Master Thesis

Title: An Analysis of the Rationale for Canada's withdrawal from the Kyoto Protocol and the possible impacts on the Canadian Oil and Gas Industry

By

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Submitted to the Environmental Policy Institute
School of Graduate Studies in partial fulfillment of the requirements for the degree of
Master of Arts in Environmental Policy
Memorial University of Newfoundland

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June 2016

Abstract

Under the Kyoto Protocol, Canada pledged to reduce its greenhouse gas (GHG) emissions by 6% below its 1990 levels, from 2008-2012. Unfortunately, Canada withdrew in December 2011, which was effective from December 2012. This thesis analyses the rationale for Canada's withdrawal and how it might impact its oil and gas industry. The qualitative method used, deploys the case study approach for the entire study. From an extensive empirical review, the research questions are analyzed using the constructive and interpretative analytical method, under two theoretical frameworks – The Rational Choice Theory and Public Choice Theory. Results show Canada renounced the Protocol because of huge oil sand deposits, which it could not have exploited under the 6% reduction target. Canada aims to check its GHG emissions only through a Canadian made GHG mitigation strategy. Opinions of oil and gas industry experts were not sampled due to lack of interest in the central research question. The thesis recommends more transparent operations from oil and gas companies regarding environmental issues. The federal government should adopt long term emission reduction goals with strict considerations of national energy resources and economic interests.

Acknowledgments

Sincere thanks go to my supervisor Dr. Andreas Klinke for the constant patience he has always demonstrated towards my work, and his guidance throughout my course of study. I am very grateful for the positive impact you have created in my academic and career world.

The professional critique from Examiners added tremendous value to the overall thesis. So, I am deeply indebted for their contributions.

I would also like to thank the library staff of Memorial University for making necessary research material available at very short notices. Your commitment for helping students achieve success is invaluable.

The Environmental Policy Institute provided adequate assistance in a variety of ways for the completion of this thesis, so I acknowledge this contribution.

To Dr. Terence Egute I say thank you for the general insight on the topic and recommendation of suitable literature.

Table of Contents

List of Tables

List of Figures

List of Abbreviations and Symbols

AAUs	Assigned Amount Units
Art.	Article
bbl	Barrels
bbl/d	Barrels per day
CAC	Criteria air Contaminant
CAD	Canadian Dollars
CCAF	Climate Change Action Fund
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFCs	Chlorofluorocarbons
CH_4	Methane
CO_2	Carbon dioxide
Mt CO_2 eq	Mega tonnes of carbon dioxide equivalent
ERU	Emission Reduction Unit
FTA	Free Trade Agreement
FNBP	First National Climate Change Business Plan
G8	Group of 8
GDP	Gross Domestic Product
GHG	Green House Gas
GHGs	Green House Gases
HFCs	Hydroflourocarbons
IOCs	International Oil Companies

I.L.M	International Legal Materials
JI	Joint Implementation
Kg	Kilogram
Km^2	Square Kilometer
LULUCF	Land Use Land Use Change and Forestry
m^3	Cubic meter
NAFTA	North American Free Trade Agreement
NG	Natural Gas
N_2O	Nitrous oxide
PFCs	Perfluorocarbons
RETs	Renewable Energy Technologies
RMU	Removal Units
SAGD	Steam Assisted Gravity Drainage
SF_6	Sulphur hexafluoride
t	Tonnes
Tcf	Trillion Cubic Feet
UNCED	United Nations Conference on Environment and Development
U.N.	United Nations
U.S. EIA	United States Energy Information Administration
USA	United States of America
USD	United States Dollar
WCSB	Western Canada Sedimentary Basin

Chapter 1: Introduction

1.1 Background of the Study

In the 1960s, scientific studies proved for the first time that anthropogenic fossil fuel usage was the principal cause of climate change, and since then, many scientific conclusions have supported the finding (Wilson and Burgh, 2008). However, growing energy demands driven by increasing human population continue to offer oil and gas a dominant role in the global energy supply mix (Armaroli and Balzani, 2011; Coley, 2008). Consequently, international organizations like the United Nations (UN) have held numerous conferences to resolve the energy and environment related issues. A good example is the United Nations Conference on Environment and Development (UNCED). It resulted in multilateral environmental agreements like the United Nations Framework Convention on Climate Change (UNFCCC), whose objective is to stabilize GHG concentrations in the atmosphere, in order to prevent adverse anthropogenic interference with the ecosystem (United Nations Framework Convention on Climate Change Secretariat, 2013). This led to the drafting of Kyoto Protocol to the UNFCCC to reduce global GHG emissions from 2008 to 2012 by at least 5% below 1990 levels (Yam, 2013). Canada had a target to reduce its GHG emissions by 6% below 1990 levels, between 2008 and 2012 (Government of Canada, 2010). The first commitment phase of the Kyoto Protocol expired in 2012 without reaching its goal (United Nations Framework Convention on Climate Change Secretariat, 2013). On 15th December 2011, Canada became the first State Party to the Protocol out of the 191 to submit a petition for withdrawal, and this took effect on 15th December 2012, in accordance with article 27 of the Kyoto Protocol (Yam, 2013). Therefore, Canada has no pledged reduction target under the second commitment period that aims to reduce GHG emissions by at least 18% below 1990 levels from January 2013 until December 2020.

While many advocate more use of renewable energy sources to address environmental problems including climate change that have been linked to fossil fuel usage, countries like Canada tend to invest in their oil and gas industry to find new ways to exploit their unconventional oil and gas resources (Coley, 2008; Jaccard, 2005). In the beginning of 2015, Canada had about 172 billion barrels of proven oil reserves, the third largest amount in the world after Venezuela and Saudi Arabia, with roughly 98% as oil sands (United States Energy Information Administration, 2016).

In terms of gas reserves, by the end of 2015, Canada had an estimated 72 trillion cubic feet (Tcf) of natural gas (NG) reserves and currently ranks third largest global producer of dry NG after Russia and the United States (U.S.), and fourth largest global NG exporter after Russia, Norway and Qatar (United States Energy Information Administration, 2014).

1.2 Statement of Problem

Cognizant of increasing scientific consensus on the connection between human use of fossil fuels and GHG emissions inducing climate change, one would be tempted to assume that, an industrialized nation like Canada holding so much oil and gas reserves, and with a thriving oil and gas industry on the global stage, would not completely abrogate its committed GHG reduction target under the Kyoto Protocol. Even though a former Canadian Environment Minister Peter Kent announced Canada's withdrawal from the Kyoto Protocol during the 2011 Durban Conference and presented some economic justifications which some critics have labeled political reasons (Yam, 2013), it remains uncertain why the country withdrew from the protocol, and how this decision will impact domestic GHG emissions reduction efforts, as well as the oil and gas industry. Hence, it seems to be evident that, reconciling oil and gas production with emission reductions in Canada is a knotty conflict of interest requiring more research for better comprehension.

1.3 Research Questions

Considering the background and statement of problem, the research questions this study seeks to address include the following:

I. What was the Canadian Government's rationale to discontinue its commitments to the Kyoto Protocol?
II. To what extend can it be concluded that Canada's bowing out of the Protocol signifies the country's unwillingness to reduce GHG emissions and to address climate change related concerns?
III. Before withdrawal, how did Canada's obligations to the Kyoto Protocol affect its Oil and Gas Industry?

IV. How is the retreat going to effect the Canadian Oil and Gas Industry and national GHG abatement endeavors?

1.4 Aim and Objectives

Considering the background of the study and the research questions, the aim of this thesis is therefore to investigate from the political, social, economic and environmental perspectives, why Canada pulled out of the Kyoto Protocol, and to ascertain how this might impact the future of the oil and gas industry in the country. The following objectives will guide the research:

I. Searching for diverse perspectives on Canada's position in the global efforts to address GHG emissions and climate change related dilemmas.
II. Studying the relationship that existed between the Kyoto Protocol Commitments and the Canadian Oil and Gas Industry.
III. Understanding the connection between politics, economics, technological and social attributes in relation to environmental concerns in Canada.

1.5 Motivation for the Study

Coupled with the research questions and objectives, the additional motivation for this study is the author's strong interest in energy related issues and concerns pertaining to global climate change, which brings the aspect of environmental sustainability to the fore. With this aspect in mind, the author believes that International Environmental Agreements should be pragmatic means for resolving arguments related to natural resource depletion and atmospheric pollution, especially when bonded with adequate political and social willingness.

The case of Canada has been chosen because, just as their withdrawal came as a big shock to the international community (Yam, 2013), it was also very surprising to the author of this thesis. One can assume the Canadian decision as ironic and controversial. It is ironic because Canada was an active nation in the formation process that resulted in the Kyoto Protocol (Yam, 2013). It is controversial because if empirical studies have proven the direct connection between fossil fuels consumption and GHG emissions, a country like Canada with huge amounts of oil and significant gas reserves should not abandon an International Climate Change Agreement of that magnitude.

Additionally, Canada has ratified other International Environmental Accords like the Vienna Convention for the Protection of the Ozone Layer (I.L.M. 26 [1987], 1529) and the Montreal Protocol on Substances that Deplete the Ozone Layer (I.L.M. 26 [1987], 1550). The controversy and irony here are clear given that, Canada renounced one Global Environmental Treaty, but simultaneously remained committed to others. What really influenced the decision for withdrawal? Was it economic, political and limited technical capacity or was it a lack of concern on the part of the Federal Government? All these questions, coupled with the importance of oil and Gas in the Canadian economy drive the author to be highly motivated in knowing how the Canadian departure from the Kyoto Protocol might affect the Oil and Gas Industry of the country.

1.6 Significance of the Research

Noting that Canada's bowing out of the Kyoto Protocol echoed a lot of global controversy, the author is left with strong convictions that this is a good academic field to examine, especially within the frame of political science, environmental policy and economics. Many lessons could be learned from the Canadian case. With Canada being the first to leave, it remains uncertain whether or not this action paves way for other countries to withdraw from the Protocol. If final conclusions show that Canada's departure from the Kyoto Protocol might have significant adverse effects on domestic efforts to reduce GHG emissions and on its Oil and Gas Industry, the author anticipates that, other major holders of oil and gas reserves who are parties to the Kyoto Protocol with plans of stepping out as well, might possibly re-evaluate their decision. However, it should be noted that, because different countries have different national priorities, other factors of national interest not regarding oil and gas can also influence a country's withdrawal.

The most significant limitation of the research is the fact that it did not directly include sampled opinions of experts from the various expert groups – Pro Oil and Gas Industry Experts, Pro Environment Sector, and Government Officials. This limitation is the result of the abortive endeavors to engage especially the Oil and Gas Industry Experts. Hence, it would have been a biased presentation if only sampled opinions of Pro Environment Experts and Government Officials were presented. So, the research resorted to extensive secondary literature collation covering all expert categories to systematically answer the research questions.

Chapter 2: Canada and its Connection to Oil and Gas

This chapter introduces Canada as the research area with the goal of enhancing knowledge about the economic and political structure of the country based on data from the Central Intelligence Agency (CIA, 2016); otherwise any other sources are cited. It also presents briefly how petroleum is formed, the environmental impacts of oil sand production in Canada, oil and gas reserves and their roles in the Canadian economy.

2.1 The Economic and Political Situation of Canada

Canada's economy is the tenth largest in the world, making it one of the wealthiest countries with one of the highest rates of economic freedom, and member of economic blocks like the Organization for Economic Co-operation Development (OECD) and the Group of Eight (G8) (Environment Canada, 2011). It has evolved economically and technologically in line with the U.S.A, its neighbor and biggest trading partner, to become a high-tech nation in the trillion dollar class, and with a market inclined economic constitution characterized by a wealthy life style. The 1989 Free Trade Agreement (FTA) with the U.S.A and the 1994 North American Free Trade Agreement (NAFTA) that included Mexico, paved the way for a new and booming economic era for Canada. Key natural resources are oil and gas, coal, iron ore, lead, wildlife, nickel, rare earth metals, copper, gold, silver, molybdenum, zinc, diamonds, fish, hydropower, potash and timber. As of 2012, the service industry was contributing roughly 69.6% of Canada's GDP followed by industrial productions of 28.6% and 1.8% from agriculture. The country enjoyed significant economic growth from 1993 through 2007, a 12 year surplus until the 2008 global financial crisis. Export goods include crude petroleum and natural gas, automobiles and parts, telecommunication devices, electricity, industrial machines and aircrafts, chemicals and fertilizers, aluminum and plastic products, timber and wood pulp.

Politically, Canada became an independent nation from Britain on 1st July 1867, though it has always kept very close ties to the British Monarchy. Since 6th February 1952, Queen Elizabeth II of Britain is the Canadian head of state, however, represented by a Governor General. Though the Prime Minister is head of government, the governing system is comprised of a democratic parliament, a federal system and a constitutional monarchy. Accepted unwritten and written acts, judicial systems, customs and traditions formulate the constitution. The written section is made up

of the Constitution Act of 29th March 1867 and that of 17th April 1982. The former gave birth to a four province federation, while the latter shifted command of the Constitution from Britain to Canada, and provided a Canadian Charter of Rights and Freedom, including criteria for constitutional reforms. Canada is member to over sixty regional and international organizations with some notable examples being the North Atlantic Treaty Organization (NATO), the World Health Organization (WHO), the International Monetary Fund (IMF), and the United Nations.

2.2 Oil and Gas in Canada

2.2.1 A Brief Description of Oil and Gas Formation

Petroleum originates from dead marine microorganisms like algae that have been buried in sedimentary basins for millions of years and covered with sediments over time, forcing the death microorganisms to become kerogen which sinks and hardens, resulting in temperature and pressure increases that force oil to migrate from the organic matter rich harden sediments (source rocks) (Bott, 2012; Blanchard, 2005). A sedimentary basin is a depression on the earth crust especially under water bodies where tiny plants and animals live or are deposited after death, with other sediments like silt and mud (Bott, 2012). Though planet earth is about 4.5 billion years old, the organic theory of petroleum formation has revealed that the first sediments that produced global oil and gas were deposited about 560 million years ago (Bott, 2012). Petroleum is formed at depths between 2000 to 4500 meters, a region known as the oil window, and for petroleum to have any economic value; it has to collect in reservoirs (Blanchard, 2005). Hence, pressure within the source rocks forces oil to migrate to low pressure zones with large cracks sealed by impermeable rocks to act as reservoirs, otherwise, the petroleum seeps out to the surface where it becomes oxidized. In conclusion, the source rocks and effective traps are the most important prerequisite in a geological context for an oil field to be economically minable (Blanchard, 2005).

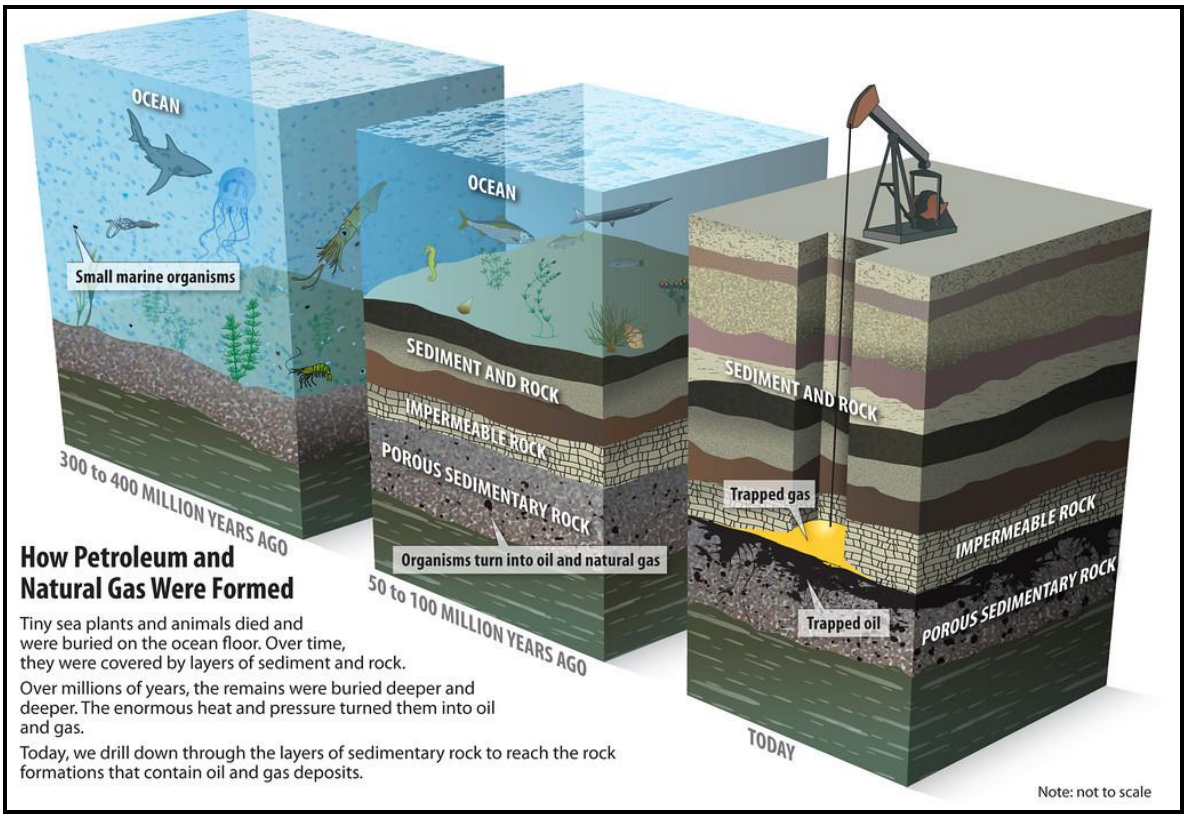

Figure 1: A Schematic Representation of Oil and Gas Formation

Source: National Energy Education Program (2013)

In Canada, all oil and gas are formed via similar procedures except for the oil sands, which have other secondary formation processes. However, the primary formation pattern for oil sands is similar to that which has already been described, because it involves oil formation before transformation to oil sands.

According to petroleum geologists, about 50 million years ago, enormous amounts of oil moved upward through rocks until they entered and impregnated an area of sand and sandstone just below or at the surface of the earth, which is why it is known as oil sands (Bott, 2011). Bacteria then digested most of the hydrocarbons, starting with the lighter ones, by converting them to water and CO_2, and left remains of bigger hydrocarbon molecules and trace metals that could not be digested. The bacteria may have also modified simpler sulphur compounds into complex ones. This explains why there are more complex sulphur compounds and metal elements in bitumen (heavy oil) than in conventional crude oil, making drilling and refining of oil sands more cumbersome and costly. With the Athabasca oil sands in Alberta, it is believed that bacteria action must have digested about

two to three times the amount of bitumen buried in the sands today. While bacteria action is seen as the principal formation means of bitumen in the Athabasca oil sands, a combination of other factors like oxidation, evaporation and loss of light oil through pores in rocks, have contributed in the formation of bitumen in different oil rich regions of the world. In Alberta, each granule of sand is encapsulated by a water layer in a coating of bitumen as seen on the figure below. The water layer impedes direct absorption of the bitumen by the sand, which otherwise, would make extraction even more difficult and way over costly (Bott, 2011).

Figure 2: A Schematic View of an Oil Sand Particle in Alberta

Source: Bott (2011)

2.2.2 Oil and Gas Reserves in Canada

Oil production in Canada was insignificant until 1940 when extensive discoveries were made in Alberta (Blanchard, 2005). Commercial production from the Albertan tar sands started in 1967, and the first mining operation was producing roughly 4,800 m^3 or about 30,191 bbl of synthetic crude oil daily (Olivier et al., 2013). However, prior to 2003, oil reserves in Canada did not increase largely until when oil sands became more economically obtainable, such that, Canada currently has about 173 billion barrels of oil reserves, of which, approximately 98 % come from the oil sands located in Alberta, making Canada third largest oil reserve nation, and sixth largest global oil

producer, with about 99% of its annual crude oil exports destined for U.S.A (U.S. EIA, 2015). In Alberta alone, oil sand deposits underlie an area of about 142,000 km^2, which is bigger than the surface area of Newfoundland (Bott, 2011). Traditionally, the Western Canada Sedimentary Basin (WCSB) covering the provinces of British Columbia, Alberta, Saskatchewan and Manitoba (as seen on map 1 in figure 3), has always been the core of Canadian oil production (Bott, 2012; Blanchard, 2005) because it has one of the most abundant global oil and gas deposits (U.S. EIA, 2012). A Geological survey of Canada shows that the WCSB harbors roughly 57% of Canada's conventional petroleum resources (Bott, 2012).

Offshore deposits exist in the Atlantic waters of Canada (as seen on map 2 in figure 3). The most important offshore site is the Hibernia Field discovered in 1979 at Jeanne d'Arc Basin far in the eastern coastal province of Newfoundland and Labrador, which however, did not witness any production activities until 1990 due to the enormous financial cost and technology required for exploration at the North Atlantic Ocean (Blanchard, 2005). Other significant sites include Terra Nova, where production commenced in 2002, and White Rose, where drilling started in 2005 (Bott, 2012; Blanchard, 2005). However, the offshore activities have been impeded by legislations, such as the 1972 suspension of developments in the Pacific Coast (that harbors about 9.8 billion bbl of obtainable oil resources), and federal injunctions that have hampered a boost in the Arctic, though some oil companies have managed to invest in holdings at the Beaufort Sea (U.S. EIA, 2012). Canadian geological survey indicates that Atlantic Canada holds about 18% of conventional petroleum resources of the country (Bott, 2012).

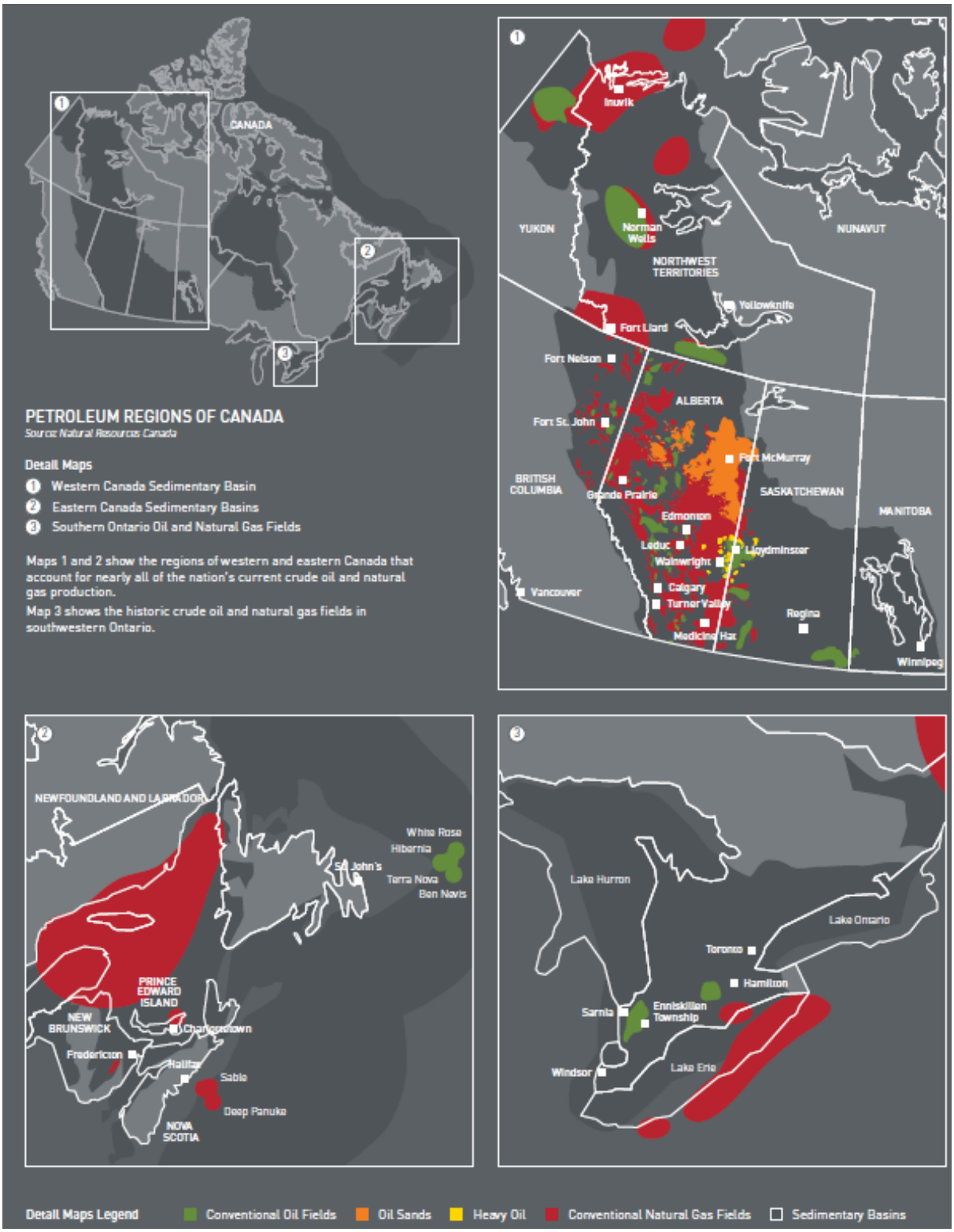

Figure 3: Sedimentary Basins and Petroleum Regions of Canada

Source: Bott (2012)

Canada is expected to be one of the biggest suppliers in the anticipated growth in global liquid fuels consumption in both the short and long term (U.S. EIA, 2012). In the short term, it is estimated that production in Canada will witness an average annual increase of about 200 thousand bbl/d, while in the long term and by 2035, it could reach 6.6 million bbl/d because of contributions from oil sands (U.S. EIA, 2012), located in the WCSB and predominantly in the province of Alberta a seen on map 1 in figure 3.

Regarding NG, while first offshore discoveries were made in 1969 at Nova Scotia, NG however, has been part of Canada's energy mix since the 1880s following first discoveries in Ontario, and Alberta in 1883 (Canadian Association of Petroleum Producers, 2011). Proven reserves as of January 2015 were about 72 Tcf, with most coming from conventional sources located chiefly in the WCSB (as seen on map 1 in figure 3), while other significant locations include offshore fields at the Eastern Canadian shore (as seen on map 2 in figure 3), especially near Newfoundland, Nova Scotia, the Arctic Region, and the Pacific Coast. Globally, Canada ranks third in dry NG production and fourth in NG exports after Russia, Norway and Qatar, with almost 100% of its NG exports destined for the U.S.A. However, because demand for NG in Canada is increasing, export to U.S.A is expected to decline (U.S. EIA, 2016).

Extensive amounts of unconventional NG resources are also found in the WCSB as shale gas, coal bed methane, and tight gas. Though they have not been significantly developed, preliminary studies by EIA indicates Canada has about 388 Tcf of technically minable shale gas resources, concentrated mainly in five locations as organic rich shale in the WCSB (U.S. EIA, 2012). The five locations include: The Horn River, the Cordova Embayment, and Laird in northern British Columbia, the Deep Basin/Montney in Central Alberta and British Columbia, and the Colorado Group in Central and Southern Alberta. These five locations account for about 355 Tcf out of the total 388 Tcf, while the remaining 33 Tcf are located in potential fields in Quebec, Nova Scotia, and New Brunswick, which are areas that have been characterized so far by limited exploration (U.S. EIA, 2012). As of 2011, NG was suppling 30% of Canada's final energy demands yearly (Canadian Association of Petroleum Producers, 2011).

2.2.3 The Structure of the Canadian Oil and Gas Industry

The Canadian Oil and Gas Industry is divided into various sectors that include upstream, midstream and downstream facilities, regulatory bodies, other satellite and subsidiary intermediaries due to the complex production techniques needed in the exploitation of the country's unconventional resources (U.S. EIA, 2012).

The upstream sector, commonly known as exploration and production, involves prospection of possible underground and underwater oil and gas fields, the development and operation of drilling wells, and the extraction of crude oil and raw NG (Trencome, 2013). Canadian firms have a significant presence at the upstream sector through involvements in large-scale commercial projects and test projects for novel technologies (U.S. EIA, 2012). The midstream is responsible for the processing, storage, transport, and marketing of crude oil and NG, while downstream refines crude oil, sells and distributes NG, and crude oil derivatives to consumers (Trencome, 2013). Suncor (which took over Petro-Canada in 2009), Canadian Natural Resources Limited, Imperial Oil, Cenovus, and Husky, are leading Canadian based firms at the upstream and downstream sectors, while Enbridge and TransCanada are leading the midstream pipeline domain (U.S. EIA, 2012). As part of the downstream sector, Canada has 17 crude oil refineries with 1.9 million bbl/d total processing capacity as of 2012, located in eight provinces, predominantly in Ontario (460,000 bbl/d), Alberta (370,000 bbl/d), and Quebec (370,000 bbl/d), with New Brunswick however having the biggest refinery (Oil and Gas Journal cited in U.S. EIA, 2012). All these divisions promote specializations at different levels, and with the privatization of the oil and gas sector in the country, the industry currently involves both domestic and international oil companies (U.S. EIA, 2012).

The presence of international oil companies (IOCs) in Canada has surged very quickly, such that, they now include both privately owned and state owned IOCs, especially from USA and China. Kinder Morgan, a strong midstream pipeline company, along with other upstream and downstream operators like Chevron, ConoPhilips, Devon Energy, and ExxonMobil, are typical privately owned companies from U.S.A. Notable examples of Chinese companies are PetroChina under China National Petroleum Corporation, China National Offshore Corporation, and Sinopec, while BP, Shell, Statoil, and Total, constitute other major IOCs with operations and planned projects on oil sands (U.S. EIA, 2012).

With respect to regulatory bodies, they are present at both the federal and provincial levels as presented on the table below.

Table 1: Canadian Oil Sand Regulatory Bodies and their Roles

Government of Alberta Level: Primary Resource Jurisdiction	
Regulatory body	Function
Alberta Energy	Holder of resource rights and crown royalties
Energy Resource Conservation Board (ERCB)	Approval of projects and compliance monitor
Alberta Environment	Environmental impact assessment, air and water control, protection and restoration
Sustainable Resource Development (SRD)	Public land access, fish and wildlife management
Federal Government Level: National Policies and Standards	
Canadian Environmental Assessment Agency (CEAA)	National environmental assessments
Environment Canada	Monitoring migratory birds, air and water quality and species at risk
Fisheries and Ocean Canada	Monitoring fisheries, fish habitats and species at risk
Transport Canada	Controlling navigable waters
National Energy Board (NEB)	Monitoring interprovincial pipelines

Source: Adapted from Canadian Association of Petroleum Producers (2011)

2.2.4 A Brief Description of the Major Oil Sand Recovery Techniques

As of November 2011, while estimated oil sand resources in Canada were about 1.7 trillion bbl, approximately 169.3 billion bbl were considered recoverable based on present extracting technologies and economic situations, of which 80% or about 135 billion barrels can only be obtained through in-situ techniques (Bott, 2011). 20% are recovered by surface mining, as demonstrated by the figure below, which is usually deployed to a maximum depth of 70 metres (CAPP, 2010).

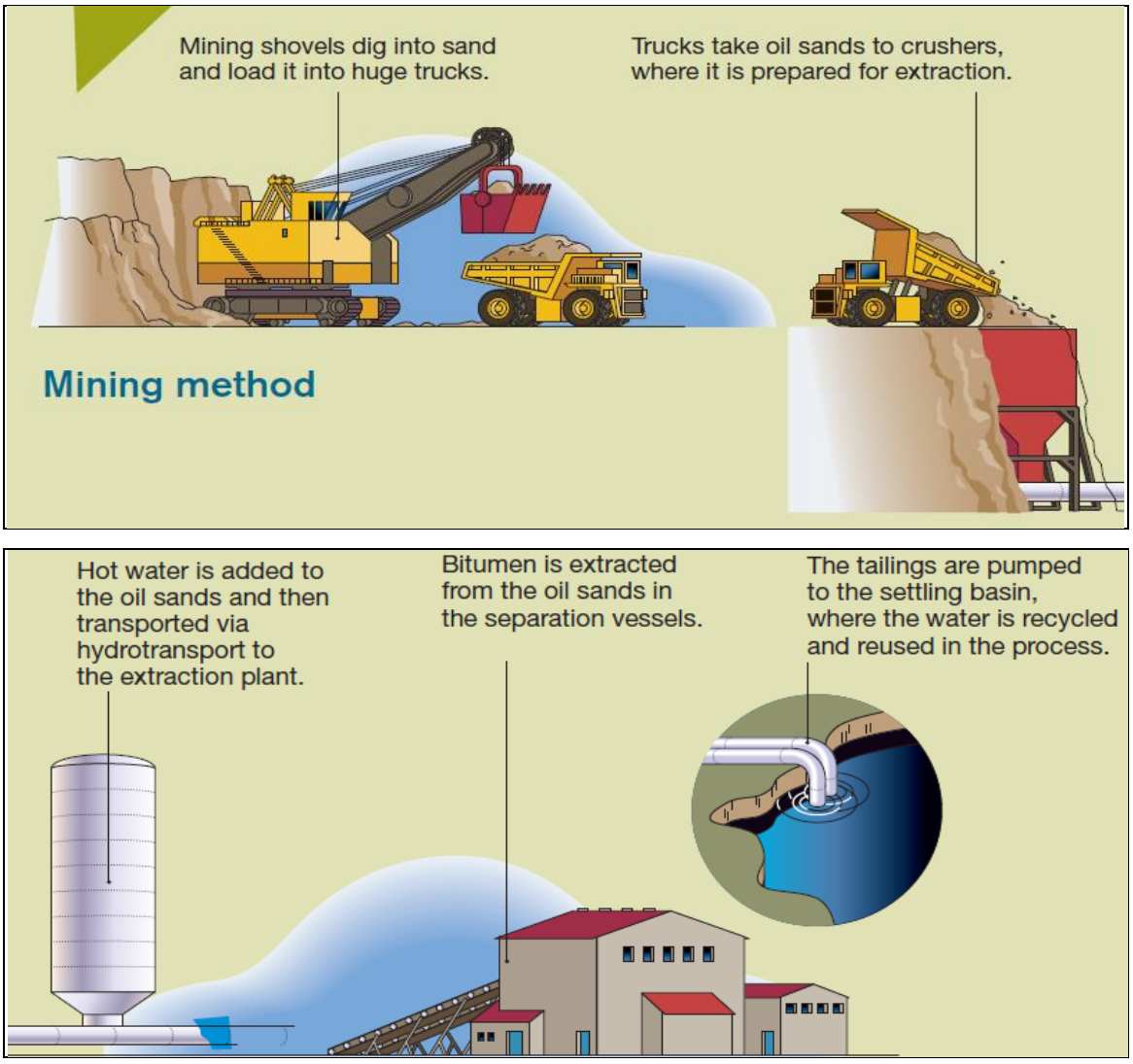

Figure 4: Mining Method in Oil Sand Extraction

Source: Canadian Association of Petroleum Producers (2010)

Major in-situ recovery methods include: steam assisted gravity drainage and cyclic steam stimulation drilling as the schematic figures below represent.

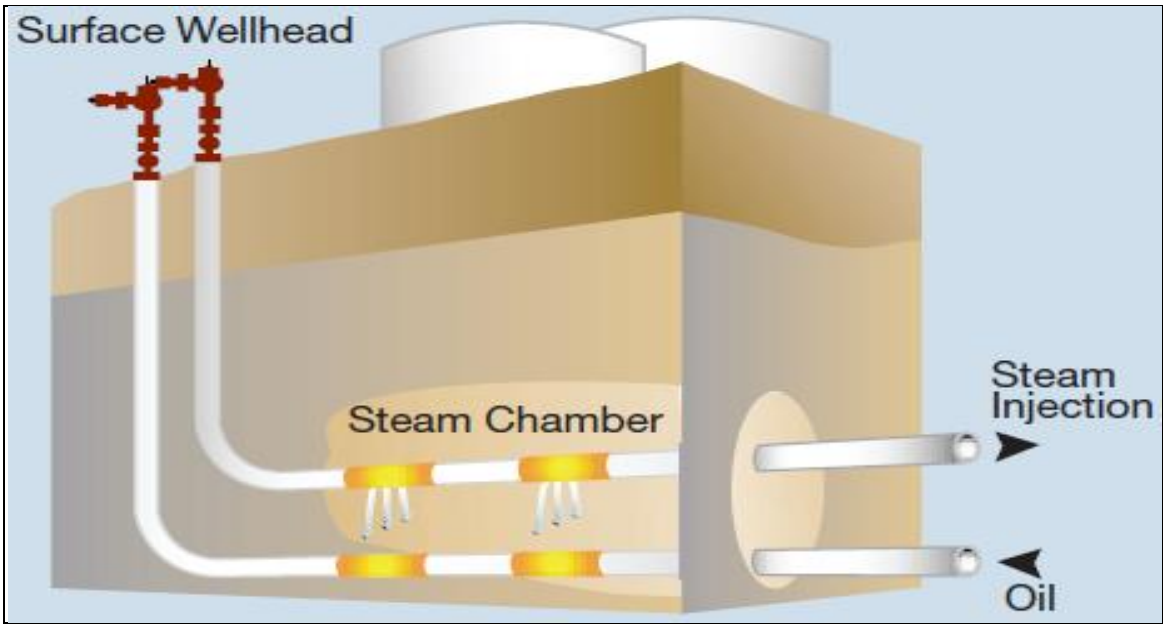

Figure 5: Steam Assisted Gravity Drainage

Source: Canadian Association of Petroleum Producers (2010)

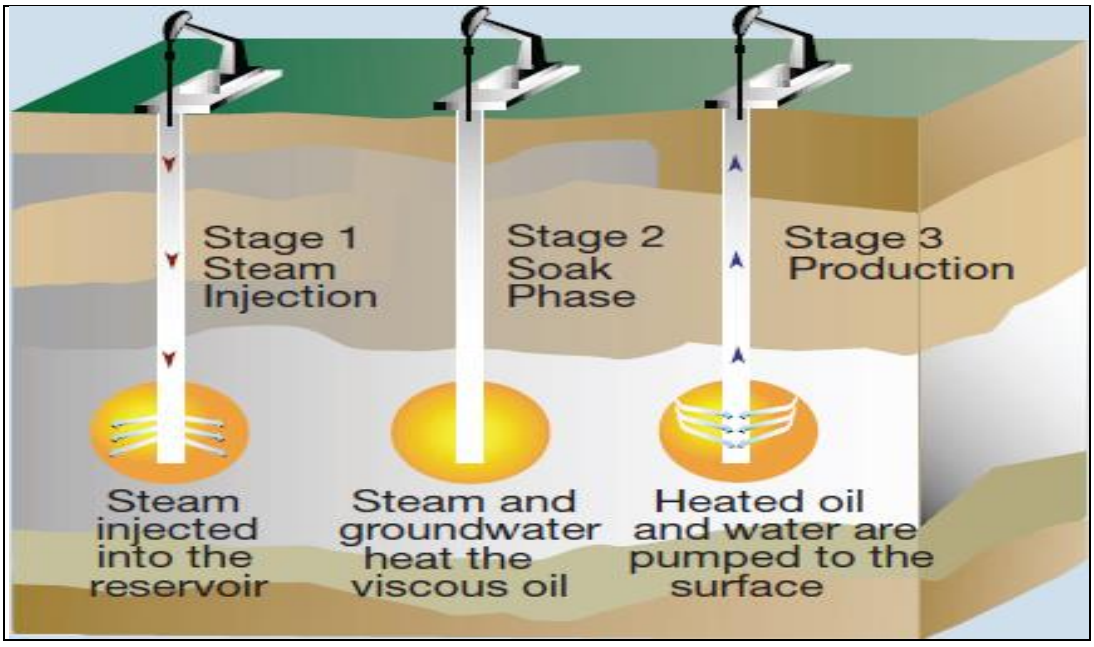

Figure 6: Cyclic Steam Stimulation Drilling

Source: Canadian Association of Petroleum Producers (2010)

Adding to the methods are horizontal drilling and hydraulic fracturing, which have increased the attractiveness of tight oil production from shale oil traps, such that by the end of 2011, WCSB produced more than 200 thousand bbl of tight oil, predominantly from the Cardium formation in Alberta, and the Bakken that extends from Saskatchewan to Manitoba (U.S. EIA, 2012). Upon extraction, because bitumen is a very heavy and sticky crude oil, it has to be diluted with lighter oils or upgraded at an upgrading facility into light-sweet (synthetic) crude oil before it is transported via pipelines to processing plants (U.S. EIA, 2012). So given the complexities and high cost of oil sand recovery, the production has a relatively high break-even price, with the most cited ranges standing at 40-70 USD per bbl for new in-situ works, and 80-100 USD per bbl for new surface mining installations (U.S. EIA, 2012). This explains why, though the biggest oil sand projects in Canada use surface mining techniques, there are however, more in-situ projects in the country. Consequently, oil sand productions are very sensitive to oil price changes.

2.3 The Importance of Oil and Gas in the Canadian Economy

The Athabasca deposits are under serious commercial exploitation and as of 2008; around 64 million litres (400,000 barrels) of oil were produced daily from 500,000 tonnes of opencast mined rocks using the world's biggest excavators (Coley, 2008). Coupled with conventional drillings, they are yielding enormous benefits both in and out of Canada that range from energy supply needs, socio-economic, to political and technology transfer benefits.

2.3.1 Meeting Energy Demand Needs

Oil and gas in general, and oil sands in particular, uniquely guarantee supplies that meet growing energy demands in Canada and the rest of North America especially USA, that gets about 25% (2.2 billion bbl) of its daily imports from Canada (Munro and Mortlock, 2012). Global energy demand from 2008 to 2035 is anticipated to increase by 47%, and Canada is expected to be a key supplier, most of which will come from oil sands (Canadian Association of Petroleum Producers (CAPP), 2010). The guarantee of supply has greatly contributed to make Canada a net energy exporter as figures 7 and 8 represent, though consumption has also increased.

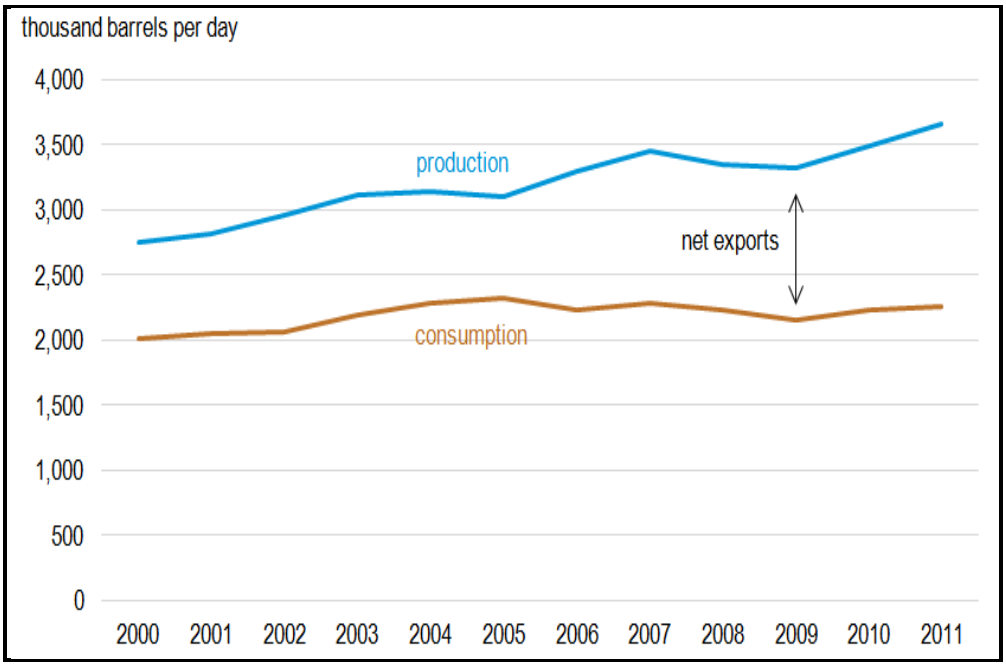

Figure 7: Canadian Oil Production and Consumption, 2000-2011

Source: U.S. EIA, 2012

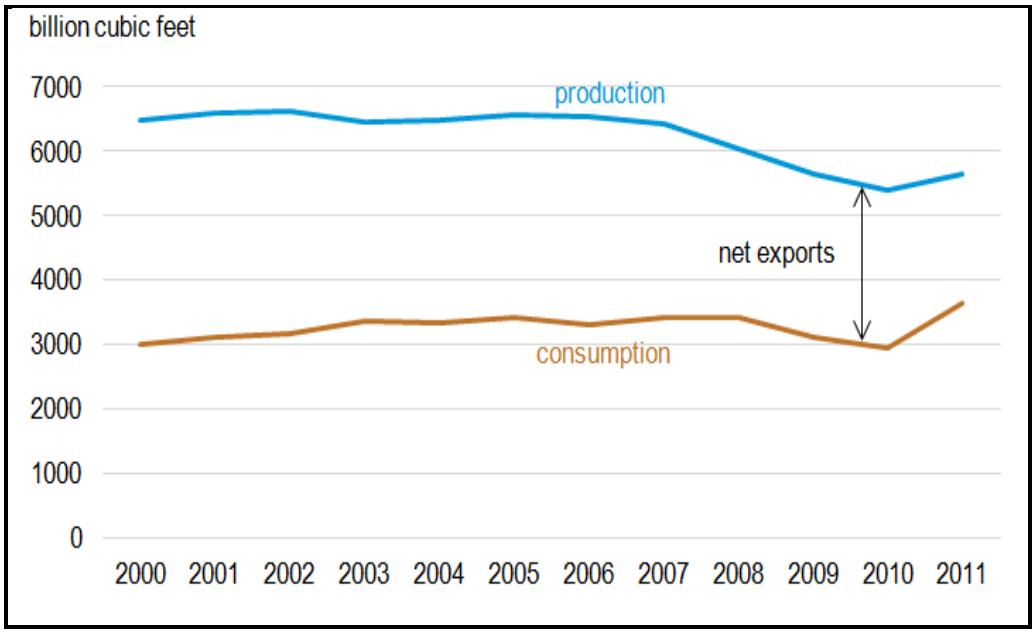

Figure 8: Canadian NG Production and Consumption, 2000-2011

Source: U.S. EIA, 2012

2.3.2 Socio-Economic Benefits

Socio-economic benefits result from Canada being a net exporter of petroleum. According to Investment Canada Act, any large investment projects in Canada must guarantee net benefits to the country, hence signaling foreign limits on controls of strategic resources (U.S. EIA, 2012). So in terms of investment benefits, while national governments control about 77% of the global oil and gas resources, of the 23% left under private investments, nearly 51% are found in the oil sands of Canada (CAPP, 2010). These investments generate so much revenue in taxes, and will raise more significant amounts as shown on table 2.

Table 2: Federal and Provincial Tax Revenue Impact of Western Canadian Oil and Gas Industry from 2010-2035 (million USD)

	Total oil and gas		**Total oil**		**Total gas**	
	Federal	Provincial	Federal	Provincial	Federal	provincial
British Columbia	64,980	61,297	9,167	8,647	55,813	52,650
Alberta	269,217	153,587	178,569	101,872	90,648	51,714
Saskatchewan	31,959	33,066	22,354	23,128	9,605	9,938
Manitoba	5,493	6,015	4,317	4,727	1,176	1,288
Ontario	18,286	18,966	9,538	9,892	8,749	9,074
Quebec	6,057	7,984	3,678	4,848	2,379	3,136
New Brunswick	784	794	471	478	312	317
Nova Scotia	1,173	1,331	633	718	540	613
Prince Edward Island	177	191	106	115	71	77
Newfoundland and Labrador	533	708	337	447	196	260
Yukon Territory	276	125	149	68	127	58
Northwest Territory	518	256	254	125	265	131

Nunavut	254	77	162	49	92	28
Canada	399,707	284,398	229,733	155,115	169,973	129,282

Source: Adapted from Gibbins and Roach, 2010

The numbers on table 2 are totals for a 25 years period (2010-2025). Though the huge resource presence is a natural endowment, factors like political and economic stability, proximity to a ready market (USA), good legal and business system, and technological expertise have greatly contributed to consolidate the 51% investments in Canada (Munro and Mortlock, 2012). The bulk of it is expected to come from Asian investors, especially China, given that Asia will lead global demand for oil and gas in the long run (Munro and Mortlock, 2012). Currently, oil and gas exploration, extraction and refining generate more than 31.3% (or 53.4 billion USD) of capital investments in Western Canada, and this is a capacity that will continue to yield enormous amounts of revenues even in the long run, with some fearing that these big dividends will continuously encourage oil sand production policies and neglect renewable energy development options (Gibbins and Roach, 2010).

In terms of employment, as of 2008, the oil and gas industry of Western Canada was directly employing over 130,000 people, accounting for more than 52.1% (or 96.7 billion USD) of the region's international exports, and generating approximately 10.3% (or 42.1 billion USD) of Western Canada's GDP (Gibbins and Roach, 2010). These benefits do not include those generated from indirect economic activities supported by the oil and gas industry both in western Canada and the country as a whole. Good examples are the doctors, nurses and teachers in Alberta, who are employed thanks to the heavy presence of oil and gas in the region, and the steel mill workers in Ontario who supply steel to the industry for oil sand projects (CAPP, 2010). Directly and indirectly, the oil and gas industry of the country currently affects the jobs of more than 144,000 people, and this number is expected to increase to 590,000 over the next 25 years, with about 103,000 to be supplied by provinces other than Alberta (CAPP, 2010). According the Petroleum Human Resource Council of Canada, the petroleum sector of the country needs to fill about 9,500 jobs between 2015 and 2016, but however forecasts that, roughly 36% of the vacancies may not be filled (Munro and Mortlock, 2012). This indicates that labor demands in the industry are very high.

The investment and employment benefits have garnered big financial gains. But despite being a net exporter as figures 7 and 8 depicted, there is however a growing perception that all the economic benefits of resource development accumulate in Alberta while the rest of the country is neglected, and this has intensified interprovincial tensions and undermined efforts to develop a national energy strategy (Holden, 2013). However, it has been argued that, while the oil and gas industry is the main economic driver in the development of western Canada, it is also the principal economic steering of the country as a whole (Gibbins and Roach, 201). Assessments show that over the next 25 years, the Canadian oil and gas industry will add over 3.5 trillion USD to the country's GDP (Gibbins and Roach, 2010), as table 4 indicates, and during this period, it is estimated that the industry will acquire more than 170 billion USD worth of supplies and services from other Canadian provinces out of Western Canada (CAPP, 2010).

Table 3: Provincial and Federal Economic Benefits of Western Canadian Oil and Gas Industry over the next 25 Years (2010-2035) (GDP million USD)

	Total oil and gas	Total from oil	Total from gas
British Columbia	461,750.07	65,141.16	396,608.91
Alberta	2,552,754.51	1,693,212.96	859,541.56
Saskatchewan	244,979.04	171,351.89	73,627.15
Manitoba	36,070.60	28,348.86	7,721.73
Ontario	143,838.77	75,022.97	68,815.80
Quebec	45,305.92	27,512.37	17,793.55
New Brunswick	4,558.69	2,740.64	1,818.06
Nova Scotia	7,085.73	3,822.13	3,263.60
Prince Edward Island	907.86	543.82	364.04
Newfoundland and Labrador	4,011.65	2,537.00	1,474.65
Yukon Territory	892.33	481.85	410.49
Northwest Territory	3,058.95	1,497.74	1,561.20
Nunavut	654.59	416.85	237.74
Canada	3,505,868.72	2,072,630.24	1,433,238.48

Source: Adapted from Gibbins and Roach, 2010

In summary, the above statistics provide an impressionable magnitude of economic benefits that will be lost if very tight oil sand unfriendly environmental policies are enacted. While some argue that renewable energy technologies can guarantee the same magnitude of socio-economic benefits, others say it will however, fail to generate the same amount of revenues, and hence, they are considering the oil and gas industry to be the pivot of the current and future Canadian economic prosperity (Gibbins and Roach, 2010).

2.3.3 Political and Technology Transfer Benefits

Geo-politically, it is believed that the government has indirectly used the presence of the resources to strategically justify its withdrawal from the Kyoto Protocol (Carrington and Vaughan, 2011). By extension, it is a political maneuver that has permitted the country to save 14billion Canadian Dollars (CAD), had it been the Federal Government used the money to buy emission credits to meet the Canadian Kyoto Protocol target.

Besides economic and political benefits, the Canadian oil and gas industry is considered one of the global leading players in cutting-edge petroleum technologies and expertise that can be applied to unconventional resources in other parts of the world (U.S. E.I.A, 2012). Technology is a very decisive factor in fostering extraction processes, reducing negative environmental effects, and extraction cost in the industry. With the rapid evolution in the industry, those who fail to invest in novel technologies risk becoming insolvent (Munro and Mortlock, 2012). The industry provides the possibility for buttressing insolvency.

2.4 Environmental Impacts of Oil Sands Production in Canada

The mentioned benefits have not been achieved without damaging costs on the environment. All forms of petroleum exploitation result to disturbances on the environment. However, the environmental worries attributed to oil sand productions in Canada are more severe in terms of land use distortions, intensity of emissions generated, water use and toxic tailing ponds, and energy intensiveness of processing methods demanded (U.S. EIA, 2012).

2.4.1 Problems of Land Use Distortions

For a better understanding of the problem, note that the area of land covering oil sands in the province of Alberta is over 140,800 km^2 or 21% of the province, of which, 99% of the 4,750 km^2 designated for mining were already leased out by the end of 2009 (Dyer, 2009).

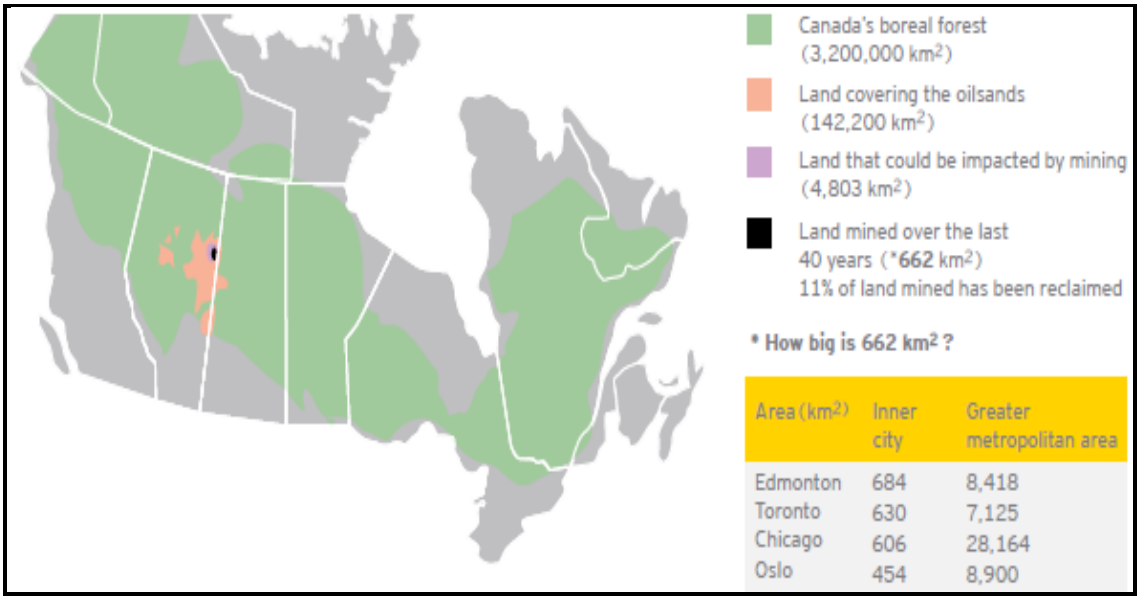

Figure 9: Oil Sand Mining on the Boreal Forest Land Impact

Source: Munro and Mortlock, 2012

Despite the statistics on figure 9, some researchers say in situ exploitation could consume up to 30 times the amount of land designated for mining, which would result in serious disturbances in the boreal forest (Dyer, 2009). Figure 10 on the next page shows land distortions and change in land use due to oil sands mining development projects.

Figure 10: In situ Exploitation on the Boreal Forest of Alberta

Source: Nikiforuk (2010)

Land distortions occur as linear disturbances resulting from construction of production well pads, roads and pipelines, and adversely affect species that do not easily adapt to linear disturbances, such as the caribou woodlands (Dyer, 2009). Generally, linear disturbances are conditions that upset the natural order of a population structure, available resources, and the community or ecosystem and their physical environment through the creation of relatively straight line patterns on the natural landscape (Dyer, 2009). Though they can also be natural, they however form passages that affect the boreal forest ecosystem. The boreal forest of Canada has 35% of wetlands and the biggest peat lands in the world, and is home to many life forms with the highest diversity of bird species in North America, stretching 310 million hectares and covering 30 % of the land mass of Canada (Woynillowicz, Severson-Baker, and Raynolds, 2005). The most significant problems with transformations on the boreal forest include: fragmentation, soil erosion, forcing central habitats to become marginal habitats, invasion by non-native species, humans and other predators, which further generate competition at the detriment of the native species (Dan, Chris, and Marlo, 2005). Currently, both in situ and mining oil sands projects have industrialized 1.4 million hectares of forested land in Canada, which is about 40 times bigger than the city of Denver or 17 times Berlin (Nikiforuk, 2010).

2.4.2 Excessive Water Use

After considering water recycling, each barrel of synthetic crude oil regained from oil sands mining requires 2 to 4 barrels of fresh water, and current operational licenses permit companies to collectively extract more than 590 million cubic metres annually, an amount that could serve a city of 3 million inhabitants in one year (Dyer, 2010). A large steam plant operator, Opti-Nexen, that planned to use 2 barrels of steam to produce 1 barrel of bitumen is now using 6 (Nikiforuk, 2010). This growth in water demands increases threats on the local hydrology. In Alberta, most of the water needed for operations comes from the Athabasca River, a river which undergoes seasonal and yearly fluctuations, hence, during low periods mainly in winter, extraction potentially damage aquatic lives (Dyer, 2010). For example, it is a huge threat to waterfowls given that the Athabasca River is one of the most important waterfowl nesting habitats in North America (Woynillowicz, Severson-Baker, and Raynolds, 2005). So according to Alberta Chamber of Resources, water use in mining oil sands projects is one of the top four challenges for the industry (Woynillowicz, Severson-Baker, and Raynolds, 2005).

Though in situ projects require roughly 0.9 barrels of water for each barrel of oil extracted, this amount is still higher than the average 0.1 to 0.3 barrels of water per barrel of oil used in conventional exploitation (Dyer, 2010). However, the waste water produced by in situ projects is not stored in tailing ponds but rather, infused into deep aquifers (Dyer, 2010). The oil and gas industry affirms that in the next 20 years, there will be no alternatives to the current water based technologies (Woynillowicz, Severson-Baker, and Raynolds, 2005). This poses a critical management issue for the government to find the balance between the amount of water demanded for extraction, and that needed to sustain aquatic lives without stress.

2.4.3 Problems of Land Reclamation and Toxic Tailing Ponds

Problems in land reclamation and the presence of toxic tailing ponds are a collective result of disturbances on the landscapes the excessive water use, especially from mining projects. Land reclamation to an original state after development and production has been completed on a particular site is very challenging, as the numbers on the figure below presents.

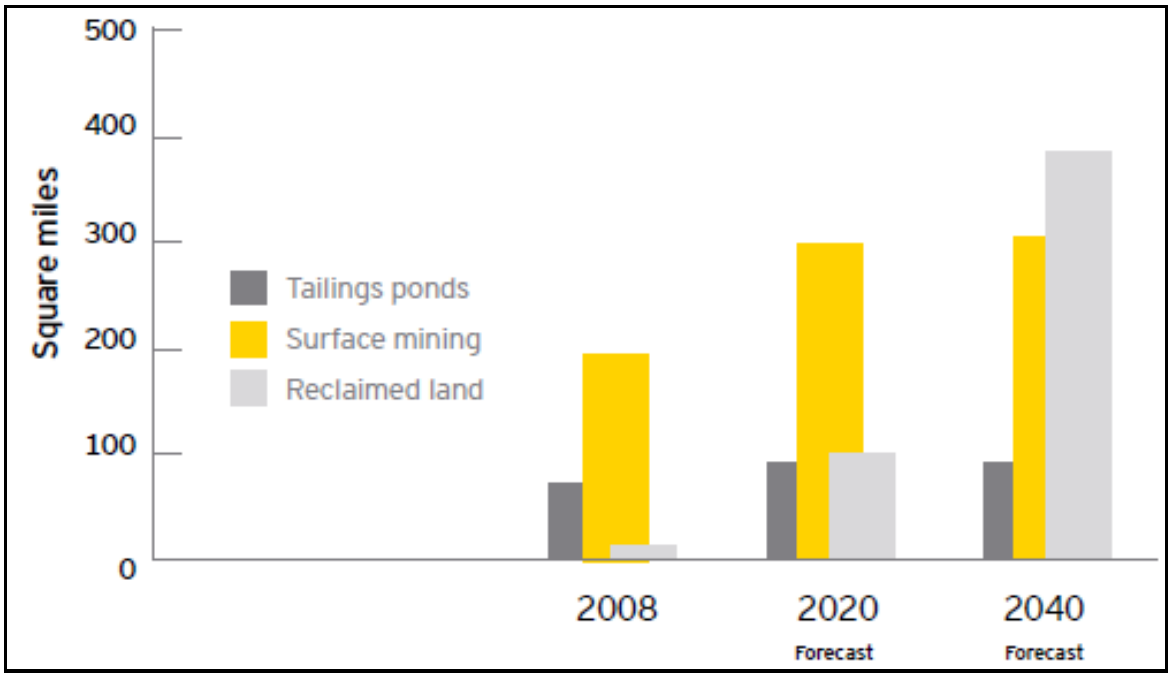

Figure 11: Oil Sand Mining Footprint, Reclamation Progress and Tailing Ponds

Source: Adapted from Munro and Mortlock, 2012

As seen on figure 11, so far, the size of reclaimed land is smaller, relative to the size of land disturbed through mining and tailing ponds, signaling that there is still so much work to be done. Full reclamation of the boreal forest after oil sand exploitation remains a tremendous challenge for the industry, and there are even indications that, original restorations can never be reached. For example, though wetlands cover 40 to 50% of landscapes prior to exploitation, most reclamation do not consider their original state, since the entire landscapes are principally restored to upland forested ecosystem (Dyer, 2009). To enhance reclamation, the Government of Alberta makes it mandatory for oil and gas companies to have a security deposit as guarantee against unforeseen possibilities like bankruptcy. However, some have noted that the securities cannot guarantee long term environmental liabilities, and hence, this policy is under review by the government of Alberta (Dyer, 2009).

In addition, mining projects produce huge amounts of toxic wastes including polycyclic aromatic hydrocarbons, cyanide, arsenic, and naphthenic acids, stored in unstable dykes called tailing ponds that occupy up to 140 km^2 of forest along the Athabasca River (Dyer, 2010; Nikiforuk, 2010). In

2005, tailing ponds covered about 50 km^2 (Woynillowicz, Severson-Baker, and Raynolds, 2005), meaning it has more than doubled. These wastes are toxic to both aquatic lives and human health. In an effort to reduce production cost from waste transportation to landfills, most companies are constructing their own disposal facilities and landfills, an action with long term environmental worries. As an example, it is estimated that between 2005 and 2025, EnCana's Foster Creek SAGD projects will dump roughly 48 million cubic meters of sludge in deep wells, and about 260,000 tonnes of waste on landfill (Woynillowicz, Severson-Baker, and Raynolds, 2005).

The objective of a tailing pond is to permit clay and fine particles to settle at the bottom to form fluid fine tailings, an endeavor which can take up to 150 years depending on the technology used (Woynillowicz, Severson-Baker, and Raynolds, 2005). However, due to its bitumen content and wet nature, the fluid fine tailings cannot be discharged on a reclaimed landscape. Prior to 2009, tailing ponds were even more hazardous because, federal and provincial guidelines for publicizing the amounts of pollutants on the waste sites and for minimizing mining wastes did not become practical until 2009 (Nikiforuk, 2010). Another disturbing issue is the fear of pollutants migrating from tailing ponds into the ground water, surrounding soil, and eventually surface water, which puts the Mackenzie River Basin, the world's third largest watershed, at risk (Dyer, 2010; Nikiforuk, 2010). Though there are known cases of tailing seepages, there is however, no publicly available information reporting the amounts of infiltrations (Dyer, 2010). Notwithstanding, as figure 12 has indicated, land surface occupied by tailing ponds are expected to be fairly constant between 2020 and 2040 because of increasing rates of waste water recycling. This is backed by statistics revealing oil sands producers recycle 80% to 95% of their waste water (CAPP, 2010, p.40), though the projected 310 km^2 of tailing ponds by 2040 would be almost equal the size of Vancouver (Dyer, 2010).

2.4.4 High Emission Intensity

In terms of emissions, oil sands productions produce 3.2 to 4.5 times GHG emissions per barrel, relative to conventional oil extraction in North America (Nikiforuk, 2010). As of 2010, Canada was contributing roughly 2% of total global annual GHG emissions (Munro and Mortlock, 2012), of which, oil sand productions were generating about 7% of this total (Environment Canada, 2012). In oil sands mining, while the production and upgrading needed to obtain synthetic crude oil generates GHG emissions in the range from 62 to 164 kg of CO_2 equivalent per barrel, in situ

projects produce emissions ranging from 99 to 179 kg of CO_2 equivalent per barrel (Charpentier et al., 2009). Adding to this, up to one-fifth of Canada's NG demand is used for boiling water to heat bitumen from oil sands, and when considering the life-cycle analysis, oil sands remain one of the most intensive GHG fuel sources (Nikiforuk, 2010). Ever since oil sands productions became a lucrative business, the Fort McMurray inhabitants and other towns in the oil sands regions, which are home to the aboriginal people like the Métis, have complained about air toxins and acid forming pollutants (Woynillowicz, Severson-Baker, and Raynolds, 2005). This puts their local lifestyle and water bodies at risk. Potentially, acidifying pollutants can travel over long distances, and therefore, the acid fumes generated in oil sands operations in Alberta can restrain efforts to reduce impacts in Eastern Canada (Woynillowicz, Severson-Baker, and Raynolds, 2005). The government of Alberta defines the most common pollutants from burning of hydrocarbons by the Criteria Air Contaminant (CAC). These CACs are contaminants that pose negative effects on human health and the environment. The most predominant pollutants identified include: sulphur dioxide, oxides of nitrogen, volatile organic compounds, and particulate matter (Woynillowicz, Severson-Baker, and Raynolds, 2005). These emissions from oil sand productions are the fastest growing source of emissions in Canada, expected to increase from 48 million tonnes in 2010 to about 104 million tonnes in 2020 if checks are not implemented (Environment Canada, 2012), as seen on the table below.

Table 4: Oil and Gas Sector Emissions by Production Types (Mt CO_2 eq)

	2005	2010	2020	Absolute change (2005-2020)
Natural gas production and processing	**57**	**46**	**44**	**-13**
Conventional oil production	**33**	**29**	**27**	**-6**
Conventional light oil production	10	9	9	-1
Conventional heavy oil production	21	18	15	-6
Frontier oil production	2	2	2	0
Oil sands	**32**	**48**	**104**	**73**

Bitumen in-situ	10	18	55	45
Bitumen mining	9	13	25	16
Bitumen upgrading	14	17	23	9
Oil and natural gas transmission	**16**	**11**	**9**	**-7**
Downstream oil and gas	**22**	**20**	**20**	**-2**
Petroleum products	20	18	18	-2
Natural gas distribution	2	2	2	0
Total	**160**	**154**	**204**	**44**

Source: Environment Canada, 2012

Chapter 3: Review of Related Literature

In this chapter, literatures relating to the subject matter of the thesis are reviewed in a comprehensive and step-wise manner. It begins with the understanding of the UNFCCC and Kyoto Protocol, through Canada's role in the formation of the Protocol, cutting across Canada's commitment to the Protocol, what previous studies say about the thesis research questions, and ending with the Canadian relationship to other environmental agreements.

3.1 The United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol

3.1.1 The UNFCCC

As mentioned in chapter 1.2, the UNFCCC is one of the Multilateral Environmental Agreements that resulted from the Rio Earth Summit which took place at Rio de Janeiro, Brazil, in 1992 (I.L.M 31 [1992], 849) and thus, one of the three Conventions adopted including U.N. Convention on Biological Diversity, and the Convention to Combat Desertification (UNFCCC Secretariat, 2013). Adopted on the 9th of May 1992 at U.N. Headquarters, New York City (in accordance with Art. 20 of the UNFCCC), the Convention entered into force on the 21st of March 1994 (in accordance with Art. 23, Para. 1 of the UNFCCC). The cardinal objectives, congruent with the relevant provisions of the Convention are stated as follows;

"…*stabilization of greenhouse gas concentration in the atmosphere at a level that would prevent dangerous interference with the climatic system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner*" (Art. 2, UNFCCC).

The scientific evidences that led to the development of the UNFCCC, followed by similar evidences at the time the UNFCCC entered into force were not so strong relative to present evidences (UNFCCC Secretariat, 2013). Therefore, the UNFCCC was preeminent since despite the uncertainty, it called on member states to act in the interest of human safety under the Principle of Common but Differentiated Responsibility (Art. 4, Para. 1, UNFCCC). Under the said principle,

the UNFCCC recognizing that industrialized nations have historically produced most of the anthropogenic GHG emissions; charged them to undertake the biggest emissions reduction targets. These developed nations, categorized as Annex I countries and belonging to the OECD, including twelve countries with economies in transition from Central and Eastern Europe, were expected by the year 2000 to reduce their emissions to 1990 levels (UNFCCC Secretariat, 2013). While many, especially the European Union 15 countries, have taken proactive actions registering some successful results, some are still lagging behind (Cleland, Gibbins and Rolfe, 2012, p.2).

Annex II countries on the other hand include the OECD members states and other developed countries charged with the responsibility of providing finance and technological knowhow to the developing country parties of the UNFCCC, to enable them to implement the provisions of the convention (Art. 4, Para. 4 and 5, UNFCCC). All parties to the convention are expected to submit regular reports (in accordance with Art.12) to the Secretariat on efforts made towards reducing their emissions (Art. 4, Para. 1[a], UNFCCC). To this effect, Annex I countries (in accordance with Art.4, Para. 2[a] and 2[b]) are obliged to include detailed descriptions of their climate change policies and measures including annual inventories of GHG emissions (Art. 12, Para. 2[a], UNFCCC). Final reports for 2012 were due on the 15th of April 2014 (Government of Canada, 2010).

The Convention has 195 countries known as parties that have ratified it as of the 30th of April 2014 (UNFCCC Secretariat, 2013). The supreme body of the convention is the Conference of Parties (COP) that acts as coordinator, monitor and regulator of all the affairs of the Convention (Art. 7, Para. 2, UNFCCC), under whose auspice, a protocol to the Convention had to be adopted (Art. 17, Para. 1, UNFCCC).

3.1.2 The Kyoto Protocol

The mandate entrusted to the COP by Art. 17 of the UNFCCC resulted to the drafting of a protocol to the UNFCCC at COP3 on the 11th of December 1997 at Kyoto in Japan, hence the reason for the appellation Kyoto Protocol. In 2001, the criteria for its enforcement were adopted at COP7 at Marrakesh in Morocco, referred to as the "Marrakesh Accords" (UNFCCC Secretariat, 2013). The Protocol entered into force (in accordance with Art. 25, Para. 1 and 3 of the Protocol) on the 16th of February 2005 (I.L.M. 37 [1998], 22). It commits parties to reduce GHG emissions not

controlled by the Montreal Protocol (Art. 2, Para. 1[a] [ii], [vi] and [vii], Kyoto Protocol). So using the Principle of Common but Differentiated Responsibility, the Kyoto Protocol sets binding targets for Annex I countries of the UNFCCC (or Annex B countries to the Protocol), however, with the major burden on the developed country parties. Each Annex B party has an assigned reduction target expressed in terms of allowed emissions or assigned amounts, and divided into Assigned Amount Units (AAUs). To this effect, the following GHGs; Carbon dioxide (CO_2), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), nitrous oxide (N_2O) and sulfur hexafluoride (SF_6) (as indicated under Annex A of the Protocol), had to be reduced to at least 5% below 1990 levels from 2008 to 2012 (Art.3, Para. 1, Kyoto Protocol). Though the protocol advocates that Annex I countries should achieve their targets chiefly according to national measures and circumstances (Art. 2, Para. 1[a], Kyoto Protocol), it however offers additional flexible means for them to fulfill their obligations through three market-based mechanisms which include:

I. International Emissions Trading: Provided by Art. 17 of the Kyoto Protocol, this mechanism makes commercialization of AAUs possible. In essence, emissions trading created a new commodity market that involves trade in CO_2, given that CO_2 is the principal GHG (UNFCCC Secretariat, 2013). Under this mechanism, countries which do not generate up to their permitted amounts of emissions, may sell the spare units to countries that produce more than their assigned emission amounts. Other tradable units under this scheme are; Removal Unit (RMU) from Land Use, Land Use Change and Forestry (LULUCF) projects like reforestation, Emission Reduction Unit (ERU) under Joint Implementation (JI) projects, and Certified Emission Reduction (CER) obtained from Clean Development Mechanism (CDM) engagements (UNFCCC Secretariat, 2013).

II. Clean Development Mechanism (CDM): This mechanism is a provision of Art. 12 of the Kyoto Protocol and through it; CERs are earned when an Annex B Country executes emissions reduction projects in a developing country party. A good example of a CDM project could be rural electrification with solar panels. Each CER is equal to 1 tonne of CO_2 and via this mechanism; international sustainable development and emissions abatement are promoted because the scheme is the first of its kind that provides a standardized emission offset instrument in the form of CER (UNFCCC Secretariat, 2013). The mechanism became functional in 2006 and as of 30th April

2013; it has recorded 6,755 projects, issued 1,307,846,088 CERs for projects and 58,401 CERs for Programme of Activities (UNFCCC Secretariat, 2013). The acknowledgement of CDM projects is done by Appointed National Authorities while the CDM Executive Board guides the mechanism and reports to the parties to the Protocol (UNFCCC Secretariat, 2013).

III. Joint Implementation (JI): Provided by Art. 6 of the Kyoto protocol, the JI allows an Annex B Country to earn ERUs by implementing projects that curb emissions in another Annex B Country, with the aim of achieving emission abatement targets while encouraging foreign investment and technology transfer. A project must be endorsed by the recipient party before commencement, and invitation to take part in the execution is granted by a party involved in the project (Art. 6 Para. 3, Kyoto Protocol). The ability to reduce emissions by sources or enhance removals by sinks determines project credibility based on two procedures called Track 1 and Track 2 procedures. Under Track 1 procedure, a project host party that qualifies to transfer and/or obtain ERUs, could verify if the emission reductions or enhancement of removals resulting from JI projects is an addition that would have occurred had the project not taken place. After such confirmation, the party may issue or obtain the allocated ERUs (UNFCCC Secretariat, 2013). In contrary, Track 2 procedure is a condition where the host country only partially qualifies to transfer and/or obtain ERUs. Consequently, independent accredited committees of the Joint Implementation Supervisory Committee (JISC) verify if the emission reductions or enhancement of removals from JI projects are additions that would have been generated if the project was not carried out. It is only after such verifications that a country could qualify to obtain or issue an ERU (UNFCCC Secretariat, 2013).

Unfortunately, despite the institution of the various mechanisms to help countries meet their reduction targets, the Kyoto Protocol failed to achieve its objectives within the duration from 2008 to 2012 which was of the first commitment period. So it had to be extended. To this effect, on the 8th of December 2012, at the COP 18/Conference of Parties serving as Meeting of Parties to the Kyoto Protocol (CMP) 8 at Doha, Qatar, the Doha Amendment to the Kyoto Protocol was adopted (in accordance with Art. 20 and 21 of the Protocol) by decision 1/CMP8 and includes the following (UNFCCC Secretariat, 2013):

I. New commitments for Annex I countries who concur to carry on with obligations in a second commitment period starting from January 1st 2013 and ending on December 31st 2020 (Art. 1A, Doha Amendment).

II. A revision of the list of GHGs that parties have to report on during the second commitment phase, under which, nitrogen trifluoride (NF_3) has been included to the existing list as the 7th GHG controlled by the Kyoto Protocol (Art. 1B, Doha Amendment).

III. General Amendments of the Kyoto Protocol especially articles that make reference to the first commitment period, require updates to reflect the second commitment period.

According to the Amendment, the new objective of the Kyoto Protocol is that, parties should achieve an 18% cut in anthropogenic GHGs below 1990 levels from 2013 to 2020 (Art. 1C, Doha Amendment). The amendment was circulated on the 21st of December 2012 (by the Secretary General of the United Nations serving as Depositary), to all Parties of the Kyoto Protocol (in accordance with Art. 20 and 21 of the Protocol). 66 countries have ratified the Treaty as 18 July 2016.

In conclusion, it remains very uncertain if the second commitment period will be successful especially as leading global economic players like the United States of America (USA) and China, including fast emerging economies like Brazil and India, were not committed to the first phase (Environment Canada, 2011). In addition, the mentioned countries along with Russia, New Zealand, and Japan are not willing to participate under mandatory obligations in the second commitment period. And with key players like Canada abandoning their commitment, the uncertainty surrounding the future of the Kyoto Protocol grows wider. Only time will reveal how successful this endeavor will be.

3.2. Canada versus the UNFCCC and the Kyoto Protocol

After providing an overview of the UNFCCC and the Kyoto Protocol, it is imperative now to shed light on how Canada contributed in their formation and also how the country was committed to the protocol.

3.2.1. The Role Played by Canada in the Formulation of the Kyoto Protocol

The Toronto Conference on the Changing Atmosphere that held from the 27th to the 30th of June 1988 likened climate change threats as *"second only to a global nuclear war"* and advocated a 20% decrease in GHG emissions by 2005 (Cleland, Gibbins & Rolfe, 2012). This conference was the precursor of the Rio Summit of 1992. So noting that Canada has a good history of championing agreements to resolve environmental pollutions (Government of Canada, 2010; Flannery, 2009), the Canadian government, through the UN treaty discussions, helped formulate the Kyoto Protocol and its controlled GHGs (Tellus Institute et al., 2002). Before the Kyoto Meeting, in 1990, the Government of the then Conservative Prime Minister Brian Mulronney, delivered the Canadian *Green Plan for a Healthy Environment (Green Plan)* to serve as a blueprint of Canada's environmental policy for the next five years, with the objective of stabilizing GHG emissions to 1990 levels by 2000 (Yam, 2013). So in 1997, the Liberal Prime Minister Jean Chrétien after launching various voluntary reduction schemes involving mainly large industrial polluters in 1993 proclaimed that Canada would have a committed GHG amount at Kyoto, an action which is believed to have encouraged other countries (Yam, 2013).

3.2.2 The Canadian Commitment under Kyoto Protocol and its Level of Success

Being one of the first countries to show commitment, Canada signed the Kyoto Protocol on the 29th of April 1998 and ratified it on the 17th of December 2002, with the commitment to reduce its GHG emissions by 6% below 1990 amounts from 2008 to 2012 (Government of Canada, 2010). The Canadian Federal, Provincial and Territorial Government leaders resorted to working together in an effort to achieve this goal. This was why the Federal, Provincial and Territorial Joint Ministers of Energy and Environment accepted, under the supervision of First Ministers, to set-up national criteria for assessing the impacts, costs and benefits of enforcing the Canadian Kyoto Protocol Commitments and the different possible implementation alternatives (Health Canada, 2007). Principal to this course of action was the formulation of 16 Issue Tables in 1998, covering a diverse range of challenging issues like transportation, energy and municipal development by 450 experts from academic, industrial, governmental and non-governmental organizations (Health Canada, 2007). It led to the establishment of the Climate Change Action Fund (CCAF) by the Government of Canada to dispense 150 million CAD over three years in support of the Issue Tables and other initiatives geared towards achieving the Canadian Kyoto Protocol goals. These

developments resulted to the creation of the First National Climate Change Business Plan (FNBP) in October 2000, and the Action Plan 2000 as the Federal Government's share to the FNBP, allocating 500 million CAD over five years for particular GHG abatement projects (Health Canada, 2007).

Ensuing were other national plans to help Canada achieve its Kyoto Protocol Commitments outlined here based on news reports (CBC News, 2007), otherwise sources are stated.

With its 21st of November 2002 Climate Change Plan, the Canadian Government was dedicated to curtail its GHG emissions by 240 million tonnes annually by the end of 2012 through a combination of tax remedies, regulations, and other carrot policies. Consequently, on the 12th of August 2003, an additional 1 billion CAD budgeted by the Federal Government to its Climate Change Plan to motivate consumers and industries with incentives, augmented total federal spending on the Kyoto Protocol to 3.7 billion CAD. The Canadian Government further introduced the *"One Tonne Challenge"* on the 26th of March 2004, soliciting all its citizens to reduce their GHG emissions annually by one tonne, through utilizing more public transportation means instead of private cars, using thermostats that could be programmed, and composting food residue. In January 2005, the Canadian Government declared intensions to revive its 2002 Kyoto plans. In addition, the Federal Government and car manufacturers reached a consensus on emission standards on the 23rd of March 2005 as part of the action plan, agreeing that 5.3 mega tonnes of emissions should be curbed through the use of new automobiles with more efficient fuel systems.

Later, the government published details on how to achieve its Kyoto Target on the 13th of April 2005, pledging 10 billion CAD to abate GHGs annually by 270 mega tonnes from 2008 to 2012, while reducing pressure on large industrial emitters. This prompted action from a Yukon Environmental Group requesting that, rather than the government consulting with large industries responsible for about 50% of Canada's GHGs; they should force them to reduce their emissions, especially in the oil and gas sector. In reacting to the above, on the 03rd of November 2005, the Provincial Government of Alberta, the hub of the Canadian Oil and Gas Industry, submitted a formal objection to the Federal Government's intention of adopting Kyoto Protocol Commitments, stating that it would hinder progress in the Provincial Oil and Gas Sector. So, the then Environment Minister of the Province Guy Boutilier, suggested that Alberta should be in position to adopt its

own mitigation strategies. However, in November 2005, Canadian corporate leaders wrote a letter to the Prime Minister at the time, Paul Martins, with an opening paragraph as follows:

"As corporate leaders representing a broad cross section of the Canadian economy, we believe that all governments, corporations, consumers and citizens have responsibilities under the Kyoto Protocol and that the world must act urgently to stabilize the accumulation of greenhouse gases in the atmosphere and minimize the global impacts of climate change" (Canadian Executive Forum on Climate Change, 2005 cited by Vincent, 2007). All these differences initiated an uncertain future for Canada's Kyoto Protocol Commitments.

The future of the commitments witnessed the most serious initial downplay with the coming to power of the Conservative Government in January 2006. It was worsen by the fact that, by the 16th of February 2005 when the Kyoto Protocol entered into force, the Liberal Government that ratified the Protocol, had not revealed concrete details of how it planned to meet the Kyoto Protocol Target. Despite the various plans to mitigate its GHG emissions, details for their implementation that would meet the Kyoto Target were released only on the 13th of April 2005, already three years after ratification by Canada, and two months after the Protocol had entered into force. More so, on the 6th of April 2005, an effort made by the Liberal Government to offer the Kyoto Protocol a place in its budget bill, had been blocked by the opposition Conservatives, preventing GHGs from becoming controlled substances to be regulated by the Federal Government. This explains why in their first budget on the 2nd of May 2006, the Conservatives failed to make allocations for the Kyoto Protocol. Preferably, they insisted on adopting a more Canadian oriented climate change mitigation plan, which would cost 2 billion CAD over five years, simply sidelining the Kyoto Protocol. Again, in October 2006, there was no reference to the Kyoto Protocol in their announcement to introduce the Clean Air Act, although, on the 31st of March 2006, Rona Ambrose the then Environment Minister, had revealed that, Canada's GHG emissions since ratifying the Protocol, were up by 24%, meaning four times more than the original 6% reduction commitment, in a span of just four years. This was given as a justification for Canada's decision to embark on a rather national than global action plan against GHGs. The plan was partly to encourage public transportation means through tax reductions on monthly transit tickets, and raising the ethanol content in gasoline and diesel fuel to 5% by 2010. To further demonstrate denial of the Kyoto Protocol, Ambrose commended the Asia-Pacific Partnership Voluntary Pact on Clean

Development and Climate, a substitute for the Kyoto Protocol, championed by the United States, Japan, South Korea, Australia, China and India. This pact encouraged voluntary rather than binding targets, and the development of clean energy technologies in the fight against climate change. To make matters worse, on the 5th of April 2006, the Natural Resource Minister Gary Lunn informed that the Federal Government has slashed finances for many programs against climate change. Affected were the *"one Tonne Challenge"*, 40 public information bureaus, and many science and research institutes working on climate change. Consequently, on the 28th of September 2006, the Environment Commissioner communicated that Canada would not be able to deliver its Kyoto Protocol Commitments and called on the Government to adopt a more realistic objective. In an attempt to remedy the fear, on the 10th of October 2006, the government announced plans to adopt a "*made-in-Canada"* program, plus the Clean Air Act to enforce strict controls on smog emitting firms. To offer more hope, on the 2nd of December 2006, the newly elected Liberal Leader, Stéphane Dion, a resolute advocator of the Kyoto Protocol declared intensions to concentrate on environmental problems. On the 8th of February 2007, the then Liberal Environment Minister John Baird said, legislations as part of the Conservative Clean Air Act would be enacted from January 2010, reaffirming that, there was no way for Canada to achieve the promise it made to the Kyoto Protocol. Still in an attempt to fix the uncertainty, the Federal Government implemented the Energy Efficiency Act on the 1st of April 2007 to minimize energy consumption from electronic equipments and enhance energy efficiency on buildings through installing tighter doors and windows (Government of Canada, 2010). In May 2007, Environment Canada, Transport Canada, and the Railway Association, reached a Memorandum of Understanding to set emission caps for different rail services (Government of Canada, 2010). At the same time, through the International Civil Aviation Organization, the government introduced emission standards for new carriers to be ready by 2013, and joined forces with the International Maritime Organization to redress emissions from international shipping activities (Government of Canada, 2010). The government also developed a couple of policies to aid the renewable energy sector under the ecoACTION Investments including ecoAGRICULTURE Biofuels Capital Initiative, ecoENERGY Initiatives, and ecoTRANSPORT Initiatives (Government of Canada, 2010).

Finally, on the 29th of January 2010, the Federal Government pledged commitment to a non-binding target during the COP15/CMP5 at Copenhagen in Denmark, to diminish its emissions by

17% below 2005 amounts before 2020 (Government of Canada, 2010). This promise was formally recounted a year later at the COP16/CMP6 in Cancun, Mexico, and on the 15th of December 2011; Canada officially filed a withdrawal notification from the Kyoto Protocol during the COP17/CMP7 at Durban in South Africa, which took effect on the 15th of December 2012 (Yam, 2013). The legal foundation for Canada's withdrawal is provided by Art. 27 of the Kyoto Protocol which states as follows (I.L.M. 37 [1998], 22):

"1. At any time after three years from the date on which this Protocol has entered into force for a Party, that Party may withdraw from this Protocol by giving written notification to the Depositary.

2. Any such withdrawal shall take effect upon expiry of one year from the date of receipt by the Depositary of the notification of withdrawal, or on such later date as may be specified in the notification of withdrawal.

3. Any Party that withdraws from the Convention shall be considered as also having withdrawn from this Protocol."

Nevertheless, Canada is still a party to the UNFCCC and therefore, it will continue to take part in collaborative discussions on global climate change under the UNFCCC (Environment Canada, 2012; Yam, 2013). This is however a matter of uncertainty.

3.2.3 Canada's Emission Profile from 1990 to the Time of Withdrawal

As seen in 3.2.2, despite the endeavors some advocates made to force Canada to keep to its commitments, Canada could not reach its target. For a better comprehension of the degree of success, the emissions profile of Canada from 1990 to the time of withdrawal is reviewed based on data as provided by Environment Canada (2013). Otherwise, any other sources are stated.

Firstly, it is important to understand that the emission profile of Canada is necessary because Canada is a significant global producer and consumer of fossil fuels. However, like for other developed countries, Canada's relative contribution to total global GHGs are expected to decline given that emissions from emerging economies like China and India are increasing more rapidly than those from developed countries. A good example is the fact that, China with its 20% contribution in 2005, overtook USA as the largest GHG emitter and by 2020; China's contributions are expected to account for 27% of global totals (Environment Canada, 2011).

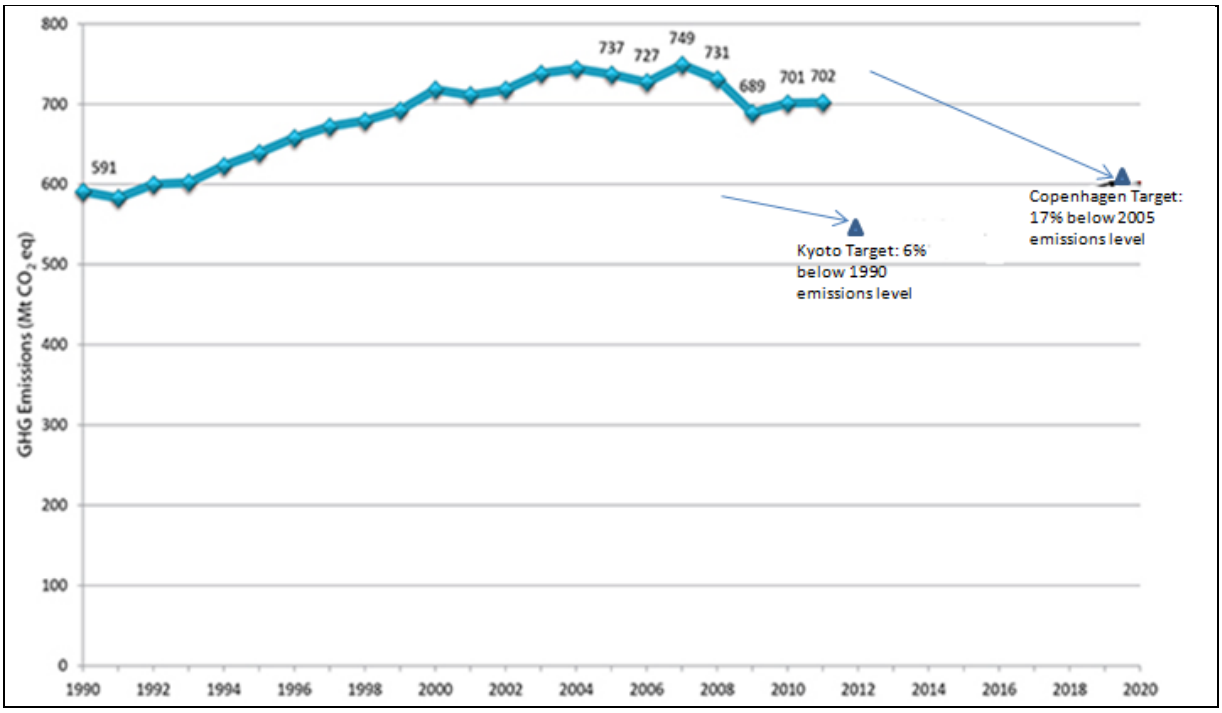

Figure 12: Canada's Emission Levels, 1990-2011 and the Copenhagen Target

Source: Adapted from Environment Canada (2013)

Figure 12 clearly shows that GHG emissions in Canada stood at 591 mega tonnes of carbon dioxide equivalent (Mt CO_2 eq) in 1990 and 702 Mt CO_2 eq by the end of 2011. So put simply, before withdrawal from the Kyoto Protocol and relative to its 1990 level, Canada released 111 Mt CO_2 eq or about 18.8% more GHGs. And noting that Canada's Kyoto target was 6% (35.46 Mt CO_2 eq) below its 1990 level (591 Mt CO_2 eq) regrettably means that, the increase in emissions by 2011 was slightly three times above Canada's pre-supposed 6% reduction target. Nevertheless, figure 12 also shows that emissions from 2000 and above did not have a steady increase profile like in the 1990s. Rather, there were periodical significant falls. These changes in the 2000 trends are linked to increases in efficiency, novelty in industrial techniques, and structural adjustments in the constitution of the economy as a result of the various action plans presented in chapter 3.2.2. Besides the various plans, the sharp fall in emissions from 2007 to 2009 was also partially due to the global recession at that time, which halted production activities and hence GHG emissions.

The 17% (125.29 Mt CO_2 eq) below 2005 level (737 Mt CO_2 eq) by 2020 is based on the future outcomes of changes in crucial economic and energy aspects like oil prices, GDP, and increase in

population, coupled with the uncertain impacts of future government actions. Important is the fact that, changes in any of the economic and energy driving factors will be subjected to unknown degrees of uncertainties. However, besides some of the action plans already indicated, to reach the 2020 target, the Canadian Government aims at concentrating more on its largest emission sectors, which are, transportation and electricity generation, after the oil and gas industry.

To this effect, in 2010, the federal government announced the *Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations.* In line with those in the USA, the regulations aim at establishing continuous and more rigorous GHG emission codes for new passenger vehicles and light trucks produced from 2011 to 2016. With these new codes, average GHG emissions from new vehicles manufactured during these years are expected to fall by 25% relative to automobiles bought in 2008. Adding to this, the Federal Government, in April 2012, broadcasted proposed methods to reduce GHG emissions from new on-road heavy-duty-vehicles, short and long duration tractors, heavy automobiles for cement transportation, refuse disposal trucks, buses and large pick-up trucks, starting from the 2014 model year and above.

In August 2011, the Federal Government announced regulations for the coal-fired electricity sector. These regulations set tougher operational standards for new coal-fired plants and equally for those that have exhausted their economic life on grounds with the objective that, a progressive phase-out of old coal-fired utilities will significantly reduce emissions. The Government of Canada also has intentions of introducing new regulations in other important sectors including oil and gas, until Canada reaches its Copenhagen target. In July 2011, Environment Canada published Canada's emission trends and according to the report, Canada has already achieved about one-quarter of its Copenhagen 2020 commitment. The Federal Government has also aired its dedication to continue to produce updates of the report, in order to guarantee transparency in its fight against GHG emissions as the country strives to realize the 2020 target.

The efficiency increases, technological and structural adjustments brought by implementation of various action plans have led to a steady decline in the link between gross domestic product (GDP) growths and emissions generation. Consequently, there has been on average, an annual 2% reduction in GHG emissions per unit GDP (GHG intensity of the economy) since 1996, which has

facilitated a disconnection between economic growth and emissions production in Canada as seen on figure 13 below. The figure does not include inflation adjustments.

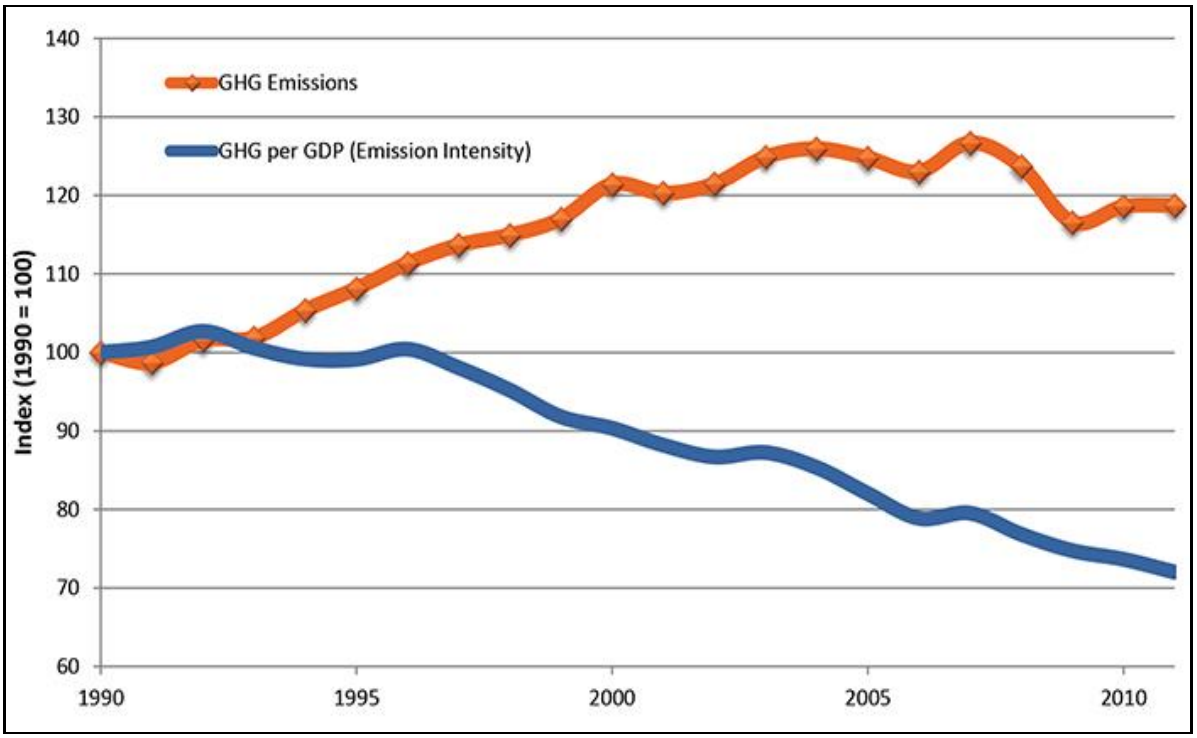

Figure 13: GHG Emissions and GHG Intensity, 1990-2011

Source: Environment Canada (2013)

On the per capita dimension, peak emissions were registered from 2000 to 2003 as shown on figure 14, with the highest amount of 23.4 tonnes registered in 2000. This shows that though GHG emissions are still high, in relation to GDP growth, they are reducing especially when compared to 1990 levels. A complete disconnection between GDP growth and emissions generation is a very daunting challenge. Figure 14 on the next page presents per capita emissions in Canada from 1990-2011.

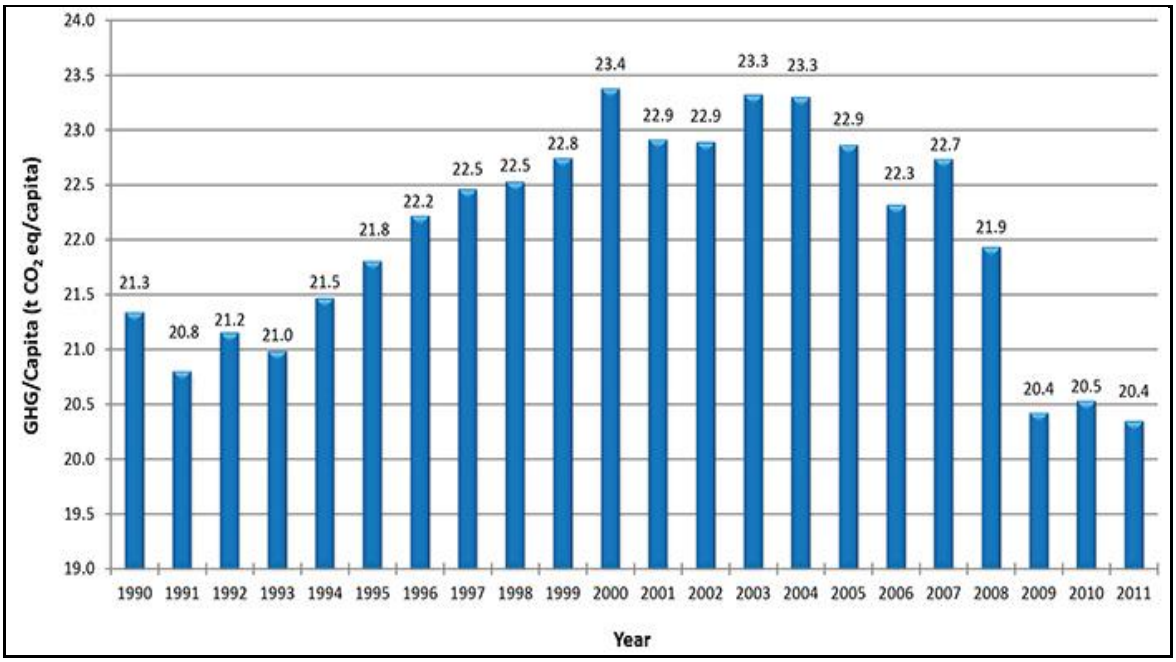

Figure 14: Canada's per Capita Emissions, 1990-2011

Source: Environment Canada (2013)

As seen on figure 14, while Canada generated 21.3 tonnes of GHG per capita in 1990, in 2005 the amount rose to 22.9 tonnes, and dropped to 20.4 tonnes by 2011. Though Canada's annual emissions make up just about 2% of yearly global totals, its emissions per head is amongst the greatest, mostly due the large size of the country characterized by a climate-driven energy demand with an economy depending extensively on fossil fuel resources. CO_2 dominates greatly as table 5 shows. Some numbers in table 5 might not add exactly due to round-off effects.

As seen from table 5 on the next page, CO_2 is followed by CH_4 and then N_2O in terms of quantity of GHG generated. HFCs, PFCs and SF_6 combined, make up relatively small emission amounts. Table 6 also shows that the bulk of these emissions are from the oil and gas sector. Some numbers in table 6 might not sum up exactly due to round-off effects.

Table 5: Canada's Emission Levels by Types of GHGs, 1990-2011 (Mt of CO2 eq)

GHGs/Years	1990	2000	2005	2007	2008	2009	2010	2011
National GHG totals	591	718	737	749	731	689	701	702
CO_2	459	565	579	595	577	542	554	556
CH_4	72	94	98	96	94	91	90	91
N_2O	49	49	50	49	52	47	47	46
HFCs, PFCs, SF_6	11	10	10	8	9	9	9	9

Source: Environment Canada (2013)

Table 6: Canada's GHG Emissions by Economic Sectors, 1990-2011 (Mt CO2 eq)

GHGs/Years	1990	2000	2005	2007	2008	2009	2010	2011
National GHG totals	591	718	737	749	731	689	701	702
Oil and gas	101	150	162	170	164	162	164	163
Electricity	94	129	121	120	112	97	99	90
Transportation	128	155	168	169	166	163	167	170
Emission intensive and trade exposed industries	93	85	87	89	86	74	75	78
Buildings	70	82	84	84	83	82	79	84
Agriculture	54	66	68	69	71	67	69	68
Waste and others	50	51	49	48	49	46	48	49

Source: Environment Canada (2013)

Table 6 shows that while the oil and gas sector, after the transport industry, is responsible for most of Canada's GHGs, waste and others (light manufacturing, construction, and forest resources)

collectively produce the smallest share. Emissions from intensive and trade exposed industries include those from mining processes not involving oil and gas, smelting and refining, and the manufacture of products like paper, pulp, and cement.

On a territorial basis, in 2011, all Canadian Provinces witnessed a general increase in emissions owing to the rise in industrial product demands relative to 2010. While the province of Ontario was the largest emitter in 1990, by 2011, Alberta had become the biggest emission producer, a situation pinned to Alberta's position as the oil and gas production hub of Canada. The emission decline in Ontario was also because coal stations were shut down, resulting to emissions reduction by 4.8 mega tonnes (24%) in its electricity sector. A look at figure 15 enhances a better understanding of the territorial situation.

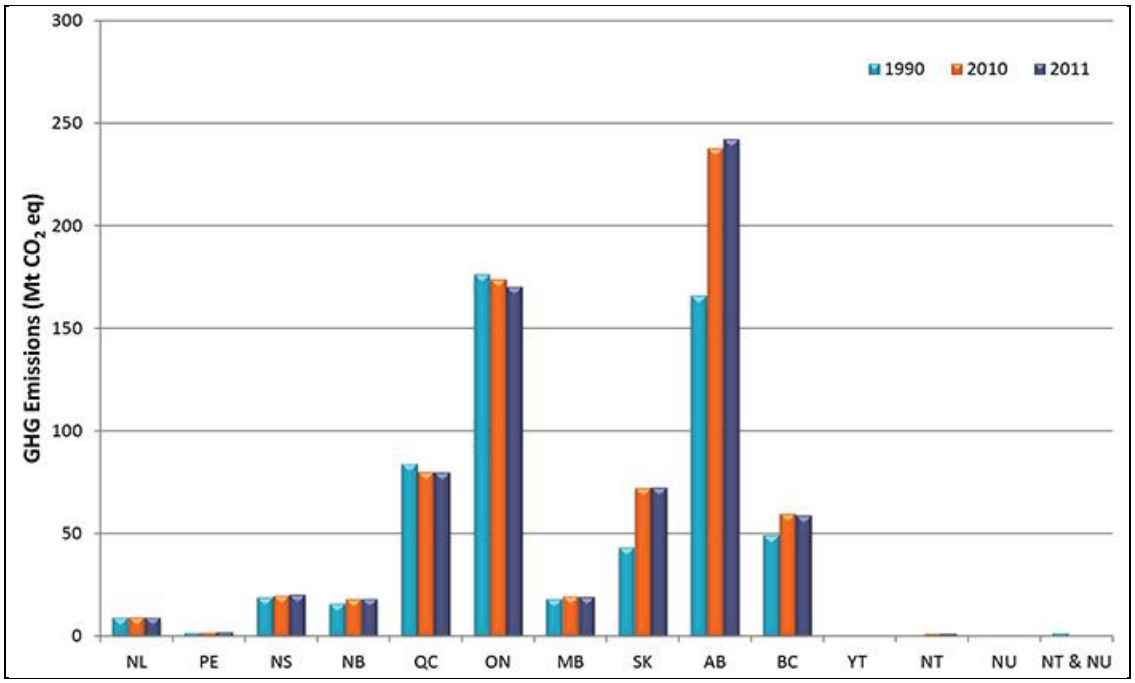

Figure 15: Canada's GHG Emissions by Province

Source: Environment Canada (2013)

A transcription of the numbers on figure 15 is that in 2011, emissions from Alberta (AB) and Ontario (ON) generated 59% (35% and 24% respectively) of Canada's 702 Mega tonnes total. The hydroelectric dependent provinces of Quebec (QC) and British Columbia (BC) maintain fairly high but relatively stable emission profiles. Saskatchewan (SK) shows an increase in

emission due to the presence of oil and gas industries, including potash and uranium mining which collectively increased emissions by 67% between 1990 and 2011. Finally, emissions from the provinces of Newfoundland (NL), Nova Scotia (NS), New Brunswick (NB), Prince Edward Island (PE) and Manitoba (MB) remain at fairly low constants due to limited oil and gas and mining activities. Contributions from the three territories – Yukon (YT), North West Territories (NT), and Nunavut (NU) remain always minimal due to the absence of oil and gas explorations and the relatively small population size of the area, which is responsible for the absence of significant emissions generating and related activities.

In conclusion, Canada made good attempts to reach its Kyoto obligations. However, the attempts were not sufficient as has been proven by the failure. GHG emissions by the time of withdrawal had increased markedly with the greatest contributions from the oil and gas rich state of Alberta followed by Ontario. And despite the fact that in 2000, emissions showed lower rates of increase in relation to the 1990s, reaching its Copenhagen Target will require Canada to implement more strict actions against emissions.

3.3 On why Canada Withdrew from the Kyoto Protocol

There are several reasons that have been forwarded for Canada's withdrawal, nationally and internationally. They range from financial as the most significant at the national level, through environmental, to political reasons as most significant at the international level.

3.3.1 The Financial and Economic View Point

Financially, meeting the Kyoto target would have required Canada to buy large amounts of emission credits that would have cost the government up to 14 billion CAD or 1,600 CAD from each family; an amount neither the government nor its citizens were ready to spend (Carrington and Vaughan, 2011). Economically, purchase of any such credits would have been tantamount to compromising investments on national priorities, even including domestic environmental issues (Environment Canada, 2012). According to the former Canadian Environment Minister, Peter Kent, meeting the target would have required either taking away all cars from Canadian roads or shutting down the farming and agricultural sector, and cutting heat supply to homes, offices, hospitals, and office complexes, an action which would have had devastating economic consequences (Vaughan, 2011).

3.3.2 The Environmental Perspective

From the environmental side, the Canadian Government believes the Kyoto Protocol has failed to serve its purpose of providing a fair and comprehensive measure for targeting global climate change since it does not adequately cover major economies like the USA, which is responsible for 20% of the global GHG emissions (Environment Canada, 2013). Other major emitters not covered by the Kyoto Protocol include China, Brazil and India who together with USA, account for 40% of total global GHG emissions (Environment Canada, 2011). For the Canadian Government, it was unfair for the Protocol to cover nations whose sum total account for only 27% of global GHG emissions, while the major emitters carried on with their massive emission rates (Environment Canada, 2011).

In addition, while some believe that an emission trading is the single most important policy tool for redressing climate change, others assert this instrument is popular only in parts of Europe and few North American states like the Canadian province of British Columbia (Cleland, Gibbins and Rolfe, 2012). More so, the steady decline in Canada's emissions per unit of gross domestic product (GDP) or emissions intensity from 1990 onwards, must have been consoling enough for the government to quit the Kyoto Protocol and focus on a rather Canadian based emission reduction strategy with the notion that, it could better promote a disconnection between economic growth and emissions generation (Cleland, Gibbins and Rolfe, 2012).

3.3.3 The Political Influence

Politically, the refusal from USA in March 2001 to ratify the Kyoto Protocol coupled with their launching of the "Clean Skies Initiative" to target acid rain rather than specific GHGs as the Kyoto Protocol did, were considered uncomfortable political moves by the Canadian Government especially as USA is Canada's biggest trading partner (CBC News, 2007). With USA accounting for up to 75% of Canada's export, Canada's fear, that enacting stringent measures to meet its Kyoto commitments might result in the Canadian dollar losing its value to the American Dollar, was a hard political stand for the Canadian Government (Petz, 2011).

3.4 About the Effects of the Withdrawal and its Impacts on the Canadian Oil and Gas Industry

3.4.1 The Loss of Status as a Lead Country in International Collaborations

The withdrawal paints a controversial picture of the former Conservative Canadian Government both at home and abroad regarding international collaborations in the fight against climate change. At home, while many describe the action as *"shameful"* and *"a total abdication of responsibilities"*, Warren Mabee, director of the Queen's Institute for Energy and Environmental Policy in Ontario, says *"Our economy is becoming ever more dependent upon the riches of the oil sands and other energy products. Ultimately, either we'll run out (of these fossil fuels) or the world will decide that it doesn't want them anymore. The latter option is much more likely"* (Carrington and Vaughan, 2011). Mike Hudema of Green Peace Canada adds that *"The Harper government is more concerned about protecting polluters than people,"*, and Hanna McKinnon of Climate Action Network Canada commends it is *"a total abdication of our responsibilities"* (Carrington and Vaughan, 2011).

On the international platform, while the U.N. Climate Chief Christiana Figueres regrets Canada's action and timing, and affirms that it is a moral duty for Canada to lead global collaborations, China, on agreeing to non-binding commitments at Durban, calls Canada's decision *"preposterous"* and considers it *"an excuse to shirk responsibility"* in the fight against climate change (Carrington and Vaughan, 2011). India believes Canada's action could endanger efforts made at Durban and Ian Fry, a climate official from Tuvalu, one of the small South Pacific Island nations most threatened by rising sea levels notes *It's an act of sabotage on our future, a reckless and totally irresponsible act"* (Carrington and Vaughan, 2011). And while Japan calls it *"disappointing"*, Liu Weimin, a former Chinese Foreign Ministry Spokesperson further states that *"It flies in the face of the efforts of the international community for Canada to leave the Kyoto protocol at a time when the Durban meeting made important progress by securing a second phase of commitment"* (Carrington and Vaughan, 2011).

3.4.2 The Creation of a Fundamental Challenge in Environmental Performance

The withdrawal is believed to have created a fundamental challenge for Canada since the government now finds itself on a more difficult position on how to curtail GHG emissions without compromising benefits on the national economy made possible by the lucrative western Canadian oil and gas exploitation (Cleland, Gibbins and Rolfe, 2012). On this, while some say the actions of the oil and gas industry just need to be restrained, others hold exploitation should be shut down completely, which is rather an over simplistic reaction.

3.4.3 Distortions in Subsidies to Oil and Gas Companies

Subsidies to oil and gas consignments have been affected. When the federal government proclaimed it was going to ratify the Kyoto Protocol and reduce its GHG emissions, it was however, still disbursing huge financial subsidies to the oil and gas industry of up to CAD 1,446 million in 2002 (Taylor, Bramley and Winfield, 2013). Because of the subsidies, the industry was under a general low taxation scheme, high tax concessions for tar sands, and big gains for oil and gas companies (Taylor, Bramley and Winfield, 2013). Following the withdrawal from the Kyoto Protocol, the Canadian Federal Government has witnessed increased amounts of pressure from environmental watch groups to stop subsidizing the oil and gas industry otherwise; GHG emissions from tar sands will triple from 33 million to 100 million tonnes between 2005 and 2020, which will outstrip any abatement made elsewhere in the economy (Petz, 2011).

3.5 Canada and Other Environmental Commitments and Treaties

This chapter presents a quick glance of the Canadian relationship and commitment to other International Environmental Treaties and Agendas.

First, Canada is party to the Montreal Protocol on substances that deplete the Ozone Layer, signed at Montreal in Canada, on 16th March, 1987. The protocol official forbid use of chlorofluorocarbons (CFCs) in developed countries by 1995 and everywhere else by 2010 (I.L.M. 26 (1987), 1550). The Vienna Convention for the Protection of the Ozone Layer (I.L.M. 26 (1987), 1529) preceded the Montreal Protocol and did not specify binding targets, just like the UNFCCC preceded the Kyoto Protocol without stipulating legally binding targets. Similar to the Kyoto Protocol, the Montreal Protocol sets legally binding targets within a given time frame. On almost every judgment, the Montreal Protocol has been successful by achieving a very drastic reduction

in ozone depleting substances with its attainment of universal ratification (Cleland, Gibbins & Rolfe, 2012).

Secondly, within Canada, the Federal Government is investing in efforts that help Canadians to adapt to climate change challenges. The 2011 budget allocated CAD 148.8 million from 2011 to 2016 to enhance federal programs to improve on knowledge and awareness of climate change and to help Canadians be ready for climate change related impacts (Environment Canada, 2012). The funding gives priority to crucial sectors like community health, economy, and will also accelerate conclusions on climate change, based on concrete scientific findings to buttress decision making on adaptation policies, especially for Northern Canada.

Furthermore, Canada is collaborating with other international partners out of the formal United Nations Agreements, in a process that gathers small groups of countries to approach targeted issues through a more manageable mechanism that should achieve more appropriate results (Environment Canada, 2012). The attempts include actions under the canopy of Group of 8 Countries (G8), Group of 20 Countries (G20) and Major Economies Forum on Energy and Climate Change. The country is also aiding international efforts by donating USD 1.2 billion in new and supplementary climate change financing by the end of the fiscal year 2012/2013 to help developing countries in their efforts to reduce their GHG emissions and adapt to climate change related impacts (Environment Canada, 2012).

In addition, Canada is party to agreements on the following: Air Pollution, Air Pollution - Nitrogen Oxide, Antarctic-Environmental Protocol, Hazardous Waste, Law of the Sea, Endangered Species, Biodiversity, Marine Dumping, Ship Pollution, Tropical Timber 94, Environmental Modification, Tropical Timber 83, Antarctic Treaty, Desertification, Marine Life Conservation, Antarctic Seals, Air Pollution-Sulphur 94, Air Pollution-Sulphur 85, Air Pollution-Persistent Organic Pollutants, Antarctic Environmental Protocol, and Antarctic Marine Living Resources (U.S. EIA, 2012).

4.0 Research Method and Relevant Theoretical Frameworks

This chapter explains how research has been conducted to answer the thesis research questions. To begin with, it defines different qualitative research methods, followed by the choice of method used in the thesis.

4.1 Defining Qualitative Research Method

Qualitative research has long been embedded in social sciences, and has always been necessary for scientists because it grants the possibility to study human behavior and human interactions within social environments (Hancock, 1998). It involves using various materials, interviews, life stories and personal experiences, case studies, visual texts, in order to describe and understand people and their environment (Denzin and Lincoln, 2000). It does not only describe events, the experiences of people and opinions, but also makes use of inductive reasoning to establish possible theories that explain the occurrences (Hancock, 1998; Dezin and Lincoln, 2000; Gomman and Clayton, 2005). The main aim of a qualitative research method is to compile and evaluate information regarding opinions, beliefs, or attitudes of people within their social environment (Hancock, 1998). Qualitative research can be carried out in numerous ways depending on the nature of the study, or the objectives and goals of the investigation. Generally, there are four popularly used qualitative research methods, which include: the case study approach, ethnography, grounded theory, and phenomenology (Hancock 1998).

The case study approach is mostly used by social scientists to examine a current phenomenon within its real life context (Gomman and Clayton, 2005). Ethnography, on the other hand, involves studying people and their culture within their societies (Creswell, 2002). Originally from the discipline of anthropology, ethnography includes, but is not limited to, fieldwork, observation of participants, and interviews (Denzin and Lincoln, 2000). Phenomenological research methods involve the study of phenomena, which can be made of the experiences of people, their perceptions of the world, events, situations, and concepts (Hancock, 1998). The grounded theory approach involves the simultaneous collection and analysis of data. Studies that use the grounded theory generally start by asking questions that aim to guide the intentions of the research. The data collection process is characterized by the identification of theoretical concepts, and the

development of linkages between these concepts and the data (Gomman and Clayton, 2005). An important procedure for analysis in grounded theory approach is coding because it provides a process for organizing and classifying data into concepts and themes, which permits the researcher to comprehend analytical patterns within the data, for more accurate data analysis (Gomman and Clayton, 2005). In environmental sciences for example, qualitative research methods help environmental scientists and resource managers to analyze, determine, and describe spatial and temporary patterns in their environment, and how humans shape those patterns and vice versa.

4.2. The Research Method Applied in the Study and Justification

The research is principally secondary in structure with a systematic in-depth collection and synthesis of relevant data from text books, peer-reviewed journal articles, government and non-government institutions, and adopts the case study research approach because it is important in achieving the aim of the thesis. Especially, conflicting evidences are highlighted and justified, so as to enhance clearer comprehension of the subject matter. One good thing about the case study approach is that, it enables the researcher to ask questions that produce answers to solve problems in social sciences (Stake, 2000). There are six major conventional steps in designing a case study research which include: definition of research questions, case study selection, data collection, analyzes, evaluation of data, and reporting of the research results (Stake, 2000). This research makes use of these systematic steps.

The thesis analyses the empirical review under the review of related literature. This empirical review had been analyzed using the reconstructive and interpretative analytical method within the scope of the Rational Choice Theory and Public Choice Theory. These theoretical frameworks have not been dealt with under the literature review because they aim to guide conclusions. This also justifies why the empirical review is relatively longer than the analysis and conclusion. The intention was to present an exhaustive empirical review to facilitate an unbias analysis before making any conclusions. This also explains the apodictic tendency of the thesis, as conclusions were predominantly deduced from the analysis of the lengthy empirical review.

Though the entire thesis adopts the case study approach as its qualitative method, the research questions on the rationale for Canada's withdrawal from the Kyoto Protocol has been analyzed through a reconstructive and interpretative analytical method, under the two aforementioned theoretical frameworks. Reconstructive analysis has also been used in presenting the review from related literature. Reconstructive analysis involves the principles from universal pragmatics and critical theory, however with knowledge from hermeneutics and structuralism (Carspecken, 2007). Reconstructive analysis is deployed in the study of meaning and structured forms of experience at different substantive levels – from the analysis of singular actions to the analysis of themes and discourses that reveals the difference within entire cultures or sub-cultures. In summary, the various perspectives – from national to international- regarding the research questions have been analyzed using reconstructive and interpretative method.

4.3 Relevant Theoretical Frameworks

The following relevant theoretical frameworks guide the research: *The Rational choice theory and the public choice theory*. These theories guide the empirical analysis of the research and possibly lead to statements that can be tested in future research.

4.3.1 The Rational Choice Theory

This theory was first propounded by sociologist George Homas in 1961, when he introduced the basic framework for exchange theory with assumptions drawn from behavioral psychology (Creswell, 2002). In essence, the rational choice theory is an economic theory with the underlying assumption that, individuals always make frugal and rational decisions that provide the greatest self-benefit or satisfaction, reflecting their highest self-interest (Creswell, 2002). Therefore, the theory holds that, economics predominantly determines human behavior. This means that, people are often motivated by money and profit maximizing possibilities, and always calculating the cost and benefits of their actions before carrying out any endeavors (Creswell, 2002). Economic theories chiefly explain how production, distribution and consumption of goods and services are controlled by money. Granted that all individual needs cannot be met, it becomes imperative to make rational choices regarding the best alternative outcomes of individual goals and the means of attainment. Central to the rational choice theory is the idea that, every individual action is fundamentally rational, and the argument that, social actions are rationally motivated, no matter

how irrational they may appear (Creswell, 2002). Interestingly, it also assumes that, complex social phenomena are the result of individual actions, a notion known as methodological individualism (Creswell, 2002).

However, the rational choice theory has been criticized. Firstly, that if individual actions are always intended for private benefits, why would people do something that benefit others than themselves? Thus, the theory has selfless, altruistic and philanthropic base. Secondly, people sometimes do things based on social norms that result to selfless benefits. And lastly, the theory is too individualistic and fails to explain the existence of larger social structures because, social structures cannot be limited to mere individual actions (Creswell, 2002). This permits the introduction of the next theoretical framework of this thesis.

4.3.2 The Public Choice Theory

This theory analyzes the political system and enables a closer look at its functions, including how it interacts with economic actors, and how the state of the economy shapes political decision-making. The theory holds that, every part of a state makes decisions based on their constraints and personal interests, drawing from the rational choice idea that states are the result of individual actions (Schneider and Volkert, 1999). This confirms why government programmes are not executed by a uniform structure, but by different actors with varying understandings and perception of the situation in question (Scharpf, 2006). In such situations, normative preferences and actor interests based on available resources become prevalent. This characteristic makes the public choice theory a very suitable approach for understanding environmental policy making especially in a political economy setting like Canada. Generally, the public choice theory pinpoints four main actors including: The political system, comprised of the ruling government and opposition; the administration; the voters, made up of the general public; and different interest groups representing either private or industry interest. They all interact and in the process, influence each other in varying proportions, while adhering to the pursuit of their separate goals (Schneider and Volkert, 1999). Important factors that shape different actor interests include their surrounding environment, which in the context on environmental policies in this thesis, consist of the national and global economic situations (Schneider and Volkert, 1999). Therefore, both the state of the environment and the economy provide the range of actions for the different actors. The

public choice theory is an extensively accepted framework for analyzing environmental policy making because, it combines economic and political rationales, as well as identifies multiple actors in the decision making process (Schneider and Volkert, 1999).

The theoretical frameworks fit the context of the research questions. For example, the rational choice theory will perfectly guide the question why Canada withdrew from the Kyoto protocol. Repeating all the research questions and objectives has been avoided here. However, the careful contextual subjection of all the research questions through the theoretical frameworks revealed that, these two theoretical frameworks fit well in the context of this thesis because their contents provide a suitable empirical foundation or basis for understanding the results to the research questions as dealt with under the Results and Analysis.

Chapter 5: Results and Analysis

This chapter presents results to the research questions using the reconstructive and interpretative analytical method within the frameworks of the Rational Choice Theory and Public Choice Theory. Each question is presented, followed by analyzes of the different perspectives and tested against the theoretical frameworks, before making a conclusion on the result.

I. What was the Canadian Government's rationale to discontinue its commitments to the Kyoto Protocol?

In deploying the reconstructive and interpretative analytical method to analyze the perspectives of the financial and economic viewpoint, evidently, the federal government holds that, meeting the Canadian Kyoto Protocol target would have jeopardized Canadian energy and economic interest, a strongly coherence to the principle of Rational Choice Theory. In essence, they form the category of advocates who foster Canadian economic progress through the advancement of oil sand drilling. It is important to note that it was under the rule of a liberal government that Canada signed the Kyoto Protocol, but due to a change in power, meeting the Canadian target became the burden of the conservative government under the leadership of Stephen Harper. So, because of financial burden involved, the conservative government tried to adopt a more Canadian oriented climate change mitigating strategy, one that will check local pollution while permitting economic progress from oil sand exploitation. Summarily, according to the federal government, Canada pulled out of the Kyoto Protocol because it could not meet its target without huge financial losses and negatively hampering its economy.

From the category of environmental activists, they believe Canada pulled out of the Kyoto Protocol because it could not meet its target due to the heavy presence of oil sands, and equally intends in every way to continue oil sand exploitation. To this category therefore, oil sand exploitation should not be subsidized, but rather, be highly taxed, with the hope that the high taxation will trigger better environmental performance and more subsidies for renewable energy generating options (Carrington and Vaughan, 2011). Analytically, Canada's limited success was the result of an inappropriate endeavor on the part of the federal government to reach the set target. In a more realistic frame, any serious climate change mitigating strategy will target oil sand exploitation, which of course is not in the interest of the federal government. Again, it is believed that the limited success and withdrawal could also be linked to the structure of its government. Though it is the

authority of the federal government to negotiate international agreements and implement regulations to honor their terms, the legislation in the case of climate change focuses strongly on energy, which is of provincial jurisdiction. Analytically, despite the fact that the federal government made some attempts, there must have been differences at the provincial levels whether actions were needed and if needed, how and to what extent they were to be enacted. This reason also justifies why the former Environment Minister says the Liberal Government that signed and ratified the Protocol did not know the gravity of what they were doing; otherwise, they would not have set such an unrealistic target for Canada. Conclusively, the perspective of the environmental activists is more coherent with the principle of the Public Choice Theory.

II. To what extend can it be concluded that Canada's bowing out of the Protocol signifies the country's unwillingness to mitigate GHG emissions and to address climate change related concerns?

The federal government indicates that, Canada is increasingly streamlining the global climate change agreement to suit the Canadian environment. So categorically, it means that Canada is still willing to continue the fight against climate change, but on a rather local level, and whose rigorousness cannot be measured by any prescribed parameters of any international climate change agreement. Therefore, for the federal government, a Canadian oriented strategy will yield more practical results in checking pollutions and fostering a strong Canadian economic growth at the same time. So, by extension of this perspective, any conclusion that Canada is unwilling to mitigate its GHG emissions is very misleading, especially as Canada is still party to the UNFCCC. This means Canada can still attend the conferences and to an extent, take part in decision making on climate change related dilemmas. However, one can argue that this is merely a political move to prevent Canada from souring its image any further on the international stage regarding global efforts to curtail global warming.

For environmental activists, any such conclusion is inappropriate, and hence, it will be a misrepresentation. This signifies that Canada is willing, but geopolitically, it is not doing enough to curtail climate change. Conclusively though Canada bowed out of the Kyoto Protocol, it is in a way, still willing to continue the fight against global warming in a less conventional manner which still falls within the principle of the Public Choice Theory.

III. Before withdrawal, how did Canada's obligations to the Kyoto Protocol affect its Oil and Gas Industry?

An interpretation of the conservative government response to the Kyoto Protocol would be that the Canadian obligation to the Kyoto Protocol prior to withdrawal did not have any significant effects on its oil and gas industry. Noting that the Kyoto Protocol was set in at the time when oil sand drilling in Alberta was witnessing increasing investments, it is economically logical that, a continuous obligation by the Kyoto Protocol to reach the Canadian 6% GHG reduction target would have had very damaging consequences to the entire Canadian economy in terms of investments, revenue and job losses. Analytically, this signals that the dictations of the Kyoto protocol for Canada was, and is in contrast to the interest of the oil and gas industry, and the Canadian economy as a whole.

Furthermore, the economic effects of the current low oil prices have demonstrated that the Canadian economy is strongly tied to its oil and gas industry. Therefore, this question is also one reason why Canada retreated from the Kyoto Protocol. Generally, it has been seen that the oil and gas industry generates the biggest amounts of pollution in the country. So logically, in order to meet the 6% reduction target for Canada, its oil and gas industry would definitely be the biggest target, a strategy which as noted, runs contrary to the interest of the government especially in Alberta. Additionally, the endeavor of trying to remain committed to the Kyoto Protocol would have mounted more pressure on the oil and gas industry to check their actions and their influences on the local environment, and hence, their general levels of environmental performance and corporate social responsibility. So analytically, the fear of stepping up the environmental performance and corporate social responsibility would have resulted in net negative investments and revenues in the oil and gas industry, and therefore, the easy way out was to retreat from the Protocol. Had it been Canada remained dedicated to the stipulated 6% target; more subsidies would have been geared towards renewable energy generating options. This means Canada would have most probably been having more built in renewable energy capacity than it currently has, but it remains a matter of uncertainty whether this would have generated the amounts of jobs and revenues that the oil and gas industry has generated. Nevertheless, one can still argue that any jobs and revenue losses from oil sand exploitation would have been limited to oil rich province of

Alberta, and this gap would have been bridged by investments in renewable energies, which equally would have generated revenues from clean energy jobs. Again an issue for further research.

IV. How is the retreat going to effect the Canadian Oil and Gas Industry and national GHG abatement endeavors?

The federal government's perspective indicates that the retreat is not really affecting the oil and gas industry, but rather, planned increases in investments in the industry are welcomed. Since Canada is willing to enact homemade GHG abatement measures, it implies that, though planned investments are welcomed in oil and gas, they shall however undergo more scrutiny in an effort to check environmental pollutions. On a different perspective, the retreat is affecting the oil and gas industry because there has been an increase in pressure from environmental watch groups, which is resulting to major changes in policies, especially towards obtaining operation licenses (Petz, 2011). Therefore, the departure from the Kyoto Protocol has surprisingly increased environmental awareness in the oil and gas industry because, the same industry which was formerly not ready, now welcomes a more Canadian oriented climate change alleviation mechanism. However, the author argues that, the fact that the Canadian Oil and Gas Industry welcome a more nationalistic climate abatement working strategy does not necessarily increase the environmental awareness level of the industry. The author considers it a rather comfortable business working atmosphere for the industry within the context of the Rational Choice Theory.

From an avid environmental dimension, the retreat is affecting the oil and gas industry, but in a rather favorable way. The environmental perspective has stated it is because of the presence of oil sands that Canada could principally not meet its Kyoto target, forcing it to withdraw. Therefore, it remains very logical that the retreat is beneficial to the oil and gas industry, since they can now operate with little considerations on their pollution levels. The oil sand industry lobbyists in the government have simply achieved their goals in permitting the industry to continue its unchecked environmental pollution while making windfall profits (Carrington and Vaughan, 2011). Analytically, one can argue that this indicates, there are some individuals in the federal government who are privately profiting from the oil sand exploitation business, but it is unknown in what way and to what extent they make these profits. Hence, no conclusion can be drawn on this.

Following the analysis of the federal government's perspective, in terms of policy changes in the long run, the absence of the Kyoto Protocol Commitments will simply allow the country adequate flexibility to draft and concentrate on policies that serve the national interest through the guarantee of oil sand exploitation to foster economic development, while they struggle simultaneously to curtail environmental pollutions. This will require so much investments in technological advancement, especially in the science of novel environmentally benign oil and gas technologies. As already noted, the Canadian Oil and Gas Industry is more comfortable to operate with a Canadian oriented climate mitigating strategy. When this is strongly practicalized, the environmental performance of oil sand producing companies gets better especially in terms of land reclamation and management of tailing ponds. Two examples of streamlining dictations under the Kyoto Protocol to suit the national environment includes: Firstly, the emissions trading scheme (ETS) in Alberta which started in 2007 under the control of the government of Alberta. Secondly, the Western Climate Initiative, which is equally an ETS that started in 2012, and involves 11 states in the U.S.A and all Canadian provinces.

In contrast to the federal government dimension, the analysis of environmental concludes that, the absence of stringent respect of climate change agreements like the Kyoto Protocol will only make environmental issues worse off in Canada, due to more oil sand productions. This is because in terms of policy changes, it will be hard to comprehend the claim that, a more Canadian oriented climate mitigating strategy will realize more practical results than a severe Kyoto Protocol stipulated obligations. The absence of Kyoto Protocol Commitments is an easy way forward for oil sand lobbyists in the government to adopt more oil sand exploitation friendly policies at the detriment of cleaner energy technologies. Canada's backlash has greatly injured its image on the international platform, and if great care is not taken, the injured image will deteriorate further. This assertion is based on the fact that Canada was an active member in the preliminary treaties that paved way for the Climate Change Treaty, especially when recalling the Montreal Protocol on Substances the Deplete the Ozone Layer, which has achieved a universal ratification.

Nevertheless, it is inappropriate to compare Canada in this respect with other oil and gas producing nations who remain party to the Kyoto Protocol because different countries have different national priorities; hence, other factors of national interest not regarding oil and gas can also influence a country's withdrawal. Taking USA as common example affirms that, it is practically very difficult

for any country whose economy has been built traditionally on heavy fossil energy dependence, to succumb completely to the Kyoto Protocol prescriptions. Canada's geographical location characterized by long and harsh winters makes it liable to consume enormous amounts of energy, which can readily be guaranteed by its vast deposits of oil and gas resources. Oil and gas resources in Canada are natural endowments the country should comprehensively make use of because; any country in the position of Canada would act in the same way, according the principles of Rational Choice Theory and Public Choice Theory. Any party to the Kyoto Protocol with similar oil and gas resources like Canada that steps out of the Protocol, simply does so to protect its national interest, and not because Canada withdrew. Analytically, this indicates that, geopolitics also plays a very important role in such decisions.

Chapter 6: Conclusions and Recommendations

In this last chapter, closing statements regarding the overall thesis and the research findings are made. Due to the limitations of the research, recommendations are suggested in order to promote further studies and findings regarding the subject matter of this thesis.

6.1 Conclusions

The stated aim of this research was to analyses why Canada withdrew from the Kyoto Protocol and how this action might impact the Canadian Oil and Gas Industry. So, the conclusions are done with references to the thesis research questions and objectives, and drawn from a combination of the perspectives of current literature, and the reconstructive and interpretative analyses within the study's theoretical frameworks. The most significant general characteristic of the findings is that, they reveal a big divide in opinion between different groups, for instance, the federal government on the one side, and the environmental perspective on the other side.

Regarding the Kyoto Protocol in general, there is every indication that a second commitment period might still not achieve its target given that the biggest polluters are not bound by obligatory targets. Therefore, the fight to curtail global climate change is a dire matter of uncertainty. Only time will disclose it, just like it has revealed the failure of the first period.

As to why Canada pulled out of the Kyoto Protocol, though there are differences in opinions, the one clear conclusion that can be drawn from the literature review and the analyses admits it is due to the presence of oil sands in the country. Analytically, this is an indication that a country's economic and national interest will most probably always be more prioritized than any global fight against climate change. So, no wonder the Kyoto Protocol has failed to achieve its original goals. One importance of this thesis stated in chapter 1.6 was that, if Canada's action will affect its domestic efforts to fight climate change and affect its oil and gas industry, other countries with intensions of abandoning the Kyoto Protocol might reassess their decision. The conclusion here is that no other party to the Kyoto Protocol has fully withdrawn from the treaty as of the 6th of June 2016, like Canada did. It is likely that a country might withdraw, but however, will not state Canada's action as the direct influence.

Regarding Canada's withdrawal as an unwillingness to mitigate its GHG emissions, it is clear that any such conclusion is a misrepresentation as the analyses have asserted. Canada is willing to continue the fight against climate change through the implementation of Canadian made policies and not by any international agreement whose dictations undermine the country's energy interest. Through this, Canada communicates its practical stand to the international community on the fight against global climate change. This fully captures the strong link between the Kyoto Protocol, the Canadian Oil and Gas Industry and the Canadian economy.

In trying to meet the Canadian 6% emission reduction target, the pressure mounted on the oil and gas industry prior to withdrawal was the major effect the Kyoto Protocol had on the industry, though it was an indirect effect. The industry was the main target because it is the source of most of Canada's GHG emissions. This shows that, there was a very strong link that existed between the Kyoto Protocol and the Canadian Oil and Gas Industry. Definitely, this knowledge will help Canada to better consider its targets in any future climate change related policy making.

As to what extent the retreat will affect the industry, the major changes so far is an increase in investments with a corresponding increase in pressure from environmental watch groups calling for better environmental performance. This will also be one of the major characteristics of the future of the Canadian Oil and Gas Industry in the absence of Kyoto Protocol Commitments. More investments will trigger more pressure, and more pressure for improved means of exploitation will provoke investments for more environmentally less damaging ways of drilling and usage. Canada will also use this opportunity to work to restore its image on the international platform as a lead country in the global efforts to control climate change. The country will depend on its oil sands for job creation, revenue generation, and an overall economic boom. However, energy from renewable energy sources will not be given the same priority like oil and gas. The oil sands in Alberta will continue to present a big business opportunity in Canada, and the government is currently so interested in exploiting this opportunity, with little considerations on plans for the future when oil sands will no longer be lucrative due to exhaustion.

6.2 Recommendations

To check the weaknesses of this study and promote further research in this area, the following recommendations have been proposed.

I. The researcher calls for more practical international collaboration in the fight against global warming, since there is no need for an international climate change agreement when politics and national interests are more prioritized than the actual problem.

II. The environmental watch groups and government in Canada should encourage the oil and gas companies to be more transparent with their opinions regarding issues of climate change, especially within the country. This might help in restoring Canada's environmental image, its political and economic character.

III. It would yield more practical results for the federal government if it adopts emission reduction targets with strict considerations to national natural energy resource availability and production.

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Appendices

Appendix I: Relevant Environmental Agreements Cited

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