Who Owns Canada's Fossil-Fuel Sector?

MAPPING THE NETWORK OF OWNERSHIP & CONTROL

By William K. Carroll and M. Jouke Huijzer

OCTOBER 2018

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This report is part of the Corporate Mapping Project (CMP), a research and public engagement initiative investigating the power of the fossil fuel industry. The CMP is jointly led by the University of Victoria, Canadian Centre for Policy Alternatives BC and Saskatchewan Offices, and Parkland Institute. This research was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC).

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Social Sciences and Humanities Research Council of Canada Conseil de recherches en sciences humaines du Canada Canadä

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ACKNOWLEDGEMENTS

This report has benefited from comments by four anonymous reviewers and from advice from Professor J.P. Sapinski of the Université de Moncton. We appreciate the encouragement we received from other members of the Corporate Mapping Project, particularly Co-Director Shannon Daub.

PUBLISHING TEAM

Shannon Daub, Jean Kavanagh, Terra Poirier
Layout: Paula Grasdal
Copyedit: Lucy Kenward
Cover image: Garth Lenz
ISBN: 978-1-77125-421-2

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Summary

In Canada's fossil-fuel industry, a relatively small number of major oil, gas and coal producers generate the lion's share of revenues.

WHO OWNS AND CONTROLS CANADA'S FOSSIL-FUEL SECTOR, and therefore, who has both an *interest* in the sector's continued growth and the *economic power* to shape its future?

By fossil-fuel sector, we mean the corporations involved in extraction, processing and transport of oil (including bitumen), gas and coal.

This study:

1. Identifies the most significant owners of the fossil-fuel sector and tracks trends in overall ownership over a recent six-year period,
2. Provides an overview of the mechanisms through which significant shareholders—corporate, personal, institutional—wield strategic control over individual corporations in the sector, and
3. Maps the key ownership relations that tie the largest corporations in the sector into a national and transnational network of corporate power.

Ownership and control as share of fossil-fuel industry revenues

In Canada's fossil-fuel industry, a relatively small number of major oil, gas and coal producers generate the lion's share of revenues. Oil—by far the most important source of revenue for fossil-fuel companies in Canada—is dominated by a handful of big players.

One way to measure ownership is to consider the share of overall industry revenues any given investor (or shareholder) controls. We looked at the largest fossil-fuel firms in Canada during the period from 2010 to 2015 (including any firm that was among the largest 50 during this period), identified their shareholders and calculated what share of the industry's total revenues these shareholders claimed.

Our analysis finds that not only the production of fossil fuels but also the ownership and control of the sector are highly concentrated. The top 25 owners together account for more than 40 per cent of overall revenues during this period. Ownership is even more concentrated if we consider any majority shareholder to fully "own" a company given their incontestable control of it.

The top 25 owners of Canada's fossil-fuel industry are ranked in the table below (based on their average share of total sector revenues over this period). Amid many thousands of investors, this small group has had an enduring presence, remaining largely unchallenged in the aftermath of the global financial crisis and the collapse in oil prices.

Top 25 owners of Canada's fossil-fuel sector, 2010 to 2015 (by share of sector revenues)

	Largest owners	Type of investor	Region	Avg. ownership share, 2010–15 (%)
1	Exxon Mobil Corp	Foreign Corporate	US	6.57
2	Royal Bank of Canada	Bank	Canada	3.35
3	Desmarais Family Residuary Trust	Family	Canada	2.46
4	BlackRock Inc	Investment Fund	US	2.44
5	Capital Group Co Inc	Investment Fund	US	2.21
6	Toronto-Dominion Bank	Bank	Canada	2.03
7	FMR LLC	Investment Fund	US	2.02
8	Royal Dutch Shell Plc	Foreign Corporate	Other developed country	2.02
9	Bank of Montreal	Bank	Canada	1.98
10	CK Hutchison Holdings Ltd	Family	Other developed country	1.96
11	Bank of Nova Scotia	Bank	Canada	1.71
12	LF Investments Ltd	Family	Other developed country	1.69
13	CIBC	Bank	Canada	1.39
14	Korea National Oil Corp	Foreign Government	Other developed country	1.22
15	Province of Quebec	Government	Canada	1.10
16	Jarislowsky Fraser Ltd	Investment Fund	Canada	1.01
17	Franklin Resources Inc	Investment Fund	US	0.89
18	Keevil Holding Corporation	Investment Fund	Canada	0.89
19	Sentgraf Enterprises Ltd	Family	Canada	0.83
20	Trencap LP	Investment Fund	Canada	0.82
21	Spectra Energy Corp	Foreign Corporate	US	0.81

Amid many thousands of investors, this small group has had an enduring presence, remaining largely unchallenged in the aftermath of the global financial crisis and the collapse in oil prices.

	Largest owners	Type of investor	Region	Avg. ownership share, 2010–15 (%)
22	Wellington Management Group LLP	Investment Fund	US	0.77
23	China-People's Rep	Foreign Government	China	0.76
24	Invesco Ltd	Investment Fund	US	0.72
25	The Government of Canada	Government	Canada	0.56
	Average total share of sector controlled by top 10 owners			26.20
	Average total share of sector controlled by top 25 owners			42.67

Source: Orbis and annual reports

To better understand the types of owners who dominate, we looked at a larger pool of leading investors (any shareholder that ranked among the top 50 owners in a given year) and found:

- majority ownership by foreign corporations accounts for the largest share (16 per cent) of fossil-fuel industry revenues between 2010 and 2015;
- asset managers and investment funds such as BlackRock and Capital Group follow closely with approximately 15 per cent of revenues;
- banks and life insurers are the third-largest type of owner (approximately 12 per cent of revenues), with the big five Canadian banks (RBC, TD, Scotiabank, BMO and CIBC) consistently ranking among the top investors;
- wealthy families control approximately 8.5 per cent of revenues—among them are the Desmarais family (who control investment company Power Corporation of Canada) the Southerns (who own Atco and Canadian Utilities through their holding company Sentgraf Enterprises) and Hong Kong's richest person, Li Ka-Shing (the majority owner of Husky Energy);
- foreign governments are also represented (accounting for 3 per cent of industry revenues) via sovereign wealth funds in the case of Norway and Japan, and via CNOOC and KNOC respectively in the case of China and Korea; and
- Canadian federal and provincial governments together own 2 per cent.

Majority ownership by foreign corporations accounts for the largest share (16 per cent) of fossil-fuel industry revenues between 2010 and 2015.

Strategic control of fossil-fuel industry corporations

Another way of looking at ownership is to consider the different ways corporations are controlled. These different modes include:

- companies under the *absolute* (or semi-absolute) control of a single owner,
- those controlled by a major shareholder owning a *majority* of shares,

- those controlled by a shareholder owning a *minority* of shares (10 to 49.9 per cent) large enough to enable strategic control, and
- those with no identifiable controlling owner, i.e., widely held companies.

We looked at how the 200 largest (by revenue) fossil-fuel companies in Canada are controlled (using shareholder data as of March 2017):

- the most common mode is minority control, which applies to just over half the companies;
- a quarter of the fossil-fuel industry firms are widely held, with no owner holding 10 per cent or more shares; and
- the remaining corporations are either wholly owned by a single owner (12 per cent of firms) or majority-owned by a single owner (11 per cent).

Although widely held firms are not controlled by single owners, institutional investors—financial institutions, pension funds, asset managers—typically own substantial blocs of shares in these companies. In these cases, each institutional investor owns less than 10 per cent of shares, but as a group the leading institutional investors own far more than 10 per cent. This places them in a position to exert control as a "constellation of interests," if senior management fails to deliver sufficient profit, or if another hostile interest attempts a takeover.

Mapping the network of ownership

A final way of assessing who controls the fossil-fuel industry is to map the network of ownership relationships.

An investor who owns shares in a fossil-fuel corporation is tied to that company in an ownership relationship or stake, which could be weaker (where an owner holds a small stake of 1 or 2 per cent of shares) or stronger (a stake ranging from 10 to 100 per cent).

We mapped ownership relationships for the top 50 fossil-fuel industry corporations. Overall, we see a network made up of hundreds of weak ties—smaller institutional holdings mostly held by financial companies like banks, asset managers and life insurance companies—along with a few dozen large holdings that give clear-cut strategic control to corporate or personal owners.

Canada's big five banks play a prominent role, along with five US-based asset managers (Capital Group, Vanguard, Franklin Resources, Fidelity Management & Resources and BlackRock). Together, these 10 institutional investors have 190 ownership stakes in the top 50 fossil-fuel industry companies, accounting for 43 per cent of all ownership relations in the entire network.

Of particular note, two finance companies—the Royal Bank of Canada (RBC) and US-based Vanguard Group—each hold stakes in 30 of the 50 top fossil-fuel firms. Although they have the same number of ownership stakes, the average size of RBC's ownership blocs (4 per cent) is double that of Vanguard.

As noted earlier, Canada's fossil-fuel industry is dominated by a handful of major players. The network map (page 24) shows the ownership relationships for the eight largest companies: Enbridge, Suncor, Canadian Natural Resources Limited, Cenovus, Teck Resources, Encana, TransCanada Corporation and Pembina Pipeline.

Canadian banks are also major lenders to the fossil-fuel industry, given the capital-intensive nature of extracting, processing and transporting fossil fuels.

The ownership network for these eight big players is highly integrated thanks to the overlapping investment portfolios of the big banks and other financial institutions (four of the major Canadian banks have significant stakes in all eight of the major fossil-fuel companies). Of course, shareholdings are not the only kind of relationship that links these two sectors—Canadian banks are also major lenders to the fossil-fuel industry, given the capital-intensive nature of extracting, processing and transporting fossil fuels.

Conclusion

By investigating ownership and control in Canada's fossil-fuel sector, this report reveals the major investors that have stakes in maintaining business as usual.

The findings point to a confluence of Canadian ownership, via wealthy families and financial institutions, and foreign ownership, via transnational corporations and asset management firms. Whether domestic or foreign, the concentration of fossil-fuel ownership/control represents a massive centralization of economic power in the hands of private investors accountable only to themselves.

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Some of the world's largest transnational corporations continue to control several of the largest Canadian fossil-fuel firms. But what stands out in this study are the many comparatively small yet significant holdings of institutional investors—some of them major US-based asset managers, but also all of Canada's big banks—that form constellations of interests in partnership with the top-level management of fossil-fuel companies.

Rising levels of Canadian corporate ownership and control of the sector in recent years appear to have made little difference in how the industry functions. Decades ago, foreign control of Canada's energy sector (and other sectors) was seen as a threat to Canadian self-determination and democracy, but the trend toward more Canadian corporate control of fossil-fuel extraction has made little to no difference in how the industry functions.

In mapping ownership and control of Canada's fossil-fuel sector, this study:

- reveals the massive centralization of economic power and the extent to which the financial benefits from fossil-fuel production go predominantly to a relatively small number of corporations, investment funds, wealthy families and governments;
- highlights the broad economic risks of continued heavy investment in what may become stranded assets, as the world moves away from fossil-fuel-based energy. Divestment campaigns directed at institutional investors and governments are particularly important in helping to reduce these risks; and
- identifies the need to shift from fossil-fuel oligarchy to energy democracy, in which control of economic decisions shifts to people and communities, such as through public ownership of renewables and much greater democratic participation in energy policy.

Introduction

ADVOCATES FOR THE CONTINUED EXPANSION OF FOSSIL-FUEL PRODUCTION tend to represent the sector as a "black box" out of which flows the lifeblood for our consumer ways.[1] In addition to powering our cars and homes with the "buried sunshine" of fossil-fuel energy, the black box—it is claimed—provides jobs and income for legions of workers. In this narrative, all Canadians benefit from the production and consumption of fossil fuels. Yet the fossil-fuel sector is actually a complex of corporations, each of which is owned by specific moneyed interests, not necessarily located in Canada, that claim the profits and are thereby the primary beneficiaries of this sectoral activity. In this report, we look inside the black box to identify the investors who own substantial share blocs in Canada's leading fossil-fuel companies and who have the most compelling stake in continuing to expand fossil-fuel production. We have undertaken a network analysis of ownership relations and offer several views of the powerful interests that dominate fossil-fuel activities in Canada. We also reveal how the financial benefits from fossil-fuel production go predominantly to a small number of corporations, investment funds, wealthy families and governments.

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Since the discovery of oil near Edmonton in 1947 and the development of the tar sands which began in earnest in the 1970s, the extraction, processing and transport of fossil fuels have become the core of Alberta's economy and a leading sector in the Canadian economy.[2] Currently, Canada ranks as the fifth-largest producer of natural gas in the world, and the seventh-largest producer of crude oil, and it claims the third-largest oil reserves globally, enough for 105 more years of extraction at current rates.[3] The oil and gas sector is among the most capital intensive; it employs sophisticated technology but generates relatively few jobs—employing below 1 per cent of Canada's national labour force.[4] In this sense, investors have a much clearer interest in this sector than workers do, though relatively high wages have been a magnet for workers, particularly from Atlantic Canada.[5]

The fossil-fuel sector's substantial importance to the Canadian economy, exemplified by the common-sense view that new pipelines naturally fit into the "national interest" as Prime Minister Justin Trudeau has argued, is matched by increasing concerns—domestically and internationally—about the country's growing carbon footprint. Indeed, Canada's carbon emissions have escalated at the same time that international recognition of the dire need to slow or even reverse global warming has increased. These contradictory trends mark Canada's hypocrisy on this issue (despite the government's rhetoric and spin), and they also highlight a looming economic risk. As the world moves away from fossil-fuel-based energy, investments in fossil-fuel infrastructure may become stranded assets with little to no value yet steep financing costs.[6] The pressure on investors, including pension funds and institutions, to divest their holdings in the fossil-fuel sector is therefore motivated not only by environmental concerns but also by increasingly rational economic ones. Scientist and environmentalist David Suzuki has observed that "many banks and investment advisers are warning clients about the dangers of fossil-fuel-related portfolios, noting that climate agreements, government regulations, reduced demand and market volatility make them risky."[7]

An important issue is who owns and controls Canada's fossil-fuel sector, and thus, who has both an *interest* in the sector's continued growth and the *economic power* to shape its future. This idea in turn raises the question of how ownership of corporate shares confers economic power. Under corporate capitalism, investors are offered shares in the company and each share grants them part ownership in that company. For each share, the owner-investor is entitled to a portion of the company's profit (as dividends) and a vote at the Annual General Meeting, where the board of directors is elected and key policy proposals (including mergers and acquisitions and shareholder resolutions) are put to a vote. (The owner-investor's financial liability is also limited to the par value of the share.) Therefore, who owns those shares is of great consequence. Although most corporations are not listed on stock exchanges — their shares are privately held by individuals, states or other corporations — the shares of many of the largest corporations are publicly traded and thus distributed among many owners, including wealthy individuals, other corporations, small shareholders and institutional investors. The last category, whose shareholdings have increased with the financialization of capitalism,[8] includes banks and life insurance companies, pension funds, asset managers and hedge funds.

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According to some scholars, the dispersal of corporate shares among many investors dilutes the power of capital owners, leaving salaried managers in charge. In their classic analysis of the "managerial revolution" in the largest US-based corporations, economists Adolf Berle and Gardiner Means discerned such a trend, portending a separation of owners of capital (mostly small investors) from actual controllers of capital, namely, professional managers.[9] In the 1950s, Rolf Dahrendorf and other sociologists argued that this separation of corporate ownership and control had led to a "decomposition of class" as the owners of capital no longer controlled the functioning units of corporate capitalism.[10] Yet scholars soon demonstrated that there was (and still is) reason to question the validity of these classic accounts.[11] For the vast majority of corporations in Canada and elsewhere, whose shares are not listed on stock exchanges, there has been no separation of ownership and control. In these cases, one owner or possibly a few associated investors wield absolute strategic power over the corporation. But what of the largest corporations, most of which issue shares that are publicly listed on stock exchanges? In these cases it is typical for the wealthiest investors to amass strategic blocs of shares. By holding, say, 10 per cent or more of a company's shares an investor can (if the rest of the share capital is scattered among many small investors) control a corporation whose capital is many times greater than the value of the shares held. This strategy further concentrates corporate power in the hands of people and corporations that assemble such blocs. *Strategic control* refers to the ability to control the composition of the board of directors based on ownership of such blocs.

In Canada, beginning with sociologist John Porter's research based on data from 1960,[12] studies have consistently shown that most publicly traded corporations are controlled by individuals, families and other corporations.[13] As geographer Bill Burgess noted, "The Canadian corporate network is characterized by the large degree of majority or strong minority control, and by the incorporation of many firms within larger corporate groups,"[14] whether the controlling interest be a family or another corporation. The most recently published comprehensive study of corporate ownership and control in Canada reported that, among 1,120 Canadian-controlled corporations whose shares are publicly listed on stock exchanges, 56.17 per cent are ultimately controlled by wealthy families, and only 17.79 per cent are without a clearly identifiable controlling interest.[15]

Economic concentration and foreign control

ECONOMIC CONCENTRATION AND FOREIGN CONTROL of Canadian corporations are key issues in understanding who owns Canada's fossil-fuel sector. Overall, the Canadian economy is dominated by a relatively small number of giant corporations that hold the lion's share of capital. Economist Jordan Brennan found that in the half century after 1960, the share of total net business profits in Canada claimed by the 60 largest firms listed on the Toronto Stock Exchange grew from 35 per cent to an astonishing 60 per cent.[16] In 2000, slightly more than one million firms based in Canada reported under the Corporations Returns Act, and of these, just 2,493 (0.239 per cent) were large enterprises (revenue greater than $75 million). However, these large enterprises claimed 58.72 per cent of all corporate revenue. By 2015, the total number of corporations had grown to 1.7 million, of which large enterprises, now numbering 2,644, constituted only 0.156 per cent but garnered 59.71 per cent of revenue (see Table 1).[17] Concentration of revenue in the oil and gas sector is especially pronounced, as we will show below. Moreover, oil and gas companies create few jobs relative to companies in other sectors. Of the thousands of firms in this sector, just 21 — all of them based in Alberta — employed more than 500 workers each in 2016.[18]

Concentration of revenue in the oil and gas sector is especially pronounced. Moreover, oil and gas companies create few jobs relative to companies in other sectors.

Table 1: Concentration of economic wealth in Canada, 2000 and 2015

Indicator	2000	2015
Number of all enterprises	1 million	1.7 Million
Number of large enterprises	2,493	2,644
Large enterprises as a percentage of all enterprises	0.239%	0.156%
Per cent of all corporate revenue claimed by large enterprises	58.72%	59.71%

Source: Calculated from Statistics Canada, "Corporations Returns Act (CRA), enterprise characteristics by country of control and operating revenue size groups," CANSIM Table 179-0005.

A related concern is whether ownership and control is in Canada or in foreign domains (and if the latter, where). In Canadian studies, a recurring issue has been the role of foreign-based centres of strategic control in structuring corporate power within Canada. Concern about high levels of foreign control in key sectors, including oil and gas, goes back to the Royal Commission on Canada's Economic Prospects in 1956–57. Although levels of control by foreign entities have fallen more recently, the issue retains salience. In the 1970s, economist Kari Levitt identified high levels of foreign control as a threat to economic sovereignty, leading to what she projected would be a bitter "harvest of lengthening dependency"[19] But a large body of research since then points to the success of Canadian capitalists in maintaining their own positions and even expanding internationally.[20] In an era of capitalist globalization, each local capitalist class cedes some control of its home market, but as quid pro quo is able to accumulate capital more effectively outside that market, in other countries.[21]

In the oil and gas industry, foreign-controlled firms accounted for 39.5 per cent of revenue and 44.3 per cent of assets in 2015.

One indisputable fact is the strong alignment of foreign ownership with economic concentration. Recent data from Statistics Canada show that in 2015, 0.645 per cent of all corporations based in Canada were foreign controlled (down from 0.751 per cent in 2000) but that these firms earned 27.7 per cent of all corporate revenues (down from 29.7 per cent in 2000 and from 36.6 per cent in 1975). Foreign control is concentrated among the Canadian subsidiaries of giant transnational corporations, which themselves tend to be big companies. As of 2015, among large enterprises (with revenues exceeding $75 million), foreign-controlled firms comprise 38.3 per cent of companies and 42.5 per cent of revenue.[22] In the broadly defined oil and gas industry (including extraction as well as supports such as oil-well servicing), foreign-controlled firms accounted for 39.5 per cent of revenue and 44.3 per cent of assets in 2015, with enterprises based in the United States (39.0 per cent) and the European Union (24.3 per cent) owning nearly two-thirds of assets under foreign control.[23]

In this report, we focus on investors that own substantial share blocs in the leading fossil-fuel companies in Canada. The analysis offers several views of the powerful interests that dominate fossil-fuel activities in Canada. This report has four objectives:

1. To identify who owns the lion's share of the fossil-fuel sector and to track trends in overall ownership over a recent six-year period;
2. To provide an overview of the mechanisms through which significant shareholders—corporate, personal, institutional—wield strategic control over individual corporations in the sector;
3. To map, more closely, the key ownership relations that tie the largest corporations in the sector into a national and transnational network of corporate power; and
4. To take up policy implications for addressing corporate power in Canada's fossil-fuel sector.

Who owns the largest players in the sector?

To identify the ownership interests that dominate Canada's fossil-fuel sector, we selected 103 fossil-fuel firms that had ranked among the largest 50 in Canada at some point between 2010 and 2015 and identified their shareholders in each year (see Appendix 1 for details). Longitudinal analysis is of value here, as Canada's fossil-fuel sector has been subjected to ongoing capital restructuring. After the global financial crisis of 2008, oil prices fluctuated tremendously, reaching a peak in 2011 and crashing to unexpected lows in 2014 before partially recovering more recently. As a consequence, companies saw much of their revenues vaporize and some struggled to keep their businesses afloat. In total, we identified 1,061 owners with holdings in one or more of the companies between 2010 and 2015, with a minimum of 459 individual owners in 2010 and a maximum of 595 in 2015. We then aggregated the holdings by owner for each year, weighting them by each firm's annual revenue to determine the amount of the entire sector's revenue each owning interest claimed.[24] Revenue is a flow-based measure of the total capital (aggregated over all firms in the sample) attributable to a given owning interest. Thus, if a company is responsible for 4 per cent of the sectoral revenue—and 5 per cent of its shares are owned by one owner, such as Royal Bank of Canada (RBC), the RBC total ownership stake in the sample of firms increases by 4 per cent × 5 per cent, i.e., 0.2 per cent. As can be seen in Table 2, the sum of all such RBC holdings of the companies in our sample amounts to 3.83 per cent total revenues in 2015.

It is worth noticing that revenue in Canada's fossil-fuel sector is quite concentrated. The three largest producers (Enbridge, Suncor and Imperial Oil) account for over 30 per cent of total revenue in the sample each year. The top 10 already cover about 60 per cent of the total revenue each year, and this number increases to over 80 per cent when one considers the top 25 producers. Also of note is that while our analysis is concerned with any type of fossil fuels (oil, gas, coal), oil is by far the most important source of revenue for fossil-fuel companies active in Canada. And when it comes to production and revenue, we find that the market is already dominated by a handful of players. Table 2 indicates that not only production, but also ownership and control in the sector are highly concentrated. Although there are approximately 500 owners of identified share blocs in each year, the top 10 owners together account for over 25 per cent of the sector's total revenue. This share increases to over 40 per cent for the top 25 owners and to 50 per cent when the top 50 shareholders are considered. The numbers are even higher if we consider any majority owner to wholly "own" a company given their uncontestable control of it (see "control" columns in Table 2).

The three largest producers in the fossil-fuel sector (Enbridge, Suncor and Imperial Oil) account for over 30 per cent of total revenue in the sample each year.

Table 2 lists the top 25 shareholders at each point in the period under study, ranked by their average share of total sectoral revenue over the whole period. The list includes only 32 shareholders, pointing to stable relationships between investors and companies that are not quickly broken. Amid many thousands of investors, a small group has had a prominent and enduring presence, remaining largely unchallenged in the aftermath of the global financial crisis and the sudden drop in oil prices. The largest owners include foreign-based fossil-fuel transnationals (notably Exxon Mobil, owner of both Imperial Oil and ExxonMobil Canada, and Royal Dutch Shell, owner of Shell Canada), Canadian banks (notably Royal Bank of Canada, Toronto-Dominion Bank and Bank of Montreal), wealthy families such as the Montreal-based Desmarais family who control investment company Power Corporation of Canada, and asset management firms such as BlackRock Inc. and Capital Group (both based in the US). For instance, the Royal Bank of Canada's shareholdings (which are spread across a wide range of carbon companies) enabled it to claim 3.83 per cent of the capital flowing through the entire sample of leading carbon-extractive firms in 2015.

Table 2: Largest owners (by avg. share) of Canada's fossil-fuel sector, 2010 to 2015

	2010		2011		2012		2013		2014		2015	
	Control %	Share %	Control %	Share %	Control %	Share %	Control %	Share %	Control %	Share %	Control %	Share %
Total share of top 10 owners	28.0	26.1	31.0	26.8	28.1	25.6	29.6	27.1	28.4	26	27.8	25.6
Total share of top 25 owners	43.0	40.9	49.0	44.4	45.8	42.3	48.3	44.7	46.8	43	44.6	40.7
Total share of top 50 owners	52.2	49.9	58.5	53.9	55.9	52.3	57.3	53.8	56.0	52.2	53.6	49.7
Largest owners	**Rank**	**Share**	**Rank**	**Share**	**Rank**	**Share**	**Rank**	**Share**	**Rank**	**Share**	**Rank**	**Share**
Exxon Mobil Corp	1	6.59	1	4.9	1	6.98	1	6.99	1	7.03	1	6.92
Royal Bank of Canada	3	2.97	3	3.21	2	3.23	2	3.41	2	3.47	2	3.83
Desmarais Family Residuary Trust	4	2.6	4	3.04	5	2.31	7	2.19	3	2.34	4	2.26
BlackRock Inc	2	3.72	2	3.75	14	1.16	3	3.23	13	1.36	12	1.44
Capital Group Co Inc	7	2.07	8	2.17	7	2.11	9	2.05	10	1.96	3	2.9
Toronto-Dominion Bank	8	1.96	11	1.74	10	1.87	8	2.06	5	2.31	5	2.22
FMR LLC	6	2.17	9	2.13	8	1.94	10	1.9	7	2.1	8	1.86
Royal Dutch Shell Plc	9	1.74	7	2.27	6	2.15	6	2.21	8	2.08	9	1.66
Bank of Montreal	5	2.26	10	1.91	11	1.85	11	1.9	9	2.07	7	1.91
CK Hutchison Holdings Ltd	-	-	6	2.59	4	2.45	5	2.4	6	2.24	6	2.07
Bank of Nova Scotia	10	1.71	12	1.63	12	1.76	12	1.79	11	1.88	10	1.46
LF Investments Ltd	-	-	5	2.72	3	2.56	4	2.52	4	2.34	-	-
CIBC	14	1.13	16	1.21	13	1.52	14	1.49	12	1.52	11	1.45
Korea National Oil Corp	12	1.5	13	1.37	9	1.88	13	1.5	16	1.02	147	0.05
Province of Quebec	13	1.23	15	1.24	17	0.97	18	0.94	17	0.97	13	1.26
Jarislowsky Fraser Ltd	11	1.56	14	1.35	15	1.12	23	0.71	24	0.65	22	0.64
Franklin Resources Inc	28	0.51	23	0.66	19	0.83	16	1.05	14	1.22	14	1.04
Keevil Holding Corporation	15	1	18	1.05	18	0.95	19	0.8	23	0.67	19	0.88
Sentgraf Enterprises Ltd	24	0.6	28	0.57	16	1.07	15	1.07	21	0.74	17	0.91

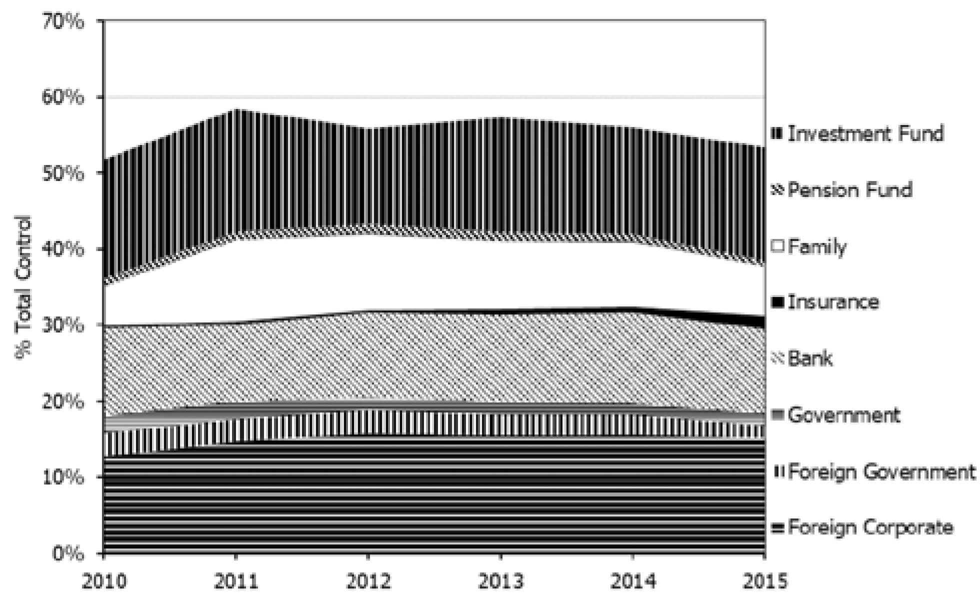
	2010		2011		2012		2013		2014		2015	
Largest owners	**Rank**	**Share**	**Rank**	**Share**	**Rank**	**Share**	**Rank**	**Share**	**Rank**	**Share**	**Rank**	**Share**
Trencap LP	16	0.81	19	0.86	21	0.8	17	0.98	15	1.03	28	0.45
Spectra Energy Corp	19	0.69	17	1.14	20	0.81	21	0.78	22	0.71	20	0.73
Wellington Management Group LLP	20	0.66	21	0.73	25	0.59	20	0.78	19	0.92	16	0.93
China-People's Rep	18	0.75	20	0.78	22	0.71	24	0.66	18	0.93	21	0.71
Invesco Ltd	25	0.58	27	0.59	23	0.66	22	0.71	20	0.86	18	0.9
The Government of Canada	22	0.62	25	0.61	24	0.6	26	0.57	26	0.58	34	0.39
Concerned Parents and Teachers of Wycocomagh and Area	21	0.66	24	0.62	26	0.59	25	0.6	29	0.43	42	0.32
Government of Norway	31	0.42	32	0.43	31	0.51	27	0.56	25	0.6	23	0.63
Goldring Capital Corp	17	0.77	22	0.71	28	0.55	29	0.47	37	0.37	58	0.22
Chevron Corp	-	-	-	-	27	0.57	28	0.53	27	0.57	24	0.58
Manulife Financial Corp	33	0.39	33	0.43	40	0.33	50	0.23	72	0.16	25	0.55
Vanguard Group Inc	240	0.01	84	0.12	65	0.17	58	0.21	46	0.27	15	0.94

Source: Orbis and annual reports (see Appendix 1)
Note: Ranking is based on average ownership within the six-year period.

Investor share ownership

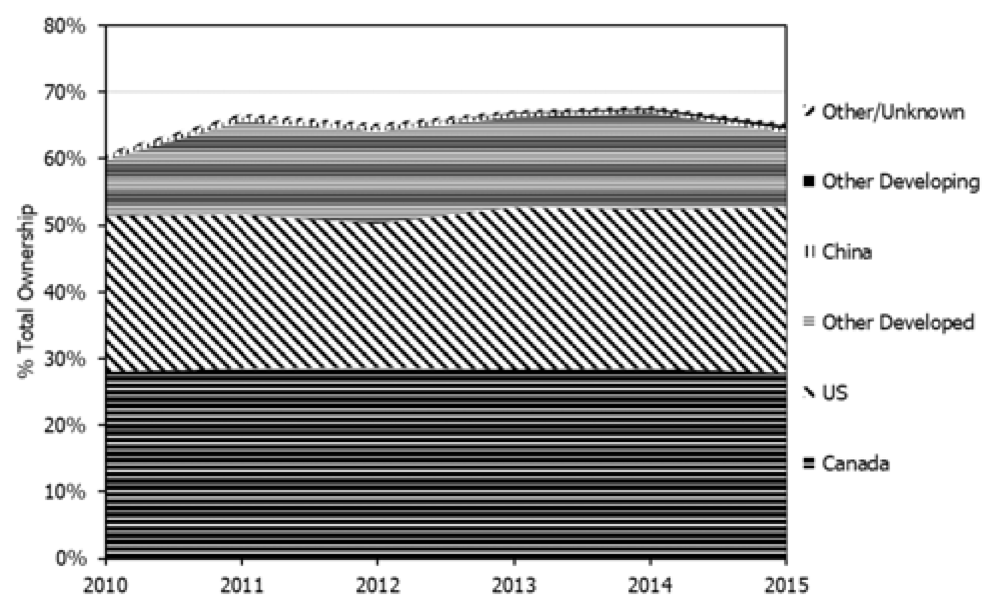
To further understand the concentration of share ownership among a relatively small number of owners, Figure 1 shows the 77 investors that have been among the top 50 largest owners in any year surveyed. This overview breaks down the relative share of total revenue claimed by each type of investor. As a group, these leading investors account for approximately 70 per cent of the revenue of the top 50 in each year (the rest is divided among many thousands of small investors). Majority ownership by foreign corporations controls the largest share of revenue, closely followed by mainly asset managers and investment funds. The third major type of shareholder is banks, which, like most insurance companies and pension funds, are predominantly based in Canada. As Table 2 indicated, the "big five" Canadian banks—Royal Bank of Canada, Toronto-Dominion Bank, Bank of Nova Scotia, Bank of Montreal and Canadian Imperial Bank of Commerce—are continuously present in the top 15 largest investors. Together, the big five account for over 10 per cent ownership of the total sector. The holdings of wealthy families account for another tranche

Figure 1: Control of total revenue by top 50 investors in Canada's fossil-fuel sector, by type of investor, 2010 to 2015



Source: Orbis and annual reports (see Appendix 1)

Figure 2: Ownership of total revenue in Canada's fossil-fuel sector, by geographical region, 2010 to 2015



Source: Orbis and annual reports (see Appendix 1) of the sector's capital, though in recent years their share has declined somewhat. Among them are the Desmaraises, the Southerns (who own Atco and Canadian Utilities through their holding company Sentgraf Enterprises) and Hong Kong's richest person, Li Ka-Shing, the majority owner, through various holdings, of Husky Energy. Finally, foreign governments are represented via sovereign wealth funds in the case of Norway and Japan, and via CNOOC and KNOC respectively in the case of China and Korea. Foreign governments own about 3 per cent of the total sample, closely followed by the Canadian federal and provincial governments combined (2 per cent).

The difference between foreign and Canadian investment can be seen more directly in Figure 2, which apportions total top 50 revenue according to where the owners are located geographically. The overall picture is one of stability rather than change. Neither the 18 takeovers between 2010 and 2015, nor the aforementioned fluctuations in oil prices, have had a significant impact on the geographic distribution of ownership. Canadian investors still control the largest share of sectoral revenue, slightly less than 30 per cent. They are followed by US investors with around 25 per cent, and other investors from countries in Europe as well as Australia and New Zealand with approximately 10 per cent.[25] Asian investment has decreased recently, from 3 per cent to 2 per cent. Investors from China, Hong Kong, Korea, Japan and Malaysia have been and remain scarcely involved in Canada's fossil-fuel sector, though many of the foreign activities of Canadian firms are located in those regions. The remaining shareholders of note are based in tax havens or could not be classified geographically because their location or nationality was unknown.

It is worth noting that data are currently available only through the end of 2015, which is before several major global fossil-fuel firms sold their stakes in the tar sands to Canadian companies.[26] This sell-off gave Canadian interests 80 per cent ownership of tar sands production.[27] Canadian fossil-fuel firms have also been increasing their investments in the US and elsewhere.[28]

Neither the 18 takeovers between 2010 and 2015, nor the aforementioned fluctuations in oil prices, have had a significant impact on the geographic distribution of ownership.

Ownership and control in the top 200 companies

A company lacking a dominant shareholder may be controlled by a constellation of interests.

IN THIS SECTION, WE DIG BENEATH THE OVERALL TRENDS revealed above to provide a snapshot of the strategic control of the 200 largest-revenue companies in Canada's fossil-fuel sector (including extraction, processing and transporting of oil, gas, bitumen and coal), as of March 2017.[29] If, as we noted in the introduction to this paper, Berle and Means's hypothesis of a growing separation of ownership and control does not exactly fit the case of Canada, it can still be credited with stimulating a longstanding research program into the *modes* by which corporations are controlled. They drew distinctions between several modes of control:

- companies under the *absolute* (or semi-absolute) control of a single owner,
- those controlled by a major shareholder owning a *majority* of shares,
- those controlled by a shareholder owning a *minority* of shares large enough to enable strategic control, and
- those with no identifiable controlling owner, i.e., widely held companies.

Among the top 200 companies, the most common mode is minority control (10 to 49.9 per cent), which pertains to 51.5 per cent of companies. Slightly more than one-quarter of the sample (25.5 per cent) has no owner with 10 per cent or more shares. The remaining corporations are either wholly owned by a single owner (12.0 per cent) or majority-owned by a single owner (11.0 per cent).

Berle and Means viewed corporations with no identifiable controlling owner (widely held corporations) as being directed internally by management. The situation, however, is actually more complex, especially with today's financialized capitalism, in which institutional investors own significant blocs of shares in many companies.[30] As sociologist John Scott has documented, a company lacking a dominant shareholder may be controlled by a *constellation of interests*.[31] Depending on the circumstances, these can include key creditors, senior management and shareholders whose combined share ownership would be large enough to give them at least minority control (i.e., greater than 10 per cent of shares), but who lack the unity required to wield control in an active way. Admittedly, our use of share ownership as the criterion in determining how a company is controlled does not demonstrate whether or not a controlling constellation operates in a coherent and coordinated way. In fact, this mode of strategic control is virtually invisible unless internal corporate management fails to deliver on profit or unless an external capitalist makes a hostile takeover bid. In the former case, the controlling constellation might initiate a change in top management. In the latter, the constellation might mobilize its combined share bloc against the unwanted suitor to protect its collective investment.[32]

In these scenarios, institutional investors often play key roles. Since the 1980s, as capitalism has become more financialized, major banks, life insurance companies, asset management firms and other institutional investors have taken ownership stakes in corporations, sometimes exceeding the 10 per cent level that has typically been seen as the threshold for strategic control. Yet unlike corporations that amass share blocs with the intent of gaining control and influence, these investors do not seek representation on the boards of the many companies in which they invest. In this sense, institutional investors are passive, but their investments represent votes of confidence in current management. The converse is also true: institutional investors can be active when they divest from a firm because their "exit power" can register as a vote of non-confidence in corporate management. Moreover, "one-on-one meetings between CEOs and institutional investors" can be another way to exert influence.[33]

We thus distinguish the following types of controlling interests:

- wealthy individual shareholders or families,
- states or state bodies, including sovereign wealth and similar investment funds,
- constellations of interests (with no one interest owning more than 10 per cent),
- institutional investors (one of which owns more than 10 per cent), and
- another corporation.

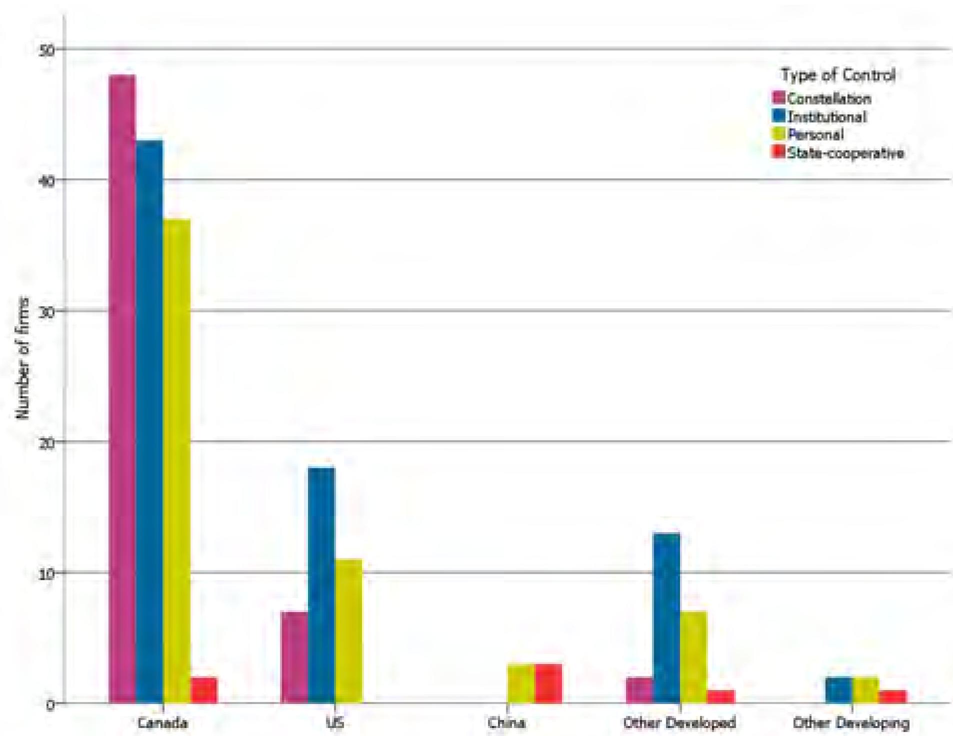
These categories are key in determining the country in which control resides. For firms controlled by individuals and families, the country of control is the family's country of principal residence.[34] Control by a constellation of interests typically involves a multitude of financial institutions and asset managers, each holding stakes of 2 to 9 per cent. In these cases, we assume that strategic control is in Canada unless the constellation is uniformly based in another country (in which case control resides in that country). The last two types of controlling interests invite a further investigation to determine which individual/family, state or constellation of interests controls the parent firm that has ultimate control in the chain of inter-corporate ownership. For the 52 firms we found to be controlled by another corporation, we traced the controlling interest in the parent firm to the global ultimate owner (GUO), that is, to the institution, individual/family or state at the top of the ownership chain and we noted the country of that GUO. In the case of control by institutional investors (financial institutions, asset managers, pension funds), we noted the location of the GUO of the investor holding the dominant stake (typically a share bloc greater than 20 per cent).

Overall, institutional investors are the most common ultimate controlling interest, accounting for 38 per cent of the top 200 firms.

Overall, institutional investors are the most common ultimate controlling interest, accounting for 38 per cent of the top 200 firms, followed by personal control (30 per cent), control by a constellation of interests (28.5 per cent) and control by a state (3.5 per cent, or in one case, a co-operative based in India). While wealthy families and individuals control a substantial share of Canada's fossil-fuel sector, most corporations are ultimately controlled by various constellations in which institutional investors figure prominently. Moreover, the mean 2016 revenue of the 60 firms ultimately controlled by persons (US$5.2 billion) is substantially less than the mean revenue of firms ultimately controlled by constellations of interests (US$8.6 billion) and institutional investors (US$14.6 billion), though greater than the mean for the few state (and co-op) controlled companies (US$1.1 billion). As for the country in which ultimate control of these firms resides (see

Figure 3 and Appendix 2), we found that 65 per cent are in Canada, 18 per cent in the US, 11.5 per cent in other jurisdictions of developed countries, 3 per cent in China and 2.5 per cent in developing countries. Compared to the ownership analysis in the previous section, US-based investors are less numerous. This result is due to two factors: 1) control by American transnational corporations is concentrated among the largest fossil-fuel companies, which means when we expand the sample from 50 to 200 firms and consider the number of firms rather than the amount of revenue flowing through them, the US-controlled segment shrinks; 2) US-based asset managers own small but significant pieces of many Canadian fossil-fuel firms, but most of those investments are not large enough to confer strategic control. Fully 70 per cent of the fossil-fuel firms controlled in Canada have constellations of interest or institutional investors as their ultimate controlling interests, with the rest mostly controlled by individuals and families. Institutional investors predominate as ultimate controllers of firms controlled in developed countries, including the US. However, personal control is prominent among the small number of companies ultimately controlled in China and other developing countries, as is state control in the case of China.

Figure 3: Mode of control of top 200 investors in Canada's fossil-fuel sector, by geographical location of global ultimate owner, March 2017



Source: Corporate Mapping Project (based primarily on data from Orbis).

Given the prevalence of control by constellations of interest and institutional investors, network theory can illuminate who the key players are and how their stakes are configured. By analyzing the links between companies and mapping them, we can better see the patterns. We take up this challenge next.

Mapping the top 50 companies in 2017

GIVEN THAT CAPITAL IS CONCENTRATED in the very largest fossil-fuel firms, we focus our analysis of networks on the top 50 corporations within our core sample of 200.[35] As of July 2017, the Orbis database[36] identified 1,679 ownership blocs into which the shares of the top 50 companies have been concentrated, ranging in size from 0.01 per cent of a company's share capital (the Soros Fund's stake in Canadian Natural Resources Ltd) to 100 per cent (Royal Dutch Shell's stake in Shell Canada). However, 1,233 blocs amounted to less than 1 per cent of the owned firm's share capital while 89 blocs made up at least 5 per cent of the owned firm's share capital. Since our interest is in the major lines of ownership, we established 1 per cent as a minimum criterion and focused on the 446 shareholdings of at least 1 per cent that link the top 50 companies to a variety of major investors.

Although seven of the top 50 fossil-fuel companies are detached from the dominant component the other 43 are connected in an intricate web of corporate ownership.

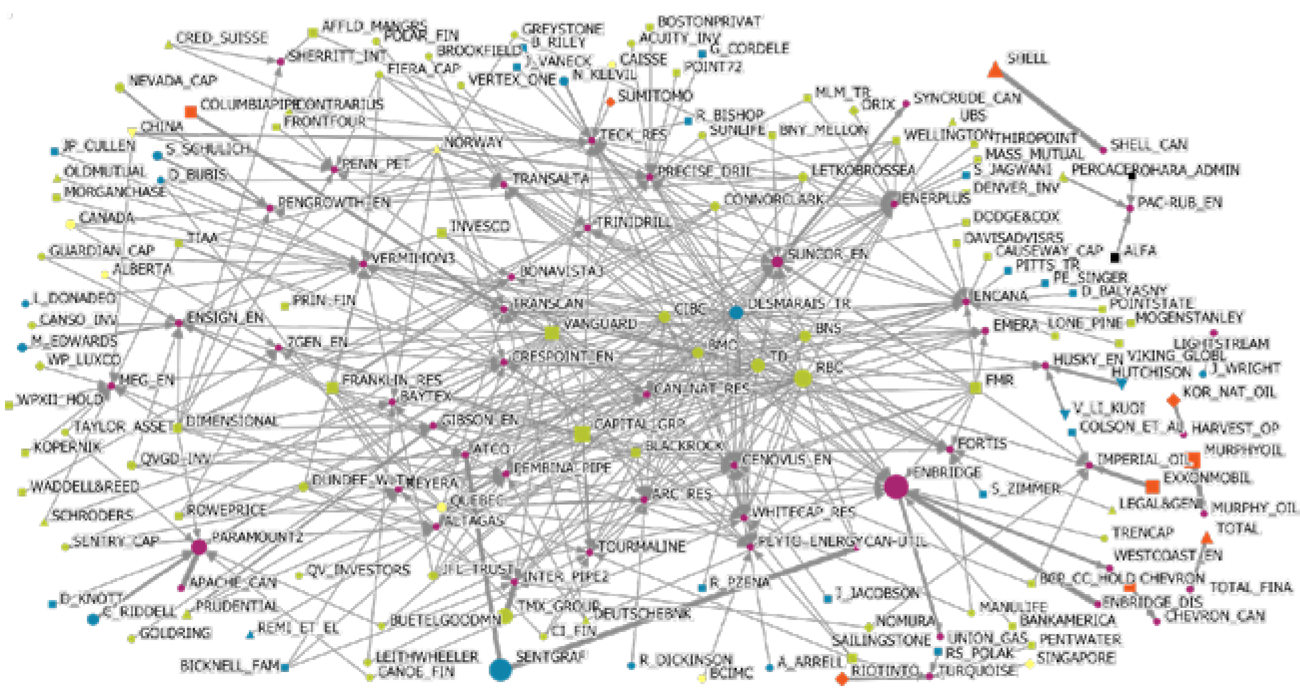
Not surprisingly, we found that the 446 significant blocs were owned by a much smaller number of investors. As of summer 2017, those blocs were directly held by 127 interests—corporate, institutional, personal and state—*outside* Canada's top 50 fossil-fuel companies.[37] Together, the top 50 and these 127 outside owners constitute a *network* of 177 entities with a total of 446 significant ownership ties, 89 of which involve stakes of 5 per cent or more in a given fossil-fuel firm. Any network consists of points and lines. In the network of ownership, each point is either a top 50 fossil-fuel company or (one of) its owner(s), and each line is a significant ownership tie that links a top 50 fossil-fuel company to (one of) its owner(s).

When we map these 177 entities, most of them—161, in fact—form a network of interconnected points. In the parlance of network analysis, this is the "dominant component." The other 16 entities (seven fossil-fuel companies and nine investors in them) form their own separate networks:

- Ten of the 16 are simply dyads consisting of a foreign-based parent and its Canadian fossil-fuel subsidiary.[38]
- The other six consist of a dyad involving personal ownership of a fossil-fuel company and a network of three investor companies and one fossil-fuel company.[39]

So, although seven of the top 50 fossil-fuel companies are detached from the dominant component the other 43 are connected in an intricate web of corporate ownership.

Figure 4: Network map of Canada's top 50 fossil-fuel companies and their significant owners, 2017



Source: Corporate Mapping Project (based primarily on data from Orbis).
Note: See Appendix 3 for full names of companies.

The entire network is mapped in Figure 4, with the small, isolated networks shown to the right of the dominant component. In this sociogram, the fossil-fuel firms and their owners appear as points, and ownership blocs appear as directed lines leading from the owner to the owned. Line thickness indicates the proportion of shares held by a given owner as of the summer of 2017. Node size is proportionate to "weighted outdegree" (the sum of a given investor's ownership stakes in the top 50 firms), highlighting the owners that, overall, hold the most substantial stakes in the top 50. Colour indicates the *type of entity* (top 50 fossil-fuel companies are purple, nine corporate owners are orange, 79 financial company owners are green, 31 personal owners are blue, eight state owners are yellow). Shape denotes the geographic location of the ultimate owner (circles are Canada, squares are the US, up-triangles are Europe, diamonds are other developed countries, down-triangles are China [including Hong Kong] and circles in boxes indicate developing countries).

The network is a configuration produced by hundreds of weak ties (smaller institutional holdings mostly owned by financial companies, including banks, asset managers and life insurance companies), along with a few dozen large holdings that confer clear-cut strategic control upon their corporate or personal owners. In the small networks that are isolated from the dominant component, and which exemplify bilateral relations of strategic control (shown at the right-hand margin), we can see several transnational parents, including Royal Dutch Shell, owner of Shell Canada. What pulls the dominant component together as a connected network are many relatively small holdings, typically owned by institutional investors—the large green circles and squares that form the core of this network. Among them, Canada's top five banks (the circles) are prominent, along with five US-based asset managers (the squares, namely Capital Group, Vanguard, Franklin Resources, FMR [Fidelity Management and Research] and BlackRock). These 10 major institutional investors have a total of 190 ownership stakes in 36 of the top 50 companies. Their weak ownership ties radiate from the network's core, representing 43 per cent of all ownership relations in the entire network. The Montreal-based Desmarais dynasty (represented in the network as the Desmarais Family Residuary Trust, abbreviated as DESMARAIS_TR) straddles the institutional/ personal divide as its majority-controlled investment company, Power Corporation of Canada, ultimately holds controlling interest in a range of Canadian (and European) corporations and also holds smaller stakes in many Canadian corporations.

The network map shows that many of the top fossil-fuel firms are partly owned by a number of institutional investors, as in control by a constellation of interests. However, this is not to say that personal ownership is unimportant. Through its private investment company, Sentgraf Enterprises, the Southern family controls two major fossil-fuel power producers: Atco and Canadian Utilities. Clayton Riddell, founder of Paramount Resources, is the major shareholder of Sentgraf (and of several other fossil-fuel firms). In summer 2017, Paramount bought controlling interest in Apache Canada from Houston-based Apache Corporation. Both the Southerns and Riddells (including Clayton's daughter Susan Riddell Rose, CEO of family-controlled Perpetual Energy) are ensconced in Calgary's tightly knit fossil-fuel elite. Riddell's influence in the community goes even farther; he is a part owner of the Calgary Flames hockey team along with several other leaders in the oil and gas sector.

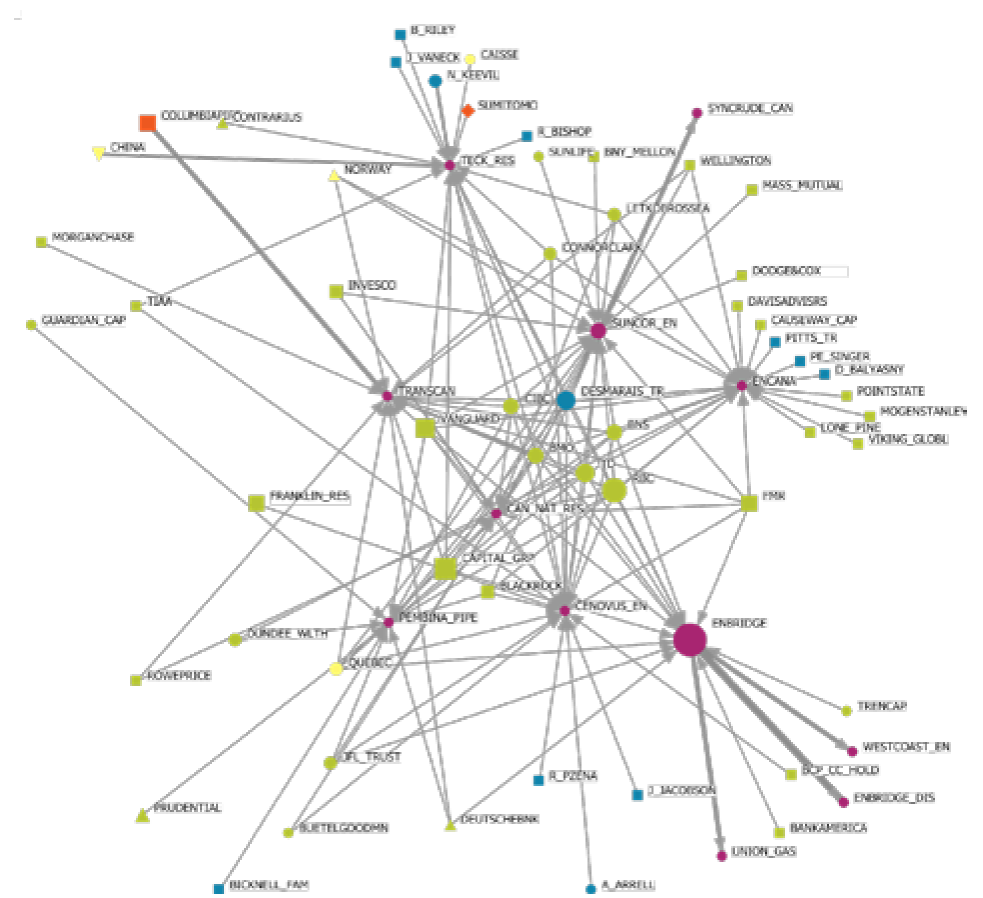
All but one of these major Canadian-controlled companies are controlled by complex and overlapping constellations of interests involving the chartered banks and other financial institutions.

In sum, the ownership network comprises a combination of a small number of highly concentrated share blocs (the thick lines in the sociogram, affording individuals and corporations strategic control) and many relatively small blocs owned by financial companies (the thin lines). Individual investors and corporations tend to maintain a few strong ownership ties whereas financial companies maintain a great many weak ownership ties. Two finance companies (the Royal Bank of Canada and US-based Vanguard Group) each hold stakes in a remarkable 30 of 50 fossil-fuel firms, making them the most central investors in the ownership network. Although they have the same number of ownership stakes, the average size of RBC's ownership blocs (3.92%) is nearly double that of Vanguard (2.09%).

The division of share capital within ownership networks

Great variety exists in how share capital is distributed among significant owners of the top 50 fossil-fuel companies. On average, each of the top firms has 8.88 owners, each with a stake of at least 1 per cent. Although 12 of the top 50 companies have only one owning interest (and 10 of these are majority-controlled by other corporations), most have multiple owners. A dozen have 14 or more (typically institutional) significant shareholders; among this group are eight of the largest Canadian-controlled firms: Encana (23 significant shareholders), Cenovus (21), Teck Resources (18), Suncor Energy (19), TransCanada Corporation (17), Canadian Natural Resources Ltd (16), Pembina Pipeline (15) and Enbridge (14). Consistent with our earlier finding, all but one of these major Canadian-controlled companies are controlled by complex and overlapping constellations of interests involving the chartered banks and other financial institutions.[40]

Figure 5: Network map of eight major Canadian-controlled fossil-fuel companies and their owners, 2017



Source: Corporate Mapping Project (based primarily on data from Orbis).

Note: Colour indicates the type of entity (fossil-fuel companies are purple, corporate owners are orange, financial company owners are green, personal owners are blue, state owners are yellow). Shape denotes the geographic location of the ultimate owner (circles are Canada, squares are the US, up-triangles are Europe, diamonds are other developed countries, down-triangles are China [including Hong Kong]). See Appendix 3 for full names of companies.

Figure 5 reveals the significant connections among the owners of these eight major Canadian-controlled fossil-fuel companies. Fifty-nine of the 127 external owners have stakes in one or more of these eight major firms, and 37 are financial companies. The ownership network is highly integrated by virtue of the overlapping investment portfolios of the big banks and other financial institutions: four of the five major Canadian banks have significant stakes in all eight of the major fossil-fuel companies.[41] Canada's most important financial institutions thus have a common interest in the continued growth of Canada's fossil-fuel sector, and, it must be said, they also have a common interest in each other. Other research has shown that each of these banks is a significant shareholder of the others. The Royal Bank of Canada holds an average of 5.1 per cent ownership in the other four banks, and even the Bank of Nova Scotia, the least invested of the five, holds an average of 3.7 per cent.[42]

Finally, to isolate the central core of ownership interests, we performed a stepwise reduction of the network, successively raising the minimum ownership criterion from 1 per cent to 10 per cent (see Table 3). This procedure reveals the strong ties in the network as the weaker ownership connections fall away.

Table 3: Stepwise reduction of the ownership network of Canada's fossil-fuel companies, from a minimum ownership stake of 1 per cent through 10 per cent

Minimum ownership stake (%)	# of ties	# of firms in the network	# of core sample firms	# of corporate owners	# of financial owners	# of personal owners	# of state owners	Size of dominant component
1	446	177	50	9	79	31	8	161
2	260	136	50	9	54	17	6	120
3	151	117	50	9	41	12	5	95
4	108	104	48	9	32	11	4	78
5	89	99	47	9	28	11	4	51
10	35	65	35	8	11	8	3	14

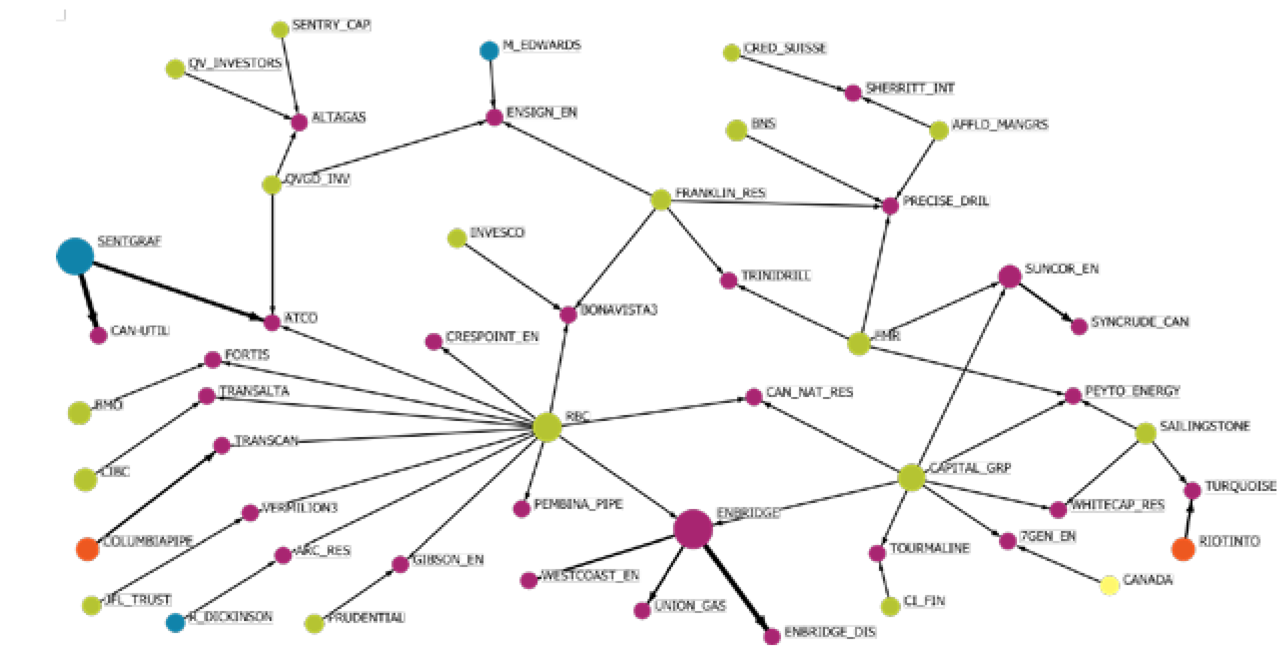
Source: Corporate Mapping Project (based primarily on data from Orbis).

Canada's most important financial institutions have a common interest in the continued growth of Canada's fossil-fuel sector, and, it must be said, they also have a common interest in each other.

When the minimum criterion for a significant ownership stake is raised to 2 per cent, 41.7 per cent of the ties and 23.2 per cent of firms participating in the network disappear, leaving a network of 136 companies linked by 260 ownership ties. Clearly, many of the connections are well below the level at which strategic control or influence could be asserted. At a minimum ownership stake of 5 per cent, the network is reduced to 99 firms linked by 89 ownership ties, with 51 firms constituting a dominant component. At a minimum ownership stake of over 10 per cent, the network breaks into 22 components, each organized around particular strategic-control relations.

Financial owners (including banks, insurance companies and asset management firms) are very involved at lower levels of ownership: they make up 63 per cent of all owners whose stakes are between 1 and 3 per cent. Among owners with stakes of 10 per cent or more, however, the proportion of financial companies drops to 37 per cent (11 of 30). Similarly, but less dramatically, though 19 personal owners have stakes of 1 to 2.99 per cent, only a dozen of them have stakes over 3 per cent in any one of the top 50 fossil-fuel companies. As is well known, several giant operating companies in the fossil-fuel sector (notably Enbridge) own controlling interest in major

Figure 6: Network map of the dominant component of Canada's top 50 fossil-fuel companies, at a minimum ownership stake of 5 per cent, 2017



Source: Corporate Mapping Project (based primarily on data from Orbis).

Note: Purple: fossil-fuel firms based in Canada; Yellow: states; Orange: foreign-based corporations; Green: financial institutions and asset managers; Blue: persons/families. See Appendix 3 for full names of companies.

Canadian firms. Eight of these major global companies have stakes of 10 per cent or more in one of the top 50 firms in the sector.

Isolating the subset of firms linked by ownership relations over 5 per cent, we arrive at the network map of the dominant component shown in Figure 6. In this configuration, which includes 28 of the top 50 fossil-fuel companies, 17 of the 23 owners are financial companies. Four of Canada's "big five" banks are part of the network and US-based institutional investors, particularly Capital Group but also Franklin Resources, FMR and SailingStone Capital, have significant stakes in multiple fossil-fuel firms. The Royal Bank of Canada, however, is by far the major stakeholder, with over 5 per cent ownership of 12 corporations. Earlier research revealed that RBC, which promotes itself as "Canada's leading energy bank, for conventional, non-conventional and renewable resources," matches many of its ownership stakes in fossil-fuel companies and shares members of its board/senior management with those of the firms it partly owns.[43]

Of course, shareholdings are not the only—or even the most weighty—capital relations between high finance and big carbon. Canadian banks are major lenders to the fossil-fuel sector; however, because detailed data on these relations are not systematically available, our mapping is restricted to ownership stakes. From 2017 until the federal government purchased the pipeline in August 2018 the Kinder Morgan Trans Mountain Pipeline expansion project had a $5.5-billion loan facility agreement with the five big Canadian banks. The Royal Bank of Canada was the administrative

From 2017 until the federal government purchased the pipeline in August 2018 the Kinder Morgan Trans Mountain Pipeline expansion project had a $5.5-billion loan facility agreement with the five big Canadian banks.

agent of that agreement.[44] Without such financial enablement (complemented by government largesse, including the federal government's purchase of Kinder Morgan's Trans Mountain Pipeline assets), megaprojects such as the proposed bitumen pipeline could not be mounted.

Conclusion

The concentration of fossil-fuel capital and of its ownership/control represents a massive centralization of economic power in the hands of private investors accountable only to themselves.

OUR MAPPING OF OWNERSHIP AND CONTROL in Canada's fossil-fuel sector reveals the major investors with stakes in maintaining business as usual. We find a confluence of Canadian ownership, via wealthy families and financial institutions, and foreign ownership, via transnational corporations and asset management firms. When mapped, these ownership relations reveal a network of many weak ties (smaller institutional holdings) and a few dozen large holdings that confer strategic control upon their corporate or personal owners. As concentrated as the sector is, its owners are even more concentrated: a small group has dominant control over much of the sector. The concentration of fossil-fuel capital and of its ownership/control represents a massive centralization of economic power in the hands of private investors accountable only to themselves. Although foreign-based capital figures in the ownership of many corporations (through asset managers and in some cases transnational parent corporations), Canadian capitalists, including bankers, own and control a substantial share of the sector. Yet far from representing the national interest of Canadians, these owners simply pursue their own interests in maximizing immediate profits from extracting and processing fossil fuels.

Control of Canadian fossil-fuel capital by individuals and wealthy families remains important, though it is prevalent more among mid-sized fossil-fuel companies than the larger ones. Some of the world's largest transnational corporations continue to control several of the largest Canadian fossil-fuel firms. But what stands out are the many comparatively small yet significant holdings of institutional investors (some of them major US-based asset managers) that form constellations of interests in partnership with the top-level management of fossil-fuel companies.

This pattern is consistent with two sets of earlier findings. A mapping of the elite network of interlocking directorates around the largest Canada-based fossil-fuel firms, circa 2015, revealed a well-integrated, east-west configuration of financial institutions (based mainly in Toronto) and fossil-fuel corporations (based mainly in Calgary).[45] The oligarchic ownership and control of fossil-fuel capital is bolstered by a densely connected elite network of corporate directors and executives. A mapping of the global corporate ownership network, circa 2007, showed that "the socialization of capital within the capitalist class, mediated by institutional investors and expressed through intercorporate ownership of proportionately small, fluidly held blocs of shares, is now a global phenomenon."[46] The idea of "socialization of capital within the capitalist class" may seem like a contradiction in terms. It refers to the fact that, as the largest capitalist enterprises outgrow the capacities of individual investors to own them outright, major investors assemble portfolios of corporate shares that overlap with the portfolios of other investors, creating a shared interest in corporate profitability beyond particular firms. Within this form of capitalist socialization, major financial institutions participate in overlapping constellations of interest in a close symbiosis of fossil-fuel capital and financial capital. Their stakes in various firms, sometimes accompanied by board interlocks, give them an obvious interest in the vitality of the entire sector and in resisting efforts to wind down fossil-fuel capital and to expand renewables.

Our findings from this research suggest several areas for discussion, both in the short term and going forward. Of immediate interest should be a strategy to press the financial enablers of fossil-fuel capital to divest their holdings. Such an action targets a wider, though still limited, number of players within the close network of investors and companies active in the Canadian fossil-fuel industry. Banks, government pension and investment funds and other institutional investors can be held as much accountable for continued and escalating carbon emissions as producer companies.[47] Divestment does not pre-empt other policy- or movement-based initiatives to reduce or undo the highly concentrated ownership of Canada's fossil-fuel sector, and it is not a panacea.

Divestment does not challenge corporate power as it operates across the economy. Nor does divestment in itself suggest what will replace fossil fuels or, equally important, how the social relationships in a post-carbon economy can be organized democratically rather than oligarchically. Although fossil-fuel divestment has registered victories in other countries,[48] Canada's major financial institutions, as we have seen, are so deeply invested in fossil-fuel capital that here divestment must push especially hard against an entrenched "new denialism" that acknowledges the verdict of climate science yet refuses to take meaningful action.[49] Even unsuccessful divestment campaigns can have a salutary impact in raising consciousness about the actualities of economic power in fossil-fuel capitalism.[50] Moreover, divestment may gain political traction as major fossil-fuel companies such as Suncor acknowledge that some reserves are best left in the ground[51] at the same time that research highlights emerging risks to fossil-fuel investors, such as climate-damage liabilities and stranded assets.[52] Finally, the call for divestment bridges nicely to another investment-centred demand: to defund new fossil-fuel projects, in effect to keep the carbon in the ground.[53] As a leading divestment organization argues, "It's time for banks to stop the lines of credit and project-level loans to fossil fuel infrastructure like new pipelines or fracking drill rigs."[54]

Banks, government pension and investment funds and other institutional investors can be held as much accountable for continued and escalating carbon emissions as producer companies.

Going forward, our findings underline the need to democratize the control of energy in the shift from carbon-based fuel sources to renewables. Decades ago, foreign control of Canada's energy sector (and other sectors) was seen as a threat to Canadian self-determination and thus to democracy. Yet the trend we noted earlier toward more Canadian control of the fossil-fuel sector has made little to no difference in how the industry functions. Much the same may hold true for energy transitions. As we have shown, the concentrated ownership of Canada's fossil-fuel sector is nothing short of oligarchical. Shifting to renewables while sticking with oligarchical ownership and control (whether under the control of foreign or domestic investors and executives) may reduce Canada's carbon footprint, but it will not move us an inch toward economic justice.

Energy democracy nicely summarizes the double power shift, from fossil-fuelled power to renewables (decarbonization) and from corporate oligarchy to public, democratic control of economic decisions (democratization). Both are urgently needed. A feasible and just alternative to the oligarchical ownership and control of fossil-fuel capital, energy democracy has been endorsed by the international trade union movement, including Canada's largest unions and the Canadian Labour Congress, through Trade Unions for Energy Democracy.[55] Leading international non-governmental organizations have created an open space for groups fighting for energy democracy,[56] emphasizing public and social ownership of energy and democratic participation in energy policy. Consistent with our findings, proponents of energy democracy recognize that, given the symbiosis

Given the symbiosis between energy and finance, a robust power shift must bring the financial sector itself under democratic control.

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Environmental scientists Matthew Burke and Jennie Stephens have examined energy democracy's three overarching goals—"*resisting* the fossil-fuel-dominant energy agenda while *reclaiming* and democratically *restructuring* energy regimes"[57]—in terms of 22 policy instruments, from regulations that limit fossil-fuel capital and enlarge the scope for renewables, to new financial arrangements to fund alternatives and new democratically controlled economic institutions and energy systems. This wide-ranging agenda requires a movement-building strategy that connects the dots between divestment initiatives, First Nations protectors, anti-fracking protests, community solar projects, renewable energy co-ops, efforts to put privatized resources back into public hands, etc.[58] Although resistance, reclamation and restructuring need to be taken up in concert, they operate within different time frames.

Because of the growing urgency to respond to climate change, the push to resist expansion of fossil-fuel extraction may need to take precedence over reclaiming and restructuring the energy sector. Immediate action is needed to resist expansion, whereas reclaiming the sector can extend over many years to decades and restructuring the energy sector may take even longer.[59]

In sum, our fossilized system of oligarchical ownership needs more than fine-tuning if we are to avoid the ecological time bomb of climate change.

Appendix 1: Methodological notes

To track sectoral ownership longitudinally, as reported in our first findings section, we could not simply take a set of companies dominant at one point in time and trace their owners over time. To do so would miss companies that were prominent years ago but went bankrupt, were taken over or did not grow quickly enough to remain in the top 50 of Canada's fossil-fuel firms. For a complete analysis, we therefore constructed a sample of all companies in the top 50 of the *Alberta Oil*[60] Top 100+50, each of which made at least one appearance on the *Alberta Oil* list in the period under study. The *Alberta Oil* list includes natural gas and pipeline companies as well as several large coal-producing firms, so it provides reasonably comprehensive coverage of the largest corporations in the fossil-fuel sector. Our initial compilation from the *Alberta Oil* annual lists yielded a sample of 101 companies.

We found that this initial sample included some wholly owned subsidiaries of other companies also on the list, as well as some energy and utility companies not directly involved in fossil-fuel production. Yet, this initial sample excluded several subsidiaries of foreign-based firms. We therefore excluded eight companies but added 10 of the largest foreign-owned subsidiaries based in Canada (such as Shell Canada, Total Canada and Chevron Canada). In total, the sample comprised 102 companies of which 18 were taken over in the period under study.[61]

We gathered data on firms' total revenue or sales from annual reports (used as an indicator of size) and their shareholders as listed in the Orbis Bureau van Dijk database. This database lists only shareholdings of size; rarely are share blocs of less than one-tenth of 1 per cent of outstanding shares listed, even though some of these blocs are valued in millions of dollars.[62] Thus, small shareholdings are excluded from our analysis. Our estimates of the ownership shares held by major owners are rather conservative for another reason: for firms majority-controlled by an identified owner, Orbis often reports share ownership simply as majority owned, without indicating the percentage of shares owned. We initially coded these cases as ownership of 50.01 per cent, yet actual ownership may range up to 100 per cent, and, as noted earlier, majority ownership confers absolute control. In that light, we did an additional analysis of control, taking each majority holding as effectively 100 per cent ownership while removing all other holdings from the analysis (see "control" columns in Table 2). An additional methodological complication stemmed from the secrecy of financial information pertaining to some wholly owned subsidiaries of foreign-based corporations. For six such firms we imputed total revenue by benchmarking on the basis of their total production in Canada.[63]

Appendix 2: Cross-tabulation of the owners of Canada's leading fossil-fuel companies, by country of control and by type of ultimate control as of 2017

		TYPE OF ULTIMATE CONTROL 2016				
		Constellation	**Institutional**	**Personal**	**State-cooperative**	**Total**
Canada	Count	48	43	37	2	130
	% within country of control 2016 5-cat	36.9%	33.1%	28.5%	1.5%	100.0%
	% within type of control 2016 recoded	84.2%	56.6%	61.7%	28.6%	65.0%
US	Count	7	18	11	0	36
	% within country of control 2016 5-cat	19.4%	50.0%	30.6%	0.0%	100.0%
	% within type of control 2016 recoded	12.3%	23.7%	18.3%	0.0%	18.0%
China	Count	0	0	3	3	6
	% within country of control 2016 5-cat	0.0%	0.0%	50.0%	50.0%	100.0%
	% within type of control 2016 recoded	0.0%	0.0%	5.0%	42.9%	3.0%
Other developed	Count	2	13	7	1	23
	% within country of control 2016 5-cat	8.7%	56.5%	30.4%	4.3%	100.0%
	% within type of control 2016 recoded	3.5%	17.1%	11.7%	14.3%	11.5%
Other developing	Count	0	2	2	1	5
	% within country of control 2016 5-cat	0.0%	40.0%	40.0%	20.0%	100.0%
	% within type of control 2016 recoded	0.0%	2.6%	3.3%	14.3%	2.5%
Total	Count	57	76	60	7	200
	% within country of control 2016 5-cat	28.5%	38.0%	30.0%	3.5%	100.0%
	% within type of control 2016 recoded	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Corporate Mapping Project (based primarily on data from Orbis). Companies immediately controlled by another corporation are categorized according to the type of control and country of control of the ultimate owner. Developing countries include 16 firms based in Europe, two based in other Organisation for Economic Co-operation and Development countries, two firms based in Hong Kong plus three based in high-income island tax havens. Some of the cases classified under personal control involve a combination of a major personal shareholder and a corporation with a major stake.

Appendix 3: Full names of Top 50 companies and their owners, as shown in Figures 4–6[1]

	Company Name	Status
7GEN_EN	Seven Generations Energy Ltd	Top 50
A_ARRELL	Anthony Hugh Arrell	Owner
ACUITY_INV	Acuity Investment Management Inc	Owner
AFFLD_MANGRS	Affiliated Managers Group Inc	Owner
ALBERTA	Government of Alberta	Owner
ALFA	Alfa, S.A.B. DE C.V.	Owner
ALTAGAS	Altagas Ltd	Top 50
APACHE_CAN	Apache Canada Ltd	Top 50
ARC_RES	Arc Resources Ltd.	Top 50
ATCO	Atco Ltd	Top 50
B_RILEY	Brian Joseph Riley	Owner
BANKAMERICA	Bank of America Corp	Owner
BAYTEX	Baytex Energy Corp	Top 50
BCIMC	British Columbia Investment Management Corp	Owner
BCP_CC_HOLD	BCP CC Holdings L.P.	Owner
BICKNELL_FAM	Bicknell Family Holding Co LLC	Owner
BLACKROCK	BlackRock Inc	Owner
BMO	Bank of Montreal	Owner
BNS	Bank of Nova Scotia	Owner
BNY_MELLON	Bank of New York Mellon Corp	Owner

1 Enbridge Inc., Paramount Resources and Suncor Energy are Top 50 Canadian fossil-fuel companies that also own significant stakes in other Top 50 Canadian fossil-fuel companies. All other companies are either members of the Top 50 or owners of them.

BONAVISTA3	Bonavista Energy Trust	Top 50
BOSTONPRIVAT	Boston Private Financial Holdings Inc	Owner
BROOKFIELD	Brookfield Asset Management Inc	Owner
BUETELGOODMN	Beutel Goodman	Owner
C_RIDDELL	Clayton Riddell	Owner
CAISSE	Caisse de Depot et Placement du Quebec	Owner
CAN_NAT_RES	Canadian Natural Resources Ltd	Top 50
CAN-UTIL	Canadian Utilities Ltd	Top 50
CANADA	Government of Canada	Owner
CANOE_FIN	Canoe Financial LP	Owner
CANSO_INV	Canso Investment Counsel Ltd.	Owner
CAPITAL_GRP	Capital Group Co Inc	Owner
CAUSEWAY_CAP	Causeway Capital Holdings LLC	Owner
CENOVUS_EN	Cenovus Energy Inc	Top 50
CHEVRON	Chevron Corp	Owner
CHEVRON_CAN	Chevron Canada Resources Ltd	Top 50
CHINA	People's Republic of China	Owner
CI_FIN	CI Financial Corp	Owner
CIBC	Canadian Imperial Bank of Commerce	Owner
COLSON_ET_AL	Eric R Colson, Charles J Daley Jr and Gregory K Ramirez	Owner
COLUMBIAPIPE	Columbia Pipeline Group, Inc.	Owner
CONNORCLARK	Connor, Clark & Lunn Financial Group Ltd.	Owner
CONTRARIUS	Contrarius Investment Management Limited	Owner
CRED_SUISSE	Credit Suisse Group AG	Owner
CRESPOINT_EN	Crescent Point Energy Corp	Top 50
D_BALYASNY	Dmitri Balyasny	Owner
D_BUBIS	Daniel Avrum Bubis	Owner

D_KNOTT	David M. Knott Partnership	Owner
DAVISADVISRS	Davis Selected Advisors LP	Owner
DENVER_INV	Denver Investment Advisors LLC	Owner
DESMARAIS_TR	Desmarais Family Residuary Trust	Owner
DEUTSCHEBNK	Deutsche Bank AG	Owner
DIMENSIONAL	Dimensional Holdings Inc	Owner
DODGE&COX	Dodge & Cox	Owner
DUNDEE_WLTH	Dundeewealth Inc	Owner
EMERA	Emera Inc	Top 50
ENBRIDGE	Enbridge Inc	Top 50
ENBRIDGE_DIS	Enbridge Gas Distribution Inc	Top 50
ENCANA	Encana Corp	Top 50
ENERPLUS	Enerplus Corp	Top 50
ENSIGN_EN	Ensign Energy Services Inc	Top 50
EXXONMOBIL	Exxon Mobil Corp	Owner
FIERA_CAP	Fiera Capital Corp	Owner
FMR	FMR LLC	Owner
FORTIS	Fortis Inc	Top 50
FRANKLIN_RES	Franklin Resources Inc	Owner
FRONTFOUR	Frontfour Capital Group LLC	Owner
G_CORDELE	Griffin Kenneth Cordele	Owner
GIBSON_EN	Gibson Energy Inc	Top 50
GOLDRING	Goldring Capital Corporation	Owner
GREYSTONE	Greystone Capital Management Inc	Owner
GUARDIAN_CAP	Guardian Capital Group Ltd	Owner
HARVEST_OP	Harvest Operations Corp	Top 50
HUSKY_EN	Husky Energy Inc	Top 50

HUTCHISON	CK Hutchison Holdings Limited	Owner
IMPERIAL_OIL	Imperial Oil Limited	Top 50
INTER_PIPE2	Inter Pipeline Fund	Top 50
INVESCO	Invesco Ltd	Owner
J_JACOBSON	Jonathon Scott Jacobson	Owner
J_VANECK	Jan Frederick Vaneck	Owner
J_WRIGHT	John D. Wright	Owner
JFL_TRUST	Jfl Management Trust	Owner
JP_CULLEN	James Patrick Cullen	Owner
KEYERA	Keyera Corp	Top 50
KOPERNIK	Kopernik Global Investors LLC	Owner
KOR_NAT_OIL	Korea National Oil Corporation	Owner
L_DONADEO	Lorenzo Donadeo	Owner
LEGAL&GENL	Legal & General Group Plc	Owner
LEITHWHEELER	Leith Wheeler Investment	Owner
LETKOBROSSEA	Letko Brosseau & Associates	Owner
LIGHTSTREAM	Lightstream Resources	Top 50
LONE_PINE	Lone Pine Capital LLC	Owner
M_EDWARDS	N Murray Edwards	Owner
MANULIFE	Manulife Financial Corp	Owner
MASS_MUTUAL	Massachusetts Mutual Life Insurance Co	Owner
MEG_EN	MEG Energy Corp	Top 50
MLM_TR	MLM Trust B LLC	Owner
MOGENSTANLEY	Morgan Stanley	Owner
MORGANCHASE	JPMorgan Chase & Co	Owner
MURPHY_OIL	Murphy Oil Co Ltd	Top 50
MURPHYOIL	Murphy Oil Corp	Owner

N_KEEVIL	Keevil Holding Corporation	Owner
NEVADA_CAP	Nevada Capital Corp Ltd	Owner
NOMURA	Nomura Holdings Inc	Owner
NORWAY	Government of Norway	Owner
OHARA_ADMIN	O’Hara Administration Co and Affiliates LPC Investments	Owner
OLDMUTUAL	Old Mutual Plc	Owner
ORIX	Orix Corporation	Owner
PAC-RUB_EN	Pacific Rubiales Energy Corp	Top 50
PARAMOUNT2	Paramount Resources Ltd	Top 50
PE_SINGER	Paul Elliott Singer	Owner
PEMBINA_PIPE	Pembina Pipeline Income Fund	Top 50
PENGROWTH_EN	Pengrowth Energy Trust	Top 50
PENN_PET	Obsidian Energy Ltd	Top 50
PENTWATER	Pentwater Capital Management LP	Owner
PERCACER	Percacer SL	Owner
PEYTO_ENERGY	Peyto Energy Trust	Top 50
PITTS_TR	Pitts Family Trust	Owner
POINT72	Point72 Asset Management LP	Owner
POINTSTATE	Point State Capital LP	Owner
POLAR_FIN	Polar Financial Corp.	Owner
PRECISE_DRIL	Precision Drilling Corp	Top 50
PRIN_FIN	Principal Financial Group Inc	Owner
PRUDENTIAL	Prudential Plc	Owner
QUEBEC	Province of Quebec	Owner
QV_INVESTORS	QV Investors Inc	Owner
QVGD_INV	QVGD Investors Inc	Owner
R_BISHOP	Robert James Bishop	Owner

R_DICKINSON	Robert Dickinson	Owner
R_PZENA	Richard Stanton Pzena	Owner
RBC	Royal Bank of Canada	Owner
REMI_ET_EL	Partners of Pictet: Remi Best, Renaud De Planta, Bertrand Demole, Marc Pictet, Nicolas Pictet & Laurent Ramsey	Owner
RIOTINTO	Rio Tinto Limited	Owner
ROWEPRICE	T Rowe Price Group Inc	Owner
RS_POLAK	Loren Robert Polak	Owner
S_JAGWANI	Sunil Jagwani	Owner
S_SCHULICH	Schulich Foundation	Owner
S_ZIMMER	Stuart Jason Zimmer	Owner
SAILINGSTONE	Sailingstone GP LP	Owner
SCHRODERS	Schroders Plc	Owner
SENTGRAF	Sentgraf Enterprises Ltd	Owner
SENTRY_CAP	Sentry Select Capital Corp	Owner
SHELL	Royal Dutch Shell Plc	Owner
SHELL_CAN	Shell Canada Ltd	Top 50
SHERRITT_INT	Sherritt International Corp	Top 50
SINGAPORE	Singapore	Owner
SUMITOMO	Sumitomo Metal Mining Co Ltd	Owner
SUNCOR_EN	Suncor Energy Inc	Top 50
SUNLIFE	Sun Life Financial Inc	Owner
SYNCRUDE_CAN	Syncrude Canada Ltd	Top 50
TAYLOR_ASSET	Taylor Asset Management Inc (Canada)	Owner
TD	Toronto Dominion Bank	Owner
TECK_RES	Teck Resources Ltd	Top 50
THIRDPOINT	Third Point LLC	Owner
TIAA	Tiaa Board of Overseers	Owner

TMX_GROUP	TMX Group Ltd	Owner
TOTAL	Total S.A.	Owner
TOTAL_FINA	Total E & P Canada Ltd	Top 50
TOURMALINE	Tourmaline Oil Corp	Top 50
TRANSALTA	Transalta Corp	Top 50
TRANSCAN	Transcanada Corp	Top 50
TRENCAP	Trencap LP	Owner
TRINIDRILL	Trinidad Drilling Ltd	Top 50
TURQUOISE	Turquoise Hill Resources Ltd	Top 50
UBS	UBS Group AG	Owner
UNION_GAS	Union Gas Ltd	Top 50
V_LI_KUOI	Victor Li Tzar Kuoi	Owner
VANGUARD	Vanguard Group Inc	Owner
VERMILION3	Vermilion Energy Inc	Top 50
VERTEX_ONE	Vertex One Asset Management	Owner
VIKING_GLOBL	Viking Global Investors LP	Owner
WADDELL&REED	Waddell & Reed Financial Inc	Owner
WELLINGTON	Wellington Management Group LLP	Owner
WESTCOAST_EN	Westcoast Energy Inc	Top 50
WHITECAP_RES	Whitecap Resources Inc	Top 50
WP_LUXCO	WP Luxco III S.à.r.l.	Owner
WPXII_HOLD	WP XII International Holdings LLC	Owner

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Notes

1 See Huber, 2013, for an especially astute analysis.

2 Steward, 2017.

3 Central Intelligence Agency, The World Factbook, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2241rank.html. BP, Statistical Review of World Energy 2017, https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html, accessed May 17, 2018.

4 Albo and Yap, 2016.

5 Ferguson, 2012.

6 Clarke et al., 2013; Anderson, 2018.

7 Suzuki, 2016.

8 See Durand, 2017, 75. Durand defines financialization as "a reorientation of capital accumulation away from productive and commercial activities toward ones concerning finance."

9 Berle and Means, 1932.

10 Dahrendorf, 1959.

11 Scott, 1997.

12 Porter, 1965, 591–95.

13 Niosi, 1978; Morck et al., 2000; Carroll, 2004.

14 Burgess, 2002, 249.

15 Gadhoum, 2006.

16 Brennan, 2012, 19–20.

17 Calculated from Statistics Canada, "Corporations Returns Act (CRA), enterprise characteristics by country of control and operating revenue size groups," CANSIM Table 179-0005. Downloaded on May 10, 2018.

18 Statistics Canada, "Businesses—Canadian Industry Statistics, Oil and Gas Extraction," https://www.ic.gc.ca/app/scr/app/cis/businesses-entreprises/211, accessed May 14, 2018.

19 Levitt, 1970, page vii.

20 Moore and Wells, 1975; Niosi, 1981; Carroll, 1986; Klassen, 2014 and Kellogg, 2015.

21 Carroll and Klassen, 2010.

22 Calculated from Statistics Canada, "Corporations Returns Act (CRA), enterprise characteristics by country of control and operating revenue size groups," CANSIM Table 179-0005. Downloaded on May 10, 2018. The figure for 1975 is from "Foreign control in the Canadian economy, 2015," *Statistics Canada Daily,* July 4, 2017, https://www150.statcan.gc.ca/n1/daily-quotidien/170704/dq170704a-eng.htm

23 "Foreign control in the Canadian economy, 2015."

24 We used revenue as a criterion because it is the most widely available measure of firm size. In the current era, revenue has an additional virtue, compared to assets, as a measure of firm size. Carbon-extractive companies include as assets the reserves of potentially extractable carbon to which they have exclusive access. Calculations of carbon budgets reveal that most of these reserves (particularly of coal and bitumen) will have to stay in the ground if Canada is to meet its international obligations regarding climate mitigation (Lee, 2018). In this hopeful scenario, most of the declared assets of corporations heavily invested in bitumen or coal would be "stranded," meaning they would be left without economic value.

25 Data are currently available only through the end of 2015, before several major global carbon companies sold their stakes in the tar sands to Canadian companies.

26 Adomaitis and Bousso, 2017.

27 Jaremko, 2017.

28 Bickis, 2016; Krugel, 2016.

29 As with the analysis of the top 50 (above), the data on the Top 200 and the ownership relations converging on them were downloaded from the Orbis business database.

30 Durand, 2017.

31 Scott, 1997.

32 Glasberg, 1981; Scott, 1997, 47–50; Carroll and Sapinski, 2018.

33 Carroll, 2008, 59.

34 Each of these control categories has certain nuances. For instance, in 2017 Canadian N. Murray Edwards held a 16.61 per cent stake in Ensign Energy Services, which afforded him minority control. In 2016, he chose to move his official personal residence to the UK to take advantage of lower tax rates on capital gains there. Ensign is thus categorized here as British controlled, an accurate yet quite odd description since Edwards continues to be a central player in Canada's carbon-capital community. See Healing, 2016.

35 Included are firms on the *Alberta Oil* list (used in the longitudinal analysis of ownership of the top 50 in the previous section). As in that analysis, we have removed non-carbon-based energy companies (several hydroelectric firms) and replaced them with several large, privately held corporations mostly under foreign control, namely Apache Canada (which was taken over by Canadian-owned Paramount Resources in the summer of 2017), Total E&P Canada, Chevron Canada Resources, Syncrude Canada, Korean National Oil Company (KNOC), Murphy Oil Canada and Shell Canada.

36 Orbis is an online database that includes ownership and other information on 300 million companies worldwide. https://www.bvdinfo.com/en-gb/our-products/data/international/orbis.

37 In a few cases, firms in the top 50 owned significant stakes in each other; for instance, Enbridge's shares in Union Gas, Westcoast Energy and Enbridge Distribution.

38 The five Canadian subsidiaries are Shell Canada, Chevron Canada Resources, Murphy Oil Canada, Total Fina, and Harvest Operations (owned by Korea National Oil Co).

39 J. Wright owns 3.5 per cent of Lightstream; Pacific Rubeus Energy is owned 19 per cent by Alpha Group, 19 per cent by Percacer and 10 per cent by Ohara Asset Administrators.

40 The exception is Vancouver-based Teck Resources, whose major shareholder is Norman Keevil who owns 29 per cent (with additional financial participation by the Government of China, Sumitomo Metals of Japan and a host of institutional investors).

41 The Bank of Nova Scotia's 0.93 per cent holding in Teck Resources falls just short of our minimum criterion for a significant holding. This pattern also holds for US-based Vanguard Group, which is invested in all eight major Canadian-controlled carbon companies (as well as 22 other top 50 carbon firms).

42 Carroll and Sapinski, 2018.

43 Daub and Carroll, 2016.

44 Allan, 2018.

45 Carroll, 2017.

46 Carroll, 2012, 71. More recent research shows that this tendency has continued at least through 2016, further concentrating the ownership of capital on a global basis, particularly since the global financial crisis of 2008. See Brancaccio et al., 2018.

47 See, for instance, Yunker et al., 2018.

48 For instance, in September 2016, New York's Amalgamated Bank became the first North American bank to divest its fossil-fuel holdings in favour of a clean energy transition (Stewart, 2016); in October 2017, BNP Paribus became the first global bank to announce its divestment from tar sands and shale oil projects (Valentini and Ward, 2017).

49 Klein and Daub, 2016.

50 Rowe et al., 2016.

51 Linnitt, 2016.

52 Shue, 2017; Carbon Tracker Initiative, 2017.

53 See, for instance, the Go Fossil Free campaign organized by 350.org, which has as a core goal to 'stop and ban' new fossil-fuel projects. https://gofossilfree.org/stop-and-ban/

54 350.org, 2018.

55 See http://unionsforenergydemocracy.org/. Formed in the wake of a roundtable of trade unionists in 2012, Trade Unions for Energy Democracy currently includes 66 unions in 20 countries.

56 See www.energy-democracy.net.

57 Burke and Stephens, 2017, 35, emphasis added.

58 Ibid., 45.

59 Ibid., 44.

60 *Alberta Oil* ceased publication in 2017. *Oilweek* has continued to publish an annual listing using the same methodology. For downloadable data see https://www.jwnenergy.com/reports/oilweek-top-100/.

61 Only companies taken over by another company in the sample were excluded from the analysis in years subsequent to the takeover.

62 Orbis does not report all holdings every year. We considered any holding of a particular percentage to last until a different ownership percentage was reported in a later year.

63 We used the barrels of oil equivalent (BOE) metric in this benchmarking. We estimated the revenue per BOE and used this number to estimate the revenue for the companies on which we did not have any revenue data. If (also) production data was missing for some firms, we assumed revenue growth to equal the average growth in the sample as compared to the year before.

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