

The Fossil Fuel Industry and the Case for Divestment

Toronto350.org

June 23, 2013

This is a **working draft** intended for review by members of Toronto350.org and outside experts.

This work is licensed under the Creative Commons Attribution-NonCommercial 3.0 Unported License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/3.0/>. Toronto350.org does not require attribution by those making non-commercial use of this material.

How to use this brief

This brief explains in detail 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:

- 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 Respect to University Divestment](#),
- provide a comprehensive and well-documented case supporting each major claim,
- and give people the opportunity to understand the main elements of the argument quickly.

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 agree with this brief as a whole.

1 | Executive summary

The governments of the world, including the government of Canada, have agreed we should avoid raising global temperatures to more than 2°C above where they were before we started burning fossil fuels.¹ This is the threshold at which the world has agreed that climate change becomes “dangerous”. Based on hundreds of thousands of years of evidence on how the climate responds to greenhouse gases (GHGs), we can calculate that avoiding a 2°C increase means we must keep future GHG pollution to no more than 565 billion tonnes (gigatonnes) of carbon dioxide (CO₂).² 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.^{3,4}

Climate change is a defining 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, human health impacts, and more severe extreme weather. Likewise, 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 at a level 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 coal than they need... assuming temperatures are not to rise by more than 2°C”.⁵ 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. Right now, we are adding about 30 gigatonnes (billions of tonnes) of CO₂ to the atmosphere each year, and the amount we add is increasing at a rate of about 3%. 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 find a way to meet the world’s energy needs while leaving 80% of the world’s fossil fuel reserves unburned.⁶ 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”.⁷ This requires a massive redirection of investment from fossil fuel energy sources to different energy sources that do not alter the climate. 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 this occurs, the global effects

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 For an excellent summary that is accessible to non-experts see: McKibben, *Global Warming’s Terrifying New Math*.

³ Carbon Tracker Institute, *Unburnable Carbon: Are the world’s financial markets carrying a carbon bubble*.

⁴ Another accessible summary of the issue can be found in: This American Life, *Hot In My Backyard*.

⁵ The Economist, *Unburnable fuel*.

⁶ 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?](#).

⁷ Hansen and Sato, *Paleoclimate Implications for Human-Made Climate Change*.

will be catastrophic. As such, much of the value of these companies is illusory, based on an out-dated assumption that we can use the atmosphere forever as a free dumping ground for CO₂.

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 2035.⁸ 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. The University of Toronto can take part in the redirection of investment that is necessary to prevent climatic catastrophe by selling its shares in fossil fuel companies before investors at large accept that most of their reserves are unburnable. To avoid dangerous climate change, the whole world must progressively replace its fossil-fuel-intensive energy infrastructure with one that is compatible with climate stability. This requires the massive redirection of investment away from new fossil fuel facilities like pipelines and unconventional oil and gas facilities and toward cost-effective approaches to CO₂ mitigation, including energy conservation and renewable energy deployment.⁹

Universities, which collectively have endowments and pension funds worth many billions of dollars, can play an important role in driving this shift. University divestment of fossil fuel company shares would demonstrate that the ‘smart money’ is sufficiently concerned about climate change to take meaningful action, and could prompt other investors to reconsider their own investment decisions. Divestment would help decrease investor confidence in the viability of new projects like coal-fired power plants and oil pipelines, while maintaining an overall portfolio with stable and attractive returns.

The authors and supporters of this brief therefore 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 within five years,
- 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 over five years](#), and
- Divest from Royal Dutch Shell by the end of 2013.

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 an ongoing history of social injury, both in Canada and around the world. As the university’s single largest international equity holding, Shell sends the message that the University of

⁸Agency, *World Energy Outlook 2012 Factsheet*.

⁹The consultancy McKinsey & Company has studied and ranked global mitigation options, in terms of their cost, plausible deployment speed, and their capacity to mitigate greenhouse gas pollution. See: McKinsey & Company, *Impact of the Financial Crisis on Carbon Economics: Version 2.1 of the Global Greenhouse Gas Abatement Cost Curve*, p. 8.

Toronto is committed to fossil fuel exploitation. Divestment would send the opposite message: that it is committed to addressing climate change. The university would not suffer financially as a consequence of divesting from Shell and, by doing so, it would protect itself from the risks created by this investment.

Across North America, the peer schools of the University of Toronto are considering divestment. There include Harvard, Yale, Princeton, Stanford, and MIT. [NUMBER] schools have already committed to divest.¹⁰ By leading the way and becoming the first major university to divest, the University of Toronto can distinguish itself as being ahead of the pack on one of the major issues of the 21st century.

Finalize the number of schools in the paragraph above when the rest of the brief is done.

The University of Toronto's Statement of Institutional Purpose includes "a resolute commitment to the principles of equal opportunity, equity and justice."¹¹ 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 greenhouse gas pollution by continuing to impose risk and suffering on innocent people around the world 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 has a special moral obligation to be part of the solution.

By choosing to divest, the University of Toronto can improve its financial prospects, uphold its values, and take part in a necessary global transition away from CO2-intensive forms of energy.

¹⁰For an up-to-date list, see: <http://gofossilfree.org/commitments/>

¹¹Toronto Governing Council, *Statement of Institutional Purpose*.

Contents

1	Executive summary	3
2	Climate change is settled science	9
2.1	From the U of T divestment policy	9
2.2	It is not properly the subject of ongoing academic debate that	9
2.3	The University of Toronto is already taking action on climate change	12
2.4	Fossil fuel companies acknowledge the reality and danger of climate change	13
3	The activities of fossil fuel companies are socially injurious, and this social injury cannot be reasonably remedied through shareholder voice	15
3.1	From the U of T divestment policy	15
3.2	Social injury	15
	Pricing the social cost of carbon	17
	Impacts on agriculture	17
	The inundation of coastal areas	20
	Storms, droughts, and other extreme weather	22
	Wildfires	24
	Increased risks to human health	24
	Ecosystem collapse	26
	Threats to First Nations groups and indigenous cultures	29
	Threats to the infrastructure of cities, including Toronto	30
	Abrupt and non-linear adverse climate impacts	33
	Security implications	34
3.3	The harm caused is inherent to the primary business of fossil fuel companies	36
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	37
	Canadian domestic law	37
	U.S. domestic law	39
	Domestic law in other jurisdictions	40

International law	41
3.5 Why fossil fuels are like tobacco	42
4 Divestment is compatible with the university’s fiduciary duties	45
4.1 From the U of T divestment policy	45
4.2 Fossil fuel divestment is financially responsible	45
4.3 There is no evidence of a divestment penalty for investors	46
4.4 Market capitalization and value at risk	47
Stated policy objectives are incompatible with the current valuation of fossil fuel reserves	48
Regulatory risk is not adequately priced	48
There is a strong potential for malinvestment in capital-intensive, long-term projects	49
Fossil fuel reserves as stranded assets	51
Volatility of investor sentiment	52
4.5 Fossil fuels represent a risk to the university’s other investments	52
4.6 Attractive substitutes exist for divested equities	53
4.7 Pensions and climate change	54
4.8 The significance of U of T’s investments	56
4.9 Towards divestment	56
5 Actions have been taken by the Canadian government and international bodies on this issue	57
5.1 From the U of T divestment policy	57
5.2 Canadian federal government	57
5.3 Government of Ontario	58
5.4 City of Toronto	58
5.5 Actions taken by other national bodies	60
United States	60
United Kingdom	64
Germany	65
China	67
India	68
France	68
5.6 Actions taken by international bodies	71

6	Why start with Royal Dutch Shell?	73
6.1	Shell's ongoing history of social injury	73
	Legal offences in Nigeria	74
	Infringements on governmental regulations and international health and environmental standards with respect to operations in Nigeria	77
	Legal offences in Alberta	77
	Continued threats to human rights, environmental well-being and international law	79
6.2	Shell represents financial risk	80
	Poor reputation for social responsibility lowers shareholder confidence	80
	Fossil fuel extraction in the arctic represent particularly high-risk and unpredictable endeavours	80
6.3	Divestment from Shell would not hurt the university financially	83
7	Short answers to common questions	85
7.1	Why should the university 'take sides' in this matter? Is it appropriate for the university to take stances on social and political issues?	85
7.2	Isn't shareholder activism a better option?	86
7.3	Other people will buy the stocks we sell, so how does this make a difference?	86
7.4	What are the University of Toronto's peer schools doing?	86
7.5	But don't fossil fuel companies also invest in renewable energy?	88
7.6	In what cases have courts found that fossil fuel companies caused injury?	89
7.7	Isn't the energy sector, including oil and gas extraction, production and distribution, highly regulated by government at all levels?	89
7.8	Can humanity manage without fossil fuels?	90
7.9	Won't divestment hurt the endowment, including U of T's ability to provide scholarships?	91
7.10	Shouldn't U of T fight climate change through research and education?	91
7.11	Won't carbon capture and storage (CCS) save us?	91
8	Sources cited	94
9	Appendix I: Issues with respect to university divestment	111
9.1	Policy on Social and Political Issues With Respect to University Divestment	111
9.2	Procedures for Responding to Social and Political Issues with Respect to University Divestment	112
10	Appendix II: The 200 companies with the largest fossil fuel reserves	115

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 10,000 years of human civilization have taken place during a span of relative climatic stability.¹²¹³
- Burning coal, oil, and gas produces known quantities of carbon dioxide (CO₂).¹⁴
- Before the industrial revolution, the concentration of CO₂ in the atmosphere was approximately 280 parts per million (ppm).¹⁵¹⁶
- It has now risen to over 390 ppm, largely because of the burning of fossil fuels.
- 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.¹⁷¹⁸¹⁹
- 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.
- Adding carbon dioxide to the atmosphere reduces the amount of energy the Earth radiates into space. This causes the planet to warm.²⁰
- Based on evidence from ice cores, we know that doubling the amount of CO₂ in the atmosphere causes global

¹²This 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.

¹³Alley, *The Two Mile Time Machine: Ice Cores, Abrupt Climate Change, and Our Future*, p. 4.

¹⁴For example, the U.S. Environmental Protection Agency lists quantities of CO₂ produced by burning a barrel of oil, metric tonne of coal, or therm of natural gas: United States Environmental Protection Agency, *Calculations and References*.

¹⁵Evidence 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.

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

¹⁷Agency, *Redrawing the Energy-Climate Map*.

¹⁸National Oceanic and Atmospheric Administration, *Trends in Atmospheric Carbon Dioxide*.

¹⁹See also: Hansen, Kharecha, and Sato, "Climate forcing growth rates: doubling down on our Faustian bargain".

²⁰Intergovernmental Panel on Climate Change, *Climate Change 2007: Working Group I: The Physical Science Basis, TS.2 Changes in Human and Natural Drivers of Climate*.

temperatures to rise by about 3°C.²¹

- Governments around the world, including the government of Canada, have adopted 2°C as the threshold beyond which climate change should be considered ‘dangerous’.²²²³²⁴
- 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.^{25262728 29}

Comprehensive and authoritative scientific statements on the key elements of climate change date back at least to the 1979 U.S. National Academy of Sciences report (the Charney report).³⁰ The report concluded that human activities — particularly greenhouse gas emissions — were altering the climate in potentially dangerous ways. These conclusions have been subsequently re-affirmed in the four major reports of the Intergovernmental Panel on Climate Change (IPCC) in 1990, 1995, 2001, and 2007.³¹³²³³³⁴ In May 2009, the national science academies of the G8 countries plus Brazil, China, South Africa, and India released a remarkable joint statement.³⁵ The statement explains that: “The need for urgent 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% 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”.

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

²¹Rockstrom et al., “A safe operating space for humanity”, p. 473.

²²The 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*.

²³Government of Australia Climate Commission, *The Critical Decade 2013*, p. 5.

²⁴See also: Rockstrom et al., “A safe operating space for humanity”, p. 473.

²⁵Agency, *World Energy Outlook: 2012*.

²⁶The Economist, *Unburnable fuel*.

²⁷McKibben, *Global Warming’s Terrifying New Math*.

²⁸The 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.

²⁹For a detailed rebuttal of the argument that carbon capture and storage eliminates this necessity, see: [Won’t carbon capture and storage \(CCS\) save us?](#).

³⁰U.S. National Academy of Sciences, *Ad Hoc Study Group on Carbon Dioxide and Climate*.

³¹Intergovernmental Panel on Climate Change, *First Assessment Report*.

³²Intergovernmental Panel on Climate Change, *Second Assessment Report: Climate Change 1995*.

³³Intergovernmental Panel on Climate Change, *Third Assessment Report: Climate Change 2001*.

³⁴Intergovernmental Panel on Climate Change, *Fourth Assessment Report: Climate Change 2007*.

³⁵Academia Brasileira de Ciencias, Brazil; Royal Society of Canada, Canada; Chinese Academy of Sciences, CHina, Academie des Sciences, France; Deutsche Akademie der Naturforsher Leopoldina, Germany; Indian National Science Academy, India; Accademia Nazionale dei 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*.

papers and found that all of them either take no position on climate change or endorse the consensus position.³⁶

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.

Oreskes' book *Merchants of Doubt* elaborates on the article, discussing the strength of this consensus, while also providing details on the active campaigns of disinformation that fossil fuel companies have directed at decision-makers and the general public.³⁷³⁸ 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, 97.1% endorsed the consensus position that humans are causing global warming".³⁹

Mitigating climate change is important for allowing the university to achieve its academic mission. In the event that the world fails to curb greenhouse gas emissions 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% 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."⁴⁰ 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.

James Powell, former President of Oberlin, Franklin and Marshall, and Reed College, argues 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."

Taking action to address climate change is not an example of needlessly taking sides in a controversial issue. Rather, it is a matter of taking 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.

³⁶Oreskes, "Beyond the Ivory Tower: The Scientific Consensus on Climate Change", p. 1686.

³⁷Oreskes and Conway, *Merchants Of Doubt*.

³⁸See also: Hoggan and Littlemore, *Climate Cover-Up: The Crusade to Deny Global Warming*.

³⁹Cook et al., "Quantifying the consensus on anthropogenic global warming in the scientific literature".

⁴⁰Stern, *The Economics of Climate Change: The Stern Review*, See long executive summary at: http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf.

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

In response to the settled science of 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 greenhouse gas pollution impact. The university's actions show climate change to be "directly pertinent to higher education and academic research".

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.⁴¹

The decision to divest 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, the University of Toronto 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.

Policies and infrastructure decisions justified with reference to climate change

The university has adopted an Environmental Protection Policy

This section needs to be filled out

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 a wide array of public lectures focused around climate-related themes. 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

⁴¹ 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, Wilfrid 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*.

- 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 Inst. of Technology, March 5, 2013.⁴²

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

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

The University of Toronto 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”.⁴³

Climate change is certainly an area of active scholarly research, but that research does not question the fundamental connection between burning fossil fuel 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.⁴⁴⁴⁵⁴⁶⁴⁷ In their 2011 submission to the Carbon Disclosure Project, ExxonMobil acknowledged “risks to society and ecosystems from rising greenhouse gas emissions”.⁴⁸ 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 disputing that increasing CO₂ emissions in the atmosphere is going to have an impact. It’ll have a warming impact.”⁴⁹ On their website, ConocoPhillips rec-

⁴²University of Toronto Centre for Global Change Science, *Distinguished Lecturer Series (2012-13)*.

⁴³Environment, *Environmental Research Database*.

⁴⁴Cheeseman, *Oil Companies are Actually Planning for Climate Change*.

⁴⁵Koronowski, *Oil companies that caused climate change now fear its financial impacts*.

⁴⁶Skuce, *Big Oil and the Demise of Crude Climate Change Denial*.

⁴⁷Sheppard, *Energy Companies Say One Thing, Do the Opposite on Climate Change*.

⁴⁸ExxonMobil, *Carbon Disclosure Project: CDP 2011 Investor CDP 2011 Information Request*.

⁴⁹Tillerson, *The New North American Energy Paradigm: Reshaping the Future*.

ognizes 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”.⁵⁰ 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”.⁵¹ ⁵² 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”.⁵³ On BP’s website, they summarize the conclusions of the Intergovernmental Panel on Climate Change and say that even with more aggressive GHG mitigation policies growth in CO₂ emissions will “probably not [be] enough to limit warming to no more than 2°C”.⁵⁴ Entergy — an S&P 500 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”.⁵⁵

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.

There are lots of greenwashing ads - possibly even from Shell - that we can use to demonstrate that the fossil fuel industry itself acknowledges climate change.

When the University of Toronto decided to divest from tobacco companies, President David Naylor noted the significance of tobacco companies themselves acknowledging the health risks of smoking: “that there is no serious academic or social debate about tobacco’s health effects – even tobacco manufacturers by now concede them.”⁵⁶

⁵⁰ ConocoPhillips, *Climate Change Position*.

⁵¹ Shell, *Climate change*.

⁵² Shell also has a climate change advisor, with a blog at: <http://blogs.shell.com/climatechange/>

⁵³.

⁵⁴ BP, *Climate change: Addressing the global challenge of climate change will require the efforts of governments, industry and individuals*.

⁵⁵ Gunther, *The Coming Shift to ‘Climate Preparedness’*.

⁵⁶ Girard, *U of T to sell off its tobacco holdings*.

3 | The activities of fossil fuel companies are socially injurious, and this social injury cannot be reasonably remedied through shareholder voice

Since this whole section is largely about law, we need to (a) be completely clear and correct in what we say about the contents and interpretation of these laws (b) make completely defensible claims about the impacts of climate change and fossil fuel extraction generally (c) make sure to run this by some lawyers and people familiar with the U of T administration before we submit it

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 health, safety, or basic freedoms

3.2 Social injury

The primary activities of fossil fuel companies impose social injury on consumers, employees, or other persons. The burning of a large portion of the world's 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

In their 2007 report, the IPCC included a table that summarized how various forms of injury associated with climate change can be expected to worsen as the amount of warming increases:

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 United Nations Development Programme, “climate change... already imposes substantial costs, with the brunt of them borne by poor countries and poor communities”.⁵⁷ 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.”⁵⁸

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 1961-1990.⁵⁹ These projections are based on moderate assumptions about greenhouse gas reductions; however, estimates based on high emissions scenarios may be more realistic, 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”.⁶⁰ They also concluded that: “Global mitigation leading to a low climate change future reduces costs to Canada in the long term.”⁶¹ 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 stockmarket 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

⁵⁷United Nations Development Programme, *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*, p. 34.

⁵⁸*Ibid.*, p. 87.

⁵⁹Expert Panel on Climate Change Adaptation, *Adapting to Climate Change in Ontario*, p. 15.

⁶⁰National Round Table on Energy and the Environment, *Paying the Price: The Economic Impacts of Climate Change for Canada*, p.15.

⁶¹*Ibid.*, p.16.

been dampened and plateaued to reach this new global reality.”⁶²

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”.⁶³

The sections below will elaborate on these forms of social injury, providing empirical evidence of the observed adverse impacts and predicted future risks from climate change.

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 \$36.⁶⁴⁶⁵ In the United Kingdom, the government has been using a “shadow cost” of carbon to estimate social harm since 2007.⁶⁶ 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 ton of CO₂ equivalent in 2000.⁶⁷ 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, Quebec, Switzerland, the European Union, Kazakhstan, Tokyo, Australia, and New Zealand.⁶⁸ 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 action at scale”.⁶⁹

Impacts on agriculture

Agriculture is widely considered to be one of the most vulnerable systems to climate change in large part because its productivity is highly dependent on stable climate cycles and weather patterns. For instance, in their Fourth

⁶²National Round Table on Energy and the Environment, *Paying the Price: The Economic Impacts of Climate Change for Canada*, p.18.

⁶³De Soza, *Bureaucrats urged Kent to take global warming seriously*.

⁶⁴Plumer, *An obscure new rule on microwaves can tell us a lot about Obama's climate policies*.

⁶⁵Henn, *The White House Just Strengthened the Case for Fossil Fuel Divestment*.

⁶⁶Price, 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*.

⁶⁷Stern, *The Economics of Climate Change: The Stern Review*.

⁶⁸The World Bank, *Mapping carbon pricing initiatives : developments and prospects*, p. 11.

⁶⁹*Ibid.*, p. 12–13.

Assessment Report, the IPCC concluded that some African countries agricultural production, including access to food, “is projected to be severely compromised”.⁷⁰ 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 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.”⁷¹

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 due to water quality and quantity issues
- financial challenges for rural municipalities exposed to extreme weather events and needing large infrastructure enhancements to cope with such events (bridges, roads, etc.)⁷²

Climate change is also expected to do between \$2 and \$7 billion in damage to Canada’s timber industry by 2050, “through changes in pests, fires, and forest growth”.⁷³

Studies exploring economic approaches to dealing with climate change show that adaptation can provide one route to alleviate risks to Canada’s agricultural sector.⁷⁴ 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.⁷⁵ Indeed, possibilities of extreme weather events are often outside the scope of adaptation policies that outline strategies and recommendations for coping with less acute impacts such as those listed above.⁷⁶

The ongoing drought in the United States provides a glimpse of what may become increasingly 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

⁷⁰Intergovernmental 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.

⁷¹United Nations Development Programme, *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*, p. 6.

⁷²Ontario Ministry of Agriculture and Food, *Climate Change and Agriculture*.

⁷³National Round Table on Energy and the Environment, *Paying the Price: The Economic Impacts of Climate Change for Canada*, p.16.

⁷⁴Amiraslany, *The impact of climate change on Canadian agriculture : a Ricardian approach*.

⁷⁵Isik and Devadoss, “An analysis of the impact of climate change on crop yields and yield variability”.

⁷⁶See for instance: Malcolm et al., *Agricultural Adaptation to a Changing Climate: Economic and Environmental Implications Vary by U.S. Region*.

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 (USDA) 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 Climate Prediction Center and the National Drought Mitigation Center at the University of Nebraska-Lincoln predicted that, despite various localized improvements, the drought is set to worsen in general through spring 2013, and will in fact expand to affect areas in California, Texas and Florida.⁷⁷ 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.

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. The IPCC expects increased incidence of drought in Asia, Australia and 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".⁷⁸ Canada has experienced significant 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 the other ten years later in 1998, were both consistent with predictions in climate change scenarios for the Great Lakes region.⁷⁹ In their latest assessment report, the IPCC 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 "[r]educ[ed] water availability, hydropower potential, and changing seasonality of flows in regions supplied by meltwater from major mountain ranges".⁸⁰ They also concluded that: "[t]he negative impacts of climate change on freshwater systems outweigh its benefits (high confidence)."⁸¹

In a report prepared for the U.S. Federal Emergency Management Agency, AECOM estimated that the portion of the U.S. at risk from flooding will increase by 45% by 2100, with 70% of that increase attributable to climate change.^{82,83}

The International Food Policy Research Institute (IFPRI) finds that declines in yields of one critical world crop

⁷⁷National Oceanic and Atmospheric Administration, *NOAA Monthly Climate Teleconference: February 2013*.

⁷⁸Intergovernmental 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.

⁷⁹Koshida et al., "Drought Risk Management in Canada-U.S. Transboundary Watersheds: Now and in the Future. Drought and Water Crises: Science, Technology, and Management Issues".

⁸⁰Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p. 49.

⁸¹*Ibid.*, p. 49.

⁸²AECOM, *The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100*, p. ES-7.

⁸³See also: Sheppard and West, *FEMA Report: Climate Change Could Increase Areas at Risk of Flood by 45 Percent*.

— wheat — will become greater the longer mitigation is delayed. Using a 2000 baseline, they project a decline in yield for rainfed wheat in the developed world of 1.3 percent by 2030, 4.2 percent by 2050, and 14.3 percent by 2080.⁸⁴ Up to 2050, climate change's impact on agriculture might be manageable to some extent; however, the IFPRI report concludes: "Starting the process of slowing emissions growth today is critical to avoiding a calamitous post-2050 future". (Gray et al., 2010).⁸⁵ While adaptation strategies may provide certain methods for dealing with select risks to agricultural production that are directly associated with climate change, mitigation in the form of reducing GHG emissions is essential to the long-term health and prosperity of the agricultural sector in Canada.

The inundation of coastal areas

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".⁸⁶ 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 [are] 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.⁸⁷ In 2011, the NRTEE projected that "The costs of flooding from climate change could be between \$1 billion and \$8 billion per year by the 2050s".⁸⁸

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 Maritimes region.⁸⁹ The study projects major climatic changes in the region: "By 2050, there would be a 2 to 4°C increase in summer temperature... Future warming of 1.5 to 6°C during winter can be anticipated".⁹⁰ 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".

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

⁸⁴Nelson et al., *Food Security, Farming, and Climate Change to 2050: Scenarios, Results, Policy Options*, p. 85.

⁸⁵*Ibid.*, p. 86.

⁸⁶Lemmen and Warren, *Climate Change Impacts and Adaptation: A Canadian Perspective*, p. xvi.

⁸⁷*Ibid.*, p. xvii.

⁸⁸National Round Table on Energy and the Environment, *Paying the Price: The Economic Impacts of Climate Change for Canada*, p.16.

⁸⁹Natural Resources Canada, *From Impacts to Adaptation: Canada in a Changing Climate 2007*.

⁹⁰*Ibid.*, p.131.

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”.⁹¹ 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.

Many Maritime coastal communities such as those along the Bay of Fundy are also at risk due to the melting ice sheets, glaciers, and ice caps that are causing the steady and continuous rising of sea levels across the globe.⁹² Concurrent with rise in water 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 seemingly insignificant rise could in fact have a devastating effect on many local coastal areas. Firstly, 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 due to rising sea levels, could have unparalleled consequences for Maritime communities.

From Vancouver to Halifax, communities across Canada face significant risks from sea-level rise and accompanying impacts. In the long-term, unmitigated climate change risks causing Greenland and the West Antarctic ice sheet (WAIS) to melt. 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”.⁹³ It goes on to say that: “Widespread deglaciation would not be reversible except on very long time-scales, if at all”. 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

⁹¹Natural Resources Canada, *Climate Change Impacts and Adaptation: A Canadian Perspective*, p. xv.

⁹²Percy, *A Rising Tide of Change*.

⁹³Intergovernmental 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/ch19s19-3-5-2.html.

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.⁹⁴

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.⁹⁵ 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 floods, hurricanes and storms.⁹⁶ 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.⁹⁷ 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”.⁹⁸

The Fourth Assessment Report of the IPCC (2007) asserts that changes in the frequency and intensity of extreme climate events will occur going into the future and will likely challenge human and natural systems to a much greater extent than natural changes in weather conditions. These include hurricanes⁹⁹ and other extreme events including droughts, heat waves and floods. 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.¹⁰⁰ 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”.¹⁰¹ This accords with the basic science of hurricanes, which are driven by the latent heat in

⁹⁴Intergovernmental 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”.

⁹⁵According to Munich RE, weather-related hazards can be described as a “great natural catastrophes” 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

⁹⁶Munich RE, *Overall picture of natural catastrophes in 2010 – Very severe earthquakes and many severe weather events*.

⁹⁷See: Intergovernmental Panel on Climate Change, *Has there been a Change in Extreme Events like Heat Waves, Droughts, Floods and Hurricanes?*

⁹⁸Environment Canada, *Impacts of Climate Change*.

⁹⁹Knutson and Tuleya, “Impact of CO₂ - Induced Warming on Simulated Hurricane Intensity and Precipitation: Sensitivity to the Choice of Climate Model and Convective Parameterization”.

¹⁰⁰Intergovernmental 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”.

¹⁰¹Intergovernmental Panel on Climate Change, *Has there been a Change in Extreme Events like Heat Waves, Droughts, Floods and Hurricanes?*

water vapour and gain strength from travelling over warmer water.

In Canada, temperatures have warmed by an average of 0.24°C per decade, as indicated by data dating from the first official records of temperature conditions in 1948 through to 2010.¹⁰² 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.¹⁰³

Precipitation levels in Canada have risen during the past half-century, with mean national levels increasing by about 12%. 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. 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, Figure ?? 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, which has remained fairly consistent.¹⁰⁴

With an influx of extreme weather comes mounting costs for dealing with such events. In the United States, private insurers determined that 2012 was the most expensive year ever in terms of disasters linked to climate change, with a total cost of \$139 billion.¹⁰⁵ In Canada, the NRTEE projected that total costs associated with climate change could reach between \$21 billion and \$43 billion a year by the 2050s.¹⁰⁶ 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 (ICLR) for the Insurance Bureau of Canada (IBC) 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, and with levels exceeding \$100 billion in 2011.¹⁰⁷ Within Canada, property insurance claims resulting from severe weather-related events from 2010-2012 have cost roughly \$1B a year. The report outlines a number of specific examples of such claims, including:

- 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.

¹⁰²The Institute for Catastrophic Loss Reduction, *Telling the Weather Story*, p. 13.

¹⁰³*Ibid.*, p. 13.

¹⁰⁴The Clean Air Partnership, *A Scan of Climate Change Impacts on Toronto*, p. 8.

¹⁰⁵The Economist, *Blown away*.

¹⁰⁶National Round Table on Energy and the Environment, *Paying the Price: The Economic Impacts of Climate Change for Canada*, p.15.

¹⁰⁷The Institute for Catastrophic Loss Reduction, *Telling the Weather Story*, p. 5.

As the report details, claims resulting in both severe and smaller-impact weather events represent significant property damage for consumers, with losses driven in large part from aging sewage and water infrastructure that cannot handle the new higher precipitation levels; in fact, a rise in water levels for water-related insurance claims now “surpass[es] fire as the number one cause of home insurance losses in many parts of the country”.¹⁰⁸ The report also details projections running through the 2050s of extreme weather events in Canada, 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.

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 vast new liabilities and threatening the performance of insurers’ vast investment portfolios”.¹⁰⁹ 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”.¹¹⁰

Wildfires

Increased temperatures contribute to the frequency and severity of wildfires.¹¹¹ 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.”¹¹²

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 ongoing risks. The WHO, for example, 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.¹¹³

¹⁰⁸The Institute for Catastrophic Loss Reduction, *Telling the Weather Story*, p. 7.

¹⁰⁹Leurig, *Climate Risk Disclosure By Insurers: Evaluating Insurer Responses to the NAIC Climate Disclosure Survey*, p. 9.

¹¹⁰National Round Table on Energy and the Environment, *Paying the Price: The Economic Impacts of Climate Change for Canada*, p. 16.

¹¹¹Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p. 33, 48, 50, 51, 53, 65.

¹¹²Government of Australia Climate Commission, *The Critical Decade 2013*, p. 4.

¹¹³World Health Organization, *Climate and health: Fact sheet*, July 2005.

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 climate change since the 1970s has contributed to diarrhoea, flood injury, malaria, undernutrition, and related disease outcomes.¹¹⁴ 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% of diarrhoea, 3% of malaria and 3.8% of dengue fever deaths worldwide in 2004. Total attributable mortality was about 0.2% of deaths in 2004; of these, 85% 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.¹¹⁵

The WHO also claims that global warming has been causing 140,000 deaths per year since 2004.¹¹⁶ 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.”¹¹⁷ 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.”¹¹⁸ 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.¹¹⁹

¹²⁰ The report describes how “the economic 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

¹¹⁴World Health Organization, *Global health risks: Mortality and Burden of Disease Attributable to Selected Major Risks*, p. 44.

¹¹⁵*Ibid.*, p. 24.

¹¹⁶World Health Organization, *Climate change and health*.

¹¹⁷DARA International, *Climate Vulnerability Monitor: A Guide to the Cold Calculus of A Hot Planet*, p. 16.

¹¹⁸*Ibid.*, p. 17.

¹¹⁹Health Canada, *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity*.

¹²⁰Notably, this is one of many climate science reports produced by Canadian civil servants and essentially ‘buried’ by the government 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.

health and well-being of Canadians and their communities”.¹²¹

It is generally accepted that the greatest impacts of ongoing 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”.¹²² Also, a growing body of literature is drawing attention to the incommensurate impacts of climate change on vulnerable and marginalized populations.¹²³¹²⁴

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)”.¹²⁵ 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.”¹²⁶

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 10 additional deaths per 100,000 people per year by 2050 as well as contribute to increasing pressure on Toronto hospitals due to sickness and other heat-related conditions that could swell associated costs to between \$3 million to \$8 million annually by the 2050s.¹²⁷ 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 — Montréal, 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.¹²⁸

Ecosystem collapse

Climate change is expected to have a substantial effect on ecosystems and biodiversity around the world.¹²⁹ Writing in *Nature Climate Change*, a group of researchers concluded that “without mitigation, large range contractions can be

¹²¹Health Canada, *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity*, p. 432.

¹²²World Health Organization, *Climate change and health*.

¹²³Costello et al., “Managing the health effects of climate change”, p. 1693–1733.

¹²⁴World Health Organization, *Closing the gap in a generation: Health equity through action on the social determinants of health*.

¹²⁵The City of New York, *A Stronger, More Resilient New York*, p. 31.

¹²⁶Government of Australia Climate Commission, *The Critical Decade 2013*, p. 4.

¹²⁷National Round Table on Energy and the Environment, *Paying the Price: The Economic Impacts of Climate Change for Canada*, p. 87.

¹²⁸*Ibid.*, p. 16.

¹²⁹Foden et al., “Identifying the World’s Most Climate Change Vulnerable Species: A Systematic Trait-Based Assessment of all Birds, Amphibians and Corals”, p. 1.

expected even amongst common and widespread species, amounting to a substantial global reduction in biodiversity and ecosystem services by the end of this century”.¹³⁰ These ecosystems are vital to the survival and prosperity of humanity, so ecosystem damage is another 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.”¹³¹

Salmon provide just 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 serve as an extension of the discussion relating to 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 populations; and salmon play a critical role in the functioning of their marine ecosystems.

A report from the International Union for Conservation of Nature (IUCN) that the salmon fishing industry contributed more than \$2 billion to economies in Russia, Japan, the US and Canada and directly employed more than 35,000 people.¹³² Salmon are also harvested on a smaller scale, both for recreational and subsistence purposes. Many individuals, communities and small businesses are dependent on salmon to sustain their livelihoods and to provide a significant contribution of their diet. 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 “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.¹³³ The report includes a detailed discussion about the problems that increasing global temperatures will pose to the safety of the world’s salmon populations. For instance, with respect to the role of this species in their natural environment, salmon provide food for a suite of predators and scavengers that live along the coasts of the ocean and beside the banks of streams and rivers that they traverse as part of their extensive migratory routes. Animals such as seals, whales, otters, bears, birds, and many invertebrates feed on salmon, many at critical stages in their own yearly feeding cycles, as a vital source of protein and fat. Furthermore, throughout a salmon’s life cycle, it will transport essential nutrients from saltwater 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

¹³⁰Warren et al., *Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss*, p. 1.

¹³¹United Nations Development Programme, *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*, p. 95.

¹³²International Union for Conservation of Nature, *Salmon and Climate Change: Fish in Hot Water*, p. 2.

¹³³International Union for Conservation of Nature, *Species and Climate Change: More than Just the Polar Bear*.

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 gravel.

Warmer ocean temperatures have also been shown to reduce the abundance of other smaller fish into certain 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 forecast 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 greenhouse gas emissions into the atmosphere.

Both because of warming and because of the acidification of the world's oceans in response to rising CO₂ concentrations, coral reefs are especially vulnerable to climate change. In their fourth assessment 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.¹³⁴ Significant damage to coral reefs has already been observed, including the loss of 50.7% of initial coral cover in Australia's Great Barrier Reef.¹³⁵ Caribbean corals are also experiencing record thermal stress, bleaching, and mortality.¹³⁶ As exceptionally rich ecosystems, coral reefs has an importance that goes beyond their inherent biological value. Ecosystem services provided by coral reefs, including food, jobs, and tourism, have an estimated value of as much as \$375 billion per year.¹³⁷

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”.¹³⁸ One 2013 study found that “608–851 bird (6–9%), 670–933 amphibian (11–15%), and 47–73 coral species (6–9%)” are “highly

¹³⁴Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p.51.

¹³⁵De'ath et al., “The 27-year decline of coral cover on the Great Barrier Reef and its causes”.

¹³⁶Eakin et al., “Caribbean Corals in Crisis: Record Thermal Stress, Bleaching, and Mortality in 2005”.

¹³⁷National Oceanic and Atmospheric Administration, *Heat Stress to Caribbean Corals in 2005 Worst on Record*.

¹³⁸International Arctic Science Committee, *Arctic Climate Impact Assessment*, Executive summary, p. 10.

climate change vulnerable”.¹³⁹

Considerable scope exists for reducing the degree of ecosystem damage resulting from climate change by reducing future greenhouse gas pollution emissions. The article in *Nature Climate Change* concludes that: “without mitigation, $57 \pm 6\%$ of plants and $34 \pm 7\%$ of animals are likely to lose $\geq 50\%$ of their present climatic range by the 2080s. With mitigation, however, losses are reduced by 60% if emissions peak in 2016 or 40% if emissions peak in 2030”.¹⁴⁰

Threats to First Nations groups and indigenous cultures

Climate change threats to northern Canadian provinces, as well as the Aboriginal communities that live there, are becoming increasingly recognized. For example, Natural Resource Canada’s recently published national assessment “From Impacts to Adaptation: Canada in a Changing Climate 2007” states explicitly 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.”¹⁴¹ Similarly, the Arctic Council and the International Arctic Science Committee (IASC) issued a report in 2004 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.¹⁴² 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. These findings are supported by a more recent study conducted by researchers from McGill University that focused on two separate Inuit communities.¹⁴³ 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”.¹⁴⁴

According to a 2009 article in *Global Environmental Change*, “health inequality [in relation to climate change] is particularly pronounced among Aboriginal Canadians”.¹⁴⁵ While climate change in general “has been identified as potentially the biggest health threat of the 21st century”, 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

¹³⁹Foden et al., “Identifying the World’s Most Climate Change Vulnerable Species: A Systematic Trait-Based Assessment of all Birds, Amphibians and Corals”, p. 1.

¹⁴⁰Warren et al., *Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss*.

¹⁴¹Natural Resources Canada, *From Impacts to Adaptation: Canada in a Changing Climate 2007*, p.3, p. 14.

¹⁴²International Arctic Science Committee, *Arctic Climate Impact Assessment*.

¹⁴³Ford et al., “Climate change in the Arctic: current and future vulnerability in two Inuit communities in Canada”.

¹⁴⁴*Ibid.*, p. 45, p. 54.

¹⁴⁵Ford et al., “Vulnerability of Aboriginal health systems in Canada to climate change”, p. 1.

vulnerable”.¹⁴⁶

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. 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’s Cities for Climate Protection network.¹⁴⁷ 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 2004.¹⁴⁸ Follow-up reports detailing strategies for reducing emissions were published soon after.¹⁴⁹ Additionally, there is a growing body of literature that examines current trends and anticipated affects of climate change to Toronto and surrounding areas.¹⁵⁰¹⁵¹¹⁵²¹⁵³¹⁵⁴

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”.¹⁵⁵

It is now generally recognized that impacts of climate change are already being felt in Toronto and the GTA. Toronto has experienced extreme heat, floods, droughts, new insect pests, new vector-borne diseases and other problems worsened by climate change.¹⁵⁶ In terms of fluctuations to regular weather patterns, Toronto has seen an average temperature increase of 2.7°C since the late 1800s.¹⁵⁷

Record high temperatures, accompanied by smoggier skies, have also been recorded in recent summer seasons. For instance, 2005 saw the warmest June 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.¹⁵⁸ While precipitation patterns have not undergone such drastic changes, it has been predicted that precipitation will likely arrive during heavy rainfall events.¹⁵⁹ For instance, snowfall is expected to decrease and rainfall will increase in its stead, accompanied by an influx of freezing rain episodes.¹⁶⁰

¹⁴⁶Ford et al., “Vulnerability of Aboriginal health systems in Canada to climate change”, p. 1.

¹⁴⁷See: <http://www.icleicanada.org/programs/mitigation/pcp>

¹⁴⁸ICF International, *Greenhouse Gases and Air Pollutants in the City of Toronto: Toward a Harmonized Strategy for Reducing Emissions*, p. IV.

¹⁴⁹The Clean Air Partnership, *Climate Change Adaptation and Health Equity: Background Report*.

¹⁵⁰Toronto Environment Office, *Climate Change, Clean Air and Sustainable Energy Action Plan*.

¹⁵¹Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*.

¹⁵²The Clean Air Partnership, *A Scan of Climate Change Impacts on Toronto*.

¹⁵³Feltmate and Thistlewaite, *Climate Change Adaptation: A Priorities Plan for Canada*.

¹⁵⁴MacLeod, *Adaptation to a Changing Climate: City Infrastructure Preparedness*.

¹⁵⁵The City of New York, *A Stronger, More Resilient New York*, Foreword, p. 2.

¹⁵⁶Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*.

¹⁵⁷The Clean Air Partnership, *A Scan of Climate Change Impacts on Toronto*, p. 5.

¹⁵⁸*Ibid.*, p. iii, p. 7.

¹⁵⁹*Ibid.*, p. 6.

¹⁶⁰Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*, p. 8.

More ice-storms are also expected.¹⁶¹ More freeze-thaw cycles in the city are also projected, which take a heavy toll on roads as well as urban green spaces.¹⁶²

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 occurring as a consequence of climate change can also be extremely costly for municipalities that have to deal with the consequences and clean-up. For example, the intense storm that took place in the city on August 19, 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.¹⁶³ 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.¹⁶⁴

I cannot find the source of this last figure.

More frequent storms and severe weather will likely continue to cause damage to city infrastructure and put strain on city resources. Indeed, the floods, storms, droughts and other weather-related phenomena that already occur annually in Canada can cost hundreds of millions of dollars.¹⁶⁵ Furthermore, recent events such as Hurricane Sandy have revealed that even developed countries can be devastated by extreme weather events that are difficult to prepare for and which can be unprecedented in terms of strength and geographic scope.

Increased health risks to vulnerable populations

While severe storms and extreme weather can be very costly, the longer-term impacts of climate change will have an adverse affect on the city and its residents in ways that “[go] well beyond the reported monetary costs”.¹⁶⁶ It is widely documented that certain populations in a particular city are more vulnerable to the adverse affects of climate change than others.¹⁶⁷¹⁶⁸¹⁶⁹¹⁷⁰ ‘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”.¹⁷¹ 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,

¹⁶¹Cheng et al., “Possible impacts of climate change on freezing rain in south-central Canada using downscaled future climate scenarios”.

¹⁶²Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*, p. 8.

¹⁶³The Clean Air Partnership, *A Scan of Climate Change Impacts on Toronto*, p. iii.

¹⁶⁴Toronto Environment Office, *Ahead of the Storm: Preparing Toronto for Climate Change*, p. 11.

¹⁶⁵Health Canada, *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity*, p. 11.

¹⁶⁶The Clean Air Partnership, *Climate Change Adaptation and Health Equity: Background Report*, p. 19.

¹⁶⁷Ebi, “Facilitating Climate Justice through Community-Based Adaptation in the Health Sector”.

¹⁶⁸McKeown, *Hot Weather Response Plan - Update*.

¹⁶⁹Marmot, “Achieving health equity: from root causes to fair outcomes”, p. 1153–1163.

¹⁷⁰Public Health Agency of Canada, *Reducing Health Disparities - Roles of the Health Sector: Discussion Paper*.

¹⁷¹The Clean Air Partnership, *Climate Change Adaptation and Health Equity: Background Report*, p. 6.

severe storm events can affect physical environments by causing extensive property damage; challenges linked with income and social status can be reinforced as those 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 preexisting or underlying conditions, First Nations, those whose livelihood is reliant on natural resources, and those with low social and economic standings.¹⁷²¹⁷³¹⁷⁴

The current and forecasted future makeup of the City of Toronto is one that is both highly diverse and increasingly expanding; indeed, the population of the Greater Toronto Area is estimated to reach 9.2 million by 2036.¹⁷⁵ Toronto's swelling population encompasses a number of the vulnerable populations identified above. For instance, according to Statistics Canada, the First Nations population of the city grew 20% from 2001, reaching a total of 13,605 people as of 2006.¹⁷⁶ This figure represents over 0.5% of the total population in the City, and 43% of the First Nations population in the Greater Toronto Area (GTA). Moreover, Statistics Canada reports that the City of Toronto was home to over 350,000 seniors in 2006. This number constitutes 14% of the City's population, and 53% of all seniors living in the GTA. The city's Social Development, Finance and Administrative Division forecasts that seniors will make up 17% of the City of Toronto population by 2031.¹⁷⁷ Finally, an increasing number of Torontonians are low-income. For instance, 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.¹⁷⁸ The size of the low-income population recorded in 2005 was greater than in the early 1990s, and represents almost double the size as in the rest of the GTA.¹⁷⁹

The literature on health equity in a Canadian context shows a direct relationship between health and income.¹⁸⁰¹⁸¹¹⁸² People living in poor areas in Toronto experience increased risk factors for illness, higher occurrence of disease, and early 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 connection between effects of climate change and 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.¹⁸³

¹⁷²The Clean Air Partnership, *Climate Change Adaptation and Health Equity: Background Report*.

¹⁷³Health Canada, *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity*.

¹⁷⁴Health Canada, *Climate Change: Preparing for the Health Impacts*.

¹⁷⁵Ontario Ministry of Finance, *Ontario Population Projections Update: 2011 – 2036*.

¹⁷⁶Statistics Canada, *Aboriginal Profile for the City of Toronto*.

¹⁷⁷City of Toronto Social Development, Finance and Administration Division, *Toronto Seniors Demographic Snapshot 2006*, p. 5.

¹⁷⁸City of Toronto Social Development, Finance and Administration Division, *Profile of Low Income in the City of Toronto*, p. 5.

¹⁷⁹*Ibid.*, p. 6.

¹⁸⁰McKeown, *Hot Weather Response Plan - Update*.

¹⁸¹Lightman, Mitchell, and Wilson, *Poverty is making us sick: A comprehensive survey of income and health in Canada*.

¹⁸²Raphael, *Poverty, Income Inequality, and Health in Canada*.

¹⁸³Wandel et al., *Homelessness and Global Climate Change in Waterloo Region: Are We Ready?*

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”.¹⁸⁴ It includes details about the affect of impacts on Toronto’s water supply and water quality, energy sources, transportation sector and services, buildings and infrastructure, urban ecosystem, tourism, and economy.

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 greenhouse gases. These include the way in which 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 greenhouse gas — from melting permafrost and subsea methane clathrate deposits. 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.¹⁸⁵ 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.

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”.¹⁸⁶

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.¹⁸⁷ 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-

¹⁸⁴The Clean Air Partnership, *Climate Change Adaptation and Health Equity: Background Report*.

¹⁸⁵See: Hansen, *Storms of My Grandchildren*.

¹⁸⁶U.S. National Aeronautics and Space Administration, *Is a Sleeping Climate Giant Stirring in the Arctic?*

¹⁸⁷Intergovernmental Panel on Climate Change, *Thermohaline circulation changes in the North Atlantic: possible impacts for Europe*.

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

In their Fourth Assessment Report, the IPCC explains that “[a]nthropogenic warming could lead to some impacts that are abrupt or irreversible”, including in the form of “metres of sea level rise”, “significant extinctions” (40 to 70% 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”.¹⁸⁸

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% of marine species and 70% of terrestrial species become extinct, and took as long as 10 million years to recover from.¹⁸⁹ 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’.”¹⁹⁰ It is possible that human GHG 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.

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.¹⁹¹ 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.¹⁹²

Security implications

A number of major analyses have been focused on the likely global security implications of climate change. In 2008, a National Intelligence Assessment was assembled by 16 U.S. intelligence agencies. While the report is classified, the chairman stated publicly that climate change could disrupt US access to raw materials, create millions of refugees, and cause water shortages and damage from melting permafrost.¹⁹³ A 2003 report commissioned by the Pentagon considered some of the more dramatic possible warming scenarios and concluded that:

¹⁸⁸Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, p. 53.

¹⁸⁹Sahney and Benton, “Recovery from the most profound mass extinction of all time”, p. 759–765.

¹⁹⁰Benton and Twitchett, “How to kill (almost) all life: the end-Permian extinction event”, p. 358.

¹⁹¹Rasool and De Bergh, “The Runway Greenhouse and the Accumulation of CO₂ in the Venus Atmosphere”.

¹⁹²Hansen, *Climate Threat to the Planet: Implications for Energy Policy and Intergenerational Justice*, p. 22-23.

¹⁹³Craven, *What’s the Worst That Could Happen?: A Rational Response to the Climate Change Debate*.

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.¹⁹⁴

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”.¹⁹⁵ 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”.¹⁹⁶ 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”.¹⁹⁷ 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”.¹⁹⁸

In 2012, the U.S. National Academy of Sciences published a report on: “Climate and Social Stress: Implications for Security Analysis”.¹⁹⁹ 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.²⁰⁰

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.²⁰¹

¹⁹⁴Schwartz and Randall, *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, p. 22.

¹⁹⁵*Ibid.*, p. 1.

¹⁹⁶Center for Naval Analyses, *National Security and the Threat of Climate Change*, p. 3.

¹⁹⁷Center 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.

¹⁹⁸*Ibid.*, p. 78.

¹⁹⁹Steinbruner, Stern, and Husbands, *Climate and Social Stress: Implications for Security Analysis*.

²⁰⁰*Ibid.*, p. S-2.

²⁰¹*Ibid.*, p. S-4.

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

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”.²⁰²

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 digging up coal, oil, and gas. These harms are inseparable from the continuation and expansion of these core business activities. As a result, shareholder voice is not an effective strategy for mitigating these harms. The value of these companies also reflects the assumption that these reserves will be extracted and burned. The University of Toronto’s investments in these 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 fuel companies in which the university is invested. 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.

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, lubricants, bitumen and liquified petroleum gas (LPG) for home, transport and industrial use.”²⁰³ ExxonMobil describes its upstream and downstream activities similarly.²⁰⁴

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 method to address social injury since the companies could not abandon the socially injurious activity without dissolving their existing business models. Moreover, the market value of these companies reflects an assumption that their reserves will be extracted and burned. Therefore, it would be unreasonable for the University of Toronto to expect to be able to alter the socially injurious activities of these companies while holding onto its investments in the fossil fuel industry. Thus,

²⁰²Bender, *Chief of US Pacific forces calls climate biggest worry*.

²⁰³Shell Canada, *Shell At a Glance*.

²⁰⁴ExxonMobil, *Exxon: What We Do*.

divestment is the only appropriate response for the University of Toronto to adopt in order to dissolve any financial complicity in the fossil fuels industry's socially injurious activities.

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.

The section below needs a fair amount of work. We need to go beyond pointing to very general rights in the constitution and international legal documents and work toward a convincing legal case.

Canadian domestic law

First, these activities undermine 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.” Since life and security of the person depend on a healthy environment, implicit in this statement is the right to a healthy environment. By contributing to increasingly dangerous global climate change, the activities of companies in the fossil fuels industry undermine the right to life by depriving people of the benefits of a healthy environment.

In addition, numerous pieces of Canadian environmental legislation explicitly recognize and seek to protect the right to a healthful environment. The *Ontario Environmental Bill of Rights* (1993) 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.” 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. 1993, c. 28, s. 2 (1).

Legislation cited here should be cited using the same \LaTeX footnote system employed through the rest of the brief.

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. 1993, c. 28, s. 2 (2).

The activities of fossil fuel companies frustrate all of the above purposes by contributing to climate change, thereby undermining the right to a healthy environment of the people of Ontario.

More specific examples of how each of these purposes are challenged by climate change should be added.

Environmental laws in Canada's provinces recognize and seek to protect the same right to a healthy environment. For example, Part 1, section 6 of the *Yukon Environment Act* states that: "The people of the Yukon have the right to a healthful natural environment." In accordance with this right, the Act seeks to protect the environment of the Yukon by providing an appropriate process to assess the environmental effects of projects and activities in the Yukon or that may have effects in the Yukon. 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. By pursuing the extraction of fossil fuels, the companies in question undermine the right to a healthy environment that these acts articulate and protect. Finally, Quebec's *Environmental Quality Act* states that, "Every person has a right to a healthy environment and to its protection, and to the protection of the living species inhabiting it, to the extent provided for by this Act and the regulations, orders, approvals and authorizations issued under any section of this Act and, as regards odours resulting from agricultural activities, to the extent prescribed by any standard originating from the exercise of the powers provided for in subparagraph 4 of the second paragraph of section 113 of the Act respecting land use planning and development" (chapter A-19.1).

Should we be including legislation from provinces other than Ontario? If so, it should be cited in the standard way for the brief.

We should add something about the uncompensated injury caused by climate change, both that which has taken place already and that which will take place if oil and gas extraction continue.

The activities of the fossil fuels industry in Canada also violate the constitutional and treaty rights of Canada's First Nations. 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 waters and land and to fish, hunt and trap; and the aboriginal rights affirmed in Canada's constitution. Keepers of the Athabasca member 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 livelihood, and thus a violation of s.35(1) of the Constitution”.

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 6.²⁰⁵ 560,000 barrels of oil per day are being extracted from the territory in question - 30% 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.

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.²⁰⁶ 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. While the answers to these questions are not clear in the United States, and barriers to litigation exist, it is conceivable that as the severity of climate change increases and the harms being imposed by GHG pollution become more evident, courts will show a greater willingness to recognize climate change as an issue where victims can seek recompense for damage and in which the unlimited appetite of polluters to make free use of the atmosphere may be curbed.

In 2007, the U.S. Supreme Court decided “*Massachusetts v. Environmental Protection Agency*” — a suit brought by twelve states and several cities against the Environmental Protection Agency (EPA).²⁰⁷ The court held that the Clean Air Act 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:

²⁰⁵Tait and Cryderman, *Alberta First Nations band wins right to trial over oil sands' effect on treaty rights*.

²⁰⁶Meltz, *Climate Change and Existing Law: A Survey of Legal Issues Past, Present, and Future*.

²⁰⁷United States Supreme Court, *Massachusetts et al. v. Environmental Protection Agency et al.*

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.²⁰⁸

The court found that the failure of the EPA to regulate GHG emissions under the CAA violated the law's "clear statutory command".²⁰⁹ In 2009, the EPA responded by deciding that six GHGs are indeed a danger to the environment and human health.²¹⁰

Later in 2007, the U.S. Ninth Circuit Court of Appeals ruled on "Center for Biological Diversity vs. National Highway Traffic Safety Administration".²¹¹ In this suit, the Center for Biological Diversity headed an alliance 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) and 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 greenhouse gas 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".²¹² 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".

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 by activists to the Kingsnorth power station in Kent was justifiable in light of the amount of environmental damage being done by the power plant.²¹³ During the

²⁰⁸United States Supreme Court, *Massachusetts et al. v. Environmental Protection Agency et al.* p. 30.

²⁰⁹See: Greenhouse, *Justices Say E.P.A. Has Power to Act on Harmful Gases.*

²¹⁰The Economist, *A green figleaf.*

²¹¹Fletcher, *Center for Biological Diversity vs. National Highway Traffic Safety Administration.*

²¹²Center for Climate and Energy Solutions, *National Environmental Policy Act Cases.*

²¹³McCarthy, *Jury Decides That Threat of Global Warming Justifies Breaking The Law.*

trial, the jurors heard testimony from NASA climatologist James Hansen.

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”.²¹⁴ Following this example, Bolivia amended its constitution in 2011 with the Rights of Mother Earth Act (articles 56-60).²¹⁵²¹⁶

International law

This section needs to be specific both in terms of impacts and in terms of laws. Where possible, we want to be able to point to specific documented effects that contravene specific pieces of applicable legislation.

The activities of the fossil fuels companies in which the University of Toronto is invested also frustrate international law. First, Article 3 of the *Universal Declaration of Human Rights* states that “Everyone has the right to life, liberty and security of person.” The right to life is a precondition to all other fundamental human rights. The activities of companies in the fossil fuels industry undermine the right to life by depriving people of the benefits of a healthy environment. In addition, the *Hague Declaration on the Environment* (1989), to which Canada is a signatory, makes the link between the right to life and the harmful change 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.” In signing onto this Declaration, Canada recognized the reality of the threat to human life posed by climate change and pledged to take measures to address that threat. The University of Toronto’s investment in fossil fuels frustrates any efforts Canada has taken or may take in the future to address the problem of climate change by supporting the companies that most significantly contribute to the problem.

Fossil fuel companies have repeatedly frustrated the enforcement of the International Labour Organization’s *Indigenous and Tribal Peoples Convention, 1989*.²¹⁷ 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 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.

²¹⁴Republic of Ecuador, *Constitution of the Republic of Ecuador*.

²¹⁵Plurinational State of Bolivia, *Constitucion Politica del Estado*, p. 28–29.

²¹⁶Eaton, *Bolivia Gives Legal Rights To Mother Earth*.

²¹⁷International Labour Organization, *Convention No. 169*.

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,

The activities of fossil fuel companies are also at odds with the fundamental objective of the *United Nations Framework Convention on Climate Change* (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”. Countries including Canada have since adopted a threshold of 2°C of global temperature increase above pre-industrial levels as constituting ‘dangerous’ climate change. 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.

3.5 Why fossil fuels are like tobacco

Get a working anchor for the link in part 3

In 2007, the University of Toronto decided to divest from tobacco companies, after determining that the case to do so was consistent with university policies. There are several important ways in which the tobacco precedent is relevant to fossil fuel divestment.

Firstly, 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.

Secondly, 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 greenhouse gas pollution.

Thirdly, 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”.²¹⁸ As acknowledged by University of Toronto 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.²¹⁹ Similarly, environmentalists

²¹⁸See: Advisory Board on Tobacco Investment, University of Toronto, *Report of the Advisory Board on Tobacco Investment*, p. 9.

²¹⁹Girard, *U of T to sell off its tobacco holdings*.

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.²²⁰

Fourthly, 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".²²¹ While no local, provincial or federal legislation banned the production of cigarettes or the activity of smoking on a universal scale, the absence of such regulations did not deter 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".²²² 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 in its academic programming.²²³

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 legitimate basis for divestment based on the precedent of the tobacco case.

Furthermore, the ability and desire to divest in the absence of official legislation that can be cited to validate claims of "social injury" is possible and has precedent in the events leading up to the university's decision to divest from companies operating in apartheid South Africa. For instance, in response to growing social pressure calling on an end to apartheid and to international complicity in the system, the Canadian government passed Bill 9, "An Act Permitting Trustees and other Persons to dispose of South African Investments". This piece of legislation was tabled first 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 held in South African companies on January 21st 1988, almost a full 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 growing rapidly and was manifesting itself in policy changes and legislation such as Bill 9.

While no such Canadian legislation currently exists with regards to the extraction and burning of fossil fuels

²²⁰See, for example: Hove, Le Menestrel, and Bettignies, "The oil industry and climate change: strategies and ethical dilemmas", p. 3–18.

²²¹See: Advisory Board on Tobacco Investment, University of Toronto, *Report of the Advisory Board on Tobacco Investment*, p. 9.

²²²University of Toronto Governing Council, *University Environmental Protection Policy*.

²²³See: [The University of Toronto is already taking action on climate change](#)

which are the direct causes of climate change, we propose that the university give the same weight to the strengthening consensus amongst governments, scientific organizations, and financial institutions that are increasingly recognizing the risks of climate change not only to human health and ecosystems but to global economic stability and, on by direct implication, to the maintenance of sound investment policies

[Get a working link to the tobacco precedent section in part 6 here](#)

4 | Divestment is compatible with the university's fiduciary duties

4.1 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.

4.2 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 section will consider both the financial case for divestment and questions about the practicality of divesting from a financial perspective, including in terms of the fiduciary duties borne by the University of Toronto.

In advice provided to the United Nations Environment Programme Finance Initiative, Freshfields Bruchhaus 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".²²⁴ They go on to explain that: "[t]here is accordingly no reason why

²²⁴United Nations Environment Programme, *A legal framework for the integration of environmental, social and governance issues into institutional*

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.”²²⁵ Discussing Canada specifically, they explain: “the power of investment is undertaken in a prudent manner when adequate 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”.²²⁶ 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.²²⁷ In the same report, they claim: “Climate change is an obvious example of an environmental consideration that is recognised as affecting value.”²²⁸ As this brief explains in detail, the beneficiaries and purposes of the University of Toronto's investments will be well-served by fossil fuel divestment. Such divestment will not 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.

4.3 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 UN Environment Program Finance Initiative's analysis of twenty academic studies on the effect of incorporating Environmental, Social and Governance factors in the investment management process found there to be 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.²²⁹

Risk Based Assessment The Aperio Group found that divesting from the “Filthy Fifteen” “increases absolute portfolio risk by only 0.0006%, 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% return penalty. In other words, the portfolio does become riskier, but by such a trivial amount that the impact is statistically insignificant.²³⁰

Forward Looking Carbon Tracker and Standard & Poors together conducted a study on the implications of carbon

investment, p. 6.

²²⁵United Nations Environment Programme, *A legal framework for the integration of environmental, social and governance issues into institutional investment*, p. 6.

²²⁶*Ibid.*, p. 51.

²²⁷*Ibid.*, p. 52.

²²⁸*Ibid.*, p. 11.

²²⁹United Nations Environment Programme Finance Initiative and Mercer, *Demystifying Responsible Investment Performance: A review of key academic and broker research on ESG factors*.

²³⁰Geddes, *Do the Investment Math: Building a Carbon-Free Portfolio*.

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,

“as 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.”²³¹

Meta Analysis It is frequently assumed that excluding the fossil-fuel sector from a portfolio will inevitably lead to a reduced performance, due to the reduction in potential investment opportunities. However, 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.^{232 233}

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 share 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.²³⁴

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 2013.²³⁵

Thus, not only does divestment present little risk of missing out on improved ratings (and therefore, investment returns), divestment could actually benefit the portfolio, in that it would remove risk of being invested in companies whose ratings only appear to decline in the long term.

4.4 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”.²³⁶ Even

²³¹ Redmond and Wilkins, *What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness*.

²³² Group, *Sustainable Investing: Establishing Long-term Value and Performance*.

²³³ Mercer, *Shedding Light on Responsible Investment: Approaches, Returns and Impacts*.

²³⁴ Humphreys, *Institutional Pathways to Fossil-Free Investing*.

²³⁵ Nelson, *Socially responsible investment funds hold their own*.

²³⁶ Lee and Ellis, *Canada's Carbon Liabilities: The Implications of Stranded Fossil Fuel Assets for Financial Markets and Pension Funds*, p.5.

with a high estimate of how much of the world's total carbon budget Canada can use up, they conclude that: "78% of Canada's proven reserves, and 89% of proven-plus- probable reserves... need to remain underground".²³⁷ In short, the business plans and stock market valuations of fossil fuel companies are based on the 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 becomes more obvious, it is likely that more governments will step in to regulate greenhouse gas pollution, eventually compelling fossil fuel companies to leave significant reserves unburned.²³⁸ 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 very substantial amounts of social injury, and the prospect of strengthened regulations on greenhouse gas pollution threatens the profitability and stockmarket value of fossil fuel companies.

The Climate Commission established by the Australian government echoes these findings.²³⁹ 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".²⁴⁰

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 emissions lead to accelerated and possibly catastrophic warming. The international community is in broad agreement that this must not happen.

Regulatory risk is not adequately priced

As one scenario for the World Energy Outlook in 2012, the International Energy Agency assumes international cooperation to keep CO₂ under 450ppm, which in their model constrains the likelihood of warming greater than 2°C to 55%. 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. Regarding the effect this policy environment

²³⁷Lee and Ellis, *Canada's Carbon Liabilities: The Implications of Stranded Fossil Fuel Assets for Financial Markets and Pension Funds*, p.6.

²³⁸See, for instance: De Souza, *Global climate efforts threaten oilsands growth, memo told Natural Resources Minister Joe Oliver*.

²³⁹Government of Australia Climate Commission, *The Critical Decade 2013*.

²⁴⁰Priest, *Climate Commission warns coal will be left in ground*.

would have 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% lower. The price for natural gas falls by 23% in Europe and 4% in North America.²⁴¹

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”.²⁴²

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. Marginal projects will become unprofitable and returns to investors for even the most profitable projects will decline. Indeed, the study conducted by Standard & Poors even indicates near-term threats to the stability of investing in some fossil fuel 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).²⁴³ 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, even “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).

There is a strong potential for malinvestment in capital-intensive, long-term projects

The IEA’s World Energy Outlook (2012) concluded that, “more than two-thirds of current proven fossil-fuel reserves cannot be commercialized in a 2DegC world before 2050.”²⁴⁴ The Standard & Poors Carbon Tracker Initiative study raises concerns concerning 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.”²⁴⁵ As explained by the National Round Table on Energy and the Environment (NRTEE):

Every year of delay in sending strong, economy-wide policy signals represents a wasted opportunity to

²⁴¹ Agency, *World Energy Outlook: 2012*, p. 257.

²⁴² Smith, *Assessing Climate Change Risks and Opportunities for Investors: Oil and Gas Sector*, p. 14.

²⁴³ Redmond and Wilkins, *What A Carbon-Constrained Future Could Mean For Oil Companies’ Creditworthiness*.

²⁴⁴ Agency, *World Energy Outlook: 2012*.

²⁴⁵ Redmond and Wilkins, *What A Carbon-Constrained Future Could Mean For Oil Companies’ Creditworthiness*.

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% from 2005 levels by 2050 implies close to \$87 billion in refurbishments, retrofits and premature retirement of assets.²⁴⁶

Investment in CO₂-emissions-enabling infrastructure is contrary to the international community's consensus about the direction of the future.

The persistently high price of 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 tar 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.

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 on the part of both the private and public sectors, economically feasible sequestration of emissions at scales needed to mitigate climate change remains elusive.²⁴⁷ There are currently 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.²⁴⁸ 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%, or just 4% of total global reserves.²⁴⁹ 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.²⁵⁰

CCS has many other problems associated with it. For example, CCS would use extra energy, potentially as much as 40% of the power generated by a power station.²⁵¹ 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.²⁵² Storing carbon underground is risky — safe and permanent storage of CO₂ cannot

²⁴⁶National Round Table on Energy and the Environment, *Framing the Future: Embracing the Low-Carbon Economy*, p. 19.

²⁴⁷For more information on CCS, see: Won't carbon capture and storage (CCS) save us?

²⁴⁸Cambridge Energy Research Associates, *Crossing the Divide: The Future of Clean Energy*.

²⁴⁹Carbon Tracker Institute, *Unburnable Carbon 2013: Wasted capital and stranded assets*.

²⁵⁰Carbon Tracker Institute, *Unburnable Carbon: Are the world's financial markets carrying a carbon bubble*.

²⁵¹Greenpeace, *False Hope: Why carbon capture and storage won't save the climate*.

²⁵²Nelder, *Why carbon capture and storage will never pay off*.

be guaranteed, and even very low leakage rates could undermine any climate mitigation efforts.²⁵³ Finally, money spent on CCS will divert investments away from sustainable solutions to climate change, which the world will need to transfer 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 with fossil fuel reserves as their largest assets 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 reports that in 2012 the Fossil Fuel sector spent \$674 billion prospecting for new sources of carbon, sources which cannot be exploited if the 2°C target is to be met.²⁵⁴

As the Carbon Tracker Initiative's 2012 report made clear, fossil fuel companies have significantly more exploitable sources of carbon available than is safe to burn.²⁵⁵ Therefore, when considering "What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness," Standard & Poors decided that, "instead of considering issues of peak oil in terms of supply, this introduces a concept of peak oil demand."²⁵⁶ A reduction in oil 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."²⁵⁷

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

²⁵³Greenpeace, *False Hope: Why carbon capture and storage won't save the climate*.

²⁵⁴Carbon Tracker Institute, *Unburnable Carbon 2013: Wasted capital and stranded assets*.

²⁵⁵Carbon Tracker Institute, *Unburnable Carbon: Are the world's financial markets carrying a carbon bubble*.

²⁵⁶Redmond and Wilkins, *What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness*.

²⁵⁷Chan et al., *Canada's Bitumen Industry Under CO₂ Constraints*.

meltdown—by a full order of magnitude.”²⁵⁸ 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.”²⁵⁹

Volatility of investor sentiment

Current market capitalization of the fossil fuel industry rests in part on the assumption that the global investor class 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*,²⁶⁰ *Business Week*²⁶¹ and the *Financial Times*²⁶² 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”.²⁶³ The Guardian recently reported

The message to all the players across the financial chain, from ratings agencies through accountants, 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).²⁶⁴

The afore-mentioned Standard & Poors 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.”²⁶⁵ 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 currently have divestment campaigns, along with several religious institutions.²⁶⁶

4.5 Fossil fuels represent a risk to the university’s other investments

Institutional investors, and universities in particular, are often expected to plan financially on a timescale far longer than average. On timescales of 50 years or more, the consequences of unconstrained emissions are very likely to

²⁵⁸Humphreys, *Institutional Pathways to Fossil-Free Investing*, p. 3.

²⁵⁹Fullerton, *The big choice: money or planet?*

²⁶⁰The Economist, *Unburnable fuel*.

²⁶¹Bloomberg Businessweek, *Economist: Energy reserves overvalued by global markets*.

²⁶²Stern, *A profound contradiction at the heart of climate change policy*.

²⁶³Hickman, Jeremy Grantham, environmental philanthropist: ‘We’re trying to buy time for the world to wake up’.

²⁶⁴Leggett, J. and McKibben, Bill, *How your pension is being used in a \$6 trillion climate gamble*.

²⁶⁵Redmond and Wilkins, *What A Carbon-Constrained Future Could Mean For Oil Companies’ Creditworthiness*.

²⁶⁶For detailed information on the status of ongoing divestment campaigns, see: [What are the University of Toronto’s peer schools doing?](#)

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% annually from global GDP. By 2030, the researchers estimate, the cost of climate change and air pollution combined will rise to 3.2% of global GDP, with the world's least developed countries forecast to bear the brunt, suffering losses of up to 11% of their GDP.²⁶⁷ Going further into the future is increasingly hard to predict, with estimates varying widely: the Stern Review estimates losses of between 5%-20%,²⁶⁸ and a United Nations report asserts that climate change could cost Latin American and Caribbean countries 137% of GDP by 2100.²⁶⁹ 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”.²⁷⁰ 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.

4.6 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 enormous growth potential and is starting to match even conventional fossil-fuel energy prices (let alone unconventional energy prices). According to 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”.²⁷¹ In particular, they argue that the “public and private sectors need to mobilize investment in low-carbon infrastructure and technology”.²⁷² 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.²⁷³ Solar power is predicted to be cheaper than fossil fuel power in the USA as soon as 2015.²⁷⁴ In March 2013, 100% of the new energy on the U.S. grid was solar power.²⁷⁵

There are three broad-based mutual funds that are completely fossil free: Green Century Balanced Fund (GCBLX), Portfolio 21 Global Equity Mutual Fund (PORTX), and Shelton Green Alpha Fund (NEXTX).²⁷⁶ The GCBLX is solidly in the middle of its grouping regarding overall rating, returns and risk of the category,²⁷⁷ and as mentioned earlier, the PORTX has actually out-performed its peers.²⁷⁸ The Shelton Green Alpha Fund only started recently, and hasn't

²⁶⁷ DARA International, *Climate Vulnerability Monitor: A Guide to the Cold Calculus of A Hot Planet*.

²⁶⁸ Stern, *The Economics of Climate Change: The Stern Review*.

²⁶⁹ Economic Commission for Latin America and the Caribbean, *Economics of Climate Change in Latin America and the Caribbean*.

²⁷⁰ Stern, *The Economics of Climate Change: The Stern Review*, Executive summary at: http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf.

²⁷¹ National Round Table on Energy and the Environment, *Framing the Future: Embracing the Low-Carbon Economy*, p. 15.

²⁷² *Ibid.*, p. 17.

²⁷³ Bloomberg New Energy Finance, *Renewable Energy Now Cheaper Than New Fossil Fuels in Australia*.

²⁷⁴ GlobalData, *Grid Parity for Wind and Solar Power - Future Outlook and Impact Analysis*.

²⁷⁵ Fleischfresser, *Solar power produced 100% of new energy on U.S. grid in March*.

²⁷⁶ Fossil Free, *Move My Money*.

²⁷⁷ Fidelity Investments, *GCBLX Summary - Green Century Balanced Fund*.

²⁷⁸ Fidelity Investments, *PORTX Summary - Portfolio 21 Global Equity Fund Class R*.

yet received a rating.²⁷⁹

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.”²⁸⁰ 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.

4.7 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 will be a much more hostile world than one in which there has only been a 2°C rise, with 6°C or greater rises being more hostile still.²⁸¹ The previous sections 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 that a concentration of CO₂ in the atmosphere that is higher than 350ppm is not compatible with the planet “on which civilization developed and to which life is adapted.”²⁸² 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’”²⁸³ 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”.²⁸⁴

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

²⁷⁹ Fidelity Investments, *NEXTX Summary - Shelton Green Alpha*.

²⁸⁰ United Nations Environment Programme, *A legal framework for the integration of environmental, social and governance issues into institutional investment*.

²⁸¹ The World Bank, *Turn Down the Heat: Why a 4°C Warmer World Must be Avoided*.

²⁸² Hansen et al., *Target Atmospheric CO₂: Where Should Humanity Aim?*

²⁸³ United Nations Environment Programme, *A legal framework for the integration of environmental, social and governance issues into institutional investment*, p. 11.

²⁸⁴ Carbon Trust, *A Climate for Change: A Trustee’s Guide to Understanding and Addressing Climate Risk*, p. 2, 10.

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”.²⁸⁵ They also argue that: “by not accounting for climate risk, large amounts of invested capital are vulnerable to the carbon bubble”.²⁸⁶ 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”.²⁸⁷ Stern projected that up to 20% 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.²⁸⁸ 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.²⁸⁹ 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 the University of Toronto (its current employees) to live in a world with a stable climate. According to Elizabeth Sawin of the Sustainability Institute, if a 55-year-old college president were to insist today that a portfolio requires fossil fuel investment, then when that president reached the age of retirement, only 11% of the CO₂ released during the class of 2016’s education would have left 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 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.”²⁹⁰

James Powell, former-president of Oberlin, Franklin and Marshall, and Reed College, further reinforces this concept,

²⁸⁵Lee and Ellis, *Canada’s Carbon Liabilities: The Implications of Stranded Fossil Fuel Assets for Financial Markets and Pension Funds*, p.8–9.

²⁸⁶*Ibid.*, p.9.

²⁸⁷Stern, *The Economics of Climate Change: The Stern Review*, See also: http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf.

²⁸⁸Adam, *I underestimated the threat, says Stern*.

²⁸⁹Stern, *A profound contradiction at the heart of climate change policy*.

²⁹⁰Sawin, *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*.

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”.²⁹¹

Therefore, not only is divestment from the fossil fuel industry a sound financial decision for meeting the financial obligations of prudent investment, the current employees of the University of Toronto will benefit from such divestment.

4.8 The significance of the University of Toronto’s investments

This section also needs to specifically address this section from the Procedures for Responding to Social and Political Issues with Respect to University Divestment: “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 University of Toronto 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 Plc ADR (\$9,814k) and BP PLC (\$7,788k).²⁹² Although not all investment quantities are listed by UTAM, and the precise quantity of investment is likely to change daily, it is clear from UTAM’s reports that direct holdings of fossil fuel companies are a significant investment on the part of the University of Toronto’s endowment.

Likewise, although not all of the 200 companies listed in Appendix II are purely fossil-fuel companies, the holdings of those companies is significant. Another large investment listed in 2012, Rio Tinto PLC (\$5,281), is primarily a mining company, but also has a large reserve of carbon dioxide estimated at 5.23Gt, giving it the rank of 14th-largest reserve out of the coal companies.²⁹³ The Energy and Minerals section of the Rio Tinto Group was responsible for 28% of underlying earnings in 2008.²⁹⁴ However, 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.

4.9 Towards divestment

The specific path taken by the University of Toronto in its divestment from fossil fuel companies is beyond the scope of this brief. However, with increasing interest in fossil fuel divestment globally, there are now many resources

²⁹¹McKibben, *The Case for Fossil-Fuel Divestment*.

²⁹²UTAM_2012_Int.

²⁹³Carbon Tracker Institute, *Unburnable Carbon: Are the world’s financial markets carrying a carbon bubble*.

²⁹⁴RioTintoChartbook.

available to aid the portfolio managers is this task, and many 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.²⁹⁵
- Resilient Portfolios & Fossil-Free Pensions by HIP Investor Inc. and GoFossilFree.org.²⁹⁶
- Divestment from Fossil Fuels: A guide for city officials and activists²⁹⁷

²⁹⁵Humphreys, *Institutional Pathways to Fossil-Free Investing*.

²⁹⁶HIP Investor, *Resilient Portfolios & Fossil-Free Pensions*.

²⁹⁷**MayorsInnovationDivestGuide.**

5 | Actions have been taken by the Canadian government and international bodies on this issue

5.1 From the U of T divestment policy

Responses should be based on the following principles:

...

(iii) actions taken by the Canadian government or other national or international bodies with regard to the particular issue of concern.

5.2 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% of those sold in 2008.²⁹⁸

Heavy duty vehicles In April 2012, the federal government released regulations for heavy duty vehicles beginning with the 2014 model year.²⁹⁹

Coal-fired power plants In September 2012, final regulations were introduced to limit emissions from the coal-fired electricity sector.³⁰⁰

Renewable fuel requirement As of December 2010, gasoline is required to contain an average of 5% renewable content, with a 2% requirement for diesel fuel.³⁰¹

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.³⁰²

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.³⁰³

²⁹⁸Environment Canada, *Reducing Greenhouse Gases*.

²⁹⁹*Ibid.*

³⁰⁰Environment Canada, *Harper Government Moves Forward on Tough Rules for Coal-Fired Electricity Sector*.

³⁰¹Environment Canada, *Reducing Greenhouse Gases*.

³⁰²*Ibid.*

³⁰³Environment Canada, *Reducing Greenhouse Gases*.

5.3 Government of Ontario

The province of Ontario has laid plans based on its 2007 Climate Change Action Plan, to reduce its GHG emissions to “6% below 1990 levels by 2014; 15% below 1990 levels by 2020; and 80% below 1990 levels by 2050”.³⁰⁴ 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.”³⁰⁵

Emission reduction targets The Government of Ontario has legislated greenhouse gas emission reduction targets of 6% below 1990 levels by 2014, 15% below by 2020, and 80% below by 2050.³⁰⁶

Phasing out coal The Government of Ontario has committed to phasing out coal-fired electricity generation by 2014.³⁰⁷

Public transit investments The Ontario government is contributing over \$9 billion to the Metrolinx Regional Transportation Plan.³⁰⁸

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.³⁰⁹ 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.³¹⁰

Establishment of a Climate Change Secretariat In 2008, the province created a permanent secretariat to coordinate its *Climate Change Action Plan*.³¹¹

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.³¹²

5.4 City of Toronto

Climate Change Action Plan

The city’s Climate Change, Clean Air and Sustainable Energy Action Plan was unanimously adopted by Toronto

³⁰⁴Government of Ontario, *Annual Report 2008-09: Climate Change Action Plan*, p.3.

³⁰⁵Ontario Ministry of Agriculture and Food, *Climate Change and Agriculture*.

³⁰⁶Ontario Ministry of the Environment, *Climate Change - Greening Our Ways*.

³⁰⁷Government of Ontario, *Ontario Regulation 496/07: Cessation of Coal Use – Atikokan, Lambton, Nantcoke and Thunder Bay Generating Stations*.

³⁰⁸Ontario Ministry of the Environment, *Climate Change - Greening Our Ways*.

³⁰⁹Ontario Ministry of the Environment, *Green Energy Act*.

³¹⁰ForestEthics, *Robbing the Carbon Bank: Global Warming & Ontario’s Boreal Forest*.

³¹¹Ontario Ministry of the Environment, *Climate Change - Greening Our Ways*.

³¹²Ontario Ministry of the Environment, *Climate Change - Greening Our Ways*.

City Council in July 2007. The city allocated over \$1 billion over the next five years to projects to reduce greenhouse gas emissions.³¹³

These commitments included:

- \$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 greenhouse gas 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 for the purchase of electric-hybrid buses; and
- \$10 million plus for a range of initiatives including the Green Fleet Transition, the Eco-Roofs and Greenroofs 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.³¹⁴

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:³¹⁵

- 6 percent by 2012 (1,320,000 tonnes per year)
- 30 percent by 2020 (6,600,000 tonnes per year)

³¹³Toronto Environment Office, *Climate Change, Clean Air and Sustainable Energy Action Plan*.

³¹⁴*Ibid.*

³¹⁵City of Toronto, *Toronto Atmospheric Fund - Emission reduction*.

- 80 percent by 2050 (17,600,000 tonnes per year)

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), Peaksaver 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.

Live Green Toronto This five-year, \$20-million dollar program is intended to promote and support actions by residents and community groups to reduce emissions, clean our air and protect our climate.

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 atmosphere”. City of Toronto, *Toronto Atmospheric Fund - Emission reduction*

Greenhouse Gas and Air Emissions Inventory In 2007, the city completed a combined greenhouse gas 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% reduction from 1990 in greenhouse gas emissions and could well exceed a 37% reduction”.³¹⁶

5.5 Actions taken by other national bodies

The extensive actions undertaken by other countries demonstrates the seriousness of climate change. In many cases, they have implemented significantly more ambitious policies than those enacted in Canada to date. This action demonstrates 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

³¹⁶City of Toronto, *Summary of Toronto’s 2011 Greenhouse Gas and Air Quality Pollutant Emissions Inventory*, p. 15.

At the federal level, the White House under the leadership of President Obama has taken many steps towards mitigating and adapting to climate change.³¹⁷³¹⁸³¹⁹

Monitoring Emissions The United States is comprehensively cataloguing greenhouse gas emissions from its largest emitting sources.

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. 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.

Creation of the Climate Change Adaptation Task Force (CCATF) and the U.S. Global Change Research Program (USGCRP)

The CCATF recommends how federal agency policies and programs can better prepare the United States to address the risks associated with a changing climate. 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.

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. Since 2009, the Department of Interior has approved 29 onshore renewable energy projects, including 16 solar, 5 wind, and 8 geothermal projects. Moving forward, the Department of Interior is committed to issuing permits for 10,000 megawatts of renewable power on public lands and in our offshore waters by the end of 2012, enough to power 3 million homes. In 2010, President Obama also set a goal of breaking ground on at least four commercial scale cellulosic or advanced biorefineries by 2013. That goal was accomplished a year ahead of schedule.

Smart Grid In 2011, the Administration announced that it would accelerate the permitting review of seven proposed electric transmissions lines. 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. The Administration also launched a Green Button initiative in 2011 to empower Americans to reduce energy use in their homes. 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.

Clean Energy Research & Development In 2009, the Administration funded the Department of Energy’s Advanced

³¹⁷The White House, *Climate Change*.

³¹⁸The White House, *Climate Change Adaptation Task Force*.

³¹⁹The White House, *Develop and Secure America’s Energy Resources*.

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. Building upon the initial investment, in late September 2011, the ARPA-E program announced 60 cutting-edge research projects in 25 states. In total, The ARPA-E has supported more than 120 individual projects.

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 United States to solve major energy challenges. 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 energy efficient building systems design, and using modelling and simulation for advanced nuclear reactor operations.

The President’s Better Buildings Challenge The President’s Better Buildings Challenge has set a goal to improve the energy efficiency of commercial buildings by 20 percent by 2020. The Administration has also partnered with manufacturing companies, representing over 1,400 plants, to improve energy efficiency by 25 percent over 10 years.

The Environmental Protection Agency (EPA)

The EPA develops standards for greenhouse gas emissions from mobile and stationary sources under the Clean Air Act. Its federal regulatory activities are in addition to its volunteer programs, international partnerships, and partnerships with states and tribes.

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 greenhouse gas emissions and improved fuel use. 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 tons of carbon dioxide emissions

Renewable Fuel Standard Program A set of regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel. By 2022, the Renewable Fuel Standard (RFS) program will reduce greenhouse gas emissions by 138 million metric tons, about the annual emissions of 27 million passenger vehicles, replacing about seven percent of expected annual diesel consumption

Proposed Carbon Pollution Standard for New Power Plants On March 27, 2012, 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. 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.

Oil and Natural Gas Air Pollution Standards On April 18, 2012, EPA finalized cost effective regulations to reduce

harmful air pollution from the oil and natural gas industry, while allowing continued, responsible growth in U.S. oil and natural gas production. 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. The rules will also reduce air toxics and emissions of methane, a potent greenhouse gas.

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 Water Act's Underground Injection Control Program.

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: (1) assess climate change vulnerabilities, (2) develop and implement adaptation strategies, and (3) engage and educate stakeholders.
- The EPA's Climate Ready Water Utilities (CRWU) initiative assists the water sector, which includes drinking water, wastewater, and stormwater utilities, in addressing climate change impacts.

Some federal departments are also taking actions specific to their purview. For example, the Department of Transportation's Congestion Mitigation and Air Quality (CMAQ) Improvement Program provides over \$8.1 billion dollars in funds to State DOTs, MPOs, and transit agencies to invest in projects that reduce emissions from transportation-related sources. 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.

Regional/State/Local level

This is the only place in the brief where we include raw URLs right in the brief text

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 catalogued in this space. However, the Department of Transportation has two useful web-pages with links to various databases and initiatives across the country.

- Local action: <http://climate.dot.gov/state-local/local-action-plans.html>
- Regional initiatives: <http://climate.dot.gov/state-local/regional-initiatives.html>

One initiative notable for its aggressiveness in tackling climate change is California Senate Bill X1-2. SBX1-2 directs California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of electricity generated from eligible renewable energy resources per year to an amount that equals at least 20% of the total electricity sold to retail customers in California per year by December 31, 2013, 25% by December 31, 2016 and 33% by December 31, 2020.

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.³²⁰ They include:

- North America 2050: <http://www.c2es.org/us-states-regions/regional-climate-initiatives#NA2050>
- Western Climate Initiative: <http://www.c2es.org/us-states-regions/regional-climate-initiatives#WCI>
- Regional Greenhouse Gas Initiative: <http://www.c2es.org/us-states-regions/regional-climate-initiatives#RGGI>
- Midwest Greenhouse Gas Reduction Accord: <http://www.c2es.org/us-states-regions/regional-climate-initiatives#MGGRA>
- Transportation and Climate Initiative <http://www.c2es.org/us-states-regions/regional-climate-initiatives#TCI>

United Kingdom

The Climate Change Act 2008 made the UK the first country in the world to have a legally binding long-term framework to cut carbon emissions. It introduced a long-term framework for managing emissions through a system of national carbon budgets: caps on the total quantity of greenhouse gases permitted in the UK over a specified time. Each carbon budget covers a five year period, with the first three carbon budgets running from 2008 to 2012, 2013-2017 and 2018-2022. During these periods, emissions must be reduced (from 1990 levels) by 22%, 28% and 34% respectively.

The Act also created a framework for building the UK's ability to adapt to climate change, including:

- a UK-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 UK
- a mandate giving the government the power to require 'bodies with functions of a public nature' and 'statutory undertakers' (eg water and energy utilities) to report on what they are doing to address the risks posed by climate change to their work.

The UK 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 greenhouse gases the UK is allowed to emit over a specified time
- using statistics on greenhouse gas emissions and further evidence, analysis and research to inform energy and climate change policy
- using the EU Emissions Trading Scheme (EU ETS) to meet over 50% of the UK's carbon emissions reduction target between now and 2020

³²⁰Centre for Climate and Energy Solutions, *Multi-State Climate Initiatives*.

- using a set of values for carbon to make sure project and policy appraisals account for their climate change impacts
- using the 2050 Calculator to let policy makers and the public explore the different options for meeting the 2050 emissions reduction targets

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 greenhouse gases and other emissions from transport
- reducing greenhouse gas emissions from agriculture

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 UK's electricity market
- providing over £200 million of funding for innovation in low-carbon technologies from 2011 to 2015

Publicly reporting carbon emissions from businesses and the public sector:

- encouraging corporate reporting of greenhouse gas emissions
- asking English local authorities to measure and report their greenhouse gas emissions

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% in the period 2008 to 2012 compared with 1990. In addition, Germany has pledged to reduce its GHG emissions by 40% by 2020, 55% by 2030, 70% by 2040, and by 80-95% by 2050 (compared with 1990 levels). Germany has also set ambitious targets for increasing the share of renewable energy in final energy consumption, with 18% by 2020, 30% by 2030 and by 60% by 2050.

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 than their current level of emissions. Furthermore, 10 percent of the allowances will be auctioned.

Feed-In Tariff

The use of an adequate, long-term and predictable feed-in tariff encourages the construction of many renewable energy production sites. The differentiated feed-in tariff leads to one of the most diversified ranges of renewable energy technologies used within the European Union.

Integrated Energy and Climate Programme (IECP)

In order to reach the German climate protection goals the Federal Government has elaborated a comprehensive Integrated Energy and Climate Programme (IECP). Its goal is to ensure an ultramodern, secure and climate-friendly energy supply in Germany. It comprises measures for enhanced energy efficiency and expanded use of renewable energy sources.

Measures contained in the IECP include:

Amendment to the Combined Heat and Power Act The share of high-efficiency CHP plants in electricity production will be doubled by 2020 from the current level of around 12 percent to around 25 percent.

Amendment to the Energy Industry Act Liberalising electricity metering will facilitate and promote innovative metering methods and demand-related, time-variable tariffs. This will enable consumers to reduce their energy costs and will improve the efficiency of the power generation sector.

Report and draft amendment to the Energy Saving Ordinance Energy standards will be tightened by an average 30 percent from 2009. As a second step (planned for 2012), these efficiency standards will be tightened by a further 30 percent.

Clean power plants Standards will be laid down for nitrogen oxide emissions from new power plants.

Guidelines on the procurement of energy-efficient products and services Energy-efficient appliances and services will be promoted through priority procurement.

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. The amendment to the Renewable Energy Sources Act contains among other things new provisions for regulating tariffs for offshore wind farms.

Renewable Energies Heat Act The share of renewable energies in heat provision will be increased to 14 percent by 2020. Obligations to use renewable energies in new buildings are laid down in the Renewable Energies Heat Act. 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 from 2009.

Amendment to the Gas Grid Access Ordinance The amendment to the Gas Grid Access Ordinance will ensure that

biogas can be fed into the natural gas grid to a greater extent. A share of 10 percent biogas is possible by 2030.

Amendment to the Biofuel Quota Act The share of biofuels will be increased and from 2015 will be geared more towards reducing greenhouse gas emissions. 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.

Sustainability Ordinance The Sustainability 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.

Fuel Quality Ordinance The amended Fuel Quality Ordinance will increase the blending limit of bioethanol in petrol fuels from 5 to 10 percent volume. For biodiesel in diesel fuels, this blending limit will increase from 5 to 7 percent volume.

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.

Chemicals Climate Protection Ordinance This Ordinance will reduce emissions of fluorinated greenhouse gases from mobile and stationary cooling installations through provisions on leakproofness and labelling of the installations and on recovery and return of the refrigerants used.

China

China has surpassed the United States as the world's largest greenhouse gas emitter. Nonetheless, the actions of the Chinese government show an increasing willingness to take climate change mitigation seriously. In 2011, China was the world leader in renewable energy technology investments, spending \$52 billion.

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. 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 40 – 45% from 2005 levels by 2020.³²¹

Transformation and upgrading of traditional industries

Conserving energy and cutting emissions by optimizing and upgrading its industrial structure. The government has stepped up evaluation and examination of energy conservation, environmental impact assessments, and preliminary examination of land used for construction projects. It has raised the entry threshold for certain industries and

³²¹United Nations Development Programme, *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*, p. 108.

limited new projects in industries with high energy consumption, high pollutant emissions or excess capacity. It has also controlled the export of products with high energy consumption and high pollutant emissions.

Supporting the development of strategic and newly emerging industries

China has initiated a special fund to boost the development of strategic emerging industries, and expanded its venture capital program for emerging industries. So far 102 venture capital funds have been set up under the program, managing a total of 29 billion yuan. Among these funds, 24, with a total value of 7 billion yuan, are designed to stimulate the development of the energy-saving, environmental protection and new energy sectors.

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. It is estimated that the tax would begin at 10 yuan (\$1.59) per ton of carbon dioxide emitted, and would increase depending on the company's emission levels (information is not yet available on the details of the tax increases).

Five Chinese cities (Shanghai, Beijing, Shenzhen, Tianjin, and Chongqing) and two provinces (Guangdong and Hubei) are currently preparing pilot emissions trading schemes, set to begin in 2013. The Chinese government has ordered these areas to set greenhouse gas emissions control targets, and to implement an emissions trading scheme in order to meet these targets. This pilot project is considered to be an important learning step, leading up to the implementation of a national emissions trading scheme by 2015.

India

In 2010, India announced voluntary targeted reductions of 20% –25 % in carbon intensity.³²²

Can we find anything more on Indian action?

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 greenhouse gas emissions; in 2010, France had reached a 6.6% reduction in emissions (compared to 1990 levels). France is committed to meeting the EU target of a 20% reduction in emissions by 2020 (1990 levels) and has also set a goal of a 75% reduction in emissions by 2050 (1990 levels), with intermediary targets of 40% reduction by 2030 and 60% reduction by 2040. Currently, France estimates that it will exceed its targets and achieve a 22.8% reduction in greenhouse gas emissions by 2020 (compared to 1990 levels).

³²²United Nations Development Programme, *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*, p. 108.

L'Observatoire National sur les Effets du Réchauffement Climatique (ONERC - National Observatory on the Effects of Climate Change)

ONERC was created by legislation passed on February 19th 2001. The ONERC has three main purposes:

- To collect and spread information on risks related to global warming
- To formulate recommendations on adaptation measures to mitigate the effects of climate change.
- To be the focal point of the IPCC in France.

Stratégie nationale d'adaptation au changement climatique (SNACC - National Strategy from Climate Change Adaptation)

France's national adaptation strategy was adopted on the 13th of November 2006, based on recommendations from the ONERC.

It outlines four priority areas for adaptation

- Acting to ensure public security and health
- Addressing social aspects and inequalities of climate-change risk
- Limiting costs and taking advantage of the change
- Protecting cultural heritage

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

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. It has led to the following policies and actions in these areas:

Residential Sector

- After 2012, all new buildings must have a primary energy consumption of less than 50kWh/m²/year on average. This standard was implemented in after 2010 for all public buildings and for construction under the

National Urban Renovation Program. By 2020, all new buildings must have a primary energy consumption that is less than the amount of renewable energy produced in the buildings (energy positive buildings).

- Eco-loans at 0% 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.
- All public and state owned buildings will undergo an energy performance assessment by 2010, and renovations will begin on these buildings in 2012 that should result in a 40% reduction in energy consumption and a 50% reduction of greenhouse gas emissions within a period of 8 years.
- The most energy intensive 800,000 social housing units will be renovated prior to 2020. Loans will be made available at a 1.9% 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.

Transportation

- 2,000 km of high-speed rail will be built by 2020 and an additional 2,500km will be planned.
- France will meet the EU objective of reducing vehicle emission to 120g CO₂/km.
- 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 than 160g CO₂/km.
- France had the objective of a 5.75% biofuel mix between 2001-2008, and increased the target to 7% in 2010 and 10% 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.

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. This measure will achieve, at the European level a 21% reduction of emissions in this sector between 2005-2020 (1990 levels).

Energy

- Certificates of Energy Efficiency, in place since 2006, will be expanded.
- The “Ecoconception” Directive will be implemented:
- Completely retiring incandescent light bulbs by 2012.
- Limiting the consumption of single digital decoders to 1W by 2010 and 0.5W by 2012.
- Improving the performance of electric chargers and external power supplies.
- Developing renewable energy to achieve 23% mix in energy consumption by 2020 by increasing the annual

production of renewable energy by 20 million tons of oil equivalent.

- Renewable Heat Fund (Fonds chaleur renouvelable): this program created a fund of 1 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,
- Tax credit for sustainable development that promotes the purchase of solar water heaters and solar panels was extended until 2012.
- The construction of new biomass plants with a capacity of 250MW.
- Increasing the capacity of geothermal energy sixfold by 2020, by providing 2 million homes with heat 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.
- 1 billion euros will be devoted to research into sustainable development.

For solar energy

- Building a solar plant in each French region for a cumulative power of 300 MW, supported by simplified tariffs to secure long term investment.
- Creating a 45 euro cent/kWh tariff to facilitate the installation of solar panels on private buildings.
- 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.
- Construction permits cannot oppose the installation of renewable energy production systems on buildings.

5.6 Actions taken by international bodies

Substantially more information and examples could be added here.

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.

United Nations Framework Convention on Climate Change (UNFCCC)

- Signed in 1992, came into force in 1994 with 50 ratifications
- Objective: “stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”
- This has subsequently come to be understood to mean limiting warming to less than 2°C

Other sub-components of UNFCCC – adaptation funding, etc

Canada has repeatedly endorsed the 2°C limit for warming

- The 2009 Copenhagen Accord - signed by Canada - recognizes “the scientific view that the increase in global temperature should be below 2 degrees Celsius”
- Other references to the limit
- For the world to reach this goal, fossil fuels need to be phased out aggressively

6 | Why start with Royal Dutch Shell?

This is a section where we need to be very careful to maintain a dispassionate tone and to include strong evidence supporting our factual and legal claims. Ideally, we want impeccably-documented examples of wrongdoing by Shell, along with information on which laws they have violated.

The preceding sections of this brief show how climate change is causing of 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 fuels the continuation of these activities and thus constitutes deriving financial benefit from harmful activity. This is not in accordance with socially or ethically responsible investment practices.³²³

As a first step toward divestment from the fossil fuel industry, we ask that the University of Toronto divest 100% of its holdings from Royal Dutch Shell by the end of 2013. 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.

In addition to the broader implication of Shell's activities as directly contributing to the harmful affects of climate change, Shell represents an ideal case for divestment due to 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 due to proposed projects that are costly and high-risk.
3. Divestment from Shell will not adversely affect the university's portfolio.

6.1 Shell's ongoing history of social injury

Royal Dutch Shell has been found to repeatedly and willfully 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 consistently and knowingly inflicted social harm as a consequence of a number of its global operations.

³²³Richardson, *Socially Responsible Investment Law: Regulating the Unseen Polluters*.

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.³²⁴ A United Nations report in 2011 determined that cleaning up mangroves contaminated by Shell would take 30 years and at least \$1 billion.³²⁵ In the same report, it was identified that some families in the area were consuming water with benzene levels 900 times higher than those considered safe by the World Health Organization.³²⁶

Currently, 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.³²⁷

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).³²⁸ The parties are currently 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.³²⁹ 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".³³⁰

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.³³¹

Kiobel v. Royal Dutch Petroleum Co.:

³²⁴ Sekularac and Deutsch, *Dutch court says Shell responsible for Nigeria spills*.

³²⁵ United Nations Environment Programme, *Environmental Assessment of Ogoniland*.

³²⁶ The Economist, *Oil spoils*.

³²⁷ Royal Dutch Shell, *Building an Energy Future: Annual Report*, p.138.

³²⁸ See also: Sekularac and Deutsch, *Dutch court says Shell responsible for Nigeria spills*.

³²⁹ Royal Dutch Shell, *Building an Energy Future: Annual Report*, p. 139.

³³⁰ The Economist, *Oil spoils*.

³³¹ Sekularac and Deutsch, *Dutch court says Shell responsible for Nigeria spills*.

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.³³²³³³ 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 Akpan for incidents occurring in 2004, 2005, 2007.³³⁴ Compensation is being negotiated. *The Economist* argued that “[t]he ruling could open a flood-gate to legal complaints against oil companies”.³³⁵

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.”³³⁶ 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.

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 Vizer, 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.³³⁷ They also alleged that Shell was paying soldiers involved in human rights abuses in the region.³³⁸ Shell settled legal action out of court with a payout of \$15.5 million dollars.³³⁹ The settlement is

³³²Centre for Constitutional Rights, *Kiobel v. Royal Dutch Petroleum Co.*

³³³Radio France Internationale, *Shell could face trial in US for alleged complicity in torture in Nigeria.*

³³⁴Chazan, *Shell ordered to pay Niger Delta farmer.*

³³⁵The Economist, *A mixed verdict.*

³³⁶United Nations Environment Programme, *Environmental Assessment of Ogoniland*, p.27.

³³⁷Kearney, *New York trial delayed for Nigerians suing Shell.*

³³⁸Mouawad, *Shell to Pay \$15.5 Million to Settle Nigerian Case.*

³³⁹Mouawad, *Shell to Pay \$15.5 Million to Settle Nigerian Case.*

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.

Notably, four years after the execution of his father, Ken Saro-Wiwa Jr. was a Visiting Fellow and Senior Resident at the University of Toronto'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 Sr. and inscribed with a poem criticizing Shell.³⁴⁰

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 US 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 US 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."³⁴¹ The case is significant as setting potential precedents of vigilance for global companies that utilize external contractors in parts of the world "where resources are plentiful but the rule of law is shaky."³⁴²

With respect to Shell's role, the company was implicated in corrupt activities that took place in Nigeria and included the expedition of 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).³⁴³ Shell consented to pay a disgorgement of \$18.15 million and a criminal fine of \$30 million.³⁴⁴ Shell subjected to a Deferred Prosecution Agreement (DPA) with the U.S. Department of Justice (DOJ) for violations of bribery and books provisions of the Foreign Corrupt Practices Act (FCPA).³⁴⁵ 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."³⁴⁶

³⁴⁰See: <http://www.flickr.com/photos/sindark/7947170092/in/set-72157631444407428>

³⁴¹Kochan and Goodyear, *Corruption: The New Corporate Challenge*, p. 119.

³⁴²Scannell and Catan, *Settlements Near In Bribery Case*.

³⁴³Voreacos and Calkins, *Shell Bribes Among 'Culture of Corruption,' Panalpina Admits*.

³⁴⁴Sullivan and Cromwell, LLP. *Foreign Corrupt Practices Act – Recent Developments*.

³⁴⁵Royal Dutch Shell, *Building an Energy Future: Annual Report*, p.17.

³⁴⁶Royal Dutch Shell, *Building an Energy Future: Annual Report*.

Gas flaring

Since 2005, Shell has refused to comply with a Federal High Court order to end gas flaring in the Iwherekhan community in Nigeria. Shell is also avoiding payment of \$1.5 billion in compensation to the Delta's Ijaw ethnic group for decades of pollution.³⁴⁷

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.³⁴⁸

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 United Nations Environment Programme (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 UN condemned Shell for failing to comply to its own operating standards and for under-reporting pollution.³⁴⁹

The same UN report also confirms that all water bodies in Ogoniland are polluted with hydrocarbons and reveals that benzene, a known carcinogen, is concentrated at a level 900 times above World Health Organization standards for safe drinking water.

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 and prompt and effective response to oil spills.³⁵⁰³⁵¹

Legal offences in Alberta

Shell is one of the biggest players in developing the Athabasca oil sands, with 249,000 barrels per day of production from its Scotford upgrader.³⁵² Shell Canada currently operates the Alberta Oil Sands Project (AOSP), which consists of the Albion Sands Mine, Muskeg River Mine, Jackpine Mine, and the Scotford Upgrader.

The AOSP is close to a number of First Nations communities who claim that the project adversely affects their health, livelihood, and lands.³⁵³ Under Canadian constitutional law, there is a duty to consult and accommodate aboriginal people on development projects that affect them. There are currently a series of legal proceedings related

³⁴⁷Ukala, "Gas Flaring in Nigeria's Niger Delta: Failed Promises and Reviving Community Voices".

³⁴⁸The Economist, *A mixed verdict*.

³⁴⁹United Nations Environment Programme, *Environmental Assessment of Ogoniland*.

³⁵⁰Steiner, *International Standards to Prevent and Control Pipeline Oil Spills, Compared with Shell Practices in Nigeria*.

³⁵¹Steiner, *Double standard: Shell practices in Nigeria compared with international standards to prevent and control pipeline oil spills and the Deepwater Horizon oil spill*.

³⁵²AlbertaEnergy, *Facts and Statistics*.

³⁵³Amuna et al., *Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria*.

to tar sands developments launched by First Nations that could impact the viability of Shell's current and future operation plans, as outlined below:

Ongoing - ACFN vs. Shell Canada In continuing legal battles throughout 2011-2012, the Athabasca Chipewyan 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.³⁵⁴ 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 the 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 organization, 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 an overhaul of regulatory approval processes in the province.³⁵⁵

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.³⁵⁶ 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 ensuring environmental safety. While groundwater cases remain ongoing, a study published by Alberta Health in 2008 confirmed a 30% rise in the number of cancers between 1995 and 2006 in the community of Fort Chipewyan,³⁵⁷ providing scientific evidence supporting the appeals of First Nations residents that AOSP activities were polluting the surrounding environment.³⁵⁸ An internal government memo, obtained by journalist Mike De Souza by virtue of Access to Information legislation, 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.³⁵⁹³⁶⁰

³⁵⁴CTV Calgary, *First Nation sues Shell*.

³⁵⁵Amuna et al., *Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria*.

³⁵⁶One 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, 11 million litres of waste leaks into the Athabasca River from tar sands operations. These toxins are known carcinogens and leaks have had devastating impacts on human and ecological health.

³⁵⁷Amuna et al., *Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria*.

³⁵⁸This study, however, lacks appropriate data and is considered a conservative estimate by many residents.

³⁵⁹Natural 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*.

³⁶⁰See also: De Souza, *Oilsands tailings leaking into groundwater, Joe Oliver told in memo*.

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.³⁶¹ 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."³⁶² 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.

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 the case of Shell, one can reasonably argue that where there is smoke there is fire — that is, regardless of the outcomes of individual legal challenges, the sheer volume of allegations against the company stand as evidence of Shell's willful and repeated acts of social injury. 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 indicates 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.³⁶³ 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 the 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.³⁶⁴

In May 2013, members of the Native Village of Port Hope, Alaska and the Athabasca Chipewyan First Nation (ACFN) participated in Shell's Annual General Meeting and confronted Shell's chairman about the risks of drilling in the

³⁶¹ Sosa, *License to Operate: Indigenous Relations and Free Prior and Informed Consent in the Mining Industry*.

³⁶² 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.

³⁶³ Minio-Paluello, *Shell supports Syrian regime with \$55 million during crackdown; one out of six Syrian tanks runs on Shell oil*.

³⁶⁴ Amuna et al., *Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria*, p. 13.

arctic.³⁶⁵ In addition to the direct threat posed to people living in the region, arctic drilling risks adding to the already dangerously large reserves of fossil fuels being exploited globally, contributing further to the universal threat of climate change.

6.2 Shell represents financial risk

Royal Dutch Shell or any of 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; these 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.

Poor reputation for social responsibility lowers shareholder confidence

Shell's reputation for complicity in human rights and environmental degradation has resulted in lowered 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).³⁶⁶ 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 numerous other Nigerian scientists and communities, found the Delta to be "one of the most severely oil-impacted ecosystems in the world."³⁶⁷ This collaborative team of scientists and Nigerian residents that led to the 2011 UNEP assessment discussed above. As stated on 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.³⁶⁸

Fossil fuel extraction in the arctic represent particularly high-risk and unpredictable endeavours

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 disappear-

³⁶⁵Gemmell, *Shell and the Arctic Oil Rush*.

³⁶⁶Reuters, *Shell to scrap bonus link to sustainability index*.

³⁶⁷Nigeria Conservation Foundation and IUCN/CEESP, *Niger Delta Natural Resource Damage Assessment and Restoration Project – Phase I Scoping Report*.

³⁶⁸Right Livelihood Award Foundation, *Petition for Norway Pension Fund. The Right Livelihood Award*.

ing at a faster rate than previously predicted.³⁶⁹ The IPCC has observed that: “Average Arctic temperatures have increased at almost twice the global average rate in the past 100 years.”³⁷⁰ 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 as a consequence.

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 secure further exploration and drilling.³⁷¹ Because Shell’s production has been decreasing for the past 10 years — with the exception of a 5% 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. While 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 due to technological requirements, human resources, costs of spill cleanups, and other related expenses. For example, recent projects such as Shell’s Sakhalin-2 project in Russia saw an unexpected cost overrun from \$6 - \$22 billion dollars in 2006.³⁷²

Moreover, recent incidents have occurred casting doubt on Shell’s capacity to safely undertake arctic operations. Sixteen distinct and serious safety and environmental violations were discovered on the Noble Explorer — a Shell drilling rig anchored in the arctic waters off Alaska. The UK Coast Guard inspected the rig and reported findings of “systematic failure and lack of main engine preventative maintenance.”³⁷³³⁷⁴ 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

³⁶⁹Vidal, *Arctic expert predicts final collapse of sea ice within four years*.

³⁷⁰Intergovernmental Panel on Climate Change, *Fourth Assessment Report: Climate Change 2007*, Climate Change 2007: Synthesis Report - Observed changes in climate and their effects.

³⁷¹Broder, *With 2 Ships Damaged, Shell Suspends Arctic Drilling*.

³⁷²For more on these four central risk factors see: Greenpeace and FairPensions, *Out in the Cold: Investor Risk in Shell’s Arctic Exploration*.

³⁷³Cockerham, *Coast Guard: Shell Arctic rig findings turned over to Justice Dept*.

³⁷⁴See also: Beinecke, *Six Reasons Arctic Offshore Drilling Cannot Be Done Safely*.

safely” in the arctic.³⁷⁵ 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 currently 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 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.”³⁷⁶

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.³⁷⁷ 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 (IFIs) 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 due to serious breaches of their environmental and sustainability guidelines. Growing frustration and resistance on behalf of First Nations communities and the implementation of new IFC guidelines promise more delays on account of legal challenges posed by affected communities.³⁷⁸

Supporting industry-based evidence of risks to Shell’s ongoing 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 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.”³⁷⁹
3. Total, the French oil company, has disavowed drilling in the arctic; CEO Christophe de Margerie claims that

³⁷⁵Broder, *With 2 Ships Damaged, Shell Suspends Arctic Drilling*.

³⁷⁶Holland-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*.

³⁷⁷Broder, *With 2 Ships Damaged, Shell Suspends Arctic Drilling*.

³⁷⁸Mathiason, *EBRD freezes Shell Sakhalin loan*.

³⁷⁹Naidoo, *Drilling for oil in the Arctic: the risks are too great for companies to take on*.

“Oil on Greenland would be a disaster ... A leak would do too much damage to the image of the company.”³⁸⁰

4. Growing resistance around production of tar sands puts operations there at risk, as Shell has already faced shareholder resolutions demanding greater clarity over the risk of tar sands investments.
5. The Carbon Bubble: Latest climate science tells us that approximately 80% 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 unconventional reserves may be undermined.^{381 382 383}

6.3 Divestment from Shell would not hurt the university financially

Get a working anchor for the link in part 3

Shell constitutes the university's largest single holding at approximately \$9.48 million dollars as of March 2012.³⁸⁴ At the same time, it represents about 1% 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% of US equities and .98% of international equities, for a total weight in tobacco stocks of 2.28%.³⁸⁵ 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.

CAN SOMEONE PLEASE READ THE BLURB BELOW (taken from the Advisory Board Report explaining their decision for tobacco divestment) AND MAKE SURE I AM RIGHT IN THIS LAST PARAGRAPH? I'M REALLY SLOW WHEN IT COMES TO THIS KIND OF STUFF AND I WANT TO MAKE SURE I'M NOT JUST MAKING THIS UP!

Milan - I need to get this document from Monica before I can assess the following paragraphs. It doesn't seem to be available via Google. Also, everything about why shareholder activism is inadequate should probably go into part 3, possibly with a hyperlink here.

In its assessment of the impact of prohibiting University funds on tobacco investments, UTAM indicated that it could implement the divestment of tobacco stocks only for Separate Accounts with minimal management and monitoring costs expected. While Separate Accounts constitute 54% of total investments, as of the end of July 2006, the amount of equities in Separate Accounts as a proportion of total investments is 28%. The amount of tobacco stocks that could be divested would be a very small portion of this 28%.

The case for Pooled Accounts which make up 46% of total investments is a different matter. Divestiture of all

³⁸⁰NBC News Wire, *Environmental risk of drilling in Arctic too high, CEO of oil giant Total says*.

³⁸¹Carbon Tracker Initiative, *Carbon Tracker Initiative*.

³⁸²United Nations Environment Programme, *Climate and Trade Policies in a Post-2012 World*.

³⁸³Spedding, Mehta, and Robins, *Oil and carbon revisited: Value at risk from 'unburnable' reserves*.

³⁸⁴University of Toronto Asset Management Corporation, *Canadian Equities Above \$1 Million As at March 31, 2012*.

³⁸⁵Advisory Board on Tobacco Investment, University of Toronto, *Report of the Advisory Board on Tobacco Investment*.

Pooled Account holdings would involve significant time and costs as it would require a fundamental change in the UTAM business model for managing the university's investments. It is not feasible for the university to change its investment structure to move away from pooled funds, given that it is substantially less expensive to manage, and so provide a higher expected return, net of costs. Thus the "prudent investor" rule would only permit divestment from tobacco stocks held in separate accounts.

Get a working link to the tobacco precedent section in part 6 [here](#)

The university's Policy on Social and Political Issues With Respect to University Divestment contemplates the possibility of the university voting proxies and attempting to influence the conduct of companies in which it invests ("shareholder activism"). Some other institutions, including Yale, do so. The University of Toronto has neither the resources nor the jurisdiction to monitor the business practices of tobacco companies, or any other enterprises. The university must devote its resources to its mission of research and teaching. Nor is the university a large enough investor to shape the conduct of companies in which it invests.

This seems like a weak ending for this section

7 | Short answers to common questions

7.1 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 sufficiently clear and important to justify divestment. For the reasons extensively elaborated 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.³⁸⁶

Divestment from fossil fuels follows the precedents established by the university in divesting from South Africa in response to apartheid and divesting from tobacco in response to the human health impacts.³⁸⁷ 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”.³⁸⁸ 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 greenhouse gas pollution by continuing to impose risk and suffering on innocent people around the world and in future generations.

Fossil fuel divestment is also justified because governments have been so ineffective in combatting climate change. The United Nations Framework Convention on Climate Change came into force in 1994, and there have already been 20 Conferences of the Parties. The Kyoto Protocol came into force in 2005. Despite all this diplomacy and effort, greenhouse gas 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 making the problem worse and toward solving it. They can also help push governments to act more efficaciously and with greater speed.

³⁸⁶See: [The University of Toronto is already taking action on climate change](#)

³⁸⁷See: [Why fossil fuels are like tobacco](#)

³⁸⁸Toronto Governing Council, *Statement of Institutional Purpose*.

7.2 Isn't shareholder activism a better option?

As with the tobacco industry, the problem with the fossil fuel industry is the product itself. It is not plausible that the University of Toronto could attend a shareholder meeting of Peabody Energy and convince them to stop digging up and burning coal. Likewise, Shell cannot be persuaded by shareholder activism to stop producing oil and gas.³⁸⁹

Partly because of the political influence of these corporations — and the effectiveness of their campaign to delay government action — climate change has become an urgent problem. The decisions made 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 become. By taking decisive and well-justified action now, the university can help respond to this urgent problem.

7.3 Other people will buy the stocks we sell, so how does this make a difference?

Divestment has proven itself to be a successful strategy in the past, notable in the cases of tobacco and South African Apartheid. Divestment campaigns have undermined the social license to operate of damaging companies. 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.

Divestment would signal that the 'smart money' is shifting away from fossil fuels. 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.³⁹⁰

7.4 What are the University of Toronto's peer schools doing?

Fossil fuel divestment campaigns are ongoing 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, Simon Fraser University,
- and Oxford University.

To date, six universities and colleges have pledged to pursue fossil fuel divestment : San Francisco State University Foundation, Hampshire College, Unity College, Sterling College, College of the Atlantic, and Green Mountain College.³⁹¹

³⁸⁹See also: "Can shareholders pressure fossil fuel companies without divesting?" at: <http://gofossilfree.org/faq/>

³⁹⁰See 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/>

³⁹¹For a complete and up-to-date list, see: <http://campaigns.gofossilfree.org/>

Divestment campaigns are ongoing at many prominent American schools:

- Divest **Harvard** has met with the university administration and with trustees to discuss divestment.³⁹²³⁹³
On April 11th 2013, 1,300 petition signatures were delivered to the Harvard administration in support of divestment.³⁹⁴ 71% of students supported a referendum calling for fossil fuel divestment.³⁹⁵
- On May 30th 2013, the faculty senate at the **University of California**, Santa Barbara voted in favour of fossil fuel divestment. Earlier that week, the student government at Stanford University voted in favour of divestment. In total, the student governments at seven campuses of the University of California have voted in favour of divestment.³⁹⁶
- At **Stanford**, the undergraduate senate passed a resolution in support of fossil fuel divestment in May 2013.³⁹⁷
- 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.³⁹⁸
- **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.³⁹⁹

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 on by the Board of Governors on May 23rd 2013.⁴⁰⁰⁴⁰¹
- At the **University of New Brunswick**, students have collected over 300 signatures in support of divestment.⁴⁰²
They have also submitted a presentation and resolution of support to the student union.⁴⁰³
- 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.⁴⁰⁴

No major university has yet committed to divest from fossil fuels. This gives the University of Toronto 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 increasingly clear that fossil fuel stocks are overvalued. By moving early, the University of Toronto can contain this risk while gaining

³⁹²Divest Harvard, *Divest Harvard Meeting With Administration 2/1/13*.

³⁹³Borowsky, Maxmin, and Franta, *Harvard Students Meet With Trustees To Discuss Divestment*.

³⁹⁴Divest Harvard, *150 People Gather For Divest Harvard Petition Delivery*.

³⁹⁵Twomey, *Students Are Clamoring for Fossil Fuel Divestment*.

³⁹⁶University of California Santa Barbara Environmental Affairs Board, *UCSB Faculty Senate Votes in Favor of Fossil Fuel Divestment*.

³⁹⁷Svoboda, *Senate passes fossil fuel divestment bill*.

³⁹⁸Henn, *Tufts Administration Forms Working Group to Study Divestment*.

³⁹⁹Twomey, *Students Are Clamoring for Fossil Fuel Divestment*.

⁴⁰⁰Divest McGill, *Letters from All Major Student Execs (2012-13, 2013-14) Call for Divestment Today*.

⁴⁰¹Fenton, *Divest McGill Delivers Social Injury Briefs*.

⁴⁰²Fossil Free UNB, *Petition signature count: 306!*

⁴⁰³Fossil Free UNB, *Today, our Fossil Free UNB team is presenting our project and a resolution of support to the UNB Student Union*.

⁴⁰⁴Katic, *Why we're asking UBC to divest from oil and gas*.

reputational advantages.

7.5 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'.⁴⁰⁵ This is now widely seen as an example of 'greenwashing' — a practice defined as devoting extensive resources to advertising how environmentally-friendly an organization claims to be, while not actually adopting sustainable practices.⁴⁰⁶ BP has since abandoned its foray into solar power generation and put its U.S. wind-farm business up for sale.⁴⁰⁷ This behaviour is typical of the fossil fuel industry, which has spent vast sums of money touting its environmental credentials, at the same time as their business plans — which depend on burning all of their fossil fuel reserves — are fundamentally at odds with environmental sustainability. As BP's chief executive, 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".⁴⁰⁸ In April 2010, BP's Deepwater Horizon oil platform in the Gulf of Mexico exploded, causing over \$40 billion in damage, alongside massive ecological harm.⁴⁰⁹

The sums being invested in renewable energy by fossil fuel companies 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 2016.⁴¹⁰ In 2003, BP invested \$6.75 billion in Russia's Tyumen Oil Company, which is involved with the massive Sakhalin offshore project.⁴¹¹

More examples of paltry investments in renewables being trumped by huge investments in unconventional fossil fuels, the oil sands, etc

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 the industry is making

⁴⁰⁵Pearce, *Greenwash: BP and the myth of a world 'Beyond Petroleum'*.

⁴⁰⁶The Oxford English Dictionary defines the term as: "The creation or propagation of an unfounded or misleading environmentalist image"

⁴⁰⁷Winkley, *Energy Journal: BP No Longer Beyond Petroleum*.

⁴⁰⁸The Economist, *In the black stuff*.

⁴⁰⁹McCarthy, *Canada raises liability for offshore oil spills to 1 — billion*.

⁴¹⁰The Wall Street Journal, *BP Plans 1 Billion in New Spending on Alaska*.

⁴¹¹The Economist, *Not beyond petroleum*.

in renewables.⁴¹²

7.6 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. Those that exist can be found in [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.](#)

In past instances, the University of Toronto has accepted the appropriateness of divestment before a comprehensive legal justification has been in place.

Find information about how U of T divested from South Africa before Canada passed the law to facilitate that. Also, the tobacco precedent.

** Legal efforts by small island states * One example: <https://www.sindark.com/2008/09/14/carbon-emissions-worse-than-criminal-damage/> * Fossil fuel companies also cause injury in forms other than climate * Oil spills - Deepwater Horizon * Toxic air pollution - deaths from coal * This guy might be able to make some suggestions: <http://www.law.columbia.edu/courses/L845I-advanced-climate-change-law/spring-2013/section-001> * Also: <http://envirolaw.com/about/meet-dianne/>*

7.7 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. 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.

Not only that, but many governments in Canada have been going out of their way to help the oil and gas industry grow, for instance by weakening environmental assessments, suppressing scientific research into the harm taking place, and providing subsidies for fossil fuel production.

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 — until it is in place — socially conscious organizations should take action themselves in response to the harm being caused by fossil fuels.

⁴¹²See: [Pricing the social cost of carbon](#)

7.8 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.⁴¹³ 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”.⁴¹⁴ While doing this with only giant solar facilities would be impractical and probably expensive, the example does demonstrate 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.⁴¹⁵

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% of American electricity could come from wind, reducing annual electric sector CO₂ emissions by 825 million metric tons.⁴¹⁶ Iowa already generates 39% of its energy from this low-carbon source.⁴¹⁷ Concerns about the intermittency of wind energy have also proven exaggerated; by balancing production from wind facilities in different areas, consistent power output can be created.⁴¹⁸

Huge opportunities exist to reduce energy use by improving efficiency, including in industry, transport, power generation, and buildings. According to the International Energy Agency (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”.⁴¹⁹ The IEA explains 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.⁴²⁰ By 2035, the IEA predicts that improved energy efficiency could cut energy expenditures by 20%, alongside “wider economic gains, particularly for India, China, the United States and Europe”.⁴²¹

⁴¹³MacKay, *Sustainable Energy – without the hot air*.

⁴¹⁴*Ibid.*, p. 178.

⁴¹⁵*Ibid.*, p. 106, 238.

⁴¹⁶U.S. Department of Energy, *20% Wind Energy by 2030: Increasing Wind Energy’s Contribution to U.S. Electricity Supply*.

⁴¹⁷The Economist, *Blown away*.

⁴¹⁸*Ibid.*

⁴¹⁹Agency, *World Energy Outlook 2012: Presentation to the press*, p. 13.

⁴²⁰*Ibid.*, p. 14.

⁴²¹Agency, *World Energy Outlook 2012: Presentation to the press*, p. 15.

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% renewable energy in the United States 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.”⁴²² The report finds that this policy would create three times as many jobs as producing the same amount of energy from fossil fuels.⁴²³ 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 currently 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.”^{424 425} 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.”⁴²⁶

Whether we like it or not, humanity must learn how to manage without fossil fuels.

7.9 Won’t divestment hurt the endowment, including U of T’s ability to provide scholarships?

As discussed at greater length in ??, there is evidence that portfolios that exclude companies that cause social injury do not suffer a financial penalty for doing so. 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 relationships between financial performance and the incorporation of ESG factors into portfolio management.^{427 428} A 2013 analysis of fossil-fuel divestment by Patrick Geddes found that: “”

This should cover both the effect on returns and the effect on portfolio diversity

⁴²²Union of Concerned Scientists, *Clean Energy, Green Jobs*.

⁴²³See also: Union of Concerned Scientists, *Benefits of Renewable Energy Use*.

⁴²⁴The World Bank, *Mapping carbon pricing initiatives : developments and prospects*, p. 13.

⁴²⁵See also: Schuetze, *Environmental Woes Could Reverse Global Development*.

⁴²⁶Government of Australia Climate Commission, *The Critical Decade 2013*, p. 5.

⁴²⁷Group, *Sustainable Investing: Establishing Long-term Value and Performance*.

⁴²⁸Mercer, *Shedding Light on Responsible Investment: Approaches, Returns and Impacts*.

7.10 Won't fossil fuel companies stop making donations to U of T?

7.11 Shouldn't U of T fight climate change through research and education?

The university is doing this, and will continue to do so, which is very welcome, but 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 can be incompatible with the values of the university.

7.12 Won't divestment hurt Canadian jobs and the economy?

7.13 Can't we just adapt to climate change?

7.14 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. The technology has already been deployed in certain applications, such as the re-injection of unwanted CO₂ Sleipner gasfield in Norway.

CCS cannot solve our climate change problem for two major reasons: scale and economics.

Humanity is currently emitting roughly 30 billion tonnes of CO₂ into the atmosphere annually.⁴²⁹ As explained in an article in the *MIT Technology Review*: “[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.”⁴³⁰ 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 supposed ‘clean coal’ facility announced by President George W. Bush in 2003, but which was subsequently scrapped due to intolerably high costs. As *The Economist* explains: “there is not a single big power plant using CCS anywhere in the world”.⁴³¹

In terms of economics, *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

⁴²⁹Agency, *Redrawing the Energy-Climate Map*.

⁴³⁰Bullis, *What Carbon Capture Can't Do*.

⁴³¹The Economist, *Trouble in store*.

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.⁴³²

Despite considerable government subsidies, including \$3.4 billion in an Americans stimulus bill, CCS remains unattractive to energy utilities largely because of cost.⁴³³ 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.⁴³⁴

Other considerations include the stability of formations into which CO₂ is injected and the seismic consequences of doing so.⁴³⁵⁴³⁶ Carbon dioxide is heavier than air, so leaks from CCS facilities could smother people and animals nearby.⁴³⁷ 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 where CO₂ cannot plausibly be separated from waste gases and stored. Given that 85% 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.⁴³⁸⁴³⁹

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 expected by the federal and provincial governments, making it all the more important to begin investing in decarbonization now.

7.15 Won't geoengineering save us?

⁴³²Ibid.

⁴³³The Economist, *The illusion of clean coal*.

⁴³⁴Al-Juaied and Whitmore, *Realistic Costs of Carbon Capture*.

⁴³⁵Zoback and Gorelick, "Earthquake triggering and large-scale geologic storage of carbon dioxide".

⁴³⁶See also: Sheridan, 'Carbon capture' too risky, earthquake prone: US study.

⁴³⁷The Economist, *Trouble in store*.

⁴³⁸Canadian Broadcasting Corporation, *Secret advice to politicians: oilsands emissions hard to scrub*.

⁴³⁹McCarthy, *Carbon capture no 'silver bullet'*.

8 | Sources cited

References

- Academia Brasileira de Ciencias, Brazil; Royal Society of Canada, Canada; Chinese Academy of Sciences, CHina, Academie des Sciences, France; Deutsche Akademie der Naturforsher Leopoldina, Germany; Indian National Science Academy, India; Accademia Nazionale dei 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*. 2009. URL: <http://www.nationalacademies.org/includes/G8+5energy-climate09.pdf>.
- Adam, David. *I underestimated the threat, says Stern*. 2008. URL: <http://www.guardian.co.uk/environment/2008/apr/18/climatechange.carbonemissions>.
- Advisory Board on Tobacco Investment, University of Toronto. *Report of the Advisory Board on Tobacco Investment*. 2007.
- AECOM. *The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100*. 2013. URL: http://www.aecom.com/deployedfiles/Internet/News/Sustainability/FEMA%20Climate%20Change%20Report/Climate_Change_Report_AECOM_2013-06-11.pdf.
- Agency, International Energy. *Redrawing the Energy-Climate Map*. 2013. URL: <http://www.slideshare.net/internationalenergyagency/redrawing-theenergyclimatemappresentation>.
- *World Energy Outlook: 2012*. Organization for Economic Cooperation and Development, 2012. ISBN: 9789264180840. DOI: 10.1787/weo-2012-en. URL: http://www.oecd-ilibrary.org/energy/world-energy-outlook-2012_weo-2012-en.
- *World Energy Outlook 2012 Factsheet*. 2012. URL: <http://www.worldenergyoutlook.org/media/weowebiste/2012/factsheets.pdf>.
- *World Energy Outlook 2012: Presentation to the press*. 2012. URL: <http://www.worldenergyoutlook.org/pressmedia/recentpresentations/PresentationWE02012launch.pdf>.
- Al-Juaied, Mohammed and Adam Whitmore. *Realistic Costs of Carbon Capture*. 2009. URL: http://belfercenter.ksg.harvard.edu/publication/19185/realistic_costs_of_carbon_capture.html?breadcrumb=%2Fproject%2F43%2Fenvironment_and_natural_resources.
- AlbertaEnergy. *Facts and Statistics*. URL: <http://www.energy.alberta.ca/oilsands/791.asp>.
- 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*. 2009. URL: <http://sustainability.utoronto.ca/Assets/Sustainability+Digital+Assets/commitment.pdf>.
- Alley, Richard. *The Two Mile Time Machine: Ice Cores, Abrupt Climate Change, and Our Future*. Princeton University Press, 2000.
- Amiraslany, Afshin. *The impact of climate change on Canadian agriculture : a Ricardian approach*. 2010. URL: <http://ecommons.usask.ca/handle/10388/etd-05252010-102012>.
- Amuna, B. et al. *Risking Ruin: Shell's Dangerous Developments in the Tar Sands, Arctic, and Nigeria*. 2012. URL: <http://platformlondon.org/wp-content/uploads/2012/06/Shell-Risking-Ruin.pdf>.
- Beinecke, Frances. *Six Reasons Arctic Offshore Drilling Cannot Be Done Safely*. 2013. URL: <http://theenergycollective.com/francesbeinecke/236171/six-reasons-why-offshore-drilling-arctic-cannot-be-done-safely>.
- Bender, Bryan. *Chief of US Pacific forces calls climate biggest worry*. 2013. URL: <http://www.bostonglobe.com/news/nation/2013/03/09/admiral-samuel-locklear-commander-pacific-forces-warns-that-climate-change-top-threat/BHdPVCLrWEMxRe9IXJZcHL/story.html>.
- Benton, Michael J. and Richard J. Twitchett. "How to kill (almost) all life: the end-Permian extinction event". In: *TRENDS in Ecology and Evolution* 18.7 (2003). URL: <http://palaeo.gly.bris.ac.uk/Benton/reprints/2003TREEPr.pdf>.
- Bloomberg Businessweek. *Economist: Energy reserves overvalued by global markets*. 2013. URL: http://investing.businessweek.com/research/markets/news/article.asp?docKey=600-201304201443UPI____TOPITRAK_130454_7316-1.
- Bloomberg New Energy Finance. *Renewable Energy Now Cheaper Than New Fossil Fuels in Australia*. 2013. URL: <http://about.bnef.com/press-releases/renewable-energy-now-cheaper-than-new-fossil-fuels-in-australia/>.
- Borowsky, Hannah, Chloe Maxmin, and Ben Franta. *Harvard Students Meet With Trustees To Discuss Divestment*. 2013. URL: <http://divestharvard.com/harvard-students-meet-with-trustees-to-discuss-divestment/>.
- BP. *Climate change: Addressing the global challenge of climate change will require the efforts of governments, industry and individuals*. URL: <http://www.bp.com/en/global/corporate/sustainability/the-energy-future/climate-change.html>.
- Broder, John M. *With 2 Ships Damaged, Shell Suspends Arctic Drilling*. 2013. URL: http://www.nytimes.com/2013/02/28/business/energy-environment/shell-suspends-arctic-drilling-for-2013.html?_r=0.
- Bullis, Kevin. *What Carbon Capture Can't Do*. 2013. URL: <http://www.technologyreview.com/view/516166/what-carbon-capture-cant-do/>.
- Cambridge Energy Research Associates. *Crossing the Divide: The Future of Clean Energy*. 2007. URL: http://www.precaution.org/lib/crossing_the_divide_brochure.080105.pdf.

- Canadian Broadcasting Corporation. *Secret advice to politicians: oilsands emissions hard to scrub*. 2008. URL: <http://www.cbc.ca/news/canada/story/2008/11/24/sands-trap.html>.
- Carbon Tracker Initiative. *Carbon Tracker Initiative*. URL: <http://www.carbontracker.org>.
- Carbon Tracker Institute. *Unburnable Carbon 2013: Wasted capital and stranded assets*. 2013. URL: <http://carbontracker.live.kiln.it/Unburnable-Carbon-2-Web-Version.pdf>.
- *Unburnable Carbon: Are the world's financial markets carrying a carbon bubble*. 2012. URL: <http://www.carbontracker.org/wp-content/uploads/downloads/2012/08/Unburnable-Carbon-Full1.pdf>.
- Carbon Trust. *A Climate for Change: A Trustee's Guide to Understanding and Addressing Climate Risk*. 2009. URL: http://www.iigcc.org/__data/assets/pdf_file/0010/262/A_climate_for_change.pdf.
- Center for Climate and Energy Solutions. *National Environmental Policy Act Cases*. URL: <http://www.c2es.org/federal/courts/national-environmental-policy-act-cases>.
- Center for Naval Analyses. *National Security and the Threat of Climate Change*. 2007. URL: <http://www.cna.org/sites/default/files/news/FlipBooks/Climate%20Change%20web/flipviewerexpress.html>.
- Center for Strategic and International Studies and the Center for a New American Security. *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change*. 2007. URL: http://csis.org/files/media/isis/pubs/071105_ageofconsequences.pdf.
- Centre for Climate and Energy Solutions. *Multi-State Climate Initiatives*. URL: <http://www.c2es.org/us-states-regions/regional-climate-initiatives>.
- Centre for Constitutional Rights. *Kiobel v. Royal Dutch Petroleum Co*. URL: <http://ccrjustice.org/ourcases/current-cases/kiobel>.
- Chan, Gabriel et al. *Canada's Bitumen Industry Under CO₂ Constraints*. 2010. URL: http://globalchange.mit.edu/files/document/MITJPSPGC_Rpt183.pdf.
- Chazan, Guy. *Shell ordered to pay Niger Delta farmer*. 2013. URL: <http://www.ft.com/intl/cms/s/0/d30ad810-6acc-11e2-9670-00144feab49a.html>.
- Cheeseman, Gina-Marie. *Oil Companies are Actually Planning for Climate Change*. 2012. URL: <http://www.triplepundit.com/2012/01/oil-companies-actually-planning-climate-change/>.
- Cheng, C. S. et al. "Possible impacts of climate change on freezing rain in south-central Canada using downscaled future climate scenarios". In: *Natural Hazards and Earth System Sciences* 7 (2007). URL: <http://www.nat-hazards-earth-syst-sci.net/7/71/2007/nhess-7-71-2007.html>.
- City of Toronto. *Summary of Toronto's 2011 Greenhouse Gas and Air Quality Pollutant Emissions Inventory*. 2013. URL: <http://www.toronto.ca/legdocs/mmis/2013/pe/bgrd/backgroundfile-57187.pdf>.
- *Toronto Atmospheric Fund - Emission reduction*. URL: http://www.toronto.ca/taf/emission_reduction.htm.

- City of Toronto Social Development, Finance and Administration Division. *Profile of Low Income in the City of Toronto*. 2010. URL: http://www.toronto.ca/demographics/pdf/poverty_profile_2010.pdf.
- *Toronto Seniors Demographic Snapshot 2006*. 2006. URL: http://www.toronto.ca/demographics/pdf/seniors_pres_2006_census_nov08.pdf.
- Cockerham, Sean. *Coast Guard: Shell Arctic rig findings turned over to Justice Dept*. 2013. URL: <http://www.adn.com/2013/02/22/2798607/coast-guard-finds-violations-on.html>.
- ConocoPhillips. *Climate Change Position*. URL: <http://www.conocophillips.com/sustainable-development/our-approach/living-by-our-principles/positions/Pages/climate-change.aspx>.
- Cook, John et al. “Quantifying the consensus on anthropogenic global warming in the scientific literature”. In: *Environmental Research Letters* 8.2 (2013). URL: <http://iopscience.iop.org/1748-9326/8/2/024024/>.
- Costello, Anthony et al. “Managing the health effects of climate change”. In: *The Lancet* (2009). URL: <http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2809%2960935-1/fulltext>.
- Craven, Greg. *What’s the Worst That Could Happen?: A Rational Response to the Climate Change Debate*. Perigee Trade, 2009.
- CTV Calgary. *First Nation sues Shell*. 2011. URL: <http://calgary.ctvnews.ca/first-nation-sues-shell-1.733736>.
- DARA International. *Climate Vulnerability Monitor: A Guide to the Cold Calculus of A Hot Planet*. 2nd edition. DARA and the Climate Vulnerable Forum, 2012. URL: <http://www.daraint.org/wp-content/uploads/2012/10/CVM2-Low.pdf>.
- De Souza, Mike. *Global climate efforts threaten oilsands growth, memo told Natural Resources Minister Joe Oliver*. 2013. URL: <http://www.canada.com/business/Global+climate+efforts+threaten+oilsands+growth+memo+told+Natural+Resources+Minister+Oliver/8202635/story.html>.
- *Oilsands tailings leaking into groundwater, Joe Oliver told in memo*. 2013. URL: <http://o.canada.com/2013/02/17/oilsands-tailings-leaking-into-groundwater-joe-oliver-told-in-memo/>.
- De Soza, Mike. *Bureaucrats urged Kent to take global warming seriously*. 2011. URL: <http://www.sierraclub.ca/en/climate-change/in-the-news/bureaucrats-urged-kent-take-global-warming-seriously>.
- De’ath, Glenn et al. “The 27–year decline of coral cover on the Great Barrier Reef and its causes”. In: *Proceedings of the National Academy of Sciences* (2012). URL: <http://www.pnas.org/content/early/2012/09/25/1208909109>.
- Divest Harvard. *150 People Gather For Divest Harvard Petition Delivery*. 2013. URL: <http://divestharvard.com/15-people-gather-for-divest-harvard-petition-delivery/>.
- *Divest Harvard Meeting With Administration 2/1/13*. 2013. URL: <http://divestharvard.com/divest-harvard-meeting-with-administration-2113/>.
- Divest McGill. *Letters from All Major Student Execs (2012-13, 2013-14) Call for Divestment Today*. 2013. URL: <http://divestmcgill.com/264/>.

- Dore, Mohammed. "Forecasting the Conditional Probabilities of Natural Disasters in Canada as a Guide for Disaster Preparedness". In: *Natural Hazards* 28 (2003). URL: <http://link.springer.com/article/10.1023%2FA%3A1022978024522>.
- Eakin, C. Mark et al. "Caribbean Corals in Crisis: Record Thermal Stress, Bleaching, and Mortality in 2005". In: *PLOS One* (2010). URL: <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0013969>.
- Eaton, Janet. *Bolivia Gives Legal Rights To Mother Earth*. 2012. URL: <http://www.sierraclub.ca/en/main-page/bolivia-gives-legal-rights-mother-earth>.
- Ebi, Kristie. "Facilitating Climate Justice through Community-Based Adaptation in the Health Sector". In: *Environmental Justice* 2 (4 2009). URL: <http://online.liebertpub.com/doi/abs/10.1089/env.2009.0031>.
- Economic Commission for Latin America and the Caribbean. *Economics of Climate Change in Latin America and the Caribbean*. 2009. URL: http://www.eclac.cl/publicaciones/xml/3/38133/2009-851-Summary-Economics_climate_change-WEB.pdf.
- Environment, University of Toronto School of the. *Environmental Research Database*. URL: <http://apl.environment.utoronto.ca/EnvironmentalResearchDatabase/>.
- Environment Canada. *Harper Government Moves Forward on Tough Rules for Coal-Fired Electricity Sector*. URL: <http://www.ec.gc.ca/default.asp?lang=En&n=714D9AAE-1&news=4D34AE9B-1768-415D-A546-8CCF09010A23>.
- *Impacts of Climate Change*. URL: <http://www.climatechange.gc.ca/default.asp?lang=En&n=036D9756-1>.
- *Reducing Greenhouse Gases*. URL: <http://climatechange.gc.ca/default.asp?lang=En&n=4FE85A4C-1>.
- Expert Panel on Climate Change Adaptation. *Adapting to Climate Change in Ontario*. 2009. URL: http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/std01_079212.pdf.
- ExxonMobil. *Carbon Disclosure Project: CDP 2011 Investor CDP 2011 Information Request*. 2011. URL: http://www.exxonmobil.com/Corporate/Files/cdp_investor_2011.pdf.
- *Exxon: What We Do*. URL: http://www.exxonmobil.com/Corporate/about_what.aspx.
- Feltmate, Blair and Jason Thistlewaite. *Climate Change Adaptation: A Priorities Plan for Canada*. 2012. URL: <https://uwaterloo.ca/environment/sites/ca.environment/files/uploads/files/CCAP-Report-30May-Final.pdf>.
- Fenton, Cam. *Divest McGill Delivers Social Injury Briefs*. 2013. URL: <http://gofossilfree.ca/divest-mcgill-delivers-social-injury-briefs/>.
- Fidelity Investments. *GCBX Summary - Green Century Balanced Fund*. 2013. URL: <https://fundresearch.fidelity.com/mutual-funds/summary/392768107>.
- Fidelity Investments. *NEXTX Summary - Shelton Green Alpha*. 2013. URL: <https://fundresearch.fidelity.com/mutual-funds/summary/823010692>.
- *PORTX Summary - Portfolio 21 Global Equity Fund Class R*. 2013. URL: <https://fundresearch.fidelity.com/mutual-funds/summary/742935588>.

- Fleischfresser, Chantal. *Solar power produced 100% of new energy on U.S. grid in March*. 2013. URL: <http://www.smartplanet.com/blog/bulletin/solar-power-produced-100-of-new-energy-on-us-grid-in-march/18083>.
- Fletcher, B. *Center for Biological Diversity vs. National Highway Traffic Safety Administration*. 2007. URL: <http://www.climatelaw.org/cases/country/us/case-documents/us/CBDvNHTSA>.
- Foden, Wendy B. et al. "Identifying the World's Most Climate Change Vulnerable Species: A Systematic Trait-Based Assessment of all Birds, Amphibians and Corals". In: *PLOS One* 8 (6 2013). URL: <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0065427>.
- Ford, James et al. "Vulnerability of Aboriginal health systems in Canada to climate change". In: *Global Environmental Change* (2010). URL: <http://www.jamesford.ca/wp-content/uploads/2010/06/in-press-version.pdf>.
- Ford, James D. et al. "Climate change in the Arctic: current and future vulnerability in two Inuit communities in Canada". In: *The Geographical Journal* 174.1 (2008). URL: [http://www.uoguelph.ca/gecg/images/userimages/Ford%20et%20al.%20\(2008\)_The%20Geographic%20Journal.pdf](http://www.uoguelph.ca/gecg/images/userimages/Ford%20et%20al.%20(2008)_The%20Geographic%20Journal.pdf).
- ForestEthics. *Robbing the Carbon Bank: Global Warming & Ontario's Boreal Forest*. 2007. URL: <http://www.borealbirds.org/resources/report-fe-robbingthecarbonbank.pdf>.
- Fossil Free. *Move My Money*. 2013. URL: <http://gofossilfree.org/mymoney/>.
- Fossil Free UNB. *Petition signature count: 306!* 2013. URL: <http://fossilfreeunb.tumblr.com/post/46956124327/petition-signature-count-306>.
- *Today, our Fossil Free UNB team is presenting our project and a resolution of support to the UNB Student Union*. 2013. URL: <http://fossilfreeunb.tumblr.com/post/47385670362/today-our-fossil-free-unb-team-is-presenting-our>.
- Fullerton, John. *The big choice: money or planet?* 2011. URL: <http://www.guardian.co.uk/sustainable-business/blog/carbon-reduction-commitment-finance>.
- Geddes, Patrick. *Do the Investment Math: Building a Carbon-Free Portfolio*. Electronic - Aperio Group. 2013. URL: http://www.aperiogroup.com/system/files/documents/building_a_carbon_free_portfolio.pdf.
- Gemmill, Faith. *Shell and the Arctic Oil Rush*. 2013. URL: <http://climate-connections.org/2013/05/24/shell-and-the-arctic-oil-rush/>.
- Girard, Daniel. *U of T to sell off its tobacco holdings*. 2007. URL: http://www.thestar.com/news/2007/04/10/u_of_t_to_sell_off_its_tobacco_holdings.html.
- GlobalData. *Grid Parity for Wind and Solar Power - Future Outlook and Impact Analysis*. 2012. URL: <http://store.globaldata.com/market-reports/alternative-energy/Grid-Parity-for-Wind-and-Solar-Power-Future-Outlook-and-Impact-Analysis>.
- Government of Australia Climate Commission. *The Critical Decade 2013*. 2013. URL: http://climatecommission.gov.au/wp-content/uploads/The-Critical-Decade-2013_medres_web.pdf.

- Government of Ontario. *Annual Report 2008-09: Climate Change Action Plan*. 2009. URL: http://www.ene.gov.on.ca/stdprodconsume/groups/lr/ene/@resources/documents/resource/std01_079210.pdf.
- *Ontario Regulation 496/07: Cessation of Coal Use – Atikokan, Lambton, Nantcoke and Thunder Bay Generating Stations*. URL: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_070496_e.htm.
- Greenhouse, Linda. *Justices Say E.P.A. Has Power to Act on Harmful Gases*. 2007. URL: <http://www.nytimes.com/2007/04/03/washington/03scotus.html>.
- Greenpeace. *False Hope: Why carbon capture and storage won't save the climate*. 2013. URL: <http://www.greenpeace.org/usa/Global/usa/report/2008/5/false-hope-why-carbon-capture.pdf>.
- Greenpeace, Platform and FairPensions. *Out in the Cold: Investor Risk in Shell's Arctic Exploration*. 2012. URL: http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/oel/20120521-Risiken-Oelbohrungen-Arktis-Investoren-englisch.pdf.
- Group, Deutsche Bank. *Sustainable Investing: Establishing Long-term Value and Performance*. 2012. URL: https://www.dbadvisors.com/content/_media/Sustainable_Investing_2012.pdf.
- Gunther, Marc. *The Coming Shift to 'Climate Preparedness'*. 2012. URL: <http://www.greenbiz.com/blog/2012/01/23/coming-shift-climate-preparedness>.
- Hansen, James. *Climate Threat to the Planet: Implications for Energy Policy and Intergenerational Justice*. 2008. URL: http://www.columbia.edu/~jeh1/2008/AGUBjerknes_20081217.pdf.
- *Storms of My Grandchildren*. Bloomsbury USA, 2010.
- Hansen, James, Pushker Kharecha, and Makiko Sato. "Climate forcing growth rates: doubling down on our Faustian bargain". In: *Environmental Research Letters* 8.1 (2013). URL: <http://iopscience.iop.org/1748-9326/8/1/011006>.
- Hansen, James and Makiko Sato. *Paleoclimate Implications for Human-Made Climate Change*. 2012. URL: http://www.columbia.edu/~jeh1/mailings/2011/20110118_MilankovicPaper.pdf.
- Hansen, James et al. *Target Atmospheric CO₂: Where Should Humanity Aim?* 2008. URL: http://www.columbia.edu/~jeh1/2008/TargetCO2_20080407.pdf.
- Health Canada. *Climate Change: Preparing for the Health Impacts*. 2005. URL: <http://www.hc-sc.gc.ca/sr-sr/pubs/hpr-rpms/bull/2005-climat/index-eng.php>.
- *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity*. 2008. URL: <http://www.2degreesc.com/Files/CCandHealth.pdf>.
- Henn, Jamie. *The White House Just Strengthened the Case for Fossil Fuel Divestment*. 2013. URL: http://www.huffingtonpost.com/jamie-henn/fossil-fuel-divestment_b_3394142.html.
- *Tufts Administration Forms Working Group to Study Divestment*. 2013. URL: <http://gofossilfree.org/tufts-administration-forms-working-group-to-study-divestment/>.

Hickman, Leo. *Jeremy Grantham, environmental philanthropist: 'We're trying to buy time for the world to wake up'*. 2013.

URL: <http://www.guardian.co.uk/environment/2013/apr/12/jeremy-grantham-environmental-philanthropist-interview>.

HIP Investor. *Resilient Portfolios & Fossil-Free Pensions*. 2013. URL: <http://gofossilfree.org/files/2013/05/Resilient-Portfolios-and-Fossil-Free-Pensions.pdf>.

Hoggan, James and Richard Littlemore. *Climate Cover-Up: The Crusade to Deny Global Warming*. Greystone Books, 2009.

Holland-Bartels, L. and B. Pierce. *An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf energy Development in the Chukchi and Beaufort Seas, Alaska*. 2011. URL: <http://pubs.usgs.gov/fs/2011/3048/pdf/fs20113048.pdf>.

Hove, Sybille van den, Marc Le Menestrel, and Henri-Claude de Bettignies. "The oil industry and climate change: strategies and ethical dilemmas". In: *Climate Policy* 2 (1 2002). URL: <https://www.sciencedirect.com/science/article/pii/S1469306202000086>.

Humphreys, Joshua. *Institutional Pathways to Fossil-Free Investing*. 2013. URL: <http://gofossilfree.org/files/2013/05/Institutional-Pathways-to-Fossil-Free-Investing1.pdf>.

ICF International. *Greenhouse Gases and Air Pollutants in the City of Toronto: Toward a Harmonized Strategy for Reducing Emissions*. 2007. URL: http://www.toronto.ca/taf/pdf/ghginventory_jun07.pdf.

Intergovernmental Panel on Climate Change. *Climate Change 2007: Synthesis Report*. 2007. URL: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf.

— *Climate Change 2007: Working Group I: The Physical Science Basis, TS.2 Changes in Human and Natural Drivers of Climate*. URL: https://www.ipcc.ch/publications_and_data/ar4/wg1/en/tssts-2.html.

— *First Assessment Report*. URL: https://www.ipcc.ch/ipccreports/1992%20IPCC%20Supplement/IPCC_1990_and_1992_Assessments/English/ipcc_90_92_assessments_far_overview.pdf.

— *Fourth Assessment Report: Climate Change 2007*. URL: https://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html.

— *Has there been a Change in Extreme Events like Heat Waves, Droughts, Floods and Hurricanes?* 2007. URL: https://www.ipcc.ch/publications_and_data/ar4/wg1/en/faq-3-3.html.

— *Second Assessment Report: Climate Change 1995*. URL: <https://www.ipcc.ch/pdf/climate-changes-1995/ipcc-2nd-assessment/2nd-assessment-en.pdf>.

— *Thermohaline circulation changes in the North Atlantic: possible impacts for Europe*. 2007. URL: https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch12s12-6-2.html.

— *Third Assessment Report: Climate Change 2001*. URL: http://www.grida.no/publications/other/ipcc_tar/.

International Arctic Science Committee. *Arctic Climate Impact Assessment*. 2004. URL: <http://amap.no/acia/>.

International Labour Organization. *Convention No. 169*. 1989. URL: <http://www.ilo.org/indigenous/Conventions/no169/lang-en/index.htm>.

- International Union for Conservation of Nature. *Salmon and Climate Change: Fish in Hot Water*. 2009. URL: http://www.wildsalmoncenter.org/pdf/salmon_and_climate_change.pdf.
- *Species and Climate Change: More than Just the Polar Bear*. 2009. URL: http://cmsdata.iucn.org/downloads/species_and_climate_change.pdf.
- Isik, Murat and Stephen Devadoss. “An analysis of the impact of climate change on crop yields and yield variability”. In: *Applied Economics* 38 (7 2006), pp. 835–44. URL: <http://www.tandfonline.com/doi/abs/10.1080/00036840500193682#.UaFBDWT7284>.
- Katic, Gordon. *Why we’re asking UBC to divest from oil and gas*. 2013. URL: <http://ubyssey.ca/opinion/katic-why-were-asking-ubc-to-divest-from-oil-and-gas/>.
- Kearney, Christine. *New York trial delayed for Nigerians suing Shell*. 2009. URL: <http://uk.reuters.com/article/2009/04/06/shell-nigeria-idUKN0641522820090406?sp=true>.
- Knutson, Thomas and Robert Tuleya. “Impact of CO₂ - Induced Warming on Simulated Hurricane Intensity and Precipitation: Sensitivity to the Choice of Climate Model and Convective Parameterization”. In: *Journal of Climate* 17.18 (2004). URL: http://www.gfdl.noaa.gov/bibliography/related_files/tk0401.pdf.
- Kochan, Nick and Robin Goodyear. *Corruption: The New Corporate Challenge*. Palgrave MacMillan, 2011.
- Koronowski, Ryan. *Oil companies that caused climate change now fear its financial impacts*. 2012. URL: <http://climateresearchproject.org/2012/06/12/oil-companies-that-caused-climate-change/>.
- Koshida, Grace et al. “Drought Risk Management in Canada-U.S. Transboundary Watersheds: Now and in the Future. Drought and Water Crises: Science, Technology, and Management Issues”. In: *Drought and Water Crises: Science, Technology, and Management Issues*. Ed. by Donald A. Wilhite. CRC Press, 2005.
- Lee, Marc and Brock Ellis. *Canada’s Carbon Liabilities: The Implications of Stranded Fossil Fuel Assets for Financial Markets and Pension Funds*. 2013. URL: <http://www.policyalternatives.ca/publications/reports/canadas-carbon-liabilities>.
- Leggett, J. and McKibben, Bill. *How your pension is being used in a \$6 trillion climate gamble*. 2013. URL: <http://www.guardian.co.uk/environment/blog/2013/apr/19/pension-6-trillion-climate-gamble>.
- Lemmen, Donald S. and Fiona J. Warren, eds. *Climate Change Impacts and Adaptation: A Canadian Perspective*. 2010. URL: http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/earth-sciences/files/pdf/perspective/pdf/report_e.pdf.
- Leurig, Sharlene. *Climate Risk Disclosure By Insurers: Evaluating Insurer Responses to the NAIC Climate Disclosure Survey*. 2011. URL: <http://www.ceres.org/resources/reports/naic-climate-disclosure>.
- Lightman, Ernie, Andrew Mitchell, and Beth Wilson. *Poverty is making us sick: A comprehensive survey of income and health in Canada*. 2008. URL: <http://wellesleyinstitute.com/files/povertyismakingussick.pdf>.
- MacKay, David. *Sustainable Energy – without the hot air*. 2009. URL: <http://withouthotair.com/>.

- MacLeod, David. *Adaptation to a Changing Climate: City Infrastructure Preparedness*. 2011. URL: http://www.fcm.ca/Documents/presentations/2011/webinars/Adaptation_to_a_Changing_Climate_EN.pdf.
- Malcolm, Scott et al. *Agricultural Adaptation to a Changing Climate: Economic and Environmental Implications Vary by U.S. Region*. 2012. URL: <http://www.ers.usda.gov/media/848748/err136.pdf>.
- Marmot, Michael. "Achieving health equity: from root causes to fair outcomes". In: *The Lancet* 370 (9593 2007). URL: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(07\)61385-3/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(07)61385-3/abstract).
- Mathiason, Nick. *EBRD freezes Shell Sakhalin loan*. 2005. URL: <http://www.guardian.co.uk/business/2005/jun/19/oilandpetrol.observerbusiness>.
- McCarthy, Michael. *Jury Decides That Threat of Global Warming Justifies Breaking The Law*. 2013. URL: <https://www.commondreams.org/headline/2008/09/11-6>.
- McCarthy, Shawn. *Canada raises liability for offshore oil spills to 1 – billion*. 2013. URL: <http://m.theglobeandmail.com/report-on-business/canada-raises-liability-for-offshore-oil-spills-to-1-billion/article12647765/>.
- *Carbon capture no 'silver bullet'*. 2009. URL: <http://www.theglobeandmail.com/report-on-business/carbon-capture-no-silver-bullet/article1170007/>.
- McKeown, David. *Hot Weather Response Plan - Update*. 2006. URL: http://www.toronto.ca/health/hphe/pdf/boh_hot_weather.pdf.
- McKibben, Bill. *Global Warming's Terrifying New Math*. 2012. URL: <http://www.rollingstone.com/politics/news/global-warmings-terrifying-new-math-20120719>.
- *The Case for Fossil-Fuel Divestment*. 2013. URL: <http://www.rollingstone.com/politics/news/the-case-for-fossil-fuel-divestment-20130222>.
- McKinsey & Company. *Impact of the Financial Crisis on Carbon Economics: Version 2.1 of the Global Greenhouse Gas Abatement Cost Curve*. 2010. URL: http://www.mckinsey.com/client_service/sustainability/latest_thinking/greenhouse_gas_abatement_cost_curves.
- Meltz, Robert. *Climate Change and Existing Law: A Survey of Legal Issues Past, Present, and Future*. 2013. URL: <https://www.fas.org/sgp/crs/misc/R42613.pdf>.
- Mercer. *Shedding Light on Responsible Investment: Approaches, Returns and Impacts*. 2011. URL: <http://www.mercer.com/articles/1423880>.
- Minio-Paluello, Mika. *Shell supports Syrian regime with \$55 million during crackdown; one out of six Syrian tanks runs on Shell oil*. 2011. URL: <http://platformlondon.org/2011/05/29/shell-supports-syrian-regime-with-55-million-during-crackdown-one-out-of-six-syrian-tanks-runs-on-shell-oil/>.
- Mouawad, Jad. *Shell to Pay \$15.5 Million to Settle Nigerian Case*. 2009. URL: <http://www.nytimes.com/2009/06/09/business/global/09shell.html>.

- Munich RE. *Overall picture of natural catastrophes in 2010 – Very severe earthquakes and many severe weather events.* 2011. URL: http://www.munichre.com/en/media_relations/press_releases/2011/2011_01_03_press_release.aspx.
- Naidoo, Kumi. *Drilling for oil in the Arctic: the risks are too great for companies to take on.* 2012. URL: <http://www.guardian.co.uk/sustainable-business/blog/drilling-oil-arctic-risks-too-great-companies>.
- National Oceanic and Atmospheric Administration. *Heat Stress to Caribbean Corals in 2005 Worst on Record.* 2010. URL: http://www.noaa.gov/stories2010/20101115_coralbleaching.html.
- NOAA Monthly Climate Teleconference: February 2013. 2013. URL: <http://www.noaa.gov/advisories/20130219-advisory-climatewebinar.html>.
- Trends in Atmospheric Carbon Dioxide. URL: <http://www.esrl.noaa.gov/gmd/ccgg/trends/>.
- National Round Table on Energy and the Environment. *Framing the Future: Embracing the Low-Carbon Economy.* 2012. URL: <http://collectionsCanada.gc.ca/webarchives2/20130322185857/http://nrtee-trnee.ca/wp-content/uploads/2012/10/framing-the-future-report-eng.pdf>.
- *Paying the Price: The Economic Impacts of Climate Change for Canada.* 2011. URL: <http://collectionsCanada.gc.ca/webarchives2/20130322143132/http://nrtee-trnee.ca/wp-content/uploads/2011/09/paying-the-price.pdf>.
- Natural Resources Canada. *Climate Change Impacts and Adaptation: A Canadian Perspective.* 2004. URL: http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/earth-sciences/files/pdf/perspective/pdf/report_e.pdf.
- *From Impacts to Adaptation: Canada in a Changing Climate 2007.* 2007. URL: http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/earth-sciences/files/pdf/assess/2007/pdf/full-complet_e.pdf.
- *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.* 2012. URL: <http://www.scribd.com/doc/125689533/Oilsands-groundwater-contamination>.
- NBC News Wire. *Environmental risk of drilling in Arctic too high, CEO of oil giant Total says.* 2012. URL: http://worldnews.nbcnews.com/_news/2012/09/26/14107150-environmental-risk-of-drilling-in-arctic-too-high-ceo-of-oil-giant-total-says.
- Nelder, Chris. *Why carbon capture and storage will never pay off.* 2013. URL: <http://www.smartplanet.com/blog/take/why-carbon-capture-and-storage-will-never-pay-off/534>.
- Nelson, Gerald C. et al. *Food Security, Farming, and Climate Change to 2050: Scenarios, Results, Policy Options.* 2010. URL: <http://www.ifpri.org/sites/default/files/publications/rr172.pdf>.
- Nelson, Jacqueline. *Socially responsible investment funds hold their own.* 2013. URL: <http://www.theglobeandmail.com/globe-investor/investment-ideas/number-cruncher/socially-responsible-investment-funds-hold-their-own/article9845687/>.
- Nigeria Conservation Foundation and IUCN/CEESP. *Niger Delta Natural Resource Damage Assessment and Restoration Project – Phase I Scoping Report.* 2006. URL: http://cmsdata.iucn.org/downloads/niger_delta_natural_resource_damage_assessment_and_restoration_project_recommendation.doc.

- Ontario Ministry of Agriculture and Food. *Climate Change and Agriculture*. URL: <http://www.omafr.gov.on.ca/english/engineer/facts/climatechange.htm>.
- Ontario Ministry of Finance. *Ontario Population Projections Update: 2011 – 2036*. 2012. URL: <http://www.fin.gov.on.ca/en/economy/demographics/projections/>.
- Ontario Ministry of the Environment. *Climate Change - Greening Our Ways*. URL: http://www.ene.gov.on.ca/environment/en/category/climate_change/STDPROD_078897.html.
- *Green Energy Act*. URL: http://www.ene.gov.on.ca/environment/en/legislation/green_energy_act/index.htm.
- Oreskes, Naomi. “Beyond the Ivory Tower: The Scientific Consensus on Climate Change”. In: *Science* 306.5702 (2004). URL: <https://www.sciencemag.org/content/306/5702/1686.short>.
- Oreskes, Naomi and Erik Conway. *Merchants Of Doubt*. Bloomsbury US, 2011.
- Pearce, Fred. *Greenwash: BP and the myth of a world 'Beyond Petroleum'*. 2008. URL: <http://www.guardian.co.uk/environment/2008/nov/20/fossilfuels-energy>.
- Percy, Jon. *A Rising Tide of Change*. 2007. URL: <http://www.elements.nb.ca/theme/climate07/jon/jon.htm>.
- Plumer, Brad. *An obscure new rule on microwaves can tell us a lot about Obama's climate policies*. 2013. URL: <http://www.washingtonpost.com/blogs/wonkblog/wp/2013/06/05/what-an-obscure-microwave-rule-says-about-obamas-climate-plans/>.
- Plurinational State of Bolivia. *Constitucion Politica del Estado*. 2013. URL: <http://www.presidencia.gob.bo/documentos/publicaciones/constitucion.pdf>.
- Price, Richard, Simeon Thornton, and Stephen 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*. 2007. URL: <http://archive.defra.gov.uk/evidence/series/documents/shadowpriceofcarbondec-0712.pdf>.
- Priest, Marcus. *Climate Commission warns coal will be left in ground*. 2013. URL: http://www.afr.com/p/national/climate_commission_warns_coal_will_0s3K60MAR9LJPTDd2nGTD0.
- Public Health Agency of Canada. *Reducing Health Disparities - Roles of the Health Sector: Discussion Paper*. 2004. URL: <http://www.phac-aspc.gc.ca/ph-sp/disparities/ddp-eng.php>.
- Radio France Internationale. *Shell could face trial in US for alleged complicity in torture in Nigeria*. 2012. URL: <http://www.english.rfi.fr/node/138583>.
- Raphael, Dennis. *Poverty, Income Inequality, and Health in Canada*. 2002. URL: <http://www.povertyandhumanrights.org/docs/incomeHealth.pdf>.
- Rasool, S. I. and C. De Bergh. “The Runway Greenhouse and the Accumulation of CO₂ in the Venus Atmosphere”. In: *Nature* 226 (1970). URL: http://pubs.giss.nasa.gov/docs/1970/1970_Rasool_DeBergh.pdf.

Redmond, Simon and Michael Wilkins. *What A Carbon-Constrained Future Could Mean For Oil Companies' Creditworthiness*. 2013. URL: http://www.carbontracker.org/wp-content/uploads/downloads/2013/03/SnPCT-report-on-oil-sector-carbon-constraints_Mar0420133.pdf.

Republic of Ecuador. *Constitution of the Republic of Ecuador*. 2008. URL: <http://pdba.georgetown.edu/Constitutions/Ecuador/english08.html>.

Reuters. *Shell to scrap bonus link to sustainability index*. 2011. URL: <http://www.reuters.com/article/2011/03/07/shell-idAFLDE7261PQ20110307>.

Richardson, Benjamin. *Socially Responsible Investment Law: Regulating the Unseen Polluters*. Oxford University Press, 2008.

Right Livelihood Award Foundation. *Petition for Norway Pension Fund. The Right Livelihood Award*. 2012. URL: http://www.rightlivelihood.org/petition_norway_shell.html.

Rockstrom, Johan et al. "A safe operating space for humanity". In: *Nature* 461 (2009). URL: <http://www.nature.com/nature/journal/v461/n7263/full/461472a.html>.

Royal Dutch Shell. *Building an Energy Future: Annual Report*. 2011. URL: http://reports.shell.com/annual-report/2012/servicepages/downloads/files/entire_shell_ar12.pdf.

Sahney, Sarda and Michael J. Benton. "Recovery from the most profound mass extinction of all time". In: *Proceedings of the Royal Society* 275.1636 (2008).

Sawin, Elizabeth. *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*. 2012. URL: <https://climateinteractive.wordpress.com/2012/12/05/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/>.

Scannell, Kara and Thomas Catan. *Settlements Near In Bribery Case*. 2010. URL: http://online.wsj.com/article/SB10001424052748703631704575552410420207630.html?mod=djem_jiewr_BE_domainid.

Schuetze, Christopher. *Environmental Woes Could Reverse Global Development*. 2013. URL: <http://rendezvous.blogs.nytimes.com/2013/03/18/environmental-woes-could-reverse-global-development/>.

Schwartz, Peter and Doug Randall. *An Abrupt Climate Change Scenario and Its Implications for United States National Security*. 2003. URL: http://www.climate.org/PDF/clim_change_scenario.pdf.

Sekularac, Ivana and Anthony Deutsch. *Dutch court says Shell responsible for Nigeria spills*. 2013. URL: <http://www.reuters.com/article/2013/01/30/us-shell-nigeria-lawsuit-idUSBRE90516X20130130>.

Shell. *Climate change*. URL: <http://www.shell.com/global/environment-society/environment/climate-change.html>.

Shell Canada. *Shell At a Glance*. URL: <http://www.shell.ca/en/aboutshell/at-a-glance-tpkg.html>.

- Sheppard, Kate. *Energy Companies Say One Thing, Do the Opposite on Climate Change*. 2012. URL: <http://www.motherjones.com/blue-marble/2012/05/corporate-hypocrisy-climate-change>.
- Sheppard, Kate and James West. *FEMA Report: Climate Change Could Increase Areas at Risk of Flood by 45 Percent*. 2013. URL: <http://www.motherjones.com/environment/2013/06/climate-change-could-double-number-americans-federal-flood-insurance>.
- Sheridan, Kerry. 'Carbon capture' too risky, earthquake prone: US study. 2012. URL: http://www.google.com/hostednews/afp/article/ALeqM5hgEyHrcoMyK34_ZT-sdeeyiC4ADw?docId=CNG.6e8cb246738bfc1e0c48f4ac564e68fa.471.
- Skuce, Andy. *Big Oil and the Demise of Crude Climate Change Denial*. 2012. URL: <http://www.skepticalscience.com/bigoil.html>.
- Smith, Michael H. *Assessing Climate Change Risks and Opportunities for Investors: Oil and Gas Sector*. 2013. URL: http://www.igcc.org.au/Resources/Documents/oil_gas_assessing_climate_change_risks_for_investors.pdf.
- Sosa, Irene. *License to Operate: Indigenous Relations and Free Prior and Informed Consent in the Mining Industry*. 2011. URL: http://www.sustainalytics.com/sites/default/files/indigenouspeople_fp1c_final.pdf.
- Spedding, P., K. Mehta, and N. Robins. *Oil and carbon revisited: Value at risk from 'unburnable' reserves*. 2013.
- Statistics Canada. *Aboriginal Profile for the City of Toronto*. 2006. URL: http://www.toronto.ca/children/bs/aboriginal_profile.pdf.
- Steinbruner, John D., Paul C. Stern, and Jo L. Husbands. *Climate and Social Stress: Implications for Security Analysis*. 2012. URL: http://www.nap.edu/catalog.php?record_id=14682.
- Steiner, Richard. *Double standard: Shell practices in Nigeria compared with international standards to prevent and control pipeline oil spills and the Deepwater Horizon oil spill*. 2010. URL: <http://www.milieudefensie.nl/publicaties/rapporten/double-standard>.
- *International Standards to Prevent and Control Pipeline Oil Spills, Compared with Shell Practices in Nigeria*. 2008.
- Stern, Nicholas. *A profound contradiction at the heart of climate change policy*. 2011. URL: <http://www.ft.com/intl/cms/s/0/52f2709c-20f0-11e1-8a43-00144feabdc0.html>.
- *The Economics of Climate Change: The Stern Review*. Cambridge University Press, 2007. URL: http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/sternreview_index.htm.
- Sullivan and Cromwell, LLP. *Foreign Corrupt Practices Act – Recent Developments*. 2010. URL: http://www.sullcrom.com/files/Publication/506e03de-55a2-461e-93dd-1dff80fc4a2d/Presentation/PublicationAttachment/eb3ca298-3c98-442b-bf24-1f693ea61ba5/SC_Publication_Foreign_Corrupt_Practices_Act_Recent_Developments.pdf.
- Svoboda, Lucy. *Senate passes fossil fuel divestment bill*. 2013. URL: <http://www.stanforddaily.com/2013/05/28/senate-passes-fossil-fuel-divestment-bill/>.
- Tait, Carrie and Kelly Cryderman. *Alberta First Nations band wins right to trial over oil sands' effect on treaty rights*. 2013. URL: <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/alberta-first-nations-band-wins-right-to-trial-over-oil-sands-effect-on-treaty-rights/article12353571/>.

- The City of New York. *A Stronger, More Resilient New York*. 2013. URL: http://nytelecom.vo.llnwd.net/o15/agencies/sirr/SIRR_singles_Lo_res.pdf.
- The Clean Air Partnership. *A Scan of Climate Change Impacts on Toronto*. 2006. URL: http://www.cleanairpartnership.org/pdf/climate_change_scan.pdf.
- *Climate Change Adaptation and Health Equity: Background Report*. 2009, URL: http://www.toronto.ca/health/hphe/air_quality/pdf/climate_change_health_equity.pdf.
- The Economist. *A green figleaf*. 2009. URL: <http://www.economist.com/node/13528073/>.
- *A mixed verdict*. 2013. URL: <http://www.economist.com/blogs/baobab/2013/02/shell-and-nigeria>.
- *Blown away*. 2013. URL: <http://www.economist.com/news/united-states/21579046-wind-power-doing-well-it-still-relies-irregular-and-short-term-subsidies-blown>.
- *In the black stuff*. 2010. URL: <http://www.economist.com/node/16056805/>.
- *Not beyond petroleum*. 2003. URL: <http://www.economist.com/node/1578190>.
- *Oil spoils*. 2011. URL: <http://www.economist.com/node/21525963>.
- *The illusion of clean coal*. 2009. URL: <http://www.economist.com/node/13235041>.
- *Trouble in store*. 2009. URL: <http://www.economist.com/node/13226661>.
- *Unburnable fuel*. 2013. URL: <http://www.economist.com/news/business/21577097-either-governments-are-not-serious-about-climate-change-or-fossil-fuel-firms-are>.
- 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*. 2009. URL: <http://unfccc.int/resource/docs/2009/cop15/eng/l07.pdf>.
- The Institute for Catastrophic Loss Reduction. *Telling the Weather Story*. URL: http://www.ibr.ca/en/natural_disasters/documents/mcbean_report.pdf.
- The Wall Street Journal. *BP Plans 1BillioninNewSpendingonAlaska*. 2013. URL: <http://online.wsj.com/article/SB10001424127887324063304578523302286297478.html>.
- The White House. *Climate Change*. URL: <http://www.whitehouse.gov/energy/climate-change>.
- *Climate Change Adaptation Task Force*. URL: <http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation>.
- *Develop and Secure America's Energy Resources*. URL: <http://www.whitehouse.gov/energy/securing-american-energy#clean%20energy>.
- The World Bank. *Mapping carbon pricing initiatives : developments and prospects*. 2013. URL: <http://documents.worldbank.org/curated/en/2013/05/17751166/mapping-carbon-pricing-initiatives-developments-prospects>.
- The World Bank. *Turn Down the Heat: Why a 4°C Warmer World Must be Avoided*. 2012. URL: http://climatechange.worldbank.org/sites/default/files/Turn_Down_the_heat_Why_a_4_degree_centrigrade_warmer_world_must_be_avoided.pdf.

- This American Life. *Hot In My Backyard*. 2013. URL: <http://www.thisamericanlife.org/radio-archives/episode/495/hot-in-my-backyard>.
- Tillerson, Rex W. *The New North American Energy Paradigm: Reshaping the Future*. 2013. URL: <http://www.cfr.org/united-states/new-north-american-energy-paradigm-reshaping-future/p28630>.
- Toronto Environment Office. *Ahead of the Storm: Preparing Toronto for Climate Change*. 2008. URL: http://www.toronto.ca/teo/pdf/ahead_of_the_storm.pdf.
- *Climate Change, Clean Air and Sustainable Energy Action Plan*. 2007. URL: http://www.toronto.ca/changeisintheair/pdf/clean_air_action_plan.pdf.
- Toronto Governing Council, University of. *Statement of Institutional Purpose*. 1992. URL: <http://www.governingcouncil.toronto.ca/policies/mission.htm>.
- Twomey, Matt. *Students Are Clamoring for Fossil Fuel Divestment*. 2013. URL: <http://www.cnn.com/id/100788907>.
- Ukala, Eferiekose. “Gas Flaring in Nigeria’s Niger Delta: Failed Promises and Reviving Community Voices”. In: *Journal of Energy, Climate and Environment* (2011), pp. 98–126. URL: <http://scholarlycommons.law.wlu.edu/jece/vol2/iss1/4/>.
- Union of Concerned Scientists. *Benefits of Renewable Energy Use*. URL: http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/public-benefits-of-renewable.html.
- *Clean Energy, Green Jobs*. 2009. URL: http://www.ucsusa.org/clean_energy/smart-energy-solutions/increase-renewables/clean-energy-green-jobs.html.
- United Nations Development Programme. *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World*. 2013. URL: <http://hdr.undp.org/hdr4press/press/report/index.html>.
- United Nations Environment Programme. *A legal framework for the integration of environmental, social and governance issues into institutional investment*. 2005. URL: http://www.unepfi.org/fileadmin/documents/freshfields_legal_resp_20051123.pdf.
- *Climate and Trade Policies in a Post-2012 World*. 2009. URL: http://www.unep.org/climatechange/Portals/5/documents/ClimateAndTradePoliciesPost2012_en.pdf.
- *Environmental Assessment of Ogoniland*. 2012. URL: http://postconflict.unep.ch/publications/OEA/UNEP_OEA.pdf.
- United Nations Environment Programme Finance Initiative and Mercer. *Demystifying Responsible Investment Performance: A review of key academic and broker research on ESG factors*. 2007. URL: http://www.unepfi.org/fileadmin/documents/Demystifying_Responsible_Investment_Performance_01.pdf.
- 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. 1976*. URL: <http://www1.umn.edu/humanrts/instrree/b3ccpr.htm>.
- United States Environmental Protection Agency. *Calculations and References*. URL: <http://www.epa.gov/cleanenergy/energy-resources/refs.html>.

- United States Supreme Court. *Massachusetts et al. v. Environmental Protection Agency et al.* 2006. URL: <http://www.supremecourt.gov/opinions/06pdf/05-1120.pdf>.
- University of California Santa Barbara Environmental Affairs Board. *UCSB Faculty Senate Votes in Favor of Fossil Fuel Divestment*. 2013. URL: <http://eab.as.ucsb.edu/2013/06/03/ucsb-faculty-senate-votes-in-favor-of-fossil-fuel-divestment/>.
- University of Toronto Asset Management Corporation. *Canadian Equities Above \$1 Million As at March 31, 2012*. 2012. URL: <http://www.utam.utoronto.ca/Assets/UTAM+Digital+Assets/UTAM/UTAM+Digital+Assets/reports/CanadianQ1+2012.pdf>.
- University of Toronto Centre for Global Change Science. *Distinguished Lecturer Series (2012-13)*. 2012. URL: http://www.cgcs.utoronto.ca/Series/Lecture_Series.htm.
- University of Toronto Governing Council. *University Environmental Protection Policy*. 2010. URL: <http://www.governingcouncil.utoronto.ca/policies/enviro.htm>.
- U.S. Department of Energy. *20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply*. 2008. URL: <http://www.nrel.gov/docs/fy08osti/41869.pdf>.
- U.S. National Academy of Sciences. *Ad Hoc Study Group on Carbon Dioxide and Climate*. URL: http://www.atmos.ucla.edu/~brianpm/download/charney_report.pdf.
- U.S. National Aeronautics and Space Administration. *Is a Sleeping Climate Giant Stirring in the Arctic?* 2013. URL: <http://www.nasa.gov/topics/earth/features/earth20130610.html>.
- Vidal, John. *Arctic expert predicts final collapse of sea ice within four years*. 2012. URL: <http://www.guardian.co.uk/environment/2012/sep/17/arctic-collapse-sea-ice>.
- Voreacos, David and Laurel Brubaker Calkins. *Shell Bribes Among 'Culture of Corruption,' Panalpina Admits*. 2010. URL: <http://www.bloomberg.com/news/2010-11-05/shell-bribes-among-culture-of-corruption-panalpina-admits.html>.
- Wandel, Johanna et al. *Homelessness and Global Climate Change in Waterloo Region: Are We Ready?* 2010. URL: <http://www.homelesshub.ca/library/homelessness-and-global-climate-change-in-waterloo-region-are-we-ready-53859.aspx>.
- Warren, R. et al. *Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss*. 2012. URL: <http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate1887.html>.
- Winkley, Ben. *Energy Journal: BP No Longer Beyond Petroleum*. 2013. URL: <http://blogs.wsj.com/marketbeat/2013/04/03/energy-journal-bp-no-longer-beyond-petroleum/>.
- World Health Organization. *Climate and health: Fact sheet, July 2005*. 2005. URL: <http://www.who.int/globalchange/publications/factsheets/fsclimandhealth/en/index.html>.
- *Climate change and health*. 2012. URL: <http://www.who.int/mediacentre/factsheets/fs266/en/>.
- *Closing the gap in a generation: Health equity through action on the social determinants of health*. 2008. URL: http://www.who.int/social_determinants/thecommission/finalreport/en/index.html.

— *Global health risks: Mortality and Burden of Disease Attributable to Selected Major Risks*. 2009. URL: http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf.

Zoback, Mark and Steven Gorelick. “Earthquake triggering and large-scale geologic storage of carbon dioxide”. In: *Proceedings of the National Academy of Sciences* (2012). URL: <http://www.pnas.org/content/early/2012/06/13/1202473109.abstract>.

9 | Appendix I: Issues with respect to university divestment

9.1 Policy on Social and Political Issues With Respect to University 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 health, safety, or basic free-

doms; 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.

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, students, 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.

9.2 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 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.

10 | 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 the following 200 companies, as listed in the Carbon Tracker Initiative's 2012 report, *Unburnable Carbon*.⁴⁴⁰ These are the top 200 listed companies ranked by estimated carbon reserves.

- African Rainbow Minerals Ltd.
- AGL Energy
- Alcoa Inc.
- Allete Inc.
- Alliance Resource Partners L.P.
- Alpha Natural Resources Inc.
- Anadarko Petroleum Corp.
- Anglo American PLC
- Apache Corp.
- Aquila Resources Ltd.
- Arc Resources Ltd.
- ArcelorMittal
- Arch Coal Inc.
- Aston Resources Pty Ltd.
- ATP Oil & Gas Corp.
- Bandanna Energy Ltd.
- Bankers Petroleum Ltd.
- Banpu PCL
- Bashneft
- Baytex Energy Corp.
- Berry Petroleum Co. (Cl A)
- BG Group PLC
- BHP Billiton
- Black Hills Corp.

⁴⁴⁰Carbon Tracker Institute, *Unburnable Carbon: Are the world's financial markets carrying a carbon bubble*.

- Bonavista Energy Corp
- BP PLC
- Bumi Resources
- Cairn Energy PLC
- Canadian Natural Resources Ltd.
- Canadian Oil Sands Ltd.
- Capital Power Corp.
- Cenovus Energy Inc.
- Chesapeake Energy Corp.
- Chevron Corp.
- China Shenhua Energy Co. Ltd.
- Churchill Mining PLC
- Cimarex Energy Co.
- Cliffs Natural Resources Inc.
- Cloud Peak Energy Inc.
- CLP Holdings Ltd.
- CNOOC Ltd.
- Coal India Ltd.
- Coal of Africa Ltd.
- Compania Espanola de Petroleos S.A.
- Concho Resources Inc.
- ConocoPhillips
- Consol Energy Inc.
- Continental Resources Inc. Oklahoma
- Crescent Point Energy Corp.
- Datang International Power Generation Co. Ltd.
- Datong Coal Industry Co. Ltd.
- Denbury Resources Inc.
- Devon Energy Corp.
- Ecopetrol S.A.
- El Paso Corp.
- EnCana Corp.

- Energen Corp.
- Enerplus Corp.
- ENI S.p.A.
- EOG Resources Inc.
- EQT Corp.
- Eurasian Natural Resources Corp. PLC
- Evraz Group S.A.
- Exxaro Resources Ltd.
- Exxon Mobil Corp.
- FirstEnergy Corp.
- Forest Oil Corp.
- Fortune Minerals Ltd.
- Fushan International Energy Group Ltd.
- Gansu Jingyuan Coal Industry & Electricity Power
- Gazprom OAO
- GDF Suez S.A.
- Global Energy Development PLC
- Grupo Mexico S.A.B. de C.V.
- Gujarat NRE Coke Ltd.
- Gujarat NRE Coking Coal Ltd.
- Hess Corp.
- Homeland Energy Group Ltd.
- Huolinhe Opencut Coal Industry Corp. Ltd.
- Husky Energy Inc.
- Idemitsu Kosan Co. Ltd.
- Imperial Oil Ltd.
- INA-Industrija Nafta
- Inner Mongolia Yitai Coal Co. Ltd.
- Inpex Corp.
- International Coal Group Inc.
- Irkutskenergo
- Itochu Corp.

- James River Coal Co.
- Jindal Steel & Power Ltd.
- Jizhong Energy Resources Co. Ltd.
- Kazakhmys PLC
- Kuzbassenergo
- Linn Energy LLC
- Lukoil Holdings
- Lundin Petroleum AB
- Macarthur Coal Pty Ltd.
- Magnitogorsk Iron & Steel Works
- Marathon Oil Corp.
- Mariner Energy
- Massey Energy Co.
- Mechel OAO
- Mitsubishi Corp.
- Mitsui & Co. Ltd.
- Mitsui Matsushima Co. Ltd.
- MOL Hungarian Oil and Gas Plc
- Mongolian Mining Corp.
- Murphy Oil Corp.
- NACCO Industries Inc. (Cl A)
- New Hope Corp. Ltd.
- New World Resources N.V.
- Newfield Exploration Co.
- Nexen Inc.
- Neyveli Lignite Corp. Ltd.
- Noble Energy Inc.
- Noble Group Ltd
- Northern Energy Corp. Ltd.
- Novatek
- Novolipetsk Steel OJSC
- NTPC Ltd.

- Occidental Petroleum Corp.
- Oil & Natural Gas Corp. Ltd.
- Oil India Ltd.
- Oil Search Ltd.
- OMV AG
- Optimum Coal Holdings Ltd.
- PA Resources AB
- Pacific Rubiales Energy Corp.
- Patriot Coal Corp.
- Peabody Energy Corp.
- Pengrowth Energy Corp.
- Penn West Petroleum Ltd.
- PetroBakken Energy Ltd.
- Petrobank Energy & Resources Ltd.
- Petrobras
- Petroleum Development Corp.
- Pingdingshan Tianan Coal Mining Co. Ltd.
- Pioneer Natural Resources Co.
- Plains Exploration & Production Co.
- Polo Resources Ltd.
- Polyus Gold OAO
- Premier Oil PLC
- Prophecy Resource Corp.
- PT Adaro Energy
- PT Bayan Resources
- PTT PCL
- Public Power Corp. S.A.
- Questar Corp.
- Quicksilver Resources Inc.
- Range Resources Corp.
- Raspadskaya OJSC
- Repsol YPF S.A.

- Resolute Energy Corp.
- Rio Tinto
- Rosneft
- Royal Dutch Shell PLC
- RWE AG
- SandRidge Energy Inc.
- Santos Ltd.
- Sasol Ltd.
- Severstal JSC
- Shanxi Coking Co. Ltd.
- Sherritt International Corp.
- SINOPEC Shandong Taishan Petroleum Co. Ltd.
- SK Holdings Co. Ltd.
- SM Energy Co.
- Soco International PLC
- Southwestern Energy Co.
- Statoil ASA
- Straits Asia Resources Ltd.
- Suncor Energy Inc.
- Swift Energy Co.
- Talisman Energy Inc.
- Tata Power Co. Ltd.
- Tata Steel Ltd.
- Teck Resources Ltd.
- Tokyo Electric Power Co. Inc.
- Total S.A.
- TransAlta Corp.
- Tullow Oil PLC
- Ultra Petroleum Corp.
- United Co. Rusal PLC
- United Industrial Corp. Ltd.
- Vale SA

- Venoco Inc.
- Walter Energy, Inc.
- Wescoal Holdings Ltd.
- Wesfarmers Ltd.
- Western Coal Corp.
- Westmoreland Coal Co.
- Whitehaven Coal Ltd.
- Whiting Petroleum Corp.
- Williams Cos.
- Woodside Petroleum Ltd.
- Xstrata PLC
- Yanzhou Coal Mining Co. Ltd.
- YPF S.A.
- Zhaikmunai L.P.
- Zhengzhou Coal Industry & Electric Power Co. Ltd.