and Gasoline Prices, by Month." October 2015. Accessed October 26, 2015.

¹⁰⁶ Alternative Fuels Data Center. "Fuel Properties Comparison." Department of Energy. October 29, 2014. Accessed October 27, 2015.

¹⁰⁷ The Interagency Working Group consists of the Council of Economic Advisers, Council on Environmental Quality, Department of Agriculture, Department of Commerce, Department of Energy, Department of Transportation, Environmental Protection Agency, National Economic Council, Office of Management and Budget, Office of Science and Technology Policy, and Department of the Treasury

¹⁰⁸ This value is for a 3% discount rate, which is a conservative value in line with economists such as Nordhaus. Other economists such as Lord Stern prefer discount rates much closer to zero to reflect true intergenerational equity - a lower discount rate would drastically increase social cost of carbon values.

¹⁰⁹ U.S. Environmental Protection Agency. "The Social Cost of Carbon." October 5, 2015. Accessed October 26, 2015.

lower bound on coal emissions), crude oil, and natural gas.^{110,111,112} These values and the required calculations are summarized in the following table. We include the effect of methane leakages originating from natural gas extraction to find a carbon dioxide equivalent value: 1.5% leakage occurs from total production,¹¹³ methane has 56 times the greenhouse potential as carbon dioxide, the density of methane is 0.6797 kg/m³, and one cubic meter equals 35.31 cubic feet.^{114, 115}

Fuel	Coal	Natural Gas	Oil
Emissions factor	93.28 kg CO ₂ / MMBtu	53.06 kg CO ₂ / MMBtu	10.29 kg CO ₂ / gallon
Heat content	19.622 MMBtu / Short Ton	1,032 Btu / cubic foot	
Emission per quantity	1830. kg CO ₂ /short ton	70.97 kg CO ₂ e / Mcf	
Social cost at \$40	\$73 / short ton	\$2.8 / Mcf	\$0.41 / gallon
Average market price	\$66 / MWh	\$61 / MWh	\$1.95 / gallon
Alternative price	\$81 / MWh	\$81 / MWh	\$2.17 / gallon-equivalent
Consumer surplus*	\$28.84 / short ton	\$1.98 / Mcf	\$0.22 / gallon
Harm-to-benefit ratio	2.5	1.4	1.8

¹¹⁰ U.S. Energy Information Administration. "Voluntary Reporting of Greenhouse Gases Program (Voluntary Reporting of Greenhouse Gases Program Fuel Carbon Dioxide Emission Coefficients)." January 31, 2011. Accessed October 30, 2015.

¹¹¹ U.S. Energy Information Administration. "Heat Content of Natural Gas Consumed." September 30, 2015. Accessed October 27, 2015.

¹¹² U.S. Energy Information Administration. "Table A5. Approximate Heat Content of Coal and Coal Coke." October 2015. Accessed October 26, 2015.

¹¹³ U.S. EPA Office of Air Quality Planning and Standards. "Oil and Natural Gas Sector Leaks". April 2015.

¹¹⁴ United Nations Framework Convention on Climate Change. "Global Warming Potentials". 2014. Accessed October 20, 2015.

¹¹⁵ "Methane, CH₄, Physical Properties." *Air Liquide Gas Encyclopedia*.

Distributional Welfare: Injustice

As explained in detail throughout the sections above, the harms of fossil fuel companies are intersectional and disproportionately inflicted upon already-marginalized groups in society. The disparity of fossil fuel companies' impacts based on ethnicity, socioeconomic status, and national origin, is systematically rooted and unjust. Thus, climate justice is fundamentally tied to racial and economic justice, because climate change exacerbates existing these inequalities.

Globally, climate change impacts like extreme weather events and increased disease incidence are disproportionately borne by people of color in developing countries. For example, the 2013 monsoon flooding in India had a death toll of up to 10,000 people, and Typhoon Haiyan in the Philippines killed more than 6,000 people. While the world has made significant progress in addressing global poverty and inequality, the United Nations Development Programme warn that “[t]he impacts of climate change will reverse decades worth of human development gains”.¹¹⁶

Within the United States, people of color have been experiencing a long history of environmental racism induced by fossil fuel companies. While African Americans are 12.7% of the population, they account for 26% of asthma deaths.¹¹⁷ According to the NAACP, “African Americans are hospitalized for asthma at three times the rate of whites and die of asthma at twice the rate of whites,” and “[h]eat-related deaths among African Americans occur at a 150 to 200 percent greater rate than for non-Hispanic whites.”¹¹⁸

Energy Poverty

Advocates of the fossil fuel industry often claim that global energy poverty, i.e. the lack of access to modern energy services, is a reason to continue fossil fuel development. The lack of modern energy access is a real, significant issue affecting more than a billion people;¹¹⁹ however, it has been exploitatively co-opted by fossil fuel interests. In fact addressing energy poverty is consistent with fossil fuel divestment, and divestment is a step towards energy justice.

First, the vast majority of the populations affected by energy poverty reside in rural communities,¹²⁰ which have very limited reachability from grid extension and can be better

¹¹⁶ United Nations Development Programme. "Climate Change and Poverty Reduction." 2015. Accessed August 25, 2015.

¹¹⁷ Russell, Leslie. "Reducing Disparities in Life Expectancy: What Factors Matter?" *Roundtable on the Promotion of Health Equity and the Elimination of Health Disparities of the Institute of Medicine*, 2011.

¹¹⁸ National Association for the Advancement of Colored People. "The Hidden Consequences of Climate Change." Accessed August 25, 2015.

¹¹⁹ International Energy Agency. "Energy poverty." 2015. Accessed October 26, 2015.

¹²⁰ Ibid.

served by distributed renewables and microgrid technologies.^{121,122} The nonprofit organization Power for All, which is a collection of private industries and public organizations, explains that “bottom-up distributed energy solutions should be the *preferred* solution for assuring universal access to electricity because they are faster, cleaner, and cheaper than extending power grids to rugged or sparsely-populated regions.”¹²³ Examples already flourish demonstrating renewable energy positively impacting developing countries, such as Google’s investment into the Lake Turkana Wind Power Project in northern Kenya or SunEdison’s development of distributed solar-battery microgrids in rural India.^{124,125} Therefore, reinvestment into clean energy actually represents a superior method to address energy poverty concerns as an investor.

Second, even if expanding fossil fuel usage to areas may create private economic value, the above section demonstrates that fossil usage on net creates severe externalities that outweigh the benefits. Since these harms such as climate change and extraction pollution are inflicted disproportionately on marginalized communities, the populations undergoing energy poverty would suffer even more net harm due to fossil fuels.

2.6 Warrants for Nexus to Moral Evils

As a result of their central nexus to fossil fuel extraction, these companies have a significant, clear, and undeniable nexus to the moral evil delineated above. In the global economic system, fossil fuel production is driven by supply and demand. However, the fact that we individually continue to use fossil fuels does not negate the moral reason to divest. For example, the University continues using fossil fuels despite having divested from seven multinational oil companies operating in the Sudan region. The University is using petroleum products originally extracted by these seven companies, and then sold oil into the global commodity market,¹²⁶ yet still found it necessary to divest from these companies.

In addition, the relative magnitudes of moral complicity are drastically different between sellers and buyers. As an institutional consumer with thousands of individual students, faculty, and alumni, Penn’s 2014 emissions were 184,218 metric tons of carbon dioxide equivalent

¹²¹ International Energy Agency. "Chapter 2 - Extract: Modern energy for all". *World Energy Outlook 2013*. November 12, 2013.

¹²² International Energy Agency, UN Development Programme, UN Industrial Development Organization. "Energy Poverty: How to make modern energy access universal?" September 2010.

¹²³ Fairley, Peter. "Renewable Minigrids Should Be the End Goal for Rural Poor." *Institute of Electrical and Electronics Engineers Spectrum*, May 22, 2015.

¹²⁴ Metz, Cade. "Google Pumps Funds into Africa's Biggest Wind Power Project." *WIRED*, October 20, 2015.

¹²⁵ Doom, Justin. "SunEdison Buying Imergy Batteries for Microgrids in Rural India." *Bloomberg Business*, March 25, 2015.

¹²⁶ Even if they were not the same physical barrels of oil, the participation of any consumer contributes to global demand creating the commodity price.

(based on an 18% reduction from 2007),¹²⁷¹²⁸ a large portion of which derives from fossil fuel usage. This is a significant footprint that we should care about; indeed, Penn has already demonstrated leadership by decreasing our carbon footprint by 18% through the Climate Action Plan initiated by President Amy Gutmann. However, our moral complicity as fossil fuel consumers is vastly outweighed by our complicity as fossil fuel investors. On an annual basis, even the smallest coal company on our targeted list (Alcoa) produced 39.4 million metric tons of coal in 2014, responsible for about 79.5 million metric tons of carbon dioxide equivalent¹²⁹ - more than 400 times the annual Penn amount. The smallest oil-gas company (Enerplus) on our list produced 14.7 million barrels of crude oil and 130.0 million cubic feet of natural gas in 2014, responsible for a total of 15.5 million metric tons of carbon dioxide equivalent¹³⁰ - more than 80 times the annual Penn amount. The rest of the targeted companies have even more highly concentrated contributions to global social injury, far outweighing any individual at Penn.

¹²⁷ Penn Green Campus Partnership. "University of Pennsylvania: Climate Action Plan Progress Report 2011". 2011. Accessed September 21, 2015.

¹²⁸ Penn Green Campus Partnership. "University of Pennsylvania: Climate Action Plan 2.0". 2011. Accessed September 21, 2015.

¹²⁹ This value was estimated using a coal energy content coefficient of 19.622 Million Btu per Short Ton from U.S. Energy Information Administration's "Table A5. Approximate Heat Content of Coal and Coal Coke", and an emissions rate of 93.28 kg CO₂ per Million Btu for bituminous coal (bituminous has the lowest emissions factor, in order to give a conservative estimate) from U.S. EIA's "Voluntary Reporting of Greenhouse Gases Program (Voluntary Reporting of Greenhouse Gases Program Fuel Carbon Dioxide Emission Coefficients)".

¹³⁰ This figure was estimated using crude oil and natural gas emissions rates of 10.29 kg CO₂ / gallon and 53.06 kg CO₂ / MMBtu found in the second EIA source above. It used a natural gas energy content coefficient of 1,032 Btu per cubic foot from EIA's "Heat Content of Natural Gas Consumed".

3| Fiduciary Responsibility

Fossil fuel divestment is consistent with the Trustees' fiduciary responsibility. The purpose of the university endowment is the long-term support of the university's core mission. Penn's Chief Investment Officer Peter Ammon explains that the university endowment should "take a time horizon longer than the vast majority of investors can."¹³¹ First, historical evidence tracking actual performances of fossil-free portfolios compared to non-divested benchmarks shows that divestment from fossil fuels does not decrease risk-adjusted returns. Second, an analysis of fossil fuel companies' business fundamentals shows that failing to divest would increase the endowment portfolio's exposure to carbon bubble and climate change risk.

3.1 Empirical Evidence

Fossil fuel divestment is objectively consistent with fiduciary responsibility. Several studies conducted independently by investment managers MSCI, Impax Asset Management, and Advisor Partners (together with more than \$75 billion under management) all conclude that portfolios free from fossil fuel companies perform either equally or better compared to non-divested benchmark portfolios.^{132,133,134} Reinforcing these conclusions, a Morgan Stanley report finds that the performance of sustainable investing has usually met or exceeded comparable traditional investments, on "both an absolute and a risk-adjusted basis, across asset classes and over time."¹³⁵

Specifically, to consider the effect of fossil fuel divestment on a portfolio, we compare the performance of the benchmark portfolio versus the performance of the same portfolio excluding fossil fuel companies. In the absence of Penn publishing its exact endowment holdings, we can use other well-diversified portfolios as proxies. These following example portfolio comparisons show that fossil fuel divestment is financially sound: it increased returns, increased risk-adjusted returns (measured through the Sharpe ratio), and decreased risk. This empirical fact outweighs any theoretical conjecture that divestment always increases portfolio risks due to imposing constraints on the selection of securities.

*S&P 500 "Core", GFF, "Extended"*¹³⁶

The authors of a Journal of Environmental Investing study compared the performance of the S&P 500 to three fossil free portfolios: a "core" portfolio that excludes companies directly owning and operating fossil fuel reserves, a GFF portfolio that excludes companies on the top

¹³¹ Grabarz, Kristen. "Endowment Returns Fail to Outpace the Pack." *The Daily Pennsylvanian*. October 28, 2014. Accessed January 3, 2015.

¹³² MSCI ESG Research. "Responding to the Call for Fossil-fuel Free Portfolios." December, 2013. Accessed October 25, 2015.

¹³³ Impax Asset Management. "Beyond Fossil Fuels: The Investment Case for Fossil Fuel Divestment." Accessed October 25, 2015.

¹³⁴ Kern, Daniel, Jim Blachman, and Gerard Cronin. "Fossil Fuel Divestment: Risks and Opportunities." Advisor Partners, LLC. July, 2013. Accessed October 25, 2015.

¹³⁵ Morgan Stanley Institute for Sustainable Investing. "Sustainable Reality: Understanding the Performance of Sustainable Investment Strategies". March 2015.

¹³⁶ Willis, John, and Paul Spence. "The Risks and Returns of Fossil Fuel Free Investing." *The Journal of Environmental Investing*, 2015. Accessed October 31, 2015.

200 fossil fuel list, and an "extended" portfolio that further divests from other carbon-intensive companies. All three of these fossil free portfolios outperformed on the benchmark over the timeframe from 2009 through 2013, in terms of annual returns and Sharpe ratios. It is noteworthy that the most constrained "extended" portfolio of the three achieved the best performance, furthering demonstrating that investment constraints do not necessarily lead to higher risk or lower return. Moreover, the long pre-2014 time period under study ensured that the results were robust to short term commodity price fluctuations, e.g. the recent oil price downturn.

	Annualized Returns			Annualized Volatility			Sharpe Ratio		
	5 Years	3 Years	1 Year	5 Years	3 Years	1 Year	5 Years	3 Years	1 Year
S&P 500 Index	19.9%	15.8%	28.7%	15.2%	12.1%	8.4%	1.30	1.30	3.38
Core	20.6%	16.5%	29.5%	15.1%	11.5%	8.5%	1.36	1.43	3.46
GFF	20.7%	16.3%	29.5%	15.3%	11.9%	8.6%	1.35	1.38	3.44
Extended	20.9%	16.8%	30.0%	15.3%	11.8%	8.6%	1.36	1.42	3.49

Source: SICM

Note that the highest annualized returns are shown in blue.

MSCI Ex Fossil Fuels Index¹³⁷

The MSCI ACWI Index is a global benchmark portfolio "across all sources of equity returns in 23 developed and 23 emerging markets". The MSCI ex Fossil Fuels Index is based on the parent index but excludes companies owning coal, oil, and natural gas reserves. This latter fossil free index actually outperformed the non-divested benchmark in terms of returns throughout 2012 (13.47% vs. 11.67%), 2013 (22.68% vs. 21.15%), and 2014 (13.23% vs. 11.22%), representing a divestment premium of at least 1.5 percentage points for each year. Furthermore, the fossil free index had a higher three year Sharpe ratio of 1.22 compared to the benchmark's 1.09, meaning that fossil fuel divestment generates higher risk-adjusted returns; since the fossil free index achieved superior returns this means that fossil fuel divestment also decreased the portfolio risk across this time period by reducing volatility. In this case, divestment was the superior financial strategy.

FFIUS¹³⁸

The Fossil Free Indexes US Index is based on the S&P 500 but excludes the current top 200 fossil fuel companies (the same list targeted by this proposal). FFIUS consistently outperformed the underlying benchmark in terms of cumulative returns across the 3-month, 6-month, 1-year, 3-year, 5-year, and 10-year timeframes. Furthermore, FFIUS had a higher 5-year (2010-2015) Sharpe ratio than the benchmark: 0.75 vs. 0.70. Again, fossil fuel divestment created superior risk-adjusted returns.

Although past performance does not indicate future performance, the empirical facts above demonstrate two implications. First, fossil fuel investments are risky due to high volatility of commodity prices. Thus, divestment helps to reduce portfolio risk and improve risk-adjusted

¹³⁷ MSCI. "MSCI ACWI EX FOSSIL FUELS INDEX (GBP)." September 30, 2015. Accessed October 1, 2015.

¹³⁸ Fossil Free Indexes. "Fossil Free Indexes US (FFIUS) Fact Sheet." March 31, 2015. Accessed October 1, 2015.

returns. Second, the assumption that imposing external constraints on an endowment portfolio would always increase risk is clearly proven wrong.

3.2 Fundamentals Evidence

Looking beyond the historical evidence, one finds that the long-term business models of fossil fuel extraction companies are fundamentally unsustainable.¹³⁹ According to Meinshausen et al in *Nature*, in order to have an 80% chance of limiting global warming to 2°C, cumulative carbon dioxide emissions from 2000 to 2049 must be constrained to 886 Gt.¹⁴⁰ According to the World Resources Institute's Climate Analysis Indicators Tool 2.0, the world already emitted more than 492 Gt since 2000, leaving only 394 Gt for the world to emit.¹⁴¹ At the same time, according to the International Energy Agency's World Energy Outlook, "total potential emissions from fossil-fuel reserves" are 2860 Gt.¹⁴² This means 86% of fossil fuel reserves are unburnable if we want to avoid the worst catastrophic effects of climate change. If Penn fails to divest there are two possible scenarios, both of which constitute a violation of fiduciary responsibility. Since these scenarios are logically exhaustive, fossil fuel divestment is actually equivalent to upholding fiduciary responsibility.

Scenario I: Penn does not divest and the world exceeds the carbon budget.

If this were to happen, the planet would suffer the very worst climate impacts of global warming past 2°C. The endowment cannot support core university missions if students and professors are physically unable to live on this planet. Moreover, these impacts would decimate Penn's endowment as a "universal owner" of a well-diversified portfolio.¹⁴³ Using a 3% discount rate for present value (similar discounts are favored by economists like Nordhaus), DARA and the Climate Vulnerable Forum calculate that 2.1% of world GDP would be lost each year by 2030 if climate change goes unchecked in this fashion.¹⁴⁴ Since the long-term success of Penn's endowment relies on the success of the overall economy, these economic harms translate directly into financial losses of companies in Penn's endowment portfolio. In fact, the vast majority of companies in the economy are already suffering from climate change. Of the respondents to the Climate Disclosure Project, 77% of S&P 500 companies are exposed to negative financial impacts of climate change.¹⁴⁵ For these companies, extreme weather events were the top climate risk drivers; this financial risk exposure would increase catastrophically if we were to exceed the

¹³⁹ Spedding, Paul, Kirtan Mehta, and Nick Robins. "Oil & Carbon Revisited: Value at Risk from 'unburnable' Reserves." HSBC Global Research. January 25, 2013. Accessed September 21, 2015.

¹⁴⁰ Meinshausen, Malte, Nicolai Meinshausen, William Hare, Sarah C. B. Raper, Katja Frieler, Reto Knutti, David J. Frame, and Myles R. Allen. "Greenhouse-gas Emission Targets For Limiting Global Warming To 2 °C." *Nature* 458 (2009): 1158-162. Accessed July 27, 2015. doi:10.1038

¹⁴¹ "CAIT: WRI's Climate Data Explorer." World Resources Institute. 2014. Accessed July 27, 2015.

¹⁴² "World Energy Outlook 2012." International Energy Agency. November 12, 2012. Accessed July 27, 2015.

¹⁴³ United Nations Environment Program Finance Initiative. "Universal Ownership: Why environmental externalities matter to institutional investors." 2011. Accessed September 21, 2015.

¹⁴⁴ DARA, Climate Vulnerable Forum. *Climate Vulnerability Monitor 2nd Edition: A Guide to the Cold Calculus of a Hot Planet*. 2012. Accessed September 21, 2015.

¹⁴⁵ CDP, PricewaterhouseCoopers. "Investment, transformation and leadership: CDP S&P 500 Climate Change Report 2013". 2013. Accessed September 21, 2015.

2°C threshold. Thus, exceeding the carbon budget would fundamentally destroy Penn's ability to support its mission.

Under this scenario, Penn's continued investments in the fossil fuel industry would have been directly culpable in actively supporting humanity's failure to meet the carbon budget. A failure to divest clearly constitutes a violation of Penn's fiduciary duty of care, by ignoring the holistic impacts of investment decisions on the entire portfolio: fossil fuel companies do not exist in a vacuum and impose negative externalities on all other assets that the endowment holds.

Scenario II: Penn does not divest and the carbon budget is not exceeded.

Were this to happen, in order for the world to stay within the carbon budget its fossil fuel combustion would have to have been drastically reduced. As a result, valuations of fossil fuel companies would be drastically undercut, because their current valuations from business fundamentals are based on the ability of fossil fuel reserves to generate future cash flows. In this scenario, with 86% of reserves remaining in the ground, the vast majority of the current value of Penn's fossil fuel assets would evaporate. Moreover, even amid low oil price, fossil fuel companies continue to wastefully convert shareholder equity through billions of dollars of capital expenditures on drilling new wells to augment their already-excessive reserves, further increasing the proportion of stranded assets. In this scenario, the long-term and permanent impact of stranded assets significantly outweighs cyclical fluctuations based on fuel prices. In this case, Penn's investment decision would have violated its duty of care by incurring direct financial losses from lost company valuations.

Technological solutions do have a role to play in mitigating climate change; however, even the most optimistic technological forecasts would not enable these companies to keep extracting fossil fuels at the current rate without exceeding 2°C. First, any downstream technology improvements such as energy efficiency or more efficient heat rates in power plants would decrease the demand for upstream fossil fuel products; the targeted 200 companies are chiefly upstream extraction companies and would not fare well under this case. Second, the only technological improvement that is relevant to protecting fossil fuel companies' cash flows is carbon capture and storage (CCS), which has limited feasibility and success. According to a London School of Economics and Carbon Tracker report, in even the most idealized scenario of CCS project development (requiring a 47,400% increase from the current 8 to 3800 large-scale projects), CCS can only extend the carbon budget by 125 Gt CO₂ to 2050.¹⁴⁶ In this highly idealized case, 83% of fossil fuel reserves will still be unburnable and thus worthless. Moreover, for carbon capture and storage to actually be commercially monetized and deployed, there must be a pricing mechanism for carbon. Otherwise, the captured carbon dioxide is currently more economically used for enhanced oil recovery (EOR), further exacerbating the emissions problem. Fossil fuel companies are in fact actively lobbying against such policies from being enacted. Penn cannot rely on technology to absolve fossil fuel companies' long-term unprofitability.

¹⁴⁶ Grantham Research Institute on Climate Change and the Environment, LSE, and Carbon Tracker Initiative. "Unburnable Carbon 2013: Wasted capital and stranded assets". 2013. Accessed September 21, 2015.

4|Consistency with Existing Penn Commitments

The University of Pennsylvania is committed to taking action on climate change, and has implemented programs to address climate change and other environmental issues. From academic programs such as the Penn Program for Environmental Humanities, Kleinman Center for Energy Policy, and Wharton's Initiative for Global Environmental Leadership, to student-led programs such as Eco-Reps, these programs signal the importance that Penn seeks to place on environmental sustainability. In the fall of 2014, Amy Gutmann released the Climate Action Plan 2.0, which recognizes Penn's need for environmental sustainability. This plan states new standards for campus sustainability performance, such as carbon emissions. The plan also expands on the educational opportunities for students studying sustainability, and gives support for the faculty researching and teaching sustainability.¹⁴⁷

Penn's Climate Action Plan 2.0 sets Penn as an institution that prioritizes sustainability as an issue that needs immediate action. Divesting from fossil fuels is the natural next step in taking action on environmental issues. Divestment has shown to be superior over other tactics. In comparison to Penn's existing climate action programs, divestment solves the moral evil and fiduciary duty problems that would persist even if all of Penn's programs are 100% successful. Investing in something an institution does not believe in or that goes against its morals equates to funding a moral evil.

There are many options for reinvestment as well. Renewable energy has a very strong growth potential, and the prices of renewable energy have been decreasing substantially.^{148,149} While some may argue that shareholder activism is the better alternative to this issue, the problem with the fossil fuel industry is the product itself, and no amount of shareholder activism will persuade these companies to stop producing oil and gas. Additionally, the political influence the fossil fuel industry has at best conjured has caused climate change agendas to be set aside by politicians when creating new laws and policies, and at worst has led to the funding of climate denial "science", an activity that directly conflicts with Penn's commitments to both academic rigor and honesty as well as environmental research.

4.1 Benefits of Reinvestment

Given that Penn has made a strong commitment to benefit the environment and climate, the university should make the best decisions to maximize its positive impact given its finite resources. Reinvesting some of the endowment holdings into clean energy would allow Penn to maximize this impact, and would allow Penn to position itself as a participant in the necessary societal transition from fossil fuels to clean energy.

¹⁴⁷ Penn Green Campus Partnership. "University of Pennsylvania: Climate Action Plan 2.0". 2011. Accessed September 21, 2015.

¹⁴⁸ Patel, Tara. "Fossil Fuels Losing Cost Advantage Over Solar, Wind, IEA Says." Bloomberg Business. August 31, 2015. Accessed October 30, 2015.

¹⁴⁹ International Energy Agency. "Technology Roadmap: Solar Photovoltaic Energy - 2014 edition." September 2014. Accessed October 31, 2015.

In addition to campus sustainability and research, Penn has the power as a large institutional investor to make positive climate impacts. Financial investment in renewables is direly needed. According to the International Energy Agency, in order to limit climate change to 2°C, “investments in low-carbon energy technologies will need to at least double, reaching \$500 billion annually by 2020, and then double again to \$1 trillion by 2030.”¹⁵⁰ Similarly, the think tank Ceres concludes that an additional \$36 trillion must be invested in clean energy by 2050, an average of an additional \$1 trillion every year beyond a “business as usual” scenario of current investments.¹⁵¹

However, governments are severely constrained in their ability to make such investments, especially in the presence of anti-climate lobbying by fossil fuel companies. Therefore private actors like Penn, who have already made an institutional commitment to help solve this issue, have a significant role to play. Specifically, investing in clean energy increases the deployment of these solutions while simultaneously decreasing their costs through learning-by-doing effects.¹⁵² Thus, reinvestment into clean energy allows Penn to make a positive climate impact as well as address the problem of energy poverty. Each marginal dollar of reinvestment into clean energy would create massive benefits to society.

4.2 Lack of Fossil Fuel Companies’ Climate Benefits

On the other hand, investing in fossil fuel companies would make relatively small contributions to advancing renewable and alternative solutions. In fact, the largest fossil fuel players have been quitting renewables en masse. Chevron exited its solar and geothermal business in 2014, along with units that performed solar and efficiency installations.¹⁵³ Similarly, Shell exited the solar industry in 2006,¹⁵⁴ with BP following in 2011. ExxonMobil never significantly invested in renewables, preferring to actively fund climate change denial.¹⁵⁵ Reinvesting in clean energy companies, where all investments directly support clean energy, has an obviously higher impact on improving the climate compared to the lip service and abandonment by oil companies.

Statistics reinforce the fact that fossil fuel companies’ climate-destroying activities far outweigh any of their climate benefits. As shown in the following table based on company

¹⁵⁰ "Energy Technology Perspectives 2012: Pathways to a Clean Energy System." International Energy Agency. 2012. Accessed October 30, 2015.

¹⁵¹ Fulton, Mark, and Reid Capalino. "Investing in the Clean Trillion: Closing The Clean Energy Investment Gap." Ceres. 2014. Accessed September 21, 2015.

¹⁵² Learning-by-doing is a standard economic concept where productivity gains are achieved through incremental innovations from practice, such that cumulative production volume is a driving factor for costs. In context, this implies that deploying more renewables would make these solutions even more affordable.

¹⁵³ Gallucci, Maria. "Chevron Finalizes Sale Of Its Clean Energy Subsidiary, Marking Latest Oil Industry Move Away From Renewables." *International Business Times*, September 3, 2014, Companies sec.

¹⁵⁴ "SolarWorld Acquires Shell's Solar Business." *RenewableEnergyWorld*, February 2, 2006.

¹⁵⁵ Goldenberg, Suzanne. "Exxon Knew of Climate Change in 1981, Email Says – but It Funded Deniers for 27 More Years." *The Guardian*, July 8, 2015. Accessed September 27, 2015.

financial reports, oil-gas companies are usually exactly that: oil-gas companies with only very small portions of their businesses related to non-fossil fuel activities (coal companies are not known to make significant alternative energy investments either). For example, for \$1.00 of Chevron's economic productivity, \$0.007 comes from activities unrelated to fossil fuel production. In fact, most of this amount currently comes from Chevron's conventional power generation assets.

Company	2014 non-fossil fuel % of total segment
Gazprom	8.13% ¹⁵⁷
Rosneft	0.51%
PetroChina	(already divested)
ExxonMobil	0.05%
Lukoil	1.09%
BP	5.07%
Petrobras	8.52%
Royal Dutch	0.02%
Chevron	0.70%
Novatek	0.00%

These facts represent a fundamental decision for Penn in terms of opportunity costs: if the Trustees are in fact committed to supporting an energy transition away from fossil fuels, should Penn spend \$1 directly on investments with high positive climate benefits, or should it continue to spend the dollar on companies whose insignificant climate benefits, often abandoned when inconvenient, are heavily outweighed by the aforementioned and undeniable harms?

¹⁵⁶ For these values we calculate the percentage of revenues from any segments that are not related to oil or gas exploration, production, processing, and marketing. The total segment revenues include intersegment effects in order to capture the total economic magnitudes of each company's segment operations.

¹⁵⁷ The vast majority of non-fossil segment revenues for Gazprom arises from their natural gas power generation business.

Appendix

A. Company-Specific Moral Evils

In addition to the above systematic moral evils wrought by fossil fuel companies, the following list provides a non-exhaustive sampling of social injuries committed by individual target companies, including illegal pollution, violation of indigenous rights, and deaths and injuries of workers due to company negligence. The nexus to the moral evil of each specific case is undeniably clear.

Coal Corporations

Coal India - According to Comptroller and Auditor General (CAG), Coal India was operating 239 coal mines without prior environmental clearances in 2011 and was thus in total violation of Ministry of Forest and Environment instructions.¹⁵⁸

China Shenhua - According to a 2013 Greenpeace report, China Shenhua has drained more than 50 million tons of groundwater from the Haolebaoji region in Inner Mongolia.¹⁵⁹ The report additionally found high levels of toxic chemicals in discharged wastewater, including carcinogens.¹⁶⁰

Adani - Adani was found in February 2014 to have failed to gain proper environmental approval for construction of India's largest private port, located in Gujarat, which destroyed mangroves and displaced local villages. Adani is seeking to build a \$16 billion coal export facility in Australia to export coal to India.¹⁶¹

Shanxi Coking - Seventy-four people died and 114 were injured in a 2009 explosion at a Shanxi Coking Coal Group mine in northern China.¹⁶²

Peabody Energy - Peabody Energy is strongly connected to the effort to deny climate science. Fred Palmer, Peabody's main lobbyist as senior vice president of government relations, was a founding member of the Greening Earth Society, which actively promoted the idea that climate change would be a net positive for the planet.¹⁶³

Datong Coal - In April of 2015, 21 Datong Coal Mine Group workers were killed when the shaft in which they were working at the Jiangjiawan mine near the city of Datong, China filled with water that had accumulated in a "mined-out area of the colliery."¹⁶⁴

¹⁵⁸ "Coal India operating 239 mines without environment clearance: CAG." *The Economic Times*. September 7, 2011. Accessed October 27, 2015.

¹⁵⁹ "China's Shenhua drains groundwater for coal project." *Reuters*. July 23, 2013. Accessed October 24, 2015.

¹⁶⁰ Greenpeace. "Thirsty Coal 2: Shenhua's Water Grab." 2013. Accessed September 23, 2015.

¹⁶¹ Koutsoukis, Jason and Daniel Flitton. "Concerns at Barrier Reef contractor's humanitarian, environment record." *The Sydney Morning Herald*. September 5, 2014. Accessed October 24, 2015.

¹⁶² Wong, Edward. "At Least 74 Miners Are Killed in China Blast." *New York Times*. February 22, 2009. Accessed September 25, 2015.

¹⁶³ Goldenberg, Suzanne. "The truth behind Peabody's campaign to rebrand coal as a poverty cure." *Guardian*. May 19, 2015.

¹⁶⁴ "21 confirmed dead in north China coal mine flood". *Al Jazeera*. April 23, 2015. Accessed October 23, 2015.

Arch Coal - After committing hundreds of Clean Water Act violations related to illegal discharges of pollutants at and near its mines in West Virginia, Kentucky, Pennsylvania, Maryland and Virginia, Arch Coal and its subsidiaries agreed to pay a settlement of \$2 million to federal and state governments and to conduct comprehensive upgrades of their operations.¹⁶⁵

Alpha Natural Resources - Alpha Natural Resources Incorporated agreed to pay \$27.5 million in fines and spend close to \$200 million to implement wastewater treatment systems as part of a settlement with the U.S. government over toxic discharges from its mines in Kentucky, Pennsylvania, Tennessee, West Virginia and Virginia in 2014.¹⁶⁶

Evraz - The U.S. Department of Labor cited Evraz for several worker safety violations in 2014, with proposed fines totalling \$49,900.¹⁶⁷

Raspadskaya - In 2010, two explosions at a Raspadskaya coal mine in Kemerovo Oblast claimed the lives of 68 miners and rescue workers. Poor compliance with safety regulations led to the explosions, which were caused by accumulation of methane underground and a concealed underground fire. Russian officials blamed Raspadskaya for basing wages on output and offering productivity bonuses that encouraged suppression of methane detection systems. Prosecutors initiated a criminal case against the mine's director, contending that he violated safety regulations.¹⁶⁸

Teck - Admitted in 2012 as a result of lawsuit that they had polluted hazardous effluent and other pollutants into the Columbia River in the U.S. from 1896 to 1995.¹⁶⁹ A judge in U.S. District Court in Yakima found them liable under U.S. environmental law for contaminating the Columbia River.¹⁷⁰

Whitehaven Coal - In 2014, Whitehaven coal blocked access to sites considered sacred by Australian Aborigines, despite that reasonable access of the land for the Aborigines is required of the company.¹⁷¹

Banpu - Owner of Centennial Coal, responsible for major release of coal fines into the Wollangambe River and World Heritage listed areas of the Blue Mountains National Park.¹⁷²

¹⁶⁵ U.S. EPA. "Arch Coal, Inc. and International Coal Group Subsidiaries Settlement." August 6, 2015. Accessed October 23, 2015.

¹⁶⁶ Pearson, Sophia. "Alpha Natural Resources Agrees to \$27.5 Million Fine." *Bloomberg Business*. Accessed October 23, 2015.

¹⁶⁷ U.S. Department of Labor Occupational Safety & Health Administration. "US Department of Labor's OSHA cites Evraz Rocky Mountain Steel in Pueblo, Colo., for safety violations following inspection of seamless tube mill Proposed penalties total nearly \$50,000." March 9, 2011. Accessed October 23, 2015.

¹⁶⁸ U.S. Department of State Bureau of Democracy, Human Rights, and Labor. "2010 Human Rights Report: Russia." April 8, 2011. Accessed October 23, 2015.

¹⁶⁹ Teck. "Teck Resources Announces Agreement as to Certain Facts in Upper Columbia River Litigation." September 10, 2012. Accessed October 23, 2015.

¹⁷⁰ State of Washington Department of Ecology. "Official Ecology statement on U.S. District Court finding that Teck Metals liable for contamination in Columbia River." December 14, 2012. Accessed October 23, 2015.

¹⁷¹ Lamacraft, Tim. "Whitehaven Coal warned to respect aboriginal traditions at Maules Creek Mine." *ABC*. September 3, 2014. Accessed October 23, 2015.

¹⁷² Belmer, Nakia, Carl Tippler, Peter Davies, and Ian A. Wright. "Impact of a coal mine waste discharge on water quality and aquatic ecosystems in the Blue Mountains World Heritage area." *7th Australian Stream Management Conference*. July 2014. Accessed October 23, 2015.

Consol Energy - Agreed to pay a \$5.5 million civil penalty for Clean Water Act violations that took place between 2007 and 2009 at six of its mines in West Virginia in 2011. One such violation was the discharge of mining wastewater containing chloride in excess of its National Pollutant Discharge Elimination System (NPDES) permit limits.¹⁷³

Mitsui & Co - Accepted partial blame for the Deepwater Horizon Oil Spill in 2010. In 2012 they agreed to pay a \$90 million settlement for alleged violations of the Clean Water Act.¹⁷⁴

Allele - In 2014, Minnesota Power, an Allele company, agreed to pay civil penalties of \$1.4 million due to violations of the Clean Air Act at three of its coal-fired power plants.¹⁷⁵

Marubeni - In 2014 Marubeni was sentenced by the U.S. Department of Justice for violating foreign bribery laws in Indonesia and agreed to pay \$88 million as a result.¹⁷⁶

Walter Energy - Walter Coke, owned by Walter Energy, was fined \$171,500 by the U.S. Department of Labor for 30 worker safety violations in 2010, including "failure to provide proper machine guarding."¹⁷⁷

Arcelor Mittal - The Ministry of the Environment laid 13 charges against the company for violations at its coke-making plants in March 2013; in May 2014 the company pleaded guilty to six of the charges and was fined \$390,000.¹⁷⁸

Fortune Minerals - They are seeking to build a coal mine on Mount Klappan in Canada, which is within traditional Tahltan First Nation territory, without the support of the Tahltan.¹⁷⁹

Zhengzhou Coal - Fifteen miners died in a coal explosion in 2006 in Henan, China at a Zhengzhou Coal mine. 148 miners were killed after a gas explosion at Zhengzhou's Daping Coal Mine in Xinmi City in Henan Province in 2004.¹⁸⁰

Jingyuan - An explosion at a Jingyuan mine Northwest China's Gansu Province in 2006 killed 29 workers. http://www.chinadaily.com.cn/china/2006-11/01/content_721452.htm

James River - Their Bledsoe Coal Corporation's Abner Branch Rider Mine in Kentucky was cited for multiple violations by the Mining Safety and Health Administration, which targets mines with chronic health and safety violations.¹⁸¹

¹⁷³ U.S. EPA. "Consol Energy Clean Water Act Settlement." March 14, 2011. Accessed October 23, 2015.

¹⁷⁴ Fowler, Tom. "Mitsui Unit Settles With U.S. on Deepwater Spill." *Wall Street Journal*. February 18, 2012. Accessed October 23, 2015.

¹⁷⁵ U.S. EPA. "Minnesota Power Settlement." July 16, 2014. Accessed October 20, 2015.

¹⁷⁶ Department of Justice Office of Public Affairs. "Marubeni Corporation Sentenced for Foreign Bribery Violations." May 15, 2014. Accessed October 20, 2015.

¹⁷⁷ Piper, Ben. "Walter Coke penalized for safety violations." *Birmingham Business Journal*. August 24, 2010. Accessed October 20, 2015.

¹⁷⁸ "ArcelorMittal Dofasco fined after guilty pleas to 6 pollution charges." *CBC News*. May 26, 2014. Accessed October 20, 2015.

¹⁷⁹ "First Nation bans Fortune Minerals from mining Mount Klappan." *Vancouver Sun*. April 24, 2014. Accessed October 20, 2015.

¹⁸⁰ "15 miners die in coal mine explosion in Henan." *China Labour Bulletin*. February 13, 2006. Accessed October 20, 2015.

¹⁸¹ Chuanjiao, Xie. "Gansu mine blast kills 29, 19 injured." *China Daily*. November 11, 2006. Accessed October 20, 2015.

Alcoa - The Alcoa Anglesea in Australia, before being shut down, "cost the public more than \$231m a year in health and environmental" costs according to Environment Victoria, who cited recent research conducted by Harvard University.¹⁸²

Oil and Gas Corporations

Gazprom - Gazprom's Kolskaya floating oil rig capsized and sank in the Sea of Okhotsk in the Arctic off the coast of Russia. The accident caused the deaths of 53 crew members and the project represented the first time a Russian oil company tried to operate in the Arctic, where storms are frequent and ice ridges often yards deep.¹⁸³

Rosneft - Rosneft's east Siberian Achinsk oil refinery in Russian Siberia experienced a fire and explosion in 2014 that caused the deaths of seven people.¹⁸⁴

Petrochina - Petrochina's Dalian oil refinery in China was the site of fires in July and August 2011. Their oil storage depot nearby in Dalian's Xingang port was additionally the site of an explosion in July 2010 which caused China's worst oil spill up to that time, with 1,500 metric tons of oil spilling into the Yellow Sea.¹⁸⁵

Exxon Mobil - Exxon Mobil first learned of climate change and fossil fuels' role in 1977 due to research conducted by their scientists, yet spent \$30 million starting in the mid-1980s to discredit anthropogenic climate change.¹⁸⁶

BP - In 2015 the U.S. Justice Department announced that BP will pay \$20.8 billion for its role in the Deepwater Horizon oil spill in 2010, making it the largest environmental settlement in U.S. history. This settlement includes civil claims under the Clean Water Act, natural resource damages under the Oil Pollution Act, economic damages to state and local governments, and restoration costs.¹⁸⁷

Royal Dutch Shell - As of 2011, Royal Dutch Shell has admitted liability in oil spills that have taken place in the Ogoni region of the Niger Delta in Nigeria, and faces damages estimated by experts that run into the hundreds of millions of dollars. They have additionally been accused by industry watchdog group Platform in a 2011 report of human rights abuses in Nigeria, including having "paid government forces who have attacked, tortured and killed Nigerians living in the creeks and swamplands of the Niger Delta."¹⁸⁸

Chevron - Chevron's facilities and operations experienced a series of accidents in 2011 and 2012, including an explosion at an oil refinery in Wales in June 2011 which killed four workers,

¹⁸² Hjalmarson, Dori. "MSHA issues pattern-of-violations notice for Leslie mine." *Kentucky Lexington Herald-Leader*. April 13, 2011. Accessed October 20, 2015.

¹⁸³ "Drill in Arctic Seas? Rig That Sunk, Killing 53, Casts Doubt." *Msnbc.com*. December 23, 2011. Accessed October 30, 2015.

¹⁸⁴ Vasilyeva, Nataliya. "Rosneft Halts Achinsk Oil Refinery After Explosion Kills Seven | News." *The Moscow Times*. June 17, 2014. Accessed October 30, 2015.

¹⁸⁵ Foster, Peter. "Fire at Dalian Oil Refinery Raises Tensions in China." *The Telegraph*. August 29, 2011. Accessed October 30, 2015.

¹⁸⁶ Shekhtman, Lonnie. "Exxon Knew about Climate Change Decades Ago, Spent \$30M to Discredit It." *The Christian Science Monitor*. September 17, 2015. Accessed October 30, 2015.

¹⁸⁷ Davenport, Coral, and John Schwartz. "BP Settlement in Gulf Oil Spill Is Raised to \$20.8 Billion." *The New York Times*. October 5, 2015. Accessed October 30, 2015.

¹⁸⁸ "Shell Fuelled Human Rights Abuses in Nigeria." *Reuters*. October 3, 2011. Accessed October 30, 2015.

an oil spill in November 2011 off the coast of Brazil which prompted criminal investigations and fines, and a fire in August 2012 at their refinery in Richmond, California that sent 9,000 surrounding residents to the hospital.¹⁸⁹

Total - In 1999, a Total chartered oil tanker sank off the coast of Brittany in France, releasing 30,000 barrels of heavy fuel oil into the Atlantic Ocean. In 2008, Total was convicted of negligence for overlooking maintenance problems with the tanker and was ordered to pay 375,000 Euros in fines and nearly 200 million euros in damages to the French state and the local fishing industry.¹⁹⁰

ConocoPhillips - ConocoPhillips been forced to pay millions of dollars for its involvement with the Bohai Bay spill which polluted over 6,200 square kilometers of water in the Ocean in northern China in 2011. ConocoPhillips and CNOOC, the two companies responsible, have settled with the Ministry of Agriculture and Chinese State Oceanic Administration to pay 2.683 billion Yuan for damages.¹⁹¹

ENI - ENI reported causing 349 oil spills in Nigeria in 2014 and over 500 in 2013.¹⁹²

Statoil - Norway-based Statoil was fined \$190,000 for violating water regulations in 2011 at its oil sands site in northern Alberta after it contravened its water license and provided false information in relation to water withdrawals taken from its facility near Conklin in northern Alberta in 2008 and 2009.¹⁹³

SinoPec - A 2013 explosion at a SinoPec oil pipeline in Qingdao caused by an oil leak in 2013 which killed 35 people and injured 166.¹⁹⁴

CNOOC - China's largest producer of offshore crude oil and natural gas, CNOOC was implicated in U.S. Treasury Department sanctions on the Burmese government in 2008, allegedly cooperating with a company run by a family involved in heroin trafficking activities in Myanmar.¹⁹⁵

BG Group - The Karachaganak Oil and Gas Fields project, operated by a consortium which includes a BG Group called KPO, was fined \$21 million for environmental violations in Kazakhstan, including for an excessive amount of waste dumping.¹⁹⁶

¹⁸⁹ Baker, David. "Chevron's Safety Record Hit by Accidents." SFGate. August 16, 2012. Accessed October 30, 2015.

¹⁹⁰ "France Upholds Total Verdict over Erika Oil Spill - BBC News." BBC News. September 25, 2012. Accessed October 30, 2015.

¹⁹¹ "Green Group Sues ConocoPhillips, CNOOC over China Oil Spill." Reuters. July 26, 2015. Accessed October 30, 2015.

¹⁹² "Nigeria: Hundreds of Oil Spills Continue to Blight Niger Delta." Amnesty International. March 19, 2015. Accessed October 30, 2015.

¹⁹³ "Statoil to Pay Alberta Fine for Improper Water Use." Financial Post. November 1, 2011. Accessed October 30, 2015.

¹⁹⁴ Aizu, Chen. "Sinopec Oil Pipeline Blast Kills 35 in Eastern China." Reuters. November 22, 2013. Accessed October 30, 2015.

¹⁹⁵ Wai-yin Kwok, Vivian. "Treasury Sanctions On Myanmar Traffickers Implicate CNOOC." Forbes. February 27, 2008. Accessed October 30, 2015.

¹⁹⁶ Reiner, Karen. "Most Environmentally and Socially Conscious Companies of 2010." Reprisk. December 15, 2010. Accessed October 30, 2015.

Canadian Natural Resources - Canadian Natural Resources was sentenced to C\$125,000 in penalties in March 2015 as a result of an oil spill that took place in May of 2010 in northern Alberta.¹⁹⁷

Andarko Petroleum - The federal government reached a settlement with Andarko Petroleum in 2014 for \$5.15 billion for claims relating to the cleanup of thousands of sites that had been tainted with hazardous chemicals over the last several decades in communities throughout the United States.¹⁹⁸

Ecopetrol - Thirty-three people were killed and numerous homes were destroyed when an Ecopetrol pipeline ruptured in Dosquebradas in Colombia, which the Colombian comptroller ruled was caused by negligence.¹⁹⁹

Suncor Energy - Six months after a spill from a Suncor oil refinery in Colorado that contaminated the South Platte River and subsequent cleanup efforts, benzene levels are still six times higher than the national safety standard in the South Platte River.²⁰⁰

Marathon Petroleum Corporation - Marathon violated Clean Air Act standards for 40 tons of excess emission of pollutants, including toxins "known or suspected to cause cancer or other serious health or environmental effects" and was ordered to pay a civil penalty of \$2.9 million in 2015 as a result.²⁰¹

Continental Resources - Continental Resources' oil extraction operations in North Dakota have been the site of 11 oil well blowouts between 2006 and November 2014.²⁰²

OMV - OMV was fined for \$28,600 for 500 liters of oil spilled in the Cotmeana River in Romania in 2012.²⁰³

Antero Resources - The West Virginia Department of Environmental Protection issued a notice of violation to Antero Resources for a well drilling accident in 2014 that could have released methane gas into 12 personal water wells in West Virginia, with the Office of Oil and Gas additionally citing Antero Resources with a cease and desist order.²⁰⁴

¹⁹⁷ Blais, Tony. "Calgary Oil Company Fined for Releasing Oil into Northern Alberta Creek." Edmonton Sun. March 13, 2015. Accessed October 30, 2015.

¹⁹⁸ Tucker, Eric, and Dinah Cappiello. "US Reaches \$5.15 Billion Environmental Settlement." Yahoo! News. April 3, 2014. Accessed October 30, 2015.

¹⁹⁹ Hall, Marc. "Negligence Caused Fatal Ecopetrol Explosion: Comptroller." Colombia Reports. March 6, 2012. Accessed October 30, 2015.

²⁰⁰ Finley, Bruce. "Suncor Spill Still Taints South Platte, Proves Benzene a Tough Mop-up." The Denver Post. May 15, 2013. Accessed October 30, 2015.

²⁰¹ "Marathon Petroleum Corporation Clean Air Settlement." EPA United States Environmental Protection Agency. May 19, 2015. Accessed October 30, 2015.

²⁰² Sontag, Deborah, and Robert Gebeloff. "The Downside of the Boom." The New York Times. November 22, 2014. Accessed October 30, 2015.

²⁰³ Timu, Andra. "OMV Petrom in Romania Fined for Oil Spill in Cotmeana River." BloombergBusiness. May 22, 2012. Accessed October 30, 2015.

²⁰⁴ "WV DEP Issues Notice of Violation to Antero over Doddridge County Drilling Incident." The State Journal. October 5, 2015. Accessed October 30, 2015.

Linn Energy - In 2009 the EPA cited Linn Energy with a cease and desist order for violations of the federal Clean Water Act for unauthorized discharge of oil field brine into waterways in Osage County, Oklahoma from a Linn oil production facility.²⁰⁵

PTT - During a faulty transfer between a seabed pipeline and a tanker of PTT a 50,000 liter oil spill occurred in Thailand on the island of Koh Samet in 2013.²⁰⁶

Pioneer Natural Resources - Pioneer Natural Resources paid a fine of \$10,000 to the Alaska Oil and Gas Conservation Commission for injecting an unapproved chemical, glycol, into its oil reservoir on Alaska's North Slope in 2010. The violations were reported by a whistleblower in the company who left Pioneer after making the allegations.²⁰⁷

SK Innovation - A 164,000-litre oil spill occurred in February 2013 as a result of a leak in one of their pipelines, with the oil leaking off of South Korea's southern coast.²⁰⁸

Ultra Petroleum - According to a 2012 shareholder rebuttal filed by As You Sow, Ultra Petroleum has more than 200 alleged violations in the five years leading up to 2012 in Wyoming and Pennsylvania, and has failed to provide little if any information on fines and enforcement actions for its operations. Information showed that they had spent tens of millions of dollars in mitigation efforts in Wyoming in response to their emission of air pollutants.²⁰⁹

Maersk Group - According to a 2004 report by the Institute for Global Labour and Human Rights, Maersk maintained abusive working conditions in El Salvador, including 16-hour shifts, and repression of freedom of expression and unionization campaigning, including forcing workers to take lie detector tests regarding union activity.²¹⁰

Energen - Energen does not participate in the Carbon Disclosure Project (CPD) as many oil and gas corporations do and generally has poor public disclosure of carbon asset risk.²¹¹

Energy XXI - Energy XXI is responsible for 105 health and environmental violations that took place between 2007 and 2012, according to the House Committee on Natural Resources Democrats' report, which was released in 2013.²¹²

²⁰⁵ "EPA Orders Linn Energy, LLC to Cease Discharge of Pollutants." EPA United States Environmental Protection Agency. June 29, 2009. Accessed October 30, 2015.

²⁰⁶ Stevens, Andrew. "Thailand Oil Spill: Tourists Abandon Blackened Koh Samet Beach." CNN. August 1, 2013. Accessed October 30, 2015.

²⁰⁷ "Pioneer Natural Resources Fined for Violation." Oil & Gas Financial Journal. September 24, 2010. Accessed October 30, 2015.

²⁰⁸ "UPDATE 1-S.Korea Completing Sea Cleanup 164,000 Litres Oil Leak-Coast Guard." Reuters. February 3, 2014. Accessed October 30, 2015.

²⁰⁹ "SHAREHOLDER REBUTTAL TO THE ULTRA PETROLEUM OPPOSITION STATEMENT REGARDING HYDRAULIC FRACTURING RISKS." EDGARPro. May 10, 2012. Accessed October 30, 2015.

²¹⁰ "Maersk Drivers Face Repression and Abuse in El Salvador." INSTITUTE FOR GLOBAL LABOUR AND HUMAN RIGHTS. November 1, 2004. Accessed October 30, 2015.

²¹¹ "Energen Carbon Asset Risk 2015." Ceres. 2015. Accessed October 30, 2015.

²¹² "Dangerous Drillers Offshore Safety Lapses Continue Three Years After BP Spill." Dangerous Drillers Offshore Safety Lapses Continue Three Years After BP Spill. May 10, 2013. Accessed October 30, 2015.

B. Undergraduate Student Referendum Results

The Nominations and Elections Committee held an undergraduate referendum on fossil fuel divestment and clean reinvestment from February 23rd to February 27th, 2015. It was the first student referendum in six years, and Fossil Free Penn gathered over 500 signatures to initiate the ballot initiative. To ensure a high turnout, Fossil Free Penn mobilized eighty volunteers during the referendum voting period. The results of the referendum demonstrate resounding support for our proposal among the student body, with 87.8% of participants voting in favor.

The results additionally make the referendum's proposition the official position of the Undergraduate Assembly.

Referendum Language:

“We, the undergraduates at the University of Pennsylvania, call upon the Undergraduate Assembly to recommend formally that the Trustees of the University of Pennsylvania:

1. Stop new investments in the fossil fuel industry;
2. Remove direct and commingled holdings in the top 200 fossil fuel companies within 5 years;
3. Reinvest a portion of the extricated funds into clean energy assets.”²¹³

Votes For
2866
Votes Against
397
Voter Turnout
33%

²¹³ "Referendum Results." Nominations & Elections Committee. February 27, 2015. Accessed October 31, 2015.

C. Alumni Statements in Support of Fossil Fuel Divestment

“Yes! Yes! Yes! I graduated in 2012, and saw the creation of PennGreen, Eco-reps, Green Campus Partnerships, the Sustainability and Environmental Management minor, the Penn Garden, and Bon Appetite brought onto campus during my tenure. It was an exciting time, but the one thing that made it all feel like a farce was that Penn wasn't putting its money where its mouth was. Even from the outside it was apparent: the 2011 Green Report Card from the Sustainable Endowments Institute gave Penn A's in every category, except for ‘Endowment Transparency’, for which it earned an emphatic D. (citation: <http://www.greenreportcard.org/report-card-2011/schools/university-of-pennsylvania.html>). It is a truly a heroic effort from the students, and a statement about Penn's authentic commitment to sustainability if this movement succeeds. As an alum, this means a lot. I might even give to the Penn Fund this year.”

-Zachary Bell, College 2012

“Available scientific evidence indicates strongly that most fossil fuels must be left in the ground if there is to be any hope of meeting the 2°C goal regarded as the limit beyond which irreversible climate change can become catastrophic. At the same time, the major energy corporations are quite openly declaring their intentions of exploiting all the reserves available, and unearthing new ones. These decisions are driving the world to disaster. There is everyone reason to take whatever actions we can to divert them from this disastrous course. University disinvestment would be a welcome and significant step in this direction.”

-Noam Chomsky, College, College 1949 (B.A.), School of Arts and Sciences 1951 (M.A.), School of Arts and Sciences 1955 (Ph.D.)

“If Penn wants to be able to say it cares about innovation and civic engagement, then it has to divest.”

-Laura Cofksy, College 2013

“Penn has always been a thought leader. We only have one planet, one environment. I want my alma mater to be leading the way in ethical action and sustainable investment!”

-Daniel Cohen, Wharton 2010

“What is the purpose of our education if not to create a better world for all? Continuing our reliance on fossil fuels fails to do that.”

-Jack Cohen, Wharton 2009

“There are more responsible, sound investments that a university as great as Penn can make. By divesting in fossil fuels and supporting clean energy assets, the University will continue to be a leader in sustainability among campuses nationwide and globally.”

-Shannon Macika, College 2014

“I support fossil fuel divestment because it is a contradictory mission for a university to both prepare young men and women for their futures and, at the same time, profit from the industries that are unequivocally killing our planet. Given that the fossil fuel industry plans to exploit the oil that scientists argue must stay in the ground to limit global warming to levels that already threaten to spur catastrophic economic, environmental and social tragedy, it is unconscionable to maintain such investments. While divestment alone will not shut down the fossil fuel industries, the symbolic gesture of divestment will serve to stigmatize this industry and make others re-consider their investments. Some might argue that divestment is not an effective strategy, but one need only look at the example of apartheid to see that divestment can actually have huge political implications. And, luckily, fossil free portfolios are performing well and Penn might actually stand to gain financially from such a move. As a university professor and parent, I care deeply about the issue of climate change and believe strongly that divestment is one of many efforts that need to be taken to help solve this problem of global proportions. I HIGHLY support the work of Fossil Free Penn. Go Quakers!!”

-Anne O’Neil-Henry, College 2002

“I am a student of divinity and religion. If there is anything the wisdom traditions of the world have taught us and have been trying to teach us, it is that our humanity is interconnected. Not only with that of our fellow human beings, but also with the planet on which we rely for life. ‘Walk softly on the earth, for when you are walking, you walk on your mother’s face,’ a professor of mine has said. By not divesting from fossil fuels, we choose instead to stomp on our mother’s face. Not only that, but we stomp on the faces of those other human beings and creatures who inhabit this planet with us. We fail to extend ourselves on behalf of others, blind to the ways in which we are complicit in the suffering of those whom our investment in fossil fuels most directly affects. It is a fact that people of color, indigenous communities around the world, and residents of the ‘third world’ are some of the primary victims of our dependence on fossil fuels. These individuals, affected by generations of systemic oppression and structural violence, are most likely to live in unhealthy environments and have their lands taken away to make way for waste plants and other elements of the fossil fuel industry. Fossil fuel companies and multinational corporations target these communities to locate their facilities, understanding that these groups have historically had little power to resist such exploitation. All the while, climate change is leading to deforestation, mudslides, and drought that are destroying the ways of life of communities who rely on their immediate environments to maintain their livelihoods and their cultural traditions. As part of the ‘First World,’ we must now bear witness to the ecological and humanitarian crises we ourselves are creating. We must take responsibility. From Rabbi Hillel: ‘If I am not for myself, who will be for me? If I am not for others, what am I? And if not now, when?’”

-Shrestha Singh, College 2012

D. February 2013 Speech to University Council Regarding Fossil Fuel Divestment

Divestment at Penn (DAP)
University Council Speech
Wednesday, February 20, 2013

Good afternoon, my name is Sara Allan and I am representing Divestment at Penn. In addition, my viewpoint comes as a college sophomore majoring in environmental studies; the co-chair of the Student Sustainability Association at Penn, the umbrella organization of environmentally-related student groups; and a member of the Penn Haven Housing Co-Op.

Divestment at Penn (DAP) is Penn's local chapter of a national movement calling on universities to divest their financial holdings in fossil fuel companies. Penn is one of over 250 colleges and universities, including all of the ivy's, currently campaigning for fossil fuel divestment.

Climate change is accelerating. We are witnessing the increasing impacts of a warming planet more and more consistently; in this last year alone our country experienced record-breaking heat, droughts, and hurricanes, which impacted hundreds of thousands of people and cost our country hundreds of billions of dollars. Hurricane Sandy alone caused \$50 billion in damages. Experts agree that global warming caused by humans burning fossil fuels will continue to accelerate and intensify these tragic climate disasters. The scientific consensus is clear and overwhelming; we cannot safely burn even a quarter of global fossil-fuel reserves without dangerously warming the planet for several thousand years.

As public pressure to confront climate change builds, we call on The University of Pennsylvania to immediately freeze any new investment in fossil-fuel companies, and to divest within five years from direct ownership and from any commingled funds that include fossil-fuel public equities and corporate bonds. We believe such action on behalf of The University of Pennsylvania will not only be a sound decision for our institution's financial portfolio, but also for the wellbeing of its current and future graduating classes, who deserve the opportunity to graduate with a future not defined by climate chaos. As an educational institution, Penn should be focusing on long-term investment horizons.

Scientists estimate that humans can only pour 565 more gigatons of carbon dioxide into the atmosphere while staying below two degrees of global warming. However, fossil fuel corporations have 5 times more oil, coal, and gas than that in known reserves, equivalent to 2,795 gigatons of CO₂. In other words, we have to keep 80% of fossil fuel reserves underground to keep the earth in livable shape.

At the present time, Divestment at Penn is meeting as a student group on campus, collecting signatures for a petition supporting divestment, and planning actions to raise awareness for the issue. We ask Penn to form a task force committee to determine a course of action for divestment. According to the Office of Investments, "The Associated Investments Fund is

invested in accordance with the policies set out by an Investment Board appointed by the trustees of the university.” We ask the university to include environmental concerns in these policies.

In signing the ACUPCC, President Gutmann committed to “exercise leadership in [the] community and throughout society by modeling ways to minimize global warming emissions...” As the first Ivy president to sign the commitment, President Gutmann set a precedent for Penn to be a leader in combating climate change. With one of the largest endowments in the nation, Penn is poised to take national leadership on this issue and divest financial holdings in fossil fuel industries.

Thank you.

E. Endorsements from Campus Organizations

Organizations Endorsing Fossil Free Penn's Proposal:

- Asian Pacific Student Coalition (APSC)
- CityStep Penn
- The Daily Pennsylvanian Editorial Board
- Democracy Matters at Upenn
- Earth and Environmental Science Graduate Advisory Board
- Engineers Without Borders, Upenn Chapter
- J Street U Penn
- Mex@Penn
- Penn Environmental Group (PEG)
- Penn for Immigrant Rights (PIR)
- Penn Korean Student Association (KSA)
- Penn Microfinance
- Penn Outdoors Club
- Penn Students for Justice in Palestine
- Penn Student Labor Action Project (SLAP)
- Penn Students for Sensible Drug Policy (SSDP)
- Shira Chadasha @ Penn
- University of Pennsylvania Democrats
- Upenn Consciousness Club