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**Sustainable Development in Canada in
Relation to Oil Sands Development**

Diplomová práce

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Abstrakt

Cílem práce je hodnocení Kanady a státu Alberta v oblasti ochrany životního prostředí. Autor se v práci snaží posoudit, jak vlády těchto zemí se snaží skloubit principy udržitelného rozvoje s přijatými dokumenty OSN a zároveň jak vymáhají zákony o ochraně životního prostředí, které jsou základním předpokladem k dosažení udržitelnosti. Autor hodnotí míru dosažené implementace konceptu udržitelného rozvoje v Kanadě a Albertě na základě teoretického přístupu “slabé” a “silné” udržitelnosti. Autor vychází z předpokladu, že Kanada tak jak uzákonila principy udržitelného rozvoje ve své legislativě, se řídila přístupem “silné” udržitelnosti, která zdůrazňuje přísnější prostředky ochrany životního prostředí. Tato opatření se musí ovšem konfrontovat s rozsáhlým rozvojem těžby ropných písků v Albertě, který má zásadní vliv na životní prostředí Alberta a tak i celé Kanady. Autor konkretizuje vliv těžby ropných písků na vodní zdroj v Albertě a tato situace mu slouží jako případová studie ke komparaci a analýze oficiálního postoje vlády a nezávislých studií hodnotících míru udržitelnosti vodních zdrojů.

Záměrem autora je porozumět dopadu vlivu ropných společností na vodní zdroje v Albertě a jak se k tomu problému staví vláda Alberty a Kanady. V této souvislosti autor poukazuje, jak se vláda v Albertě stává zdrženlivější v implementaci přísnějších environmentálních zákonů na případové studii řeky Athabasca v Albertě. Závěr této práce naznačuje, že vláda Alberty i Kanady se řídí principy slabé udržitelnosti, která vyžaduje slabší ochranu životního prostředí.

Tyto principy vycházejí z výsledků studií nezávislých vědců, kteří poskytli veřejnosti významné důkazy o faktu, že těžba ropných písků značně znečišťuje vodní zdroje v Albertě. To ve svém důsledku odporuje všeobecně přijímanému obrazu Kanady jakožto mezinárodního leadra v otázkách naplňování principů udržitelného rozvoje.

Abstract

The aim of this thesis is to evaluate to what extent Canada and Alberta have been fulfilling the principles of sustainable development as they have adopted in the 1990s from the essential U.N. documents – the Brundtland Report and the Rio Declaration- and to what extent both governments failed in providing and enforcing efficient environmental law protection as it is the basic premise for achieving sustainability. I assessed this level of sustainability in Canada and Alberta on the basis of a stronger and weaker sustainability theoretical framework.

Author's presumption was that Canada, as it defined sustainable development in its legislation, acted according to stronger sustainability, which emphasizes stronger protective environmental measures. Given a very large scope of environmental impacts of oil extraction on different ecosystems, the sector of water resources was selected to serve as a case study to compare and analyze government and alternative reports assessing the sustainability of water management. Thus, the author follows how the oil industry in Alberta affects the water resources and how both governments of Canada and Alberta provide environmental protection to the water resources. In this respect the author illustrates how the government is reluctant towards the implementation of stronger environmentally protective measures in the case study of the Athabasca River.

The conclusion of this thesis suggests that Canada and Alberta have been acting according to weaker sustainability that implies lower environmental protection. There is significant evidence from independent scientists that the oil related industry in Alberta is heavily polluting the water resources, which contradicts the well-received image of Canada as a leader in sustainable development.

Klíčová slova

Udržitelný rozvoj – přírodní kapitál – ekosystém – ropné písky – Alberta – vodní zdroje

Keywords

Water Management – Sustainable Development – Genuine Progress Indicator – Biodiversity – Natural Capital – Water – Ground Water – Surface Water – Legislation – Protection – Environmental Protection – Environmental Sustainability – Economic, Social and Environmental Sustainability – Measurement – Canada – Alberta – Athabasca River

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Prohlášení

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3. Souhlasím s tím, aby práce byla zpřístupněna pro studijní a výzkumné účely.

V Praze dne 16. května 2013

Adam Podhola

Institut mezinárodních studií

Teze diplomové práce [doplňte formulář tezí podle zadání institutu]

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Introduction

a. The context of thesis

The increasing concern about the uncertain trajectory of the world's environment has been anchored in the concept of sustainable development that primarily aims at integrating the aspects of environment and society into a basic decision-making process. It argues that the economic development still prevails and that the needs of the environment and society should also be taken into serious consideration. Canada has brusquely adopted this innovating concept and has implemented its essential principles into federal and later provincial legislations. For many years Canada has been regarded as a global leader in promoting environmental issues due to higher legal recognition of sustainable development however, as the recent trends in Ottawa show, there is a major concern that Canada is abandoning this position due to the increasing development of oil sands extraction in Alberta.

I approached the issue of sustainable development in Canada with the theoretical framework of stronger and weaker sustainability. The use of natural resources is the key component to this theory. The proponents of weaker sustainability (see Robert Sollow) argue that the extraction of natural resources – in this case the depletion of natural capital - is acceptable in terms of economic development, but under a condition that the capital gained from those resources is reinvested into produced capital. This approach suggests that produced capital is substitutable to natural capital. The advocates of stronger sustainability (see Herman Daly) on the other hand argues that extraction of natural resources – natural capital - should be limited. Stronger sustainability proponents oppose that natural capital is not substitutable and thus must be protected, given its irreplaceable functions. In this respect, stronger sustainability recommends to apply stricter conservation measures in the protection of natural capital – environment – and vice versa.

In 2006 Stephen Harper announced that Canada is becoming a world energy superpower.¹ He referred to increasing oil sands development in Alberta that proved that Alberta has the second largest oil reserve in the world. The revenues from oil sands

¹ Stephen Harper, "Canada and China: a good and frank relationship to build on" (speech presented at official visit to China, Shanghai, China, December 4, 2009), <http://www.pm.gc.ca/eng/media.asp?category=2&id=3010> (last access on 12 February, 2013).

have created a unique opportunity for Canada to boost its economic performance and transform Canada in an internationally acclaimed energy leader. However, it was also an occasion for Canada to prove whether its proclaimed environmentally supportive commitments are embedded in the sustainable development policies and are in fact enforced. In the case of the extraction of Alberta's natural resources, the revenues from oil sands are essential, providing a financial input into both federal and provincial budget, which makes the question of sustainable development in Canada debatable. In this respect, it is being assumed that Alberta's oil sands are a major factor influencing the political and economic decisions of Canadian political leaders who can enforce appropriate environmental protection measures.

According to the Canadian constitution, the authority to maintain its natural resources is allocated to provinces. It means that Alberta is from a larger extent responsible for the development of its oil sands. However, the federal government also poses certain legal and fiscal authority over maintaining natural resources while providing environmental legislation or collecting taxes. It is a shared responsibility of both governments, but major responsibility relies on Alberta.

The main responsibilities of Alberta in relation to the topic of this thesis, is the authority to collect royalty tax from oil sands development and grant water licenses to oil companies. Royalties are an important part of Alberta's budget bringing significant amounts of revenue, which makes Alberta one of the most progressive provinces in Canada. However, in this regard, I will research on how Alberta maintains those revenues and what are the major challenges in distributing those royalties. Considering water licences, Alberta is responsible for the management of its water resources. As the oil industry operating in oil sands is demanding on water resources, it has been argued (see David Schindler or Dan Woyillowicz) that Alberta faces increasing challenges to provide efficient policies protecting its waters. It is also part of this thesis to elaborate such serious assumptions.

Alberta's oil sands are an unconventional source of oil. It means that to extract a barrel of oil from oil sands, it requires higher energy and financial and natural resources compared to the extraction of conventional oil that is overall less demanding. This higher capital that is required to input into oil sands extraction, implies that the environment, in this case the natural capital, is being significantly impacted. The stronger sustainability approach considers that natural capital is irreplaceable, because of its life-sustaining functions. At the same time the both governments of Canada and

Alberta adopted stronger sustainability approaches that are anchored in the basic U.N. documents on sustainable developments, signed by Canada in its legislation. It is suggested that the extraction of oil sands in Alberta creates a dilemma for Canada to choose between the benefits received from increasing oil sands development or sustaining its commitments to sustainable development. The limited scope of this thesis does not enable me to research into detail, however, to illustrate this discrepancy between the priorities of Canada's governments, I will focus on the case study of how oil sands development impacts the water resources and how the government of Alberta and Canada have both approached this problem.

The aim of this thesis is to evaluate to what extent Canada and Alberta have been fulfilling the principles of sustainable development adopted in the 1990s from the essential U.N. documents - the Brundtland Report and the Rio Declaration. Given the enormous impact that oil extraction has on different ecosystems, the thesis focuses on a sector of water resources. Comparing the government and alternative analysis of oil industry impacts on water resources, the thesis assesses to what extent both federal and Albertan governments succeed in environmental law enforcement protection that is the premise for reaching sustainability.

I argue that Canada has officially identified with the stronger sustainability approach, which confirms the idea that the environment should be "factored-in" basic political decision-making and that the natural capital is to a certain extent irreplaceable. On the other hand, I assume that Alberta decides more on a weaker sustainability approach because it has difficulties in enforcing of the principles of sustainable development as it secured high revenues from oil sands development. The thesis questions whether the Alberta government has been successful in adopting sustainable oil extraction development since the 2003 oil extraction boom and whether the industry became a motor for Alberta economy.

b. Literature review

The main research technique employed is a comprehensive critical literature review. Both primary and secondary sources were consulted to provide supporting evidence for this thesis.

To grasp the theoretical framework of stronger and weaker sustainability, I mostly studied the work of prominent environmental economists as Herman E. Daly,

Robert M. Sollow, John M. Hartwick and Daily Gretchen. Daly's article *Sustainable Development: From Concept and Theory to Operation Principles* has become a cornerstone of a stronger sustainability approach. He explains why it is important to conserve the environment in order to reach sustainability and he is in strong opposition to the neoclassical economic approach, which has been later defined as a weaker sustainability, of Robert M. Sollow. In his landmark article *Sustainability: An Economist Perspective*, Sollow refused the definition of sustainability as it was articulated in the U.N. reports and proposed another view, based on his neoclassical economist perspective. He enforced the idea of weaker environmental protection to stronger natural resource depletion. His ideas were supported by his colleague John M. Hartwick who in his major work *Intergenerational Equity and the Investing of Rents from Exhaustible Resources* strengthened the idea that natural resources, as a form of natural capital, are substitutable by produced capital, referred to as manmade capital. Therefore, the environmental protection standards should not prevent national states from extracting, because this revenues from natural resources were according to Hartwick a primary key to the economic development. Daily Gretchen opposed both Sollow and Hartwick in her book *Natural Capital: Theory and Practices of Ecosystem Services*, because she argued that the natural capital is in its essential role irreversible because of the life-sustaining functions that it provides. Thus sustainable development cannot be achieved if natural capital is being depleted.

Further to theoretical literature, my research is overwhelmingly based on the analysis of primary sources, especially the documents of the United Nations and the Canadian federal and provincial legislations. The origins and the basic principles of sustainable development are well described in the report *Our Common Future*, often referred to as the Brundtland Report, where definition of sustainable development is cited the most. The Brundtland Report is an extensive two hundred pages long that elaborates all segments of sustainable development. I paid special attention to the sections concerning the environment, natural resource depletion and the protection of the environment. The definition of sustainable development from this report has also been a direct inspiration for the adopting of *Federal Sustainable Development Act*.

On the level of basic legislation related to sustainable development in Canada I primarily worked with: *Federal Sustainable Development Act*, *Auditor General Act*, *Canada Environmental Protection Act*, *Species at Risk*, *Federal Water Act* and *Alberta Water Act*. *The Federal Sustainable Development Act* anchored the very definition of

sustainability from the U.N. documents into Canadian legislation. The *Federal Water Act* and the *Alberta Water Act* were important legal acts, while I was demonstrating the lack of law enforcement on the case of oil sands development and its impact on water resources in Alberta. Other important primary sources were Alberta's annual reports on sustainability referred to as *Measuring Up*. They provided the basic information about the level of implementation of sustainable development in Alberta. Their aim is to provide citizens of Alberta the idea to what extent Alberta has moved forward in terms of sustainable development and to what extent it lags behind. In this respect, I also paid a closer look at the water related information. Although those reports provided limited understanding about the sustainability of water resources in Alberta, it was eventually a valuable source while compared to alternative sustainable accounting frameworks prepared by the Pembina Institute, which I will refer to later on in the literature review. All of those legal provisions are accessible on the official government's websites: Canada Environment, National Energy Board, Fisheries and Oceans Canada, Alberta Environment and Sustainable Resource Development, Alberta Treasury Board and Finance and Alberta Energy.

Regarding secondary literature, I used comparative analysis of major publications related to sustainable development, oil sands and water management resources. The largest volume of comparable information towards the official government's reports and Acts were the reports of the Pembina Institute, which is a respected Canadian think-tank. I especially found important publications of Mark Anielski whose main interest were the sustainable accountability systems in Canada and Alberta. His lengthy report *A Sustainability Accounting System for Canada: An Assessment of the State of Sustainable Development Accounting and Indicator Reporting at the National, Provincial, Municipal-Community and Corporate Level* served me as an introduction to the sustainable accountability in Alberta and Canada, which is an important part in understanding the implementation and enforcement of sustainability in Alberta. From the same Institute, I will mention Dan Wyonilowicz who has researched the impact of the oil sands industry to water resources. I will especially mention his reports *Oilsands Fever: The Environmental Implications of Canada's Oilsands Rush; Troubled Waters, Troubling Trends; Down to the Last Drop: The Athabasca River and Oilsands and Oil and Troubled Waters*.

Glen Toner and John Meadowcraft edited the book *Innovation, Science and Environment 1987-2008: Charting Sustainable Development in Canada*, which was an

extremely valuable source where the history and implementation of sustainable development in Canada is concerned. Their observations concluded that Canada lags in environmental law enforcement, which was my original assumption. This was also an inspiration of research for other sources related to sustainable development in Canada such as David R. Boyd and his book *Unnatural Law: Rethinking Canadian Environmental Law* or Paulle Halley and Pierre-Olivier DesMarchais's report *Sustainable Development under Canadian Law*.

Perhaps the most important sources related to the sustainability of water resources were articles published by David Schindler and his research team. He is originally a professor of biology at the University of Alberta and he conducted extensive independent research in the rivers and lakes around Alberta. His research in the Athabasca River basin concluded that oil sand operations have a direct impact on Alberta's water resources and are major pollutants. In his research paper *Oil sands development contributes polycyclic aromatic compounds to the Athabasca River and its tributaries* he confirmed the presence of dangerous materials in the Athabasca River. This conclusion has caused a major upheaval on the federal and provincial level, because until that time the official data provided by government agencies were excluding the presence of any dangerous pollutants.

The scope of this thesis is large and many sources were used to evaluate my hypothesis. Those above are, in my opinion, the most important articles and books, that I found most relevant to my topic.

c. Structure

The thesis is organized into four chapters. The first chapter will analyze the basic terminology, the development of this concept and basic theoretical approaches. The first section explains the general ideas of sustainable development, basic definitions, development and the limits of the concept as such. The second section of the first chapter introduces the theoretical framework of stronger and weaker sustainability. It contextualizes the natural capital and the role of ecosystems in a stronger sustainability approach. In the second chapter, I will focus on the implementation of sustainable development into Canadian and Albertan legislation. The first section of the second chapter focuses on the historical context (chapter of sustainability in Canada and Alberta) however the section compares the sustainability accounting frameworks

Measuring Up of Alberta's government and the alternative approach *Genuine Progress Indicator* prepared by the Pembina Institute. The first section provides basic terminology and facts about oil sands in Alberta. A special focus is taken on the economic importance of Alberta's oil sands and the implications for Alberta's and federal governments. The fourth chapter is a case study of oil sands and its impact on water resources in Alberta. It will contrast the Canadian and Albertan legislation towards water resources to the reports of independent researchers and organizations.

A. Sustainable Development

a. Background

i. General ideas

The most cited definition of sustainable development (SD) is derived from the 1987 report of the United Nations' World Commission on Economy and Environment *Our Common Future* that is also known as the "Brundtland Report." SD is defined as "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs."² The Brundtland Report refers to two dimensions of development: The first demands equity, highlighting the widening gap between the rich and the poor and strengthening the necessity of the international community to assist developing countries to reduce the widespread poverty; the second principle refers to integration; it demands to involve the needs of the environment and society into basic decision-making. This idea arose from environmental concerns from increasing natural resource exploitation, general degradation caused by human activity and the absence of internationally binding environmental framework. In this respect, the Brundtland Report has become the cornerstone of the concept of SD.

The aspect of equity- thinking about future generations- is an important element of the concept of SD. The Brundtland Report paid special attention to support this inter-generational equity and stressed that the future generation should enjoy the same level of prosperity and wealth as the current generation. "If needs are to be met on a sustainable basis the Earth's natural resource base must be conserved and enhanced. (...) However, the case for the conservation of nature should not rest only with development goals. It is part of our moral obligation to other living beings and future generations."³ The Brundtland report emphasized that the quality of life for future generations should not be diminished because of irresponsible resource depletion or environmental degradation. Although this aspect of equity is an important part in making the development sustainable, it is also one of the most difficult tasks to make sustainability work.⁴

² United Nations World Commission on Environment and Development, *Our Common Future*. (Oxford: Oxford University Press, 1987), 37.

³ *Ibid.*, 45.

⁴ Paule Hallley and Pierre-Olivier Des Marchais, "Sustainable Development under Canadian Law" (paper

The authors of the Brundtland Report strengthened the idea that development is a complex process that needs to integrate the perspectives on economy, environment and society into basic decision-making. As it is argued in the Brundtland Report that “In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.”⁵ The development should be considered holistically where the economy, environment and society – three elements of development - are in balance. The OECD in its definitions of SD also enforces the aspect of integration. It states “Our decisions should take into considerations potential impact on society, the environment and the economy, while keeping in mind that: our actions will have impacts elsewhere and our actions will have an impact on the future.”⁶ The aspect of integrity played an important role in defining new theoretical approaches towards SD.

The basic idea of the Brundtland Report was to remind the international community that the world was divided between the rich and the poor and that Western society played a key role in assisting developing countries to achieve economic prosperity without compromising the assets of environment and society. At the same time SD represents a challenge for developed countries to redefine their traditional perception of progress and wealth. In this respect the Brundtland Report is a unique approach that sought to unite the divided nations and to find common solutions to the sustainable future.

ii. The Development of the concept of sustainability

The United Nations Conference on Environment, which took place in 1972 in Stockholm, was a landmark conference on this topic. It was for the first time in the modern history that the leaders of the international community discussed the problems of the environment from a global perspective. The final report of this conference *Only One Earth* formulated the idea that the environment should be protected and it is the obligation of the both individual and the collective, to protect it. It states that “man has

presented at the Symposium on Environment in the Courtroom: Key Environmental Concepts and the Unique Nature of Environmental Damage, University of Calgary, March 23-24, 2012), 9.

⁵ UNWCED, *Our Common Future*, 38.

⁶ Tracey Strange and Anne Bayley, *Sustainable Development: Linking economy, society and environment*

the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of a dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations.”⁷ *Only one Earth* became a source of inspiration for the Brundtland Commission to write *Our Common Future* fifteen years later. This conference was also an important milestone because it was an occasion for representatives from the developed and developing world to meet and discuss the increasing concerns about environmental challenges in their countries. However the main question of this conference – how to use natural resources responsibly and effectively in order to achieve progress - remained for a long time a matter of debate.⁸

The World Conservation Strategy (WCS), an important document prepared by three international organizations – The United Nations Environment Program (UNEP), the World Wildlife Forum (WWF) and the International Union For Conservation of Nature and Natural Resources (UCNR) concluded “human kind was having a significant negative impact on the environment and the global ecological system was needed.”⁹ The outcomes of the WCS lead to the establishment of the World Commission on Environment and Development (WECD) in 1983, which later prepared the materials for the Brundtland Commission in 1987.

The breakthrough in the popularization of SD was the final report of the United Nations conference on Environment and Development, known as “Earth Summit” in Rio de Janeiro, or Rio Declaration on Environment and Development in 1992. More than 185 countries confirmed the principles of SD and encouraged countries to adopt twenty-seven principles of SD into their national legislation, “in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.”¹⁰ Earth Summit was heavily covered by media, which helped to grab attention to create international consciousness about sustainability. Earth Summit was also an important conference, as

(Paris: OECD, 2008), 24.

⁷ United Nations Environment Programme, *Declaration of the United Nations Conference on the Human Environment*, 16 June 1972, <<http://www.unep.org/Documents.Multilingual/Default.asp?documentid=97&articleid=1503>> (last access October 7, 2012).

⁸ Wayland Kennet, “The Stockholm Conference on the Human Environment,” *International Affairs* 48 (1972), 39.

⁹ World Conservation Strategy, 3.

¹⁰ World Commission on the Environment and Development, *Rio Declaration on Environment and Development*, 14 June 1992.

essential conventions were signed on climate change and biodiversity. The outcome of “Earth Summit” was an internationally adopted action plan “Agenda 21” that advised to implement the aspects of SD into national legislations.

Since the adoption of “Agenda 21” the aspect of implementing the concept of sustainability into national legislation was emphasized and discussed at the United Nations Program for Environment and Development in Rio de Janeiro in 2012.¹¹

Since 1972, the United Nations conferences on sustainability were important events that inspired many leaders of the international community to adopt environmentally and socially cautious policies into their national legislations. The environmental degradation that has been found in developing countries for fast economical enrichment, has been a reminder for the developed world that progress bears its limits and that there is a necessity to protect environment.

iii. The limits of sustainable development

For many critics, SD is a concept that is difficult to grasp due to a large number of theoretical approaches, strategies and frameworks. Robert Sollow criticized the vagueness in the definition of SD as it was stated in the “Brundtland Report.” He argues that “sustainability is an essentially a vague concept, and it would be wrong to think of it as being precise, or even capable of being made precise. It is therefore probably not in any clear way an exact guide to policy.”¹² Norgaard criticized this complexity of SD in his book “Development Betrayed: The End of Progress and a Co-evolutionary Revisioning of the Future” where he pointed out that “it is impossible to define sustainable development in an operational manner in the detail and with the level of control presumed in the logic of modernity, because the strongly normative nature of the sustainable development concept makes it difficult to pin down analytically.”¹³ He stressed the argument that sustainable development is almost hardly measurable and this makes it difficult to account it as a functioning concept.

¹¹ United Nations Sustainable Development Knowledge Platform, “Inter-governmental processes”, <<http://sustainabledevelopment.un.org/intgovmental.html>> (last access 13 March 2013).

¹² Robert M. Sollow, “Sustainability: An Economist’s Perspective,” in *Economics of the Environment*, ed. Robert Stavins (New York: W.W. Norton and Company, 2012), 180.

¹³ Richard B. Norgaard, *Development Betrayed: The End of Progress and a Coevolutionary Revisioning of the Future*. (London: Routledge, 1994), 54.

Overall there have been over eighty definitions of SD identified.¹⁴ This large number of interpretations has been considered as a weakness of SD, however it might be argued it this could be its ultimate strength.¹⁵ An advocate of this complexity of sustainability Herman E. Daly argues, that” a lack of a precise definition of the term 'sustainable development' is not all bad. It has allowed a considerable consensus to evolve in support of the idea that it is both morally and economically wrong to treat the world as a business in liquidation.”¹⁶ He believes that that the concept of SD was becoming emptied, because many people could not understand it and explain it differently, he states “But the term is now in danger of becoming an empty shibboleth. For example, many people in the development community who use the term cannot specify what is being sustained in sustainable development – whether a level of economic activity or a rate of growth of economic activity.” However, the concept of SD has been evolving since the 1970s.

William M. Lafferty argued in his work *The Politics of sustainable development: Global norms for national implementation* that “sustainable development is best understood as a new international norm – guiding environment and development decision-making body – like other concepts such as justice, democracy or freedom.”¹⁷ It means that it is up to each country to assess whether to implement sustainable development policies or not and leaves this “flexibility” or “rigidity” on governmental representatives to reinterpret. So they literally used SD as “a common idiom or reference point to move away from bad practices.”¹⁸

Perhaps one of the greatest challenge of SD is accountability. It is also a paradox of SD that on one hand, there have been many serious initiatives of detailed systems of sustainability and accountability developed by international organizations such as the UN¹⁹, the OECD²⁰ or the World Bank²¹, but on the other hand there has been lack of

¹⁴ Collin C. Williams and Andrew C Millington, “The diverse and contested meanings of sustainable development,” *The Geographical Journal* 170 (2004): 99.

¹⁵ Simon Dietz and Eric Neumayer, “Weak and Strong Sustainability in the SEEA: Concepts and Measurement,” *Ecological Economics* 61(2007): 620.

¹⁶ Herman E. Daly, “Sustainable Development: From Concept and Theory to Operational Principles”, *Population and Development Review* 16 (1990): 32.

¹⁷ William Lafferty, “The politics of sustainable development: global norms for national implementation,” *Environmental Politics* 5 (1996): 187.

¹⁸ Glen Toner, “Engaging with SD: Setting the Canadian Experience in Context,” in *Innovation, Sciences, Environment 1987-2007: Charting Sustainable Development in Canada, 1987-2007*, ed. Glen Toner and James Meadowcroft (Montreal: McGill-Queen’s University Press, 2009), 37.

¹⁹ United Nations Sustainable Development Knowledge Platform, “Indicators”, <<http://sustainabledevelopment.un.org/index.php?menu=200>> (last access 7 April 2013).

²⁰ Organisation for Economic Co-operation and Development, *Environmental Indicators: Toward*

willingness to implement sustainability into legal structures at the national levels. Such international initiatives failed, because they were in most cases not legally binding by their signatories. Mark Anielski assumed in his article on sustainable accountability that “without an enabling SD framework and clear vision-mission statements, the “state of sustainability” measured in terms of sustainability indicators and government performance “outcome” measures cannot be assessed.”²² He basically argues that it is impossible to measure sustainability if effective legal framework for sustainable development is not implemented.

The main critique towards the concept of SD is aimed at a large volume of definitions that for many opponents dilutes the very meaning of it. Despite this ambivalence, for many advocates it is perceived as strength, because this flexibility in terms of definition enables us to work with this concept on many levels. SD was also perceived as a principle that if it is cultivated overtime, it will remain a livable concept as democracy or human rights.

b. Theoretical approaches to sustainable development

i. The theoretical Approaches towards Sustainable Development: Weaker and Stronger Sustainability

Since many international conferences were organized to discuss how the ideas of SD should be implemented, it was a fertile ground for academia to develop theoretical frameworks of sustainability. One of such theoretical approaches, how to classify SD, is the paradigm of weaker and stronger sustainability. This theoretical framework assesses the basic question whether society believes that the natural capital – i.e. the range of functions the natural environment provides for humans and for itself²³ - should have a special form of protection or whether it can be substituted by other forms of capital, especially produced capital.²⁴ The weaker sustainability assumes that it is human’s intrinsic right to use natural capital in order to reach sustainability, but under a condition

Sustainable Development, 2001, <<http://www.oecd.org/site/worldforum/33703867.pdf>> (last access 9 December 2013)

²¹ World Bank, *World Development Indicators*, 2012 <http://data.worldbank.org/sites/default/files/wdi-2012-ebook.pdf>

²² Mark Anielski, *A Sustainability Accounting System for Canada: An Assessment of the State of Sustainable Development Accounting and Indicator Reporting at the National, Provincial, Municipal, Community and Corporate Level* (Calgary: Pembina Institute: 2002), 57.

²³ Paul Ekins, “Limits to Growth and Sustainable Development: Grappling with Ecological Realities,” *Ecological Economics* 8 (1993): 270.

that revenues received from natural capital are reinvested in produced capital. However, the stronger sustainability emphasizes the protection of natural capital and allocates “nature” its “biotic rights.”²⁵ In a general sense the weaker sustainability is explained as “sustaining development” whether stronger sustainability is referred to as “sustaining environment.”

The origins of weaker sustainability are derived from a neo-classical view on economic theory from the 1970s. The most prominent advocate of weaker sustainability is Robert M. Sollow, a winner of the Nobel Peace Prize for economy. In his article “Sustainability: An Economist’s Perspective” he refused the idea that people should not make any use of mineral resources and should leave the world as they found it. He states “it is an obligation to conduct ourselves so that we leave to the future the option or the capacity to be as well off as we are. Sustainability is an injunction not to satisfy ourselves by impoverishing our successors.”²⁶ He basically enforced the idea that depletion of natural resources is generally acceptable to support national economy – societal well-being - and thus strict environmental protection should be avoided. In this respect Sollow argues that technology can bridge this gap created by depletion of natural resources and ensure that the environment will be protected. Sollow claims, “Goods and services can be substituted for one another. If you don’t eat one species of fish, you can eat another species of fish. Resources are, to use of a favorite word of economist, fungible in certain sense. They can take the place of each other. It suggests that we do not owe to the future any particular thing. There is no specific object that the goal of sustainability, the obligation of sustainability, requires us to leave untouched.”²⁷

Sollow’s arguments were supported by his colleague John M. Hartwick who also claimed that extraction of natural resources are essential part of the human’s progress. He also enforced the idea that this extraction of natural resources must be reinvested back into production capital otherwise sustainability is not achieved. In his article “Intergenerational Equity and the Investing of Rents from Exhaustible Resources” he argues, “Invest all profits or rents from exhaustible resources in reproducible capital. This injunction seems to solve the ethical problem of the current generation by “overconsuming” the current product, partly ascribable to current use of exhaustible

²⁴ Dietz and Neumayer, “Weak and Strong Sustainability in the SEEA, 620.

²⁵ Williams and Millington, “The diverse and contested meanings,” 100.

²⁶ Sollow, “Sustainability,” 181.

²⁷ Ibid.

resources.”²⁸ He suggests that natural capital – in this case natural resources – are substitutable for produced capital – manmade capital. It means that if you harvest timber and constructs mills, the capital is allocated and sustainable growth is reached. Both Sollow and Hartwick are being criticized, because they perceived SD as sustainable growth, which is simply not possible if natural resources are considered as a finite resource. This aspect has been severely criticized by advocates of stronger sustainability.

The stronger sustainability puts natural capital in the forefront of manmade capital and strengthens the vital role of environment in terms of development. Herman E. Daly, an advocate of stronger sustainability, encompasses this idea and elaborates the significance of natural capital in the concept of SD. He argues “capital we have endeavored to maintain intact is manmade only and there is also the important but relatively unappreciated category of natural capital.”²⁹ In this respect Daly strictly opposes the approach of Sollow or Hartwick who argues that natural capital can be substituted with manmade capital. “Neoclassical economic theory has taught us that manmade capital is a near-perfect substitute for natural resources and for the stock of natural capital that yield the flow of these natural resources. Substitution in economic theory is reversible, while the substitution of manmade for natural capital is frequently irreversible.” He replaces substitution for complementation – natural capital can complement manmade capital – not substitute. Daly also points at current GDP measurement that does not include the price of natural capital depletion, he states “The present System of National Accounts treats receipts from liquidating natural assets as income, thus giving countries the illusion that they are better off than they really are.”³⁰This illusion is an extremely important fact, because the depletion of natural capital is even today primarily considered as revenues and not as costs. In this respect Daly adds, “At current margin in many countries, natural capital is limiting SD, yet it is routinely sacrificed for more manmade capital under the prevailing mode of unsustainable development based on national accounts that treat consumption of natural capital as income.”³¹In general it is considered that stronger sustainability sees the solution in redefining the “wealth” to “well-being,” because “wealth” still bears economically

²⁸ John M. Hartwick, “Intergenerational Equity and the Investing of Rents from Exhaustible Resources,” *The American Economic Review* 67 (1977): 972

²⁹ Herman E. Daly, “Sustainable Development: From Concept and Theory to Operational Principles”, *Population and Development Review* 16 (1990): 33.

³⁰ *Ibid.*, 34.

focused connotations rather than environmentally sensitive interpretations.³²The aim of stronger sustainability is to reduce people's consuming habits and advise them to think about natural resources more efficiently.

The theoretical approach of weaker or stronger sustainability raised important questions about the concept of SD as such. Those two different ideological camps revealed its weaknesses and strengths: the problem of having a clear definition, the uncertain role of natural capital – and that is to protect it or use its resources to achieve SD, or whether manmade capital can replace natural capital. This division is also significant when analyzing the approaches of government and environmental organizations toward sustainable development. The federal government of Canada and provincial government in Alberta represent the weaker sustainability approach and the Pembina institute might be considered as a supporter of stronger sustainability. However, today the stronger sustainability prevails in general acceptance of SD, although it might be arguable that the economical aspect is still dominant over the environmental aspect.

ii. Ecosystems services and the value of environment

Daily Gretchen, a conservation biologist from Stanford University, defines ecosystem in her book *Natural Capital: Theory and Practices of Ecosystem Service* as “a set of organisms living in an area, their physical environment, and the interactions between them.”³³ This definition explains the aspect of “living” organisms, its attachment to physical space and the interaction that happens between the space and object. This relation between the space and the object is important while considering the role of ecosystems in environment. However in her research she is more focused on the value of natural ecosystem. She confirmed the idea that “goods and services flowing from natural ecosystems are undervalued by society and for most part, the benefits those ecosystems provide are not traded in formal markets and do not send price signals of changes in their supply or condition.”³⁴ And also she emphasized the importance to conserve the environment, that if “natural ecosystems are disrupted and for example a

³¹ Ibid., 35.

³² Anielski, “Sustainability,” 13.

³³ Gretchen C. Daily et. al., *Natural Capital: Theory and Practice of Mapping Ecosystem Services* (Oxford: Oxford University Press, 2011), 392.

³⁴ Ibid., 25.

native species is extinct, it is difficult or impossible to revert on any time scale of relevance to society.”³⁵

The natural ecosystems are the products of billions of years of evolution and have existed in forms similar to those seen today for at least hundreds of millions of years.³⁶ In this respect human beings are dependent on the continuation of natural cycles for their existence. Any disruption of those complex cycles leads to environmental degradation that has a direct impact on people. However, Daily also brings up an interesting remark that it is due to this loss of nature and “Earth’s life-support systems” such as deforestation that people revealed the critical role of ecosystems, because of its negative impact.

In his book *Innovation, Sciences and Environment: Charting Sustainable Development in Canada* Glen Toner argues “to pay as much attention to the protection of the environment as well as to support the economic system, the sustainable development strengthens the role of environment as a critical determinant of human well-being – unless ecosystems, biodiversity, and environmental quality are maintained, sustainable development will be impossible.”³⁷ He strengthens the idea that it is important to pay as much attention to the environment and as it is to economics. He thus assumes that the overall goal is to “factor-in” the environmental dimension into the process of important decision-making within different stakeholders.

Robert Costanza, a leading environmental economist, argues that the environment has not been properly implemented in decision-making process and legislation, due to a lack of knowledge of the value of natural capital and the role of ecosystems as such.³⁸ He strengthens the fact that ecosystems do not only provide people with goods such as food or timber, but it also provides people basic life-support functions such as cleansing, recycling and renewal. If the aim of sustainable development is an ability to make “trade-offs” between the short-term benefits from natural resources and long-term conservation of for example a watershed, from the global perspective this barter proves that society is poorly equipped to evaluate the environmental aspect.

³⁵ Ibid., 28.

³⁶ Gretchen C. Daily et. al., “Protecting Natural Capital Through Ecosystem Service District,” *Stanford Environmental Law Journal* 20 (2001): 334.

³⁷ Toner, “Engaging with SD,” 11.

³⁸ Robert Costanza et al. , “The Evolution of Preferences: Why Sovereign Preferences May Not Lead to Sustainable Policies and What to Do About It”, *Ecological Economics* 24 (1998): 201.

There have been many critical voices of ecological environmentalists such as Costanza or Daily who were raising awareness about the value of ecosystems and the necessity to protect environment due to its irreversible functions. Moreover it was also Herman Daly cited above who strengthened this idea that natural capital is not substitutable. However, this approach is being approached by those authors, it is still being criticized due to lack of accountability of natural ecosystems.

iii. The Natural Capital

One of the most intriguing challenges of the environmental economy is the ability to account the “real” value of social and environmental assets that are in the context of sustainability, which are important factors contributing to human well-being. In his book *Framework for the practical application of the concepts of critical natural capital and strong sustainability* Paul Ekins defines the capital as a capacity to provide utility³⁹ and he recognizes four forms of capital: produced, natural, human and social.⁴⁰ Here he defined natural capital as “the range of functions the natural environment provides for human and for itself.”⁴¹ Natural capital allocates to important functions to human utility. Firstly, it supplies raw materials for production and consumption such as food, fossil fuels or timber. Secondly, it assimilates the waste products of production and consumption. Thirdly, it provides amenity services and fourthly natural capital embodies the basic-life support functions on which human life depends.⁴² It is the life-supporting function of natural capital that is valued the most. The natural capital provides essential life functions without which the existence of human beings would not be possible. There are many voices among sustainability scientists such as Costanza or Daily who argue that it is too risky to challenge those limits if for example the depletion of natural resources is concerned. However, it is often the short-term economical benefit that foreshadows the long-term environmental impact that eventually decides.

“Capital approach” is often referred as “an economic approach” towards sustainability. It is derived from the needs of the economist to express the value of stocks in assets. Stocks in this case represent capitals. This approach is valued, because

³⁹ Paul Ekins et al., “A Framework for the Practical Application of the Concepts of Critical Natural Capital and Strong Sustainability”, *Ecological Economics Volume 44* (2003):167.

⁴⁰ Eric Neumayer, *Sustainability and Well-Being Indicators* (UNU-WIDER, 2004), 1.

⁴¹ Ekins, “Framework,” 167.

of its practical meaning. It is easier to prepare sustainability indicators that can track down specific goal set by appropriate SD strategies or framework and measure the progress that has been made. So when the sustainability can be measured in “economic” terms, it is also easier to prove whether the sustainability is achieved.

A study by the World Wildlife Foundation on “The Economic Values of the World’s Wetlands” estimated that the economic value of global wetlands is around \$3,4 billion.⁴³ In this case the researchers on wetlands demonstrated that the destruction of wetlands – such natural capital – is in fact economically very disturbing, because wetlands represented many functions that are not usually appreciated. The wetlands are ecosystems that provide numerous goods and services that have an economic value, as they are important sources for food, freshwater and valuable services such as water treatment and erosion control.⁴⁴

In this sense water resources represent one of such natural ecosystems and its services and functions are essential to human beings. It is also part of a SD framework to assess sustainability of water resources and to evaluate to what extent it is important to conserve it and to what extent water resources might be used to human needs.

⁴² Dietz and Neumayer, “Weak and Strong Sustainability,” 623.

⁴³ Kirsten Schuyt and Luke Brander, *Living Waters: Conserving the source of life: The Economic values of the World’s Wetlands*, (Amsterdam: WWF, 2004), 6.

⁴⁴ *Ibid.*, 3.

B. Sustainable Development in Canada

a. The implementation of sustainable development on federal level and in Alberta

i. Historical perspectives

Since the World Commission on Environment and Development released “Our Common Future” in 1987, the concept of SD has brusquely become embedded in the Canadian political vocabulary. SD is mentioned in federal legislations and is featured in the mandates of several departments as the country’s Parliamentary Commissioner for the Environment and Canada has adopted Federal Sustainable Development Act in 2008.⁴⁵

By 1984, when Conservative leader Brian Mulroney was elected as a Prime Minister, a little attention was paid to environmental issues. In that time the Department of Environment was regarded as a junior ministry and it had little regulatory authority. In general it was perceived as weak in comparison to other ministries.⁴⁶ In 1987 after “Our Common Future” was published, Canada witnessed a boom in the rising public interest in environmental issues. It was also due to the increasing number of industrial accidents, new scientific discoveries, and the work of international environmental movements, which made Canadians approach the concept of sustainability positively.⁴⁷ Mulroney took a political opportunity by seizing this increasing consciousness about the environment and SD and than strengthening spending programs. That is also why Mulroney is being acknowledged as Canadian’s greenest Prime Minister today.⁴⁸ It was also under his authority that the National Round Table on Economy and Environment, a multi-stakeholder advisory body, was established in 1988.

After 1990 when the Green Plan, a first comprehensive federal environmental policy was introduced, Canada became regarded as a global leader in sustainable development governance. The Green Plan attempted to anchor its approach within the main ideas from the Brundtland’ report as Mulroney said: “Sustainable development is

⁴⁵ Lafferty and Medowcroft, *Implementing Sustainable Development: Strategies and Initiatives in High Consumption Societies* (Oxford University Press, 2004), 54.

⁴⁶ Toner, “*Engaging with SD*,” 34.

⁴⁷ “Canada Case Study: Analysis of National Strategies for Sustainable Development” (Ottawa: Stratos, 2004), 3, <http://www.iisd.org/measure/capacity/sdsip.asp> (last access on 12 April 2013).

⁴⁸ Toner, “*Engaging with SD*,” 56.

what we want to achieve. The Green Plan sets out how we are going to achieve it.”⁴⁹ However, this attempt was eventually turned down, because it did not receive support from the central agencies and required financial contributions to sustain its maintenance. The shift came back with the election of liberals that strengthened the idea of sustainable development in their election manifesto, the “Red Book”.⁵⁰

In 1995 Jean Chrétien adopted the Guide to Green Government (GGG) which was an important landmark in the institutionalization of ideas and provisions of sustainable development: “achieving sustainable development requires an approach to public policy that is comprehensive, integrated, open and accountable.”⁵¹ In this respect the GGG was truly revolutionary, because the guidance to measuring sustainable development was formulated in terms of the “state of the nation” and in terms of government performance outcomes. The Commissioner of Environment and Sustainable Development was charged to implement sustainability measures into government and ministries.⁵² Despite Chrétien’s early efforts in pushing sustainability forward, his administration later impeded in introducing new environmental legislations and measures. David R. Boyle, an environmental lawyer and professor at University of Victoria, criticized Chrétien for his reluctance to adopt important environmental legislations such as the Species at Risk Act.”⁵³

Recent developments towards the implementation of sustainability measures in Canada have been critically reviewed by the current Conservative government of Stephen Harper. Concretely, Harper’s government decided to cut environmental programs such as funding for NRTEE⁵⁴ and left international negotiations about reducing carbon emissions within Kyoto Protocol that have been discussed in Canada since the early 1990s. Harper argues that his government had to adopt sever financial cuts in governmental programs because of the 2007 economic recession that hit international financial markets.⁵⁵ But it is being argued that Stephen Harper simply

⁴⁹ Bruce Doern, *How Ottawa Spends, 2004-2005: Mandate Change and Continuity in the Paul Martin Era*, (Montreal: McGill-Queen’s University Press, 2004), 199.

⁵⁰ Tarasofsky, “Canada’s Progress in Addressing the Strategic Imperatives set out in Our Common Future”, *International Institute for Sustainable Development* (2004): 5.

⁵¹ “Canada Case Study,” 4.

⁵² Toner, “*Engaging with SD*,” 34.

⁵³ David R. Boyle, *Unnatural Law: Rethinking Canadian Environmental Law and Policy* Gerogetown: UBC Press, 2003), 6.

⁵⁴ Jeffrey Simpson, “Ottawa Kills the Emission Messenger,” *The Globe and Mail*, 2012, <<http://www.theglobeandmail.com/commentary/ottawa-kills-the-emissions-messenger/article4350552/>> (last access on 23 April 2013).

⁵⁵ Louise Egan and Randal Palmer, “The Lesson from Canada on Cutting Deficits,” *The Globe and Mail*,

prefers supporting policies that are in favor of oil industry in Alberta that brings high financial revenues for Canada instead of restrictive environmental policies that would come from the extension of Kyoto Protocol.⁵⁶

ii. The implementation of sustainability measures in federal legislation

Due to the pragmatic green policies of Brian Mulroney and Jean Chretien in the 1990s, Canada has for a long time been a leading country in the implementation of sustainable development into legal practice. Since the adoption of the Brundtland Report in 1987, Canada has flourished in terms of creating new institutions and provisions measuring the sustainability in federal and provincial legislations. Special attention was paid to legal provisions protecting the environment, as this aspect was an important part of the concept of sustainable development. However, Canada on the turn of a new century stood at the brink of abandoning those environmentally sounding policies.

Canada decided to regulate protection of the environment in order to achieve better environmental performance. There are three major federal acts that incarnated this regulative framework. In 1988 Mulroney's government introduced *Canadian Environmental Protection Act (CEPA)*. CEPA provides comprehensive regulatory authority to protect the environment and human health by, controlling toxic chemicals, waste disposal at sea, the products of biotechnology, hazardous wastes and the pollution from transportation sources.⁵⁷ In 1992 under Mulroney's administration *Canadian Environmental Assessment Act (CEAA)* was adopted. This act provides different types of environmental assessment for projects over which the federal government has authority. In 2002 the same administration adopted *Species at Risk Act* whose main objective was to prevent wildlife species from becoming extinct and to secure the necessary actions for their recovery.⁵⁸

2011, <<http://www.theglobeandmail.com/report-on-business/economy/the-lesson-from-canada-on-cutting-deficits/article4252006/?page=all>> (last access on 25 April 2013).

⁵⁶ Sean Silcoff, "Ottawa Strikes Back at Al Gore's Remark on Oil Sands as Open Sewer", *News and Globe*, May 6, 2013, <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/ottawa-strikes-back-at-al-gores-remarks-on-oil-sands-as-open-sewer/article11729948/> (last access 8 May 2013).

⁵⁷ *Non-renewable Natural Resources, Forestry Resources and Electrical Energy*, 92A. <http://laws-lois.justice.gc.ca/eng/Const/page-4.html#h-20> (last access 8 May 2013).

⁵⁸ Ministry of Environment, *Enforcement: Species at Risk Act*, 2002, <<http://www.ec.gc.ca/alef-ewe/default.asp?lang=en&n=ED2FFC37-1>> (last access 3 February 2013).

In 1995 the federal government adopted the *Auditor General Act* where Canada has assigned responsibility for sustainable development to individual government departments and agencies.⁵⁹ This marked an important landmark in the Canadian commitment to sustainable development. Canada did not create a single national strategy, but rather shared this responsibility under the Auditor General Act among twenty-five departments that are obliged to submit to Parliament individual SD strategies.⁶⁰ The Auditor General Act carries the inherent principles of the Rio Declaration such as respect for nature and the needs of future generations, the integration of the environment and the economy, protecting ecosystems, an integrated approach to planning and making decisions that takes into account the environmental and natural resource costs, etc.⁶¹

The most important act in regard of the implementation of SD into Canadian legislation was the adoption of the *Canadian Sustainable Development Act* (CSDA) by Harper's government in 2008. This act obliges the federal government and each ministry to report on sustainability within their departments every year. The way, in which CSDA is implemented, is defined in the *Federal Sustainable Development Strategy* (FSDS).⁶² However, FSDS is a serious commitment from the federal government towards implementing sustainable development principles into the Canadian federal legislation and its outcomes are not mandatory and bears reporting function.

It was not only legislative acts that were embedded into Canadian legislation but it was also the creation of institutions representing the ideas of SD. The National Round Table on Economy and Environment was an important institution that firstly aimed at the integration of sustainability solutions into legislation and secondly at the promotion of the ideas of sustainable development into Canadian public life.⁶³ The strong aspect of Round tables was that they were instituted in each province and territory along with the National Round Table on the Environment and the Economy on the federal level. Canada was one of the few countries that were inherently inspired by the international agreements on sustainability that were adopted at the United Nations conferences. In

⁵⁹ Halley and DesMarchais, "Sustainable Development under Canadian Law," 3.

⁶⁰ "Canada Case Study".

⁶¹ Auditor General Act, RSC 1985, c A-17, 21.1. <<http://laws-lois.justice.gc.ca/eng/acts/a-17/page-9.html#h-9>> (last access 12 June 2012)

⁶² *Federal Sustainable Development Strategy*, 2013, <<http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1>> (last access 2 May 2013)

⁶³ "NRTEE," <<http://collectionsCanada.gc.ca/webarchives2/20130322143635/http://nrtee->

this respect, both the legislative definitions of the Sustainable Development Act and the Canadian Environmental Protection Act worked closely with the definitions of sustainability in the Brundtland Report and the Rio Declaration as it stated in both Acts: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”⁶⁴

Although the federal government managed to articulate sounding “green policies” or “guidelines” since the reception of the sustainability concept in 1987, Canada is still having difficulties in implementing the principles of sustainable development into federal legislation. Firstly, it was because of the financial cuts to environmental programs, agencies and even the environment ministry that prevented politicians from implementing the SD policies. For example in the environmental portfolio alone between 1994-5 and 1997-9, the provincial and territorial government as a whole reduced the size of their environmental departments by twenty-five percent. In the federal government the budgetary cuts were by thirty-two percent in 1995.⁶⁵ In 1994 the economic downfall was caused by peso crisis in Mexico and in 2007 it was because of the collapse of the world’s financial markets. The financial cuts caused by those crises were often an excuse for politicians to remain reluctant towards the implementation of sustainability measures. Secondly, it was this unwillingness of politicians to emphasize the agenda of sustainable development in policies and the slow uptake of economic instruments to addressing environmental problems. “While politicians and governments come and go in democratic political systems, the public service is the custodian of long term problems.”⁶⁶ Thirdly, even though Canada established institutions such as the NRTEE or the International Institute for Sustainable Development (IISD), however, these institutions were marginalized outside the executive branch. They were also vulnerable because of their dependency on funding from the government.⁶⁷

In 2001 a research group from the University of Victoria prepared a study, which compared Canada’s environmental performance within twenty-nine OECD countries and found out that Canada had one of the poorest environmental records of industrial countries. Canada’s overall ranking among the OECD’s nations was a dismal 28th out of

trnee.ca/mission—finding-sustainable-pathways[>] (last access on 23 May 2013)

⁶⁴ *Sustainable Development Act*, 2008, <<http://laws-lois.justice.gc.ca/PDF/F-8.6.pdf>. 2> (last access 18 December 2013)

⁶⁵ Lafferty and Medowcroft, *Implementing Sustainable Development*, 65.

⁶⁶ Toner, “Engaging with SD,” 43.

29.⁶⁸ In a 2010 study, accomplished by a research team at Simon Fraser University, it was confirmed “Canada’s environmental record continued to be poor compared to other developed countries, as Canada’s environmental performance ranked 24th out of 25 countries.” This report also suggested that “Canada’s lackluster record is due to poor environmental policies, and it is not due to natural factors such as climate and geography.” Those reports were an important reminder to the Canadian public who was for a long time comforted that Canadian environmental protection measures are adequate to economic well-being.

Canada has warmly grasped the concept of sustainability when the concept of SD was introduced in the global meetings. Federal administrations had brusquely foreseen in SD a political opportunity to boost their political image and preferences to win federal elections as in the case of Mulroney and later Chrétien. Meanwhile federal governments implemented environmentally protective measures into important legislations such as the CEPA, FSDA or SRA. However; the federal government has lagged behind in demanding to make SD accountable. That is also why Canada has been ranked by several independent reports having a very poor environmental record.

iii. Sustainable development in Alberta

The federal government has been active since the 1990s in adopting sustainable development measures into its federal legislation, governmental bodies or institutions. However, Canada is a federal country and thus certain legal provisions are shared between federal and provincial authority.

The Alberta government is a recognized leader in Canada when it comes to using indicators to measure and report on the province’s progress. Alberta was the first provincial government in Canada that adopted publicly reported indicators to track progress on a number of important social, economic and environmental goals.⁶⁹ It is also the level of institutionalization of SD policies into the legal framework of Alberta that put it high in the sustainability ranking. The commitment of the government of Alberta to implement those sustainability measures distinguished Alberta from other provinces. Alberta embedded measures of sustainability into the Auditor General Act

⁶⁷ Ibid., 33.

⁶⁸ David Boyd, “Canada vs. the OECD: An Environmental Comparison,” *Eco-Research Chair of Environmental Law and Policy* (2001): 1.

⁶⁹ Amy Taylor, *Sustainability Indicator Frameworks in Alberta: Setting the Context and Identifying*

and the Government Accountability Act. The Auditor General Act requires the government of Alberta to annually report on the level of “well-being, as it states, “Under Section 10, the government must prepare and make public on or before June 30 of each year a consolidated annual report for the Province of Alberta for the fiscal year ended on the preceding March 31.”⁷⁰ The Audit Committee reviews the report issued by the Auditor General Act.⁷¹

When the federal government under Mulroney issued to establish the National Round Table on Environment and Economy, it was also an impulse to establish the Alberta Round Table on Economy and Environment (ARTEE). ARTEE developed unique system of sustainable accountability that was one of the best examples of a framework of SD implementation in North America. It was exceptional because of the details paid in each indicator accounting for the level of sustainability in Alberta. In 1994 this advisory body to the government of Alberta issued a report “*Alberta’s Sustainable Development Indicators*” which aimed at monitoring the level of sustainability in Alberta. The Report had nine vision elements (goals), which were supported by fifty-nine economic, social and environmental indicators.⁷² However, ARTEE was eventually dissolved due to the financial cuts that also hit provinces in 1994. The government of Alberta has thereafter signed up to monitor the level of “well-being” and scheduled to release annual and three year business plans in “Measuring Up (MU) reports” The purpose of MU reports is to check whether the government has realized what it promised in the year and three years reports before and it will be discussed further in detail below.

The Pembina Institute, a respected Canadian think-tank, prepared an alternative accountability system on measuring the level of sustainability in Alberta. This institute developed the idea of Alberta’s Genuine Progress Indicator of Sustainability Well-Being index that in a certain way alters the traditionally adopted report on government performance through GDP. The aim of Alberta’s Genuine Progress Indicator (AGPI) is to assess the overall “quality of life” based on the results of fifty-one indicators measuring economic, environmental and social progress in Alberta that were recorded in the last forty years. The exact definition is proposed in the subchapter below. The purpose of this balance sheet is to measure the level of sustainability in Alberta. The

Opportunities (Calgary: The Pembina Institute, 2006), 5.

⁷⁰ “Progress Report on the Government of Alberta Business Plan” *Annual Report 2011-2012*, 5.

⁷¹ Taylor, *Sustainability Indicator Frameworks in Alberta*, 2.

outcomes of this report, however, distort the outcomes of the MU reports issued by the Government. In this sense the Pembina Institute argues that even though Alberta has achieved high economic performance as measured by GDP, the overall quality of life has been decreasing.⁷³

When the concept of SD was gaining on its popularity in the 1990s, the government of Alberta did not lag behind. It developed a unique system of sustainable accountability within all of Canada. However, the financial crisis in 1994 also hit provinces and this system was eventually dissolved. A couple of years after that the government of Alberta came with a different system and committed itself to measure the level of sustainability in the province. Despite this governmental effort to track the progress of Alberta in annual reports, there have been an increasing number of voices that the level of sustainability in Alberta is in fact much lower. The alternative system measuring the “well-being” in Alberta was developed by an independent organization that proved that the sustainability performance in the province is actually worse than government’s outcomes. This dichotomy in results shows the conceptual problem of SD as such. As there are many different definitions of SD and the number of indicators accounting for SD, it creates significant distortion in results. The efforts of measuring sustainability in Alberta illustrate this discrepancy.

b. The Sustainable monitoring systems in Alberta

i. “Measuring Up” – Annual monitoring system of sustainability in Alberta

“The Measuring Up” (MU) is an annual “performance” report issued by the government of Alberta to provide relevant information to its citizens about the progress of the province in implementing “sustainability” issues in Alberta. MU sets ten goals and seventy-six performances where those sixty-two performances indicate on how Alberta has moved forward in the implementation of the proposed ten goals in economy, environment and society. The MU has been issued since 2001 and first reports are slightly different in terms of number of goals and performance indicators. However, the goals remain the same as in most recent ones. The issue of the MU reports

⁷² Ibid., 23.

⁷³ Mark Anielski, *The Alberta GPI Blueprint: The Genuine Progress Indicator (GPI) Sustainable Well-Being Accounting System* (Calgary: The Pembina Institute, 2001), 32.

is obliged by Section 10 of the Auditor General Act and is submitted to control by the Auditor General.

In respect to environment and water related issues MU reports enable citizens to compare to what extent those goals and performances were given priority by government and to what extent government prioritized other related subjects. In MU report from 2011-2012 on environmental sustainability, referred as “Resourceful, Responsible- Ensure Alberta’s energy resources are development in an environmentally sustainable way,” has become a number one goal.⁷⁴ This means that the environment has a high priority and this is a significant shift forward compared to the last priority (16th out of 16 goals) and 11th ranking environment had in 2000 and in 2005⁷⁵, respectively.⁷⁶ This means that the issues of environmental sustainability has become higher priority to the government of Alberta.

In the MU there is one indicator related to water resources – “Water quality index” (WQI) and it measures the quality of water in Alberta’s rivers. While comparing this indicator to the former 1994 Alberta’s Sustainability Development Indicators of Alberta where there were six indicators referring to water: size and distribution of significant wetlands, groundwater quality index, lake water quality index, condition of major rivers, length of heritage rivers and the percent of sewage and runoff treated at the primary, secondary and tertiary levels,⁷⁷ the decrease in water related indicators in MU is significant. However, Alberta has developed a special sustainable strategy for water resources, which is embodied in “Water for Life: Sustainability Strategy” that committed the government of Alberta to sustainable management of Alberta’s water resources. The purpose of the Water for Life strategy will be though explained in Chapter 4.

According to most of the MU reports from 2000 to 2011 WQI has been stable and shows very high performance levels. WQI measured six major Alberta rivers at key sites and the data were based on four groups of variables such as metals, bacteria, nutrients and pesticides. While in 2010 the MU reported that five out of six river

⁷⁴“Measuring Up, Progress Report on the Government of Alberta Business Plan”, *Annual Report 2010-2011*, 36.

⁷⁵“Measuring Up, Progress Report on the Government of Alberta Business Plan,” *Annual Report 2005-2006*, 27.

⁷⁶“Measuring Up, Progress Report on the Government of Alberta Business Plan,” *Annual Report 2000-2001*, 104.

⁷⁷Anielski, “Sustainability,” 18.

systems reached good to excellent water quality⁷⁸, in 2000 five to six river systems had fair to excellent water quality.⁷⁹ According to the MU, the overall water quality of water has been increasing and only minor changes in the WQI have occurred.

The question remains why Alberta chose to monitor only “Water Quality Index”, because this WQI can barely report on “sustainability” of water resources. From the official statement in the MU reports the government is aware of the fact that it cannot measure all performances related to water such as water quantity and availability within the surface and groundwater within MU reports. However there are increasing concerns from independent scientists such as David Schindler or Timoney and Lee about related issues to water resource management such as surface water quantity and the quality of groundwater in Alberta due to increasing demands on water from oil sands operations in Northern Alberta. This aspect was also accounted in the MU reports. The alternative sustainability accounting system proposed by the Pembina Institute, which is described in details below, it proposed four indicators measuring water related issues such as the sustainability of water resources in Alberta: Fish and Wildlife, wetlands, peatlands and water quality.

MU was an alternative sustainable accountability system developed after the 1994’s wasted efforts to create unique sustainable accountability system in Alberta. Although MU is a well-developed monitoring system, while compared to other provinces, it lacks behind in providing relevant information about the stated goals. If water resources are concerned, one indicator – WQI – is a weak response of the government of Alberta to water sustainability.

ii. Genuine Progress Indicator: The case of Alberta

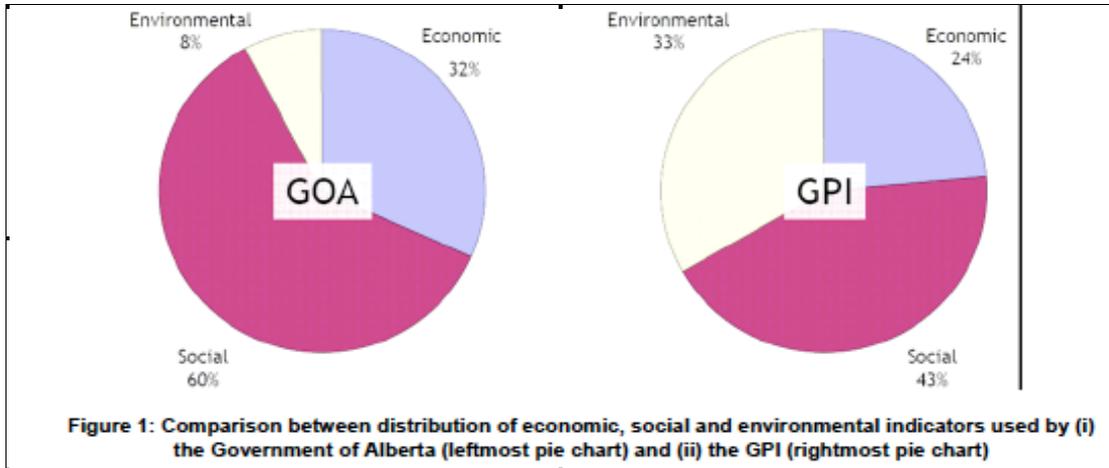
The Genuine Progress Indicator (GPI) is defined as “a system for measuring the total well-being and sustainability of nations or state”⁸⁰This system was presented as an alternative to the current measures of economic progress like the GDP. The essential role of the GDP is to measure flow of capital in an economy. It functions on the basic premise that if more goods are exchanged for money in the market, the more GDP

⁷⁸“Measuring Up, Progress Report on the Government of Alberta Business Plan,” *Annual Report 2010-2011*, 36.

⁷⁹“Measuring Up, Progress Report on the Government of Alberta Business Plan,” *Annual Report 2000-2001*, 126.

arises. Thus the GDP counts car accidents or oil and gas extractions also as a financial input.⁸¹ Simon Kuznets, one of the principal architects of the international system of national accounts warned the U.S. Congress in 1934 in a famous speech where he stated that “the welfare of a nation can scarcely be interred from a measurement of national income as defined by the GDP and distinction between quantity and quality of growth must be made.”⁸² In this respect, the GPI represents an alternative measuring system that quantifies the condition of living and produced capital more than economic performance.

The Pembina Institute applied this sustainability framework to Alberta and developed Alberta’s GPI Sustainable Well-being Accounting System. This system measures the level of sustainability through fifty-one indicators such as household debt, free time, obesity, public infrastructure, oil sands reserve, ecological footprint or volunteerism that tracked down the progress in economy, society and environment in the last forty years in Alberta.⁸³ The Pembina Institute compared the Alberta’s GPI system to the government’s MU reports and found out significant misbalance between the number of indicators allocated to each section of the sustainability domain. The graph bellows shows this disproportion.⁸⁴



Alberta’s GPI differs from other sustainability frameworks because it uses conventional accounting language and structures such as ledgers, balance sheet and income statement to measure and report on economic, social and environmental

⁸⁰ Ibid

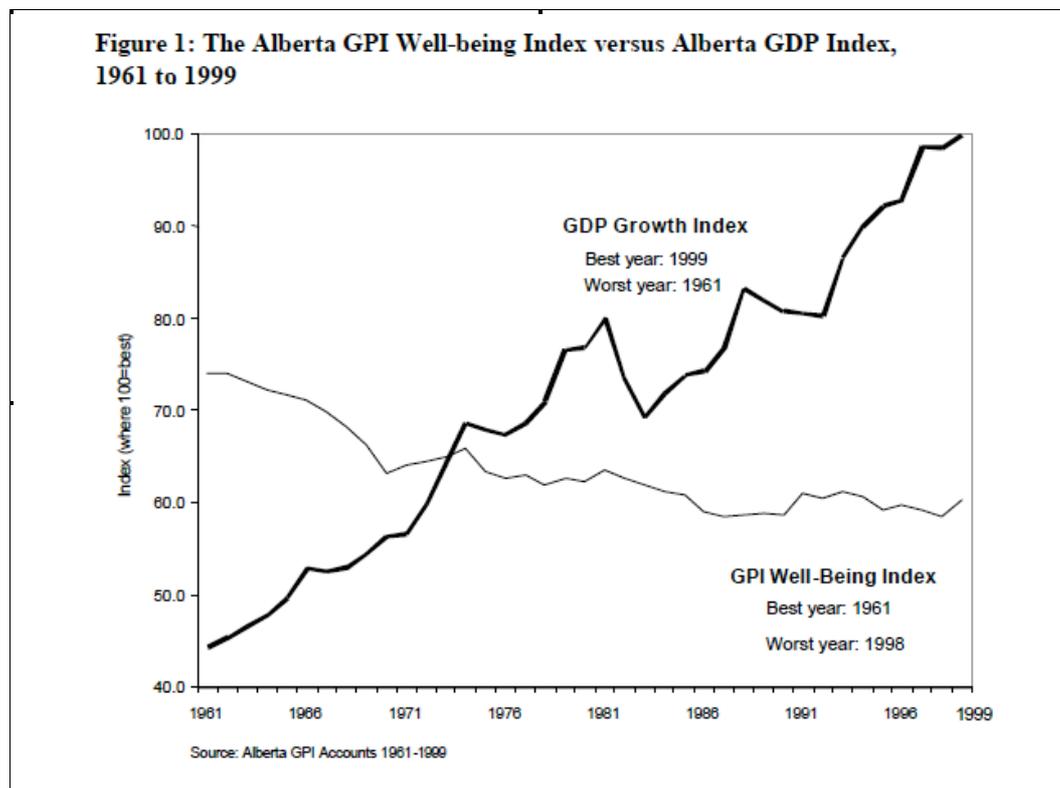
⁸¹ Mark Anielski, et al., *Alberta Sustainability Trends 2000: The Genuine Progress Indicators Report 1961 to 1999* (Pembina Institute, 2001), 23

⁸² Ben Beachy and Justin Zorn, *21st Century GDP: National Indicators for a New Era* (Harvard: Harvard University Press, 2012), 1

⁸³ Mark Anielski, “*The Alberta GPI Blueprint: The Genuine Progress Indicator (GPI) Sustainable Well-Being Accounting System*, 2001, 34.

sustainability.⁸⁵ That is also why Alberta’s GPI Sustainability Well-Being Index was marked as an important milestone in sustainability accounting.⁸⁶

Alberta’s GPI Sustainability Accounting System revealed that even though Alberta is being reported as a wealthy and prosperous economy – if only GDP per capita is concerned - the overall quality of well being – measured by the GPI Well-being Index - has been declining. The graph below shows that the peak of the GPI Well-Being Index was in 1961 and since then, it has been steadily decreasing. From 1961 to 1999, Alberta’s GDP increased over 400 per cent, or 4.4. per annum, while the Alberta GPI Well-being Index declined at an annual rate of 0.5 percent.⁸⁷



If the environment is taken into account within Alberta’s GPI Sustainable Well-Being Accounting System, the GPI Environmental Sustainability Index (GPI ESI) is a composite of 17 indicators of natural resource sustainability and environmental quality. The figure below compares Alberta’s GPI Environmental Sustainability to GDP growth. Again, the Environmental Sustainability GPI Index decreases at annual rate of 1.0, GDP

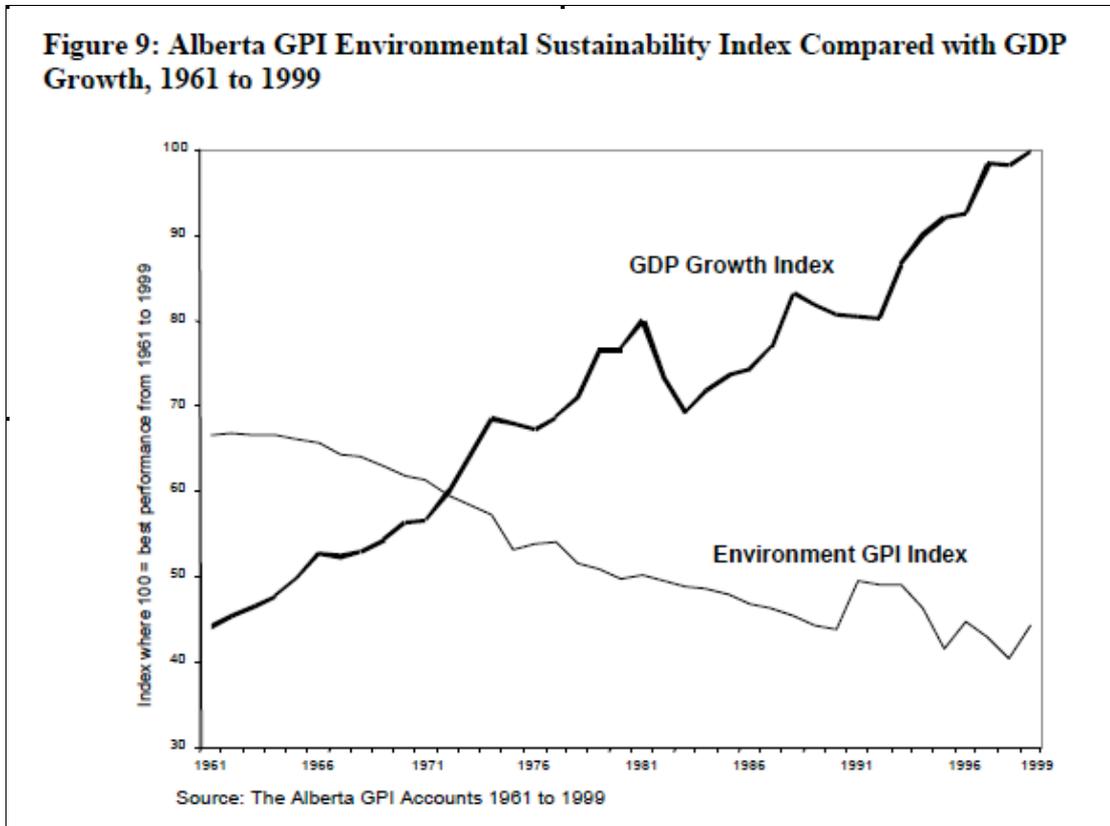
⁸⁴ Anielski et al., “Alberta Sustainability Trends 2000,” 23.

⁸⁵ Anielski, *A Sustainability Accounting System for Canada: An Assessment of the State of Sustainable Development Accounting and Indicator Reporting at the National, Provincial, Municipal-Community and Corporate Level* (The Pembina Institute, 2005), 63.

⁸⁶ Ibid. 32.

⁸⁷ Anielski et al., “Alberta Sustainability Trends 2000,” 21.

Growth Index averaging 2.2 percent per year shown on the graph below.⁸⁸ The GPI ESI decline can be explained as an overall environmental degradation in Alberta such as the increasing intensity of energy use, declining fish and wildlife populations or shrinking wetlands.⁸⁹



Alberta's GPI collected data for fifty-one different indicators for more than forty years and developed a unique system of national accountancy. It showed that even though the standard of living was increasing, the overall quality of life was decreasing. It was due to a limited scope of a conventional system of measuring growth by GDP. The system of GPI reveals that GDP does not include the value of social or natural capital and emphasizes that economy is not a seldom factor to measure progress.

⁸⁸ Ibid.

C) Oil Sands Development in Alberta

a. Background

i. General information

Canada has the third largest oil reserves in the world after Saudi Arabia and Venezuela. It is estimated that there is around 1.7 trillion barrels of crude bitumen whereas about 10% of this volume is recoverable with current technology.⁹⁰ Based on the levels of reserves and current rates of production, Canada's resource base has one of the largest production windows globally, suggesting that Canada's role in global energy markets will likely to grow over time.⁹¹

Most of the oil sands are located in the Northern part of Alberta and underlie an area of 140.000 square kilometres, an area as large as the state of Florida. This area represents 21% of Alberta and 37% of Alberta's Boreal Forest Natural Region.⁹² There are three major areas of production: Athabasca, Peace River and Cold lake; Alberta By January of 2013 more than 127 projects were operating and producing over 1.5 million barrels of oil per day (bpd).⁹³ According to the statistics from the Albertan Energy Department, the production is expected to double to 3.5 million bpd by 2020⁹⁴ and another scenario proposed by the federal government shown on the image below even predicts the production to reach 5 million bpd between 2020 and 2030.⁹⁵

⁸⁹ Ibid., 22.

⁹⁰ Liz Dowdeswell et al., A Foundation for the Future: Building an Environmental Monitoring System for the Oil Sands (Gatineau: Ministry of Environment, 2010), 11.

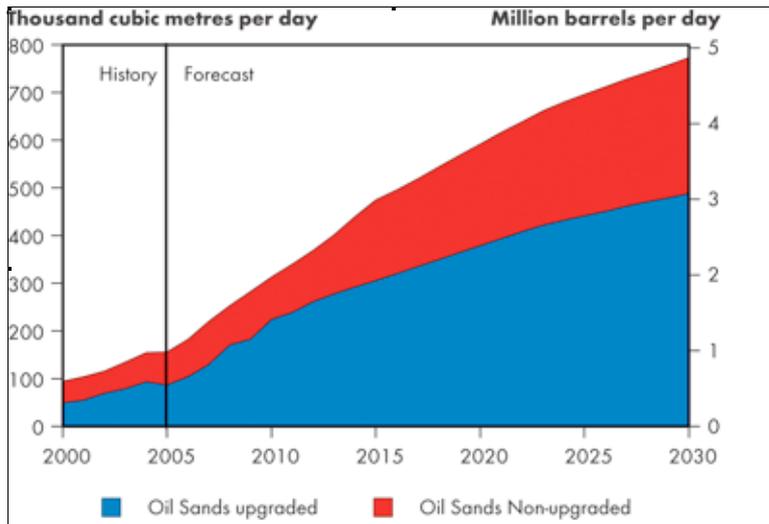
⁹¹ Oliver Bladec et al., "Alberta's Energy Cluster," *Microeconomics of Competitiveness*, 2010,23, [http://www.isc.hbs.edu/pdf/Student_Projects/Canada_\(Alberta\)_Energy_2010.pdf](http://www.isc.hbs.edu/pdf/Student_Projects/Canada_(Alberta)_Energy_2010.pdf) (last access 12 February 2013).

⁹² Meche, "A Comprehensive guide to Alberta Oil Sands: Understanding the environmental and human impacts, export implications, and policial, economic, and industry influences," 5.

⁹³ Government of Alberta, Ministry of Energy, *Facts and statistics*, <<http://www.energy.alberta.ca/OilSands/791.asp>> (last access 14 February 2013).

⁹⁴ Government of Alberta. Ministry of Energy Energy. „Oil Sands“..

⁹⁵ National Energy Board of Canada: *Canada's Energy Future: reference case and scenarios to 2030,2007* <<http://www.neb.gc.ca/clf-nsi/rnrgynfmr/nrgyrprt/nrgyftr/2007/nrgyftr2007chptr6-eng.html>> (last access 10 January 2013).



Source: National Energy Board of Canada (2007) Canada's energy future: reference case and scenarios to 2030, available at

ii. Extraction techniques

The oil sands are a non-conventional source of energy and demand special extraction, production and upgrading techniques. Out of all reserves there is eighty percent of bitumen stored seventy-five meters below the surface, which requires the in-situ drilling method. The other twenty percent is extracted by a conventional open mining method whereas there are only five open pit mines operating.⁹⁶

The in-situ method requires an invasive intervention into the underground-water levels. First hot water together with steam and toxic chemicals are injected under high pressure to the underground reservoirs, where bitumen melts together with hot water. The result, a cocktail of black „asphalt“, is pumped out of the ground and is delivered to the production facilities. It is argued that the in-situ technique requires a minimal disturbance in the land, but if all processes are taken into account such as generation plants, well pads, roads, 3-D seismic lines and pipelines, eventually extensive areas of land are disturbed.⁹⁷ In-situ extraction recovery often referred to as Steam Assisted Gravity Drainage (SAF-D) currently requires approximately 0.5 barrels of fresh water for each barrel of oil.⁹⁸ However, this number is also debatable, because even more water is required for all in-situ processes. At the same time in-situ is seriously questioned about its impact on the groundwater, because of the lack of data. Currently there are emerging and experimental technologies being developed for in-situ extraction

⁹⁶ Ministry of Energy, „Facts and statistics,“

⁹⁷ WWF, Unconventional Oil: Scraping the bottom of the barrel, 10.

⁹⁸ Dowdeswell, „A Foundation for the Future,“ 12.

such as Toe to Heel Air Injection or Combustion Overhead Gravity Drainage. Those techniques should employ less natural resources such as water to operate drilling.

The surface mining method constitutes around twenty percent of the total oil sands production and its character is more invasive in terms of excavation. The process of surface mining is energetically and environmentally demanding. To obtain the processed oil, the extracted crude bitumen must be mixed up with a huge quantity of water and heated up till the certain temperature that allows the oil to separate from other compounds. The water is crucial and is an essential ingredient to bitumen production and extraction. Up to 90% of water is not recyclable and ends up in tailing ponds, huge surface reservoir, first created as an experiment to store the toxic mining waste. It is also estimated that by surface mining to produce one barrel of oil at least two tonnes of materials is mined.⁹⁹ The result of surface mining is irreversible transformation of landscape even though Alberta is obliged by the *Environmental Protection and Enhancement Act* to reclaim affected land.¹⁰⁰

Alberta's oil sands are considered as an unconventional source of petroleum. This means that the extraction of a barrel of crude oil from oil sands is more expensive than from other conventional sources, because more resources and technology are necessary to process, refine and upgrade crude bitumen to oil. To illustrate this discrepancy in order to produce one barrel of oil from bitumen sands costs around \$36 to \$40 per barrel (extraction, production, upgrading, transport, etc.), but to produce a barrel of conventional oil, it costs under \$1.¹⁰¹ This price is also varying as new and less costly technology is being introduced.

iii. Oil sands development in historical perspectives

In the 1960s, the government of Alberta officially issued oil sands exploration agreements within Northern part of province. Later in 1967 first commercial operations in Canada's oil sands industry commenced with the start-up of the Great Oil Sands mining, extraction and upgrading project.¹⁰² Canadian companies Suncor and Syncrude were the first companies started operating in Alberta's oil sands..By 1973 it was still to

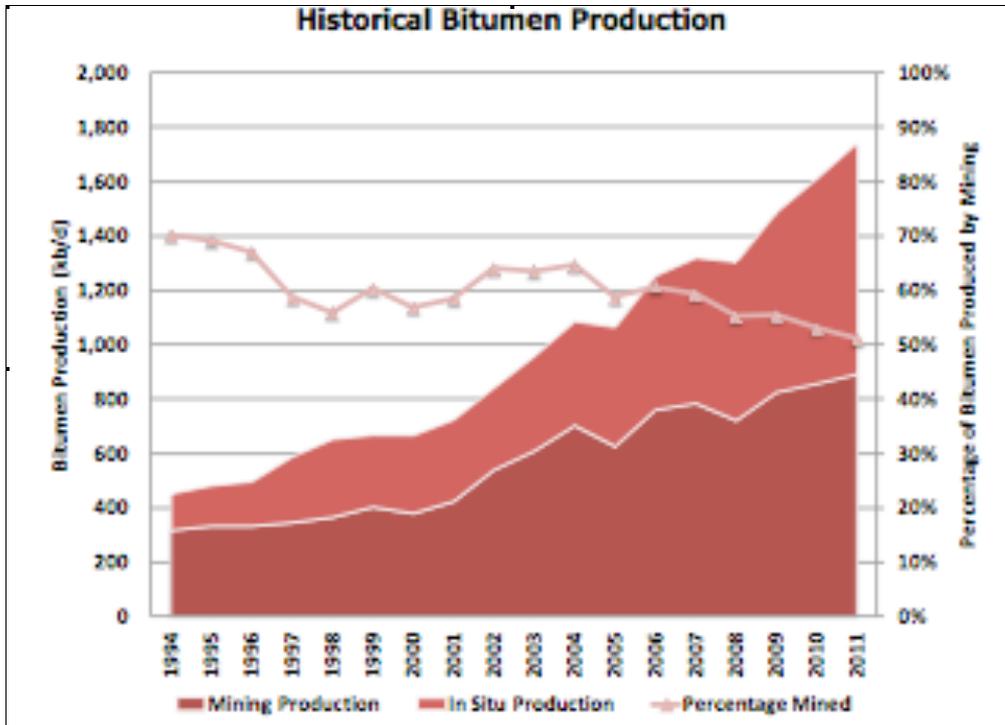
⁹⁹ WWF, "Unconventional Oil: Scraping the bottom of the barrel," 9.

¹⁰⁰ *Alberta Environment and Resource Development*, <<http://www.environment.gov.ab.ca/info/faqs/faq4-Reclamation.asp>> (last access 17 April 2013).

¹⁰¹ Bladek, "Alberta's Energy Cluster," 7..

risky for companies to invest in Alberta’s oil sands extraction, and thus the government of Alberta decided to invest in the oil sands by forming the Alberta Energy Company, which later became a direct investor in Syncrude’s operations.¹⁰³

In the 1980s the Alberta Energy Utilities Board established the three oil sands areas and ruled that, with the exception of natural gas and coal, all hydrocarbons produced in these areas were considered to be oil sands.¹⁰⁴ However, in the late 1990s Canada’s massive oil reserves were still not widely recognized. This recognition arrived with a growing realization that conventional reserves were shrinking and were imported from unstable regions of the world. It was also a trigger for other companies to explore investment opportunities in the region. With advancement in technology new extraction techniques were introduced and helped Alberta to promote investments in oil sands and in 1985 first in-situ Imperial Oil’s Canada Lake was announced. In-situ technique diminished the percentage of bitumen produced by mining projects and later contributed to bigger investments as it is seen in the figure below. Moreover, the introduction of new technologies reduced operating costs of producing synthetic crude oil and contributed to increased production.¹⁰⁵



¹⁰² Robert Dunbar, “Canada’s Oil Sands: A world-scale hydrocarbon resource,” *Strategy West* (2009), 6.

¹⁰³ Dan Woynillowicz et al., *Oil Sands Fever* (The Pembina Institute, 2005), 11.

¹⁰⁴ Alberta Government, “Alberta Oil Sands Tenure Guidelines,” 1-5

¹⁰⁵ Woynillowicz, *Oil Sands Fever*, 11.

An important milestone that helped to attract new investors came with “The Oil Sands: A New Energy Vision for Canada”, a report issued by Alberta Chamber of Resources in 1993, that laid out a 25-year strategy that envisioned tar sands production doubling or tripling to reach 800,000 and 1.2 million barrels per day by 2020.¹⁰⁶

As the first companies struggled to make the business pay, and their projects were viewed with scepticism by investors, today every major Canadian and international oil company has interests in the oil sands.¹⁰⁷ Since 1967, Alberta has produced 6.99 billion barrels of raw crude bitumen from the oil sands.¹⁰⁸

b. The economic importance of oil sands

i. Oil Sands revenues

Even though Alberta’s economy has been performing excellent results, if GDP per capita is compared to other provinces, current government has significant problems in stabilizing the deficit in the Alberta’s annual budget that has been in the third consecutive years negative. Alberta’s government expected higher revenues from oil sands, but due to higher oil price volatility, the revenues were much lower than expected. This dependency on revenues from a single commodity, that causes regular financial busts and booms, is not a premise to long-term commitment of SD, as the Brundtland Report, which has been signed by Canada, suggests. However, if revenues from oil sands were redistributed equally, as advocate of stronger sustainability Herman Daly advises, SD might be achieved. Current trend, however, shows the opposite, because Alberta fails to provide “Heritage fund” that would secure enough finances for future generations, and current lower royalty tax, which is in strong favour of oil sands companies, does not contribute to “economic sustainability” of oil sands development. It is thus important to understand how oil sands revenues are redistributed and how much money is invested in oil sands. It is because of this higher fiscal revenue that is eventually a major factor influencing federal and provincial governments’ decision-

¹⁰⁶ Ibid.’ 12.

¹⁰⁷ “Sustainability Perspectives: Unconventional Risks: An investor response to Canada’s oil sands,” 4

¹⁰⁸ Meche, “Comprehensive guide,”5.

making. This chapter will argue why how oil sands revenues matter to the future of sustainability of Alberta.

Fiscal revenues from the oil sands are a driving force of the Albertan economy. They directly contribute \$40.1¹⁰⁹ billion to \$260 billion GDP that ranks Alberta in the third place in Canadian economy after Ontario and Quebec.¹¹⁰ Alberta's GDP per capita reaches \$75,000 which is 60 percent higher than the Canadian average.¹¹¹ Albertans have significantly benefited from revenues generated by oil sands extraction.

The 1930's Natural Resources Transfer Act embodied into the Canadian constitution the rights to deal with the natural resources to its provinces and Alberta gained the privilege to administer 97% of its natural wealth.¹¹² The Canadian and foreign companies are authorized to develop the resources under certain rules that are set by the Alberta Act, a constitution of Alberta, and managed by the Department of Energy. In the fiscal year 2011-2012 the government of Alberta received directly C\$4.5 billion in royalties from oil sands projects.¹¹³

The governments of Alberta as well as federal government are responsible for collecting the economic rent associated with oil sands production. Their role is to withdraw the maximum of economic rent from companies on behalf of citizens of the province. However, the current practice shows slightly different picture. The Pembina Institute argues that both provincial and federal governments fail to capture all the available economic rent and thus oil companies receive higher profits in excesses of their fair return on investment.¹¹⁴ Government prefers to leave more assets to companies to risk for new investments. This argument explains why government promotes strategy of rapid oil sands development.

Alberta government collects royalties from oil sands developments. By 1996 when more rapid development of oil sands was commencing, the Alberta government imposed a tax policy that was in a strong favour of oil companies to avoid investment risks. That is why government set 1 percent royalty tax until all the costs of projects

¹⁰⁹ Alberta Finance, *Fiscal Plan Tables. Budget 2012*, <<http://www.finance.alberta.ca/publications/budget/budget2012/fiscal-plan-tables.pdf>> (last access 25 October 2012).

¹¹⁰ Government of Alberta, Ministry of Energy, "Facts and Statistics"

¹¹¹ Bladek, "Alberta's Energy Cluster," 9

¹¹² Government of Alberta, Ministry of Energy, "Facts and Statistics".

¹¹³ Ibid.

¹¹⁴ Wyonillowicz, "Oil Sands Fever," 69.

were repaid.¹¹⁵ As the number of new project was increasing, one would expect that revenues from royalties were increasing, but as this initial royalty rate was only 1 percent, it was rather an incentive to companies to reinvest profits from oil sands into expansion, which eventually delayed revenue collection by the province. The government of Alberta is being thus criticized, because of imposing one of the lowest royalty rates in the world. It was estimated that between 1995 and 2004, oil sands increased by 133 percent while government royalties decreased by 30 percent.¹¹⁶ This approach of government has been criticized as it primarily supports companies instead of citizens.

Although Alberta receives high oil sands revenues, the government of Alberta fails in saving money into Heritage fund, which causes from long-term a significant problem to sustainable development. If savings to special fund covering future needs is considered, Alberta has a poor record while compared to another countries. For example Norway or Alaska, as both countries rely on high oil revenues, created oil funds out of incomes from oil taxes and if the amount is counted per capita, Alberta committed \$US 3,768 to its fund; Alaska \$US 47,570 and Norway almost \$US 791,650.¹¹⁷ Fraser Institute, a respected Canadian think tank, wrote in their report “*Alberta’s \$22-billion Lost Opportunity*,” that “ Alberta government fails to save resource revenues in Heritage Fund that leaves little for Alberta’s future generation.”¹¹⁸ Alberta does not have any legislative or constitutional requirement for government to save resource revenues.

There is also another leverage how government of Alberta and federal government support oil companies in investing in new oil sands projects. Both governments offer mining companies significant tax brakes that free them from paying the initial capital that is repaid in tax brakes. According to a 2010 report *Fossil Fuels: At What Costs?* from the IISD, Canadian federal and provincial governments provided C\$2.84 billion to support oil production in 2008.¹¹⁹ Both governments are criticized for those tax reductions, as the oil companies are one of the richest industries in Canada. Suncor, the company having the largest operations in Alberta, earned in the 2nd quarter

¹¹⁵ Amy Taylor, “Klein shortchanging Alberta and putting Albertans at risk” *Pembina Institute*, March 25 2006, <http://www.pembina.org/oped/> (last access 3 February 2013).

¹¹⁶ Meche, “A Comprehensive Guide,” 60.

¹¹⁷ *Ibid.*, 5.

¹¹⁸ Mark Milke, *Alberta’s \$22-billion Lost Opportunity: How Spending Beyond Inflation + Population Growth Created Alberta’s Red Ink* (Fraser Institute, 2013), 8.

¹¹⁹ International Institute for Sustainable Development, *Fossil Fuels: At What Cost?: Key Findings*, April

of 2010 more than C\$480 million, which is higher than Canadian Oil Sands trust reaching C\$237 million.¹²⁰

The National Energy Board of Canada estimates that capital expenditures to construct all announced projects over the period 2006 to 2015 are worth C\$ 125 billion.¹²¹ Some projections even estimated that total investments could reach around \$500 billion.¹²² Recent years have shown a flood of investment by major oil companies; Suncor, the biggest investor in Alberta's oil sands development outlined a C\$ 20 billion expansion for Voyager project, Petro-Canada committed to C\$ 26 billion to Fort Hills project in 2007 or Exxon Mobile applied for a C\$ 6.8 billion development of its Kearl oil sands 4.4 billion barrel reserve.¹²³ This shows that a number of major companies are intending to have significant production of several thousand bpd from oil sands in close future. This reliance on unconventional production is a strategy, which backs high oil price and a low carbon price.¹²⁴ However start-ups of new project is determined to stabilize prices for oil on world markets, unless new projects are suspended.

The decision of investors whether to start new oil sands projects in Alberta depends from larger extent on oil prices. Financial crisis in 2007 shattered the price of oil on the global market, which inevitably led to suspensions, cancellations and delays of new projects. The drop also meant that companies received fewer revenues and were less keen in investing more financial resources into oil sands. Only by October 2008, the price dropped from \$120 per barrel to \$35 and \$50 during 2009.¹²⁵ It is needed to add that the oil extracted and produced from oil sands is due to expensive and extensive proceeding rentable from \$40 per barrel.¹²⁶ This price volatility reduced capital and possibilities of many oil companies to theoretical future expansion in oil sands. It was not only price of oil that is deciding factor for investors to make an investment in oil

2010, 116.

¹²⁰ "Pumped Up – How Canada Subsidies Fossil Fuels at the Expense of Green Alternatives," *KAIROS*, February 15, 2011.

¹²¹ National Energy Board of Canada, *Canada's Oil Sands: Opportunities and challenges to 2015: An Energy Market Assessment*, October 2006, 11.

¹²² Andrew Nikiforuk, *Tar Sands: Dirty oil and the Future of a Continent* (Vancouver: Greystone Books, 2008), 123.

¹²³ Dunbar, "Canada's Oil Sands," 15.

¹²⁴ James Leaton, "Unconventional Oil: Scraping the bottom of the barrel," *World Wildlife Foundation* (2008): 9.

¹²⁵ Michael A. Levi, "The Canadian Oil Sands: Energy security vs. Climate Change," *Council on Foreign Relations: Center for Geoeconomic Studies, Council Special Report 47* (2009): 6.

¹²⁶ Lauren Krugel, "Canadian Oil Sands profit hit by crude price gap," *The Globe and Mail*, January 31, 2013, <<http://www.theglobeandmail.com/globe-investor/canadian-oil-sands-profit-hit-by-crude-price-gap/article8081817/>> (last access 3 March 2013).

sands. It is also the price of commodities such as steel, cement, and natural gas that are also essential materials to oil sands production. They have fallen sharply during the recent economical downturn in 2007.¹²⁷ Eventually, it is also increasing labour costs that are from long-term perspective an important factor for investors to decide over future ventures. The government argues that it is its priority to keep oil sands investors in Alberta that high quality of life of Albertans is sustained.¹²⁸

ii. The budget of Alberta and The volatility of oil prices

The geological dispositions predestined Alberta to become the global leader in energy supplies. This presumption even supported Stephen Harper who proclaimed Canada as a future energy superpower on his official visit to China.¹²⁹ The raising demands and shrinking reserves of the conventional oil count with the Albertan oil sands as Alberta Energy Board estimated the extraction to double by 2030. However, the volatility of the oil prices on the international markets shows the fragility of the entire energy sector in Alberta. As shows the figure below, investment in oil sands between 2008 and 2009 decreased by almost fifty percent.¹³⁰ The higher oil price volatility and higher investment capital makes future investments in oil sands more risky. Thus oil companies wish to receive adequate guarantees from government to secure their initial investments. Those guarantees are implicitly anchored in lower royalties but also in lowering environmental standards by both federal and provincial government that is becoming more reluctant towards environmental law enforcement.^{131,132,133} One of the example might be the dissolution of NRTEE by

¹²⁷ Levi, "The Canadian Oil Sands," 8.

¹²⁸ Alberta Energy, "Progress Report 2011: Responsible Actions: A Plan for Alberta's Oil Sands," 3, <<http://www.energy.alberta.ca/pdf/OSSResponsibleActionsProgressReport2011.pdf>> (last access 9 April 2013).

¹²⁹ Harper, "Canada and China,"

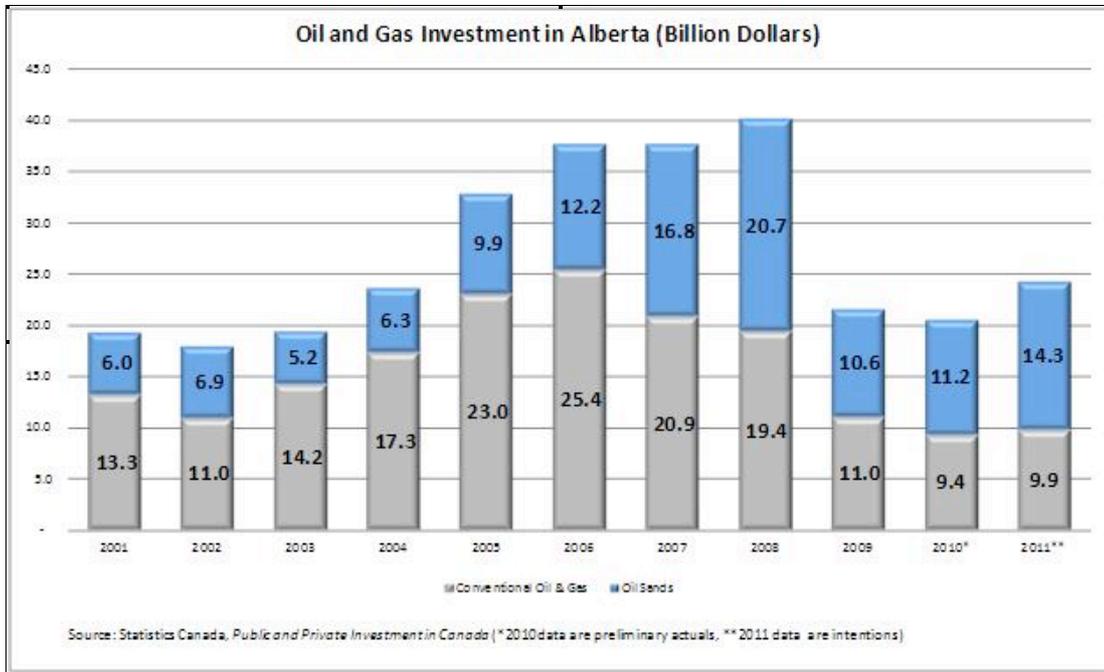
¹³⁰ Alberta Energy, *Facts and Statistics*, 2010, <<http://www.energy.alberta.ca/oilsands/791.asp>> (last access 15 January 2013).

¹³¹ Carys Mills, "Why Tory Decision to Shrink Environmental Role is no Surprise," *The Globe and Mail*, April 16, 2012. <<http://www.theglobeandmail.com/news/politics/why-tory-decision-to-shrink-environmental-role-is-no-surprise/article4100657/>> (last access 7 January 2013).

¹³² Shawn McCarthy et al., "Industries hail Ottawa's environmental oversight overhaul," *The Globe and Mail*, April 17, 2012. <<http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/industries-hail-ottawas-environmental-oversight-overhaul/article4100756/?from=4100657>> (last access January 13, 2013)

¹³³ Shawn McCarthy and John Ibbitson, "Ottawa to Unveil Sweeping Changes to Environmental Oversight," *The Globe and Mail*, April 16, 2012. <[http://www.theglobeandmail.com/news/politics/ottawa-to-unveil-sweeping-changes-to-environmental-](http://www.theglobeandmail.com/news/politics/ottawa-to-unveil-sweeping-changes-to-environmental-oversight/)

Harper's government after NRTEE released report that oil sands development will inevitably release more carbon dioxide and carbon emissions to the atmosphere, which basically violated Kyoto protocol that Canada has officially signed before withdrawing from future talks in 2008.¹³⁴



Source: Alberta Energy, Facts and Statistics: <http://www.energy.alberta.ca/oilsands/791.asp>

However, Alberta receives lower prize for its oil, because of the lower quality of Alberta's crude oil and because of unfavourable geographical location that makes oil companies operating in Alberta more difficult to reach the world's market. Alberta's crude oil is referred to as "heavy crude oil", which is usually thicker and more difficult to refine. Western Canada Select (WCS) is the benchmark for heavy crude oil in Alberta, including oil sands bitumen. WCS is cheaper than other crude oils produced in the world and by 2013 the WCS was priced at about \$58 a barrel which is much less compared to lighter crude oil such as West Texas Intermediate that is priced at \$94 a barrel.¹³⁵ Moreover, due to Alberta's geographical position, the crude bitumen from oil sands is difficult to be delivered to the market. That is why Alberta together with federal governments thrive to construct two new pipelines – first Keystone XXL to the south to

oversight/article4203069/> (last access January 20, 2013).

¹³⁴ Jeffrey Simpson, "Ottawa Kills the Emission Messenger," *The Globe and Mail*, June 20, 2012. <<http://www.theglobeandmail.com/commentary/ottawa-kills-the-emissions-messenger/article4350552/>>(last access April 3, 2013).

¹³⁵ Alberta Government, *Alberta's Heavy Oil Prices*, January 11, 2013.

<<http://www.energy.alberta.ca/Org/pdfs/FSheavyOilPrices.pdf>> (last access 17January 2013).

Mexican Gulf and second to Northbridge Gateway to the West coast of Canada to reach China - that are now key to the future of oil sands development in Alberta.

Michael Levi argues in his report *Canadian Oil Sands: Energy Security vs. Climate Change* that if Alberta's crude oil is going to be sold on the world markets, except the U.S. and Canadian energy market, the world price of oil will go higher.¹³⁶ He refuses the idea that if Canadian crude oil is delivered in the full scale to the world market, and that is by constructing those two pipelines, the price of oil sands will be stabilized. The Alberta Energy, the ministry responsible for energy security, argues that the problem, why the price for Alberta's oil is currently lower, is because this crude oil does not reach world's market and because Alberta receives lower price for its crude oil.¹³⁷ The stable price for Alberta's crude oil is important for Alberta's government, because currently there is a six billion deficit in 2013's budget. Alison Redford, the Prime Minister of Alberta, argues "discounted price for Alberta crude will inflict a 6 billion hit on the provincial treasury this year."¹³⁸ The government of Alberta blames this "high oil price volatility" for the increased and "unexpected" budgetary deficit. However, the truth is that the government counted with higher oil prices that eventually were much lower. In this respect, Alberta can hardly influence the price of oil on the world's market, but what can this government do, is to make a pressure to construct those proposed pipelines, that would secured an access of Alberta's crude oil to the world's market. However, the construction of those pipelines rise environmental concerns that point at higher environmental risk and possible accidents.¹³⁹

The Alberta's crude oil is a form of unconventional oil that is harder to extract and process. Those characteristics make oil sands more costly and thus increase the price of Alberta's crude oil. However, the price of oil on the world's market is decided on current supply and demand, which Alberta is less likely to influence. Redford's administration faces unexpected financial challenges caused by this lower price of oil, which will inevitably lead to program cuts. The budget of Alberta's environment has

¹³⁶ Levi, "The Canadian Oil Sands," 12

¹³⁷ Government of Alberta, *Fiscal Challenge*, <<http://alberta.ca/Fiscal-Challenge.cfm>> (last access December 3, 2012).

¹³⁸ Sarah O'Donnell, "Voters Refused to Blame Bitumen Bubble for Alberta's Financial Problems," *Calgary Herald*, April 25,

2013, <<http://www.calgaryherald.com/business/Poll+Voters+refuse+blame+bitumen+bubble+Alberta+financial+problems/8292068/story.html#ixzz2S4QuTf00>> (last access December 8, 2012).

¹³⁹ Shawn McCarthy, Environmental Agency Letter Adds to Uncertainty over Keystone, *The Globe and Mail*, April 22, 2013, <<http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/environmental-agency-letter-adds-to-uncertainty-over-keystone/article11492448/>> (last access April 23, 2013).

been cut by \$20 million for next year. It is though expected that there will be less money spent on environmental monitoring and proposed programs.¹⁴⁰

The approach of federal government and government of Alberta raises justifiable concerns about trajectory of Alberta in terms of sustainable development. The high government's subsidies to oil companies, higher tax reduction, extensive oil sands development and dependency on oil sands revenues are factors why Andrew Nikiforuk in his book *Tar Sands: Dirty Oil and Future of a Continent* claims that Alberta suffers from petro-state characteristics. The basic definition of petro-state refers to high dependence on oil resulting in a particular set of political-economic challenges captured in the "resource curse" concept.¹⁴¹ However, the scope of this paper does not allow exploring the social and political consequences of high oil dependency in Alberta.

¹⁴⁰ Josh Wingrove, "Bitumen Bubble Means a Hard Reckoning for Alberta, Redford Warns," *The Globe and Mail*, January 24, 2013, <<http://www.theglobeandmail.com/news/national/bitumen-bubble-means-a-hard-reckoning-for-alberta-redford-warns/article7833915/>> (last access January 27, 2013).

¹⁴¹ Angela V. Carter, "Regulating the Environmental Impacts of Alberta's Tar Sands," *Buffet Center for International and Comparative Studies Working Papers: Energy Series* (2010): 23.

D) Case study: Oil Sands and water resources

a. The management of sustainability of water resources: Federal and provincial perspective

i. Federal perspective on water sustainability

In Canada, there are over twenty federal agencies covering eleven pieces of legislation dealing with environmental protection issues related to water resource management.¹⁴² However, the key federal document on water management is the Federal Water Policy adopted in 1987, which recognized that the federal government must provide leadership in water management. It is believed that “federal leadership is necessary to create constituency across all provinces and territories, build cross-boundary collaboration and help save money by providing strong guidance that could reduce duplication of efforts.”¹⁴³ The Canada Water Act requires the federal government to “provide data on the quality of Canadian waters through research and monitoring” and also allows the federal government to enter into shared monitoring with provinces.¹⁴⁴ The Canadian Environmental Protection Act “obligates the Government of Canada to establish and maintain environmental monitoring systems, including for water.”¹⁴⁵

Sustainable use of water requires, according to Peter Gleick “the maintenance of a desired flow of benefit to a particular group or place, undiminished over time whereas the benefits involve cultural values and issues, and are a function of the stock of, and the demand for water, both of which vary with technology and population.”¹⁴⁶ He supports the idea that water is not only essential to sustain life, but it also plays an integral role in ecosystem support, economic development, community well-being, and cultural values.¹⁴⁷

¹⁴² National Round Table on the Environment and the Economy, *Changing Currents: Water sustainability and the future of Canada's Natural Resource Sector* (Ottawa: NRTEE, 2010): 47.

¹⁴³ Karla Zubrycki et al., *Water Security in Canada: Responsibilities of the Federal Government* (April: International Institute for Sustainable Development, 2011), 6

¹⁴⁴ Ibid, 19.

¹⁴⁵ Environment Canada, *The Canadian Environment Protection Act*, 1999, <<http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=24374285-1>> (last access November 19, 2012).

¹⁴⁶ Peter H. Gleick, “Water in crisis: Paths to sustainable Water Use, Ecological Applications,” *Ecological Application* 8 (1998): 573.

¹⁴⁷ Ibid., 573.

According to the “Environment Canada” Canada has seven percent of the world’s total renewable freshwater supply and Canadians are among the highest water users per capital in the world.”¹⁴⁸ Water is essential for the Canadian economy, “approximately sixty percent of Canada’s GDP is directly dependent on water for sectors such as resource extraction, manufacturing and the producing and processing of food.”¹⁴⁹ The demands for water are increasing as Canada’s population is expected to increase by twenty-five percent and Canadian economy is predicted to grow fifty-five percent by 2030¹⁵⁰ and thus federal government is obliged to take adequate measures to assure the sustainable management of its water resources.

In this respect the *Federal Sustainable Development Strategy* (FSDS) defines “the maintaining water quality and availability” as one of the four priorities of federal government’s sustainable development strategy. On the subject of the water quality “access to safe, clean water is a crucial for Canadians and the government of Canada is”, states the FSDS, “committed to ensuring that everyone has access to a reliable and secure supply of clean water, and that our water resources are used wisely, both economically and ecologically.”¹⁵¹ Concerning water availability Environment Canada wishes to “ensure that Canadians can manage and use water resources in a manner consistent with the sustainability of the resource.”¹⁵²

The National Round Table on Economy and Environment’s report, *Changing Currents: Water Sustainability and the future of Canada’s natural resource sector of 2010* confirmed the idea that “water must be managed sustainably to ensure the continued economic prosperity of Canada’s natural resource sectors.” It not just strengthens the economic dimension of water ecosystems, but also the federal government’s belief that “managing water from a supply perspective alone can pose risks to both the environment and society when there is little to no consideration for the needs of natural environment.”¹⁵³

¹⁴⁸ Environment Canada, *Planning for a sustainable future: A Federal Sustainable Development Strategy*, October 2010, <<http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=16AF9508-1>> (last access January 23, 2013).

¹⁴⁹ Ibid.

¹⁵⁰ National Round Table on the Environment and the Economy, “Changing Currents,” 15.

¹⁵¹ Environment Canada, “Planning for a Sustainable Future”.

¹⁵² Ibid.

¹⁵³ National Round Table on the Environment and the Economy, “Changing Currents,” 47.

ii. Alberta's perspective on water sustainability

The *Constitutional Act* defines that provinces and territories exercise direct control over natural resources, which grants Alberta the responsibility over its water resources. The government of Alberta “owns the rights to all water within its borders, and through legislation, regulates all developments and activities that might impact rivers, lakes and groundwater.”¹⁵⁴ In Alberta, the key piece of legislation to water management is the *Water Act*, which applies to all surface water and groundwater. Alberta’s “Water Act” provides an example of a provincial measure that enables the protection of the aquatic environment in specific watersheds. The Act enables the Crown to develop in-stream flow requirements and withhold up to fifteen percent of flows through the use water conservation objective if it is in the public interest.¹⁵⁵ Alberta Environment, a ministry primarily responsible for management of water resources, is authorized to issue licenses to use of fresh water. Alberta grants the allocations on the basis of the “first in time, first in right” principle. It means that all water diversions and use of water are prioritized according to the age of license, rather than the indented water use.¹⁵⁶ This aspect is being criticized by many non-governmental organizations, because some projects that have been operating in oil sands might have environmental impact.

In 2003 Alberta developed a unique sustainability framework for managing its water resources in the *Water for Life: Alberta's Strategy for Sustainability*, it states that “in Alberta, the quality of life, and life itself, depends on having a healthy and sustainable water supply for the environment, for communities and economic well-being.”¹⁵⁷ . This strategy was designed to meet the challenge posed by the increasing demand for water in the province. Here the government committed its means to manage its water resources, both the water’s quantity and quality. It stated three key goals to achieve desired sustainability of water resources in Alberta: First goal is to assure that drinking water for Albertans is safe; Second goal ensures that the province’s aquatic ecosystems are maintained and protected; and third goals assures that water is managed

¹⁵⁴ Mary Griffiths et al., *Troubled Waters, Troubling Trends: Technology and Policy Options to Reduce Water Use in Oil and Oil Sands Development in Alberta* (The Pembina Institute, 2006), 34.

¹⁵⁵ National Round Table on the Environment and the Economy, “Changing Currents,” 40.

¹⁵⁶ Ibid.

¹⁵⁷ Alberta Environment, *Water for Life: Alberta's Strategy for Sustainability*, November 2003, 2, <<http://www.waterforlife.gov.ab.ca/docs/strategyNov03.pdf>> (last access January 12, 2013).

effectively to support sustainable economic development.¹⁵⁸ The strategy set a target of a thirty percent improvement in the efficiency and productivity of water between 2005 and 2015. There were many factors that pushed the government to decision over finding sustainable approaches towards its water resources due to population growth, droughts and agricultural and industrial developments and the risk to drinking water safety

b. The oil industry and its impact on water resources in Alberta

i. Water resources in Alberta and oil sands industry

Approximately two and four barrels of water are required to produce a barrel of synthetic crude oil from oil sands in Alberta.¹⁵⁹ Water is thus an essential ingredient in extraction, upgrading and refining processes of oil sands development. The predictions shows that the number of mining operations will increase as new projects have been signed and await realization. Since 2000 the production of bitumen expanded exponentially from 0.7 to 1.6 million barrels per day and the production is expected to double.¹⁶⁰ This increase of new projects will inevitable lead to increase in the demand on water resources as oil sands operations are completely dependent on the use of water. The impact of oil industry on water is still less studied while comparing the attention paid to the increased GHG emissions. This is perhaps because of local nature and much greater complexity of water issues in Alberta. This projection raises many questions about water sustainability in Alberta. However, it is mainly a responsibility of government of Alberta that needs to take adequate measures to secure the access to healthy and reliable sources of water to both Albertan citizens and energy industry. However, Alberta's monitoring programs have been recognized as being inadequate, indicating a need for improved data acquisition and transparent reporting.¹⁶¹

Alberta in turn holds approximately 2.2 percent of Canada's freshwater.¹⁶² Alberta is a large province over 660, 000 square kilometres with rivers flowing to the Arctic Ocean, Hudson's Bay, and the Gulf of Mexico. Those rivers mostly originate

¹⁵⁸ Ibid. 3.

¹⁵⁹ Alberta Energy, *Facts and Statistics*, <<http://www.energy.alberta.ca/oilsands/791.asp>> (last access February 3, 2013).

¹⁶⁰ Sarah M. Jordan, "Land and Water Impacts of Oil Sands Production in Alberta", *Environmental Science and Technology*, 46 (2012): 3615.

¹⁶¹ Pierre Gosselin et al., "Royal Society of Canada. Environmental and Health Impacts of Canada's Oil Sands Industry" (report of the Royal Society of Canada Expert Panel, Ottawa, 2010), 34.

from glaciers and snowpack in the Rocky Mountains. The amount of water that will influence the water flow in Alberta's rivers depends on season and precipitation. In summer time the river flow is usually higher, because of snow meltdown in the mountains. In contrast during the winter period the levels of water are usually lower and reserves are attributed to groundwater flow. Situations of water scarcity can arise at times during the year, or in lower flow years, when water demand accounts for a larger percentage of supply.¹⁶³ Although Alberta has a good supply of water, variations in geography, climate, and the hydrologic cycle create regions and periods of water scarcity. So thus environmental events such as droughts and flooding add to the variability of water quantity throughout Alberta.

In Alberta, water diversions are managed primarily through a system of water licences issued by Alberta Environment under the Water Act. Municipalities, private companies, individuals, and others can apply for a licence to divert water.¹⁶⁴ Water allocation for energy production in Alberta in 2007 was about 33% of total allocations. Out of those 33% then 7% of total water allocation was for the production of oil and gas both from surface and groundwater.¹⁶⁵ Within the groundwater the proportion of water allocated for oil industry related activities was around 42%, which is disproportionately higher than at surface water allocation. Those water allocations are regulated under the Water Act that issues licences for a fixed term. This has been reverted, because before the Act was adopted in 1999, the licences were granted in perpetuity. Although there are still some oil companies holding water licences for perpetuity. This volume of water allocated to oil industry might seem smaller than comparing to water allocated to irrigation or municipal needs, which is proportionally much higher. However, in 2007, approved oil sands mining operations licensed to divert 349 million cubic meters of water per year, which is the same amount of water satisfying three million people with their water needs.¹⁶⁶

About 97% of water used in oil sands development comes directly from surface water, mostly from rivers, and the rest volume is allocated from fresh groundwater.¹⁶⁷ There is a difference in the allocation of groundwater for energy production, because the

¹⁶² Alberta Environment, *Water For Life*, 5.

¹⁶³ *Ibid.*, 6.

¹⁶⁴ *Ibid.*, 34.

¹⁶⁵ Griffiths et al., "Troubled Waters", 5.

¹⁶⁶ Andrew Nikiforuk, "Dirty Secrets," *Explorer* (2007): 60.

¹⁶⁷ Mary Griffiths and Dan Wyonillovicz, *Heating Up in Alberta: Climate Change, Energy Development and Water* (The Pembina Institute, 2009), 26

percentage of water use for oil sands processing is higher compared to water used in cooling. One of the problems elevated from allocation of water to oil industry is that water after processing is not being returned to its source and it remains either stored in tailing ponds or underground. So for example allocation for commercial cooling, as it is also the largest water allocation for energy production, discharges majority of water back to its source. In contrast, the water used for industrial processing of oil sands is all consumed and none of this water used for injection is returned to its source.¹⁶⁸

ii. Main challenges

The main challenge that is posed by oil industry to water resources in Alberta is to reduce withdrawals from surface water and to sustain surface water quality. To government of Alberta the biggest challenge is to measure the impact of oil industry on groundwater due to lack of data. However, the issues of water sustainability are far more complex, and there more concerns are identified such as cumulative impact of oil industry, climate change or tailing ponds.

Although 93% percent of oil operations are in situ, which requires less water to sustain operation; surface water from river streams and aquifers is the major source of water for oil sands industry. The main challenge is thus to find the balance between how much oil industry can withdraw from surface water reserves and what river flow needs to be preserved in order to sustain water ecosystem. In 2007 the overall water allocation was over 550 million cubic meters a year. Out of this volume the largest source of surface water is the Athabasca River whereas over 800% of water was allocated directly from it.¹⁶⁹ According to Alberta government, all existing and approved oil sands projects together will withdraw less than 3% of the average annual flow of the Athabasca River. However, there the river systems are subjected to different conditions as a result of changing annual seasons. So during winter season when the river flow is naturally lower, water consumption is limited to the equivalent of 1.3 percent of annual flow.¹⁷⁰ This means that industrial users will be restricted to withdraw less than half of their normal requirements for water absorption. The problem of large water withdrawals has negative impact on the entire aquatic ecosystem. Sarah Jordan from Harvard

¹⁶⁸ Griffiths et al., "Troubled Waters," 13.

¹⁶⁹ Griffiths and Wyonillowicz, *Heating Up in Alberta*, 26

¹⁷⁰ Alberta Government, *Alberta Oil Sands: Resourceful, Responsible*, September 2008, 5.

University emphasizes this aspect in her study *Land and Water Impacts of Oil Sands Production in Alberta* that “withdrawals may affect a larger portion of fish habitat and decrease the amount of dissolved oxygen available to fish in the winter that may delay hatching, change the mass of post hatched fish and change spawning periods for certain species of fish.”¹⁷¹

With the increasing number of in situ projects, there will be an increasing demand for groundwater, thus larger impact on groundwater is expected. If considering scale of in situ operations, when more than 242 million barrels of bitumen were recovered in 2009, the annual water withdrawals are significant.¹⁷² It is also important to emphasize that over 93% of oil deposits in Alberta are situated below 75 meters and thus accessible only by using in situ technique. In situ basically injects hot steam mixed with toxics and chemicals under high pressure underground and pump the liquefied bitumen back to the surface. This injection of water under high pressure causes the depressurization of the basal aquifer.¹⁷³ It means that when steam of hot water is pumped under higher pressure to underground and retrospectively pumped on the surface with bitumen, it causes a decrease in the pressure and water levels in the entire aquifer around the injection well. The Pembina Institute argues in their research report *Troubled Waters, Troubling Trends: Technology and Policy Options to Reduce Use in Oil and Oil Sands Development in Alberta* that this decrease in pressure can cause water from aquifers close to the surface to “leak” down, which can cause lowering of water in wetlands, reduce discharge of groundwater to streams, lakes and wetlands and it can also impact the lowering of the water table.”¹⁷⁴ Another concern is the lack of data provided to monitor the impact of in situ mining technique to groundwater, because the hot steam being injected underground is a mix of dangerous materials. In another report *Water Resources and Quality: GPI Technical Report* prepared by the Pembina Institute it is though argued that longer-term implications on groundwater are not fully known, as the seismic holes, the result of in situ drilling, can form surface pollutants to enter the

¹⁷¹ Jordan, “Land and Water,” 3615.

¹⁷² The Council of Canadian Academies, *The Sustainable Management of Groundwater in Canada, Report of the Expert Panel on Groundwater*, 2009, 146.

¹⁷³ Griffiths et al., “Troubled Waters.”³

¹⁷⁴ Wyonillowicz, *Oil Sands Fever*, 31.

ground.”¹⁷⁵ It also states “by now there has been hundreds of thousands of seismic holes drilled each year in Alberta while searching for oil and gas.”¹⁷⁶

The oil sands industry in Alberta often argues that due to technology development they managed to reduce the impact on environment and that there is weak evidence claiming industries of pollution. This argument has been questioned by many scientists such as David Schindler, Erin Kelly or Daniel Woynillowicz opposed that there has been little attention paid to cumulative environmental impact of oil industry on Alberta’s environment. The cumulative environment impact explains, “The accumulation of impacts may appear insignificant on their own but can lead to significant and often irreversible ecological damage.”¹⁷⁷ The depressurization of aquifers due to in situ mining technique illustrates how the hot steam injection in one place can result in reduced groundwater flows to wetlands and other surface water bodies. This impacted areas by the drawdown effect of water removal was estimated to be up to one hundred square kilometres.¹⁷⁸

Another example of the misuse of water reserves is storage of used water in tailing ponds. Tailing ponds are a water mix of clay, sands, hydrocarbons, and heavy metals that remains after production process.¹⁷⁹ According to the Canadian Association of Petrol Producers (CAPP) oil sand projects recycle 80-95% of the water used.¹⁸⁰ However, other report from the WWF shows that only 5-10% is returned to the river, because the rest is too toxic and must be stored in tailing ponds.¹⁸¹ Tar Island Dyke is one of the oldest tailing ponds constructed in the 1967. It encompasses the surface area of 170 square kilometres with four kilometres in length and ninety-one meters in height. It has been argued that there are leaks releasing millions of litres of toxic water everyday down to the groundwater reservoirs and to neighbouring the Athabasca River.¹⁸² The biggest threat of tailing ponds lies in the presence of dangerous chemicals

¹⁷⁵ Sara Wilson et al. , *The Alberta GPI Accounts: Water Resource and Quality* (The Pembina Institute, 2001), 26.

¹⁷⁶ *Ibid.*,28.

¹⁷⁸ *Ibid.*,29.

¹⁷⁹ World Watch Institute, *Oil Sands Could Threaten Millions of Migratory Birds*, 2012, <<http://www.worldwatch.org/node/6052>> (last access March 3, 2013).

¹⁸⁰ Canadian Association of Petroleum Producers, *Water Use In Canada’s Oil Sands: Statistical Handbook*,” *Canadian Association of Petroleum Producers*, 2009, (last access March 4, 2013) <<http://www.capp.ca/getdoc.aspx?DocId=193756>>.

¹⁸¹ James Leaton, “Unconventional Oil: Scraping the Bottom of Barrel,” *Word Wildlife Foundation* (2010): 65.

¹⁸² Kevin Timoney and Peter Lee, “Does the Alberta Tar Sands Industry Pollute? The scientific evidence,” *Open Conservation Biology Journal* 3 (2009): 72.

and toxins known as PAH (Polycyclic Aromatic Hydrocarbons). According to Timoney and Lee fourteen out of twenty-five PAH's carcinogens.¹⁸³ Tailing ponds represent direct dangers to the environment. Not just for the leeks, but also for the migratory birds.

The leaks of toxic materials into water systems from tailing ponds are an example of possible threats that are posed by the increasing development of oil sands. This is also a main argument of many environmentalists groups such as Greenpeace International who warns about future oil spills or pipelines accidents.¹⁸⁴ In this respect David Schindler argues that "if any of these tailing ponds ever burst the world would forever forget about the Exxon Valdez."¹⁸⁵

The scope of water resource sustainability is also discussed within global context of climate change that is referred to be the trigger of Athabasca glacier meltdown. David Schindler points out that the Athabasca Glacier has receded over 1.5 kilometres in the last century and the annual loss of ice is now over 16 million cubic meters greater than the annual recharge.¹⁸⁶ The loss of Athabasca Glacier will have a direct impact on river flow in the Athabasca River and the entire ecosystem as increased evaporation, dry ups, wetlands decline in the quantity of water in rivers and streams will follow.¹⁸⁷ However, there is not a direct relation confirmed that oil sands development would directly contribute to the meltdown of the Athabasca Glacier. It is primarily a cause of multiply factors within global warming that is responsible for this glacier withdrawal that cannot be easily quantified.

iii. The oil industry and Athabasca River

The Athabasca River is the longest river in Alberta and one of the longest free-flowing rivers in the North America. It originates as most of Alberta's rivers in the

¹⁸³ Ibid., 73.

¹⁸⁴ Mike Hudema, "Another Tar Sands Spill you Never Heard About," *Greenpeace Canada*, April 2, 2013, <<http://www.greenpeace.org/canada/en/Blog/another-tar-sands-spill-you-never-heard-about/blog/44545/>> (last access January 3, 2013).

¹⁸⁵ Nathan Lemphers, *Are the Oil Sands Prepared for a Worst-case Scenario? Research Assignment Turns into Wild Goose Chase* (The Pembina Institute, 2010), <<http://www.pembina.org/blog/391>> (last access March 17, 2013).

¹⁸⁶ David W. Schindler and William F. Donahue, "An Impending Water Crisis in Canada's Western Prairie Provinces," *Proceedings of the National Academic Sciences of the United States of America* 103 (2006): 7213.

¹⁸⁷ David W. Schindler. "The Cumulative Effects of Climate Warming and Other Human Stresses on Canadian Freshwaters in the New Millennium," *Canadian Journal of Fisheries and Aquatic Sciences* 58 (2001): 22.

Rocky Mountains and it make its way through the Lake Athabasca to the Arctic Ocean. The Alberta River Basin is though much bigger than river stream and covers an area of approximately 159,000 km². The Athabasca River merges with The Peace River and forms Peace Athabasca Delta, which is the world's largest inland freshwater deltas and is a wetland of international significance.

The Alberta River Basin is an important watershed providing habitat for large populations of species and ecosystems. Continued withdrawals of fresh water for oil sands development threaten the ecological sustainability of the Athabasca River, especially during winter periods, when the river flow is usually lower. There is an increased concern when more water is withdrawn from the Athabasca River that ecological integrity of this river systems will be significantly shattered. The Athabasca River is also an important migratory route for many species especially fish.

The *Federal Sustainable Development Strategy* issued by federal government in 2010 is aware of the value of natural capital and its essential life-supporting functions that ecosystems provide. It states that in 2005 Canada's natural resource wealth crossed the trillion-dollar mark whereas boreal forest provided the net economic value of natural capital extraction of \$50.9 billion.¹⁸⁸ Moreover the non-economic value of its ecosystem services was estimated at \$703 billion. In the same time Pembina Institute reported that Alberta's original wetland ecosystem has disappeared by 60 percent since 1966 due to agricultural and other industrial development.¹⁸⁹

Northern part of Alberta is also an important transient area of spring migratory birds. Athabasca delta is the most important waterfowl in Canada whereas 16,000 birds fly over the area every spring.¹⁹⁰ There have been several cases where migratory ducks died in the tailing ponds while flying over the region. In 2009 over 1600 ducks died in one of the tailing ponds operated by the Canadian oil company Syncrude.¹⁹¹ The birds were not able to recognize the tailing pond from a regular lake, and that is why they land on the surface of tailing ponds. There is a hope to challenge the current situation,

¹⁸⁸ Environment Canada, *Priorities for Environmental Sustainability in "Planning for a sustainable future: A Federal Sustainable Development Strategy*, October, 2010, < <http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=16AF9508-1>> (last access November 11, 2012).

¹⁸⁹ Mark Anielski et al., *Alberta Sustainability Trends 2000: The Genuine Progress Indicators Report 1961 to 1999* (The Pembina Institute: 2001), 24.

¹⁹⁰ *Ibid.*, 26.

¹⁹¹ Bob Weber, "Syncrude Guilty in Death of 1,600 Ducks in Toxic Tailing Pond," *Toronto Star*, January 25, 2010, <http://www.thestar.com/news/canada/2010/06/25/syncrude_guilty_in_death_of_1600_ducks_in_toxic_tailing_pond.html> (last access December 17, 2013)

because a group of environmental agencies and non-governmental organizations under Ecojustice petitioned the Minister of Interior of the United States to certify to president the “failure of Canadian tar sands extraction to prevent or mitigate the impacts on migratory bird species” in September 2011.¹⁹²

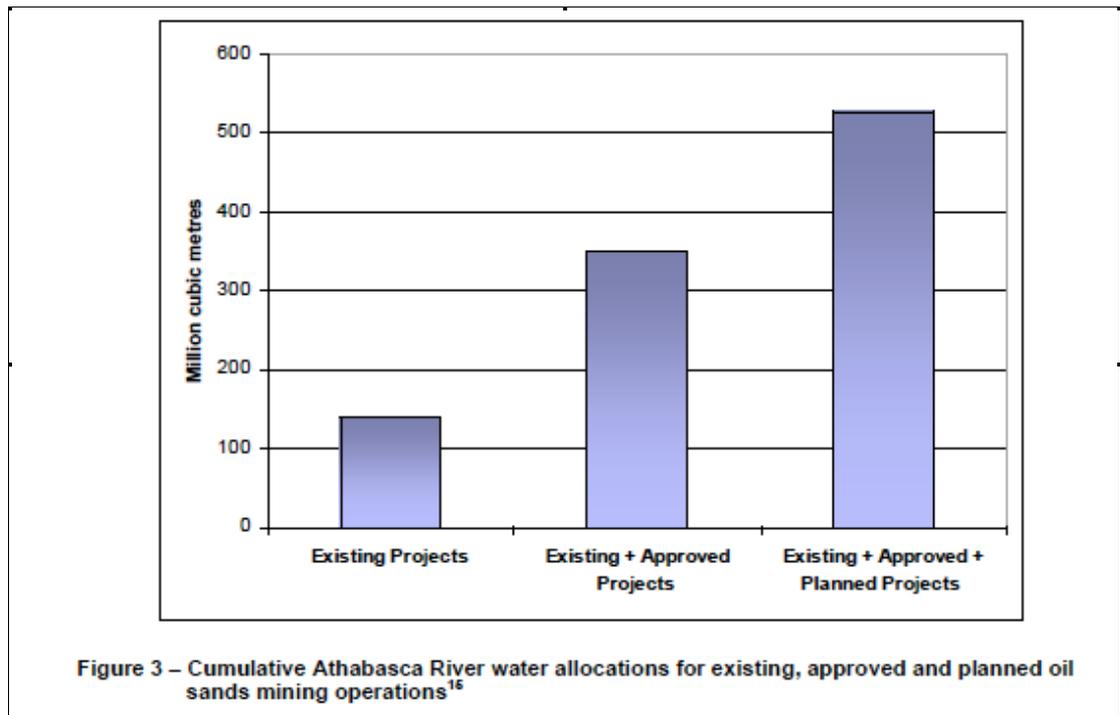
There are several legal acts prohibiting the killings of migratory birds such as *Federal Migration Birds Act* that makes illegal to drown ducks and geese in bitumen tailing ponds or *Migratory Bird Convention*, signed on behalf of Canada, the U.S. and Great Britain in 1916 that makes unlawful “by any means or in any manner” to take, kill, or attempt to take or kill any migratory bird, nest, or egg to any such bird¹⁹³ or *Canada Species at Risk Act*¹⁹⁴ from 2002 which protects the animals within national parks. The last mentioned legislation has been severely criticized, because it protects the animals just within the national parks and do not require the provincial government to act beside the legislation’s framework.

Oil sands surface mineable deposits in the Athabasca watershed contain over hundred and ten billion barrels of bitumen and underlie an area of 2800 square kilometers. Sixty-five percent of the water withdrawals from the Athabasca River are used for oil sands mines and most of those withdrawals are not returned to river because they contain higher than acceptable levels of toxic materials. Alberta Environment granted to divert 349 million cubic meters of water per year to oil industry. This volume is expected to increase with new projects signed to 529 million cubic meters per year. On the figure below, there is a comparison of “Cumulative Athabasca River water allocations for, existing, approved and planned oil sands mining operations” prepared by the Pembina Institute that illustrates the increasing demand for water.

¹⁹² “Birds migration petition,” *Ecojustice*, 2010, <<http://www.ecojustice.ca/media-centre/media-release-files/tar-sands-pelly-petition>> (last access December 19, 2013).

¹⁹³ Ibid.

¹⁹⁴ “Endangered Species Legislation,” *David Suzuki Foundation*, <<http://www.davidsuzuki.org/issues/wildlife-habitat/science/endangered-species-legislation/canadas-species-at-risk-act/>> (last access January 12, 2013).



Alberta Environment prepared *Interim Framework: Instream Flow Needs and Water Management System for Specific Reaches of the Lower Athabasca River*, which is an official response towards increasing demands on water issues from oil industry in Athabasca watershed. This framework identifies flow regimes, which are designed to manage the increasing risk of impacts associated with declining river flows, and limit withdrawals.¹⁹⁵ It differs three stages “green, yellow and red” in which each of color signifies whether water withdrawals from the Athabasca River are possible or not. The Pembina Institute criticizes this governmental framework because it uses for oil sands water withdrawals targets that are set on voluntary basis. The Pembina Institute suggests imposing mandatory limits with no withdrawals during red conditions.¹⁹⁶ However, even government’s Interim Framework is not a solution to the fact that the amount of Water in the Athabasca River is decreasing and the ecosystems has its limits.

A research team of scientists from think tank Ceres claims in their report *Canada’s Oil Sands: Shrinking Window of Opportunity* that “Oil sands companies could run out of adequate winter water supplies as early as 2014.” So this poses the “sustainability” of future oil sands extraction at stake, because if the amount of water from the water system of the Athabasca River, that is known to be decreasing and the

¹⁹⁵ Alberta Environment and Fisheries and Oceans Canada, *Water Management Framework: Instream Flow Needs and Water Management System for the Lower Athabasca River*, February, 2007, 9.

¹⁹⁶ Griffiths et al., “Troubled Waters,” 45.

river flows are in each season fluctuating, the vary oil extraction in the future will technically be not possible.

In this respect even The National Energy Board has questioned the sustainability of water withdrawals in their report *Canada's Oil Sands: Opportunities and Challenges to 2015*, stating “ At current rates of withdrawal from the Athabasca River, there would be insufficient volumes to support all the announced oil sands mining projects. River flows are low in the winter and the removal of large volumes of water during these periods is a concern.”¹⁹⁷ Eventually Department of Fisheries and Oceans (DFO) has noted in an October 2010 report, “A flow should be established for the Lower Athabasca River below which there would be no water withdrawal. This flow should be established using a precautionary approach.”¹⁹⁸

Official response of Alberta Environment to increasing concerns about preservation of Athabasca River was the creation of the Regional Aquatic Monitoring Program, originally funded by oil industry, which aim is to collect and analyze data on water quality. In their recent annual reports, it was repeatedly claimed, “differences in water quality were negligible low.”¹⁹⁹ In 2010 an independent research team of scientists lead by David Schindler and Erin Kelly made a research on the water quality in the Athabasca River and found different results from RAMP reports. They found that “levels of the pollutants cadmium, copper, lead, mercury, nickel and zinc exceeded federal and provincial guidelines of the protection of aquatic life in melted snow or water collected near or downstream from oil sands mining.”²⁰⁰ David Schindler and Erin Kelly, in another independent research study in collaboration with other scientists, warned the Alberta Environment in their previous report from 2009 about the higher

¹⁹⁷ National Energy Board, *Canada's Oil Sands - Opportunities and Challenges to 2015: An Update - Questions and Answers*, 2011, <<http://www.neb.gc.ca/clf-nsi/rnrgynfntn/nrgyrprt/lsnd/pprntnsndchllngs20152004/qapprntnsndchllngs20152004-eng.html>> (last access November 22, 2013).

¹⁹⁸ Fisheries and Oceans Canada, *Sciences Evaluation of Instream Flow Needs for the Lower Athabasca River, Canadian Sciences Advisory Secretariat Sciences Advisory Report*, September 2010, 3, <http://www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010_055_e.pdf> (last access November 22, 2012).

¹⁹⁹ RAMP reports (2010,2011,2012) <http://www.ramp-alberta.org/UserFiles/File/AnnualReports/2010/RAMP_2010_Final_Executive%20Summary.pdf
http://www.ramp-alberta.org/UserFiles/File/RAMP_2011_Final_Executive_Summary.pdf
http://www.ramp-alberta.org/UserFiles/File/AnnualReports/2012/RAMP_2012_Final_Executive%20Summary.pdf> (last access March 6, 2013).

²⁰⁰ David W. Schindler et al., “ Oil Sands Development Contributes Elements Toxic at Low Concentrations to the Athabasca River and its Tributaries”, *Proceedings of the National Academy of Sciences of the United States of America*, 2010, <<http://www.pnas.org/content/107/37/16178.long>> (last access March 6, 2013).

presence of PAC in the Athabasca River, “oil sands industry is a far greater source of contamination than previously realized.”²⁰¹

Current oil sands development in the Athabasca River Basin impacts the ecological sustainability of the River through in situ injections to groundwater and mining of its tributaries that provide an important habitat for large volume of species. The government of Alberta fails in guaranteeing the protection of the Athabasca River with *Interim Framework* nor proposed *Water for Life Strategy*. Alberta Water Council, authorized advisory body by Alberta Environment, revised the implementation of *Water for Life* strategy and issued a report that claimed “There was a concern that research and technology is unable to sustain the planning envisioned by the Alberta *Water for Life Strategy*.”²⁰² It is also a matter of concern of federal government that is according to Canadian Fisheries Act responsible for the maintenance of fish populations and fish habitat and thus the Department of Fisheries and Oceans must evaluate whether the Alberta’s proposed “measuring framework” will achieve these responsibilities. With new oil sands project proposals and increasing demands on water resources in the Athabasca River Basin, this concern will not be diminished, because water is also an essential ingredient to run oil sands development.

²⁰¹ Schindler et al., “Oil Sands Development Contributes Polycyclic Aromatic Compounds to the Athabasca River and its Tributaries,” *Proceedings of the National Academy of Sciences of the United States of America*, 2009, <<http://www.pnas.org/content/106/52/22346.full?sid=d3d5ab92-d660-4b9c-8d26-23c13100e193>> (last access April 12, 2013).

²⁰² Alberta Water Council, *Renewal Water for Life Strategy, Summary of Response to Engagement*, October 5, 2007, 6, <<http://www.awc.ca/Portals/0/pdfs/Renewal%20WWH%20%20Final%20Report.pdf>> (last access March 6, 2013).

Conclusion

As shown in the introduction, sustainable development is a concept aiming at integrating the environment and society into a decision-making process. However, Canada has created this image of being a leader in environmental issues, based on the report of the Fraser Institute or the research report of the University of Victoria. This thesis suggests that Canada has been lacking behind in demonstrating high environmental performance. This presumption was also confirmed by research studies of Boyd and Toner who focused on the implementation of environmental provisions in Canadian legislation. Both proved that Canada lags behind in sustainable development implementation and its enforcement due to regular financial cuts to environmental ministries, a reluctance from politicians in adopting sustainability measures and the exclusion of sustainable development institution outside the executive branch.

The theoretical background of stronger and weaker sustainability offered me two approaches on how to grasp the concept of sustainable development. The weaker sustainability that was represented by major works of Sollow or Hartwick proposed the idea that the depletion of natural resources is acceptable under a condition that the revenues obtained from natural capital will be reinvested into produced capital. This neoclassical economic approach was contrasted with the stronger sustainability approach represented by Daly and Daily. They suggested strengthening environmentally protective measures that would secure the overwhelming depletion of natural resources, referred to as a natural capital. If the official definitions of sustainable development that are encompassed in the Brundtland Report signed by Canada and the *Federal Sustainable Development Act* are taken into consideration, it suggests that Canada has been representing the stronger sustainability approach, which would in this respect implicitly require stronger protective measures of the environment. However, based on a large literature review the thesis concludes that the government of Canada represented the weaker sustainability approach, which was reflected in the weaker environmental law enforcement. The case study on oil sands industry impacting water resources in the Athabasca River demonstrated the reluctance of Alberta in that value of their wetlands has been wiped out in the Athabasca River basin.

The sustainable development concept requires freedom of access to information and environmental transparency. The research outcomes of David Schindler proved that

the government has been providing disproportionate information to its citizens regarding the negative environmental impact of the oil sands industry in the Athabasca River basin. The results of his research were in strong opposition to the government's proposed data in the RAMP reports. This discrepancy between the result of government issued research and the independent research study articulates a concerning tendency about the relevance and trustworthiness of provided information. Moreover, there are many stakeholders involved and if the results of Schindler's research were considered to be relevant, the health of water ecosystems as well as of Alberta's citizens would be seriously questioned.

While comparing the data provided by Alberta's official sustainability report *Measuring Up* to Pembina's *Genuine Progress Indicator* the results showed that Alberta's environmental performance was decreasing. The Pembina Institute argues that it is due to increased environmental degradation caused by oil sand operations that was not reflected in *MU*. Based on the comparisons between *MU* reports since 2000 to 2010, it did not include the possible negative impact of oil sands industry. This thesis also included indicators related to water resources. Comparing *MU* and the *GPI*, there was a significant distortion in results. That was because *MU* tracked less water sustainability indicators than the *GPI*. *MU* only focused on "Water Index Quality" that remained almost unchanged. The *GPI* on the other hand tracked five water related indicators providing different image. If other reports by the Pembina Institute on decreasing water scarcity and increasing pressure on the Athabasca River were included into *MU*, it would suggest different outcomes, as were found in the *MU* reports. However, this thesis concludes that other indicators than the Water Quality Index should be reflected in a controlled system in order to provide the Albertan government with a relevant monitoring mechanism. Although the Alberta economy has been exponentially increasing, its environmental record is much more ambiguous.

SD also refers to intergenerational equity that was identified in the definition of SD in the Brundtland Report. This principle of equity would suggest that the revenues from natural resources would be redistributed equally and it would also think on future generations. However, there is a serious concern that Alberta fails to think on future generations, what has actually been confirmed in the reports prepared by the Fraser Institute about Alberta's incapability to save revenues to the Heritage Fund. The current fiscal problems of Alberta's government have actually proved that Alberta has not coped with the dependency on the income from one commodity. The government of

Alberta has serious difficulties in managing “sudden” budget deficit that was a result of false predictions of the oil price on the world’s market. This will inevitably be a challenge for future representatives of the Alberta government to balance this discrepancy.

An increasing economic contribution of oil industry to Alberta as well as whole national economy puts Canadian and Albertan governments in an unenviable situation on how to balance economic development and environmental protection. Stephen Harper’s current government showed a high reluctance towards environmental issues after it cut funding to the NRTEE, it also released information about increasing GHG emissions from Alberta’s oil sands and it abandoned the U.N. talks on reducing carbon emissions within the Kyoto protocol. The serious findings of David Schindler in the Athabasca River actually reveals the real problem and that the government is officially providing misleading data and disgracing scientific research.²⁰³ Alberta Environment issued on Schindler’s finding from 2010 another report also from independent scientists that twisted the negative outcomes of Schindler’s research.²⁰⁴ In one of the interviews conducted with Schindler, he argued that this is an official policy of Alberta to create confusion with multiplying reports on the impact of the oil sand industry in Alberta.²⁰⁵ With this confusion, the government is given the opportunity to mask the true motives, that I argue are mostly economical.

²⁰³ David Schindler, “Protecting the Athabasca River from Oil Sands Development“ (keynote speech at Carleton University), http://www.youtube.com/watch?v=_wzH919TS6E (last access on May 14, 2013).

²⁰⁴ Peter Dillon et al., “Evaluation of Four Reports on Contamination of the Athabasca River System by Oil Sands Operations,” *Water Monitoring Data Review Committee* (2011): 26.

²⁰⁵ Schindler, “Protecting the Athabasca River”.

Resumé

Kanada se od konce 90. let prezentovala na venek jako leader v otázce ochrany životního prostředí a podpory koncepce udržitelného rozvoje. Vlády premiéra Mulroneya i Chrétiena se obě zavázaly k hlubší implementaci principů udržitelného rozvoje a k vymáhání přísnějších environmentálních zákonů jako jsou „Canada Environmental Protection Act“ nebo „Species at Risk Act.“ Moji výzkumnou otázkou bylo zjistit, zda-li je Kanada nadále leadrem v těchto otázkách a to i přes vysokou těžbu ropných písků v Albertě. Mým závěrem bylo zjištění, že se Kanada od tohoto obrazu pomalu odchyluje.

Současná těžba ropných písků v Albertě je nesmírně náročná na životní prostředí, proto jsem se soustředil na jeden segment a to, jaký vliv má tato těžba na vodní zdroje v Albertě. Studie nezávislého think-tanku „The Pembina Institute“, a to především výzkumné zprávy Dana Woynillowicze, Amy Griffithové a Marka Anielskiho, prokazují, že současná úroveň těžby nebude v Albertě do roku 2014 technicky vůbec možná, v případě, že vláda Alberty bude pokračovat ve vydávání povolenky na nové těžební projekty. Ty jsou totiž odkázány na vodu jako nezbytnou ingredienci v těžebních postupech, vrtech a zpracování. Současně tyto výzkumné zprávy na konkrétní oblast v povodí řeky Athabaska také uvádějí, že dochází k poklesu průměrného toku této řeky, kde se nachází většina těžebních operací a odkud je odebíráno nejvíce vody. Ta se jen z malé části vrací zpět do koryta řeky. Tito vědci také argumentují, že tím, že dochází ke snižování hladiny toku řeky, řada ekosystémů je proto ohrožena. V současné chvíli, jak jsou ze zákona nastaveny pravidla pro odebírání vody z řeky, nabízí to vládě Alberty pouze omezené možnosti, protože tyto vodní licence nejsou ze zákona vymahatelné, a jsou vymahatelné pouze na „dobrovolný“ příslib. Alberta proto může tyto společnosti při nezákonném odběru vody pouze pokutovat, ale nemůže jim to ze zákona nařídit.

David Schindler potvrdil zvýšenou hladinu nebezpečných a toxických látek – tzv. polycyklických aromatických karbohydrátů - v řece Athabaska a v bezprostředním okolí těžby ropných písků. Tyto výsledky se ovšem neshodovaly se závěry výzkumných zpráv „Regionální monitorovací stanice vodních zdrojů.“ Tyto diskrepence jsou vážným důvodem k pochybám o stavu vodních zdrojů v Albertě. Zde je nutné podotknout fakt,

že výzkum Davida Schindlera byl primárně sponzorovaný Národní akademií věd Spojených Států a klad si za cíl vnést do dané situace nezávislý pohled.

Jednotlivé výzkumné zprávy nezávislých think-tanků o stavu životního prostředí v Kanadě, z nichž tři tyto zprávy – Fraser Institute, University of Victoria a Alberta's GPI – potvrdily, že Kanada i Alberta vykazují nižší environmentální ukazatele než řada jiných vyspělých zemí. V případě výsledné zprávy z Fraser Institut dokonce vychází, že Kanada je na předposledním místě v otázce ochrany životního prostředí v porovnání s dvaceti sedmi zeměmi Organizace pro ekonomickou spolupráci a rozvoj. Jako důvody uvádějí tyto výzkumy, že Kanada zaostává v implementaci a vymáhání zákonů o ochraně životního prostředí. Zajímavý pohled nabídlo srovnání vládních zpráv „Measuring Up“ měřících úroveň udržitelného rozvoje v Albertě a nevládní organizace „The Pembina Institute“ a jejího alternativního systému „Alberta Genuine Progress Indicator“ pro měření udržitelnosti. The Pembina Institut uvádí, že i přes rychle rostoucí ekonomické ukazatele Alberty, které ji zaručují místo jedné z nejvíce progresivních provincií, index pro měření stavu životního prostředí v posledních čtyřiceti letech klesal. A to proto, že Pembina zakomponovala do svého systému řadu „problematických“ ukazatelů, kterým se politická reprezentace v Albertě chtěla vyhnout.

Zajímavé bylo také zjištění, že i přes to, že Alberta získává vysoké příjmy z těžby ropných písků, vláda vkládá do „Fondu Budoucnosti“ jen velmi nepatrnou částku. Toto zjištění, při porovnání s Aljaškou či Norskem, zeměmi které jsou také z větší části odkázané na příjmy z nerostných surovin, že v tomto má Alberta značný deficit. Pokud Alberta i Kanada schválí znění principu udržitelnosti s definicí z Brundtlandovi zprávy či Deklaraci z Ria, tento fakt ohrožuje význam konceptu udržitelného rozvoje jako takového. Protože ten definuje povinnost současné generace myslet také na budoucí.

Teoretickým východiskem mi posloužila koncepce „slabé“ a „silné“ udržitelnosti. V úvodu jsem předpokládal, že Kanada i Alberta se budou řídit dle principů silné udržitelnosti, která předpokládá přísnější ochranu životního prostředí na úkor omezené těžby nerostných surovin. Závěry mého výzkumu mne ale přesvědčili o tom, že Alberta i Kanada se chovají spíše dle slabší udržitelnosti, tj. polevují na vymáhání ochrany životního prostředí a podporují naopak těžbu nerostných surovin. Z tohoto hlediska je možné usoudit, že současná ochrana životního prostředí v Kanadě čelí značným problémům. Závěrem bych dodal, že vlády Alberty i Kanady stojí před

nelehkým úkolem, jak balancovat mezi ekonomickými prioritami a ochranou životního prostředí, a že z tohoto výzkumu se zdá, že ekonomické priority převažují

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