



# Winding Down BC's Fossil Fuel Industries

Planning for climate justice in a zero-carbon economy

By Marc Lee & Seth Klein

MARCH 2020



CCPA  
CANADIAN CENTRE  
for POLICY ALTERNATIVES  
BC Office



CORPORATE  
MAPPING PROJECT

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For more information, visit [www.corporatemapping.ca](http://www.corporatemapping.ca).



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The CCPA-BC is located on unceded Coast Salish territory, including the lands belonging to the xʷməθʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish) and səílwətaʔ /Selilwitulh (Tsleil-Waututh) Nations.

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# Contents

Summary.....	5
Introduction.....	9
A snapshot of BC’s fossil fuel sectors.....	12
Oil and gas.....	12
Coal.....	16
Who’s who in BC fossil fuels.....	18
Framework for a managed wind-down.....	20
1. Establish carbon budgets and fossil fuel production limits.....	21
BC emissions in context.....	22
Shifting to carbon budgeting in BC.....	23
2. Invest in the domestic transition off of fossil fuels and develop a green industrial strategy.....	25
The domestic energy transition.....	25
Develop a green industrial strategy.....	27
Creating green jobs.....	28
3. Ensure a just transition for workers and communities.....	30
Lessons from other jurisdictions.....	30
Employment in fossil fuels in BC.....	32
4. Reform the royalty regime for fossil fuel extraction.....	36
Gas royalties.....	36
Coal royalties.....	38
Royalty reforms.....	39
Conclusion.....	41

# Summary

IMAGINE IT'S 2025 AND BECAUSE OF THE ESCALATING CLIMATE CRISIS, governments in Asia have declared ambitious new climate action plans, including the elimination of metallurgical coal for steel manufacturing within five years, to be replaced by state-of-the-art hydrogen-powered furnaces; and an aggressive transition off of natural gas and toward renewables within a decade. After a short period of time, BC's fossil fuel exports dry up, workers are laid off and local communities get hit with declines in both public- and private-sector jobs due to falling incomes.

It is this type of scenario that needs to inform planning for BC's fossil fuel industries (coal, oil and gas). This report's framework for a managed wind-down aspires to thoughtfully and strategically phase out the extraction and production of fossil fuels in BC, most of which are exported and burned elsewhere.

The BC government's continued interest in expanding production and export of its fossil fuels suggests little willingness to contemplate a managed wind-down so long as there are external buyers for BC resources. However, there is a risk that market conditions could change abruptly as other jurisdictions implement more aggressive climate policies and importers cut their consumption of fossil fuels.

Fully phasing out BC's fossil fuel industries over the next 20 to 30 years may be—for now at least—politically unthinkable. Nonetheless, this report aims to start a necessary conversation in BC. The managed wind-down framework is built on four pillars:

1. Establish carbon budgets and fossil fuel production limits;
2. Invest in the domestic transition from fossil fuels and develop a green industrial strategy;
3. Ensure a just transition for workers and communities;
4. Reform the royalty regime for fossil fuel extraction.

More than half of BC's gas production is exported to Alberta for oil sands processing, with additional exports to the United States. Only 9 per cent of production is consumed within BC. Virtually all of the province's coal is exported, with little domestic consumption. The bulk of production is higher-quality metallurgical coal used in steelmaking as opposed to thermal coal used to generate electricity.

Wind-down policies must acknowledge Indigenous rights and title, and key elements of a wind-down must be planned with First Nations. As BC has now embedded the United Nations

Fully phasing out BC's fossil fuel industries over the next 20 to 30 years may be—for now at least—politically unthinkable. Nonetheless, this report aims to start a necessary conversation in BC.

Declaration on the Rights of Indigenous Peoples into law, we must understand that fossil fuel resources—which we have until now called Crown or publicly owned—are generally on land that is unceded by First Nations or are subject to treaties that may be violated by the cumulative damages from fossil fuel extraction activities.

## 1. Establish carbon budgets and fossil fuel production limits

It is now widely understood that the world needs to keep a large share of fossil fuel reserves in the ground. A carbon budget is typically defined as a global maximum amount of carbon dioxide that can be released before critical temperature thresholds are surpassed.

BC should follow the United Kingdom, which has established a carbon budget framework for its climate action policies. Carbon budgets should be applied both to emissions released within BC's borders (the standard way of measuring emissions) and for extracted carbon (all fossil fuels removed from BC soil). And they should be used to *map out a schedule* to bring production down from current levels to zero by 2050. Planning within a carbon-budgeting framework should also entail a carbon test for major infrastructure projects.

Carbon budgeting would compel policy-makers to confront the classic economic problem of allocating resources subject to a budget constraint. Ideally, a carbon budget pushes policy-makers toward strategic use of remaining fossil fuel reserves, as opposed to the current Wild West mindset that seeks to extract and export as much as possible, exacerbating global oversupply problems.

By approving LNG Canada and other liquefied natural gas (LNG) proposals, the government is requiring all other sectors of the economy to reduce their emissions even more if BC is to meet its 2030 greenhouse gas emission target. Looking further out, locked-in emissions from LNG Canada alone will make it extremely difficult, if not impossible, for BC to meet its 2040 and 2050 targets. The BC government's support for LNG as a growth sector for the economy is ethically untenable and an economic vulnerability given the need for global decarbonization.

## 2. Invest in the domestic transition from fossil fuels and develop a green industrial strategy

Decarbonization is increasingly seen as a new framework for economic development. A forward-thinking green industrial strategy, informed by climate justice considerations, should serve as a template for growing jobs and incomes in the transition to zero-carbon. Shifting investment patterns away from fossil fuels and toward green alternatives is essential for a managed wind-down.

BC should commit to fully phasing out fossil fuels for domestic purposes to clearly signal that we are on a wind-down path. There is potential to leverage the government's CleanBC plan into a more comprehensive industrial strategy, starting with domestic emissions in buildings, transportation and industry. This means, for example, no new buildings (residential, commercial or public like hospitals and schools) should be allowed to use gas or tie into gas pipelines.

Mapping decarbonization pathways for large industry points to a range of existing and near-term technology options that move us toward a net-zero economy. Getting on to these technology pathways will require government intervention in the form of carbon pricing, incentives, support for research and development and tools like government procurement to spur demand. But it will also require strong regulations and mandatory targets for each industrial sector.

Carbon budgets should be applied both to emissions released within BC's borders and for extracted carbon.

BC's plentiful clean electricity supply and storage capacity are a major advantage in this transition. The BC government should stop making commitments to provide electricity to LNG plants and fracking operations, and instead use this electricity to supplant the existing use of fossil fuels in industrial, commercial and residential facilities.

A lot of work will be required to make the transition from fossil fuels. The best defense against job losses in fossil fuel industries is a good offense: efforts to create new green jobs in areas that decarbonize the economy and more inherently green jobs in the public sector, such as child care and seniors' care.

Dedicated annual capital funding over a 20- to 30-year transition period will be needed to create new jobs like building new transit lines, retrofitting buildings and adaptation. BC should aim to invest 2 per cent of its GDP annually in these areas (about \$6 billion in 2019), which would yield at least 42,000 direct and indirect jobs in a range of green economic activity.

### 3. Ensure a just transition for workers and communities

While the transition before us will see a net increase in jobs overall, they will not be the same jobs in the same places. The bigger challenge is that direct fossil fuel jobs are highly concentrated in certain regions of BC, and green investments (such as a new transit line) may not be in the same geographic areas. Historically, industrial transitions have been characterized by false promises and inadequate funding. The next transition must be different to ensure a just transition for workers and communities.

In recent years, just transition has shifted from the abstract to actual policy and packages for workers, funded by governments. Alberta funded a landmark just transition plan for workers and communities producing coal for electricity generation. In 2018, an agreement between the Spanish government and unions representing Spanish coal workers was developed that has been praised as a precedent for responsible transition. These experiences provide helpful models for BC.

With a managed wind-down over 20 to 30 years, most of the heavy lifting can be accomplished through attrition, as existing workers hit retirement age, although ensuring decent and stable pension income is essential. Just-transition strategies must include efforts to maintain employment in areas where jobs are likely to be lost. In this regard, remediation of old coal mines and oil and gas wells should be a major category of reinvestment. BC can also be more focused on deriving additional value from renewable-resource sectors, in particular forestry.

Pro-active planning and collaboration across government, industry, unions and Indigenous communities is critical and should enhance income security for workers, support early retirement initiatives for some, help people through retraining, and connect people to new jobs. In addition, community supports and development need to be major parts of any just-transition plan. In this regard, BC has an existing model in the Columbia Basin Trust that could be applied to regions with a disproportionate burden from a wind-down.

### 4. Reform the royalty regime for fossil fuel extraction

BC's royalty regime for fossil fuels is aimed at encouraging and ramping up these industries, not winding them down. This regime must be overhauled to maximize returns from the extraction of this collectively owned resource, revenues that, for the next 20 to 30 years, can support the transition to a zero-carbon society.

Pro-active planning and collaboration across government, industry, unions and Indigenous communities is critical and should enhance income security for workers, support early retirement initiatives for some, help people through retraining, and connect people to new jobs.

Royalty reform can ensure public benefits and reduce incentives for companies to tap marginal wells or those with high environmental costs. Key directions for reform include:

- A moratorium on issuing new leases or tenures.
- Increase royalty rates and set a minimum royalty per unit extracted (unlike now, where the royalty rate is primarily based on the price of gas).
- Establishment of a Wind-Down Fund from increased royalty revenues.
- Eliminate subsidies, including: credits against royalties for fracking and associated infrastructure in the gas industry, low industrial electricity rates through BC Hydro, and low industrial usage charges for water.
- Shift to public ownership, including the development of Crown corporations that can capture greater public benefits from development, while operating within a wind-down schedule.
- For the remaining years that we extract fossil fuels, new revenue-sharing agreements must allot income from resource extraction between Indigenous communities and the public at large.

## CONCLUSION

To date, BC's role as a major exporter of fossil fuels has been sidestepped, and political parties have not been willing to engage in an honest conversation about what is needed to get to net-zero emissions by mid-century.

This report outlines nine main directions and a vision for a managed wind-down.

1. Push for a global agreement on limits to fossil fuel extraction.
2. Develop a carbon budget framework for BC.
3. Plan pathways to zero carbon emissions.
4. Fully phase out BC's domestic use of natural gas.
5. Invest in green infrastructure and alternatives.
6. Develop new Crown corporations to drive the transition.
7. Create a Just Transition Fund to support worker transitions.
8. Reform the royalty regime.
9. Place a moratorium on new leases.

Fundamentally, BC must live within a declining carbon budget and must make decisions within that budget to promote a strong and equitable economy. This will require investments in green infrastructure, skills and training, and development of a decarbonization industrial strategy. The wind-down approach developed in this report is informed by climate justice to ensure that the transition is fair, that the path forward is set in partnership with Indigenous people, and that no one—in particular workers and communities in the existing fossil fuel sectors—is left behind.

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# Introduction

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It is this type of scenario that needs to inform planning for BC's fossil fuel industries (coal, oil and gas). While the science is clear and compelling that the world must rapidly reduce greenhouse gas (GHG) emissions to "net zero" by mid-century,<sup>2</sup> in BC (and Canada as a whole) there has been no government willing to stand up to the powerful vested interests in the fossil fuel production sector. Economic development remains premised on increasing fossil fuel extraction and exports, with alternative pathways, at best, advanced in parallel to (but not in place of) the central priority of extraction.

Already, one-quarter of BC's total GHG emissions are from the extraction and processing of fossil fuels, the vast bulk of which are from natural gas production.<sup>3</sup> BC's commitment to supply a liquefied natural gas (LNG) export industry is pushing the province beyond its legislated GHG targets. The BC government is seeking emission reductions by powering upstream operations with "clean" electricity while continuing to be a growing exporter of fossil fuels. This approach to managing the climate costs of fossil fuel extraction is ultimately untenable.

Major investments in BC to expand gas production are a local manifestation of a global fossil fuel oversupply problem that threatens to undermine the objective of the 2015 Paris Agreement on climate change to hold "the increase in the global average temperature to well below 2°C

One-quarter of BC's total GHG emissions are from the extraction and processing of fossil fuels, the vast bulk of which are from natural gas production.

- 1 "How Hydrogen Could Solve Steel's Climate Test and Hobble Coal," Bloomberg, August 29, 2019, <https://www.bloomberg.com/news/articles/2019-08-29/how-hydrogen-could-solve-steel-s-climate-test-and-hobble-coal>
- 2 The term "net zero" for carbon dioxide (CO<sub>2</sub>) emissions means removals of CO<sub>2</sub> from the atmosphere equivalent to any remaining emissions from fossil fuel use. These removals include planting additional trees but also various forms of carbon capture and storage. The underlying assumption is that such technology will be available at economical cost and at sufficient scale in the second half of the century, a proposition that is currently more hope than reality. A widely assumed approach in climate modelling is bioenergy with carbon capture and storage (BECCS), which burns organic matter for energy but then captures the emissions and buries them underground.
- 3 Environment and Climate Change Canada, "Table A12-11: GHG Emissions for British Columbia by Canadian Economic Sector, 1990-2017," D Tables, <http://data.ec.gc.ca/data/substances/monitor/canada-s-official-greenhouse-gas-inventory/D-Tables-Canadian-Economic-Sector-Provinces-Territories/>.

above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels” (Article 2).<sup>4</sup>

For example, Shell, the lead corporation behind the LNG Canada development in Kitimat, is forecast to increase its global gas production by one-quarter by 2030 and its crude oil production by more than one-half.<sup>5</sup> Even amid growing evidence of climate change impacts and widespread demonstrations calling for climate action, Shell plans to launch 35 new oil and gas projects by 2025. Its CEO recently stated, “Despite what a lot of activists say, it is entirely legitimate to invest in oil and gas because the world demands it.”<sup>6</sup>

The times, however, are changing, and BC will need to change with them. This paper contemplates what is—for now at least—the politically unthinkable: phasing out BC’s fossil fuel industries over the next 20 to 30 years. This idea of a managed wind-down is a relatively new proposition, one consistent with emerging supply-side (or “keep it in the ground”) policies, which aim to restrict production and export of fossil fuels. Such policies complement demand-side policies (such as carbon taxes, fuel standards and building regulations) aimed at reducing emissions from domestic consumption of fossil fuels. Together, they would support a coordinated global move to fulfill the promise of the 2015 Paris Agreement.

Protests against bitumen pipelines, new coal mines and fracking are all examples of taking aim at the fossil fuel supply chain. By considering a managed wind-down, this paper focuses more on what we dig up for export—coal, oil and gas extraction—rather than the fossil fuels we burn for domestic uses, although there is some overlap. This builds on research that finds that Canada’s contribution to global climate change doubles when we consider the carbon extracted and exported from Canadian soil, rather than just the emissions within Canada’s borders (the conventional approach to counting emissions).<sup>7</sup>

Fossil fuel producers are no ally in this transition, and owing to their political influence, they play an oversized role in shaping policy and delaying meaningful action.<sup>8</sup> Because fossil fuel interests will fight a managed wind-down tooth and nail, it will take much stronger political will and public oversight (i.e., regulation and management) of our fossil fuel resources and industrial activity in order to undertake the wind-down outlined in this paper.

The BC government’s continued interest in expanding production and export of its fossil fuels suggests little willingness to contemplate a managed wind-down so long as there are external buyers for BC fossil fuels. Yet these policies contain significant risks. Market conditions could change abruptly as other jurisdictions implement more aggressive climate policies and importers cut their consumption of fossil fuels.

Because fossil fuel interests will fight a managed wind-down tooth and nail, it will take much stronger political will and public oversight of our fossil fuel resources and industrial activity in order to undertake a wind-down.

4 United Nations Framework Convention on Climate Change, Paris Agreement, document FCCC/CP/2015/L.9 (December 2015), <https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf>.

5 Jonathan Watts, Jillian Ambrose and Adam Vaughan, “Oil Firms to Pour Extra 7m Barrels per Day into Markets, Data Shows,” *Guardian*, October 10, 2019, <https://www.theguardian.com/environment/2019/oct/10/oil-firms-barrels-markets>.

6 Rob Bousso and Dmitry Zhdannikov, “Exclusive: No Choice but to Invest in Oil, Shell CEO Says,” *Reuters Business News*, October 14, 2019, <https://www.reuters.com/article/us-shell-climate-exclusive/exclusive-no-choice-but-to-invest-in-oil-shell-ceo-says-idUSKBN1WT2JL>.

7 These represent two different approaches to counting emissions and attributing them to a jurisdiction. See Marc Lee, *Extracted Carbon: Re-examining Canada’s Contribution to Climate Change through Fossil Fuel Exports* (Vancouver, BC: CCPA-BC, Corporate Mapping Project and Parkland Institute, 2017), <https://www.policyalternatives.ca/publications/reports/extracted-carbon>.

8 Nicholas Graham, William Carroll and David Chen, *Big Oil’s Political Reach: Mapping Fossil Fuel Lobbying from Harper to Trudeau* (Vancouver, BC: CCPA-BC, Parkland Institute and Corporate Mapping Project, 2019), <https://www.corporatemapping.ca/lobbying/>.

BC communities that are dependent on fossil fuel extraction and exports are highly vulnerable in the growing movement toward decarbonization. Major shifts in global climate policy and energy demand require BC to take a more proactive and planned approach to fossil fuel extraction. Unjust transitions permeate Canadian history—whether from plant closures due to industrial consolidation, commodity price busts or free-trade agreements. Without advance planning, change may come from the outside, and too often workers end up being cast aside.

What would a managed wind-down look like? This paper aims to provide an initial road map to align BC's fossil fuel extraction with these new realities, drawing on supply-side measures to restrict production eventually to zero. The next section provides an overview of BC's fossil fuel industries: where they are located, trends in production and exports, and the province's reserves. Then we turn to a framework for managed wind-down built on four pillars:

- Establish carbon budgets and fossil fuel production limits;
- Invest in the domestic transition off of fossil fuels and develop a green industrial strategy;
- Ensure a just transition for workers, being mindful of the regional nature of resource employment;
- Enhance public returns from resource development through tax and royalty reform to fund the transition.

There are, of course, many other environmental and health reasons for winding down fossil fuel industries, apart from climate change. Mining coal has adverse health impacts on workers, and burning it has adverse impacts on people exposed to the resulting air pollution. Pipelines rupture and coal trains derail, causing damage to habitat and ecosystems even when far away from human settlements. Gas extraction can contaminate aquifers and have long-term impacts on freshwater supplies. A plan to wind down fossil fuel extraction and export will thus have substantial co-benefits besides reducing greenhouse gas emissions, but for the purposes of this paper we primarily focus on carbon or GHG emission reductions.

BC communities that are dependent on fossil fuel extraction and exports are highly vulnerable in the growing movement toward decarbonization. Major shifts in global climate policy and energy demand require BC to take a more proactive and planned approach to fossil fuel extraction.

# A snapshot of BC's fossil fuel sectors

BC gas production hit a record high of 59 billion cubic metres in 2018.

FOSSIL FUELS REMAIN THE DOMINANT WAY ENERGY IS CONSUMED around the world. BC is both a consumer of fossil fuels as well as a producer and exporter selling to global markets. This section reviews the geography and economics of BC's fossil fuel extraction and export sectors. Additional data and information about carbon emissions and employment is included later as part of the wind-down framework.

## Oil and gas

BC's oil and gas production is located in the Northeast, to the east of the Rocky Mountains and adjacent to Alberta.<sup>9</sup> Geologically, this is part of the Western Canada Sedimentary Basin (WCSB), a formation that extends to Saskatchewan and includes vast reserves of fossil fuels.

BC gas production hit a record high of 59 billion cubic metres in 2018.<sup>10</sup> Whereas a couple decades ago it appeared that BC would soon run out of conventional natural gas supplies, the industry has been transformed since the mid-2000s by the adoption of unconventional hydraulic fracturing and horizontal drilling techniques (known as fracking). This involves the injection of water, sand and chemicals several kilometres underground to tap previously inaccessible gas trapped in rock formations. About 87 per cent of BC's gas production is not conventional natural gas but unconventional or fracked gas.<sup>11</sup>

Extracted fossil fuels are processed locally, removing sulphur and carbon dioxide, and separating out oil, gas and "natural gas liquids" (intermediate hydrocarbon chains such as ethane,

9 In this paper we simply use the term "gas" as the term "natural gas" lends itself to greenwashing and the idea that it is a "clean" fossil fuel.

10 BC Ministry of Energy, Mines and Petroleum Resources, *Production and distribution of Natural Gas in B.C.*, <https://www2.gov.bc.ca/gov/content/industry/natural-gas-oil/statistics>.

11 BC Oil and Gas Commission, *British Columbia's Oil and Gas Reserves and Production Report: 2017* (Fort St. John, BC: BC Oil and Gas Commission, 2019), <https://www.bcogc.ca/node/15405/download>.

propane, butane, isobutane, pentane and condensate) for distribution via pipelines.<sup>12</sup> There are 121 gas-processing facilities in BC.<sup>13</sup> Condensate (a natural gas liquid used to dilute bitumen into a form that can pass through pipelines) production in BC has swelled in recent years, with 2.4 million cubic metres produced in 2018, almost double 2017 production levels and 10 times 2008 production.<sup>14</sup>

BC production of oil is fairly limited and has been declining. In 2018, there were 1.2 million cubic metres (7.6 million barrels) of oil produced in BC.<sup>15</sup> Canada as a whole produces 4.6 million barrels *per day*,<sup>16</sup> so BC's production was equivalent to less than two days of Canadian output. Pembina Pipelines operates an oil pipeline from northeastern BC to the Husky refinery in Prince George, which produces refined petroleum products (e.g., gasoline and diesel) for the region, then connects to the Trans Mountain Pipeline (TMP) at Kamloops.

While BC does not produce much oil, the province receives crude oil and other petroleum products through the TMP from Alberta. For the southern BC market, crude oil is processed at the Parkland refinery in Burnaby into gasoline, diesel and jet fuel, but additional refined products are shipped via the TMP and rail from Edmonton refineries, supplemented by imports from the United States.<sup>17</sup> The TMP's capacity is approximately 300,000 barrels per day, with more than half of the shipments crossing the border at Sumas, headed for Washington state refineries. At the Westridge dock in Burnaby, crude from the TMP is loaded onto tankers primarily heading to the US West Coast. An expansion of the TMP is under way but has faced significant resistance from the BC government, First Nations and environmental groups.

Technological changes in fracking and horizontal drilling have enabled substantially higher North American gas production and low gas prices. In 2017 some 92 per cent of all wells drilled, and 77 per cent of gas produced, were in the Montney formation, near Fort St. John (Figure 1).<sup>18</sup> Development in the Horn River basin is now considered uneconomic due to low gas prices, and thus production there has fallen in recent years. In the Montney, producers have focused on drilling portions that are rich in natural gas liquids, for which there has been a premium price in Alberta, where gas liquids are used to dilute bitumen for pipeline transportation.<sup>19</sup>

Condensate production in BC has swelled in recent years, with 2.4 million cubic metres produced in 2018, almost double 2017 production levels and 10 times 2008 production.

12 Oil, gas and natural gas liquids are all hydrocarbons (molecules of hydrogen and carbon), each of which has a slightly different chemical formula. Methane is commonly known as natural gas, and when chilled to liquid form is "liquefied natural gas" (LNG), not to be confused with "natural gas liquids."

13 BC Oil and Gas Commission, "Facility Activity Tab," section 4.3 in *Oil and Gas Activity Application Manual* (Fort St. John, BC: BC Oil and Gas Commission, 2019), <https://www.bcogc.ca/bts-documentation/apps-manual/chapter-4/43-facilities>.

14 BC Stats, "Historical Stats," in *BC Oil Production Report*, <https://www2.gov.bc.ca/gov/content/industry/natural-gas-oil/statistics>.

15 Ibid.

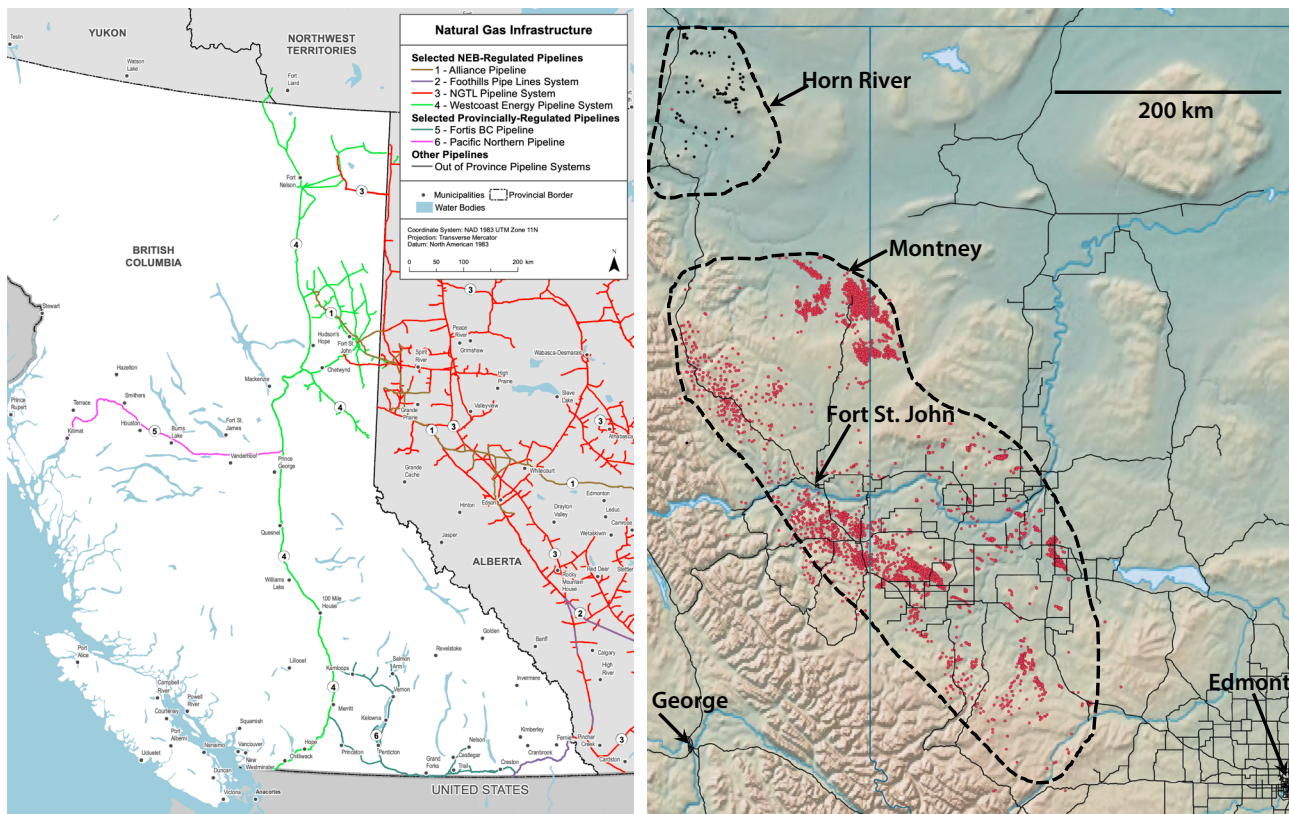
16 "Crude Oil Facts," Energy Data and Analysis, Natural Resources Canada, accessed November 4, 2019, <https://www.nrcan.gc.ca/science-data/data-analysis/energy-data-analysis/energy-facts/crude-oil-facts/20064>.

17 A report by the BC Utilities Commission provides a detailed description of the supply chain for gasoline and diesel in BC, although numerous details are still missing because of commercial confidentiality issues. BCUC, *British Columbia Utilities Commission: Inquiry into Gasoline and Diesel Prices in BC; Final Report* (Vancouver, BC: BCUC, 2019), [https://www.bcuc.com/Documents/Proceedings/2019/DOC\\_55251\\_BCUC-Inquiry-Gasoline-Diesel-Report-FINAL-web.pdf](https://www.bcuc.com/Documents/Proceedings/2019/DOC_55251_BCUC-Inquiry-Gasoline-Diesel-Report-FINAL-web.pdf).

18 BC Oil and Gas Commission, 2019.

19 Ben Parfitt, "The Petro State Lackey: How BC's Zest for Natural Gas Fuels Alberta's Oil Sands," *Policy Note* (blog), CCPA-BC, August 8, 2018, <https://www.policynote.ca/the-petro-state-lackey-how-bcs-zest-for-natural-gas-fuels-albertas-oil-sands/>.

Figure 1: BC gas production and interconnections with Alberta



Sources: L) National Energy Board, *Natural Gas and Infrastructure Map*, figure 5 in “Provincial and Territorial Energy Profiles — British Columbia,” Canada Energy Regulator, <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmpfrls/bc-eng.html>

R) David Hughes, *A Clear Look at BC LNG: Energy Security, Environmental Implications and Economic Potential* (Vancouver, BC: CCPA-BC, 2015), <https://www.policyalternatives.ca/publications/reports/clear-look-bc-lng>.

Note: Red dots are existing Montney wells and black dots are Horn River wells. The approximate limits of the plays are indicated; however, the prospectivity within those limits is by no means uniform across the area.

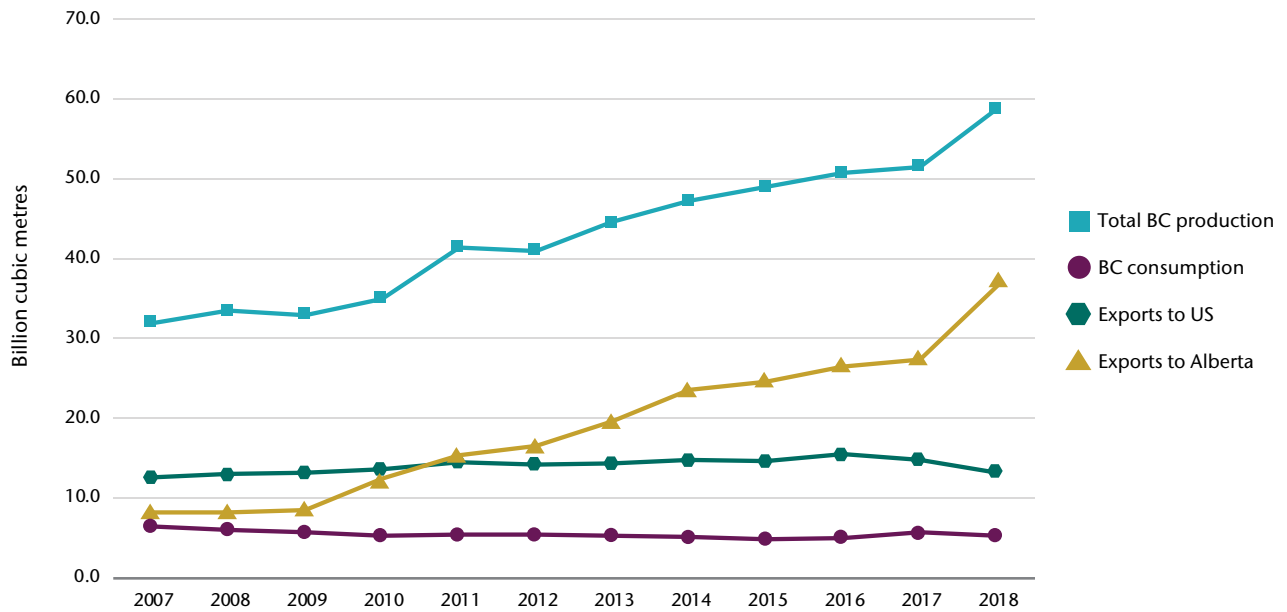
Figure 2 shows total BC gas production, consumption and exports to the US and Alberta. Despite declining prices, gas production surged by 84 per cent between 2007 and 2018 (blue line).<sup>20</sup> Metro Vancouver is connected via Enbridge’s Westcoast pipeline system, which notably experienced an explosion near Prince George in late 2018 and disrupted supplies to domestic and US customers.<sup>21</sup>

Interestingly, BC’s own consumption of gas (residential, commercial and industrial uses) accounted for only 9 per cent of BC production in 2018, and has fallen somewhat, from 6.5 to 5.3 billion cubic metres between 2007 and 2018 (purple line). In terms of domestic gas distribution, FortisBC has 1.1 million customers in BC, spanning 135 communities, and Pacific Northern Gas has 40,000 customers in Northern BC.

20 BC Ministry of Energy, Mines and Petroleum Resources, *Production and Distribution of Natural Gas in B.C., 2007 to 2018*, <https://www2.gov.bc.ca/gov/content/industry/natural-gas-oil/statistics>.

21 Jesse Ferreras, “Pipeline Explosion Near Prince George Forces about 100 Evacuations from First Nation Community,” *Global News*, October 10, 2018, <https://globalnews.ca/news/4531677/prince-george-fire-evacuation/>.

Figure 2: BC gas production, consumption and exports, 2007–18



Source: Authors' calculations based on supply and distribution data from the BC Ministry of Energy, Mines and Petroleum Resources. <http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-gas-oil/production-statistics/gasnew.xls>

BC gas exports to the United States have declined somewhat over the past couple of years to 13.2 billion cubic metres in 2018, when they accounted for 22 per cent of BC production. Most BC gas production is exported to Alberta, where gas is used as input for processing oil-sands deposits into crude oil for export, and also moved farther east for domestic consumption and export to the US. Between 2007 and 2018, gas exports to Alberta more than tripled from 8.2 to 36.6 billion cubic metres, an increase of 344 per cent (yellow line).

Thus, BC's gas wind-down is intimately connected with a parallel wind-down needed in Alberta.

BC is looking to LNG exports as a major new industrial sector. The Shell-led LNG Canada consortium includes the major Asian buyers for BC's gas (South Korea's Kogas, Japan's Mitsubishi, Malaysia's Petronas, and PetroChina) and will export 14 million tonnes of LNG per year (Phase One) when the facility is complete in 2025. Smaller facilities in southern BC could soon join LNG Canada as exporters, including the Woodfibre LNG plant near Squamish. FortisBC has a small LNG plant in Delta (Tilbury Island), which was recently expanded with the aim of exporting LNG.<sup>22</sup>

A new AltaGas facility in Prince Rupert started operations in 2019 to process and export liquefied propane gas (LPG), mostly to Asia. Some 50 to 60 CN rail cars per day of pressurized liquid propane are offloaded at the facility to be cooled into LPG and exported by tanker, approximately

BC's gas wind-down is intimately connected with a parallel wind-down needed in Alberta.

22 "Liquefied Natural Gas (LNG) Facilities," FortisBC, accessed October 21, 2019, <https://www.fortisbc.com/about-us/facilities-operations-and-energy-information/liquefied-natural-gas-facilities>.

1.2 million tonnes per year.<sup>23</sup> This process is similar to LNG, but with less energy and equipment required.

BC's remaining gas reserves (as of the end of 2017) were 1,355 billion cubic metres, of which 77 per cent is unconventional supply.<sup>24</sup> This is equivalent to 23 years of production at 2018 rates, although estimates of reserves are constantly being updated (typically upward) as new discoveries are made. By region, 73 per cent of gas reserves are in the Montney formation. In addition, BC has reserves of 18 million cubic metres of oil, 41 million cubic metres of condensate and 125 million cubic metres of LPG.<sup>25</sup>

## Coal

BC has a long history of coal mining beginning in the mid-1800s. With the advent of railways, the Kootenays emerged as BC's major coal-producing region, but Vancouver Island also has a history of coal mining. Currently, the bulk of BC coal production comes from five mines in the Kootenays operated by Teck Resources, which together accounted for 26 million tonnes out of 31 million tonnes of overall BC production in 2018.<sup>26</sup> A smaller amount of coal production is located in BC's northeast, south of Fort St. John, which added five million tonnes in 2018.

BC coal is an interesting case because it is virtually all exported, with little domestic consumption. The vast bulk of production is higher-quality metallurgical coal used for steelmaking, as opposed to thermal coal used for electricity generation. A thermal coal mine on Vancouver Island, Quinsam, reopened in late 2017 after a closure of 20 months. It supplies coal as an input into cement production at the Lehigh cement plant in Delta and the Ash Grove cement plant in Seattle.<sup>27</sup>

Coal production levels in BC have fluctuated and are impacted by global commodity prices. Overall, production has been relatively flat over the past 20 years, averaging about 26 million tonnes of coal per year, which is exported primarily to Asia. Depending on the year, coal accounts for one-half to two-thirds of the value produced from all mining activity in BC.

Coal exports have historically been valued at \$3 billion to \$6 billion per year depending on the year.<sup>28</sup> In 2017, coal was BC's second-largest commodity export, with value slightly less than lumber exports. The share of coal mining in BC's GDP, however, is much less: under 1 per cent between 2014 and 2016 (the last years for which we have data).<sup>29</sup>

BC coal is an interesting case because it is virtually all exported, with little domestic consumption.

23 AltaGas, *Ridley Island Propane Export Facility: Project Description* (Calgary, AB: AltaGas, 2016), [https://www.altagas.ca/sites/default/files/2016-07/AltaGas%20Propane%20Export%20Facility%20Project%20Description\\_Final.pdf](https://www.altagas.ca/sites/default/files/2016-07/AltaGas%20Propane%20Export%20Facility%20Project%20Description_Final.pdf).

24 BC Oil and Gas Commission, 2019.

25 Ibid.

26 BC Ministry of Energy, Mines and Petroleum Resources, *British Columbia Coal Industry Overview 2018* (Victoria, BC: Ministry of Energy, Mines and Petroleum Resources, 2019), information circular 2019-02, [http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS\\_IC2019-02.pdf](http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS_IC2019-02.pdf).

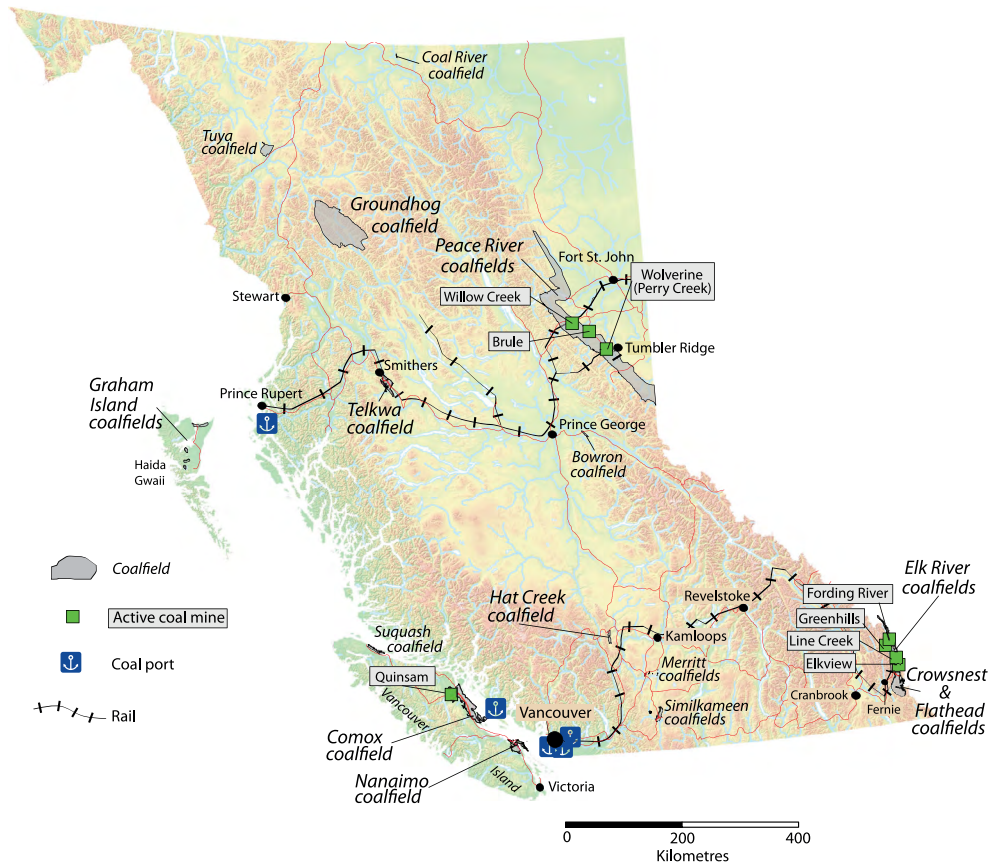
27 Eric de Place and Ahren Stroming, "Is Coal Still Needed in the Pacific Northwest? Proposal to Reopen King County Mine Reveals How Coal Figures into Cascadia's Modern Economy," *Articles in Climate & Energy*, Sightline Institute, November 28, 2018, <https://www.sightline.org/2018/11/28/is-coal-still-needed-pacific-northwest-john-henry-no-1-mine/>.

28 BC Stats, *Annual BC Exports*, November 5, 2019, <https://www2.gov.bc.ca/gov/content/data/statistics/business-industry-trade/trade/trade-data>.

29 Statistics Canada, Table 36-10-0402-01 Gross domestic product (GDP) at basic prices, by industry, provinces and territories (x 1,000,000), <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610040201>.



Figure 3: Coal fields and operating coal mines in British Columbia



Source: BC Ministry of Energy, Mines and Petroleum Resources, British Columbia Coal Industry Overview 2018 (Victoria, BC: Ministry of Energy, Mines and Petroleum Resources, 2019), information circular 2019-02, fig. 2, [http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS\\_IC2019-02.pdf](http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS_IC2019-02.pdf).

Coal is transported by rail from the Kootenays to export terminals in Delta (Westshore Terminals) and North Vancouver (Neptune Terminals) for loading onto ships going to Asia. From the north-east, coal travels by rail to Prince Rupert (Ridley Terminals). Plans for increased export capacity at Neptune Terminals and a new coal export terminal at Fraser Surrey Docks were vigorously opposed by citizen groups, and expansion plans have been put on hold amid low export prices.

BC ports have also been used for trans-shipment of thermal coal from other jurisdictions in the US and Alberta. This became a contentious point during the 2017 BC election campaign when premier Christy Clark proposed a ban on thermal coal being shipped through BC ports, regardless of origin, including Alberta coal exports.

While this measure would have required federal cooperation, Clark went further, stating that if BC had to act alone, it would institute a \$70-per-tonne carbon levy on coal exports trans-shipped through BC. The levy would have been imposed by regulation under the provincial Greenhouse Gas Industrial Reporting and Control Act, and at the time was more than double BC's carbon tax. The levy would not apply to metallurgical coal but would effectively make it uneconomic to ship thermal coal via BC.

“I think in the fight against climate change, we all have a responsibility,” Clark said at the time (arguably disingenuously).<sup>30</sup> “The levy will account for the emissions from the extraction, processing, transportation and combustion of thermal coal handled by BC terminals.”<sup>31</sup> While political theatre played a large role in Clark’s stated plan, an aggressive agenda on coal exports by the current BC government would be welcome.

## WHO’S WHO IN BC FOSSIL FUELS

The BC government’s December 2018 CleanBC strategy takes important steps toward reducing greenhouse gas emissions within BC’s borders, with most of the focus on emission reductions in buildings and personal transportation. However, industrial emissions, including those from fossil fuel production, make up three-fifths (59 per cent) of BC’s total.<sup>32</sup>

There are a large number of companies involved in various aspects of fossil fuel production in BC, most of which will have little or no name recognition for a typical British Columbian. Much of the fossil fuel activity in BC is an extension of Alberta’s. For example, the BC Oil and Gas Commission lists 239 oil and gas operators in BC, of which 183 are headquartered in Calgary, compared to just 42 based in Metro Vancouver, nine in Fort St. John and three in Fort Nelson.<sup>33</sup>

Table 1 shows the top 20 companies in coal, oil and gas in BC, based on industrial facility data released by the BC government.<sup>34</sup> The table includes companies with upstream oil and gas production, pipeline transmission, refineries and coal mines. The top 20 accounted for 12 million tonnes of CO<sub>2</sub> equivalent emissions in 2017, or one-fifth of BC’s total emissions. Note that most of these companies are engaged in exporting fossil fuels, which means that the much larger carbon emissions embodied in those fossil fuel exports are counted in the jurisdictions where they are combusted (Alberta and the US for gas, Asian countries for coal), not in BC’s inventory.

Enbridge, which took over Spectra Energy’s assets in 2017, tops the list as the province’s biggest polluter, with more than four million tonnes of CO<sub>2</sub> emitted in 2017. Next up is Teck Coal, responsible for 1.7 million tonnes of CO<sub>2</sub>, and this table does not include another 580,000 tonnes of emissions from Teck’s metal operations. Beware of foxes appointed to guard the henhouse: Marcia Smith, a Teck senior vice president, co-chaired the BC government’s Climate Solutions and Clean Growth Advisory Committee, and the committee even held meetings at Teck’s downtown Vancouver office.

Beware of foxes appointed to guard the henhouse: a Teck senior vice president co-chaired the BC government’s Climate Solutions and Clean Growth Advisory Committee, and the committee even held meetings at Teck’s downtown Vancouver office.

30 Brent Jang, “Christy Clark’s Proposed Tax on Thermal Coal Would Hurt Alberta, U.S.,” *Globe and Mail*, May 2, 2017, <https://www.theglobeandmail.com/news/british-columbia/clark-wants-us-coal-hit-with-carbon-tax-in-wake-of-softwood-levy/article34875996/>.

31 Vaughn Palmer, “Christy Clark Takes Firm Stand on U.S. Thermal Coal,” *Vancouver Sun*, May 2, 2017, <http://vancouver.sun.com/opinion/columnists/vaughn-palmer-christy-clark-takes-firm-stand-on-u-s-thermal-coal>.

32 Industrial emissions exclude agriculture, residential and commercial buildings, waste, and household transportation. Environment and Climate Change Canada, *National Inventory Report 1990-2017: Greenhouse Gas Sources and Sinks in Canada* (Ottawa, ON: Environment and Climate Change Canada, 2019), part 3, 53, table A12-11, [http://publications.gc.ca/collections/collection\\_2019/eccc/En81-4-2017-3-eng.pdf](http://publications.gc.ca/collections/collection_2019/eccc/En81-4-2017-3-eng.pdf).

33 BC Oil and Gas Commission, *Active Oil and Gas Operators (CSV)*, Accessed October 23, 2019, <https://www.bcogc.ca/industry-zone/activity-levels>.

34 BC requires facilities with more than 10 kilotonnes of CO<sub>2</sub> equivalent emissions to report their emissions, so this list may miss smaller facilities that are owned by the companies named. Data from BC Ministry of Environment, *2017 BC Industrial Facilities GHG Report Update*, <https://www2.gov.bc.ca/gov/content/environment/climate-change/data/industrial-facility-ghg>.

**Table 1: BC's top 20 fossil fuel industry emitters**

	Total emissions (CO <sub>2</sub> equivalent)
Enbridge	4,041,392
Teck Coal	1,691,938
Canadian Natural Resources	1,198,350
Encana Corporation	801,683
Petronas Energy	587,693
Parkland Refining	539,770
Conuma Coal	505,692
Tourmaline Oil	450,951
Arc Resources	362,693
Transcanada Pipelines	354,831
Shell Canada	266,437
AltaGas	185,864
Predator Oil	171,409
Cenovus Energy	157,692
Canbriam Energy	149,765
Husky Oil Operations	143,676
FortisBC Energy	137,903
Crew Energy	134,047
Black Swan Energy	103,897
Kelt Exploration	85,397
<b>Top 20 total</b>	<b>12,071,080</b>

Source: BC Ministry of Environment, *2017 BC Industrial Facilities GHG Report Update*, <https://www2.gov.bc.ca/gov/content/environment/climate-change/data/industrial-facility-ghg>.

Notes: These emissions are from fossil fuels only, not including biomass. Emissions in CO<sub>2</sub> equivalent include greenhouse gases other than carbon dioxide (for example, methane), and these have been converted using standard conversion factors. Progress Energy and Spectra Energy are reported in the greenhouse gas inventory, but the table has been modified to reflect Progress's name change to Petronas Energy in 2018, and the Spectra and Enbridge merger in February 2017. In October 2019 Encana announced it would be moving its headquarters to the US and rebranding itself as Ovintiv.

# Framework for a managed wind-down

The focus of this section is on fossil fuel production and exports, an area that has been neglected by the new CleanBC climate plan's more conventional demand-side approach.

THE PREVIOUS SECTION SHOWS THAT FOSSIL FUEL PRODUCTION for export is substantial, and that fracked gas and LNG in particular are viewed as a growth sector for the economy. This is ethically untenable and a real economic vulnerability given the need for global decarbonization. Far better to contemplate a phase-out of fossil fuel production rather than abrupt shifts that may occur due to developments in export markets.

This section develops a framework for a managed wind-down based on four interlocking pieces:

- Establish carbon budgets and fossil fuel production limits;
- Invest in the domestic transition off of fossil fuels and develop a green industrial strategy;
- Ensure a just transition for workers, being mindful of the regional nature of resource employment;
- Enhance public returns from resource development through tax and royalty reform to fund the transition.

The focus is on fossil fuel production and exports, an area that has been neglected by the new CleanBC climate plan's more conventional demand-side approach (i.e., reducing emissions within BC's borders, mostly in buildings and from transportation). That said, we also address how British Columbians can phase out our own use of natural gas, the less than 10 per cent of BC gas production that is consumed within the province. The main recommendations are summarized in the conclusion of this paper.

The intersection of wind-down policies with Indigenous rights is an important consideration. The BC government recently passed legislation to align BC laws with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). This legislation promises foundational change in policy-making for BC, and it obviously would have implications for the joint decision-making and management of BC fossil fuel resources. This includes ensuring that regulations and laws are compliant with UNDRIP, as well as providing Indigenous people with the resources and capacity for full participation in decision-making.

Precisely what consent and co-governance should look like in relation to a managed wind-down is beyond the scope of this paper. Key elements of a wind-down would need to be planned

with First Nations whose territories and ability to practise and preserve their cultures have been so heavily impacted by the cumulative impacts of fossil fuel extraction. For the Northeast, in a previous CCPA report, Ben Parfitt recommends new governance co-management boards that “would be tasked with proactively addressing proposed developments over broad geographic areas and setting mutually-agreed-to curbs on development.”<sup>35</sup>

## 1. Establish carbon budgets and fossil fuel production limits

It is now widely understood that the world needs to keep a large share of fossil fuel reserves in the ground in order to keep global temperature increase below critical thresholds. In this section, we propose a carbon-budgeting framework to set out limits to production and use of fossil fuels—limits that decline over time until production ends. A carbon budget is typically defined as a global maximum amount of CO<sub>2</sub> that can be released before critical temperature thresholds are surpassed. Put another way, a carbon budget puts limits on the amount of fossil fuels that can be extracted from below ground.

While climate scientists have been calling for urgent reductions in greenhouse gas emissions for decades, efforts to date have not been ambitious enough to put the planet on a pathway to keep temperature increase below 2°C higher than pre-industrial levels, a widely cited threshold in climate science, much less the 1.5°C limit of the Paris Agreement. An October 2018 report from the Intergovernmental Panel on Climate Change (IPCC) on limiting temperature increase to 1.5°C states that by 2050 the world should be at net zero emissions.

Because of different temperature targets and the probabilities of reaching them, and different climate models, there is a range of carbon budget estimates.<sup>36</sup> The IPCC’s special report on keeping temperature increase below 1.5°C puts the global carbon budget between 580 and 770 billion tonnes (gigatons or Gt) of CO<sub>2</sub> for a 50 per cent probability of staying below 2°C, and between 420 and 570 Gt for a 66 per cent probability of staying below 1.5°C.<sup>37</sup> At current global emission levels of 37 Gt CO<sub>2</sub> per year,<sup>38</sup> the 1.5°C budget will be depleted within 11 to 15 years (and just over 20 years for the 2°C budget).

The main point is clear: a rapid transition off of fossil fuels is needed—amounting to decarbonization of the world economy by the second half of the 21st century. Achieving this necessitates a level of coordinated action previously seen only in wartime. The global phase-out of ozone-depleting substances, arising from the 1987 Montreal Protocol, is another relevant case of international cooperation,<sup>39</sup> although much more narrowly targeted than fossil fuels.

A rapid transition off of fossil fuels is needed—amounting to decarbonization of the world economy by the second half of the 21st century.

35 Ben Parfitt, *Captured: British Columbia’s Oil and Gas Commission and the Case for Reform* (Vancouver, BC: CCPA and Corporate Mapping Project, 2019), <https://www.policyalternatives.ca/publications/reports/captured>.

36 See Glen Peters, “Should Climate Policy Aim to Avoid 2°C or to Exceed 2°C?,” *Climate News* (blog), CICERO (Center for International Climate Research), March 30, 2017, <https://www.cicero.oslo.no/en/posts/climate-news/should-climate-policy-aim-to-avoid-2c-or-to-exceed-2c>.

37 Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*, Special report, [https://report.ipcc.ch/sr15/pdf/sr15\\_spm\\_final.pdf](https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf).

38 Kelly Levin, “New Global CO<sub>2</sub> Emissions Numbers Are In. They’re Not Good,” blog, World Resources Institute, December 5, 2018, <https://www.wri.org/blog/2018/12/new-global-co2-emissions-numbers-are-they-re-not-good>.

39 “About Montreal Protocol,” Who We Are, UN Environment, accessed October 22, 2019, <https://www.unenvironment.org/ozonaction/who-we-are/about-montreal-protocol>.

## BC EMISSIONS IN CONTEXT

Greenhouse gas (GHG) emissions from the extraction and processing of BC's fossil fuels account for one-quarter of BC's total emissions: 15 million tonnes (Mt) of CO<sub>2</sub> equivalent out of a total 62.1 Mt in 2017. Most of this (13.4 Mt) is from oil and gas production, while coal production added another 1.6 Mt.<sup>40</sup>

The BC government's CleanBC plan aims for a 40 per cent reduction in GHG emissions (relative to 2007 levels) by 2030. The plan claims to get to 75 per cent of BC's legislated 2030 GHG target, although such claims should be treated with caution. By its own estimation, CleanBC currently falls short of the 2030 target by an estimated 6 Mt.<sup>41</sup> Additional measures are promised by the end of 2020 for BC to meet its 2030 target.

The approval of LNG Canada contradicts the spirit of the CleanBC plan. LNG Canada's Phase One facility in Kitimat will add at least 3.5 Mt of CO<sub>2</sub> emissions in BC per year (including upstream emissions) when completed in the mid-2020s, and quite possibly a good deal more.<sup>42</sup>

BC has yet to develop actions to meet the province's longer-term legislated targets of a 60 per cent reduction by 2040 and 80 per cent by 2050 (also relative to 2007 levels). In addition, those targets themselves need tightening, as climate science and the IPCC now tell us we need to achieve net-zero emissions by 2050. While an 80 per cent reduction by 2050 may have made sense a decade ago, greater ambition is now needed around the world, and should be led by wealthy jurisdictions such as BC.

These figures do not include the emissions from the eventual combustion of fossil fuels that BC exports to other provinces and countries. In 2018, combustion emissions from the use of BC coal in overseas markets, for example, equalled approximately 68 Mt of CO<sub>2</sub>, and combustion emissions from exported BC gas amounted to 98 Mt CO<sub>2</sub>.<sup>43</sup> This 166 Mt CO<sub>2</sub> embodied in BC's fossil fuel exports is two and a half times larger than all of BC's domestic GHG emissions.

These figures highlight the need to consider all fossil fuels extracted in BC, not just fossil fuels burned within the province's borders. The potential emissions associated with extracting BC's known reserves of coal, oil and gas are massive. BC's remaining gas reserves, should they be fully combusted and put into the atmosphere, would be equivalent to two billion tonnes of CO<sub>2</sub>, an amount equivalent to 32 times BC's current annual GHG emissions.<sup>44</sup> BC's proven coal reserves from existing mines are estimated to be just under one billion tonnes<sup>45</sup> — more than 30 years at

BC's remaining gas reserves, should they be fully combusted and put into the atmosphere, would be equivalent to two billion tonnes of CO<sub>2</sub>, an amount equivalent to 32 times BC's current annual GHG emissions.

40 Data from Environment and Climate Change Canada, *National Inventory Report*, 2019, table A12-11, [http://publications.gc.ca/collections/collection\\_2019/eccc/En81-4-2017-3-eng.pdf](http://publications.gc.ca/collections/collection_2019/eccc/En81-4-2017-3-eng.pdf). National GHG data do not include "afforestation and deforestation" in the total, while BC's published inventory does. If using the latter, total GHG emissions were 64.5 Mt in 2017 (the last full year of data for BC-government-published inventory).

41 Outside of buildings and transportation, the modelling of industrial emissions is far less certain, and claimed emission reductions do not square with actions proposed to date. See Marc Lee, "BC's Shiny New Climate Plan: A Look under the Hood," *Policy Note* (blog), CCPA-BC, December 17, 2018, <https://www.policynote.ca/clean-bc/>.

42 This figure is claimed by the BC government, although no detailed estimates have been provided. Incremental emissions from LNG Canada could be much higher and will depend on how much production rises above existing levels, successes in reducing upstream emissions, and actual performance of the LNG liquefaction facility.

43 Authors' calculations based on standard emission factors in Environment and Climate Change Canada, *National Inventory Report*, 2019, table A12-11.

44 Authors' calculation based on standard emission factors and reserves data from BC Oil and Gas Commission, 2019.

45 Ministry of Energy, Mines and Petroleum Resources, 2019.

current production rates — equivalent to 2.2 billion tonnes of CO<sub>2</sub> should all of those reserves be combusted.

For BC, the bottom line is that most coal, just like oil and gas, must be left in the ground, even if its use is for steel production rather than electricity. Existing reserves are far above what the province could reasonably expect to burn under any scenario that takes climate change seriously.

## SHIFTING TO CARBON BUDGETING IN BC

A carbon budget approach would have a number of advantages over current political commitments pitched in terms of targets and timelines. Carbon budgeting would be more like the conventional way we do fiscal planning: a target is stated at the start of the year, along with actions on how it will be achieved (including credible investments that create jobs in green infrastructure), followed by routine monitoring and reporting. Like the annual BC Budget process, a carbon budget framework could set out rolling three-year plans and forecasts (or five- or ten-year plans).

The experience of carbon budgeting in the United Kingdom is informative. The UK passed the Climate Change Act in 2008, which set out a carbon budget system based on three five-year budget periods going forward at any time. The Act also created a Committee on Climate Change (CCC), which provides independent oversight, recommends mitigation measures and engages in research. The government is required to consult the CCC, and there are substantial reporting obligations on the part of government. The UK experience also includes development of a carbon-accounting system, including international transfers and rules for moving an available budget from one year or period to the next.

Carbon budgets should be applied both to emissions released within BC's borders (the standard way of measuring emissions) as well as to extracted carbon (the amount of fossil fuels removed from BC soil, the vast majority of which are combusted elsewhere). BC's new Climate Change Accountability Act is a positive step toward greater tracking of domestic emissions, but it does not address the matter of fossil fuel extraction and exports, and it delays the establishment of targets for individual sectors until 2021.

Carbon budgets should be used to *map out a schedule* to bring production down from current levels to zero by 2050. The allocation of a supply-side carbon budget to national and sub-national jurisdictions would be the outcome of political negotiation at the international and the federal and provincial levels. BC's share of a supply-side carbon budget could be approximated by looking at BC's share of global reserves.<sup>46</sup> BC's proven gas reserves represent some 0.77 per cent of the global total. BC has approximately 0.6 per cent of proven reserves of anthracite and bituminous coal, which are high-grade qualities of coal used for steelmaking.

This implicitly assumes that all reserves are equal when, in fact, putting limits on global production would mean prioritizing the lowest-cost and more easily-accessed reserves. In BC, uneconomic extraction is propped up by a wide range of subsidies and incentives through the royalty system (see the section below on royalty reform). Through a carbon budget framework,

Carbon budgeting would be more like the conventional way we do fiscal planning: a target is stated at the start of the year, along with actions on how it will be achieved, followed by routine monitoring and reporting.

<sup>46</sup> In practice there are different categories of reserves. Here we consider proven reserves, which are those that are technologically and economically viable at current prices, and that are established based on seismic testing and drilling.

BC could outline “no go” zones where fossil fuel development is precluded, such as a moratorium on shale gas development in undeveloped watersheds.<sup>47</sup>

Pioneering climate research from Christophe McGlade and Paul Ekins in the United Kingdom used an integrated assessment model to consider globally *which reserves* would be kept underground based on production costs, type of fossil fuel (oil, gas or coal) and region. For Canada, they conclude that 99 per cent of unconventional and 72 per cent of conventional oil reserves (proven plus probable) are unburnable, as are 71 per cent of unconventional and 73 per cent of conventional gas reserves, and 98 per cent of coal reserves.<sup>48</sup>

A fair allocation of supply cuts among producing jurisdictions must also wrestle with different conceptions of justice, including considerations of one’s total GHG emissions, emissions intensity, production costs, historical emissions, and level of economic development.<sup>49</sup> Places like BC are arguably best positioned to engage in supply cuts because of high levels of wealth and income, and also having disproportionately benefitted historically from both extraction and consumption of fossil fuels.<sup>50</sup>

Notwithstanding these challenges, carbon budgeting would compel policymakers to confront the classic economic problem of how to allocate resources that are subject to a budget constraint. Ideally, a carbon budget pushes policymakers toward a strategic use of remaining fossil fuel reserves, as opposed to the current Wild West mindset that seeks to extract and export as much as possible, exacerbating global oversupply problems.

For example, by approving LNG Canada and other LNG proposals, all other sectors of the economy will need to tighten their belts even more to accommodate increased LNG-related emissions if BC is to meet its 2030 GHG target. Looking further out, locked-in emissions from LNG Canada alone will make it extremely difficult, if not impossible, for BC to meet its 2040 and 2050 targets of 60 and 80 per cent emission reductions (below 2007 levels). The CleanBC plan does not yet consider how to meet these future targets.

Planning within a carbon-budgeting framework would thus entail a carbon test for major infrastructure projects. Decisions on proposed new public and private investments should be informed by an understanding of how they fit, or don’t fit, within a carbon budget framework. The Obama administration included a climate test for assessing the Keystone XL pipeline project, and such tests should be invoked in the future for other fossil fuel megaprojects. Major transportation-infrastructure projects, like roads, bridges and transit, could be similarly informed by such an approach.

Finally, a carbon budget framework would helpfully shift the public conversation by more effectively engaging the public in the effort to reduce emissions: most people understand the need for a budget and the trade-offs required to stay within one. Carbon budgets raise questions of

A carbon budget framework would helpfully shift the public conversation by more effectively engaging the public in the effort to reduce emissions: most people understand the need for a budget and the trade-offs required to stay within one..

47 See Ben Parfitt, *Fracking Up Our Water, Hydro Power and Climate: BC’s Reckless Pursuit of Shale Gas* (Vancouver, BC: CCPA and Wilderness Committee, 2011), [https://www.policyalternatives.ca/sites/default/files/uploads/publications/BC%20Office/2011/11/CCPA-BC\\_Fracking\\_Up.pdf](https://www.policyalternatives.ca/sites/default/files/uploads/publications/BC%20Office/2011/11/CCPA-BC_Fracking_Up.pdf).

48 Christophe McGlade and Paul Ekins, “The Geographical Distribution of Fossil Fuels Unused When Limiting Global warming to 2°C,” *Nature* 517 (January 8, 2015), 187–90, <http://www.nature.com/nature/journal/v517/n7533/full/nature14016.html>.

49 Philippe Le Billon and Berit Kristofferson, “Just Cuts for Fossil Fuels? Supply-Side Carbon Constraints and Energy Transition,” *Environment and Planning A*, January 2019, <https://doi.org/10.1177/0308518X18816702>.

50 That said, within BC there are wide differences across income groups, regions and economic sectors in terms of who has benefitted from fossil fuels.



fairness and equity in the allocation of the budget across industries, communities and households. Carbon budgets could thus form an integral part of public engagement and outreach with companies, workers and unions, First Nations, and communities, just as our conventional fiscal budget processes do today.

## 2. Invest in the domestic transition off of fossil fuels and develop a green industrial strategy

Decarbonization is increasingly seen as a new framework for economic development, with a shift to 100 per cent renewables. The Solutions Project, led by Stanford University's Mark Jacobson, moves in this direction, as do calls for a Green New Deal<sup>51</sup>. Thus, a forward-thinking green industrial strategy, informed by climate justice considerations, should serve as a template for growing jobs and incomes in the transition to zero carbon.

A key dimension of transition is not just decarbonization *per se* but shifting investment patterns away from fossil fuels to green alternatives. Carbon pricing and ending subsidies for fossil fuels represent a good start, and later we contemplate changes in the royalty regime for fossil fuels. Proactive green investments are an essential part of a managed wind-down plan to complement the just-transition measures we discuss in the next section.

A key dimension of transition is not just decarbonization *per se* but shifting investment patterns away from fossil fuels to green alternatives.

### THE DOMESTIC ENERGY TRANSITION

The BC government's CleanBC plan rightly frames the challenge as an opportunity for new industrial development and employment gains, but, if anything, CleanBC moves too slowly.<sup>52</sup> There is potential to leverage CleanBC into a more comprehensive industrial strategy, starting with domestic emissions in buildings, transportation and industry. This would include energy efficiency improvements, technological innovation and shifting fuel to 100 per cent renewable sources. Driving changes in the marketplace could be met with more aggressive carbon pricing, higher standards and regulation, and public-sector investments in infrastructure and retrofits.<sup>53</sup>

Residential, commercial and institutional buildings produce 11 per cent of BC's GHG emissions, mainly from burning natural gas for heating and hot water. We have the technology for this to end. For new homes and buildings, we already know how to build passive homes that need virtually no energy for space heating or cooling. Updated building codes are needed to make the deployment of these techniques mandatory within the next few years. There are already prefab passive solar homes coming onto the market, which can be used to quickly provide secure and healthy low-income housing that is carbon-zero.

For existing homes, better insulation, smart thermostats and other building retrofits have the potential to save households considerable money on their monthly energy bills. What's more,

51 The Solutions Project and the Green New Deal argue for a massive shift away from fossil fuels and that this is inseparable from economic transformation and social justice. The Solutions Project foregrounds the climate leadership of women and people of colour, and the Green New Deal highlights Indigenous sovereignty and the full implementation of UNDRIP. See <https://thesolutionsproject.org/> and <https://greennewdealcanada.ca/>.

52 For a critical overview, see Lee, "BC's Shiny New Climate Plan," 2018.

53 For a more fully articulated plan looking at domestic/territorial emissions, see Marc Lee and Amanda Card, *A Green Industrial Revolution: Climate Justice, Green Jobs and Sustainable Production in Canada* (Vancouver, BC: CCPA, June 2012), <https://www.policyalternatives.ca/publications/reports/green-industrial-revolution>.

it is well established that improved energy efficiency and conservation is where we get the best “bang-for-the-buck” returns when it comes to energy investments. Modern electric heat pumps are so much more efficient than traditional electric heating that monthly operating costs are comparable to low-cost natural gas.

The upfront capital cost, however, of converting one’s home heating to electric heat pumps can be very steep. So low- and middle-income families will need financial help making the switch. But government action and mass adoption of heat pumps can also significantly reduce their cost. Heat pumps and their installation in much of Asia, for example, are much cheaper because they are the norm and economies of scale and building codes make their use much less expensive.

As for commercial and apartment buildings, they too need to fuel-switch, either at the building level or at the neighbourhood utility level. In Vancouver, the new housing developments in False Creek are all required to join a publicly-owned Neighbourhood Energy Utility that derives most of its energy by extracting heat from the sewer system.<sup>54</sup> Similarly, in Richmond, BC, all new downtown buildings, rather than being heated with natural gas, must now tie into the city’s district energy utility, which uses a geo-exchange system that extracts energy from the ground — a move that has been unanimously supported across Richmond council’s political divide.

Notably, societies have quickly transitioned home heating sources before. In England, prior to the 1960s, most homes used what was called “town gas” — a coal-derived gas that was particularly volatile and noxious delivered by municipal pipe. Town or coal gas had a high level of carbon monoxide, and its use was associated with distressingly high suicide rates. The dangers associated with town gas convinced the government that it should be phased out and replaced by the much-safer natural gas. That decision necessitated replacing all home appliances (the burners were quite different), and this was done over a ten-year period.

BC should thus commit to fully phasing out its use of fossil fuels for domestic purposes to clearly signal that we are on a wind-down path. Following the lead of places like Berkeley, California, BC should announce that no new buildings (residential, commercial or public such as hospitals and schools) will be allowed to use natural gas or tie into natural gas pipelines.<sup>55</sup> All new buildings would need to use electric, heat pump or geothermal space and hot-water heating, and next-generation electric induction stoves. In addition, the provincial government should regulate that all existing buildings will need to be off gas by 2040. Commercial, institutional and industrial users should be given an intermediate timeline to phase out their use of gas. The key point here is that if we are to truly wind down domestic use of gas, we need to move beyond incentives and rebates, and simply mandate a timetable by which these fuel switches are the law.

This points toward shifting existing fossil fuel use to zero-carbon sources, primarily electricity. However, it need not be the case that every gigajoule of fossil fuel is replaced by a gigajoule of grid electricity. Major gains in efficiency are achievable for buildings as it is already possible to build to passive-house standards, which require little energy input. In addition, buildings themselves can be equipped to generate their own electricity (solar panels) and heat (solar hot water). There will inevitably be some need for additional grid electricity, but not in direct proportion to the fossil fuels being displaced.

54 Marc Lee, *Innovative Approaches to Low-Carbon Urban Systems: A Case Study of Vancouver’s Neighbourhood Energy Utility* (Vancouver, BC: CCPA-BC and E3 Network, 2015), <https://www.policyalternatives.ca/publications/reports/innovative-approaches-low-carbon-urban-systems>.

55 David Baker and Mark Chedia, “Berkeley Is the First City in America to Ban Gas from New Homes,” *Bloomberg*, July 17, 2019, <https://www.bloomberg.com/news/articles/2019-07-17/california-s-berkeley-bans-natural-gas-in-new-buildings>.

If we are to truly wind down domestic use of gas, we need to move beyond incentives and rebates, and simply mandate a timetable by which these fuel switches are the law.

Similarly for vehicles, not every litre of gas needs to be replaced by a zero-carbon source. We can drive lighter, more efficient vehicles, and there are gains in efficiency that arise from the use of electric engines over internal-combustion engines. In addition, it is worth putting direct reductions in consumption on the table given our energy-intensive lives. Carpooling, grouping together multiple trips into one and avoiding trips by telecommuting are all ways that reduce the total amount of vehicle kilometres driven. A shift to more complete communities could eliminate the need for long commutes for many and reduce them substantially for others.<sup>56</sup> And a large-scale shift to electric-powered public transit would significantly reduce the overall demand for power.

## DEVELOP A GREEN INDUSTRIAL STRATEGY

A major shortcoming of the BC government's CleanBC plan is its lack of emphasis on reducing industrial emissions. Industry accounts for three-fifths of BC's GHG emissions, and CleanBC lacks clear targets and measures to reduce these emissions. Overall, it is more concerned about potentially undermining the "competitiveness" of BC's export industries.

The CleanBC plan includes industrial incentives funded by the incremental carbon-tax revenues paid by industry (that is, the portion above \$30 per tonne). This includes: rebates for additional carbon tax paid as a reward to the lowest GHG performers or to companies that meet a world-class standard; and a Clean Industry Fund that will invest in emission reduction projects for industry. It is unclear what kind of impact this recycling of carbon taxes back to industry will have.

The next round of CleanBC initiatives should aim for industry-level strategies and specific mandated target dates that advance decarbonization (i.e., efficiency and clean energy supply). Research on technology options and deep-decarbonization pathways for large industry notes that all new investment must be net zero emitting by 2035 to be consistent with the Paris Agreement. A framework developed by Simon Fraser University's Chris Bataille and others includes a decision tree with various options and choices along the way to a net-zero solution. These include reducing demand, improving efficiency, fuel switching and carbon capture, in conjunction with an abundant supply of clean electricity.<sup>57</sup>

Mapping decarbonization pathways for large industry points to a range of existing and near-term technology options that move us toward a net-zero economy. Getting onto these technology pathways will require government intervention in the form of carbon pricing, incentives, support for research and development and tools like government procurement to spur demand. But it will ultimately take, as noted above with buildings, the use of clear mandatory regulations. In addition, there is potential to create multiparty (involving business, labour, First Nations and government) sectoral councils that would then be tasked with coordinating, planning and achieving emissions reductions within the context of a carbon budget.

BC's plentiful clean electricity supply and storage capacity are a major advantage in this transition. The BC government should stop making commitments to provide electricity to LNG plants and fracking operations, and instead use this electricity to supplant the existing use of fossil

Industry accounts for three-fifths of BC's GHG emissions, and CleanBC lacks clear targets and measures to reduce these emissions.

<sup>56</sup> Patrick Condon et al., *Transportation Transformation: Building Complete Communities and a Zero-Emission Transportation System in BC* (Vancouver, BC: CCPA-BC, 2011), <https://www.policyalternatives.ca/transportationtransformation>.

<sup>57</sup> Chris Bataille et al., "A Review of Technology and Policy Deep Decarbonization Pathway Options for Making Energy-Intensive Industry Production Consistent with the Paris Agreement," *Journal of Cleaner Production* 187 (June 20, 2018): 960-73, <https://doi.org/10.1016/j.jclepro.2018.03.107>.

fuels in industrial, commercial and residential facilities. A phase-out of demand from fossil fuel industries writ large would add to BC Hydro's current planning surplus.<sup>58</sup> This power would be available for a wide range of decarbonization initiatives such as greening industry, transportation and buildings, while storage capacity in hydro dams would enable BC to build out a more diversified energy system that includes ramp-ups in solar, wind, geothermal and even pumped storage electricity.

Another area where there is long-term potential for emission reductions is with materials management for "zero waste" or the "circular economy." The CCPA's Climate Justice Project research on zero waste has modelled substantial increases in collection (diversion from landfills and incineration) and recycling rates of core materials in BC, which yield an estimated six million tonnes of reduced GHG emissions by 2040. These reductions would be accompanied by a net increase in jobs of 12,000 full-time-equivalent workers.<sup>59</sup>

A bold move in this direction is not impossible. Government procurement policies and minimum-recycled-content mandates could be used to create local demand for recycled materials, while a Crown corporation could be engaged as a "market maker" to link materials collection and supply with value-added processing to produce for the domestic market. This could also involve an element of import substitution, or displacing materials BC is currently importing (which would produce further reductions in GHGs).

## CREATING GREEN JOBS

At a macroeconomic level, the best defence against job losses in fossil fuel industries is a good offence: efforts to create new green jobs in areas that decarbonize the economy, as well as jobs in the public sector—which are by nature more green—such as child care and seniors' care. There is an important gender dimension here in that these jobs are much more likely to be done by female workers. This would complement infrastructure investments that would likely go disproportionately to men, although there is great scope for equity programs in the transition. The Vancouver Island Highway Project is a case study worth revisiting for its inclusionary participation of female and Indigenous workers.<sup>60</sup>

Put another way, a lot of work will be required to make the transition off of fossil fuels, and this should be embraced as a collective province-building project. From a jobs perspective this should emphasize dedicated annual funding over the course of the 20- to 30-year transition period. Once capacity is ramped up for building new transit lines, retrofitting buildings, and adaptation (to name the top areas for employment), a steady and predictable stream of funding is needed.

A coherent investment strategy aimed at decarbonization would be a positive source of job creation much larger than job reductions in fossil fuel sectors.

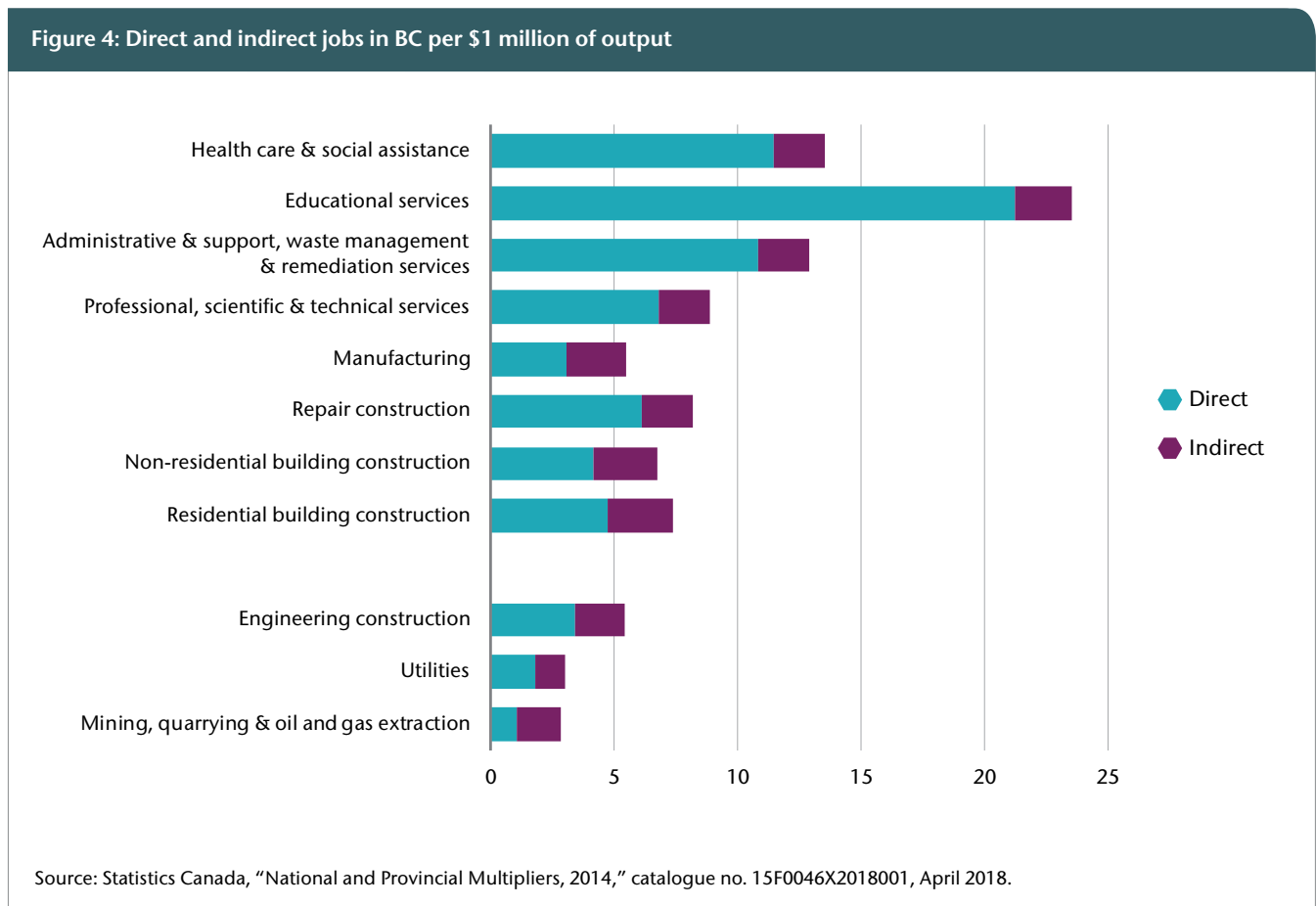
58 Some modelling of this is in my 2017 Site C submission to BCUC. Marc Lee, *Revisiting the Economic Case for Site C: Submission to the BC Utilities Commission Inquiry Respecting Site C* (Vancouver, BC: CCPA-BC, 2017), <https://www.policyalternatives.ca/publications/reports/revisiting-economic-case-site-c>.

59 Marc Lee et al., *Closing the Loop: Reducing Greenhouse Gas Emissions Through Zero Waste in BC* (Vancouver, BC: CCPA and Wilderness Committee, 2013), <https://www.policyalternatives.ca/publications/reports/closing-loop>.

60 Marjorie Griffin Cohen and Kate Braid. *The Road to Equity: Training Women and First Nations on the Vancouver Island Highway; A Model for Large-Scale Construction Projects* (Vancouver, BC: CCPA-BC, August 2000), <https://www.policyalternatives.ca/publications/commentary/vancouver-island-highway-brings-changing-face-labour-construction>.

As a start, BC should aim to invest 2 per cent of its GDP per year in these areas, or about \$6 billion per year in 2019, an amount that would grow in line with the provincial economy.<sup>61</sup> Assuring such levels of investment should give comfort to workers currently employed in the fossil fuel industry. Revenues from higher carbon taxes and royalty reforms (described below) would be an ideal source of funds, and/or governments could borrow (through green bonds) to undertake high levels of capital spending on decarbonization initiatives. In contrast, the 2019 BC Budget lists total operating and capital expenses for CleanBC over the next three years at, cumulatively, only \$679 million, less than one-tenth of a percent of BC’s GDP.<sup>62</sup>

Figure 4 shows estimates of direct and indirect jobs per million dollars of output.<sup>63</sup> As seen, not all investments are equal: oil and gas extraction, for example, creates relatively few jobs, whereas



61 The 2006 *Stern Review* of the economics of climate change called for 1 per cent of GDP to be invested in mitigation. Later, Stern upped the number to 2 per cent of GDP in order to have a stronger impact on emission reductions. See Juliette Jowit and Patrick Wintour, “Cost of Tackling Global Climate Change Has Doubled, Warns Stern,” *Guardian*, June 26, 2008, <https://www.theguardian.com/environment/2008/jun/26/climatechange.scienceofclimatechange>.

62 Marc Lee, “Goin’ Slow: BC Budget Fails to Make Meaningful Investments in Climate Action,” *Policy Note* (blog), CCPA-BC, February 22, 2019, <https://www.policynote.ca/goin-slow-bc-budget-fails-to-make-meaningful-investments-in-climate-action/>.

63 Estimates of employment impacts of new investments are typically based on input-output models that map the flow of materials, labour and income through the economy. On this basis, studies often estimate that an additional \$1 million of output in a particular sector of the economy leads to a certain number of jobs. Those jobs are broken down into direct jobs in the sector where the investment is made, indirect jobs as part of the supply chain, and induced jobs, those created when workers spend their incomes in the local economy.

service sectors that are much more labour intensive can generate far more jobs per dollar of output.

The main point here is that a coherent investment strategy aimed at decarbonization would be a positive source of job creation much larger than job reductions in fossil fuel sectors. An investment of 2 per cent of BC's \$300 billion GDP per year would yield at least 42,000 direct and indirect jobs in a range of green economic activity.<sup>64</sup>

While the transition before us will see a net increase in jobs overall, they will not be the same jobs in the same places. The bigger challenge is that direct fossil fuel jobs are highly concentrated in certain regions of BC, and green investments (such as a new transit line) may not be in the same geographic area. It is to this challenge we turn in the next section.

### 3. Ensure a just transition for workers and communities

A few years ago, the CCPA's Climate Justice Project (CJP) interviewed resource industry workers in different parts of the province, highlighting the challenges associated with unjust transitions due to plant closures, such as involuntary unemployment for laid-off workers, mental illness, domestic violence and addiction.<sup>65</sup> At the community level, this manifests as loss of income, declining home values, and closure of small businesses and local service providers who relied on the income generated from the core resource industry and spent in the local economy. There is a knock-on effect on municipal finances and services, too.

The CJP report called for a coherent managed approach starting with income supports, advanced-skills-training programs, and apprenticeships to invest in transferable skills from carbon-intensive to green industries. In addition, proactive planning and collaboration across government, industry, unions and Indigenous communities are critical, and should enhance income security for workers, support early retirement initiatives for some and help people through retraining and job search processes. A two- to three-decade wind-down period with stable management and a just-transition plan has the additional benefit of getting away from the boom-and-bust cycles typical of resource economies.

#### LESSONS FROM OTHER JURISDICTIONS

In recent years, just transition has shifted from the abstract to actual policy and transition packages for workers, funded by governments. Transition for communities reliant on coal extraction is now a real experience, with consideration of the long-term well-being of affected workers and their communities, and a commitment to invest in them.

Alberta is an interesting case in terms of concrete policies for just transition. As part of its climate planning, the Alberta government commissioned an Advisory Panel on Coal Communities. The panel issued 35 recommendations in 2017,<sup>66</sup> and the Alberta government followed by tabling a \$40 million multiyear Coal Workforce Transition Fund and a one-time \$5 million Coal Community

<sup>64</sup> At the low-end estimate of seven direct and indirect jobs per million of output.

<sup>65</sup> Karen Cooling et al., *Just Transition: Creating a Green Social Contract for BC's Resource Workers* (Vancouver, BC: CCPA-BC, 2015), <https://www.policyalternatives.ca/publications/reports/just-transition>.

<sup>66</sup> Advisory Panel on Coal Communities, *Supporting Workers and Communities: Recommendations to the Government of Alberta* (Edmonton, AB: Advisory Panel on Coal Communities, 2017), <https://www.alberta.ca/assets/documents/advisory-panel-coal-communities-recommendations.pdf>.

Proactive planning and collaboration across government, industry, unions and Indigenous communities are critical.

Transition Fund, funded out of carbon tax revenues.<sup>67</sup> While the focus is on communities producing coal for electricity generation in Alberta, and does not include coal mines producing for export, the Alberta plan is a landmark. Measures cover:

- Income replacement—workers receiving up to 75 per cent of previous weekly earnings (when combined with EI);
- Bridge to retirement—also up to 75 per cent of previous earnings up to the point when employer pensions kicks in;
- Relocation assistance—up to \$5,000 for moves over 40 kilometres away;
- Education assistance—a tuition voucher up to \$12,000 maximum for post-secondary;
- Other counselling and employment services, and potential for “worker adjustment committees” to be created by employers and unions;
- Support for communities—a fund to support alternative economic development opportunities.

In December 2018, the federal Task Force on Just Transition for Canadian Coal Power Workers and Communities released its final report.<sup>68</sup> It builds on Alberta’s coal phase-out and also considers coal mines and power production in Saskatchewan, New Brunswick and Nova Scotia (the latter two have already made huge strides in reducing coal-fired power). It echoes calls for a more robust system of income support, skills and training, pension bridging, and other services to affected workers. In addition, the task force recommends funding for local infrastructure projects in the places affected by job losses.

The federal government committed \$35 million in the 2018 budget for skills development and economic diversification in affected communities in those four provinces.<sup>69</sup> The task force estimates that “direct and indirect costs of the phase-out will stretch well into the hundreds of millions of dollars and the timeframe will go beyond 2030” and calls for “additional and more substantial investments” in future federal budgets. However, the numbers are relatively small: only 3,000 to 3,900 people spread across 50 Canadian communities are directly impacted by the coal phase-out.

Nonetheless, the report is an important framework that will need to be adapted to oil and gas in the future (as well as production of metallurgical coal, as we have highlighted in this report). It goes beyond the narrow needs of individual workers to address community-level impacts, and recommends a dedicated funding program for new economic development opportunities in those communities.

A 2018 just-transition deal between the Spanish government and unions representing Spanish coal workers has been praised as a precedent for responsible transition. In exchange for ending subsidies to Spanish mines that are no longer economically viable, the 250-million-euro (\$360 million Canadian) package includes early retirement provisions covering about 60 per cent of

A two- to three-decade wind-down period with stable management and a just-transition plan has the additional benefit of getting away from the boom-and-bust cycles typical of resource economies.

67 “Support for Workers Affected by Coal Phase Out,” Employment Support, Government of Alberta, accessed December 2018, <https://www.alberta.ca/support-for-coal-workers.aspx>. The Coal Workforce Transition Fund has been maintained by the new Kenney government in Alberta’s 2019 budget.

68 Task Force on Just Transition for Canadian Coal Power Workers and Communities, *A Just and Fair Transition for Canadian Coal Power Workers and Communities* (Ottawa, ON: Environment and Climate Change Canada, 2018), [http://publications.gc.ca/collections/collection\\_2019/eccc/En4-361-2019-eng.pdf](http://publications.gc.ca/collections/collection_2019/eccc/En4-361-2019-eng.pdf).

69 Western Economic Diversification Canada, “Minister Sohi Announces Funding to Support Alberta Communities Transitioning to a Low-Carbon Economy,” news release, November 16, 2018, <https://www.newswire.ca/news-releases/minister-sohi-announces-funding-to-support-alberta-communities-transitioning-to-a-low-carbon-economy-700697481.html>.

miners (age 48 and older or with 25 years of service); a buyout for younger workers valued at 10,000 euros (\$14,500 Canadian) plus 35 days' pay per year of service; investments in the restoration of old mining sites with priority for work given to former miners; other infrastructure upgrades in mining communities; and the development of community-level action plans, including energy efficiency and renewables.<sup>70</sup>

A report commissioned by Australia's Construction, Forestry, Maritime, Mining and Energy Union (CFMMEU) reviews case studies of just and unjust transitions around coal. On the just side, the Ruhr valley in Germany and the Limburg region of the Netherlands are held up as models. In addition to the basic components of just transition (income support, early retirement, retraining), key aspects of their plans included:

- Community-level initiatives recognizing the important role of local identity and community in ensuring successful transition;
- Engagement by all levels of government committed to developing decent high-wage work and to funding new infrastructure, education and training, and regional economic development;
- Plans to coordinate industrial decline in a staggered manner over the course of a few decades;
- Cooperation among companies, unions and workers, and multiple levels of government;
- Bottom-up processes of worker and community participation in the development of a vision and strategy.

## EMPLOYMENT IN FOSSIL FUELS IN BC

Fossil fuel extraction activities in BC are highly regionally concentrated, with gas extraction and processing in the Northeast and coal mining in the Southeast. In terms of BC employment, Table 2 shows the number of jobs and compensation for fossil fuel sectors. This includes some 66,473 workers, representing 2.6 per cent of total BC employment. Interestingly, this is close to the number of new jobs created every year in BC, so a wind-down over a couple decades need not have a massive employment impact.

The largest category is oil and gas engineering construction, with almost 40,000 workers, but note that these are temporary construction jobs related to building LNG facilities and pipelines. These jobs were much greater in 2017 and 2018, and likely reflect predevelopment activity for both LNG (terminal and pipeline) and the Trans Mountain Pipeline Expansion project. In the previous decade (2007 to 2016) these sectors averaged just under 24,000 jobs per year. The investments we highlight in the previous section would create abundant temporary construction jobs to replace those in oil and gas engineering construction.

If we look at permanent jobs, just over 27,000 are employed in various fossil fuel production activities from wellhead to domestic distribution and sales. Of those, 11,505 are gasoline station workers and another 2,580 in natural gas distribution, rather than resource workers per se. Depending on how transportation and energy policies evolve they could be transitioned into jobs at electric vehicle charging stations and renewable-biogas distribution, respectively. Upstream resource jobs represent 0.4 per cent of total BC employment (not broken out), although these jobs are regionally much more important to the Northeast of BC and to a lesser extent the Southeast.

<sup>70</sup> IndustriALL Global Union, "Spanish Coal Unions Win Landmark Just Transition Deal," November 1, 2018, <http://www.industriall-union.org/spanish-coal-unions-win-landmark-just-transition-deal>.

The investments we highlight in the previous section would create abundant temporary construction jobs to replace those in oil and gas engineering construction.



Table 2 also highlights the total and average compensation going to fossil fuel workers. Average compensation in this industry tends to be much higher than the average for the rest of the economy. On average, fossil fuel workers make 28 per cent more than workers in the rest of the economy, although this includes gasoline station workers who earn comparably low wages. Replacing more than \$5 billion of income over the course of the wind-down period is therefore a central challenge.

**Table 2: Jobs and compensation for fossil fuel workers in BC in 2018**

	Total jobs	Total compensation, in thousands (\$)	Annual compensation per job (\$)	Average hourly wage (\$)
Oil and gas extraction	1,135	217,922	192,002	85.63
Coal mining	4,460	516,534	115,815	56.11
Support activities for oil and gas extraction	2,890	265,949	92,024	39.68
Support activities for coal mining	1,653	202,155	122,333	52.71
Natural gas distribution	2,580	293,699	113,837	59.77
Oil and gas engineering construction	39,385	2,880,618	73,140	37.89
Petroleum refineries	385	84,317	219,005	110.51
Petroleum and coal product manufacturing (excluding refineries)	305	35,548	116,551	59.25
Petroleum product wholesaler-distributors	730	73,452	100,619	49.23
Pipeline transportation	1,445	190,905	132,114	75.37
Gasoline stations	11,505	407,316	35,403	22.31
<b>Subtotal (fossil fuel workers)</b>	<b>66,473</b>	<b>5,168,415</b>	<b>77,753</b>	<b>46.67</b>
<b>All industries</b>	<b>2,508,860</b>	<b>152,996,248</b>	<b>60,982</b>	<b>36.60</b>
<b>Fossil fuel workers as a % of total</b>	<b>2.6%</b>	<b>3.4%</b>	<b>127.5%</b>	<b>127.5%</b>

Replacing more than \$5 billion of income over the course of the wind-down period is a central challenge.

Source: Statistics Canada, "Labour Statistics Consistent with the System of National Accounts (SNA), by Job Category and Industry," table 36-10-0489-01, <https://doi.org/10.25318/3610048901-eng>.

Note: The employment number for "support activities for coal mining" is estimated as half the employment number for "support activities for mining," as the latter includes other metal and mineral mining.

From Table 2 above, the number of permanent jobs of concern for just transition is in the 14,000 range (temporary construction jobs are less of a concern as they can be replaced through new construction of green infrastructure). Over a 20- to 30-year transition period, a steady decline in these numbers would mean job substitution of 500 to 700 jobs per year. There is no reason to believe that such a transition should be a problem if the right policy supports are implemented and a proactive green investment strategy is pursued to create alternative employment options.

With a managed wind-down, most of the heavy lifting can be accomplished through attrition, as existing workers hit retirement age. A 2018 study of the economics of just transition in the United States, by Robert Pollin and Brian Calacci, found that over a two-decade transition period some 85 per cent of job losses can be managed through workers reaching age 65 and retiring.<sup>71</sup> Ensuring decent and stable pension income is a central issue, including the combined income from public and private pensions. Some pension-bridging arrangement may be required for workers close to but not at retirement age.

Given an aging workforce over the span of two to three decades, the challenge is more an issue for fossil-fuel-reliant communities than it is for specific workers.

In many respects, given an aging workforce over the span of two to three decades, the challenge is more an issue for fossil-fuel-reliant communities than it is for specific workers. Thus, just-transition strategies must include efforts to maintain employment in those areas where jobs are likely to be lost. In this regard, remediation of old coal mines and oil and gas wells should be a major category of reinvestment. Already we have seen evidence of accumulating public liabilities associated with these abandoned or inactive sites. A *Globe and Mail* investigation in late 2018 found that 45 per cent of abandoned sites in BC had “languished ten years or more,” and some 17 per cent for more than 20 years.<sup>72</sup>

In terms of the regional dimension of BC’s fossil fuel production, the province could consider new investments around recycled steel production through electric-arc furnaces, perhaps located in or near a coal-mining community. BC will continue to need a lot of steel for new green infrastructure and other transition items such as wind turbines, high-speed rail, buses and bikes. This could also open up opportunities for new BC-based secondary manufacturing of such steel-based products. Accessing these new jobs may require some retraining and skills upgrading, although many skills would be readily transferable (e.g., electricians).

Similarly, BC can be more focused on deriving additional value from renewable-resource sectors, in particular forestry.<sup>73</sup> The current crisis in the BC forestry sector includes some 4,000 jobs lost in 2019, due to vastly reduced timber supplies in parts of BC brought on by unsustainable logging, massive wildfires linked to climate change, and growing numbers of dead trees due to insect attacks and pathogens (also linked to climate change).<sup>74</sup> Declining prices for lumber and rising logging costs also affected some mill closures and curtailments. Revitalization and diversification

71 Robert Pollin and Brian Calacci, “The Economics of Just Transition: A Framework for Supporting Fossil Fuel-Dependent Workers and Communities in the United States,” *Labour Studies Journal* 44, no. 2 (2019, published ahead of print, July 18, 2018), <https://doi.org/10.1177/0160449X18787051>.

72 Jeff Lewis and Chen Wang, “Oil Patch Fails to Clean Up Growing Stockpile of Abandoned Wells,” *Globe and Mail*, November 25, 2018, <https://www.theglobeandmail.com/canada/article-oil-patch-fails-to-clean-up-growing-stockpile-of-abandoned-wells/>.

73 Ben Parfitt, *Making the Case for a Carbon Focus and Green Jobs in BC’s Forest Industry* (Vancouver, BC: CCPA-BC, 2011), <https://www.policyalternatives.ca/greenforests>.

74 Sean Boynton and Jennifer Palma, “After a Devastating Series of Mill Closures, Can B.C.’s Forestry Industry Recover?,” *Global News*, September 13, 2019, <https://globalnews.ca/news/5902266/bc-forestry-closures-future/>.

of the forest sector will therefore require a comprehensive plan, along the lines of that previously advocated by the CCPA.<sup>75</sup> Such a plan would:

- Expedite the review of current logging rates in all regions and reset them to sustainable levels as quickly as possible;
- Provide a comprehensive list to community and regional governments of where all trees in the province are logged and later processed so that meaningful planning can begin between communities and regions of the province;
- Empower local First Nations, communities and regions to have a direct say in forestry decisions through new regional management boards;
- Award longer-term, secure, area-based forest tenures directly to First Nations;
- Phase out all log exports and enact new “social contract” rules that require a minimum amount of timber processing nearer to the communities and regions where trees are logged.

If followed, these recommendations could lay the foundation for new manufacturing possibilities in communities where jobs were long ago lost and where the industry is currently languishing. This includes the community of Fort Nelson in northeastern BC. The community has effectively been abandoned by both the natural gas industry and the traditional forest industry, both of which pulled up stakes to concentrate on exploiting resources farther to the south and closer to markets.

New jobs from an alternative investment strategy as outlined in the previous section are sufficiently numerous relative to lost fossil fuel jobs, that a *good jobs guarantee* for those currently in fossil fuel industries could be provided. A comprehensive new report from Clean Energy Canada and Navius Research estimated the clean economy in BC at 32,000 jobs, accounting for a value added of \$8 billion (3 per cent of GDP), with a yearly average of \$5.3 billion in new investment.<sup>76</sup> More than half of the GDP contribution is from renewable-power generation, transmission and distribution.

Finally, in addition to income and transition supports to individual workers, community supports and development need to be major parts of any just-transition plan. There should be investments in community-led processes to identify and fund alternative economic opportunities. This could include related business lines, remediation of old sites, new services (such as tourism, agriculture and retirement homes) and upgrading of infrastructure. Areas disproportionately affected by the managed wind-down should receive a larger share of public reinvestment funds.

In this regard, BC has an existing model in the Columbia Basin Trust (CBT) that could be applied to regions with a disproportionate burden from a wind-down. Indeed, the East Kootenays, where most of BC’s coal mining takes place, is already within the geographic area of the CBT. The CBT was created in response to the flooding of river valleys in the Kootenays, an outcome of the 1964 Columbia River Treaty, which enables flood management and electricity generation on both sides of the Canada-US border. The CBT was established in 1995 with an endowment that is used to support economic and social well-being in the regional economy. It is a useful model for the next generation of transition.

In addition to income and transition supports to individual workers, community supports and development need to be major parts of any just-transition plan.

75 Ben Parfitt, “From Disenfranchised to Revitalized: Ten Proposals to Set Our Forests and BC’s Rural Communities on a New Course,” *Policy Note* (blog), CCPA-BC, March 13, 2017, <https://www.policynote.ca/forestryjobsbc/>. Special thanks to Ben Parfitt for crafting the forestry recommendations for this paper.

76 Clean Energy Canada, *Missing the Big Picture: Tracking the Energy Revolution 2019* (Vancouver, BC: Morris J. Wosk Centre for Dialogue at Simon Fraser University, 2019), [http://cleanenergycanada.org/wp-content/uploads/2019/05/Report\\_TER2019\\_CleanJobs.pdf](http://cleanenergycanada.org/wp-content/uploads/2019/05/Report_TER2019_CleanJobs.pdf).

## 4. Reform the royalty regime for fossil fuel extraction

BC's royalty regime for fossil fuels is aimed at encouraging and ramping up these industries, not winding them down. Moreover, royalty and tax revenues associated with increased production are often invoked to justify expansion. For example, the BC government claims it will benefit from \$23 billion in revenue over 40 years from the LNG Canada project. However, in order to "facilitate development of resources that would not otherwise be economically viable," BC has a variety of incentive or subsidy programs that greatly reduce royalties paid.<sup>77</sup> Big picture: The public return from the extraction of these finite greenhouse-gas-generating resources is nowhere near where it should be.

A central public-policy goal should be to maximize the returns to the public from the extraction of this collectively owned resource, revenues that can support the elements of a zero-carbon transition.

In the context of a managed wind-down, this regime needs an overhaul. A central public-policy goal should be to maximize the returns to the public from the extraction of this collectively owned resource, revenues that can support the elements of a zero-carbon transition described in previous sections. Reforms to this regime should also diminish the incentives for producing on more marginal sites.

Royalties differ from, say, corporate income taxes, in that they reflect a return to the provincial treasury when private development of a public resource takes place. A key concept is *economic rent*, which is the market value of the resource minus the cost of converting it into something sellable (and minus a normal rate of return to the company). It can be thought of as the excess profit from land and resources, a form of unearned income because the product is not made but is simply a "gift of nature" below ground for the taking. It is good public policy to more heavily tax economic rents because doing so does not distort other economic decision-making.

As BC moves forward with implementing the United Nations Declaration on the Rights of Indigenous Peoples, it is also vital to appreciate that these resources—which we have until now called Crown or public—are generally on land that is unceded by First Nations or are subject to treaties which may be violated by the cumulative damages from fossil fuel extraction activities. A new mindset is needed, one that understands that any income from the extraction of these resources must be shared between Indigenous communities and the public at large. New revenue-sharing agreements are needed.

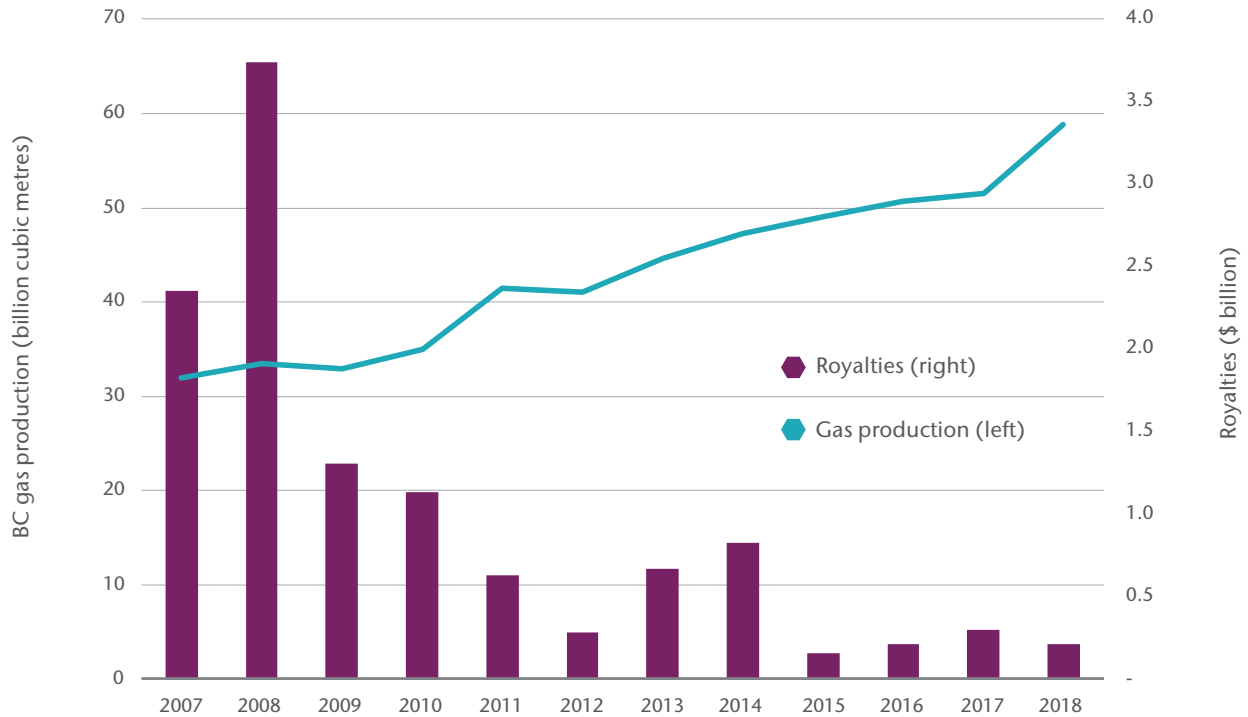
### GAS ROYALTIES

There are two components to gas royalties in BC. First, companies bid for land tenure rights for exploration, and second, they pay a royalty on actual production. Together, the royalty regime is supposed to capture a fair share of the economic rent or excess profits from exploitation of public resources. The government could aspire to collect 100 per cent of the economic rents but in practice collect much less, a trade-off of public dollars in exchange for additional economic activity and employment.

Over a decade ago, BC received large annual royalty revenues from its growing natural gas sector. This is no longer the case. BC gas production has increased substantially in recent years (see the blue line in Figure 5), up about 84 per cent in 2018 compared with 2007. Public revenues, on the other hand, have fallen substantially. Considering both royalties paid on gas production

<sup>77</sup> "Natural Gas," Industry Sectors, Trade and Invest British Columbia, accessed October 21, 2019, <https://www.britishcolumbia.ca/invest/industry-sectors/natural-gas/>.

Figure 5: BC gas production and royalties, 2007–18



Source: Authors' calculations based on data in the BC Budget and from the BC Ministry of Energy, Mines and Petroleum Resources.

and leases of Crown land, returns to the public hit a record \$3.7 billion in 2008/09 (red bars) compared to more modest results in recent years.

Another way of looking at whether the public is getting a fair share is the effective royalty—the share of the total extracted dollar value that is returned to the public treasury. From 2000/01 to 2005/06, on average 25 cents of every dollar of gas produced came back to the public sector in royalties. Since 2010/11, however, the effective royalty has averaged just over nine cents per dollar of gas sold, and in 2017/18 was only 7.3 cents.

BC's royalty regime is primarily based on the price of gas, rather than the volume produced, so extremely low market prices in recent years have been a critical factor behind lower royalty revenues. From a peak of \$8 to \$9 per thousand cubic feet in 2008, gas prices dropped to well below \$2 in 2016 and 2017 in BC's principal export market, Alberta.

A second part of the decline is the expanded use of subsidies or incentives in the form of royalty credits. These include, according to the BC government:

**Infrastructure Royalty Credit Program**

Offers credits for up to half the cost of constructing roads, pipelines, and associated facilities to remote or underdeveloped areas in British Columbia.

### **Deep Well, Deep Re-Entry Well, and Deep Discover Well Royalty Credit Programs**

Offers credits that reflect the increased costs associated with drilling in deep resource plays.

### **Marginal Royalty Program**

Offers lower royalty rates for low-productivity natural gas wells.

### **Net Profit Royalty Program**

Shares the capital risk of developments that are technically complex or remote from existing infrastructure.

### **Ultra-Marginal Royalty Program**

A program that supports the development of shallow gas wells (up to 2,500 metres for vertical wells and up to 2,300 metres for horizontal wells) with lower rates of production.<sup>78</sup>

In essence, the royalty credits were introduced to encourage fracking, a production process that is causing great harm, and a process that the industry needs no incentive to pursue. The 2019 BC Budget estimates these credits at \$431 million in 2018/19, consuming some 72 per cent of gross royalties. Use of credits to reduce royalties paid is forecast to be in the \$300 million to \$400 million range over the coming three years.

Actual credits, however, may be much larger and are stockpiled to be claimed against future royalties owing. Freedom of Information requests made by the CCPA's Ben Parfitt revealed that some 26 companies garnered just over \$700 million in deep-well credits in 2017/18 alone.<sup>79</sup> BC's Public Accounts cite outstanding deep well credits of \$2.6 billion as of the end of the 2018/19 fiscal year.<sup>80</sup> In addition, new royalty credit programs have been introduced to subsidize investments by companies that reduce GHG emissions in their operations, such as the Clean Infrastructure Royalty Credit Program and the Clean Growth Infrastructure Royalty Program.<sup>81</sup>

## **COAL ROYALTIES**

Coal tenures in BC also have a two-stage process. First, a coal licence is issued by the ministry for exploratory purposes, with an application fee of \$25 per hectare plus \$7 per hectare annual rent. Once the resource is proven, a coal lease gives the holder exclusive rights to explore, develop and produce coal, with an initial term of 30 years, followed by 15 years upon renewal.<sup>82</sup>

78 "Natural Gas," Industry Sectors, Trade and Invest British Columbia, accessed October 21, 2019, <https://www.britishcolumbia.ca/invest/industry-sectors/natural-gas/>.

79 Ben Parfitt, "BC Government Fossil Fuel Subsidy Data Finally Public," *Policy Note* (blog), CCPA-BC, November 13, 2019, <https://www.policynote.ca/deep-well-credits/>.

80 Office of the Comptroller General, *BC Office of the Comptroller General: Public Accounts 2018/19* (Victoria, BC: Government of BC, 2019), <https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/government-finances/public-accounts/2018-19/public-accounts-2018-19.pdf>.

81 "Clean Growth Infrastructure Royalty Program," Family, Natural Resources & Industry, Government of BC, <https://www2.gov.bc.ca/gov/content/industry/natural-gas-oil/oil-gas-royalties/clean-growth-infrastructure-royalty-program>.

82 BC Ministry of Energy, Mines and Petroleum Resources, *British Columbia Coal Industry Overview 2017* (Victoria, BC: Government of BC, 2017), information circular 2018-2, [http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS\\_IC2018-02.pdf](http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS_IC2018-02.pdf).

In essence, the royalty credits were introduced to encourage fracking, a production process that is causing great harm, and a process that the industry needs no incentive to pursue.

BC then receives a “coal mineral tax” (effectively a royalty) on cash flow from coal mines, but at a relatively low rate of 13 per cent of the economic rent.<sup>83</sup> Coal revenues to BC were \$338 million (\$8 million from coal tenures and \$330 million from the coal mineral tax) in 2017/18, although this figure was driven up by a spike in metallurgical coal prices in 2017. Coal mineral tax revenues are anticipated to be \$302 million in 2018/19.<sup>84</sup>

While the overall coal-mining royalty regime is well designed in terms of economic principles, there is great potential in increasing the tax rate to capture a greater share of economic rents and raise more revenue. In addition, deductions for companies against the coal mineral tax to stimulate investment should be eliminated or curtailed, such as the “new mine allowance” and “investment allowance,” as should tax breaks offered to individual investors (known as “flow-through shares”).

## ROYALTY REFORMS

For royalty reform we can look to Norway, a jurisdiction similar to BC in that it is simultaneously pursuing fossil fuel exports and domestic climate policies, and has been wrestling with the contradictions between the two. Norway’s approach to offshore oil production has historically been aimed at capturing national economic benefits in the form of employment and economic activity, and includes a state-owned oil company and a sovereign wealth fund. Their tax and royalty regime garners some 78 per cent of economic rents, which is invested in a sovereign wealth fund for a future when oil is depleted (with a current value of about \$1.4 trillion, or about a quarter million dollars for every Norwegian). Contributions to the national budget to pay for public services are limited to the income from the oil fund’s investments.<sup>85</sup>

Royalty reform can ensure public benefits and reduce incentives for companies to tap marginal wells or those with high environmental costs.

Royalty reform can ensure public benefits and reduce incentives for companies to tap marginal wells or those with high environmental costs. Key directions for reform include the following:

- A moratorium on issuing new leases or tenures. This could include restrictions on extensions of existing leases, and reclamation of existing licences that expire. Buying back some of the outstanding leases could also be considered, to be consistent with a carbon budget approach. Some of this may happen as a result of corporate decisions. For example, Imperial Oil walked away from some BC Crown leases in 2016, leading to a writedown of \$289 million, which had been anticipated as supply for an LNG megaproject that was cancelled.<sup>86</sup>
- Increase royalty rates and set a minimum royalty per unit extracted. The current system relies too much on market prices in a context of overproduction of gas in North America, with very low prices making the return to the public very small. In addition, higher royalties per unit are justified based on the inclusion of environmental and social costs

83 Rates are 2 per cent of “net current proceeds” (NCP) and 13 per cent of “net revenue” (NR). The Ministry of Finance’s *BC Financial and Economic Review 2018* describes them as “NCP tax paid on current operating cash flow until all current and capital costs, plus any investment allowance, are recovered. Then NR tax paid on cumulative cash flow. NCP tax creditable against NR tax.”

84 BC Ministry of Finance, *Making Life Better: 2019; Budget and Fiscal Plan: 2019/20 to 2021/22*, 120, table A5, [https://www.bcbudget.gov.bc.ca/2019/pdf/2019\\_budget\\_and\\_fiscal\\_plan.pdf](https://www.bcbudget.gov.bc.ca/2019/pdf/2019_budget_and_fiscal_plan.pdf).

85 Guri Bang and Bard Lahn, “From Oil as Welfare to Oil as Risk? Norwegian Petroleum Resource Governance and Climate Policy,” *Climate Policy* (November 2019), <https://doi.org/10.1080/14693062.2019.1692774>.

86 “Imperial Oil Reports Fourth-Quarter Loss on Northern Gas Project Writedowns,” *Financial Post*, February 2, 2018, <https://business.financialpost.com/pmn/business-pmn/imperial-oil-reports-fourth-quarter-loss-revenue-down-from-year-ago>.

Credits against royalties for fracking and associated infrastructure in the gas industry and similar credits for coal mining should be removed.

of extraction, processing and transportation. This would affect decision-making by companies such that marginal wells/deposits would be abandoned first.

- Establish a Wind Down Fund from increased royalty revenues. This fund would support worker and community transitions and investments, including economic diversification, green infrastructure and remediation activities. In the spirit of reconciliation, provision for royalty sharing should be made to honour the rights and title held over BC lands by First Nations.
- Eliminate subsidies. Credits against royalties for fracking and associated infrastructure in the gas industry and similar credits for coal mining should be removed. Along with these reforms, other subsidies to fossil fuel industries should be phased out. The “heritage” industrial electricity rates through BC Hydro and low industrial usage charges for water also represent subsidies to the industry. Similarly, the development of new sources of power generation and new transmission lines for resource projects, where such costs are spread across all rate payers, are essentially new subsidies to fossil fuel industries.
- Shift to public ownership. Companies invest in order to grow and generate revenues and profits for investors, a business model that may well be inconsistent with the wind-down we are seeking. An alternative would be to use a Crown energy corporation as a focal point for the transition. This would also enable full economic rents to be captured (as with Norway), and could better support a just transition for workers and communities as described above. This would likely mean buying leases from existing corporate holders, or taking them back from companies that do not wish to produce under the new regime outlined here, and taking over extraction and processing operations ourselves, with a wind-down schedule hard-wired into the business plan of the Crown corporation.



# Conclusion

THE FRAMEWORK FOR A MANAGED WIND-DOWN outlined in this paper aspires toward a strategic approach to fully decarbonizing BC's economy. To date, BC has seen only modest efforts for GHG emission reductions, limited to those emissions within BC's borders. BC's role as a major exporter of fossil fuels has been sidestepped in this conventional approach, and political parties have not been willing to engage in an honest conversation about what would be needed to get to net-zero emissions by mid-century.

The following is a summary of the main directions and vision:

**Push for a global agreement on limits to fossil fuel extraction.** It is now well known that the world has far more reserves of fossil fuels than would be permitted under a serious carbon budget framework. A global agreement aiming to steadily reduce fossil fuel production in line with targets based on climate science would represent a supply-side version of the Paris Agreement (which notably does not even mention fossil fuels). Such an agreement could then be the basis for the negotiation and allocation of carbon supply budgets to different countries to better manage the transition to zero carbon, and could also focus on specific budgets each for oil, gas and coal.

**Develop a carbon budget framework for BC.** BC should take a leadership role in developing a framework that puts clear boundaries on domestic consumption of fossil fuels, as well as extraction of coal, oil and gas in BC. Similar budgets could be developed for cities and regions or for BC economic sectors as part of a coherent approach. A climate test should be developed for major infrastructure projects.

**Plan pathways to zero carbon emissions.** Based on carbon budgets, the province, regions and sectors should be given clear paths to decarbonization. Declining carbon budgets should be used to provide BC's gas and coal industries with a clear schedule for winding up operations by 2050. These should be informed by broad conversations at different levels of how to get to zero emissions. For industry, multiparty bodies (representing government, First Nations, business and labour) should be tasked with developing sectoral strategies in line with those carbon budgets.

**Fully phase out BC's domestic use of non-renewable gas.** BC should commit that no new buildings (residential, commercial and public such as hospitals and schools) will be able to use gas or tie into gas pipelines. All new buildings would need to use electric, heat pump or geothermal space and hot water heating, and no more gas stoves. All existing buildings will need to be off

Political parties have not been willing to engage in an honest conversation about what would be needed to get to net-zero emissions by mid-century.

gas by 2040 (except in cases of renewable gas). Industrial users should be given an intermediate timeline of something like 2030 to phase out their use of gas.

**Invest in green infrastructure and alternatives.** In the transition period many jobs and substantial economic activity can be achieved through investments that build toward a vision of a zero-carbon BC. This should include new investments in clean energy supply and grid infrastructure; remediation and restoration of old fossil fuel industrial sites; and zero-emission buildings and transportation, including private recharging for electric vehicles, public transit and long-distance rail services.

**Develop new Crown corporations.** Crown corporations may be useful vehicles to drive the transition. A Crown corporation could undertake a more limited amount of fossil fuel extraction and processing consistent with a wind-down framework, as it generally runs counter to the standard modus operandi of profit-seeking corporations. Another Crown corporation could be engaged as a “market maker” to link materials collection and supply with value-added processing to produce for the domestic market. This could also involve an element of import substitution, or displacing materials BC is currently importing. A Crown corporation in the building sector could audit the energy consumption in buildings and implement energy conservation measures in the broader public sector. This could also provide some jobs for displaced workers as well as apprenticeship and training for youth, Indigenous people, women and others normally excluded from construction.

**Create a Just Transition Fund to support worker transitions.** The challenge is to go well beyond standard labour market policies like temporary income support and retraining, although these are prerequisites for a just transition. Developing a good jobs guarantee for fossil fuel workers can ensure workers who are not of retirement age are made whole through the transition.

**Invest in community-led processes.** Beyond the workers themselves, generous public support should be used by communities (including Indigenous communities) to identify and fund alternative economic opportunities. This could include related business lines, remediation of old sites, new services (such as tourism and development of retirement homes) and infrastructure upgrading. Areas disproportionately affected by the managed wind-down should receive a larger share of public reinvestment funds.

**Reform the royalty regime.** Increase royalties on existing leases and set a minimum royalty per unit extracted. Eliminate subsidies in the form of royalty credits and low-cost electricity. Share royalties with First Nations.

**Place a moratorium on new leases.** It is irresponsible for governments to auction or issue new leases for the extraction of fossil fuels. Policy could include restrictions on extensions of existing leases, reclamation of existing licenses that expire and buying back some of the outstanding leases.

Hopefully, the ideas in this paper will launch a conversation that is desperately needed. Fundamentally, BC must live within a carbon budget and must make decisions within that budget to promote a strong and equitable economy. To do this requires a commitment on the part of the BC government to invest in green infrastructure, skills and training, and to develop an industrial strategy around decarbonization. Our wind-down approach is informed by notions of climate justice—a desire to ensure that the transition is fair, that the path forward is set in partnership with Indigenous people, and that no one, in particular workers and communities in the existing fossil fuel sectors, is left behind.

Many jobs and substantial economic activity can be achieved through investments in clean energy supply and grid infrastructure; remediation and restoration of old fossil fuel industrial sites; and zero-emission buildings and transportation.





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