ENERGY SECURITY FOR CANADA: A COMPARISON OF THE SELF-SUFFICIENCY AND CONTINENTAL STRATEGIES

by

Taymaz Rastgardani

B.A., Simon Fraser University, 2005

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF ARTS

In the Department

of

Political Science

SIMON FRASER UNIVERSITY

2007

APPROVAL

Name:	**Taymaz Rastgardani**
Degree:	**Master of Arts, Department of Political Science**
Title of Thesis:	**Energy Security for Canada: A Comparison of The Self-Sufficiency and Continental Strategies**

Examining Committee:

Chair:

Dr. Lynda Erickson, Professor
Department of Political Science

Dr. Alexander Moens, Professor
Senior Supervisor
Department of Political Science

Dr. Anil (Andy) Hira, Associate Professor
Supervisor
Department of Political Science

Dr. Stephen Easton, Professor
External Examiner
Department of Economics

Date Defended/Approved: September 7th 2007

ABSTRACT

While the topic of 'energy security' has attracted considerable public attention in recent times, the various issues of relevance have been poorly conceptualized within a policy framework for the Canadian people. Arguably, Canada has lacked an energy security strategy in recent years even as the country's energy security environment has been rapidly changing. This study takes a strategic view of energy security in the sense that it treats the issue as a matter of national interest. Paradoxically, by relying on the analysis of sectoral developments over the last two decades, it is hypothesized that energy 'self-sufficiency' — even if not impractical — has severe and sobering implications for Canada's intrinsic national interests. This study examines the long-standing chasm between the 'continental' and 'self-sufficiency' perspectives against updated criteria for assessing Canada's current energy security situation.

Keywords: Energy Security; Energy Policy

Subject Terms: Energy industries – Canada; Energy Policy – Canada

Call Number: HD 9685 A2 D63 2003

DEDICATION

To my parents and sister

ACKOWLEDGEMENTS

It has been my profound fortune to count on my professors Alexander Moens and Andy Hira throughout the preparation of this study. I am grateful for their balanced approach in providing me with the benefit of their criticisms, while at the same time allowing me latitude to pursue my vision. Apart from having been my senior supervisor, Professor Moens has been a great mentor over the years. He has made a deeper impression upon me than any other person who I have met during my career at Simon Fraser University. Professor Hira has been the primary influence of my understanding of how to dissect political economic issues. His book, Ideas and Economic Policy in Latin America, is my favourite political economic study. His criticisms and encouragements have always been a source of motivation.

I am honoured and thankful for having had Professor Stephen Easton as my external examiner. I also owe special gratitude for Professor Douglas Ross' general influence and encouragement over the years. His broad strategic perspective has reinforced my inclination to adopt a multi-disciplinary approach towards complex issues.

TABLE OF CONTENTS

LIST OF TABLES

ABBREVIATIONS

ATC	Average total costs
BCUC	British Columbia Utility Commission
CAPP	Canadian Association of Petroleum Producers
CCGT	Combined cycle turbines
CERA	Cambridge Energy Research Associates
CERI	Canadian Energy Research Institute
CHP	Combined heat and power equipment
CUFTA	Canada-United States Free Trade Agreement
EMR	Ministry of Energy, Mines and Resources
EUB	Alberta Energy and Utilities Board
FERC	U.S. Federal Energy Regulatory Commission
FMA	Fair market access
GHG	Greenhouse gas
GWh	Gigawatthours
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LNG	Liquefied natural gas
MBP	Market based procedure
NAFTA	North American Free Trade Agreement
NEB	National Energy Board
NEBA	National Energy Board Act
NEGP	North European Gas Pipeline
NEP	National Energy Program
NOP	National Oil Policy
NYMEX	New York Mercantile Exchange
OPEC	Organization of Petroleum Exporting Countries
PIPs	Petroleum Incentive Payments
SAGD	Steam-assisted gravity drainage
SEC	U.S. Securities and Exchange Commission
SPE	Society of Petroleum Engineers
SPR	U.S. Strategic Petroleum Reserves
TCF	Trillion cubic feet
TPA	Third party access
UNDP	United Nations Development Programme
WCSB	Western Canadian Sedimentary Basin
WEA	World Energy Assessment
WTI	Western Texas Intermediate

1 DEFINING ENERGY SECURITY

Worries about the limited global energy supply, laced with the spectre of massive demand growth in Asia, have led some to fear the 'age of permanent shortage'. The North American reliance on foreign oil is especially seen as a critical energy security risk. However, current worries over energy security have additional dimensions on top of the 1970s era perception of a brewing struggle between the consuming countries of the industrialized West and the producing countries of the Organization of Petroleum Exporting Countries (OPEC).

The 2001 blackouts on the west coast of the U.S. and the 2003 blackouts on the east coast of the U.S. and Canada brought awareness to the need of system-wide electric reliability, especially in the post-9/11 era in which experts have identified the high-voltage transmission lines in the North American grid — as well as nuclear power plant and oil and natural gas storage facilities — as particularly vulnerable to acts of terrorism. Additionally, worries over environmental impact and the manifestation of the 'not-in-my-backyard syndrome' have frustrated efforts to establish a margin of safety by building new oil refineries, high-voltage transmission lines, oil and natural gas storage facilities, and liquefied natural gas (LNG) terminals. Moreover, North America's projected need for substantial increases in natural gas imports is seen as a supply-chain risk in itself.

While the topic of 'energy security' has attracted considerable public attention in recent times, the various issues of relevance have been poorly conceptualized within a policy framework for the Canadian people. Arguably, Canada has lacked an energy

security strategy in recent years even as the country's energy security environment has been rapidly changing. The federal government in Canada has deliberately avoided rationalizing a comprehensive energy security approach, mainly out of fear of reviving memories of the disastrous National Energy Program (NEP) of the early eighties and the federal-provincial tensions which were consequently provoked. In contrast to Canada's piecemeal approach to various policy issues relevant to energy security, the trend in the U.S. has been one towards a comprehensive rationalization of federal policy. In fact, while the federal government in Canada has been reluctant to exercise its authority even in areas clearly deemed to be within its policy mandate, its American counterpart has been aggressively expanding its powers to address issues perceived to be hindering energy security.

The avoidance of discussing an energy security strategy does not preclude the need to deal with related policy conundrums at some point. Moreover, by not framing the energy security question carefully, Canadian policymakers risk severely damaging Canada's economic and strategic interests. Indeed, the most instructive lesson of the disastrous NEP is that policymakers must not lose sight of the broader picture while concerning themselves with the details of specific initiatives. Developing a strategic approach is critical in effectively dealing with three major transformations in Canada's *actual* energy security environment: (1) The increased temptation of strategic intervention in the global energy sector by both supplying and consuming countries; (2) The significant increases in economic resource allocation to the Canadian energy sector and the rise in energy ties with the U.S.; (3) The substantial ramifications of federal greenhouse gas (GHG) policy on Canada's energy sector and overall energy security.

Although energy integration between Canada and the U.S. over the last two decades has been commercially driven, the increasing concern of American policymakers with the strategic implications of their country's energy economy provide both challenges and opportunities for Canada. The popular impression of Canada having abundant energy resources that the Americans badly need is misleading. At present, the Canadian-American energy relationship is much more complex than one strictly between a supplier and consumer.

While Canada has the potential of being a significant supplier of unconventional oil and gas to the U.S., the extent of American demand for Canadian production is far from assured. The U.S. has its own sizable reserves of coal and unconventional oil and gas, which could potentially be utilized at comparable costs to Canadian production. As in other economic areas, American policies and market trends promise to provide significant repercussions for the Canadian energy sector, and by extension Canadian energy security. Consequently, the traditional tension between the 'continental' and 'self-sufficiency' approaches to Canadian energy policy is far from being resolved. While continentalist sentiments have complemented Canadian-American energy relations in the past two decades, proponents of energy self-sufficiency have somewhat re-established their agenda in the context of present worries about energy supply security.

A review of articles published by Canadian newspapers, federal government agencies and industry journals reveal myriad accounts of economic and social issues caused by the latest Canadian energy boom. These include increasing greenhouse gas (GHG) emissions and other environmental concerns, overstretched public services in the Fort McMurray region of Alberta, a severe shortage of construction material and skilled

labour in Alberta and British Columbia, a widening inflation differential between western and eastern Canada, and a retrenching manufacturing sector in Ontario and Quebec because of the intensely strong Canadian dollar driven in part by heavy investments in the energy sector. Many of the opponents of the continental energy trade — including Gordon Laxer, a prominent self-sufficiency advocate — have pointed to these effects as the undesirable and unfair outcome of the American consumption of Canadian energy resources.[1] Others have even criticized Canadian-American energy relations on moral grounds, arguing that Canada is serving as a "military fuel pump" to the "ear based economy" of the U.S.[2]

This study takes a strategic view of energy security in the sense that it treats the issue as a matter of national interest, as defined by the realist school of international relations studies. Paradoxically, by relying on the analysis of sectoral developments over the last two decades, this author has developed the hypothesis that energy 'self-sufficiency' or 'independence' — even if not impractical — has severe and sobering implications for Canada's intrinsic national interests. This study examines the long-standing chasm between the 'continental' and 'self-sufficiency' perspectives against updated criteria for assessing Canada's current energy security situation. Recommendations for Canadian energy policymaking are then offered.

---

[1] Gordon Laxer, "Canadian Energy Security: Easterners could freeze in dark," The Globe and Mail, May 28, 2007.

[2] Hugh McCullum, Fueling Fortress America: A Report on the Athabasca Tar Sands and U.S. Demands for Canada's Energy, Canadian Centre for Policy Alternatives/Parkland Institute/Polaris Institute, 2006, pp. 39-42. < http://www.polarisinstitute.org/files/Fuelling_Fortress_America-5.pdf>

1.1 Threats to Energy Security

Notwithstanding the ever-changing global energy security environment, the World Energy Assessment (WEA) of the United Nations Development Programme (UNDP) has broadly defined the term 'energy security' to mean "the availability of energy at all times in various forms, in sufficient quantities, and at affordable prices, without unacceptable or irreversible impact on the environment."[3] It is commonly understood that either a rise in the price of energy or a disruption of energy supplies may have a detrimental impact on an energy-importing country. The adverse macroeconomic effects may include inflation, lower industrial output, a decline in investment and employment, a destabilized balance of payment situation and the flight of mobile capital. During the global energy shortages of the 1970s, both Canada and the United States were subjected to all of these effects[4]. The spike in energy prices of recent years has had milder macroeconomic consequences, although the attributed rise in inflation and the downturn in manufacturing output and exports have been notable issues of concern for Canadian monetary policy.[5]

Numerous types of events may cause disruption to energy supplies or an increase in price. For the purpose of this study, two broad categories of events have been identified: events with a global impact, and events which impact a specific country or region.

---

[3] Thomas B. Johansson and José Goldemberg (editors), World Energy Assessment Overview: 2004 Update, United Nations Development Programme, 2004, pp. 42. <http://www.energyandenvironment.undp.org/undp/indexAction.cfm?module=Library&action=GetFile&DocumentAttachmentID=1010>

[4] G. E. Angevine, The Impact of a Sharp Oil Price Increase, Calgary: Canadian Energy Research Institute, 1980; T. L. Powrie, Energy Policy and the Balance of Payments: An Outline of the Issues, Calgary, Canadian Energy Research Institute, 1979; Howard Geller, John DeCicco, Skip Laitner and Christopher Dyson, 'Twenty years after the Embargo: US Oil Import and Dependence and How it can be Reduced', Energy Policy vol. 22, 1994, pp. 471-485

[5] Bank of Canada, Renewal of the Inflation-Control Target: Background Information, Ottawa: Bank of Canada, November 2006, pp. 4. <http://www.bankofcanada.ca/en/press/background_nov06.pdf>

Table 1 Classification of energy security events

CLASSIFICATION	EVENT
Global Events	
Policy discontinuity	Reduction of output by producers in order to improve terms of trade
Fundamental discontinuity	Inherent shortage of global production capacity
Force majeure disruption	Effects of civil unrest, war, or severe natural disasters on production and export
Export restriction disruption	Embargo by importers of a specific exporting country
Local Events	
Embargo disruption	Embargo of a specific importing country by a specific exporter or transit country
Logistical disruption	Effects of natural disasters, accidents, or acts of terrorism on transmission infrastructure
Local market/structural discontinuity	Market failures or regulatory mismanagement

Within the global context, it has been generally argued that tight energy markets decrease the bargaining position of energy-importing countries in relation to energy-exporting countries. Consequently, global events that cause a discontinuity or disruption are of concern to all energy importing countries. For example, a decision by OPEC to cut production output could have a sudden and unpredictable impact on global energy prices. Moreover, a general lack of investments in the production, transportation, and processing

capacity of the primary energy carriers (oil, gas, coal) could result in fundamental discontinuity because of the scarcity of global supply in relation to global demand. [6]

Historically, the most destabilizing of global events have entailed bargaining manoeuvres between importing and exporting states. During periods of tight supply, exporting countries have traditionally been more successful at reneging on existing contracts and arrangements, and extracting better terms of trade. However, during market cycles of abundant supply, it has been importing countries that have renegotiated for better terms. Generally, since the interests of the party causing a disruption is partly damaged by the paralysis in trade, or because alternate methods of trading and transportation can be found, disruptions rarely have sustained detrimental impact.[7]

Of the disruptions caused by local events, an embargo of a specific importing country, if effective, could very quickly bring the country to its knees. An illustrative example is the successful blockade of Japan by the American Navy during the Second World War. However, in the present global context, the probability of a successful implementation of such a policy against Canada is extremely low. More probable are disruptions caused by accidents or terrorism targeting long-distance oil and gas transmission. Effective regulations and good management can reduce the frequency and impact of accidents and terrorist acts. Moreover, while the occurrence of such events will raise operating costs, the systemic paralysis of energy flows is unlikely.

---

[6] Paul Horsnell, "The Probability of Oil Market Disruption: With An Emphasis on The Middle East," in Japanese Energy Security and Changing Global Energy Markets: An Analysis of Northeast Asian Energy Cooperation and Japan's Evolving Leadership Role in The Region, James Baker III Institute for Public Policy, Rice University, 2000.
<http://www.rice.edu/energy/publications/docs/JES_ProbabilityOilMarketDisruption.pdf>

[7] John H. Lichtblau, 'Oil Imports and National Security: Is There Still a Connection?' *The Energy Journal* vol. 15, Special Issue, 1994, pp. 329-346.

For the purposes of this study, events that represent a 'discontinuity' shall be distinguished from those that constitute a 'disruption'. A discontinuity is defined as a sharp change in the price of energy resources arising from one of three sources: A *policy discontinuity* by an exporter in which output is reduced despite spare capacity; a *fundamental discontinuity* in the global marketplace in which production levels cannot keep up with global consumer demand; and *local market/structural discontinuity* in which the enactment of ineffective regulatory policies result in unstable or inefficient domestic markets.

In contrast to a discontinuity, a disruption is defined as an event of a more truncated nature, in which energy supply routes or transmission lines are abruptly interrupted. When the original procedures of the International Energy Agency (IEA) were drawn up in response to the first oil shocks of the 1970s, it had been meaningful to define the conditions for intervention in terms of the physical shortfalls that member countries experience through disruption. Since a liquid market for oil did not exist at the time, barrels of oil were moved around the world in order to coordinate the specific allocation of supplies to each region. However, as the vertically integrated supply chains began to crumble in the late 1970s, the distinguishing aspects of a disruption became blurred in instances where disruptions could be considered in terms of the price impact and effect on total flows.

The precepts regarding disruptions have largely remained unchanged, even though the globalization of energy markets has transformed the practical manifestation of crises. With the rigid supply chains of forty years ago, volumes led crises. In recent times, it has been demonstrated that consumers can ultimately avoid physical shortage by

bidding on the price and diverting energy resources from elsewhere.[8] Admittedly, the risks of physical shortage are still very real, particularly in instances where alternate routes or infrastructure cannot be relied upon. Therefore, discontinuities and disruptions essentially represent two different phenomena.

1.2 Strategic Issues for Canadian Energy Security

The essential focus of a national energy strategy should be in devising a balance between complicating global trends and the above mentioned political economic issues inherent to energy regulation. Moreover, a viable energy security strategy has to inherently contend with the reality that structural changes to the energy sector will take a long time to implement, even as various risks to energy security may evolve quickly. A good energy strategist needs the attribute that the famed scenario planners of Royal Dutch Shell have termed the 'helicopter quality': the ability to see facts or problems in a larger context while at the same time being able to zoom in on critical details. As Royal Dutch Shell's pioneering planner Pierre Wack would come to emphasize, the most important utility of strategic thinking is in opening up the mind-set of decision makers.[9] The end result is not an accurate picture of tomorrow, but better decisions about the future.

The crucial first step in devising a rational energy security strategy is in realizing and accepting the inherent complexities and uncertainties. This is not to deny the concrete and consistent nature of the fundamental energy security challenges facing Canada in recent

---

[8] David L. Goldwyn and Michelle Billig, "Building Strategic Reserves," in ed. Jan H. Kalicki and David L. Goldwyn, Energy and Security: Towards a New Foreign Policy Strategy, Washington: Woodrow Wilson Center Press, 2005, pp. 509-530.

[9] Peter Schwartz, The Art of The Long View, New York: Doubleday Currency, 1991, pp. 7-10.

years. It is apparent that on the global scale, spare production capacity for oil and gas has been dwindling even as consumer demand has remained strong. The IEA's Medium-Term Oil Market Report of July 2007 has warned that "despite four years of high oil prices, this report sees increasing market tightness beyond 2010," and has concluded that "it is possible that a supply crunch could be deferred — but not by much."[10] Yet, as concrete as the problem seems, many direct command-and-control solutions remain problematic.

Take for instance the case for government subsidies, tax breaks, and compulsory mandates for the increased blending of ethanol with petroleum-derived gasoline in the transportation fuel cocktail sold in Canada and the U.S. In his January 2007 State of the Union address, President Bush stated that "for too long our nation has been dependent on foreign oil," and among other measures, proposed that the U.S. increase its energy security by a fivefold increase in ethanol production by 2017.[11] Similarly in Canada, the federal government has mandated 5% ethanol content in retail gasoline by 2010 and various other provincial and federal financial incentives have been strengthened.[12] While those eager to endorse 'renewable fuels' and legislators vying for political support from farmers have warmly embraced these measures, many energy experts have remained far more cynical.

---

[10] Reuters, "IEA warns of 'supply crunch' in oil despite high prices," International Herald Tribune, 9 July 2007.

[11] George W. Bush, State of the Union 2007, Washington: Office of the Press Secretary, The White House, 23 January 2007. <http://www.whitehouse.gov/news/releases/2007/01/20070123-2.html>

[12] Energy Development Initiative, Developing Manitoba's Ethanol Industry, Manitoba Energy, Science and Technology, retrieved online July 2007. <http://www.gov.mb.ca/est/energy/ethanol/index.html>; Canadian Renewal Fuels Association, "Prime Minister Harper Builds on His Biofuel Promise," Canadian Renewal Fuels Association, 5 July 2007. <http://www.greenfuels.org/news/index.htm>

Critics have argued that while ethanol can nominally be considered a renewable fuel, its production is energy intensive and ironically, particularly dependent on natural gas supplies. At present, boilers of ethanol refineries are powered mostly by natural gas. Moreover, corn — the primary feedstock for ethanol produced in North American — depletes nitrogen in farm soil and consequently needs a heavy dose of nitrogen-based fertilizer, which in turn requires natural gas as a primary feedstock. Experts have warned that within just a year, ethanol production could add 1% to the total demand for natural gas and magnify an already tight natural gas market.[13]

Agricultural and environmental experts have also warned against the adverse impact of increased ethanol production on water pollution, biodiversity, and even global warming.[14] Runge and Senauer, two renowned food and agricultural policy experts, have additionally warned that the push for increased ethanol production is a severe threat to food security, both globally and within North America. These two experts have also stated that the present "ethanol bubble" is driven by the agenda of special interest groups instead of being based on prudent policymaking objectives.[15] Last but not least, the drive towards replacing petroleum-derived gasoline with ethanol has been cited as the reason for the shelving of plans by Royal Dutch Shell and its partners to build North America's largest crude oil refinery. In explaining the decision, John Hifmeister, Shell's top U.S. executive remarked: "If you're an investor getting ready to put several billion dollars into

---

[13] Timothy Gardner, "Ethanol boom may boost U.S. natural gas prices," Reuters, 19 April 2007. < http://www.reuters.com/article/reutersEdge/idUSN1942398020070419?src=041907_1857_INVESTING_comment_n_analysis>

[14] The Associated Press, "Biofuels Boom Raises Tough Questions," New York Times, 10 March 2007; Andrew Martin, "Farmers Head to Fields to Plant Corn, Lots of It," New York Times, 31 March 2007.

[15] C. Ford Runge and Benjamin Senauer, "How Biofuels Could Starve the Poor," Foreign Affairs, vol. 83, no. 3 (May/June 2007) <http://www.foreignaffairs.org/20070501faessay86305/c-ford-runge-benjamin-senauer/how-biofuels-could-starve-the-poor.html>

expanded capacity, would you do that when the president himself says we want less gasoline?"[16] At a time when chronic bottlenecks in the midstream segment have been identified as a major vulnerability for North America's energy system, the unnerved sentiments of a major investor can hardly be reassuring.

In the final analysis, a greater reliance on ethanol or other renewable fuels is not inherently misguided. In fact, the technologies and economics of producing and using renewable fuels will likely improve over time. However, the existence of significant tradeoffs cannot be ignored. Moreover, the salient question to be answered is how one identifies and measures these tradeoffs. Arguably, the inertia, volatile uncertainties, and dynamic complexities innate to the energy sector call for a unity of strategy in approaching energy security.

It is true that strategic theories should construct a framework for strategic realities by organizing, selecting, and judging probable causalities. However, more often than not, it is also true that strategic thinkers are influenced by existing trends in the strategic environment. New issues and dilemmas often evoke the renovation of old strategies. In the context of Canadian energy security, the strategic objectives of the continental and self-sufficiency strategies have remained remarkably consistent since the 1950s, even though the energy sector itself has largely changed. The essential aim of the self-sufficiency strategy has always been to shelter Canada's energy economy from the vagaries of external variables. Yet, the drawbacks of this strategy have consistently stemmed from the difficulty in keeping an insulated Canadian energy sector internationally competitive. On the other hand, the continental strategy has consistently

[16] Bloomberg, "Shell considers halting U.S. refinery plans," International Herald Tribune, 21 May 2007.

offered enhanced economic efficiency, but only by accepting some exogenous risks to Canada's energy security.

The stability of each strategy is in large part dependent on the nature of the manifested risks to energy security. Yet, the proponents of each strategy have traditionally differed in their definitions and philosophic approaches to these risks. Take for instance the issue of security of supply, undoubtedly the most important focal issue for any viable energy security strategy. Proponents of the self-sufficiency strategy have traditionally defined adequate supply in the absolute terms of available volume of domestic stock, while continentalists have been more inclined to focus on the relative price and dependability of each alternate supply chain. Consequently, an even-handed comparison of the two strategies requires the careful avoidance of disqualifying strengths or weaknesses of either on the basis of topicality. Therefore, the applied criteria have to be broad enough to accommodate the strategic logic of each strategy, but focused enough to provide adequate reflection on the focal issues pertaining to energy security.

This study evaluates the impact of both strategies on Canada's energy security by assessing how each will likely affect (1) security of supply, (2) market and regulatory stability, and (3) Canada's international bargaining position.

Security of Supply, as mentioned above, must be a high priority element of virtually any energy security strategy. However, since policymakers and regulators have to contend with the fact that structural changes to the energy system will take a relatively long time to implement, the balancing of short-term and long-term considerations has traditionally served as the fundamental tension defining security of supply issues.

Market and Regulatory Stability is necessary to prevent panic among consumers, compel long-term capital investments, and provide for an efficient allocation of resources. The increasing globalization of energy markets also means that new and evolving sectoral trends elsewhere have direct ramifications for the sustainability of Canadian energy policies. In the broader sense, the stability of any energy security strategy is largely dependent on the manifestation of anticipated risks. Therefore, the related merits of a strategy should be assessed against an elaborate set of risk probabilities.

The *International Bargaining Position* of energy-importing countries in relation to that of energy-exporting countries has traditionally been an important topic of discussion during periods of substantial adjustment in global energy prices. Since the level of global GHG emissions is primarily determined by the manner in which global energy resources are produced and expended, the relevance of global energy relations to international bargaining over the control of global GHG emissions is also becoming increasingly acute. In the context of the already elaborate and complex Canadian-American energy relationship, the bargaining power of Canada *vis-à-vis* the U.S. is of particular importance to any Canadian energy security strategy.

The next chapter provides a historical context for Canada's contemporary energy security situation. Chapters 3 and 4 respectively examine the self-sufficiency and continental strategies against the abovementioned criteria. In each case, the general approach and tendencies of each strategy shall be developed, followed by a corresponding assessment against the backdrop of contemporary energy security issues confronting Canada. Chapter 5 provides conclusions and recommendations for Canadian

energy policymaking by drawing on previous analyses, as well as proposing alternative approaches to certain focal issues that cannot be adequately addressed by a strict reliance on either one of the two compared strategies.

2 THE EVOLOTION OF CANADIAN ENERGY MARKETS AND REGULATIONS

It is a historical reality that market and regulatory conditions in the Canadian energy sector have, more often than not, reflected the status of Canada's energy trading relationship with the United States. It has been primarily in dealing with this reality that passions have flared in Canada on the question of how far the Canadian and American energy sectors should be integrated. Being a vast country with its population centres stretched along the border with the United States, Canada has historically found it relatively expensive to transmit energy products countrywide when regional networking between Canada and the United States has seemed more economical. However, nationalists have contended that linkages to the American side should be heavily controlled precisely because of the lack of economic incentives for the systematic development of an integrated Canadian energy network.[17]

While general energy relations between the two countries have gone through a complex wave of tension and cooperation, two key economic drivers for market integration have remained constant since the 1950s. The more popularly recognizable is the propensity of the sizable U.S. market to absorb marginal output from Canada. The less commonly appreciated, but equally critical driver for integration, is the unique economic opportunity for arbitrage from cross-border trade in segmented regional

[17] The most comprehensive articulation of this thesis has been developed by Karl Froschauer, in White Gold: Hydroelectric Power in Canada, (Vancouver, B.C.: UBC Press, 1999), especially chap. 2 & 8.

markets on both sides.[18] Although it is generally perceived that cross-border trade in energy is defined by the American consumption of Canadian production, the reality is much more complex, especially in the trade of electricity, natural gas, and petroleum-derived chemicals.

Anecdotes of cross-border linkages in the developmental years of the petroleum industry include the transmission of oil and natural gas to the U.S. from the world's first commercial oil wells in the 1850s at Petrolia and Essex in south western Ontario.[19] Also noteworthy is the role that a Canadian geologist from Nova Scotia — Dr. Abraham Gesner — played in the development of the process for extracting 'kerosene' from crude oil. Gesner worked on his distillation process, filed patents, and did business in both countries.[20] Another interesting instance is the use of Canadian domiciliary by American oil companies trying to gain oil concessions in territories that today constitute modern Iraq, which were under British control prior to the Second World War.

Even though the petroleum sectors in both countries had already been thoroughly linked since the nineteenth century, it is not coincidental that the politicization of Canada's energy trade with the U.S. only occurred in the 1950s when cross-border oil and gas pipelines were first proposed. It was American demand that served as the main incentive for the construction of these energy transmission pipelines. Even as two-thirds of Alberta's newly developed production capacity remained idle, Canada's major refineries in Montreal found it significantly cheaper to import foreign oil by tanker from

---

[18] The term 'arbitrage' as used in this paper is defined as the opportunity for economic gain from trade between two markets with different prices for the same commodity.

[19] Peter Mckenzie-Brown, Gordon Jaremko, David Finch, The Great Oil Age (Calgary: Detselig Enterprises Ltd, 1993): p.49.

[20] Earle Gray, The Great Canadian Oil Patch (Toronto: Maclean-Hunter Limited, 1970): chapter 1; Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power (New York, N.Y.: Free Press, 1992): p. 23.

the Middle East than to have Albertan oil trucked or piped to them. However, the American Midwest region was geographically close enough to Alberta and far enough from alternative supply chains to make oil pipelines seem commercially viable.

In many ways, the setting up of the National Energy Board (NEB) in Canada was in reaction to the politicization of the pipeline approval process. C.D. Howe — then the Canadian Industries Minister and a strong proponent of continental energy trade — is reputed to have proclaimed during the pipeline debates in parliament that he did not worry about "the nationality of a dollar." However, his political adversaries in parliament did worry.[21] The concerned stakeholders appreciated the economic benefits of oil and gas pipeline routes, but disagreed on the geographical paths the pipelines were to trek. Until the establishment of the NEB in 1959, parliament directly authorized pipeline routes and operations by virtue of the 1949 Pipe Lines Act of Canada, a bill closely patterned on the Railway Act, which provided for federal regulation of pipelines crossing provincial and national boundaries. By 1959, there was a parliamentary consensus that the regulatory process had to be depoliticised and handled by professionals.[22]

2.1 Natural Gas

For the next three decades before export controls were substantially simplified and reduced in the mid-1980s, the professionals at the NEB had to grapple with the sobering questions of how each energy transmission line would affect future development of the broader transmission network in Canada, and — in the case of natural gas — whether

[21] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board (Vancouver, B.C.: Douglas & McIntyre, 2000): pp.7-8.
[22] Douglas Fraser, "Early Years," in ed. National Energy Board: Twenty-five Years in the Public Interest (Ottawa: National Energy Board, 1984), pp. 53-59.

committed reserves to the U.S. would constrain long-term domestic supply. Since the Dinning Commission report of 1949, the principle had been set that Albertans should have first call on provincial natural gas supplies, and that Canadians should have priority over foreign users if an exportable surplus developed. Alberta accepted the recommendations of the Dinning Commission and later declared it would only authorize exports of natural gas in excess of a thirty-year supply.[23]

Historically, the NEB has been most active as a regulator of natural gas even though its official mandate equally stresses the NEB's role in regulating the inter-provincial and international trade in natural gas, oil, and electricity. Since the beginning, electricity has been the energy commodity that the NEB has been least inclined to regulate, particularly after The Constitution Act of 1982 shored up provincial authority over the electricity sector. While the intensity with which the NEB regulated the trade in oil went through cycles that generally reflected Canada's evolving oil relationship with the U.S., the NEB's role was actually substantially limited at the height of heavy-handed government regulation of the oil sector in the 1970s and early 1980s, when policy making and regulatory functions were taken away from the NEB by its political masters at the then newly established Ministry of Energy, Mines and Resources (EMR).[24]

The reason why the NEB gave special attention to natural gas regulation in the early years is because routes are more critical for gas pipelines than for oil pipelines. Although the advancement of LNG technology in recent years will probably cause change in due time, the natural gas business in North America has been characterized by the commercial infeasibility of transporting natural gas in any other manner than through

[23] G. Bruce Doern and Glen Toner, The Politics of Energy (Toronto: Methuen, 1985), pp.167-168.
[24] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board, p.37.

pipelines. When in its natural state, natural gas has a significantly lower energy density than crude oil or coal, and it is therefore uneconomical to transport gaseous natural gas by tanker over sea or land. Consequently, the North American natural gas market has been virtually insulated from overseas suppliers. Moreover, limited reserves in North America have meant that American demand for Canadian natural gas — unlike oil in the 1960s and 1980s — has remained consistent throughout the decades.

In the 1950s and 1960s when the Canadian natural gas transmission grid was still in its infancy, there were fears in Canada that sizable pipeline links to the U.S. could permanently alter the development of a grid that would sufficiently serve the interests of Canadian consumers. As late as 1966, Lester Pearson lamented that "once a 36-inch pipeline system through the United States was established, it would almost inevitably become the main line." Pearson was convinced that additions to the American-linked system "would be more economical than additions to the 30-inch system through Northern Ontario, and the Canadian line would increasingly assume a secondary position as a line to serve markets along its route."[25]

Four decades on, however, Pearson's successors are not losing sleep over pipeline routes. Since then, the pipeline infrastructure throughout Canada and the U.S. for natural gas, oil, and petroleum-derived chemicals has been extensively expanded and integrated. Instead of soothing tensions between communities fighting to attract pipeline investments, the NEB has spent two-thirds of its total efforts in the last decade on safety, reliability, and environmental friendliness of an already vast energy transmission

[25] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board, pp. 40-41.

network.[26] Even as the demand for natural gas is projected to significantly grow in the coming years as a clean and efficient alternative to oil in use for power generation, space heating, and industrial processes, the energy economists Bradley and Watkins have stated that Canadian-American natural gas integration is already in an advanced state and will not require major additions in transmission capacity.[27] In fact, Oilweek reported in February 2006 that TransCanada Pipelines Ltd was in the process of converting some of its gas pipelines to heavy crude oil pipelines to meet the transmission demands of Alberta's expanding oil sands production.[28]

Apart from the change in ideology with the coming to power of the Mulroney government in the mid-1980s, the 'unbundling' of buyer-seller transactions from the transmission of natural gas was largely due to the increasing perception that the Canadian natural gas network had matured. In what has been popularly termed 'deregulation' under the tutelage of EMR Minister Pat Carney, the federal government removed an assortment of price controls, special regulations and taxes that it had used since the 1960s to micromanage the development and direction of growth of the Canadian natural gas sector. Interestingly, a similar 'unbundling' (better known as 'third party access' in Europe) of natural gas was simultaneously being implemented in Europe, where the transmission infrastructure had also reached maturity after heavy government directed investments in the 1970s.[29]

---

[26] Ibid, pp. 103-107
[27] Paul G. Bradley and G. Campbell Watkins, "Canada and the U.S.: A Seamless Energy Border?" The Border Papers- C.D. Howe Institute Commentary no. 178 (April 2003): pp. 25-26.
[28] Deborah Jaremko, "Mind the Overflow" Oilweek, February 2006, p. 27.
[29] Javier Estrada, Arild Moe, and Kare Dahl Martinsen, The Development of European Gas Markets: Environmental, Economic, and Political Perspectives (Chichester: John Wiley & Sons, 1995): pp. 1-94.

In essence, unbundling means that even if a producer controls its own transmission and distribution network, it cannot refuse to transport the products of other producers at fair market price. Consequently, a producer can directly strike a contract with a customer, independent of the transmission and distribution operators. From a regulatory perspective, this fosters competition and ideally prevents the transmission company from exercising its natural monopoly status in the pricing of its transmission services. In contrast to how some Canadian political economists have perceived the 'deregulation' of energy transmission in Canada as essentially meaning no or very little regulation, in fact the unbundling of services in the Canadian natural gas sector — and the energy sector as a whole — has required the development of sophisticated rules and regulations.[30] These regulations have been implemented and fine tuned with the objective of preventing market failures, by means of promoting market forces instead of hindering them.

As Anil Hira has noted, the phenomenon of 'deregulation' in the global energy sector, particularly in the case of transmission lines, has been for practical purposes a case of 'reregulation'.[31] In fact, the term 'reregulation' was precisely used in the United Kingdom to describe the Gas Act of 1986 which required British Gas to meet all reasonable consumer requests for the interruptible carrying of third party supplies.[32] In the unbundling of Canadian pipelines, much of the relevant regulatory expertise established by the NEB was borrowed from practices already developed in the U.S.. The salient dilemma in the unbundling of transmission lines — whether they are for natural

[30] The view that energy transmission unbundling has substantially and effectively removed regulatory control over energy transmission and marketing firms has been articulated in detail by Marjorie Griffin Cohen, in "From Public Good to Private Exploitation: GATS and the restructuring of Canadian Electrical Utilities," Canadian-American Public Policy occasional paper series, 2001.
[31] Anil Hira, Political Economy of Energy in the Southern Cone (Westport: Praeger, 2003), pp. 9-10.
[32] Javier Estrada et al, p. 39.

gas, oil, or electricity — revolves around the question of how to establish fair market price. While there currently are variations in North America, regulators are generally mandating price systems based on a calculated fair rate of return (usually tied to the rate of interest) on fixed operating assets, rather than predetermining an absolute rate of return for the transmission company. Consequently, the profitability of transmission operations is based on the skill and efficiency with which the operators work their fixed assets.

2.2 Oil

Since Canada was late in becoming an oil-producing nation, with the discovery of the Leduc field in the Western Canadian Sedimentary Basin (WCSB) a few years after World War II, the development of a significant oil sector in Canada had to evolve with the participation of the relevant foreign capital and expertise. Along the way, an indigenous base of expertise and technology has been developed in Canada, particularly since much of the oil and gas production in Canada since the early WCSB find has come from 'unconventional' sources that have required substantial innovations to explore, produce, and refine.

The discovery of Leduc ignited the first "frenetic oil boom" of the postwar years. Although a spectacular growth in the American transportation sector (from 1945 to 1950, the number of automobiles on American streets and highways increased from 26 million to 40 million) strengthened the short-term price of oil, the increase in Canadian production also coincided with a 21 percent growth in proven U.S. reserves and an even more dramatic increase in Middle Eastern and Venezuelan oil production.[33] Within a

[33] Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power, pp.410-430.

decade, the consequence for Canada was to deal with an increasingly protectionist American attitude towards foreign oil.

From 1960, Canada switched from being a net importer to a net exporter in oil. Canada's oil exports quadrupled from 252 thousand barrels a day (bbl/d) of crude oil and oil products in 1962 to 1144 thousand bbl/d in 1972, even while the imports of oil by the eastern refineries doubled from 452 thousand bbl/d to 909 thousand bbl/d.[34] As previously noted, before the development of an efficient oil and gas pipeline infrastructure connecting western upstream production to the eastern downstream refineries, exports to the more proximate American Midwest downstream hub were crucial for the viability of the developing Western Canadian upstream operations.[35] Therefore, Ottawa was handed a difficult dilemma in dealing with the gradual implementation quotas by the Americans to shut out Canadian exports. On the one hand, the federal government felt a responsibility to support the marketability and viability of Western Canadian oil production. On the other hand, there was a realization that the eastern downstream sector and the final consumer had to essentially pay a hefty tax for forgoing cheaper Middle Eastern and Venezuelan imports.

A compromise was reached in the form of the Diefenbaker government's National Oil Policy (NOP) of 1961, which divided the Canadian market into two regions. It was determined that the Canadian market west of the Ottawa Valley ('Borden line') would purchase only domestic oil, mainly coming from Alberta. The refineries east of the

---

[34] Department of Energy, Mines and Resources, An Energy Policy for Canada-Phase I, (Ottawa, Department of Energy, Mines and Resources, 1973), p.38.

[35] In the oil and gas industry, the 'upstream' component comprises of the exploration and production (E&P). The 'midstream' component comprises of storage and transportation. The 'downstream' component comprises of refining, marketing, and distribution to end-users.

Borden line were allowed to be supplied by foreign tankers of crude. In terms of pricing, this meant a higher cost of crude oil for Ontario and Western Canada than for Eastern Canada. Subsequently, the federal authorities had to contend with the numerous innovative attempts of the downstream sector on the east of the Borden line to exploit their cost advantage by selling to customers on the Western side of the official divide. In theory, the cost advantages available to the east were to have been mitigated by an import tax on crude oil on top of a quota. In reality however, prices in the market changed more frequently than the government could respond by fine-tuning its crude oil taxes and quotas. In practice, the downstream sector and consumers on the west of the Borden line were put at a disadvantage.[36]

The vision that emerged in the minds of the federal decision-makers was an idea of a nationally oriented supply chain not only independent from the U.S., but also from OPEC's perceived rising global dominance. This rather mercantilist approach was at odds with the tremendous continentalist pull, which was evident even back then by the linkages developing within regionally proximate markets across the Canada-U.S. border. As both the Canadian and American governments would come to realize with their domination of the oil and gas sector in their respective countries, officially stated priorities and the exercise of tax and fiscal measures cannot assure the private sector's investment decisions. This became even more evident with the reversal of policy priorities after a tightening of the global oil markets in the 1970s following the Arab oil embargo.

---

[36] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board, pp. 28-37; James Laxer, Canada's Energy Crisis (Toronto: James Lewis & Samuel, 1974), pp. 37-98; John Erik Fossum, Oil, the State, and Federalism: The Rise and Demise of Petro-Canada as a Statist Impluse (Toronto: University of Toronto Press, 1997), pp. 25-40.

When the sudden rise in prices of deliverable foreign crude oil threatened to precipitate an energy crisis in both the U.S. and Canada, a continentalist approach to contain the situation was given a brief dose of optimism. Canadian energy minister J.J. Greene drew the most public attention by declaring that "people will benefit, and both countries will benefit, irrespective of where the imaginary border goes."[37] At about the same time in which Greene made these pronouncements, the George Shultz-led U.S. government report called for a "harmonization of energy policy" with Canada. The report stated that: "The risk of political instability or animosity is generally conceded to be very low in Canada. The risk of physical interruption is also minimal for those deliveries made by inland transport."[38]

However, the main stumbling block for cooperation was the American side's forceful demand that Canada completely alter the NOP by substantially reducing the dependency of the eastern Canadian refineries on foreign sources of oil. Otherwise, as the Shultz report reasoned, " in the case of [an international] supply interruption, Canada could be expected to turn to the United States to furnish those imports, or to compete for whatever supply is available, and thereby to subtract from the security value of U.S. imports from Western Canada."[39] The Nixon administration's forceful moves to muscle Canada into a formal energy pact with provisions for limiting Canadian access to the international oil market angered many Canadians, especially after the Americans bluntly

---

[37] James Laxer, The Energy Poker Game (Toronto: New Press, 1970), p.1.
[38] U.S. Cabinet Task Force on Oil Import Controls (the Shultz report), The Oil Import Question, A Report on the Relationship of Oil Imports to the National Security (Washington, D.C., U.S. Government Printing Office, 1970) p. 94.
[39] Ibid, p. 335.

admitted that they were imposing new oil quotas on Canada to force compliance on terms for a long-term energy regime.[40]

Consequently, even the openly continentalist Greene had to subsequently adjust his rhetoric in order to escape being cast as the villain in another domestic debate reminiscent of the 1950s pipeline debate. While the Nixon administration did eventually adopt a more nuanced and diplomatic approach on the issue, the movement towards an eventual continental energy arrangement occurred in piecemeal fashion. In the absence of a comprehensively structured continental energy pact, the further strengthening of oil prices in the second half of the 1970s completely destabilized the continentalist momentum and put the domestic oil policies in both countries into great disarray.

In Canada specifically, the international oil price revolution of the mid-1970s caused a complete turnaround in regional Canadian attitudes towards oil policy. The NOP had resulted in higher prices west of the Borden line, where Canadian-produced crude supplied the market. Cheaper imported crude east of the Borden line had meant cheaper general fuel costs in Quebec and Atlantic Canada. In the mid-1970s however, the sudden prospect that western Canadian crude would be cheaper than overseas crude increased the bargaining power of the producing provinces, Alberta and Saskatchewan, and increased the pressure on the federal government to refashion its oil policy. Since there was a strong general perception that OPEC had permanently taken control of the global oil market, the federal and provincial governments attempted to adapt to the new international paradigm by embarking on a highly interventionist path in oil and gas development, to match and mitigate the increasingly statist zero-sum game played by

[40] James Laxer, Canada's Energy Crisis, p. 75.

OPEC and the statist response adopted by the other the industrialized Western countries and Japan.

The goal of federal policy increasingly moved towards self-sufficiency, with the operational strategy of taxing conventional production in Alberta to finance various high-cost unconventional sources of oil, including production from deepwater Arctic drilling and synthetic crude from oil sands and other heavy sources of crude. This policy orientation reached its peak with the implementation of the NEP during the 1979-1980 global oil crisis stemming from the supply disruptions caused by the Iranian Revolution. To equalize the costs of the various sources of crude bought by the midstream sector, the government had to increasingly apply a messy cocktail of special taxes, quotas, and regulations to determine how much oil and from which source a refinery could purchase, the volume it could refine, and the price it could charge for the end product. Furthermore, the federal government continuously tinkered with the tax regimes and government sponsored financing facilities to direct specific investments in the upstream sector.

The Achilles' heel of the NEP was in its explicit assumption that international oil prices would continue to strengthen. When this thesis was falsified with the spectacular drop in international oil prices in the mid-1980s, not only was the core operational strategy of the NEP left in tatters, but the government, the oil industry, and Canadian banks were also straddled with hundreds of billions of dollars of losses stemming from over-investment in unconventional production. As early as 1983, former NEB chairman Jack Stabback had warned: "there is little doubt that the industry's expenditure plans would be far different if PIPs [Petroleum Incentive Payments] did not exist. One has to

wonder whether it is appropriate that over 50 percent of Canada's exploration expenses are being devoted to frontier [Arctic] exploration."[41]

Orchestrating the activities of the entire oil industry eventually proved too complex for the federal authorities, especially in rapidly and effectively anticipating and responding to changes in the behaviour of industry players and final-product consumers. At the height of the centralization program, companies were known to receive opposite directive from various government entities, as well as being sued for anticompetitive collusion while participating in government-mandated programs.[42] The chief problem for the industry and consumers was the state of flux in government policies and the consequent uncertainties created by the lack of reliable signals. During the period of escalating price regulation, a disconnection between regulated prices and real prices meant that producers found no incentive to produce more (especially at the downstream level squeezed by government policies), and consumers found no incentives to consume less. Moreover, by relying on price-controlled historic patterns to make future projections, government decision-makers overestimated future consumption and underestimated future production. Consequently, this reinforced the perception that even more drastic centralized redistribution measures were needed to remedy the 'gap' between future supply and demand.[43]

---

[41] Peter Foster, Other People's Money: The Banks, the Government and Dome, (Toronto: Collins, 1983), p. 256.
[42] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board, pp. 49-63.
[43] See Edward A. Carmichael and James K. Stewart, Lessons from the National Energy Program (Toronto: C. D. Howe Institute, 1983), especially pp. 56-60; Leonard Waverman, "Canadian Energy Policy after 1985: Lessons from the Present," in ed. Edward A. Carmichael and Corina M. Herrera, Canada's Energy Policy, 1985 and Beyond, (Toronto: C. D. Howe Institute, 1984), pp. 39-58; and J.A. Dawson and Z. C. Slagorsky, Benefits and Costs of Oil Self-Sufficiency in Canada, (Calgary: Canadian Energy Research Institute, 1981), esp. pp. 69-80.

In reality however, no gap would have existed had the market been allowed to clear without price regulation. Moreover, the focus on the gap rather than on the price left a strong implication that prices would not be allowed to rise and that the gap would be rationed away. The fear of physical shortage served as a self-fulfilling prophecy by encouraging a frantic build-up of inventories by traders, refineries, and households.[44] In the panic of 1979-80, it is estimated that inventory building alone cost a total shortage of about ten percent of consumption in North America.[45]

Since the deregulation of oil and the increase in Canadian-American integration in the mid-1980s, policy-makers have increasingly recognized the market itself as a source of stabilization.[46] An illustration of this new framework was demonstrated in the aftermath of the severe disruption to North American production and refining capacity caused by Hurricane Katrina in 2005, when virtually no physical shortage was reported outside of flooded areas. Critical federal and local regulatory measures were temporarily relaxed to allow supplies from around North America to move quickly to where they were most desperately needed.[47] The highly integrated nature of the Canadian-American market also meant that additional volumes of Canadian oil and gas were delivered to the U.S. on short notice. Much of this was accomplished by simply increasing the pumping pressures in pipelines carrying Canadian supplies to the U.S., or by reversing the flow of pipelines that would normally be making American deliveries to Canada.

---

[44] Thomas C. Schelling, Thinking Through The Energy Problem, (New York: Committee for Economic Development, 1979), p. chap. 4.
[45] Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power, pp. 686-687.
[46] Speech by Graham Flack (Associate Assistant Deputy Minister for Energy Policy) at the third Cross-Broder Forum on Energy Issues hosted by the Canada Institute of the Woodrow Wilson International Center for Scholars, March 21 2006.
[47] Daniel Yergin, 'Ensuring Energy Security," Foreign Affairs, vol. 85, no.2 (March/April 2006): p. 80.

2.3 Electricity

The merits of the deregulation of energy in Canada have been most vividly demonstrated in the electricity sector, where paradoxically the provincial utility corporations have voluntarily submitted to the 'unbundling' principle, despite minimal NEB regulatory control over the sector. The reasons for this phenomenon have to do with the fact that the economic benefits of integration in the electricity sector are even more obvious than those for the natural gas and oil sectors. Unlike oil and gas, electricity produced in the form of alternating currents cannot be stored as inventory. Production and consumption on the grid has to be instantaneously balanced and therefore an integrated grid has the marked advantage of more easily absorbing short-term surges in demand or shocks to production. Additionally, since electricity can be produced by power plants running on vastly different economic models and primary sources of fuel, the potential for arbitrage is significant between regional markets.

In effect, North American market integration has allowed low-cost producers with uncertain supply of primary energy (hydro or wind) to engage in swaps and futures contracts with high-cost producers who can otherwise reliably increase production (combined-cycle natural gas, thermal, or nuclear). Precisely because of the cross-border trade in electricity with the U.S., the provinces of British Columbia, Quebec, New Brunswick, and Newfoundland have been enabled to utilize hydro production to consistently sell electricity at high prices, but buy back at low prices. In fact, in recent

years British Columbia has managed to be a net-exporter in dollar terms, while being a net-importer in terms of gigawatthours (GWh).[48]

Even though deregulation and cross-border open access was slow to occur in the electricity sector — mostly not until the 1990s — its economic benefits were intuitively grasped much earlier. As far back as 1961, British Columbia premier W.A.C. Bennett exerted pressure on the Canadian federal government to make critical alterations to the Columbia River Treaty that it had just signed with the Eisenhower administration. The treaty had originally called for the U.S. to pay Canada US$64.4 million for flood control benefits resulting from three storage dams built in British Columbia and to supply the Vancouver area with half of the additional U.S. electrical power that the storage dams would facilitate. However, the forward thinking Bennett recognized that it was U.S. dollars (and not U.S. electric power) that would enable his province to undertake even more significant hydro power developments and that the province could in the long-term use its low-cost competitive advantage to extract far superior terms of trade in a competitively-priced electricity market. In the end, a new deal was negotiated in which the United States still paid $64 million for the flood control benefits, but additionally paid British Columbia a lump sum of $254 million instead of sharing electricity with it.[49]

Among other reasons, the NEB has been reluctant to regulate the trade in electricity with the same intensity that it has applied to its regulation of natural gas and oil because of the stipulation in Canada's Constitution Act of 1982, which explicitly provides the provinces with exclusive jurisdiction over the "development, conservation,

---

[48] Paul G. Bradley and G. Campbell Watkins, "Canada and the U.S.: A Seamless Energy Border?" pp. 17-21.

[49] H. Lee Briggs, "The Electrical Beginnings," in ed. National Energy Board: Twenty-five Years in the Public Interest (Ottawa: National Energy Board, 1984), pp. 61-63.

and management" of power generation.[50] In 1987 the NEB noted that electricity services "formed important components of the economic and social development policies of provincial governments" especially since Canada's electricity sector was developed in isolation, with limited inter-provincial connections. Notwithstanding this convention, the Constitution does in fact provide the federal government (NEB) with jurisdiction over both the interprovincial and international trade of electricity. Moreover, since the bottleneck in North America's long-range electricity transmission lines has become a pressing issue in recent years, it is likely that the NEB will become substantially involved in mitigating this problem. The U.S. Energy Policy Act of 2006 has already given the NEB's American counterpart, the Federal Energy Regulatory Commission (FERC), significantly increased powers to speed up the building of new electricity transmission lines.[51]

If the experience of transmission unbundling in the natural gas sector is a reliable guide, then it could be expected that the unbundling of transmission lines will encourage much needed investments in this area by breaking the monopolistic behaviour of integrated provincial electricity companies and reducing the ability to seek economic rent by under-investing in transmission capacity. Moreover, a fair distribution of economic gains from the trade in electricity relies on both adequate transmission capacity and the unbundling of transmission from production. A demonstrative case in point is the 1996

---

[50] National Energy Board, The Regulation of Electricity Exports: Report of an Inquiry by a Panel of the National Energy Board Following a Hearing in November and December 1986, National Energy Board, June 1986, (Ottawa: Ministry of Supply and Services, June 1987).

[51] Energy Picture Experts Group, North America: The Energy Picture II, North American Energy Working Group of the Security and Prosperity Partnership, January 2006, pp.48-58

FERC directive which, ironically, settled a long-standing interprovincial dispute within Canada.

For more than a decade, the Newfoundland government had been fiercely objecting to Hydro-Quebec's practice of using its monopoly power over transmission lines between Newfoundland and the U.S. to extract the arbitrage opportunities that would have otherwise been available to Newfoundland. Although the NEB had been sympathetic towards Newfoundland's complaint and had categorically recommended the unbundling of interprovincial electricity transmission lines on the model that had already been adopted for oil and gas transmission, it remained reluctant to enforce this principle. In essence, the federal authorities were wary of clashing with Quebec on an issue that could potentially trigger a contentious constitutional debate. The legal question, within the Canadian framework, centred on whether the unbundling of interprovincial transmission lines was a matter of interprovincial trade, or whether it was a matter of provincial "development, conservation and management." The answer to this multi-billion dollar question was promising a combative showdown between Newfoundland and Quebec in the Canadian Supreme Court, until the dispute was settled for all practical purposes when FERC issued an independent directive ordering the unbundling of all electricity sold in the U.S., whether by domestic or foreign companies. Consequently, Hydro-Quebec was forced to provide fair third party access of its transmission lines to Newfoundland producers in order for any of the electricity to be sold in the U.S.[52]

[52] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board, pp. 108-110.

2.4 Evaluating Contemporary Political Economic Issues

A historical review of the Canadian energy sector would no doubt highlight the important role of the state in the development of the oil, natural gas, and electricity sectors. As argued earlier, the term 'deregulation' has often been misconceived as the abolishment of regulation, when in actuality the term has been associated with the changing of the regulatory philosophy in Canada and not the reduction in government authority. The constitutional mandates of the federal and provincial agencies that regulate the energy sector in Canada have not been reduced. In fact there has been a numerical increase of personnel working at the NEB, as well as an increase in the total areas of expertise. For example, since the 1980s, environmental regulation and sectorial information collection and dissemination have been two areas of significant growth.[53]

Similarly at the provincial level, the Alberta Energy and Utilities Board (EUB) or the British Columbia Ministry of Energy, Mines, and Petroleum Resources have invested much effort into expanding environmental regulatory expertise, especially in relation to unconventional oil and gas (i.e., oil sands, coal-bed methane, tight gas and sour gas).[54] The Alberta Department of Energy, together with the EUB and the Alberta Energy Research Institute are in fact the world's leading and most significant public sector investors in the research and development of technologies related to bitumen (crude from oil sands) and heavy oil production.[55]

---

[53] Ibid, chapter 11.
[54] See Darrell Stonehouse, "The Last, Best West: British Columbia exploration and development hotbed in maturing western Canadian gas patch," Oilweek, February 2006, pp.33-36.
[55] See Deborah Jaremko, "Pressure Communications: Industry, government collaborate on gas over bitumen R&D," Oilweek, pp.45-48.

At the most fundamental level of political economic analysis, it can be argued that the energy sector will categorically be prone to market failures without government regulation. The economic literature concerned with market failures relating to natural monopolies — as in the case of energy transmission lines or certain regionally dominant power plants and refineries — has been fairly contentious in recent years, although most analysts agree to one form of regulatory regime or another.[56] However, the positive experience with the unbundling of transmission services in the telecommunications and energy sectors of North America and Europe has shifted the debate considerably towards a paradigm concerned with stimulating as much competition within an inherently imperfect market.[57]

Apart from ensuring fair market access to energy transmission infrastructure, regulation has also played a significant role in the economic stabilization of the upstream segment of the oil and natural gas sectors. A historical review of oil discoveries in North America shows that the regulation of production from single geological formations has been critical in stabilizing the economic viability of these operations. The initial discovery of oil in Alberta — like earlier episodes in Pennsylvania, New Jersey and Texas — coincided with a local economic crisis until an orderly production regulation

---

[56] William A. McEachern, Economics: A Contemporary Introduction, (New York: Thomson South-Western, 2005), pp. 317-320.

[57] See especially chapters 6-10, John D. Donahue and Jospesh S. Nye, ed., Market-Based Governance: Supply Side, Demand Side, Upside, and Downside, Washington: Brookings Institution Press, 2002; Massimo Filippini, "Are Municipal Electricity Distribution Utilities Natural Monopolies?" Annals of Public and Cooperative Economics vol. 69 no.2 (1998); Thomas J. DiLorenzo, "The Myth of the Natural Monopoly," The Review of Austrian Economics, vol. 9 no. 2 (1996): <http://www.mises.org/journals/rae/pdf/rae9_2_3.pdf>

mechanism was established.[58] Within the context of market failure literature, the historical role of the Alberta Oil and Gas Conservation Board in regulating production at the wellhead is characteristic of a successful common-pool regime that has prevented market failure due to a 'tragedy of the commons' phenomenon.

In fact, it can be argued that the threat of commodity price volatility in unregulated oil and gas production is much more severe than in the mining of other natural resources.[59] In the example of open-pit copper mining for instance, it is conceivable to have two different operators working on adjacent leases without infringing upon one another's 'correlative rights'. The two operators may mutually hurt one another by overproducing and depressing the regional price for copper, however, the rate at which each operator mines copper has no relationship to how much copper will be left for the other. In contrast, several different upstream oil and gas operators on adjacent lands in actuality hold leases to the same hydrocarbon geological structure. If one operator produces from its lease at a faster rate than its neighbouring leaseholders, it is likely that the wells of the faster producer will drain oil and gas from under the adjacent leases. In the absence of a wellhead regulatory regime, each operator will find the economic incentive to extract and market its oil and gas at a faster rate than its competitor and unleash a mutually destructive phenomenon. In fact, there have been numerous historical examples within North America when this phenomenon has led to prices collapsing far below operating costs, especially in the absence of a developed local midstream industry.

---

[58] For a comprehensive historical review of the economic and social volatility in the early years of the Alberta oil boom, see David Finch, Hell's Half Acre: Early Days in the Great Alberta Oil Patch, (Surrey, B.C.: Heritage House Publishing Company, 2005).

[59] Earle Gray, Impact of Oil: The Development of Canada's Oil Resources, (Toronto: The Ryerson Press: 1969), chap. 4.

This phenomenon has often resulted in severe local economic and social crises, including the breakdown of law and order.[60]

[60] See esp. Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power (New York, N.Y.: Free Press, 1992): pp. 248-252.

3. THE SELF-SUFFICIENCY STRAGEGY

Throughout the evolutionary development of the Canadian energy self-sufficiency perspective, two general objectives have remained consistent: (1) reducing *absolute* price volatility in the domestic Canadian energy markets, and (2) increasing Canadian ownership of capital assets in the domestic energy sector. Despite the various market and policy cycles since the 1950s, self-sufficiency proponents have staunchly believed that the fulfillment of these two objectives is essential in protecting the interest of consumers, increasing Canadian control and share of economic rent from Canadian energy resources, and nurturing the foundations of a resilient domestic energy sector. However, it is important to emphasize the gradual development and rationalization of what is herein considered the 'self-sufficiency perspective' or 'self-sufficiency strategy'. Moreover, the intellectual impact of this approach has varied from time to time on the oil, natural gas, and electricity sub-sectors.

As the trend towards integrated energy markets in North America has gained momentum in the last two decades, the prominence of the self-sufficiency perspective has been subdued from its heyday in the 1970s and early 1980s. Indeed, since the 1990s, federal government officials have not even entertained the possibility that Canada may ever again pursue a self-sufficiency strategy. Yet, worries about long-term security of supply and the adverse economic and social effects of greater American demand of Canadian energy resources have prompted some Canadian political economists to call for a return to an energy self-sufficiency strategy.

To be precise, in recent years, energy issues have not caught the imagination of Canadian political economists as much as they did during the energy crises of the 1970s. Curiously, a review of Carleton University's Studies in Political Economy — one of the most prominent academic journals favoured by members of the Canadian political economy community — reveals not a single article concerned specifically (or in significant part) with the Canadian energy sector. Despite the extensive discussion of energy issues in the mainstream Canadian news media, it is reasonable to speculate that the lack of anticipation for imminent changes in federal energy policies have muted academic interest on the topic. In contrast, the issue of global climate change and Canadian GHG emissions policy has attracted more academic attention precisely because of its prominence on the political agenda of recent years.

Gordon Laxer, a prominent Canadian political economist, has been critical of the lack of consideration for a Canadian self-sufficiency strategy, particularly since the topic of energy independence/self-sufficiency has received much political attention in the U.S.[61] Laxer has concluded that the inaction of the Canadian government has left Canada vulnerable *vis-à-vis* other countries that have been taking proactive measures in shoring up security of supply.[62] The linkage made to the interventionist measures of other states is noteworthy. Since the oil supply shocks of the 1970s, all import-dependent industrialized countries, irrespective of their strategic dispositions, have become aware of their vulnerabilities to another supply shock as a result of political instability in major oil-producing regions, particularly the Persian Gulf. To a limited extent, some of these

[61] Gordon Laxer, "Will federal parties secure Canada's energy future?" Parkland Institute Perspectives, 6 January 2007; Gordon Laxer, "Canadian Energy Security: Easterners could freeze in the dark," The Globe and Mail, 28 May 2007;
[62] Ibid.

vulnerabilities have been reduced by the greater coordination of importing countries through the framework of the IEA, mainly through the sharing of market intelligence and a framework to coordinate the release of strategic reserves. Yet, most analysts of the IEA are doubtful that the cooperation of the importing countries will survive a major crisis and consequently energy security strategies are chiefly devised unilaterally.[63]

Historic reviews of the behaviour of national governments during the energy crises of the 1970s, as well as the Suez Crisis of 1956-1957, provide ample insight into the temptations import-dependent countries face in taking unilateral measures that often have zero-sum impacts on other import-dependent countries. In the Suez Crisis, the various disagreements between Britain and France on one hand, and the Americans on the other, arguably developed into a tense standoff mainly because of the perceived differences in interests of the two sides concerning the oil resources of the Middle East.[64] During the 1970s, competition for oil resources once again developed on national lines at various instances. The British government of Prime Minister Edward Heath attempted to enact laws which mandated that Royal Dutch Shell and British Petroleum, two predominantly British companies, divert supplies from other European markets for the benefit of British security of supply.[65] At the same time, the European Community generally broke with the United States policy concerning the Arab-Israeli conflict because as French President Georges Pompiduo put bluntly to U.S. Secretary of State Henry Kissinger, "you rely on the Arabs for about a tenth of your consumption, we are

---

[63] See chapters 4 and 21, Jan H. Kalicki and David Goldwyn, Energy and Security: Towards A New Foreign Policy Strategy, (Washington: Woodrow Wilson Center Press, 2005).
[64] Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power, pp. 479-498.
[65] Stephen Howarth, A Century In Oil: The "Shell" Transport and Trading Company 1897-1997, London: Weidenfeld & Nicolson, 1997, pp. 307-311; Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power, pp. 619-632.

entirely dependent on them." Heath also pointedly told the Americans, "I don't want to raise the issue of Suez, but it's there for many people."[66]

In the more contemporary scramble for energy resources, the role of the Chinese government has come into focus for using its diplomatic and economic leverage to win preferential access for Chinese companies prospecting for global supplies. In strategically important supplier countries such as Kazakhstan, Iran, Russia, Saudi Arabia and Sudan, the Chinese government has been closely involved, if not actually playing the leading role. In Middle Eastern, African, and Latin American countries of less strategic importance, the government has still played an important supporting role.[67] Although China does not pose an explicit threat to the effective operation of the international energy markets, the competition posed by Chinese energy companies have been perceived 'unfair' because of the intervention of the Chinese government.[68] Of critical geopolitical concern to the Western powers has been China's willingness to enact close energy ties with countries such as Sudan, Turkmenistan, Iran and Venezuela, which the West has chosen to boycott politically and economically. China's reluctance to interfere in the domestic affairs of these countries has been a key cornerstone of its foreign policy. Furthermore, the consolidation of China's economic ties with these countries has undermined Western efforts to pressure them.

Analysts concerned about the trend towards greater strategic intervention by national governments — and its consequent threats to the liquidity of global energy

---

[66] Ibid, pp. 627-628.
[67] Robert E. Ebel, "China's Energy Future: The Middle Kingdom Seeks its Place in the Sun", pp. 37-54; Andrea Goldstein, Nicolas Pinaud, Helmut Reisen and Xiaobao Chen, The Rise of China and India: What's in it for Africa? (Paris, OECD, 2006).
[68] Peter C. Evans and Erica S. Downs, "Untangling China's Quest for Oil through State-backed Financial Deals", Policy Brief, no. 154 (Washington: The Brookings Institution, 2006).

markets — have also taken note of Russia's increasing inclination to use its significance as an energy exporter to project its power and pursue an aggressive foreign policy agenda. Shlapentokh has charged that Russian politicians increasing see "the 'energy card' as an instrument that would allow Russia to be a great power again and release it from its inferiority complex."[69] This point of view has been gaining traction within Western European and North American policy circles, particularly after the crisis surrounding the Russian-Ukrainian standoff in early 2006 over Russia's allegations that Ukraine was stealing transit gas meant for Western Europe. The Russians halted gas exports through Ukrainian transmission pipelines for a few days and effectively left Western European customers unable to take deliveries. On similar grounds, Russia briefly cut oil and gas transmission through Belarus in late 2006 and early 2007, again impeding deliveries meant for Western Europe.[70]

Since the mid-1990s, there has been a greater effort at the European Union (EU) level to engage Russia in a long-term energy relationship that would secure the EU's oil and gas supply. Among other things, Western European governments and the EU have been working on involving Russia in the market-based integration of European energy. They

---

[69] Jeff Share, "Russian Federation's Future Inseparable From Gazprom," Pipeline and Gas Journal, August 2006, pp. 18-21; Danila Bochkarev, "Russian Pipeline Politics In Context of 'Strong' And 'Weak' Globalization(s)," Pipeline and Gas Journal, October 2006, pp. 66-68; Valdimir Shlapentokh, "Intoxicated by high oil prices: Political Dutch disease afflicting the Kremlin," Oil and Gas Journal, 6 November 2006, pp. 18-24.

[70] The term 'third party access' (TPA) as it is used in the context of European energy pipeline regulations is roughly equivalent to the 'unbundling' principle as commonly defined in Canada and the U.S. However, the technical definition used by the IEA makes quite a clear distinction between the two. The IEA defines 'third party access' as meaning the obligation for transmission companies to carry the supplies independently contracted between various buyers and sellers. 'Unbundling' in contrast is defined as the requirement for energy companies to separate the operations and accounting of their transmission assets, for the practical and transparent implementation of 'third party access'. See International Energy Agency, Natural Gas Pricing in Competitive Markets, (Paris: Organization of Economic Cooperation and Development, 1988), pp. 23-25.

have also called for Russian ratification of the Energy Charter Treaty (initiated as the 'European Energy Community' in 1991), which among other things would formalize provisions for 'third party access' (TPA) to the Russian transmission grid.[71] The EU policy leaders have reasoned that this would facilitate direct contracting between European buyers and private Russian producers, as well as allow non-discriminatory access to Central Asian supply through the Russian transmission network.[72] However, especially since Russian President Vladimir Putin's second term in office, the Russian strategy has been geared to precisely counteract the EU's push for TPA. Russian Finance Minister Alexei Kudrin has declared that the Energy Charter Treaty has a "whole range of defects" and that Russia would not ratify it unless the TPA provisions are largely removed.[73] Furthermore, Gazprom — the state-controlled and most pre-eminent Russian energy company — has not only consolidated a virtual monopoly over Russian gas transmission capacity, but has brought under its control a significant portion of Russian

[71] The term 'third party access' (TPA) as it is used in the context of European energy pipeline regulations is roughly equivalent to the 'unbundling' principle as commonly defined in Canada and the U.S. However, the technical definition used by the IEA makes quite a clear distinction between the two. The IEA defines 'third party access' as meaning the obligation for transmission companies to carry the supplies independently contracted between various buyers and sellers. 'Unbundling' in contrast is defined as the requirement for energy companies to separate the operations and accounting of their transmission assets, for the practical and transparent implementation of 'third party access'. See International Energy Agency, Natural Gas Pricing in Competitive Markets, (Paris: Organization of Economic Cooperation and Development, 1988), pp. 23-25.

[72] The website of the Energy Charter Secretariat provides invaluable information on the East-West gas trade in Europe and the current agenda facing policymakers. < http://www.encharter.org/>

[73] RIA Novosti, "Senior Gazprom official slams Energy Charter Treaty," RIA Novosti, 20 June 2006.

oil and gas reserves, and has also bought into Eastern European electricity generation and transmission capacities.[74]

Those wary of Russian intentions have pointed to Gazprom's buying spree of Western European transmission assets as another demonstration of Russia's projection of power in Europe. Gazprom's majority interest in the proposed North European Gas Pipeline (NEGP) that is meant to bypass Ukraine, Poland, and Belarus and — through a sea route — directly connect the Russian and German transmission grids, has been increasingly perceived as a means of dividing the European markets. The Russian acquisitions in June 2006 of parts of the transmission network of Gasunie (the Netherlands's main gas transmission company) and the failed takeover bid for Centrica (the main British gas transmission company) has further raised eyebrows.

Of particular relevance to North American security of supply, has been Gazprom's signalling of its intentions to swap European delivery contracts for control of stakes held by Western European gas companies in the prized North American and Japanese liquid natural gas (LNG) markets.[75] Since Western European companies such as British Gas and Total have achieved a lead start in mastering LNG technology and developing LNG infrastructure, but have struggled in securing access to reserves, Gazprom executives have directly linked negotiations concerning European trunkline

---

[74] Gazprom's prominence was particularly secured after the forced bankruptcy and break-up of the Yukos Oil Company by the Russian government on the grounds that Yukos executives had committed tax fraud. At the time of the crackdown by the Russian authorities, Yukos and Sibneft had agreed to a merger that would have effectively created Russia's largest energy company. The Russian government halted the merger and the assets of both private companies eventually came under state control. In late 2006, the Russian government further strengthened Gazprom's pre-eminence by pressuring Royal Dutch Shell to allow Gazprom to take a stake in the Sakhalin 2 gas project. See Tom Miles, "Shell sees Sakhalin-2 deal with Gazprom this week," Reuters, 17 December 2006.

[75] Danila Bochkarev, "Russian Pipeline Politics In Context of 'Strong' And 'Weak' Globalization(s)," Pipeline and Gas Journal, October 2006, pp. 67.

deliveries with their participation in the North American LNG market. Gazprom chief executive explained this strategy at the June 2006 World Gas Conference:

> During the first stage of a Gazprom presence in the U.S. market, we plan to make spot sales of non-Russian LNG, in which swap arrangements with our [European] pipeline gas are part of the picture. The process is already under way. In September 2005, we delivered our first shipment of LNG to the U.S. market. The next step will be to sell LNG produced by ourselves on the world market which could realistically happen after 2010. Today, Gazprom is talking to the leading players in the world's LNG market about the possibility of concluding an agreement to cooperate more closely on the production and marketing of this particular product.[76]

Worries over the breakdown of market liquidity and transparency in the global energy sector could serve as the leading cause for a revitalized self-sufficiency strategy in Canada. From the mid-1970s to early 1980s, the nexus between a more interventionist international environment and the Canadian government's inclination to pursue a self-sufficiency strategy became clearly developed. While Canada was never declared to be on the list of importing countries embargoed by Arab producers, concern with the strategic threats stemming from politically motivated disruptions to Canada's international oil supplies was a key organizing theme for advocates of energy self-sufficiency. While the government's 1973 exhaustive study, An Energy Policy For Canada: Phase 1, made the case for Canadian ownership of production resources predominantly on the grounds of recovering economic rent from the American investors in the Canadian sector, by 1976, the government's An Energy Strategy For Canada: Policies for Self-Reliance paid much closer attention to 'international developments' and the threats from OPEC.[77] When introducing the NEP in 1980, the federal government

---

[76] Petroleum Economist, "The Pretenders to Qatar's throne," Petroleum Economist, November 2006, p. 18.
[77] The Minister of Energy, Mines, and Resources, *An Energy Policy For Canada: Phase 1,* Ottawa, Information Canada, 1973; The Minister of Energy, Mines, and Resources, *An Energy Strategy For Canada: Policies For Self-Reliance,* Ottawa, Supply and Services Canada, 1976.

clearly tied its efforts at promoting Canadian energy self-sufficiency to the uncertainty and insecurity of overseas supplies. The official NEP report observed: "Any country able to dissociate itself from the world oil market of the 1980s should do so, and quickly. Canada is one of the few that can."[78]

The perceived benefits of delinking Canada from the global energy economy was widely accepted among energy analysts, in large part because it was perceived that the global scramble for energy resources — as well as the economic and political consequences of this phenomenon — had cascaded into a zero-sum game among importing countries. A monograph published in February 1981 by the respected and largely non-ideological Canadian Energy Research Institute (CERI) titled *Benefits and Costs of Oil Self-Sufficiency in Canada*, overwhelmingly endorsed energy self-sufficiency on the grounds that it would (1) reduce the reliance on insecure overseas supplies, (2) reduce Canada's balance of payment deficit, (3) and enhance prospects for employment and investment in Canada.[79]

In another CERI monograph titled *Energy Policy and the Balance of Payments: An Outline of the Issues,* a mercantilist rationale was clearly developed to explain that even though increased natural gas exports to the U.S. would have reduced Canada's then significant current account deficit, the improvement to Canada's balance of payment problem would only be temporary. It was argued that increased energy exports would crowd out other Canadian exports because of their subsequent impact on currency exchange rate adjustments. Therefore, it was concluded that macroeconomic

---

[78] Energy, Mines and Resources Canada, *National Energy Program,* Ottawa, Supply and Services Canada, 1980, p. 7.

[79] J.A. Dawson and Z. C. Slagorsky, Benefits and Costs of Oil Self-sufficiency in Canada, Calgary: Canadian Energy Research Institute, February 1981.

interventions of other countries had inherently skewed international trade relations and it was no longer prudent for Canada to rely on a free-floating exchange rate or the free trade in energy.[80]

Insofar as a self-sufficiency strategy could once again dominate Canada's approach to energy security, the constituting elements of such a strategy need to be configured to the present realities of the Canadian and global energy markets. However, the dynamics that may lead to the rationalization of a new self-sufficiency strategy will most probably correspond to previous contentions with the same strategic dilemmas. Much of the contemporary literature by self-sufficiency advocates still dwells on failures of NEP era programs, rather than considering practical policy options for the present time. For one adequately in tune with the vast sectoral changes that have occurred since those times, it would be easy to dismiss the nostalgia for the NEP era as irrational and ideological. As evident in the previous chapter, the opinion of this author is consistent with the predominant policymaking view that the NEP was an economic catastrophe for its failure to appreciate basic economic principles. However, identifying the flaws of the NEP provides insufficient grounds for a categorical dismissal of an upgraded self-sufficiency approach. Therefore, the following review of a self-sufficiency strategy, in relation to the three energy security criteria, shall be developed within the context of contemporary market and regulatory conditions.

---

[80] T. L. Powrie, Energy Policy and the Balance of Payments: An Outline of the Issues, Calgary: Canadian Energy Research Institute, July 1979.

3.1 Security of Supply

Traditionally, regulatory policies concerned with security of supply have concentrated on the volume of available domestic energy stocks. In principle, an acceptable margin of safety has been represented in terms of the ratio of domestic stocks to imported volumes liable to cross-border disruption. As evident in Table 1, there are far more external threats to energy security than internal ones. In fact, of the seven categories of energy security events identified in Table 1, only two — local logistical disruption and local market/structural discontinuity — constitute events with no direct correlation to changes in the volume of cross-border trade in energy.

As the vertical structures in the energy sector have gradually eroded, and as global market liquidity has become a reality, it has become much more difficult for regulators to stabilize domestic markets in times of crisis by means of a centralized balancing of physical supplies. For example, of the few times since 1990 when the U.S. Strategic Petroleum Reserves (SPR) have been released to balance the domestic American market, there is evidence that much of the released volume has been sold by traders in Europe because of price arbitrage opportunities.[81] In any hypothetical situation where cross-border market liquidity is rampant, the availability of additional domestic supplies may not ensure absolute price stability while arbitrage opportunities remain, where overseas consumers outbid domestic consumers for supplies.

Even in the instance where a country is entirely self-sufficient with its energy needs — meaning that it is not reliant on imports of foreign energy resources — the

[81] Robert Bamberger. Issue Brief for Congress: Strategic Petroleum Reserve, (Washington, D.C.: Congressional Research Service, 2003), pp. 8-9.

ability of traders to export domestically produced supplies will correspond with the importation of inflated global energy prices. During global supply crises, a self-sufficiency strategy must essentially short-circuit export routes in order to preserve absolute price stability. The term 'absolute' is used here to highlight the policy focus on nominal prices, instead of real or relative prices. In other words, whereas a self-sufficiency strategy is successful at establishing equilibrium for domestic supply and demand without causing nominal inflation (or deflation), it fails at realizing real economic gains (and efficiency) from the sale of scarce supplies into the international markets at favourable terms of trade.[82]

At the theoretical level, the autarkic policy that a self-sufficiency strategy requires essentially forces policymakers to favour price stability over economic efficiency. Particularly in Canada's case, this distinction has more than mere academic consequences. Although Canada is a net exporter of energy resources, by virtue of geography, certain regions of Canada are heavily dependent on imported supplies. Therefore, even if one assumes that it is feasible in the long-term to build transmission lines connecting these regions to domestic production hubs, in the short-term, the need to import supplies for these regions presents a significant policy conundrum. Federal policymakers will find it politically necessary to subsidize the imports of these regions to comparable prices in the regions decoupled from the global markets. In such an instance, economic efficiency may become so compromised that — like the NEP era — Canada

[82] For a theoretic economic perspective on trade policy, see chapters 8 and 9 in Paul R. Krugman and Maurice Obstfeld, International Economics: Theory and Policy, sixth ed., (Boston: Addison Wesley, 2003), pp. 185-254.

may find itself in a balance of payment deficit due to the high cost of energy imports compounded by the loss of export revenues.

Of the three energy sub-sectors, the case for self-sufficiency in natural gas seems most appropriate at first glance, considering Canada's sizable exports relative to its limited reserves and expected acceleration in future demand. Moreover, the consumption of natural gas in Canada has accelerated substantially in the last decade and it is expected that the market share of gas in North American consumption will rise from the 24% in the year 2000, to 30% in the year 2030.[83] Much of the "dash for gas" will be driven by the use of gas in electricity production by means of combined cycle turbines (CCGT) and combined heat and power equipment (CHP).[84] This process has the dual advantage of being more environmentally benign, while also being highly economic and efficient. In Canada specifically, it has been forecasted that more than half of total consumption could be driven by oil sands projects where steam from CCGT is used in the steam-assisted gravity drainage (SAGD) production process. Various studies point to the likelihood that by 2030 consumers will be willing to pay for natural gas at roughly the equivalent price of a barrel of crude oil. In fact, the scenario planners at Royal Dutch Shell have speculated that gas will serve as the "bridge fuel" over the next two decades until significant growth in renewable energy can be achieved.[85]

---

[83] Energy Information Administration, International Energy Outlook 2007, Energy Information Administration, May 2007. <http://www.eia.doe.gov/oiaf/ieo/nat_gas.html>

[84] Hisham Khatib, Financial and Economic Evaluation of Projects in the electricity supply industry, (Stevenage: Institution of Electrical Engineers, 1997), pp.4-8.

[85] See Ibid; Jamie Spellings, The Outlook for Energy: A view to 2030, (Exxon Mobil Corporation, Dec 2006). <http://library.corporate-ir.net/library/11/115/115024/items/224208/xom_121206b.pdf>; Royal Dutch Shell Group, Energy Needs, Choices, and Possibilities: Scenarios to 2050, (Shell International Ltd, 2001). <http://www.wind-energie.de/fileadmin/dokumente/Themen_A-Z/Ziele/Shell_scenarios2050.pdf>

By simple statistical measure, it would seem that Canada's long-term demand for natural gas is relatively high and its conventional reserves of the resource are relatively low. Canadian consumption over the last three years has averaged at 3.4 trillion cubic feet (TCF), while annual rate of growth in demand until 2030 is expected to be at 1.0%, higher than the 0.6% forecasted for the U.S..[86] Between 2005 and 2007, Canada exported an average of 3.6 TCF to the U.S. on an annualized basis.[87] Yet, total conventional reserves in Canada are estimated at only between 54 to 58 TCF. The National Energy Board predicts that conventional production shall remain flat until 2010, and then gradually decline.[88]

Yet, the implementation of a self-sufficiency strategy will most probably destabilize the Canadian natural gas sector quite dramatically. In the event that natural gas exports to the U.S. are barred, the domestic price of natural gas will become significantly depressed over the medium-term, and in turn this shall dramatically reduce much needed investment in more intensive drilling of conventional gas in the WCSB and the production of unconventional gas. The dynamics of the natural gas sector are such that even with access to the buoyant American market, Canadian natural gas producers have been struggling in the last two years to remain profitable, especially as the larger and more easily developed gas fields have been depleted.

---

[86] The consumption figures are for 'dry' gas consumption, meaning that 'lease' gas consumption is not included. Lease gas is defined as unrefined natural gas which is injected into oil fields to boost pressure and the recovery of crude oil. Figures calculated from data provided online by Energy Information Administration, July 2007. <http://www.eia.doe.gov/pub/international/iealf/table13.xls>

[87] Figures calculated from data provided online by Energy Information Administration, July 2007. <http://tonto.eia.doe.gov/dnav/ng/ng_move_impc_s1_a.htm>

[88] National Energy Board, Looking Ahead to 2010: Natural Gas Markets in Transition, (Calgary: National Energy Board, 2004), pp. 6-7.

Natural gas is significantly more expensive to store than oil and in any case North America has been suffering from a chronic shortage of storage capacity in recent years. Furthermore, even though natural gas has been recognized as a fuel for the future, the demand for it varies considerably with weather patterns since it is primarily used for space heating and for electricity generation during peak periods. Consequently, limited storage capacity and wild swings in demand patterns have resulted in very volatile markets in recent years.[89] At the same time, the economics of producing from unconventional natural gas fields have proven to be quite challenging. In the Canadian context, 'unconventional' reservoirs include those for shallow gas, tight gas, coal-bed methane, shale gas, arctic gas and sour gas. The first four are relatively cost-intensive and environmentally destructive to produce because more drilling is required per surface area even while yield deteriorates quickly. Consequently, apart from the need for innovations in drilling technologies and wellhead regulation procedures, the operators also need to find innovative financial means to hedge against fluctuations in the price fetched by their production. Each play takes a long lead-time to develop, but most of the yield will be attained in the first few months of production.

While accurate estimates are not available, Canada's reserves of unconventional natural gas are substantial. According to the Alberta Geological Survey, Alberta's coal-bed methane deposits could contain as much as 500 TCF of natural gas. The Gas Technology Institute has estimated that 860 TCF of shale gas could be utilized from the WCSB. Moreover, more than 250 TCF of tight gas is estimated in British Columbia

[89] David Ebner, "TransCanada bulks up for winter," The Globe and Mail, 22 December 2006.

alone.[90] Whether or not Canada follows a self-sufficient strategy for natural gas, clearly Canada's security of supply for the resource depends on the increased utilization of unconventional natural gas. As it shall be discussed later in this chapter, a stable and successful implementation of self-sufficiency strategy will likely entail federal subsidies for producers as well as regulatory mandates for longer-term contracts between producers and consumers.

In the case of the crude oil and electricity sectors as well, the availability of adequate supply levels under a self-sufficiency strategy shall be restricted by economic considerations much more so than Canada's natural resource endowments. With presently available technology, there is little doubt that Canada possesses enough conventional oil and oil sands reserves, at 179.2 billion barrels, to supply the domestic market for more than two hundred years at current levels of consumption (the level of consumption in 2006 was at 2.2 million barrels per day).[91] Moreover this estimate ignores the possibility of deriving oil products from shale, coal, and natural gas. As far as the primary energy resources for the production of electricity is concerned, again Canada theoretically has ample coal, uranium and hydroelectric resources to produce electricity for at least five hundred years.

The most challenging aspect of implementing a self-sufficiency strategy shall be the building of infrastructure to transmit domestically produced energy to consumers who presently rely on foreign sources. The electricity sector will be particularly challenged in replacing its reliance on trade with the U.S.. In the last few years, British Columbia,

---

[90] Oilweek, "Unconventional Gas: By The Numbers," Oilweek, August 2006, p. 8.
[91] Figures calculated from data provided online by Energy Information Administration, July 2007. <http://www.eia.doe.gov/emeu/international/contents.html>

Alberta and Saskatchewan have each become substantial net importers of American electricity in terms of GWh. In theory, this reliance on American imports can be replaced by surplus production from Ontario, Quebec and Newfoundland. However, Canada at present lacks an interconnected electricity grid and this will take many years to develop.

At the same time, Canada will suffer a significant deadweight loss from pursuing a self-sufficiency strategy in electricity. Firstly, a significant amount of electric power will be lost while being transmitted over long distance lines from the East to the West of Canada. In contrast, the connecting of nearby American and Canadian regional grids causes less dissipation of electric power. Secondly, the lack of cross-border trade shall compromise market efficiency. As discussed in the previous chapter, swap contracts have allowed Canadian producers utilizing hydro power to extract particularly advantageous terms of trade from American producers utilizing higher-cost techniques. British Columbia in particular has been able to sell electricity at high prices during peak hours in California, and buy it back at prices low enough to earn a net income on top of paying for its net imports in terms of GWh.

Since Canada's oil and gas transmission infrastructure is already densely interconnected, a self-sufficiency strategy will theoretically be easier to implement in the oil and natural gas sectors than in the electricity sector. Yet, the disconnection from the U.S. system could reduce the margin of safety for regional consumers during periods of particularly high demand. There have been instances in the past few years where oil and gas transmission pipelines which normally delivered Canadian supplies to the U.S. were reversed to meet unexpected rise in the demand on the Canadian side. In the late 1990s, the crude oil pipeline linking Sarnia and Montreal (Enbridge Line 9) was reversed to

bring supplies from the U.S. Gulf Coast to Ontario.[92] Between 2000 and 2001, there was also a sharp increase in natural gas exports from the U.S. to Ontario.[93]

3.2 Market and Regulatory Stability

In the context of Canadian energy, it is important to distinguish security of supply issues with those concerning price volatility. Within public discussion, concerns with increasing energy prices are often confused with an inherent scarcity of domestic energy resources. For at least the next two centuries, Canada is not in danger of permanently running out of natural gas, oil, or the primary resources used for the generation of electricity. Since the technical definition for security of supply is the domestic availability of adequate volumes of energy resources, one need not worry about Canada's long-term security of supply. However, there are various scenarios in which short-term security of supply could be destabilized. Due to a significant disruption of Canada's energy infrastructure or delivery arrangements from foreign sources, there may be an inadequate availability of supplies for a period of time before alternate arrangements can be established.

As previously noted, the rise of liquid global energy markets have changed the manifestation of supply crises. Thirty years ago, almost all oil and natural gas was sold on the basis of long-term contracts and disruption often resulted in absolute shortfalls in volume for an affected country. In today's world, one can ultimately get sufficient quantities of oil and even natural gas if one is willing to pay the price. Inversely, unless a

---

[92] [92] Paul G. Bradley and G. Campbell Watkins, "Canada and the U.S.: A Seamless Energy Border?" The Border Papers- C.D. Howe Institute Commentary no. 178 (April 2003): p. 14.

[93] Department of Natural Resources, Canadian Natural Gas: 2001 Market Review & Outlook, Department of Natural Resources, 2002. <http://www2.nrcan.gc.ca/es/erb/prb/english/View.asp?x=447&oid=657>

country is closed to the global trade in energy, the extent of insulation from a general global crisis has been greatly reduced. The market makes no distinction between quantities that used to be part of an uninterrupted flow and quantities bought to cover a shortfall. Moreover, higher levels of interfuel competition have deepened the impact of global price movements on non-tradable supplies. Consequently, the correlation between the price movements in oil, natural gas, and electricity has increased.[94]

A self-sufficiency strategy, if successfully implemented, could theoretically insulate Canada from the vagaries of global price movements. Yet, the salient question to be answered is precisely whether a successful implementation could be made and how difficult it would be to do so. The transition towards a self-contained Canadian energy system will take time as the appropriate infrastructure is built and commercial arrangements are revamped. During this period of transition, the role of market and regulatory forces shall be critical. As the NEP demonstrated, when policy objectives oppose the commercial incentives of market participants, market forces will become enemies and not allies of regulatory stability.

The permanent alteration of reliance on foreign supplies entails economic costs that either have to be subsidized directly by the government or spread out among various market participants. Since total costs of implementation will be distributed unevenly amongst producers and consumers based on fixed variables such as geography and demand elasticity, a blanket subsidy for a particular fuel will be inherently inequitable. Moreover, the burden on the treasury would increase with the passage of time as market

---

[94] Jose A. Villar and Frederick L. Joutz, The Relationship Between Crude Oil and Natural Gas Prices, Energy Information Administration, Office of Oil and Gas, October 2006. <http://tonto.eia.doe.gov/FTPROOT/features/reloilgaspri.pdf>

participants adjust their behaviour to take optimal advantage of the distortion of the real price. If the costs of implementation are spread geographically through a disconnected regional pricing system, then the regulatory challenge shall lay in preventing both the legal and illegal measures of market participants to bridge the artificially created arbitrage opportunities.

Part of the challenge in maintaining regulatory stability will stem from soothing the political agitations of stakeholders adversely impacted during the transition to complete self-sufficiency. During the implementation of both the NOP and NEP, countless breaches of official regulations were made by market participants on the grounds that it was unconstitutional for the regulatory authorities to restrict domestic free trade. Criticism from members of parliament and provincial leaders about arbitrary price controls further mobilized public opinion.[95] As a matter of public relations, rebutting such challenges is made difficult partly because the contributing components of mandated prices cannot be cleanly broken down and explained even at the abstract theoretical level.

In the first instance, it would be convenient to explain the mandated rigidity in prices as a necessary precaution in the face of a deteriorating global energy security environment. However, a more probing examination would reveal an uncertain relationship between the attributed cause and the actual effect. If one considers disruptions or discontinuities at the global level in terms of their price impact, distinguishing and isolating the real impact of particular events become problematic. In a liquid global marketplace, the impact of events are factored into prices almost instantaneously, as are future expectations. When future expectations are particularly

[95] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board (Vancouver, B.C.: Douglas & McIntyre, 2000): pp.36-37.

dim, prices may rise sharply on speculation and then correct as the negative expectations fail to materialize.

Especially since the stocking of energy resources is expensive — because of the costs for building and maintaining physical storage facilities as well as the opportunity costs for expending financial resources to keep inventory — at varying moments of uncertainty about the future, declines in prices tend to be as pronounced as the more generally noticed increases. In fact, there have been numerous historical instances in which the occurance of an anticipated major disruption has coincided with a sharp decline in prices. For example, as the Iran-Iraq war intensified in 1986 and exports from both countries through the Persian Gulf virtually stopped, crude oil prices almost halved, falling from $24 dollars to $12.[96] In this particular case, even as material disruptions to global oil supplies were intensifying, a huge buildup of inventory over the previous months had virtually exhausted available storage capacity. Some oil companies had even resorted to using transport vessels to keep inventory. Even with the reductions to global production and continued pessimism about future output, the complete exhaustion of storage capacity forced excess supplies onto the retail market. In what became known as the 'Great Inventory Dump', the global demand from producer countries fell by 13 million barrels a day, or the equivalent of 43 percent from the levels of the preceding year.[97]

---

[96] The 'tanker war' in the Persian Gulf intensified in 1986, as did attacks against exporting terminals and offshore production facilities. While Iran and Iraq were the two principle warring parties, Kuwait's oil exports were significantly hindered as well. By November 1986, Kuwait officially requested the protection of its tankers by Soviet and American naval escorts. Crude oil prices for 1986 calculated from data provided online by Energy Information Administration, July 2007. <http://www.eia.doe.gov/emeu/aer/petro.html>

[97] Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power (New York, N.Y.: Free Press, 1992): pp. 703-720.

Energy security events could have contradicting short-term and long-term effects. A major disruption or discontinuity may have the effect of persuading some consumers to reduce their long-term energy demands by, for example, investing in capital equipment that are more energy efficient or by simply changing consumption patterns. At the same time, uncertainty about future prices or the physical availability of resources may prompt market participants to hoard supplies in the short-term or enter into futures contracts that specify delivery at a fixed price and quantity. The latter's impact on prices usually resembles the physical stocking of supplies. In practice, most sellers of futures contracts are traders or midstream companies disposing of the financial risks and rewards of their inventories. Consequently, futures markets for energy products essentially represent the transferability of ownership of short-term stocks. The first futures contracts for crude oil were sold in 1981 on the New York Mercantile Exchange (NYMEX). Since then, the range and volume of traded energy products has greatly expanded. Today, on the NYMEX as well as other international commodity exchanges, vast quantities of crude oil, gasoline, fuel oil, natural gas, coal and electricity are traded everyday.[98]

The increased market liquidity available to North American producers, traders, and consumers makes price interventions by the regulatory authorities much more challenging than thirty years ago. Even during the NEP era, breaches of the price walls happened regularly and the authorities were forced to initiate more intrusive and complex programs to stabilize the overall pricing regime. With each fluctuation in the behaviour of producers and consumers in response to real prices, the authorities were forced to impose

[98] See New York Mercantile Exchange, A Guide to Energy Hedging, New York Mercantile Exchange, 9 January 2002. <http://www.nymex.com/media/energyhedge.pdf> ; New York Mercantile Exchange, Energy Complex, New York Mercantile Exchange, 7 March 2007. <http://www.nymex.com/media/EnergyComplex.pdf>

counteracting taxes, subsidies or trading restrictions to uphold the mandated price differentials between imported or domestically produced supplies. The uncertainty about future regulations had in itself the effect of accelerating volatility in real prices. Roland Priddle, the former chairman of the NEB, later recalled that the NEP era was an "unhappy" period in which "all sorts of anti-economic things were done. I almost lost count of the number of programs."[99]

In the final analysis, periods in which supplies are tight are precisely the most inopportune moments to impose price controls. While some sort of price wall needs to be imposed during a transition towards a self-sufficiency model, such an initiative should be taken during a period when the markets are less volatile. Policymakers must accept that long-term bottlenecks cannot be addressed by short-term price interventions. The imposition of price controls during an energy supply crisis is the theoretical equivalent of the central bank tightening the supply of money in the middle of a financial crisis in order to rein in bad loans. A reduction of the money supply (increase in the rate of interest) is necessary in the long-term to discourage banks and other lenders from flooding the market with abundantly available credit. Yet, if the financial system is already in distress, then a tightening of the money supply will exacerbate the lack of liquidity. The consensus among contemporary macroeconomists is that the playing out of this dynamic precipitated the financial crisis of 1929, which led to the Great Depression. At times when the liquidity of a market is in danger, regulators must soothe this worry and not suspend the market altogether. As mentioned in the previous chapter, it was the temporary but complete suspension of energy market restrictions that allowed the quick

[99] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board (Vancouver, B.C.: Douglas & McIntyre, 2000): p. 88.

movement of supplies into regions affected by Hurricane Katrina in 2005. Remarkably, no physical shortage was reported outside of flooded areas.

3.3 International Bargaining Position

The effects of external energy relations on Canada's international bargaining position has been thoroughly discussed by self-sufficiency advocates. The issue of foreign ownership and control of the Canadian energy sector has traditionally served as a critical issue of concern for Canadian political economists. During the oil supply shocks of the 1970s and early 1980s, the effects of energy imports on Canada's balance of payments became another favourite topic for discussion. More recently, much attention has been focused on the relevance of domestic energy policy to Canada's international GHG emissions commitments.

In the 1960s, much of the inspiration for energy self-sufficiency came from the view that the multinational American energy companies had gained undue control of the Canadian energy sector and were extracting excessive economic rents from their exploitation of Canadian natural resources. The federal government's 1973 watershed report, *An* Energy Policy For Canada: Phase 1, reflected on this issue:

> A principal problem of foreign control of the Canadian energy industries is whether Canada is getting the desired benefits from the exploitation of these resources. Does the high level of foreign ownership and control of energy resources in Canada reduce the realization of benefits in Canada? Does this level of foreign participation make the realization of Canadian objectives for resource development more difficult? Does this level of foreign participation alter or limit in any way the variety of government techniques which might be appropriate to the realization of Canadian objectives?[100]

[100] The Minister of Energy, Mines, and Resources, *An Energy Policy For Canada: Phase 1,* (vol. I Analysis) Ottawa, Information Canada, 1973, p. 248.

Among other things, the report went on to catalogue the instances of foreign takeovers of Canadian controlled companies from 1963 to 1970, and provided tables of statistics on the appointments of foreign nationals to leadership positions in energy companies operating in Canada.[101] The report noted that the significant reliance on foreign capital and expertise was due to the late maturation of the Canadian energy sector. Consequently, it was argued that foreign investment and control could only be reduced with greater state participation and ownership.[102]

The view that the Canadian energy sector is being excessively exploited by foreign entities predominates the thinking of contemporary self-sufficiency proponents. Laxer has pessimistically concluded that the failure of the NEP was in large part due to the "enormous pressure from the multinationals."[103] Laxer believes that the prevailing threat to Canadian national interests in the energy sector has traditionally stemmed from the collusion between foreign companies and domestic political and financial elites. In the case of Canada's largely government controlled electricity sector, Laxer has argued that unique circumstances allowed for an uprising of middle-class coalitions to defeat initial control of Canadian hydroelectric assets by American power companies and Toronto/Montreal financiers.[104] Froushauer and Cohen have supported the view that

---

[101] The Minister of Energy, Mines, and Resources, *An Energy Policy For Canada: Phase 1,* (vol. II Appendices) Ottawa, Information Canada, 1973, pp. 217-247.
[102] The Minister of Energy, Mines, and Resources, *An Energy Policy For Canada: Phase 1,* (vol. I Analysis) Ottawa, Information Canada, 1973, pp. 179-195, 269-271.
[103] Gordon Laxer, Open For Business: The Roots of Foreign Ownership in Canada, (Toronto: Oxford University Press, 1989), p. 5.
[104] Ibid, pp. 214-216.

Canadian public interest has been better served by government ownership in the electricity sector.[105]

The basis of the intellectual framework that informs opponents of foreign investment in Canada's energy sector has its roots in the age-old debate regarding the 'staples theory'. Pioneered by Harold Innis and W.A. Mackintosh — the two founding fathers of the Canadian political economy tradition — the staples theory stipulates that economic development in Canada was determined by the nature of its commodities exports to Europe. The search for and exploitation of these staples led to the creation of institutions that defined Canadian political culture. While Mackintosh was optimistic that Canada would in time develop an independent industrial base with the help of external capital, Innis was more pessimistic. Innis and his many subsequent disciples saw Canada as a resource-exporter that has been hindered from industrial maturation by external powers and their capitalist agents in Canada.[106]

A key component of the energy self-sufficiency strategy of the late 1970s and early 1980s involved the buying out of foreign stakes in Canada's energy sector. The federal government took a three-pronged approach. Firstly, new foreign ownership legislation was passed to restrict foreign investment in Canadian energy companies, especially those engaged in oil, gas, and uranium exploration and production. In 1974 the Foreign Investment Review Agency was established to screen all sizable foreign

---

[105] Karl Froushauer, White Gold: Hydroelectric Power in Canada, (Vancouver: University of British Columbia Press, 1999); Marjorie Griffin Cohen, "From Public Good to Private Exploitation: GATS and the Restructuring of Canadian Electrical Utilities," Occasional paper series- Canadian-American Public Policy, no 48: (December 2001).

[106] W.A. Mackintosh, Approaches to Canadian History, (Toronto: University Press, 1967); Harold A. Innis, Staples, Markets and Cultural Change: Selected Essays, (Montreal: McGill-Queen's University Press, 1995).

investments. Secondly, significant amounts of federal loans and tax breaks were provided to privately held Canadian energy companies so that they could buy back assets held by foreign entities. Thirdly, the federal government formed PetroCanada to operate as Canada's own national oil company.[107]

By the mid-1980s, these measures became quite controversial. The federal subsidies to privately held Canadian companies did little to expand indigenous production, but contributed to the dramatic personal enrichment of the few private beneficiaries. Dome Petroleum — one of the more notorious abusers of the federal loans and tax breaks — used federal subsidies to acquire oil and gas reserves which it never developed, but conveniently used legal loopholes to unload these assets with various American and Japanese energy companies.[108] The federal government had to write-off more than $14 billion in bad loans to PetroCanada, on top of selling assets and shares when the company entered severe financial crisis by the early 1990s. Throughout this period, the federal bureaucrats who had been assigned to run PetroCanada received as much as ten times their previous salaries while working in Ottawa.[109]

The emphasis of federal incentives during this time strongly weighed in favour of the exploration and production of frontier (arctic) oil and gas. By the early 1980s, more than 50% of the Canadian industry's expenditure went to the development of these reserves, even as virtually no tangible results ever resulted.[110] As global oil prices sank in

---

[107] John Erik Fossum, Oil, the State, and Federalism: The Rise and Demise of Petro-Canada as a Statist Impluse, (Toronto: University of Toronto Press, 1997).
[108] Peter Foster, Other People's Money: The Banks, the Government and Dome, (Toronto: Collins, 1983), esp. chap. 7.
[109] Peter Foster, Self Serve: How Petro-Canada Pumped Canadians Dry, (Toronto: Macfarlane Walter & Ross, 1992), chaps. 1, 4, 5, 20.
[110] Earle Gray, Forty Years in the Public Interest: A History of the National Energy Board (Vancouver, B.C.: Douglas & McIntyre, 2000), chap. 6.

the 1980s, the Canadian government, banks, and oil and gas industry were straddled with hundreds of billions of dollars in loses. The financial situation of the Canadian oil and gas industry became so dire, that by the mid-1980s, overall investment and production levels fell dramatically and the federal government was compelled to remove foreign investment restrictions to allow the inflow of much needed capital. From 1980 to 1981 alone, the rate of return on capital for the Canadian energy companies fell from an average of 7.5% to 1.3%.[111] The misguided manner in which the federal government allocated capital for over a decade was one of the most visible failures of the self-sufficiency drive. After the expenditure of billions of dollars in taxpayer's money, Canada was left with a struggling energy sector by the mid-1980s.

In the present political climate, it is high unlikely that the federal government would seek to increase its participation in the commercial aspects of the energy sector. Formerly state owned companies such as PetroCanada and TransCanada have been completely privatized in the last three years and have been practically operating as independent corporations for more than a decade. However, a flurry of foreign investment in recent years has rekindled concerns about the extent of foreign control of the Canadian energy sector. In June 2007, the federal government signalled its intention to toughen the criteria for foreign takeovers on the grounds of "national security."[112] In the event that foreign state-owned companies such as PetroChina and Gazprom attempt to make strategic investments in Canada's energy sector, Ottawa may decide to weigh the intention of these foreign entities and their political masters. Yet, the link between a more

[111] Edward A. Carmichael and James K. Stewart, Lessons from the National Energy Program (Toronto: C. D. Howe Institute, 1983), pp. 22-31.
[112] Steven Case, "takeovers will face national security test," The Globe and Mail, 26th June 2007.

stringent review of foreign investments and a self-sufficiency strategy has diminished. Commercially motivated foreign investments in the energy sector are presently of no concern to Canadian policymakers. Moreover, the case for a restriction of foreign takeovers as a means of protecting Canadian energy companies overpowering American competitors has become somewhat irrelevant. A few Canadian energy companies have become major players on the global and continental scene. PetroCanada and Talisman have acquired major upstream oil and gas assets in the North Sea, South East Asia, Latin America, and Africa. As part of a joint venture, EnCana has acquired almost half the stakes in ConocoPhilips' downstream operations in the U.S..[113] TransCanada has aggressively acquired pipelines, natural gas storage facilities, and electricity generation plants in the U.S. and Mexico. Almost a third of TransCanada's total assets are in the U.S.[114]

During the spike in global energy prices in the 1970s, the pressures of oil imports on Canada's balance of payments situation was seen as a major issue by policymakers.[115] Much of the macroeconomic endorsement of a self-sufficiency strategy was based on the understanding that lower demand for oil imports would significantly reduce Canada's current account deficit and enhance its current account vis-à-vis its trading partners.[116] Moreover, OPEC's rise of power was commonly seen as a strategic challenge to an industrialized energy-importing country such as Canada. It was perceived that OPEC had

---

[113] David Ebner, "EnCana finds oil sands partner in ConocoPhilips," The Globe and Mail, 5 October 2006.
[114] TransCanada Corporation, 2006 Annual Report, TransCanada Corporation, 22 February 2007. <http://www.transcanada.com/investor/financial_annual.html>
[115] For an explanation of national income accounting and balance of payments, see esp. chap. 4 of Paul R. Krugman and Maurice Obstfeld, International Economics: Theory and Policy, sixth ed., (Boston: Addison Wesley, 2003).
[116] See J.A. Dawson and Z. C. Slagorsky, Benefits and Costs of Oil Self-sufficiency in Canada, Calgary: Canadian Energy Research Institute, February 1981; T. L. Powrie, Energy Policy and the Balance of Payments: An Outline of the Issues, Calgary: Canadian Energy Research Institute, July 1979.

quite dramatically and unfairly changed the terms of trade. It has remained convenient for North American politicians to blame high energy prices on the 'collusion' by OPEC and it has become fashionable once again to hear the politicians talk about the need to reduce North America's reliance on 'Mid-east oil'. Yet, it has been proven that not even OPEC can defy the laws of economics. From the mid-1970s to mid-1980s, OPEC lost more than a third of its market share and an even larger portion of its revenues.[117] The financial stress of the various OPEC countries became severe enough that by the mid-1980s, they were falling over one another in competition to sign long-term sales agreements.[118]

In the recent rise in energy prices, Canada has not suffered from a current account deficit in its balance of payments. In fact, the export of metal and energy commodities from Canada has been strong enough to cause a substantial current account surplus. Consequently, instead of worrying about Canada's rising indebtedness in relation to other countries, the monetary policy authorities have been worrying about the macroeconomic effects of the dramatic surge in the Canadian dollar, which among other things, has crowded out manufacturing exports. Moreover, the increase of capital allocation to the Western Canadian energy sector has caused a tightening of the markets for labour and construction material and therefore contributed to worries about inflation.[119] Nevertheless, the overall macroeconomic picture has remained surprisingly stable despite the significant shifts in capital allocation in the Canadian economy. This resilience is in no small part attributable to the neoliberal approach in Canada's contemporary fiscal and

---

[117] Energy Information Administration, International Energy Outlook 1999, Energy Information Administration, May 1999. <http://tonto.eia.doe.gov/FTPROOT/presentations/ieo99_3im/sld001.htm>
[118] Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power (New York, N.Y.: Free Press, 1992): pp. 713-742.
[119] Bank of Canada, Renewal of the Inflation-Control Target: Background Information, Ottawa: Bank of Canada, November 2006, pp. 4. <http://www.bankofcanada.ca/en/press/background_nov06.pdf>

monetary policies. Structural supply-side shifts have been allowed to occur without the intervention of the monetary authorities in the currency markets, or the loss of fiscal discipline by the federal government. Essentially, market forces have been allowed to manage Canada's adjustment to a higher energy price environment both at the sectoral and macroeconomic levels. Reliance on imports has lessened and domestic production has increased without the need for government intervention.

However, in the event that a self-sufficiency strategy is pursued, it is likely that Canada will be subjected to a balance of payment deficit, even if the neoliberal monetary and fiscal policies are maintained at the macroeconomic level. Firstly, a self-sufficiency strategy will by definition restrict Canada's energy exports, which will dramatically reduce Canada's foreign currency earnings. Secondly, the subsidized energy imports during the transition period to complete self-sufficiency will add further pressure on Canada's current account. Thirdly, the pursuit of a self-sufficiency strategy will almost certainly cause a reversal of the flow of capital to Canada. The removal of the export market will significantly reduce Canada's total energy output and cause severe deflationary conditions within the sector. The impact of a reversal of capital flows on the acceleration of a current account deficit should not be underestimated. In fact, various macroeconomic studies of the NEP have identified the outflow of capital from the energy sector as the most significant cause of Canada's substantial current account deficit in the early 1980s.[120]

[120] G. E. Angevine, The Impact of A Sharp Oil Price Increase, Calgary: Canadian Energy Research Institute, June 1980, pp. 47-84; Edward A. Carmichael and James K. Stewart, Lessons from the National Energy Program, pp. 22-31.

While the tangible benefits of a self-sufficiency strategy to Canada's international bargaining position seem tenuous in comparison to the substantial economic costs that will have to be incurred, many self-sufficiency advocates have turned to Canada's international GHG emissions control commitments to justify their case. A report by the Canadian Centre for Policy Alternatives, titled *Making Kyoto Work,* has pushed for the termination of Canada's energy trade with the U.S. on the grounds that the GHG emissions policies of the two countries are inherently incompatible. Moreover, the report has argued that Canada should altogether move away from the production and use of fossil fuels. To accomplish higher utilization of renewable energy resources, it has been argued that capital and labour should be moved away from the production of energy that is currently exported to the U.S.[121] Other self-sufficiency proponents have argued that Canada's yearly electricity exports to the U.S. contribute to the emissions in Canada of 3.6 million tons of carbon dioxide.[122] They have concluded that particularly in the case of electricity, the path to North American energy integration would make it difficult for Canada to implement the Kyoto Protocol.[123]

Notwithstanding these sentiments, if a workable domestic market for the trade in carbon credits is established to administer a national quota for GHG emissions, there is no reason to believe that the energy trade with the U.S. has by itself a detrimental effect, regardless of U.S. GHG policy. In fact, even if Canada manages to drastically reduces its GHG emissions in accordance with Kyoto — which entails the reduction of GHGs by at

---

[121] Dale Marshall, Making Kyoto Work: A transition strategy for Canadian energy workers, Canadian Centre for Policy Alternatives, 2002, pp. 32-55.
[122] Scott Vaughan, C. Line Carpenter, Zachary Patterson and Paul Miller, "Canada-U.S. Electricity Trade and the Climate Change Agenda," in ed. G. Bruce Doern, Canadian Energy Policy and the Struggle for Sustainable Development, (Toronto: University of Toronto Press, 2005), p. 161.
[123] Ibid, 164-170

least 40% by 2010 — then Canada will have to suspend a significant proportion of its industrial activities as well as energy production processes that are in themselves energy-intensive and contribute to GHG emissions. These especially include electricity generation, bitumen production and oil refining. The energy industries, *excluding* oil refining, contribute 29.4% of Canada's total GHG emissions.[124] Assuming that the Canadian-American energy trade is not completely suspended, then Canada will almost certainly find itself importing vast quantities of energy supplies from the U.S. Moreover, the vastly regionalized models for electricity generation means that certain regions — notably Alberta and Saskatchewan, which are already net importers of U.S. electricity — will be significantly at a disadvantage in curbing GHG emissions and will have to extend their reliance on U.S. electricity (because of the lack of a trans-Canadian transmission capacity) during the transition to a lower emissions model. If meeting Kyoto is strictly the objective, then the energy trade will be to Canada's advantage.

Some analysts have argued that the Liberal government's surprise 2002 announcement that Canada would implement Kyoto was driven less by practical considerations than by the broader geopolitical desire to counter the unilateral tendencies of the Bush administration.[125] Moreover, Canadian nationalists see Kyoto as an opportunity for Ottawa to reassert a direct role in the energy sector since the dismantling of the NEP, as well as to arrest the economic forces that are pulling Canada into closer

---

[124] Calculated from data provided by Mark Jaccard, John Nyboer, and Bryn Sadownik, The Cost of Climate Change, (Vancouver: UBC Press, 2002), p. 42.

[125] Keith Brownsey, "Alberta's Oil and Gas Industry in the Era of Kyoto Protocol," in ed. G. Bruce Doern, Canadian Energy Policy and the Struggle for Sustainable Development, (Toronto: University of Toronto Press, 2005), p. 201; G. John Ikenberry, "America's Imperial Ambition," Foreign Affairs, vol. 81, no. 5 (September/October 2002); Michael Hirsh, "Bush and the World," Foreign Affairs, vol. 81, no. 5 (September/October 2002).

integration with the U.S. Like the 'Canadianization' drive of the NEP era, the implementation of Kyoto has greater political significance than tangible economic benefits for Canada.

4. THE CONTINENTIAL STRAGEGY

For more than half a century, Canadian proponents of a continental strategy have been motivated by the desire to achieve maximum economic efficiency in the energy sector and to secure access to the American market as far as possible. C. D. Howe, a prominent and outspoken 'continentalist' who as Industries Minister in the late 1950s fought hard to implement his plans for a prosperous and stable Canadian energy sector, epitomized the spirit of this approach. C.D. Howe was neither driven by the desire for personal profit, nor was there ever any question about his patriotism. Yet he was a man of extreme drive and practical sense, who in his younger days had served as the first professor of civil engineering in Canada and had also experienced the bitter impact of the Great Depression when he ran a construction business. Born in Massachusetts, C. D. Howe proudly proclaimed that he was a "Canadian by choice" and because of his resourcefulness and integrity, he was often tasked with solving the most difficult problems during his years as a member of the cabinet. Appropriately, he became known as the "Minister of Everything" during the years in which he was heavily involved in dramatically expanding Canada's industrial capacity.[126]

C. D. Howe did not develop continental leanings because of an ideological investment in *laissez faire* economics. After all, he was deeply involved in the establishing and restructuring of numerous government-owned industrial concerns,

---

[126] Robert Bothwell and William Kilbourn, C. D. Howe: A Biography, (Toronto: McClelland and Stewart, 1979).

including the National Harbours Board, Canadian National Railway, Canadian Broadcasting Corporation, and Air Canada. However, as a pragmatic policymaker, he fully appreciated the impact of market forces. It was apparent to C. D. Howe that because of higher production costs and geographical isolation, Albertan oil and gas was at a major competitive disadvantage to foreign supplies in Montreal and Toronto, the main domestic consumption centres at the time. Yet, the Midwest region of the U.S. was close enough to Alberta —and distant enough from alternate supply lines — to make the marketing of Albertan oil and gas viable. Even as C. D. Howe organized federal subsidies for the building of trans-Canadian oil and gas pipelines, he was insistent that they cross into U.S. regions where possible. Why not maximize the marketability and economic returns of Canadian production?

Even though the Canadian oil and gas sector has developed quite extensively since its infancy in the 1950s, C. D. Howe's worries about the marketability of Canadian production have not become irrelevant. An extensive and dense network of pipelines has overcome the transmission bottlenecks that inhibited the delivery of Albertan oil and gas in the early days. Yet, as the more easily recoverable oil and gas from the WCSB has been depleted, the costs of production have climbed again. While the production cost of Persian Gulf crude oil is on average US$6 per barrel, crude oil produced from Alberta's oil sands can cost as much as US$36 per barrel. Moreover, the Persian Gulf crude is significantly lighter than the oil-sands derived crude and therefore sells at a higher average price.[127]

---

[127] Leonardo Maugeri, "Two Cheers for Expensive Oil," Foreign Affairs, vol. 85, no.2 (March/April 2006); The 'lightness' of crude oil is conventional measured based on a hydrometer scale established by the American Petroleum Institute, referred to as 'degree API'. Crude oil produced from Canadian oil sands has

The security associated with Canadian supplies has won Canadian exporters one key advantage over their foreign competitors in supplying the U.S. market. From 1957 to 1971 when the world was awash in cheap oil, Canadian access to the American market was by no means unrestricted, but the "overland exemption" gave Canadian producers much more latitude in exporting to the U.S. than other foreign suppliers.[128] As discussed previously, the U.S. government was willing to comprehensively harmonize and integrate its energy policies with Canada by the mid-1970s, but the American demand that Canada abandon import subsidies was unpalatable to the Canadian side. As global energy supplies have tightened again in recent years, and as geopolitical factors have destabilized key producer regions, Canadian supplies have become much more marketable in the U.S. because of the associated aura of safety. Not only are overland deliveries from Canada less liable to physical disruption than Middle Eastern, African, or Latin American supplies through longer supply chains, but the relatively strong political and economic relations that the Americans enjoy with Canada provides for greater assurance. On a recent trip to Canada, the former chairman of the U.S. Federal Reserve, Alan Greenspan, went on record stating: "We in the United States trust you. When you sign a contract it doesn't have a Russian signature."[129]

The American trust in the reliability of Canadian energy supplies implies a broad and deep confidence in the sustainability of the relationship between both countries. Within the context of the post-World War II theoretical perspectives on international

---

a lower API number than 10 and is actually heavy enough to sink in water. In contrast, oil from the North Sea or Persian Gulf could be as light as 40 API. See Paul Stastny, "The Future is Heavy," Oilweek, September 2006, pp. 27-34.

[128] G. Campbell Watkins, "Living under a Shadow: U.S. Oil Policies and Canadian Oil Pricing." In ed. R. L. Gordon, H.D. Jacoby and M.B. Zimmerman, Energy: Markets and Regulations, (Cambridge: MIT Press, 1987), p. 112.

[129] The Globe and Mail, "Greenspan Lauds Alberta's Oil Sands," The Globe and Mail, 7th October 2006.

integration, it would be easy to qualify the economic and strategic importance of the energy relationship to the overall stability of relations between Canada and the U.S.. As the formation of the European Coal and Steel Community demonstrated in the 1950s, the functional integration of strategic economic sectors — including the energy sectors — can provide a framework for stable and expandable political and economic interdependence.[130] For many contemporary integration theorists, the energy sector naturally has an aesthetically pleasing role for regional cooperation. For instance, inspired by the functionalism that led to European integration in the latter half of the twentieth century, Paik has offered ambitious proposals for developing a North-East Asian gas grid that would connect Russia, China, Japan, and South Korea, on the theory that energy linkages will help establish broader mechanisms for political cooperation.[131] Other ambitious international frameworks for energy integration have been attempted in the last two decades, including the Energy Charter Treaty that grew out of the European Energy Charter Declaration of 1991.[132]

In the context of the Canadian-American energy relationship, 'integration' can have various meanings. Most fundamentally it implies an increase in the volume of trade that signifies interdependence between suppliers and consumers in both countries. Secondly, it could mean the harmonization of market and regulatory mechanisms to reduce the costs of entry for participants in the consolidated North American marketplace for energy. Thirdly, integration could refer to a common approach to strategic energy

---

[130] See Desmond Dinan, Ever Closer Union: An Introduction to European Integration, (Boulder: Lynne Rienner, 1999), esp. chap. 1; Youri Devuyst, The European Union at the Crossroads, (Bruxelles: P.I.E.-Peter Lang, 2003), pp. 23-30.
[131] Keun Wook Paik, Gas and Oil in Northeast Asia: Politics, Projects and Prospects, (London: Royal Institute of International Affairs, 1996), pp. 261-274.
[132] See the website of the Energy Charter Secretariat <http://www.encharter.org>

security issues, including those relevant to external relations. While these three definitions are not necessarily independent from one another, they are distinct. From the 1950s to the 1980s, the Canadian-American energy relationship gradually intensified based on the first definition, even though it was much more volatile on the other two counts. From the 1980s onward, alterations to cross-border trading regulations allowed for a closer market-based integration as outlined in the second definition. A common approach to strategic energy issues — including international negotiations regarding GHG emissions — is however still lacking.

Remarkably, the continental integration in the energy-related markets for products, services, capital and information have occurred rapidly despite very few changes to the formal treaty framework between the two countries. A comparative survey of other regions suggests that commercial compatibility has been a better indicator of successful energy integration than the formalization of supranational frameworks. The market-based integration of the electricity sector within the Nordic Council — comprising Denmark, Finland, Norway, and Sweden — has been recognized as a successful example of contemporary cross-border energy integration. In contrast, the attempt at integrating the electricity and gas sectors of the MERCOSUR countries (Argentina, Brazil, Paraguay, and Uruguay) has been much more problematic. Due to private industry's lack of confidence in being protected from the collusion of regulators and state-owned companies along national lines, the chronic under-investment in the MERCOSUR energy markets has continued despite optimistic supranational

pronouncements.[133] To a lesser extent, similar problems have dogged energy integration in the European Union (EU), despite the extensive efforts of the European Commission and an already advanced state of general political and economic integration between member countries.[134]

4.1 Security of Supply

In comparison to self-sufficiency advocates, the continentalists assign greater importance to the role of economic factors in determining security of supply. The integrated continental energy market is seen as a strategic tool to promote short-term efficiency in supply allocation and demand management. At the same time, the price impact of disruptions or discontinuities is viewed as providing economic incentive for long-term supply diversification, including the expansion of production capacity that is marginally more expensive to utilize.

Essentially, the continentalists see the integration of the physical, regulatory/legal, financial, and information infrastructure as a means of reducing the costs and risks to security of supply. However, reliance on the economic interaction of participants in the integrated North American marketplace is not considered a replacement for regulations. Instead, the emphasis is placed on the fine-tuning of regulations to align the interests of market participants with broader regulatory objectives. In recent years for example, the

---

[133] Pierre-Olivier Pineau, Anil Hira and Karl Froschauer, "Measuring International Electricity Integration: A Comparative Study of The Power Systems Under the Nordic Council, MERCOSUR, and NAFTA," Energy Policy, vol. 32: 1457-1475.

[134] See Guillaume Durand, "Gas and electricity in Europe: the elusive common interest," European Policy Centre, May 2006; European Commission, Competition: Commission energy sector inquiry confirms serious competition problems, (Brussels: European Commission, 10 January 2007). <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/26&format=HTML&aged=0&language=EN&guiLanguage=en>

restructuring of the electricity sector in both Canada and the United States has been focused on utilizing the role of independent power producers in increasing total generation capacity as well as increasing competition for the benefit of consumers. In this case, the enhancement to security of supply relies on the ability of regulatory measures to direct market, industrial, and technological drivers into convergence.

For much of the history of the electricity sector, the size of the optimally efficient power plant increased so that by the 1970s, most cities were served by a handful of large plants. As CCGT emerged in the 1980s as an efficient power source, it became economical to operate much smaller power plants. Although the natural gas needed to operate a CCGT plant is more expensive per unit of energy compared to the coal used in a coal-powered plant, CCGT plants use less than two-thirds of the energy necessary to generate the same GWh from coal-powered plants. Moreover, they produce much less GHGs, take on average seven years less to build, and inspire fewer environmental objections from local communities. As CCGT has become the preferred source for electricity generation, its smaller scale has offered the promise of more competition among many operators, rather than the regional monopoly of a single producer. Since many utilities were saddled with heavy debts from bad investments in the 1980s, they began raising prices on large industrial consumers. As it became evident that the average total costs (ATC) of new CCGT plants were lower than the prices charged by the utilities, the large industrial users lobbied for the regulators to allow grid access to independent power generators.[135]

[135] Paul L. Joskow, "Restructuring, Competition and Regulatory Reform in the U.S. Electricity Sector," Journal of Economic Perspectives, vol. 11, no. 3, 1997: 119-138.

In Canada, Ontario and British Columbia have been at the forefront of regulatory initiatives to allow grid access to independent operators and importers. Ontario passed the Energy Competition Act in 1998 in a move meant to generate competition, reduce government expenditure, and allow for the importation of supplies during peak periods of demand. As a result, Ontario Hydro was broken up into separate entities: Ontario Power Generation was made responsible for electricity generation and wholesale sales, and allowed to pursue a continental business strategy by acquiring assets in the U.S., HydroOne assumed the transmission and retail distribution business. The Independent Electricity Market Operator and Electricity Safety Authority were established to dispatch generation, control the stability of the grid, and perform inspection of equipment and installations. In addition, approval was granted to independent power producers to compete directly with Ontario Power Generation. These included both newly built power plants and existing ones sold off during the restructuring.[136] While Ontario's restructuring has remained largely on track, it has not been free from controversy. Critics have charged that open access to independent operators and the privatization of Ontario Hydro assets have amounted to profiteering at the expense of taxpayers and users.[137] Even if there is merit to the assertion of the critics, the free trade in electricity holds great promise.

British Columbia's approach has been interesting for the innovative way in which the demand for public ownership of British Columbia's existing hydroelectric assets has been balanced with the need to increase independent generation and cross-border trade to

---

[136] Michael .J. Trebilcock and Roy Hrab, "Electricity restructuring in Ontario," The Energy Journal, vol. 26, no. 1 (2005): 123-146.

[137] See Howard Hampton, Public Power: The Fight For Publicly Owned Electricity, (Toronto: Insomniac Press, 2003); Martin Mittelstaedt, "Utility Sales Seen Hurting Users," The Globe and Mail, 14th December 2001; Myron Gordon and John Wilson, "Consumers Will Get Bill for The Deal With British Energy Firm," Toronto Star, 21st November 2001.

keep up with British Columbia's expanding demand for electricity. The government's Energy Policy Development Task Force strongly advocated moving towards a market-based system in which, like Ontario, the generation and transmission businesses are separated. The Task Force also recommended that the province eliminate the approval process for cross-border trade in electricity and also allow large industrial customers be allowed to strike contracts on the wholesale market.[138] British Columbia's government eventually unveiled a new energy policy in the November of 2002, which was fundamentally in tune with the recommendations of the Task Force.

Uniquely however, the policy called for a legislated 'Heritage Contract' to preserve the benefits of BC Hydro's existing low-cost and strategic generation assets for the British Columbian public. The essential elements of the 'Heritage Contract' were enforced by: (1) the enactment of the BC Hydro Public Power Legacy & Heritage Contract Act of November 2003, pursuant to which BC Hydro has been prohibited from selling of its core generation assets[139]; and (2) the enactment of a new regulation, Heritage Special Direction No. HC2, with an attached Heritage Contract between BC Hydro's generation and distribution divisions. The Heritage Contract requires the generation division to deliver to the distribution division with generation capacity of up to 49,000 GWh per year, at embedded cost. Moreover, the Heritage Special Direction requires the British Columbia Utility Commission (BCUC) to set the rates of BC Hydro on the basis that the Heritage Contract is a legally binding agreement. Furthermore, the

---

[138] Energy Policy Development Task Force, Strategic Considerations for A New British Columbia Energy Policy: Final Report of The Task Force on Energy Policy, Energy Policy Development Task Force, 15th March 2002. <http://www.gov.bc.ca/empr/down/task_force_final_report.pdf>

[139] British Columbia, BC Hydro Public Power Legacy & Heritage Contract Act 2003, <http://www.leg.bc.ca/37th4th/3rd_read/gov85-3.htm> current to Bill 85 of 2003.

Heritage Special Direction also requires the BCUC to set BC Hydro's rates on the basis that any energy deliveries from the generation to the distribution divisions in access of 19,000 GWh per year pass through to ratepayers at cost.[140]

The salient feature of British Columbia's approach is the intricate balancing of an essentially market-orientated and continental strategy with a mechanism to safeguard public ownership of the province's strategically valuable hydroelectric assets. Despite the elaborate manoeuvring around the politically sensitive issue of privatizing BC Hydro, the government's security of supply strategy for electricity is reliant on utilizing the capacity of independent producers in British Columbia and elsewhere. British Columbia has been the leading beneficiary from the cross-border market for swap agreements in electricity, even before the abovementioned restructuring. Location and timing of flows are the significant factor in British Columbia's favour. While Quebec has been a very substantial net exporter in terms of GWh, in recent years British Columbia has been a net importer. Yet, in terms of value, Quebec's net gain only exceeded British Columbia's by little more than 10%. The average prices for exports and imports were even for Quebec, while British Columbia exported supplies at an average price that exceeded import costs by a factor of two.[141] Most of British Columbia's exports have been made in the summer months when there is peak demand in California, while imports have been made in the winter when California's demand is low but British Columbia's demand is at a peak. In this instance, the market-based continental strategy has clearly provided economic efficiency and enhanced security of supply for both sides.

---

[140]British Columbia, Heritage Special Direction No. HC2 to The British Columbia Utilities Commission. <http://www.qp.gov.bc.ca/statreg/reg/B/158_2005.htm>

[141] Paul G. Bradley and G. Campbell Watkins, "Canada and the U.S.: A Seamless Energy Border?" p. 18.

Short-term security of supply for oil and natural gas can also be enhanced by continental integration. A more densely interconnected grid of transmission pipelines provides added security and flexibility during periods of unusually high regional demand. During periods of local emergency, the increased movement of supplies can be achieved quickly by adjusting the pressure in pipelines and in some cases reversing the flow between supply hubs. Moreover, an integrated financial market for commodity exchanges facilitates quick transactions by providing liquidity and price transparency.

The impact of harmonized financial regulation on security of supply is often less well understood and therefore underestimated. Since investments for the development of reserves serve an important role for the realization of adequate production capacity, the regulation of these investments plays a critical role for security of supply. To maintain the confidence of investors, upstream oil and gas companies must provide them with accurate and updated information about the reserves that they hold and the approximate costs for developing them. Since the reserves of upstream companies typically comprise of a major portion of assets, standardized accounting measures have proved essential for bridging the asymmetrical information problem that investors face in valuing companies. Most of the world's investor-owned reserves are presently accounted for by a standard of measure developed by the U.S. Securities and Exchange Commission (SEC), which is commonly referred to as the '1978 system'. All American or foreign companies that list on an American stock exchange must adhere to this standard when preparing their prospectus or reporting their financial position in their annual report. Since most of the world's major oil and gas companies are listed on the New York Stock Exchange (NYSE), the 1978 system has become a global benchmark for investors.

The SEC requires companies to disclose their reserves by calculating how much of it is recoverable based on costs and prices pegged to the last day of the company's financial year. If, for example, market prices drop below the estimated costs of recovery from a company's specific reserve holdings, then the SEC requires the 'de-booking' of these reserves from the company's financial disclosure. Therefore, the disclosed reserves of a company could fluctuate significantly with volatility in the price for its product, even in the absence of any material change to its actual reserves. A growing concern for Canadian producers has been the unfavourable treatment that the technically outdated reserve definitions of the 1978 system give the type of unconventional reserves that are increasingly becoming prominent in Canadian production programs. The major de-bookings that were forced onto Canadian bitumen producers in 2004, as well as tight and shallow gas producers in 2006, resulted in financial difficulties for some. One of the key issues for Canadian bitumen producers is the year-end price peg. Bitumen prices rise and fall seasonally, largely driven by the demand for asphalt, compounded by higher requirements for diluent to lubricate the transmission of bitumen through pipelines during winter months. Therefore, bitumen prices are notoriously weak on the 31st of December. In 2004 for instance, the SEC reserve disclosure rules required that valuations be based on a bitumen price of 21% of the Western Texas Intermediate (WTI) benchmark, despite the fact that the average annual price of bitumen had been more than 50% of WTI.[142]

The Canadian financial regulators have however developed updated disclosure rules which reflect the improvement in technology and economic conditions for the

[142] Paul Stastny, "The push for universal standards for oil and gas reserves disclosure gains momentum," Oilweek, June 2006

recovery of unconventional oil and gas.[143] The National Instrument 51-101, which came into effect in Canada on 31st September 2003, has improved on the weaknesses of the SEC's 1978 system. According to experts, the NI 51-101 system provides for a more accurate picture of a company's reserves by taking into account seasonal price variations as well as allowing for a range in reserve estimates based on the latest technical definitions provided by the Society of Petroleum Engineers (SPE). As a result, the NI 51-101 is better able to accommodate unconventional resource plays, even though it enforces notably stricter accountability and transparency requirements by means of third-party evaluations and external audits.[144] In order to improve the marketability of Canadian upstream companies in the global capital markets, the Canadian Association of Petroleum Producers (CAPP) has been lobbying the SEC and the U.S. Congress for the revision of the 1978 system in line with the NI 51-101. According to Daniel Yergin, chairman of Cambridge Energy Research Associates (CERA), "recognition has intensified in Congress."[145]

Within the market-based continental framework, the availability of oil and gas supplies is essentially a function of technology and price. Analysts estimate that about 1 trillion barrels of unconventional oil can be recovered at marginally higher costs by enhanced recovery methods. Even in mature oil fields, upstream companies have been able to substantially increase recovery by lateral drilling or the injection of an assortment of exotic gasses and liquids, including water, soap, natural gas, carbon dioxide, and

---

[143] Canada does not have a single national financial regulator. Each province has its own securities commission, although most of the rules and regulations governing Canada's capital markets are developed and implemented jointly.

[144] J. Glenn Robinson and David Elliot, "National Instrument 51-101 (NI 51-101) Reserves Reconciliation—Part 2," Journal of Canadian Petroleum Engineering, vol. 44, no. 2, February 2005.

[145] Paul Stastny, "The push for universal standards for oil and gas reserves disclosure gains momentum," Oilweek.

hydrogen sulphide. For example, Chevron engineers have revived the abandoned Kern River oil field in California, which was discovered in 1899, by injecting high-pressured steam to increase daily output in 2007 to 85,000 barrels from 10,000 barrels in the 1960s. Initially, engineers had expected to recover only 10% of the field's oil. However, after years of trial and error, Chevron now believes that it will be able to recover up to 80% of the oil.[146]

However, heavy investment in higher-cost production methods can be risky, as Canadian investors in frontier oil and gas found out in the 1980s. At the time, a confluence of factors depressed global energy prices and resulted in heavy financial distress for the Canadian upstream sector. The possibility of another substantial fall in global energy prices should not be underestimated. One needs to only consider a scenario in which a higher level of political and economic liberalization is achieved in the Middle East, where the world's most easily recoverable reserves are situated. At present, production from Iran and Iraq – the two countries with the most abundant reserves of conventional oil after Saudi Arabia – is 675 million barrels less than production levels in 1978.[147] Yet, the proven reserves of both countries have substantially increased since then, some of which are recoverable for as little as $1 per barrel. By simply re-examining old seismic data with updated analytical tools, Western oil experts have estimated in 2007 that the Anbar province of Iraq alone has an additional 100 billion barrels of oil.[148] Moreover, in contrast to the 1 million exploration wells drilled in Texas, only a thousand

---

[146] Jad Mouawad, "Oil Innovations Pump New Life Into Old Wells," New York Times, 5th March 2007.
[147] Figures calculated from data provided online by Energy Information Administration, July 2007. <http://www.eia.doe.gov/emeu/international/oilproduction.html>
[148] James Glanz, "Iraqi Sunni Lands Show New Oil and Gas Promise," New York Times, 19th February 2007.

such drillings have ever been made in Saudi Arabia and Iraq.[149] Clearly, future production from the Middle East and Venezuela should not be underestimated.

The continental approach reduces the economic risks and costs of production from Canada's unconventional oil and gas reserves. American investment in the expansion of Canadian production capacity distributes the economic risks in the event of a downturn in energy prices. An integrated financial system allows for producers to hedge their financial returns on future production while simultaneously guaranteeing the availability of supply for consumers. Moreover, such transactions allow Canadian producers to fully utilize their key competitive advantage: reliability. A Montreal or Chicago refinery does not need to buy all of its oil supplies from Albertan producers. However, in order to diversify its supply, it can rely on a long-term contract with an Albertan bitumen producer for a portion of its supplies, while buying the rest on the global spot market.

4.2 Market and Regulatory Stability

In contrast to the self-sufficiency strategy, market forces have the effect of reinforcing and not destabilizing the continental strategy. Paradoxically however, in the scenario that the market does break down because of a large enough disruption, a panicked intervention on supply movements by the regulatory authorities could be quite shocking to a system not used to such contingencies. More critically from a strategic perspective, if the intervention prevents the movement of supplies from one side to the other, then the reputation of the Canadian-American energy relationship would be

[149] Leonardo Maugeri, "Two Cheers for Expensive Oil," Foreign Affairs.

significantly compromised. Ordinary citizens unaware of the workings of the system will demand answers and changes in policy. At such a time, it would be convenient and politically opportune for public officials to defend their own competency by pointing a finger to the other side of the border. In the ensuing chaos, the alteration in the behaviour of market participants could destabilize the situation even further as liquidity is withdrawn from the system.

What is worrying is that even though Canadian-American market integration has occurred briskly, the formal energy trading regulations have remained archaic. Despite popular beliefs, the Canada-United States Free Trade Agreement (CUFTA) of 1989 and the North American Free Trade Agreement (NAFTA) of 1994 barely affected the energy trade. The energy trade was left out of the CUFTA negotiations because internal restructuring and deregulation was still ongoing in both countries, especially in the electricity sector. Furthermore, Canadian and American federal governments were intent on preserving the authority of NEB and FERC. Since the regulatory mandates of both federal governments mainly derives from cross-border (provincial/state as well as international) trade and not from the direct regulation of the means of production, both were wary of significantly diminishing their practical regulatory capabilities. Especially because of the impracticality of imposing free trade on Mexico's heavily nationalized energy sector, the NAFTA negotiators also largely ignored the energy sector. It was agreed that each country could limit the export of energy in order to promote domestic reliability, but the reductions had to be in proportion to domestic supply shortfalls. In

order to protect investors and suppliers – and in keeping with the broader spirit of NAFTA – it was decided that imports could not be restricted. [150]

In theory, NAFTA could be seen as a zero-sum win for Canada. While the 'security of demand' for Canadian producers was enhanced, Canada did not technically make any concessions on its right to restrict the flow of supplies in an emergency. Although Canada amended the National Energy Board Act (NEBA) to give effect to the agreement, the remarkably outdated language of the original legislation has been retained.[151] Under part VI of the NEBA, which is concerned with exports and imports, all trade in natural gas, oil, or electricity requires a licence, order, or permit. Licences have been generally defined as applying to longer-term exports. Short-term exports require an order in the case of natural gas and oil, and a permit in the case of electricity. Export approval requires that the quantities concerned are surplus to Canada's needs. Because of the similarities in requirement, section 118a refers to all three commodities:

> The quantity of oil or gas to be exported does not exceed the surplus remaining after due allowance has been made for the reasonably foreseeable requirements for use in Canada having regard to the trends in the discovery of oil or gas in Canada...[152]

Arguably, how one would interpret the term 'surplus' has changed considerably from when the NEBA was enacted in 1959. Until the mid-1980s, security of supply took the form of arithmetic tests designed to show that reserves were surplus after the deduction of estimated long-term Canadian demand and export commitments already made. This measure was especially applicable to natural gas, for which long-term

---

[150] G. C. Watkins, "NAFTA and Energy: A Bridge not far Enough?" in ed. Steven Globerman and Michael Walker, Assessing NAFTA: A Trinational Analysis, (Vancouver: Fraser Institute, 1993) <http://oldfraser.lexi.net/publications/books/assess_nafta/energy.html>

[151] The CUFTA amendments were incorporated in sections 119.1 to 119.7. These have been repealed in favour of the NAFTA amendments of section 120. See Part VI of Canada, National Energy Board Act. <http://www.neb.gc.ca/ActsRegulations/NEBAct/NEBActPtVI_e.htm>

[152] section 118a, ibid.

contracts with fixed prices were prevalent. However, the deregulation/regulation of the 1980s completely changed the structure of the Canadian market. Market liquidity – which by definition is reliant on the availability of short-term contracts – has caused substantial price volatility. Basic economic theory postulates that (in the absence of an absolute inelasticity in demand) a change in price must result in a corresponding change in the quantity of demand. Without fixed prices, a surplus cannot technically exist. With this logic, it seems abundantly clear that the legislation quoted above was designed for the era where the arithmetic test for surplus could be performed, and not for present circumstances in which market adjustments automatically exhaust surplus.

The NEB has managed to somewhat rationalize its mandate in light of the prevailing market conditions, by developing a market based procedure (MBP) to protect fair market access (FMA) for Canadians.[153] The intention here has been to soften the surplus requirements to the point where they do not seem as special treatment under international free trade principles, but nonetheless allow for the protection of domestic security of supply. FMA allows domestic buyers to bid on quantities proposed for export during the process in which a licence application is being reviewed. These long-term licence applications typically require a public hearing. However, short-term export orders of two years or less do not require satisfaction of FMA, need no public hearing, and are not bound by restrictions on volume, point of export, or price. The rationale for insulating short-term orders from FMA is based on the theory that the ability to acquire supply for

[153] National Energy Board, Memorandum of Guidance - Implementation of the Fair Market Access Procedure for the Licensing of Long-term Exports of Crude Oil and Equivalent, 17 December 1997 <http://www.neb.gc.ca/clf-nsi/rpblctn/ctsndrgltn/rrggnmgpnb/xprtsndmprt/mmrndmfgdnc-eng.html>

export is, by itself, an adequate demonstration of 'surplus.' Not surprisingly, an increasing proportion of Canadian export applications have been for short-term orders.[154]

To the extent that it reduces the probability of tensions over trade policy with the U.S., the MBP shores up the continental strategy. However, a complicating factor is provincial licensing requirements. For example, Alberta's Gas Resources Preservation Act requires a licence for the removal of natural gas from the province, with no distinction made between exports to other provinces or the U.S.[155] It is stipulated that removal should only be permitted if the gas is surplus to the needs of Alberta's 'core consumers', which is calculated as a multiple of 15 times their current demand.[156] Like the NEB, the EUB issues both short-term and long-term export permits. Short-term permits are free of public hearings, or the specification of a price and destination of export. Long-term permits may require a public hearing and the clarification of the source of supply and its destination. However, in contrast to the NEB export regulations, the EUB does not apply MBP and furthermore retains the right to revoke all licences in the event of shortages in Alberta.

In the scenario that Alberta does restrict exports, Canada could find itself in technical violation of the proportionality provisions of NAFTA. Moreover, especially if export restrictions are imposed after a gradual rise in price – and cannot be reasonably linked to a particular fundamental discontinuity, logistical disruption, or *force majeure* disruption – then Alberta's lack of MBP would make it difficult to establish whether

---

[154] Paul G. Bradley and G. Campbell Watkins, "Canada and the U.S.: A Seamless Energy Border?" p. 8.
[155] Alberta, Gas Resource Preservation Act, <http://www.eub.ca/docs/requirements/actsregs/grp_reg_328_2002_grp.pdf>
[156] 'Core consumers' are defined as all Alberta residential, commercial, and industrial consumers reliant on natural gas and without access to alternative sustainable fuel sources. See Alberta, Municipal Gas Systems Core Market Regulation, <http://www.eub.ca/docs/requirements/actsregs/gu_act.pdf>

Alberta has a legitimate problem with supply reliability. The American side could argue that the situation does not qualify as a security of supply event as envisioned under NAFTA, and that the export restrictions are tantamount to special treatment for Albertan consumers – something broadly prohibited under international free trade law.

Notwithstanding the broad declarations of commitment from Albertan government officials to a North American free market for energy, it is not inconceivable that Alberta may restrict exports of natural gas in the future. Alberta's conventional reserves could run out within a decade, especially if significant demand growth is propelled by oil sands producers using the SAGD method. Since residential consumers in Alberta are used to stable prices for natural gas – which is controlled by the EUB – in the event of a significant run-up in wholesale prices, there will be political pressure on the government to fully exercise its powers to reduce prices at the retail level. Without resorting to subsidies for consumers, the most tempting option will be to depress prices by restricting exports.

To be precise, there are significant incentives for Alberta to refrain from meddling in the export market. Over the past decade, the Albertan government has invested considerable political and financial resources to make Alberta the major North American natural gas hub.[157] Plans are under way to connect Alaskan and Canadian Arctic supplies to the wider North American market through Alberta. It has required considerable lobbying on the part of the Albertan government to win the approval of various stakeholders in the routing of the Alaskan and Mackenzie natural gas pipelines.

---

[157] Murray Smith, "Energy Supplies: Quantities and Qualities," speech delivered at the Rocky Mountain Natural Gas Strategy Conference and Investment Forum.
<http://www.iir.gov.ab.ca/international_relations/awo_speech_rockymountain_050801.asp>

Uncertainty over Alberta's commitment to an uninhibited market system will irrevocably tarnish Alberta's reputation in the wider Canadian and North American markets and furthermore reduce the price premium for natural gas presently piped through Alberta.

From a strategic perspective, the market-based integration of the Canadian-American energy sector presents a paradox: commercial driving forces have prevented the politicization of issues on national lines, but the sustained stability of these commercial underpinnings requires further harmonization of regulations and policies. The viability of the continental strategy cannot be ensured without political commitment. In principle, political leaders from both countries have endorsed market-based integration as it has evolved. However, further steps can be taken to solidify a truly continental energy security strategy. Market forces are part of the solution in enhancing energy security, but they are not by themselves a sufficient factor. Market participants are generally quite capable of managing their individual risks in the marketplace. However, neither are they capable, nor do they have an incentive, of taking care of systemic risks and uncertainties. Therefore, it is the responsibility of the market regulators to ensure that an adequate margin of safety is available in the event of unforeseen disruptions or discontinuities.

Long distance electricity transmission lines and oil and gas storage capacity are two of the weakest links in the North American energy system. Moreover, there is little economic incentive for industry to overcome these two particular bottlenecks. In the case of electricity transmission, the natural monopoly status of most transmission companies means that market forces provide no compelling economic incentive for the capital-intensive process of expanding transmission capacity. Unbundling has provided buyers

and sellers with freer access to transmission capacity at reasonable rates. At the same time it has led to the maximizing of flow and minimizing of spare capacity. In this case, efficiency does not equal safety. In the case of oil and gas storage capacity, industry has again not found commercial motivations to build spare capacity and stock additional supplies. As discussed in the previous chapter, the inventorying of oil and gas can entail substantial financial risks. In each case, the building and maintaining of spare capacity involves the sacrifice of some efficiency for the benefit of systemic stability. However, this does not mean that a market-based solution is inapplicable.

The banking system provides an illustrative example of how the margin of safety concept can be incorporated into a fluid and competitive market structure. After more than a century of trial and error, central bankers have fine-tuned the art of financial regulation through reserve requirements and discount lending.[158] Instead of intrusively intervening in the lending practices of commercial banks (which can still be the case in countries such as China and Iran), modern central bankers ensure the soundness of the financial system through requiring the keeping of reserve funds at each commercial bank in proportion to its overall liabilities. This requirement theoretically reduces the efficiency with which the commercial bank uses its assets as no interest can be earned on the reserve. However, with the evolution of electronic trading, a sophisticated system for

[158] There are three identifiably distinct but not entirely unrelated monetary policy tools: (1) Open market operations, (2) discount policy, and (3) reserve requirements. Open market operations entail the buying or selling of government bonds by a central bank to change money supply and hence the rate of interest. In countries with fixed exchange rates, open market operations entail the buying or selling of foreign currencies. The central bank's discount policy determines the rate at which it is willing to lend money to commercial banks, below the rate which the commercial bank can otherwise raise funds. Reserve requirements are the regulations that determine the extent to which commercial banks must keep reserve funds in proportion to their total assets and liabilities. For a more extensive discussion, see Frederic S. Mishkin, The Economics of Money, Banking, and Financial Markets, 6th ed., (Boston: Addison Wesley, 2000), chap. 17.

interbank loans has developed, including the overnight swapping of reserves. A commercial bank may also borrow money from the central bank at a discount, particularly if it enters a period of financial distress. The provisions enforced by the central bank cannot guarantee the solvency of every commercial bank, particularly in the midst of a broader financial crisis. However, the stability of the overall financial system can be better ensured.

The coordinated implementation of spare capacity requirements could serve as a useful opportunity for a harmonized continental approach to propping up the margin of safety in the North American energy markets. Spare capacity in electricity transmission and oil and gas storage can be mandated by regulation. However, to reduce the financial costs and risks to the companies and provide incentives for cooperation, the authorities can 'lease' the spare capacity or make the attributable financial losses tax deductable. Consequently, without the need for setting up parallel state-owned operations, systemic stability can be enhanced. In the case of mandated oil and gas inventories, the profit-orientated drive of the midstream participants can be relied upon to quickly distribute supplies as far and wide as possible, in order to stabilize the market during a crisis, when the authorities decide to release the reserves. For practical purposes, the release of these supplies will entail the midstream companies selling inventories from their own facilities that were held on behalf of the authorities. The authorities could sell the reserves at a slight discount to provide added incentive for the companies to aggressively market supplies. Moreover, the implication that the market will be flooded with the reserve supplies will entice the companies to aggressively market their own inventories to avoid financial loss, hence multiplying the desired effect.

There are two reasons why the implementation of this system would be most effective if enforced uniformly in the North American market. Firstly, a standardized set of requirements will prevent the opportunities for 'regulatory arbitrage' where companies in one jurisdiction are disadvantaged because of disparity in regulations, even while they have to compete in an integrated market. Secondly, the basing of spare capacity requirements in proportion to the commercial operations of each company will evenly distribute the benefits of the margin of safety across the integrated marketplace. By refraining from establishing state-run operations, the authorities shall be relieved from distributing political goods and deciding on exactly where the operations shall be based, and to which extent each region shall be covered. Moreover, harmonized regulations will curb the need for intergovernmental negotiations to equalize the effects of divergent regulatory requirements and the need for constant adjustments as market and sectoral conditions shift in each jurisdiction.

4.3 International Bargaining Position

The empirical evidence suggests that market-based integration has not relegated the role of Canadian-owned and controlled companies. Since the early 1990s, Canadian energy companies have generally excelled at home and abroad. In the upstream oil and gas sector, the success of Canadian-based companies has been particularly impressive. In many cases, competitive advantage has been achieved through the development of specialized home-grown technological, industrial, and financial expertise. As discussed previously, the main thrust of the NEP was to prop up Canadian ownership and control of the upstream sector. However, by the mid-1980s this strategy had completely failed and the Canadian industry was left in severe financial distress. Until the 1990s, foreign

ownership and control increased to above the levels before the implementation of the NEP, largely due to the Canadian industry's cash-strapped status. By the mid-1990s however, a number of independent Canadian upstream companies began gaining prominence.

From its inception – in the late nineteenth century – the oil and gas business has involved fierce competition (and collusion) on a globalized scale. Before the era of Toyota versus General Motors, Oracle versus SAP, or Boeing versus Airbus, petroleum industrialists battled over market share and access to reserves from continent to continent. Successive start-ups have had to find ingenious methods to upset the status quo order and secure their place. The annals of the oil industry is filled with strong-willed visionaries such as Henri Deterding (Shell), Enrico Mattei (ENI), and Armand Hammer (Occidental), who managed to claw their way forward from behind. For Jack Austin and Bill Hopper, the two Trudeau cronies behind the NEP and the formation of PetroCanada, the example of Enrico Mattei's ENI – Italy's state-owned oil company – was most instructive. Austin and Hopper had been impressed by how Mattei had managed to build a formidable national champion from very little start-up capital and no indigenous reserves. Unfortunately for Canadian taxpayers, the two men proved to be far less talented and focused than the Italian, but far more willing to gamble with public funds.[159]

As one of the pessimistic subscribers to the staples theory, Austin was convinced that no Canadian upstream company could become a dominant industry player without government intervention.[160] Whether he underestimated the entrepreneurship of Canadian

[159] See Peter Foster, The Sorcerer's Apprentices: Canada's Super-Bureaucrats and the Energy Mess, (Toronto: Collins, 1982), chap. 6-8.
[160] Peter Foster, Self Serve: How Petro-Canada Pumped Canadians Dry, chap. 4.

petroleum businessmen, or overestimated the malicious capabilities of the American majors, Austin has been proven wrong. Interestingly, Talisman and Nexen, two of Canada's most internationally successful upstream companies, have grown out of the divestment by British Petroleum and Occidental Petroleum of their Canadian operations during the depressed oil markets of the 1990s. In less than two decades and completely without government subsidies, each has been transformed from a small corporate orphan to a prosperous independent producer with more operations overseas than in Canada. The main production sites for both companies are in the North Sea, West Africa, Latin America, and the Middle East. However, each is domiciled in Canada with mostly Canadian senior executives and directors.[161]

EnCana, Canadian Natural Resources, and Paramount Resources are three upstream success stories with operations concentrated in Canada. EnCana and Canadian Natural Resources have expanded over the last decade mostly by acquiring expertise in the recovery of unconventional oil and gas reserves, including Alberta's Athabasca oil sands. Paramount Resources is a relatively smaller producer with a market capitalization of less than $2 billion. However, it has been extremely innovative in the recovery of shallow gas, Arctic gas, and coal-bed methane. In the midstream sector, TransCanada and Enbridge have become two leading players on the North American scene. Due to the growing importance of the flow of Canadian oil and gas supplies to the U.S., these two companies have been particularly successful in exploiting their dominance in Canada to expand into the American market. Each has consistently acquired American pipeline and

[161] Nine out of the ten directors of Talisman are Canadian citizens. Eleven out of the twelve directors of Nexen are Canadian citizens, including two recipients of the Order of Canada, a Queen's Counsel and Anne McLellan, a former Liberal cabinet minister and member of the Privy Council.

storage assets in the past few years. TransCanada has obtained considerable prestige by having been selected to build and operate the Alaskan gas pipeline, while Enbridge boasts that it operates the world's largest crude oil pipeline system.

In recent years, Canadian oil service and technology providers have attained a particularly strong international reputation in deep-sea drilling as well as the recovery and processing of heavy oils. Although Canadian service companies such as Precision Drilling and APA Petroleum Engineering remain smaller competitors to oil service giants such as Schlumberger, Baker Hughes and Haliburton, the two Canadian companies have been gaining ground in the U.S. and international markets. Moreover, the Canadian subsidiaries of Schlumberger and Baker Hughes have themselves become heavily reliant on Canadians with specialized technical expertise. Within the Canadian market, Schlumberger and Baker Hughes have been largely reluctant to challenge nimbler Canadian providers in specialized areas and have instead stuck to the manufacturing and servicing of drill bits and standard oil rigs, their areas of core competency.

The development of energy-related financial expertise has also been important in giving Canada a competitive edge. While New York and London remain the premier destinations for energy-related companies looking to raise large amounts of capital, Toronto and Vancouver have been gaining a particularly stellar reputation for the quick and low-cost public listing of venture companies in the business of resource extraction as well as the related high-technology solutions. This trend has been primarily driven by the appetite of Canadian investors for venture listings, which qualify for special treatment under the Canadian tax code. Canada remains one of the jurisdictions with the highest tax rates for capital gains and corporate dividends. However, investors who receive 'flow-

through' shares in the primary market are free from capital gains taxation on their investments and in many cases receive further tax credit for other investments in their portfolios. A high level of deal flows in recent years has resulted in Canadian bankers and commercial lawyers gaining experience in specialized areas, including transactions involving assets in politically risky regions of the world. Scotia Capital, the investment banking division of the Bank of Nova Scotia, has been especially successful in solidifying its position as a leading global investment bank focused on energy.

As discussed in the previous chapter, market-based integration has allowed Canada to maintain a far more stable current account situation than during the NEP era where a self-sufficiency strategy was pursued. As previously argued, during the NEP there was a strong correlation between capital outflows from the energy sector (and restriction on capital inflows) and instability in Canada's balance of payments. In recent years however, Canada has been more than able to finance energy imports in select regions of the east, in part because of strong export earnings from the west. Moreover, Canada's current account situation has been further bolstered by a high level of foreign investment into the energy sector. Some of this investment has come in the form of portfolio investments in the exchange-traded securities of Canadian energy companies, and the rest have been direct foreign investment in Canadian energy companies and energy projects.

The build-up of significant foreign holdings in large Canadian energy companies are bound to be controversial, as they would be in any country. Notwithstanding the political sensitivities, for practical reasons there is little to worry about. Firstly, partial or full ownership of a Canadian energy company by a foreign entity does not equate to full

'control' of operational, pricing, or environmental policies. In Canada particularly, the energy sector remains highly regulated – even as the regulatory philosophy has changed over the years. Moreover, stringent requirements for professional certification mean that most operationally sensitive positions will continue to be filled by Canadians. Strategically, foreign investment represents increased financial leverage for Canada to expand its energy sector, while at the same time reducing the economic risks and costs to Canadians during periods of market downturns in the global energy marketplace. Canada is not a vulnerable failed state that could be colonized by a foreign energy company. Foreign investment despite the high level of costs, taxes, and regulations attests to Canada's strong credibility. Even if foreign investors directly buy Canadian oil and gas reserves, they will have to pay royalties and title fees upfront, but shall be liable to Canadian laws and regulations indefinitely. The reserves cannot be shipped away like merchandise bought at a department store.

It is reasonable to argue that strong growth in the Canadian energy and mining sectors has boosted the Canadian dollar to the extent that Canadian manufactured goods have become less competitive on the global market, especially in relation to the U.S. and the Asian countries. While this issue has broad consequences for Canada's trading relationship, its scope is largely beyond the purposes of this study. However, it is wrong to think that Canada is inherently on the losing end, especially in relation to the monetary policies of the Asian countries where the authorities have deliberately depressed the domestic currency. For the Canadians who lose their manufacturing jobs the situation is undoubtedly painful, yet unemployment is at an all time low in Canada. The costs to the Asian countries could prove to be quite prohibitive in the long-term. Firstly, by holding

down their currencies, these countries are in effect surrendering their ability to set domestic interest rates in tune with the domestic economic and credit conditions. Therefore, while the monetary authorities in countries such as China have been trying to arrest excessive credit in the domestic financial system, they have remained helpless to do so using the traditional monetary policy tools. Secondly, by intervening to keep their currencies low, the governments of the Asian countries acquire large sums of Canadian dollars which at some point have to be exchanged for Canadian products, or invested in Canada. For as long as they keep the Canadian dollars as central bank reserves, they will be giving Canada an interest-free loan.

A staunch belief in the staples theory aside, there is no reason to think that Canada's role as a significant energy producer and exporter will diminish its ability to be a leading industrial power. The 'oil curse' of so many backward and unstable Third World countries has made it psychologically difficult for some to dissociate backwardness with the blessing of having abundant natural resources. It is often forgotten that the U.S. was the largest oil exporter in the first half of the twentieth century, even while it was rapidly industrializing. Until the mid-1950s, American oil production represented half of the world's total production. It has been argued that America's dominant oil production capacity played the decisive factor in the winning of the Second World War.[162] Other countries such as the Netherlands, United Kingdom, and Norway have managed to advance economically and remain politically stable during periods in which they have been significant energy exporters. In each of the three cases, a sudden growth in energy exports caused some macroeconomic pressures not dissimilar from

[162] Daniel Yergin, The Prize: The Epic Quest For Oil, Money and Power, chap. 16-19.

those Canada is presently experiencing (and thus the term 'Dutch disease'). However, overall economic conditions and living standards in these countries were positively impacted by earnings from energy exports.

As discussed in the previous chapter, continental energy integration does not restrict Canada's flexibility in implementing the Kyoto Protocol. Yet, if Canada's real concern is the reduction of global GHG emissions and not simply the domestic implementation of Kyoto *per se*, then a continental strategy is crucial. The energy economy of Canada is most similar to that of the U.S. – not to that of Western Europe or Japan. Therefore, the practical changes that Canada will have to make to reduce its GHG emissions will inevitably be similar in scope to those that will have to be undertaken in the U.S. Any influence Canada could bring to a comprehensive and realistic international GHG emissions regime would be significantly magnified by a joint North American approach. The development of a realistic international regime may take many more years if not decades to achieve.

Thomas Schelling — the Nobel Prize-winning political economist and strategic thinker, and the first person commissioned by the American Academy of Sciences to study the issue of global warming in the late 1970s — believes that a high level of uncertainty still remains about the potential impact of higher global GHG emissions.[163] Schelling has noted that the Intergovernmental Panel on Climate Change (IPCC) – the international body, comprising more than a thousand scientists from numerous countries, that is the acknowledged (even if controversial) authority on the subject – has never

[163] Robert Dodge, The Strategist: The Life and Times of Thomas Schelling, (Hollis: Hollis Publishing, 2006), pp. 167-174.

proposed what concentration of greenhouse gases would constitute unacceptable damage.[164] Moreover, Schelling has cast doubt on the workability of Kyoto:

> When 2,000 economists, including some Nobel laureates, circulated a recommendation a few years ago that nations should adopt enforceable quotas for carbon dioxide emissions and allow the purchase and sale of unused quotas, the concept was aesthetically pleasing but politically unconvincing. Although emissions should be reduced in those countries where they can be cut most economically, the economists' proposed trading system was perfectionist and impractical. The problem with trading regimes is that initial quotas are negotiated to reflect what each nation can reasonably be expected to reduce. Any country that is tempted to sell part of an emissions quota will realize that the regime is continually subject to renegotiation, so selling any "excess" is tantamount to admitting it got a generous allotment the last time around. It then sets itself up for stiffer negotiation next time.[165]

A large proportion of future GHG emissions will likely come from large and rapidly industrializing countries such as China, India, and Brazil, which have refused to make any commitments to reduce their GHG emissions. Moreover, as significant energy importers, these countries will likely cause corresponding increases in GDP growth and GHG emissions in the energy exporting countries of the Middle East and Latin America, which have also refrained from making any commitments to controlling their GHG emissions. For all their huffing and puffing, even the Western Europeans seem unable to keep to their Kyoto commitments. The European Commission's 2006 green paper on A European Strategy for Sustainable, Competitive and Secure Energy has bluntly predicted that carbon dioxide emissions from the energy sector are bound to significantly *increase* over the next few decades:

> Even with the assumption of significant improved efficiency of solid fuels based power generation and of fuel switching from solid fuels and oil to natural gas, CO2 emissions will increase by 10% by 2030 over 2000. This is virtually impossible to reconcile with a policy committed to continued reductions in CO2 emissions after 2012 unless one has –

---

[164] Thomas C. Schelling, 'What Makes Greenhouse Sense?" Foreign Affairs, vol. 81, no. 3 (May/June 2002) <http://www.foreignaffairs.org/20020501facomment8138/thomas-c-schelling/what-makes-greenhouse-sense.html>; This assertion remains true with the IPCC's fourth assessment of 2007. See the IPCC website for documents and summaries <http://www.ipcc.ch/activity/ar.htm>

[165] Ibid.

> presently unrealistic – expectations of strong reduction in transport and other sectors. Unfortunately the relevance of the scenario is confirmed by the slight increasing trend in EU CO2 emissions after 2000.[166]

The tangible costs and risks of the continued growth in global GHG emissions are uncertain at the present time, even though the contribution of GHG emissions to global warming has become widely accepted. It would be unwise for Canada to assume the prohibitive costs of neutralizing or reducing its GHG emissions, if total global emissions are to increase anyway. Not only will Canada's efforts go to waste, more importantly, it will divert economic resources from being allocated to Canada adapting to the consequences of global warming. Future adaptive measures could include the building of dykes around coastal metropolitan areas, the development of an extensive irrigation and potable water infrastructure, research and development of heat and drought resistant agricultural crops, and an expanded military capability to exercise Canadian sovereignty in the unfrozen Arctic regions, as well as to deal with global emergencies brought about by global warming-induced political and socio-economic instabilities.

If political will can be mobilized at the international level, then there are numerous practical ways in which harmonized energy policies and standardized international regulations can make significant contributions to the reduction of GHG emissions. For example, the international prohibition of the flaring of natural gas could make significant contributions to the reduction of GHG emissions. The World Bank estimates that without flaring, the world will be 13% closer to meeting the targets set in

---

[166] European Commission, Green Paper-A European Strategy for Sustainable, Competitive and Secure Energy, COM (2006) 105 final (Brussels: European Commission, March 2006), p. 14. <http://ec.europa.eu/energy/green-paper-energy/doc/2006_03_08_gp_document_en.pdf>

the Kyoto Protocol.[167] In Canada, flaring has been reduced to negligible levels since the introduction of regulations in the 1960s that prohibited the practice. However, in countries such as Nigeria, Russia, and Iran, associated natural gas is routinely flared instead of being used productively to generate electricity for local communities, or used as lease gas to enhance oil recovery.[168] In numerous Third World countries, the lack of effective governance and economic planning has resulted in gas being flared from fields adjacent to communities without electricity, despite the relative ease with which small CCGT generating stations could be set up. The weight of a joint Canadian-American approach could make a substantial difference. A continental strategy could be developed to bar Canadian or American upstream companies from participating in international projects with flaring. Moreover, international upstream companies with poor human rights or environmental records could be sanctioned from raising money in the North American capital markets or conducting other businesses.

[167] See the website of the World Bank's Global Gas Flaring Reduction Program <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTOGMC/EXTGGFR/0,,menuPK:578075~pagePK:64168427~piPK:64168435~theSitePK:578069,00.html>

[168] Some 'associated gas' always exists in solution with crude oil at high pressures within a reservoir. 'Lease gas' is unprocessed natural gas that is re-injected into oil field to enhance recovery the recovery of crude oil.

5 CONCLUSIONS

In the context of Canada's present energy security environment, the continental strategy provides for better flexibility, risk management, and economic efficiency than the self-sufficiency strategy. The threats to Canada's energy security have not diminished, but the increased globalization of energy markets has changed the manifestations of crises. The economic incentives of market participants should be recognized as a key factor in promoting diversification and liquidity in the energy markets. To this end, aligning the interests of market participants with the broader public interest provides the most important opportunity and challenge for policymakers and regulators.

The influence of global factors in shaping Canada's energy security picture provides compelling justification for the adoption of a strategic mindset in examining Canada's practical policymaking options. The increasing complexity and fluidity of the global energy system has expanded both the threats and options for ensuring domestic energy security. The ineffectiveness of traditional energy regulatory mechanisms has increased the need for a viable 'strategy' that is focused on harnessing existing driving forces so that they favourably reinforce one another. The risks and volatility inherent in the global system should be accepted and overcome through the long-term vision and strength of a chosen strategy. The sheer scale of the energy sector makes any meaningful change a matter of long-term investment. At the same time, global market liquidity and

capital mobility have made the implementation of a successful restructuring largely dependent on the reputation of the Canadian energy markets and their regulators.

Table 1 Classification of energy security events (reproduced from page 6)

CLASSIFICATION	EVENT
Global Events	
Policy discontinuity	Reduction of output by producers in order to improve terms of trade
Fundamental discontinuity	Inherent shortage of global production capacity
Force majeure disruption	Effects of civil unrest, war, or severe natural disasters on production and export
Export restriction disruption	Embargo by importers of a specific exporting country
Local Events	
Embargo disruption	Embargo of a specific importing country by a specific exporter or transit country
Logistical disruption	Effects of natural disasters, accidents, or acts of terrorism on transmission infrastructure
Local market/structural discontinuity	Market failures or regulatory mismanagement

To be precise, the increased prominence of global threats should not be confused with the proliferation of the types of global threats. The four types of global energy security events classified in Table 1 – policy discontinuity, fundamental discontinuity, *force majeure* disruption, and export restriction disruption – have been a feature of international energy relations for at least fifty years. Therefore, we have the benefit of history to contemplate the playing out of these events, even though their consequences for Canadian energy security have changed over the years. For instance, history tells us that a policy discontinuity in the form of supply cuts or the nationalization of energy assets by an exporting country entails severe costs and risks to the exporter, as it loses revenue, market share, and investments. Notwithstanding political posturing, an exporter

is constrained in the extent to which it can realistically improve its terms of trade. However, the effects of supply cuts today are quite different from those of yesteryears. The prevalence of rigid long-term contracts before the 1980s meant that the effects of supply cuts and bargaining manoeuvres were largely contained within the relationship between the specific counterparties. Today's globalized energy markets are much more susceptible to contagion; energy *insecurity* elsewhere has direct ramifications for Canada. At the same time, global market liquidity allows Canadian consumers to avoid reductions in the quantity of demand by bidding on the price of energy resources on the global marketplace and diverting their delivery to other regions of the world.

Market efficiency and flexibility provide a strategic tool for the shoring up of Canada's energy security. The impact of each of the seven adverse energy security events outlined in Table 1 can be reduced by market-driven supply diversification. As far as global events are concerned, Canada has few other options because of its limited direct influence in most scenarios. In the instance of a logistical disruption within Canadian jurisdiction, the shock to the system can be better absorbed by the availability of alternate supply routes and market mechanisms to facilitate adjustments in the economic behaviour of suppliers and consumers. In contrast to the self-sufficiency strategy, the key advantage of the continental strategy is its internalization of market-based mechanisms.

Canada has no shortage of energy resources: its total oil and gas reserves can sustain domestic consumption for two hundred years, while its present hydroelectric infrastructure can produce electricity indefinitely. Yet, an abundant endowment is not the equivalent of available supply at all times. Most of Canada's oil and gas reserves can be classified as 'unconventional' for requiring costly techniques to recover. An integrated

continental market provides Canadian producers of unconventional oil and gas with greater 'security of demand', while allowing consumers to derive better 'security of supply' through diversification. Access to a larger market improves the marketability of Canadian supplies and therefore reduces the marginal costs of developing Canada's unconventional oil and gas production capacity. In the case of the electricity sector, continental market-based integration has clearly resulted in enhanced security of supply by means of better systemic efficiency and flexibility.

As shown in Table 2 below, a self-sufficiency strategy could in theory protect Canadian consumers from volatility in the global energy markets by disengaging Canada from the global energy system. However, such an approach will take time and a significant allocation of economic resources to implement, as adequate production and transmission capacities are established to connect domestic producers with regional consumers who presently rely on foreign sourced supplies. The need to meet the demands of these consumers presents a conundrum for policymakers and regulators. The balancing of these two objectives proved difficult and costly during the implementation of the NOP and NEP. In an era of increased global price volatility and liquidity, establishing and defending a price wall will be significantly more problematic.

In Canada's case, security of supply is an issue which is distinct but related to price volatility. Assuming that Canada is not inherently in the danger of running out of natural gas, oil, or hydroelectric resources, one could argue that the issue of security of supply is predominately reliant on the short-term availability of supply rather than the long-term conservation of resources. There are various scenarios in which short-term security of supply could be destabilized due to significant disruptions to Canada's energy

infrastructure or delivery arrangements from foreign sources. During periods of tight global supply, allowing regulated prices to reflect *real* prices provides economic incentives for Canadian producers to invest in the development of unconventional supplies and thus expand the availability of supply by increasing production capacity.

In comparison to the self-sufficiency strategy, the continental strategy provides significantly superior flexibility in the short-term, in relation to both global and local events. While the self-sufficiency strategy will perform marginally better in protecting Canada from long-term global events, it will underperform with regard to long-term local events.

Table 2 Threat comparison of energy security events

CLASSIFICATION	**THREAT LEVEL**			
Global Events	**Self-Sufficiency Strategy**		**Continental Strategy**	
	Short-Term	**Long-Term**	**Short-Term**	**Long-term**
Policy discontinuity	HIGH	LOW	MEDIUM	LOW
Fundamental discontinuity	MEDIUM	LOW	MEDIUM	MEDIUM
Force majeure disruption	HIGH	LOW	MEDIUM	LOW
Export restriction disruption	HIGH	LOW	MEDIUM	LOW
Local Events				
Embargo disruption	HIGH	LOW	MEDIUM	LOW
Logistical disruption	HIGH	MEDIUM	MEDIUM	LOW
Local market/structural discontinuity	HIGH	HIGH	LOW	LOW

Although Canada's energy policies have increasingly adopted continentalist leanings in the last two decades, these have not amounted to a continentalist *strategy*. Policymakers and regulators have allowed commercial integration to occur quietly without being politicized on national lines. This has been an important stepping stone in

consolidating the reputation of an integrated North American energy market. However, the lack of an overt commitment to a harmonized approach in dealing with systemic bottlenecks could compromise the future stability of the integrated market. Insofar as market forces can be harnessed as a tool for enhanced energy security, regulations have to be kept updated with structural shifts in the energy markets. Within the market-based framework, the essential responsibility of regulators should be in aligning the interests of market participants with the public interest in having transparent and liquid energy markets.

The emergence of global market liquidity and capital mobility has increased the costs and risks of a self-sufficiency strategy. Moreover, these phenomena have brought a *de facto* recognition of the benefits of a North American market. To a certain extent however, there has been an underestimation of the level of uncertainty that the energy industry faces when making investment decisions. In the absence of direct government investment in the means of production and distribution of energy, it has to be recognized that energy security in the present era is crucially reliant on adequate private investments. These in turn will be largely determined by the lookout and future expectations of investors, particularly concerning access to the wider North American market. In this regard, perception has a self-fulfilling effect on reality. Therefore, the commitment of the authorities to a continental strategy has an important role in securing the confidence of market participants. The harmonization of financial regulations could serve as a crucial element for improving the margin of safety in bottlenecked areas of the integrated energy system, as well as providing the basis for a unified approach in relation to the global marketplace.

BIBLIOGRAPHY

Alberta, Gas Resource Preservation Act.

Alberta, Municipal Gas Systems Core Market Regulation.

Andrew Martin, "Farmers Head to Fields to Plant Corn, Lots of It," New York Times, 31 March 2007.

Angevine, G. E. The Impact of a Sharp Oil Price Increase, Calgary: Canadian Energy Research Institute, 1980.

Bamberger, Robert. Issue Brief for Congress: Strategic Petroleum Reserve. Washington, D.C.: Congressional Research Service, 2003.

Bank of Canada, Renewal of the Inflation-Control Target: Background Information, Ottawa: Bank of Canada, November 2006.

Bloomberg, "Shell considers halting U.S. refinery plans," International Herald Tribune, 21 May 2007.

Bochkarev, Danila. "Russian Pipeline Politics In Context of 'Strong' And 'Weak' Globalization(s)," Pipeline and Gas Journal, October 2006.

Bothwell, Robert and William Kilbourn, C. D. Howe: A Biography, Toronto: McClelland and Stewart, 1979.

Bradley, Paul G. and G. Campbell Watkins, "Canada and the U.S.: A Seamless Energy Border?" The Border Papers- C.D. Howe Institute Commentary no. 178, April 2003.

Briggs, H. Lee. "The Electrical Beginnings," in ed. National Energy Board: Twenty-five Years in the Public Interest. Ottawa: National Energy Board, 1984.

British Columbia, BC Hydro Public Power Legacy & Heritage Contract Act 2003.

British Columbia, Heritage Special Direction No. HC2 to The British Columbia Utilities Commission.

Brownsey, Keith. "Alberta's Oil and Gas Industry in the Era of Kyoto Protocol," in ed. G. Bruce Doern, Canadian Energy Policy and the Struggle for Sustainable Development.Toronto: University of Toronto Press, 2005.

Bush, George W. State of the Union 2007, Washington: Office of the Press Secretary, The White House, 23 January 2007.

Canada, National Energy Board Act.

Canadian Renewal Fuels Association, "Prime Minister Harper Builds On His Biofuel Promise," Canadian Renewal Fuels Association, 5 July 2007.

Carmichael, Edward A. and James K. Stewart, Lessons from the National Energy Program. Toronto: C. D. Howe Institute, 1983.

Case, Steven. "takeovers will face national security test," The Globe and Mail, 26th June 2007.

Cohen, Marjorie Griffin. "From Public Good to Private Exploitation: GATS and the restructuring of Canadian Electrical Utilities," Canadian-American Public Policy occasional paper series, 2001.

Dawson, J.A. and Z. C. Slagorsky, Benefits and Costs of Oil Self-Sufficiency in Canada. Calgary: Canadian Energy Research Institute, 1981.

Department of Energy, Mines and Resources, An Energy Policy for Canada-Phase I. Ottawa, Department of Energy, Mines and Resources, 1973.

Department of Natural Resources, Canadian Natural Gas: 2001 Market Review & Outlook, Department of Natural Resources, 2002.

Devuyst, Youri. The European Union at the Crossroads. Bruxelles: P.I.E.-Peter Lang, 2003.

DiLorenzo, Thomas J. "The Myth of the Natural Monopoly," The Review of Austrian Economics, vol. 9 no. 2, 1996.

Dinan, Desmond. Ever Closer Union: An Introduction to European Integration. Boulder: Lynne Rienner, 1999.

Dodge, Robert. The Strategist: The Life and Times of Thomas Schelling, Hollis: Hollis Publishing, 2006.

Doern, G. Bruce and Glen Toner, The Politics of Energy. Toronto: Methuen, 1985.

Donahue, John D. and Jospesh S. Nye, ed., Market-Based Governance: Supply Side, Demand Side, Upside, and Downside, Washington: Brookings Institution Press, 2002.

Durand, Guillaume. "Gas and electricity in Europe: the elusive common interest," European Policy Centre, May 2006; European Commission, Competition: Commission energy sector inquiry confirms serious competition problems, Brussels: European Commission, 10 January 2007.

E. Ebel, Robert. "China's Energy Future: The Middle Kingdom Seeks its Place in the Sun".

Ebner, David. "EnCana finds oil sands partner in ConocoPhilips," The Globe and Mail, 5 October 2006.

Ebner, David. "TransCanada bulks up for winter," The Globe and Mail, 22 December 2006.

Energy Development Initiative, Developing Manitoba's Ethanol Industry, Manitoba Energy, Science and Technology, July 2007.

Energy Information Administration, International Energy Outlook 1999, Energy Information Administration, May 1999.

Energy Information Administration, International Energy Outlook 2007, Energy Information Administration, May 2007.

Energy Picture Experts Group. North America: The Energy Picture II, North American Energy Working Group of the Security and Prosperity Partnership, January 2006.

Energy Policy Development Task Force, Strategic Considerations for A New British Columbia Energy Policy: Final Report of The Task Force on Energy Policy, Energy Policy Development Task Force, 15th March 2002.

Energy, COM (2006) 105 final, Brussels: European Commission, March 2006.

Energy, Mines and Resources Canada, *National Energy Program,* Ottawa, Supply and Services Canada, 1980, p. 7.

Estrada, Javier, et al. The Development of European Gas Markets: Environmental, Economic, and Political Perspectives. Chichester: John Wiley & Sons, 1995.

European Commission, Green Paper-A European Strategy for Sustainable, Competitive and Secure

Evans, Peter C. and Erica S. Downs, "Untangling China's Quest for Oil through State-backed Financial Deals", Policy Brief, no. 154, Washington: The Brookings Institution, 2006.

Filippini, Massimo. "Are Municipal Electricity Distribution Utilities Natural Monopolies?"Annals of Public and Cooperative Economics vol. 69 no.2, 1998.

Finch, David. Hell's Half Acre: Early Days in the Great Alberta Oil Patch. Surrey, B.C.: Heritage House Publishing Company, 2005.

Flack, Graham. Speech at the third Cross-Broder Forum on Energy Issues hosted by the Canada Institute of the Woodrow Wilson International Center for Scholars, March 21 2006.

Fossum, John Erik. Oil, the State, and Federalism: The Rise and Demise of Petro-Canada as a Statist Impluse. Toronto: University of Toronto Press, 1997.

Foster, Peter. Self Serve: How Petro-Canada Pumped Canadians Dry. Toronto: Macfarlane Walter & Ross, 1992.

Foster, Peter. Other People's Money: The Banks, the Government and Dome. Toronto: Collins, 1983.

Foster, Peter. The Sorcerer's Apprentices: Canada's Super-Bureaucrats and the Energy Mess. Toronto: Collins, 1982.

Fraser, Douglas. "Early Years," in ed. National Energy Board: Twenty-five Years in the Public Interest. Ottawa: National Energy Board, 1984.

Froschauer, Karl. White Gold: Hydroelectric Power in Canada. Vancouver, B.C.: UBC Press, 1999.

Gardner, Timothy. "Ethanol boom may boost U.S. natural gas prices," Reuters, 19 April 2007.

Geller, Howard et al. 'Twenty years after the Embargo: US Oil Import and Dependence and How it can be Reduced', Energy Policy vol. 22, 1994.

Glanz, James. "Iraqi Sunni Lands Show New Oil and Gas Promise," New York Times, 19th February 2007.

Goldstein, Andrea, et al. The Rise of China and India: What's in it for Africa? Paris, OECD, 2006.

Goldwyn, David L. and Michelle Billig. "Building Strategic Reserves," in ed. Jan H. Kalicki and David L. Goldwyn, Energy and Security: Towards a New Foreign Policy Strategy, Washington: Woodrow Wilson Center Press, 2005, pp. 509-530.

Gordon, Myron. and John Wilson, "Consumers Will Get Bill for The Deal With British Energy Firm," Toronto Star, 21st November 2001.

Gray, Earle. Impact of Oil: The Development of Canada's Oil Resources. Toronto: The Ryerson Press: 1969.

Gray, Earle. Forty Years in the Public Interest: A History of the National Energy Board. Vancouver, B.C.: Douglas & McIntyre, 2000.

Gray, Earle. The Great Canadian Oil Patch. Toronto: Maclean-Hunter Limited, 1970.

Hampton, Howard. Public Power: The Fight For Publicly Owned Electricity. Toronto: Insomniac Press, 2003.

Hira, Anil. Political Economy of Energy in the Southern Cone. Westport: Praeger, 2003.

Hirsh, Michael. "Bush and the World," Foreign Affairs, vol. 81, no. 5, September/October 2002.

Horsnell, Paul. "The Probability of Oil Market Disruption: With An Emphasis on The Middle East," in Japanese Energy Security and Changing Global Energy Markets: An Analysis of Northeast Asian Energy Cooperation and Japan's Evolving Leadership Role in The Region, James Baker III Institute for Public Policy, Rice University, 2000.

Howarth, Stephen. A Century In Oil: The "Shell" Transport and Trading Company 1897-1997, London: Weidenfeld & Nicolson, 1997.

Ikenberry, G. John. "America's Imperial Ambition," Foreign Affairs, vol. 81, no. 5, September/October 2002.

International Energy Agency, Natural Gas Pricing in Competitive Markets, Paris: Organization of Economic Cooperation and Development, 1988.

Jaccard, Mark et al. The Cost of Climate Change. Vancouver: UBC Press, 2002.

Jaremko, Deborah. "Mind the Overflow" Oilweek, February 2006.

Jaremko, Deborah. "Pressure Communications: Industry, government collaborate on gas over bitumen R&D," Oilweek, March 2006.

Johansson, Thomas B. and Jose Goldemberg, ed. World Energy Assessment Overview: 2004 Update, United Nations Development Programme, 2004.

Joskow, Paul L. "Restructuring, Competition and Regulatory Reform in the U.S. Electricity Sector," Journal of Economic Perspectives, vol. 11, no. 3, 1997.

Keynes, John Maynard. The General Theory of Employment, Interest and Money, New York: Harcourt Brace, 1935.

Khatib, Hisham. Financial and Economic Evaluation of Projects in the electricity supply industry, Stevenage: Institution of Electrical Engineers, 1997.

Krugman, Paul R. and Maurice Obstfeld, International Economics: Theory and Policy, sixth ed., Boston: Addison Wesley, 2003.

Laxer, Gordon. "Canadian Energy Security: Easterners could freeze in dark," The Globe and Mail, May 28, 2007.

Laxer, Gordon. "Canadian Energy Security: Easterners could freeze in the dark," The Globe and Mail, 28 May 2007.

Laxer, Gordon. "Will federal parties secure Canada's energy future?" Parkland Institute Perspectives, 6 January 2007.

Laxer, Gordon. Open For Business: The Roots of Foreign Ownership in Canada. Toronto: Oxford University Press, 1989.

Laxer, James. Canada's Energy Crisis. Toronto: James Lewis & Samuel, 1974.

Laxer, James. The Energy Poker Game. Toronto: New Press, 1970.

Lichtblau, John H. 'Oil Imports and National Security: Is There Still a Connection?' The Energy Journal vol. 15, Special Issue, 1994, pp. 329-346.

Mackintosh, W.A. Approaches to Canadian History. Toronto: University Press, 1967.

Harold A. Innis, Staples, Markets and Cultural Change: Selected Essays. Montreal: McGill-Queen's University Press, 1995.

Marshall, Dale. Making Kyoto Work: A transition strategy for Canadian energy workers, Canadian Centre for Policy Alternatives, 2002.

Maugeri, Leonardo. "Two Cheers for Expensive Oil," Foreign Affairs, vol. 85, no.2, March/April 2006.

McCullum, Hugh. Fuelling Fortress America: A Report on the Athabasca Tar Sands and U.S. Demands for Canada's Energy, Canadian Centre for Policy Alternatives/Parkland Institute/Polaris Institute, 2006.

McEachern, William A. Economics: A Contemporary Introduction. New York: Thomson South-Western, 2005.

Mckenzie-Brown, Peter, et al. The Great Oil Age. Calgary: Detselig Enterprises Ltd, 1993.

Miles, Tom. "Shell sees Sakhalin-2 deal with Gazprom this week," Reuters, 17 December 2006.

Mishkin, Frederic S. The Economics of Money, Banking, and Financial Markets, 6th ed., Boston: Addison Wesley, 2000.

Mittelstaedt, Martin. "Utility Sales Seen Hurting Users," The Globe and Mail, 14th December 2001.

Mouawad, Jad. "Oil Innovations Pump New Life Into Old Wells," New York Times, 5th March 2007.

National Energy Board, Looking Ahead to 2010: Natural Gas Markets in Transition, Calgary: National Energy Board, 2004.

National Energy Board, Memorandum of Guidance - Implementation of the Fair Market Access Procedure for the Licensing of Long-term Exports of Crude Oil and Equivalent, 17 December 1997.

National Energy Board, The Regulation of Electricity Exports: Report of an Inquiry by a Panel of the National Energy Board Following a Hearing in November and December 1986, National Energy Board, June 1986. Ottawa: Ministry of Supply and Services, June 1987.

New York Mercantile Exchange, A Guide to Energy Hedging, New York Mercantile Exchange, 9 January 2002.

New York Mercantile Exchange, Energy Complex, New York Mercantile Exchange, 7 March 2007.

Oilweek, "Unconventional Gas: By The Numbers," Oilweek, August 2006.

Paik, Keun Wook. Gas and Oil in Northeast Asia: Politics, Projects and Prospects, London: Royal Institute of International Affairs, 1996.

Petroleum Economist, "The Pretenders to Qatar's throne," Petroleum Economist, November 2006.

Pineau, Pierre-Olivier, et al. "Measuring International Electricity Integration: A Comparative Study of The Power Systems Under the Nordic Council, MERCOSUR, and NAFTA," Energy Policy, vol. 32, 1998.

Powrie, T. L. Energy Policy and the Balance of Payments: An Outline of the Issues, Calgary, Canadian Energy Research Institute, 1979.

Reuters, "IEA warns of 'supply crunch' in oil despite high prices," International Herald Tribune, 9 July 2007.

RIA Novosti, "Senior Gazprom official slams Energy Charter Treaty," RIA Novosti, 20 June 2006.

Robinson, J. Glenn and David Elliot, "National Instrument 51-101 (NI 51-101) Reserves Reconciliation—Part 2," Journal of Canadian Petroleum Engineering, vol. 44, no. 2, February 2005.

Royal Dutch Shell Group, Energy Needs, Choices, and Possibilities: Scenarios to 2050, Shell International Ltd, 2001.

Runge, C. Ford and Benjamin Senauer. "How Biofuels Could Starve the Poor," Foreign Affairs, vol. 83, no. 3, May/June 2007.

Schelling, Thomas C. 'What Makes Greenhouse Sense?" Foreign Affairs, vol. 81, no. 3, May/June 2002.

Schelling, Thomas C. Thinking Through The Energy Problem. New York: Committee for Economic Development, 1979.

Schwartz, Peter. The Art of The Long View, New York: Doubleday Currency, 1991.

Share, Jeff. "Russian Federation's Future Inseparable From Gazprom," Pipeline and Gas Journal, August 2006.

Shlapentokh, Valdimir. "Intoxicated by high oil prices: Political Dutch disease afflicting the Kremlin," Oil and Gas Journal, 6 November 2006.

Smith, Murray. "Energy Supplies: Quantities and Qualities," speech delivered at the Rocky Mountain Natural Gas Strategy Conference and Investment Forum.

Spellings, Jamie. The Outlook for Energy: A view to 2030, Exxon Mobil Corporation, Dec 2006.

Stastny, Paul. "The Future is Heavy," Oilweek, September 2006.

Stastny, Paul. "The push for universal standards for oil and gas reserves disclosure gains momentum," Oilweek, June 2006.

Stonehouse, Darrell. "The Last, Best West: British Columbia exploration and development hotbed in maturing western Canadian gas patch," Oilweek, February 2006.

The Associated Press, "Biofuels Boom Raises Tough Questions," New York Times, 10 March 2007.

The Globe and Mail, "Greenspan Lauds Alberta's Oil Sands," The Globe and Mail, 7th October 2006.

The Minister of Energy, Mines, and Resources, *An Energy Policy For Canada: Phase 1,* Ottawa, Information Canada, 1973.

The Minister of Energy, Mines, and Resources, *An Energy Policy For Canada: Phase 1,* vol. I, Ottawa, Information Canada, 1973.

The Minister of Energy, Mines, and Resources, *An Energy Policy For Canada: Phase 1,* vol. II, Ottawa, Information Canada, 1973.

The Minister of Energy, Mines, and Resources, *An Energy Strategy For Canada: Policies For Self-Reliance,* Ottawa, Supply and Services Canada, 1976.

TransCanada Corporation, 2006 Annual Report, TransCanada Corporation, 22 February 2007.

Trebilcock, Michael J. and Roy Hrab, "Electricity restructuring in Ontario," The Energy Journal, vol. 26, no. 1, 2005.

U.S. Cabinet Task Force on Oil Import Controls (the Shultz report), The Oil Import Question, A Report on the Relationship of Oil Imports to the National Security. Washington, D.C., U.S. Government Printing Office, 1970.

Vaughan, Scott, et al. "Canada-U.S. Electricity Trade and the Climate Change Agenda," in ed. G. Bruce Doern, Canadian Energy Policy and the Struggle for Sustainable Development, Toronto: University of Toronto Press, 2005.

Villar, Jose A. and Frederick L. Joutz, The Relationship Between Crude Oil and Natural Gas Prices, Energy Information Administration, Office of Oil and Gas, October 2006.

Von Clausewitz, Carl. On War, ed. Michael Howard and Peter Paret, Princeton: Princeton University Press, 1976.

Watkins, G. C. "NAFTA and Energy: A Bridge not far Enough?" in ed. Steven Globerman and Michael Walker, Assessing NAFTA: A Trinational Analysis. Vancouver: Fraser Institute, 1993.

Watkins, G. Campbell. "Living under a Shadow: U.S. Oil Policies and Canadian Oil Pricing." In ed. R. L. Gordon, H.D. Jacoby and M.B. Zimmerman, Energy: Markets and Regulations, Cambridge: MIT Press, 1987.

Waverman, Leonard. "Canadian Energy Policy after 1985: Lessons from the Present," in ed. Edward A. Carmichael and Corina M. Herrera, Canada's Energy Policy, 1985 and Beyond. Toronto: C. D. Howe Institute, 1984.

Yergin, Daniel. 'Ensuring Energy Security," Foreign Affairs, vol. 85, no.2, March/April 2006.

Yergin, Daniel. The Prize: The Epic Quest For Oil, Money and Power. New York, N.Y.: Free Press, 1992.