Making Energy Policy: The Canadian Experience

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Abstract

The evolution of energy policy in Canada is defined by three primary themes. First, the tension between federal and provincial jurisdiction over energy development and energy transmission. Provinces have control over the development of their energy resources, while interprovincial transport and offshore development is federally regulated, creating interregional tensions over market access. Secondly, the resource endowments in Canada are regional, leading to disparity in economic development, and federal policies that benefited parts of Canada at the expense of other regions, furthering inter-regional tensions. Thirdly, the proximity of the United States as a trading partner and primary export market has led to more north-south trade linkages compared to east-west linkages across Canada, particularly in energy trade. This has influenced the degree of interprovincial cooperation and coordination in energy policy. These three themes will be explored in describing the evolution of energy policy in Canada. Coupled with environmental concerns around energy development, energy policy in Canada has been fraught with tension over the past ten years.

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Introduction

This chapter examines the politics and policy of energy in Canada. While the majority of this text is spent on current trends and policy issues, understanding of current policies – federal and provincial – would be incomplete without examining the legacy of federal policies following Confederation in 1867 and up until the 1980s.

Canadian energy policy and regulation is defined by the division of powers between the federal government, provinces and territories, the disparity in resource endowments across Canada, and dependence on the United States as a primary market for Canada's energy products. The existence of federal, provincial and territorial governments, each with different responsibilities and policies objectives, has made the evolution of policy in Canada complex and idiosyncratic.

The rest of the chapter proceeds as follows. First, the current state of Canadian energy resource endowments is discussed, to provide context for the different objectives of various energy policies across the country. Next, energy trade patterns are discussed, again to provide context in advance of the discussion of policy development. Readers familiar with Canadian energy may safely skip these sections.

Thirdly, a brief overview is given of the powers of the federal, provincial and territorial governments as they relate to resource development, and their influence on policy. Fourth, the history of federal energy policy, with a specific emphasis on the role of regional resource endowments in influencing policy. Fifth, provincial energy policy is discussed, focusing on the major oil and natural gas producers, hydraulic fracturing, and electricity policy choices across Canada. Seventh, the role of interprovincial politics and its influence on energy policy is discussed, with an eye to contemporary energy policy.

Canadian Energy Resource Endowments

Canada is an energy-rich nation. In 2015, Canada ranked in the top ten (and often the top five) for the majority of its energy resources (measured by reserves, production and exports) compared to the rest of the world (Table 1). The significant natural resource and energy endowments Canada enjoys have substantially influenced the direction and scope of energy policy. In particular, energy security is not generally a concern,[1] though the pace and scope of resource development has been, as well as access to export markets (both domestic and international). While all energy sources will be discussed in this section, the majority of the chapter will focus on energy policy related to Canada's petroleum resources.

As to be expected in such a large country[2], Canada's energy resource endowments are geographically disparate. The majority of hydrocarbon resources are in the west, concentrated in the Western Canadian Sedimentary Basin (WCSB)[3]. In 2015, 95 per cent of crude oil production was from these western

[1] The exception is Northern Canada, where remoteness makes energy very expensive and the colder climate means per capita energy use is higher. For more details, see National Energy Board, "Energy Use in Canada's North: An Overview of Yukon, Northwest Territories, and Nunavut - Energy Facts".

[2] Canada is the world's second-largest country by area, covering almost 10 million square kilometres. The country is divided into 10 provinces (West to East: British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador) and three territories (West to East: Yukon, Northwest Territories, Nunavut); see Figure 13 and Figure 14 in the appendix for a comparison of the relative size and populations each.

[3] The WCSB is a large sedimentary basin with substantial oil, natural gas, coal and mineral wealth underlying the majority of Western Canada, including northeastern British Columbia, Alberta, southern Saskatchewan,

provinces; at year-end, 99 per cent of reserves and an estimated 95 per cent of the remaining ultimate potential production was in the WCSB (see Table 3 and Table 4 in the appendix for additional details). Historically, the majority of Canadian crude oil production has been from the western provinces, with Alberta providing the lion's share.

Table 1: Ranking of Canadian Energy Production and Reserves Relative to Other Countries, 2015

Resource	Proved reserves/capacity	Production	Exports
Crude oil	3rd	4th	3rd
Natural gas	17th	5th	4th
Coal	15th	12th	8th
Uranium	4th	2nd	2nd
Electricity	7th	6th	3rd
Renewable energy	–	7th	–
Hydroelectricity	4th	2nd	–
Wind	7th	–	–
Biofuels	–	5th	–

Source: Natural Resources Canada. 2016. "Energy Fact Book 2016-2017".
Note: Rankings are based on proved reserves for oil, natural gas, coal and uranium, and capacity for the other energy sources.

As with crude oil, the majority of Canada's natural gas resources are concentrated in the WCSB. While up-to-date reserve data is not available from the National Energy Board, as of the end of 2015, approximately 81 per cent of the ultimately remaining potential was in the WCSB. As of the end of 2013, 98 per cent of cumulative production occurred from Western Canada (see Table 5 and Table 6 in the appendix for additional details). For coal, while some reserves remain in Eastern Canada, the majority are in Western Canada.[4]

The magnitude of hydrocarbon reserves have meant the provinces are comfortably able to support their own energy demand, as well as export to the rest of Canada, the United States, and other countries. As a result, a primary policy consideration for producing provinces is access to export markets; this is discussed more in detail below.

Currently, all uranium produced comes from the province of Saskatchewan; in 2015, only 14 per cent of production was used domestically, with the remainder exported to Asia, North and Latin America, and Europe.[5] Notably, only the provinces of Ontario and New Brunswick have built nuclear reactors for electricity generation.

southwestern Manitoba and the southwest corner of the Northwest Territories. For more details, see Mossop, G.D. and Shetsen, I., (1994): Geological atlas of the Western Canada Sedimentary Basin; Canadian Society of Petroleum Geologists and Alberta Research Council.

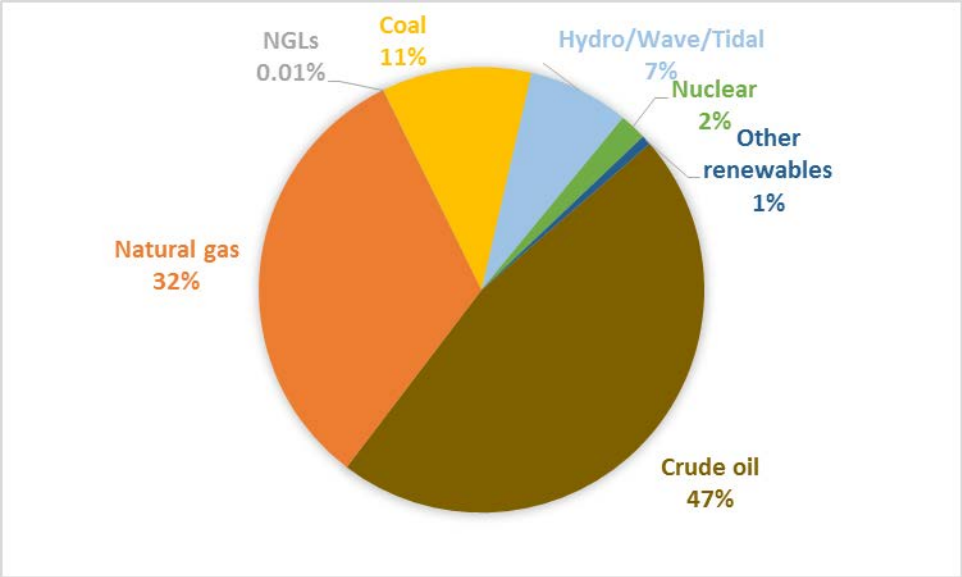
[4] Doern and Toner (1985) note that by the 1950s, coal has been supplanted by oil and natural gas as a primary energy source in Canada, decreasing its importance in energy policy. For that reason, while coal is briefly discussed here, it will not be discussed further in the context of Canadian energy policy.

[5] Natural Resources Canada. 2016. "Energy Fact Book 2016-2017."

By contrast, developed hydro resources are predominantly in British Columbia and Quebec, with smaller amounts of installed capacity in Manitoba and Newfoundland.[6] The role of other renewables in electricity capacity and generation has in large part been supported by specific policies aimed at increasing renewable penetration as part of emissions reduction or climate change goals, and will be discussed in more detail below.

Hydrocarbons dominate Canada's primary energy production. As shown in Figure 1, in 2014 a full 90 per cent of energy production, measured by the energy content of each energy source, was from hydrocarbons. This reflects both Canada's substantial endowment of hydrocarbons, as well as its role as an exporter of natural gas, oil and coal to other countries. Primary energy production in 2014 was equivalent to 18,578 petajoules (PJ), though primary energy demand was 13,829 petajoules, and total end-use demand was 11,626 PJ.[7]

Figure 1: Canadian Primary Energy Production by Source, 2014



Source: Author's calculations from National Energy Board, *Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040*.
Note: "Other renewables" includes wind, solar, biomass and geothermal.

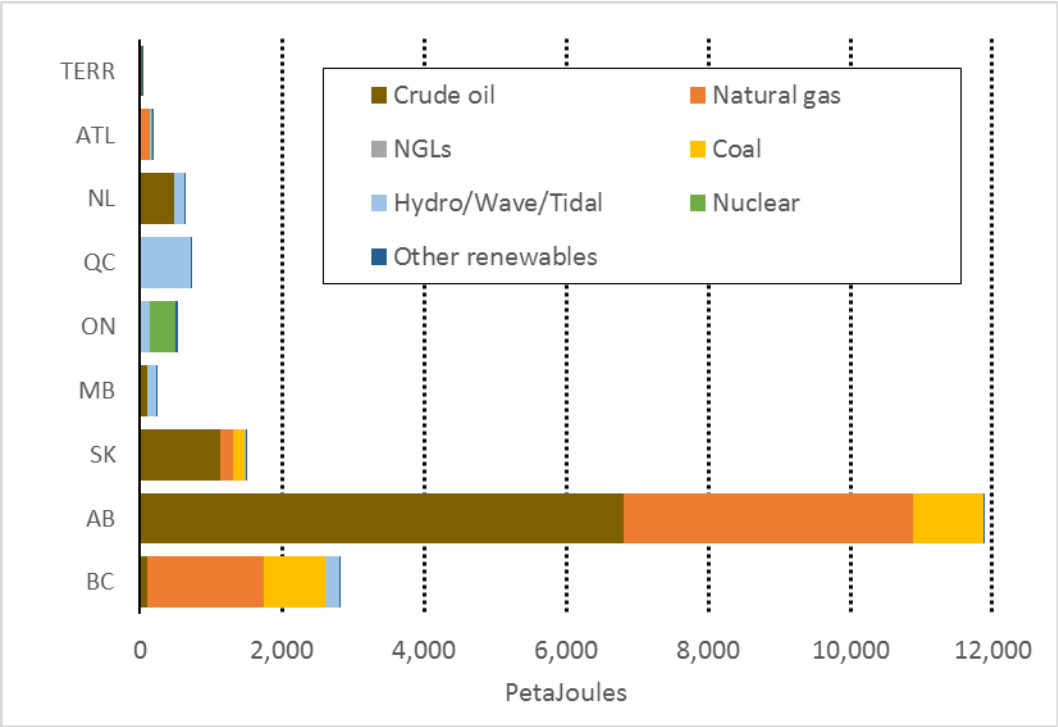
The geographic disparity in energy resources is reinforced when one examines primary energy production by source and region (Figure 2). Alberta clearly dominates, providing almost two-thirds of Canadian primary energy production. This is due to its role as Canada's major hydrocarbon producer, along with British Columbia and Saskatchewan. A primary consideration for these producers is market access; how this influences policy is discussed in more detail below. When discounting Western Canadian

[6] According to the Canadian Hydropower Association, Canada has the potential to develop an additional 160,000 MW of hydro capacity above the 76,000 MW of installed capacity in 2013. See: Canadian Hydropower Association, "Canadian Hydro Capacity & Potential (MW)".
[7] Primary demand is calculated by adding the energy used to generate electricity and steam to total end-use demand, and then subtracting the end use demand for electricity and steam. Removing end-use electricity and steam demand from the total is necessary to avoid double counting.

hydrocarbon production, the dominant source of primary energy production becomes hydro, followed by hydrocarbon production in the rest of Canada, and nuclear energy.

Generally speaking, the more populous Central Canada provinces of Quebec and Ontario, as well as the smaller Atlantic provinces are considered "have not" in terms of energy resources, whereas the less populous Western provinces are "have" provinces. The three territories, while possessing substantial resources in-place, are challenged by remoteness, low populations and less infrastructure to encourage economic development. The exception is electricity; provinces are generally self-sufficient in their installed capacity and generation, though the availability of energy fuels has constrained the *type* of generation.

Figure 2: Canadian Primary Energy Production, by Region and Source, 2014



Source: Author's calculations from (1) National Energy Board, *Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040*; (2) Statistics Canada, Table 135-0002, Production and exports of coal, CANSIM (database); (3) Government of Alberta, "Coal Statistics"; (4) Government of British Columbia, "Production Data Archive"; (5) Westmoreland Coal Company, "Mining Operations".
Note: Production for electricity is calculated based on the energy content per GWh produced. "Other renewables" includes wind, solar, biomass and geothermal.

The large differential between the provinces in energy production is reflected in the importance of the energy sector[8] in each province's economy, as measured by contribution to GDP and employment (Table

[8] The "energy sector" is defined as the combination of the business establishments of the North American Industry Classification System (NAICS) codes 211 (oil and gas extraction), 2121 (coal mining), 212291 (uranium ore mining), 21311A (support activities for oil and gas extraction), 2211 (electric power generation, transmission and distribution), 2212 (natural gas distribution), 32411 (petroleum refineries), and 486 (pipeline transportation).

2). Not surprisingly, the energy sector is a large contributor to Alberta and Saskatchewan's economies, though it is substantially less important in British Columbia, despite the province's role as the second-largest natural gas producer. Notably, the contribution of the energy sector to provincial economies has declined relative to 2013 and 2014 for the hydrocarbon-producing provinces. This change can largely be attributed to lower prices for oil and natural gas in 2015 relative to 2014, showing the importance of the value of production as well as the quantity produced. As a result of the global fall in oil prices as well as constrained export capacity, the relative weight in these provinces decreased, even though crude oil and natural gas production was maintained or increased in 2015.

Table 2: Energy Sector's Contribution to the Canadian Economy

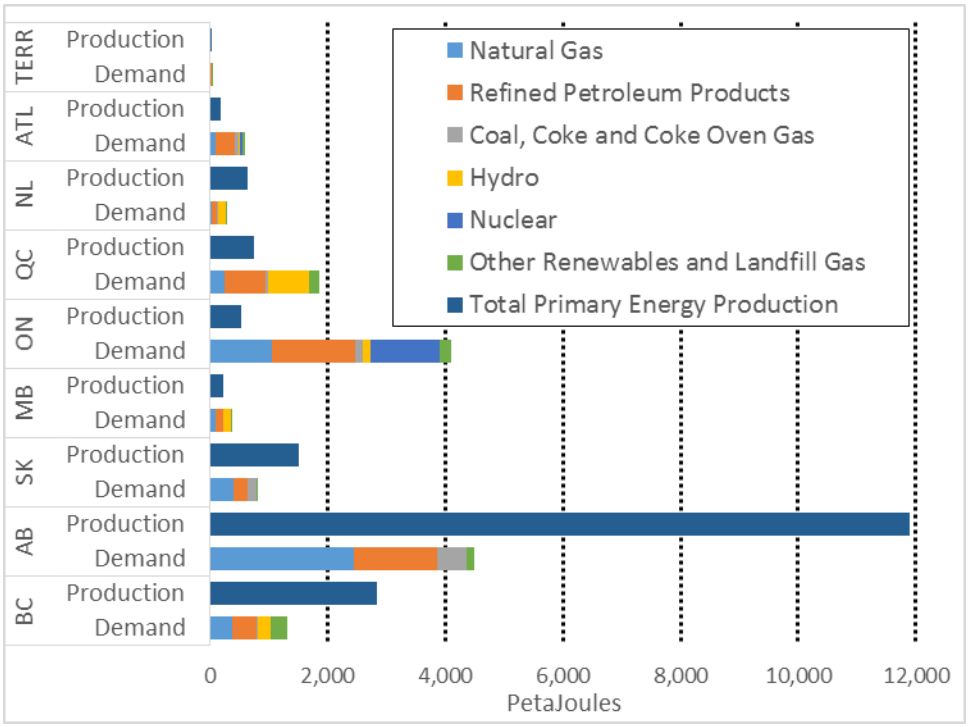
Province/territory	GDP		Employment	
	Energy sector nominal GDP (million 2015$)	Share of total GDP	Energy sector employment (jobs)	Share of total employment
Canada	144,148	7.3	280,355	1.5
British Columbia	8,749	3.5	20,400	0.9
Alberta	74,590	22.85	162,280	6.9
Saskatchewan	14,493	18.25	19,910	3.3
Manitoba	3,662	5.56	8,425	1.3
Ontario	16,716	2.19	37,290	0.5
Quebec	16,229	4.26	18,880	0.5
New Brunswick	2,363	7.15	3,300	0.9
Nova Scotia	1,227	3.05	2,645	0.6
Prince Edward Island	117	1.89	x	–
Newfoundland and Labrador	5,614	18.65	5,630	2.4
Yukon	36	1.34	215	0.8
Northwest Territories	300	6.21	835	2.6
Nunavut	52	2.11	x	–

Source: Author's calculations from (1) Statistics Canada, *Table 384-0038, Gross domestic product, expenditure-based, provincial and territorial*, CANSIM (database); (2) Statistics Canada, *Table 379-0028, Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories*, CANSIM; (3) Statistics Canada, *Table 383-0029 - Labour productivity and related variables by business sector industry, consistent with the North American Industry Classification System (NAICS) and the System of National Accounts (SNA), provinces and territories, annual*, CANSIM.

Note: The "energy sector" is defined as the combination of the business establishments of the North American Industry Classification System (NAICS) codes 211 (oil and gas extraction), 2121 (coal mining), 212291 (uranium ore mining), 21311A (support activities for oil and gas extraction), 2211 (electric power generation, transmission and distribution), 2212 (natural gas distribution), 32411 (petroleum refineries), and 486 (pipeline transportation). Employment data is suppressed by Statistics Canada for Prince Edward Island and Nunavut.

The disparity in resource endowments is even more apparent when comparing primary energy demand to primary energy production by region (Figure 3). The four major hydrocarbon-producing provinces – BC, Alberta, Saskatchewan and Newfoundland and Labrador – are the only ones where production is greater than demand. For the other provinces, native supply is significantly lower than demand. Also notable from Figure 3 is the reliance on natural gas and refined petroleum products as energy sources, the majority of which is imported into the "have not" provinces.

Figure 3: Canadian Primary Energy Demand and Production, by Region and Source, 2014

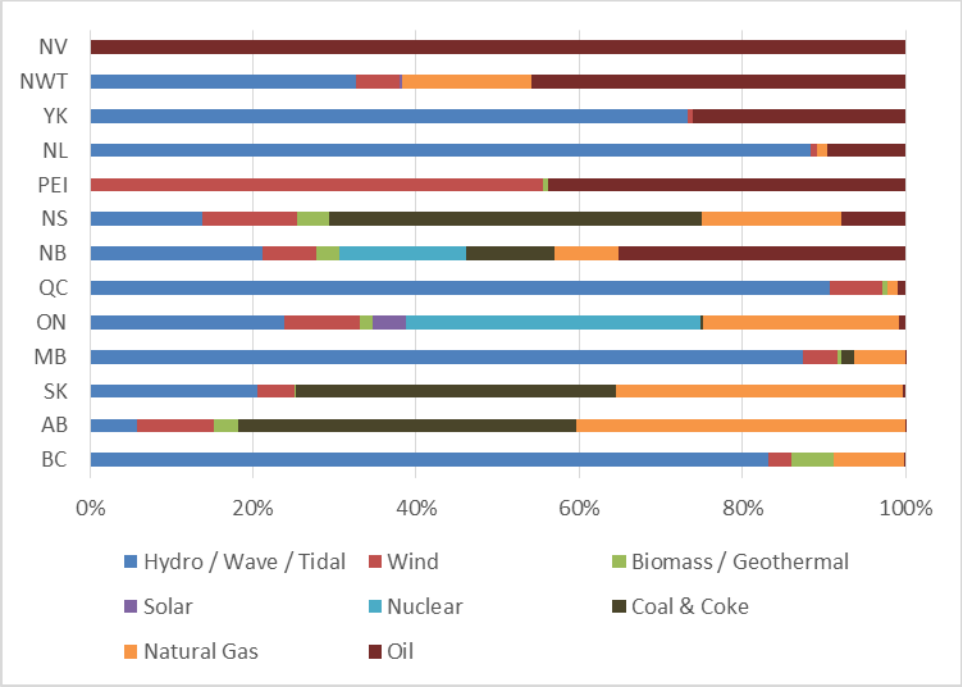


Source: Author's calculations from (1) National Energy Board, *Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040*; (2) Statistics Canada, *Table 135-0002, Production and exports of coal*, CANSIM; (3) Government of Alberta, "Coal Statistics,"; (4) Government of British Columbia, "Production Data Archive,"; (5) Westmoreland Coal Company, "Mining Operations,".
Note: Primary demand is calculated by adding the energy used to generate electricity and steam to total end-use demand, and then subtracting the end use demand for electricity and steam. Removing end-use electricity and steam demand from the total is necessary to avoid double counting.

The geographic disparity in energy resources is an historical as well as a current trend in Canada. The central provinces of Ontario and Quebec have been dependent on imports for natural gas, coal and oil. Similarly, the provinces of Manitoba, Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland and Labrador are dependent on imports, though to a lesser degree. These facts are a defining element of inter-regional relations and energy policy, as Canada faces the tension between the desire of net-importing provinces (consumers) to access low prices and the desire of net-exporting provinces (producers) to access high prices.

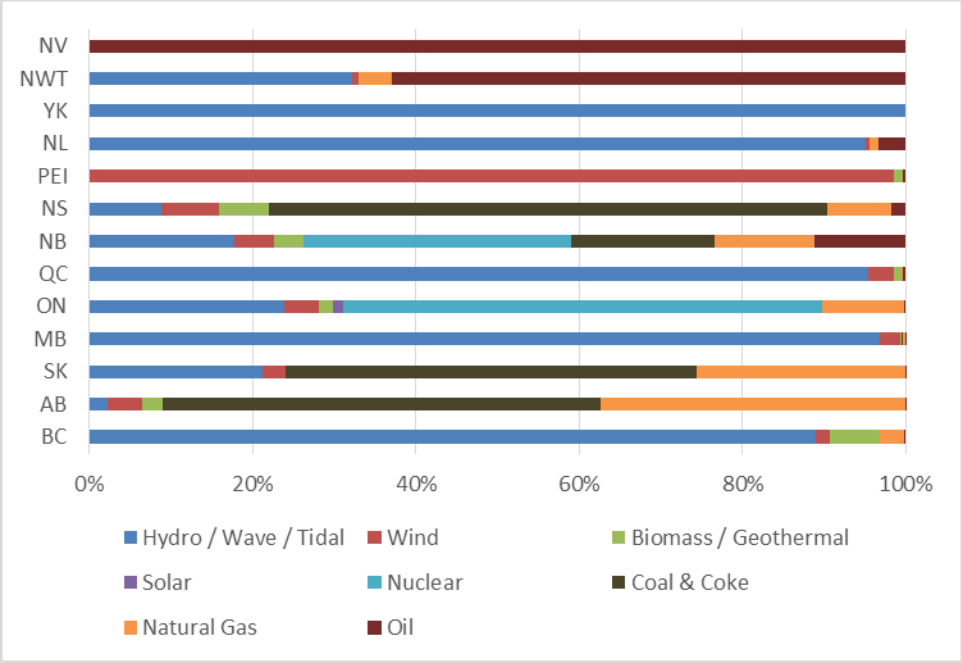
Canada's endowments of primary energy resources have strongly influenced the electricity generation and capacity mix in each province, as shown in Figure 4 and Figure 5. Overall, generation shares match capacity shares relatively well, though the figures highlight two disparate themes in electricity sources. For one group of provinces, the primary investment in capacity and source of generation is hydro; for others, the reliance is on fossil fuels.

Figure 4: Canadian Electricity Capacity Shares, by Region and Source, 2014



Source: National Energy Board, *Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040.*

Figure 5: Canadian Electricity Generation Shares, by Region and Source, 2014

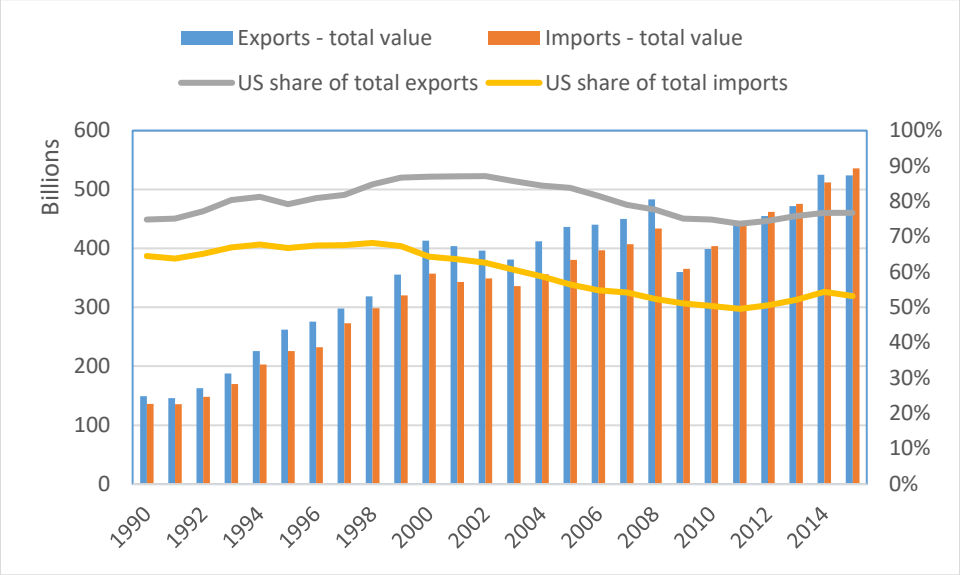


Source: National Energy Board, *Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040.*

Canadian Energy Trade

Trade with the United States has historically dominated Canada's trade relationships. Between 1990 and 2006, the value of exports to the U.S fluctuated between 74 per cent and 87 per cent of total exports.[9] Imports into Canada tell a similar story, though the U.S. is much less dominant as a supplier, with a high of 68 per cent of the value of imports and a low of 50 per cent over the same period.[10] Figure 6 displays overall Canadian trade patterns between 1990 and 2015. In contrast to external trade, the value of Canadian internal trade is relatively less important. As documented by Albrecht and Tombe (2016), on average exports account for 26 per cent of total output, with international exports accounting for 15 per cent, and intra-national exports 11 per cent. This is a function of proximity to the U.S., and the simple economics of the cost of transportation meaning North-South trade is predominant rather than East-West trade.

Figure 6: Value of Canadian trade (nominal) and U.S. share, 1990 – 2015



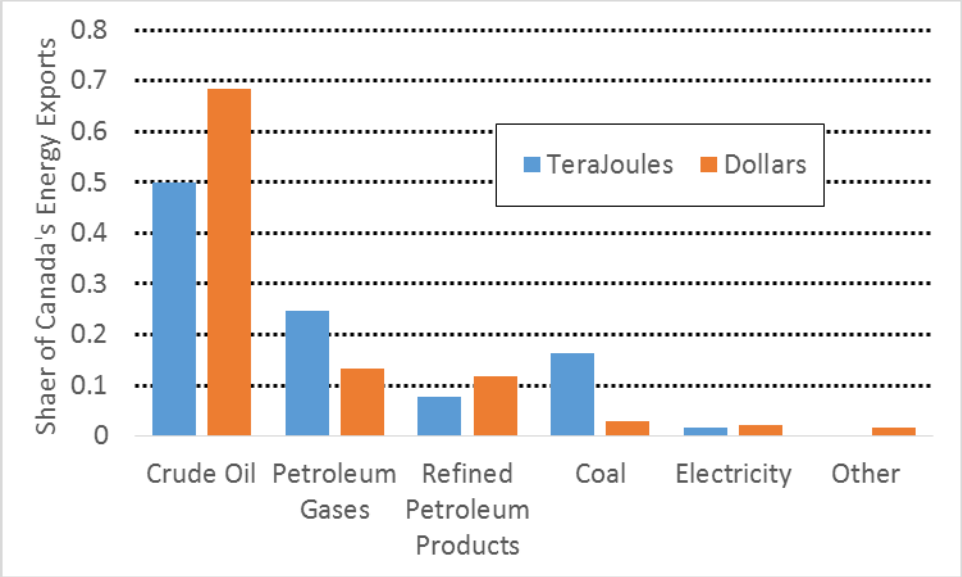
Source: Innovation, Science and Economic Development Canada, "Trade Data Online".

The overall composition of Canada's energy trade depends on whether one looks at exports or imports, or quantity (terajoules) or value (dollars). Figure 7 displays shares of total exports in 2014 by dollars and by terajoules for each of Canada's major energy product types.[11] Looking at quantities exported, crude oil accounts for 50 per cent of exports, natural gas and NGLs for an additional 25 per cent, coal for 16 per cent, refined petroleum products for eight per cent, and electricity for almost two per cent. Measuring exports by their dollar value reveals a slightly different pattern: crude oil accounts for 68 per cent of export revenue, with petroleum gases in a distant second place at 13 per cent, followed by refined petroleum products at 12 per cent, coal at three per cent, and electricity at two per cent. The United States is Canada's primary export market for energy, receiving 93 per cent of the value of Canada's energy

[9] Innovation, Science and Economic Development Canada, "Trade Data Online".
[10] Innovation, Science and Economic Development Canada, "Trade Data Online".
[11] For an overview of historical trends, see Tombe (2014).

exports in 2014. By product, Canada exported 97 per cent of crude oil, 100 per cent of petroleum gases and electricity, and 92 per cent of refined petroleum products to the U.S. The sole outlier is coal, with only three per cent going to the U.S.

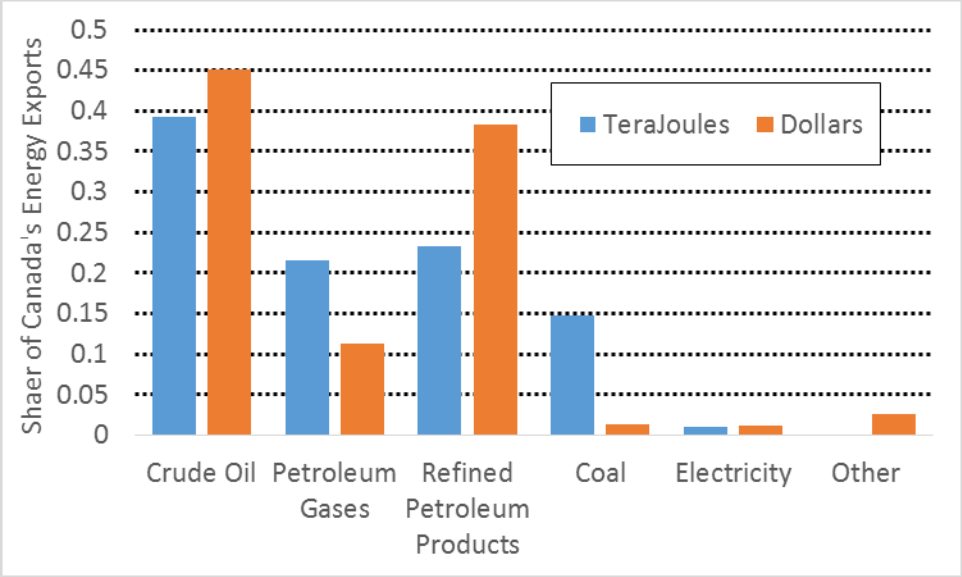
Figure 7: The Composition of Canada's Energy Exports (2014)



Source: Author's calculations from (1) Statistics Canada. *Table 127-0008 - Supply and disposition of electric power, electric utilities and industry, annual*, CANSIM; (2) Statistics Canada, *Report on Energy Supply and Demand in Canada* (57-003-X); (3) Innovation, Science and Economic Development Canada, "Trade Data Online"; (4) IEA (2016), "OECD product supply and consumption", *IEA Oil Information Statistics* (database); (5) IEA (2016), *Oil Information 2016*, OECD Publishing, Paris; (6) IEA (2016), "OECD – Coal exports by destination", *IEA Coal Information Statistics* (database).
Note: Crude oil is HS code 2709, petroleum gases is HS code 2711, refined petroleum products is HS code 2710, coal is HS code 2701, electricity is HS code 2716, and "other" includes HS codes 2702-2708 and 2712-2715.

Turning to imports, Figure 8 shows shares of total imports in 2014 by dollars and by terajoules for each of Canada's major energy product types. Crude oil accounts for 39 per cent of imports by quantity, refined petroleum products for 23 per cent, natural gas and NGLs for 22 per cent, coal for 15 per cent, and electricity for one per cent. Measuring imports by their dollar value again reveals a slightly different pattern: crude oil accounts for 45 per cent of import expenditure, followed by refined petroleum products at 38 per cent, with petroleum gases a distant third at 11 per cent, and coal and electricity at one per cent each. The United States is Canada's primary import supplier for energy, though the relationship is much less dominant compared to exports. In 2014, 68 per cent of the value of Canada's energy imports were purchased from the U.S. By product, Canada imported 53 per cent of crude oil, 95 per cent of petroleum gases, 75 per cent of refined petroleum products, and one hundred percent of electricity from the U.S. Again, the sole outlier is coal, with only 14 per cent being imported from the U.S.

Figure 8: The Composition of Canada's Energy Imports (2014)

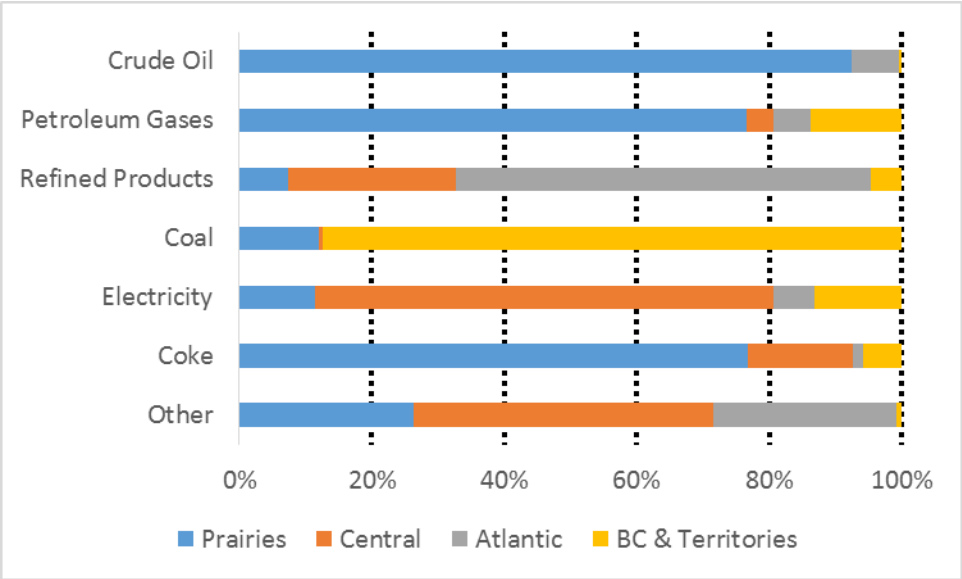


Source: Author's calculations from (1) Statistics Canada. *Table 127-0008 - Supply and disposition of electric power, electric utilities and industry, annual,* CANSIM; (2) Statistics Canada, *Report on Energy Supply and Demand in Canada* (57-003-X); (3) Innovation, Science and Economic Development Canada, "Trade Data Online,"; (4) IEA (2016), "OECD product supply and consumption", *IEA Oil Information Statistics*; (5) IEA (2016), *Oil Information 2016*, OECD Publishing, Paris; (6) IEA (2016), "OECD – Coal imports by origin", *IEA Coal Information Statistics*.
Note: Electricity includes primary (hydro, nuclear, wind, solar and other renewables) and secondary (thermal) electrical generation. Crude oil is HS code 2709, petroleum gases is HS code 2711, refined petroleum products is HS code 2710, coal is HS code 2701, electricity is HS code 2716, and "other" includes HS codes 2702-2708 and 2712-2715.

As noted above, the geographic disparity in energy resource endowments has resulted in some provinces being net exporters, and others being net importers. However, it would be misleading to assume that all provinces are not actively involved in all components of energy trade. Figure 9 shows the regional composition of Canadian energy exports for 2014. Not surprisingly, the prairie provinces of Alberta, Saskatchewan and Manitoba dominate in the export of crude oil and petroleum gases, accounting for 92 and 77 per cent, respectively. Central Canada accounts for the majority of electricity exports (69 per cent), whereas Atlantic Canada accounts for the majority (63 per cent) of refined-products exports. Finally, B.C. is almost exclusively responsible for coal exports (87 per cent).

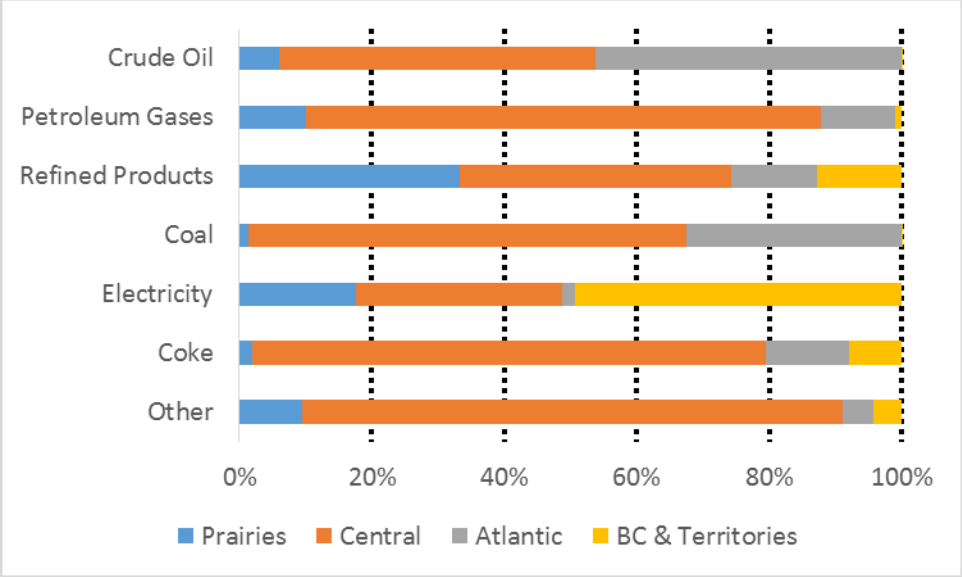
Turning back to imports, Figure 10 shows the regional composition of energy imports by product in 2015. The central provinces of Ontario and Quebec import the majority of energy products of any type – not surprising given their large populations. There are some interesting exceptions, however. B.C. imported 49 per cent of Canada's total electricity imports, and the Prairie provinces imported 33 per cent of refined products, relatively close behind the 41 per cent imported by Ontario and Quebec.

Figure 9: Regional Composition of Canadian Energy Exports (2014)



Source: Innovation, Science and Economic Development Canada, "Trade Data Online".
Note: Prairies are Alberta, Saskatchewan and Manitoba; Central is Ontario and Quebec; Atlantic is Nova Scotia, New Brunswick, Newfoundland and Labrador, and Prince Edward Island. Electricity includes primary (hydro, nuclear, wind, solar and other renewables) and secondary (thermal) electrical generation. Crude oil is HS code 2709, petroleum gases is HS code 2711, refined petroleum products is HS code 2710, coal is HS code 2701, electricity is HS code 2716, coke is HS code 2713, and "other" includes HS codes 2702-2708 and 2712, 2713, 2715.

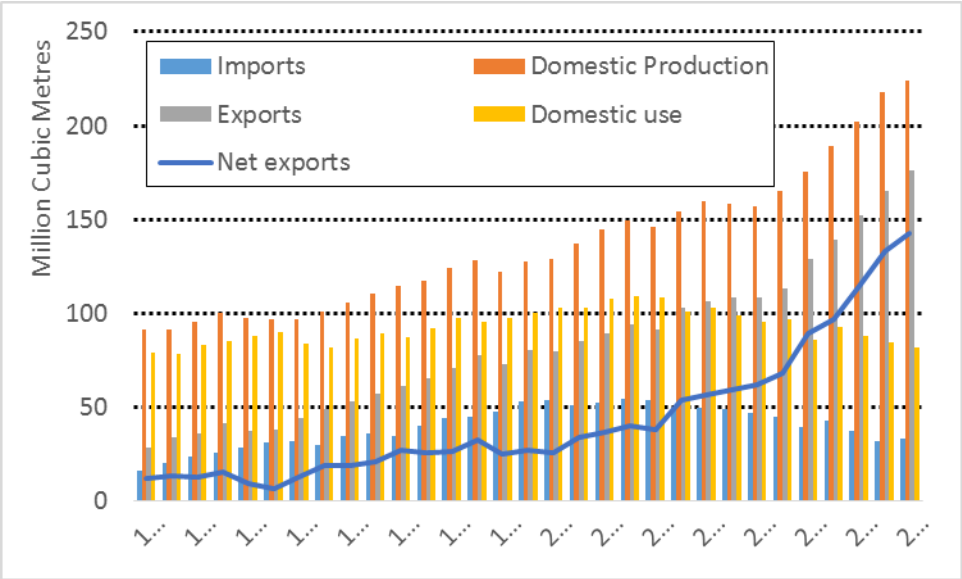
Figure 10: Regional Composition of Canadian Energy Imports (2014)



Source: Innovation, Science and Economic Development Canada, "Trade Data Online".
Note: Prairies are Alberta, Saskatchewan and Manitoba; Central is Ontario and Quebec; Atlantic is Nova Scotia, New Brunswick, Newfoundland and Labrador, and Prince Edward Island. Electricity includes primary (hydro, nuclear, wind, solar and other renewables) and secondary (thermal) electrical generation. Crude oil is HS code 2709, petroleum gases is HS code 2711, refined petroleum products is HS code 2710, coal is HS code 2701, electricity is HS code 2716, coke is HS code 2713, and "other" includes HS codes 2702-2708 and 2712, 2713, 2715.

Figure 11 shows crude oil production, domestic consumption, imports and exports by volume between 1985 and 2015. Notably, a decline in domestic use starting in the mid-2000s corresponded with increased production and exports. As noted above, the U.S. is entirely dominant as an export market: between 1985 and 2015, an average of 99 per cent of Canada's exports of crude oil and equivalent by volume went to the U.S. Interestingly, though exports as a share of production have increased from 31 per cent in 1985 to 78 per cent in 2015, the majority of the increase in exports have been absorbed by the U.S. market. Arguably, this is much a function of proximity of the U.S. as it is the gravity of the U.S. as an energy consumer. Indeed, proposals for export pipelines to access tidewater and alternative markets (including Northern Gateway, the Trans Mountain Expansion and Energy East) have been developed only in the last ten years.

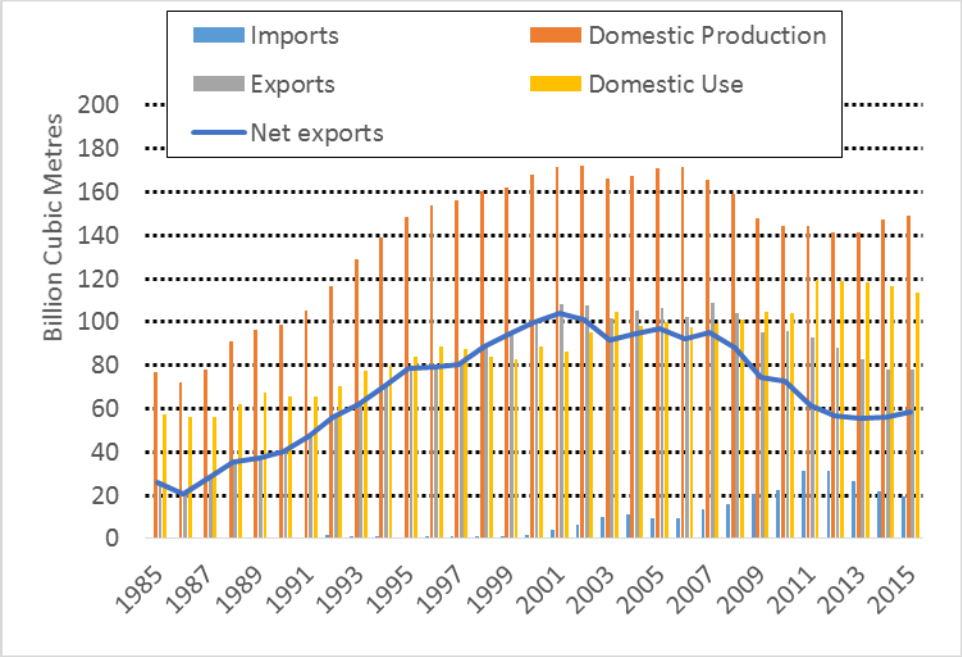
Figure 11: Canadian Crude Oil Production and Consumption (million cubic metres), 1985 – 2015



Source: Statistics Canada. *Table 126-0001 - Historical supply and disposition of crude oil and equivalent, monthly (cubic metres)*, CANSIM (database).
Note: Domestic use includes refinery consumption, inventory changes, deliveries to other purchasers, and losses and adjustments.

Canadian crude oil is subject to limited internal trade, relative to trade with the United States. Despite Western Canada's vast resources, limited pipeline infrastructure supports interprovincial trade. In part, this is due to the relative cost of overland transportation relative to shipment via tanker, as well as the relative closeness of the various Canadian markets to equivalent U.S. markets. For natural gas, domestic production supported the majority of domestic consumption, with limited imports (Figure 12). Excess production beyond that required for domestic use was exported to the United States. However, starting in the mid-2000s, Western Canadian gas supplying Eastern Canada began to be supplanted by U.S. gas, which also occurred in U.S. markets. The decline of two major export markets for Western Canadian gas has depressed natural gas prices in Canada, and also prompted consideration of liquefied natural gas as an export alternative (discussed in more detail below).

Figure 12: Canadian Natural Gas Production and Consumption (million cubic metres), 1985 – 2015



Source: Statistics Canada. *Table 131-0001- Historical supply and disposition of natural gas, monthly (cubic metres)*, CANSIM.
Note: Domestic use includes utility sales, direct sales, deliveries to storage, pipeline fuel and losses, and adjustments.

With the scope of Canadian energy resource endowments and historical patterns of energy trade in mind, we now turn to the main determinants of Canadian energy policy. As a precursor to the discussion below, the geographic disparity of resources has driven regional tensions over the relative benefits and costs of energy development accruing to each region, as well as over the simple fact that the more populous provinces are net energy importers.

The Evolution of Energy Policy in Canada

While coal was discussed briefly above in the context of resource endowments, its declining importance in Canadian energy consumption and policy means that the primary focus of the policy discussion below will be on oil, natural gas and electricity. Before diving into the specifics of Canadian policy, a brief digression on the roles and responsibilities of federal and provincial governments is in order, as these powers are important determinants of Canadian energy policy. The subsequent discussion of the evolution of Canadian energy policy will begin with federal policy, followed by the three main components of provincial policy: oil and natural gas, new policy developments in response to hydraulic fracturing, and electricity policy. This section will conclude with a discussion of interprovincial politics and its effect on energy policy.

Federal and Provincial Powers over Natural Resources

Canada's energy policy and decision-making is characterized by the division of powers between federal and provincial governments. This division of powers nonetheless has resulted in overlap of jurisdiction, as well as friction between legislative authorities. Notably, both provincial and federal governments have strong powers in the area of natural resources, contributing to the friction between the two levels of government. Thus, in order to understand energy policy in Canada, it is also necessary to understand the role and rights of the provinces as owners of the natural resources, and how the federal government may restrict those ownership rights through its exercise of constitutional jurisdiction.

The Constitution Act provides substantial provincial powers over the management of energy and natural resources, as well as direct provincial ownership of lands containing natural resources. Specifically, section 109 of the Canadian constitution defines provincial powers, conferring all lands, mines, minerals and royalties to the provinces. Section 92 details the exclusive powers of provinces, including the ability to levy direct taxes (92-2), authority over the management and sale of public lands (92-5), and property and civil rights (92-13), reinforcing provincial ownership of natural resources. Provincial ownership and oversight of non-renewable resources, forestry resources and electrical energy are specifically outlined in section 92-A, relating to exploration, development, conservation and management. The powers enumerated here give provinces the authority over the management of all lands in the province, not just public lands. As noted by Doern and Toner (1985), this also grants the provinces primary access to revenues from the development of natural resources.

Federal powers over energy and natural resources, by contrast, come from its powers over interprovincial trade (through the trade and commerce clause, 91-2), and the authority to levy taxes through any mode (91-3), treaty powers (132), as well as emergency and declaratory powers. The "trade and commerce" clause gives the federal government power over interprovincial pipelines and transmission lines, as well as exports of energy. The emergency power grants federal authority to legislate and maintain "peace, order and good government." A constraint on the taxation powers enabled by Section 91-3 is the prohibition against taxation of "lands and property" belonging to a province, which has implications for incentive systems for resource development. The federal government also maintains jurisdiction over the Canada Lands[12], which includes the territories, indigenous reserves, offshore areas and national parks. Federal jurisdiction of the Canada Lands includes the powers of the provinces[13] as well as the powers of an owner.

An exception to the provincial powers outlined in section 92 of specific note for energy policy is that the federal government has jurisdiction over "local works and undertakings" that cross interprovincial or international boundaries, or those that are wholly situated within a province but are declared to "be for the general advantage of Canada" or "two or more of the provinces." This declaratory power has become very important for the development of energy policy at a federal level, as it enabled "nation-building" infrastructure in the form of pipelines and railroads, federal control of atomic energy, and other uses.

Notably, the Constitution Act is silent on the environment, which has implications for energy policy in Canada. Most recently, energy and environmental policy have been inextricably tied, creating difficulties in effective development of both.

[12] For more details, see Natural Resources Canada, "About Canada Lands".

[13] An exception to this is the devolution of the ownership and management of land and natural resources to the Yukon and Northwest Territories, which occurred in 2003 and 2014, respectively. Resources in Nunavut are still under federal control.

Despite the constitution granting provinces control of the management of their natural resources, this was not observed in practice until 1930. As argued in great detail by Mary Janigan, the battle over resource control has been a defining characteristic of Canadian policy since confederation. The four original provinces in confederation (Ontario, Quebec, Nova Scotia and New Brunswick) maintained control of their resources, as did British Columbia and Prince Edward Island, which joined confederation in 1871 and 1873. The provinces of Alberta, Saskatchewan and Manitoba were purchased from the Hudson's Bay Company in 1869,[14] and became provinces in 1870 (Manitoba) and 1905 (Alberta and Saskatchewan) but did not have control over their lands or natural resources. Instead, there was an argument that lasted decades, with the original provinces arguing they "had bought the West, fair and square, so they owned the West's lands and resources" (Janigan 2012). In contrast, Richards and Pratt (1979) note that the federal government maintained control over natural resources and lands as an essential part of a policy of transcontinental expansion, using the control to promote immigration and settlement of Western Canada. That said, Richards and Pratt note the federal policy had lasting implications for federal-provincial relationships and Western alienation.

In 1930, Alberta, Saskatchewan and Manitoba gained control of their lands and resources. However, as a result of the dispute over ownership of natural resources, Western alienation – due in no small part to Western Canada's smaller population and subsequent smaller weight in elected representation – has been a defining theme of Canadian policy in general, and energy policy specifically.

A Brief History of Federal Energy Policy

The evolution of federal energy policy has been mainly through the federal responsibility over trade and taxation, and in cases where federal *environmental* policy affects *energy* policy, either at the federal or provincial level. In terms of trade, this is largely delegated to the National Energy Board, which determines whether infrastructure enabling trade is in the public interest, and to ensure export of energy products – crude oil, natural gas and electricity – "does not exceed the surplus remaining after Canadian requirements have been met."[15]

In some instances, the federal government has taken a stronger role in shaping energy policy in Canada than suggested by the limits on its jurisdiction. After Confederation, for example, a tariff on American coal imports was put in place to encourage greater use of domestically-produced coal (Bregha 2014). Also of note is the Atomic Energy Control Act, which transferred jurisdiction over uranium from provincial control to the federal government and delineated regulation of the production and use of uranium.[16]

The federal government has a long history of interventionist policies to support economic development, many of which were directed at energy resources. In particular, this precedent was set with John A. McDonald's National Policy, which combined immigration, tariff and transportation policy to support Central Canada and encourage east-west rather than north-south trade (Doern and Toner 1985). With federal energy policy, the federal government has faced the tension of regional differences: depending on the energy source, different parts of Canada are simultaneously net energy importers as well as net energy exporters (McDougall 1982). As noted by John McDougall, the tension between regions and Canada's

[14] The land purchased from the Hudson's Bay Company were originally called Rupert's Land and the North-Western Territory.
[15] National Energy Board, "Export and Import of Energy".
[16] The federal government also established two Crown corporations (state-owned enterprises); Atomic Energy of Canada Ltd was responsible for nuclear research, and Eldorado Nuclear Ltd was responsible for mining and refining.

self-sufficiency began with coal, but has continued with oil and natural gas. The most accessible (and lowest-cost) supply of coal, oil and natural gas for Central Canada is from the United States, and the United States is a natural market for Canada's producing provinces.

For oil and gas, the two most famous – or infamous – federal policies were the National Oil Policy and the National Energy Program. The NOP was established in 1961, and its purpose was to protect the Canadian oil industry against lower-cost foreign imports (McDougall 1982). In Western Canada, the federal government created a protected market, while Eastern Canada continued to rely on imports to meet domestic demand. The NOP was similar to earlier coal policies, where the federal government was willing to impose higher energy costs on central Canadian consumers in order to protect higher-cost Canadian producers from U.S. imports, and simultaneously provided market access for the Canadian producers facing difficulty with market access in the U.S. (McDougall 1982).

Doern and Toner (1985) note that the period between 1947 and 1973 was characterized by remarkable federal-provincial consensus on policy, development and management of oil and natural gas. The primary objective of energy policy during that time was to encourage production and growth of the domestic petroleum industry; this was achieved through a favourable tax climate to encourage investment, construction of pipelines[17] for oil and natural gas from producing provinces in Western Canada to consuming regions in Canada and the U.S., and explicit support of exports.

In 1973, federal policy changed markedly from pro-development to pro-consumer, precipitated in part by the oil price and supply shocks. As noted by John McDougall, growing public support for Canadian self-sufficiency in energy likely contributed to this major change in policy focus. Quite possibly the most interventionist set of energy policies in Canadian history, the federal government "imposed oil export controls, similar controls over the export of refined products, announced the extension of the Interprovincial oil pipeline to Montreal, froze domestic oil prices, levied an export tax on crude oil, developed an oil import compensation scheme to protect consumers dependent on imported oil, … and contemplated the imposition of oil rationing" (Doern and Toner 1985). The federal government also created a national oil company, Petro-Canada.[18] The Western provinces responded with legislation to strengthen their control over oil development, including pricing. The federal government then responded by eliminating the deductibility of provincial royalties in federal corporate income tax, and in 1975 passed the Petroleum Administration Act to provide itself the ability to set oil and natural gas prices in Canada.

Federal energy policies in the 1970s were aimed at cushioning the impact of rapidly increasing prices on Canadian consumers and the industrial sector (and thereby providing industrial exports with a comparative advantage), subsidizing Canadians dependent on imported offshore oil, slowing the transfer of wealth from energy-importing provinces to energy-exporting provinces, diminishing the inflationary effects of rising energy prices, and protecting the federal tax base and federal revenues. At the same time, energy independence was also a concern, including the development of new supplies and ensuring producing provinces received adequate prices for their production. These policy objectives set the stage for further federal intervention by way of the National Energy Program in 1980.

[17] The two oil pipelines were Trans Mountain, from Alberta to the West Coast, and Interprovincial, from Alberta to central Canada (originally planned to Montreal, the original pipeline was built only to Ontario). The two natural gas pipelines were Westcoast, from Alberta to the West Coast, and TransCanada, from Alberta to Montreal. There was a third natural gas pipeline, the Alberta-Montana line, which was built to supply natural gas to the Anaconda copper smelter in Northern Montana.

[18] It should be noted that Alberta and Saskatchewan also created state-owned oil companies.

The NEP had three (often mutually contradictory) policy objectives. First, to enable *security* of supply and independence from world oil markets, creating self-sufficiency in oil by 1990. Second, to increase the *opportunity* for Canadian involvement in the energy industry, via 50 per cent Canadian ownership and control by 1990. Thirdly, to ensure *fairness* in pricing and revenue-sharing. Each objective was supported by multiple additional policies, only some of which are highlighted here.[19] The major policy changes included a four-year oil and gas pricing regime, new taxes to increase the federal share of petroleum revenue, a program to incentivize and increase Canadian ownership of petroleum corporations, an oil substitution program to reduce imports and an exploration incentive scheme to target frontier lands.

Responses from the producing provinces and industry to the NEP's suite of policies was strong and negative, with Alberta characterizing the Program as a plan by the federal government and central provinces to "capture control of the western provinces' resources, and ensure all provinces except Ontario and Quebec remained second-class citizens" (Doern and Toner 1985, 459). Alberta retaliated by attempting production cutbacks, embarking on a constitutional challenge to the tax on natural gas exports, and withholding approval of oil sands projects. Pressure from the other provinces and industry led to the federal government and Alberta reaching a compromise agreement in 1981, and the Supreme Court of Canada subsequently ruled against federal taxation of provincially-owned oil and gas wells, further reducing the impact of the NEP. The NEP was fully dismantled in 1985, but left a legacy of distrust of the federal government, and caused a resurgence of Western Canadian alienation, affecting both policy and political relationships.

Contemporary energy policy at the federal level has been much less interventionist. The Western Accord and the Agreement on Natural Gas Prices and Markets – agreements between the governments of Canada, Alberta, British Columbia and Saskatchewan signed in 1985 – eliminated crude oil and natural gas price controls.[20] Signing the Canada-United States Free Trade Agreement (CUSFTA) in 1987 and the North American Free Trade Agreement (NAFTA) in 1994 reinforced the pre-eminence of market forces in determining prices. Current federal energy policy has three main principles: a market orientation, respect for the jurisdictional authority and the role of the provinces, and targeted intervention in the market process, where necessary, to achieve specific policy objectives.[21]

After the dismantling of the NEP, there were no energy-specific federal policy initiatives for almost thirty years. In 2012, the federal government began a review of foreign investment in the energy sector. Under the Investment Canada Act, the federal government is required to review and approve foreign investment above a certain threshold of asset value ($800 million in 2017, and $375 million if the foreign investor is a state-owned enterprise) to determine if the acquisition is of net benefit to Canada.[22] The federal review was prompted by the attempted acquisition of Canadian energy firms Nexen and Progress Energy Corporation, by the Chinese SOE China National Offshore Oil Corporation and Malaysia's Petronas, respectively. While the acquisitions were allowed to occur, as a result of the review, the federal government stated that acquisition of a Canadian oil sands business by a foreign SOE "will, going forward, be found to be of net benefit on an exceptional basis only."[23]

[19] For a detailed review of the National Energy Program, see Doern and Toner (1985).
[20] For more details, see Natural Resources Canada, "Frequently Asked Questions About Natural Gas Prices," and Natural Resources Canada, "Why Canada Doesn't Regulate Crude Oil and Fuel Prices."
[21] Natural Resources Canada, "Energy Policy."
[22] Innovation, Science and Economic Development Canada, "Investment Canada Act: Thresholds."
[23] Government of Canada, news release, "Government of Canada Releases Policy Statement and Revised Guidelines for Investments by State-Owned Enterprises".

This economic nationalism is a thread that can be drawn through the history of Canadian energy policy. It was reflected in early policy to create protected markets for Canadian oil and gas producers, the "Canadianization" initiative in the National Energy Program to increase Canadian ownership, and the creation of Canadian state-owned energy enterprises by the federal and provincial governments. However, this policy fundamentally misinterprets the ownership and control of Canadian natural resources, and represents more of a populist view. In particular, the resources are owned by the province and the right to explore and develop is through leases (this is developed more fully below). Somewhat surprisingly, this policy action by the federal government to partially restrict Alberta's access to external capital did not receive a negative reaction from the province.

Finally, contemporary energy policy at the federal level has also centred on new pipeline projects, aimed at granting Canadian producers access to new export markets. While a fulsome discussion is delayed until after a discussion of provincial energy policy, it is worthwhile to note that the (current) federal government is not uniformly in favour of additional resource development. In particular, a policy announcement in late 2016 stated the government's intention to initiate a crude oil tanker ban on British Columbia's north coast; the ban includes the port intended for one of the proposed West Coast pipelines.[24] A second new policy initiative, joint with the lame-duck Obama Administration, made Canadian Arctic waters off-limits to new oil and gas licensing.[25] While this presumably does not prevent existing licenses from being pursued, it represents a new policy direction at the federal level.

Provincial Energy Policy

In line with pre-1980 federal policy, provincial policy has focused on the development of energy resources. With some exceptions, provincial and territorial control over natural resources includes the ownership of those resources. As a result, provinces and territories (and the federal government where applicable) have by and large chosen to develop their hydrocarbon and mineral resources by leasing the right to develop to private companies. The governments therefore enjoy the gains from developing their resources with the risk taken on by the private sector, and achieve a share of the rents[26] through application of a royalty tax to the value of the resource produced. However, the government ownership of the resource itself ends when the resource is produced – ownership is "severed" at the wellhead or mine-head.

Ownership of the resources has granted each subnational government control over the pace and scope of resource development, but not ownership of the severed resource.[27] The various governments' policies proceed independently from each other, with the federal government entering when private interests seek to export the severed resource. That said, there is a strong tradition of provincial governments acting as advocates for private projects such as pipelines in political discussions, due to the provinces' role as owner of the resources.

In addition, the overlapping jurisdiction and responsibilities of the two levels of government has often led to energy policy formed via federal-provincial bargaining. This bargaining occurred in the 1970s and

[24] Government of Canada, news release, "Crude oil tanker moratorium on British Columbia's north coast".
[25] Justin Trudeau, news release, "Select actions being taken under the United States-Canada Joint Arctic Leaders' Statement".
[26] Rents are economic gains above and beyond the cost of development of the resource.
[27] In some instances, provincial Crown corporations (state-owned enterprises) were established to produce and market hydrocarbon and mineral resources.

1980s over "appropriate" levels of crude oil and natural gas prices, as well as more recently over pipeline development.

We now turn to the highlights of specific provincial policies relating to petroleum development, and electricity policy. A full description of the breadth and scope of each province's policies is beyond the scope of this chapter, but pivotal policies and their effects will be explored.

Oil and Natural Gas

The 1947 Leduc and 1948 Redwater oil discoveries – both in Alberta – are generally accepted as marking the birth of the modern Canadian oil industry (Doern and Toner 1985). Alberta's regulatory system, however, developed substantially earlier, in 1930 – as soon as resource rights were transferred to the province – as a result of the federal mismanagement of the Turner Valley light oil and natural gas field (Richards and Pratt 1979). This was complicated by the fact that a provincial government was attempting to regulate production from federally-granted leases. The years between Alberta gaining control of its resources and the discovery of new oil fields was characterized by the province asserting its newly-won authority, and attempting to minimize waste and maximize revenues. In 1938, Alberta created the Oil and Gas Conservation Board, an entity that has survived to the present (now the Alberta Energy Regulator) as an independent, arms-length regulator of hydrocarbon development.

Somewhat ironic from a modern perspective, a key political concern in the early days of Alberta's development was populist resistance to natural gas exports. However, a desire to diversify Alberta's economy away from its agrarian roots, pressure from an industry building up massive reserves and from the federal government's desire to develop Canada's resources and secure domestic supplies led to the abandonment of that policy relatively quickly. For the most part, Alberta's subsequent policies focused on enabling development and market access.

In contrast to Alberta, Saskatchewan would take a much more nationalistic role in the development of its oil resources. From 1944 to 1948, the government of Saskatchewan sought to promote economic diversification through nationalization and promotion of manufacturing and natural resources, and enacted a series of policies allowing expropriation, in addition to changing taxation to support their initiatives.[28] Opposition to and criticism of the aggressive policies (including a court challenge), combined with the new discoveries in Alberta, led to a softening of the government's policy position. By the mid-1950s, Saskatchewan's policies had largely converged with Alberta's, focusing on supporting development and acquiring export markets. While several scholars have alleged this early policy delayed the development of Saskatchewan's petroleum resources, empirical evidence is limited (Winter and Emery 2012).

In the 1970s and 1980s, diversification concerns returned to Alberta, no doubt due in part to the government's reliance on resource royalties to support spending and keep other taxes low. This is an enduring theme in Albertan energy policy, remaining to this day. As a result, the government of Alberta initiated policies to encourage the "upgrading" of energy resources at the source, commonly referred to as "adding value."[29] One specific initiative was the Alberta Petroleum Marketing Board, a provincial Crown corporation responsible for selling oil produced from Crown leases (royalties in kind rather than in cash).

[28] For more detail on this history, see Richards and Pratt (1979). For a summary of the policy changes and an analysis of their alleged effect on development in Saskatchewan, see Winter and Emery (2012).
[29] This typically involves misunderstanding and misuse of the term "value added" which refers to income. For more details on this in a Canadian policy context, see Tombe (2015).

The APMC has been used to support diversification initiatives, most recently a government-backed oil sands upgrader.[30]

A second major policy initiative was a move to maximize resource rents, via revising Alberta's royalty regime and the formation of the Alberta Heritage Savings Trust Fund. The Heritage Fund was established to save royalty revenue, reduce revenue volatility in budgeting cycles, underwrite government diversification projects and lend to other Canadian governments. Two investments of note with the Fund were the Alberta Energy Company and Syncrude (an oil sands firm); however, the majority of the projects were failed experiments in government-led economic diversification (Morton and McDonald 2015).[31]

The irresistibility of "diversification" and "value added" projects has continued to this day in Alberta energy policy. In 2012, for example, the mandate of the Alberta Petroleum Marketing Commission was expanded "to include assisting in the development of [value-added] activity in Alberta's petroleum sector, such as the development of the Sturgeon Refinery as well as new energy markets and transportation infrastructure."[32] In addition, budget 2015 included a $500 million petrochemicals diversification program to capitalize on "the growing global demand for related higher value products and promote greater energy processing" in Alberta.[33]

The involvement of the government of Alberta in resource development was characterised by Richards and Pratt as "empire-building." However, the government has also been involved in energy development in a supporting role, especially for the development of the oil sands. Namely, in 1974, the Alberta Oil Sands Technology and Research Authority (AOSTRA) was formed to support the development of new technologies for the oil sands.[34] The government's involvement in and support of technology development can be directly attributed to the success Alberta has seen in developing the oil sands. Arguably, its role as an owner of the resource, and the market failure inherent in research and development provides ample justification for government involvement in this case. This risk-sharing approach continues into the present with government-industry partnerships through Alberta Innovates.

Government policy (and politics) in Alberta have also been preoccupied with ensuring Albertans get their "fair share" of resource rents through royalties. This has led to multiple revisions to, and formal reviews of royalty regimes, in 1951, 1973, 1974, 1995, 1997, 2007, 2010, and 2015.[35] The most recent review was dominated by the government's concerns about "fair share" and industry's concerns about competitiveness. Notably, however, the government relied on an expert panel and also *accepted* all of the panel's recommendations, resulting in a regime that is arguably more efficient and addresses both competitiveness and fair share considerations.[36]

As prime example of how environmental policy is affecting energy policy, in November 2015, Alberta's newly elected New Democratic Government announced its new Climate Leadership Plan, which included among other things a cap on total oil sands emissions and an economy-wide carbon tax. Interestingly, the

[30] See Morton (2015) for an overview of this diversification project.
[31] To those familiar with the Cooperative Commonwealth Federation and its failed attempts to diversify the Saskatchewan economy (including a box factory) in the 1940s and 1950s, it is somewhat surprising that Alberta's government in the 1970s and 1980s did not take those lessons to heart.
[32] Government of Alberta, "Alberta Petroleum Marketing Commission".
[33] Government of Alberta, "Petrochemicals Diversification Program".
[34] Government of Alberta, "Alberta Oil Sands Technology and Research Authority".
[35] Government of Alberta, "Energy's History in Alberta".
[36] For more details on the changes, see Shaffer (2016).

Alberta government has subsequently sold "climate leadership" as a way to gain approval for new pipeline construction.

While less colourful than Alberta's history of energy policy, Saskatchewan also had its fair share of government involvement. Similar to Alberta, the government established a Crown corporation – Saskatchewan Oil & Gas Corporation – in 1973, and a research arm known as the Saskatchewan Research Council to meet economic development policy goals.[37]

As with Alberta and Saskatchewan, the Leduc discovery started the modern era of petroleum development in British Columbia.[38] Production from B.C. has been much more weighted to natural gas than oil, and the scope of (interesting) policy development is limited. One policy initiative of note is that in 1972, both the federal and government of B.C. imposed a moratorium on offshore drilling.[39] However, most recently, the development of natural gas resources has been an area of intense policy interest by the B.C. government. In particular, B.C.'s closeness to potential Asian markets and its substantial natural gas reserves spurred government and industry interest in export opportunities via liquefied natural gas.[40] B.C.'s 2012 natural gas strategy outlined a goal of having one LNG facility in operation by 2015, and three by 2020.[41] In this case, the government has clearly adopted a policy of championing the industry.[42] And while there are numerous projects under review, only two have been approved, one of which is facing a court challenge.[43] Unexpected delays, regulatory burden, and lower than expected natural gas prices have placed the future of this nascent industry, and the political capital invested by the government, in jeopardy.[44]

Hydraulic Fracturing

The ability of hydraulic fracturing to allow access to low permeability hydrocarbon reservoirs across North America has resulted in a significant change in energy markets, and has required ongoing adjustments in energy policy. The technology has become quite contentious, with different provinces reacting differently: it is used actively in the west, there is exploratory development in the north, and moratoriums are in place in Central and Eastern Canada.

The differing approaches to regulation and acceptance of hydraulic fracturing can be traced to the newness of the technology in its current scale and scope of use, open questions about impacts on air, water, land and human health, and the ability to regulate effectively in the absence of clear scientific information on the risks, costs and benefits (Winter, Dobson and Lorefice 2016). Despite the differing approaches to regulation, the policy responses across Canada were initially remarkably similar. In Ontario, Quebec, New Brunswick, Nova Scotia, Newfoundland and Labrador, Northwest Territories and Yukon, governments initiated public, expert-led reviews of hydraulic fracturing. This followed on from a federally-initiated study of the environmental impacts of shale gas extraction in Canada. In addition, both

[37] The Encyclopedia of Saskatchewan, "Saskatchewan Resource Council (SRC)".
[38] Government of British Columbia, "A Brief History of Oil and Gas Exploration in British Columbia".
[39] Government of British Columbia, "Sedimentary Basins of B.C.".
[40] For more detail on the policy around LNG in BC and its competitiveness, see Moore et al. (2014).
[41] Government of British Columbia, "B.C.'s Natural Gas Strategy".
[42] Government of British Columbia, "Province opens doors to Asian investment in LNG".
[43] Natalie Obiko Pearson and Josh Wingrove, "Federal Liberals approve Petronas LNG project in B.C. — with numerous conditions," *Financial Post*, September 27, 2016.
[44] Linda Givetash, "B.C.'s Woodfibre LNG to become first LNG export project, but industry doubts persist," *Vancouver Sun*, November 8, 2016.

the Alberta Energy Regulator and the B.C. Oil and Gas Commission (B.C.'s regulator) have revised their regulatory frameworks.

The various provincial and territorial reviews focused on the potential social, economic and environmental effects of allowing hydraulic fracturing, and panels generally made recommendations about policies and regulations that would need to be in place in order for development to be of net benefit to its citizens. In several cases, the recommendations and analysis provided by the reviews seem to be discounted by political leadership: Quebec, Nova Scotia and New Brunswick have moratoriums in place. Ontario has a much more neutral stance (due to lack of industry interest),[45] and Newfoundland and Labrador has a temporary moratorium (the government has yet to act on the review). This is another area of currently evolving and changing policy in Canada, and one with the potential to significantly change the historical regional energy relationships.

Electricity Policy

At the provincial level, electricity sources and policy have been very divergent. The electricity industry in Canada is involved in three main activities: generation, transmission and distribution. The majority of these activities fall under provincial jurisdiction, with the exception of inter-provincial and international transmission lines that are federally regulated. Historically, all three types of industry activity occurred via vertically-integrated electric utilities, often Crown corporations with monopoly rights.[46] The utilities were then regulated by the provincial government, either via arms-length regulatory agencies or through government ministries. However, in recent decades, the organization of electric systems in the various provinces have diverged into three basic models.

Some provinces – B.C., Saskatchewan, Manitoba, Quebec and Nunavut – still operate under the vertically integrated Crown corporation model. BC, Manitoba, Quebec and Saskatchewan also have smaller municipally-owned or investor-owned generators in addition to the central Crown corporation. Nunavut is unique in that all electricity generation is via diesel, and the territory does not have a grid per se.

The second iteration of the electricity sector involves partial privatization. This model is followed by New Brunswick, Nova Scotia, Newfoundland and Labrador, Yukon, NWT, and PEI. Northwest Territories, Yukon, New Brunswick and Newfoundland and Labrador have hybrid systems, with a Crown corporation and investor-owned corporations both involved in generation, transmission and distribution, as well as a few investor-owned generators. Nova Scotia's system involves two major investor-owned vertically integrated companies providing generation, transmission and distribution, and a few smaller investor-owned companies involved in generation. PEI has a sole vertically integrated and investor-owned utility.

Alberta and Ontario, however, have done the most to deregulate their electric industries. In Alberta, generation is essentially fully deregulated, with generators bidding into an energy-only market. Transmission and distribution are rate-regulated, though provided by investor-owned corporations. In Ontario, the market is a hybrid. While generation is deregulated, planning and contracting for electricity generation is through a Crown corporation.

Recent developments on the electricity side of energy policy in the various provinces have focused on using electricity policy as an instrument to meet emissions-reduction targets. In Ontario, for example,

[45] Government of Ontario, "Statement by Ontario's Minister of Natural Resources and Forestry on High-Volume Hydraulic Fracturing".
[46] Natural Resources Canada, "About Electricity".

passed the Green Energy Act in 2009; the purpose of the Act was to promote the growth of renewable energy projects. The policy also reinforced an existing policy to phase out coal, a process that began in 2001.[47] As part of the new policy of increasing renewables' penetration in Ontario, the government launched a feed-in-tariff (FIT) and microFIT program.[48] The Act was roundly criticized as expensive and a costly way to reduce emissions, as well as resulting in substantially (and unnecessarily) higher electricity prices (Dachis and Carr, 2011; McKitrick, 2013).

In B.C, the government passed the Clean Energy Act in 2010, which defines "clean and renewable"[49] sources of energy, and mandates that at least 93 per cent of electricity generated in B.C. come from these clean or renewable sources. The Act also outlines several other energy objectives, including achieving electricity self-sufficiency, reducing or conserving greenhouse gas emissions and energy use, becoming a net electricity exporter from clean or renewable sources, to ensure electricity rates remain competitive, and to meet these objectives without the use of nuclear power. The existence of a vertically-integrated Crown corporation makes the government's ability to meet these various objectives vastly simpler compared to jurisdictions with less centralization of planning.

Alberta's electricity policy has seen vast changes during 2016. Following deregulation in 1996, this side of Alberta's energy policy was quiet, understandably receiving little political or government attention, a poor cousin to oil and gas.[50] However, in November 2015 the aforementioned Climate Leadership Plan was announced, which included a 30 per cent renewable mandate and phasing out coal-fired generation by 2030. To provide context, in 2014, coal provided 54 per cent of Alberta's generation, and 41 per cent of generation capacity.[51] Supporting these two substantial policy changes required additional change to Alberta's electricity industry – due no small part to industry requests to maintain investor certainty – which were announced over the course of 2016.

Firstly, a Renewable Electricity Program to procure an additional 5,000 MW of renewable energy capacity via a competitive bidding process.[52] Second, payments to owners of coal generation plants representing the lost economic value associated with curtailed operations.[53] Thirdly, implementing a capacity market by 2021 to ensure capital costs of new generation capacity investments are covered.[54] The government elected to maintain the deregulated structure of Alberta's electricity industry, but meeting the new policy goals required vast changes to maintain investor confidence and interest in Alberta. Additional supporting policies are expected to unfold over the next few years, as well.

[47] Government of Ontario, "The End of Coal".
[48] Government of Ontario, "FIT and microFIT Program".
[49] The Act defines "clean or renewable" as "biomass, biogas, geothermal heat, hydro, solar, ocean, wind or any other prescribed resource."
[50] An exception was Bill 50, the Electric Statutes Amendment Act, passed in 2009, which gave the government of Alberta power to designate future transmission lines as "critical transmission infrastructure," which was rather controversial. See Government of Alberta, "Transmission" and Conor T. Schell, "Alberta's Electricity Transmission Debate – An Update on Bill 50".
[51] National Energy Board, *Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040.*
[52] For more details, see Alberta Electric System Operator, "Renewable Electricity Program" and Government of Alberta, "Renewable Electricity Program".
[53] Government of Alberta, "Phasing out coal pollution".
[54] Government of Alberta, "Electricity capacity market".

Interprovincial Politics and Energy Policy

Two energy policy issues that are a function of interprovincial relationships and federal-provincial relations have dominated the Canadian policy discussion over the last decade. The first, the importance of the energy sector in provincial and Canadian economies, and the second, market access and the relative burdens of costs and benefits from enabling transportation to new markets.

Dutch Disease

The energy sector – and its importance in regional and Canadian economies – is a source of regional tension for two reason. First, the inevitable tension between producing regions and consuming regions and the cost of hydrocarbons. Second, the fact that resource-producing provinces enjoy significant resource revenues and wealth.

In 2012, high oil and natural gas prices meant the Western provinces – B.C., Alberta, Saskatchewan and Manitoba – were booming. Oil exports were perceived to be so important that the Canadian dollar reached parity with the U.S. greenback, and concerns were raised about Canada suffering from 'Dutch disease.'[55] Thomas Mulcair, leader of the federal New Democratic Party, argued that exports from Alberta's oil sands were artificially increasing the value of the Canadian dollar and making the manufacturing sector – located predominantly in Ontario and Quebec – less competitive.[56] The assertion set off a Canada-wide debate, with numerous think tanks providing research weighing in on both sides of the issue.

Though the political discussion was largely at the federal level, between Quebec-based Mulcair and the Western-based federal conservative government, it reinvigorated a tension lasting since Confederation.

The Great Canadian Pipeline Debates: Then and Now

The desire of the federal government in the 1950s to bring Western Canadian natural gas to Central Canada is rightfully characterized the 'Great Canadian Pipeline Debate.' Part of the debate was whether the routing should be all-Canadian – in order to maintain exclusive jurisdiction and avoid "excessive rates of exports" to the U.S. – or go partially through the U.S. – in order to minimize costs and access the U.S. market (McDougall 1982). The second, equally important component of the debate was the federal government's willingness to grant loan guarantees to a U.S.-controlled company which would build the pipeline (Doern and Toner 1985). The policy decisions by the federal government, partially through a desire to have the pipeline completed before the 1957 election, led to their defeat in that same election, and emphasized the importance energy policy had and continues to have in Canada.

The Pipeline Debate led to the subsequent government to form the Royal Commission on Energy (the Borden Commission). The Borden Commission led to the formation of the National Energy Board (NEB), in addition to helping depoliticize energy policy at the time. The NEB has formed a keystone of federal energy policy since its formation, providing independent, arms-length advice to the government on whether energy projects are in the national or public interest. And for the majority of its existence, its decisions and mandate have been uncontroversial.

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[55] Coined by *The Economist* in an article from 1977, the term refers to the adverse economic effects associated with the discovery of natural gas offshore of the Netherlands and the subsequent decline of domestic manufacturing.
[56] Mark Gollom, "Is Canada suffering from 'Dutch disease'?" CBC News, May 18, 2012.

However, Canada has entered into a new 'Great Pipeline Debate.' Oil production – predominantly from Alberta – has largely outstripped current export capacity. This, combined with saturation of Alberta's historical market in the U.S. midcontinent, led to a series of four new pipeline proposals to Canada's West and East Coasts and the U.S. Gulf Coast. The proposals include Enbridge's Northern Gateway from Alberta to Kitimat, B.C.; an expansion of Kinder Morgan's Trans Mountain pipeline from Alberta to Vancouver, B.C.; TransCanada's Energy East, from Alberta to New Brunswick (involving a partial conversion of the natural gas mainline and new pipe from Quebec to the East Coast); and TransCanada's Keystone XL, from Alberta to the U.S. Gulf Coast. Each of these pipelines has been extremely controversial, and it is not clear when or if any of them will be built.[57]

One major contributor to the controversy surrounding these pipelines is comments made by federal politicians. In particular, then-Prime Minister Stephen Harper referred to Keystone XL as a "no brainer"[58] and his Natural Resources Minister (Joe Oliver) declared Northern Gateway to be "in the national interest."[59] Notably, the second statement was made before a formal recommendation from the NEB on the pipeline, and while the NEB's evaluation was ongoing. These comments gave the Canadian public the perception that pipelines would be approved, regardless of the NEB's review, and provided substantial political fodder for opposition politicians. In addition, changes to the National Energy Board Act in 2012, which included a fixed timeline for project reviews and changed the environmental assessment process, were criticized as reducing the comprehensiveness of regulatory reviews and decreasing the ability of stakeholders to participate in review processes (Colton, et al. 2016). This prompted additional comments from opposition politicians, stating Canadians has "lost trust" in the NEB and its processes.

A second contributor to the current controversy around pipelines is the issue of benefits (mainly accruing to Alberta) and the risks and costs associated with spills (mainly borne by other provinces). Brought to a forefront by the government of B.C. in 2012, five conditions were laid out as requirements for B.C. to support heavy oil pipelines.[60] The governments of Ontario and Quebec followed suit in 2014 with seven conditions for acceptance of Energy East.[61] While no overt action has been taken, these conditions have raised the spectre of a constitutional challenge regarding the rights of provinces, particularly B.C.'s condition of receiving a "fair share of fiscal and economic benefits."[62]

Related to the first two points is deep-seated concern over local environmental impacts associated with pipelines, as well as the upstream emissions from crude oil production. The former is associated with citizens along the pipeline route, whereas the latter has been the purview of environmental groups. Both concerns have led to public protests over pipelines, notably from the mayors of Burnaby and Vancouver, coastal cities along the Kinder Morgan Trans Mountain Expansion route. Underlying these concerns are the issues of trust of the NEB and the legitimacy of its decisions. Of note is that a participant in the Kinder Morgan pipeline review – Marc Eliesen, former CEO of BC Hydro, B.C.'s electricity Crown corporation – withdrew from the process, asserting it was a sham and not in the public interest.[63]

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[57] A possible exception is Keystone XL, given the various positive statements President-Elect Trump has made about the pipeline.
[58] Shawn McCarthy, "Keystone pipeline approval 'complete no-brainer,' Harper says," *The Globe and Mail*, September 21, 2011.
[59] Claudia Cattaneo, "Northern Gateway won't succumb to Keystone's fate," *Financial Post*, November 18, 2011.
[60] Government of British Columbia, "British Columbia outlines requirements for heavy oil pipeline consideration".
[61] Adrian Morrow, "Premiers Wynne and Couillard set seven criteria for Energy East," *The Globe and Mail*, November 21, 2014.
[62] Government of British Columbia, "British Columbia outlines requirements for heavy oil pipeline consideration".
[63] Eliesen, M. "Letter of Withdrawal", Oct. 30, 2014.

Relatedly, Canada's current Prime Minister, Justin Trudeau, has publicly stated multiple times that Canadians have lost trust and confidence in the NEB and Canada's environmental assessment process. Numerous court challenges of NEB pipeline decisions reinforce this image.[64] Moreover, much of the Canadian pipeline discussion has been centered on the issue of whether energy projects have "social licence," "social acceptance" or "public acceptance" (Colton, et al. 2016). Related to the idea of trust and legitimacy of the NEB and its review process, the implication of the current focus on these terms is that energy projects, and pipelines in particular, need something more than regulatory approval to proceed (Colton, et al. 2016). A resultant major policy initiative is the modernization of the NEB, reviewing its mandate, governance, decision-making role for major projects, public participation and engagement with affected Indigenous peoples.[65] Simultaneously, the federal government is also reviewing the environmental assessment process.[66] It remains to be seen whether these policy initiatives will effectively address the concerns that spurred them.

Finally, the fifth consideration adding complexity to the Canadian pipeline debate is the obligations of the federal and provincial governments, and project proponents in respecting the rights of Canadian Indigenous peoples. The history of Canada's relationships with its Indigenous peoples is not a positive one, though recent federal steps have been taken to address these failings.[67] In the context of energy policy, Supreme Court of Canada decisions have stated that Canadian governments have the duty to consult, and where appropriate, accommodate where the Crown's actions may adversely affect potential or established Aboriginal or Treaty rights.[68] A comprehensive treatment is beyond the scope of this chapter, but it is worth noting that many of the court challenges of NEB decisions are brought forth by Indigenous groups based on the government's failure to fulfill its duty to consult. This is an evolving area of case law, and will have a substantial impact on energy policy and energy development in the future. For the moment, however, the lack of resolution has created policy, regulatory and investor uncertainty.

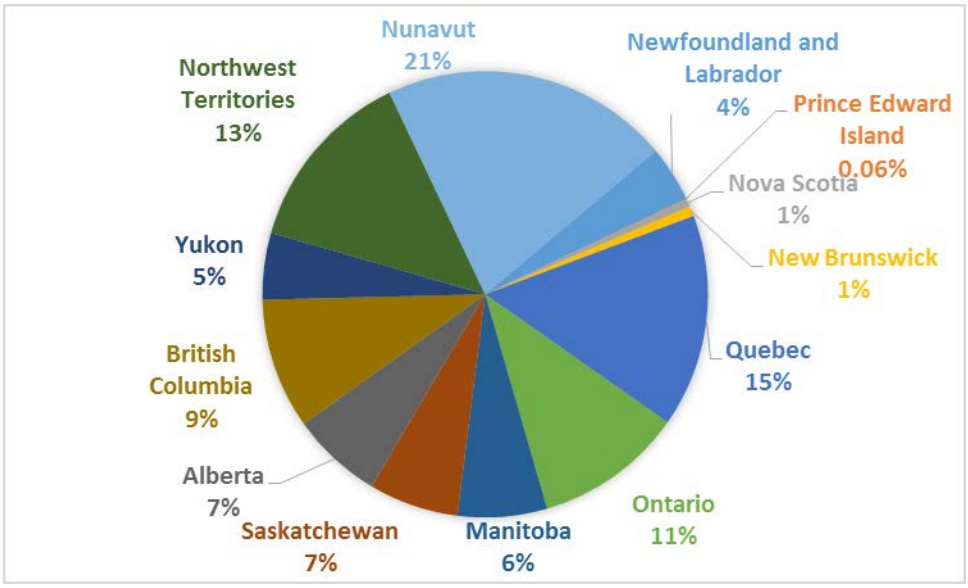
Concluding Thoughts

Canadian energy policy is constantly evolving. Most recent energy policy at both the federal and provincial level can be characterized as predominantly being used to achieve environmental or "green" objectives, particularly in electricity policy. In addition, regional disparity in resource endowments has created an ongoing tension in the desires and objectives of the various provincial governments, resulting in different approaches to energy policy as well as tension in the enactment of energy policy. On pipelines in particular, inter-provincial and federal-provincial bargaining has become a new norm. The past decade has been a decade of change, and Canada is poised for additional – and substantial – energy policy change in the near future.

[64] National Energy Board, "Court Challenges to National Energy Board or Governor in Council Decisions".
[65] Government of Canada, "National Energy Board Modernization".
[66] Government of Canada, "Environmental Assessment Processes".
[67] For more details, please see the work of the Truth and Reconciliation Commission of Canada.
[68] The terms 'Aboriginal' and 'Treaty' have distinct definitions in Canadian common law.

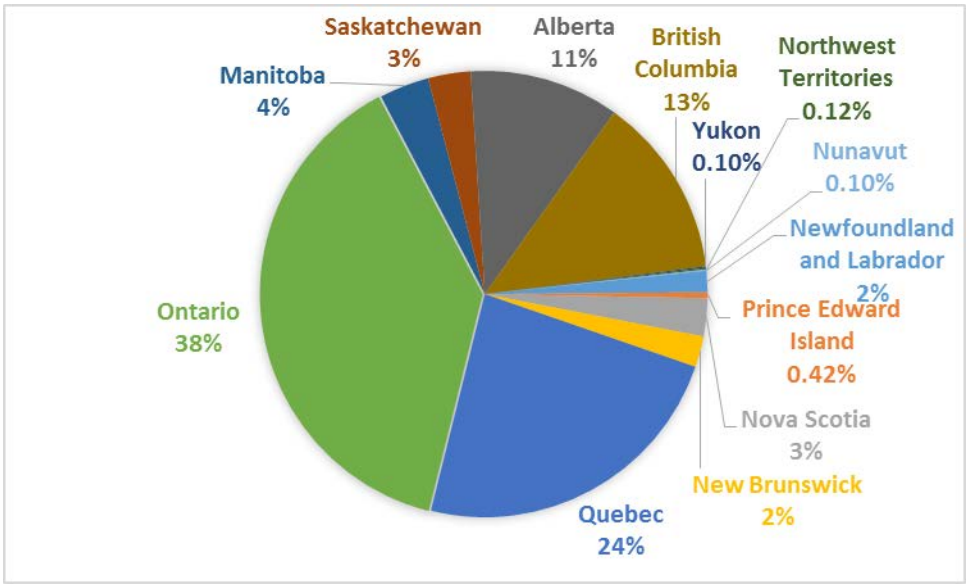
Appendix

Figure 13: Canadian Land and Freshwater Area, by Province and Territory



Source: Statistics Canada, "Land and freshwater area, by province and territory".

Figure 14: Canadian Population, by Province and Territory, 2011



Source: Statistics Canada, "Population and Dwelling Count Highlight Tables, 2011 Census".

Table 3: Canadian Crude Oil Reserves at December 31, 2015 (million barrels)

	Initial	Cumulative Production	Remaining
Conventional Light			
British Columbia	853	747	106
Alberta	16,360	15,020	1,340
Saskatchewan	2,273	1,879	394
Manitoba	429	370	43
Subtotal - WCSB	**19,916**	**18,016**	**1,883**
Ontario	101	92	9
Nova Scotia Offshore	44	44	-
Newfoundland Offshore	3,909	1,604	2,305
Mainland NWT and Yukon	333	285	48
Arctic Islands	3	3	-
Subtotal - Frontier	**4,289**	**1,936**	**2,353**
Total Conv. Light	**24,305**	**20,044**	**4,245**
Conventional Heavy			
Alberta	2,717	2,289	428
Saskatchewan	5,075	4,126	949
Total Conv. Heavy	**7,792**	**6,416**	**1,376**
Oil Sands			
Mining	38,726	6,655	32,072
In-Situ	137,967	4,711	133,249
Total Oil Sands	**176,693**	**11,366**	**165,321**
Total Canada	**208,790**	**37,825**	**170,943**

Source: National Energy Board, Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040.

Table 4: Canadian Crude Oil Resources at December 31, 2015 (million barrels)

	Discovered	Undiscovered	Ultimate Potential	Cumulative Production	Remaining Ultimate Potential
Conventional Light					
British Columbia	853	303	1,156	747	408
Alberta	16,360	2,629	18,989	15,020	3,969
Saskatchewan	2,273	352	2,625	1,879	747
Manitoba	429	13	442	370	72
Subtotal - WCSB	**19,916**	**3,296**	**23,212**	**18,016**	**5,196**
Ontario	101	-	101	94	6
Nova Scotia Offshore	44	3,981	4,025	44	3,981
Newfoundland Offshore	3,906	1,120	5,026	1,604	3,422
Mainland NWT and Yukon	333	918	1,252	283	969
Arctic Islands	3	9,372	9,375	3	9,372
Subtotal - Frontier	**4,286**	**15,391**	**19,678**	**1,934**	**17,744**
Total Conv. Light	**24,303**	**18,688**	**42,990**	**20,044**	**22,946**
Conventional Heavy					
Alberta	2,648	591	3,239	2,289	950
Saskatchewan	4,774	736	5,510	4,126	1,384
Total Conv. Heavy	**7,422**	**1,327**	**8,749**	**6,416**	**2,333**
Oil Sands					
Mining	69,188	-	69,188	6,655	62,533
In-Situ	245,302	-	245,302	4,711	240,591
Total Oil Sands	**314,490**	**-**	**314,490**	**11,366**	**303,124**
Total Canada	**346,215**	**20,015**	**366,229**	**37,826**	**328,404**

Source: National Energy Board, Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040.

Table 5: Canadian Natural Gas Reserves at December 31, 2013 (billion cubic metres)

	Initial Reserves	Cumulative Production	Remaining Established Reserves
Western Canadian Sedimentary Basin			
British Columbia	1732	709	1023
Alberta	5421	4523	898
Saskatchewan	259	215	44
Total	**7411**	**5447**	**1965**
Ontario	43	36	7
Frontier			
New Brunswick	4	1	3
Nova Scotia Offshore	55	51	4
Newfoundland	106	0	106
Mainland NWT & Yukon	32	20	13
Mackenzie Delta	0	0	0
Subtotal - Frontier	**198**	**72**	**126**
Total Canada	**7653**	**5556**	**2097**

Source: National Energy Board, *Canadian Energy Overview 2014 - Energy Briefing Note*, July 2015.

Table 6: Canadian Natural Gas Resources by NEB Reference Case at December 31, 2015 (billion cubic metres)

	Reference	High Price	Low Price
WCSB			
Conventional	16,420	11,207	24,608
Tight Gas Portion	14,492	9,708	22,120
Montney Tight Portion	12,609	8,842	18,147
CBM	1,355	1,002	1,707
Shale Gas	10,496	5,827	17,271
Horn River Portion	2,172	1,689	2,688
Total	**28,271**	**18,036**	**43,586**
Ontario	28	28	28
Quebec	198	85	283
Maritimes Basin	28	28	28
Frontiers			
NS and NL	2,542	2,542	2,542
Mackenzie - Beaufort	2,153	2,153	2,153
Arctic Islands	1,133	1,133	1,133
West Coast Offshore	482	482	482
Total	**6,310**	**6,310**	**6,310**
Canada Total	**34,835**	**34,835**	**34,835**

Source: National Energy Board, *Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040*.

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