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The Fossil Fuel Industry and the Case for Divestment: Update

Toronto350.org

April 10, 2015

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Understanding the update

This document contains four kinds of text: standard, for material unchanged since the September 2013 brief; bold, for text added in the update; crossed-out, for text removed from the 2013 brief; and blue, for hyperlinks within the document and to outside sources. A version of this document with alternative formatting for new text can be provided upon request.

The original brief was opened for endorsement by teaching staff, students, administrative staff, and alumni of the University of Toronto on September 9th 2013.

This document provides updated information and improved recommendations, taking into account what has happened since then. It also includes a new section with responses to questions from the ad hoc committee: Responses to questions from the ad hoc committee.

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How to use this brief

This brief explains why divestment from fossil fuel companies is in keeping with the values of the university and why it is feasible and financially prudent. This document is laid out to do three things:

1. respond directly to the University of Toronto's Policy on Social and Political Issues

With Respect to
University Divestment and Procedures for Responding to Social and Political Issues with R
espect to
University Divestment,

2. provide a comprehensive and well-documented case supporting each major claim,
3. and give people the opportunity to understand the main elements of the argument quickl
y.

Those seeking a relatively quick overview should examine the Executive summary, the table
of contents, and
the Short answers to common questions provided. Those seeking detailed information should
read the entirety
of the relevant section.

The petitioners who are supporting this proposal have affirmed that they have read and ag
ree with this brief as
a whole. All errors that have been corrected since the brief was opened for signature are
included in: Appendix
III: Errata.

The brief is available at: <http://Toronto350.org/divest/> and all included figures are ava
ilable at: <http://toronto350.org/divest/figures/>

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We encourage fossil fuel divestment campaigns at other institutions to adapt this document for their own use, and are happy to provide the BTPX files which it is based on. 1

Toronto350.org, author

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1. Climatic changes – Economic aspects. 2. Climatic changes – Political aspects. 3. Climatic changes – Social aspects. 4. Climatic changes – Moral and ethical aspects. 5. Environmental responsibility. 6. Global environmental change.

x We are pleased to report that the University of Glasgow committed to divest based on a modified version of this brief: Glasgow University Climate Action Society, The Fossil Fuel Industry and the Case for Divestment.

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For the Presidential Advisory Committee on Divestment from Fossil Fuels

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Chapter 1 Executive summary

The governments of the world – including the governments of Canada, the United States (U.S.), the United Kingdom (U.K.), China, Brazil, and the 27 European Union (EU) members – have agreed we should avoid raising global temperatures to more than 2 °C above pre-industrial levels. ¹ This is the threshold at which the major governments of the world have agreed that climate change becomes "dangerous". In 2009, an article in *Nature* warned that failing to constrain warming to below 2 °C "would threaten the ecological life-support systems that have developed in the late Quaternary environment, and would severely challenge the viability of contemporary human societies". ²³⁴ In the Summary for Policymakers from their Fifth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) explains:

Without additional mitigation efforts beyond those in place today, and even with adaptation, warming by the end of the 21st century will lead to high to very high risk of severe, widespread, and irreversible impacts globally. ⁵⁶

Based on hundreds of thousands of years of evidence on how the climate responds to greenhouse gases (GHGs), we can calculate the total quantity of all fossil fuels we can burn, adding the carbon they contain to the atmosphere, while still giving ourselves a good chance of avoiding a 2 °C increase. ⁷ To do so we must keep future GHG pollution to no more than 565 billion tonnes (gigatonnes) of carbon dioxide (CO₂). ⁸ At the same time, we know that burning the world's proven reserves of coal, oil, and natural gas would produce 2,795 gigatonnes of CO₂ – nearly five times as much as it would be safe to burn. ⁹¹⁰¹¹ The University of Toronto (UofT) can play a role in helping humanity stay within these planetary limits by choosing to sell its investments in fossil fuel companies.

Climate change is a denning example of social injury. Firms that produce fossil fuels do not bear any economic burden as a result of the many forms of harm they are imposing on other people, including agricultural impacts, sea level rise, damage to human health, and more severe extreme weather. Likewise

e, those who use fossil fuels enjoy the benefits while imposing these costs on others. In order to avoid severe global injury, the total quantity of fossil fuels burned by humanity must be capped far below the level of fossil fuels available to be burned. As The Economist explains: "[C]ompanies and governments already have far more oil, gas and

1 The Heads of State, Heads of Government, Ministers, and other heads of delegation present at the United Nations Climate Change Conference 2009 in Copenhagen, Copenhagen Accord.

2 Rockstrom et al., "A safe operating space for humanity".

3 Notably, some scientists have concluded that even 2 °C of warming involves an unacceptable level of harm and risk. A 2013 study argued: "Continuation of high fossil fuel emissions, given current knowledge of the consequences, would be an act of extraordinary witting intergenerational injustice". Hansen et al., "Assessing "dangerous climate change": required reduction of carbon emissions to protect young people, future generations and nature".

4 Climate scientist James Hansen argues that even a 2 °C increase would "subject young people, future generations and nature to irreparable harm". Thompson, Climate Scientist 2 Degrees of Warming Too Much.

5 Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report, p. 17 .

6 See also: The Guardian, IPCC: rapid carbon emission cuts vital to stop severe impact of climate change.

'Research published in Nature highlights how even a limit of 2 °C of warming "is not sufficient to control many other quantities, such as transient sea level rise, ocean acidification and net primary production on land". Limiting warming to a lesser level would require even more aggressive action than described in this brief. Steinacher, Joos, and Stocker, "Allowable carbon emissions lowered by multiple climate targets", p. 197.

8 For a more detailed explanation that is accessible to non-experts see: McKibben, Global Warming's Terrifying New Math.

9 Carbon Tracker Initiative, Unburnable Carbon: Are the world's financial markets carrying a carbon bubble?

10 Another accessible summary of the issue can be found in this free hour-long radio program: This American Life, Hot In My Backyard.

11 See also: Sustainable Development Solutions Network, Pathways to Deep Decarbonization,

p. xii.

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coal than they need... assuming temperatures are not to rise by more than 2 °C". 12 The International Energy Agency supports this assessment; in their "2012 World Energy Outlook" they explain that: "[n]o more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to achieve the 2 °C goal". 13 Research published in Nature in 2015 concluded that: "80%, 50% and 30% of coal, gas and oil reserves, respectively, would need to remain below Earth's surface if the world is to limit an increase in global mean temperature to 2 °C". 14 Other research in the same journal found that: "development of resources in the Arctic and any increase in unconventional oil production are incommensurate with efforts to limit average global warming to 2 °C" and that: "85% of [Canada's] 48 billion of barrels of bitumen reserves thus remain unburnable if the 2 °C limit is not to be exceeded". 15

16 The business plans of fossil fuel companies do not take this reality into account. They assume they can burn all of their proven reserves, along with any additional reserves they discover in unconventional areas like the arctic, the deep ocean, and Canada's bituminous sands. 19

20 Right now, we are adding over 35 gigatonnes of CO₂ to the atmosphere each year, and the global quantity of that pollution is rising by three percent per year. 22 That means that we are on track to exceed the 565 gigatonne limit within 15 years.

Two implications arise from this. First, we need to meet the world's energy needs while leaving 80 percent of the planet's fossil fuel reserves unburned. 23 As NASA climatologist James Hansen explains: "Rapid reduction of fossil fuel emissions is required for humanity to succeed in preserving a planet resembling the one on which civilization developed". 24 This requires a massive redirection of investment from funding fossil fuel energy

sources to deploying different energy sources that do not alter the climate. 25 Second, the stockmarket value of fossil fuel companies is based on the outdated assumption that fossil fuel extraction and use can continue without limit. If they are allowed to do this, the global effects will be catastrophic. As such, much of the value of these companies is illusory, based on the outdated assumption that we can forever use the atmosphere as a free dumping ground for CO₂. The energy sources of the future need to be compatible with a stable climate: a fact the investment community has not yet generally accepted, but which it will be confronted with increasingly as the severity of climate change becomes more obvious. It's time for the 'smart money' to start investing in energy sources that are compatible with a prosperous future, rather than those that threaten to afflict the world with frightening and avoidable harms.

12 The Economist, Unburnable fuel.

13 International Energy Agency, World Energy Outlook: 2012, p. 25.

14 Jakob and Hilaire, "Climate science: Unburnable fossil-fuel reserves".

15 McGlade and Ekins, "The geographical distribution of fossil fuels unused when limiting global warming to 2 °C".

16 See also: Monbiot, Leave fossil fuels buried to prevent climate change, study urges.

17 Dyer, Climate change study says most of Canada's oil reserves should be left underground.

18 Biello, Blacklist proposed for fossil fuels.

19 The U.S. Energy Information Administration estimates that there are 345 billion barrels of recoverable shale oil around the world, and 7,299 trillion cubic feet of shale gas: United States Energy Information Administration, Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States.

20 In their 2012 annual report, Shell describes how in the future they expect more of their "production to come from unconventional sources than at present" and how "it is expected that both the CO₂ intensity of our production, as well as our absolute Upstream CO₂ emissions, will increase as our business grows". Royal Dutch Shell PLC, Building an Energy Future: Annual Report and Form 20-F 2012, p. 14.

21 BP expresses a similar concern: "Over the long term it is likely that the carbon inten

sity of our upstream operations will continue to trend upwards as we move further into technically challenging and potentially more energy-intensive areas". BP PLC, Building a stronger, safer BP: Annual Report and Form 20-F 2012, p. 52.

22 Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report, p. 26.

23 For reasons of scale and cost, it is not plausible that carbon capture and storage (CCS) will allow us to escape this reality. See: Won't carbon capture and storage (CCS) save us?.

24 Hansen and Sato, Paleoclimate Implications for Human-Made Climate Change.

25 See: Stern, The case for a European low-carbon economy.

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Figure 1 . 1 summarizes the situation in which the world now finds itself, considering the size of fossil fuel reserves and the safe operating parameters of the planet. On the left are two circles depicting the total 'carbon budget' the world can make use of without breaching the "dangerous" 2 °C barrier. 26 The black circle shows what has already been burned and the grey circle shows what could still be burned without breaking the budget limit. The circles to the right depict the massive quantity of potential CO₂ emissions embedded in the world's remaining coal, oil, and gas. 27 The world won't be able to shift instantly to zero-carbon forms of energy, but if we are to avoid breaching the limit we have chosen, we need to stop building new fossil-fuel infrastructure that will burden the world for decades and delay investment in forms of energy that can be relied upon indefinitely. The risks of delay are highlighted in a report from the Executive Office of the President of the United States:

Because CO₂ accumulates in the atmosphere, delaying action increases CO₂ concentrations. Thus, if a policy delay leads to higher ultimate CO₂ concentrations, that delay produces persistent economic damages that arise from higher temperatures and higher CO₂ concentrations. Alternatively, if a delayed policy still aims to hit a given climate target, such as

limiting CO₂ concentration to a given level, then that delay means that the policy, when implemented, must be more stringent and thus more costly in subsequent years. In either case, delay is costly. 2829

They estimate that a delay that results in 3 °C of temperature increase rather than 2 °C would "increase economic damages by approximately 0.9 percent of global output", "[t]he next degree increase, from 3°

26 The International Energy Agency also endorses the carbon budget concept, and expects that the entire 2 °C budget will be exhausted by 2040 under their central energy use scenario. They argue that: "the 2 °C objective requires urgent action to steer the energy system on to a safer path". International Energy Agency, World Energy Outlook 2014 – Executive Summary, p. 2.

27 Carbon Tracker Initiative, Unburnable Carbon: Are the world's financial markets carrying a carbon bubble?, p. 6.

28 Executive Office of the President of the United States, The Cost of Delaying Action to Stem Climate Change, p. 1.

29 See also: Goldenberg, Delaying climate action will carry heavy economic cost, White House warned.

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to 4°, would incur greater additional annual costs of approximately 1.2 percent of global output", and

"[t]he incremental cost of an additional degree of warming beyond 3° Celsius would be even greater". 30

Delay also increases the odds of "irreversible, large-scale changes that have wide-ranging and severe

consequences" such as the loss of major ice sheets, permanent changes to the oceans arising from acidification, and massive methane release from soils, permafrost, and methane hydrates. 31

Kevin Anderson,

former director of the Tyndall Centre for Climate Change Research, warns that warming of more than 4

°C is "incompatible with any reasonable characterization of an organized, equitable and civilized global

community". 3233

U of T needs to stop funding the worldwide search for unconventional fossil fuel reserves like the bitumen sands, shale gas, and oil under what remains of the arctic ice. These objectives can be achieved without sacrificing strong financial performance, and while upholding the values of the university.

1.1 How the University of Toronto can make a difference

The International Energy Agency expects \$37 trillion to be spent on energy supply infrastructure between 2012 and 2035. 343536 Humanity must decide whether to spend this money digging ourselves deeper into a pit of fossil fuel dependence, or whether to redirect it toward moving beyond fossil fuels. U of T can help lead the necessary redirection of investment that will allow humanity to prevent climatic catastrophe while building a safe and efficient global energy system that can be relied upon indefinitely. Selling its shares in fossil fuel companies would be an effective way of contributing to this transition. As with divestment from apartheid South Africa and the tobacco industry, this choice would make a powerful statement about the kind of future the university wishes to help bring about. It would also help strip the fossil fuel industry of its social license to operate. This license is increasingly undeserved, as fossil fuel companies continue to drive the world toward dangerous climate change and impose social injury on innocent people around the world and in future generations. By selling its holdings before the majority of investors accept that most remaining fossil fuel reserves are unburnable, the university can protect itself from the risk that fossil fuel stock values will fall substantially as the world realizes that their reserves are too dangerous to burn.

The moral similarity between fossil fuel divestment and divestment in response to apartheid in South Africa has been highlighted by Archbishop Desmond Tutu:

Just as we argued in the 1980s that those who conducted business with apartheid South Africa were aiding and abetting an immoral system, we can say that nobody should profit from the rising temperatures, seas and human suffering caused by the burning of fossil fuels. 37

30 Executive Office of the President of the United States, The Cost of Delaying Action to

Stem Climate Change, p. 1, 4, 1.

31 Ibid., p. 6, 21-3.

32 Klein, *This Changes Everything: Capitalism vs. the Climate*, p. 13.

33 See also: The World Bank, *Turn Down the Heat Why a 4°C Warmer World Must be Avoided*.

34 International Energy Agency, *World Energy Outlook 2012 Factsheet*.

35 The IEA also estimates that \$350 billion in exploration and investment will be needed in every year until 2050 in order to sustain global oil use. McKibben, *Eaarth: Making a Life on a Tough New Planet*, p. 29.

36 The IEA also estimates that keeping climate change to less than 2 °C will require \$500 billion in annual investment in low-carbon energy technologies by 2020, and \$1 trillion in annual investment by 2030. Ceres, *Investing in the Clean Trillion: Closing The Clean Energy Investment Gap*.

37 Tutu, *We fought apartheid. Now climate change is our global enemy*.

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Tutu has further argued that "divestment played a key role in helping liberate South Africa. The corporations understood the logic of money even when they weren't swayed by the dictates of morality". He argued that it can help "put pressure where it counts" in dealing with climate change. 38

In March 2015, the United Nations Framework Convention on Climate Change endorsed fossil fuel divestment. Nick Nuttall, spokesperson for the organization, explained: "We support divestment as it sends a signal to companies, especially coal companies, that the age of 'burn what you like, when you like' cannot continue". 39

In a 2013 report prepared by the Stranded Assets Programme at the Smith School of Enterprise and the Environment at the University of Oxford, three distinct 'waves' are identified for to bacco and South African apartheid divestment, beginning with religious groups and industry-related public organizations; moving to universities, cities, and select public institutions; and eventually to

the wider market.

They argue that fossil fuel divestment has rapidly entered the second wave of divestment, with the

prospect to enter the third wave where it "goes global and begins to target very large pension funds and

market norms, such as through the establishment of social responsibility investment (SRI) funds". 40

Kevin Bourne, a managing director of FTSE, described divestment as: "one of the fastest-moving de-

bates I think I've seen in my 30 years in markets". 41 A report from Bloomberg New Energy Finance

explains that, compared with previous divestment campaigns against tobacco and apartheid, fossil fuel

divestment is distinguished by "its rapid growth and quick scaling". 4243

Universities, which collectively have endowments and pension funds worth many billions of dollars, can

play an important role in driving this shift toward cost-effective approaches to CO₂ mitigation, including energy

conservation and renewable energy deployment. 44 In the U.S. alone, university endowments for the 800

public and private universities that manage their own endowments are collectively worth nearly US\$400

billion. 45 University divestment of fossil fuel company shares would demonstrate that the 'smart money' is

sufficiently concerned about climate change to take effective action, and could prompt other investors to

reconsider their own portfolio decisions. Addressing the Board of Trustees at Middlebury College, Tom

Steyer explained that:

Looking to the future, the data on climate change makes it clear that something has changed,

and as the rest of the world realizes this, fossil fuel stocks will come under increasing pressure.

At the moment, other investors have not fully realized the risk that carbon reserves

will become a stranded asset; if you acknowledge what your own science departments are telling you, this gives you an edge relative to those investors. 46

Tutu, Archbishop Desmond Tutu on Divestment.

39 Carrington, Climate change: UN backs fossil fuel divestment campaign.

40 Ansar, Caldecott, and Tilbury, Stranded assets and the fossil fuel divestment campaign

: what does divestment mean for the valuation of fossil fuel assets?, p. 9-10.

41 Bloomberg New Energy Finance, Fossil fuel divestment a \$5 trillion challenge, p. 2.

42 Ibid., p. 2.

43 See also: Carmona, Bloomberg New Energy Finance Assesses Divestment and Finds Net Gain .

44 The consultancy McKinsey & Company has studied and ranked global options for mitigating GHG pollution, considering their cost, plausible deployment speed, and the scale at which they can help solve the problem. See: McKinsey & Company, Impact of the Financial Crisis on Carbon Economics: Version 2. 1 of the Global Greenhouse Gas Abatement Cost Curve, p. 8.

45 Piketty, Thomas. Trans. Arthur Goldhammer, Capital in the Twenty-First Century, p. 447 .

46 Steyer, Statement of Tom Steyer to the Middlebury College Board of Trustees, p. 1 .

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Divestment would help reduce the danger from climate change by decreasing investor confidence in the viability of new projects like coal-fired power plants and oil pipelines. As the analysis below demonstrates, U of T can divest all holdings of fossil fuel companies while still maintaining a stable portfolio providing attractive returns. The legacy of U of T's investments can either be the continued support for projects that clash fundamentally with what we know to be required to preserve a safe climate, or it can be the development and deployment of energy options that are compatible with enduring prosperity for the university and humanity as a whole.

The authors and supporters of this brief call upon the University of Toronto to:

- Make an immediate statement of principle, expressing its intention to divest its direct holdings of stock in fossil fuel companies,
- Immediately stop making new investments in the industry,

- Instruct its investment managers to wind down the university's existing direct stock holdings in the 200 fossil fuel companies listed in Appendix II: The 200 companies with the largest fossil fuel reserves within five years of receiving the recommendation of the ad hoc committee the fully - endorsed brief being delivered to the president, and
- Divest from Chevron Royal Dutch Shell within one year of receiving the ad hoc committee's recommendation endorsed brief as well as make a statement of principle that investment in Royal Dutch Shell is incompatible with its divestment policy. 47

1.2 Updated request

Since the original brief was finalized in 2013, two significant developments have affected the divestment recommendation made by Toronto350.org.

First, an updated list of the 200 companies with the largest reserves was released by the Carbon Tracker Initiative. The new list has been substituted for the old one in Appendix II: The 200 companies with the largest fossil fuel reserves. This also raises the question of how to respond to future updates. We recommend that when updated lists are released, U of T divest from any stocks that are newly listed. In the case of stocks that are de-listed, it is likely that they will continue to represent large amounts of fossil fuel reserves. As such, we recommend that they only be re-approved for investment if the company is no longer substantially involved in fossil fuel production, defined as receiving less than 10% of total revenues from such activities.

Second, according to the latest information we have been able to access, the university has sold its stock in Shell. As a result, we recommend that the university make a statement of principle asserting that stock ownership in Shell is at odds with its divestment policy, and that it will not re-invest at a future point. Furthermore, we recommend divestment from Chevron, for the reasons elaborated in: Chevron is also a problematic investment.

Divestment from Royal Dutch Shell should be a high priority for the University of Toronto

. In addition to being a major contributor to climate change, Shell has a continuing history of social injury, both in Canada and

47 Please note that the text about Shell has been left in this update to the brief because the university's decision to sell its holdings was purely financial. We are making the case that Shell should correctly be considered an inappropriate investment under U of T's divestment policy.

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around the world. By investing more in Shell than any other international equity, the university is indicating that it is committed to fossil fuel exploitation and unconcerned about the legal and human rights records of the companies in which it invests. Divestment would send the opposite message: that the university is committed to addressing climate change, and willing to start implementing that commitment by selling its holding in a particularly problematic investment. The university would not suffer financially as a consequence of divesting from Shell and, by doing so, it would protect itself from the risks this investment creates. 48

Across North America, the University of Toronto's peer schools are considering fossil fuel divestment. These include Harvard, Yale, Princeton, Stanford, and MIT. Stanford University has committed to divest from coal companies. 495051 In March 2015, Syracuse University committed to divest its US\$1.2 billion endowment from direct investments in "publicly traded companies whose primary business is extraction of fossil fuels". 5253 Twenty-six Six schools have already committed to divest. 54 By leading the way and becoming the first major public university to divest, U of T can distinguish itself as being ahead of the pack on one of the major issues of the 21st century.

The University of Toronto's Statement of Institutional Purpose includes "a resolute commitment to the principles of equal opportunity, equity and justice". 55 If future generations are to have equal opportunities, they cannot inherit a planet that has been impoverished by uncontrolled climate change. Simila

rly, the principles of equity and justice forbid us from ignoring what we know about the harms of GHG pollution by continuing to impose risk and suffering on innocent people around the world today and in future generations. Canada, Toronto, and the University of Toronto have historically benefitted from fossil fuel use far exceeding the global per capita average. Having benefited for decades from behaviour that we now know to be extremely damaging, the university now has a special moral obligation to be part of the solution.

This brief will explain in detail why a decision to divest would improve the financial prospects of the university, uphold its values, and permit the school to take a leadership role in a necessary global transition away from CO₂-intensive forms of energy.

48 See: Why start with Royal Dutch Shell?

49 The brief written in support of this campaign is available online: Fossil Free Stanford, The Case for Fossil Fuel Divestment at Stanford University.

50 Stanford News, Stanford to divest from coal companies.

51 McDonald, Stanford University Says It Will End Investing in Coal Companies.

52 Schwartz, Syracuse to Drop Fossil Fuel Stocks From Endowment.

53 Swann, Syracuse University announces it will divest from fossil fuels.

54 For an up-to-date list of fossil fuel divestment commitments, see: <http://gofossilfree.org/commitments/>

55 University of Toronto Governing Council, Statement of Institutional Purpose.

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Chapter 2 Climate change is settled science

2.1 From the U of T divestment policy

The University's core academic values include freedom of inquiry and open debate. As a general matter, the University does not take positions on social or political issues apart from those directly pertinent to higher education and academic research. Instead, its role is to provide a forum within which issues can be studied carefully and debated vigorously. Given these values, the University will not consider any proposals for restrictions on its investments that require the institution to take sides in matters that are properly the subject of ongoing academic inquiry and debate.

2.2 It is not properly the subject of ongoing academic debate that

The human impact on Earth's climate system has been extensively studied and documented. According to the U.S. National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA), 2014 was the hottest year since 1880. They explained that the trend "is largely driven by the increase in carbon dioxide and other human emissions into the planet's atmosphere" and that "[t]he majority of that warming has occurred in the past three decades".¹ Nine of the ten hottest years since 1880 have taken place since 2000.² The World Meteorological Association reports that 14 of the 15 hottest years ever recorded have been in the 21st century.³ Furthermore:

- The 10,000 years of human civilization have taken place during a span of relative climatic stability.⁴ 45
- Burning coal, oil, and gas produces known quantities of carbon dioxide (CO₂).⁶
- Before the industrial revolution, the concentration of CO₂ in the atmosphere was approximately 280 parts per million (ppm).⁷ 78
- It has now risen to over 401.390 ppm, largely because of the burning of fossil fuels.⁹ 1011
- Humanity is now adding 31.6 billion tonnes of CO₂ to the atmosphere annually, causing the atmospheric

concentration to rise at a rate of approximately 2.0 ppm per year. 121314

1 United States National Aeronautics and Space Administration, NASA, NOAA Find 2014 Warmest Year in Modern Record.

2 National Oceanic and Atmospheric Administration, Global Analysis – Annual 2013.

3 World Meteorological Organization, Warming Trend Continues in 2014.

4 This claim is supported by evidence from ice core samples taken in Vostok, Antarctica as well as other proxy measures of climate such as pollen in lake sediments and tree rings.

5 Alley, The Two Mile Time Machine: Ice Cores, Abrupt Climate Change, and Our Future, p. 4.

6 For example, the U.S. Environmental Protection Agency (EPA) lists quantities of CO₂ produced by burning a barrel of oil, metric tonne of coal, or therm (100,000 British thermal units) of natural gas: United States Environmental Protection Agency, Calculations and References.

7 Evidence for this includes the records of how much fossil fuel has been burned, as well as the changing isotopic ratio of carbon in the atmosphere.

8 Intergovernmental Panel on Climate Change, Climate Change 2007: Working Group I: The Physical Science Basis, TS.2 Changes in Human and Natural Drivers of Climate.

9 Scripps Institution of Oceanography, What Does This Number Mean?

10 The World Bank, Turn Down the Heat Why a 4°C Warmer World Must be Avoided, p. xiv.

11 National Oceanic & Atmospheric Administration, Recent Monthly Average Mauna Loa CO₂.

12 International Energy Agency, Redrawing the Energy-Climate Map.

13 National Oceanic and Atmospheric Administration, Trends in Atmospheric Carbon Dioxide.

14 See also: Hansen, Kharecha, and Sato, "Climate forcing growth rates: doubling down on our Faustian bargain".

13

- If humanity continues to burn fossil fuels at the present rate, the concentration of CO₂ in the atmosphere will rise to well over 550 ppm by 2100. 15
- Adding CO₂ and other GHGs to the atmosphere reduces the amount of energy the Earth radiates into space. This causes the planet to warm. 16
- Based on evidence from ice cores, we know that doubling the amount of CO₂ in the atmosphere causes global temperatures to rise by about 3 °C. 171819
- Governments around the world, including the government of Canada, have adopted 2 °C as the threshold beyond which climate change should be considered 'dangerous'. 202122232425
- If the world is to avoid crossing the 2 °C limit, most of the world's remaining fossil fuels must be kept in the ground. 2627282930 31

As depicted in Figure 2.1, human activity – especially burning fossil fuels – has already pushed the level of CO₂ in the atmosphere far outside the range that has existed for hundreds of thousands of years. 32 Burning the world's remaining fossil fuels would put us even further outside the climatic conditions experienced by any human civilization to date. Continuing to burn fossil fuels at the current pace will also establish a rate of climatic change never experienced by humans, straining the capacity of human and natural systems to cope. We can be confident in attributing the warming we have observed to human GHG emissions. Figure 2.2 illustrates how climate models that incorporate all known natural climate forcings, but which exclude the effect of GHGs, cannot account for observed temperature changes. Models that incorporate the greenhouse effect from GHG pollution accord with observations on all continents and the global ocean. 33

15 Intergovernmental Panel on Climate Change, Carbon Dioxide: Projected emissions and con

centrations.

16 Intergovernmental Panel on Climate Change, Climate Change 2007: Working Group I: The Physical Science Basis, TS.2 Changes in Human and Natural Drivers of Climate.

17 Rockstrom et al., "A safe operating space for humanity", p. 473.

18 Further support for the claim that the climate sensitivity estimate in IPCC models is likely to be correct can be found in:

Martinez-Botf et al., "Plio-Pleistocene climate sensitivity evaluated using high-resolution CO₂ records".

19 See also: (e) Science News, Evidence from warm past confirms recent IPCC estimates of climate sensitivity.

20 The Heads of State, Heads of Government, Ministers, and other heads of delegation present at the United Nations Climate Change Conference 2009 in Copenhagen, Copenhagen Accord.

21 Government of Australia Climate Commission, The Critical Decade 2013, p. 5.

22 See also: Rockstrom et al., "A safe operating space for humanity", p. 473.

23 See also: United Nations Environment Programme, The Emissions Gap Report Are the Copenhagen Accord Pledges Sufficient to Limit Global Warming to 2 °C or 1.5 °C? A Preliminary Assessment.

24 Clarke et al., 2010 Muskoka G8 Summit Final Compliance Report, p. 151.

25 Anderson and Bows, "Beyond 'Dangerous' climate change: emission scenarios for a new world".

26 International Energy Agency, World Energy Outlook 2012.

27 The Economist, Unburnable fuel.

28 McKibben, Global Warming's Terrifying New Math.

29 The Australian government's Climate Commission states that most fossil fuels must be left in the ground and cannot be burned.

Government of Australia Climate Commission, The Critical Decade 2013, p. 5.

30 Peters et al., "The challenge to keep global warming below 2 °C".

31 For a detailed rebuttal of the argument that carbon capture and storage eliminates this necessity, see: Won't carbon capture and storage (CCS) save us?.

32 Changes in the isotopic ratio of atmospheric carbon also allow us to identify the fraction of atmospheric CO₂ resulting from fossil fuel burning.

33 Intergovernmental Panel on Climate Change, Fourth Assessment Report Climate Change 2007.

14

Vostok ice core

Puffli

Projected
(2100)

Current
(2005)

- i 1 1 1 1 1 1 1 r

400,000 300,000 200,000 100,000 0

Years before present

Figure 2.1: CO₂ concentrations in an ice core from Vostok, Antarctica. Source: U.K Met Office

15

Global and continental temperature change

Figure 2.5. Comparison of observed continental- and global-scale changes in surface temperature with results simulated by climate models using either natural or both natural and anthropogenic forcings. Decadal averages of observations are shown for the period 1906-2005 (black line) plotted against the centre of the decade and relative to the corresponding average for the 1901-1950. Lines are dashed where spatial coverage is less than 50%. Blue shaded bands show the 5 to 95% range for 19 simulations from five climate models using only the natural forcings due to solar activity and volcanoes. Red shaded bands show the 5 to 95% range for 58 simulations from 14 climate models using both natural and anthropogenic forcings. {WGI Figure SPM.4}

Figure 2.2: Global and continental temperature change. Source: IPCC 4th Assessment Report, Synthesis Report, p. 40

16

Average Monthly Arctic Sea Ice Extent
August 1979 -2013

1978 1983 1988 1993 1998 2003 2008 2013

Year

Figure 2.3: Monthly August ice extent for 1979 to 2013 shows a decline of 10.6% per decade. Source: U.S. National Snow and Ice Data Center

Comprehensive and authoritative scientific statements on the key elements of climate change date back to the 1979 U.S. National Academy of Sciences report (the Charney report).³⁴ The report concluded that human activities – particularly GHG emissions – alter the climate in potentially dangerous ways. The science of climate change has been extensively examined by the Intergovernmental Panel on Climate Change (IPCC), a body established in 1988 by the World Meteorological Organization and the United Nations Environmental

Programme to be the leading international body on the scientific, technical, and socio-economic assessment of climate change. The four major reports of the IPCC in 1990, 1995, 2001, and 2007 have confirmed the basic conclusions of the Charney report, and elaborated considerably upon the causes and consequences of climate change. 35363738 In May 2009, the national science academies of the G8 countries plus Brazil, China, South Africa, and India released a remarkable joint statement. 39 The statement explains that: "The need for urgent

34 United States National Academy of Sciences, Ad Hoc Study Group on Carbon Dioxide and Climate.

35 Intergovernmental Panel on Climate Change, First Assessment Report 1990.

36 Intergovernmental Panel on Climate Change, Second Assessment Report Climate Change 1995.

37 Intergovernmental Panel on Climate Change, Third Assessment Report: Climate Change 2001.

38 Intergovernmental Panel on Climate Change, Fourth Assessment Report Climate Change 2007.

39 Academia Brasileira de Ciencias, Brazil; Royal Society of Canada, Canada; Chinese Academy of Sciences, China, Academie des Sciences, France; Deutsche Akademie der Naturforscher Leopoldina, Germany; Indian National Science Academy, India; Accademia Nazionale dei

17

action to address climate change is now indisputable. For example, limiting global warming to 2°C would require a very rapid worldwide implementation of all currently available low carbon technologies". Among other things, it recommends that all governments "adopt a long-term global goal and near-term emission reduction targets that will deliver an approximately 50 percent reduction in global emissions from 1990 levels by 2050" and "collaborate in the implementation of low carbon and climate-resilient infrastructure and technologies, and in the implementation of innovative incentives, through the use of economic and regulatory instruments, to accelerate adoption of clean 'green' technologies". These findings are echoed in recen

t research, including a 2013 article in *Nature Climate Change* that emphasized how "[a] shift to a 2 °C pathway requires immediate significant and sustained global mitigation". 4041

In 2015, scientists from the Lawrence Berkeley National Laboratory observed an increase in carbon dioxide's greenhouse effect at Earth's surface for the first time: 4243

The [observational] results agree with theoretical predictions of the greenhouse effect due to human activity. The research also provides further confirmation that the calculations used in today's climate models are on track when it comes to representing the impact of CO₂. 44

The accord between paleoclimatic evidence, multiple mutually-reinforcing lines of observational evidence, and computer modeling strongly indicates that the basic features of humanity's influence on the climate system through fossil fuel use are now understood.

Several significant studies have examined the state of the scientific consensus on climate change. In 2004, Naomi Oreskes published a paper in *Science* that quantified this. She examined the abstracts from 928 peer-reviewed papers and found that all of them either take no position on climate change or endorse the consensus position. 45 She concludes:

This analysis shows that scientists publishing in the peer-reviewed literature agree with IPCC, the National Academy of Sciences, and the public statements of their professional societies. Politicians, economists, journalists, and others may have the impression of confusion, disagreement, or discord among climate scientists, but that impression is incorrect. 46

Oreskes' 2010 book *Merchants of Doubt* elaborates on the article, discussing the strength of this consensus while also providing details on the campaigns of active disinformation that fossil fuel companies have directed at decision-makers and the general public. 4748 In 2010, a meta-analysis found that "97-98 percent of the climate researchers most actively publishing in the field agree with the occurrence of an anthropogenic climate change as outlined by the Intergovernmental Panel on Climate Change" and "the relative climate expertise

Lincei, Italy; Science Council of Japan, Japan; Academia Mexicana de Ciencias, Mexico; Russian Academy of Sciences, Russia; Academy of Science of South Africa, South Africa; Royal Society, United Kingdom; National Academy of Sciences, United States of America, G8 + 5 Academies' joint statement Climate change and the transformation of energy technologies for a low carbon future.

40 Peters et al., "The challenge to keep global warming below 2 °C", p. 1.

41 See also: Meinshausen et al., "Greenhouse-gas emission targets for limiting global warming to 2 °C".

42 Feldman et al., "Observational determination of surface radiative forcing by CO₂ from 2000 to 2010".

43 See also: Krotz, First Direct Observation of Carbon Dioxide's Increasing Greenhouse Effect at the Earth's Surface.

44 Ibid.

45 Oreskes, "Beyond the Ivory Tower: The Scientific Consensus on Climate Change", p. 1686

46 Ibid., p. 1686.

47 Oreskes and Conway, Merchants Of Doubt.

48 See also: Hoggan and Littlemore, Climate Cover-Up: The Crusade to Deny Global Warming.

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and scientific prominence of the researchers unconvinced of climate change are substantially below that of the convinced researchers". 49 More recently, a study examined 11,944 climate-related abstracts from 1991 to

2011 and concluded that: "[a]mong abstracts expressing a position on AGW [anthropogenic global warming],

97.1 percent endorsed the consensus position that humans are causing global warming". 50

Mitigating climate change is necessary in order for the university to achieve its academic mission. In the

event that the world fails to curb GHG pollution and produces well over 2 °C of climate change, substantial

damage is expected to be imposed on the global economy. The Stern Review on the economics of climate

change concluded that under a business-as-usual scenario, there is "at least a 50 percent risk of exceeding 5 °C global average temperature change" and that "[s]uch changes would transform the physical geography of the world. A radical change in the physical geography of the world must have powerful implications for the human geography – where people live, and how they live their lives". 51 Such an outcome threatens the growth prospects of the endowment and pension funds of the University of Toronto. It also creates additional geopolitical risks such as agricultural disruption and forced migration. 52

James Powell, former President of Oberlin, Franklin and Marshall, and Reed College, has concluded that university trustees have a quasi-legal duty to do all they can about climate change, arguing:

The board is supposed to make sure that the endowment allows for intergenerational equity, that the students who are going to Oberlin in 2075 get as much benefit from it as those there now. But with global warming, you're guaranteeing a diminution of quality of life decades out. 53

The emergence of a strong academic consensus about the key features of a problem does not mean that all academic work on the subject ceases. Scholarly work is still done on South African apartheid, despite the system having been dismantled. When the university decided to divest from South Africa, it determined that a convincing body of evidence supporting that choice had been assembled. A comparable body of evidence now exists about the causes and consequences of climate change. Taking action to address climate change is not needlessly taking sides in a controversial issue. Rather, it is a way to take part in a necessary global transition. If the world fails to constrain the worst impacts of climate change, serious deleterious impacts can be expected for Canada and the University of Toronto.

2.3 The University of Toronto is already taking action on climate change

The university has already taken a number of actions motivated by concern about climate change and a desire to reduce the university's GHG pollution impact. The university's actions show climate ch

ange to be "directly
pertinent to higher education and academic research", as required by the Policy on Social
and Political Issues
With Respect to University Divestment.

49 Anderegg et al., "Expert credibility in climate change", p. 1.

50 Cook et al., "Quantifying the consensus on anthropogenic global warming in the scientific literature".

51 Stern, The Economics of Climate Change: The Stern Review, See long executive summary at: <http://www.hm-treasury.gov.uk/d/ExecutiveSummary.pdf>.

52 See: Lopez-Carr and Marter-Kenyon, "Human adaptation: Manage climate-induced resettlement".

53 McKibben, The Case for Fossil-Fuel Divestment.

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In November 2009, the University of Toronto signed the "Ontario Universities Committed to a Greener World" pledge. In part, the pledge reads:

The Ontario university community is deeply aware of the challenges that face the world arising from climate change and the degradation of natural environments. Our universities accept this special responsibility on three scores: to assist in finding solutions to the challenges of environmental sustainability; to share knowledge about sustainability and climate change; and to incorporate, wherever possible, principles of sustainability into our own operations. 54

Divestment from fossil fuels stocks would be wholly in keeping with these objectives. Redirecting investment away from fossil fuels is a key part of solving the challenge of environmental sustainability. Furthermore, by taking the lead and choosing to divest, U of T would send an important signal about how it views the future of energy. This is also an opportunity to incorporate sustainability into university operations in a critical way, by having the university's values reflected in its stock portfolio.

2.3.1 Policies and infrastructure decisions justified with reference to climate change

In 2010, the university adopted an Environmental Protection Policy. The policy recognizes that " some of [the university's] activities, because of their scale and scope, have the potential, if not managed in compliance with the university's established standards and practices, to have significant effects on the environment".⁵⁵ These activities should certainly include the investments made by U of T. Among the principles listed, the policy says the university will:

- Operate so as to minimize negative impacts on the environment,
- Adopt practices that reflect the conservation and wise use of natural resources, and
- Respect biodiversity.

The policy also lists the conservation of energy and the reduction of waste as objectives .

In 2004, the university established the Sustainability Office at the St. George campus and the Environmental Affairs Office at the Mississauga campus.⁵⁵⁵⁷ The Environmental Affairs Office tracks the electricity and natural gas use of buildings in real-time, and makes the data available through their building dashboard.⁵⁸

In 2007, a Sustainability Office was established at the Scarborough campus.⁵⁹ This office explains that "[a] number of retrofit projects have been undertaken to reduce energy consumption as well as CO₂ emissions".⁶⁰

The Facilities and Services Department provides a breakdown of the university's GHG emissions.⁶¹ U of T also has a Sustainability Board, charged with providing guidance, support, and coordination of initiatives between the three campuses.

⁵⁴ Algoma University, Brock University, Carleton University, the University of Guelph, Lakehead University, Laurentian University, McMaster University, Nipissing University, the University of Ontario Institute of Technology, the University of Ottawa, Queen's University, Ryerson University, the University of Toronto (President David Naylor), Trent University, the University of Waterloo, the University of Western Ontario, Wildred Laurier University, the University of Windsor, York University, the Ontario College of Art & Design, and the Royal Military College of Canada, Ontario Universities Committed to a Greener World.

55 University of Toronto Governing Council, University Environmental Protection Policy.

56 University of Toronto Sustainability Office, About us.

57 University of Toronto Mississauga, Grow Smart, Grow Green.

58 See: <http://buildingdashboard.net/utorontom/>

59 See: University of Toronto Sustainability Office, About us.

60 University of Toronto Scarborough Sustainability Office, Energy.

61 See: <http://sustain.fs.utoronto.ca/campus-footprint/>

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The annual reports of the Sustainability Office include data on the GHG emissions from the St. George Campus. 62 The 2010 report justifies the installation of a solar hot water system at the Faculty of Physical Education and Health partly on the basis of reduced GHG pollution. 63 A 2010 press release describes how paper use at the St. George campus produces "greenhouse gas emissions of about 1,500 tonnes" and describes how an expanded paper conservation program aims to reduce that. 64 In a comparison of sustainability indicators, the 2011 strategic plan of the Sustainability Office lists "[g]reenhouse gas emissions" as an area where U of T "leads". 65 In particular, it says that the office will "[w]ork with specific university constituencies... to identify financially sound opportunities for emission reduction". The plan also lists "[c]limate and [r]esources" under "priority long-term goals and key actions" and identifies GHG emissions as a "key performance indicator".

2.3.2 Academic programming

In 2005, the university established a new Centre for Global Change Science (CGCS), which has since conducted exemplary research into climate change effects, as well as hosting a wide array of public lectures focused around climate-related themes. 66 Danny Harvey – a Professor in the Department of Geography who is associated with the centre – is also the author of two important books describing the causes and con

sequences of climate

change. 6768 The CGCS has hosted a number of talks as part of its Distinguished Lecture Series including:

- Successes and Challenges for Biodiversity Science: Distribution Responses to Climate Change – James Clark, Duke University, September 18, 2012
- High Altitude Climate Change: The Survival Struggle of our Earth's Alpine Glaciers – Andrew Bush, University of Alberta, October 16, 2012
- Assessing Vegetation Responses and Feedbacks to Climate Change – John Gamon, University of Alberta, November 6, 2012
- Cumulative Carbon Emissions and the Climate Mitigation Challenge – Damon Matthews, McGill University, February 5, 2013; and
- Trees to Tailpipes: Natural and Anthropogenic Influences on Global Atmospheric Composition – Colette Heald Massachusetts Institute of Technology, March 5, 2013. 69

The Koffler Scientific Reserve at Jokers Hill, a 350-hectare research facility in the Oak Ridges Moraine operated by U of T, is conducting research on how climate change is affecting plant species. The project is "using artificial warming field arrays to elevate temperatures to those predicted for 2050". 70

The Department of Computer Science operates a weekly seminar series: Collaborative Challenges for the Climate Change Research Community. 71 Recent presentation topics have included climate models, building community resilience to climate change, the response of freshwater ecosystems in Canada's north to climate change, and low-carbon cities.

The university also offers courses on climate-change-related themes, including:

62 University of Toronto Sustainability Office, 2010 St George Sustainability Office Report.

63 Ibid., p. 17.

64 University of Toronto, University of Toronto going greener this year.

65 University of Toronto Scarborough Sustainability Office, Strategic Plan 2011, p. 1.

66 See: <http://www.cgcs.utoronto.ca/>

67 Harvey, Climate and Global Environmental Change.

68 Harvey, Global Warming: The Hard Science.

69 University of Toronto Centre for Global Change Science, Distinguished Lecturer Series (2012-13).

70 University of Toronto Koffler Scientific Reserve at Jokers Hill, Climate change, range expansion and evolution of flowering phenology.

71 See: <http://www.cs.toronto.edu/climate/>

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- Applied Climate Change: Gaining Practical Skills for Climate Change Adaptation (UTSC Summer Institute 2013)
- Gaining Practical Skills for Climate Change Adaptation (UTSC Summer Institute 2013)
- Climate Change Law (LAW269H1S); and
- Climate Change and Human Health (CEM 406).

U of T also maintains an Environmental Research Database which includes "430 University of Toronto researchers across all three U of T campuses engaged in environment-related research encompassing a wide spectrum of interests ranging from environmental finance to climate change". 72

U of T identifies some of its own faculty as climate change experts. As part of the university's 'Boundless' campaign, Richard Peltier at the Centre for Global Change Science is identified as a "Physicist and Climate Scientist". 73 Ron Dembo – the founder and CEO of Zerofootprint, a software company focused on reducing humanity's environmental footprint – is also listed as one of the campaign volunteers. 74 On his Boundless

campaign page, Professor of Public Health Sciences and of Surgery Abdallah Daar identifies climate change as a threat that "do[es] not carry passports or recognize borders".⁷⁵ The Institute of Global Health Equity and Innovation within the Faculty of Medicine lists climate change as an area of research.⁷⁶ Along with Lorraine Sugar from the World Bank, Professor Chris Kennedy, at the Department of Civil Engineering, co-authored "A low carbon infrastructure plan for Toronto, Canada" published in the Canadian Journal of Civil Engineering.⁷⁷ They estimate that implementation of their strategies could produce a 31 percent reduction in per capita GHG emissions by 2031.

; University of Toronto School of the Environment, Environmental Research Database.
'University of Toronto, Richard Peltier.
University of Toronto, Ron Dembo.
University of Toronto, Abdallah Daar.

University of Toronto, Institute of Global Health Equity and Innovation.

Sugar and Kennedy, "A low carbon infrastructure plan for Toronto, Canada", p. 86-96.

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Climate change is certainly an area of active scholarly research, but that research does not question the fundamental connection between burning fossil fuels and warming the planet. Nor does it challenge the argument that climate change is likely to cause a great deal of social injury and human suffering. Rather, the academic work being conducted on climate change at U of T reinforces the case for divestment.

2.4 Fossil fuel companies acknowledge the reality and danger of climate change

Fossil fuel companies explicitly acknowledge that climate change poses a threat to the world at large, as well as to their operations and profitability.⁷⁸⁷⁹⁸⁰⁸¹ In their 2011 submission to the Carbon

Disclosure Project, ExxonMobil acknowledged "risks to society and ecosystems from rising greenhouse gas emissions".⁸² In the same document, ExxonMobil acknowledges that climate change may alter "risks of weather extremes" and states that they "manage these risks through robust design and operations contingency planning". Speaking at the Council on Foreign Relations on June 27th 2012, ExxonMobil CEO Rex Tillerson stated: "So I'm not

⁷⁸ Cheeseman, Oil Companies are Actually Planning for Climate Change.

⁷⁹ Koronowski, Oil companies that caused climate change now fear its financial impacts.

⁸⁰ Skuce, Big Oil and the Demise of Crude Climate Change Denial.

⁸¹ Sheppard, Energy Companies Say One Thing Do the Opposite on Climate Change.

⁸² ExxonMobil, Carbon Disclosure Project: Investor CDP 2011 Information Request.

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disputing that increasing CO₂ emissions in the atmosphere is going to have an impact. It 'll have a warming impact".⁸³ On their website, ConocoPhillips recognizes that: "human activity, including the burning of fossil fuels, is contributing to increased concentrations of greenhouse gases (GHG) in the atmosphere that can lead to adverse changes in global climate".⁸⁴ They also assert that "effective climate change policy must...[r]esult in the stabilization of global GHG atmospheric concentrations at safe levels". On their global website, Shell says that: "CO₂ emissions must be reduced to avoid serious climate change".⁸⁵ ⁸⁶ Chevron's website asserts that: "a successful climate policy will be one in which the reduction of GHGs is accomplished equitably by the top emitting countries of the world through long-term and coordinated national frameworks".⁸⁷ On BP's website, they summarize the conclusions of the IPCC and say that, even with more aggressive GHG mitigation policies intended to curb growth in CO₂ emissions, it will "probably not [be] enough to limit warming to no more than 2 °C".⁸⁸ Entergy – an S&P 500 energy company with nearly 15,000 employees – also acknowledges material risks from climate change. Jeff Williams, director of climate consulting for Entergy, states: "Clearly we are facing risks from sea level rise, more intense storms, flooding and surge damage".⁸⁹

In numerous advertising campaigns, fossil fuel companies have acknowledged that climate change is taking place, and even that they bear some responsibility for dealing with it. At the same time, much of the fossil fuel industry's advertising is misleading in its description of environmental effects. For instance, recent advertising in Canada has misrepresented the effect of oil sands extraction on freshwater.⁹⁰ Shell has also had two recent advertising campaigns – 'New Energy Future' and 'Let's Go' – which acknowledged the existence of climate change and the need to take action on it. The campaigns acknowledge the need to "limit CO₂ emissions" and "tackl[e] climate change". At the same time, the campaigns promote Shell's expansion into unconventional fossil fuel resources, such as the Athabasca oil sands, which threaten to undermine the global effort to keep climate change at a safe level. When the ad campaigns were challenged by the World Wildlife Fund in August 2008, the U.K. Advertising Standards Authority concluded that they were misleading.⁹¹ In their assessment, the authority described how the "large scale of the oil sands developments had considerable social and environmental impacts, including those on water conservation, greenhouse gas emissions (GHG), land disturbance and waste management". The authority concluded that: "Because 'sustainable' was an ambiguous term, and because we had not seen data that showed how Shell was effectively managing carbon emissions from its oil sands projects in order to limit climate change, we concluded that on this point the ad was misleading". Shell was ordered to take the advertisement down and not republish it in the same form. In 2007, the same body found that another Shell advertisement violated the 'Truthfulness' and 'Environmental claims' provisions of U.K. advertising law.⁹²

As elaborated upon in Why fossil fuels are like tobacco there are many parallels between fossil fuel divestment and divestment from tobacco companies. These include the awareness of the producers themselves that their products are harmful and dangerous. When U of T decided to divest from tobacco companies, Presi-

⁸³ Tillerson, The New North American Energy Paradigm: Reshaping the Future.

⁸⁴ ConocoPhillips, Climate Change Position.

⁸⁵ Shell, Climate change.

⁸⁶ Shell also has a climate change advisor, with a blog at: <http://blogs.shell.com/>

climatechange/

87 Chevron, Climate Change.

88 BP, Climate change: Addressing the global challenge of climate change will require the efforts of governments, industry and individuals.

89 Gunther, The Coming Shift to 'Climate Preparedness'.

90 Suleman, Confused by oil sands industry ads? A few helpful facts from Pembina Institute.

91 U.K. Advertising Standards Authority, ASA Adjudication on Shell International Ltd.

92 U.K. Advertising Standards Authority, ASA Adjudication on Shell Europe Oil Products Ltd.

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dent David Naylor noted the significance of tobacco companies themselves acknowledging the health risks of smoking. He stated: "that there is no serious academic or social debate about tobacco's health effects – even tobacco manufacturers by now concede them". 93 The statements made by fossil fuel companies about climate change put them in a similar position.

Girard, UofT to sell off its tobacco holdings.

Chapter 3

The activities of fossil fuel companies are socially injurious, and this social injury cannot be reasonably remedied through share-

holder voice

3.1

From the U of T divestment policy

Social injury is the injurious impact which the activities of a company are found to have on consumers, employees, or other persons, particularly including activities which violate, or frustrate the enforcement of, rules of domestic or international law intended to protect individuals against deprivation or [sic] health, safety, or basic freedoms; for purposes of this Policy, social injury shall not consist of doing business with other companies which are themselves engaged in socially injurious activities.

The primary activities of fossil fuel companies impose social injury on consumers, employees, and other persons. The burning of a large portion of the world's remaining reserves of fossil fuels would inflict great social injury through:

1. Impacts on agriculture
2. The inundation of coastal areas
3. Storms, droughts, other extreme weather
4. Wildfires
5. Increased risks to human health
6. Ecosystem collapse
7. Threats to First Nations groups and indigenous cultures
8. Threats to the infrastructure of cities, including Toronto
9. The threat of abrupt and non-linear adverse climate impacts, arising from positive feedback effects and important thresholds in the climate system
10. Security implications
11. Disproportionate impacts on the world's poorest people

12. Social injury beyond climate change

In their 2007 report, the IPCC included a table (shown in Figure 3.1) that summarized how various forms of injury associated with climate change can be expected to worsen as the amount of warming increases.

3.2

Social injury

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Examples of impacts associated with global average temperature change
(Impacts will vary by extent of adaptation, rate of temperature change and socio-economic pathway)

Global average annual temperature change relative to 1980-1999 (°C)

12 3 4

5°C

WATER

ECOSYSTEMS

FOOD

COASTS

HEALTH

Increased water availability in moist tropics and high latitudes - - - - -

Decreasing water availability and increasing drought in mid-latitudes and semi-arid low latitudes ■

Hundreds of millions of people exposed to increased water stress - - - - - i

i Up to 30% of species at

Increased coral bleaching ■

increasing risk of extinction

■ Most corals bleached Widespread coral mortality ■

■ Significant 1 extinctions ■

around the globe

Increasing species range shifts and wildfire risk

Terrestrial biosphere tends toward a net carbon source as:

~15% -40% of ecosystems affected I

Ecosystem changes due to weakening of the meridional ,
overturning circulation

Complex, localised negative impacts on small holders, subsistence farmers and fishers

Tendencies for cereal productivity
to decrease in low latitudes

Tendencies for some cereal productivity m
to increase at mid- to high latitudes

, Productivity of all cereals m
decreases in low latitudes

, Cereal productivity to
decrease in some regions

Increased damage from floods and storms ■

About 30% of
global coastal -
wetlands lost*

Millions more people could experience ,
coastal flooding each year

Increasing burden from malnutrition, diarrhoeal, cardiorespiratory and infectious disease
s >

Increased morbidity and mortality from heat waves, floods and droughts - - - - -

Changed distribution of some disease vectors - - - - -

Substantial burden on health services >

WGII 3.4.1, 3.4.3
3.ES, 3.4.1,3.4.3

3.5.1, T3.3, 20.6.2,
TS.B5

4.ES, 4.4.11

T4.1, F4.4, B4.4,

6.4.1, 6.6.5, B6.1
4.ES. T4.1, F4.2,
F4.4

4.2.2, 4.4.1,4.4.4,
4.4.5, 4.4.6, 4.4.10,
B4.5

19.3.5

5.ES, 5.4.7
5.ES, 5.4.2, F5.2

5.ES, 5.4.2, F5.2

6.ES, 6.3.2, 6.4.1,
6.4.2

T6.6, F6.8, TS.B5

8.ES, 8.4.1,8.7,
T8.2, T8.4
8.ES, 8.2.2, 8.2.3,
8.4.1, 8.4.2, 8.7,

T8.3, F8.3
8.ES, 8.2.8, 8.7,
B8.4
8.6.1

0 1 2 3 4 5 °

t Significant is defined here as more than 40%. t Based on average rate of sea level rise of 4.2mm/year from 2000 to 2080.

Warming by 2090-2099 relative to 1980-1999 for non-mitigation scenarios

m 64 ° c k

A1FI

_ 5.4"C

B1 ■

A2

A1B

B2

A1T

1 2 3 4 5 °C

Figure 3.6. Examples of impacts associated with global average temperature change. Upper panel: illustrative examples of global impacts projected for climate changes (and sea level and atmospheric CO₂ where relevant) associated with different amounts of increase in global average surface temperature in the 21st century. The black lines link impacts; broken-line arrows indicate impacts continuing with increasing temperature. Entries are placed so that the left-hand side of text indicates the approximate level of warming that is associated with the onset of a given impact. Quantitative entries for water scarcity and flooding represent the additional impacts of climate change relative to the conditions projected across the range of SRES scenarios A1FI, A2, B1 and B2. Adaptation to climate change is not included in these estimations. Confidence levels for all statements are high. The upper right panel gives the WG II references for the statements made in the upper left panel.' Lower panel: Dots and bars indicate the best estimate and likely ranges of warming assessed for the six SRES marker scenarios for 2090-2099 relative to 1980-1999. (WGI Figure SPM.5, 10.7; WGII Figure SPM.2; WGIII Table TS.2, Table 3.10)

'Where ES - Executive Summary, T - Table, B - Box and F - Figure. Thus B4.5 indicates Box 4.5 in Chapter 4 and 3.5.1 indicates Section 3.5.1 in Chapter 3.

Figure 3.1: Examples of impacts associated with different levels of global average temperature change. Source: IPCC 4th Assessment Report, Synthesis Report, p. 51

Each of these impacts has consequences for human beings, and each represents a form of social injury being imposed on innocent people by the producers of fossil fuels. According to the U.N. Development Programme, "climate change... already imposes substantial costs, with the brunt of them borne by poor countries and poor

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communities".¹² This harm is not exclusively imposed on poor countries, and can be expected to worsen in a business-as-usual scenario: "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".³ A 2009 report by the

Global Humanitarian Forum concluded that: "every year climate change leaves over 300,000 people dead, 325 million people seriously affected, and economic losses of US\$125 billion". 4

According to the 2009 report "Adapting to Climate Change in Ontario: Towards the Design and Implementation of a Strategy and Action Plan" produced by the Expert Panel on Climate Change Adaptation, Ontario is expected to experience a temperature increase of 2.5 °C to 3.7 °C by 2050, compared to mean levels from 1961-1990. 5 These projections are based on moderate assumptions about greenhouse gas reductions; however, estimates based on high emissions scenarios may be more realistic based on observed emission trajectories, and predict a rise of temperature as high as 4.0 °C by 2050.

In 2011, the National Roundtable on the Environment and the Economy (NRTEE) concluded that: "Climate change will be expensive for Canada and Canadians. Increasing greenhouse gas emissions worldwide will exert a growing economic impact on our own country, exacting a rising price from Canadians as climate change impacts occur here at home". 6 They also concluded that: "Global mitigation leading to a low climate change future reduces costs to Canada in the long term". 7 The NRTEE highlighted how Canada and the rest of the world must choose between two futures: one in which action is taken (necessarily diminishing the profits and stock-market value of fossil fuel companies) and another in which the world suffers the unmitigated consequences of climate change:

Examining long-term economic costs of climate change to Canada raises the spectre of two futures: one where the world acts – and keeps global warming to 2 °C by 2050 as world leaders have pledged – and one where it doesn't and climate change impacts grow and accelerate beyond targets. At slightly under 2 °C of global warming, the economic costs of climate change to Canada in 2050 would be between \$21 billion and \$43 billion with no adaptive action taken; costs could be at the lower end of range if economic growth slowed as part of domestic mitigation or for other reasons. If the world acts to limit warming to 2 °C, future costs could stabilize around this 2050 level since emissions growth would have been dampened and plateaued to reach this new global reality. 8

A 2012 NRTEE report identifies ice, snow, and sea; ecosystems; water resources; human health; communities and infrastructure; resource industries; service industries; and security and trade as categories in which climate change is expected to have adverse impacts in Canada. 9

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

34.

2 See also: The World Bank, World Bank Development Report 2010: Development and Climate Change.

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

87.

4 Global Humanitarian Forum, The Anatomy of A Silent Crisis, p. 1.

5 Expert Panel on Climate Change Adaptation, Adapting to Climate Change in Ontario, p. 15

6 National Round Table on the Environment and the Economy, Paying the Price: The Economic Impacts of Climate Change for Canada, p.15.

7 Ibid., p.16.

8 Ibid., p.18.

'National Round Table on the Environment and the Economy, Degrees of Change: Climate Warming and the Stakes for Canada, p. 41.

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In their 2014 report, the IPCC explains that: "Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems". 10 They note that: "Climate change will amplify existing risks and create new risks for natural and human systems. Risks are unevenly distributed and are generally greater for disadvantaged people and communities i

n countries at all levels of development". 11 They further note that: "Many aspects of climate change and associated impacts will continue for centuries, even if anthropogenic emissions of greenhouse gases are stopped. The risks of abrupt or irreversible changes increase as the magnitude of the warming increases". 12 The report notes that "[t] here are multiple mitigation pathways that are likely to limit warming to below 2 °C relative to pre-industrial levels" but notes that these "would require substantial emissions reductions over the next few decades and near zero emissions of CO₂ and other long-lived GHGs by the end of the century". 13¹⁴ The report notes that the challenges associated with mitigation increase the longer emission reductions are delayed.

In a briefing note prepared for Minister of the Environment Peter Kent, and subsequently released through an access to information request, officials at Environment Canada argued that: "Climate change is the most serious environmental issue facing the world today and carries with it significant impacts on human health and safety, the economy, natural resources, and ecosystems in Canada and throughout the world". 15

Canada is causing a disproportionate share of damage to the climate relative to its population. According to Environment Canada, "Canada's total greenhouse gas (GHG) emissions were estimated to be 699 megatonnes of carbon dioxide equivalent". 16 This compares with an estimated 35,000 megatonnes of global emissions. 17 Canada therefore represents about two percent of global emissions, while representing about 0.49 percent of the global population. 18 Furthermore, because of the enormous quantity of carbon embedded in the oil sands, Canada has the potential to single-handedly cause substantial damage to the global climate. 19

The Policy on Social and Political Issues With Respect to University Divestment specifies that the University of Toronto will use the Yale University concept of social injury when responding to any petition regarding divestment. 20 Specifically, the policy defines social injury as:

Social injury is the injurious impact which the activities of a company are found to have on consumers,

employees, or other persons, particularly including activities which violate, or frustrate the enforcement of, rules of domestic or international law intended to protect individuals against deprivation or [sic] health, safety, or basic freedoms; for purposes of this Policy, social injury shall not consist of doing business with other companies which are themselves engaged in socially injurious activities.

10 Intergovernmental Panel on Climate Change, *Climate Change 2014: Synthesis Report*, p. 8.
11 Ibid., p. 13.

12 Ibid., p. 16.

13 Emphasis in original

14 Intergovernmental Panel on Climate Change, *Climate Change 2014: Synthesis Report*, p. 21.

15 De Souza, *Bureaucrats urged Kent to take global warming seriously*.

16 Environment Canada, *National Inventory Report 1990-2012: Greenhouse Gas Sources and Sinks in Canada – Executive Summary*.

17 Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p. 5.

18 United Nations, Department of Economic and Social Affairs, Population Division, *Population Estimates and Projections Section, Total Population – Both Sexes*.

19 Biello, *Oil Sands May Irrevocably Tar the Climate*.

20 See also: Simon, Powers, and Gunnemann, *The Ethical Investor: Universities and Corporate Responsibility*.

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Climate change falls within this definition. The rest of this section lists many injurious impacts fossil fuel companies are having on consumers, employees, and other persons. It also describes ways in which the behaviour of these companies has frustrated domestic and international law and how the harm being caused is inherent to the primary business of fossil fuel companies. Each subsection elaborates on the forms of social injury associated with climate change and provides empirical evidence of the observed adv

erse impacts and predicted future risks from climate change.

3.2.1 Pricing the social cost of carbon

Many organizations have attempted to quantify the 'social cost of carbon' – the amount of damage done to third parties by emitting one tonne of CO₂. For instance, the U.S. Department of Energy recently increased its estimate from \$22 per tonne to \$36.²¹²²²³²⁴ In the United Kingdom, the government has been using a 'shadow cost' of carbon to estimate social harm since 2007.²⁵ The Department for Environment, Food and Rural Affairs explains that: "The social cost of carbon (SCC) measures the full global cost today of an incremental unit of carbon (or equivalent amount of other greenhouse gases) emitted now, summing the full global cost of the damage it imposes over the whole of its time in the atmosphere. It measures the scale of the externality which needs to be incorporated into decisions on policy and investment options in government". The Stern Review estimated a social cost of carbon of about \$30 per tonne of CO₂ equivalent in 2000.²⁶

Research published in Nature in 2014 assessed the social cost of carbon in terms of total factor productivity growth and capital depreciation and arrived at a much higher estimate of the damage per ton of CO₂: US\$220.²⁷²⁸ If correct, this would mean that the level of harm imposed through each unit of fossil fuel use is much higher than in other models, and that the economically optimal path for emission reduction would be much more rapid.²⁹

In various jurisdictions policies have been considered or implemented which were meant to internalize the social costs of fossil fuel use.³⁰ In a 2013 study, the World Bank concluded that "[r]egional, national and sub-national carbon pricing initiatives are proliferating", with systems implemented in California, British Columbia, Alberta, Quebec, Switzerland, the EU, Kazakhstan, Tokyo, Australia, and New Zealand.³¹³²³³ Systems are also under consideration in Chile, Brazil, Turkey, Ukraine, China, and Japan. The report explains that "[n]ew approaches are emerging to ensure ambition and price stabilization", that "[n]ational and regional trading schemes are starting to link up", and that "[c]limate change requires urgent acti

on at scale". 34

21 Plumer, An obscure new rule on microwaves can tell us a lot about Obama's climate policies.

22 Henn, The White House Just Strengthened the Case for Fossil Fuel Divestment.

23 See also: Wald, New Effort to Quantify 'Social Cost' of Pollution.

24 Stastna, U.S. ups 'social cost' of carbon emissions.

25 Price, Thornton, and Nelson, The Social Cost of Carbon and the Shadow Price of Carbon: What they are, and how to use them in economic appraisal in the UK.

26 Stern, The Economics of Climate Change: The Stern Review.

27 Moore and Diaz, "Temperature impacts on economic growth warrant stringent mitigation policy".

28 See also: phys.org, Social cost of climate change too low, scientists say.

29 Warren, "Environmental economics: Optimal carbon tax doubled".

30 Forthcoming work by Hamish van der Ven at U of T will provide a comparative analysis of climate change policies adopted in ten Canadian provinces, including the broad-based carbon tax implemented in British Columbia in 2008 and the credit-based trading system implemented in Alberta in 2007.

31 The World Bank, Mapping carbon pricing initiatives: developments and prospects, p. 11.

32 Pembina Institute, The B.C. carbon tax: background.

33 Chung, Canada's climate inaction leaves it 'increasingly isolated' ahead of COP 20.

34 The World Bank, Mapping carbon pricing initiatives: developments and prospects, p. 12-13.

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In Canada, the NRTEE repeatedly argued in favour of putting a price on GHG pollution in order to reflect the harm it does to society. 353637 In a 2012 report, they highlighted the costs of delaying the implementation of a price on carbon:

The NRT analysis for Environment Canada reinforces a central conclusion of all our work and many other independent sources: delay is costly. Put directly, time is money. The closer the target date approaches, the higher the carbon prices will have to be to incent investment in capital stock turnover, develop and deploy new technologies, and change firm and household energy-use behaviour. 38

"Finding the right price signal", they conclude, "is key". 39

As pointed out by Peter Foster, determining the appropriate social price of CO₂ is made more complicated by the need to somehow incorporate the worst-case scenarios associated with global climate change. 40 For instance, if we add enough CO₂ to the atmosphere to cause the eventual disintegration of a large fraction of the world's ice sheets, raising global sea levels by tens of metres, millions of people would be displaced and a huge part of the planet's cultural legacy would be forever destroyed. It is challenging to identify how such possibilities factor into a per-tonne estimate of the damage caused by GHG pollution. Nevertheless, putting a price on carbon is an effective way of encouraging cost-effective reductions in GHG emissions.

3.2.2 Impacts on agriculture

Agriculture is widely considered exceptionally vulnerable to climate change, in large part because food production depends on stable climate cycles and weather patterns. For instance, in their Fourth Assessment Report, the IPCC concluded that some African countries' agricultural production, including access to food, "is projected to be severely compromised" by climate change. 41 Production from agriculture and forestry is expected to decline in Australia and New Zealand by 2030, and in Latin America "[c]hanges in precipitation patterns and the disappearance of glaciers are projected to significantly affect water availability for human consumption, agriculture and energy generation". The 2013 U.N. Human Development Report explained: "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". 42 A 2013 study in Nature Climate Change determined that "food price spikes may increase in prevalence in future years". 434445 A report from the International Food Policy Research Institute (IFPRI) found that: "agriculture and human well-being will be negatively affected by climate

35 See: National Round Table on the Environment and the Economy, Achieving 2050: A Carbon Pricing Policy for Canada.

36 National Round Table on the Environment and the Economy, Outreach Report – Achieving 2050: A Carbon Pricing Policy for Canada.

37 National Round Table on the Environment and the Economy, Framing the Future: Embracing the Low-Carbon Economy, p. 18.

38 National Round Table on the Environment and the Economy, Reality check: The state of climate progress in Canada, p. 114.

39 Ibid., p. 117.

40 Foster, Pricing for apocalyptic externalities.

41 Intergovernmental Panel on Climate Change, Fourth Assessment Report Climate Change 2007, See: Synthesis report, Table SPM.2. Examples of some projected regional impacts, https://www.ipcc.ch/publications_and_data/ar4/syr/en/spms3.html.

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

6.

43 Iizumi et al., "Prediction of seasonal climate-induced variations in global food production", p. 1.

44 See also: Intergovernmental Panel on Climate Change, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.

45 Funk and Brown, "Declining global per capita agricultural production and warming oceans threaten food security", p. 271-289.

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change". 46 The report predicts crop declines in developing countries, especially in South Asia; price increases for the most important agricultural crops, including rice, wheat, maize, and soybeans; lo

wer calorie availability

throughout the developing world in 2050 when compared with both a no-climate-change scenario and 2000

levels; 20 percent more child malnutrition than in a world with no climate change; and costs of US\$7.1 to \$7.3

billion to raise calorie consumption sufficiently to offset the health impacts of climate change on children. 4748

Changes in climate that will affect Canadian agricultural production include events such as heat waves and

droughts, infestation of pests, and severe storms. The Ontario Ministry of Agriculture and Food's website lists

projected impacts including:

- increased heat stress on livestock,
- increased pest volumes and number of pest species,
- modified geographical extent of agricultural production and locational shifts for growth of certain crops,
- potential limitations on food processing expansions owing to water quality and quantity issues,
- and financial challenges for rural municipalities exposed to extreme weather events and needing large infrastructure enhancements to cope with such events (bridges, roads, etc.). 49

Climate change is also expected to do between \$2 billion and \$7 billion in damage to Canada's timber industry

by 2050, "through changes in pests, fires, and forest growth". 50

Studies exploring economic approaches to dealing with climate change show that adaptation can help

alleviate risks to Canada's agricultural sector. 51 However, extreme weather events, which are predicted to

occur with increasing frequency as global temperatures rise, are significant drivers of yield and impact changes

and can therefore disrupt adaptation practices and threaten the health and prosperity of agricultural systems. 52

Extreme weather events may prove more severe than anticipated by adaptation strategies as implemented to

date. 53

In 2011, Texas and Oklahoma experienced a drought with over 100 days at over 100 °F. Both states

set new high temperature records. The drought caused US\$10 billion in direct damage to agriculture

alone. 54 The continuing drought in the U.S. provides a glimpse of what may become increa

singly routine in a world altered by climate change. Beginning in the spring of 2012, the drought originally affected areas along the plains and western mid-west regions of the country. As the drought continued, the federal government declared most of the central and southern U.S. wheat belt a natural disaster area. By July, the drought had reached such extreme conditions that officials in north-central Oklahoma declared a state of emergency on account of record-low reservoir conditions. Furthermore, the U.S. Department of Agriculture granted eligibility for low-interest emergency loans to wheat growers in four major wheat-growing states: Kansas, Colorado, Oklahoma, and Texas. In early 2013, experts from the National Oceanic and Atmospheric Administration's (NOAA) Climate Prediction Center and the National Drought Mitigation Center at the University of Nebraska-Lincoln predicted that, despite various localized improvements, the drought was set to worsen in general

46 Nelson et al., Food Policy Report: Climate Change Impact on Agriculture and Costs of Adaptation, p. vii.

47 Ibid., p. vii.

48 See also: Wheeler and Braun, "Climate Change Impacts on Global Food Security".

49 Ontario Ministry of Agriculture and Food, Climate Change and Agriculture.

50 National Round Table on the Environment and the Economy, Paying the Price: The Economic Impacts of Climate Change for Canada, p.16.

51 Amiraslany, The impact of climate change on Canadian agriculture : a Ricardian approach.

52 Isik and Devadoss, "An analysis of the impact of climate change on crop yields and yield variability", p. 835-44.

53 See for instance: Malcolm et al., Agricultural Adaptation to a Changing Climate: Economic and Environmental Implications Vary by U.S. Region.

54 United States Global Change Research Program, National Climate Assessment: Extreme Weather.

through spring 2013 and expand to affect areas in California, Texas, and Florida. 55 In April 2015, California introduced the first mandatory restrictions on water use in the state's history. 5657 Martin Hoerling, a research meteorologist at NOAA, explained that: "[c]limate change is likely prolonging the duration and severity of naturally occurring drought in the Southwest" and that both reduced rainfall and higher temperatures may contribute to future droughts. 58 Moreover, less-than-average snow accumulation in surrounding areas, including the central and southern Rockies, results in a decrease of water flowing from streams and rivers to reservoirs, which adds to concerns about the potential for the drought to increase in scope. A 2014 study concluded that California's 2012-14 drought was "the most severe drought in the last 1200 years". 5960 Further research in 2015 concluded that anthropogenic warming is increasing the risk of similar future droughts in California. 6162 Other research published in Science used climate models to project that the 13th-century Chaco Canyon 'megadrought' which led to the abandonment of the area by ancient Pueblo peoples "will look 'quaint' compared with what computer models predict will hit the midwestern and southwestern United States over the next century". 63 Research conducted by NASA has found that: "In the Southwest and Central Plains of Western North America, climate change is expected to increase drought severity in the coming decades" and that both moderate and high future emissions scenarios would be accompanied by "unprecedented drought conditions during the last millennium". 64 65

Prolonged heat waves and periods of drought are projected to intensify globally, concurrent with accelerating warming of global temperatures caused by the increase of GHG levels in the atmosphere. 666768 The Met Office – the U.K.'s official meteorological agency – projects that by 2030 heat waves in Europe and the Mediterranean will become likely every two years. 69707172 The IPCC expects increased incidence of drought in Asia, Australia, New Zealand, and Europe. In North America, it expects "[w]arming in western mountains... to cause decreased snowpack, more winter flooding and reduced summer flows, exacerbating competition for over-allocated water resources". 73 Canada has experienced extreme heat and drought events

in its recent history. For instance, six wide-ranging and severe droughts took place over southern Ontario between 1936 and 1998. Two droughts, one in 1988 and another in 1998, were both consistent with predictions in climate change scenarios for the Great Lakes region. 74 In their latest assessment report, the IPCC

55 National Oceanic and Atmospheric Administration, NOAA Monthly Climate Teleconference: February 2013.

56 Office of Governor Edmund G. Brown Jr. Governor Brown Directs First Ever Statewide Mandatory Water Reductions.

57 Megerian, Stevens, and Boxall, Brown orders California's first mandatory water restrictions: 'It's a different world'.

58 Koch, Climate change's heat intensifies drought in the USA.

59 Griffin and Anchukaitis, "How unusual is the 2012-2014 California drought?"

60 ScienceDaily, California's drought is the worst in 1,200 years, evidence suggests.

61 Diffenbaugh, Swain, and Touma, "Anthropogenic warming has increased drought risk in California".

62 See also: Nuccitelli, Global warming and drought are turning the Golden State brown.

63 Underwood, "Models predict longer, deeper US droughts", p. 707.

64 Cook, Ault, and Smerdon, "Unprecedented 21st century drought risk in the American Southwest and Central Plains".

65 See also: United States National Aeronautics and Space Administration, NASA Study Finds Carbon Emissions Could Dramatically Increase Risk of U.S. Megadroughts.

66 Coumou and Robinson, "Historic and future increase in the global land area affected by monthly heat extremes".

67 See also: ScienceDaily, Heat Waves to Become Much More Frequent and Severe.

68 Tollefson, Heatwaves blamed on global warming.

69 Christidis, Jones, and Stott, "Dramatically increasing chance of extremely hot summers since the 2003 European heatwave".

70 The Guardian, Heatwaves likely 'every other year' by 2030s, says Met Office study.

71 Increased incidence of heat waves is projected to affect the productivity of outdoor and agricultural workers. See: Kjellstrom, "Climate

change, direct heat exposure, health and well-being in low and middle-income countries".

72 See also: Oxfam International, Suffering the Science: Climate Change, People and Poverty, p. 30.

73 Intergovernmental Panel on Climate Change, Fourth Assessment Report Climate Change 2007, See: Synthesis report, Table SPM.2. Ex-

amples of some projected regional impacts, https://www.ipcc.ch/publications_and_data/ar4/syr/en/spms3.html.

74 Koshida et al., "Drought Risk Management in Canada-U.S. Transboundary Watersheds: Now and in the Future. Drought and Water

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concluded that "[c]limate change is expected to exacerbate current stresses on water resources from population growth and economic and land-use change, including urbanisation" and that areas "where more than one-sixth of the world population currently lives" are expected to experience "reduced water availability, hydropower potential, and changing seasonality of flows in regions supplied by meltwater from major mountain ranges". 75 They also concluded that: "[t]he negative impacts of climate change on freshwater systems outweigh its benefits (high confidence)". 76

Climate change is likely to cause a larger fraction of winter precipitation in North America to fall as rain, rather than snow. This threatens hydroelectric power production, since reservoirs will be filled to capacity during winter but unable to rely upon melting snowpack for replenishment during the summer months. Even though 2014 was one of the two years with the smallest snowpack in California's Tuolumne River Basin, which provides water to millions of people, the level in April 2015 was 60% lower. 77 A 2012 study published in Hydrology and Earth System Sciences projects that climate change will cut snow water storage in the Oregon watershed by 56 percent. 7879 A study published in Water Resources Research identified a fifty percent chance that the Colorado River system will deplete all of its reservoir storage by 2050. 8081 This river system powers dams with over 24,000 megawatts of electrical output. Research published in Nature Geoscience in April 2015 found that "seventy per cent of glacier ice in British Columbia and Alberta could disappear by the end of the 21st century", with 90 percent of glaciers in the Rocky Mountains lost along with 50 percent of those in the Coast Mountains. 8283848586

In a report prepared for the U.S. Federal Emergency Management Agency, AECOM estimated th

at the portion of the U.S. at risk from flooding will increase by 45 percent by 2100, with 70 percent of that increase attributable to climate change. 8788 As reported by the U.S. EPA: "[m]ore extreme temperature and precipitation can prevent crops from growing. Extreme events, especially floods and droughts, can harm crops and reduce yields". 89

The IFPRI finds that declines in yields of one critical world crop – wheat – will become greater the longer mitigation is delayed. 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. 90 Up to 2050, climate change's impact on agriculture might be manageable to some extent; however, the IFPRI report concludes: "[s]tarting the process of slowing emissions growth today is critical to avoiding a calamitous post-2050 future". 91 Re-

Crises: Science, Technology, and Management Issues".

75 Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p. 49.

76 *Ibid.*, p. 49.

77 Buis, California Tuolumne snowpack 40 percent of worst year.

78 Sproles et al., "Climate change impacts on maritime mountain snowpack in the Oregon Cascades".

79 ScienceDaily, *Global Warming to Cut Snow Water Storage 56 Percent in Oregon Watershed*.

80 ScienceDaily, *Future Of Western U.S. Water Supply Threatened By Climate Change*.

81 See also: *The Economist*, *The drying of the West: The Colorado River and the civilization it waters are in crisis*.

82 Clarke et al., "Projected deglaciation of western Canada in the twenty-first century".

83 See also: Vieli, "Glacier Change: Dynamic projections".

84 Clarke and Amos, *Western Canada to lose 70 per cent of glaciers by 2100*.

85 Carman, *Near total loss of glacial ice in B.C., Alberta expected by 2100, researchers say – Skiing salmon spawning may also be casualties of melting*.

86 Chung, How Western Canada glaciers will melt away.

87 AECOM, The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100, p. ES-7.

88 See also: Sheppard and West, FEMA Report: Climate Change Could Increase Areas at Risk of Flood by 45 Percent.

89 United States Environmental Protection Agency, Agriculture and Food Supply Impacts & Adaptation.

90 Nelson et al., Food Security, Farming and Climate Change to 2050: Scenarios, Results, Policy Options, p. 85.

91 Ibid., p. xxi.

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search published in 2014 in Nature Climate Change concluded that: "warming is already slowing yield

gains at a majority of wheat-growing locations" and that: "[g]lobal wheat production is estimated to fall

by 6% for each °C of further temperature increase and become more variable over space and time". 9293

Although adaptation strategies may provide certain methods for dealing with select risks to agricultural pro-

duction that are directly associated with climate change, climate change mitigation through reducing GHG

emissions is essential to the long-term health and prosperity of agriculture in Canada.

In January 2015, the UN Food and Agricultural Organization warned that threats to the genetic

diversity of Earth's food supplies risk complicating climate change adaptation. 9495 The wild relatives of

crop plants "are likely to have genetic traits that can be used to develop well-adapted crops for use in

climate change-affected food systems", and so require active protection as a partial response to climate

change risks. 96

3.2.3 The inundation of coastal areas

A 2009 Science article examined the relationship between atmospheric CO₂ concentrations and ice sheet

stability. The paper identifies how the last time global CO₂ concentrations were at curr

ent levels, global temperatures were between 3 °C and 6 °C hotter and sea levels were "25 to 40 meters higher than at present". 97

Across Canada, coastal communities, forests, agriculture, and fisheries are increasingly at risk from climate change. In the Natural Resources Canada report *Climate Change Impacts and Adaptation: A Canadian Perspective* "sea level rise, resulting from thermal expansion of ocean waters and increased melting of glaciers and ice caps" is identified as "the main issue for marine regions". 98 The report explains that: "[o]verall, more than 7000 kilometres of Canada's coastline are considered highly sensitive to future sea level rise" and that "climate change [is] expected to lead to a suite of biophysical and socio-economic impacts" including coastal inundation, increased coastal erosion, saltwater intrusion into freshwater aquifers, reduced sea-ice cover, higher storm-surge flooding, higher sea surface temperatures, loss of coastal habitat, damage to coastal infrastructure, increased property loss, increased risk of disease, increased flood risks and potential loss of life, and loss of cultural resources and values". 99 In 2011, the NRTEE projected that "[t]he costs of flooding from climate change could be between \$1 billion and \$8 billion per year by the 2050s". 100

A closer look at the potential impacts of changing temperatures to the economic stability of Canada's Atlantic provinces illustrates some of these risks in more detail. The federal government report *From Impacts to Adaptation: Canada in a Changing Climate 2007* provides a detailed analysis of both current and projected effects of climate change to different areas in Canada, including an extensive discussion on effects specific to the Maritime region. 101 The study projects major climatic changes in the region: "By 2050, there would be a 2 to

92 Asseng et al., "Rising temperatures reduce global wheat production".

93 See also: Harvey, Global warming will cut wheat yields, research shows.

94 Food and Agricultural Organization of the United Nations, *Genetic diversity a hidden tool in coping with climate change*.

95 Arsenault, *Food diversity under siege from global warming UN says*.

96 Food and Agricultural Organization of the United Nations, Genetic diversity a hidden tool in coping with climate change.

97 Tripathi, Roberts, and Eagle, "Coupling of CO₂ and ice sheet stability over major climate transitions of the last 20 million years".

98 Lemmen and Warren, Climate Change Impacts and Adaptation: A Canadian Perspective, p. xvi.

"ibid., p. xvii.

100 National Round Table on the Environment and the Economy, Paying the Price: The Economic Impacts of Climate Change for Canada, p.16.

101 Natural Resources Canada, From Impacts to Adaptation: Canada in a Changing Climate 2007.

35

4 °C increase in summer temperature... Future warming of 1.5 to 6 °C during winter can be anticipated". 102 The

study also concludes that: "Rising sea level will result in flooding of higher, previously immune areas... and

more frequent flooding of low-lying areas". 103

These effects interact to have major economic and environmental consequences for the Maritime provinces.

There is general consensus amongst fisheries scientists that the changing climate is going to significantly impact

the Canadian fishing industry. According to a report from Natural Resources Canada "[c]limate change is

expected to have significant impacts on fish populations and sustainable harvests". 104 These changes include

impacts on Pacific and Atlantic fisheries, along with changes in arctic marine ecosystems and in freshwater

fisheries.

The harvesting of wild fish and shellfish, or the raising of these same species in anchored cages, is a major

business in many Maritime coastal communities. However, warmer water temperatures could lead to the

migration of various fish species to other areas. Similarly, increased land erosion causes greater amounts of

sediment to fall into surrounding waters, which can disrupt the feeding and breeding patterns of many species

of fish. 105

Many Maritime coastal communities such as those along the Bay of Fundy are also at risk owing to the melting ice sheets, glaciers, and ice caps that are causing the steady and continuous rising of sea levels across the globe. 106 Concurrent with rising sea levels, the land around the Bay of Fundy is subsiding by almost a foot every 100 years. Taken together, these two effects could result in the rise of sea level along the Fundy coast of almost two feet by the end of the century. This rise could have a devastating effect on many local coastal areas. The increase in coastal erosion caused by rising sea levels will affect sensitive regions along the bay, including vulnerable areas in the northern edges as well as the large low-lying sections of the coast that are already well below sea level and that accommodate roads, railways, businesses, and residential areas. Moreover, the threat of more frequent severe storms poses risks to lands and buildings guarded by the many dykes along the coast, since these structures could prolong flooding by preventing seawater drainage in the increasingly likely case of extreme weather or heavy rainfall events. Taken together, threats to natural resources, increased frequency of extreme weather events, the acceleration of coastal erosion, and the threats to safety and stability of infrastructure because of rising sea levels could have unprecedented adverse consequences for Maritime communities.

102 Ibid., p.131.

103 Natural Resources Canada, *Climate and Climate-related Trends and Projections*.

104 Natural Resources Canada, *Climate Change Impacts and Adaptation: A Canadian Perspective*, p. xv.

105 Percy, *A Rising Tide of Change*.

106 Ibid.

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Delineation Between Submerging
of Coasts

N

Line delineating present -day
submergence from emergence

Present-day Submerging of Coasts

Present day submerging areas

Coastal Sensitivity to Sea-level Rise

Low (0-4.9)
Moderate (5.0 ■ 14.9)
High (15 and up)

Capitals (Canada)

International Boundaries

it National

EEZ (200 mile)

© Provincial and Territorial

i i Canada / Kalaalilt Nunaat
/ V dividing line

f\J International

Populated Places

1 - 4999

Provincial and Territorial Boundaries

5000 - 49 999

A* Provincial / Territorial

. 50 000 - 99 999

Drainage

● 100 000 and greater

Coastline / River / Lake
shoreline

Regions outside Canada

Water areas

Land area

Water area

Figure 3.2: Many coastal areas in all provinces of Atlantic Canada are moderately to highly sensitive to the impacts of rising sea levels. Source: Gary Lines

From Vancouver to Halifax, communities across Canada face significant risks from sea-level rise and accompanying impacts. A 2013 study published in *Nature Climate Change* projects that global flood losses will increase to over US\$1 trillion in 2050, unless present levels of protection are upgraded. The study found Vancouver to be the most vulnerable city in Canada, and the 11th most vulnerable worldwide, with an

Hallegatte et al., "Future flood losses in major coastal cities".

! See also: Moore, Coastal Flooding Could Cost \$1 Trillion By 2050, Vancouver At Risk To Losses: Study.

'The Canadian Press, Future flooding scenario shows Metro Vancouver at risk.

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estimated 100 year exposure of over US\$33 billion. 110 In North Vancouver, concern about sea level rise has prompted the city council to raise the minimum height above sea level for new construction from 4.5 to 5.2 metres. This change has added \$5 million to the cost of a single new development – 800 new strata units

being built along the waterfront. 111

Sea level rise from climate change is also expected to cause substantial impacts globally. In the U.S., cities like New York and entire low-lying states like Florida are vulnerable. 112 Since 2009, the U.S. Army Corps of Engineers has been incorporating sea level rise into all civil-works programs. 113 Four of Florida's southernmost counties have formed the Southeast Florida Regional Climate Change Compact, which calls upon them to: "develop a joint policy position urging the United States Congress to pass legislation that recognizes the unique vulnerabilities of Southeast Florida to the impacts of climate change". 114 In China, 80 million people live in low-lying areas and are vulnerable to climate change-driven increases in sea level and storm surge. 115 Research published in Nature emphasized the risk of climate change to river deltas, where major cities are often located: "Coastal lowlands less than a metre above sea level will be inundated by the turn of the century. Areas at risk of flooding in deltas will grow by 50%. This global scale of delta drowning has been unprecedented in the past 7,000 years". 116

In the long-term, unmitigated climate change risks causing Greenland and the West Antarctic ice sheet (WAIS) to melt. 117118119 According to the IPCC: "Near-total deglaciation would eventually lead to a sea-level rise of around 7 m and 5 m from Greenland and the WAIS, respectively, with wide-ranging consequences including a reconfiguration of coastlines worldwide and inundation of low-lying areas, particularly river deltas". 120 It goes on to say that: "Widespread deglaciation would not be reversible except on very long time-scales, if at all". Recent research by the Potsdam Institute for Climate Impact Research, published in the Proceedings of the National Academy of Sciences, concluded that for each 1 °C of temperature increase globally, sea levels may rise by 2.3 metres. 121122 Sea level rise on this scale would constitute an exceptionally severe social injury – with entire countries like Bangladesh and the Netherlands massively inundated, along with low-lying regions like Florida, New York City, and many of the world's other densely populated areas. The IPCC identifies the "threshold for near-total deglaciation" 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. 123 Research published in Geophysical Research Letters concluded that: "between 2003 and 2009, the disappearance of Amundsen ice [in Antarctica] accelerated at a rate nearly three times faster than over the whole period between 1992

110 Hallegatte et al., "Future flood losses in major coastal cities", p. 2.

111 Richter, Rising sea levels an expensive reality: Harbourside developer faces \$5M in costs to build up land at sea level.

112 The Economist, You're going to get wet.

113 United States Army Corps of Engineers, US Army Corps response to Sea Level Rise.

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

115 The Economist, China and the environment The East is grey, p. 19.

116 Giosan et al., "Climate change: protect the world's deltas."

117 See: Goelzer et al., "Sensitivity of Greenland ice sheet projections to model formulations".

118 ScienceDaily, Contribution of Greenland Ice Sheet to Sea-Level Rise Will Continue to Increase.

119 Nghiem et al., "The extreme melt across the Greenland ice sheet in 2012".

120 Intergovernmental Panel on Climate Change, Fourth Assessment Report: Climate Change 2007, See: "Deglaciation of West Antarctic and Greenland ice sheets" https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch19sl9-3-5-2.html.

121 Levermann et al., "The multimillennial sea-level commitment of global warming".

122 See also: Reuters, Sea levels may rise 2.3 metres per degree of global warming report says.

123 Intergovernmental Panel on Climate Change, Fourth Assessment Report Climate Change 2007, See: "Projected climate change and its impacts" https://www.ipcc.ch/publications_and_data/ar4/syr/en/spms3.html.

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and 2013". Once melted, Antarctic ice may not return even if global CO₂ concentrations were

brought back below pre-industrial levels and kept there for 150 years. 127

Sea level rise also has the potential to be abrupt, heightening the associated economic and human costs.

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 rise".¹²⁸ As with many other climate impacts, the faster sea level rise happens the more costly and disruptive it will be.

3.2.4 Storms, droughts, and other extreme weather

The Earth's changing climate has led to a notable rise in the number of "great natural catastrophes" that are driven by climate-related events over the past 25 years.¹²⁹ Over the past 10 years, countries around the world have experienced approximately 785 natural catastrophes per year. During 2010 alone, a total of 950 natural catastrophes took place, nine-tenths of which were weather-related events such as floods, hurricanes and storms.¹³⁰ Climate change is likely responsible, at least in part, for the rising frequency and severity of extreme weather events, such as floods, storms and droughts, since warmer temperatures tend to produce more violent weather patterns.¹³¹¹³² According to Environment Canada "[f]uture warming will be accompanied by other changes, including the amount and distribution of rain, snow, and ice and the risk of extreme weather events such as heat waves, heavy rainfalls and related flooding, dry spells and/or droughts, and forest fires".¹³³ A 2005 study conducted by Harvard's medical school and Centre for Health and the Global Environment, in collaboration with Swiss Re and the United Nations Development Programme, concluded that a "CCF-II" scenario "correspond [ing] to non-linear impacts":

would involve blows to the world economy sufficiently severe to cripple the resilience that enables affluent countries to respond to catastrophes. In effect, parts of developed countries would experience developing nation conditions for prolonged periods as a result of natural catastrophes and increasing vulnerability due to the abbreviated return times of extreme

The report highlights how such impacts would represent the further development of existing trends:

"Overall costs from catastrophic weather-related events rose from an average of US\$4 billion per year

during the 1950s, to US\$46 billion per year in the 1990s, and almost double that in 2004.

In 2004, the combined weather-related losses from catastrophic and small events were US\$107 billion, setting a new

124 Sutterley et al., "Mass loss of the Amundsen Sea Embayment of West Antarctica from four independent techniques".

125 Nature, Antarctic ice loss accelerates.

126 See also: Rignot et al., "Acceleration of the contribution of the Greenland and Antarctic ice sheets to sea level rise".

127 Ridley and Hewitt, "A mechanism for lack of sea ice reversibility in the Southern Ocean".

128 O'Leary et al., "Ice sheet collapse following a prolonged period of stable sea level during the last interglacial", p. 1.

129 According to Munich RE, a weather-related hazard can be described as a "great natural catastrophe" if it results in any one or a combination of the following attributes: i) number of fatalities exceeds 2,000; ii) number of homeless exceeds 200,000; iii) the country's Gross Domestic Product (GDP) severely declines; and/or iv) the country is dependent on international aid.

130 Munich RE, Overall picture of natural catastrophes in 2010 - Very severe earthquakes and many severe weather events.

131 See: Intergovernmental Panel on Climate Change, Has there been a Change in Extreme Events like Heat Waves, Droughts, Floods and Hurricanes?

132 See also: Peterson et al., "Explaining Extreme Events of 2012 From a Climate Perspective".

133 Environment Canada, Impacts of Climate Change.

134 The Harvard University Center for Health and the Global Environment, Climate Change Futures: Health, Ecological and Economic Dimensions, p. 8.

record". 135

The Fourth Assessment Report of the IPCC (2007) asserts that changes in the frequency and intensity of extreme climate events will occur in the future and will likely challenge human and natural systems to a much greater extent than natural changes in weather conditions. These changes include hurricanes 136137138 and other extreme events including droughts, heat waves, and floods. 139140 The IPCC describes risks of extreme weather events as one of five special 'reasons for concern' about climate change, along with risks to unique and threatened systems, the distribution of impacts and vulnerabilities ("those in the weakest economic position are often the most vulnerable to climate change"), aggregate impacts, and risks of large-scale singularities. 141 On hurricanes, the IPCC explains: "Globally, estimates of the potential destructiveness of hurricanes show a substantial upward trend since the mid-1970s, with a trend towards longer storm duration and greater storm intensity, and the activity is strongly correlated with tropical sea surface temperature". 142 This accords with the basic science of hurricanes, which are driven by the latent heat in water vapour and gain strength from travelling over warmer water.

A 2015 report from the Climate Council of Australia found that "[d]roughts are likely to worsen in severity and duration in southern Australia if greenhouse gas emissions are not cut deeply and rapidly" and "[d]roughts have far-reaching impacts on health, agriculture and native species in Australia". 143 Other reports from the organization conclude that "[d]amage from Cyclone Pam was exacerbated by climate change", document the connection between climate change and worsening brushfires, and describe the threat from climate change-induced coastal flooding. 144145146147

135 Ibid., p. 6.

136 Knutson and Tuleya, "Impact of CO₂ - Induced Warming on Simulated Hurricane Intensity

y and Precipitation: Sensitivity to the Choice of Climate Model and Convective Parameterization".

137 See also: Villarini and Vecchi, "Projected Increases in North Atlantic Tropical Cyclone Intensity from CMIP5 Models".

138 ScienceDaily, More Intense North Atlantic Tropical Storms Likely in the Future.

139 Regarding heat waves, see: Bumbaco, Dello, and Bond, "History of Pacific Northwest Heat Waves: Synoptic Pattern and Trend".

140 ScienceDaily, Nighttime Heat Waves Quadruple in Pacific Northwest.

141 Intergovernmental Panel on Climate Change, Fourth Assessment Report: Climate Change 2007, See: "The long-term perspective" https://www.ipcc.ch/publications_and_data/ar4/syr/en/spms5.html.

^Intergovernmental Panel on Climate Change, Has there been a Change in Extreme Events like Heat Waves, Droughts, Floods and Hurricanes?

143 Climate Council of Australia, Thirsty Country: Climate Change and Drought in Australia, p. i.

144 Climate Council of Australia, Briefing Statement Damage from Cyclone Pam was exacerbated by climate change.

145 Climate Council of Australia, The heat is on: climate change, extreme heat and bushfires in WA.

146 Climate Council of Australia, Counting the Costs: Climate Change and Coastal Flooding .

147 See also: Anderson, 2013 record heatwave 'virtually impossible' without climate change, Climate Council of Australia report says.

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120

First Six Months 2011
98 Events

Figure 3.3: Global trend in the number of great natural catastrophes since 1980. Source:

Munich Re

In Canada, temperatures have warmed by an average of 0.24 °C per decade, as shown by data dating from the first official records of temperature conditions in 1948 through to 2010. 148 This figure represents twice the global average, with temperature rises in the far north occurring at rates three times faster. The average national temperature in 2010 reached 3.0 °C above normal, making it the hottest year on nationwide records. 149

In some cases, the decreased frequency and severity of cold periods is also significant. According to the IPCC, it is "virtually certain" that "fewer cold days and nights" are taking place. 150 This is significant in western Canada, where cold winter nights help to control mountain pine beetle (*Dendroctonus ponderosae*) epidemics. In a future with fewer cold winters, mountain pine beetles will cause greater damage to the western Canadian forest industry. As of 2012, an ongoing mountain pine beetle epidemic had impacted approximately 750,000 hectares of forest. 151152

Precipitation levels in Canada have risen during the past half-century, with mean national levels increasing by about 12 percent. This averages to about 20 more days of rain nation-wide compared with the 1950s. As climate change accelerates, and the rate of warming increases, the conditions for more volatile weather patterns become more common. 153154 Trends consistent with projections of climate models show increasing occurrence of extreme weather in Canada that can be traced back into the early 20th century. For instance,

148 The Institute for Catastrophic Loss Reduction, *Telling the Weather Story*, p. 13.

149 *Ibid.*, p. 13.

^Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p. 53.

151 Chapman, Veblen, and Schoennagel, "Spatiotemporal patterns of mountain pine beetle activity in the southern Rocky Mountains".

152 ScienceDaily, 2001-2002 Drought Helped Propel Mountain Pine Beetle Epidemic.

153 Research published in Nature Geoscience notes: "Precipitation extremes increase in intensity over many regions of the globe in simulations of a warming climate" O'Gorman, "Sensitivity of tropical precipitation extremes to climate change".

154 ScienceDaily, When It Rains, It Pours: Intensification of Extreme Tropical Rainfall With Global Warming Modeled.

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Figure 3.4 shows the increase in weather-related disasters in Canada over 100 years. By contrast, the number of geophysical disasters (earthquakes and landslides) that took place over the same time period has remained fairly consistent. 155 Climate change is also expected to increase the incidence of lightning in the United States by 12 percent (plus or minus 5 percent) for each degree Celsius of temperature increase, or by 50 percent over this century. 156

NATURAL DISASTERS IN CANADA 1900-2000

NATURAL DISASTERS IN CANADA 1900-2002

WEATHER-RELATED NATURAL
DISASTERS (I.E. FLOODING,
STORMS) ARE ON THE RISE,
WHILE GEOPHYSICAL
DISASTERS (I.E. EARTHQUAKES)
REMAIN CONSTANT

Source: Dore 2003

YEAR

[- ◆- GEOPHYSICAL DISASTER HYDROMETEOROLOGICAL DISASTER

Figure 3.4: Natural disasters in Canada 1900-2000. Source: Mohammed Dore, "Forecasting the Conditional Probabilities of Natural Disasters in Canada as a Guide for Disaster Preparedness"

With an influx of extreme weather comes mounting costs for dealing with such events. In the U.S., private insurers determined that 2012 was the most expensive year ever for disasters linked to climate change, with a total cost of \$139 billion. 157 In Canada, the NRTEE projected that total costs associated with climate change could reach between \$21 billion and \$43 billion per year by the 2050s. 158 The range of estimates reflects uncertainty about the extent of action taken to reduce GHG emissions as well as other economic and population growth factors. Similarly, a report by the Institute for Catastrophic Loss Reduction for the Insurance Bureau of Canada outlines trends of insured losses from severe weather and natural catastrophes both internationally and within Canada. The report reveals that financial impacts have ranged from between \$10 and \$50 billion dollars a year internationally since 2002, with levels exceeding \$100 billion in 2011. 159 Within Canada, property insurance claims resulting from severe weather-related events from 2010-2012 have cost roughly \$1 billion a year. The report outlines a number of specific examples of such claims, including:

155 The Clean Air Partnership, A Scan of Climate Change Impacts on Toronto, p. 8.

156 Romps et al., "Projected increase in lightning strikes in the United States due to global warming".

157 The Economist, Blown away.

158 National Round Table on the Environment and the Economy, Paying the Price: The Economic Impacts of Climate Change for Canada, p.15.

159 The Institute for Catastrophic Loss Reduction, Telling the Weather Story, p. 5.

- A severe wind and thunderstorm that took place on in June of 2010 in and around Leamington in Southern Ontario caused approximately \$120 million worth of insured losses to both business and residential properties.
- Areas in Southern Alberta experienced a similar storm that resulted in excessive damage to private and commercial properties as well as automobiles that totalled over \$500 million in losses.

As the report details, claims resulting from both severe and smaller-impact weather events represent significant property damage for consumers, with losses driven in large part from aging sewer and water infrastructure that cannot handle the new higher precipitation levels. Water-related insurance claims have "surpass [ed] fire as the number one cause of home insurance losses in many parts of the country".¹⁶⁰ The report also details projections of extreme weather events in Canada running through the 2050s, including hot days per year, wildfires, hail and ice storms, tornadoes, and heavy rainfall events, and includes recommendations for dealing with the expansion of insurance-related losses nationwide.

A July 2013 study prepared by the U.S. Department of Energy examined the risks posed by climate change and extreme weather to America's energy infrastructure. The report identifies impacts that are already being experienced, including fuel barges being impeded by low water levels in major waterways, floods and storms interfering with ports, and damage to transmission lines from storms.¹⁶¹ The report describes risks to thermo-electric power generation facilities, coastal energy infrastructure, oil and gas production, renewable energy (especially hydroelectric power), electricity transmission, fuel transport, and arctic oil and gas exploitation.¹⁶² It also concludes that: "[i]ncreasing temperatures will likely increase electricity demand for cooling".¹⁶³¹⁶⁴

In a report for Ceres – a network of investors, companies, and public interest groups seeking to accelerate and expand the adoption of sustainable business practices – Sharlene Leurig evaluated the threat of climate change to insurers. She concluded that: "This changing climate will profoundly alter insurers' business landscape, affecting the industry's ability to price physical perils, creating potentially va

st new liabilities and threatening the performance of insurers' vast investment portfolios". 165166 A climate that is changing increasingly rapidly is associated with severe weather, damage to infrastructure, and soaring costs. This corresponds with the finding of the NRTEE that "[g]lobal mitigation leading to a low climate change future reduces costs to Canada in the long term". 167

A 2013 report from the World Meteorological Organization (WMO) described the impacts of climate change on extreme weather around the globe, concluding that "[w]hile climate scientists believe that it is not yet possible to attribute individual extremes to climate change, they increasingly conclude that many recent events would have occurred in a different way – or would not have occurred at all – in the absence of climate change". 168169170 WMO Secretary-General Michel Jarraud explained:

WMO's report shows that global warming was significant from 1971 to 2010 and that the decadal

160 The Institute for Catastrophic Loss Reduction, *Telling the Weather Story*, p. 7.

161 Broder, *Climate Change Will Cause More Energy Breakdowns*, U.S. Warns.

162 United States Department of Energy, *U.S. Energy Sector Vulnerabilities to Climate Change and Extreme Weather*, p. I.

163 *Ibid.*, p. I.

164 See also: United States Department of Energy, *Climate Change: Effects on Our Energy*.

165 Leurig, *Climate Risk Disclosure By Insurers: Evaluating Insurer Responses to the NAIC Climate Disclosure Survey*, p. 9.

166 See also: Kollwe, *Lloyd's calls on insurers to take into account climate-change risk*.

167 National Round Table on the Environment and the Economy, *Paying the Price: The Economic Impacts of Climate Change for Canada*, p. 16.

168 World Meteorological Organization, *The Global Climate 2001-2010: A Decade of Climate Extremes*, p. 15.

169 See also: Harrabin, *Climate extremes are 'unprecedented'*.

170 Doyle, *World suffered unprecedented climate extremes in past decade – WMO*.

43

rate of increase between 1991-2000 and 2001-2010 was unprecedented. Rising concentrations of heat-trapping greenhouse gases are changing our climate, with far reaching implications for our environment and our oceans, which are absorbing both carbon dioxide and heat. 171

The report notes a "very large increase (more than 2000 per cent) in the loss of life from heatwaves", as well as describing how "Central Canada experienced its warmest and most humid summer on record in 2005. 2010 was the warmest year on record for the nation as a whole since records began in 1948". 172

As the damage from climate change mounts, the ability of individuals and firms to mitigate the risk through insurance may diminish. For instance, Blair Feltmate of the Climate Change Adaptation Project at the University of Waterloo projects that extreme weather arising from climate change will lead to "an uninsurable housing market in Canada in many, many regions". 173 Large-scale disasters are a particular threat to smaller insurers, given the danger that a large proportion of their policyholders may be impacted by a single extreme event.

A 2014 report from Natural Resources Canada argues: "Extreme weather events are a key concern for Canada and there is growing confidence that some types of extreme events will increase in frequency and/or intensity as the climate continues to warm". 174 The report also describes increased risks to human health, Canada's economic sectors, and infrastructure. 175

A 2015 report from the United Nations Office for Disaster Risk Reduction found that "climate-related disasters now dominate disaster risk management" and that "87% of disasters [are] climate-related". 176

Responding to the impact of Cyclone Pam on Vanuatu in March 2015, UN Secretary-General Ban Ki-moon said:

Climate change is intensifying the risks for hundreds of millions of people, particularly in small island developing States and coastal areas. Tropical storms in one region cause economic turbulence in another. Disaster risk reduction is a frontline defence against the impact of climate change. It is a smart investment for business and a wise investment in saving

lives. 177178179

In an assessment of the damage done by the cyclone, the Food and Agriculture Organization of the U.N. found that:

[T]he banana crop throughout the country has been almost entirely destroyed, as have most coconuts and all of the inland cabbage plants and leafy vegetables. Root crops, which are an important local food source, have been uprooted and flooded in most areas, while the majority of fruit trees have been stripped and chickens and pigs have been killed... In addition to the destruction of crops, existing food and seed stocks have also been destroyed

World Meteorological Organization, 2001-2010, A Decade of Climate Extremes.

172 World Meteorological Organization, The Global Climate 2001-2010: A Decade of Climate Extremes, p. 6, 8.

173 Bryden, 'Many, many' Canadian homes could become uninsurable.

174 Natural Resources Canada, Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation, p. 2.

175 Ibid., p. 4-5, 10, 4-5.

176 The United Nations Office for Disaster Risk Reduction, Ten-year review finds 87% of disasters climate-related.

177 Ban, Secretary-General's remarks at opening of Third UN World Conference on Disaster Risk Reduction.

178 See also: United Nations Climate Change Newsroom, Cyclone Pam Puts Spotlight on Climate Risks.

179 The Secretary-General has also specifically endorsed fossil fuel divestment: United Nations Framework Convention on Climate Change Newsroom, Ban Ki-moon Urges More Fossil Fuel Divestment.

44

by the cyclone, eliminating a vital source of food and income for families and increasing the needs for imports. The initial assessments also indicate destruction of fishing boats and

gear. 180

This destruction highlights how vulnerability to climate change bears no relationship to the fossil fuel use of any country or community. Rather, it is a form of social injury imposed through the choices of others.

3.2.5 Wildfires

Increased temperatures contribute to the frequency and severity of wildfires. 181182 A 1991 study published in the Canadian Journal of Forest Research estimated that a doubling of atmospheric CO₂ would cause a 46 percent increase in seasonal severity rating, with a similar increase in area burned. A 2004 study estimated that with a doubling of CO₂, at least twice as many fires in California would "escape" and "exceed initial containment limits"; that twice as large an area would be burned; and that there would be "widespread impacts on vegetation distribution, forest condition, and carbon storage, and greatly increase the risk to property, natural resources and human life". 183184 A 2006 study of wildfire activity in the western United States found that: "wildfire activity increased suddenly and markedly in the mid-1980s, with higher large-wildfire frequency, longer wildfire durations, and longer wildfire seasons" and that this is "strongly associated with increased spring and summer temperatures and an earlier spring snowmelt". 185 In the U.S., the area burned annually by wildfires has grown to seven million acres, twice what it was during the 1990s. 186 According to the Australian

government's Climate Commission: "Climate change has already increased the risk of extreme fire weather in some parts of Australia, especially the populous southeast". 187

3.2.6 Increased risks to human health

The impact of climate change on human health is no longer a contested issue, with major national and international organizations like the World Health Organization (WHO), Health Canada, the Centres for Disease Control and Prevention (CDC), and others recognizing both its existing impacts and its future risks. The WHO asserts 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 acknowledges the increasingly damaging impact of an ever-warmer climate on numerous social and environmental health determinants, including clean air, water, food, and shelter. 188189190 Carlos Dora, coordinator of public health and

180 Food and Agriculture Organization of the United Nations, Vanuatu: Early reports suggest vast majority of crops destroyed.

181 Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p. 33, 48, 50, 51, 53, 65.

182 See also: Union of Concerned Scientists, *Is Global Warming Fueling Increased Wildfire Risks?*

183 Fried, Torn, and Mills, "The Impact of Climate Change on Wildfire Severity: A Regional Forecast for Northern California", p. 169.

184 See also: Westerling and Bryant, "Climate change and wildfire in California".

185 Westerling et al., "Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity", p. 940-943.

186 Barringer and Chang, *Experts See New Normal as a Hotter, Drier West Faces More Huge Fires*.

187 Government of Australia Climate Commission, *The Critical Decade 2013*, p. 4.

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

189 See also: McMichael, Woodruff, and Hales, "Climate change and human health: present and future risks".

190 Jesdale, Morello-Frosch, and Cushing, "The Racial/Ethnic Distribution of Heat Risk-Related Land Cover in Relation to Residential

Segregation", p. 811-7.

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the environment at the WHO, has argued that: "Climate change is a big factor (in determining peoples' health in the short term and doctors should take notice". 191

The negative effects of climate change on human health can be traced back almost forty years. For example, a 2009 WHO report entitled Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks found that since the 1970s climate change has contributed to diarrhoea, flood injury, malaria, undernutrition, and related disease outcomes. 192 The report explains that:

Potential risks to health include deaths from thermal extremes and weather disasters, vector-borne diseases, a higher incidence of food-related and waterborne infections, photochemical air pollutants and conflict over depleted natural resources. Climate change will have the greatest effect on health in societies with scarce resources, little technology and frail infrastructure. Only some of the many potential effects were fully quantifiable; for example, the effects of more frequent and extreme storms were excluded. Climate change was estimated to be already responsible for 3 percent of diarrhoea, 3 percent of malaria and 3.8 percent of dengue fever deaths worldwide in 2004. Total attributable mortality was about 0.2 percent of deaths in 2004; of these, 85 percent were child deaths. In addition, increased temperatures hastened as many as 12 000 additional deaths; however these deaths were not included in the totals because the years of life lost by these individuals were uncertain, and possibly brief. 193

The WHO also claims that global warming has been causing 140,000 deaths per year since 2004. 194 A 2015 WHO report argues that: " [L] ong-term climate changes in temperature, rainfall and relat

ive humidity are expected to increase the distribution and incidence of at least a subset of these [vector-borne and zoonotic] diseases", noting that "dengue has already re-emerged in countries in which it has been absent for the greater part of the last century". 195196197198

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. The report finds that "[climate change has already held back global development; it is already a significant cost to the global economy". 199 The report also explains that: "Continuing today's patterns of carbon-intensive energy use is estimated, together with climate change, to cause 6 million deaths per year by 2030, close to 700,000 of which would be due to climate change. This implies that a combined climate-carbon crisis is estimated to claim 100 million lives between now and the end of the next decade". 200 According to a Health Canada assessment, the most significant impacts to human health driven by changes in climate are linked to temperature stress, extreme weather, rodent- and water-borne diseases, ultraviolet radiation, and air pollution. 201 202 The report describes how "the economic

191 Plantz, Doctors should take lead in push to curb climate change: experts.

192 World Health Organization, Global health risks: Mortality and Burden of Disease Attributable to Selected Major Risks, p. 44.

193 Ibid., p. 24.

194 World Health Organization, Climate change and health.

195 World Health Organization Department of Control of Neglected Tropical Diseases, Investing to overcome the global impact of neglected tropical diseases: Third WHO report on neglected tropical diseases, p. 15.

196 See also: Westcott, WHO Fears Climate Change Will Accelerate Spread of Some Tropical Diseases.

197 Schlanger, Climate Change Poised to Make Infectious Disease Outbreaks More Frequent.

198 Brooks, UNL researcher: More infectious diseases emerging because of climate change.

199 DARA International, Climate Vulnerability Monitor: A Guide to the Cold Calculus of A Hot Planet, p. 16.

200 Ibid., p. 17.

201 Health Canada, Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity.

202 Notably, this is one of many climate science reports produced by Canadian civil servants and essentially 'buried' by the government

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costs of extreme events in this country are rapidly increasing, as is the number of people affected by natural disasters" and that "[s]uch events and other climate-related hazards (e.g. smog, food-, water-, vector- and rodentborne diseases) continue to pose significant short- and long-term risks to the health and well-being of Canadians and their communities". 203

Climate change is expected to worsen the impact of toxic air pollution on human health. Research published in 2013 in *Climatic Change* concluded that climate change will worsen the impacts from both fine particulate matter and ozone. These impacts are expected to be especially severe in highly populated regions of East Asia, South Asia, and North America. By applying epidemiological concentration-response relationships, the researchers estimated that these effects will cause 100,000 annual premature deaths worldwide. 204205 The researchers conclude that simply to maintain current air quality standards in a world that has experienced projected levels of climate change it will be necessary to implement stronger emission controls on toxic pollutants.

It is generally accepted that the greatest impacts of continuing climate change will be felt by people in low-income countries, as regions with weak health or governmental infrastructure will not have the capacity to respond to consequences of climate change appropriately. Particularly hard hit will be children, the elderly, people with illnesses or infirmities, and people with pre-existing medical conditions. The WHO also claims that: "Many of the major killers such as diarrhoeal diseases, malnutrition, malaria and dengue are highly climate-sensitive and are expected to worsen as the climate changes". 206 Also, a growing body of literature is drawing attention to the incommensurate impacts of climate change on vulnerable and marginalized populations. 207208

Rich parts of the world are also vulnerable to health effects from climate change. The City of New York estimates that hotter summers in the 2020s "could cause an estimated 30 to 70 percent increase in heat-related deaths, or about 110 to 260 additional heat-related deaths per year on average in New York City compared to the baseline period for the analysis (1998-2002)".²⁰⁹ According to the Australian government's Climate Commission: "Heat causes more deaths than any other type of extreme weather event in Australia. Increasing intensity and frequency of extreme heat poses health risks for Australians and can put additional pressure on health services. Changes in temperature and rainfall may allow mosquito-borne illness like dengue fever to spread south".²¹⁰

In Canada, the relationship of health disparities to climate change impacts and adaptation is a newly emerging area of study. Recent reports predict that hotter city temperatures will lead to between five and ten additional deaths per 100,000 people per year by 2050 as well as contribute to increasing pressure on Toronto hospitals through sickness and other heat-related conditions that could swell associated costs to between \$3 million to \$8 million annually by the 2050s.²¹¹ The NRTEE concluded that climate change "will lead to warmer summers and poorer air quality, resulting in increased deaths and illnesses in the four cities studied - Montreal,

of Stephen Harper. Planned coast-to-coast press conferences were cancelled, the report was released without publicity, and the report is not available through the Health Canada website.

²⁰³ Health Canada, *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity*, p. 432.

²⁰⁴ Fang et al., "Impacts of 21st century climate change on global air pollution-related premature mortality".

²⁰⁵ See also: ScienceDaily, *Air Pollution Worsened by Climate Change Set to Be More Potent Killer in the 21st Century*.

²⁰⁶ World Health Organization, *Climate change and health*.

²⁰⁷ Costello et al., "Managing the health effects of climate change", p. 1693-1733.

208 World Health Organization, Closing the gap in a generation: Health equity through action on the social determinants of health.

209 The City of New York, A Stronger, More Resilient New York, p. 31.

210 Government of Australia Climate Commission, The Critical Decade 2013, p. 4.

211 National Round Table on the Environment and the Economy, Paying the Price: The Economic Impacts of Climate Change for Canada, p. 87.

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Toronto, Calgary, and Vancouver" and that this will impose costs on the health care system of between \$3 million and \$11 million per year by the 2050s. 212

A coalition of U.K. health NGOs has released a report describing the health impacts of climate change

and calling for divestment. 213214 It echoes the perspective published in The Lancet that climate change is:

"the biggest global health threat of the 21st century". 215216 The British Medical Association has already

committed itself to fossil fuel divestment. 217

3.2.7 Ecosystem collapse

Climate change is expected to have a substantial effect on ecosystems and biodiversity around the world. 218

Writing in Nature Climate Change, a group of researchers concluded that "without mitigation, large range con-

tractions can be expected even amongst common and widespread species, amounting to a substantial global

reduction in biodiversity and ecosystem services by the end of this century". 219 Because ecosystems are vital

to the survival and prosperity of humanity, climatic damage imposed on them is an important form of social

injury arising from the activities of fossil fuel companies. As emphasized by the United Nations Development

Programme, the link between ecosystem integrity and prosperity is especially important for the poor: "Climate

change is already exacerbating chronic environmental threats, and ecosystem losses are constraining livelihood

opportunities, especially for poor people". 220

Salmon are one example of an important species that faces threats from climate change. The dangers climate change poses to salmon are illustrative for a number of reasons: these fish add to the discussion of threats to Canadian coastal environments described above; salmon fisheries in particular are significant contributors to the global economy and to the subsistence of large segments of the world's population; and salmon play an important role in the functioning of their marine ecosystems. A report from the International Union for Conservation of Nature (IUCN) states that the salmon fishing industry contributed more than \$2 billion to economies in Russia, Japan, the U.S., and Canada and directly employed more than 35,000 people.²²¹ Reliance on salmon fisheries as both a source of food and income is especially important to communities along Canada's Atlantic and Pacific coasts.

In 2009, the IUCN released the "Red List of Threatened Species: More Than Just the Polar Bear", highlighting the need to more closely study the complex risks associated with climate change to delicate ecosystems and the species that inhabit them.²²² The report includes a detailed discussion of the problems that increasing global temperatures will pose to the safety of the world's salmon populations. Salmon provide food for a suite

²¹² Ibid., p. 16.

²¹³ Medact, Healthy Planet UK, the Climate and Health Council, Medsin, and the Centre for Sustainable Healthcare, *Unhealthy Investments: Fossil Fuel Investment and the UK Health Community*.

²¹⁴ See also: Carrington, *Health sector should divest from fossil fuels, medical groups say*.

²¹⁵ Medact, Healthy Planet UK, the Climate and Health Council, Medsin, and the Centre for Sustainable Healthcare, *Unhealthy Investments: Fossil Fuel Investment and the UK Health Community*, p. 5.

²¹⁶ Costello et al., "Managing the health effects of climate change".

²¹⁷ Medact, *UK Doctors Vote to End Investments in the Fossil Fuel Industry*.

²¹⁸ Foden et al., "Identifying the World's Most Climate Change Vulnerable Species: A Systematic Trait-Based Assessment of all Birds, Amphibians and Corals", p. 1.

²¹⁹ Warren et al., *Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss*, p. 1.

220 United Nations Development Programme, Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World, p. 95.

221 International Union for Conservation of Nature, Salmon and Climate Change: Fish in Hot Water, p. 2.

222 International Union for Conservation of Nature, Species and Climate Change: More than Just the Polar Bear.

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of predators and scavengers that live along the coasts of the ocean and beside the banks of streams and rivers that the fish traverse as part of their extensive migratory routes. Seals, whales, otters, bears, birds, and many invertebrates rely on salmon as a vital source of protein and fat, often at critical stages in their own yearly feeding cycles. Furthermore, throughout a salmon's life cycle, it will transport essential nutrients from salt-water to freshwater areas as well as to the surrounding lands via the excretion of waste as well as through the decay of carcasses.

Increases in water temperatures concurrent with rises in global air temperatures impose a number of negative effects on salmon. Direct biological impacts include increased physiological stress, susceptibility and exposure to disease, and challenges and disruptions to breeding. These effects on the biology of salmon may potentially lead to impacts in the long-term. For example, because the development of salmon relies on water temperature, warmer waters could result in early migration of juvenile fish. Because natural patterns are timed with other important feeding phenomena such as planktonic blooms, early migrations could mean an insufficient source of food for salmon entering the oceans at a critical point in their development. Similarly, flows of warm freshwater can create thermal barriers to migrating salmon, requiring additional energy to navigate. Such barriers can also delay or even prevent spawning altogether. Moreover, increased winter flows can damage river beds, as well as the nests of salmon eggs dug into the sediment and grav

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A 2014 study assessed the risk posed to Chinook salmon by rising temperatures. It concluded that there is "a 17% chance of catastrophic loss in the population by 2100 based on the average warming projection, with this chance increasing to 98% in the maximum warming scenario". 223224225

Warmer ocean temperatures have also been shown to reduce the abundance of other smaller fish in areas experiencing an influx of new warmer waters. Because the interaction of the multitude of biological factors that play a role in maintaining the balance of healthy ecosystems, scientists are hard-pressed to provide specific predictions, let alone detail recommendations for large-scale strategies to deal with potential climate-related threats to salmon, as well as for the increasing range of at-risk species. Acceleration of climate change will exacerbate these difficulties, and can have profound environmental as well as economic impacts. The only sure means of maintaining the health of terrestrial and aquatic ecosystems is to significantly mitigate the release of GHG emissions into the atmosphere.

At the same time as they increase global temperatures, heightened CO₂ concentrations in the atmosphere cause the oceans to become more acidic. According to the IPCC, this is "expected to have negative impacts on marine shell-forming organisms (e.g. corals) and their dependent species". 226 The IPCC also expects ocean acidification to be part of a suite of changes that makes it "likely" that "[t]he resilience of many ecosystems" will be "exceeded this century". 227 A 2010 report from the U.N. 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". 228229 The report suggests that: "[t]he obvious solution to the potential threats posed by ocean acidification is to make rapid and substantial cuts to

223 Crozier et al., "Potential responses to climate change in organisms with complex life histories: evolution and plasticity in Pacific salmon".

224 CBC News, Chinook salmon could be wiped out by 2100, new study claims.

225 Pynn, Chinook salmon at risk of 'catastrophic loss' under global warming, new study reveals.

226 Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report, p. 52.

227 Ibid., p. 48.

228 United Nations Environment Programme, Environmental Consequences of Ocean Acidification: A Threat to Food Security, p. 8.

229 See also: Morello, Ocean Acidification Threatens Global Fisheries.

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anthropogenic CO₂ emissions to the atmosphere". 230 Canada's Department of Fisheries and Oceans has also highlighted the danger of ocean acidification. In a 2013 report, they attribute the phenomenon's "unprecedented rate of occurrence" to "the significant amount of carbon dioxide that has been added to the atmosphere over the past 250 years". 231 They further explain that:

The potential effects of ocean acidification include altered seawater chemistry; decreased growth and productivity of calcium carbonate-based organisms; changes in respiration in large invertebrates, fish, and some zooplankton; increased growth of certain seaweeds and sea grass; changes in species composition and dominance; societal and economic impacts; and other potential impacts that presently remain unknown. 232

The report describes biophysical impacts on nutrients and toxicity, marine organisms, benthic invertebrates, marine fish, seaweed and sea grass, and ecosystem structure and function, along with socioeconomic impacts on marine fisheries and marine aquaculture. 233 A 2015 study published in Nature Climate Change concluded that: "Ocean acidification has already cost the oyster industry in the US Pacific Northwest nearly US\$ 1.1 billion, and directly or indirectly jeopardized about 3,200 jobs". 234235236

Because of both warming and the acidification of the world's oceans in response to rising CO₂ concentrations, coral reefs are especially vulnerable to climate change. 237 In their Fourth Asses

sment Report, the IPCC concluded that increased coral bleaching would accompany warming of 1 °C, most corals will be bleached above 1 °C, and "widespread coral mortality" is expected above 2.5 °C. 238 Significant damage to coral reefs has already been observed, including the loss of 50.7 percent of initial coral cover in Australia's Great Barrier Reef. 239 In their 2014 report, the Great Barrier Reef Marine Park Authority concluded: "Climate change remains the most serious threat to the Great Barrier Reef. It is already affecting the Reef and is likely to have far-reaching consequences in the decades to come". 240 241 Caribbean corals are also experiencing record thermal stress, bleaching, and mortality. 242 An article in Science explains that: "Atmospheric carbon dioxide concentration is expected to exceed 500 parts per million... by 2050 to 2100, values that significantly exceed those of at least the past 420,000 years during which most extant marine organisms evolved". 243 It concludes that: "[t]he result will be less diverse reef communities and carbonate reef structures that fail to be maintained". 244 When the Zoological Society of London considered the projected impacts of climate change on coral reefs, it concluded that: "[a]t anticipated rates of emission increase, it is expected that 450 ppm CO₂ will be reached before 2050. At that point, corals may be on a path to extinction within a matter of decades". 245 As exceptionally rich ecosystems, coral reefs have an importance that goes beyond

230 United Nations Environment Programme, Environmental Consequences of Ocean Acidification: A Threat to Food Security, p. 8.

231 Fisheries and Oceans Canada, Ocean Acidification: State of the Scotian Shelf Report, p. 4.

232 Ibid., p. 6.

233 Ibid., p. 13.

234 Ekstrom et al., "Vulnerability and adaptation of US shell fisheries to ocean acidification".

235 See also: The Guardian, Oysters, clams and scallops face high risk from ocean acidification, new study finds.

236 Mathis et al., "Ocean acidification risk assessment for Alaska's fishery sector".

237 ScienceDaily, Major Changes Needed for Coral Reef Survival.

238 Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p.51.

239 De'ath et al., "The 27-year decline of coral cover on the Great Barrier Reef and its causes".

240 Great Barrier Reef Marine Park Authority, *Great Barrier Reef Outlook Report*, p. v.

241 See also: *The Guardian*, Great Barrier Reefs greatest threat is climate change, says new report.

242 Eakin et al., "Caribbean Corals in Crisis: Record Thermal Stress, Bleaching, and Mortality in 2005".

243 Hoegh-Guldberg et al., "Coral Reefs Under Rapid Climate Change and Ocean Acidification", p. 1737-1742.

244 Ibid., p. 1737-1742.

245 Zoological Society of London, *Coral Reefs Exposed To Imminent Destruction From Climate Change*.

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their inherent biological value. Ecosystem services provided by coral reefs, including food, jobs, and tourism, have an estimated value of as much as US\$375 billion per year. 245

Many other species are expected to experience negative impacts from climate change. For instance, reductions in sea ice "will drastically shrink marine habitat for polar bears, ice-inhabiting seals, and some seabirds, pushing some species toward extinction" while "caribou/reindeer and other land animals are likely to be increasingly stressed as climate change alters their access to food sources, breeding grounds, and historic migration routes". 247248249 One 2013 study found that "608-851 bird (6-9 percent), 670-933 amphibian (11-15 percent), and 47-73 coral species (6-9 percent)" are "highly climate change vulnerable". 250 A 2013 study from BirdLife International found that "[c]limate change is already affecting birds in diverse ways", and that "[m]any species will suffer from range shifts and losses, and some will become extinct" a

s a result. 251252 The report also highlights how the risks to birds increase as temperature increase exceeds 2 °C: "[t]emperature rises beyond this level are predicted to lead to catastrophic extinction rates, with few management options". 253

An Environment Canada briefing released under the Access to Information Act argues that "[h]ealthy and resilient ecosystems are one of our best defences against a changing climate" and states that more than 13 percent of Canada's gross domestic product depends on healthy ecosystems. 254 The document identifies climate change as one of "several major threats" that are causing "significant biodiversity loss".

Considerable scope exists for reducing the degree of ecosystem damage resulting from climate change by reducing future GHG pollution. An article in Nature Climate Change concludes that: "without mitigation, 57 ± 6 percent of plants and 34 ± 7 percent of animals are likely to lose > 50 percent of their present climatic range by the 2080s. With mitigation, however, losses are reduced by 60 percent if emissions peak in 2016 or 40 percent if emissions peak in 2030". 255

3.2.8 Threats to First Nations groups and indigenous cultures

Climate change threats to northern Canada, as well as the Aboriginal communities that live there, are becoming increasingly recognized. For example, Natural Resources Canada's national assessment "From Impacts to Adaptation: Canada in a Changing Climate 2007" states that "resource-dependent and Aboriginal communities are particularly vulnerable to climate changes", and emphasizes that "vulnerability" to climate change risk is "magnified in the Arctic". 256 In 2004, the Arctic Council and the International Arctic Science Committee (IASC) issued a report entitled the "Arctic Climate Impact Assessment" that aimed to synthesize knowledge on climate variability and to assess and predict the impact of climate change on arctic regions and communities going into the future. 257 The report contains contributions from over 300 scientists, professionals, and Aboriginal community leaders and reveals that future climate change could be devastating for numerous Inuit communities.

246 National Oceanic and Atmospheric Administration, Heat Stress to Caribbean Corals in 2005 Worst on Record.

247 International Arctic Science Committee, Arctic Climate Impact Assessment, Executive summary, p. 10.

248 See also: Post et al., "Ecological Consequences of Sea-Ice Decline".

249 Weber, We're losing all the things that life depends on: Melting Arctic sea ice has led to mass mortality events, study says.

250 Foden et al., "Identifying the World's Most Climate Change Vulnerable Species: A Systematic Trait-Based Assessment of all Birds, Amphibians and Corals", p. 1 .

251 BirdLife International, State of the World's Birds: Indicators for our changing world , p. 15.

252 See also: Paris, 1 in 8 bird species threatened with extinction.

253 BirdLife International, Human-induced climate change may pose the greatest challenge.

254 De Souza, Major threats to biodiversity loom on Canadian economy: federal briefings.

255 Warren et al., Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss.

256 Natural Resources Canada, From Impacts to Adaptation: Canada in a Changing Climate 2007, p. 3, p. 14.

257 International Arctic Science Committee, Arctic Climate Impact Assessment.

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These findings are supported by a more recent study conducted by researchers from McGill University that focused on two separate Inuit communities. 258 The study identifies that "climatic conditions which currently pose risks are expected to be negatively affected by future climate change" and explains that "young Inuit and those without access to economic resources, in particular, are vulnerable". 259

According to a 2009 article in Global Environmental Change, "health inequality [in relation to climate change] is particularly pronounced among Aboriginal Canadians". 260 Climate change in general "has been identified as potentially the biggest health threat of the 21st century", and the article goes on to explain that "[t]he

existing burden of ill-health increases the sensitivity of Indigenous peoples to the adverse impacts of climate change, which combined with a proportionally higher dependence of many Indigenous livelihoods on the environment, spiritual and cultural ties to the land, demographic trends, and experience of marginalization, makes Indigenous peoples particularly vulnerable". 261

A 2014 study on the Athabasca Oil Sands found elevated levels of pollutants in wild-caught foods in Northern Alberta, creating potential health risks for the Mikisew Cree First Nation and Athabasca Chipewyan First Nation. 262 Pollutants found in elevated levels include arsenic in muskrat and moose; cadmium in beaver and ducks; and mercury in ducks, moose, and muskrat. 263 Oil sands activity was found to be a more significant cause of human health decline than upstream agriculture or substance abuse. 264

3.2.9 Threats to the infrastructure of cities, including Toronto

More than half the world's population live in cities and urban areas. As a first step towards addressing climate change, many cities have conducted assessments of their GHG emissions, as well as begun to evaluate their vulnerability to climate change impacts. The City of New York projects that – because of rising sea levels and ocean temperatures – by 2050 "a storm like [Hurricane Sandy] could cause an estimated \$90 billion in losses (in current dollars) – almost five times as much [as Sandy cost]". 265

In Canada, over 200 municipalities are taking part in the Partners for Climate Protection program, which is the Canadian component of International Council for Local Environmental Initiatives' Cities for Climate Protection network. 266 The Province of Ontario and the City of Toronto are among those actively implementing numerous plans and initiatives to reduce GHG pollution. The first attempt on behalf of the city to assess GHG levels came in 2004. 267 Follow-up reports detailing strategies for reducing emissions were published soon after. 268 Additionally, there is a growing body of literature that examines current trends and expected effects

258 Ford et al., "Climate change in the Arctic: current and future vulnerability in two Inuit communities in Canada".

259 Ibid., p. 45, p. 54.

260 Ford et al., "Vulnerability of Aboriginal health systems in Canada to climate change", p. 1.

261 Ibid., p. 1.

252 McLachlan, Environmental and Human Health Implications of the Athabasca Oil Sands for the Mikisew Cree First Nation and Athabasca Chipewyan First Nation in Northern Alberta.

263 Ibid., p. 11.

264 Ibid., p. 12.

265 The City of New York, A Stronger, More Resilient New York, Foreward, p. 2.

266 See: <http://www.icleicanada.org/programs/mitigation/pcp>

267 ICF International, Greenhouse Gases and Air Pollutants in the City of Toronto: Toward a Harmonized Strategy for Reducing Emissions, p. IV.

268 The Clean Air Partnership, Climate Change Adaptation and Health Equity: Background Report.

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of climate change to Toronto and surrounding are as. 269270271272273

The impacts of climate change are already being felt in Toronto and the Greater Toronto Area (GTA).

Toronto has experienced extreme heat, floods, droughts, new insect pests, new vector-borne diseases and

other problems worsened by climate change. 274 Toronto has seen an average temperature increase of 2.7 °C

since the late 1800s. 275 Record high temperatures, accompanied by smoggier skies, have also been recorded in

recent summer seasons. June 2005 was the warmest on record: 37 days had a maximum temperature greater

than 30 °C (more than double the average from 1971-2000); humidex values exceeded 35 more than 44 times;

and 48 smog days were declared, the highest number on record. 276 Although precipitation patterns have not

undergone such drastic changes, it has been predicted that more precipitation will likely arrive during heavy

rainfall events. 277 Snowfall is expected to decrease and rainfall will increase in its s

tead, accompanied by an influx of freezing rain episodes. 278 More ice-storms are also expected. 279 More freeze-thaw cycles in the city are also projected, which take a heavy toll on roads as well as urban green spaces. 280

Increased financial burdens on the city

High density cities such as Toronto are particularly susceptible to damage caused by extreme weather or natural disasters. Extreme weather events driven by climate change can be costly for municipalities in terms of lives lost and damage to cultural assets, as well as financially. The intense storm of August 19th 2005 caused millions of dollars of damage. This storm's heavy rainfall washed out a part of Finch Avenue, and caused flash flooding and widespread damage across the city. Parks and Recreation spent \$12.5 million restoring damaged trees and urban parks. \$600,000 was spent by Urban Forestry Services to clear fallen trees. 281 Likewise, Transportation Services spent close to \$5 million repairing Finch Avenue. The total damage, including public and private property, was estimated at approximately \$400-\$500 million – the most expensive storm in Toronto's history. 282

More frequent storms and severe weather will likely continue to cause damage to city infrastructure and put strain on city resources. The floods, storms, droughts and other weather-related phenomena that already occur annually in Canada can cost hundreds of millions of dollars. 283 Furthermore, recent events such as Hurricane Sandy have revealed that even developed countries can experience substantial injury from extreme weather events that are difficult to prepare for, and which can be unprecedented in strength and geographic scope.

269 Toronto Environment Office, Climate Change, Clean Air and Sustainable Energy Action Plan.

270 Toronto Environment Office, Ahead of the Storm: Preparing Toronto for Climate Change.

271 The Clean Air Partnership, A Scan of Climate Change Impacts on Toronto.

272 Felton and Thistlewaite, Climate Change Adaptation: A Priorities Plan for Canada.

- 273 MacLeod, *Adaptation to a Changing Climate: City Infrastructure Preparedness*.
- 274 Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*.
- 275 The Clean Air Partnership, *A Scan of Climate Change Impacts on Toronto*, p. 5.
- 276 *Ibid.*, p. iii, p. 7.
- 277 *Ibid.*, p. 6.
- 278 Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*, p. 8.
- 279 Cheng et al., "Possible impacts of climate change on freezing rain in south-central Canada using downscaled future climate scenarios"
- 280 Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*, p. 8.
- 281 The Clean Air Partnership, *A Scan of Climate Change Impacts on Toronto*, p. iii.
- 282 Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*, p. 11.
- 283 Health Canada, *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity*, p. 11.

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Increased health risks to vulnerable populations

Severe storms and extreme weather can be very costly, and the longer-term impacts of climate change will have an adverse effect on Toronto and its residents in ways that "[go] well beyond the reported monetary costs". 284 It is widely documented that certain populations in any particular city are more vulnerable to the adverse effects of climate change than others. 285286287288 'Vulnerability' in this sense can be defined as "the degree to which individuals and systems are susceptible to or unable to cope with the adverse effects of climate change". 289 Determinants of health, such as income and social status, education and literacy, social and physical environments, or genetics, etc., can be used to assess a population's vulnerability to the various impacts of climate change. For example, severe storm events can affect physical environments by causing extensive

property damage; challenges linked with income and social status can be reinforced as people with inadequate employment or insufficient funds could have more difficulty acquiring financial resources to repair property, deal with displacement, or finance interim accommodation. Populations that are particularly vulnerable to climate change impacts in the City of Toronto include infants and babies, women, the elderly, those with pre-existing or underlying conditions, First Nations people, those whose livelihood is reliant on natural resources, and those with low social and economic standings. 290291292

The current and forecasted future makeup of the City of Toronto is highly diverse and increasingly expanding; indeed, the population of the Greater Toronto Area is projected to reach 9.2 million by 2036. 293 Toronto's swelling population encompasses a number of the vulnerable populations identified above. According to Statistics Canada, the aboriginal population of the city grew 20 percent from 2001, reaching a total of 13,605 people as of 2006. 294 This figure represents over 0.5 percent of the total population in the City, and 43 percent of the aboriginal population in the Greater Toronto Area (GTA). In addition, Statistics Canada reports that the City of Toronto was home to over 350,000 seniors in 2006. This number constitutes 14 percent of the city's population, and 53 percent of all seniors living in the GTA. The city's Social Development, Finance and Administrative Division forecasts that seniors will make up 17 percent of the City of Toronto population by 2031. 295 Finally, an increasing number of Torontonians are low-income. In 2005 there were 134,247 family households and 165,156 persons not living in family households that reported before-tax income levels below Statistics Canada's Low Income Cut-off. 296 The size of the low-income population recorded in 2005 was greater than in the early 1990s, and the low income rate for seniors in Toronto was nearly double that in the rest of the GTA. 297

The literature on health equity in a Canadian context shows a direct relationship between health and

284 The Clean Air Partnership, *Climate Change Adaptation and Health Equity: Background Report*, p. 19.

285 Ebi, "Facilitating Climate Justice through Community-Based Adaptation in the Health S

ector".

286 McKeown, Hot Weather Response Plan – Update.

287 Marmot, "Achieving health equity: from root causes to fair outcomes", p. 1153-1163.

288 Public Health Agency of Canada, Reducing Health Disparities – Roles of the Health Sector: Discussion Paper.

289 The Clean Air Partnership, Climate Change Adaptation and Health Equity: Background Report, p. 6.

290 Ibid.

291 Health Canada, Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity.

292 Health Canada, Climate Change: Preparing for the Health Impacts.

293 Ontario Ministry of Finance, Ontario Population Projections Update: 2011 - 2036.

294 Statistics Canada, Aboriginal Profile for the City of Toronto.

295 City of Toronto Social Development, Finance and Administration Division, Toronto Seniors Demographic Snapshot 2006, p. 5.

296 City of Toronto Social Development, Finance and Administration Division, Profile of Low Income in the City of Toronto, p. 5.

297 Ibid, p. 6.

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income. 298299300 People living in poor areas in Toronto experience increased risk factors for illness, higher occurrence of disease, and earlier mortality than people who reside in more affluent areas. Such risks will very likely be aggravated by the impacts of climate change on the city. A Waterloo-based study exploring the effects of climate change on the homeless population found that exposure to extreme weather was high for this segment of the population; furthermore, exposure exacerbated pre-existing illnesses such as drug and alcohol addictions, mental illness, cardiovascular and respiratory conditions, as well as feelings of isolation and increased stress. 301

A more comprehensive examination of the various ways that the City of Toronto will suffer social, economic, and environmental injury as a direct result of climate change can be found in the 2009 Clean Air Partnership Report "Climate Change Adaptation and Health Equity".³⁰² It includes details about impacts on Toronto's water supply and water quality, energy sources, transportation sector and services, buildings and infrastructure, urban ecosystem, tourism, and economy.

3.2.10 Abrupt and non-linear adverse climate impacts

The Earth's climate system includes some powerful positive feedback mechanisms capable of multiplying the climate-altering effect of GHGs. For instance, tropical ecosystems can generate significant quantities of CO₂ when temperatures rise.³⁰³³⁰⁴ Recent research has found the Amazon rainforest weakening as a carbon sink.³⁰⁵³⁰⁶ Another positive feedback mechanism is how melting ice decreases the planet's albedo (reflectiveness), causing more of the sun's energy to be directed toward increasing temperatures. Other feedback mechanisms include the release of methane – a powerful GHG – from melting permafrost and subsea methane clathrate deposits.³⁰⁷³⁰⁸³⁰⁹ These large methane deposits would add substantially to global temperature increase if released abruptly. Abrupt methane release has been associated with past instances of abrupt global warming, such as during the Paleocene-Eocene Thermal Maximum 55 million years ago, and several of these instances were accompanied by major global extinction events both on land and in the oceans.³¹⁰ According to NASA:

Over hundreds of millennia, Arctic permafrost soils have accumulated vast stores of organic carbon – an estimated 1,400 to 1,850 petagrams of it (a petagram is 2.2 trillion pounds, or 1 billion metric tons). That's about half of all the estimated organic carbon stored in Earth's soils. In comparison, about 350 petagrams of carbon have been emitted from all fossil-fuel combustion and human activities since 1850. Most of this carbon is located in thaw-vulnerable topsoils within 10 feet (3 meters) of the surface.³¹¹

McKeown, Hot Weather Response Plan – Update.

298 R

299 Lightman, Mitchell, and Wilson, Poverty is making us sick: A comprehensive survey of income and health in Canada.

300 Raphael, Poverty, Income Inequality, and Health in Canada.

301 Wandel et al., Homelessness and Global Climate Change in Waterloo Region: Are We Ready?

302 The Clean Air Partnership, Climate Change Adaptation and Health Equity: Background Report.

303 Wang et al., "Variations in atmospheric CO₂ growth rates coupled with tropical temperature".

304 See also: ScienceDaily, Tropical Ecosystems Boost Carbon Dioxide as Temperatures Rise.

305 Brienen et al., "Long-term decline of the Amazon carbon sink".

306 (e) Science News, Amazon's carbon uptake declines as trees die faster.

307 See: Whiteman, Hope, and Wadhams, "Vast costs of Arctic change".

308 See also: Levy et al., "Accelerated thermokarst formation in the McMurdo Dry Valleys, Antarctica".

309 See also: Vidal, Rapid Arctic thawing could be economic timebomb, scientists say.

310 See: Hansen, Storms of My Grandchildren.

311 United States National Aeronautics and Space Administration, Is a Sleeping Climate Giant Stirring in the Arctic?

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NASA also explains that: "Permafrost soils are warming even faster than Arctic air temperatures... 1.5 to 2.5 degrees Celsius in just the past 30 years" and that this warming "threatens to mobilize these organic carbon reservoirs and release them into the atmosphere as carbon dioxide and methane, upsetting the Arctic's carbon balance and greatly exacerbating global warming". 312313314315

In 2014, researchers discovered methane clathrates melting off the west coast of North America, as a

result of warming ocean temperatures. 316 Evan Solomon explained that four million tonnes of methane were released between 1970 and 2013 – an annual release rate equivalent to the volume of the 2010 Deepwater Horizon oil spill, and 500 times the natural rate of release. 317 Since 1970, the boundary line between frozen and gaseous methane on the sea floor has shifted offshore by about one kilometre, and is expected to shift a further one to three kilometres by 2100. 318

Several potentially dangerous 'tipping points' have been identified by scientists, including the danger that the thermohaline circulation (which produces Europe's relatively warm climate relative to its latitude) may be disrupted, though this is now considered unlikely, at least within the next century. 319 Writing in *Nature* in 2009, Johan Rockstrom et al. explain that:

We propose that human changes to atmospheric CO₂ concentrations should not exceed 350 parts per million by volume, and that radiative forcing should not exceed 1 watt per square metre above pre-industrial levels. Transgressing these boundaries will increase the risk of irreversible climate change, such as the loss of major ice sheets, accelerated sea level rise and abrupt shifts in forest and agricultural systems. Current CO₂ concentration stands at 387 p.p.m.v. and the change in radiative forcing is 1.5 W m⁻². 320

In their Fourth Assessment Report, the IPCC explains that "[a]nthropogenic warming could lead to some impacts that are abrupt or irreversible", including "metres of sea level rise", "significant extinctions" (40 to 70 percent of species assessed if warming exceeds 3.5 °C), and "[c]hanges in terrestrial and ocean CO₂ uptake [that] may feed back on the climate system". 321

The climate system has experienced dramatic changes in the past, such as the Permian-Triassic extinction event. This event, which took place 252 million years ago, saw 96 percent of marine species and 70 percent of terrestrial species become extinct, and took as long as 10 million years to recover from. 322 Possibly caused by volcanism, this event involved "global warming by 6 °C and huge input of light carbon into the ocean-atmosphere system" and "an ever-worsening positive-feedback loop, the 'runaway greenhouse'". 323

The Palaeocene-Eocene thermal maximum was another period in Earth's history where massive carbon release in the atmosphere led to abrupt warming, estimated at 5-8 °C. 324 It is possible that human GHG

312 *ibid.*

313 See also: Vaks et al., "Speleothems Reveal 500,000-Year History of Siberian Permafrost", p. 183-6.

314 Harvey, 1.5C rise in temperature enough to start permafrost melt, scientists warn.

315 Bakewell, Arctic Ice-Melt Cost Seen Equal to Year of World Economic Output.

316 Hautala et al., "Dissociation of Cascadia margin gas hydrates in response to contemporary ocean warming".

317 (e) Science News, Warmer Pacific Ocean could release millions of tons of seafloor methane.

318 *Ibid.*

^Intergovernmental Panel on Climate Change, Thermohaline circulation changes in the North Atlantic: possible impacts for Europe.

320 Rockstrom et al., "A safe operating space for humanity".

321 Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report, p. 53.

322 Sahney and Benton, "Recovery from the most profound mass extinction of all time", p. 759-765.

323 Benton and Twitchett, "How to kill (almost) all life: the end-Permian extinction event", p. 358.

324 See: Bowen et al., "Two massive, rapid releases of carbon during the onset of the Palaeocene-Eocene thermal maximum".

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pollution on a significant scale could induce massive additional GHG release as permafrost and clathrates melt, and as forests dry out and burn. A severely amplified anthropogenic greenhouse effect could pose a significant danger to human civilization and many forms of life on Earth.

In 2014, the American Association for the Advancement of Science expressed concern about danger-

ous thresholds in the climate system:

Most projections of climate change presume that future changes – greenhouse gas emissions, temperature increases, and effects such as sea level rise – will happen incrementally. A given amount of emission will lead to a given amount of temperature increase that will lead to a given amount of smooth incremental sea level rise. However, the geological record for the climate reflects instances where a relatively small change in one element of climate led to abrupt changes in the system as a whole. In other words, pushing global temperatures past certain thresholds could trigger abrupt, unpredictable, and potentially irreversible changes that have massively disruptive and large-scale impacts. At that point, even if we do not add any additional CO₂ to the atmosphere, potentially unstoppable processes are set in motion. We can think of this as sudden climate brake and steering failure, where the problem and its consequences are no longer something we can control. In climate terms, abrupt change means change occurring over periods as short as decades or even years.

The same document urges that action on climate change not be delayed: "Waiting to take action will inevitably increase costs, escalate risk, and foreclose options to address the risk" and notes that: "The effects of CO₂ emissions cannot be reversed from one generation to the next until there is a large-scale, cost-effective way to scrub carbon dioxide from the atmosphere". 326

The planet Venus may have experienced a 'runaway' climate change scenario. Beginning in a state where liquid water existed on its surface, as the result of the sun growing brighter over long periods of time Venus experienced an accumulation of water vapour and CO₂ in its atmosphere. 327 Now the surface of the planet has an average temperature of 462 °C. NASA climatologist James Hansen has suggested that the Earth could experience a runaway greenhouse effect and adopt a climate like that of Venus if fossil-fuel use continues until reserves are exhausted. 328 Research published in Nature Geoscience in July 2013 concluded that the threshold for such runaway warming may be lower than previously estimated. 329

3.2.11 Security implications

A number of major analyses have assessed the likely global security implications of climate change. In 2008, a National Intelligence Assessment was assembled by 16 U.S. intelligence agencies. Although the report is classified, 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. 330 A 2003 report com-

325 American Association for the Advancement of Science, *What We Know: The Reality, Risks, and Response to Climate Change*, p. 6.

326 *Ibid.*, p. 1.

327 Rasool and De Bergh, "The Runway Greenhouse and the Accumulation of CO₂ in the Venus Atmosphere".

328 Hansen, *Climate Threat to the Planet Implications for Energy Policy and Intergenerational Justice*, p. 22-23.

329 Goldblatt et al., "Low simulated radiation limit for runaway greenhouse climates".

330 Craven, *What's the Worst That Could Happen?: A Rational Response to the Climate Change Debate*.

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missioned by the Pentagon considered some of the more dramatic possible warming scenarios and concluded that:

In short, while the US itself will be relatively better off and with more adaptive capacity, it will find itself in a world where Europe will be struggling internally, large number so [sic] refugees washing up on its shores and Asia in serious crisis over food and water. Disruption and conflict will be endemic features of life. 331

It also argues that: "with inadequate preparation, the result [of abrupt climate change] could be a significant drop in the human carrying capacity of the Earth's environment". 332333 A report prepared for the Center for Naval Analysis – produced by a "blue-ribbon panel of retired admirals and generals from the Army, Navy, Air Force, and Marines" – calls climate change "potentially devastating". 334 A joint report from the Center

for Strategic and International Studies and the Center for a New American Security describes how current projections from climate models are "too conservative" and that "at higher ranges of the [warming] spectrum, chaos awaits".³³⁵ The report also highlights the need for urgent action to reduce emissions: "An effective response to the challenge of 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".³³⁶

In 2012, the U.S. National Academy of Sciences published a report on: "Climate and Social Stress: Implications for Security Analysis".³³⁷ The report concludes that:

Anthropogenic climate change can reasonably be expected to increase the frequency and intensity of a variety of potentially disruptive environmental events – slowly at first, but then more quickly. Some of this change is already discernible. Many of these events will stress communities, societies, governments, and the globally integrated systems that support human well-being.³³⁸

And that:

It is prudent to expect that over the course of a decade some climate events – including single events, conjunctions of events occurring simultaneously or in sequence in particular locations, and events affecting globally integrated systems that provide for human well-being – will produce consequences that exceed the capacity of the affected societies or global systems to manage and that have global security implications serious enough to compel international response. It is also prudent to expect that such consequences will become more common further in the future.³³⁹

All told, the report describes in great detail the ways in which climate change is a national security issue for the U.S., as well as a threat to international peace and security.

³³¹ Schwartz and Randall, *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, p. 22.

³³² *Ibid.*, p. 1.

333 See also: CBC News, Pentagon adds climate change to list of security threats, Canada faces pressure to follow suit.

334 Center for Naval Analyses, National Security and the Threat of Climate Change, p. 3.

335 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, p. 78.

336 Ibid., p. 78.

337 Steinbruner, Stern, and Husbands, Climate and Social Stress: Implications for Security Analysis.

338 Ibid., p. S-2.

339 Ibid, p. S-4.

58

In March 2013, Admiral Samuel J. Locklear III – the 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". 340

A 2013 article published in the journal of the Royal United Services Institute describes how climate change could contribute to global instability by exposing cities to extreme events. It also raises concerns about unforeseen social and political consequences from adaptation and mitigation, as well as the possibility of geo-engineering.

In a 2010 study conducted by the Canadian Department of National Defence (DND), climate change was identified as one reason why "[t]he maritime domain... will become increasingly contested over the coming years and decades". 342 In 2012, officials from the Canadian Security and Intelligence Service and DND attended a briefing on the security risks posed by climate change. 343 The presentation – which has been declassified for release through access to information legislation – described climate change impacts including extreme weather events, impacts on coastal cities, damage to food security, and loss of biodiversity.

In their 2014 Climate Change Adaptation Roadmap, the U.S. Department of Defense argued: "Rising global temperatures, changing precipitation patterns, climbing sea levels, and more extreme weather events will intensify the challenges of global instability, hunger, poverty, and conflict. They will likely lead to food and water shortages, pandemic disease, disputes over refugees and resources, and destruction by natural disasters in regions across the globe". 344

3.2.12 Disproportionate impacts on the world's poorest people

In a 2009 report, Oxfam International highlighted the ways in which climate change is already having a disproportionate impact on the poorest people in the world. 345 Because these are also the world's least intensive fossil fuel users, the fact that they bear this new burden is a double injustice. The report explains that: "hundreds of millions of people are already suffering damage from a rapidly changing climate, which is frustrating their efforts to escape poverty". 346 The report identifies numerous impacts which are already happening, and includes projections about those expected to emerge in the future. Oxfam estimates that 26 million people have already been displaced by climate change; that such displacement may rise to 200 million people per year by 2050; that 375 million people may be affected by climate-related disasters by 2015; and that "[s]everal major cities that are dependent on water from mountain ranges face collapse". 347 They also observe that "[f]or the poor countries in the tropics and sub-tropics particularly, almost every observation and prediction about health, food security, water shortage, natural disasters, famine, drought, and conflict is worsening at an alarming rate". 348 Climate change threatens to reverse progress that has been made in addressing extreme poverty: "[w]ithout action, most of the gains that the world's poorest countries have made in development and amelio-

340 Bender, Chief of US Pacific forces calls climate biggest worry.

341 Dalby, "Climate Change: New Dimensions of Environmental Security".

342 Byers and Webb, That Sinking Feeling Canada's Submarine Program Springs a Leak, p. 25

343 De Souza, Canadian spy agency, top security officials invited to 'secret' meeting on climate dangers in 2012.

344 United States Department of Defense, 2014 Climate Change Adaptation Roadmap, p. 1.

345 See also: The World Bank, Climate Change Complicates Efforts to End Poverty.

346 Oxfam International, Suffering the Science: Climate Change, People and Poverty, Summary, p. 3.

347 Ibid., Summary, p. 4.

348 Ibid., Summary, p. 4.

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rating the harmful effects of poverty in the past 50 years will be lost, irrecoverable in the foreseeable future". 349 Observed impacts which are projected to increase with further warming include an increase in hunger, diverse detrimental health impacts, more harmful climate-related disasters, threats to water supplies, and increased climate-driven migration. 350

This accords with the conclusions of the IPCC. In their latest assessment report, they conclude that:

"Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development". 351

The risks created by worsening climate change extend to the viability of subsistence farming, relied upon by people around the world. As Bill McKibben explains:

The one asset a peasant always possessed – the confidence that if her grandmother grew corn or wheat or rice in a particular field, she could, too – erodes daily, as monsoons fail, floods roar, the sun bakes. 352

This risk connects directly to the danger that climate change will drive large-scale huma

n migration and
contribute to conflict.

In addition to the human costs of these impacts, the harm posed to global development by climate change represents one dimension of financial risk. Much of the world's recent economic growth has been concentrated in rapidly-growing states like India, China, and Brazil. If climate change weakens or reverses this development, it would likely have an impact on the financial returns experienced by investors. In a speech in January 2014, World Bank Group President Jim Yong Kim explained that "carbon. . .threatens development gains over the last 20 years" and endorsed carbon taxes and divestment as response strategies. 353

A 2015 report from the United Nations Environment Programme concluded that even with international efforts to keep warming below 2 °C, Africa "could see climate change adaptation costs rise to US\$50 billion per year by 2050". 354355 In a scenario where temperatures rise 4 °C by 2100, the report estimates costs of US\$100 billion per year. 356

In April 2015, Academics Stand Against Poverty, a group of over 2,000 poverty and development researchers around the world, issued a statement calling for universities to divest from fossil fuel companies:

At this moment in history, it is paradoxical for universities to remain invested in fossil fuel companies. What does it mean for universities to seek to educate youth and produce leading research in order to better the future, while simultaneously investing in and profiting from the destruction of said future? This position is neither tenable nor ethical. 357358

349 Ibid., Summary, p. 5.

350 Ibid., Summary, p. 5-6.

351 Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report, p. 13.

352 McKibben, *Eaarth: Making a Life on a Tough New Planet*, p. 76.

353 Kim, World Bank Group President Jim Yong Kim Remarks at Davos Press Conference.

354 United Nations Environment Programme, Costs of Climate Change Adaptation Expected to Rise Far Beyond Africa's Coping Capacity Even if Warming Kept Below 2°C.

355 United Nations Environment Programme, Africa's adaptation gap 2: Bridging the gap – mobilising sources.

356 Ibid., p. viii.

357 Academics Stand Against Poverty, ASAP Calls on Universities to Divest from Fossil Fuels.

358 See also: Howard, Top academics ask world's universities to divest from fossil fuels.

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The group includes scholars who have done important work on climate ethics including Henry Shue at Oxford and Peter Singer at Princeton.

3.2.13 Social injury beyond climate change

Although the focus of this brief is on social injury from fossil fuels by way of worsening climate change, other well-documented adverse impacts from fossil fuel use exist, including air and water pollution, habitat destruction, and impacts on human health. These other forms of injury are also related to many features of the University of Toronto's Policy on Social and Political Issues With Respect to University Divestment and Procedures for Responding to Social and Political Issues with Respect to University Divestment. Like GHG pollution, air and water pollution are socially injurious and the harm caused is inherent to the primary business of fossil fuel companies. These non-climate impacts are also examples of how the fossil fuel industry's business activities frustrate the enforcement of the rules of domestic and international law intended to protect individuals against deprivation of health, safety, and basic freedoms.

In addition to the risks of climate change, there are numerous harmful effects to humans from the extraction and burning of fossil fuels. The communities downstream of the Athabasca oil sands extraction tailings ponds, particularly the marginalized aboriginal community of Fort Chipewyan, have suffered increases in rates of many diseases including diabetes, renal failure, and lupus since oil sands development began. 359 The increased incidence of these diseases has been linked to a variety of chemicals found in tailings pond water, a byproduct of oil sand extraction. 360

Oil spills are a further source of social injury from the fossil fuel industry. The major oil spill in the Gulf of Mexico in 2010 caused socioeconomic issues for local fisherman even years after the accident, as the fish and other marine animal populations struggled to replenish themselves. 361 Any accidental spill of fossil fuels has the potential to kill significant numbers of plants and animals with value for local communities.

Burning fossil fuels – particularly coal – is also a major source of air pollution, with direct impacts on human health. The Union of Concerned Scientists has released information regarding the types of harmful substances released in the burning of coal, including toxic lead, cadmium, mercury, and arsenic. 362 Toxic components of exhaust from coal-fired facilities include sulfur dioxide, nitrogen oxides, particulate matter, and mercury. In coal-burning areas there is also evidence of carbon monoxide at levels high enough to cause headaches and irritate pre-existing heart disease. 363

In a paper prepared for the IMF, Ian Parry, Chandara Veung, and Dirk Heine highlight how policies enacted to control climate change can have substantial additional benefits, "primarily health co-benefits from reduced air pollution at coal plants and, in some cases, reductions in automobile externalities". 364 The authors estimate that 3.7 million people are killed per year by outdoor air pollution from coal,

359 Tenenbaum, "Oil sands development: a health risk worth taking?"

360 Ibid.

361 Upton, The Deepwater Horizon Oil Spill and the Gulf of Mexico Fishing Industry.

362 Union of Concerned Scientists, Coal power: air pollution.

363 Ibid.

364 Parry, Veung, and Heine, How Much Carbon Pricing is in Countries' Own Interests? The Critical Role of Co-Benefits, p. 1.

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natural gas, and petroleum products. 365

3.3 The harm caused is inherent to the primary business of fossil

fuel companies

All the social injuries described above are imposed on innocent parties by fossil fuel companies in the course of their fundamental business activity of extracting coal, oil, and gas. These harms are inseparable from the continuation and expansion of these core business activities. According to the Government of Canada, 80 percent of Canada's GHG emissions arise from the "production or consumption of fossil fuels for energy purposes". 366 Fuels exported from Canada for use elsewhere also exacerbate global warming. 367 Particularly by funding the construction of long-lasting fossil fuel infrastructure, U of T's investments in fossil fuel companies increase the amount of harm that will arise as a result of climate change.

Divestment is the only way for the University of Toronto to avoid contributing financially to the fossil fuel industry, and by extension, to the socially injurious impacts delineated above. Besides divestment, another approach to socially responsible investment is to try to alter a firm's behaviour by applying pressure through shareholder voice. However, the harmful activities (extracting and selling fossil fuels) are inherent to the primary business of fossil fuels companies in which the university is invested. For example, Shell Canada lists its business activities as follows: "Shell Canada's Upstream businesses explore for and extract natural gas, and market and trade natural gas and power. Our Downstream business refines, supplies, trades and ships crude oil worldwide and manufactures and markets a range of products, including fuels, lubrican

ts, bitumen and
liquified petroleum gas (LPG) for home, transport and industrial use". 368 ExxonMobil describes its upstream
and downstream activities similarly. 369 In this sense, investments in fossil fuel companies closely parallel
investments in tobacco companies; in both cases, the problem is the primary product being produced by the
industry. As a result, shareholder voice is not an effective strategy for mitigating these harms.

Given the centrality of oil and natural gas extraction, as well as the refinement and sale of these resources,
to the business models of these companies, shareholder voice would not be an effective way to address the
social injury from climate change. Fossil fuel companies could not abandon the socially injurious activity
without dissolving their existing business models. Therefore, it would be unreasonable for U of T to expect
to be able to alter the socially injurious activities of these companies while maintaining its investments in the
fossil fuel industry. Divestment is the most appropriate response for U of T to adopt in order to eliminate any
financial complicity in the fossil fuels industry's socially injurious activities.

365 Ibid., p. 4.

366 Government of Canada, Greenhouse Gas Emissions.

367 The Westshore terminal near Vancouver ships 21 million metric tons of coal annually, which in turn produces GHG emissions equivalent to 5 percent of Canada's total. Sightline Institute, Northwest Coal Exports.

368 Shell Canada, Shell At a Glance.

369 ExxonMobil, Exxon: What We Do.

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3.4 The business activities of these companies frustrate the enforcement of the rules of domestic and international law intended to protect individuals against deprivation of health, safety, and basic freedoms

The socially injurious activities of fossil fuel companies frustrate the enforcement of rules of domestic and international law intended to protect individuals against deprivation of health, safety, and basic freedoms.

This includes the violation of specific domestic and international statutes, the violation of common law duties through the creation of nuisance, and the frustration of international diplomatic efforts to address climate change. Effective climate change policies will need to remain in place for decades while global emissions fall.

In order to protect individuals against the harms it will cause, policy-makers must pre-commit themselves to mitigation efforts in ways that are hard to undo in the future. 370 Fossil fuel companies have been active in preventing the emergence of such policies and meaningful constraints. The mitigation working group of the IPCC has concluded:

A defining image of the climate governance landscape is that key actors have vastly disproportionate capacities and resources, including the political, financial, and cognitive re-

sources that are necessary to steer the behaviour of the collective within and across ter-

ritorial boundaries. A central element of governance therefore relates to huge asymmetry in such resources and the ability to exercise power or influence outcomes. Some actors, in-

cluding governments, make use of negotiation power and/or lobbying activities to influence

policy decisions at multiple scales and, by doing so, affect the design and the subsequent

allocation and distribution of benefits and costs resulting from such decisions. The problem,

however, also resides in the fact that those that wield the greatest power either consider it

against their interest to facilitate rapid progress towards a global low carbon economy or in-

sist that the accepted solutions must be aligned to increase their power and material gains.

The most notable effect of this is that despite some exceptions, the prevailing organization

of the global economy, which confers significant power on actors associated with fossil fuel

interests and with the financial sector, has provided the context for the sorts of governance

practices of climate change that have dominated to date. 371

This disproportionate influence, held by the finance and fossil fuel industries, has frustrated efforts

to control climate change through both domestic and international law. The profits of the

fossil fuel

industry, which do not reflect the social injury from fossil fuel use, are so enormous that the industry has a substantial ability to influence politics. The extent of those profits is demonstrated by a quote from Thomas Piketty's *Capital in the Twenty-First Century*:

370 In the *Cornell Law Review*, Richard James Lazarus notes that: "The traditional objection to lawmaking precommitment strategies – that the present should not be allowed to bind future lawmakers – also has little force in the climate change context where the purpose of such strategies is not to protect the present at the expense of the future, but the precise opposite: to protect the future at the expense of the present." Lazarus, "Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future", p. 101.

371 Intergovernmental Panel on Climate Change, *Climate Change 2014: Mitigation of Climate Change*, p. 298.

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To sum up, petroleum rents might well enable the oil states to buy the rest of the planet (or much of it) and to live on the rents of their accumulated capital. 372

With such substantial resources fighting for the continued right to emit unlimited GHG pollution, it is not surprising that fossil fuel companies and governments which are determined to support them have been so effective in frustrating the enforcement of the rules of domestic and international law intended to protect individuals against deprivation of health, safety, and basic freedoms.

The lobbying influence of the fossil fuel industry in the U.S. is particularly well-documented. 373 In the U.S., the permissive legal environment for corporate political donations allows oil and gas companies to exert significant influence on the political process. Recent attempts at climate change legislation and regulations have prompted increased lobbying activity. According to the Union of Concerned Scientists, the lobbying expenditures of energy sector companies "increased by 92 percent from 2007 to 2009, when climate change bills were being actively debated in Congress". 374 In 2013, th

e oil and gas industry spent nearly \$400,000 per day lobbying Congress and other government officials. 375 They also spent \$73 million on federal campaign and political donations for the 2012 election cycle – up 87% from 2008. 376 Energy sector companies donate heavily to members of Congress who oppose legislation intended to curb climate change. 377 At the state level, where regulations on direct corporate contributions to candidates are often stricter, companies circumvent these restrictions by funneling money into political action committees (PACs) and other political committees and organizations which are able to spend more freely. For instance, the oil and gas industry spent \$11.79 million on state level elections in Colorado in 2014, compared with US\$800,000 in 2013. 378 Much of that was spent to oppose ballot initiatives that would have restricted the use of hydraulic fracturing. 379 Energy sector companies also influence the political process by donating heavily to campaigns for or against specific pieces of legislation. For example, the overwhelming majority of financial support for the 2010 campaign for Proposition 23, which would have severely delayed the implementation of California's 2006 climate change statute A.B. 32, came from the oil and gas industry. 380 Valero and Tesoro – operators of California oil refineries – spent the most on the campaign. 381 There is reason to believe campaign and political spending by the fossil fuel industry has an influence on political outcomes. 382 For instance, in November 2014 Republican senator Jim Inhofe was appointed to chair the Senate Environment and Public Works Committee, despite (or perhaps because of) his unwillingness to acknowledge the human influence on the climate system. 383 Between 2009 and 2014, Inhofe accepted US\$454,500 in donations from the oil and gas industry. 384 In March 2015, he accepted \$10,000 from a PAC funded by donations

372 Piketty, Thomas. *Trans. Arthur Goldhammer, Capital in the Twenty-First Century*, p. 462.

373 For a detailed account, see: Oreskes and Conway, *Merchants Of Doubt*.

374 Union of Concerned Scientists, *A Climate of Corporate Control*, p. 19.

375 Klein, *This Changes Everything: Capitalism vs. the Climate*, p. 149.

376 *Ibid.*, p. 149.

377 Union of Concerned Scientists, *A Climate of Corporate Control*, p. 17.

378 Ethics Watch, *Money Spill*, p. 1.

379 *Ibid.*, p. 1.

380 Biber, "Cultivating a Green Political Landscape: Lessons for Climate Change Policy from the Defeat of California's Proposition 23", p. 413.

381 *Ibid.*, p. 413.

382 Not least because these companies need to justify such expenditures to their shareholders.

383 Goldenberg, Climate change denier Jim Inhofe in line for Senate's top environmental job.

384 OpenSecrets.org, James M. Inhofe.

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from BP staff in the U.S. In total, he has received \$1,757,071 in contributions from the oil and gas industry. 386

Canada does not require industry to disclose the total size of campaign donations, but does track the number of meetings between companies and public officials. 387 Between 2008 and 2012, the Canadian Association of Petroleum producers met with officials 536 times, while pipeline company TransCanada had 279 meetings. 388

In a legal analysis by Sarah Burton, many risks to the fossil fuel industry from climate litigation are described, including how: "[c]ompanies who have led protracted campaigns of denial, misinformation, and misrepresentation with respect to climate change are likely to face mounting lawsuits". 389 She also notes that: "[t]he more a company continues to invest in major GHGs projects, the more likely the right to mine, drill, and burn will be challenged based on climate change grounds" and that these companies "face the risk of having to pay damages for the harm caused by their GHG emissions and face orders to stop climate damaging activities". 390 The Native Village of Kivalina in Alaska has sued

ExxonMobil on the basis that climate change is forcing the village to relocate. 391 She also argues that climate change litigation could make fossil fuel companies uninsurable. 392

3.4.1 Canadian domestic law

The Center for Climate Change Law at the Columbia Law School has assembled lists of U.S. and non-U. S. litigation related to climate change, including eight cases from Canada between 2007 and 2013. 393394395 These eight cases are not the only ones in Canada in which "climate change" or "global warming" is mentioned. A LexisNexus Quicklaw search of all Canadian court cases produces 35 results in which the phrase "climate change" occurs, including federal court judgments, Supreme Court of Canada rulings, and judgments in provincial and territorial courts. 396 Similarly, the phrase "global warming" comes up in 15 precedents, from a variety of courts.

Not all of these cases led to positive action being taken in addressing climate change. In "Citizens of Riverdale Hospital v. Bridgepoint Health Services", the Ontario Superior Court of Justice determined that CO₂ emissions had been adequately considered in plans to demolish a hospital. 397 While it didn't order action, the court implicitly endorsed the view that CO₂ emissions are a legitimate issue to be considered, both in public planning processes and in the deliberations of the judiciary.

In 2008, the Federal Court of Canada considered the case brought forward by the Pembina Institute that the environmental assessment conducted on Imperial Oil's Kearle project in the oil sands had been flawed and

385 Bowers, Climate-sceptic US senator given funds by BP political action committee.
386 Supran, Until universities divest from fossil fuels they will undermine all they stand for.
387 Klein, This Changes Everything: Capitalism vs. the Climate, p. 149.
388 Ibid., p. 149.

389 Burton, Risky Business: The Threat of Climate Litigation to the Fossil Fuel Industry, p. 5.

390 Ibid., p. 7, 8.

391 Ibid., p. 8.

392 Ibid., p. 10.

393 Gerrard et al., Non U.S. Climate Change Litigation Chart, p. 23.

394 Gerrard, Howe, and Barry, Climate Change Litigation in the U.S.

395 See also: Gerrard, Global Climate Change and U.S. Law.

396 For a summary of the history of judicial interpretation of the powers of the federal and provincial governments concerning environmental protection, see Chapter 3 of: Harrison, Passing the Buck: Federalism and Canadian Environmental Policy.

397 Gerrard et al., JVon U.S. Climate Change Litigation Chart, p. 111.

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not taken climate change sufficiently into account. 398 The court found Imperial Oil's claim that "the adverse environmental effects of the greenhouse gas emissions of the Project would be insignificant" to be flawed, noting that:

According to Imperial Oil's EIA [Environmental Impact Assessment], the Project will be responsible for average emissions of 3.7 million tonnes of carbon dioxide equivalent per year, which equals the annual greenhouse gas emissions of 800,000 passenger vehicles in Canada, and will contribute 0.51% and 1.7% respectively, of Canada and Alberta's annual greenhouse gas emissions (based on 2002 data). 399

The court ordered limited action, calling for the matter to be remitted back to the panel which initially approved the project and directing them to "provide a rationale for its conclusion that the proposed mitigation measures will reduce the potentially adverse effects of the Project's greenhouse gas emissions to a level of insignificance". 400 In 2009, Imperial Oil announced the \$8 billion first phase of the Karl Oil Sands project, producing 110,000 barrels a day of bitumen. 401 The company also announced plans to expand the project in two further phases, eventually bringing up production to 300,000 barrels per day. Nonetheless, the prece-

dent supports the view that there is some legal obligation to consider GHG pollution in the environmental assessment process, and some onus on the proponents of a project to present and justify mitigation measures.

Decisions that mention climate change but which have not been examined by the Center for Climate Change Law include "Tsilhqot'in Nation v. British Columbia", in which the Supreme Court of British Columbia acknowledged the contribution of climate change to B.C.'s mountain pine beetle epidemic, as well as its general impact on biodiversity. 402 "Halalt First Nation v. British Columbia (Minister of Environment)" acknowledges climate change as a factor likely to alter the state of water resources. 403

At the highest level, the activities of fossil fuel companies risk undermining the Canadian Charter of Rights and Freedoms. Section 7 states: "the right to life, liberty and security of the person and the right not to be deprived thereof except in accordance with the principles of fundamental justice". 404 Arguably, the harms associated with climate change could become so substantial as to deprive people of these rights. In particular, this could be the case for particularly vulnerable populations and communities within Canada, such as small northern settlements. Settlements built on permafrost could become too dangerous to inhabit, as those dependent on ice roads for supplies could become too isolated to be economically viable. Further, if the sea level rise projections discussed in The inundation of coastal areas prove justified, the security of the person and lives of many people across Canada could be threatened.

The activities of the fossil fuels industry in Canada also violate the constitutional and treaty rights of Canada's First Nations, Metis, and Inuit peoples. These violations arise both from the specific impact of fossil fuel development projects – such as the oil sands – and from the inevitable consequences of burning fossil fuels. Rights that are being violated include the right to consultation and accommodation; the right to fish, hunt, and trap; and the aboriginal rights affirmed in Canada's constitution. 405 Keepers of the Athabasca member

398 Ibid., p. 116.

399 Federal Court of Canada, Pembina Institute for Appropriate Development, et al v. Attorney General of Canada and Imperial Oil.

400 Ibid.

401 Imperial Oil Ltd. Imperial Oil Approves First Phase of Kearl Oil Sands Project.

402 Supreme Court of British Columbia, *Tsilhqot'in Nation v. British Columbia*, 2007 BCSC 1 700, p. 358, 406.

403 Supreme Court of British Columbia, *Halalt First Nation v. British Columbia (Minister of Environment)*.

404 Government of Canada, Canadian Charter of Rights and Freedoms.

405 Government of Canada, Constitution Act.

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Vivienne Beisel explains how the oil sands development has violated Treaty 8 and the constitution:

The cumulative impacts of oil sands development has all but destroyed the traditional livelihood of First Nations in northern Athabasca watershed. The law is clear that First Nations must be consulted whenever the province contemplates action that may negatively affect Aboriginal and treaty rights. ..The province has continued to issue approvals for new developments without obtaining their consent or consulting with First Nations in a meaningful and substantial way. This is in direct breach of Treaty 8 First Nations' treaty-protected Aboriginal rights to live lihood, and thus a violation of s.35(1) of the Constitution. 406407

In June 2013, the Lac La Biche-area Cree won a case at the Court of Appeal of Alberta allowing them to proceed with a lawsuit against the Canadian federal government and the Government of Alberta. The Cree allege that the cumulative impacts of 300 operating oil sands projects impact their rights to hunt and fish under Treaty 6. 408 560,000 barrels of oil per day are being extracted from the territory in question – 30 percent of the total output from the oil sands. Future projects that have been announced would increase that total to 1.6 million barrels per day.

The impact of climate change is being felt disproportionately in Canada's arctic. This makes it a particular

threat to the way of life of the Inuit. Melting permafrost, the loss of summer sea ice, and impacts on marine mammal populations all threaten to substantially affect their way of life, culture, and economic subsistence. 409

Canadian Inuit activist and former International Chair for Inuit Circumpolar Council discusses these issues at length in her book *The Right to be Cold*. 410

Analysis from the Pembina Institute highlights some of the ways in which oil sands expansion is especially damaging, including concerning land disturbance, air quality, water use, GHG emissions, and the production of tailings. 411 Each of these impacts has both direct and indirect effects on aboriginal communities, ranging from the contamination of local water supplies to the general worsening of climate change. The oil sands are the fastest-growing source of GHG pollution in Canada, undermining Canada's domestic climate change objectives and reducing the chances of the world as a whole keeping the degree of warming below the accepted safe level.

A comprehensive analysis of environmental incidents associated with the oil sands demonstrates how numerous violations of environmental regulations have been since 1996, as well as how rarely they have led to enforcement action. In a peer-reviewed report prepared for Treeline Ecological Research and Global Forest Watch Canada, Kevin Timoney and Peter Lee found that over 4,000 alleged contraventions of regulations took place in Canada's oil sands between 1996 and 2012. 412413414 Syncrude's Mildred Lake operation and Suncor were collectively responsible for 86.6 percent of these contraventions. 415 During the time period under con-

406 Keepers of the Athabasca, Unanimous passing of No New Oil Sands Approvals resolution at the Assembly of Treaty Chiefs Meeting.

407 See also: Government of Canada, Treaty No. 8 Made June 21, 1899 and Adhesions, Reports, Etc.

408 Tait and Cryderman, Alberta First Nations band wins right to trial over oil sands' effect on treaty rights.

409 See: Ahmed, White House warned on imminent Arctic ice death spiral.

410 Watt-Cloutier, *The Right to Be Cold: One Woman's Story of Protecting Her Culture, the Arctic, and the Whole Planet*.

411 Grant, Angen, and Dyer, Forecasting the impacts of oilsands expansion: Measuring the land disturbance, air quality, water use, greenhouse gas emissions, and tailings production associated with each barrel of bitumen production, p. 1.

412 Timoney and Lee, Environmental Incidents in Northeastern Alberta's Bitumen Sands Region, 1996-2012, p. 8.

413 See also: Young, Alberta enforcing fewer than one per cent of oilsands environmental violations: Report.

414 See also: The Canadian Press, Study finds Utile environmental enforcement in oilsands incidents.

415 Timoney and Lee, Environmental Incidents in Northeastern Alberta's Bitumen Sands Region, 1996-2012, p. 8.

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sideration, Alberta's environment ministry only took action to enforce regulation in 37 cases, representing 0.9 percent of the total. In cases where enforcement action was taken, the mean penalty was \$ 4,500.

Figure 3.5: Pipeline spill northeast of Peace River, Alberta, on May 4th 2011. Source: Global News

A study conducted by Global News found that Alberta experienced 28,666 crude oil spills between 1975

and 2012. 416 This figure excludes spills from pipelines that cross provincial or national borders. The study

found that Alberta's Energy Resources Conservation Board (ERCB) has been conducting a decreasing number

of field inspections and finding more cases of "high-risk noncompliance": a figure that rose from 263 in 2010

to 437 in 2011. Out of 362 drilling operations inspected, 41 were found to be "high-risk noncompliant". 417

According to the ERCB, Alberta experienced 700 crude oil and bitumen spills in 2012. 418 The Canadian Natural

Resources Ltd. Wolf Lake central treating facility has experienced 157 spills in the past 37 years. 419 Imperial

Oil Resources, Canadian Natural Resources Ltd., Husky Oil Operations Ltd., BP Canada Energy Company, the

Encana Corporation, and Penn West Petroleum Ltd. have all experienced more than 1,000 oil spills since 1975:

with total volumes ranging from 20,474 cubic metres to 79,505 cubic metres. 420

In a 2010 study by a Royal Society of Canada Expert Panel, it was concluded that "[reclamation [of land] is not keeping pace with the rate of land disturbance" and that "[c]urrent practices for obtaining financial security for reclamation leave Albertans vulnerable to major financial risks". 421 The study identifies that: "increasing direct GHG emissions from growing bitumen production creates a major challenge for Canada to meet our international commitments for overall GHG emission reduction that current technology options do not resolve". 422 The study also finds major defects with environmental regulatory performance in Canada and Alberta. It states that:

The environmental regulatory capacity of the Alberta and Canadian Governments does not appear

416 Young, Introduction: 37 years of oil spills in Alberta.

417 Young and Paperny, Watching the pipelines: How good are Alberta's energy regulators?

418 Young and Papemy, Anatomy of an oil spill.

419 Ibid.

420 Ibid.

421 The Royal Society of Canada Expert Panel, Environmental and Health Impacts of Canada's Oil Sands Industry, p. 5.

422 Ibid., p. 5.

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to have kept pace with the rapid growth of the oil sands industry over the past decade. The EIA [Environmental Impact Assessment] process relied upon by decision-makers to determine whether proposed oil sands projects are in the public interest has serious deficiencies in relation to international best practice. Environmental data access for cumulative impact assessment needs to improve. 423

Each of these represents a significant case of the business activities of fossil fuel companies frustrating the enforcement of domestic law and regulations intended to protect individuals against deprivation of health, safety, and basic freedoms.

A 2011 report from the B.C. Commissioner of the Environment and Sustainable Development found that the National Energy Board had been failing to follow up on identified deficiencies in the transport of dangerous products, that oversight of emergency procedures manuals was deficient, and that improvements were needed in implementing a risk-based monitoring approach. 424 The report identifies that in cases where deficiencies were identified, they were not followed up in 93 percent of cases.

In addition, numerous pieces of Canadian environmental legislation explicitly recognize and seek to protect the right to a healthful environment. The 1993 Ontario Environmental Bill of Rights recognizes the "inherent value of the natural environment" and states that "the people of Ontario have the right to a healthful environment" and "have as a common goal the protection, conservation and restoration of the natural environment for the benefit of present and future generations". 425 The purposes of the act are:

1. to protect, conserve and, where reasonable, restore the integrity of the environment by the means provided in this Act;
 2. to provide sustainability of the environment by the means provided in this Act; and
 3. to protect the right to a healthful environment by the means provided in this Act.
- The above purposes include the following:

1. The prevention, reduction and elimination of the use, generation and release of pollutants that are an unreasonable threat to the integrity of the environment.
2. The protection and conservation of biological, ecological and genetic diversity.
3. The protection and conservation of natural resources, including plant life, animal life and ecological systems.
4. The encouragement of the wise management of our natural resources, including plant life, animal life

and ecological systems.

5. The identification, protection and conservation of ecologically sensitive areas or processes. 426

Through numerous mechanisms described in this brief, the activities of fossil fuel companies undermine the integrity and sustainability of the environment, along with the right of the population of Ontario to a healthful environment. GHG pollution poses an unreasonable threat to the integrity of the environment, while threatening biodiversity and the ability of Ontario to manage natural resources wisely and protect sensitive areas.

Environmental laws in Canada's provinces and territories recognize and seek to protect the same right to a healthy environment. For example, the Yukon Environment Act states that: "The people of the Yukon

423 The Royal Society of Canada Expert Panel, Environmental and Health Impacts of Canada's Oil Sands Industry, p. 5.

424 British Columbia Commissioner of the Environment and Sustainable Development, 2021 December Report of the Commissioner of the Environment and Sustainable Development, p. 21, 24, 26.

425 Government of Ontario, Environmental Bill of Rights.

426 Government of Ontario, Ontario Environmental Bill of Rights.

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have the right to a healthful natural environment". 427 Among its objectives, the act also seeks: "to ensure the maintenance of essential ecological processes and the preservation of biological diversity", "to ensure comprehensive and integrated consideration of environmental and socioeconomic effects in public policy making in the Yukon", and "to fully use the knowledge and experience of Yukon residents in formulating public policy on the environment". 428 Because of the general failure to deal with climate change effectively in Canada, these objectives are being frustrated. Similarly, the Northwest Territories Environmental Rights Act recognizes that "the people of the Northwest Territories have the right to a healthy environment and a right to protect the integrity, biological diversity and productivity of the ecosystems in the Northwest Territories" and establishes

the means by which individuals can act to protect the environment from harm. 429 Companies that extract fossil fuels undermine the right to a healthy environment that this act endeavours to protect. Finally, Quebec's Environmental Quality Act states that: "[e]very person has a right to a healthy environment and to its protection, and to the protection of the living species inhabiting it" and that: "A judge of the Superior Court may grant an injunction to prohibit any act or operation which interferes or might interfere with the exercise of [these] right[s]". 430

Over and above violations of specific pieces of legislation, climate change represents a massive example of 'nuisance' as defined in Canadian tort law. Under the common law in Canada "a landowner's right to use and enjoy his property doesn't give him the right to engage in activities that interfere with the rights of neighbours to use and enjoy their own properties". 431 That is to say, the fact that fossil fuel companies own the land and mineral rights in the areas where they are operating does not mean they have the right to impose extreme weather, rising sea levels, and other well-understood climate change harms on other landowners across Canada. This principle is also incorporated into the bylaws of many Canadian jurisdictions. For instance, the town of Musgrave, Nova Scotia has a nuisance bylaw stating: "No person shall cause, suffer or allow to be discharged or emitted from any fuel burning equipment, internal combustion engine, vehicle or outside open fire any smoke, dust, fly-ash, soot or fumes or other solid or gaseous product or combustion to an extent which is detrimental to the property of any other person". 432 Nuisances are also regulated under provincial and territorial law.

3.4.2 U.S. domestic law

In a report prepared for the U.S. Congressional Research Service, Robert Meltz discusses many of the legal issues associated with climate change. 433 This includes questions about the power of various bodies to impose limits on GHG pollution. It also includes issues of liability for harm caused by climate change, including through water shortages, sea level rise, and extreme precipitation. The answers to these questions are not clear in the United States, and barriers to litigation exist. At the same time, it is con

ceivable that as climate change becomes more severe, and the harms being imposed by GHG pollution become more evident, courts will be more willing to accept climate change as an issue where victims can seek compensation for damage, as well as more willing to curb the unlimited right of polluters to make free use of the atmosphere.

427 Government of Yukon, Environment Act, p. 14.

428 Ibid., p. 13.

429 Government of the Northwest Territories, Environmental Rights Act.

430 Government of Quebec, Environmental Quality Act.

431 Environmental Compliance Insider, The Law of 'Nuisances': Environmental Regulation through the Backdoor.

432 Ibid.

433 Meltz, Climate Change and Existing Law: A Survey of Legal Issues Past, Present, and Future.

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In 2007, the U.S. Supreme Court decided "Massachusetts v. Environmental Protection Agency" (EPA)

- a suit brought by twelve states and several cities against the EPA. 434 Justice John Paul Stevens stated in

his opinion that: "[t]he harms associated with climate change are serious and well-recognized" and that the

"EPA does not dispute the existence of a causal connection between man-made greenhouse gas emissions

and global warming". The court held that the Clean Air Act (CAA) grants the EPA the authority to regulate

tailpipe emissions of GHGs, and required the EPA to review its rationale for not regulating CO₂ and other GHG

emissions:

Under the clear terms of the Clean Air Act, EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable

explanation as to why it cannot or will not exercise its discretion to determine whether they do. 435

The court found that the failure of the EPA to regulate GHG emissions under the CAA violated the law's "clear statutory command". 436 In an April 17th 2009 decision, the EPA determined that six GHGs are indeed a danger to the environment and human health. 437438

Later in 2007, the U.S. Ninth Circuit Court of Appeals ruled on "Center for Biological Diversity vs. National Highway Traffic Safety Administration". 439 In this suit, the Center for Biological Diversity headed an alliance which included 11 states, two cities, and four environmental groups calling for rigorous analysis of greenhouse gas emissions in the National Environmental Policy Act (NEPA) process. Specifically, this alliance challenged a rule broadcast by the National Highway Traffic Safety Administration (NHTSA) entitled: "Average Fuel Economy Standards for Light Trucks, Model Years 2008-2011". This rule set corporate average fuel economy (CAFE) standards in accordance with the Energy Policy and Conservation Act (EPCA), prior to the passage of a new energy bill. In this decision, the court overturned the government's lenient fuel economy standards for pick-up trucks and sport utility vehicles on the basis of a number of violations, including failure to adequately consider the GHG implications of the standards in the NEPA analysis and "failure to monetize the value of carbon emissions". The court found that the "impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impact analysis that NEPA requires agencies to conduct". The Center for Climate and Energy solutions explains that "[t]he court also discredited contrary precedent by stating more is now known about climate change", holding that the 2007 ruling "Massachusetts v. Environmental Protection Agency" is "more relevant than past cases where climate change science was allowed to be ignored". 440 The New York Times described the ruling as "a major setback for both the auto industry and the White House at a time of growing public concern over the rising price of gasoline and the issue of climate change". 441

Another example of a fossil fuel company frustrating U.S. domestic law can be found in the recent revelation that the oilfield services company Halliburton destroyed evidence related to the 2010 Gulf of Mexico oil spill. 442 Halliburton provided cementing services to BP, intended to help seal the well. They advised BP

434 United States Supreme Court, Massachusetts et al v. Environmental Protection Agency et al.

435 Ibid., p. 30.

436 See: Greenhouse, Justices Say E.P.A. Has Power to Act on Harmful Gases.

437 United States Environmental Protection Agency, Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act.

438 The Economist, A green figleaf.

439 United States Court of Appeals for the Ninth Circuit, Center for Biological Diversity vs. National Highway Traffic Safety Administration.

440 Center for Climate and Energy Solutions, National Environmental Policy Act Cases.

441 Barringer and Maynard, Court Rejects Fuel Standards on Trucks.

442 Reuters, Halliburton pleads guilty to destroying Gulf oil spill evidence.

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that 21 'centralizer' devices should have been installed, to improve cementing, but BP chose to install only six.

After the disaster, "Halliburton ordered workers to destroy computer simulations that showed little difference

between using six and 21 centralizers". 443 The disaster caused by the well blowout caused 11 deaths, along

with substantial amounts of environmental and economic damage in the region.

In 2014, Bristol District Attorney C. Samuel Sutter declined to charge two activists who had blocked

a 40,000 ton coal shipment to the Brayton Point power plant in Somerset. 444445 Sutter argued that their

action was justified by the seriousness of climate change and the inadequacy of the political response

to date in the U.S.

3.4.3 Domestic law in other jurisdictions

A limited recognition of the seriousness of climate change can be found in some legal decisions from the United

Kingdom. For instance, in 2008 jurors decided that damage caused to the Kingsnorth power

station in Kent by protesting climate change activists was justifiable in light of the amount of environmental damage being done by the power plant. 446 During the trial, the jurors heard testimony from NASA climatologist James Hansen.

In a small number of cases, Australian courts have asserted the need to consider GHG emissions. In "Australian Conservation Foundation v. Minister for Planning", it was decided that GHG emissions must be considered when evaluating plans to expand coal mines. 447 In "Gray v. The Minister for Planning and Ors", the Land and Environment Court of New South Wales found that GHG emissions from coal burning must be considered during environmental assessments of coal mines. 448 The court found that cumulative GHG emissions play an important role in intergenerational equity, and that the precautionary principle should be applied when "there is, or will be, a serious or irreversible threat of environmental damage".

When it added articles 71-74 to its constitution in 2008, Ecuador became the first nation to grant the environment the inalienable right to exist, persist, and be respected. For instance, article 73 holds that: "The State shall apply preventive and restrictive measures on activities that might lead to the extinction of species, the destruction of ecosystems and the permanent alteration of natural cycles". 449 Following this example, Bolivia amended its constitution in 2011 with the Rights of Mother Earth Act (articles 56-60). 450451

The domestic law of several other countries criminalizes "ecocide" – a phenomenon defined by Polly Higgins as: "The extensive damage to, destruction of or loss of ecosystem(s) of a given territory, whether by human agency or by other causes, to such an extent that peaceful enjoyment by the inhabitants of that territory has been or will be severely diminished". 452 Article 342 of the Penal Code of Vietnam concerns "crimes against mankind" and states that:

Those who, in peace time or war time, commit acts of annihilating en-mass population in an area, destroying the source of their livelihood, undermining the cultural and spiritual life of a country,

443 *ibid.*

444 Abel, DA drops charges in case of blocked coal shipment to power plant.

445 Plautz, Verdict Charges Dropped on Account of Climate Change.

446 McCarthy, Jury Decides That Threat of Global Warming Justifies Breaking The Law.

447 Victorian Civil and Administrative Tribunal, Australian Conservation Foundation v. Minister for Planning.

448 Land and Environment Court of New South Wales, Gray v. The Minister for Planning and Ors.

449 Republic of Ecuador, Constitution of the Republic of Ecuador.

450 Plurinational State of Bolivia, Constitution Política del Estado, p. 28-29.

451 Eaton, Bolivia Gives Legal Rights To Mother Earth.

452 Higgins, Eradicating Ecocide: Laws and Governance to Stop the Destruction of the Planet.

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upsetting the foundation of a society with a view to undermining such society, as well as other acts of genocide or acts of ecocide or destroying the natural environment, shall be sentenced to between ten years and twenty years of imprisonment, life imprisonment or capital punishment. 453

Article 394 of the Criminal Code of the Republic of Armenia similarly prohibits ecocide, as does the Criminal Code of Belarus, the Criminal Code of Moldova, the Criminal Code of Ukraine, and the Criminal Code of Georgia.

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More than 100 countries have incorporated the right to a healthy environment into their constitutions. 459 In 2005, the Federal High Court of Nigeria "ordered gas flaring to stop because it violates guaranteed constitutional rights to life and dignity". 460

3.4.4 International law

The activities of the fossil fuels companies in which U of T invests also frustrate international law. First, the Universal Declaration of Human Rights states that: "Everyone has the right to life, liberty and security of person".⁴⁶¹ The right to life is a precondition to all other fundamental human rights. The activities of companies in the fossil fuels industry threaten the rights to life and security of the person through mechanisms including the increased frequency and severity of extreme weather, increased occurrence of infectious disease, and loss of agricultural productivity. In addition, the 1989 Hague Declaration on the Environment, to which Canada is a signatory, makes the link between the right to life and the harmful effects of climate change explicit: "The right to live is the right from which all other rights stem. Guaranteeing this right is the paramount duty of those in charge of all States throughout the world. Today, the very conditions of life on our planet are threatened by the severe attacks to which the earth's atmosphere is subjected".⁴⁶² By signing this declaration, Canada recognized the threat to human life posed by climate change and pledged to take measures to address that threat. The determination of fossil fuel companies to dig up and burn their entire reserves of coal, oil, and gas directly frustrates these international laws. If fossil fuel companies are able to continue to operate under business-as-usual conditions and execute their business plans, the world will experience far more than 2 °C of climate change, with severe impacts on people everywhere.

Fossil fuel companies have repeatedly also frustrated the enforcement of the International Labour Organization's Indigenous and Tribal Peoples Convention, 1989.⁴⁶³ 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". In many parts of the world, oil, gas, and coal extraction have taken place without such consultation, or even in the face of active and energetic opposition

⁴⁶³ Government of Vietnam, Penal Code.

⁴⁶⁴ Government of Armenia, Criminal Code of the Republic of Armenia.

455 International Committee of the Red Cross, Belarus: Practice Relating to Rule 45. Causing Serious Damage to the Natural Environment.

456 Government of Moldova, Criminal Code of the Republic of Moldova.

457 Government of Ukraine, Criminal Code of Ukraine.

458 Government of Georgia, The Criminal Code of Georgia.

459 Boyd, The Environmental Rights Revolution: A Global Study of Constitutions, Human Rights, and the Environment.

460 Burton, Risky Business: The Threat of Climate Litigation to the Fossil Fuel Industry, p. 12 .

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

462 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".

463 International Labour Organization, Convention No. 169.

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from indigenous groups. The activities of Shell in the Niger Delta – described more comprehensively in Why start with Royal Dutch Shell? – are an especially notable and egregious example.

The political influence of fossil fuel corporations in Canada has pushed the federal government to adopt obstructionist tactics at international climate change negotiations. For example, Canada has repeatedly been 'awarded' the satirical 'Fossil of the Year' award for obstructing negotiations at the Conferences of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC). 464465 At the Copenhagen COP in 2009, a coalition of environmental groups declared Canada "the absolute worst country at the talks". 466 Many countries questioned the appropriateness of Canada's frequent argument that it would not take more substantial action on the issue until "all major emitters" agreed to do likewise, despite the wide discrepancy between the historical and per-capita emissions of Canada and those of states like India. 467

The activities of fossil fuel companies are also at odds with the fundamental objective of the UNFCCC, which was ratified by Canada and which entered into force on March 21st 1994. The UNFCCC affirms the intention of signatories to achieve "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". 468 Countries including Canada have since adopted a threshold of 2 °C of global temperature increase above pre-industrial levels as constituting 'dangerous' climate change. Canada's behaviour to date – and the behaviour of fossil fuel companies – has not been consistent with achieving this objective. Achieving this objective requires that most of the reserves of fossil fuel companies be left unburned underground. It also requires the abandonment of projects intended to extract unconventional reserves of fossil fuels, through activities including oil and gas drilling in the arctic, exploitation of the oil sands, and extraction of previously inaccessible oil and gas reserves through hydraulic fracturing. Rather than curtailing such activities, the Government of Canada has worked intensively to reduce the environmental oversight to which the oil sands are subjected, while aggressively promoting pipelines and other projects to increase the export capacity of the oil sands. 469470 The Canadian government has spent millions of dollars on a "Go with Canada" advertising campaign, trying to encourage the approval of the Keystone XL pipeline by the U.S. government. 471472 The federal government is also spending \$120 million on studies to facilitate the construction of the proposed Northern Gateway pipeline, intended to export diluted bitumen from the oil sands via British Columbia. 473 Documents obtained by The Canadian Press show that the Canadian government spent US\$1.6 million on an ad campaign promoting Canadian oil in the U.S. in 2013, followed by US\$24 million in spending for the same purpose in 2014 and 2015. 474

Despite ratifying the Kyoto Protocol in 2002, the Government of Canada never developed an adequate plan to achieve the target it chose for itself: a reduction in GHG pollution to 6 percent below 1990 levels by 2012. Contrary to the government's objectives, Canadian emissions increased by 24.1 percent between 1990 and 2008. 475 This frustrated the objectives of the UNFCCC and Kyoto Protocol both directly and indirectly. It

464 Climate Action Network Canada, Canada Wins Fossil of the Year Award in Durban.

465 See also: Simpson, Climate-change reputation in tatters? Try blustering.

466 CBC News, Canada tagged as 'Fossil of the Year'.

457 McCarthy, Canada won't budge on environment, Peter Kent insists.

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

469 See: Smith, Is Peter Kent's trail of destruction finally coming to an end?

470 Harper, PM selling pipelines from the pulpit yet again.

471 Hall, Harper offers Obama climate plan to win Keystone approval.

472 See also: De Souza, Stephen Harper's government withholds details of \$16-million PR campaign for oil industry.

473 Meissner, Feds spend \$120 million to 'grease' Enbridge's Northern Gateway bid, Greens say.

474 Panetta, 'Go big': Inside the \$24M plan to market Canadian oil to the U.S.

475 United Nations Framework Convention on Climate Change, Report of the individual review of the annual submission of Canada submitted

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did so directly because Canada failed to reduce emissions as promised. It also did so indirectly insofar as Canadian inaction was interpreted by countries around the world as evidence of Canada's lack of seriousness about confronting the problem of climate change, which could be used to justify inaction on the part of other countries.

3.5 Why fossil fuels are like tobacco

In 2007, U of T decided to divest from tobacco companies, after determining that doing so was consistent with university policies. There are several important ways in which the tobacco precedent is relevant to fossil fuel

divestment.

First, the scientific case demonstrating the harm caused by tobacco strengthened progressively over the span of decades. Companies were initially willing to challenge these claims, but the weight of evidence eventually made their case untenable. Similarly, the evidence demonstrating the seriousness of anthropogenic climate change has now progressed beyond the point where it can be considered a subject of ongoing academic inquiry and debate.

In the case of tobacco, the university considered it important that tobacco companies had undertaken a campaign to mislead the public and decision-makers about the dangerousness of their product. The 2007 Report of the Advisory Board on Tobacco Investment cites the argument that:

The University should not be part owner of an industry that "has deliberately set about to misinform the public" and "seeks to erode the very values that the University has vowed to protect". 476

The efforts of the fossil fuel industry to mislead the public and elected officials are documented in Naomi Oreskes' *Merchants Of Doubt* and James Hoggan's *Climate Cover-Up*. 477478479 For example, ExxonMobil gave more than \$27 million to 66 organizations that challenge the scientific evidence on climate change between 1998 and 2012. 480 The conflicts between the actions of fossil fuel companies and the values of the university are documented throughout this brief, including the Chapter on social injury: The activities of fossil fuel companies are socially injurious, and this social injury cannot be reasonably remedied through shareholder voice.

Second, in both the cases of tobacco and fossil fuels, the problem is the primary product being produced by the industry. Just as it would be ineffective to use shareholder voice to try to convince a tobacco company to stop producing and selling tobacco, it is implausible that the university could use shareholder activism to convince fossil fuel companies to desist from activities that create and facilitate major GHG pollution. When the university decided to divest from tobacco, it concluded that "[t]he University of Toronto has neither the resources nor the jurisdiction to monitor the business practices of tobacco companies

, or any other enterprises". 481 The same is true for fossil fuel companies; shareholder activism is not a credible strategy for

in 2010, p. 3.

476 University of Toronto Advisory Board on Tobacco Investment, Report of the Advisory Board on Tobacco Investment, p. 5.

477 Oreskes and Conway, Merchants Of Doubt.

478 Hoggan and Littlemore, Climate Cover-Up: The Crusade to Deny Global Warming.

479 See also: Union of Concerned Scientists, Smoke, Mirrors & Hot Air: How ExxonMobil Uses Big Tobacco's Tactics to Manufacture Uncertainty on Climate Science.

480 Supran, Until universities divest from fossil fuels they will undermine all they stand for.

481 University of Toronto Advisory Board on Tobacco Investment, Report of the Advisory Board on Tobacco Investment, p. 7.

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influencing their decisions, and the university lacks the capability to effectively monitor them in terms of their climatic impact.

Third, both tobacco and fossil fuel consumption are distinct from other products that can be argued to cause social harm in that each item has "no safe use". 482 As acknowledged by former U of T President David Naylor in his letter regarding the university's decision to divest from tobacco shares, both anti-smoking advocates and major producers alike acknowledged tobacco's negative effects on human health. 483 Similarly, environmentalists and scientists, along with spokespeople from the fossil fuel industry, have publicly conceded that the business of extracting and burning fossil fuels has multiple adverse effects on the ecological health of the planet as well as on global economic stability. 484 485

Fourth, both investments in tobacco and fossil fuels challenge pre-existing policies that were developed

and implemented in alignment with the university's core values. For instance, the case for tobacco divestment was logical given that an anti-smoking policy was already implemented on campus "in recognition of the medical consensus on the health effects of smoking, and the University's place in the promotion of health". 486 Although no local, provincial, or federal legislation banned the production of cigarettes or the activity of smoking at U of T, the absence of such regulations did not dissuade the university from divestment. The same logic can be applied to the case for divesting from fossil fuels. For instance, the university's Environmental Protection Policy, developed in 2010, reflects the university's commitment "to being a positive and creative force in the protection and enhancement of the local and global environment". 487 Divestment from fossil fuels is a legitimate action in recognition of the governmental and scientific consensus on the detrimental effects of fossil fuel extraction and consumption, and in acknowledgment of the university's own position on promoting environmental health as stipulated in its Environmental Protection Policy as well as in its academic programming. 488

In the absence of legislation banning the extraction or burning of fossil fuels, recognition of the adverse effects of these activities, legitimated through the enactment of the Environmental Protection Policy and other university initiatives, constitutes a legitimate basis for divestment based on the tobacco precedent. The university's decision to divest from companies operating in apartheid South Africa shows that such action can be taken in the absence of official legislation that can be cited to validate claims of "social injury".

In addition, the decision of a prominent and influential institution like U of T may help encourage the emergence of such enabling legislation. In the case of South Africa, in response to growing social pressure calling for an end to apartheid and to international complicity in the system, the Ontario government passed Bill 9, An Act Permitting Trustees and other Persons to dispose of South African Investments. 489 This legislation was introduced on November 5th 1987 and enacted in the Legislature of Ontario on December 15th 1988. However, the Governing Council at the university voted to divest from stocks in South African companies on January 21st 1988, almost a year before Bill 9 was passed. This progressive action on the part of the

university represents
a forward-thinking response to the trajectory of social sentiment regarding the issue of apartheid, which was

482 See: *ibid.*, p. 9.

483 Girard, UofT to sell off its tobacco holdings.

484 See, for example: Hove, Le Menestrel, and Bettignies, "The oil industry and climate change: strategies and ethical dilemmas", p. 3-18.

485 See also: Fossil fuel companies acknowledge the reality and danger of climate change

486 See: University of Toronto Advisory Board on Tobacco Investment, Report of the Advisory Board on Tobacco Investment, p. 9.

487 University of Toronto Governing Council, University Environmental Protection Policy.

488 See: The University of Toronto is already taking action on climate change

489 See: Trumpickas and Dunlop, On the Road to Tobacco Divestment: A Progress Report.

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growing rapidly and was manifesting itself in policy changes and legislation such as Bill 9.

Although no Canadian legislation currently exists limiting the extraction and burning of fossil fuels, which directly causes climate change, U of T should act in response to the strengthening consensus amongst governments, scientific organizations, and financial institutions. These organizations are increasingly recognizing the risks of climate change to human health and ecosystems as well as global economic stability and the viability of investments around the world.

The tobacco precedent is also relevant to the question of whether permanent divestment from Shell is likely to harm the university financially. For more information, see: Divestment from Shell would not hurt the university financially.

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3.6 Divestment is compatible with the university's fiduciary duties

3.6.1 From the U of T divestment policy

(i) prudent investment The University has a fiduciary duty to manage investments responsibly to maximize return on its investments within a policy risk tolerance as approved by Business Board from time to time.

The committee will consider the following guidelines in considering the appropriate response to any request:

- the extent and significance of the University's investment in a particular entity. Determination of whether investments are considered significant will depend on the committee's judgment of the relative magnitude of the University's holdings both as a fraction of all University investments and in relation to the market capitalization of the entity under review.
- the degree to which the entity itself is involved in the undesirable activity.

Normally, activity is considered significant if more than ten percent of the entity's revenues are derived from the undesirable activity.

3.7 Fossil fuel divestment is financially responsible

Any fiduciary has two main factors to consider in investments: risk and return. Fossil fuel divestment offers considerable potential to mitigate important risks, while creating only negligible new ones. In addition, the historical returns of a portfolio that excludes fossil fuel stocks are comparable to those with no such exclusion, and there are good reasons to believe that the future returns of non-fossil-fuel investments will be competitive. This chapter will consider both the financial case for divestment and questions about the practicality of divesting from a financial perspective, including the need to uphold the fiduciary duties borne by the University of Toronto. 490

In advice provided to the United Nations Environment Programme Finance Initiative, Freshfields Bruch-

haus Deringer considered the relationship between fiduciary duty and environmental, social and governance (ESG) issues within common law jurisdictions. They explain that: "[t]he modern prudent investor rule, which incorporates both a duty of care and a duty of loyalty, emphasises modern portfolio theory and provides that: ...there is no duty to 'maximise' the return of individual investments, but instead a duty to implement an overall investment strategy that is rational and appropriate to the fund". 491 They go on to explain that: "[t]here is accordingly no reason why investment strategies should not include investments with positive ESG characteristics. The important limiting requirement is that imposed by the duty of loyalty: all investment decisions must be motivated by the interests of the fund's beneficiaries and / or the purposes of the fund". 492 Discussing Canada specifically, they explain: "the power of investment is undertaken in a prudent manner when adequate

490 For a shorter version of the financial argument, see: Fossil Free Stanford, The Case for Fossil Fuel Divestment at Stanford University, p. 9-10.

491 United Nations Environment Programme, A legal framework for the integration of environmental, social and governance issues into institutional investment, p. 6.

492 Ibid., p. 6.

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processes (including completion of studies of the nature and quality of a proposed investment in light of the plan's total assets and obligations) have been followed and salient information (including expert opinions) has been considered". 493 The report lists a number of major Canadian institutional investors that have incorporated ESG issues into their processes, including the Ontario Municipal Employees Retirement System, the Ontario Teachers' Pension Plan Board, and the Canada Pension Plan Investment Board. 494 In the same report, they claim: "Climate change is an obvious example of an environmental consideration that is recognised as affecting value". 495 As this brief explains in detail, the beneficiaries and purposes of U of T's investments will

be well-served by fossil fuel divestment. Such divestment is unlikely to be financially harmful, will help the university reduce exposure to important risks, and will be in keeping with the values and reputation of the institution.

The Freshfields advice accords with advice that U of T itself sought in the case of tobacco divestment in 2007. Timothy Youdan of Davies Ward Phillips & Vineberg was hired to produce a legal opinion on the university's investment policy with respect to a proposed prohibition on investment in the tobacco industry.

Mr. Youdan found that: "the position taken in England by the Pension Law Review Committee is applicable in Ontario and applicable to trustees of a charity as well as pension trustees". He found further that this allows: "pension trustees to properly exclude investments for nonfinancial reasons if doing so will not have a detrimental effect on the financial performance of the fund". 496

The International Energy Agency argues that: "the deployment of a low-carbon energy system... delivers wide benefits by enhancing energy security, environmental protection and economic growth", that "a low-carbon energy system increases energy security, particularly for energy importing countries, through reduced energy dependence and greater diversity of energy sources and technologies", and that "the pathway to [stabilizing global temperatures at less than 2 °C above pre-industrial levels] is not just environmentally necessary but economically sound". 497 They argue that the net benefit of decarbonization amounts to US\$61 trillion if not discounted and US\$5 trillion if using a 10 percent discount rate. Furthermore, they argue that: "low-carbon technologies often also reduce local air pollution, providing other environmental benefits and improve quality of life".

World Bank Group President Jim Yong Kim has urged investors to give thought to what fiduciary duty means in a world impacted by climate change:

Be the first mover. Use smart due diligence. Rethink what fiduciary responsibility means in this changing world. It's simple self-interest. Every company, investor and bank that screens new and existing investments for climate risk is simply being pragmatic. 498499

This accords with warnings from Paul Fisher, Deputy Head of Supervision for Banks and Insurance Com-

panies at the Bank of England, who explains that: "As the world increasingly limits carbon emissions, and moves to alternative energy sources, investments in fossil fuels - a growing financial market in re-

493 United Nations Environment Programme, A legal framework for the integration of environmental, social and governance issues into institutional investment, p. 51.

494 Ibid., p. 52.

495 Ibid., p. 11.

496 University of Toronto Advisory Board on Tobacco Investment, Report of the Advisory Board on Tobacco Investment, p. 6.

497 International Energy Agency, The wider benefits of the 2 °C Scenario.

498 Kim, World Bank Group President Jim Yong Kim Remarks at Davos Press Conference.

499 See also: Rusbridger, The argument for divesting from fossil fuels is becoming overwhelming.

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cent decades - may take a huge hit". 500501 The U.K. House of Commons Environmental Audit Committee

raised similar concerns. Committee chair Joan Walley MP has stated:

The UK Government and Bank of England must not be complacent about the risks of carbon exposure in the world economy... Financial stability could be threatened if shares in fossil

fuel companies turn out to be overvalued because the bulk of their oil, coal and gas reserves

cannot be burnt without further destabilising the climate. 502503504

3.7.1 There is no evidence of a divestment penalty for investors

Several studies have attempted to quantify the financial consequences of taking environmental factors into

account in the investment management process. In aggregate, these studies found no significant impact on

investment risk in predictive models, nor a performance penalty in tests using historical data.

Historical The U.N. Environment Program Finance Initiative's analysis of twenty academic studies on the effect of incorporating ESG factors in the investment management process found no evidence of a resulting performance penalty. The two reviewed studies that focused specifically on environmental factors found a positive relationship between consideration of those factors and performance. 505

Risk Based Assessment The Aperio Group found that divesting from the "Filthy Fifteen" increases absolute portfolio risk by only 0.0006 percent, or about a half of one one-thousandth of a percent. " Even divesting from the entire fossil fuel sector only results in a 0.0034 percent return penalty. 506 In other words, the portfolio does become riskier, but by such a trivial amount that the impact is statistically insignificant. 507

Forward Looking Carbon Tracker and Standard & Poor's together conducted a study on the implications of carbon constraints for credit ratings of the oil and gas sector. Their scenario assumes reducing demand for CO₂-intensive fuels, in line with the internationally recognized limit of a 2 °C rise in global temperatures, and is "not materially different from the current price deck assumptions". The study concludes with the statement:

[A]s the price declines persist in our stress scenario of weaker oil demand, meaningful pressure could build on ratings. First to be affected would be the relatively focused, higher cost producers, and then the more diversified integrated players. In both cases, according to our study, the causes would be a decline in operating cash flows, weakening free cash flow and credit measures, along with less certain returns on investment and less robust reserve replacement. 508

Meta Analysis It is frequently assumed that excluding the fossil-fuel sector from a portfolio will inevitably lead to reduced performance, owing to the reduction in potential investment opportunities. However,

500 Carrington, Bank of England warns of huge financial risk from fossil fuel investments

501 See also: Carrington, Bank of England investigating risk of 'carbon bubble'.

502 McGrath, 'Carbon bubble' threatens stock markets, say MPs.

503 See also: House of Commons Environmental Audit Committee, Green Finance: Twelfth Report of Session 2013-14.

504 Harvey, 'Carbon bubble' poses serious threat to UK economy, MPs warn.

505 United Nations Environment Programme Finance Initiative and Mercer, Demystifying Responsible Investment Performance: A review of key academic and broker research on ESG factors.

506 For the purposes of this study, the "Filthy Fifteen" was defined as the group of 15 U.S. companies judged by As You Sow and the Responsible Endowment Coalition to be the most harmful based on the amount of coal mined and coal burned along with other metrics.

507 Geddes, Do the Investment Math: Building a Carbon-Free Portfolio.

508 Redmond and Wilkins, What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness.

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empirical research has repeatedly shown this assumption is fallacious. Deutsche Bank and Mercer have conducted major meta-studies that discovered the vast majority of academic studies of ESG investment performance found the incorporation of ESG factors into portfolio management to be either neutral or positive from the perspective of returns. 509510

Case Study Portfolio 21, based in Portland, Oregon, created one of the first sustainability-themed global equity mutual funds, known as Portfolio 21 Global Equity Fund (PORTX). The institutional shares class has outperformed its benchmark by 105 basis points annualized over the past five years and by 93 basis points annualized over the last decade. Portfolio 21 has therefore demonstrated for more than a decade that a global investment strategy that avoids fossil fuels – and many other unsustainable industries – need not come at the cost of financial performance or increased portfolio risk. 511

Canadian socially-responsible investment funds like the NEI Ethical Canadian Dividend A fund (which tries to

balance social concerns with returns) have outperformed the S&P / TSX total return in 2013. 512

In July 2013, Impax Asset Management published a study examining the last seven years worth of data on

international equity markets. They compared a portfolio consisting of the MSCI World Index with another in

which fossil fuel stocks were excluded and determined:

Excluding the fossil energy stocks from the MSCI World Index over the last seven years (to the end of April 2013) would have had a small positive impact on returns (0.5 percent annually) and only a modest increase in tracking error of 1.6 percent a year. For the five years to the end of April 2013, which excludes the dramatic run up in energy prices ahead of the 2008 financial crash, excluding the fossil energy sector would have improved returns by almost 0.5 percentage points annually, to 2.3 percent a year from 1.8 percent. Again, tracking error is low at 1.6 percent. 513514

These conclusions are echoed in 2013 analysis from MCSI ESG Research:

Over the period from January 2008 through March 2013, the market capitalization of the 247 fossil fuel reserve-owning companies described above ranged from approximately 7 percent to 8 percent of the MSCI ACWI IMI. Hence, excluding these stocks left between 93 percent and 94 percent of the MSCI ACWI IMI intact over the time series in terms of market capitalization. This meant that for each 10 percent active return differential in the carbon reserve stocks relative to the MSCI ACWI IMI, the effect of removing these stocks from the index ranged from 0.7 percent to 0.8 percent (70 to 80 basis points) in changes to active returns. Nearly all of this effect was due to industry factors, as opposed to country exposure and other style factors... [T]he performance of the MSCI ACWI IMI excluding the carbon reserve stocks closely tracked the MSCI ACWI IMI over the time series. Slight underperformance of the "ex Carbon list" appeared near the beginning of the time series, and slight outperformance of the "ex Carbon list" emerged toward the end of the time series. The active return differential over the entire time series was 1.2 percent (120 basis

points) in favor of the "ex Carbon list" relative to the full MSCI ACWI IMI. The tracking error

509 Deutsche Bank Group, Sustainable Investing: Establishing Long-term Value and Performance.

510 Mercer, Shedding Light on Responsible Investment: Approaches, Returns and Impacts.

511 Humphreys, Institutional Pathways to Fossil-Free Investing.

512 Nelson, Socially responsible investment funds hold their own.

513 Impax Asset Management, Beyond Fossil Fuels: The Investment Case for Fossil Fuel Divestment, p. 5.

514 See also: Thorpe, Investment Funds Divested From Fossil Fuels "Will Perform Better".

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relative to full index was 1.9 percent (190 bps). 515

In an analysis done for Advisor Partners, relative returns were examined for a portfolio which excluded

72 "U.S. oil, gas and coal companies that own carbon in the ground, as well as many chemical companies,

utilities and miners" compared with the S&P 500. 516 Looking back to 1990, the authors found that

" [d] ivestment has little impact overall" on performance. 517 Since 2010, the FTSE North American fossil

fuel free index "has consistently outperformed the conventional benchmark index". 518 The reason is

to believe, therefore, that divestment would involve only a limited risk of foregoing improved ratings and

investment returns. Indeed, divestment could actually benefit the portfolio, in that it would remove some risk

of being invested in companies whose ratings appear most likely to decline in the long term.

Alison Prout, who manages ethical investments for the Quakers in the U.K. explains that:

" [fossil fuel divestment] has not negatively affected our holdings in any way. In fact, the portfolio is doing better

than if we had kept the two holdings we had in oil and gas". 519²⁰ This accords with independent analysis

from MSCI, which concludes: "Fossil fuel divestment has the potential to reduce overall portfolio risk

because of Energy Sector volatility". 521 It also accords with the 2013-14 report of the Asset Owners

Disclosure Project, which found that: "There is no evidence at all that the leaders in the AODP Index are sacrificing members returns even in the short-term and even when they are actively underweight high-carbon and overweight low-carbon investments and thus looking to stabilise their portfolio in preparation for future potential problems as the world economy transitions to a low-carbon model". 522

A further 2014 analysis from Impax Asset Management concluded that: "over the past six years, eliminating the fossil fuel sector from a global benchmark index would actually have had a small positive return effect". 523 They advised that: "the most compelling strategy for investors is to... ascribe a higher risk premium to the ownership of fossil fuel assets" and "reduce levels of ownership of fossil fuels accordingly". 524 In the report, they consider three different specific approaches to divestment and conclude: "all three portfolios would have improved returns relative to the MSCI World Index with limited tracking error". 525

Coal investments have been especially uncompetitive in recent years. While the Dow Jones Industrial Average rose 69 percent between 2009 and 2014, the Dow Jones Total Market Coal Sector Index fell by 76 percent, while 26 U.S. coal companies went into bankruptcy. 526 Between 2011 and 2013, at least 264 American coal mines were closed. 527 One significant explanation for this is the increasing difficulty of the industry in remaining profitable while complying with a growing set of environmental regulations. 528

515 MSCI ESG Research, Responding to the Call for Fossil-fuel Free Portfolios, p. 5.
516 Kern, Blachman, and Cronin, Fossil Fuel Divestment Risks and Opportunities, p. 3.
517 Ibid., p. 5.

518 Lehner, Divestment outperforms conventional portfolios for the past 5 years.

519 Yeo, What has the divestment movement achieved so far?

520 See also: Quakers in Britain, Disinvestment from fossil fuels.

521 MSCI ESG Research, Responding to the Call for Fossil-fuel Free Portfolios, p. 8.

522 Asset Owners Disclosure Project, Global Climate Index 2013-14, p. 5.

523 Impax Asset Management, Storms on the Horizon: Is Climate Change Policy Likely to Undermine the Value of Fossil Fuel Assets, and Should Investors Divest?, p. 1 .

524 Ibid., p. 1.

525 Ibid., p. 3.

526 Carbon Tracker Initiative, The US Coal Crash: Evidence for Structural Change, p. 6, 18.

527 Mathieson, US coal sector in 'terminal decline', financial analysts say.

528 Carbon Tracker Initiative, The US Coal Crash Evidence for Structural Change, p. 25-27 .

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Coal has also been a poor investment globally. While the MCSI World Index rose by 44 percent between

2010 and 2015, the global coal sector declined in value by 43 percent. 529

3.7.2 Market capitalization and value at risk

In a report for the Canadian Centre for Policy Alternatives, Marc Lee and Brock Ellis explain that: "Canada is experiencing a carbon bubble that must be strategically deflated in the move to a clean energy economy". 530

Even with a high estimate of how much of the world's total carbon budget Canada can use up, they conclude

that: "78 percent of Canada's proven reserves, and 89 percent of proven-plus-probable reserves... need to

remain underground". 531 This unwelcome information has not been internalized by the fossil fuel industry. As

a result, the business plans and stock market valuations of fossil fuel companies are based on the unjustified

assumption that they can continue to use the global atmosphere as a free dumping ground for greenhouse

gas pollution. As the injury caused by climate change has become more obvious, governments have become

increasingly willing to regulate the use of fossil fuels. This progression can be expected to continue in the

future, eventually compelling fossil fuel companies to leave significant reserves unburned

d. 532 If the damage from fossil fuel burning amounts to \$50 per tonne (the low end of Lee and Ellis' estimate) then the damage that burning all Canadian fossil fuels would do amounts to \$844 billion, equivalent to two-and-a-half times the market capitalization and nearly twice the total assets of Canadian fossil fuel companies. Based on a high damage estimate of \$200 per tonne, burning Canada's fossil fuel reserves would cause \$5.7 trillion in damage – a figure 17 times larger than the market capitalization of these 144 firms and 13 times larger than their assets. The analysis from Lee, Ellis, and others makes two things clear: burning fossil fuels causes considerable amounts of social injury, and the prospect of strengthened regulations on greenhouse gas pollution threatens the profitability and stockmarket value of fossil fuel companies.

A recent article in the National Post describes the 'carbon bubble' and the risks it poses for investors:

"energy sector valuations ignore the world's climate change target and could be decimated if the international community puts its money where its mouth is and collectively moves to protect Mother Earth by attacking demand for oil, coal and gas". 533534 It goes on to explain: "if the international community gets serious about its stated [2 °C] temperature goal, about two-thirds of existing energy sector reserves, which currently support about US\$4 trillion in share value and back more than US\$1 trillion in debt, are actually superfluous to the world's needs". The Climate Commission established by the Australian government echoes these findings. 535 Simon McKeon, the executive chairman of the commission, argues that: "[a]nyone who believes they have literally hundreds of millions tonnes of first rate high emitting CO₂ coal can no longer blindly believe there will be a strong market for that in 20, 30 years" and that "the best of resource investors are absolutely on to this". 536

A report from the Generation Foundation further highlights the risks to investors from the carbon bubble:

529 Carbon Tracker Initiative, *The US Coal Crash: Evidence for Structural Change*, p. 16.

530 Lee and Ellis, *Canada's Carbon Liabilities: The Implications of Stranded Fossil Fuel*

Assets for Financial Markets and Pension Funds, p. 5.

531 Ibid., p.6.

532 See, for instance: De Souza, Global climate efforts threaten ousands growth, memo to
d Natural Resources Minister Joe Oliver.

533 Watson, Oil giants could feel major pain should world get serious about reducing glob
al temperatures.

534 See also: Lubber, Fossil Fuel Divestment Is A Timely Issue For Investors.

535 Government of Australia Climate Commission, The Critical Decade 2013.

536 Priest, Climate Commission warns coal will be left in ground.

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Maintaining the status quo, whereby investors fail to properly account for the risks inhe
rent

in owning carbon-intensive assets, will cause the 'carbon asset bubble' to grow until the

artificially high valuations for these assets can no longer be sustained. The presence of
a

bubble is often not recognized by the market due to classic behavioural finance decision-

making biases, such as endowment bias and system justification theory. 537

Research conducted by HSBC Global Research in 2013 found that: " [1] owing carbon emiss
ions could

put future oil and gas developments at risk" and: " [d] emand effects may mean lower oil
and gas prices,

a greater value risk". 538 Taken together, they estimate that these risks are "equivalent
to 40-60% of

the market capitalisation of affected companies" and note that " [c] apital-intensive, hi
gh-cost projects,

such as heavy oil and oil sands, are most at risk under our scenario". 539

3.7.3 Stated policy objectives are incompatible with the current valuation of fossil
fuel reserves

Fossil fuels may provide a hedge against other asset classes, but only in scenarios where
unconstrained emis-

sions lead to accelerated and possibly catastrophic warming. The international community
is in broad agree-

ment that this must not happen.

Regulatory risk is not adequately priced

As one scenario for the World Energy Outlook in 2012, the IEA assumes international cooperation to keep CO₂

under 450 ppm, which in their model constrains the likelihood of warming greater than 2 °C to 55 percent.

This is in contrast to their baseline New Policies Scenario, which assumes modest reductions in the rate of

emissions increase compared to the third scenario, Current Policies. Evaluating the effect of this scenario on

the price of fossil fuels, they estimate:

Compared with the New Policies Scenario, the global oil price in the 450 Scenario in 2035 is \$25

per barrel lower and the coal price almost 40 percent lower. The price for natural gas falls by 23

percent in Europe and 4 percent in North America. 540

In a report for the Australian National University and the Investor Group on Climate Change, Dr. Michael

H. Smith concluded that: "Climate change is forecast to dramatically increase the exposure of oil and gas

companies to climate, energy and carbon price risks". 541

For any scenario where emissions are constrained to keep warming under 2 °C, market assumptions regarding the profitability of fossil fuel extraction are necessarily optimistic. 542543

Marginal projects will become

unprofitable and returns to investors for even the most profitable projects will decline.

Indeed, a study conducted by Standard & Poor's even indicates near-term threats to the stability of investing in some fossil fuel

537 Generation Foundation, *Stranded Carbon Assets: Why and How Carbon Risks Should Be Incorporated in Investment Analysis*, p. 2.

538 Spedding, Mehta, and Robins, *Oil & carbon revisited: Value at risk from 'unburnable' reserves*, p. 1.

539 Ibid., p. 4.

540 International Energy Agency, *World Energy Outlook: 2012*, p. 257.

541 Smith, *Assessing Climate Change Risks and Opportunities for Investors: Oil and Gas Sector*, p. 14.

542 See: Kiesel, Why It Makes More Sense to Dump Your Fossil Fuel Stocks.

543 Yonavjak, Divesting From Fossil Fuels Means A Cleaner, Safer And More Resilient Future.

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companies: "Under our stressed scenario, the ratings on companies with high development and production costs, including those focused on unconventional resources, could see rating pressure build within one or two years, especially if the companies are relatively undiversified" (emphasis ours). 544 The study continues: "We see a deterioration in credit measures for these smaller oil companies over 2014-2015, to a degree that could potentially lead to negative outlook revisions and downgrades over 2014-2017... this could result in an earlier deterioration in our business risk profile assessments". Furthermore, "the financial risk profiles of the oil majors would weaken modestly over the next five years". It is also worth noting that the study claims: "the core business model [of fossil fuel companies] could come into question," and that "this could potentially result in a downgrade of more than one notch if we were to place less reliance on undeveloped or probable reserves than at present" (emphasis ours). These possibilities are acknowledged by fossil fuel companies. In their 2012 annual report, Shell explains that "continued public and political attention to climate change concerns, including existing and future regulatory frameworks to reduce greenhouse gas emissions, could result in increasing production costs, lengthening project implementation times and reducing demand for hydrocarbons". 545 They also claim that: "The management of emissions of carbon dioxide (CO₂) will become increasingly important as concerns over climate change lead to tighter environmental regulation". 546 In their 2013 annual report, BP states that: "Given the pressures in the sector, we expect regulation and taxation of the energy industry and energy users to increase in many areas in the future". 547

New climate regulations are reasonably likely to be implemented in the years ahead. The Obama administration is expected to move forward with emissions limits on existing power plants. 548

549 In anticipation of his June 25th 2013 climate speech, in which he was expected to announce restrictions on CO₂ emissions from existing coal plants, the stock price of major coal companies fell significantly: shares in Consol Energy fell 7.2 percent, those in Cliffs Natural Resources fell 7.6 percent, Peabody Energy's share price fell 7.2 percent, and those in Alpha Natural Resources fell 8 percent. 550 551 President Obama pledged to regulate CO₂ emissions from existing power plants, promote the deployment of renewable energy, modernize the electrical grid, and further increase fuel economy standards for vehicles. The fall in the stock value of coal companies deepened after the details of the new Obama plan were announced. 552 The Government of China may also be considering imposing a carbon tax. 553 Tightened regulations could pose a major risk for the value of fossil fuel companies. A study by HSBC concluded that: "Oil and gas majors, including, BP, Shell and Statoil, could face a loss in market value of up to 60 percent should the international community stick to its agreed emission reduction targets". 554

Both the Bank of England and the Environmental Audit Committee of the British House of Commons have initiated studies on the carbon bubble. 555 Joan Walley, the Member of Parliament who chairs the committee, has argued: "Policy makers and now central banks are waking up to the fact that much

544 Redmond and Wilkins, What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness.

545 Royal Dutch Shell PLC, Building an Energy Future: Annual Report and Form 20-F 2012, p. 14.

546 Ibid., p. 47.

547 BP PLC, Building a stronger, safer BP: Annual Report and Form 20-F 2012, p. 12.

548 Broder, Obama Readying Emissions Limits on Power Plants.

549 Executive Office of the President, The President's Climate Action Plan.

550 Mufson, Coal shares plunge ahead of Obama's climate-change speech.

551 All four companies are included in Appendix It The 200 companies with the largest fossil fuel reserves

552 Mitchell, Obama climate change plan pounds coal stocks.

553 Bajaj, Taxing Carbon.

554 Jabusch, The Economic Case for Divesting from Fossil Fuels.

85

of the world's oil, coal and gas reserves will have to remain in the ground unless carbon capture and storage technologies can be developed more rapidly". 556 557 Former Bank of Canada governor Mark Carney argued at a World Bank seminar that the "vast majority of reserves are unburnable" if global temperature rises are to be limited to below 2 °C. 558 Paul Fisher, deputy head of the Bank of England's prudential regulation authority, has argued: "As the world increasingly limits carbon emissions, and moves to alternative energy sources, investments in fossil fuels – a growing financial market in recent decades – may take a huge hit". 559

Motivated in part by concerns about regulatory risk, Norway's sovereign wealth fund divested from 14 companies in the coal mining sector in 2014, as well as from five companies involved in the oil sands, two involved with cement production, and one coal-fired electricity producer. 560 561 562 Their 2014 annual report includes an entire section on "risk-based divestments", in which they explain that "[c]ompanies that rely on value chains with particularly high greenhouse gas emissions may be exposed to risk from regulatory or other changes, leading to a fall in demand" and "[e]lectricity production from coal is an area that may face particularly high risk in connection with regulatory changes in selected markets". 563

In a 2014 report produced by the Green European Foundation, "[e]quity, bond and credit exposures of EU financial institutions to firms holding fossil fuel reserves" was estimated at "approximately € 260-330 billion for EU pension funds, € 460-480 billion for banks and € 300-400 billion for insurance companies". 564 565 566

The possibility of moratoriums on various forms of unconventional fossil fuel production is also a

source of regulatory risk. Recent moratoriums on the extraction of natural gas from hydraulic fracturing, or 'fracking', demonstrate this risk. According to the Canadian Association of Petroleum Producers: "most of the growth in supply from today's recoverable gas resources is found in unconventional formations". 567 Unconventional reservoirs of gas require fracking to extract them and make them "commercially viable". 568 This is because in unconventional reservoirs, gas is stored in considerably smaller pores of the rock, which are not naturally interconnected. By injecting water and chemicals at high pressure, fracking creates the necessary pathways for the gas to flow to the well. 569 Without fracking, these large reservoirs of gas would not be extractable. Therefore, fracking bans would leave gas companies with significant stranded assets.

Banning fracking is an increasingly popular choice because of the environmental and health risks that fracking poses. The group Physicians for Social Responsibility has adopted an anti-fracking posi-

556 Ibid.

557 E

Regarding the claim that carbon capture and storage might eliminate the need to keep most fossil fuel reserves underground, see:

Carbon capture and storage cannot make fossil fuel extraction compatible with climate stability

558 Shankleman, Mark Carney: most fossil fuel reserves can't be burned.

559 Carrington, Bank of England warns of huge financial risk from fossil fuel investments

560 Norges Bank Investment Management, 2024 Responsible Investment Government Pension Fund Global, p. 71.

561 See also: Smith, World's richest sovereign wealth fund divests from dozens of coal companies.

562 Carrington, World's biggest sovereign wealth fund dumps dozens of coal companies.

563 Norges Bank Investment Management, 2024 Responsible Investment Government Pension Fund Global, p. 71-80.

564 Green European Foundation, The Price of Doing Too Little Too Late: The impact of the carbon bubble on the EU financial system.

565 See also: The Greens: European Free Alliance, Deflating the Financial Carbon Bubble: A Presentation & Panel Debate on a Greens/EFA Study.

566 3 50.org, Two new reports, one conclusion: pressing need to divest from fossil fuels.

567 Canadian Association of Petroleum Producers, Conventional & Unconventional.

568 Ibid.

569 Canadian Society for Hydraulic Fracturing, Understanding Hydraulic Fracturing.

86

tion, calling for a moratorium. 57 They based their position on evidence of health risks from fracking, including seismic activity and pollution. One of the greatest risks comes from the chemicals that drilling companies inject in order to fracture the rocks: "Some components are known carcinogens; many more are unknown, because manufacturers consider their composition to be proprietary information or a trade secret". 571 These dangerous chemicals can leach into surrounding ground water and aquifers. 572 Documented health impacts experienced by people living in areas where fracking is taking place include "shortness of breath, coughing, chronic fatigue and skin burning". 573574575 Research by the Lubbock Board of Health in Texas found that volatile organic compounds produced by fracking could be linked to increased rates of leukemia and fetal abnormalities. 576 Fracking also causes air pollution, including toxic smog "in rural areas at levels worse than downtown Los Angeles" and leaks of methane, a potent greenhouse gas that contributes to climate change. 577 Methane has "a global warming potential 28-34 times greater than CO₂ using a 100-y horizon and even greater on shorter time scales". 578 According to one study, "if total CH₄ emissions are greater than approximately 3.2% of production, the immediate net radiative forcing for natural gas use is worse than for coal when used to generate el

electricity". 579 In light of these dangers, resistance to fracking is growing in many areas.

Fracking bans have already been enacted by many governments worldwide. For example, on February 4, 2015, Wales banned fracking, following a moratorium passed a week earlier by Scotland. 580 Just a few months earlier, on December 17th 2014, New York State passed a fracking ban. 581 Governor Andrew Cuomo cited concerns over health risks as the factor which led him to support the ban, despite his previous openness to fracking. 582 Local bans are also becoming more common, even reaching Texas, where the oil industry is highly politically influential: in November 2014, the citizens of Denton introduced a ban which won by a landslide at the polls. 583

In Canada, Newfoundland has declared a moratorium, Nova Scotia declared its intention for a ban, and Quebec also recently announced a ban, following a moratorium for environmental investigation. 58458

These bans already limit the area in which gas extraction companies can operate. In recent corporate filings, Kinder Morgan has listed fracking bans as a key business risk. 587 If such bans continue to proliferate, companies will find themselves with decreasing opportunities for extraction.

570 Gottlieb, Hydraulic Fracturing: How Great Is the Risk to Health?

571 Ibid.

572 Ibid.

573 Leslie, Fracking criticism spreads, even in Alberta and Texas.

574 Bamberger and Oswald, "Long-term impacts of unconventional drilling operations on human and animal health".

575 Brown, Lewis, and Weinberger, "Human exposure to unconventional natural gas development: A public health demonstration of periodic high exposure to chemical mixtures in ambient air".

576 Epstein, A Medical Perspective on Oil and Gas Development.

577 Natural Resources Defense Council, Unchecked Fracking Threatens Health, Water Supplies.

578 Caulton et al., "Toward a better understanding and quantification of methane emissions from shale gas development".

579 Ibid.

580 Reuters, Wales votes against shale gas fracking.

581 Goldenberg, New York state to ban fracking over 'red flags' to public health.

582 Kaplan, Citing Health Risks, Cuomo Bans Fracking in New York State.

583 Heinkel-Wolfe, Denton fracking ban passed in landslide.

584 The Telegram, Moratorium on fracking announced by Newfoundland government.

585 Erskine, Nova Scotia to ban fracking.

586 CBC News, Quebec Premier Philippe Couillard says no to shale gas.

587 Klein, This Changes Everything: Capitalism vs. the Climate, p. 216.

87

There is a strong potential for malinvestment in capital-intensive, long-term projects

The IEA's 2012 WorldEnergy Outlook concluded that "more than two-thirds of current proven fossil-fuel reserves

cannot be commercialized in a 2 °C world before 2050". 588 The Standard & Poor's Carbon Tracker Initiative

study raises concerns about the fossil fuel sector: "This illustrates to us the apparent divergence between the

assets owned by coal, oil, and gas companies and the direction of negotiations at UNFCCC conferences". 589

The study concludes that up to \$6 trillion could be wasted in fossil fuel investments that become unviable

because of tightened climate change policies globally. 590 As explained by the National Round Table on the

Environment and the Economy (NRTEE):

Every year of delay in sending strong, economy-wide policy signals represents a wasted opportunity to take advantage of natural cycles of infrastructure and equipment renewal, making it

more difficult and expensive to meet emissions reduction targets. Our analysis shows that waiting

until 2020 to implement climate policy aimed at cutting emissions by 65 percent from

2005

levels by 2050 implies close to \$87 billion in refurbishments, retrofits and premature retirement of assets. 591

Another study found that up to 75 gigawatts of coal-fired electricity capacity will need to be retired by 2030 because of tightened environmental regulations. 592 Investment in CO₂-emissions-enabling infrastructure is contrary to the international community's consensus about the direction of the future. 593 Nonetheless, the Conference Board of Canada expects \$364 billion to be invested in Canada's bitumen sands by 2035. 594

The high prices for fossil fuels on the world market in recent years has led to unprecedented investment on the part of the fossil fuel industry in projects that were previously deemed too marginal to profitably develop. Development of unconventional hydrocarbon reserves such as the bitumen sands, oil shale, offshore drilling in extremely deep water and the arctic, hydraulic fracturing, and mountaintop removal coal mining entails extremely high capital investment. Scenarios in which carbon emissions are restricted sufficiently to keep global temperatures from rising more than 2 °C would likely cripple the return on much of this investment.

The UNFCCC points out that "[i]n many sectors the lifetime of capital stock can be thirty years or more. The fact that total investment in new physical assets is projected to triple between 2000 and 2030 provides a window of opportunity to direct the financial and investment flows into new facilities that are more climate friendly and resilient". 595 Continued development of extreme fossil fuel energy projects which are fundamentally incompatible with keeping climate change to a manageable level risks being a major mistake. Costly fossil fuel facilities may need to be shut down before the end of their economically viable lives, while investments in climate-safe forms of energy may then need to be undertaken at a much faster rate and higher cost.

588 International Energy Agency, World Energy Outlook: 2012.

589 Redmond and Wilkins, What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness.

590 Bakewell, Carbon-Intensive Investors Risk \$6 Trillion 'Bubble,' Study Says.

591 National Round Table on the Environment and the Economy, Framing the Future: Embracing the Low-Carbon Economy, p. 19.

592 Lowe and Sanzillo, Financial Risks of Investments in Coal, p. 10.

593 Watkins, This gamble on carbon and the climate could trigger a new financial crisis.

594 Klein, This Changes Everything: Capitalism vs. the Climate, p. 145.

595 United Nations Framework Convention on Climate Change, Investment and Financial Flows to Address Climate Change.

88

Carbon capture and storage cannot make fossil fuel extraction compatible with climate stability

In anticipating restrictions on carbon emissions, the fossil fuel industry has been pinning its hopes on the development of effective methods of carbon capture and sequestration (CCS). Despite tremendous investment in CCS technology from both the private and public sectors, economically feasible sequestration of emissions at scales needed to mitigate climate change remains elusive. 596 There are no commercial-scale CCS projects in operation on the planet, and in 2008 Cambridge Energy Research Associates (CERA) predicted that it would be another two decades before CCS saw large-scale deployment. 597 According to the Carbon Tracker Initiative, even if CCS is deployed in line with an idealised scenario by 2050, this would only extend fossil fuel carbon budgets by 12-14 percent, or just 4 percent of total global reserves. 598 It must be remembered that at the current rate of global carbon emissions, the entire budget of carbon emissions would be spent by the late 2020s, several years before large-scale CCS can be expected to come online. 599

CCS is associated with many other problems. For example, CCS would use extra energy, potentially as

much as 40 percent of the electricity generated by a power station. 600 This reduces the efficiency of the power plant, both increasing financial costs and increasing the amount of fuel needed per energy output, which in turn contributes to the problems associated with fossil fuel extraction. Indeed, the increased cost of the energy provided by CCS-enabled power stations would likely be higher than the cost of energy from renewable sources, and so would almost certainly never be implemented. 601 Storing carbon underground is risky – safe and permanent storage of CO₂ cannot be guaranteed, and even very low leakage rates could undermine climate mitigation efforts. 602 Finally, money spent on CCS will divert investments away from sustainable solutions to climate change, which the world will need to transition to eventually, whether or not it burns all the available (non-renewable) fossil fuels. Therefore, pinning our hopes on a non-existent technology, that is likely to both be more expensive and problematic than other energy sources, is a false hope.

Fossil fuel reserves as stranded assets

Given the degree to which proven reserves of carbon exceed allowable emissions for sub-2 °C warming, companies whose largest assets are fossil fuel reserves may be substantially overvalued under current market conditions. Stranded assets in the form of unburnable reserves and large liabilities incurred to develop those reserves combine to create a risk not only to equity, but to bondholders as well. The Carbon Tracker Initiative estimated that in 2012 the top 200 oil and gas companies allocated \$674 billion for the exploration and development of new reserves, investment which will be wasted if the 2 °C target is to be met. The Carbon Tracker Initiative reports that in 2012 the fossil fuel sector spent \$67.4 billion prospecting for new sources of carbon, sources which cannot be exploited if the 2 °C target is to be met. 603

As the Carbon Tracker Initiative's 2012 report makes clear, fossil fuel companies have significantly more exploitable sources of carbon available than is safe to burn. 604 Therefore, when considering "What A Carbon-

596 For more information on CCS, see: Won't carbon capture and storage (CCS) save us?

597 Cambridge Energy Research Associates, Crossing the Divide: The Future of Clean Energy

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598 Carbon Tracker Initiative, Unburnable Carbon 2013: Wasted capital and stranded assets

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599 Carbon Tracker Initiative, Unburnable Carbon: Are the world's financial markets carrying a carbon bubble?

600 Greenpeace, False Hope: Why carbon capture and storage won't save the climate.

601 Nelder, Why carbon capture and storage will never pay off.

602 Greenpeace, False Hope: Why carbon capture and storage won't save the climate.

603 Carbon Tracker Initiative, Unburnable Carbon 2013: Wasted capital and stranded assets

.

604 Carbon Tracker Initiative, Unburnable Carbon: Are the world's financial markets carrying a carbon bubble?

89

Constrained Future Could Mean For Oil Companies' Creditworthiness", Standard & Poor's decided that, "instead of considering issues of peak oil in terms of supply, this introduces a concept of peak oil demand". 605 Whether they took the form of tightened efficiency requirements, the establishment of a cap-and-trade scheme, or the promulgation of a carbon tax, enhanced climate regulations would generally have the objective of reducing fossil fuel demand. A reduction in oil, gas, and coal demand would have serious consequences for the fossil-fuel industry, particularly in Canada.

For example, MIT conducted a study that explored the effects CO₂ emissions reduction policies would likely have on Canada's bitumen industry. The study reaches the conclusion that, "with CO₂ emissions caps implemented worldwide, the Canadian bitumen production becomes essentially non-viable even with CCS technology, at least through our 2050 horizon". 606

Analysis from the Climate Policy Initiative found that "oil accounts for the majority of value at risk", despite how reducing oil consumption is less critical than reducing coal consumption for avoiding dangerous climate change. This is because of oil's high marginal production costs and high profit margins. 607

As any investment manager knows, past performance does not guarantee future results, and it is becoming increasingly common for analysts and investors to discuss the prospect that the historical outperformance of fossil-fuel companies may be similar to the tech boom of the 1990s and the housing bubble of recent years. However, the so-called "carbon bubble" potentially poses a much greater risk than either of these previous bubbles. "Conservative estimates for the financial worth of the unburnable carbon reserves have ranged from \$20 trillion to \$27 trillion, so any associated write-down of fossil-fuel company valuations could very easily dwarf the recent \$2 trillion housing meltdown – by a full order of magnitude". 608 According to John Fullerton, founder and president of the Capital Institute, this multi-trillion "externality" presents civilization with a "Big Choice": "either we must absorb a \$20tn write-off into our already stressed global economy over the next decade, or we will implicitly accept civilization-transforming climate change". 609

Volatility of investor sentiment

Current market capitalization of the fossil fuel industry rests in part on the assumption that global investors will continue to see the sector as a reliable investment even as damage from climate change becomes apparent. This assumption has been increasingly challenged from both outside and within the financial industry. Traditionally conservative-minded publications such as *The Economist*, 610 *Business Week*, 611 and the *Financial Times* 612 have published articles suggesting the fossil fuel sector is overvalued. In recent months, other voices within the financial industry such as investor groups and hedge fund managers have been increasingly sounding the alarm over the 'carbon bubble'. 613 *The Guardian* recently reported:

The message to all the players across the financial chain, from ratings agencies through account-

605 Redmond and Wilkins, What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness.

606 Chan et al., Canada's Bitumen Industry Under CO₂ Constraints.

607 Climate Policy Initiative, Moving to a Low-Carbon Economy: The Impact of Policy Pathways on Fossil Fuel Asset Values, p. v.

608 Humphreys, Institutional Pathways to Fossil-Free Investing, p. 3.

609 Fullerton, The big choice: money or planet?

610 The Economist, Unburnable fuel

611 Bloomberg Businessweek, Economist Energy reserves overvalued by global markets.

612 Stern, A profound contradiction at the heart of climate change policy.

613 Hickman, Jeremy Grantham, environmental philanthropist: 'We're trying to buy time for the world to wake up'.

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tants, to actuaries, investment advisors and all the rest, is also obvious. If the regulators won't do their job, do it for them. Jump, before you are pushed (emphasis ours). 614

The aforementioned Standard & Poor's study, which saw a declining trend on both the short-term and long-term outlook for fossil fuel companies (both mid-size and large), reached its conclusion without "explicitly [factoring in] any mitigating measures such as...material cuts in near-term capital investment". 615 However, there is already a significant, international fossil-fuel divestment movement that could result in such material cuts: over 300 colleges and universities and over 100 cities and states have active divestment campaigns, along with several religious institutions. 616

3.7.4 Fossil fuels represent a risk to the university's other investments

Institutional investors, and universities in particular, are required to plan financially on a timescale far longer than average. On timescales of 50 years or more, the consequences of unconstrained emissi

ons are very likely to overshadow all other financial considerations. According to a 2012 report by DARA, climate change is already costing the world more than \$1.2 trillion, wiping 1.6 percent annually from global GDP. By 2030, the researchers estimate, the cost of climate change and air pollution combined will rise to 3.2 percent of global GDP, with the world's least developed countries forecast to bear the brunt, suffering losses of up to 11 percent of their GDP. 617 Going further into the future is increasingly hard to predict, with estimates varying widely: the Stern Review estimates losses of between 5-20 percent, 618 and a United Nations report asserts that climate change could cost Latin American and Caribbean countries 137 percent of GDP by 2100. 619 However, regardless of the variations of predictions, the trend is clear: the more the climate changes, the greater the reductions to GDP. As the Stern Review explains, "[t]he benefits of strong, early action on climate change outweigh the costs". 620 Therefore, mitigating climate change can be expected to result in a relatively higher GDP, and to result in greater returns on the university's investments over the long term. 621 The Global Commission on the Economy and Climate – a group of former chief executives, prime ministers, and finance ministers – echoes this analysis. In a 2014 report, they argue that "countries at all levels of income now have the opportunity to build lasting economic growth at the same time as reducing the immense risks of climate change". 622 623 They also stress the urgency of action, arguing that "[t]he next 15 years will be critical, as the global economy undergoes a deep structural transformation" and that "[t]he next 15 years of investment will also determine the future of the world's climate system". 624

In 2012, the NRTEE studied the risks posed to business by climate change. They identified many categories of associated risk, including fire and property damage, storms and other natural perils, business interruption,

614 Leggett and McKibben, How your pension is being used in a \$6 trillion climate gamble.

615 Redmond and Wilkins, What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness.

616 For detailed information on the status of active divestment campaigns, see: What are the University of Toronto's peer schools doing?

617 DARA International, Climate Vulnerability Monitor: A Guide to the Cold Calculus of A Hot Planet.

618 Stern, The Economics of Climate Change: The Stern Review.

619 Economic Commission for Latin America and the Caribbean, Economics of Climate Change in Latin America and the Caribbean.

620 Stern, The Economics of Climate Change: The Stern Review, Executive summary at: http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf.

621 See also: Jabusch, The Economic Case for Divesting from Fossil Fuels.

622 The Global Commission on the Economy and Climate, Better Growth Better Climate: The New Climate Economy Report, p. 6.

623 See also: Harrabin, Climate change remedies 'affordable', says global body.

624 The Global Commission on the Economy and Climate, Better Growth, Better Climate: The New Climate Economy Report, p. 6.

91

disease and disability, and liability claims. 625 The report concludes that: "some industries will be impacted significantly and permanently". 626627 They project that climate change will cost Canada roughly \$5 billion

per year by 2020, rising to between \$21 billion and \$43 billion per year by mid-century. 628 In "Facing the Elements: Building Business Resilience in a Changing Climate", the NRTEE identifies the oil and gas sector,

mining, agribusiness, retail and distribution, hydroelectricity, technology and communications, and financial services as industries at risk of being negatively impacted by climate change. 629

A 2013 report prepared for the Global Investor Coalition on Climate Change explains that "[institutional investors are taking note of climate risks" and that "[t]he majority of respondents continue to view climate

change as a material risk across their total portfolio and make reference to this in their investment policy". 630631

The report describes how:

Climate risk analysis in equity portfolios for example is performed by almost 100% of respondents and real estate and infrastructure portfolios are receiving increasing levels of attention with respect to physical climate and policy or regulatory impacts. Around half of asset owners undertook a climate risk assessment at the portfolio level, and around half of these made changes to their investment activities as a result. 632

The report further explains that "[a] number of respondents are either divesting or electing not to invest, based on climate change concerns". 633634

Howard Covington, from Cambridge University, and Raj Thamotheram, from the University of Oxford, have undertaken a detailed analysis of the risks posed to investment portfolios by climate change, and of the prudent response for portfolio managers. They "estimate that in a plausible worst case for climate damage the value at risk in 2030 may be equivalent to a permanent reduction of between 5% and 20% in portfolio value compared to what it would have been without warming". 635 Further, they argue that: "Long-term investors should consider doing whatever they reasonably can to bring a rapid energy transition about and investment fiduciaries may have an obligation to do so". 636

Ninety percent of the companies included in the S&P Global 100 Index list climate change as a present or future threat to business. 637 There are many specific industries and investments which are especially threatened by climate change, from the snow-dependent skiing and hydroelectricity industries of North

625 National Round Table on the Environment and the Economy, *Managing the business risks and opportunities of a changing climate: A primer for executives on adaptation to climate change*, p. 3.

626 Ibid., p. 2.

627 See also: National Round Table on the Environment and the Economy, *Leveraging investments in climate science and impacts and adaptation research to support business responses to climate change today*.

628 National Round Table on the Environment and the Economy, Managing the business risks and opportunities of a changing climate: A primer for executives on adaptation to climate change, p. 2.

629 National Round Table on the Environment and the Economy, Facing the Elements: Building Business Resilience in a Changing Climate, p. 9-10.

630 Global Investor Coalition on Climate Change, Global Investor Survey on Climate Change : 3rd Annual Report on Actions and Progress, p. 5, 7.

631 See also: Yeo, Fund managers worth \$14tr say climate change influences investments.

632 Global Investor Coalition on Climate Change, Global Investor Survey on Climate Change : 3rd Annual Report on Actions and Progress, p. 6.

633 Ibid., p. 6.

634 See also: Vittorio, Investors See Climate Change as Risk That Influences Decisions: Report.

635 Covington and Thamotheram, The Case for Forceful Stewardship (Part 1): The Financial Risk from Global Warming.

636 Covington and Thamotheram, The Case for Forceful Stewardship (Part 2): Managing Climate Risk.

92

America to investments in low-lying property. 638639 Once Toronto350.org has received more information about the university's portfolio, it may be possible to begin quantifying these risks. 640

3.7.5 Attractive substitutes exist for divested equities

There are many attractive alternatives that could form substantial portions of the university's portfolio. The renewable energy sector has strong growth potential and is starting to match conventional fossil-fuel energy prices (let alone unconventional energy prices). According to the NRTEE: "Understanding the implications of the global low-carbon transition for Canada and making choices that maximize the opportunities and minimize the risks are critical to Canada's long-term prosperity". 641 In particular, they argue that the "public and

private sectors need to mobilize investment in low-carbon infrastructure and technology". 642 Analysis from the Climate Policy Initiative found that: "the transition from fossil fuels to renewable electricity, the savings from avoided fossil fuel investment and operating costs would more than offset the increased capital investment and stranded assets, leading to a net financial benefit of up to \$1.8 trillion from 2015-2035". 643 Unsubsidised renewable energy is now cheaper than electricity from new-build coal- and gas-fired power stations in Australia, according to new analysis from research firm Bloomberg New Energy Finance. 644 Solar power is predicted to be cheaper than fossil fuel power in the U.S. as soon as 2015. 645 In March 2013, 100 percent of the new energy on the U.S. grid was solar power. 646

There are now six three broad-based mutual funds that are completely fossil free: Green Century Balanced Fund (GCBLX), Portfolio 21 Global Equity Mutual Fund (PORTX), Green Century Equity Fund (GCEQX), Parnassus Endeavor Fund (PARWX), Pax World Growth Fund (PXWGX), and Shelton Green Alpha Fund (NEXTX). 647 The GCBLX is solidly in the middle of its grouping regarding overall rating, returns and risk of the category, 648 and as mentioned earlier, the PORTX has actually out-performed its peers. 649 The Shelton Green Alpha Fund only started recently, and hasn't yet received a rating. 650 With growing interest in divestment, fossil free funds are becoming increasingly common. In fact, since the first publication of this brief, the number of broad based fossil free funds has doubled. These funds are also financially acceptable options. In a report entitled "The Climate has Changed: Exploring the Investment Potential of Fossil Fuel Free Portfolios", the Responsible Investment Association of Canada states that: "while [fossil fuel free] funds may not offer a radically more profitable opportunity than traditional funds, they do offer a comparable investment option for investors". 651

638 The British Columbia ski industry alone is worth \$600 million per year. Hydroelectricity depends on winter snowfall in many parts of the world to balance out the flow rate into reservoirs between high precipitation winter months (where snow builds up) and low precipitation summer months (where melting snow helps maintain reservoir levels). Johansen, Peak Snow? BC Ski Resorts Brace for Warmer

Era.

639 See also: Carman, Near total loss of glacial ice in B.C., Alberta expected by 2100, researchers say – Skiing, salmon spawning may also be casualties of melting.

640 See: U of T's portfolio

641 National Round Table on the Environment and the Economy, Framing the Future: Embracing the Low-Carbon Economy, p. 15.

642 Ibid., p. 17.

643 Climate Policy Initiative, Moving to a Low-Carbon Economy: The Financial Impact of the Low-Carbon Transition, p. 16.

644 Bloomberg New Energy Finance, Renewable Energy Now Cheaper Than New Fossil Fuels in Australia.

645 GlobalData, Grid Parity for Wind and Solar Power – Future Outlook and Impact Analysis .

646 Fleischfresser, Solar power produced 100% of new energy on U.S. grid in March.

647 Fossil Free, Move My Money.

648 Fidelity Investments, GCBLX Summary – Green Century Balanced Fund.

649 Fidelity Investments, PORTX Summary – Portfolio 21 Global Equity Fund Class R.

650 Fidelity Investments, NEXTX Summary – Shelton Green Alpha.

651 The Responsible Investment Association of Canada, The Climate has Changed: Exploring the Investment Potential of Fossil Fuel Free Portfolios,

93

A report from Bloomberg New Energy Finance argues that:

Clean energy is a trillion-dollar investment opportunity for institutional investors. We forecast \$5.5trn of investment in renewable energy power generation investment from today through 2030, half of which will happen in the next decade. As this capacity is being built, new financial instruments are emerging to recycle capital and allow institutional investors easier access to the sector. 652

The report describes divestment as an opportunity, saying that it represents: "an opportunity to create new investment opportunities, and to convince holders of trillions of dollars of capital that alternatives

to fossil fuels are equally worthy investments". 653

There is a body of credible evidence demonstrating that environmental, social, and governance (ESG)

considerations often have a role to play in the proper analysis of investment value. As such they cannot be

ignored, because doing so may result in investments being given an inappropriate value. A UNEP Finance

Initiative report points out, "many people wonder what good an extra percent or three of patrimony are worth

if the society in which they are to enjoy retirement and in which their descendants will live deteriorates". 654

The report notes that, in Canada, there is an increasing frequency of debate regarding ESG issues, and that

there is "considerable and persistent support" for increased consideration of ESG investment strategies.

U of T's holdings, being long-term and widely diversified, make it what has been termed a "universal

owner". This means that "[b]ecause their fortunes are closely linked to the overall performance of the

entire economy, more than to the individual performance of any particular asset or industry within their

portfolio, it is in the financial best interest of universal owners perform [ance] to support a sustainable

economy and efficient financial markets". 655 In their recent paper on Climate Responsible Investing,

Cleveland and Reibstein suggest that "a universal owner's broad portfolio and need for a stable long-

term position provides strong motivation to support policy measures that seek to correct such market

imperfections, of which climate change is arguably the most pressing at this time". 656 By divesting from

fossil fuels U of T would be pulling their support out of the industry that is putting the remainder of

their holdings at risk.

3.7.6 Pensions and climate change

Pensions are intended to allow the pensioner to enjoy a satisfactory, even comfortable, retirement. However,

the more the climate changes, the lower the retirees' quality of life will be. A study conducted by the World

Bank makes it clear that a 4 °C hotter world would be much more hostile than one in which there has only

been a 2 °C rise, with 6 °C or greater rises being more hostile still. 657 The previous s

ections of this brief demonstrate that even a 2 °C rise will result in a greater frequency of natural disasters than the relative climate stability of the development of human civilisation thus far. Indeed, the world's top scientists have calculated

p. 26.

652 Bloomberg New Energy Finance, Fossil fuel divestment a \$5 trillion challenge, p. 8.
653 Ibid., p. 16.

654 United Nations Environment Programme, A legal framework for the integration of environmental, social and governance issues into institutional investment.

655 Cleveland and Reibstein, The Path to Fossil Fuel Divestment for Universities: Climate Responsible Investment, p. 8.
656 Ibid., p. 10.

657 The World Bank, Turn Down the Heat Why a 4°C Warmer World Must be Avoided.

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that a concentration of CO₂ in the atmosphere that is higher than 350 ppm is incompatible with the planet "on which civilization developed and to which life is adapted". 658 The relationship between pension obligations and climate change has already been acknowledged by financial analysts. In their report to the UNEP Finance Initiative, Freshfields Bruchhaus Deringer explain: "Following the recent release of a report by Mercer Investment Consulting noting the financial impact that climate change has already had on companies' costs, revenues, assets and liabilities, the UK Carbon Trust expressed the view that 'Pension fund trustees have a duty to address the financial risk posed by climate change when making investment decisions'". 659 The Carbon Trust report further explains that: "[i]t is crucial that actions to address climate risk be taken by pension fund trustees" and "the impact of climate change on corporations is not just something to worry about over the longer-term, it is an issue to consider today". 660661

In their report for the Canadian Centre for Policy Alternatives, Marc Lee and Brock Ellis

also consider the special question of divestment and pension funds. They highlight how "[a]ddressing risk is inherent to financial market investment" but point out that "there has been a general failure to account for climate risks, and a tendency to view any screening for environmental purposes to be detrimental to financial performance". 662

They also argue that: "by not accounting for climate risk, large amounts of invested capital are vulnerable to the carbon bubble". 663 In assessing the university's obligation toward pensioners, it is also worth thinking beyond

the simple metric of the financial performance of their pension funds. Unmitigated climate change is expected

to cause substantial harm to both human prosperity and the quality of the natural environment around the

world. In his comprehensive study of the economics of climate change, Nicholas Stern concluded that failing

to mitigate climate change "create risks of major disruption to economic and social activity... on a scale similar

to those associated with the great wars and the economic depression of the first half of the 20th century". 664

Stern projected that up to 20 percent of global GDP could be swallowed up by damage from climate change.

Since the publication of the Stern Review in 2007, Nicholas Stern has stated that they underestimated the

threat in their assessment. 665 He has also drawn specific attention to the mismatch between the size of proven

fossil fuel reserves and the quantity of fossil fuels that can be burned without exceeding the 2 °C target. 666

In evaluating its obligations to pensioners, the university must consider both their financial welfare (which

is threatened by unmitigated climate change) and the kind of impoverished world future pensioners can be

expected to inhabit if nothing is done to seriously constrain how much fossil fuel is burned.

It is in the best interests of the future pensioners of U of T (its current employees) to live in a world with

a stable climate. Elizabeth Sawin of the Sustainability Institute explains the long lifetime of GHGs in the

atmosphere by comparing it with educational timelines. By the time a college president who is now 55 retires,

89% of the CO₂ released between 2012 and 2016 would remain in the atmosphere. The same article also

highlights the perspective of students:

Even if today's college students live to be 100 years old, more than half of the CO₂ released into

658 Hansen et al., Target Atmospheric CO₂ : Where Should Humanity Aim?

659 United Nations Environment Programme, A legal framework for the integration of environmental, social and governance issues into institutional investment, p. 11.

660 Carbon Trust, A Climate for Change: A Trustee's Guide to Understanding and Addressing Climate Risk, p. 2, 10.

661 See also: Michelson, The Norwegian Government Pension Fund's investments in Canadian tar sands may be illegal, concludes a legal opinion.

662 Lee and Ellis, Canada's Carbon Liabilities: The Implications of Stranded Fossil Fuel Assets for Financial Markets and Pension Funds, p. 8-9.

663 Ibid., p. 9.

664 Stern, The Economics of Climate Change: The Stern Review, See also: http://www.hm-treasury.gov.Uk/d/Executive_Summary.pdf.

665 Adam, J underestimated the threat, says Stern.

666 Stern, A profound contradiction at the heart of climate change policy.

95

the atmosphere during the four years they are in college will still be present there at the end of their lives – warming the planet and contributing to extreme events, like droughts, floods, and storms all the while – long after the decision makers behind those investment choices will have left office. The college students across the US who are arguing that their education should not be funded by actions that diminish the health of the world in which their future will unfold have a strong case, supported by the basic physics of the climate. 667

James Powell, former-president of Oberlin, Franklin and Marshall, and Reed College, further reinforces this concept, suggesting that trustees have a quasi-legal duty to do all they can about climate change: "The board is supposed to make sure that the endowment allows for intergenerational equity, that the students who are

going to Oberlin in 2075 get as much benefit from it as those there now. But with global warming, you're guaranteeing a diminution of quality of life decades out". 668

Therefore, not only is divestment from the fossil fuel industry a sound financial decision for meeting the financial obligations of prudent investment, but the current employees of U of T will benefit from such divestment.

3.8 The significance of the University of Toronto's investments

U of T has significant holdings in fossil fuel companies. For example, the largest two single-company holdings listed by the University of Toronto Asset Management Corporation (UTAM) in 2012 were Royal Dutch Shell Pic (\$9.8 million) and BP PLC (\$7.8 million). 669 Although not all investment quantities are listed by UTAM, and the precise quantity of investment is likely to change frequently, it is clear from UTAM's reports that direct holdings of fossil fuel companies are a significant part of U of T's endowment.

Likewise, although not all of the 200 companies listed in Appendix II: The 200 companies with the largest fossil fuel reserves are purely fossil-fuel companies, the holdings of those companies is significant. Another large investment listed in 2012, Rio Tinto PLC (\$5.3 million), is primarily a mining company, but also has large fossil fuel reserves, with a quantity of CO₂ estimated at 5.23 Gt, meaning it has the 14th-largest reserves out of the coal companies listed. 670 The Energy and Minerals section of the Rio Tinto Group was responsible for 28 percent of underlying earnings in 2008. 671 Most of the 200 companies listed in the appendix have much higher proportion of fossil-fuel attachments, as many of them are primarily fossil-fuel companies, and collectively they possess a quantity of fossil fuels sufficient to breach the 2 °C barrier and impose dangerous climate change on the rest of the world. In most if not all cases, more than ten percent of the revenues of the 200 listed firms are derived from the undesirable activity of fossil fuel production, as specified in the Procedures for Responding to Social and Political Issues with Respect to University Divestment.

If U of T decided to divest, it would have an impact out of proportion with how much of each firm's market

capitalization is owned by the university. This is because of the important signal divestment would send to the university's peer schools, as well as to other institutional investors.

667 Sawin, Carbon Dioxide Will Persist in the Atmosphere Long After Current Decision Makers Have Left Their Roles: On Ethical Grounds, Young People Should Have a Say.

668 McKibben, The Case for Fossil-Fuel Divestment.

669 University of Toronto Asset Management Corporation, International Equities Above \$1 Million As at March 31, 2012.

670 Carbon Tracker Initiative, Unburnable Carbon: Are the world's financial markets carrying a carbon bubble?

671 Rio Tinto Annual Report 2008, Rio Tinto Chartbook.

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3.9 Toward divestment

Many resources now exist to guide those who are considering fossil fuel divestment. In addition, asset managers, indexing firms, and other financial intermediaries are rapidly developing new products and services to respond to investor demand for fossil-free investment options. The following resources provide valuable guidance:

- Institutional Pathways to Fossil-Free Investing by Joshua Humphreys 572
- Resilient Portfolios & Fossil-Free Pensions by HIP Investor Inc. and GoFossilFree.org 673
- Divestment from Fossil Fuels: A guide for city officials and activists 574
- The Climate Change Guide – Corporate Canada: Responsible Business Action on Climate Change 675
- Climate Proofing Your Investments: Moving Funds Out of Fossil Fuels 676
- The Path to Fossil Fuel Divestment for Universities: Climate Responsible Investment 677

In November 2014, Cambridge Associates, an institutional investment advisor that serves endowments,

announced that they would support universities and other institutions that wish to divest from fossil fuels. 678

; Humphreys, Institutional Pathways to Fossil-Free Investing.
'HIP Investor, Resilient Portfolios & Fossil-Free Pensions.

'Mayor's Innovation Project, Divestment from Fossil Fuels: A guide for city officials and activists.

'Canadian Business for Social Responsibility, The Climate Change Guide – Corporate Canada : Responsible Business Action on Climate Change.

'The Australia Institute, Climate Proofing Your Investments: Moving Funds Out of Fossil Fuels.

Cleveland and Reibstein, The Path to Fossil Fuel Divestment for Universities: Climate Responsible Investment.

'McChesney, Key Points from the Cambridge Associates Decision.

Chapter 4

Actions have been taken by the Canadian government and international bodies on this issue

4.1 From the U of T divestment policy

Responses should be based on the following principles:

(Hi) actions taken by the Canadian government or other national or international bodies with regard to the particular issue of concern.

4.2 Canadian federal government

Emission standards for passenger vehicles and light trucks In November 2012, proposed regulations were released for vehicles beginning with the 2017 model year. Average emissions from vehicles in 2025 are expected to be 50 percent of those sold in 2008. 1

Heavy duty vehicles In April 2012, the federal government released regulations for heavy duty vehicles beginning with the 2014 model year. 2

Coal-fired power plants In September 2012, final regulations were introduced to limit emissions from the coal-fired electricity sector. 3

Renewable fuel requirement As of December 2010, gasoline is required to contain an average of five percent renewable content, with a two percent requirement for diesel fuel. 4

Carbon capture and storage (CCS) Canada's federal and provincial governments have committed a total of approximately \$3 billion in funding for CCS, which could lead to as many as five to six large-scale demonstration projects in Canada. 5

Agricultural greenhouse gases Canada is contributing \$27 million toward the Global Research Alliance on Agricultural Greenhouse Gases, a group created to advance research, technology transfer, and adoption of beneficial management practices to mitigate agricultural greenhouse gases. 6

Environment Canada also publishes information on Canada's GHG emissions as part of its suite of environmental indicators. 7

1 Environment Canada, Reducing Greenhouse Gases.

2 Ibid.

3 Environment Canada, Harper Government Moves Forward on Tough Rules for Coal-Fired Electricity Sector.

Environment Canada, Reducing Greenhouse Gases.

5 Ibid.

6 Ibid.

Environment Canada, National Greenhouse Gas Emissions.

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4.3 Government of Ontario

The province of Ontario has implemented plans, based on its 2007 Climate Change Action Plan, to reduce its GHG emissions to "6 percent below 1990 levels by 2014; 15 percent below 1990 levels by 2020; and 80 percent below 1990 levels by 2050".⁸ As stated on the website of the Ontario Ministry of Agriculture and Food: "All sectors of Ontario society must contribute to lowering our GHG emissions, including the agricultural industry, food processors and rural communities".⁹

Emission reduction targets The Government of Ontario has legislated greenhouse gas emission reduction targets of 6 percent below 1990 levels by 2014, 15 percent below by 2020, and 80 percent below by 2050.¹⁰

Phasing out coal The Government of Ontario committed to phasing out coal-fired electricity generation by 2014.¹¹

Public transit investments The Ontario government is contributing over \$9 billion to the Metrolinx Regional Transportation Plan.¹²

Green Energy Act Ontario's 2009 Green Energy Act created a system of feed-in tariffs to support the deployment of renewable energy options including solar photovoltaic, biogas, biomass, landfill gas, and wind power.¹³ It established a right for all renewable energy projects to be connected to the grid, streamlined the approval process for green energy projects, and began the implementation of a 'smart' energy grid.

Forest protection Ontario has protected roughly half of the province's boreal forest from mining and forestry,

motivated in part by the forest's importance as a carbon sink. 14

Establishment of a Climate Change Secretariat In 2008, the province created a permanent secretariat to coordinate its Climate Change Action Plan. 15

Community Go Green Fund The province provided \$6 million to 90 community groups in order to help charitable or environmental organizations, youth or cultural associations, educational institutions, and Aboriginal communities reduce their carbon footprint. 16

4.4 City of Toronto

Climate Change Action Plan

The city's Climate Change, Clean Air and Sustainable Energy Action Plan was unanimously adopted by Toronto City Council in July 2007. The city allocated over \$1 billion over the next five years to projects to reduce greenhouse gas emissions. 17

These commitments included:

Government of Ontario, Annual Report 2008-09: Climate Change Action Plan, p.3.
'Ontario Ministry of Agriculture and Food, Climate Change and Agriculture.
'"Government of Ontario, Annual Report 2008-09: Climate Change Action Plan, p.3.

11 Government of Ontario, Ontario Regulation 496/07: Cessation of Coal Use – Atikokan, Lambton, Nantcoke and Thunder Bay Generating Stations.

12 Ontario Ministry of the Environment, Climate Change – Greening Our Ways.

13 Ontario Ministry of the Environment, Green Energy Act.

14 ForestEthics, Robbing the Carbon Bank Global Warming & Ontario's Boreal Forest.

15 Ontario Ministry of the Environment, Climate Change – Greening Our Ways.

16 Ibid.

17 Toronto Environment Office, Climate Change, Clean Air and Sustainable Energy Action Plan.

- \$67 million for the Better Building Partnership and the Sustainable Energy Funds, which are low interest revolving loan funds that support energy conservation and renewable energy;
- \$136 million for energy retrofits to and installation of renewable energy systems on city-owned buildings;
- \$24 million for tree planting, in addition to the \$40 million a year operating budget for the city's Forestry Unit;
- \$36 million to accelerate implementation of the city's bike plan;
- \$20 million for the Live Green Toronto program which provides support for neighbourhood and community groups in taking action on climate change;
- \$10 million for continued conversion of traffic signals to LED lights;
- \$7 million for the Clean Roads to Clean Air street sweeping initiative;
- \$186 million for water efficiency and improved energy efficiency in Toronto Water operations that will achieve an annual avoidance of an estimated 14,000 tonnes of GHG emissions;
- \$21 million for methane gas capture and control at closed and operating landfills;
- \$67 million to build anaerobic digestion facilities that will capture biogas from collected Green Bin organic materials and generate enough electricity to power an estimated 1,700 homes;
- \$380 million to improve rapid transit services, such as new light rapid transit lines, rapid transit routes for buses, and an improved signalling system that will increase the capacity of the Yonge subway line;
- \$400 million to purchase of electric -hybrid buses; and
- \$10 million plus for a range of initiatives including the Green Fleet Transition, the Eco-Roofs and Green-roofs Incentive programs, and support initiatives that promote production and consumption of locally grown food.

These investments are specifically justified with reference to the danger of climate change, with expected impacts on the city including rising mean temperatures, warmer winters, changes in disease vectors, changes in precipitation patterns, increased extreme weather, falling lake and stream levels, and rising sea levels. 18

The City of Toronto has also committed to specific greenhouse gas reduction targets, starting with the city's 1990 baseline level of approximately 22 million tonnes per year:

- 6 percent by 2012 (1,320,000 tonnes per year)
- 30 percent by 2020 (6,600,000 tonnes per year)
- 80 percent by 2050 (17,600,000 tonnes per year) 19

Other actions taken by the city include:

Adaptation The city is making efforts to prepare for the impacts of climate change, through programs and policies including Toronto's Heat Alert system and Hot Weather Response Plan, The Wet Weather Flow Master Plan, Green Roof Pilot Incentive Program, Deep Lake Water Cooling (Enwave), Peakserver and Keep Cool Programs (Toronto Hydro), Green Development Standard, and Better Buildings Partnership.

Great Lakes Climate Change Policy Coordination Along with 10 other cities in the Great Lakes region, Toronto is working to develop an international city-level policy on climate change.

Landfill gas The City of Toronto collects and burns landfill gases that are emitted at its three largest landfill sites: Keele Valley, Brock West, and Beare. The city explains that: "the process of collecting and incinerating landfill gases is crucial to the goal of combating the emission of greenhouse gases into the

18 *ibid.*

19 City of Toronto, Toronto Atmospheric Fund – Emission reduction.

atmosphere".

Greenhouse Gas and Air Emissions Inventory In 2007, the city completed a combined GHG and air quality emissions inventory, with information about energy consumption and pollutants within the city.

Concern about oil sands pipelines The Toronto City Council has expressed its desire to review the application of Enbridge to reverse their Line 9 pipeline to carry diluted bitumen from the oil sands. The city may apply to become an intervenor in the National Energy Board process. A progress report issued in March 2013 concluded that: "The City Community is expected to exceed its

approved 2012 target of a 6 percent reduction from 1990 in greenhouse gas emissions and could well exceed

a 37 percent reduction". 21

4.5 Actions taken by other national bodies

The extensive actions undertaken by other countries demonstrate the seriousness of climate change. In many cases, they have implemented significantly more ambitious policies than those enacted in Canada to date.

These actions demonstrate how, in the view of the world's major governments, the need to mitigate climate change is not properly the subject of academic inquiry and debate.

United States Federal government

At the federal level, under the leadership of President Obama, the White House has taken many steps toward mitigating and adapting to climate change. 222324

Monitoring Emissions The U.S. is comprehensively cataloguing greenhouse gas emissions from its largest emitting sources. 25

Government Procurement and Energy Consumption President Obama directed the Federal Government – the largest energy consumer in the U.S. economy – to reduce its greenhouse gas emissions

from direct sources, such as building energy use and fuel consumption, by 28 percent by 2020. 26 He also directed federal agencies to reduce their greenhouse gas emissions from indirect sources, such as those from employee commuting, by 13 percent by 2020. 27

Climate Change Adaptation Task Force (CCATF) and the U.S. Global Change Research Program (USGCRP) The CCATF advises on how federal agency policies and programs can better prepare the U.S. to address the risks associated with a changing climate. 28 The USGCRP is a collaborative effort involving 13 federal agencies to evaluate the current and future impacts of climate change, inform policy-makers and the public about scientific findings, and investigate effective ways to reduce greenhouse gas emissions and deploy cost-effective clean energy technology. 29

20 City of Toronto, Toronto Atmospheric Fund – Emission reduction.

21 City of Toronto, Summary of Toronto's 2011 Greenhouse Gas and Air Quality Pollutant Emissions Inventory, p. 15.

22 The White House, Climate Change.

23 The White House, Climate Change Adaptation Task Force.

24 The White House, Develop and Secure America's Energy Resources.

25 United States Environmental Protection Agency, Greenhouse Gas Reporting Program.

26 Council on Environmental Quality, Federal Leadership in Environmental, Energy and Economic Performance – Executive Order 13514.

27 Ibid.

28 The White House, Climate Change Adaptation Task Force.

29 United States Global Change Research Program, About.

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Investing in Clean Energy With the support of administration policy, the U.S. has nearly doubled renewable

energy generation from wind, solar, and geothermal sources since 2008. 30 Since 2009, the Department of Interior has approved 29 onshore renewable energy projects, including 16 solar, five wind, and eight geothermal projects. 31 Moving forward, the Department of Interior is committed to issuing permits for 10,000 megawatts of renewable power on public lands and in offshore waters by the end of 2012, enough to power three million homes. 32 In 2010, President Obama also set a goal of breaking ground on at least four commercial scale cellulosic or advanced biorefineries by 2013. 33 That goal was accomplished a year ahead of schedule. 34

Smart Grid In 2011, the administration announced that it would accelerate the permitting review of seven proposed electric transmissions lines. 35 These infrastructure projects, when built, will increase grid capacity, facilitating better integration of renewable energy sources, avoiding blackouts, and helping to accommodate the growing number of electric vehicles on the road. 36 The administration also launched a Green Button initiative in 2011 to empower Americans to reduce energy use in their homes. 37 Already, utilities across the country have committed to providing 27 million households with access to data about their own energy use with a simple click of an online "Green Button" that will help them reduce waste and shrink their energy bills. 38

Clean Energy Research & Development In 2009, the administration funded the Department of Energy's Advanced Research Project Agency-Energy (ARPA-E), which focuses on "out-of-the-box" transformational energy research that brings together the nation's best scientists, engineers, and entrepreneurs. 39 Building upon the initial investment, in late September 2011, the ARPA-E program announced 60 cutting-edge research projects in 25 states. 40 In total, the ARPA-E has supported more than 120 individual projects. 41

Clean Energy Innovation Hubs The administration also launched a series of clean energy innovation hubs, which bring together teams of the best researchers and engineers in the U.S. to solve major energy challenges. 42 The hubs will focus on improving batteries and energy storage, reducing constraints from critical materials, developing fuels that can be produced directly from sunlight, improving e

energy efficient

building systems design, and using modelling and simulation for advanced nuclear reactor operations. 43

The President's Better Buildings Challenge The President's Better Buildings Challenge has set a goal of improving the energy efficiency of commercial buildings by 20 percent by 2020. 44 The administration has also partnered with manufacturing companies, representing over 1,400 plants, to improve energy efficiency by 25 percent over ten years. 45

30 The White House, Obama Administration Record on an All-of-the-Above Energy Strategy.

31 Ibid.

32 United States Department of the Interior, Salazar Authorizes Landmark Wyoming Wind Project Site.

33 The White House, Obama Administration Record on an All-of-the-Above Energy Strategy.

34 Ibid.

35 United States Department of Energy, Obama Administration Announces Job-Creating Grid Modernization Pilot Projects.

36 Ibid.

37 Office of Science and Technology Policy, Green Button: A Smart Decision.

38 Ibid.

39 Wurzelmann, "Advanced Research Projects Agency – Energy (ARPA-E): Innovation Through the U.S. Department of Energy".

40 Advanced Research Projects Agency, Department of Energy Awards \$156 Million for Groundbreaking Energy Research Projects.

41 Ibid.

42 United States Department of Energy, Energy Innovation Hubs: Achieving Our Energy Goals with Science.

43 United States Department of Energy, Energy Innovation Hubs.

44 United States Department of Energy, Progress Update Spring 2013.

45 Ibid.

In June 2013, President Obama announced a new climate change action plan. 46 Among the substantive commitments, it included a promise to set limits for CO₂ emissions from existing power plants – the largest source of GHG pollution in the U.S. The plan also includes accelerated permitting for renewable energy, energy grid modernization, further increases to vehicle fuel efficiency standards, restrictions on the release of hydrofluorocarbons and methane, as well as new energy efficiency initiatives.

The Environmental Protection Agency (EPA)

The EPA develops standards for greenhouse gas emissions from mobile and stationary sources under the Clean Air Act. 47 Its federal regulatory activities are in addition to its volunteer water monitoring programs, international partnerships, and partnerships with states and tribes. 4849

Standards to Cut Greenhouse Gas Emissions and Fuel Use for New Motor Vehicles The EPA is enabling the production of a new generation of clean vehicles – from the smallest cars to the largest trucks – through reduced GHG emissions and improved fuel use. 50 Together, the enacted and proposed standards are expected to save more than six billion barrels of oil through 2025 and reduce more than 3,100 million metric tonnes of CO₂ emissions. 51

Renewable Fuel Standard (RFS) Program A set of regulations to ensure that transportation fuel sold in the U.S. contains a minimum volume of renewable fuel. 52 By 2022, the RFS program will reduce GHG emissions by 138 million metric tonnes, about the annual emissions of 27 million passenger vehicles, replacing about seven percent of expected annual diesel consumption. 53

Proposed Carbon Pollution Standard for New Power Plants On March 27th 2012, the EPA proposed a Carbon Pollution Standard for New Power Plants that would, for the first time, set national limits on the amount of carbon pollution that power plants can emit. 54 The proposed rule, which applies only to new fossil-fuel-fired electric utility generating units, will help ensure that current progress continues toward a cleaner, safer, and more modern power sector. 55

Oil and Natural Gas Air Pollution Standards On April 18th 2012, the EPA finalized cost-ef

fective regulations to reduce harmful air pollution from the oil and natural gas industry, while allowing what they consider to be responsible growth in U.S. oil and natural gas production. 56 The final rules are expected to yield a nearly 95 percent reduction in VOC emissions from more than 11,000 new hydraulically fractured gas wells each year. 57 The rules will also reduce toxic air pollution and emissions of methane, a potent GHG. 58

Geologic Sequestration of Carbon Dioxide The EPA has finalized requirements for geologic sequestration, including the development of a new class of wells, Class VI, under the authority of the Safe Drinking

46 Executive Office of the President, The President's Climate Action Plan.

47 United States Environmental Protection Agency, Air Enforcement.

48 United States Environmental Protection Agency, EPA's Volunteer Monitoring Program.

49 United States Environmental Protection Agency, About the Office of International and Tribal Affairs.

50 United States Environmental Protection Agency, Regulatory Initiatives.

51 Ibid.

52 Ibid.

53 Ibid.

54 Ibid.

55 Ibid.

56 Ibid.

57 Ibid.

58 Ibid.

Water Act's Underground Injection Control Program. 59

The EPA is also taking adaptation measures. These include:

- The Climate Ready Estuaries program works with the National Estuary Programs and the coastal management community to: assess climate change vulnerabilities, develop and implement adaptation strategies, and engage and educate stakeholders. 60
- The EPA's Climate Ready Water Utilities initiative assists the water sector, which includes drinking water, wastewater, and stormwater utilities, in addressing climate change impacts. 61

Some federal departments are also taking actions specific to their purview. For example, the Department of Transportation's (DOT) Congestion Mitigation and Air Quality Improvement Program provides over \$8.1 billion dollars in funds to state DOTs, metropolitan planning organizations, and transit agencies to invest in projects that reduce emissions from transportation-related sources. 62 Since October 2009, the Department of Energy and the Department of Housing and Urban Development have jointly completed energy upgrades in more than one million homes across the country. 64

Regional, state, and local level

There are a vast number of initiatives happening across the U.S. at the regional, state, and local levels. Due to the sheer volume, these initiatives cannot possibly be comprehensively catalogued in this brief. However, the website of the Department of Transportation includes useful links to local action plans and databases of regional initiatives across the country. 65

One notably aggressive regional initiative is California Senate Bill XI -2, signed into law as the California Renewable Energy Resources Act by California Governor Jerry Brown in 2011. 67 The act directs the California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of electricity generated from eligible renewable energy resources to at least 20 percent of the total electricity sold to retail customers in California per year by December 31st 2013, 25 percent by December 31st 2016, and 33 percent

by December 31st 2020. 68

Joint State-Provincial Initiatives

There are several cross-border initiatives between U.S. states and Canadian provinces that are working to address climate change. These initiatives have been designed to reduce GHG emissions, develop clean energy sources, and achieve other environmental and economic goals. 69 They include:

North America 2050 " [A] multi-state, multi-regional collaborative working constructively on climate change and clean energy" where "participants are committed to policies that move their jurisdictions toward a low carbon economy while creating jobs, enhancing energy independence and security, protecting public health and the environment, and demonstrating climate leadership". 70

59 *ibid.*

60 United States Environmental Protection Agency, *Water: Climate Ready Estuaries*.

61 United States Environmental Protection Agency, *Climate Ready Water Utilities (CRWU)*.

62 United States Department of Transportation, *CMAQ and SAFETEA-LU*.

63 United States Department of Transportation, *Congestion Mitigation and Air Quality Improvement (CMAQ) Program*.

64 The White House, *Develop and Secure America's Energy Resources*.

65 United States Department of Transportation, *Climate Action Plans*.

66 United States Department of Transportation, *State and Regional Initiatives*.

67 Nahai, *California's SB X 1-2 Law Walks Renewable Energy Tightrope*.

68 California Energy Commission, *California Renewable Energy Overview and Programs*.

69 Centre for Climate and Energy Solutions, *Multi-State Climate Initiatives*.

70 *Ibid.*

Western Climate Initiative A coalition consisting of California, British Columbia, Manitoba, Ontario, and Quebec which aims to "reduce regional GHG emissions to 15 percent below 2005 levels by 2020 and spur investment in and development of clean-energy technologies, create green jobs, and protect public health" in part by implementing a "flexible, market-based, regional cap-and-trade program that caps greenhouse gas emissions and uses tradable permits to incent development of renewable and lower-polluting energy sources". 717273

Regional Greenhouse Gas Initiative (RGGI) A cooperative effort involving Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont, the RGGI is the first market-based regulatory program in the U.S. to reduce GHG emissions. The initiative aims to cap and reduce CO₂ emissions from the power sector. 7475

Midwest Greenhouse Gas Reduction Accord This regional agreement between the nine governors in the Midwestern Governors Association (Illinois, Indiana, Iowa, Kansas, Minnesota, Michigan, Missouri, Ohio, and Wisconsin) and the premier of Manitoba aims to establish GHG reduction targets, "[d]evelop a market-based and multi-sector cap-and-trade mechanism to help achieve those reduction targets", establish a system to track GHG reductions, and take additional steps in areas like low-carbon fuel standards. 7677

Transportation and Climate Initiative This regional collaboration "seeks to develop the clean energy economy and reduce oil dependence and greenhouse gas emissions from the transportation sector", with a focus in four main areas: "clean vehicles and fuels, sustainable communities, freight efficiency, and information and communication technologies". 78 Participating jurisdictions include Connecticut, Delaware, the District of Columbia, Maryland, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. 79

United Kingdom

The Climate Change Act 2008 made the U.K. the first country in the world to have a legally binding long-term framework to cut carbon emissions. ⁸⁰ It introduced a long-term framework for managing emissions through a system of national carbon budgets: caps on the total quantity of GHG emissions permitted in the U.K. over a specified time. ⁸¹ Each carbon budget covers a five year period, with the first three carbon budgets running from 2008 to 2012, 2013-2017, and 2018-2022. ⁸² During these periods, emissions must be reduced (from 1990 levels) by 22 percent, 28 percent, and 34 percent. ⁸³

The act also created a framework for building the U.K.'s ability to adapt to climate change, including:

⁷¹ Western Climate Initiative, WCI Provincial and State Partner Contacts.

⁷² Western Climate Initiative, Program Design.

⁷³ Centre for Climate and Energy Solutions, Multi-State Climate Initiatives.

⁷⁴ Regional Greenhouse Gas Initiative, Regional Greenhouse Gas Initiative.

⁷⁵ Centre for Climate and Energy Solutions, Multi-State Climate Initiatives.

⁷⁶ Illinois Energy Association, Governors Sign Climate Platform and Greenhouse Gas Accord .

⁷⁷ Centre for Climate and Energy Solutions, Multi-State Climate Initiatives.

⁷⁸ Transportation & Climate Initiative of the Northeast and Mid-Atlantic States, About us.

⁷⁹ Georgetown Climate Center, Transportation & Climate Initiative of the Northeast and Mid-Atlantic States.

⁸⁰ Department of Energy and Climate Change, The UK's Fifth National Communication under the United Nations Framework Convention on Climate Change.

⁸¹ Ibid.

⁸² Ibid.

⁸³ Ibid.

- a U.K.-wide Climate Change Risk Assessment that must take place every five years,
- a National Adaptation Programme which must be put in place and reviewed every five years to address the most pressing climate change risks to the U.K.,
- a mandate giving the government the power to require "bodies with functions of a public nature" and "statutory undertakers" (such as water and energy utilities) to report on what they are doing to address the risks posed by climate change to their work. 84

The U.K. Department of Energy & Climate Change has set the following national policies and strategies for combating climate change:

- setting carbon budgets to limit the amount of GHGs the U.K. is allowed to emit over a specified time,
- using statistics on GHG emissions and further evidence, analysis, and research to inform energy and climate change policy,
- using the European Union Emissions Trading Scheme (EU ETS) to meet over 50 percent of the U.K.'s carbon emissions reduction target between now and 2020,
- using a set of values for carbon to make sure project and policy appraisals account for their climate change impacts,
- and using the 2050 Calculator to let policy makers and the public explore the different options for meeting the 2050 emissions reduction targets. 8586

They have also developed plans for reducing the demand for energy and helping people and businesses to use energy more efficiently:

- reducing demand for energy with smart meters and other energy-efficient measures for industry, businesses, and the public sector,
- reducing emissions by improving the energy efficiency of properties through the Green Deal,

- providing incentives for public and private sector organisations to take up more energy-efficient technologies and practices through the CRC Energy Efficiency Scheme,
 - reducing GHGs and other emissions from transport,
 - and reducing GHG emissions from agriculture. 87
- They are also investing in low-carbon technologies:
- taking action to increase the use of low-carbon technologies and creating an industry for carbon capture and storage,
 - reducing emissions from the power sector and encouraging investment in low-carbon technologies by reforming the U.K.'s electricity market,
 - and providing over £200 million of funding for innovation in low-carbon technologies from 2011 to 2015. 88

Finally, they are encouraging public reporting carbon emissions from businesses and the public sector:

- encouraging corporate reporting of GHG emissions,
 - and asking English local authorities to measure and report their GHG emissions. 89
- 84 *ibid.*

85 Government of the United Kingdom, Reducing the UK's greenhouse gas emissions by 80% by 2050.

86 Government of the United Kingdom, EU Emissions Trading System (EU ETS).

87 Government of the United Kingdom, Reducing the UK's greenhouse gas emissions by 80% by 2050.

88 *Ibid.*

89 *Ibid.*

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Germany

Targets

In the framework of EU effort sharing under the Kyoto Protocol, Germany has committed itself to cutting its emissions of climate-damaging gases by a total of 21 percent in the period 2008 to 2012 compared with 1990. 90 In addition, Germany has pledged to reduce its GHG emissions by 40 percent by 2020, 55 percent by 2030, 70 percent by 2040, and by 80-95 percent by 2050 (compared with 1990 levels). 91 Germany has also set ambitious targets for increasing the share of renewable energy in final energy consumption, by 18 percent by 2020, 30 percent by 2030, and by 60 percent by 2050. 92 Between 2008 and 2012, the portion of German electricity derived from renewable sources rose from 15 percent to 22 percent. 93 It is expected to reach 48 percent by 2022. 94

Emissions Trading

Emissions trading in particular makes a significant contribution to emissions reductions in Germany. The climate protection targets for the period 2008 to 2012 have been made significantly more stringent: from 2008, old power plants in Germany will be allocated around 30 percent fewer emission allowances. 95 Furthermore, ten percent of the allowances will be auctioned. 96

Feed-In Tariff

The use of an adequate, long-term, and predictable feed-in tariff encourages the construction of many renewable energy production sites. 97 The differentiated feed-in tariff has fostered deployment of a diversified range of renewable energy technologies. 98

Integrated Energy and Climate Programme (IECP)

In order to reach the German climate protection goals the federal government has implemented a comprehensive IECP. 99 Its goal is to ensure an ultra-modern, secure, and climate-friendly energy supply in Germany. 100 It comprises measures for enhanced energy efficiency and expanded use of renewable energy sources. 101

Measures contained in the IECP include:

Amendment to the Combined Heat and Power Act By 2020, the share of high-efficiency CHP plants in elec-

tricity production will be doubled from the current level of around 12 percent to around 25 percent. 102

Amendment to the Energy Industry Act Liberalising electricity metering will facilitate and promote innovative metering methods and demand-related, time-variable tariffs. 103 This will enable consumers to reduce their energy costs and will improve the efficiency of the power generation sector. 104

90 European Commission, Kyoto emissions targets: Joint fulfillment, burden sharing' and base years.

91 German Missions in the United States, Key Messages on German Climate and Energy Policy .

92 Ibid.

93 The Economist, Tilting at windmills, p. 12.

94 Ibid.

95 German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety, The Integrated Energy and Climate Programme of the German Government.

96 Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, General Information – Emissions Trading.

97 H6hne, Niklas and Geurts, Fieke and Teckenburg, Eva, Germany.

98 Ibid.

"Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, General Information – Climate Protection.

100 Ibid.

101 Ibid.

102 German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety, The Integrated Energy and Climate Programme of the German Government.

103 Ibid.

104 Ibid.

107

Report and draft amendment to the Energy Saving Ordinance Energy standards will be tighte

ned by an average of 30 percent from 2009. 105 As a second step (planned for 2012), these efficiency standards will be tightened by a further 30 percent. 106

Clean power plants Standards will be laid down for nitrogen oxide emissions from new power plants. 107

Guidelines on the procurement of energy-efficient products and services Energy-efficient appliances and services will be promoted through priority procurement. 108

Amendment to the Renewable Energy Sources Act The government's goal is to increase the share of renewables in the electricity sector from the current level of over 13 percent to 25-30 percent in 2020, and then to continue increasing the level further. 109 The amendment to the Renewable Energy Sources Act contains among other things new provisions for regulating tariffs for offshore wind farms. 110

Renewable Energies Heat Act The share of renewable energies in heat provision will be increased to 14 percent by 2020. 111 Obligations to use renewable energies in new buildings are laid down in the Renewable Energies Heat Act. 112 Funding for the government support programme for existing buildings will increase – from 130 million euro in 2005 to up to 350 million in 2008 and up to 500 million euro in 2009. 113

Amendment to the Gas Grid Access Ordinance This amendment is intended to ensure that biogas can be fed into the natural gas grid to a greater extent. 114 A share of ten percent biogas is possible by 2030. 115

Amendment to the Biofuel Quota Act The share of biofuels will be increased and from 2015 will be geared more towards reducing GHG emissions. 116 The amendment to the Biofuel Quota Act will lead to a rise in the biofuels' share to around 20 percent by volume (17 percent by energy content) by the year 2020. 117

Sustainability Ordinance The ordinance will ensure that when producing biomass for biofuels, minimum requirements for sustainable management of agricultural land and for the conservation of natural habitats are complied with. 118

Fuel Quality Ordinance The amended ordinance will increase the blending limit of bioethanol in petrol fuels

from five to ten percent by volume. 119 For biodiesel in diesel fuels, this blending limit will increase from

five to seven percent by volume. 120

Reform of vehicle tax to a pollutant and CO₂ basis For new vehicles, this tax will then be calculated on the

basis of a vehicle's emissions rather than engine capacity as before. 121

Chemicals Climate Protection Ordinance This ordinance will reduce emissions of fluorinated GHGs from mo-

bile and stationary cooling installations through provisions on leakproofness and labelling of the instal-

105 *ibid.*

106 *ibid.*

107 *ibid.*

108 *ibid.*

109 *ibid.*

110 *ibid.*

m *ibid.*

112 *ibid.*

113 *ibid.*

114 *Ibid.*

115 *Ibid.*

116 *Ibid.*

117 *Ibid.*

118 *Ibid.*

119 *Ibid.*

120 *Ibid.*

m *Ibid.*

108

lations and on recovery and return of the refrigerants used. 122

China

China has surpassed the U.S. as the world's largest greenhouse gas emitter. Nonetheless, the actions of the

Chinese government show an increasing willingness to take climate change mitigation serio

usly. 123 In 2011, China was the world leader in renewable energy technology investments, spending US\$52 billion. 124 In June 2013, the Chinese government announced that it would spend US\$275 billion over five years on reducing air pollution – equivalent to the GDP of Hong Kong or twice China's annual defence budget. 125

Out of US\$310 billion of total global investment in renewable energy in 2014, 29 percent was invested in China, where the renewable sector has grown more than four times over the last 10 years. In 2014 alone, China invested US\$89.5 billion in clean energy. 126127

Targets

Under China's 12th Five Year Plan, the government set binding targets to reduce energy consumption per unit of GDP by 16 percent, cut CO₂ emissions per unit of GDP by 17 percent, and raise the proportion of non-fossil fuels in the overall primary energy mix to 11.4 percent. 128 At the Copenhagen Climate Change Summit in 2009, the Chinese government signalled its goal to reduce the carbon emissions intensity per unit of GDP by 40¹⁵ percent from 2005 levels by 2020. 129130

In March 2013, China introduced new vehicle fuel efficiency standards of 6.9 litres per 100 km by 2015 and 5.0 litres per 100 km by 2020. 131

Transformation and upgrading of traditional industries

China plans to conserve energy and cut emissions by optimizing and upgrading its industrial structure. 132 The government has stepped up evaluation and examination of energy conservation, environmental impact assessments, and preliminary examination of land used for construction projects. 133 It has raised the entry threshold for certain industries and limited new projects in industries with high energy consumption, high pollutant emissions, or excess capacity. 134 It has also controlled the export of products with high energy consumption and high pollutant emissions. 135

Over the past five years, Chinese carbon emissions per unit of GDP (energy intensity) fell by about 20 percent. The government aims to cut them by 40-45 percent by 2020, mostly by ordering energy efficiency

improvements in state-owned enterprises. In terms of the absolute scale of GHG pollution reduction that would

122 German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety, The Integrated Energy and Climate Programme of the German Government.

123 Jones, China tops CO₂ emissions.

124 Forbes, China Leads The World In Renewable Energy Investment.

125 The Economist, China and the environment: The East is grey, p. 18.

126 Bloomberg New Energy Finance, Global Trends in Clean Energy Investment.

127 See also: The Climate Group, China accounts for 29% of world's total renewable energy investment.

128 Centre for Climate and Energy Solutions, Energy and Climate Goals of China's 12th Five-Year Plan.

129 United Nations Development Programme, Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World, p. 108.

130 Centre for Climate and Energy Solutions, Energy and Climate Goals of China's 12th Five-Year Plan.

131 The Economist, Supermajordammerung, p. 21.

132 China.org.cn, China curbs CO₂ emissions through industrial restructuring.

133 Ibid.

134 Ibid.

135 Ibid.

109

result, The Economist describes the plan as "arguably the single most important climate policy in the world". 136

Supporting the development of strategic and newly emerging industries

China has established a special fund to boost the development of strategic emerging industries, and expanded its venture capital program for emerging industries. 137 So far 102 venture capita

1 funds have been set up under the program, managing a total of 29 billion yuan. 138 Among these funds, 24, with a total value of seven billion yuan, are designed to stimulate the development of the energy-saving, environmental protection and new energy sectors. 139

China invested US\$76 billion in renewable energy in 2012, three times the amount invested in Germany.

China aims to get 20 percent of its energy from renewable sources by 2020, and to have 100 gigawatts of wind capacity and 35 gigawatts of solar capacity by 2015. 140

Carbon pricing

Although this was not included in China's 12th Five Year Plan, there have been reports that the Chinese government will be introducing a carbon tax on major energy consumers before the end of the plan. 141 It is estimated that the tax would begin at 10 yuan (\$1.59) per tonne of CO₂ emitted, and would increase depending on the company's emission levels (information is not yet available on the details of the tax increases). 142

Five Chinese cities (Shanghai, Beijing, Shenzhen, Tianjin, and Chongqing) and two provinces (Guangdong and Hubei) are preparing pilot emissions trading schemes, set to begin in 2013. 143 144 The Chinese government has ordered these areas to set GHG emission control targets, and to implement an emissions trading scheme in order to meet these targets. 145 This pilot project is considered to be an important learning step, leading up to the implementation of a national emissions trading scheme by 2015. 145

India

India's 2007 Integrated Energy Policy includes policies, regulations, and legislation intended to promote climate change mitigation. This includes the promotion of energy efficiency in all sectors, an emphasis on mass transport, an emphasis on renewables including biofuels plantations, provisions for the accelerated development of nuclear and hydroelectric power, and focused research and development on clean energy related technologies.

On June 30th 2008, the Prime Minister's Council on Climate Change released the first National Action Plan on Climate Change. 147148 The plan outlines existing and future policies and programs intended to advance climate mitigation and adaptation. The plan "identifies measures that promote our development objectives while also yielding co-benefits for addressing climate change effectively" and includes eight 'missions' which are to run through 2017:

136 The Economist, China and the environment: The East is grey, p. 21.

137 China.org.cn, Mitigating Climate Change.

138 Ibid.

139 Ibid.

140 The Economist, China and the environment: The East is grey, p. 21.

141 Stanway, David, China to levy carbon tax before 2015 – Report.

142 Ibid.

143 Lutenecker, Brian, Issue Brief: China's Actions on Clean Power.

144 The Economist, China and the environment: The East is grey, p. 21.

145 Lutenecker, Brian, Issue Brief: China's Actions on Clean Power.

146 Ibid.

147 Government of India, Prime Minister's Council on Climate Change, National Action Plan on Climate Change.

148 See also: Center for Climate and Energy Solutions, Summary: India's National Action Plan on Climate Change.

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- National Solar Mission
- National Mission for Enhanced Energy Efficiency
- National Mission on Sustainable Habitat
- National Water Mission
- National Mission for Sustaining the Himalayan Ecosystem

- National Mission for a Green India
- National Mission for Sustainable Agriculture
- National Mission on Strategic Knowledge for Climate Change

In 2010, India announced voluntary targeted reductions of 20-25 percent in carbon intensity.

France Targets

France continues to support the targets stipulated in the Kyoto Protocol and sees the UNFCCC as a primary body through which climate change negotiations will move forward. France has already made progress in reducing its GHG emissions. In 2010, France had reached a 6.6 percent reduction in emissions (compared to 1990 levels). 150 France is committed to meeting the EU target of a 20 percent reduction in emissions by 2020 (1990 levels) and has also set a goal of a 75 percent reduction in emissions by 2050 (1990 levels), with intermediary targets of 40 percent reduction by 2030 and 60 percent reduction by 2040. 151 152 France estimates that it will exceed its targets and achieve a 22.8 percent reduction in GHG emissions by 2020 (compared to 1990 levels). 153

L'Observatoire National sur les Effets du Rechauffement Climatique (ONERC – National Observatory on the Effects of Climate Change)

The ONERC was created by legislation passed on February 19th 2001. 154 It has three main purposes:

- To collect and spread information on risks related to global warming 155
- To formulate recommendations on adaptation measures to mitigate the effects of climate change 156
- To be the focal point of the IPCC in France 157

Strategic nationale d'adaptation au changement climatique (SNACC – National Strategy for Climate Change Adaptation)

France's national adaptation strategy was adopted on November 13th 2006, based on recommendations from the ONERC. 158

It outlines four priority areas for adaptation:

- Acting to ensure public security and health
- Addressing social aspects and inequalities of climate-change risk

149 United Nations Development Programme, Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World, p. 108.

150 Embassy of France in Washington, France – rising to the international climate challenge.

151 French Embassy in Ottawa, France and the fight against global warming.

152 France Diplomatic, Issues and reasons behind the French offer to host the 21st Conference of the Parties on Climate Change 2015.

153 Egert, "France's Environmental Policies: Internalising Global and Local Externalities".

154 Climate-Adapt, ONERC (Observatoire National sur les Effets du Rechauffement Climatique).

155 Egert, "France's Environmental Policies: Internalising Global and Local Externalities".

156 Ibid.

157 Climate-Adapt, ONERC (Observatoire National sur les Effets du Rechauffement Climatique).

158 National Observatory on the Effects of Global Warming, National Strategy for Adaptation to Climate Change.

III

- Limiting costs and taking advantage of the change

- Protecting cultural heritage 159

There are eight strategic action steps developed in the strategy:

- Developing scientific knowledge
- Consolidating observation systems
- Informing and educating all actors
- Promoting a regional and community-oriented approach
- Financing adaptation actions
- Utilizing legislative and regulatory instruments
- Taking into consideration the special status of overseas territories
- Contributing to international cooperation 160

Grenelle Environment

The Grenelle Environment was a series of political talks initiated by Nicolas Sarkozy in September and October 2007 that brought together representatives of all levels of government, civil society, and industry to develop public policy on environmental and sustainable development issues. 161 It has led to the following policies and actions in these areas:

Residential Sector

- After 2012, all new buildings must have average primary energy consumption of less than 50 kWh/m²/year. This standard was implemented after 2010 for all public buildings and for construction under the National Urban Renovation Program. By 2020, all new buildings must have primary energy consumption that is less than the amount of renewable energy produced in the buildings (energy positive buildings). 162
- Eco-loans at zero percent interest allow owners to take 10-15 year loan of up to 30,000 euros towards improving the energy efficiency of their property. This program can be combined with other financial support tools. 163
- All public and state owned buildings will undergo an energy performance assessment by 2

010, and renovations will begin on these buildings in 2012 that should result in a 40 percent reduction in energy consumption and a 50 percent reduction of GHG emissions within a period of eight years. 164

- The 800,000 most energy-intensive social housing units will be renovated by 2020. Loans will be made available at a 1.9 percent interest rate between 2009-2010 to allow for the immediate renovation of 100,000 units, and upgrades will continue at a rate of 70,000 units per year. 165

Transportation

- 2,000 km of high-speed rail will be built by 2020 and an additional 2,500 km will be planned. 166

- France will meet the EU objective of reducing vehicle emission to 120g CO₂ /km. 167

- The "bonus-malus" program in place since January 2008 provides a credit for the purchase of low-emitting vehicles (less than 130g CO₂ /km) and imposes a tax on purchase of vehicles emitting more

159 *ibid.*

160 *ibid.*

161 Vieira and Betaille, Grenelle de Venvironnement Is France Making Up for Lost Time?

162 Ministry of Ecology, Energy, Sustainable Development and the Sea, French Climate Plan

J *Ibid.*

163j

164 *Ibid.*

165 *Ibid.*

166 *Ibid.*

167 *Ibid.*

112

than 160g CO₂ /km. 168

- France had the objective of a 5.75 percent biofuel mix between 2001-2008, and increased the target to seven percent in 2010 and ten percent by 2015. To reach these objectives, a general tax on polluting activities (TGAP) will be imposed on operators not respecting this fuel mix ratio and an exemption program on the domestic tax for petroleum products (TIPP) for biofuels will be implemented. 169

Industry

- The 2005 directive creating a cap and trade system will be reviewed. This review was adopted by the European Parliament and Council in December 2008. It will allow the implementation period to be extended, to harmonize the system of quota allocation and to reinforce the objectives of reducing greenhouse gas emissions in this sector. At the European level, this measure will achieve a 21 percent reduction of emissions in this sector between 2005-2020 (1990 levels). 170

Energy

- Certificates of Energy Efficiency, in place since 2006, will be expanded. 171
- The "Ecoconception" Directive will be implemented.
- Completely retiring incandescent light bulbs by 2012 172
- Limiting the consumption of single digital decoders to 1 W by 2010 and 0.5 W by 2012 173
- Improving the performance of electric chargers and external power supplies 174
- Developing renewable energy to achieve 23 percent mix in energy consumption by 2020 by increasing the annual production of renewable energy by 20 million tons of oil equivalent 175
- Renewable Heat Fund (Fonds chaleur renouvelable): this program created a fund of one billion euros for 2009-2011 to develop renewable sources such as wood, geothermal, and solar to be used for heating in the tertiary sector and in industry. 176

- The tax credit for sustainable development that promotes the purchase of solar water heaters and solar panels was extended until 2012. 177

- The construction of new biomass plants with a capacity of 250 MW 178

- Increasing the capacity of geothermal energy sixfold by 2020, by providing two million homes with heat

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pumps

- A fixed tariff for wind energy and improving the planning and consultation process for new wind turbines; simplification of the process for developing off-shore wind energy 180

- One billion euros will be devoted to research into sustainable development. 181
Solar energy deployment

168 Ministry of Ecology, Energy, Sustainable Development and the Sea, French Climate Plan

169 Ibid.

170 Ibid.

171 Ibid.

172 Ibid.

173 Ibid.

174 Ibid.

175 Ibid.

176 Ibid.

177 Ibid.

178 Ibid.

179 Ibid.

180

Ibid,
^bid.

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- Building a solar plant in each French region for a cumulative power of 300 MW, supported by simplified tariffs to secure long term investment. 182
- Creating a 45 euro cent/kWh tariff to facilitate the installation of solar panels on private buildings 183
- Reducing the administrative and financial steps when panels do not exceed 30 m²
- Increasing the scope of the public buildings that are eligible for the reduced tariff for purchasing electricity produced from renewable sources 185
- Construction permits cannot restrict the installation of renewable energy production systems on buildings. 186

4.6 Actions taken by international bodies

International efforts to address climate change have often been centred around the United Nations Framework Convention on Climate Change (UNFCCC), though many other international forums and organizations have also made efforts to address the issue. The UNFCCC was signed in 1992 and came into force in 1994, after 50 ratifications. The objective of the treaty is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". 187 This has subsequently come to be understood to mean limiting warming to less than 2 °C.

The Kyoto Protocol is an international treaty establishing binding obligations on industrialized countries to reduce GHG emissions. 188 The treaty was opened for signature in 1997 and entered into fo

... rce in 2005 after it was ratified by 55 states accounting for 55 percent of the world's 1990 GHG pollution. Under the protocol, 37 industrial nations as well as the EU are obliged to meet binding lowered emissions targets for GHG emissions. The protocol includes two commitment periods: the first period applies to emissions between 2008-2012 while the second applies to emissions between 2013-2020. At the December 2012 UNFCCC Conference of the Parties, it was agreed that a successor to the Kyoto Protocol would be established by 2015.

Canada has repeatedly endorsed the 2 °C limit for warming, including by signing the 2009 Copenhagen Accord which recognizes "the scientific view that the increase in global temperature should be below 2 degrees Celsius". 189

World Health Organization

On World Health Day in 2008, the World Health Organization (WHO) chose to highlight the effects of climate change on human health in recognition of the increasing risk that climate change poses to global public health

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security.

182 *ibid.*

183 *ibid.*

184 *ibid.*

185 *ibid.*

186 *ibid.*

187 Parties to the United Nations Framework Convention on Climate Change, United Nations Framework Convention on Climate Change, Article 2: "Objective".

188 Parties to the Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto Protocol to the United Nations Framework Convention on Climate Change.

189 The Heads of State, Heads of Government, Ministers, and other heads of delegation present at the United Nations Climate Change Conference 2009 in Copenhagen, Copenhagen Accord, Article 1.

190 World Health Organization, World Health Day 2008: protecting health from climate change.

114

In collaboration with the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety, the European regional office of the WHO has launched a broad-scale initiative to protect health from climate change across seven countries including Albania, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, the former Yugoslav Republic of Macedonia, and Uzbekistan. 191 The initiative includes action on climate adaptation and strengthening health infrastructure.

In 2010, the WHO and United Nations Development Programme (UNDP) launched Climate Change Adaptation to Protect Human Health, the first ever global public health project focusing on a adaptation to climate change. The program aims "to increase adaptive capacity of national health system institutions, including field practitioners, to respond to climate-sensitive health risks" and is led by the ministries of health in seven national partners including China, Jordan, and Kenya. 192

G8

The G8 has repeatedly pledged to take action on climate change. The group first acknowledged it at the 1989 Paris Summit, and commitments to reduce emissions have been regular features of G8 declarations since then. 193 At the 2005 Gleneagles summit, all G8 members affirmed the importance of "tackling climate change, promoting clean energy and achieving sustainable development globally". At the 2008 summit in Hokkaido and Tokyo, G8 members pledged to reduce global emissions by 50 percent by 2050, expanded to "80% or more. ..for developing countries by 2050" at the 2009 summit in L'Aquila. 194 The joint declaration from the 2010 Muskoka summit recognized "the scientific view that the increase in global temperature should not exceed 2 degrees Celsius". 195

The Arctic Council

As Chair of the Arctic Council, Swedish Minister of Foreign Affairs Carl Bildt stated:

The fight against climate change is an imperative common challenge for the international community and requires immediate global measure... We therefore urge all countries to take decisive action, recognizing that deep cuts in global GHG emissions are required according to science with a view to reducing global GHG emissions so as to hold the increase in global average temperature below 2 °C above pre-industrial levels. 195

The statement was made to the UNFCCC and supported by all eight member states of the Arctic Council, including Canada and the U.S.

Commonwealth of Nations

The Commonwealth Forum of National Human Rights Institutions (CFNHRI) officially recognizes the threat of climate change impacts on human rights, and affirms the need for vulnerable populations to have a voice in

191 World Health Organization, Protecting health from climate change: a seven-country initiative in the eastern part of the WHO European Region.

192 World Health Organization, Climate Change Adaptation to Protect Human Health.

193 Clarke et al., 2010 Muskoka G8 Summit Final Compliance Report, p. 127.

194 Ibid., p. 128.

195 Ibid., p. 151.

196 Bildt, Statement to the UNFCCC COP XVII.

115

international discussions around policy and plans to address consequences of climate change such as human displacement, desertification, and rising sea levels. 197

In 2007, the Commonwealth approved the Lake Victoria Climate Change Action Plan. 198 The document notes that: "climate change is a direct threat to the very survival of some Commonwealth countries, notably

small island states".

The Council of Europe

Founded in 1949, the Council of Europe is an international organization with 47 member states, devoted to promoting cooperation in areas including human rights. In 2009, the Parliamentary Assembly adopted Recommendation 1879 which calls on member states to promote renewable energy, improve the efficiency of fossil fuel use, and promote research. 199 In January 2011, the Committee on the Environment, Agriculture, and Local and Regional Affairs issued a declaration calling for global temperature to be "held to a rise of no more than 2 °C from pre-industrial levels" and arguing that "[a] failure to act would consign the poorest 40 per cent of the world's population – 2.6 billion people – to a dismal future, jeopardising their right to life and access to water, food, good health, decent housing and security". 200

Indian Ocean Commission (IOC)

Created in 1982, the IOC is composed of five countries in the Indian Ocean. Since 2008, they have officially acknowledged climate change as a major challenge for Small Island Developing States (SIDS), and recognizes climate change adaptation as an integral component of IOC's actions. Their ACCLIMATE project focuses on growing sustainable agriculture, mitigating natural risks, and building capacity for SIDS to protect themselves from the threats posed by changes in weather. 201

U.N. Educational, Scientific and Cultural Organization (UNESCO) World Heritage Committee

The UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage was adopted by the organization's general conference in 1972 and came into force in 1975. 202 Under the treaty, both individual states and the international community as a whole are obligated to cooperate to protect both cultural heritage (monuments, buildings, and sites) and natural heritage. In 2006, the World Heritage Committee recognized the

threat posed by climate change to sites including the Sagarmatha National Park (Nepal), Huascarán National Park (Peru), the Great Barrier Reef (Australia) and the Belize Barrier Reef Reserve System (Belize).²⁰³ The committee strongly encouraged state parties to "highlight the threats posed by climate change to natural and cultural heritage, start identifying the properties under most serious threats, and also use the network to demonstrate management actions that need to be taken to meet such threats".

197 Commonwealth Forum of National Human Rights Institutions, *The Human Rights Impact of Climate Change*.

198 Commonwealth of Nations, *Lake Victoria Commonwealth Climate Change Action Plan 2007*.

199 Council of Europe Parliamentary Assembly, *Recommendation 1879: Renewable energies and the environment*.

200 Council of Europe Committee on the Environment, Agriculture, and Local and Regional Affairs, *As the world's warmest year ends, time for climate change to be seen as a human rights issue*.

201 Indian Ocean Commission, *ACCLIMATE: Adaptation au changement climatique*.

202 The General Conference of the United Nations Educational, Scientific and Cultural Organization, *Convention Concerning the Protection of the World Cultural and Natural Heritage*.

203 United Nations Educational, Scientific and Cultural Organization World Heritage Committee, *Threats to World Heritage Properties*.

116

U.N. High Commissioner for Human Rights

The website of the U.N. Office of the High Commissioner for Human Rights (OHCHR) explains that: "[i]t is becoming apparent that climate change will have implications for the enjoyment of human rights".²⁰⁴ The OHCHR has repeatedly recognized the threat to basic human rights posed by the varied consequences of climate change, including through five resolutions passed by the United Nations Human Rights Council during the past five years. These include Resolution 7/23, adopted March 28th 2008, in which the council expressed

concern that climate change "poses an immediate and far-reaching threat to people and communities around the world". 205 The resolution also called upon the OHCHR to produce a study on the relationship between climate change and human rights, which was published in 2009. The report concluded that: "An increase in global average temperatures of approximately 2 °C will have major, and predominantly negative, effects on ecosystems across the globe, on the goods and services they provide". 206

On March 25th 2009, the Human Rights Council adopted Resolution 10/4, noting that:

climate change-related impacts have a range of implications, both direct and indirect, for the effective enjoyment of human rights including, inter alia, the right to life, the right to adequate food, the right to the highest attainable standard of health, the right to adequate housing, the right to self-determination and human rights obligations related to access to safe drinking water and sanitation, and recalling that in no case may a people be deprived of its own means of subsistence 207

and that:

the effects of climate change will be felt most acutely by those segments of the population who are already in vulnerable situations owing to factors such as geography, poverty, gender, age, indigenous or minority status and disability.

This was followed by further resolutions on March 24th 2011 and in September 2011. 208209

On March 30th 2012, U.N. High Commissioner for Human Rights Navi Pillay released an open letter to all Permanent Missions in New York and in Geneva that underscores the responsibilities on behalf of all states to ensure "full coherence between efforts to advance the green economy, on the one hand, and their human rights obligations on the other". 210 Pillay also argued that:

[Strategies based on the narrow pursuit of economic growth without due regard for equity and related environmental, social, and human rights considerations will both fail in their economic objectives, and risk damaging the planet, and the fundamental rights of the people who li

ve
here. Incoherence between international human rights standards, environmental strategies,
and
economic policies can undercut all three. The logic of integration... is unavoidable. Wit
hout

4 United Nations Office of the High Commissioner for Human Rights, Human rights and clima
te change.

204 ^

205 United Nations Human Rights Council, Resolution 7/23: Human rights and climate change
.

206 United Nations Office of the High Commissioner for Human Rights, Report of the Office
of the United Nations High Commissioner for Human
Rights on the relationship between climate change and human rights, p. 7.

207 United Nations Human Rights Council, Resolution 10/4: Human rights and climate change
.

208 United Nations Human Rights Council, Human rights and the environment.

209 United Nations Human Rights Council, Human rights and climate change.

210 Pillay, Open Letter To all Permanent Missions in New York and Geneva, p. 1.

117

explicit human rights safeguards, policies intended to advance environmental or developme
nt
goals can have serious negative impacts on those rights. 211

The World Bank

In 2012, the World Bank lent \$7.1 billion for climate change mitigation measures, along w
ith \$4.6 billion
for adaptation. 212 In July 2013, the World Bank announced that it will be amending its l
ending policy to
restrict financial support for coal-fired power plants, except in exceptional circumstanc
es where "no feasible
alternatives" exist. 213214 World Bank President Jim Yong Kim has tied this new policy di
rection explicitly to the
risks posed by climate change, including food shortages, droughts, floods, sea level rise
, and water scarcity. 215

In August 2013, the World Bank launched a US\$550 million green bond initiative, "designed to address the challenges of climate change in the developing world". 216

African Development Bank

The President of the African Development Bank has stated that: "Climate change is central to the core business of the African Development Bank and requires urgent action". 217 In 2009, the Bank Group developed its Strategy of Climate Risk Management and Adaptation (CRMA), which calls for growth and support in capacity building for African countries to confront the challenges of climate change. It lays down guidelines for loans and investment that ensure all projects are "climate proof, which means that they are "designed, installed, implemented and managed to reduce to a minimal level the adverse effects of climate change, with the most cost-effective ratio as possible". 218 This strategy calls for increased support for capacity building of African countries to tackle climate change risks. It also declares that all investments financed by the bank should work toward "enhancing climate resilience and climate-proofing of economic and social infrastructure". 219 The CRMA outlines strategies to decrease the vulnerability of African nations to climate change and build sustainable energy infrastructure, and includes investments of almost US\$8 billion by 2015.

4.7 These actions are not adequate to avoid dangerous climate change

Despite the growing willingness of governments at all levels to strengthen climate change policies, the world's emissions are not on a trajectory that is compatible with keeping warming to less than 2 °C . 220221 222 Humanity is now adding over 35 gigatonnes (billions of tonnes) of CO₂ to the atmosphere each year , and the global

[^]ibid., p. 2.

211j

212 The World Bank, Climate Change Projects & Programs.

213 The World Bank, World Bank Group Sets Direction for Energy Sector Investments.

214 See also: Yukhananov and Volcovici, World Bank to limit financing of coal-fired plants.

215 Kim, Ending Poverty Includes Tackling Climate Change.

216 The World Bank, World Bank Launches USD 550 million Green Bonds.

217 African Development Bank Group, Climate Change.

218 African Development Bank Group, Climate Risk Management and Adaptation.

219 Ibid., p.11.

220 See: Peters et al., "The challenge to keep global warming below 2 °C".

221 ScienceDaily, Reaching 2009 International Climate Change Goals Will Require Aggressive Measures.

222 Stocker, "The Closing Door of Climate Targets", p. 280-2.

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quantity of that pollution is rising by three percent per year. 223 That means that we are on track to exceed the 565 gigatonne limit for keeping warming under 2 °C within 15 years.

Canada's latest official report on emissions trends highlights how the severity of future climate change is closely linked with the growth or contraction of the oil and gas sector. 224 Even large emission reductions – like those associated with Ontario's coal phase-out – risk being more than nullified by aggressive growth in the oil sands and the fossil fuel sector more generally.

Projected change in GHG emissions
by province, 2005-2020

PE
NL I
MS .
NB

QC J

MB

SK

AB

BC

Canada

=i 1 -

-70 -50 -30 -10 10 30

GHG emissions (Mt CO₂e), excl. land-use

50

70

Figure 4.1: Projected change in Canadian emissions by province, 2005-2020

Projected change in Canada's GHG emissions
by economic sector, 2005-2020

National Total
Expected LULUCF credit
Waste and Others
Agriculture
EITE
Buildings

>

Transportation
Oil and Gas (excl oilsands)

-80 -60 -40 -20 0 20 40 60 80

GHG emissions (Mt CO₂e)

Figure 4.2: Projected change in Canadian emissions by economic sector, 2005-2020

Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p. 26.
See: Environment Canada, *Canada's Emission Trends 2014*.

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In 2014, the Office of the Auditor General and the Commissioner of the Environment and Sustainable Development evaluated the performance of Canada's federal government on climate change. The report specifically examined whether the policies in place are in alignment with emission reduction promises made by the government of Canada, both domestically and as part of international agreements like the Copenhagen Accord. Among their major findings:

- "Regulations to reduce emissions have been delayed and good practices have not been consistently followed"
- "Departments are not yet assessing the success of current regulatory measures"

- "Environment Canada is not coordinating with the provinces and territories to achieve the national target"
- "Environment Canada still does not have a planning process for how the federal government will contribute to achieving the national target"

The conclusion of the report states: "While the Government of Canada has recognized the need to urgently combat climate change, its planning has been ineffective and the action it has taken has been slow and not well coordinated" and: "We are concerned that Canada will not meet its 2020 emission reduction target and that the federal government does not yet have a plan for how it will work toward the greater reductions required beyond 2020". 227228

In order to stabilize warming at any level, the total quantity of GHGs in the atmosphere must be stabilized. For this to be accomplished, deep global emission cuts are required – far beyond those that will result from policies announced and implemented to date. As a consequence, it is necessary for additional action to be taken, including the redirection of investment away from new fossil fuel projects and toward cost-effective pollution mitigation options, including conservation and renewable energy.

225 The report was accompanied by a video summary: Office of the Auditor General of Canada, Federal government is not doing enough to reduce greenhouse gas emissions and fight climate change.

226 See also: Brewster, Federal government falling further behind on emissions reductions, audit finds.

227 Office of the Auditor General of Canada, 2014 Fall Report of the Commissioner of the Environment and Sustainable Development Chapter 1 – Mitigating Climate Change.

228 See also: CTV News, Canada must move to clean energy quickly, climate activists say.

Chapter 5

Why start with Royal Dutch Shell?

Update on Shell

Between the completion of the original brief in September 2013 and the formation of the ad hoc committee to consider fossil fuel divestment on September 3rd 2014, the University of Toronto sold off its direct stock holdings in Shell. Given that this decision was taken for purely financial reasons, rather than as the result of a divestment petition, the choice bolsters the case that selling fossil fuel stock is financially prudent. Nonetheless, Shell remains an especially problematic investment. As a result, we recommend that U of T publicly state that share ownership in Shell is not in keeping with its investment policies and commit to not re-investing in the future.

The preceding chapters of this brief show how climate change is causing increasing instability and harm to the planet. Consequences of climate change have the potential to cause unprecedented levels of social and environmental damage, unless dramatic policy changes are put into place rapidly. One important dimension of that response is the redirection of large amounts of investment away from new fossil fuel developments. The extraction and burning of fossil fuels are the direct causes of climate change, and of all the adverse consequences that follow from it. Investing in the fossil fuel industry perpetuates these activities and thus constitutes deriving financial benefit from harmful activity. This violates the principles of socially and ethically responsible investment. 1

As a first step toward divestment from the fossil fuel industry, we propose that U of T divest 100 percent of its holdings in Royal Dutch Shell within a year of receiving the recommendation of the ad hoc committee this fully endorsed brief. As one of the largest fossil fuel companies in the world, as well as the university's largest single holding, Shell represents an ideal starting point for the university's move to divest from the fossil fuel industry.

Shell's activities contribute directly to the harmful affects of climate change. Shell al so represents an ideal case for divestment for three main reasons related to the operations of the company:

1. Shell has repeatedly carried out actions resulting in social injury, including conduct in Nigeria and Alberta that conflicts with domestic and international law.
2. Shell represents a financial risk to investors, with even greater shareholder uncertainty in the medium- and long-term owing to proposed projects that are costly and high-risk.
3. Divestment from Shell will not adversely affect the university's portfolio.

The decision to divest from Shell would also signal U of T's determination to combat climate change to other academic institutions, as well as to prospective students, faculty, and staff members. It would be a concrete case of the university applying its values in its key decision-making.

1 Richardson, Socially Responsible Investment Law: Regulating the Unseen Polluters.

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5.1 Shell's continuing history of social injury

Royal Dutch Shell has been found to cause social injury as a result of activities that:

1. Directly conflicted with national and international law, and
2. Infringed on governmental regulations or on international health and safety or environmental standards.

The following list of legal actions taken against Shell demonstrates that the company has repeatedly inflicted social harm as a consequence of a number of its global operations.

5.1.1 Legal offences in Nigeria

Shell has a long history of human rights and environmental abuses in the Niger Delta region, where it has operated since 1958. In 2012 alone, 198 oil spills took place at Shell facilities in Nigeria, releasing 26,000 barrels of oil. 2 A U.N. report in 2011 determined that cleaning up mangroves contaminated by Shell would take 30 years and cost at least \$1 billion. 3 The same report concluded that some families in the area were consuming water with benzene levels 900 times higher than those considered safe by the World Health Organization. 4

Shell is the midst of a number of litigation processes at various stages, as documented in Shell's 2011 Annual Report:

Shell subsidiaries and associates operating in Nigeria are parties to various environmental and contractual disputes. These disputes are at different stages in litigation, including at the appellate stage, where judgments have been rendered against Shell. If taken at face value, the aggregate amount of these judgments could be seen as material. 5

Since the publication of the report, Shell has been found responsible for oil pollution and ordered to pay compensation by a Dutch court in Niger Delta Farmers vs. Shell (detailed below). 6 The parties are in the process of negotiating compensation. The full financial impact of the company's "environmental and contractual disputes" in Nigeria is not yet known and could have a material effect on the company. 7 In 2011, The Economist argued that "[l]egal pressures on the company are increasing" and that Shell has "paid out \$1.7m in compensation to groups in the delta affected by spills". 8

The following is a partial list of legal challenges to Shell's activities in Nigeria over the span of approximately fifteen years:

Bodo vs. Shell:

This case is ongoing. It was first brought before the High Court in London on June 18th 2012, and will be heard sometime this year. Shell is challenged by 11,000 members of the Niger Delta Bodo community, who say the company is responsible for spilling approximately 500,000 barrels of oil in 2008. Shell has admitted liability for two spills in the Bodo region. 9

2 Sekularac and Deutsch, Dutch court says Shell responsible for Nigeria spills.

3 United Nations Environment Programme, Environmental Assessment of Ogoniland.

4 The Economist, Oil spoils.

5 Royal Dutch Shell, Building an Energy Future: Annual Report, P.138.

6 See also: Sekularac and Deutsch, Dutch court says Shell responsible for Nigeria spills.

7 Royal Dutch Shell, Building an Energy Future: Annual Report, p. 139.

8 The Economist, Oil spoils.

9 Sekularac and Deutsch, Dutch court says Shell responsible for Nigeria spills.

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In January 2015, Shell agreed to a \$84 million settlement with the Bodo community of the Niger delta. 10

Kiobel v. Royal Dutch Petroleum Co.:

This case is ongoing. It was first brought before the United States Supreme Court and granted petition on October 17th 2011. Nigerian plaintiffs accuse Royal Dutch Shell and its affiliate Shell Transport and Trading Company PLC of providing transportation and payments to government forces who committed crimes against humanity in the Ogoni region, including the arrest, torture, and murder of protestors challenging Shell operations. 1112 This case involves activities included in the Wiwa v. Royal Dutch Shell Co. cases described below.

Niger Delta Farmers vs. Shell Oil Company:

A verdict for this case was reached in January 2013. Shell Nigerian subsidiary, Shell Petroleum Development Company of Nigeria Ltd. (SPDC), was sued in a Dutch court by four farmers and the environmental organization Friends of the Earth on October 10th 2012. SPDC was found responsible for oil spills in Niger Delta on one of four counts and ordered to pay compensation to Nigerian farmer Friday Akp

an for incidents occurring in 2004, 2005, 2007. 13 Compensation is being negotiated. The Economist argued that "[t]he ruling could open a flood-gate to legal complaints against oil companies". 14

Wiwa v. Royal Dutch Shell Co.:

In 1993, Ken Saro-Wiwa took part in a march by 300,000 Ogoni people, demanding a share in oil revenues and increased political autonomy. Following a trial by a military tribunal, Saro-Wiwa and eight other Ogoni leaders were hanged in 1995. According to the United Nations Environment Programme: "Continued social upheaval in the area further alienated the Ogoni community from SPDC [Shell Petroleum Development Company (Nigeria) Ltd], and MOSOP [Movement for the Survival of the Ogoni People] has since been campaigning for the total expulsion of Shell from Ogoniland". 15 Saro-Wiwa was identified as a "prisoner of conscience" by PEN Canada and Amnesty International, and international appeals and global outrage took place in response to the tribunal's decision. Nigeria was also partly suspended from the Commonwealth in response to the hangings. 16

Under the Alien Tort Statute, the Torture Victim Protection Act of 1992, and Racketeer Influenced and Corrupt Organizations Act (RICO), the Wiwa family has brought 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 involved the hanging of Saro-Wiwa and eight others, the detention and torture of Owens Wiwa and Michael Tema Vizor, and the shooting of Karololo Kogbara while she peacefully protested the bulldozing of her crops to permit the construction of a Shell pipeline. The plaintiffs alleged that the executions were carried out with the "knowledge, consent and/or support" of Shell. 17 They also alleged that Shell was paying soldiers involved in human rights abuses in the region. 18 Shell settled legal action out of court with a payout of \$15.5 million dollars. 19 The settlement is one of the largest payouts by a multinational corporation charged with human rights violations to date and speaks to the company's complicity in these activities.

10 BBC News, Shell agrees \$84m deal over Niger Delta oil spill.
11 Centre for Constitutional Rights, *Kiobel v. Royal Dutch Petroleum Co.*

12 Radio France Internationale, Shell could face trial in US for alleged complicity in torture in Nigeria.

13 Chazan, Shell ordered to pay Niger Delta farmer.

14 The Economist, A mixed verdict.

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

16 The Economist, The Commonwealth: What is it for?

17 Kearney, New York trial delayed for Nigerians suing Shell.

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

19 Ibid.

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Notably, four years after the execution of his father, Ken Saro-Wiwa Jr. was a Visiting Fellow and Senior Resident at U of T's Massey College. The college possesses the final handwritten letter Saro-Wiwa Sr. wrote to his son prior to his execution, along with a handmade chair crafted by Saro-Wiwa Jr. and inscribed with a poem criticizing Shell. 20

US Dept. of Justice vs. Panalpina, Shell, et al.

In 2010, Shell was implicated in a case brought against Panalpina, a Swiss-based company that provides international air and ocean freight, by the U.S. Department of Justice. Panalpina was implicated in foreign bribery charges by U.S. regulatory bodies and settled on a total of \$85 million over these allegations. Royal Dutch Shell and five other oil companies were also implicated and charged along with Panalpina, paying a total of \$246 million in penalties altogether. As stated by Robert Khuzami, the Director of Enforcement for the U.S. Securities and Exchange Commission (SEC): "These companies resorted to lucrative arrangements behind the scenes to obtain phoney paperwork and special favors, and they landed themselves squarely in investigators' crosshairs". 21 The case is significant for setting a potential precedent of vigilance for global companies that employ external contractors in parts of the world "where resources are plentiful but the

rule of law is shaky". 22

With respect to Shell's role, the company was implicated in corrupt activities that took place in Nigeria and included the expeditious services such as clearing drilling rigs and other equipment through customs (more specifically, using a customs broker to pay officials to acquire special treatment for a project conducted in Nigeria). 23 Shell consented to pay a disgorgement of \$18.15 million and a criminal fine of \$30 million. 24 Shell was subjected to a Deferred Prosecution Agreement (DPA) with the U.S. Department of Justice (DOJ) for violations of the bribery and bookkeeping provisions of the Foreign Corrupt Practices Act (FCPA). 25 Shell also consented to a Cease and Desist Order from the U.S. Securities and Exchange Commission (SEC) on account of record keeping violations and internal control provisions of the FCPA. As a result, the DPA outlined an ethics program designed to prevent and identify any breach of the FCPA as well as any other applicable anti-corruption laws corresponding to all aspects of Shell's operations. The program also calls for Shell to immediately report any evidence of questionable activity to the DOJ. As stated in Shell's 2011 annual report, such activity could have a significant impact on the company: "Any violations of the DPA, or of the SEC's Cease and Desist Order, could have a material adverse effect on the Company". 26

Gas flaring

In November 2005, a Federal High Court of Nigeria found that "continuing to flare gas in the course of their oil exploration and production activities in the applicants' community is a gross violation of their fundamental right to life (including healthy environment) and dignity of human person as enshrined in the Constitution". 27 The court ordered that Shell "take immediate steps to stop the further flaring of gas in the applicant's community".

Since 2005, Shell has refused to comply with the court order to end gas flaring in the Iw herekan community in Nigeria. Shell is also avoiding payment of \$1.5 billion in compensation to the Delta's Ijaw ethnic group for

20 Photographs of the letter and chair can be accessed at: <http://www.flickr.com/photos/sindark/sets/72157636446975176/>

21 Kochan and Goodyear, *Corruption: The New Corporate Challenge*, p. 119.

22 Scannell and Catan, Settlements Near In Bribery Case.

23 Voreacos and Calkins, Shell Bribes Among 'Culture of Corruption,' Panalpina Admits.

24 Sullivan and Cromwell, LLP. Foreign Corrupt Practices Act - Recent Developments.

25 Royal Dutch Shell, Building an Energy Future: Annual Report, p. 17.

26 Ibid.

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

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decades of pollution. 28

Oil spills

Going forward, Shell faces thousands of claims related to oil spills in Nigeria, and charges in the most

recent case ("Niger Delta Farmers vs. Shell Oil Company") opens doors for further legal actions. 29

Possible corrupt practices

In 2011, along with the oil company ENI, Shell purchased a block of offshore oil rights in Nigeria from

a corporation called Malabu. Malabu was established days before it acquired the offshore block, and had no

employees or other assets. The corporation was controlled by Dan Etete, a former Nigerian oil minister who was

convicted of money laundering in France in 2007 and 2009. 30 Court documents show that Shell representatives

met directly with Etete. 31 The Economist claims that the deal created "reputational and legal risks" for Shell, and

that the company "might conceivably face action under [its] home country's anti-corruption laws". 32 Global

Witness – an American non-governmental organization (NGO) that focuses on natural resource exploitation

– has called the deal "a lesson in corruption". 3334

5.1.2 Infringements on governmental regulations and international health and environmental standards with respect to operations in Nigeria

The release of the Assessment of the Environment of Ogoniland by the UNEP on August 4th 2011 confirmed the

devastating extent of pollution in the minority Ogoni region. The estimated time required for clean-up is between 25 to 30 years. The U.N. condemned Shell for failing to comply to its own operating standards and for under-reporting pollution. 35 The same U.N. report also confirms that all water bodies in Ogoniland have become unsafe for drinking because they have been contaminated with hydrocarbons and carcinogens from Shell's activities.

Shell has repeatedly ignored Nigerian federal law (and its own internal policies) calling for regular inspection and maintenance and upgrading of pipelines and production facilities, as well as prompt and effective response to oil spills. 3637

5.1.3 Legal offences in Alberta

Shell is one of the biggest players developing the Athabasca oil sands, with 249,000 barrels per day of production from its Scotford upgrader. 38 Shell Canada operates the Alberta Oil Sands Project (AOSP), which consists of the Albian Sands Mine, Muskeg River Mine, Jackpine Mine, and the Scotford Upgrader. In July 2013, a major expansion of the Jackpine Mine was authorized, despite the expectation that this will "involve the permanent

28 Ukala, "Gas Flaring in Nigeria's Niger Delta: Failed Promises and Reviving Community Voices".

29 The Economist, A mixed verdict.

30 The Economist, Safe sex in Nigeria.

31 Global Witness, Shell knew that US\$1.1 billion payment was destined for convicted money launderer.

32 The Economist, Safe sex in Nigeria.

33 See: Global Witness, Shell's obscure payments kill its case for weak US and EU transparency laws.

34 Global Witness, Shell and ENI must come clean over oil deals in Nigeria.

35 United Nations Environment Programme, Environmental Assessment of Ogoniland.

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

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

38 AlbertaEnergy, Facts and Statistics.

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loss of thousands of hectares of wetlands, which would harm migratory birds, caribou and other wildlife and wipe out traditional plants used for generations" and that "Shell's plans for mitigation are unproven and. . .some impacts would probably approach levels that the environment can't support". 394041 The Athabasca Chipewan First Nation expressed its disappointment about this decision. 42

The AOSP is close to a number of First Nations communities who claim that the project adversely affects their health, livelihood, and lands. 43 Under Canadian constitutional law, there is a duty to consult and accommodate aboriginal people on development projects that affect them. First Nations have launched a series of legal proceedings related to bitumen sands development that could impact the viability of Shell's current and future operation plans:

Ongoing – ACFN vs. Shell Canada In continuing legal battles throughout 2011-2012, the Athabasca Chipewan First Nations (ACFN) sued Shell Canada for breach of terms of agreements made in 2003 and 2006 regarding the company's existing tar sands mines. 44 The ACFN alleges that Shell has not honoured these agreements and that these breaches have allowed Shell's operations to continue damaging the surrounding environment and infringing upon the rights of ACFN peoples. Affected First Nations communities continue to seek legal options to delay or halt Shell's operations in the AOSP.

2009 – Ecojustice vs. Shell Canada Ecojustice, an environmental NGO, took Shell to the Alberta Court of Appeal after Shell breached signed commitments with the government of Alberta to reduce carbon emissions for the Jackpine and Muskeg River mines. Alberta courts instructed regulators to ignore the breach. However, the ruling has prompted both residents and elected officials in Alberta to demand

d an overhaul
of regulatory approval processes in the province. 45

Cases related to groundwater contamination As described in their 2011 Annual Report, Royal Dutch Shell (including subsidiaries), has been sued repeatedly by public and semi-private water purveyors, as well as governmental bodies, who insist that Shell take responsibility for groundwater contamination in various instances. 46 As outlined in the Annual Report, at the end of 2011, fewer than 10 of these cases remained open, with the remaining cases in various stages of litigation. The number of allegations made by numerous public and private entities, including governmental agencies, speaks to Shell's consistent negligence in protecting environmental safety. While groundwater cases remain ongoing, a study published by Alberta Health in 2008 confirmed a 30 percent rise in the number of cancers between 1995 and 2006 in the community of Fort Chipewyan, 47 providing scientific evidence supporting the allegations of First Nations residents that AOSP activities were polluting the surrounding environment. 48 An internal government memo, obtained by journalist Mike De Souza by virtue of access to information legislation,

39 Canadian Environmental Assessment Agency, Joint Review Panel Issues Report On Jackpine Mine Expansion Project.

40 The Canadian Press, Alberta greenlights Shell's Jackpine oilsands expansion.

41 The Canadian Press, Shell Canada's oilsands expansion approved amid environmental concerns.

42 Athabasca Chipewyan First Nation, ACFN disappointed by JRP's initial approval of Shell tar sands mine expansion; expects mitigation and accommodation to be in place prior to further approvals for the expansion.

43 Amuna et al., Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria.

44 CTV Calgary, First Nation sues Shell.

45 Amuna et al., Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria.

46 One barrel of surfaced-mined oil from tar sands extraction requires 2-4 barrels of freshwater and creates about 1.5 barrels of toxic waste. This waste is held in 'tailings ponds', which covered 176km² in 2010 and contained 830 billion litres of toxic waste. Shell's

tailings ponds cover 23km² and contain millions of litres of toxic waste. Each day, 1.1 million litres of waste leaks into the Athabasca River from tar sands operations. These toxins are known carcinogens and leaks have had serious impacts on human and ecological health.

47 Amuna et al., *Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria*.

48 This study, however, lacks appropriate data and is considered a conservative estimate by many residents.

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confirms groundwater toxins related to bitumen mining and upgrading are seeping from tailings ponds and contaminating groundwater. These toxins are not naturally occurring, contrary to statements made by government and industry. 4950
Alongside the promise of future legal conflicts as a result of the company's activities in Nigeria, more legal challenges are almost certain to arise as First Nations communities continue to oppose Shell's operations.

The International Finance Corporation's (IFC) implementation of a new Sustainability Framework, which requires clients of Equator Principle banks to obtain the free, prior, and informed consent of indigenous communities impacted by mining projects, poses a significant obstacle to the company going forward where they conflict with the interests of various First Nations communities. 51 In addition, the International Covenant on Civil and Political Rights states that: "In no case may a people be deprived of its own means of subsistence". 52
Shell violates this obligation by making the waters of the Niger Delta unsafe to drink, and threatens to do so further by contaminating the food and water of aboriginal communities in Alberta and the arctic.

5.1.4 Continued threats to human rights, environmental well-being, and international law

Court rulings in cases brought against Shell over the past fifteen years have resulted in

determinations of guilt, out of court settlements, and case dismissals. In Shell's case, the sheer volume of allegations against the company is 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 Toronto, in addition to being a material risk to the company's profitability going forward. Moreover, a review of Shell's most recent activities and the projects it has slated for the immediate future suggests that Shell will continue to engage in activities that constitute human rights abuses and environmental degradation. For instance:

1. In the summer of 2011, Shell supported Syrian President Bashar al-Assad's regime by contributing over \$55 million during government crackdowns.⁵³ Moreover, Shell continued drilling and exporting crude oil from Syria throughout the first year of the popular revolt and did not halt operations until Western-imposed oil sanctions and global outrage forced them to withdraw from the country on December 2nd 2011.

2. Both Shell's current activities and its proposed projects in the arctic will threaten local First Nations communities such as the Inupiat who live around the Beaufort and Chukchi Sea and who practice a subsistence culture, both by tradition and by necessity.⁵⁴

In May 2013, members of the Native Village of Port Hope, Alaska and the ACFN participated in Shell's Annual General Meeting and confronted Shell's chairman about the risks of drilling in the arctic.⁵⁵ In addition to the direct threat posed to people living in the region, arctic drilling risks adding to the already dangerously large

⁴⁹ Natural Resources Canada, Memorandum to the Minister: Pending Release by Natural Resources Canada of Reports on Natural vs. Human-Caused Contamination in the Oil Sands Region of the Athabasca River, Alberta.

⁵⁰ See also: De Souza, Oilsands tailings leaking into groundwater, Joe Oliver told in memo.

⁵¹ Sosa, License to Operate: Indigenous Relations and Free Prior and Informed Consent in the Mining Industry.

⁵² Part I, Article I (2) United Nations General Assembly, International Covenant on Civil and Political Rights, G.A. res. 2200A (XXI), 21 U.N.

GAOR Supp. (No. 16) at 52, U.N. Doc. A/6316 (1966), 999 U.N.T.S. 171.

53 Minio-Paluello, Shell supports Syrian regime with \$55 million during crackdown; one out of six Syrian tanks runs on Shell oil.

54 Amuna et al., Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria, p. 13.

55 Gemmill, Shell and the Arctic Oil Rush.

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reserves of fossil fuels being exploited globally, contributing further to the universal threat of climate change.

5.2 Shell represents financial risk

Royal Dutch Shell and its subsidiaries are a risky investment for two main reasons:

1. Previous violations of human rights and environmental regulations may ultimately have a material affect on the company; the same activities can also manifest in decreased shareholder confidence.

2. High-risk ventures going into the medium and long term introduce uncertainty on a number of levels.

5.2.1 Poor reputation for social responsibility lowers shareholder confidence

Shell's reputation for complicity in human rights and environmental degradation has resulted in reduced shareholder confidence and has prompted socially conscious investors to avoid holding Shell stock. For instance, the Dow Jones Sustainability Index, which integrates assessment of economic, environmental and social criteria with emphasis on long-term shareholder value, excluded Shell from the index in both 2010 and 2011 following concerns about the company's activities in Nigeria (which include both human rights and environmental abuses).⁵⁶ Shell's European Universe was included in the 2012 Index, but all others remain excluded (including the North American, Asia Pacific, Aussie, Emerging Markets, Korean Universes).

In February of 2012, 28 Right Livelihood Award Laureates, including conservation scientists and professionals, petitioned the Norway Government Pension Fund to divest all its holdings in Royal Dutch Shell. The

petition was made after this group, in collaboration with Nigerian scientists and communities, found the Delta to be "one of the most severely oil-impacted ecosystems in the world".⁵⁷ This collaboration between scientists and Nigerian residents led to the 2011 UNEP assessment discussed above. As stated in their petition, the argument for divestment is based on the company's "willful negligence" which resulted in the extensive environmental harm found in the Niger Delta region.⁵⁸

In an era where mass media coverage surrounds environmental disasters and human rights abuses, the reputational risks of conduct like Shell's are magnified.

5.2.2 Fossil fuel extraction in the arctic is a particularly high-risk and unpredictable endeavour

The arctic is experiencing some of the most profound and rapid effects of climate change. World renowned physicist and oceans expert Peter Wadhams calls the situation in the arctic a "global disaster", observing that ice is disappearing at a faster rate than previously predicted.⁵⁹ The IPCC has observed that: "Average Arctic temperatures have increased at almost twice the global average rate in the past 100 years".⁶⁰ The rapid warming of the arctic has global consequences, as vanishing sea ice is replaced with darker water and more energy and heat are absorbed by the Earth from the sun.

⁵⁶ Reuters, Shell to scrap bonus link to sustainability index.

⁵⁷ Nigeria Conservation Foundation and IUCN/CEESP, Niger Delta Natural Resource Damage Assessment and Restoration Project - Phase I Scoping Report.

⁵⁸ Right Livelihood Award Foundation, Petition for Norway Pension Fund The Right Livelihood Award.

⁵⁹ Vidal, Arctic expert predicts final collapse of sea ice within four years.

⁶⁰ Intergovernmental Panel on Climate Change, Fourth Assessment Report: Climate Change 2007, Climate Change 2007: Synthesis Report - Observed changes in climate and their effects.

Despite the growing body of accepted scientific facts that point towards the significant and unpredictable consequences of a melting arctic, Shell has spent over \$4.5 billion on operations and lease purchases in the far north, taking advantage of the climate impacts in the arctic to advance further exploration and drilling. 61 Because Shell's production has been decreasing for the past ten years – with the exception of a five percent increase in 2010 – booking new reserves is of primary importance for the company. This is driving Shell to invest in more pollution-intensive forms of oil, such as those in Canada's oil sands, as well as oil reserves that are riskier to extract, such as those in the arctic. Shell's Alaskan project alone accounted for about one-seventh of Shell's total exploration spending in 2011. Although arctic extraction projects represent a new branch of growth for the company, these projects are also risky for shareholders for four reasons:

High costs

Unconventional methods of extracting oil, especially in harsh and isolated regions such as the arctic, are extremely costly because of technological requirements, human resources, costs of spill cleanups, and other related expenses. For example, Shell's Sakhalin-2 project in Russia saw an unexpected cost overrun from \$6 billion to \$22 billion in 2006. 62

Moreover, recent incidents have cast doubt on Shell's capacity to undertake arctic operations safely. Sixteen distinct and serious safety and environmental violations were discovered on the Noble Explorer – a Shell drilling rig anchored in the arctic waters off the coast of Alaska. The UK Coast Guard inspected the rig and reported findings of "systematic failure and lack of main engine preventative maintenance". 6364 These findings have been turned over to the U.S. Department of Justice and U.S. federal prosecutors have been asked to take legal action over these violations as of late February, 2013.

Arctic projects are dependent on a favourable political climate

An interaction of soaring costs, uncertainty related to project completion, and popular resistance against drilling in sensitive regions such as the arctic may lead to difficulties securing subsidies or tax breaks from governments. Shell has "spent several years on an intensive lobbying campaign to persuade

federal officials that it could drill safely" in the arctic. 65 The credibility of this claim is diminished by Shell's inability to operate drilling rigs safely in the region. Furthermore, the Deepwater Horizon disaster in the Gulf of Mexico has raised awareness among policy-makers and the general public about the risks involved in oil extraction within extreme environments, as well as the inability of major oil firms to rapidly contain serious spills when they occur.

Lack of oil spill plan

There is no proven method to clean up an oil spill in the remote and extreme arctic landscape, nor are there many resources available for such an event. A 2011 report from top scientists at the U.S. Geological Survey

61 Broder, With 2 Ships Damaged, Shell Suspends Arctic Drilling.

62 For more on these four central risk factors see: Greenpeace, Platform, and FairPensions, Out in the Cold: Investor Risk in Shell's Arctic Exploration.

63 Cockerham, Coast Guard: Shell Arctic rig findings turned over to Justice Dept

64 See also: Beinecke, Six Reasons Arctic Offshore Drilling Cannot Be Done Safely.

65 Broder, With 2 Ships Damaged, Shell Suspends Arctic Drilling.

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confirm that not enough is known about the arctic's unique marine environment to ensure an adequate or sufficient clean up plan in the case of an oil spill. As asserted in this survey, this lack of knowledge presents a "major constraint to a defensible scientific framework for critical Arctic decision making". 66

Shell's inability to operate drilling equipment safely in the arctic is highlighted by the damage suffered by the company's two drilling ships – Kulluk and Noble Discoverer – which were attempting to operate in the region. 6768 As a result of these incidents, Shell has canceled its arctic drilling plans outright through 2013, though it has stated its intention to resume arctic drilling in future seasons.

Funding challenges

The social and environmental responsibility guidelines of international financial institutions and signatories to the Equator Principles – the voluntary set of standards for assessing and managing social and environmental risk – have delayed or halted funding for frontier extraction projects in the past. For example, the European Bank did not solicit funds in 2003-2006 for the Reconstruction and Development (EBRD) of Shell's Sakhalin-2 because of serious breaches of their environmental and sustainability guidelines. Growing frustration and resistance from First Nations communities and the implementation of new IFC guidelines promise more delays on account of legal challenges raised by affected communities. 69

Supporting industry-based evidence of risks to Shell's current and proposed projects

1. On March 8th, 2013, Norwegian state-owned oil company, Statoil, announced that it is slowing plans to drill for oil in U.S. arctic waters after Shell's most recent string of incidents in the arctic.
2. German bank WestLB announced it would not invest in any company drilling in the arctic because the "risks and costs are simply too high". 70
3. Total, the French oil company, has disavowed drilling in the arctic; CEO Christophe de Margerie claims that "Oil on Greenland would be a disaster... A leak would do too much damage to the image of the company". 71
4. Growing resistance around production of oil sands puts operations there at risk, as Shell has already faced shareholder resolutions demanding greater clarity over the risk of oil sands investments.
5. The carbon bubble: Latest climate science tells us that approximately 80 percent of reserves owned by fossil fuel companies cannot be burned. As policy-makers and the financial industry absorb this information, the business case for drilling in extreme environments and exploiting unconventio

nal reserves
may be undermined. 727374

66 Holland-Bartels and Pierce, An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf energy Development in the Chukchi and Beaufort Seas, Alaska.

67 Broder, With 2 Ships Damaged, Shell Suspends Arctic Drilling.

68 Funk, The Wreck of the Kulluk.

69 Mathiason, EBRD freezes Shell Sakhalin loan.

70 Naidoo, Drilling for oil in the Arctic: the risks are too great for companies to take on.

71 NBC News Wire, Environmental risk of drilling in Arctic too high, CEO of oil giant Total says.

72 Carbon Tracker Initiative, Carbon Tracker Initiative.

73 United Nations Environment Programme, Climate and Trade Policies in a Post-2012 World

74 Spedding, Mehta, and Robins, Oil & carbon revisited: Value at risk from 'unburnable' reserves.

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5.3 Divestment from Shell would not hurt the university financially

Shell constitutes the university's largest single holding at approximately \$9.48 million dollars as of March

2012. At the same time, it represents about 1 percent of the institution's total known endowment. When

the university divested from the tobacco industry its holdings in the industry were calculated at 1.6 percent of

U.S. equities and 0.98 percent of international equities, for a total weight in tobacco stocks of 2.28 percent. 76

In the case of tobacco, the ad hoc committee assembled by the President to consider divestment concluded

that selling tobacco stocks would not adversely affect the university's portfolio. Given the lesser size of the

university's investment in Shell, it is likely that divestment in this case will also not damage the university

financially. 77

Because divestment as proposed here only involves selling direct stock holdings, it will not be necessary to identify or divest from pooled holdings that include Shell or any of the other 200 listed fossil fuel companies.

The social injury imposed through tobacco and fossil fuels is also similar. For more information, see: Why fossil fuels are like tobacco.

5.4 Chevron is also a problematic investment

Please note: this entire section is new.

According to the latest information we have been able to access, Chevron is now U of T's largest direct stock holding. Chevron is also a problematic investment, both because of the climatic impacts of its primary business practices, and due to other legally problematic behaviours.

Between 1964 and 1990, Texaco (which merged with Chevron in 2001) had substantial oil extraction operations in the Ecuadorian Amazon. The campaign group ChevronToxico alleges that during that time the company deliberately dumped more than 18 billion gallons of toxic wastewater and spilled close to 17 million gallons of crude oil. The "[c]ontamination of soil, groundwater, and surface streams has caused local indigenous and campesino people to suffer a wave of mouth, stomach and uterine cancer, birth defects, and spontaneous miscarriages". 78 This allegedly negligent disregard for the environment and the people living there led to a court case seeking justice for these wrongs.

The claim was first brought in 1993 in the United States at a federal trial court. Chevron (technically Texaco at this time but for continuity's sake referred herein as Chevron) argued throughout the lengthy trial that the case would be best tried in Ecuador and that the U.S. courts were not an appropriate venue. This argument is widely believed to be due to the greater perceived chances of success for Chevron in Ecuadorian courts due to a sympathetic regime. Along the way they filed 14 sworn affidavits praising the quality of the Ecuadorian judicial system. 79 The U.S. court agreed and subsequently dismissed the suit. However, one of the

conditions of doing so was that Chevron makes a commitment to submit to the jurisdiction of the Ecuadorian

75 University of Toronto Asset Management Corporation, Canadian Equities Above \$1 Million As at March 31, 2012.

76 University of Toronto Advisory Board on Tobacco Investment, Report of the Advisory Board on Tobacco Investment.

77 See also: There is no evidence of a divestment penalty for investors

78 ChevronToxico, About the Campaign.

79 CSRWire, Chevron Using 60 Law Firms and 2,000 Legal Personnel To Evade Ecuador Environmental Liability, Company Reports.

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courts and abide by any judgement rendered there. 80

The case was brought to Ecuador and the trial judge found Chevron liable for approximately \$18 billion

in damages. 81 This was appealed all the way to the Ecuadorian Supreme Court which in late 2013 upheld

\$9.51 billion of these damages. 82 However, prior to this judgement, Chevron Ecuador had ceased operations

and effectively left the country. By removing all its assets, Chevron has been able to avoid paying damages

to the populations directly affected by their behaviour. Essentially, "[o]nce the Ecuadorian courts made their

decisions, Chevron chose not to abide by them". 83 In fact, Chevron has even gone so far as to obtain (before

it was stuck down by a higher court) a "global injunction from a New York federal district court barring the

enforcement of the Ecuadorian judgement in any court in any country around the world". 84

For over 20 years, a group of marginalized Ecuadorians "whose lands, waterways, livelihoods, and way

of life were harmed by environmental pollution" have been seeking justice. 85 Chevron has been found to be

at fault and responsible for the damages caused by the appropriate courts. Instead of paying, they are now

using their substantial resources to frustrate the enforcement of these rulings. Toward this end, they have

employed over 2,000 lawyers from at least 60 law firms. 86 According to Aaron Page, an American lawyer

representing the Ecuadorians: "This is probably the most money any company in history has spent defending itself on environmental claims" and "[t]he total legal cost for Chevron shareholders is likely approaching \$2 billion and it is rising fast". 87

Chevron has not so far demonstrated an intention to pay the sum ordered in the final ruling. A Chevron spokesperson has said: "[w]e're going to fight this until hell freezes over. And then we'll fight it out on the ice". 88 The situation as it currently stands is summarized in a press release by the plaintiffs:

After agreeing to jurisdiction in Ecuador, Chevron sold its remaining assets there. Chevron then returned to the same U.S. court where it had blocked the original lawsuit to try to prevent enforcement in this country. That forced the villagers to try to collect their judgment in Canada and Brazil. But Chevron claims its assets there are immunized because they are held by wholly owned subsidiaries. Given that Chevron operates outside the U.S. only through its wholly owned subsidiaries, under the company's theory the villagers – after 22 years of litigation – will never collect the first dollar of their judgment anywhere. That is a mockery of the rule of law. 89

This case is an important example of the fossil fuel industry frustrating the enforcement of international and domestic law.

80 Court of Appeal for Ontario, *Yaiguaje v. Chevron Corporation*, 2013 ONCA 758, Para. 8.

81 *Ibid.*, Para. 9.

82 *Ibid.*, Para. 10.

83 *Ibid.*, Para. 67.

84 *Ibid.*, Para. 67.

85 ChevronToxico, *About the Campaign*.

86 CSRWire, *Chevron Using 60 Law Firms and 2,000 Legal Personnel To Evade Ecuador Environmental Liability*, *Company Reports*.

87 *Ibid.*

88 Court of Appeal for Ontario, *Yaiguaje v. Chevron Corporation*, 2013 ONCA 758, Para. 74.

89 Dozinger, Chevron vs. Ecuador: Which Side Is the Manipulator?

Chapter 6

Short answers to common questions

6.1 Why should the university 'take sides' in this matter? Is it

appropriate for the university to take stances on social and political issues?

The University of Toronto's Policy on Social and Political Issues With Respect to University Divestment and Procedures for Responding to Social and Political Issues with Respect to University Divestment establish appropriate criteria for deciding when an issue is no longer properly the subject of academic debate, meaning that divestment is justified. For the reasons extensively elaborated upon in this brief, divestment from fossil fuel companies is compatible with this policy. Furthermore, the university has already taken several actions that acknowledge the seriousness of climate change and the appropriateness of changing university practices in order to make it less severe. 1

Divestment from fossil fuels follows the precedents the university established in divesting from South Africa in response to apartheid and divesting from tobacco in response to the human health impacts. 2 The benefits from burning fossil fuels accrue to those who use them directly – groups that are disproportionately influential politically and legally. By contrast, the harms from burning these fuels are imposed on everybody, including those who have made little use of them historically and defenceless members of future generations.

Permitting unmitigated climate change challenges the core values of the university, including its "resolute commitment to the principles of equal opportunity, equity and justice". 3 If future generations are to have equal opportunities, they cannot inherit a planet that has been impoverished by uncontrolled climate change.

Similarly, the principles of equity and justice forbid us from ignoring what we know about the harms of GHG pollution by continuing to impose risk and suffering on innocent people around the world now and in future generations.

Fossil fuel divestment is also justified because governments have been ineffective in combatting climate change. The United Nations Framework Convention on Climate Change came into force in 1994, and there have already been 21 30 Conferences of the Parties. The Kyoto Protocol came into force in 2005. Despite all this diplomacy and effort, GHG pollution continues to increase, and the amount of CO₂ in the atmosphere continues to grow to ever-more-dangerous levels. Organizations including universities and other institutional investors can play an important role in redirecting investment away from exacerbating the problem and toward solving it. They can also help push governments to act more efficaciously and with greater speed.

In 1972, Yale University published *The Ethical Investor: Universities and Corporate Responsibility*. The book describes a "moral minimum" obligation. It is not possible for universities to take action in response to every social wrong, but they should work to "avoid and correct self-caused social injury".⁴ Given the robustness of our current scientific understanding of climate change, investing in the further development and exploitation of fossil fuel resources falls into this category of behaviours.⁵ The Terms of Reference of U of T's Responsible

1 See: Policies and infrastructure decisions justified with reference to climate change

2 See: Why fossil fuels are like tobacco

3 University of Toronto Governing Council, Statement of Institutional Purpose.

4 Simon, Powers, and Gunnemann, *The Ethical Investor: Universities and Corporate Responsibility*, p. 21.

5 *The Ethical Investor* also describes the Key Gardens Principles of need, proximity, capability, and last resort. They require a social harm

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Investing Committee also recognize: "that certain principles related to social, environmental or governance matters may be established to supplement our investment strategies without compromising our fiduciary obligations", that "[s]uch principles may in fact be both prudent and consistent with the University's academic mission", and that "it is widely acknowledged that, for a company to be financially successful in the long term, management must engage in sustainable and sound business practices".⁶ These considerations increasingly justify that the university take action to reduce its own contribution to the well-established problem of climate change, and that it adopt a leadership role in implementing effective solutions.

The emergence of a strong academic consensus about the key features of a problem does not mean that all academic work on the subject ceases. Scholarly work is still done on South African apartheid, despite the system having been dismantled. When the university decided to divest from South Africa and from tobacco, it determined that a convincing body of evidence supporting that choice had been assembled. A comparable body of evidence now exists about the causes and dangers of climate change.

As discussed in detail in *Divestment is compatible with the university's fiduciary duties*, there is little evidence to support the view that fossil fuel divestment will harm investment performance. Divestment would also allow the university to control the risk of being exposed to fossil fuel stocks which may lose value as governments adopt more stringent climate policies.

In their analysis for Boston University, Cutler Cleveland and Richard Reibstein argue that the existence of many well-documented harms associated with climate change:

puts universities that are reluctant to alter their current investment structures in a tough spot. Denial that climate change is upon us and already wreaking significant harm is not an option. It would be viewed – ever more widely – as an abdication of their treasured position as representing the intelligence of society. They are left with the argument that investment is an essentially one-dimensional affair and that it is not their concern, but

that
of the money managers they trust, who are only supposed to look at the numbers. They
can buttress this argument by citing their responsibility to preserve and expand the asse
ts
of the university, and point out that this defends and supports the mission of education.

Instead of denying the consequences of climate change, this is an argument for ignoring
consequences. 7

Given the clear evidence of social injury arising from climate change and the important r
ole played by
universities in democratic societies, a strong case can be made that fossil fuel divestme
nt is justified.

6.2 Isn't shareholder activism a better option?

As with the tobacco industry, the problem with the fossil fuel industry is the product it
self. It is not plausible
that U of T could attend a shareholder meeting of Peabody Energy and convince them to sto
p digging up and

which calls for redress, proximity in the sense of having an understood effect, having an
opportunity to act, and last resort. In discussing
'last resort', the book explains that: "the guilt of all becomes the guilt of no one. Thi
s result is unacceptable. We may not be able to
avoid the world's guilt, but we can seek to reduce the level of injury" (p. 26). The book
also explains: "if the university is able, by non
self-sacrificial means, to mitigate injury caused by a company of which it is an owner, i
t would not seem unreasonable to ask it to do so"
(p. 24).

6 University of Toronto Responsible Investing Committee, Terms of Reference.

7 Cleveland and Reibstein, *The Path to Fossil Fuel Divestment for Universities: Climate R
esponsible Investment*, p. 8.

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burning coal. 8 Likewise, shareholder activism cannot persuade Shell to stop producing oi
l and gas. 9

Partly because of the political influence of these corporations – and the effectiveness o
f their campaign
to delay government action – climate change has become an urgent problem. The decisions m

ade in the next few decades will do a great deal to determine what sort of energy infrastructure will be dominant for the century ahead. That, in turn, will do much to determine how severe climate change will be come. By taking decisive and well-justified action now, the university can help respond to this urgent problem.

6.3 Other people will buy the stocks we sell, so how does this

make a difference?

Divestment has proven to be a successful strategy in the past, notably in the cases of tobacco and South African apartheid. Divestment campaigns have undermined damaging companies' social license to operate. They have also signalled that important institutions with access to large amounts of expert advice have considered the questions involved seriously and decided that it is appropriate to act.

Universities are respected institutions with the power to help shape public opinion and perceptions about the future. The fossil fuel industry is already aware of this. In a May 2013 presentation given by Meredith Xcelerated Marketing to the American Coal Council, divestment campaigns were described as "a potent form of publicity".¹⁰ Benjamin Sporton, acting chief executive of the World Coal Association, has stated that: "Coal companies are concerned that divestment campaigns will lead to responsible investors leaving the industry".¹¹ The same basic analysis is echoed by the Smith School at Oxford: "The outcome of the stigmatisation process, which the fossil fuel divestment campaign has now triggered, poses the most far-reaching threat to fossil fuel companies and the vast energy value chain".¹² Luisa Florez, senior responsible investment analyst at Axa Investment Managers, argues: "climate risk is becoming synonymous with reputation risk" and "moral issues are also playing a growing role, with the divestment movement steadily gaining traction amongst investors across the globe".¹³ Bevis Longstreth, who was appointed to the U.S. Securities and Exchange Commission by Ronald Reagan, has argued: "I believe the pressure will build [on fossil fuel stock values] ... [t] here's going to be a tipping point. And when that

happens we're going to have the mother of all crowds jamming one exit [to sell fossil fuel stocks] ". 14

8 See also "Shareholder engagement with fossil fuel companies is the best way to drive change" in: Carrington, 10 myths about fossil fuel divestment put to the sword.

9 See also: "Can shareholders pressure fossil fuel companies without divesting?" at: <http://gofossilfree.org/faq/>

10 Sheppard, The Coal Industry Knows That Enviros Are Winning.

n Yeo, Coal lobby plays down divestment fears.

12 Ansar, Caldecott, and Tilbury, Stranded assets and the fossil fuel divestment campaign : what does divestment mean for the valuation of fossil fuel assets?, p. 13.

13 Carrington, Axa IM warns that companies linked to fossil fuels risk their reputations.

14 Begos and Loviglio, College fossil-fuel divestment movement builds.

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Divestments: A Potent Form of Publicity

Bloomberg
Businessweek

The Apartheid Playbook : Activists Push Fossil Fuel
Divestment

College Divestment Campaigns Creating Passionate
Environmentalists

Students to address Brown board on divestment

Figure 6.1: Slide from a presentation on threats to the coal industry. Source: Meredith X
celerated Marketing

Divestment would signal that the 'smart money' is shifting away from fossil fuels. 15 This could help produce a political climate in which significant action can be taken, including in the form of carbon pricing and reduced subsidies for fossil fuels. 16

6.4 What are the University of Toronto's peer schools doing?

Fossil fuel divestment campaigns are active at more than 300 schools across North America, including:

- Harvard, Yale, Princeton, Stanford, MIT, Duke, Caltech, the University of Michigan, Tufts, Wellesley,
- The University of British Columbia, McGill, the University of New Brunswick-Fredericton, the University of Victoria, McMaster University, Concordia University, and Simon Fraser University.

Many divestment campaigns are active in Europe as well, including at Oxford University. To date, twenty-six universities and colleges have pledged to pursue fossil fuel divestment, including: San Francisco State University Foundation, Hampshire College, Unity College, Sterling College, College of the Atlantic, The New School, the University of Glasgow, and Green Mountain College. 171819

All told, 181 institutions committed to fossil fuel divestment in 2014, including cities, churches, universities, and private foundations. The total quantity divested was approximately \$50 billion. 20

One notable example is the Rockefeller Brothers Fund, with \$860 million in assets, originally from the

15 See also "Divestment is pointless – it can't bankrupt the coal, oil and gas companies" and "Divestment means stocks will be picked up cheaply by investors who don't care about climate change at all" in: Carrington, 10 myths about fossil fuel divestment put to the sword.

16 See also: "Companies like ExxonMobil, Shell, BP have billions of dollars/euros. How can divesting the funds from a few institutions like universities, pensions and churches make an impact?" at: <http://gofossilfree.org/faq/>

17 For a complete and up-to-date list, see: [http : //gofossilfree.org/commitments/](http://gofossilfree.org/commitments/)

18 Notably, the University of Glasgow's decision to divest was based on a modified version of this brief. Glasgow University Climate Action Society, *The Fossil Fuel Industry and the Case for Divestment*.

19 See also: Brooks, *Glasgow becomes first university in Europe to divest from fossil fuels*.

20 350.org, 2014 in review.

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Standard Oil fortune of John D. and William Rockefeller. 21 In 2014, the fund committed to withdraw

from fossil fuel investments, which made up seven percent of their portfolio at the time.

22 Stephen

Heintz, president of the Rockefeller Brothers Fund, explained: "John D Rockefeller, the founder of

Standard Oil, moved America out of whale oil and into petroleum... We are quite convinced that if he

were alive today, as an astute businessman looking out to the future, he would be moving out of fossil

fuels and investing in clean, renewable energy". 23 The Guardian Media Group has also committed to

divest its £800 million portfolio from fossil fuel company shares and bonds over "a couple of years" and

from co-mingled funds which include some fossil fuel investments over five years. 24

Divestment campaigns are active at many prominent American schools:

- Divest Harvard has met with the university administration and with trustees to discuss divestment. 2526

On April 11th 2013, 1,300 petition signatures were delivered to the Harvard administration in support

of divestment. 27 71 percent of students supported a referendum calling for fossil fuel divestment. 28

- On May 30th 2013, the faculty senate at the University of California, Santa Barbara voted in favour of

fossil fuel divestment. In total, the student governments at seven campuses of the University of California

have voted in favour of divestment. 29 The University of California has also signed the Montreal

Carbon Pledge, committing itself "to measuring and annually disclosing the carbon footprint of

its investments with the goal of using this information to inform carbon asset risk and m

anagement
strategies". 30

- At Stanford, the undergraduate senate passed a resolution in support of fossil fuel divestment in May 2013. 31 Stanford has since committed to divestment from coal stocks.
- The president of Tufts University has established a working committee to consider fossil fuel divestment, as well as other steps the school could take to address climate change. 32
- Hampshire College, which was the first university to divest from South Africa during the 1980s, was also the first school to officially commit to fossil fuel divestment. 33
- The New School committed to divest in February 2015. 34353637
- In March 2015, Syracuse University committed to divest its US\$1.2 billion endowment from direct investments in "publicly traded companies whose primary business is extraction of fossil fuels". 3839

21 Goldenberg, Heirs to Rockefeller oil fortune divest from fossil fuels over climate change.

22 Ibid.

23 Ibid.

24 Carrington, Guardian Media Group to divest its £800m fund from fossil fuels.

25 Divest Harvard, Divest Harvard Meeting With Administration 2/1/13.

26 Borowsky, Maxmin, and Franta, Harvard Students Meet With Trustees To Discuss Divestment.

27 Divest Harvard, 150 People Gather For Divest Harvard Petition Delivery.

28 Twomey, Students Are Clamoring for Fossil Fuel Divestment.

29 University of California Santa Barbara Environmental Affairs Board, UCSB Faculty Senate Votes in Favor of Fossil Fuel Divestment.

30 University of California Office of the President, University of California announces progress on sustainable investment strategy.

31 Svoboda, Senate passes fossil fuel divestment bill.

32 Henn, Tufts Administration Forms Working Group to Study Divestment.

33 Twomey, Students Are Clamoring for Fossil Fuel Divestment.

34 Zandt and Marshall, The New School.

35 Trupin, The New School Divests!

36 Silverman, Fossil Fuel Divestment Victory at The New School.

37 The New School, The New School Submits Bold Plan to Tackle Climate Change.

38 Schwartz, Syracuse to Drop Fossil Fuel Stocks From Endowment.

39 Swann, Syracuse University announces it will divest from fossil fuels.

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Divestment is also being considered at schools across Canada:

- The McGill divestment campaign is the most advanced of the Canadian divestment campaigns: the three major student unions have endorsed the divestment campaign, the petition was presented to the Board of Governors on February 1st, and was rejected by the Board of Governors on May 23rd 2013. 4041
- At the University of New Brunswick, students have collected over 300 signatures in support of divestment. 42 They have also submitted a presentation and resolution of support to the student union. 43
- At the University of British Columbia, students are calling on the UBC Investment Management Trust to sell the school's \$7.14 million in oil and gas investments. 4445 In June 2013, UBC adopted a new responsible investment strategy.

No major public university has yet committed to divest from fossil fuels. This gives U of T an opportunity to distinguish itself and show leadership. As the severity of climate change worsens, the case for divestment will strengthen; at the same time, as governments become more active it will become increasing

ly clear that fossil fuel stocks are overvalued. By moving early, U of T can contain this risk and gain reputational advantages.

6.4.1 Questions about divestment raised at other schools

At other universities where fossil fuel divestment has been proposed, university administrations have responded with specific objections about the proposed course of action. Toronto350.org's fossil fuel divestment proposal has been designed to take these considerations into account and this brief includes detailed responses to a number of counter-arguments.
McGill

At McGill, a proposal to divest from oil sands and fossil fuels was considered and rejected by the university administration in May 2013.⁴⁶ This brief comprehensively addresses the issues the McGill administration raised. For instance, the Report of the Committee to Advise on Matters of Social Responsibility states that:

In discussion with the Committee, the representatives of Divest McGill acknowledged they were unaware of examples of corporations involved in oil sands and fossil fuels which had been found to have violated or frustrated the enforcement of rules of domestic or international law intended to protect individuals against deprivation of health, safety or basic freedoms.⁴⁷

Two sections of this brief address this matter: The business activities of these companies frustrate the enforcement of the rules of domestic and international law intended to protect individuals against deprivation of health, safety, and basic freedoms and In what cases have courts found that fossil fuel companies caused injury?

McGill's Committee to Advise on Matters of Social Responsibility also states that:

⁴⁰ Divest McGill, Letters from All Major Student Execs (2012-13, 2013-14) Call for Divestment Today.

⁴¹ Fenton, Divest McGill Delivers Social Injury Briefs.

⁴² Fossil Free UNB, Petition signature count 306!

⁴³ Fossil Free UNB, Today, our Fossil Free UNB team is presenting our project and a resol

ution of support to the UNB Student Union

44 Katic, Why we're asking UBC to divest from oil and gas.

45 See also: UBCC350, Fossil Fuel Divestment at the University of British Columbia: A Responsible Investment Proposal.

46 The proposal is available at: <http://Toronto350.org/brief/mcgill/the-social-injury-of-tar-sands-and-fossil-fuels.pdf>

and the response is at: <http://Toronto35G.org/brief/mcgill/camsrdocuments0.pdf>

47 McGill University Committee to Advise on Matters of Social Responsibility, Report of the Committee to Advise on Matters of Social Responsibility: Board of Governors meeting of May 23, 2013, p. 4.

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During the discussion, it was noted that a number of energy companies are actively engaged in

research into and the production of alternate forms of energy, which suggests that investment in

these companies may help to promote and encourage the use of alternate sources of energy.

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This specific objection is addressed in: But don't fossil fuel companies also invest in renewable energy?

The committee at McGill also "took note that the energy sector, including oil and gas extraction, production

and distribution, is highly regulated by government at all levels". This objection is considered in the section:

Isn't the energy sector – including oil and gas extraction, production, and distribution – highly regulated by

government at all levels?

In conclusion, the committee at McGill decided that:

While some members noted environmental and health effects related to the oil sands, the Committee

found that Divest McGill had presented no evidence of a court finding of injury on the part

of oil sands or fossil fuels companies, and otherwise had provided insufficient data and evidence

to establish that social injury had occurred. 49

This brief provides detailed evidence of the social injury caused by fossil fuel companies, in the chapter: The activities of fossil fuel companies are socially injurious, and this social injury cannot be reasonably remedied through shareholder voice.

Divestment as proposed by Toronto350.org is substantially more focused than what was proposed by Divest McGill. This brief calls only for the sale of direct holdings in 200 listed companies, and does not call upon the university to identify firms involved in any specific fossil-fuel-related activity. Furthermore, this proposal does not call for divestment from companies that make loans to the 200 companies listed. This greatly simplifies the process of divestment, and removes any uncertainty about whether the firms in question are directly involved in the social injury described in this brief.

The University of British Columbia

On June 4th 2013, the Board of Governors of the University of British Columbia (UBC) approved a new responsible investment strategy that included a number of objections to using divestment in response to concern about companies causing social injury. 50

The first concern the board raised is about the challenge of effectively screening potential investments according to environmental, social, and governance concerns:

Issues with portfolio screening are multiple and complex. Ethically, portfolio screening is difficult to apply to reflect the competing political, environmental and social interests playing out at any given time, and whether these interests should be company specific or sector-wide.

This concern is eliminated in the approach proposed at U of T. The list of companies where divestment is encouraged is already prepared and included in: Appendix II: The 200 companies with the largest fossil fuel reserves. Since these are the 200 global companies with the largest fossil fuel reserves, there is a direct logical reason why each is included in the list. This pertains both to the degree of social injury that burning their

48 McGill University Committee to Advise on Matters of Social Responsibility, Report of the Committee to Advise on Matters of Social Responsibility: Board of Governors meeting of May 23, 2013, p. 4.

49 Ibid., p. 4.

50 University of British Columbia, Vice President Finance, Resources, & Operations, UBC Adopts Responsible Investment Strategy.

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reserves would cause, as well as the degree of regulatory risk involved in investing in these firms, given the growing willingness of governments to regulate GHG pollution. Another issue raised in the UBC document is:

Economically, screening out entire sectors such as the Canadian energy sector would push more of the endowment outside of the country, into geographic areas that often have more questionable social and environmental records.

The 200 companies listed in this proposal are global, mitigating the risk that U of T would shift its endowment into more damaging companies elsewhere. This brief also includes a response to the concern: Won't divestment hurt Canadian jobs and the economy?

The last objection to divestment included in the UBC document is:

Financially, implementing a direct screening policy would prevent UBC from investing in pooled or indexed funds and would generate significant overhead that would negatively impact student and researchers supported by the endowment.

Once again, this concern does not apply to the approach proposed by Toronto350.org, which calls only for divestment of direct stock holdings at this time.
Harvard

Please note: this text was provided as a separate document along with the original brief in September 2013.

In October of 2013, Harvard's President, Drew Faust, released a statement arguing against a student proposal to divest from fossil fuel companies. 51 Both Harvard Students for a Just and Stable Future and

Toronto350.org disagree with President Faust's analysis, which fails to fully appreciate the positive case in favour of divestment while introducing arguments against it that can be reasonably questioned.

One of President Faust's first points was that Harvard should "be very wary of steps intended to instrumentalize our endowment in ways that would appear to position the University as a political actor rather than an academic institution". Concern about using a university's endowment for political purposes is very understandable. At the same time, continued fossil fuel investment in the face of climate change is also a political choice. By investing in fossil fuel companies, both Harvard and the University of Toronto are deriving benefits from ongoing activities that threaten the security and prosperity of billions of people, now and in future generations. The existence of a divestment policy at U of T – and its application in the past in the cases of tobacco and South African apartheid – demonstrates that the university is committed to avoiding investments that cause substantial social harm. By applying those values in this case, U of T would be living up to its own standards.

Harvard has also chosen to divest in some past instances. In 1990, they divested from tobacco, following the advice of the Harvard Advisory Committee on Shareholder Responsibility. Explaining the decision, the university cited the lack of government regulation of tobacco sales in developing countries as one justification. The lack of governmental regulations in dealing with greenhouse gas emissions is at least as problematic as limited tobacco sales regulation in developing countries. Global CO₂ emissions continue to rise, despite the overwhelming scientific consensus that this creates grave dangers for human beings everywhere. Total emissions from some developing countries are rising very rapidly. Meanwhile, per capita emissions in developed

51 The full statement is available at: <http://www.harvard.edu/president/fossil-fuels>

countries including Canada and the U.S. are extremely high – as are the emissions associated with overseas production of the imports they consume. This adds to the responsibility on institutions like Harvard and U of T to take a principled stance and refuse to invest in sustaining and expanding the business-as-usual operations of the fossil fuel industry.

Like their tobacco counterparts two decades ago, fossil fuel companies are failing to provide adequate information on the risks associated with their products. As detailed in this brief, fossil fuel companies have spent large amounts of money obscuring public understanding of the science of climate change and opposing the effective regulation of their harmful activities. These problematic behaviours strengthen the case for using divestment as a tool for dealing with companies that are abusing their social license to operate.

President Faust also used the high degree of global reliance on fossil fuels as an argument against divestment:

I also find a troubling inconsistency in the notion that, as an investor, we should boycott a whole class of companies at the same time that, as individuals and as a community, we are extensively relying on those companies' products and services for so much of what we do every day. Given our pervasive dependence on these companies for the energy to heat and light our buildings, to fuel our transportation, and to run our computers and appliances, it is hard for me to reconcile that reliance with a refusal to countenance any relationship with these companies through our investments.

While it is true that the fossil fuel industry currently provides us with much of our energy, this doesn't empower us to ignore the consequences that arise from it. Burning fossil fuels puts our livelihoods and those of future generations at great risk. Avoiding the worst possible consequences of climate change requires deep and sustained cuts in fossil fuel use. Re-directing investment away from fossil fuel companies is a logical part of that process. Continued human prosperity – and the academic success of institutions like U of T and Harvard

– certainly depends on continued access to energy. A global transition away from the fossil fuel energy that is putting humanity at ever-greater risk must be achieved by deploying carbon-neutral energy sources that are compatible with a human future that can be prosperous indefinitely.

At present, companies are spending hundreds of billions of dollars a year seeking new fossil fuel reserves.

This is starkly at odds with the knowledge that we can only avoid dangerous climate change by leaving the

great majority of existing proven reserves unused. As stressed by British economist Nicholas Stern, the total

cost of the global transition to climate-safe forms of energy depends a great deal on how early the process

begins. Heavy investment in extreme fossil fuels like offshore drilling and the oil sands is triply costly. Hu-

manity is investing heavily in new fossil fuel infrastructure that will need to be scrapped before the end of

its economically productive life in order to avoid dangerous climate change. At the same time, it is delaying

investment in climate-safe infrastructure, raising its eventual total cost. Finally, these investments worsen

climate change, which threatens the security and prosperity of people around the world.

President Faust also commented on the efficacy of divesting for reducing emissions:

I also feel compelled to ask whether a focus on divestment does not in fact distract us from more

effective measures, better aligned with our institutional capacities.

This perspective is at odds with the success of the tobacco and Apartheid divestment campaigns that took

place at many universities. As respected institutions that need to manage their endowments for the long term,

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universities are watched closely by other institutional investors. This has even been recognized by fossil fuel

companies themselves. As described in greater detail in Other people will buy the stocks we sell, so how does

this make a difference?, a May 2013 presentation given by Meredith Xcelerated Marketing to the American

Coal Council described fossil fuel divestment campaigns as "a potent form of publicity".

If U of T chose to divest, it would become the first big educational institution to do so. The message that would send to other institutional investors would have a much greater effect than the direct impact of selling our stocks.

The world's proven fossil fuel reserves now largely consist of stranded assets and, as a consequence, a massive carbon bubble has been inflated in the stock prices of fossil fuel companies. As investors around the world realize this, much of the apparent value of these companies will disappear. President Faust's arguments against divestment are ultimately unconvincing. The University of Toronto has an opportunity to pre-empt this bursting of the carbon bubble, outsmart Harvard, and affirm its institutional values all at the same time. We should take advantage of the opportunity.

Dalhousie

In 2014, the Board of Governors at Dalhousie University decided not to divest from fossil fuel companies, but rather "decided to step up its efforts to work with fund managers who respect environmental, social and governance (ESG) investment principles, and to investigate options for donors who want assurances that their endowments will be invested outside the fossil fuel sector".⁵² They argued that: "engagement with the companies on its behalf and by other like-minded investors will have greater influence and chance for success".⁵³ This argument is unconvincing for the reasons elaborated in: Isn't shareholder activism a better option? Creating an option for donors to avoid having their contribution invested in fossil fuel companies is desirable, but not an adequate response to the problem of climate change.

To justify this decision, the board argued that Dalhousie's investments are too small to make a difference; that shareholder activism is a preferable approach; and that divestment from the large pooled funds where the university currently invests 80% of its assets would be inconvenient.⁵⁴
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These objections have limited relevance for U of T and the proposal from Toronto350.org. U of T has a much larger endowment than Dalhousie's \$486 million, as well as a substantially larger

global stature

– meaning a decision to divest here would send a stronger signal to other institutional investors around the world. The argument that shareholder activism can convince fossil fuel companies to leave the great majority of their reserves unburned is fundamentally unconvincing. Finally, Toronto350.org has called for divestment of direct holdings of stock in the 200 companies with the largest reserves, specifically to avoid any difficulties and inconveniences associated with fossil fuel investments within pooled funds.

In addition, there are reasons to doubt Dalhousie's commitment to effectively addressing climate change through shareholder activism. In April 2015, the university accepted a \$600,000 donation from Shell Canada, \$100,000 of which is dedicated to offshore exploration – the kind of extreme energy development we can no longer afford to undertake in a carbon-constrained world. 56

52 Dalhousie University Board Investment Committee, The Proposal to Divest Dalhousie's Holdings in 'carbon-holding' companies, p. 3.

53 Ibid., p. 3.

54 Ibid., p. 12, 3, 12.

55 See also: McNutt, Dal Board Decides Not to Divest Fossil Fuel Endowment Holdings.

56 CBC News, Shell Canada's \$600K donation to Dalhousie University spurs protest.

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6.5 What are other large investors doing?

Several cities are considering divesting themselves from fossil fuel stocks. 57 The mayor of Seattle has called for the city to divest its fund for daily operations (US\$1.4 billion), its deferred compensation plan (US\$700 million), and its pension system (US\$1.9 billion). 58 The mayor of Portland, Oregon has urged the Oregon State Treasurer, the Local Government Investment Pool, and the Oregon Investment Council to divest all state holdings in fossil fuel companies. The San Francisco Board of Supervisors has urged the retirement board to divest US\$583 million of fossil fuel holdings in the city's \$16 billion retirement fund. 59 In June 2013, the city

council of Providence, Rhode Island voted 11-1 in favour of divestment. 60

Eleven regional conferences of the United Church of Christ in the United States have voted to divest. 51

Numerous other churches and faith-based organizations are considering divestment, including the First Uni-

tarian Church of Salt Lake City, the Evangelical Lutheran Church of Oregon, and the Uniting Church of New

South Wales & ACT, Australia. 62 The World Council of Churches, with over 500 million members in 30

municipalities, has committed to divest. 6364

Hedge fund billionaire Tom Steyer has decided to divest his holdings in fossil fuel companies. He argues

that a portfolio that excludes fossil fuels "will outperform the market". 65 In July 2013, the Norwegian financial

services company Storebrand ASA announced that they will be divesting from 19 fossil fuel companies. 66 The

decision was motivated by the belief that the value of these companies would fall because of their negative

climate change impacts. 6768 The Dutch bank Rabobank has also decided not to fund shale oil development. 69

According to a spokesperson from the bank, this is because "[t]he bank's global policy is not to be involved

with extracting fossil fuels where it is not clear what the risks and consequences may be". 70

In July 2013, European Union Climate Commissioner Connie Hedegaard called for the European Investment

Bank (EIB), the European Bank for Reconstruction and Development (EBRD), and the World Bank to eliminate

public support for fossil fuels. 7172 Each year, these three institutions provide US\$168 billion in funding for

projects around the world. 73

McGinn, An update on fossil fuel divestment.

59 Saxifrage, Divestment may protect from 40-60% overvaluation of fossil fuel stock.

60 Henn, Providence, RI Approves Divestment from Fossil Fuels.

61 Wangsness, More churches calling for divestment from fossil fuel.

62 See: Galbraith, Churches Go Green by Shedding Fossil Fuel Holdings.

63 Vaughan, World Council of Churches rules out fossil fuel investments.

64 See also: Atkin, Group Representing Half A Billion Christians Says It Will No Longer Support Fossil Fuels.

65 Steyer, To the Middlebury College Board of Trustees.

66 Storebrand ASA, Storebrand reduserer CO₂-eksponeringen i sine investeringer – 19 selskaper ekskluderes.

67 Blackburne, Norwegian pension fund divests from 'financially worthless' fossil fuel firms.

68 See also: Grandia, Major Norwegian Pension Fund Drops Tar Sands Investments.

69 Bertini, Dutch bank refuses loans to businesses involved in shale gas.

70 DutchNews.nl, Rabobank will not finance shale gas extraction.

71 The CEE Bankwatch Network, SEE Change Net, and the WWF, Invest in Haste, Repent at Leisure, p. 9-10.

72 See also: EurActiv.com, Hedegaard urges development banks to divest from fossil fuels.

73 The CEE Bankwatch Network, SEE Change Net, and the WWF, Invest in Haste, Repent at Leisure, p. 10.

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6.6 But don't fossil fuel companies also invest in renewable energy?

In 2008, British Petroleum (BP) launched a rebranding effort in which it claimed that its initials now meant

'Beyond Petroleum'. 74 This is now widely seen as an example of 'greenwashing' – devoting extensive re-

sources to advertising how environmentally-friendly an organization claims to be, while not actually adopting

sustainable practices. 75 BP has since abandoned its foray into solar power generation and put its U.S. wind-

farm business up for sale. 7677 This behaviour is typical of the fossil fuel industry, which has spent vast sums

of money touting its environmental credentials, while its business plans – which depend on burning all of

their fossil fuel reserves – are fundamentally at odds with environmental sustainability.

As BP's chief exec-

utive, John Browne spent \$200 million advertising the 'Beyond Petroleum' slogan. Under his tenure, BP was

"marred by a succession of devastating accidents... [including] an explosion at BP's Texas City refinery in 2005

that killed 15 workers and injured 170 others, and an oil spill a year later that dumped 4,800 barrels of oil

at Prudhoe Bay, on the coast of Alaska". 78 In April 2010, BP's Deepwater Horizon oil pla

tform in the Gulf of Mexico exploded, causing 11 deaths and over \$40 billion in damage, alongside massive ecological harm. 79 All told, BP may end up paying over US\$90 billion in fines and compensation for causing the disaster. 80 At the peak, BP was directing six percent of overall investment toward renewables. This compares with 2.5 percent at Chevron and Shell, with no other major oil company investing more than one percent. 81

The sums fossil fuel companies are investing in renewable energy are dwarfed by the investments they are making in unconventional sources of coal, oil, and gas. For example, BP has announced its intention to increase spending on arctic drilling by \$1 billion over five years, increasing its fleet of oil rigs from seven to nine by 2016. 82 In 2003, BP invested \$6.75 billion in Russia's Tyumen Oil Company, which is involved with the massive Sakhalin offshore project. 83 In total, the Government of Alberta expects over \$218 billion to be invested in the oil sands over the next 25 years. 84 The 200 fossil fuel companies with the largest reserves spent \$674 billion in 2012 identifying and developing new fossil fuel reserves, as well as researching ways to extract fossil fuels from proven reserves. 8586

Conventional fossil fuel sources are more than sufficiently abundant to allow humanity to far exceed the 2 °C 'safe limit' for climate change. The costly pursuit of exotic new reserves shows how fossil fuel companies have failed to internalize the reality of climate change and are continuing to implement investment plans that are sharply at odds with planetary safety. Also, based on various credible estimates of the social cost of carbon, the total damage being done to society by fossil fuel burning substantially exceeds the scale of the investments

74 Pearce, Greenwash: BP and the myth of a world 'Beyond Petroleum'.

75 The Oxford English Dictionary defines the term as: "The creation or propagation of an unfounded or misleading environmentalist image"

76 Winkley, Energy Journal: BP No Longer Beyond Petroleum.

77 David, 'Beyond Petroleum' No More? BP Goes Back to Basics.

78 The Economist, In the black stuff.

79 McCarthy, Canada raises liability for offshore oil spills to \$1-billion.

80 The Economist, Supermajordammerung, p. 20.

81 Juhasz, Big Oil's Big Lies About Alternative Energy.

82 The Wall Street Journal, BP Plans \$1 Billion in New Spending on Alaska.

83 The Economist, Not beyond petroleum.

84 Government of Alberta, Economic Benefits.

85 Carbon Tracker Initiative, Unburnable Carbon: Are the world's financial markets carrying a carbon bubble?, p. 4.

86 See also: Steiner, Decarbonising the economy: the pivotal role of the financial sector

.

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the industry is making in renewables. 87

Chevron, much like its competitors, launched a strong push towards renewables at the turn of the millennium but has recently left these ambitions behind and settled back into its oil-focused business

model. In January 2014 the renewable energy group, tasked by Chevron with launching large scale and

profitable clean-energy projects, was told funding would be diverted elsewhere and the project would

be ended. 88 This was followed up by the suspension of operations at two solar installations in Hawaii

in August 2014, as well as the sale of its renewable energy subsidiary on August 29th 2014.

ExxonMobil's energy outlook paints a pessimistic picture for renewable resources. According to their

internal estimates, non-hydroelectric renewable energy production will make up only four percent of

the world's energy by 2040. 89 This outlook illustrates the lack of interest or optimism afforded by major

oil and gas companies for renewable energy. According to Michael Mann of Penn State's Earth System

Science Center, this outlook simply cannot come to fruition:

Exxon's vision of a fossil fuel-driven future is one in which carbon dioxide levels rise well

beyond the dangerous limit, where we will witness fundamental threats to food, water, lan

d,
our economy, national security, and our environment.

He goes on to say: "let us hope, for the sake of us and our planet, that this is not our future". 90 Referring

to the fossil fuel business, Ken Cohen, ExxonMobil's vice-president of government affairs, has said:

" [i] t's the business we're in, it's the business that we know and that is the biggest p
ortion of the global

energy portfolio today and going forward". What's more: " [w] e aren't, as a corporation,
inclined to get

involved in businesses that at the present time require government subsidy to be competit
ive with our

core business, which is producing oil and natural gas". 91 ExxonMobil also made its posit
ion on using

all available fossil fuel reserves clear in response to a 2014 shareholder resolution req
uesting a report

"on the Company's strategy to address the risk of stranded assets presented by global cli
mate change,

including analysis of long and short term financial and operational risks to the company"
. 92 In their

response, the company asserted that: "we are confident that none of our hydrocarbon reser
ves are now

or will become 'stranded.'". 93

Shell has also been winding down its renewable energy investment over the past several ye
ars.

According to reporter George Monbiot, as of 2009 "Shell's spending on renewables – except
biofuel

appears to have fallen from \$200 million a year to zero over the past nine years". 94 The
company exited

the solar industry entirely in 2009, though it ironically predicted in 2013 that solar po
wer may expand

into the world's biggest energy source in the next half century. 95 Despite such projecti
ons, the company

does not appear to be interested in turning away from its core business model. Little has
changed in

their renewable investments since Linda Cook, Shell's executive director of gas and power
stated that:

" [i] f there aren't investment opportunities which compete with other projects we won't
put money into

87 See: Pricing the social cost of carbon

88 Elgin, Chevron Dims the Lights on Green Power.

89 Associated Press in New York, Wind and solar energy are 'not ready for primetime, ' sa
ys Exxon analyst.

90 Ibid.

91 Irwin, Why Isn't ExxonMobil in the Renewables Business?

92 Arjuna Capital, Report on goals and plans to address carbon asset risk.

93 ExxonMobil, Energy and Carbon – Managing the Risks.

94 Monbiot, Shell's subtle switch from renewables to the murky world of 'alternative' energy.

95 Gismatullin and Bakewell, Shell Sees Solar as Biggest Energy Source After Exiting It.

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it. We are businessmen and women. If there were renewables [which made money] we would put money into it". 96

ConocoPhillips' website contains vague statements about "evaluating and developing technologies for renewable energy" but these assertions do not appear to have resulted in significant investment in renewable energy sources. 97 Antonia Juhasz has reported that in April 2012 ConocoPhillips actually divested from all its alternative energy activities and a company spokesperson has subsequently said " [w] e do not have an active renewable energy segment within our portfolio". 98

Not only are the major fossil fuel companies showing signs of doubling down on oil, gas, and coal, but the government subsidies this industry is granted has been shown to have detrimental effects on renewable technology development. Subsidies provided to these companies (to offset the prohibitive cost of extraction and exploration of fossil fuels) are hampering the development of energy alternatives. The IEA estimates that fossil fuel companies receive \$500 billion in subsidies annually and are consequently holding back investment in cleaner forms of energy. 99100101102 In their 2014 study on the "Impact of Fossil-Fuel Subsidies on Renewable Electricity Generation" Richard Bridle and Lucy Kitson found that "fossil-fuel subsidies impair the competitiveness of renewable energy technologies, reinforce

the continuation of fossil-fuel-based systems, and distort investment decisions in favour of fossil-fuel technologies".¹⁰³ In the U.S., subsidies for exploration and production of coal, oil, and natural gas doubled between 2009 and 2013, to US\$21.6 billion.¹⁰⁴ Adjusted for inflation, total U.S. subsidies to the oil and gas industry between 1918 and 2009 are estimated at US\$447 billion.¹⁰⁵ In 2013, the IMF estimated that Canadian subsidies to the fossil fuel industry added up to \$34 billion per year, with \$19.4 billion of that taking the form of uncollected taxes on the externalized costs of burning transportation fuels including gasoline and diesel, along with impacts like carbon emissions, air pollution, and road congestion.¹⁰⁶¹⁰⁷

The fossil fuel industry has also been very active in resisting the political changes that are necessary for decarbonization: by misleading lawmakers and the public about climate science, and by lobbying intensely against all new pollution regulations.¹⁰⁸¹⁰⁹ In his analysis of regime resistance to low-carbon transitions, Frank Geels explains:

[S]ocio-political struggles with fossil fuel companies and other incumbent firms (e.g. electric utilities, car companies) will be crucial in the case of low-carbon transitions. In fact,

⁹⁶ Webb, Shell dumps wind, solar and hydro power in favour of biofuels.

⁹⁷ ConocoPhillips, Renewable energy position.

⁹⁸ Juhasz, Big Oil's Big Lies About Alternative Energy.

"Morales, Fossil Fuels With \$550 Billion Subsidies Hurt Renewables.

¹⁰⁰ In their 2014 World Energy Outlook, the IEA states: "Fossil-fuel subsidies totalled \$ 550 billion in 2013 – more than four times those to renewable energy – and are holding back investment in efficiency and renewables". International Energy Agency, World Energy Outlook 2014 – Executive Summary, p. 4.

¹⁰¹ See also: Solomon, Fossil fuel subsidies are starving innovation.

102 In 2014, the World Bank Group established the Energy Subsidy Reform and Delivery Technical Assistance Facility to try to reduce the harm imposed on the world's poor by distortive energy subsidies. Cleveland and Reibstein, *The Path to Fossil Fuel Divestment for Universities: Climate Responsible Investment*, p. 17.

103 Bridle and Kitson, *The Impact of Fossil-Fuel Subsidies on Renewable Electricity Generation*, p. 5.

104 Cleveland and Reibstein, *The Path to Fossil Fuel Divestment for Universities: Climate Responsible Investment*, p. 29.

105 *Ibid.*, p. 29.

106 International Monetary Fund, *Energy Subsidy Reform: Lessons and Implications*, p. 44-66.

107 Anderson, *IMF Pegs Canada's Fossil Fuel Subsidies at \$34 Billion*.

108 See: Geels, "Regime resistance against low-carbon transitions: Introducing politics and power into the multi-level perspective".

109 Oreskes and Conway, *Merchants Of Doubt*.

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politically-inspired regime destabilization may be necessary to create opportunities for the wider diffusion of renewables, which now face uphill struggles against resistant regime.
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Arguably, the investments made by the fossil fuel industry have been much more about public relations and acquiring political cover to resist legislative and regulatory change genuine steps toward a post-carbon world.

6.7 In what cases have courts found that fossil fuel companies caused injury?

So far, there are a limited number of legal precedents in which the seriousness of climate change and the injury being caused by fossil fuel companies are recognized. For examples from Canada, see: Canadian domestic law. 111112 For those in the United States, see: U.S. domestic law. For international cas

es, see: Domestic law in other jurisdictions. While these precedents focus on the climatic impacts of the activities of fossil fuel companies, there are numerous other areas in which they cause social injury, including toxic air and water pollution.

In past instances, U of T has accepted the appropriateness of divestment before a comprehensive legal justification has been in place. For more information, see: Why fossil fuels are like tobacco.

6.8 Isn't the energy sector – including oil and gas extraction, production, and distribution – highly regulated by government at all levels?

When it comes to GHG pollution, the fossil fuel industry is essentially unregulated at the federal level in Canada. Firms are free to use the atmosphere as a dumping ground for CO₂ pollution. 1131
14 The harm the industry is causing is largely dispersed, which makes it hard to assign responsibility, but we know there are major damaging impacts in the aggregate.

Furthermore, many governments in Canada have adopted policies intended to accelerate the growth of the fossil fuel sector. These include aggressive international lobbying for oil pipelines and other forms of fossil fuel export infrastructure. 115116117 They also include steps to weaken environmental assessment processes, reduce the scope of scientific research being conducted on climate change while suppressing the publication of results from government scientists, and maintain substantial subsidies to the fossil fuel industry. Canada's 2020 emissions are expected to substantially exceed the target it adopted under the Copenhagen Accord. 118 In

110 Geels, "Regime resistance against low-carbon transitions: Introducing politics and power into the multi-level perspective".
m See also: Gage and Byers, Why climate litigation could soon go global.

112 Gage and Byers, Payback Time? What the Internationalization of Climate Litigation Could Mean for Canadian Oil and Gas Companies.

113 See: Paris, Oil and gas industry emission rules still not ready from Ottawa.

114 See also: Stewart, On Keystone XL, beware John Baird bearing gifts.

115 See, for example: Harder, Meet Canada, Keystone's Marquee Lobbyist.

116 McCarthy, Keystone pipeline approval 'complete no-brainer,' Harper says.

117 Over, An open letter from the Honourable Joe Oliver, Minister of Natural Resources, on Canada's commitment to diversify our energy markets and the need to further streamline the regulatory process in order to advance Canada's national economic interest.

118 Partington, Trust us? Canada's climate credibility challenge.

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their assessment of Canada's compliance with G8 efforts to control climate change, the G8 Research Group at U of T's Munk School concluded that: "Canada has not complied with its commitment to take robust legislative and funding action to reduce its greenhouse gas emissions by 2020". 119 They also argue that Canada has not "passed legislation that demonstrates a sincere effort to limit its domestic emissions". 120

The regulation that exists in Canada is not putting the country on a pathway toward making a fair contribution in the global climate change mitigation effort. Additional regulation is required and – at least until it is in place – socially conscious organizations should take action themselves in response to the harm being caused by fossil fuels.

6.9 Can humanity manage without fossil fuels?

This question was extensively examined by Cambridge physicist David MacKay, resulting in his 2009 book *Sustainable Energy - without the hot air*, which is available for free online. 121122 In his detailed analysis, MacKay considers both the scope for reducing energy demand through energy efficiency and the opportunities for producing energy from low- and zero-carbon sources like renewables and nuclear power. In order to demonstrate the feasibility of providing everyone in the world with enough energy to sustain a high standard of living, MacKay calculates that "[t]o supply every person in the world with an average European's power consumption (125 kWh/d [kilowatt-hours per day]), the area required would be two 1000 km by 1000 km squares in the desert". 123 Although doing this with only giant solar facilities would be impract

ical and probably prohibitively expensive, the example nonetheless demonstrates that humanity can enjoy an improved standard of living without relying on fossil fuels at all. MacKay concludes that by combining wind, hydro, tidal, wave, geothermal, solar, and nuclear power it is possible for everyone in the world to consume 80 kWh per day – equivalent to the total per capita energy use in Hong Kong today. 124

The opportunities associated with renewable energy deployment are already being realized, and major growth potential remains. The U.S. Department of Energy believes that by 2030, 20 percent of American electricity could come from wind, reducing annual electric sector CO₂ emissions by 825 million metric tons. 125 Iowa already generates 39 percent of its energy from this low-carbon source. 126 Concerns about the intermittency of wind energy have also been proven exaggerated; by balancing production from wind facilities in different areas, consistent power output can be created. 127

Huge opportunities exist to reduce energy use by improving efficiency, including in industry, transport, power generation, and buildings. According to the IEA, these possibilities have not yet been factored into government planning: "[t]wo-thirds of the economic potential to improve energy efficiency remains untapped in the period to 2035" and energy efficiency remains "a huge opportunity going unrealised". 128 The IEA ex-

119 Clarke et al., 2010 Muskoka G8 Summit Final Compliance Report, p. 129.

120 Ibid., p. 156.

121 MacKay, Sustainable Energy - without the hot air.

122 See also "Divestment from fossil fuels will result in the end of modern civilisation" and "We all use fossil fuels everyday, so divestment

is hypocritical" in: Carrington, 10 myths about fossil fuel divestment put to the sword.

123 MacKay, Sustainable Energy - without the hot air, p. 178.

124 Ibid., p. 106, 238.

125 United States Department of Energy, 20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply.

126 The Economist, Blown away.

127 Ibid.

128 International Energy Agency, World Energy Outlook 2012: Presentation to the press, p. 13.

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plains that "[e]conomically viable efficiency measures can halve energy demand growth to 2035" and produce reductions in oil use equivalent to the production from Russia and Norway. 129 By 2035, the IEA predicts that improved energy efficiency could cut energy expenditures by 20 percent, alongside "wider economic gains, particularly for India, China, the United States and Europe". 130

A 2007 report from the UNFCCC found addressing climate change to be financially feasible:

additional investments required to bring the emissions to current levels are small in relation to estimated global gross domestic product (GDP) (0.3 - 0.5 per cent) and global investment (1.1 - 1.7 per cent) in 2030. A conscious effort will have to be made to redirect traditional investment flows to climate-friendly alternatives. 131

The transition to renewable energy will bring jobs and other economic benefits. Analysis from the Union of Concerned Scientists found that a national standard of 25 percent renewable energy in the U.S. by 2025 would "create more 'green' jobs, lower consumer energy bills in every region of the country, and reduce carbon dioxide (CO₂) and other harmful emissions from power plants – the biggest source of global warming pollution in the United States". 132 The report finds that this policy would create three times as many jobs as producing the same amount of energy from fossil fuels. 133 A zero-carbon energy system would also reduce volatility in energy prices, since the inputs are free once the infrastructure is built, and would eliminate the security and economic risks experienced by states dependent on fossil fuel imports.

On a business-as-usual pathway in which humanity burns most or all of the planet's remaining fossil fuels, the planet can be expected to experience catastrophic changes that will wreak considerable economic damage.

As such, the choice we are facing is not between perpetuating the status quo indefinitely or committing to

decarbonization. Rather, our choice is between decarbonization and catastrophic climate change. The World

Bank has argued that "[t]he current level of action puts us on a pathway towards a 3.5-4 °C warmer world

by the end of this century" and that "[s]uch a scenario would have a devastating impact on the climate and

would threaten our current economic model with unprecedented and unpredictable impacts on human life and

ecosystems in the long term".¹³⁴¹³⁵ As the Australian government's Climate Commission explains: "Burning

all fossil fuel reserves would lead to unprecedented changes in climate so severe that they will challenge the

existence of our society as we know it today".¹³⁶

Whether we like it or not, humanity must learn how to manage without fossil fuels.

A 2015 study conducted by dozens of Canadian academics concluded:

Because renewable energy resources are plentiful, we believe that Canada could reach 100%

reliance on low carbon electricity by 2035. This makes it possible, in turn, to adopt a long-

term target of at least 80% reduction in emissions by the middle of the century, consistent

with Canada's international climate mitigation responsibility.¹³⁷

¹²⁹ International Energy Agency, *World Energy Outlook 2012: Presentation to the press*, p. 14.

¹³⁰ *Ibid.*, p. 15.

¹³¹ United Nations Framework Convention on Climate Change, *Investment and Financial Flows to Address Climate Change*.

¹³² Union of Concerned Scientists, *Clean Energy, Green Jobs*.

¹³³ See also: Union of Concerned Scientists, *Benefits of Renewable Energy Use*.

¹³⁴ The World Bank, *Mapping carbon pricing initiatives: developments and prospects*, p. 13.

135 See also: Schuetze, Environmental Woes Could Reverse Global Development.

136 Government of Australia Climate Commission, The Critical Decade 2013, p. 5.

137 Sustainable Canada Dialogues, Acting on Climate Change: Solutions from Canadian Scholars, p. 8.

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They acknowledge that: "the transition to a low-carbon economy require [s] strong investment", pointing to other research that has been done on the importance of climate change for Canadian investment decisions. 138

6.10 Won't divestment hurt the endowment, including U of T's

ability to provide scholarships?

As discussed at greater length in There is no evidence of a divestment penalty for investors, there is evidence that portfolios that exclude companies that cause social injury do not suffer a financial penalty for doing so. 139

Deutsche Bank and Mercer have conducted major meta-studies on portfolios that consider environmental, social, and governance (ESG) factors and found that there is either a neutral or positive relationship between financial performance and the incorporation of ESG factors into portfolio management. 140
141 Hedge fund billionaire Tom Steyer explained in a letter to the Corporation of Brown University:

The available research, looking backward, shows that the return penalty would be tiny – but in any event good investors rarely look backward. Looking to the future, the data on climate change makes it clear that something has changed, and as the rest of the world realizes this, coal stocks will come under increasing pressure. At the moment, other investors have not fully realized the risk that carbon reserves will become a stranded asset; if you acknowledge what your own science departments are telling you this gives you an edge relative to those investors. I can tell you that in my own investments, I have directed my financial team to divest my holdings of coal invest

tments

so that I will have a coal free portfolio myself – in part because I am convinced it will outperform the market. 142143

Unlike fossil fuel divestment, failing to deal with the 'carbon bubble' could harm the university's financial standing in the long term.

In 2013, The Associated Press commissioned S&P Capital IQ to evaluate the relative returns that would have been associated with divested university portfolios:

The firm calculated the total returns of the broad U.S. market as tracked by the S&P 500 index, with and without the companies singled out by Fossil Free. An endowment of \$1 billion that excluded fossil fuel companies would have grown to \$2.26 billion over the past 10 years, but an endowment that included investments in fossil fuel companies would have grown to \$2.14 billion. That extra \$119 million could pay for 850 four-year scholarships, assuming tuition of \$35,000 per year. 144

Universities are entities that expect to exist forever and which therefore have very long time horizons for their investment decisions. In the long term, the university's ability to fund research and provide scholarships

138 Ibid., p. 53.

139 See also "Divestment means investors will lose money" in: Carrington, 10 myths about fossil fuel divestment put to the sword.

140 Deutsche Bank Group, Sustainable Investing: Establishing Long-term Value and Performance.

141 Mercer, Shedding Light on Responsible Investment Approaches, Returns and Impacts.

142 Steyer, Letter from Tom Steyer to the Brown Corporation.

143 See also: Steyer, To the Middlebury College Board of Trustees.

144 Begos and Loviglio, College fossil-fuel divestment movement builds.

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depends on general financial health, which would be improved by divestment.

6.11 Won't fossil fuel companies stop making donations to U of

T?

Donations from fossil fuel companies are reasonably limited. For instance, 'President's Circle' donors who have given over \$1,827 annually include Husky Energy, the Imperial Oil Foundation, the Mitsui Canada Foundation, Petro-Canada (a subsidiary of Suncor), RioTinto Alcan, and Shell Canada. 145 The full list includes several hundred donors. Three fossil fuel companies have also participated in the university's Boundless campaign: Husky Energy Inc., RioTinto Alcan, and the Mitsui Canada Foundation. 146 Once again, the list includes a dominant share of non-fossil-fuel-corporation donors. According to the university's Research Report, only seven percent (\$83 million out of \$1.2 billion) of research funding in 2011-12 came from industry, surpassed by government and non-profit funding. 147

These donations do not offset the financial risks associated with heavy investment in fossil fuels, nor do they compensate for the ways in which fossil fuel investments are contrary to the university's values and policies.

Two major motivations for corporate donations to the university are advertising and positive publicity. Neither of these objectives would be undermined by divestment, so it is plausible that corporate donations from fossil fuel companies could continue in spite of divestment. Indeed, Imperial Tobacco is included in the 'President's Circle' donors, despite the university's divestment from the tobacco industry in 2007.

In the case of industry's funding of university research and jobs, the major motivation is the accrued mutual benefits. Donations motivated primarily by advertising (such as naming buildings) would remain equally appealing to companies irrespective of divestment. Another major motivation for corpo-

rate donations is the desire to develop research partnerships. Academic research develops knowledge, technology, and skilled workers that help advance industrial goals. If fossil fuel companies were to cut that tie due to divestment, it would be to the detriment of that partnership, and thus would presumably be done as a political statement. The university's strong commitment to freedom of speech, along with academic and research freedom, is espoused in its statement of purpose. This precludes the consideration of such potential political influences on its ethical, financial, or curricular decisions. 148

Fossil fuel divestment and a strong commitment to addressing climate change could attract new donors and research funding from the renewable energy sector and in other research areas connected to decarbonization. If the world initiates the rapid transition to climate-safe forms of energy which is required to keep temperature increase below 2 °C, a great deal of research and development will be required. 149 It is plausible that donors and corporations that are concerned with finding climate change solutions will see fossil fuel divestment at U of T as a feature that encourages partnership. When Unity College divested, they experienced an uptick in applications and donations. 150

145 See: <http://boundless.utoronto.ca/member-listing/>

146 See: <http://boundless.utoronto.ca/member-listing/>

147 University of Toronto, An Academic Ecosystem.

148 University of Toronto, Mission & Purpose.

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McKibben, The Case for Fossil-Fuel Divestment, p. 4.

151

6.12 Shouldn't U of T fight climate change through research and

education?

U of T is active in climate change research and teaching, and this will continue. 151 This research has helped to establish what a serious and pressing problem climate change is for people in Canada and around the world.

Although this work is very welcome, it is not a substitute for divestment. The very existence of the divestment policy shows that the university has accepted the basic argument that some investments are incompatible with the values of the university. 152

6.13 Won't divestment hurt Canadian jobs and the economy?

This question gets the argument backwards: not dealing with climate change could cause enormous harm to Canadian prosperity. At the same time, there are major risks associated with continuing to invest hugely in fossil fuel infrastructure, at a time when the policy-makers of the world are starting to get serious about controlling climate change. As detailed extensively in Chapter 3 (The activities of fossil fuel companies are socially injurious, and this social injury cannot be reasonably remedied through shareholder voice), climate change poses a serious risk to Canadian prosperity. Furthermore, as detailed in Chapter 4 (Divestment is compatible with the university's fiduciary duties), there are major risks associated with continuing to invest in fossil fuel projects.

Right now, the Canadian economy is excessively dependent on fossil fuel production and export. Canada also has excessively high per capita emissions of GHG pollution – meaning we will probably need to cut faster and deeper than most, as part of a fair global transition to a low-carbon economy. Given that the future will be carbon-constrained, it is urgent that we start reducing that dependence. Divestment by U of T would send an important signal to help initiate this necessary transition. As highlighted in the Stern Review: "The benefits of strong, early action on climate change outweigh the costs". 153 Early divestment could also help reduce the risk of large amounts of investment being tied up in fossil fuel projects that will need to be shut down before the end of their economic lives as global and Canadian restrictions on GHG pollution are tightened.

Furthermore, as the world gets serious about decarbonization, many economic opportunities will arise in this sector. The Stern Review concluded that the net benefits of strong climate change mitigation policies would be of the order of \$2.5 trillion. 154 These will include the retrofitting of buildings to improve efficiency, the construction of renewable energy infrastructure, and research and development to support and enhance the transition. As a key research institution, U of T can participate directly in that part of the world's economic realignment.

In a 2014 report, Clean Energy Canada argued that employment in renewable energy, energy conservation, clean transportation, and clean energy infrastructure had grown to 23,700, compared with

See: Academic programming

; See also: Mandery, The Missing Campus Climate Debate.
'Stern, The Economics of Climate Change: The Stern Review, p. i.
Ibid., p. xvii.

152

22,340 working directly in the oil sands. 155156157

6.14 Can't we just adapt to climate change?

As described at considerable length in Chapter 3 (The activities of fossil fuel companies are socially injurious, and this social injury cannot be reasonably remedied through shareholder voice), the impacts of even 2 °C of climate change would be severe, and a business-as-usual pathway in which we continue to use fossil fuels the way we do now would likely see temperatures up more than 5 °C by 2100. 158

There is no adapting to climate change that melts the Greenland and West Antarctic ice sheets, flooding

huge populated areas. Similarly, climate change on such a scale would be accompanied by an acute risk of abrupt and irreversible effects. 159 In order to have a reasonable chance of adaptation that leads to a world with comparable human prosperity to what we enjoy now, climate change must be kept under 2 °C. That means most of the world's fossil fuels cannot be burned, leading to the various implications described in this brief.

6.15 Won't carbon capture and storage (CCS) save us?

Carbon capture and storage (also called carbon capture and sequestration) is a technology that promises to separate CO₂ from the emissions of facilities like power plants and bury it in underground formations such as saline aquifers. 160 The technology has already been deployed in certain applications, such as the re-injection of unwanted CO₂ in the Sleipner gasfield in Norway. CCS cannot solve our climate change problem for two major reasons: scale and economics.

Humanity is now emitting roughly 30 billion tonnes of CO₂ into the atmosphere annually. 161 As an article in the MIT Technology Review explains: "[I]f we were to bury just one-fifth of the global carbon dioxide emissions, we would need to build an industry capable of handling twice the volume of stuff as the entire oil industry, an industry that took 100 years to develop, driven by a large and mostly expanding market". 162 Rather than being a genuine means for dealing with climate change, CCS has more often been a way for the fossil fuel industry to delay serious government action by claiming that a wonderful technological solution will soon exist. This claim is at odds with the difficulties encountered by test projects like FutureGen – a supposedly 'clean' coal-fired power plant announced by President George W. Bush in 2003, but which was subsequently scrapped because of intolerably high costs. In January 2015, the U.S. Department of Energy announced that it was withdrawing support for the FutureGen project. 163 164 As The Economist explains: "there is not a single big power plant using CCS anywhere in the world". 165

155 Clean Energy Canada, *Tracking the Energy Revolution: Canada Edition 2014*, p. 5.

156 See also: Woynillowicz, *Behind the Numbers: Our Oil Sands and Clean Energy Job Compar*

ison.

157 Blackwell, Green energy sector jobs surpass total oil sands employment.

158 See also: ActlionAid, CARE, Germanwatch, and the WWF, Into Unknown Territory: The Limits to Adaptation and Reality of Loss and Damage from Climate Impacts.

159 See: Abrupt and non-linear adverse climate impacts

160 See also: Carbon capture and storage cannot make fossil fuel extraction compatible with climate stability

161 International Energy Agency, Redrawing the Energy-Climate Map.

162 Bullis, What Carbon Capture Can't Do.

163 Science, DOE scraps carbon capture plant.

164 Marshall, Clean Coal Power Plant Killed, Again.

165 The Economist, Trouble in store.

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On the economics of CCS, The Economist explains:

The problem with CCS is the cost. The chemical steps in the capture consume energy, as do the compression and transport of the carbon dioxide. That will use up a quarter or more of the output of a power station fitted with CCS, according to most estimates. So plants with CCS will need to be at least a third bigger than normal ones to generate the same net amount of power, and will also consume at least a third more fuel. In addition, there is the extra expense of building the capture plant and the injection pipelines. If the storage site is far from the power plant, yet more energy will be needed to move the carbon dioxide. 166

Despite considerable government subsidies, including \$3.4 billion in an American stimulus bill, CCS remains unattractive to energy utilities largely because of cost. 167 In a discussion paper published by the Belfer Center

for Science and International Affairs at Harvard, it was estimated that sequestering one tonne of CO₂ would cost approximately \$150 – far more than the cost of avoiding the emissions in the first place by implementing lower-cost measures. 168

Other considerations include the stability of formations into which CO₂ is injected and the seismic consequences of doing so. 169170 Carbon dioxide is heavier than air, so leaks from CCS facilities could suffocate people and animals nearby. 171 Water saturated with CO₂ also becomes acidic, which could undermine the integrity of equipment and underground formations intended to contain it. CCS is also useless for mobile sources of emissions like automobiles and aircraft where CO₂ cannot plausibly be separated from waste gases and stored. Given that 85 percent of the total emissions associated with fuels from the oil sands occur when the fuels are burned in vehicles, this means the scope for decreasing the climate impact of the oil sands with CCS is especially limited. 172173

The climatic benefits of CCS also risk being negated if the CO₂ which is sequestered is used to force otherwise unrecoverable oil out of the ground as part of 'enhanced oil recovery'. 174175176

The failure of CCS to live up to its promise is especially problematic for Canada, given the degree to which the climate change plans of the federal government and the Government of Alberta depend on this technology becoming cheap and effective in the near term. Canada's unrealistic expectations for CCS mean that decarbonization will be even more challenging than the federal and provincial governments expected, making it all the more important to begin investing in decarbonization now.

6.16 Won't geoengineering save us?

Geoengineering is the deliberate modification of the climate system, intended to counteract the effect of anthropogenic climate change. Several different mechanisms for achieving this have been proposed, but each

166 Ibid.

167 The Economist, The illusion of clean coal.

168 Al- Juaied and Whitmore, Realistic Costs of Carbon Capture.

169 Zoback and Gorelick, "Earthquake triggering and large-scale geologic storage of carbon dioxide".

170 See also: Sheridan, 'Carbon capture' too risky, earthquake prone: US study.

171 The Economist, Trouble in store.

172 Canadian Broadcasting Corporation, Secret advice to politicians: oilsands emissions hard to scrub.

173 McCarthy, Carbon capture no 'silver bullet'.

174 Roberts, Turns out the world's first "clean coal" plant is a backdoor subsidy to oil producers.

175 See also: Klein, This Changes Everything: Capitalism vs. the Climate, p. 247-8.

176 Gunther, Direct air carbon capture: Oil's answer to fracking?

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is deeply problematic for a variety of reasons. Geoengineering mechanisms can be broadly broken down into those that would seek to reduce global temperatures without lowering atmospheric CO₂ concentrations and those that would actually seek to draw CO₂ from the atmosphere.

The latter sort – which could theoretically reduce the atmospheric concentration of GHGs – suffers from the same problems of scale and economics experienced by CCS, exacerbated by the additional cost of separating CO₂ from air (where it is relatively low in concentration) rather than directly from the waste stream of power plants and other facilities where it is relatively concentrated.

The former sort, which could be achieved through means like injecting large volumes of sulfate aerosols into the upper atmosphere, suffers from even more significant problems. For one thing, it would do nothing to stop the acidification of the world's oceans: a trend that threatens the ability of marine organisms to form shells and skeletons from calcium, along with other unknown global effects on marine food webs. For

another, geoengineering of this type would be likely to further alter global precipitation patterns, in addition to the changes climate change would create. This sort of intervention would also need to be undertaken constantly and forever; if it were to be discontinued, global temperatures would spike. Rapid cessation of sulfate injection is expected to cause "an abrupt, spatially broad, and sustained warming over land... that is well outside 20th century climate variability bounds", as well as a rapid increase in total global precipitation accompanied by increased drought in almost half of land areas. 177

In short, geoengineering adds new risks on top of those from climate change, there is no guarantee it would be effective in reducing global temperatures and addressing the other consequences of climate change, and it would be likely to bring significant side-effects. Choosing to geoengineer would mean choosing to impose even more risk and damage upon future generations than we already are. 178

6.17 What implications do low oil prices have for fossil fuel divestment?

In recent years, the price of oil has demonstrated substantial variability: reaching \$140 per barrel in June 2008, before falling as low as \$45 per barrel in March 2015. 179 The price of oil is so unstable that the U.S. Federal Reserve excludes it from core inflation. 180 Bloomberg Business estimates that the 2015 drop in oil prices has led to \$393 billion in losses since June 2014: \$353 billion from the shares of fossil fuel exploration and production companies and \$40 billion from high-yield energy bonds. 181

The volatility of oil prices contributes to instability in the exchange rates of oil-producing countries and the stockmarket value of oil companies. Volatility also makes long-term infrastructure planning difficult, especially when infrastructure which is reliant on fossil fuels is designed to last for several decades. We will not speculate about the future direction of fossil fuel prices, and the case for divestment doesn't depend on assumptions about long-term price trends. That being said, the volatility of fossil fuel prices greatly complicates attempts to make rational and economically-efficient energy in

vestments

177 McCusker et al., "Rapid and extensive warming following cessation of solar radiation management".

178 See: Gardiner, "Is 'Arming the Future' with Geoengineering Really the Lesser Evil? Some Doubts about the Ethics of Intentionally Manipulating the Climate System".

179 Schmollinger, Oil Is Little Changed After Falling as Investors Sell Contracts.

180 Board of Governors of the Federal Reserve System, What is inflation and how does the Federal Reserve evaluate changes in the rate of inflation?

181 Loder and Dexheimer, Cheap Oil Burns \$390 Billion Hole in Investors' Pockets.

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for the decades ahead. Getting off the roller coaster of volatile fossil fuel prices is one major benefit associated with decarbonization.

Because of the high costs of production in Canada's oil sands and other unconventional sources of fossil fuels, prolonged periods of low prices threaten to make major investments unprofitable. Analysis from CanOils found that: "[1] less than 20% of leading Canadian oil and gas companies with oil-weighted production will be able to sustain their business long-term at US\$50 a barrel". 182 A 2014 report from the Carbon Tracker Initiative identified "Deepwater, Arctic, Oil sands and other unconventional" as facing the largest financial risks from lower demand, price, and emissions scenarios. 183

The reason why this brief calls for U of T to divest from direct stock holdings over the course of five years is to allow the university's investment advisors to sell these holdings at a time which they consider to be appropriate.

6.18 Would divestment just be a symbolic act?

A frequent response from those skeptical about fossil fuel divestment is to say that that the decision to

sell an institution's holdings in fossil fuel companies would be 'merely symbolic'.¹⁸⁴ These companies are hugely valuable, when measured by stock market price. Universities collectively hold a small portion of their total stockmarket value.

The central message of the divestment campaign, however, is that these companies are operating with a flawed vision of the future. Their expectation remains that they will be allowed to burn the fossil fuels they possess. It's on that basis that they continue to invest vast amounts of money into the development of extreme energy projects like arctic drilling, mountaintop removal, and the bitumen sands.

The ability of these companies to bring in the massive investment they require for these projects relies upon continued confidence that these coal, oil, and gas reserves remain valuable. As the world progressively accepts that the fuels cannot be burned, the value of these companies will diminish correspondingly.

The key shift here is a psychological one: from a world where most investors continue to see a bright future for the fossil fuel industry to one where people realize that we need a global energy transition. Many organizations are now concerned about climate change, and major policy changes like fossil fuel divestment will draw a great deal of attention. At the very least, they will drive investment managers around the world to start thinking about the risks climate change poses to their portfolios.

'Symbolic' is a word too often preceded with 'merely'. When your campaign is largely about affecting how people think, the fact that actions can be symbolic amplifies their ability to be powerful. Having U of T divest would add momentum and legitimacy to the campaign overall – helping to initiate the massive shift in investment which we need if climate change is to be kept to a manageable level.

¹⁸² CanOils, How Sustainable is Canadian Oil & Gas at \$50 per Barrel?

¹⁸³ Carbon Tracker Initiative, Carbon Supply Cost Curves: Evaluating Financial Risk to Oil Capital Expenditures, p. 2.

184 See also "Divestment is not meaningful action – it's just gesture politics" in: Carrington, 10 myths about fossil fuel divestment put to the sword.

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6.19 Through what process has U of T divested in the past?

On January 21, 1988 the Governing Council decided to divest from shares in companies operating in South Africa, in response to apartheid. 185186 In this case, the university committed to divesting its endowment fund only, and not its pension fund. 187

U of T committed to divest from holdings of tobacco stocks in April 2007. This included both endowment and pension investments, worth \$10.5 million out of a total of \$2.5 billion. 188 The process used was the same as the one which has been followed for fossil fuels by Toronto350.org, with a petition presented to former President David Naylor, followed by consideration of the question by an ad hoc committee. In addition to divesting from direct holdings, the committee recommended divestment from pooled funds where tobacco companies represented more than 10% of revenues. 189

6.20 There is no point in restricting fossil fuel supply. Shouldn't we address demand instead?

Certainly, it is appropriate to make a major effort to restrain fossil fuel demand, through measures ranging from creating higher building standards, implementing carbon pricing, strengthening efficiency requirements for vehicles, and encouraging sustainable lifestyle changes. That being said, the argument that the fossil fuel industry simply serves the demands of consumers is faulty. For one thing, fossil fuel companies must make vast forward-looking investments in new projects, based only on projections about what future prices and demand will look like. They are not simply tracking the day-by-day demand for coal, oil, and gas and then setting production at that level, but rather making investment choices

that will affect the functioning of fossil fuel markets for decades.

When it comes to efforts to constrain the social injury associated with any number of business activities, from the manufacture of land mines to the international trade in endangered species, governments have consistently sought to restrict both supply and demand. 190 The urgency of addressing climate change contributes further to the case for restricting both supply and demand. Unless all effective approaches are implemented promptly and simultaneously, the possibility of restricting warming to less than 2 °C will not be realized.

A further reason why fossil fuel companies cannot be seen simply as neutral suppliers is the many market failures associated with their business activities. Fossil fuels are not traded as neutral commodities, but rather have prices which have been actively manipulated by suppliers for decades – for instance, through the price control efforts of the Organization of the Petroleum Exporting Countries. There are also major negative externalities associated with fossil fuel use, from human health impacts to climate change and environmental degradation, so it cannot be argued that the market will automatically establish the supply and demand for these commodities at an appropriate level.

185 Trumpickas and Dunlop, *On the Road to Tobacco Divestment A Progress Report*, p. 2-3.

186 See also: *Global Nonviolent Action Database*, University of Toronto students win divestment from apartheid South Africa, 1984-1990.

187 Ibid.

188 Girard, *UofT to sell off its tobacco holdings*.

189 *The Canadian Press*, *UofT divesting of tobacco industry stocks*.

190 See: *Monbiot, Applauding Themselves to Death*.

157

Furthermore, the active political involvement of fossil fuel companies limits the applicability of the

claim that they are neutral suppliers of demanded commodities. Fossil fuel companies have worked against pollution restrictions, as well as attempts to increase efficiency through regulations and legislation. In short, they have worked to maintain and enlarge the demand for their products, despite the many forms of social injury associated. Climate change poses an existential threat to the fossil fuel industry, so they can be expected to use all their financial, legal, and political resources to try to protect the demand for their products.

6.21 Bonus FAQ – Why isn't the 'brief brief?

For this document, 'brief means: "A letter of authority" not "Something abbreviated". 191
192 The brief needs to meet the standards of the University of Toronto's Policy on Social and Political Issues With Respect to University Divestment and Procedures for Responding to Social and Political Issues with Respect to University Divestment. It must also support the mandate of the Presidential Advisory Committee on Divestment from Fossil Fuels, which is "to review the petition and accompanying brief, and – first and foremost – consider the University's response to the call for divestment. The Committee may also reflect more generally on the University's most appropriate and effective responses to the challenges posed by climate change". 193 The argument supporting fossil fuel divestment is compelling but complex, requiring a significant amount of explanation and justification to cover the ethical, financial, and legal reasoning.

Oxford English Dictionary, brief, n.

Oxford English Dictionary, breve, n.

Gertler, Presidential Advisory Committee on Divestment from Fossil Fuels.

Chapter 7

Responses to questions from the ad hoc com-

mittee

Please note: this entire chapter is new.

7.1 What does U of T have invested in these companies? What alternatives are available?

7.1.1 U of T's portfolio

The information on U of T's investment holdings is held by the University of Toronto Asset Management Corporation (UTAM). While Toronto350.org has requested information on the university's portfolio in general – and on its direct holdings in these 200 companies specifically – we have not yet received the requested information. In an email from March 23rd 2015, Dr. Tony Gray informed us that Dr. Bryan Karney, chair of the ad hoc committee, is requesting the same information from UTAM, and that the committee will be willing to share it with us to the extent that it is not privileged or confidential.

Based on documents from 2013, U of T's direct holdings in the 200 listed companies added to about \$30 million. They probably remain at a similar level now. All told, about 60 percent of both the endowment and the pension fund consist of equities, with about 16 percent in Canadian equity, 18 percent in U.S. equity, 16.5 percent in international developed markets equity, and 10 percent in emerging markets equity. 1

Beyond knowing what the university's direct holdings are (both as a specific dollar amount and as a proportion of the total endowment), having a general breakdown of U of T's investment strategy would be helpful for addressing some objections to divestment. Specifically, it has been argued in some places that fossil fuel stocks have particular financial characteristics which are desirable from a portfolio management perspective. With a broad understanding of U of T's portfolio, it would be possible to identify alternative investments that share the financial features which the university finds appealing about fossil fuel stocks, but without the associated

social injury.

7.1.2 Alternatives for divested funds

Ultimately, the university will have full discretion to allocate its divested holdings as it sees fit. This brief does not insist on any particular use or location for these divested funds. Instead, we suggest considering a range of alternatives that the university may choose to adopt either in whole or in part. These alternatives are listed in order of preference.

Invest in on-campus efficiency and reducing fossil fuel dependence

Toronto experiences temperature extremes in both winter and summer. Nonetheless, the efficiency standards of many buildings on campus do not reflect this, and some proposed new construction at U of T is wastefully

University of Toronto Asset Management Corporation, Annual Report 2013, p. 8.

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inefficient. The university may choose to re-invest their fossil fuel holdings into on-campus retrofits to make the university infrastructure more energy efficient. This move would lessen dependence on fossil fuels, cut operating costs, and show that the U of T is willing to take meaningful steps to reduce its fossil fuel dependence. With recent energy efficiency retrofits, the City of Toronto has been able to save more than \$4 million per year on energy purchases and reduce emissions by more than 15,000 tonnes of CO₂ annually. If an investment in energy efficiency is announced in conjunction with divestment it will show the school is willing to act on climate change with both its investments and its actions. It would also address the argument that it is hypocritical for an institution that makes extensive use of fossil fuels to divest, as it would extend the logic of overcoming fossil fuel dependence from financial investment decisions to physical infrastr

structure decisions.

According to reporting in *The Varsity*, the Robarts Common expansion project will only meet LEED Silver standards. ³ This is despite the high likelihood that building to a higher standard of energy efficiency would be financially beneficial over the life of the facility, while also reducing U of T's campus-generated pollution and limiting fossil fuel dependence. One option for investing funds divested from fossil fuel companies would be to make sure new on-campus construction meets energy standards that are sensible for Toronto's year-round weather conditions.

In April 2015, U of T announced the results of a retrofit of the Medical Science Building and surrounding buildings, which resulted in savings of "more than \$1 million annually in energy costs, as well as hundreds of tonnes of CO₂ emissions". ⁴ The announcement notes that an earlier retrofit to the Ontario Institute for Studies in Education building produced savings of \$520,000 per year, while energy efficiency upgrades at Robarts are producing a current estimated annual saving of \$1.1 million per year.

Invest in new or existing financial instruments designed with climate change in mind

If the university wishes to continue to hold these assets in the financial markets, there are a number of options through which the university can invest wisely while continuing to avoid direct holdings in the fossil fuel industry.

With the impending end of the fossil fuel era, renewable resources are becoming increasingly viable both technologically and financially. Re-investing selectively in direct holdings of renewable energy and other companies supporting decarbonization would be an appropriate allocation of these recently divested resources.

Compiled lists, such as the one available at ALT Energy Stocks, show the volume of this sector and the attractive opportunities within it. ⁵ Re-investing U of T's fossil fuel holdings into the technologies necessary to reduce our society's fossil fuel dependence would be a wise and principled approach.

If pooled funds are preferred, fossil free mutual funds are now offered by a number of companies both in Canada and internationally. To name a few, there are the Green Century Alpha Fund, Green

Century Equity

Fund, Parnassus Endeavor Fund, Pax World Growth Fund, Portfolio 21, and Shelton Green Alpha Fund. In a

report entitled "The Climate has Changed: Exploring the Investment Potential of Fossil Fuel Free Portfolios",

the Responsible Investment Association of Canada states that "while [fossil fuel free] funds may not offer a

radically more profitable opportunity than traditional funds, they do offer a comparable investment option

2 City of Toronto, Energy & Waste Management.

3 Gass, Robarts Library to expand.

4 Lavender, Reducing U of T's carbon footprint: Medical Science Building retrofit.

5 ALT Energy Stocks, CleanTech Stocks.

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for investors". What's more, "[t]his conclusion holds true regardless of whether they are designed to mitigate

the risk of stranded assets or to satisfy environmental and social concerns". 6 As the divestment movement has

gained momentum and investors more broadly have begun to evaluate carbon risk seriously, these financial

products are increasingly commonplace in the market. U of T choosing to re-invest its holdings in these

progressive and environmentally conscious funds would be consistent with the intentions of divestment.

With a sufficiently large investment, U of T would likely be able to convince a major investment firm

like Vanguard to create a custom alternative investment. For instance, it could consist of an exchange-traded

fund which tracks a selected index, but which excludes the fossil fuel sector. 7 Such an investment instrument

could allow for diversification with low management fees, and may also appeal to the many other institutional

investors who have committed to fossil fuel divestment.

As a university preparing students for a climate change impacted world, U of T may choose to take its funds

divested from fossil fuels and use them to create a 'sustainable initiatives fund'. This fund would reinvest the

approximately \$30 million into the market (excluding fossil fuels) and use the returns on

this investment to foster sustainability initiatives by students and the university. It could provide start-up capital for environmental engineering students looking to launch their technology into the market; scholarships to incoming students in order to attract the best young minds wanting to work on creating a sustainable society; and bursaries to students already studying, allowing them to spend the summer developing their work as opposed to finding work elsewhere. Such a fund would help reframe U of T as a leader among Canadian universities on the pressing issue of environmental sustainability. U of T's chief export is its students and using the divested funds to provide these students the ability and incentive to tackle climate change would be a bold and visionary move.

Re-invest in conventional financial instruments

If these options are deemed to be outside of what UTAM is willing to explore, the university has further alternatives to meet the requirements of the divestment request. First, the university could re-invest its assets into the non-fossil fuel stocks of its choice. The fact that fossil fuel stocks have not been a good investment in recent years only helps with this decision. In fact, "[t]he Energy Sector consistently has been among the most risky sectors in the global economy since 2005".⁸ Divesting from the provided list of 200 companies undoubtedly reduces the diversification of the portfolio, but the fact that fossil fuel industry is such a risky sector makes the overall change in risk negligible.⁹ While there are a multitude of alternative industries, utilities and materials may be a logical alternative for re-investment.

Finally and, for obvious reasons, a less preferable approach would simply be to re-invest the requested direct holdings into any available pooled funds. This would indeed meet the requests of the divestment proposal but would somewhat undermine its intentions. To re-invest in pooled funds that then themselves invest in fossil fuels would limit the positive message divestment would send and also fail to limit the endowment's exposure to carbon risk.

⁶ The Responsible Investment Association of Canada, *The Climate has Changed: Exploring the Investment Potential of Fossil Fuel Free Portfolios*, p. 26-7.

7 For one proposal on how to implement such a fund, see: Ilnyckyj, Proposal for a Low Fee , Low Carbon Mutual Fund.

8 MSCI ESG Research, Responding to the Call for Fossil-fuel Free Portfolios, p. 7.

9 Geddes et al., Building a Carbon-Free Equity Portfolio.

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7.2 What message would divestment send?

By divesting from its fossil fuel holdings, the University of Toronto would be sending the message that it is willing to stand behind the values of its students and faculty, and those set out in its Statement of Institutional Purpose. The importance of divesting is partly symbolic, but that shouldn't be misinterpreted as meaning 'trivial' or 'insignificant'. The message divestment would send to other investors is a key part of the rationale for selling off the university's fossil fuel holdings. If U of T were to divest, it would be the first university to do so in Canada as well as the largest public university in North America to take this step. This would send a strong message to those with even larger investments and more financial sway. This move would represent the university recognizing its place in society – not only as a body made up of members of the society it exists in, but as an institution with the power to shape the future of that society in a positive way. The ability to have this impact is extremely empowering – it is a chance to use the intelligence of the university to better the world. It is also an undeniable opportunity to change the conversation about fossil fuel corporations and their power to impact the future. If taken, it would be an important step toward lessening their social license.

Apathy is only possible through a series of tiny lies that tell us we cannot do anything, and that it would not matter even if we tried. However, when we believe this, we give up our power, and when power is relinquished, it is forfeited to someone else. If the university stood by its commitment to equity and justice, and divested its holdings in the fossil fuel sector, it would be a step toward claiming the power this institution has to set an example, and to lead its peers in making decisions with the best interests of its students and the

whole world at heart.

Divesting sends a message of vision. Relying on the fossil fuel sector may be yielding returns right now, but investing money in other areas is investing in the future – of the country, of the university, and of its students. The university is built on the expectation that it will last forever as a sustainable and evolving centre for knowledge and learning. Protecting the long-term integrity of the planet is therefore a value which should be reflected in its investments.

7.3 What implications would divestment have for U of T's research agenda?

U of T's Mission and Purpose states:

Within the unique university context, the most crucial of all human rights are the rights of freedom of speech, academic freedom, and freedom of research. And we affirm that these rights are meaningless unless they entail the right to raise deeply disturbing questions and provocative challenges to the cherished beliefs of society at large and of the university itself. 10

If the argument that fossil fuel companies are causing social injury and frustrating the enforcement of law is accepted, and the argument that divestment would be financially prudent is accepted, there seems little ground for objecting to fossil fuel divestment on the basis of a hypothesized impact on U of T's research agenda. Furthermore, there are strong reasons for maintaining a separation between the financial activities

10 University of Toronto, Mission & Purpose.

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which the university must undertake in order to remain viable and the research activities it must undertake to remain one of the world's most impressive research institutions. Allowing the university's research agenda to be strongly influenced by corporations in which U of T invests threatens academic freedom, and the ability of

the university to seek honest and accurate answers to the world's most pressing and intriguing questions.

Harvard undergraduate Canyon Woodward explains: "By investing in the fossil fuel industry, Harvard undermines its intellectual and moral integrity. It is a sad irony that Harvard funds its researchers by ignoring the implications of their findings".¹¹ The same concerns apply at U of T. The university should not fund itself by persisting in behaviours that its own researchers have identified as major sources of social injury, as well as the source of threats to the future of its students.

¹¹ Rocheleau, Harvard sit-in protests school's investments.

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Regrettably, material on the internet has a tendency to be moved or removed in ways we cannot control.

In the event that a link in the bibliography is no longer functional, one resource to try is the Wayback Machine run by the Internet Archive: <https://archive.org/web/web.php>. The site automatically archives copies of prominent websites, and may include a copy of the resource you are seeking.

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Chapter A Appendix I: Issues with respect to university divestment

divestment

A.1 Policy on Social and Political Issues With Respect to University Divestment

sity Divestment

March 4, 2008

Preamble

The University's core academic values include freedom of inquiry and open debate. As a general matter, the University does not take positions on social or political issues apart from those directly pertinent to higher education and academic research. Instead, its role is to provide a forum within which issues can be studied carefully and debated vigorously. Given these values, the University will not consider any proposals for restrictions on its investments that require the institution to take sides in matters that are properly the subject of ongoing academic inquiry and debate.

As a corollary, the University's response to any petition regarding divestment must be governed by the fundamental place of diversity of opinion within its community. Except in those situations in which the University must settle on an answer to controversial questions about how best to achieve its academic mission, the University risks abandoning its core values if it takes sides in ongoing debates and is perceived to be advancing a specific political or social position.

Principles

In responding to questions about social and political issues with respect to University investment, it is acknowledged that first and foremost, maximizing economic return consistent with the University's stated risk tolerance should be the criterion for purchase and sale of stock in all normal circumstances. In specific instances where the University's social responsibility as an investor is questioned, however, credible and effective procedures for responding should exist.

Responses should be based on the following principles:

(i) prudent investment. The University has a fiduciary duty to manage investments responsibly to maximize return on its investments within a policy risk tolerance as approved by Business Board from time to time.

(ii) the Yale University concept of social injury:

(a) Social injury is the injurious impact which the activities of a company are found to

have on consumers, employees, or other persons, particularly including activities which violate, or frustrate the enforcement of, rules of domestic or international law intended to protect individuals against deprivation or [sic] health, safety, or basic freedoms; for purposes of this Policy, social injury shall not consist of doing business with other companies which are themselves engaged in socially injurious activities.

(iii) actions taken by the Canadian government or other national or international bodies with regard to the particular issue of concern.

Consideration of questions about social and political issues with respect to University investment must take into account applicable legislative requirements and government or University policy, as well as the legal standards applicable to prudent institutional investors.

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Advisory Committee

The President will establish an ad hoc committee of qualified individuals to review any investments claimed to be in conflict with University's social and political positions and to advise the President on possible actions to be taken. Chaired by a senior University officer designated by the President, the committee will consist of individuals with relevant expertise from among the teaching staff, administrative staff and alumni. The Executive Committee of the Governing Council will be asked to approve the appointments on the recommendation of the President.

In making recommendations regarding the membership, the President will take into account any potential conflicts of interest proposed members might be expected to have with a view to minimizing such conflicts of interest on the part of committee members

The committee's report and the President's decision will be reported to the Governing Council through the Executive Committee.

The President will issue procedures regarding the implementation of this policy. The first such procedures are included here for information, and the President will review any substantive changes in those procedures with the Executive Committee of the Governing Council.

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A. 2 Procedures for Responding to Social and Political Issues with Respect to University Divestment

January 2008
Raising Issues

Members of the University of Toronto community who wish to raise issues with regard to University investments that are in conflict with stated University policies may do so by:

- preparing a convincing brief establishing the case; and
- presenting the evidence of general concern in the University community by collection of signatures.

Responsibility for initiating a request for University action regarding its investments rests with members of the University community. One or more individuals must prepare a fully documented brief identifying the social or political issue that they believe requires divestment.

When the brief has been fully prepared, the initiators of the request must secure evidence of support for their cause through the collection of at least 300 signatures endorsing the brief. Up to 200 of the signatures could come from a single constituency of the University community (for the purposes of these procedures, the constituencies are teaching staff, students, administrative staff, and alumni); the remaining 100 signatures must be from at least two other University constituencies with a minimum of 25 signatures from any individual

constituency. Each signatory must attest that he/she has read and agrees with the entire content of the brief.

When signatures have been added to the brief, the material is to be deposited with the office of the President.

Response

The administration will respond by establishing an ad hoc review committee as specified by the policy.

This committee, chaired by a senior officer designated by the President, will consider the briefs. The committee may consult with investment and other experts as they deem necessary.

If the committee determines that the brief repeats previous submissions, or is vexatious or frivolous, it will cease its deliberations and recommend to the President that the brief be dismissed. If the brief is not repetitive, vexatious or frivolous, the committee shall complete its deliberations and provide its recommendation in writing to the President regarding the appropriate action to be taken by the University.

The committee will consider the following guidelines in considering the appropriate response to any request:

- the extent and significance of the University's investment in a particular entity. Determination of whether investments are considered significant will depend on the committee's judgment of the relative magnitude of the University's holdings both as a fraction of all University investments and in relation to the market capitalization of the entity under review.
- the degree to which the entity itself is involved in the undesirable activity.

Normally, activity is considered significant if more than ten percent of the entity's revenues are derived from the undesirable activity.

The President will consider the recommendations and make the final decision.

Reporting

The written report and the President's decision will be provided to the Governing Council through the

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Executive Committee. Following receipt of the report and the President's decision by the Governing Council, the report and decision will be provided to the petitioners.

Approved by Governing Council on March 4, 2008, replacing the Policy on Social and Political Issues with Respect to University Investment revised and approved by the Governing Council on December 14, 1994.

Chapter B Appendix II: The 200 companies with the largest fossil fuel reserves

Toronto350.org is asking the University of Toronto to divest from direct stock holdings in the following 200 companies, as listed in the Carbon Tracker Initiative's 2012 report, Uriburnable Carbon. 1 These are the top 200 listed companies ranked by estimated carbon reserves.

Since the original brief was released, Fossil Free Indexes has published two updated versions of the 200 companies with the largest reserves. 23 The list below is now the most recently updated version, which includes estimates of each companies total fossil fuel reserves expressed in gigatonnes of CO₂.

- Adani (25.383)
- Adaro (1.607)
- AGL (2.704)
- Alcoa (0.18)
- Allele (0.723)
- Alpha Natural Resources (5.458)

- Anadarko Petroleum (0.984)
- Anglo American (13.488)
- Antero Resources (0.41)
- Apache (0.969)
- ARC Resources (0.112)
- Arcelor Mittal (0.464)
- Arch Coal (6.513)
- ARLP (1.468)
- ARM (0.383)
- Asia Resource (3.181)
- Aspire (0.67)
- Bandanna (0.731)
- Banpu (2.04)
- BASF (0.483)
- Bashneft (0.892)
- Bayan (1.957)
- BG Group (1.122)
- BHP Billiton (12.351 Gt in coal)
- BHP Billiton (0.854 Gt in oil and gas)
- Black Hills (0.431)
- BP (6.719)
- Breitburn Energy Partners (0.081)

1 Carbon Tracker Initiative, Unburnable Carbon: Are the world's financial markets carrying a carbon bubble?

2 Source: Heartwell, The New 200 List, Compelling Data to Divest.

3 Fossil Free Indexes, The Carbon Underground 200 2015.

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- Cabot Oil & Gas (0.3)
- Canadian Natural Resources (0.995)
- Canadian Oil Sands (0.102)
- Capital Power (0.367)
- Cardero (0.323)
- Cenovus Energy (0.374)
- CESC (0.185)
- Chesapeake Energy (0.909)
- Chevron (4.073)
- China Coal (12.103)
- China Resources (0.567)
- China Shenhua (36.807)
- Churchill Mining (1.745)
- Cimarex Energy (0.144)
- Cliffs Natural Resources (0.247)
- Cloud Peak (2.753)
- CLP Holdings (0.696)
- CN00C (1.548)

- CoAL (1.339)
- Coal Energy (0.503)
- Coal India (57.722)
- Coalspur (2.545)
- Cockatoo (0.8)
- Concho Resources (0.194)
- ConocoPhillips (2.798)
- Consol Energy (1.887 Gt in coal)
- Consol Energy (0.312 Gt in oil and gas)
- Continental Resources (0.426)
- Crescent Point Energy (0.157)
- Datang Intl (12.206)
- Datong Coal (10.281)
- DEH (9.339)
- Denbury Resources (0.19)
- Devon Energy (0.889)
- Dragon Oil (0.202)
- Ecopetrol (0.774)
- Encana (0.548)
- Energen (0.128)
- Energi Mega Persada (0.085)
- Energy Ventures (2.184)
- Energy XXI (0.096)

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- Enerplus (0.08)
- ENI (2.356)
- EOG Resources (0.772)
- EQT (0.449)
- EVRAZ (4.855)
- Exxaro (8.793)
- ExxonMobil (8.223)
- FirstEnergy (0.458)
- Fortune (0.328)
- Freeport-McMoRan (0.183)
- Gazprom (43.915)
- GDF SUEZ (0.155)
- Genel Energy (0.107)
- Glencore Xstrata (10.698)
- Golden Energy (1.354)
- Grupo Mexico (0.42)
- Hess (0.565)
- Huolinhe Opencut (1.387)
- Husky Energy (0.343)
- Idemitsu Kosan (1.53)
- Imperial Oil (0.552)
- Indika (0.485)

- Inpex (0.908)
- Itochu (0.878)
- James River (0.195)
- Jingyuan (0.297)
- Jizhong Energy (0.742)
- JSPL (0.301)
- JX Holdings (0.146)
- Kazakhmys (0.998)
- KazMunaiGas EP (0.4)
- Kuzbass Fuel (2.504)
- Linn Energy (0.364)
- Lukoil (6.988)
- Maersk Group (0.174)
- Marathon Oil (0.683)
- Marubeni (0.568)
- Mechel (6.739)
- MEG Energy (0.173)
- Mitsubishi (4.738)
- Mitsui & Co (1.344 Gt in coal)

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- Mitsui & Co (0.142 Gt in oil and gas)
- MMC (0.903)

- MMK OJSC (1.046)
- MOL (0.131)
- Murphy Oil (0.242)
- Nacco (1.557)
- National Fuel Gas (0.088)
- New World Resources (0.972)
- Newfield Exploration (0.223)
- Neyveli Lignite (3.035)
- NLMK (1.288)
- Noble Energy (0.49)
- Novatek (3.853)
- NTPC(0.74)
- Oasis Petroleum (0.094)
- Occidental (1.327)
- Oil India (0.113)
- Oil Search (0.114)
- OMV(0.42)
- ONGC (2.457)
- Pacific Rubiales Energy (0.154)
- PDC Energy (0.095)
- Peabody Energy (11.484)
- Penn West Petroleum (0.137)
- Petrobras (5.432)
- PetroChina (8.591)

- Peyto E&D (0.088)
- Pingdingshan (3.023)
- Pioneer Natural Resources (0.302)
- Polish Oil & Gas (0.132)
- Polo Resources (0.726)
- Polyus Gold (2.294)
- Prophecy Coal (0.272)
- PTT (0.359 Gt in coal)
- PTT (0.317 Gt in oil and gas)
- QEP Resources (0.233)
- Range Resources (0.443)
- Raspadskaya (4.084)
- Repsol (0.823)
- Resource Generation (1.818)
- Rio Tinto (3.696)

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- Rosetta Resources (0.093)
- Rosneft (13.224)
- Royal Dutch Shell (4.544)
- Rusal (3.081)
- RWE (1.943)
- RWE (0.093)

- SAIL (0.307)
- SandRidge Energy (0.157)
- Santos (0.195)
- Sasol (2.731 Gt in coal)
- Sasol (0.201 Gt in oil and gas)
- Severstal (2.577)
- Shanxi Coal (0.376)
- Shanxi Coking (18.445)
- Shanxi Lanhua Sci-Tech (0.338)
- Shanxi Meijin Energy (0.784)
- Shougang Fushan (0.299)
- Sinopec (1.722)
- SK Innovation (0.263)
- SM Energy (0.148)
- Southwestern Energy (0.38)
- Stanmore (0.287)
- Statoil (1.985)
- Suncor Energy (0.715)
- TAQA (0.123)
- Tata Power (1.062)
- Tata Steel (2.709)
- Tatneft (2.62)
- Teck (2.603)
- Total (3.802)

- Tourmaline Oil (0.093)
- Tullow Oil (0.087)
- Ultra Petroleum (0.2)
- Vale (4.401)
- Walter Energy (0.556)
- Wescoal (0.43)
- Wesfarmers (1.011)
- Westmoreland (1.835)
- Whitehaven Coal (2.055)
- Whiting Petroleum (0.244)
- WHSP (1.851)

Woodside Petroleum (0.36)

WPX Energy (0.275)

Xcite Energy (0.088)

Yangquan Coal (7.298)

Yanzhou Coal (9.788)

Yitai Coal (12.223)

YPF (0.389)

Zhengzhou Coal (0.319)

Chapter C Appendix III: Errata

Please note: this section contains the minor changes that were made between when the original brief was closed for signature and when the ad hoc committee was formed. The substantive changes made to the brief subsequently are marked as described in the front matter of this document.

According to the University of Toronto's Policy on Social and Political Issues With Respect to University

Divestment: "When the brief has been fully prepared, the initiators of the request must secure evidence of support for their cause through the collection of at least 300 signatures endorsing the brief... Each signatory must attest that he/she has read and agrees with the entire content of the brief."

This appendix includes any corrections that have been made to the brief since it was officially opened for signature on September 9th 2013.

October 1st 2013: In Appendix II: The 200 companies with the largest fossil fuel reserves, the sentence: "Toronto350.org is asking the University of Toronto to divest from direct stock holdings the following 200 companies" was corrected to "Toronto350.org is asking the University of Toronto to divest from direct stock holdings in the following 200 companies".

October 11th 2013: In Legal offences in Nigeria, the original link to a photograph of the first two pages of Ken Saro-Wiwa's letter to his son at <http://www.flickr.com/photos/sindark/7947170092/in/set-72157631444407428> was replaced with a link to photographs of the entire letter at: <http://www.flickr.com/photos/sindark/sets/72157636446975176/>. The explanatory footnote "Photographs of the letter and chair can be accessed at" was also added.

November 12th 2013: In Pricing the social cost of carbon, the phrase: "climate change mitigation through reducing GHG emissions is essential to the long-term health and prosperity of the agricultural sector in Canada" was replaced with the phrase: "climate change mitigation through reducing GHG emissions is essential to the long-term health and prosperity of the agricultural sector in Canada". The phrase: "these fish serve add to the discussion of threats to Canadian coastal environments described above" was replaced with the phrase: "these fish add to the discussion of threats to Canadian coastal environments described above". In There is no evidence of a divestment penalty for investors, the phrase: "As the injury caused by climate change has more obvious" was replaced with the phrase: "As the injury caused by climate change has become more obvious". In What are the University of Toronto's peer schools doing?, the phrase: "and was rejected on by the Board of Governors on May 23rd 2013" was replaced with the phrase: "and was rejected by the Board

of Governors on May 23rd 2013".

December 7th 2013: In Legal offences in Nigeria, the sentence: "Nigeria was also partly suspended from the Commonwealth in response to the hangings" was added.

March 3rd 2014: In The inundation of coastal areas, missing quotation marks were added after: "loss of cultural resources and values".

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