ALBERTA'S COAL PHASE-OUT

A Just Transition?

PARKLAND INSTITUTE

CORPORATE MAPPING PROJECT

Ian Hussey and Emma Jackson

Contents

Alberta's Coal Phase-Out: A Just Transition?

Ian Hussey and Emma Jackson
This report was published by Parkland Institute
November 2019

Parkland Institute
University of Alberta
1-12 Humanities Centre
Edmonton, AB T6G 2E5

Phone: 780.492.8558
Fax: 780.492.8738
Email: parkland@ualberta.ca
parklandinstitute.ca

ISBN: 978-1-894949-70-5

Tables

Acknowledgements

We are grateful to two anonymous reviewers and our colleagues at Parkland Institute for their comments on an earlier version of this report. We are also appreciative of Parkland Institute volunteer Jakob Meyer's work in the winter term of 2018 to help draft the initial timeline of key dates in the early stages of this research project.

About the Authors

Ian Hussey is a research manager at Parkland Institute, and a steering committee member of the SSHRC-funded Corporate Mapping Project.

Emma Jackson recently completed her MA in sociology at the University of Alberta. She was a research assistant at Parkland Institute for the SSHRC-funded Corporate Mapping Project from September 2016 through December 2018.

About Parkland Institute

Parkland Institute is an Alberta research network that examines public policy issues. Based in the Faculty of Arts at the University of Alberta, it includes members from most of Alberta's academic institutions as well as other organizations involved in public policy research. Parkland Institute was founded in 1996 and its mandate is to:

- conduct research on economic, social, cultural, and political issues facing Albertans and Canadians.
- publish research and provide informed comment on current policy issues to the media and the public.
- sponsor conferences and public forums on issues facing Albertans.
- bring together academic and non-academic communities.

All Parkland Institute reports are academically peer reviewed to ensure the integrity and accuracy of the research.

For more information, visit **www.parklandinstitute.ca**

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

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

For more information, visit **www.corporatemapping.ca.**

Executive Summary

This report explains that Alberta will have little coal-fired electricity left by the end of 2023, six years ahead of the federally mandated coal phase-out deadline of December 31, 2029. This relatively rapid transition away from coal power is the result of numerous decisions made since 2007 by various provincial and federal governments, a few arms-length agencies of the Alberta government, and several large publicly traded corporations that produce electricity for the Alberta market. Our report aims to evaluate Alberta's electricity transition to date against principles and lessons gleaned from the just transition literature.

Following the introduction, the report proceeds as follows. In Section 2, we provide an overview of Alberta's coal power industry, communities, and workforce. In Section 3, we delineate key principles and lessons from the just transition literature. In Section 4, we present case studies on the three companies affected by the Notley government's accelerated coal phase-out (TransAlta, ATCO, and Capital Power). We examine the Notley government's transition programs for coal workers in Section 5 and for coal communities in Section 6. Section 6 also includes a case study of Parkland County, which is the municipal district in Alberta perhaps most affected by the phase-out of coal-fired electricity. In Section 7, we provide an analytic discussion of our research results by evaluating the government's transition programs against the key principles and lessons drawn from the just transition literature. In Section 8, we outline our conclusions based on the research results.

Overview of Alberta's Coal Power Industry, Communities, and Workforce

Coal's dominance in Alberta's electricity market has steadily declined since the late 1980s, when coal plants provided over 80% of Alberta's electricity. Coal power was over 50% of Alberta's installed capacity in 2015 when the Alberta New Democratic Party (NDP) government was elected. In March 2019, at the end of the NDP government's mandate, coal plants only provided 35.5% of Alberta's electricity, while gas plants supplied 47.2%, wind facilities provided 9%, hydroelectric added 5.6%, and 2.7% came from other sources.

Alberta has had a deregulated electricity market since 2000, and most power generating facilities in the province are privately owned. In 2017, the entire electricity industry employed 2% of Alberta's workforce and produced 1% of the province's gross domestic product, yet, because of the heavy reliance on coal power, the industry was responsible for 17% of Alberta's annual greenhouse gas (GHG) emissions. The prevalence of coal power in the

province has resulted in Alberta cities having among the worst air quality in Canada.

There are 20 municipalities and First Nations impacted by the coal phase-out in Alberta. Most are rural communities, and a few are larger towns that are bedroom communities of Edmonton.

Key Principles and Lessons from the Just Transition Literature

Without deliberate and coordinated action, the workers and communities most dependent on fossil fuel extraction shoulder a disproportionate share of the challenges of the energy transition. Calls for a just transition are thus rooted in the understanding that an equitable climate policy agenda must dismantle existing social inequalities and prioritize the well-being of both workers and their communities. At a bare minimum, just transition is about ensuring that the costs of climate change are distributed more equally.

While there is no single approach to just transition, there are some common values and approaches expressed in the just transition literature.

The transition strategies employed will be different for each workforce, but many are found consistently throughout the just transition literature, including support for re-employment or alternative employment, income and benefit support, pension bridging and early retirement assistance, and retraining and educational programs.

What a just transition looks like will vary from community to community, which is why local leadership is critical in the process. Just transition policies must anticipate the consequences of the energy transition on fossil fuel-dependent communities. Key to local community adaptation is the ability to count on the provincial and federal governments to produce clear timelines and plans for the wind-down of facilities, so workers and communities can prepare for the changes.

Public investments in support of economic diversification are fundamental to a just transition. In the initial phase of transition, public investments in local infrastructure projects can help provide jobs and the necessary infrastructure that local communities need to transition to being more sustainable and resilient in the face of increasing climate instability.

Rather than limiting one's scope to renewable energy development alone, economic development plans should also include investments in energy efficiency measures and in already-low-carbon sectors of the economy, such as health care and education. Renewable energy generation, energy efficiency, and public sector provision are labour-intensive and local, and

therefore should be prioritized in the transition away from a fossil-fuel-based economy.

While the public sector is essential to both leading and directing a just transition, the private sector must also contribute to the process. For example, preferential hiring is seen as a way of smoothly transitioning some workers from one job to another within the same company. Employers must also fulfill obligations to their employees, such as issuing records of employment and fulfilling pension obligations. As such, employers have a role to play in certain just transition processes, such as bridging workers to retirement.

Worksite-specific transition plans must be developed and executed under a larger just transition framework. This larger framework will fail to adequately protect workers and communities if it does not take worksite-specific data into account. Various government officials must therefore be given access to data on companies' workforces and future business plans in order to create plans that include whether workers can be transitioned from one business segment to another in the same company, or temporarily absorbed into future capital projects.

The Transition of Alberta's Coal Power Companies

Federal regulations announced by Stephen Harper's Conservative federal government in 2012 mean 12 of Alberta's 18 coal-fired electricity units must be retired by 2029 (some of the coal units can now be converted to gas because of regulations passed by Justin Trudeau's Liberal government in 2018). In 2015, Rachel Notley's Alberta NDP government accelerated the phase-out of the province's six youngest coal units (the ones not affected by the Harper government's regulations). In 2015, TransAlta, ATCO, and Capital Power owned the six units.

The Notley government wanted to avoid stranded capital as a result of the accelerated coal phase-out, so it entered into discussions with the three companies. In November 2016, the Notley government announced the Off-Coal Agreements with the companies, which will see the provincial government compensate the three corporations a total of $1.36 billion over 14 years (2017–2030), with the funds coming from the province's carbon tax on large industrial emitters.

The Off-Coal Agreements are confidential, so details other than the level of compensation to the firms are not publicly known. Some general details have been made public; for example, the three companies agreed to keep their headquarters and a small number of employees in Alberta, and to keep investing in the province's power system. The extent of these employment and spending commitments is unknown, but decisions made by the

companies since November 2016 seem to indicate that the commitments made by the firms to the Government of Alberta are not overly onerous or restrictive.

In mid-2017, ATCO and TransAlta—the two biggest coal power producers in Alberta in 2016—announced plans to convert their coal units to natural gas before the 2029 federal deadline. ATCO said it would convert its units by 2020, and TransAlta said it would do the same by the end of 2023. In 2018, ATCO changed business strategies and decided to substantially reduce its profile as an electricity producer. In mid-2019, the company sold all of its Canadian-based fossil-fuel electricity assets, including nine generating units in Alberta.

Capital Power, on the other hand, initially said in 2016 that it would continue to operate its three Genesee coal units until 2029 and then it would convert them to gas. In 2017, the firm changed strategies to dramatically reduce its use of coal by the end of 2023. In total, 14 of Alberta's 18 coal units will be converted to gas by 2029.

Since the Notley government announced the acceleration of the coal phase-out in 2015, TransAlta had net earnings in 2016 of $276 million (11.5% net profit) and net losses in 2017 of $118 million (5.1% net loss) and in 2018 of $90 million (4% net loss). Of the three companies that we studied, TransAlta is the only one with net losses in 2017 and 2018. This is at least in part because TransAlta has the most coal units to convert or retire of the three firms. TransAlta terminated a net total of 497 jobs in 2016–2018 (20.9% of their workforce).

In 2017, TransAlta released almost 30 million tonnes of carbon pollution, an increase of 7.6% since 2011. In 2018, the firm retired two coal units and temporarily mothballed two more. These operational changes resulted in the elimination of over nine million tonnes of annual carbon pollution, or about 30% of the firm's annual GHG emissions.

ATCO had net earnings in 2016 of $675 million (16.7% net profit), in 2017 of $493 million (10.7% net profit), and in 2018 of $671 million (13.7% net profit). ATCO terminated a net total of 1,305 jobs in 2016–2018 (17.3% of their workforce). ATCO's GHG emissions were almost 11 million tonnes in 2018, a decrease of 30% since 2011. This is likely the result of ATCO decreasing its use of coal.

Capital Power had net earnings in 2016 of $102 million (8.4% net profit), in 2017 of $134 million (11.7%), and in 2018 of $267 million (19.2% net profit). The company added a net total of 134 jobs in 2016–2018 (growing their workforce by 19.7%). Capital Power's annual GHG emissions increased 8% from 2013 to 2017 because the firm became more reliant on coal. As of

October 3, 2019, Capital Power has yet to publish its GHG emissions data for 2018.

Alberta's Transition Programs for Coal Workers

Based on the recommendations of an advisory panel, the Notley government announced the creation of a $40-million transition fund to finance several support programs for the province's coal workers. The programs began to operate in January 2018, and consist of six components:

1. A bridge to re-employment relief grant;
2. A bridge to retirement relief grant;
3. Reimbursement for moving expenses for workers who have to move for a new job;
4. A tuition voucher if workers wish to retrain within five years of being laid off;
5. Career consultants and employment service providers were made available to assist workers in their transition;
6. The provincial government provided employers and unions with a list of qualified facilitators who can be hired to assist employers, workers, and unions with setting up a workforce adjustment committee to create plans for individual worksites.

There were about 3,100 thermal coal jobs in Alberta in 2017. Of these, about 2,480 are in coal mining and processing, and all of these jobs are likely to be terminated by 2029. We estimate an additional 410 power plant jobs will be terminated by 2029. This is because gas plants require just one-third of the labour of coal plants. Based on the coal-to-gas conversion plans of the three impacted companies, most of these estimated 2,890 layoffs are likely to occur by 2023.

Offsetting these layoffs are the job creation estimates associated with increasing renewable power generation and energy efficiency measures and with converting 14 of the 18 coal units to gas. The coal-to-gas conversions are estimated to require $15 billion in private investments, and this investment could create 15,000 full-time equivalent jobs. Over 14 years (2017–2030), converting the generating units will create on average about 1,070 full-time jobs per year.

In 2016, a Pembina Institute report estimated an employment potential of 900 to 2,500 full-time equivalents per year for 2017–2030 related to ramping up to 30% renewable generation by 2030 and increasing energy efficiency. We estimate that about 300 of these annual full-time equivalent jobs would have been created in the upstream renewable energy industry outside of Alberta.

In sum, if Alberta continued with the former NDP government's plans to increase renewable energy and energy efficiency and with the electricity firms' plans to convert most of their coal facilities to gas, the estimated total number of jobs created by all of this economic activity would be between 1,970 and 3,570 annual full-time equivalent jobs, which is roughly comparable to the estimated 2,890 coal jobs that the province will lose by 2030.

Alberta's Transition Programs for Coal Communities

Acting on a recommendation of its advisory panel, in September 2017 the Alberta NDP government announced a $5-million Coal Community Transition Fund. The provincial government announced in March 2018 that 12 projects in 17 coal communities had been funded, exhausting the full funding allocation.

In November 2018, the NDP government announced $200 million over the next 20 years for the Community Generation Program to support small-scale, locally generated electricity projects. Up to $50 million of the total funding envelope was earmarked to support projects in communities affected by the coal phase-out. In late May 2019, the new United Conservative Party (UCP) provincial government canceled the program.

Parkland County Case Study

Alberta coal communities have experienced significant change in the two years since the Coal Community Transition Fund was announced, let alone in the seven years since the Harper government's 2012 coal-fired electricity regulations were announced. One way to examine how larger political and economic changes are affecting a local coal community is to research a municipal case study. We chose to develop a case study on the municipal district of Parkland County because it is likely the community most affected by the coal phase-out in Alberta.

Parkland County is a municipal district of over 30,000 residents west of Edmonton that includes Stony Plain and Spruce Grove (which are governed as separate municipalities). Parkland County is an interesting case study because it is part rural and part urban, and in 2015 nine of the 18 coal units in Alberta were located in the rural part of the county.

In 2017, TransAlta accounted for about a quarter of Parkland County's annual tax revenue, or almost 10% of the county's total annual revenue. TransAlta has also been the largest employer in Parkland County in recent years.

In August 2017, Parkland County Mayor Rod Shaigec asserted that the coal phase-out could result in $2 million per year in lost property tax revenue for the municipal district. Parkland County's budget in both 2017 and 2018 was about $158 million. In 2019, the county's budget is about $150 million, a 5.5% overall reduction. About $4 million of the revenue shortfall was cut from the operating budget, for a 3.75% cut to municipal operations.

Parkland County has already lost over 300 jobs at the Highvale Mine, and could lose up to another 700 coal mining and power plant jobs because of the coal phase-out. TransAlta, the owner of the Highvale Mine, plans to build Sundance 7, a new gas-fired generating unit, in Parkland County from 2020 to 2022. The company estimates the project will generate 400–600 construction jobs. Since 2018, Parkland County has also attracted significant private investments in pet food manufacturing, renewable energy, and leisure. The county is also working to expand opportunities in agriculture and related value-added industries.

In January 2019, the Alberta NDP government announced two highway construction projects in Parkland County. The two projects will cost a total of $155-195 million, and they will support 800 direct and indirect jobs.

In June 2019, the federal Liberal government announced it was granting Parkland County $2.2 million to develop the Tri-Region's regional plan with Stony Plain and Spruce Grove. The funding is part of the $35-million Canada Coal Transition Initiative announced in 2018.

Analytic Discussion of the Research Results

The transition programs developed and implemented by the Alberta NDP government cover the main components of a just transition: bridge to re-employment grants, bridge to retirement grants, funds for moving expenses, tuition vouchers for workers who decide to return to school, career and employment consulting services, and multi-stakeholder workforce adjustment committees to create tailored transition plans for individual workers.

The just transition literature emphasizes the need for governments to fund retraining and education programs for displaced workers. These programs should include both skills development and career counselling to support workers through the process of transition, and this is the case for the Alberta transition programs implemented in January 2018.

The federal government is also supporting skills development and economic diversification projects through the $35-million Canada Coal Transition Initiative, announced as part of the 2018 federal budget. In 2019, $6.8 million of these funds were committed to Alberta coal communities to support the

transition away from coal power.

The just transition literature also stresses the importance of provincial and national renewable energy programs as part of an industrial development and job creation strategy that guides the transition to a low carbon economy. Neither the Alberta nor the federal governments have developed a comprehensive green industrial strategy to date that would help absorb considerable numbers of laid-off coal power workers into renewable energy and other low-carbon sectors.

Local communities and governments in Alberta were consulted by the provincial government about the coal phase-out and given an opportunity to decide for themselves what transition looks like for them. Our municipal case study shows that Parkland County identified public infrastructure improvements that would enable the county to attract more private capital investment and job creation. Parkland County's transition strategy aligns with the just transition principle that improved public infrastructure is one way that the benefits of a just energy transition can be accorded to the whole local community, not just the directly affected workers.

As mentioned above, in January 2019, the Alberta NDP government approved two highway construction projects in Parkland County. Two months later, the 2019 federal budget created a $120 million infrastructure fund over four years. Each year beginning in 2020, $21 million will go to Western Economic Diversification Canada to support economic diversification in Western Canadian coal power communities. Alberta coal communities can expect to receive a significant portion of this infrastructure funding in the next four years.

An important reason to transition away from coal power is the health benefits. Alberta residents, particularly those in the Edmonton metropolitan region, will have cleaner air with the retirement or conversion of most of the coal generating units set to occur by the end of 2023. Along with improving Albertans' health, the transition away from coal could save Alberta's public health care system an estimated $300 million per year related to poor air quality due to coal-fired electricity generation. However, most of the coal capacity will be replaced by gas facilities, so the Alberta electricity sector may still produce an estimated 25 million tonnes of annual carbon pollution in 2030 (down from 45.2 million tonnes in 2016), and this will contribute to global warming and thus adversely affect the natural environment and communities.

The just transition literature emphasizes that strong public services are needed to support diverse, low carbon, labour-intensive industries. However, Parkland County's 2019 budget included a 3.75% cut to municipal operations

because of reduced business property tax revenue related to the coal phase-out. On top of the financial strain placed on coal communities in the last two years, the UCP's 2019 budget reduced capital grants for municipalities and cut spending on provincial public services.

Private employers must be involved in the energy transition planning and implementation process, and this has been the case in Alberta. Workforce adjustment committees that involve companies, labour unions, and other stakeholders are and will continue to operate at affected worksites to enable the smoothest transition possible for workers to another job, retraining, or retirement. This type of multi-stakeholder work to develop and implement tailored plans for specific worksites and workers is critical to the success of any just transition process.

Alberta Labour spokespeople told us that TransAlta, ATCO, and Capital Power have given the provincial government access to data about the companies' workforces. Data sharing like this is important for any just transition involving private employers and has helped the Government of Alberta plan and rollout its transition programs for workers and communities. Given this data has not been publicly released, it is impossible for us to say how many affected coal workers will be able to transition to another business segment of their employer's operations. This type of preferential hiring by employers is an important way to ensure a smooth transition for some workers.

Most of Alberta's coal units will be converted to burning gas by 2023. This will financially benefit electricity producers because it enables the businesses to save on carbon costs and to reduce their workforces. Indeed, all three Alberta-based power companies affected by the federal and provincial governments' accelerated coal phase-out are speeding up the transition even more than is required because it makes financial sense to do so.

While the choice by the Alberta and federal governments, via their regulatory and financial decisions, of a strategy to largely transition Alberta's electricity sector from coal power to gas power is in the private interest of the electricity companies, it is not in the public interest of Albertans and Canadians. Alberta's electricity sector may still annually produce 25 million tonnes of carbon dioxide equivalent emissions in 2030 because of the domination of gas-fired generation. Therefore, Alberta's coal phase-out and increased use of gas-fired generation has undermined the central objective of the coal phase-out: the creation of deep GHG emissions cuts.

While it is true that natural gas produces less GHG emissions per unit of energy than both oil and coal, its release of methane—an even-more-potent GHG than carbon dioxide—results in a longer emissions life cycle than other fossil fuels. In short, natural gas is not a climate change solution. Rather, in

acknowledging the reality that all fossil fuels must be phase-out by mid-century, it becomes clear that long-term investments in natural gas are misguided. Alberta's and Canada's climate targets and commitments mean that we must reduce gas combustion, not increase it.

Prior to its cancelation by the UCP government, Alberta's Renewable Energy Program (REP) ran three competitive auctions that set record low prices for new renewable electricity capacity in the province. It is still early in the energy transition process, and restarting the REP would be a cost-effective way for Alberta to ramp up renewable generating capacity in the coming years.

Conclusion

The Off-Coal Agreements between the Government of Alberta and TransAlta, ATCO, and Capital Power, as well as the federal regulations on coal plants, provide two backstops for the coal phase-out and mean it is unlikely to be rolled back by the UCP or a future provincial government (though most of the phase-out will be complete before the 2023 Alberta election).

It seems likely that Alberta municipalities and First Nations affected by the coal phase-out will need further support from the provincial and federal governments as the transition to gas-fired and renewable energy continues in the coming years. After all, for decades these communities have relied heavily on coal power plants and their associated mines as substantial sources of property tax revenue and family-sustaining jobs.

1. Introduction

The Alberta New Democratic Party (NDP) won a majority government in the May 2015 provincial election. The NDP's platform included commitments to phase out coal-fired electricity generation and to expand wind and solar power production (Hussey 2015).

Coal power made up over 50% of Alberta's installed capacity in 2015, however, coal's dominance in Alberta's electricity market had steadily declined since the late 1980s, when coal-fired units provided over 80% of Alberta's electricity (AFL and CTC 2017, 9). In 2018, coal-fired electricity was 47% of power generation in Alberta, down sharply from 59% in 2017 (Clancy 2019b). At the same time, gas-fired generation in the province increased from about 10% in 1988 to 31% in 2017, and to 42% in 2018 (AFL and CTC 2017, 9; Clancy 2019b). In March 2019, coal plants only provided 35.5% of Alberta's electricity, while gas plants supplied 47.2%, wind provided 9%, hydro added 5.6%, and 2.7% came from other sources (AESO 2019). Our report explains that Alberta will have little coal-fired electricity left by the end of 2023, and that this outcome is the product of numerous decisions made since 2007 by various provincial and federal governments, a few arms-length agencies of the Alberta government, and several large publicly traded companies that produce electricity for the Alberta market.

In November 2015, just six months into its mandate, Premier Rachel Notley's NDP government announced its Climate Leadership Plan.[1] The plan aimed to accelerate the transition away from coal power toward natural gas and renewable electricity generation (Government of Alberta 2015a). The plan also included a carbon levy on transportation and heating fuels (Hussey 2016), an oil sands emissions cap (Hussey 2017), a directive to increase renewable energy in the province from 9% of total power generation in 2015 to 30% by 2030, and the creation of Energy Efficiency Alberta, a Crown corporation that promotes and channels public funds toward energy efficiency. The target of 30% renewable energy by 2030 was subsequently legislated. In December 2015, a month after Alberta's climate plan was announced, Prime Minister Justin Trudeau's Liberal government committed Canada to the Paris Agreement (see Hussey and Janzen 2018).

In the following three years, the Alberta NDP and federal Liberal governments both made several policy and related financial decisions to enable the coal phase-out to succeed. The two governments worked hard to politically "own" the coal phase-out, but in truth, outside of Ontario, the Canadian coal phase-out started in September 2012 with the announcement of new regulations for coal-fired electricity units by then-prime minister Stephen Harper's Conservative government (Government of Canada 2012; McCarthy 2012). For Alberta, the province that has produced the most coal-fired electricity in recent years, the new regulations meant 12 of the

province's 18 coal units would close by the end of 2030 (the 12 units are part of three plants). The Harper government did not develop a transition plan for affected workers, communities, and businesses and neither did the then-Progressive Conservative provincial government.

For its part, in November 2016 the federal Liberal government announced it would spend $21.9 billion over 11 years to help transition Canada's electricity system from 80% non-emitting in 2016 to 90% non-emitting by 2030 (Government of Canada 2016b).[2] In the same month, the Trudeau government sped up Harper's 2030 phase-out timeline by one year, to December 31, 2029, unless the units are retrofitted with carbon-capture technology or an affected province negotiates alternate arrangements with the federal government (McCarthy 2016). A year later, at the November 2017 United Nations Conference of the Parties in Bonn, Germany, Canada and the United Kingdom launched the Powering Past Coal Alliance with 25 partners, including the Government of Alberta (Government of Canada 2017). The alliance is advocating for the accelerated phase-out of coal power around the world.

In the spring 2018 budget, the federal government committed $35 million to skills development and economic diversification projects through the Canada Coal Transition Initiative (Government of Canada 2019a). In November 2018, federal Finance Minister Bill Morneau announced a new, temporary tax incentive that enables companies to write off the costs of new wind and solar energy installations against their taxes (Meyer 2018).[3] A month later, in December 2018, the federal government's Just Transition Task Force submitted its advisory report on possible further actions to help transition coal power workers and communities in the four provinces that still produce coal-fired electricity—Alberta, Saskatchewan, New Brunswick, and Nova Scotia (Government of Canada 2018a and 2018f). Following one of the recommendations from the task force, in March 2019 the Liberal government created a $120 million infrastructure fund over four years for coal communities, with $84 million going to Western Canadian coal communities.

The Notley government's climate plan targeted Alberta's six youngest coal units (six units in three plants), which are the units not affected by the Harper government's earlier regulations (the youngest of these coal units could have operated until 2061 according to the Harper regulations). In the last two years, the three firms that own these units have announced they will be converted to almost entirely gas-fired generation by the end of 2023. This will mean that the vast majority of Alberta's coal-fired electricity capacity will be phased-out six years faster than the Trudeau government's accelerated coal phase-out schedule (more on this in Section 4).

Elected to a majority government on April 16, 2019, the United Conservative Party (UCP) has already cancelled the Renewable Energy Program, the provincial carbon levy on transportation and heating fuels (which will be replaced by the federal carbon tax on January 1, 2020), and ongoing work to transition the provincial electricity market to a capacity market in 2021 (the UCP decided to stay with the current energy-only market). However, the Off-Coal Agreements between the Government of Alberta and TransAlta, ATCO, and Capital Power, as well as the federal regulations on coal plants, provide two backstops for the coal phase-out and mean it is unlikely to be rolled back by the UCP or a future provincial government (though, as mentioned above, most of the phase-out will be complete before the next scheduled Alberta election in 2023).

Alberta's and Canada's coal phase-outs have catalyzed an important conversation about what constitutes a "just transition" and have provided on-the-ground examples of what has long been a mostly theoretical discussion. In this report, we analyze Alberta's coal phase-out with the understanding that just transition is a social, economic, and climate justice framework that must constantly evolve to attend to the shifting needs of people and the planet (more on this in Section 3). As the Canadian Labour Congress (CLC) put it nearly 20 years ago, "We have to remember that transition is a number of processes, not something which we aim for, then stop" (CLC 2000, n.p.). This understanding of just transition recognizes that such transitions do not have clear and absolute endings, leaving space for further interventions and the ability to address shortcomings in how transition actions and programs have been rolled out.

The report proceeds as follows. In Section 2, we provide an overview of Alberta's coal power industry, communities, and workforce. In Section 3, we review several reports from labour unions and think tanks on just transition and delineate key principles and lessons from the literature. In Section 4, we present case studies on the three companies affected by the Notley government's accelerated coal phase-out (TransAlta, ATCO, and Capital Power). We examine the Notley government's transition programs for coal workers in Section 5 and for thermal coal communities in Section 6 (because this is the sequence the transition programs were developed by the government). Section 6 also includes a case study of Parkland County, which is the municipal district in Alberta perhaps most affected by the phase-out of coal-fired electricity. In Section 7, we provide an analytic discussion of our research results by evaluating the government's transition programs against the key principles and lessons drawn from the just transition literature. In Section 8, we outline our conclusions based on the research results.

2. Overview of Alberta's Coal Power Industry, Communities, and Workforce

In 1995, then-premier Ralph Klein began to deregulate Alberta's electricity market, and by the end of 2000 the province's energy market was fully deregulated and most of the power plants in the province were privately owned (Wallace 2001). In 2017, there were about 3,100 workers in Alberta's coal power plants and their associated mines (AFL and CTC 2017, 6).[4] In 2017, the entire electricity industry employed 2% of Alberta's workforce and produced 1% of the province's gross domestic product (GDP), yet the industry was responsible for 17% of Alberta's greenhouse gas (GHG) emissions (Vriens 2018, 5). In 2016, Alberta's electricity sector produced 58% of the total GHG emissions from power generation across Canada, or 45.2 million tons of carbon pollution, because of Alberta's heavy reliance on coal power (NEB 2019).

Alberta has been over-supplied with electricity in recent years, and as a result consumers have benefited from low prices. In 2016, Alberta's power-generating capacity was more than 35% above the supply needed to meet peak demand (AESO 2017). As of February 2019, the province's reserve margin was 37.7% (AESO 2019). The abundance of power supply has made the phase-out of coal units easier to undertake than it would have been if the province had a tighter reserve margin, and thus higher electricity prices (Vriens 2018, 6).

In 2016, five of Alberta's top 10 industrial emitters of GHGs were coal plants (Thibault and Read 2016). The prevalence of coal power in the province has resulted in Alberta cities having among the worst air quality in Canada (ibid). The health costs of Alberta's poor air quality from burning coal for electricity have been estimated at $300 million per year (Anderson et al. 2013). Coal power in Alberta in 2015 was estimated to be responsible for 81 emergency room visits and 92 premature deaths (Israel et al. 2016).

There are 20 municipalities and First Nations impacted by the coal phase-out in Alberta. Most are rural communities, along with a few larger towns that are bedroom communities of Edmonton. Nine of the province's 18 coal units are in Parkland County (two of the nine units were retired on January 1, 2018), a municipal district located west of Edmonton that includes Stony Plain and Spruce Grove (see Section 6 for a case study of Parkland County).

In November 2016, the Alberta NDP government announced its intentions to implement "the AESO's [Alberta Electric System Operator's] recommendation to transition from an energy market to a new framework that includes an energy market and a capacity market" (AESO 2016; see

also Government of Alberta 2016a and 2018a). After two years of the AESO working toward implementing a capacity market by 2021, in mid-2019 the newly elected UCP government cancelled the plan to switch from an energy-only market to a capacity market (Government of Alberta 2019d; Graney 2019).

In June 2017, the NDP government's electricity price cap came into force. The cap is temporary, and is intended to protect families and businesses from possible price volatility as the province transitions to a capacity market. The price cap "ensures Albertans will pay no more than 6.8 cents per kilowatt hour for electricity" until May 31, 2021 (Government of Alberta 2017a). The 2002–2018 average price for electricity in Alberta was 7.3 cents, with a historic high of 15.06 cents in January 2012 and a historic low of 2.88 cents in April 2017.[5] The UCP has stated that it will make a decision about the price cap in the fall 2019 legislative session. It would not be surprising to see the price cap cancelled, since the UCP has already cancelled the consumer carbon levy that helped pay for the price cap.

Before examining the Alberta government's actions and programs to transition the province's coal-fired electricity businesses, workers, and communities in Sections 4 through 6, we turn now to some key principles and lessons found in the just transition literature. The term "just transition" originated in the trade union movement, so we focus on just transition reports from several unions and from think tanks that produce research on labour issues. We return to these key principles and lessons from the literature in Section 7 in order to evaluate the Alberta government's actions and programs.

3. Key Principles and Lessons from the Just Transition Literature

It is now widely recognized that climate change is no longer a future threat, but a reality already affecting millions of people around the world. While the transition to a zero-carbon economy will create significant opportunities for workers and communities, it will also inevitably bring about immense challenges for certain sectors of the economy. Without deliberate and coordinated action, the workers and communities most dependent on fossil fuel extraction are set to shoulder a disproportionate share of the challenges of the energy transition. Calls for a just transition are thus rooted in the understanding that an equitable environmental policy agenda must dismantle existing social inequalities and prioritize the well-being of both workers and their communities.

Of course, there is no single approach to just transition. Rather, as the International Trade Union Confederation (ITUC) notes, "Just Transition strategies will vary as the diversity of the world of work demands. The challenges faced by countries and regions in the transition make defining a single approach difficult" (ITUC 2017, 11). While there is no single approach to just transition, there are some common values and approaches expressed in the just transition literature.

Over the last decade, the critical importance of just transition policies has begun to gain international recognition. As the ITUC notes, the 2008 global financial crisis played a significant role in fuelling this understanding by raising "the prospect of an environmentally sound recovery through a Green New Deal to connect climate and jobs" (ITUC 2017, 8).

In addition to aspiring to keep global warming to 1.5C, the Paris Agreement (UNFCCC 2015), which was sealed on December 12, 2015, also enshrined a commitment to a just transition that creates decent jobs for workers around the world. In 2015, the International Labour Organization (ILO) also unanimously adopted the *Guidelines for a Just Transition towards environmentally sustainable economies and societies for all* (ILO 2015). On the one hand, these international decisions point to the growing recognition by governments, employers, and labour unions of the employment dimension of climate policy. On the other hand, governments around the world have still made few plans that take seriously the need for an immediate and rapid transition away from fossil-fuel dependence. Mirroring the reality of global emissions cuts to date, the gap between these international commitments and the on-the-ground action required to meet them is not closing fast enough.

The rest of this section of the report explicates key principles and lessons from the just transition literature.

Just Transition as an Inherent Right

While definitions of just transition vary, the assertion that an equitable transformation of the economy must be an inherent right of all workers and communities, rather than an economic privilege afforded to some, is a foundational point made in much of the literature. At a bare minimum, just transition is about ensuring that the costs of climate change are distributed more equally. However, some push this notion further, arguing that a just transition should be leveraged to equalize past inequities—creating an economy where those who contributed the least to climate change are able to benefit most from the action it requires. As the Canadian Labour Congress (CLC) notes:

> Just Transition is about many things. It is about fairness and environmental justice. It is about quality employment in an economy based on sustainable production and infrastructure. It is about communities as the focus of Just Transition programs—communities as centres of diverse, labour-intensive industries, with a strong public sector to support them. It is, above all, about alternative employment in a sustainable economy. (CLC 2000, n.p.)

The vision of a just transition requires workers' participation and control over their own future. Social protection is thus critical to any just transition. As the ITUC puts it, "If people feel vulnerable, they will be more reluctant to support change" (ITUC 2017, 11).

Critical to just transition is not only coordinated policy implementation, but also adequate foresight. As the CLC notes, "We have to anticipate economic change and plan transition, including the retraining programs needed, accordingly, as an integral part of industrial change" (CLC 2000, n.p.).

A Just Transition for Workers

The concept of just transition emerged from a deep concern with the costs that climate change policy would impose on workers. As a result, the most detailed just transition recommendations are concerned with social and economic protections for workers. While this concern is necessary to protect the well-being of workers, it is also essential to combating climate change. As the Alberta Federation of Labour-led Coal Transition Coalition notes:

> Governments of all stripes, and of all levels, should take note that transitional planning for workers is not just about fairness, but about the political viability of climate change policies. In the coming years, many more policies to address climate change will be needed, many of which will prompt significant shocks within the economy and labour market. If governments and industries ignore the needs of workers in designing and implementing these policies, they will undermine the social license needed to implement them. (AFL and CTC 2017, 6)

Consulting workers and unions at all stages of a transition program—from planning through to implementation—is critical to ensuring its effectiveness. Just transition programs should bring workers and government together to identify workers' needs and opportunities for skills development, decent work, and social development. The strategies employed will be different for each workforce, but many are found consistently throughout the just transition literature, including support for re-employment or alternative employment, income and benefit support, pension bridging and early retirement assistance, and retraining and educational programs.

Support for re-employment or alternative employment

As most just transition reports make clear, workers need to work, and good transition programs must provide displaced workers with new employment opportunities. However, re-employing workers in positions where they fare far worse than they did pre-transition is inadequate. As the Coal Transition Coalition notes, "We should aspire to help workers find good jobs that are of comparable value to their old positions" (AFL and CTC 2017, 21).

The prime aim of just transition should thus be the continuation of employment without loss of pay, benefits, or seniority. As the CLC argues, "Job equity is at least as deserving of preservation as the equity of corporations" (CLC 2000, n.p.).

With this, much of the literature on just transition points to the importance of developing provincial and national energy programs that include robust strategies for creating jobs in renewable energy and low-carbon industries. The focus of these programs should be industrial restructuring for workers, and the potential for the clean energy economy to absorb many workers currently employed in the fossil fuel sector.

Just compensation and protection of income

Another key element of a just transition for workers includes the idea that in cases where continuation of employment is not possible, workers should be fairly compensated. Any just transition program should therefore include an income security scheme that is committed to the just compensation of workers over that of corporations.

In Canada, the primary labour adjustment mechanism currently in place is Employment Insurance (EI). While in theory EI should be sufficient to support workers through a just transition, in practice the program has been eroded over recent decades to the point where significant deficiencies exist (Mertins-Kirkwood 2018). As a result, Canada needs to invest heavily in social security programs that support workers in industries facing job losses. Canada also needs to invest in adequately filling income gaps for workers during their transition to a new job or bridging them to retirement; this will likely require a top-up to EI benefits.

Retraining and education

The just transition literature widely acknowledges the need for governments to fund retraining and education programs for displaced workers. These programs should include not only skills development, but also career counselling to support workers through the process of transition.

In Canada, workers who need retraining and qualify for EI can access Part 2 benefits under EI (Part 1 benefits are wage replacement and Part 2 benefits are related to training). These are administered under Labour Market Development Agreements (LMDAs), and typically last less than a year.

The Canada Job Fund Agreement has recently been replaced by Workforce Development Agreements (WDAs), with the governments of Canada and Alberta announcing their agreement in mid-2018 (Government of Canada 2018d).

Indigenous Canadians may also be able to access money through the Aboriginal Skills and Employment Training Strategy (ASETS). In April 2019, ASETS was replaced by the Indigenous Skills and Employment Training (ISET) Program (Government of Canada 2018e).

Both LMDAs and WDAs give the province some discretion to target funds, while ASETS/ISET is federally controlled.

In sum, these federal and provincial workforce development programs have the potential, if funded adequately (as mentioned above, this may not currently be the case, particularly with EI), to support workers through Canada's necessary transition to a net-zero-emissions economy.

A Just Transition for Communities

Communities must be able to decide for themselves what a just transition needs to look like in order to meet their specific needs and those of their residents. As the CLC notes, "the key to achieving environmental sustainability, is by promoting the idea that sustainable communities will drive global sustainability—from the grassroots up" (CLC 2000, n.p.).

Rural communities often have strong ties to companies in the fossil-fuel economy. As the ITUC notes, in these communities, "[fossil fuel] businesses not only provide jobs and generate others indirectly, they contribute to public budgets and could even help fund (through taxes and/or philanthropy) education, health and infrastructure" (ITUC 2017, 14).

As a result, just transition policies must anticipate the social, economic, and political consequences of transition on fossil fuel-dependent communities. Key to community adaptation is the ability to count on government to produce clear timelines and plans for the wind down of facilities, so workers and communities can prepare in advance for the changes (Mertins-Kirkwood 2018).

The CLC defines a sustainable community as "a community that lives on, after a main business that employed its citizens has closed or moved on" (CLC 2000, n.p.). Key to creating sustainable communities is having equitable mechanisms in place to distribute wealth and create access to decent jobs. In sustainable communities, local governments are responsive to the needs of citizens and prioritize the public good over private interests, and the costs and benefits of economic activity are fairly distributed. As such, the benefits of a just transition "must be accorded to the whole community, not just the workers in the affected single industry" (ibid).

Environmental sustainability requires that a community meet its own needs without compromising the ability of future generations to meet theirs. Sustainable communities protect the air, water, and soil, and maintain the biodiversity of their region. They prioritize GHG reductions by investing in green construction and the retrofitting of buildings for energy conservation, renewable energy sources, low-carbon transportation systems, land reclamation, community-based sustainable industries, and waste management.

At the community level, economic sustainability requires that all citizens have access to the resources necessary for a good standard of living, including shelter, health care, education, and community services. A sustainable economy is a diversified economy—one that is not intricately tied to the boom-and-bust tendencies of global commodity markets. Such an economy will provide good jobs, not only in renewable energy and energy efficiency,

but also in already-low-carbon sectors of the economy, including public service provision. This is particularly critical when we consider the fact that the economic benefits of fossil fuel-dependent communities are largely accrued by white, male workers (Alook, Hussey, and Hill 2019; Government of Alberta 2018e; Jackson and Hussey 2017; Lahey 2016; Lahey 2015; O'Shaughnessy and Dogu 2016; Dorow 2015). Diversifying the economy and investing heavily in the public sector is thus critical to creating a just transition that also serves the interests of women and racialized workers.

Program Design and Implementation

Just transition requires the collaboration and coordination of both the private and public sectors, and must include multiple levels of government. While the process must be participatory and multi-stakeholder, its success depends on the community dictating the priorities of its own transition; the community must determine what it needs in order to be economically, socially, and environmentally sustainable.

But a just transition also cannot occur without employment-focused macroeconomic policies that facilitate the ability of communities to shape their transition with as few barriers as possible. While it is impossible to place discrete boxes over each sector's role in a just transition, it is worthwhile to identify certain responsibilities that must fall to the public sector versus those which must be taken on by private employers, understanding that these roles and responsibilities are not static and may shift throughout the course of transition.

The role of the public sector

Governments at all levels have a responsibility to improve labour market information about green jobs and access to education and training opportunities. Provincial and national governments should also regularly provide the public with up-to-date information on the local, national, and global economic trends (which sectors are rising, which are diminishing), and these governments should use this information and related research to develop industrial strategies that enable and prioritize transition.

Providing expanded social protections is also an essential component of any just transition, and the ability to expand such protections largely rests with provincial and federal governments. At the federal level, the government must improve access to EI income benefits, EI training opportunities, and employment support (Mertins-Kirkwood 2018). The provincial and federal governments should also be leaders in funding vocational and educational training and in establishing skills-specific programs that ensure vulnerable workers are equipped with the skills they need to transition successfully to a net-zero-emissions economy (ITUC 2017).

Public investments in the creation of green jobs and a diversified economy are fundamental to a just transition. In the initial phase of transition, public sector policies should prioritize the design and delivery of low-emissions infrastructure projects, "with the aim of creating decent, high value work throughout the value chain and with a focus on vulnerable communities and regions" (ITUC 2017, 18). Rather than limiting one's scope to renewable energy development alone, alternative economic development plans should also include investments in energy efficiency measures and in already-low-carbon sectors of the economy, such as health care and education. Renewable energy generation, energy efficiency, and public service provision are labour-intensive and local, and therefore are industries that should be prioritized in the transition away from a fossil-fuel-based economy.

Local governments—whether municipal or First Nations—have a responsibility to engage their local communities and advocate on their behalf. What a just transition looks like will vary from community to community, which is why local leadership is critical in directing the process. One way local governments can engage local residents is by organizing and facilitating participatory community mapping workshops to ensure transition actions and programs are relevant to the local community's needs and to increase community buy-in.

The role of the private sector

While the public sector is essential to both leading and directing a just transition, the private sector must also adequately contribute to the process. In fact, some elements of a just transition can only be done by private employers (AFL and CTC 2017, 21). For example, preferential hiring is often seen as an essential way of smoothly transitioning workers from one job to another within the same company. As a result, employers must be involved in the transition planning and implementation process alongside workers, unions, and First Nations, Métis, Inuit, municipal, provincial, and federal levels of government.

Worksite-specific transition plans must be developed and executed under a larger just transition framework. Consequently, this larger framework will fail to adequately protect workers and communities if it does not take worksite-specific data into account. Multiple stakeholders, including the public sector, must therefore have access to information about companies' workforces and their future business plans in order to create detailed plans that include whether workers can be transitioned from one business segment to another in the same company, or temporarily absorbed into future capital projects.

Finally, employers must also fulfill their obligations to their employees, such as issuing records of employment and fulfilling pension obligations. As such, employers have a role to play in the implementation of certain just transition mechanisms, such as bridging workers to retirement.

We turn now to the details of the Alberta government's coal phase-out and our case studies of the three impacted corporations: TransAlta, ATCO, and Capital Power.

4. The Transition of Alberta's Coal Power Corporations

From the outset, former premier Rachel Notley instructed her minister of energy to avoid stranded capital in the coal phase-out (Government of Alberta 2015b). The government was concerned about maintaining investor confidence because the province needed an estimated $15 billion in private investment to replace the coal capacity with (converted) gas-fired units (Vriens 2018). The NDP government had also set a goal of attracting a further $10.5 billion in private investment to increase renewable power generation to 30% of Alberta's total electricity production by 2030.

In April 2016, the Alberta government hired Terry Boston, a former executive of an American electricity firm, to lead the dialogue with TransAlta, ATCO, and Capital Power. At the time, the three firms owned the six coal units in Alberta not affected by the Harper government's 2012 regulations. Boston submitted his advice in September 2016 (see Boston 2016), and this advice shaped the Off-Coal Agreements that the province subsequently negotiated with the three corporations.[6]

The province announced the Off-Coal Agreements in November 2016 (Government of Alberta 2016b). The agreements will see the provincial government compensate the three corporations a total of $1.36 billion over 14 years, with the funds coming from the province's carbon tax for large industrial emitters, a tax first implemented by the Progressive Conservative government in 2007 (see Hussey 2016). The compensation was based on the six coal units' "2015 net book value, pro-rated by the number of years between 2030 and the original federal end-of-life date (the years that the unit was 'stranded' by Alberta's policy)" (Vriens 2018, 11). Part of the value of the six units was subtracted from the compensation because some of the components of the units will be reused for coal-to-gas conversions.

Besides the compensation to the three corporations, the exact details of the Off-Coal Agreements are not publicly known because the agreements are confidential. Some general details have been made public; for example, the three companies agreed to keep their headquarters and a small number of employees in Alberta, and to keep investing in the province's power system. The extent of these commitments is unknown, but decisions made by the companies since November 2016 seem to indicate that the commitments made by the firms to Alberta are not very onerous or restrictive (more on this below).

Six months after the Off-Coal Agreements were signed, ATCO and TransAlta—the two biggest coal-fired electricity producers in Alberta in 2016-17—announced plans to convert their coal units to natural gas well before the 2030 deadline. ATCO said it would convert its units by 2020 (Morgan 2017a) and TransAlta said it would do the same by the end of 2023 (TransAlta 2019a).

In 2018, ATCO changed business strategies and decided to substantially reduce its profile as an electricity producer. In mid-2019, the company's new strategy resulted in the sale of 12 of their 17 electricity assets, comprising 2,276 MW of their 2,517 MW of productive capacity. The sold assets encompassed ATCO's entire Canadian-based fossil-fuel electricity assets, including 12 coal and gas units—nine in Alberta, and one each in Saskatchewan, British Columbia, and Ontario. US-based Heartland Generation bought 11 of the assets, and SaskPower bought ATCO's 50% stake in the Cory Cogeneration Station in Saskatoon (The Canadian Press 2019).

Capital Power, on the other hand, initially said in 2016 that it would continue to operate Genesee 1, 2, and 3 as coal-fired generating units until the government-mandated deadline, at which time the units will be converted to gas (Kent 2016). In 2017, Capital Power decided on a substantial change in strategy to dramatically reduce its reliance on coal by the end of 2023. Following this strategy, the company announced in mid-2019 that it would be accelerating the conversion of the Genesee units to dual fuel. Genesee 2 will be able to run on 100% gas by mid-2020, Genesee 1 will be able to do the same by spring 2021, and Genesee 3 will be able to use up to 40% gas by the third quarter of 2020 (Capital Power 2019a).[7] Once converted to gas, the company says the life of its generating units will likely be extended by 15 years beyond 2030. In the last two years, Capital Power has bought two gas plants (one in the US and one in Ontario) and built two wind facilities (one in Alberta and one in the US). Several other gas and wind facilities are in the developmental stage.

Table 1 provides an overview of Alberta's coal-fired electricity units, the co-located thermal coal mines, whether the generating units were affected by the 2012 regulations introduced by the Harper government or by the Notley government's accelerated coal phase-out, and which units will be converted to gas in the coming years.

Table 1. Alberta's Coal-Fired Electricity Units, July 2019

Coal unit & owner	Mine & owner	Affected by Harper's 2012 regulations?	Affected by Notley's coal phase-out?	Being converted to gas?
HR Milner (M1), Maxim Power	Coal Valley, Westmoreland	Yes	No	Yes (partly), now dual fuel (coal and gas); unit will run at full capacity for 2019 and then at 9% capacity for 10 years
Battle River 3, Heartland Generation (US); sold by ATCO in 2019	Paintearth & Vesta, Westmoreland	Yes	No	No, but increasing use of natural gas as a supplemental fuel to coal
Battle River 4, Heartland Generation (US); sold by ATCO in 2019	Paintearth & Vesta, Westmoreland	Yes	No	No, but since Q1 of 2018 it uses at least 50% coal and up to 50% gas
Battle River 5, Heartland Generation (US); sold by ATCO in 2019	Paintearth & Vesta, Westmoreland	Yes	No	Yes
Sundance 1, TransAlta	Highvale, TransAlta	Yes	No	Retired on January 1, 2018
Sundance 2, TransAlta	Highvale, TransAlta	Yes	No	Retired on July 31, 2018
Sundance 3, TransAlta	Highvale, TransAlta	Yes	No	Yes (mothballed on April 1, 2018 for up to 2 years)
Sundance 4, TransAlta	Highvale, TransAlta	Yes	No	Yes
Sundance 5, TransAlta	Highvale, TransAlta	Yes	No	Yes (mothballed on April 1, 2018 for up to 2 years)
Sundance 6, TransAlta	Highvale, TransAlta	Yes	No	Yes
Keephills 1, TransAlta	Highvale, TransAlta	Yes	No	Yes
Keephills 2, TransAlta	Highvale, TransAlta	Yes	No	Yes
Keephills 3, Capital Power & TransAlta	Highvale, TransAlta	No (could have run until 2061 under the Harper regulations)	Yes	Yes
Sheerness 1, TransAlta & Heartland Generation (US); 50% sold by ATCO in 2019	Sheerness, Westmoreland	No (could have run until 2036 under the Harper regulations)	Yes	Yes
Sheerness 2, TransAlta & Heartland Generation (US); 50% sold by ATCO in 2019	Sheerness, Westmoreland	No (could have run until 2040 under the Harper regulations)	Yes	Yes
Genesee 1, Capital Power	Genesee, Westmoreland	No (could have run until 2044 under the Harper regulations)	Yes	Yes
Genesee 2, Capital Power	Genesee, Westmoreland	No (could have run until 2039 under the Harper regulations)	Yes	Yes
Genesee 3, Capital Power & TransAlta	Genesee, Westmoreland	No (could have run until 2055 under the Harper regulations)	Yes	Yes

Source: AFL and CTC 2017, 12; Vriens 2018, 3; Alberta Utilities Commission 2018; TransAlta, Annual Integrated Report, 2018, p. 1; ATCO, Annual Report, 2018, p. 64 and 78; The Canadian Press 2019.

Table 1 shows that 14 of the 18 coal units will be converted to gas by 2029. This high number of coal-to-gas conversions is better for Alberta than a whole new set of natural gas combined cycle plants (Boston 2016). This is because companies would expect new gas plants to operate for 30 to 35 years, but this long of a timeline may make the firms and the province vulnerable to future federal regulations on gas-fired plants, cheaper renewables, or international pressure. According to the new federal regulations, coal-to-gas units can operate 5 to 10 years past their federal end-of-coal life, depending on their GHG emission profile (Government of Canada 2018c). For Canada to meet its Paris Agreement emissions targets, all of this gas-fired capacity will need to be replaced by renewables by 2050.

TransAlta Case Study

TransAlta is an electricity generator and marketing company headquartered in Calgary. Formerly Calgary Power, TransAlta began as a hydroelectric generating company and now has power plants in Canada, the United States, and Australia. As of January 2019, the company owns or co-owns 72 power generating facilities (12 coal, 11 gas, 21 wind, 1 solar, and 27 hydroelectric). In 2018, TransAlta's total generating capacity was 8,273 MW (see Table 3).

TransAlta's assets were worth $9.43 billion in 2018 and the firm's annual revenue for 2018 was $2.25 billion. TransAlta's annual revenues have declined 14.3% since 2014 (see Table 2). Since the Notley government announced the acceleration of the coal phase-out in 2015, TransAlta had net earnings in 2016 of $276 million (11.5% net profit) and net losses in 2017 of $118 million (5.1% net loss) and in 2018 of $90 million (4% net loss) (TransAlta 2019b, M5 and M8). Of the three companies that we studied, TransAlta is the only company with net losses in 2017 and 2018, at least in part because TransAlta has the most coal generating units to convert or retire of the three firms.

In its latest annual integrated report, TransAlta said the decline of revenue in 2018 was "mainly as a result of lower production within the Canadian Coal [business] segment due to retirement of Sundance Units 1 and 2 and the mothballing of Sundance Units 3 and 5 resulting from the termination of the Sundance B and C PPAs" (TransAlta 2019b, M5; for more on the Sundance PPAs, see footnote 15). The value of TransAlta's assets was 14.3% lower in 2018 compared to 2016, and much of this change is attributable to the retirement or mothballing of four Sundance units. From 2013 to 2018, the company's dividends paid per common share declined 82.8%.

Table 2. TransAlta's Financials, 2011–2018[8]

	2011	2012	2013	2014	2015	2016	2017	2018
Revenues ($ millions)	2,618	2,210	2,292	2,623	2,267	2,397	2,307	2,249
Assets ($ millions)	9,780	9,503	9,624	9,833	10,947	10,996	10,304	9,428
Dividends paid per common share	$1.16	$1.16	$1.16	$0.83	$0.72	$0.20	$0.12	$0.20

Source: Data for 2011-2015 are from TransAlta, Annual Integrated Report, 2017, p. 200–201. Data for 2016-2018 are from TransAlta, Annual Integrated Report, 2018, p. M5.

The majority of TransAlta's business is conducted in Canada. In Alberta, the company owns or co-owns 38 generating facilities (nine coal, two gas, 17 hydroelectric, and 10 wind), so about half of TransAlta's power generating business is conducted in Alberta. As Table 3 shows, the majority of TransAlta's generating capacity was derived from coal in 2018, but the company also had the highest percentage of renewable generating capacity of the three firms in our study. The 560 MW or 10.9% reduction in coal power capacity in 2018 is the result of the retirement of Sundance 1 and 2 and the mothballing of Sundance 3 and 5.

Table 3. TransAlta's Generating Capacity by Fuel Type (MW and %), 2011–2018

	2011	2012	2013	2014	2015	2016	2017	2018
Coal (Canada and US)	4,325 52.4%	4,551 52.1%	5,111 53.9%	5,111 57.8%	5,126 57.7%	5,131 57.3%	5,131 58.2%	4,571 55.3%
Natural gas	1,567 19%	1,731 19.8%	1,779 18.7%	1,531 17.3%	1,405 15.8%	1,482 16.6%	1,403 15.9%	1,395 16.9%
Renewables (wind, solar, and hydro)	1,974 23.9%	2,058 23.6%	2,202 23.2%	2,204 24.9%	2,350 26.5%	2,334 26.1%	2,289 25.9%	2,308 27.9%
Equity investments	390 4.7%	390 4.5%	396 4.2%	N/A	0	0	0	0
Total generating capacity	8,256 100%	8,730 100%	9,488 100%	8,846 100%	8,881 100%	8,947 100%	8,823 100%	8,273 100%

Source: Data for 2011–2017 are from TransAlta, Annual Integrated Report, 2017, p. 200–201. Data for 2018 are from TransAlta, Annual Integrated Report, 2018, p. 188.

Table 4 shows how TransAlta used its generating capacity in practice. From 2011 through 2014, the company increased its production of coal-fired electricity by 9,315 GWh, or 40.6%. Over this four-year period, TransAlta also increased its production of gas-fired electricity by 19.3% and of wind power by 19.8%, but decreased production of hydroelectricity by 8.9%. As the bottom row of Table 4 indicates, TransAlta's total electricity production declined by 36.9% from 2014 through 2018.

Table 4. TransAlta's Net Generation by Fuel Type (GWh and % of net), 2011–2014, and Total Generation Production (GWh), 2011–2018[9]

	2011	2012	2013	2014	2015	2016	2017	2018
Coal	22,922.4 67.8%	24,001 61.9%	28,279 66.6%	32,237.4 71.6%	N/A	N/A	N/A	N/A
Natural gas	6,196 18.3%	8,230 21.2%	7,854.2 18.5%	7,390.3 16.4%	N/A	N/A	N/A	N/A
Hydro	2,068.5 6.1%	2,356 6.1%	2,084.6 4.9%	1,885 4.2%	N/A	N/A	N/A	N/A
Wind	2,650 7.8%	2,583 6.7%	2,709 6.4%	3,175.2 7.1%	N/A	N/A	N/A	N/A
Equity investments	0	1,579.7 4.1%	1,555 3.7%	314.5 0.7%	N/A	N/A	N/A	N/A
Total generation production	41,012	38,750	42,482	45,002	40,673	38,157	36,900	28,409

Source: Data for 2011 net generation by fuel type are from TransAlta, Report on Sustainability, 2013, p. 57. Data for 2012-2014 net generation by fuel type are from TransAlta, Report on Sustainability, 2014, p. 65. Data for total generation production 2011-2017 are from TransAlta, Annual Integrated Report, 2017, p. 200–201. Datum for total generation production for 2018 is from TransAlta, Annual Integrated Report, 2018, p. 188.

Owning Canada's largest wind-generating capacity and the majority of Alberta's hydro generation, TransAlta claims to be a "clean energy" leader. In 2017, the company released 29.93 million tonnes of CO_2e (carbon dioxide equivalent), an increase of 7.6% from the 27.82 million tonnes released in 2011 (see Table 5). However, in 2018 the firm retired two units and mothballed two other units at the Sundance plant. These operational changes resulted in TransAlta eliminating 9.13 million tonnes of carbon dioxide equivalent, or 30.5% of the firm's GHG emissions in 2018 compared to 2017.

Table 5. TransAlta's Greenhouse Gas Emissions (million tonnes of CO2e), 2011–2018

	2011	2012	2013	2014	2015	2016	2017	2018
Total direct GHG emissions	N/A	26.39	30.52	34.89	32.04	30.46	29.7	20.6
Total indirect GHG emissions	N/A	0.18	0.19	0.18	0.19	0.25	0.23	0.2
Total GHG emissions	27.82	26.57	30.71	35.07	32.23	30.71	29.93	20.8

Source: Datum for 2011 emissions is from TransAlta, Report on Sustainability, 2013, p. 56. Data for 2012 emissions are from TransAlta, Report on Sustainability, 2014, p. 64. Data for 2013–2015 emissions are from TransAlta, Climate Change 2016 Information Request, n.p. [TransAlta's 2016 CDP filing[10]]. Data for 2016 emissions are from TransAlta, Climate Change 2017 Information Request, n.p. [TransAlta's 2017 CDP filing]. Data for 2017 emissions are from TransAlta, Annual Integrated Report, 2017, p. M70 and 203. Data for 2018 emissions are from TransAlta, Annual Integrated Report, 2018, p. 191.

TransAlta has an ownership stake in four coal plants in Alberta: Sundance, Keephills, Genesee, and Sheerness (see Table 6). It is the sole owner of its Sundance and Keephills 1 and 2 facilities, and it owns half of Keephills 3 and Genesee 3. TransAlta also has a 25% ownership stake in Sheerness. Keephills 3, Genesee 3, and Sheerness are affected by the accelerated coal phase-out. Sundance 3-6, Keephills 1, 2, and 3, Genesee 3, and Sheerness 1 and 2 will all be converted to gas (see Table 1 on page 25).

Table 6. TransAlta's Coal Facilities, May 2019

Facility	Installed capacity (MW)	Ownership stake	Owned capacity (MW)	Region	Commissioning date	Contract expiry date
Sundance 3–6	1,581	100%	1,581	Alberta	1970–1980	2018
Keephills 1 & 2	790	100%	790	Alberta	1983	2020
Keephills 3	463	50%	232	Alberta	2011	-
Genesee 3	466	50%	233	Alberta	2005	-
Sheerness	790	25%	198	Alberta	1986	2020
Centralia	1,340	100%	1,340	Washington State	1972 (coal), 2002 (gas)	2020–2025

Source: The commissioning date data are from TransAlta's "Our History" webpage (https://www.transalta.com/about-us/history/) and Capital Power's "All Facilities & Projects" webpage (https://www.capitalpower.com/generationportfolio/Pages/default.aspx). The remaining data, except for Sundance 3–6's installed capacity, were retrieved from TransAlta, Annual Integrated Report, 2017, p. 202. Sundance 3–6's installed capacity was retrieved from TransAlta, Annual Integrated Report, 2018, p. 190.

On November 24, 2016, TransAlta announced that it had entered into the Off-Coal Agreement with the Government of Alberta, which would result in the company receiving transition payments in exchange for the cessation of coal-fired emissions from its Keephills 3, Genesee 3, and Sheerness coal-fired plants. Beginning in 2017, TransAlta will receive annual cash payments of about $37.4 million per year ending in 2030, for a total of $524 million.

Following the agreement, TransAlta announced in May 2017 that it would save $1.5 billion by converting its coal-fired generating stations to natural gas by 2023, ahead of the Government of Alberta's 2030 deadline (which was sped up to 2029 by the federal Liberal government) (Morgan 2017b). TransAlta CEO Dawn Farrell said the company considered a range of factors in determining the future of its coal plants, including an oversupply of electricity, historically low prices, Alberta's industrial and consumer carbon taxes, and the fact that gas-fired plants are now more affordable to run. Farrell remarked, "Having greater access to natural gas allows TransAlta to blend natural gas with coal, prior to fully converting the units, allowing us to take advantage of low natural gas prices and reduce our carbon costs" (TransAlta 2017).

Citing the decision as part of it ongoing conversion plan, in December 2017 TransAlta and Tidewater Midstream entered into an agreement to build a new $150-million pipeline to supply TransAlta's Sundance and Keephills generating stations with natural gas from the Montney and Deep Basin at Tidewater's Brazeau River Complex in west-central Alberta (ibid). In announcing the agreement, TransAlta credited the "clarity provided" by the federal government regarding coal-to-gas conversion rules. In a statement released by the company, TransAlta said:

> Although not yet finalized, the Government of Canada has proposed coal-to-gas conversion rules that would extend the life of TransAlta's gas conversion units by five-to-ten years past their federal end of coal life, depending on their CO_2 emissions profile. The proposed rules would see the life of TransAlta's entire coal-fired fleet extended by an aggregate of approximately 75 years. (Quoted in Jaremko 2017)

TransAlta expects that, once converted to natural gas, Sundance and Keephills will run through to 2031 and 2039, respectively. The company has stated that it does not expect the capacity of the Sundance and Keephills generating units to change much following the conversion.

In following this conversion plan, in 2018 TransAlta retired two of the coal-fired generating units at its Sundance plant and temporarily mothballed two additional units, preparing them for natural gas conversion. TransAlta's transition alone is set to result in a 10% increase in natural gas use in Alberta. Overall, the conversion of TransAlta's coal plants is expected to cost $300 million and will cut the plants' emissions by 40% (Morgan 2017b).

TransAlta has issued several broad statements expressing concern for its workforce and coal communities in general. The company says it hopes to redeploy some of its coal workers to its gas-fired plants and renewable energy facilities. Conditions set out in the Government of Alberta's Off-Coal Agreement with TransAlta also seek to mitigate the risks borne by workers and coal communities. While it is too early to assess the full costs to workers and communities of TransAlta's transition, Table 7 shows that the firm has terminated 889 jobs, or 32.1% of its workforce, since 2013.

Table 7. TransAlta's Workforce, 2011–2018

	2011	2012	2013	2014	2015	2016	2017	2018
Employees	2,195	2,084	2,772	2,786	2,380	2,341	2,228	1,883
Change in workforce		-111	+688	+14	-406	-39	-113	-345

Source: The datum for 2011 is from TransAlta, Report on Sustainability, 2013, p. 58. Data for 2012-2014 are from TransAlta, Report on Sustainability, 2014, p. 66. Data for 2015-2017 are from TransAlta, Annual Integrated Report, 2017, p. 204. The datum for 2018 is from TransAlta, Annual Integrated Report, 2018, p. 188.

One way TransAlta will create jobs in the next few years is through the construction of Sundance 7, an 856 MW gas-fired power plant that TransAlta and partner MidAmerican Energy Holdings will build in Parkland County beside the Sundance coal units (which are in the process of being converted to gas). Proposed in 2012 and approved for construction in 2015, Sundance 7 was originally scheduled to come online in 2018 (TransAlta 2012b, 2014a,

and 2016). However, TransAlta and MidAmerican successfully applied to the Alberta Utilities Commission in 2016 to postpone the start of construction because of slowing demand for electricity (related to Alberta's oil-price-induced recession) and uncertainty about provincial climate change policy (TransAlta 2016; AUC 2016; Ewart 2015). The construction of Sundance 7 is now expected to start in 2020 and finish in 2022. The construction workforce will be 400–600 workers and the project is expected to require 1.8 million construction hours (TransAlta 2014b, 6).

ATCO Case Study

Headquartered in Calgary, ATCO Ltd. (hereafter ATCO) is a Canadian holding company with a number of subsidiaries—including, among others, Canadian Utilities Limited, ATCO Power, ATCO PowerLine, ATCO Pipelines, ATCO Electric, ATCO Gas, and ATCO Energy—that operate in natural gas pipelines, electricity generation and distribution, manufacturing, construction and rental of modular structures (i.e., work camps), industrial water, port facilities and port operation services, and commercial real estate. So, ATCO is a multifaceted holding company with numerous and diverse revenue streams. ATCO owns assets and operations in various locations, making the firm less connected to the local political and economic conditions of any one city, province, or country.

Going forward, less of ATCO's revenue will come from electricity generation. As discussed earlier in Section 4, ATCO sold 12 of its 17 power-generating facilities in mid-2019 (The Canadian Press 2019). Nine of the 12 sold facilities are in Alberta. US-based Heartland Generation now owns those nine assets, which have a combined capacity of 1,787 MW (ATCO 2019a, 66–67). ATCO now owns 241 MW of capacity, including one hydroelectric facility in Alberta (24 MW), another in Mexico (35 MW), and a gas plant in Mexico (6 MW) and two more in Australia (176 MW) (ibid).

As Table 8 shows, ATCO's annual revenue was $4.89 billion in 2018. The company owns $23.34 billion in assets, making ATCO more than twice the size of TransAlta and about three times the size of Capital Power by this metric in 2018. ATCO has increased its gross revenues (18.3%), assets (22.5%), and dividends paid to shareholders (52.5%) since the announcement in late 2015 of Alberta's Climate Leadership Plan and accelerated coal phase-out.

ATCO had net earnings in 2016 of $675 million (16.7% net profit), in 2017 of $493 million (10.7% net profit), and in 2018 of $671 million (13.7% net profit) (ATCO 2018b, 4; ATCO 2019c, 6).

Table 8. ATCO's Financials, 2011–2018

	2011	2012	2013	2014	2015	2016	2017	2018
Revenues ($ millions)	3,991	4,012	4,359	4,554	4,131	4,045	4,600	4,888
Assets ($ millions)	12,453	14,055	16,010	17,689	19,055	19,724	21,786	23,344
Dividends paid per common share	$0.57	$0.66	$0.75	$0.86	$0.99	$1.14	$1.31	$1.51

Source: Data for 2011–2012 are from ATCO, Annual Report, 2014, p. 57. Data for 2013-2016 are from ATCO, Annual Report, 2017, p. 183. Data for 2017-2018 are from ATCO, Annual Report, 2018, p. 8.

Table 9 depicts the substantial number of job cuts that ATCO has made since 2013. ATCO terminated 36.4% of its workforce in the last five years, a larger reduction than TransAlta's 32.1% cut over the same period.

Table 9. ATCO's Workforce, 2011–2018

	2011	2012	2013	2014	2015	2016	2017	2018
Employees	8,891	9,428	9,816	9,170	7,546	6,751	6,752	6,241
Change in workforce		+537	+388	-646	-1,624	-795	+1	-511

Source: Data for 2011–2014 are from ATCO, Sustainability Report, 2014, p. 32–33. Data for 2015-2017 are from ATCO, Sustainability Report, 2017, p. 30–31. Datum for 2018 is from ATCO, Sustainability Report, 2018, p. 40.

As Table 10 shows, ATCO's electricity portfolio in 2018 relied heavily on coal and gas (this is before its asset sale in mid-2019), with its renewable electricity being generated solely from hydroelectric power.

Table 10. ATCO's Generating Capacity by Fuel Type (MW and %), 2011–2018[11]

	2011	2012	2013	2014	2015	2016	2017	2018
Coal	1,050 38.8%	1,050 38.8%	1,079 39.5%	1,079 43.5%	1,079 43.8%	1,079 43.6%	1,084 43.1%	1,006.5 40%
Natural gas	1,631 60.3%	1,631 60.3%	1,631 59.7%	1,376 55.5%	1,359 55.2%	1,370 55.4%	1,374 54.6%	1,451.5 57.7%
Hydro	24 0.9%	24 0.9%	24 0.9%	24 1%	24 1%	24 1%	59 2.3%	59 2.3%
Total owned capacity	2,705	2,705	2,734	2,479	2,462	2,473	2,517	2,517

Source: Data for 2011–2012 are from ATCO, Annual Report, 2012, p. 54, 60, and 72. Data for 2013-2017 are from ATCO, Annual Information Form, 2013–2017, Appendix 1 in each annual form. Data for 2018 are from ATCO, Annual Information Form, p. 66-67. Battle River 4 was reported as a co-fired (coal and gas) unit in 2018, so we accredit its capacity 50/50 in 2018 to coal and natural gas.

Like TransAlta, ATCO also casts itself as a "clean energy" leader. In 2018, ATCO retrofitted one of its office buildings to reduce carbon emissions, installed three electric-vehicle charging stations (and has plans to build 20 more), and installed over 1,000 solar panels globally (ATCO 2019b, 5).

In its 2017 annual report, the company boasts of its efficiency initiatives and reduction in direct GHG emissions (ATCO 2018a). As part of its sustainability efforts, ATCO has set its sights on "renewable natural gas" (RNG), or biomethane produced from forest residue. The company has launched a RNG partnership with several stakeholders, including the Government of Canada and Alberta Innovates, and believes that this conversion of waste wood to fuel could reduce GHG emissions by as much as 85%. ATCO has also conducted research into using torrefied wood biomass as a potential fuel source.

As Table 11 illustrates, ATCO's GHG emissions were 10.85 million tonnes of CO_2e in 2018. ATCO reduced its emissions 30% from 2011 through 2018. This is likely the result of ramping down its use of its coal-fired generating capacity over time.

Table 11. ATCO's Greenhouse Gas Emissions (million tonnes of CO2e), 2011–2018

	2011	2012	2013	2014	2015	2016	2017	2018
Total direct GHG emissions	15.22	13.29	12.91	12.91	10.35	10.38	10.71	10.81
Total indirect GHG emissions	0.28	0.28	0.27	0.25	0.21	0.17	0.19	0.043
Total GHG emissions	15.5	13.57	13.18	13.16	10.56	10.55	10.9	10.85

Source: Data for 2011-2014 are from ATCO, Sustainability Report, 2014, p. 32–33. Data for 2015–2017 are from ATCO, Sustainability Report, 2017, p. 30–31. Data for 2018 are from ATCO, Sustainability Report, 2018, p. 40.

Prior to its mid-2019 asset sale, ATCO owned five coal units in Alberta, two of which are affected by the accelerated phase-out. As Table 12 indicates, the Harper government's regulations would have allowed Sheerness 1 and 2 to operate until 2036 and 2040, respectively. Following the Alberta government's announcement of the accelerated phase-out in November 2016, ATCO announced that it would work with the government to convert coal units to natural gas. In the same month, ATCO and the Government of Alberta signed a conditional agreement for transition payments for the elimination of emissions from the Sheerness units by December 31, 2030 (as noted previously, the Trudeau government subsequently sped up this timeline by one year). ATCO will receive $4.7 million annually from the Government of Alberta from 2017 to 2030, or $66 million over the 14 years. As Table 12 shows, the Battle River units are older and were already scheduled to close before 2030 under the Harper government's 2012 regulations. Battle River 5 and the two Sheerness units are being converted to gas in the next couple of years (see Table 1 on page 25).

Table 12. ATCO's Coal Facilities, 2018

Facility	Installed capacity (MW)	Ownership stake	Owned capacity (MW)	Region	Commissioning date	Expiry date
Sheerness 1 and 2	790	50%	395	Alberta	1986, 1990	2036, 2040
Battle River 3, 4, and 5	689	100%	689	Alberta	1969, 1975, 1981	2019, 2025, 2029

Source: Data are from ATCO, Annual Information Form, 2017, p. 58 (Appendix 1).

Despite reaching its own compensation agreement with the Government of Alberta, ATCO's CEO Nancy Southern responded to the details of the coal phase-out by claiming that the province was giving ATCO's competitors an "unfavourable advantage" (Kent 2017). Southern claimed that ATCO was aware of issues surrounding the carbon-intensive nature of coal over a decade ago, which is why it had begun to diversify its portfolio, largely by investing in gas-fired generation. For this reason, Southern claimed the amounts being received by Capital Power and by TransAlta would create an "unlevel playing field" (ibid).

Following the 2017 annual general meeting of subsidiary Canadian Utilities Limited, Southern stated:

> They [Capital Power and TransAlta] invested in those plants with their eyes wide open, making their own risk decisions, and now they have been compensated for those investments to a degree that I believe has actually ended up disenfranchising the value that should have gone to Albertans. We make bilateral contracts with industry, bilateral contracts with governments … but those plants didn't have those types of contracts, so compensation for a higher-risk investment I think has been an injustice. (ibid)

Southern went on to say that while she believed the companies should be compensated, there ought to have been an adjustment made to level the playing field.

In May 2017 ATCO announced that it would switch its coal units to natural gas by 2020 (the conversions are expected to continue under the new owners, Heartland Generation). The work to convert the units began in 2017. ATCO's conversion plans were motivated by the expiry of power-purchase contracts in 2020 and the availability of cheap natural gas in Western Canada, and not by the introduction of the provincial carbon tax (Morgan 2017a).

ATCO's 2017 annual report indicates that the firm is exploring the potential of developing hydroelectricity in northern Alberta (ATCO 2018a). The company has yet to diversify its portfolio into commercial scale wind and solar power production.

Capital Power Case Study

Capital Power is an independent power generation company headquartered in Edmonton. Capital Power was formerly part of City of Edmonton-owned EPCOR, but was spun off and privatized in 2009. While Capital Power develops, owns, and operates power-generation facilities from a variety of energy sources, its primary focus in recent years has been coal-fired generation. Coal power accounted for 77% of Capital Power's net generation by energy source in 2017, but dropped sharply to 48.8% of net generation in 2018 (see Table 15 on page 37). This dramatic decline in coal's relative importance to Capital Power is because the firm changed their power-generating profile to include more gas and wind power and less coal power.

Capital Power has also been trying to become less reliant on the volatile Alberta electricity market since the mid-2014 oil price crash. In the last two years, the company has been mostly buying and building gas and wind assets outside of Alberta. The firm plans to continue this strategy for the next few years. Of its 11 facilities in development or in construction in mid-2019, only four are in Alberta (Whitla Wind, Halkirk 2 wind, and the Genesee 4 and 5 gas-fired units), the other seven projects are wind facilities in seven states in the US.

Capital Power is the youngest and smallest of the three corporations in our study, with revenue of about $1.4 billion in 2018 (see Table 13). The firm's annual revenues increased by 21.6% in 2018 compared to 2017. As of 2018, Capital Power's assets were worth $7.66 billion (a 42% increase since 2015). The firm has increased its dividends paid to shareholders 22.7% since the announcement of Alberta's Climate Leadership Plan and accelerated coal phase-out in late 2015.

Since the Notley government announced the acceleration of the coal phase-out in 2015, Capital Power had net earnings in 2016 of $102 million (8.4% net profit), in 2017 of $134 million (11.7% net profit), and in 2018 of $267 million (19.2% net profit) (Capital Power 2018, 2; Capital Power 2019c, 2).

Table 13. Capital Power's Financials, 2011–2018

	2011	2012	2013	2014	2015	2016	2017	2018
Revenues ($ millions)	1,736	1,296	1,393	1,218	1,241	1,214	1,146	1,394
Assets ($ millions)	4,743	5,134	5,219	5,420	5,393	6,062	6,898	7,660
Dividends paid per common share	$1.26	$1.26	$1.26	$1.31	$1.41	$1.51	$1.615	$1.73

Source: Data for 2011-2017 are from Capital Power, Annual Report, 2017, p. 142. Data for 2018 are from Capital Power, Annual Report, 2018, p. 26.

As Table 14 shows, Capital Power employed 813 people in 2018. The company terminated 24.7% of its workforce in 2013–2017, with most of these job terminations occurring in 2013, but the company then increased its workforce by 18.7% in 2018. In sum, since 2013 Capital Power has increased its workforce by 16.6%, while ATCO and TransAlta reduced their respective workforces by 36.4% and 32.1% in this same time period.

Table 14. Capital Power's Workforce, 2011–2018

	2011	2012	2013	2014	2015	2016	2017	2018
Employees	892	910	697	698	679	668	685	813
Change in workforce		+18	-213	+1	-19	-11	+17	+128

Source: Data are from Capital Power, Corporate Sustainability Report, 2017, p. 16. The datum for 2018 is from Capital Power, Annual Information Form, 2018, p. 45.

As of December 31, 2018, Capital Power owns 5,073 MW of power generation capacity distributed between 25 merchant and contracted facilities throughout Canada and the United States. Capital Power's seven merchant facilities are all located in Alberta and include three natural gas plants, one landfill gas-fired plant, two coal units, and one wind power facility. The company's contracted facilities are located in Alberta, British Columbia, Ontario, and several states in the US. While Capital Power owns and operates several wind facilities in Canada and in the US, the largest share of its power generation stemmed from coal in 2018 (see Table 15). In total, coal-fired and gas-fired generation comprised 84.6% of Capital Power's 2018 power production.

Table 15. Capital Power's Net Generation by Fuel Type (GWh and %), 2011–2017, and Total Generation by Fuel Type (GWh and %), 2018

	2011	2012	2013	2014	2015	2016	2017	2018
Coal	9,887 62%	9,366 59.9%	10,034 81.6%	9,770 80%	10,519 80.5%	10,114 79.6%	10,249 77%	9,872 48.8%
Natural gas	5,375 33.7%	5,468 35%	588 4.8%	450 3.7%	338 2.6%	386 3%	567 4.3%	7,243 35.8%
Hydro	139 0.9%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Solar	0 0%	0 0%	0 0%	0 0%	0.3 0.002%	29 0.2%	27 0.2%	27 0.13%
Biomass	279 1.8%	412 2.6%	392 3.2%	410 3.4%	397 3%	421 3.3%	377 2.8%	0 0%
Wind	102 0.6%	192 1.2%	1,005 8.2%	1,221 10%	1,377 10.5%	1,339 10.5%	1,787 13.4%	2,283 11.3%
Tire-derived fuel	125 0.8%	157 1%	263 2.1%	356 2.9%	428 3.3%	405 3.2%	284 2.1%	766 3.8%
Landfill gas	32 0.2%	32 0.2%	15 0.1%	13 0.1%	7 0.05%	6 0.05%	17 0.1%	0 0%
Waste heat	0	0	0	0	0	0	0	38 0.19%
Total net production	15,939	15,627	12,297	12,220	13,066.3	12,700	13,308	N/A
Total production	N/A	N/A	N/A	N/A	N/A	N/A	17,194	20,229

Source: Data for 2011-2017 are from Capital Power, Corporate Sustainability Report, 2017, p. 61. Capital Power is in the process of changing the way it does sustainability reporting, and it appears the company will not publish a 2018 Corporate Sustainability Report. The 2018 data and the 2017 total production figure were retrieved from Capital Power, Annual Report, 2018, p. 32.

Capital Power will complete construction on the 298.8 MW Whitla Wind facility in Forty Mile, Alberta, by the end of 2019. The firm received approval in April 2018 to build the 148 MW Halkirk 2 wind facility in Paintearth, Alberta, but is waiting for market conditions to improve before beginning construction (that is, the market is overbuilt and prices are low). Besides growing its wind capacity by more than 22 times in the last seven years, the firm's carbon reduction strategies also include investments in solar, waste heat electricity generation, and reducing its use of coal at the three Genesee units and Keephills 3.

As Table 16 shows, Capital Power's total direct emissions from its generation of electricity increased 8% from 2013 to 2017. The company sold natural gas assets in New England in November 2013, and its portfolio became more reliant on coal-fired generation after that. As of October 3, 2019, Capital Power has yet to publish its GHG emissions data for 2018.

Table 16. Capital Power's Greenhouse Gas Emissions (million tonnes of CO2e), 2011–2017

	2011	2012	2013	2014	2015	2016	2017
Total direct GHG emissions	11.92	11.4	9.74	9.86	10.84	10.45	10.52
Total indirect GHG emissions	N/A	N/A	0.0027	0.0026	0.0024	0.0025	0.0028
Total GHG emissions	N/A	N/A	9.7427	9.8626	10.8424	10.4525	10.5228

Source: The datum for 2011 is from Capital Power, Climate Change 2012 Information Request, 2012, n.p. The datum for 2012 is from Capital Power, Corporate Sustainability Report, 2017, p. 64. Data for 2013 are from Capital Power, Climate Change 2014 Information Request, 2014, n.p. Data for 2014 are from Capital Power, Climate Change 2015 Information Request, 2015, n.p. Data for 2015 are from Capital Power, Climate Change 2016 Information Request, 2016, n.p. Data for 2016 are from Capital Power, Climate Change 2017 Information Request, 2017, n.p. Data for 2017 are from Capital Power, Climate Change 2018 Information Request [Capital Power's annual CDP filing], 2018, n.p. As of October 3, 2019, Capital Power has yet to publish its 2018 GHG emissions data.

As Table 17 shows, Capital Power is the sole owner of Genesee 1 and 2, which are located near Warburg, Alberta. Capital Power's other two coal units are jointly owned and operated with TransAlta. All four units will be converted to gas (see Table 1 on page 25). Capital Power manages the operations of Genesee 3 and TransAlta manages Keephills 3.

Table 17. Capital Power's Coal Facilities, 2019

Facility	Installed capacity (MW)	Ownership stake	Owned capacity (MW)	Region	Commissioning date	Contract expiry date
Keephills 3	463	50%	231	Alberta	2011	-
Genesee 3	466	50%	233	Alberta	2005	-
Genesee 2	860 (combined)	100%	1 and 2 combined capacity of 860 MW	Alberta	1989	2039
Genesee 1	860 (combined)	100%	1 and 2 combined capacity of 860 MW	Alberta	1994	2044

Source: The data for Keephills 3 and Genesee 3 are from Capital Power, Annual Information Form, 2017, p. 21, and from TransAlta, Annual Integrated Report, 2017, p. 202. The data for Genesee 1 and 2 are from Capital Power, Annual Information Form, 2017, p. 21.

In October 2016, following the Government of Alberta's announcement of the accelerated phase-out, Capital Power delayed approval of its $1.4 billion Genesee 4 and 5 gas-fired units, which are co-owned by ENMAX, citing continued uncertainty about the coal phase-out. The company said that bringing the new Genesee units online was contingent upon it receiving fair compensation from the province for the early closure of its coal units. Shortly afterward, Capital Power became the greatest beneficiary of the Off-Coal Agreements. The corporation will receive annual installments of $54 million from 2017 to 2030, for a total compensation of $734 million.

Capital Power subsequently received approval from the Alberta Utilities Commission to delay construction on Genesee 4 and 5 because the Alberta electricity market is oversupplied. According to the time-extension decision, the two generating units must be built by March 31, 2023. Building the two units will require 1,200 job-years of employment, and operating the units will require 25–30 full-time staff (Capital Power 2019b).

To summarize the three case studies, coal power in Alberta will be almost entirely phased out by the end of 2023. The rapid phase-out of coal power will improve air quality in the province and eliminate most of the $300 million per year in health costs associated with poor air quality from burning coal for power generation.

Most of Alberta's coal generating units will be converted to gas. This outcome is the result of several factors, including: 1) the regulatory deadlines to phase-out coal power announced by the Harper government in 2012 and the Notley government in 2015, 2) an oversupplied provincial electricity market resulting in low power prices, 3) the expiry or termination of several of the province's power-purchase agreements, 4) new federal regulations that allow coal units to be converted to gas, 5) a cheap and abundant supply of natural gas, and 6) natural gas has a lower carbon cost than coal. In addition to the 14 coal-to-gas conversions that will be mostly complete by the end of 2023, TransAlta and Capital Power both plan to construct new gas-fired units in the next few years that will generate considerable construction employment in Parkland County and Leduc County.

Alberta's power will mostly be supplied by gas-fired facilities by the early 2020s. Converting coal units to gas saves power companies money, in large part by reducing their workforces and their carbon costs. It also allows them to boast about significant reductions in GHG emissions, while continuing to produce large amounts of GHG emissions. TransAlta, for example, eliminated 9.13 million tonnes of carbon pollution in 2018 due to its accelerated phase-out of coal, but the firm still produced more than 20 million tonnes of carbon pollution in 2018. Overall, Alberta's electricity sector produced 45.2 million tonnes of carbon pollution in 2016, and the sector may still produce 25 million tonnes of annual carbon pollution by 2030 because the sector will be dominated by gas power generation.[12]

Given the province's current trajectory under the UCP government, it seems unlikely that Alberta will meet its legislated target of 30% renewable energy by 2030, and it is possible that more than 75% of Alberta's power will be fuelled by natural gas in 2030. For Canada to meet its emissions targets under the Paris Agreement, all of this gas-fired capacity will need to be replaced by renewables by 2050 (Mertins-Kirkwood and Hussey 2019). This long-term trajectory leaves a lot of heavy lifting from 2030 to 2050 to replace gas power with renewable power.

TransAlta and Capital Power are major producers of renewable energy in Canada and the two firms are positioned to help add some of the large amount of new renewable generating capacity that Alberta will need built by 2050. ATCO, on the other hand, has almost entirely divested from Alberta's power-generating industry, but the firm still has significant investments in related industries, including natural gas distribution, power lines, and electric-vehicle charging stations.

Having examined the ongoing transition away from coal of these three electricity companies, the next section turns to the Alberta government's transition programs for coal workers.

5. Alberta's Transition Programs for Coal Workers

In September 2016—four months after Terry Boston was hired to work with the three power companies—the Alberta government established an advisory panel to consult with coal workers and communities. The panel, which included municipal and First Nations leaders, small businesses, and community economic development organizations, was tasked with examining potential impacts of the coal phase-out and to identify ways to support worker transition (Government of Alberta 2016c).

During the advisory panel's consultation period, the Alberta Federation of Labour (AFL) established the Coal Transition Coalition (CTC) to advocate for the interests of impacted coal workers and their communities. The coalition was composed of eight labour unions that collectively represent roughly 1,500 members—about half the workers in Alberta's coal-fired units and their associated mines—divided roughly evenly between mine workers and plant workers.

The CTC hosted several town hall meetings in coal communities and published a report in March 2017 on the need for a just transition strategy (see AFL and CTC 2017). In preparing its report, the CTC researched four workforce transition case studies to identify best practices and lessons to inform Alberta's transition away from coal power. A number of the recommendations from the coalition's research were ultimately mirrored in the recommendations submitted to the provincial government by its advisory panel.

The advisory panel's recommendations to the government were released in September 2017 (see Government of Alberta 2017g), about 10 months after the Off-Coal Agreements with the three companies were announced.[13]

Based on the advice of the panel, the Notley government announced the creation of a $40-million transition fund to finance several support programs for the province's coal workers (Government of Alberta 2017c and 2017d). These programs began to operate in January 2018 (Government of Alberta 2017d) and consist of the following six components:

1. The bridge to re-employment relief grant provides workers "up to 75% of their previous weekly earnings when combined with Employment Insurance benefits." This relief grant can last up to 45 weeks or until the worker starts new full-time employment.
2. The bridge to retirement relief grant provides financial support for workers that are close to retirement but not yet eligible for their employer pension, providing "up to 75% of their previous weekly earnings until they're eligible for [their] employer pension, or 72 weeks, or when gross employment income is greater than the relief payment, whichever is shorter."
3. Coal workers that are laid off and move at least 40 kilometres to begin a new job are eligible to be reimbursed up to $5,000 for moving-related expenses.
4. Coal workers are eligible for a tuition voucher of up to $12,000 if they wish to return to school to retrain within five years of being laid off.
5. Career consultants and employment service providers will be made available to work directly with coal workers to share information, develop individualized plans, and provide short-term skills development courses as needed.
6. The provincial government provided employers and unions with a list of qualified facilitators who can be hired to assist employers, workers, and unions with setting up a workforce adjustment committee to create a tailored transition plan for individual worksites using labour market research.

As part of the research that went into this report, we sent a series of questions to Alberta's Ministry of Labour asking for further details on the transition programs available to affected workers and communities.

A ministry spokesperson answered most of the questions that we asked them.[14] The questions that were not answered were in regard to how many overall layoffs the government expects due to the coal phase-out, when these

layoffs will occur, how many layoffs will occur at each worksite and company, and the gender and age of workers in thermal coal mining and power plants. In response to these questions, the ministry spokesperson wrote, "The Government of Alberta (GoA) has access to the following information obtained from employers. However, the GoA committed to employers this information will be collected for internal GoA use only and will not be shared publicly" (P. Cummings, email communication, October 30, 2018).

While we generally appreciate how carefully information given in confidence must be handled, the question does need to be asked, what is the litmus test for determining what is confidential and what is not? As a principle, in a situation where more than $1 billion in government funds are involved—in this case, most of this money is being paid to private businesses—all government information related to these funds and their disbursement should be publicly available so the government's handling of these decisions can be independently scrutinized to ensure the public interest is being served. In the case of the coal phase-out in Alberta, there are some decisions that cannot be fully evaluated because not all of the data are publicly available.

We can, however, offer some estimates of how many layoffs will occur in Alberta's electricity sector in the coming years and approximately when the layoffs will occur. As mentioned in Section 2, in 2017 there were approximately 3,100 thermal coal jobs in Alberta affected by the phase-out of coal-fired electricity. Binnu Jeyakumar's (2016, 8) research shows that "[a]bout 80% of these [jobs] are in coal mining and processing, while the remaining 20% are in the power plants." In addition, it is estimated that gas-fired plants require just one-third of the labour of coal-fired plants and there are no co-located mining jobs (Vriens 2018, 13). In sum, this means that the coal phase-out in Alberta will likely result in the loss of about 2,480 coal mining and processing jobs and about 410 power plant jobs by the end of 2029, for a total of 2,890 terminated jobs. Based on the coal-to-gas conversion plans of the three impacted companies (see Section 4), most of these layoffs will occur in 2018 through 2023, with the remaining layoffs forecast to occur from 2024 to 2029.

Offsetting these layoffs are the estimates of job creation associated with increasing renewable power generation and energy efficiency measures and with converting 14 of the 18 coal-fired electricity units to gas-fired units.

Let's start by estimating the jobs that would have been created in renewable energy and energy efficiency between 2017 and 2030 if the former NDP government's plans had been followed throughout this 14-year period.

Between 2017 and 2030, the former NDP government was hoping to attract $10.5 billion in private investment to reach the target of 30% renewable power generation by 2030. The government claimed this level of investment would create 7,200 job-years, or on average about 510 full-time equivalent jobs per year for 14 years (see Government of Alberta 2017f). The government claimed all of these jobs would be created in Alberta, but it is likely that less than half of the $10.5 billion would have been spent in the province (see Sharp 2019) because much of the upstream activity (e.g., manufacturing wind turbine components) would have occurred outside of Alberta.

In 2016, Jeyakumar used conservative job factors to estimate the employment potential of renewable energy (ramping up to 30% renewable generation by 2030) and energy efficiency in Alberta to be between 900 and 2,500 full-time equivalent jobs per year for 2017 to 2030. Again, many of the upstream/manufacturing renewable energy jobs in this estimation would have been created outside of Alberta.

Besides renewable energy and energy efficiency jobs, the coal-to-gas conversions are expected to require $15 billion in private investment (Vriens 2018, 9), and this investment could create up to 15,000 full-time equivalent jobs (AFL and CTC 2017, 22). Over 14 years, converting the generating units will create on average about 1,070 full-time jobs per year.

In sum, if Alberta continued with the former NDP government's plans to increase renewable energy and energy efficiency and with the electricity firms' plans to convert most of their coal facilities to gas, the total number of jobs created by all of this economic activity—between 1,970 and 3,570 annual full-time equivalent jobs[15]—would be roughly comparable to the 2,890 coal jobs that the province will lose by 2030. It is important to note that Alberta is losing power plant and mine jobs that are mostly unionized positions and under this scenario would be gaining mostly short-term construction jobs, many of which will not be unionized.

Beyond the topic of job projections, we asked the Ministry of Labour if the government has any programs to bridge coal workers to employment in other power plants or jobs, and were told:

> There are no programs that would specifically focus on bridging workers from employment at one of the effected plants to employment at another affected plant. However, the Bridge to Re-employment grant provides financial support to coal workers while they transition to other employment. Support for career planning, job search and training is available through Alberta Labour and Alberta Supports. Through Workforce Adjustment Committees

> (WACs), the companies, unions, government and other stakeholders work to support a smooth transition for workers to other employment, retraining or retirement. (P. Cummings, email communication, October 30, 2018)

As noted above, the provincial government's transition programs for workers began to operate in January 2018, so we asked for information on the number of workers who have accessed the programs. The response stated:

> Through August 30, 2018 there have been 68 approved Bridge to Re-employment grants and 24 Coal and Electricity Transition Tuition Vouchers. As of October 1, 2018 only one of the affected coal companies has announced layoffs. With the Alberta economy improving, that company has seen significant attrition. This program is new and the uptake seems to align with the number of layoffs that have been reported. (P. Cummings, email communication, October 30, 2018)

So, over the first eight months of existence the Alberta government's programs supported a total of 92 coal workers to bridge to new employment or to return to school.

We also inquired about the counselling services being made available to workers, and were told:

> For the one company that has announced layoffs, the GoA worked with the company to provide onsite career counselling pre-layoff. Ongoing career counselling is available to coal workers and other Albertans through Alberta Supports offices. Through WACs [Workforce Adjustment Committees] the GoA is working with the coal companies and unions to ensure that workers are aware of the supports available. Initially, affected coal workers were meeting one on one with a Career and Employment Consultant at the site, which included booked appointments and drop in availability. Meetings were also attended by Labour and Community and Social Services with presentations to explain the coal transition programs to workers. Coal workers are now connecting with local Career Employment Consultants to discuss career counselling, employment, and training needs and resources. Initial contact is made with the Alberta Supports Contact Centre, appointments are booked and communication with affected workers now takes place through phone calls, emails and one on one appointments.

> Other counselling resources have included Career Employment Consultant availability at resource fairs for group and individual consulting. (P. Cummings, email communication, October 30, 2018)

This response indicates that the provincial government, affected unions, and electricity companies are working together to provide substantial counselling and support services to Alberta's thermal coal workers.

We also asked ministry officials whether the Off-Coal Agreements between the government and the three electricity firms included provisions for job protections or if the companies have guaranteed that they will maintain a certain number of jobs in Alberta. The response stated:

> In 2016, the Government of Alberta established off-coal agreements with ATCO, Capital Power and TransAlta to end coal-fired emissions by 2030. The goal of these agreements is to ensure that these industry members remain active in Alberta's electricity market until 2030. While GoA is unable to provide details of these confidential agreements, it encompasses areas such as employment, community investment, workers transition, electricity market participation, and more. (P. Cummings, email communication, October 30, 2018)

To summarize, while a variety of programs have been put in place to transition Alberta's thermal coal workers, the uptake of the provincial government's programs has been limited to date and evaluation of the programs and of the electricity companies' actions vis-à-vis their workforces is difficult because some data are being kept confidential between the government and the impacted corporations.

Having examined the ongoing transition programs for coal workers, we now turn to transition programs for thermal coal communities.

6. Alberta's Transition Programs for Coal Communities

Acting on a recommendation of its advisory panel, in September 2017 the Alberta NDP government announced a $5-million Coal Community Transition Fund (Government of Alberta 2017b). Twenty Alberta municipalities and First Nations impacted by the coal phase-out were eligible to apply to the CCTF.

The provincial government announced in March 2018 that 12 projects in 17 coal communities had been funded, exhausting the $5 million allocated to the fund (Government of Alberta 2018b). The projects include strategic planning, feasibility studies, tourism development, and "work to expand economic hubs, including agribusiness, transportation and high-tech industries" (ibid). Unfortunately, further details on the funded projects are not provided in the government's media release or on the Coal Community Transition Fund website.

In addition to the Coal Community Transition Fund, the Alberta government announced in 2017 a second fund through the Community and Regional Economic Support program (Government of Alberta 2017h). This two-year, $30-million fund was available to rural communities across the province, including coal communities.

In November 2018, the Alberta government announced $200 million over the next 20 years for the Community Generation Program to support small-scale, locally generated electricity projects (Government of Alberta 2018d). Up to $50 million of the total funding envelope was earmarked to support projects in communities affected by the coal phase-out. In late May 2019, the new UCP provincial government canceled the Community Generation Program.

Alberta coal communities have experienced a lot of change in the two years since the Coal Community Transition Fund was announced, let alone in the seven years since the Harper government's 2012 coal-fired electricity regulations were announced. One way to examine how these larger political and economic changes are affecting a local coal-power community is to research a municipal case study. We chose to develop a case study on the municipal district of Parkland County because it is likely the community most affected by the coal phase-out in Alberta.

Parkland County Case Study

Parkland County is a municipal district of over 30,000 residents located west of Edmonton that includes Stony Plain and Spruce Grove (which are

themselves bedroom communities of Edmonton). Parkland County is an interesting case study because it is part rural and part urban, and in 2015 nine of the 18 coal-fired electricity units in Alberta were located in the rural part of the county.

Parkland County and the Coal Community Transition Fund

The announcement of the Coal Community Transition Fund was made in Parkland County, but the county did not end up applying to the fund. However, the municipalities of Stony Plain and Spruce Grove did apply and receive funds for economic diversification planning from the CCTF (Government of Alberta 2018b).

Parkland County Mayor Rod Shaigec said that the county anticipated the transition away from coal-fired electricity "long before the introduction of the Climate Leadership Plan" in November 2015 (Davies 2018). The county commissioned 30 studies on various topics—for example, an inventory of the county's wetlands, and a study on the economic potential of agriculture in the county—prior to the announcement of the CCTF in September 2017. The county's elected officials decided that the county did not need to apply to the CCTF for funds to do more economic diversification planning (Parkland County 2018).

Parkland County's budget

In 2017, Parkland County was home to nine coal-fired generating units (Sundance 1–6 and Keephills 1–3), and the co-located Highvale coal mine. TransAlta is the sole owner of these assets, except Keephills 3, which is co-owned with Capital Power. In 2017, TransAlta accounted for about a quarter of Parkland County's annual tax revenue (Davies 2018), or almost 10% of the county's total annual revenue. TransAlta was also the largest employer in Parkland County in recent years. The service industry and residential property values in Parkland County and other coal communities have also historically been dependent on the coal power industry (Vriens 2018, 13).

In August 2017, Parkland County Mayor Shaigec asserted that the coal phase-out could result in $2 million per year in lost property tax revenue for the municipal district (French 2017). By April 2018, TransAlta had retired Sundance 1 and 2, and temporarily mothballed Sundance 3 and 5 in preparation for conversion to gas.[16] TransAlta is converting the seven remaining generating units—Sundance 3–6 and Keephills 1–3—to gas by the end of 2023, and constructing Sundance 7 (a 856 MW gas-fired unit) from 2020 to 2022 (more on this below).[17] The converted Sundance units are expected to operate until 2031 and the converted Keephills units are expected to operate until 2039.

With the change in status of four power-generating units in 2018, Parkland County collected less property tax revenue.[18] The county has also seen less tax revenue from the oil and gas industry since the mid-2014 oil price crash. In December 2018, Parkland County wrote off about $90,000 in unrecoverable taxes from oil and gas companies (Aldrich 2018b).

Parkland County's budget in both 2017 and 2018 was about $158 million. In 2019, the county's budget is about $150 million, a 5.5% overall reduction from the previous two years. About $4 million of the revenue shortfall was cut from the operating budget, for a 3.75% cut to municipal operations (see Parkland County 2019).

Private sector jobs and investment in Parkland County

In March 2019, Mayor Shaigec stated that "upwards of a thousand people stand to lose their jobs" in the coal power industry in Parkland County (Yourex-West 2019). "We need immediate support and long-term support to help us transition away from coal," Shaigec added (ibid).

Indeed, several hundred coal plant and mine jobs have already been lost at the Sundance plant and the Highvale Mine. Highvale Mine, one of the largest employers in the county, employed 650 workers in 2018, and by March 2019, employment at the mine was down to slightly more than 300 (ibid).

TransAlta, the owner of the mine and power plant, plans to build Sundance 7, a new gas-fired generating unit, from 2020 to 2022. The company estimates the project will generate 400 to 600 construction jobs and will require 1.8 million construction hours to complete (TransAlta 2014b, 6).

Besides this significant new investment by TransAlta, Parkland County has successfully attracted other private capital investments. In 2018, Pinnacle Renewable Energy opened an energy-pellet plant in Entwistle (west of Wabamun Lake), and Champion Petfood announced a plant in the Acheson industrial area (Aldrich 2019a). The Petfood factory created 340 construction jobs and 200 full-time jobs to operate the plant (Aldrich 2019c).

In May 2019, Groupe Nordik announced plans to spend $50 million building a Nordic spa in Parkland County, although the exact location has not been made public (Fida 2019). Construction will start in 2021 and last 18 months.

Parkland County is also working to expand opportunities in agriculture and related value-added industries. In 2018, an agricultural program and service review recommended that Parkland County increase agricultural land in the county by 40% and improve irrigation to increase the productivity of the land (Aldrich 2018a). The review found that farmland in the county decreased 22.2% from 1996 to 2016 (most of this arable land was lost to

coal mining and urban expansion), and the number of farms dropped from 1,196 to 679 in those two decades (-43.3%), but farm income increased by 37%, with technological innovations aiding in the intensification of the local agriculture economy.

Cannabis cultivation and processing is another possibility that the county is considering (Aldrich 2019d).

Two new public infrastructure construction projects in Parkland County

The Alberta NDP government's Coal Phase-out Advisory Panel and the federal Liberal's Just Transition Task Force both recommended that the provincial and federal governments prioritize funding local infrastructure projects in coal communities. Infrastructure projects are a way to generate short-term economic activity and construction jobs in the communities. Municipalities also need new public infrastructure to support an economy that does not include the coal power industry.

In January 2019, the Alberta NDP government announced two public infrastructure construction projects in Parkland County. The first project will see the twinning of Highway 60 west of Edmonton and the construction of a new overpass at a busy intersection in Acheson with a rail crossing (located about 20 km west of Edmonton, Acheson is the location of Parkland County's industrial park). The infrastructure project is estimated to cost between $85 and $105 million (Clancy 2019a), and it is the first project announced out of a new $1.6 billion Government of Alberta initiative to upgrade the province's heavy-load road network (Morgan 2019). Construction will begin in late 2019 and take up to three years. The project will support 450 direct and indirect jobs (ibid).

Parkland County Mayor Rod Shaigec expects the new public infrastructure will help the municipal district attract more private sector investment and jobs, particularly in the Acheson industrial park. After the announcement of the project, Shaigec stated that the mayors of the Tri-Region—Parkland County, Stony Plain, and Spruce Grove—"[have] been advocating for well over a decade to have this key infrastructure built, and it's going to benefit not just Parkland County but the entire Edmonton Metropolitan Region" (Clancy 2019a).

The second public infrastructure project announced by the provincial government in January 2019 will see the realignment and reconstruction of Highway 628 (a busy 15 km section of road west of Edmonton that is currently unpaved). Construction will begin in 2021 and take four to six years to complete. After the announcement of the project, Mayor Shaigec stated that Parkland County had been advocating for the highway to be fixed

for 15 years (McEwan 2019). Once complete, the new road will improve safety, shorten commute times for Tri-Region residents, and "improve access to industrial parks in Parkland County, Spruce Grove and Enoch First Nation" (Aldrich 2019b). The infrastructure project is estimated to cost $70–90 million, and it will support 350 direct and indirect jobs in the region (ibid).

Developing a new regional plan for the Tri-Region

In January 2019, the mayors of Parkland County, Stony Plain, and Spruce Grove signed a letter of intent to develop a regional plan to further integrate their public service delivery to maximize cost efficiencies to save tax dollars over time (Aldrich 2019c). The local chambers of commerce of the Tri-Region are in the process of amalgamating and, once combined, will form the third-largest chamber in Alberta.

In late June 2019, the federal government announced it would spend $3.2 million in Alberta coal communities to aid in the transition away from coal power (Cook 2019). Parkland County was granted most of the funding ($2.2 million) to develop the regional plan with Stony Plain and Spruce Grove. The funding is part of the $35 million Canada Coal Transition Initiative announced by the federal Liberal government in 2018.[19]

To summarize our municipal case study, the governments of Alberta and of Canada have each made funds for local economic planning available to coal communities. Regarding the provincial fund, there was broad uptake of the CCTF by 17 of the 20 affected municipalities and First Nations, but Parkland County did not feel the need to apply to the fund. The county is, however, benefitting from two major local infrastructure projects announced by the Alberta NDP government in January 2019.

Parkland County was able to maintain its $158 million budget in 2018, but had to cut 3.75% from its operating budget in 2019, in large part because the county is over-reliant on property tax revenue from TransAlta and the company retired two coal units in 2018 and mothballed two more in preparation for conversion to gas. It is likely that Parkland County will need further support from the provincial and federal governments in the future as the local power industry continues with the phase-out of coal and the conversion to gas.

It is still early in the transition process, but Parkland County is off to a good start in their work to diversify the local economy. County officials have thus far been successful in attracting substantial new private and public investments, related construction employment and, therefore, indirect support for other local jobs, as well as new permanent jobs in the Pinnacle Renewable Energy and Champion Petfood plants. Future research should

examine if and how Parkland County's agriculture and related value-added industries have been able to grow in the coming years.

We now turn to an evaluation of the transition actions and programs of the Alberta and federal governments against the key just transition principles and lessons outlined in Section 3.

7. Analytic Discussion of the Research Results

Evaluating the Transition Programs for Alberta's Coal Power Workers

Just transition is understood as an inherent right in much of the literature we reviewed, but that does not mean it is inevitable that the transition will be just for workers and communities. The Government of Alberta's advisory panel consulted with coal workers and communities in fall 2016 and the first half of 2017 to examine potential impacts of the coal phase-out and to identify ways to support the transition of workers and communities.

Based on the advisory panel's recommendations, the Alberta NDP government committed $40 million to transition programs for workers that cover the main components of a just transition: bridge to re-employment grants, bridge to retirement grants, funds for moving expenses, tuition vouchers for workers who decide to return to school, career and employment consulting services, and multi-stakeholder workforce adjustment committees to create tailored transition plans for individual workers.

Most thermal coal mining and power plant workers in Alberta will lose their jobs by the end of 2023. It is unknown how many of these workers will be re-deployed by their employers in another segment of the company. For workers that are able to transition to a new position with the same employer, there is the possibility of continued pay, benefits, and seniority, which are aspirations discussed in the just transition literature.

Regarding the principle of just compensation and protection of income for workers, the Government of Canada needs to invest heavily in EI and other social security programs. They should allow EI flexibility and a top-up to EI for workers affected by the energy transition.

The just transition literature emphasizes the need for governments to fund retraining and education programs for displaced workers. These programs should include both skills development and career counselling to support workers through the process of transition, and this is the case for the Alberta transition programs implemented in January 2018.

The just transition literature also stresses the importance of provincial and national renewable energy programs as part of an industrial development and job creation strategy that guides the transition to a low carbon economy. Neither the Alberta nor the federal government has developed a comprehensive green industrial strategy to date that would help absorb

considerable numbers of laid-off coal power workers into renewable energy and other low-carbon sectors.

Evaluating the Transition Programs for Alberta's Coal Power Communities

Local communities and governments in Alberta were consulted by the provincial government about the coal phase-out and given an opportunity to decide for themselves what a transition would look like for them. Our municipal case study shows that Parkland County identified public infrastructure improvements that would enable the county to attract more private capital investment and job creation (indeed, elected officials in the Tri-Region had been advocating for the projects for the last decade). Parkland County's choice of transition strategy aligns with the just transition principle that improved public infrastructure is one way that the benefits of a just energy transition can be accorded to the entire local community, not just the workers in the coal-power industry.

In January 2019, the Alberta NDP government approved two highway construction projects in Parkland County that will contribute between $155 and $195 million to the regional economy, and support 800 direct and indirect jobs. Two months later, the 2019 federal budget created a $120 million infrastructure fund over four years. Each year beginning in 2020, $21 million will go to Western Economic Diversification Canada to support economic diversification in Western Canadian coal power communities. Alberta coal communities can expect to receive a significant portion of this infrastructure funding in the next four years.

In addition to investing in public infrastructure in coal communities, the Alberta NDP government supported economic planning and diversification in coal communities. In March 2018, the government disbursed $5 million to economic planning and diversification projects in 17 and the 20 municipalities and First Nations affected by the phase-out of coal power through the Coal Community Transition Fund.

The federal government is also supporting skills development and economic diversification projects through the $35 million Canada Coal Transition Initiative, announced as part of the 2018 federal budget. In 2019, $6.8 million of these funds were committed to Alberta coal communities to support the transition away from coal power.

In November 2018, the NDP provincial government announced the $10-million-per-year Community Generation Program to support small-scale, locally generated electricity projects, with a quarter of the funds earmarked for coal communities. The program, along with the Renewable Energy Program and several energy efficiency programs, was effectively

cancelled by the UCP on May 30, 2019 with the cancellation of the consumer carbon levy, even though it was an important way to increase Albertans' participation in the energy transition and to reduce electricity costs in rural municipalities and First Nations communities. The UCP will consider restarting the energy efficiency programs on a case-by-case basis in the coming months. The UCP should also consider reinstating the $10 million in annual funding for the Community Generation Program.

An important reason to transition away from coal power is the health benefits. Alberta residents, particularly those in the Edmonton metropolitan region, will have cleaner air with the retirement or conversion of most of the coal generating units set to occur by the end of 2023. Along with improving Albertans' health, the transition away from coal could save Alberta's public health care system $300 million per year related to poor air quality due to coal-fired electricity generation.

The just transition literature emphasizes that strong public services are needed to support diverse, low carbon, labour-intensive industries. However, Parkland County's 2019 budget included a 3.75% cut to municipal operations. The UCP's 2019 budget reduced capital grants for municipalities and cut spending on provincial public services.

It seems unlikely given the UCP's election platform, its legislative agenda to date, and its 2019 budget, but the new government should consider earmarking funds in future budgets for Alberta coal communities, especially since most of the coal-to-gas conversions are set to occur in the next four years. Municipalities and First Nations affected by the coal phase-out will also need continued support from the federal government as the energy transition continues in the coming years.

Evaluating the Overall Program Design and Implementation of Alberta's Transition Away from Coal Power

Private employers must be involved in the energy transition planning and implementation process, and this has been the case in Alberta. Workforce adjustment committees that involve companies, labour unions, and other stakeholders are and will continue to operate at affected worksites to enable the smoothest transition possible for workers to another job, retraining, or retirement. This type of participatory and multi-stakeholder work to develop and implement tailored plans for specific worksites and workers is critical to the success of any just transition process.

The Ministry of Labour told us that TransAlta, ATCO, and Capital Power have given the provincial government access to data about the companies'

workforces. Data sharing like this is important for any just transition involving private employers and has helped the provincial government plan and rollout its transition programs for workers and communities. Given that this data has not been publicly released, it is impossible for us to say how many affected coal workers will be able to transition to another business segment of their employer's operations. This type of preferential hiring by employers is an important way to ensure a smooth transition for some workers.

The Off-Coal Agreements will see the Government of Alberta compensate the three corporations a total of $1.36 billion over 14 years (2017–2030), with the funds coming from the province's carbon tax on large industrial emitters. In an interview with *The Narwhal*, Nigel Bankes, a professor of resource law at the University of Calgary, stated that as a matter of law, the Alberta government did not have to compensate coal power companies because of the introduction of new regulations (Wilt 2017). Moreover, research shows that four of the six coal-fired generating units affected by the Notley government's accelerated coal phase-out would receive a fair return on capital by 2030, thus calling into question the case for compensation from the provincial government (Marr-Laing and Thibault 2015). The other two generating units—Keephills 3 and Genesee 3—are both co-owned by TransAlta and Capital Power, and these companies were aware when they made the decision to invest in these units that their investments would be negatively affected by climate policy in their expected lifetimes.

As the product of numerous decisions made since 2007 by the federal government, the Alberta government, arms-length provincial government agencies, and several large publicly traded electricity companies, Alberta will have little coal power generation by the end of 2023. Most of this generating capacity will be replaced by gas-fired capacity. As discussed in Section 4, this approach is of financial benefit to the power companies, in large part because it enables the firms to save on carbon costs and to reduce their workforces.

While the choice by the Alberta and federal governments, via their regulatory and financial decisions, of a strategy to largely transition Alberta's electricity sector from coal power to gas power is in the private interest of the electricity companies, it is not in the public interest of Albertans and Canadians. Alberta's electricity sector may still annually produce 25 million tonnes of carbon dioxide equivalent emissions in 2030 because of the domination of gas-fired generation. Therefore, Alberta's coal phase-out and increased use of gas-fired generation has undermined the central objective of the coal phase-out: the creation of deep GHG emissions cuts.

While it is true that natural gas produces less GHG emissions per unit of energy than both oil and coal, its release of methane—an even-more-potent GHG than carbon dioxide—results in a longer emissions life cycle than other fossil fuels. In short, natural gas is not a climate change solution (Lee 2012, 2014, 2015, 2016, and 2018; Wilt 2018). Rather, in acknowledging the reality that all fossil fuels must be phased out by mid-century, it becomes clear that long-term investments in natural gas are misguided (Mertins-Kirkwood 2017; Mertins-Kirkwood and Hussey 2019). Alberta's and Canada's climate targets and commitments mean that we must reduce gas combustion, not increase it.

Prior to its cancelation by the UCP government, Alberta's Renewable Energy Program (REP) ran three competitive auctions that set record low prices for new renewable electricity capacity in the province. It is still early in the energy transition process, and restarting the REP would be a cost-effective way for Alberta to ramp up renewable generating capacity in the coming years.

8. Conclusion

In recent years, coal has become an obvious target for climate action from the local to global level. Coal power capacity in the United States declined by a third from 2010 to 2018 (BNEF 2018b), despite the Trump administration's efforts to reverse this trend. Renewables are increasingly cost competitive with fossil fuel-based electricity generation and wind and solar are forecast to account for almost half of global power generation by 2050 (BNEF 2018a).

In Alberta, coal's cost competitiveness has been declining for over a decade because of low natural gas prices and because of the provincial government's introduction of an industrial carbon tax in 2007 and a consumer carbon levy on transportation and heating fuels in 2017 (which was cancelled on May 30, 2019 by the UCP government, and will be replaced by the federal consumer carbon tax on January 1, 2020).

All three Alberta-based power companies affected by the accelerated coal phase-out are speeding up the transition even more than is required because it makes financial sense to do so. These regulatory and financial motivations have already resulted in coal-fired electricity declining from 59% of generation in Alberta in 2017 to 35.5% of production by March 2019 (Clancy 2019b; AESO 2019).

The health of Albertans is benefiting from the accelerated transition away from coal power. The transition could save up to $300 million per year in public health care costs related to poor air quality due to Alberta's historical reliance on coal-fired electricity (Stolte 2019).

The Off-Coal Agreements between the Government of Alberta and TransAlta, ATCO, and Capital Power, as well as the federal regulations on coal plants, provide two backstops for the coal phase-out and mean it is unlikely to be rolled back by the UCP or a future provincial government (though most of the phase-out will be complete before the 2023 Alberta election).

To summarize our research results on the Government of Alberta's transition programs for thermal coal workers, it is fair to say that arrangements have been made to transition the province's coal workers, but the uptake of the provincial government programs has been limited and evaluation of the programs and of the electricity companies' actions vis-à-vis their workforces is difficult because some data are being kept confidential between the government and the affected companies.

Only limited details about the 12 projects in 17 coal communities funded by the Coal Community Transition Fund have been released to the public, including no real details on the possible economic and employment benefits of the projects. In addition, we did not receive an answer from the Ministry of Labour on how coal unit closures or conversions will affect the level of property taxes collected by various municipalities. In August 2017, Parkland County Mayor Rod Shaigec stated the coal phase-out could result in $2 million per year in lost property tax revenue for the municipal district (French 2017). This is a topic worth researching in the coming years as many of the coal unit closures and conversions will be complete by the end of 2023.

The current fiscal year is the first time that the coal phase-out has had an impact on Parkland County's budget (their operating budget is down 3.75%), with the county collecting less property tax revenue from TransAlta, which retired two coal units in 2018 and mothballed two more in preparation for conversion to gas. It is still early in the transition process, but Parkland County has already been successful in attracting substantial new private and public investments, related construction employment and therefore indirect support for other local jobs, as well as new permanent jobs in the Pinnacle Renewable Energy and Champion Petfood plants. The county is hoping that the agriculture industry, and related value-added industries, can continue to grow so they can help replace some of the lost local economic activity from the coal power industry.

It seems likely that Alberta municipalities and First Nations affected by the coal phase-out will need further support from the provincial and federal governments as the transition to gas-fired and renewable energy continues in the coming years. After all, for decades these communities have relied heavily on coal power plants and their associated mines as substantial sources of property tax revenue and family-sustaining jobs.

Alberta's and Canada's coal phase-outs have catalyzed an important conversation of what constitutes a "just transition" and have provided on-the-ground examples of what has long been a mostly theoretical discussion. A just transition requires deliberate and coordinated action that is participatory and multi-stakeholder. Alberta's electricity companies, workers, and labour unions have been and still are actively involved in the ongoing coal phase-out through local workforce adjustment committees.

The number of new jobs related to the renewable energy and energy efficiency programs established by the former NDP government—had they been continued by the UCP government—along with jobs related to the 14 coal-to-gas conversions and the construction of new gas-fired facilities, would have been roughly comparable to the number of coal jobs that the province will lose by 2030. In addition, in the first half of 2019, the former Alberta NDP government and the federal Liberal government both made significant commitments to local public infrastructure development in Alberta coal communities.

Unfortunately, the UCP government chose to cancel the province's Renewable Energy Program—which was yielding low-cost new renewable generation through competitive auctions—at a time when the world is trying to rapidly transition to a lower-carbon economy. Alberta is now on a trajectory to have about 75% gas-fired electricity by 2030. This means Alberta's electricity sector may still produce 25 million tonnes of annual carbon pollution by 2030.

Yet, for Canada to meet its Paris Agreement emission reduction targets, all of this gas-fired power will need to be phased out and replaced by renewables by 2050. This long-term trajectory leaves Alberta's electricity sector to undergo a major transition from gas to renewables from 2030 to 2050, including the possibility that new gas generating units built in the 2020s will need to have their lives truncated by 2050.

Appendix: Timeline of Key Dates

2007

Alberta's Specified Gas Emitters Regulation (SGER) first came into effect in 2007 under the Progressive Conservative (PC) government (Hussey 2016). The SGER put a $15 per tonne price on carbon for large industrial emitters, and thus negatively affected coal's competitiveness because it is a more greenhouse-gas-intensive source of power compared to natural gas (and, of course, the operation of renewable energy facilities does not produce GHG emissions).

December 2011

Stephen Harper's Conservative government withdrew Canada from the Kyoto Protocol, "abandoning the world's only legally binding plan to tackle global warming" (Curry and McCarthy 2011).

September 2012

The Harper government announced new regulations for coal-fired electricity units (Government of Canada 2012; McCarthy 2012). For Alberta, the new regulations meant 12 of the province's 18 coal units would close by 2030.

2015

The global shift away from investment in coal-fired electricity became apparent in 2015. The US Energy Information Administration forecasts that world thermal coal demand will only grow 1% through 2040. Demand in China and the United States is expected to continue to decline in this time period, while demand in India is expected to somewhat counterbalance this long-term trend (see Crooks and Kao 2017).

May 2015

The Rachel Notley-led New Democratic Party (NDP) won a majority government in the Alberta general election. The NDP's platform included commitments to phase-out coal-fired electricity generation and to expand wind and solar energy production (Hussey 2015).

November 2015

The Notley government announced its Climate Leadership Plan (Government of Alberta 2015a). The plan included a carbon levy on transportation and heating fuels (Hussey 2016), an oil sands emissions cap (Hussey 2017), a directive to increase renewable energy in the province from 9% of total power generation in 2015 to 30% by 2030, and the creation of Energy Efficiency Alberta, a Crown corporation that promotes and channels public funds toward energy efficiency. The target of 30% renewable energy by 2030 was subsequently legislated.

December 2015

At the United Nations Conference of the Parties, Justin Trudeau's Liberal government committed Canada to the Paris Agreement. Canada's target is to reduce its GHG emissions by 30% below 2005 levels by 2030.

October 2016

The Trudeau government announced its pan-Canadian plan to price carbon pollution (Government of Canada 2016a). The carbon price was $10 per tonne in 2018 and will rise to $50 per tonne in 2022.

November 2016

The Trudeau government announced a new coal phase-out plan: "The coal regulation would accelerate the existing timetable—laid down by the Conservative government in 2012—for the four provinces that still burn coal for electricity to either adopt technology to capture carbon emissions or shut down the plants [by December 31, 2029]" (McCarthy 2016).

November 2016

The Notley government endorses the Alberta Electric System Operator's recommendation to transition the province's energy-only market to a new framework called a "capacity market" (AESO 2016; Government of Alberta 2016a and 2018a). A capacity market actually has two separate markets: one in which electricity producers compete to sell power and one in which producers compete for payments to provide electricity capacity on demand.

November 2016

The Notley government announced that it reached agreements with TransAlta, ATCO, and Capital Power to end the production of coal-fired electricity by 2030 (Government of Alberta 2016b). The three companies own the six coal units in Alberta not affected by the Harper government's 2012 regulations. The agreements mean Alberta will compensate the three firms a total of $1.36 billion over 14 years, with the funds coming from the province's carbon tax for large industrial emitters.

January 2017

The Alberta carbon levy on transportation and heating fuels took effect on January 1. The levy was $20 per tonne in 2017 and $30 per tonne in 2018.

May 2017

ATCO and TransAlta, the two biggest coal-fired electricity producers in Alberta, announced plans to convert their coal units to natural gas well before the 2030 deadline. ATCO said it would convert its units by 2020 (Morgan 2017a) and TransAlta said it would do the same by the end of 2023 (TransAlta 2019a). In 2018, ATCO changed business strategies and in mid-2019 the firm

sold all of its Canadian-based fossil-fuel electricity assets, including 11 coal and gas plants in Alberta, British Columbia, and Ontario (The Canadian Press 2019). Capital Power, on the other hand, initially said in 2016 that it will continue to operate Genesee 1, 2, and 3 until the government-mandated deadline, at which time the units will be converted to gas (Kent 2016). Capital Power changed strategies in 2017-2018, and in 2019 the company announced the Genesee units would be converted to dual fuel by 2021.

June 2017

Alberta's Bill 16, *An Act to Cap Regulated Electricity Rates*, came into force. The price cap, a temporary measure intended to protect against possible price volatility as the province transitions to a capacity market, "ensures Albertans will pay no more than 6.8 cents per kilowatt hour for electricity" until May 31, 2021 (Government of Alberta 2017a). The 2002–2018 average price for electricity in Alberta is 7.3 cents, with a historic high of 15.06 cents in January 2012 and a historic low of 2.88 cents in April 2017.

September 2017

The Notley government announced the $5-million Coal Community Transition Fund "to support municipalities and First Nations impacted by the phase-out of coal in Alberta" (Government of Alberta 2017b).

November 2017

The Notley government announced the creation of a $40-million transition fund and support program for Alberta coal workers (Government of Alberta 2017c and 2017d).

November 2017

At the United Nations Conference of the Parties, Canada and the United Kingdom launched the Powering Past Coal Alliance with 25 partners, including the Government of Alberta (Government of Canada 2017).

December 2017

The results of Alberta's Renewable Energy Program's first competitive auction were announced. The winning bid set a record low price for renewable power in Canada of 3.7 cents per kilowatt-hour (Government of Alberta 2017e).

2018

In 2018, coal-fired electricity accounted for 47% of power generation in Alberta, down sharply from 59% the previous year (Clancy 2019b). At the same time, power generation from gas-fired facilities increased from 31% of Alberta's total in 2017 to 42% in 2018 (ibid). At the international level, Bloomberg New Energy Finance forecasts that coal will "shrink to just 11% of

global electricity generation by [2050], from 38% [in 2018]" and that "wind and solar are set to surge to almost '50 by 50'—50% of world generation by 2050" (BNEF 2018a). Bloomberg also reports that "U.S. coal power capacity has fallen by a third since 2010" (BNEF 2018b).

March 2018

The Notley government announced that its "Coal Community Transition Fund will support 12 [economic diversification] projects in 17 communities across the province" (Government of Alberta 2018b).

March 2018

The 2018 federal budget was passed in March, and it committed $35 million to skills development and economic diversification projects through the Canada Coal Transition Initiative (Government of Canada 2019a).

April 2018

The Notley government announced "the second and third rounds of the Renewable Electricity Program" (Government of Alberta 2018c). In total, the three Renewable Energy Program auctions resulted in 20-year contracts for 1,360 MW of wind power projects.

April 2018

The Trudeau government announced the members of its Just Transition Task Force for coal workers and communities (Government of Canada 2018a). The task force provided recommendations to the government in late 2018.

April 2018

The Trudeau government announced new regulations to reduce methane pollution from oil and gas production (Government of Canada 2018b). Methane is the main ingredient of natural gas, and is a more potent greenhouse gas than carbon dioxide.

November 2018

The Trudeau government announced a new tax incentive for companies that invest in wind and solar energy installations. The "immediate expensing" temporary rule enables companies "to immediately write off the cost of 'specified clean energy equipment' on their taxes" (Meyer 2018).

November 2018

The Notley government announced the $10 million per year Community Generation Program to support small-scale, locally generated electricity projects (Government of Alberta 2018d).

November 2018

The United Nations Environment Programme published its annual "emissions gap" report. The report shows that "most of the largest emitting countries—including Canada and the United States—are not on track to achieve their current emissions targets, let alone adopt tougher ones proposed under the Paris accord" (McCarthy 2018b).

December 2018

The federal Liberal government announced the final regulations to phase-out coal power by December 31, 2029, and the final GHG regulations for gas-fired electricity generation (Government of Canada 2018f).

March 2019

The Government of Canada's 2019 budget was passed. The budget does not include details on what the government will do to protect the wages and pensions of thermal coal workers across the country, but the budget did create a $120 million infrastructure fund over four years. The funds are intended to support economic diversification in thermal coal communities. Starting in 2020, Western Economic Diversification Canada will receive $21 million per year for four years, and the Atlantic Canada Opportunities Agency will receive $9 million per year for four years.

April 2019

The Jason Kenney-led United Conservative Party (UCP) won a majority government in the Alberta provincial election. The UCP's platform included commitments to cancel much of the former government's Climate Leadership Plan, Renewable Energy Program, and Community Generation Program.

May 2019

The UCP's first bill repealed the provincial carbon levy on transportation and heating fuels, and came into force on May 30, 2019 (Government of Alberta 2019a). Repealing the provincial pricing mechanism means the federal carbon pricing system—$20 per tonne in 2019, rising $10 per year to $50 per tonne in 2022—will be imposed on Alberta in 2020. The Renewable Energy Program, Community Generation Program, and several energy efficiency programs that were funded by the former provincial carbon levy were effectively cancelled with the repeal of the levy. The UCP government said it will consider restarting the energy efficiency programs on a case-by-case basis in the coming months.

June 2019

In mid-June, the UCP government announced a 90-day electricity market review to examine whether Alberta should proceed with plans to move away from an energy-only system to a capacity market system (Government of Alberta 2019b).

June 2019

In late June, the Trudeau government announced that starting in 2021 large portions of GHGs emitted from new gas-fired electricity plants will be subject to the federal carbon pricing system. In 2021 and beyond, plant owners would pay for emissions above 370 tonnes of carbon dioxide equivalent per year. The allowable emissions cap will decline "each year until it hits zero in 2030, meaning the power plant would have to pay for all its emissions that year" (Meyer 2019).

June 2019

In late June, the Trudeau government announced $4.5 million in funding for nine communities and organizations in Alberta and Saskatchewan related to the coal phase-out. The funds will go toward retraining workers and economic diversification. Parkland County received the largest amount of funding ($2.2 million) that "will go toward developing a plan to align land use, municipal services and infrastructure investments between the municipalities of Parkland County, Stony Plain and Spruce Grove" (Herring 2019).

July 2019

The UCP government consulted with large industrial emitters on lowering the carbon tax they pay. No environmental organizations were invited to the consultation. The new Technology Innovation and Emissions Reduction (TIER) system will come into force on January 1, 2020 (Government of Alberta 2019c).

July 2019

Less than halfway through its 90-day review of the province's electricity sector, the UCP government announced that it had cancelled the move to a capacity market from an energy-only market (Government of Alberta 2019d; Graney 2019). The AESO had been working on the transition for the past two years.

Endnotes

1 Alberta's Climate Leadership Plan is based on the report of the provincial government's Climate Change Advisory Panel, submitted on November 20, 2015 (see Government of Alberta 2015c). The advisory panel recommended the government develop a tailored transition plan for Alberta's thermal coal communities and workers, and that the affected parties be actively involved in the development of the transition programs.

2 In 2016, "66% of Canada's electricity [came] from renewable sources and 81% from non-GHG emitting sources" (NRC 2018). In that year, 59% of Canada's power was from hydro, 7% was from other renewable sources, 15% was nuclear, 9% was coal, and 10% was gas, oil, or other fossil fuels.

3 The United Conservative Party (UCP) government in Alberta adopted a similar tax incentive in October 2019 (see Government of Alberta 2019e).

4 There are three export coal mines in Alberta that are not used for power generation and thus not affected by the coal-fired electricity phase-out. Two of the mines are in Hinton and one is in Grand Cache (AFL and CTC 2017, 12).

5 In December 2017, the Alberta government announced that the successful bids in its first renewable energy auction "set a record for the lowest renewable electricity pricing in Canada" of 3.7 cents per kilowatt-hour (Government of Alberta 2017e).

6 All of Alberta's coal-fired units are mine-mouth facilities. US-based Westmoreland Coal Company owns half of the mines co-located with the power plants (AFL and CTC 2017, 12). However, Westmoreland wasn't included in the Off-Coal Agreements because the provincial government's aim was to ensure investment in the transition of the electricity system. Westmoreland filed for bankruptcy in October 2018 (IEEFA 2018), and in November 2018 the company launched a NAFTA suit against Alberta, "saying it is entitled to the same compensation for losses at mines in the province as Canadian firms received" (McCarthy 2018a). The claim has yet to be adjudicated.

7 Converting its coal units in the Genesee plant to dual fuel allows Capital Power the option to burn some coal until the federal coal phase-out deadline of December 31, 2029. In August 2019, Capital Power's CEO Brian Vaasjo said the company would use some coal in its Genesee units if gas prices increase in the future (quoted in Varcoe 2019).

8 The financial, workforce, and GHG data in all three case studies starts in 2011 because we wanted to look at each company's history starting the year before the Harper government passed regulations on coal-fired electricity units that meant 12 of the 18 coal units in Alberta would be phased out by 2030. Our case studies are thus also able to examine the initial effects of the Alberta NDP government's accelerated phase-out of the remaining six coal units, which was announced in late 2015.

9 TransAlta stopped producing annual reports on sustainability after 2014 and switched to publishing an annual integrated report that includes financial, operational, workforce, climate, and environmental data. Unfortunately, this change in the firm's annual reporting seems to have resulted in the company ceasing to publish annual net generation by fuel type data.

10 CDP was formerly known as the Climate Disclosure Project.

11 ATCO reports the generating capacity owned by its various subsidiaries in disaggregated totals (disaggregated into domestic (Canadian) facilities and international facilities). Table 10 includes data for both its domestic and international facilities.

12 The US Energy Information Administration states that gas facilities produce about 40% less carbon pollution as (subbituminous) coal power (USEIA 2019). We used the USEIA's numbers to estimate the amount of annual pollution that Alberta's gas plants will produce in 2030.

13 The discrepancy in timelines was the result of the two processes being coordinated by separate government ministries.

14 All responses from the Alberta Ministry of Labour quoted in this report are from Percy Cummins, Executive Director, Workplace Evidence, Engagement and Strategic Policy, Ministry of Labour, in email communication to the authors, October 30, 2018.

15 A rough estimate is about 300 of these annual full-time equivalent jobs would have been created in the upstream renewable energy industry outside of Alberta.

16 Sundance 1 and 2 had to retire by the end of 2019 according to the 2012 federal coal regulations. However, TransAlta decided to retire the two units on January 1, 2018 because electricity prices were low and it made financial sense to do so (Varcoe 2018). The two units were no longer profitable because the Sundance A Power-Purchase Agreement (PPA) expired at the end of 2017. It is noteworthy that TransAlta temporarily shutdown Sundance 1 and 2 in December 2010 because of concerns about operating the units safely (TransAlta 2012a). The Balancing Pool,

an arms-length agency of the Government of Alberta, returned the Sundance B and C PPAs to TransAlta on March 31, 2018, because the Balancing Pool was "losing significant sums of money" on the PPAs "given low market prices and high PPA related costs" (Balancing Pool 2018). The Balancing Pool saved between $475 and $518 million by terminating the Sundance B and C PPAs. The Alberta Electric System Operator's (AESO's) mothballing rule, which it adopted in 2016, allowed TransAlta to temporarily mothball Sundance 3 and 5 on April 1, 2018 in preparation for conversion to gas.

17 The 2012 Harper government's regulations did not allow for coal-to-gas conversions. The Alberta NDP government advocated for the federal Liberal government to make that recent regulatory change.

18 We asked the Ministry of Labour about the expected budgetary impact of the coal phase-out on the property tax base of impacted municipalities, and what provisions to mitigate such impacts were included in the Off-Coal Agreements. Unfortunately, the Government of Alberta is unable to provide details of the confidential Off-Coal Agreements.

19 In early September 2019, funds from the Canada Coal Transition Initiative were granted to the Hanna Learning Centre ($693,500), the County of Paintearth ($2.74 million), and the United Steel Workers 1595 ($200,000) (Government of Canada 2019b).

References

Alberta Electric System Operator (AESO). 2016. "Capacity market transition." Last accessed November 28, 2018. https://www.aeso.ca/market/capacity-market-transition/

Alberta Electric System Operator (AESO). 2017. "Annual Market Statistics." Last accessed November 28, 2018. http://www.aeso.ca/download/listedfiles/2017-Annual-Market-Stats.pdf

Alberta Electric System Operator (AESO). 2019. "Electricity in Alberta." Last accessed August 7, 2019. https://www.aeso.ca/aeso/electricity-in-alberta/

Alberta Federation of Labour (AFL) and Coal Transition Coalition (CTC). 2017. "Getting it Right: A Just Transition Strategy for Alberta's Coal Workers." Last accessed November 28, 2018. https://www.coaltransition.ca/read_the_report

Alberta Utilities Commission (AUC). February 4, 2016. "Time Extension to Construct Sundance 7." Last accessed August 7, 2019. http://www.auc.ab.ca/regulatory_documents/ProceedingDocuments/2016/21062-D02-2016.pdf

Alberta Utilities Commission (AUC). August 27, 2018. "Alberta Power (2000) Ltd. Battle River Power Plant Alterations." Last accessed November 28, 2018. http://www.auc.ab.ca/regulatory_documents/ProceedingDocuments/2018/23558-D01-2018.pdf

Aldrich, Joshua. October 12, 2018 (2018a). "Report recommends increasing Parkland County agriculture land." The High River Times. Last accessed August 7, 2019. https://www.highrivertimes.com/news/local-news/report-recommends-increasing-parkland-county-agriculture-land/wcm/cd0c3879-0cd0-46d8-971d-90f55d595b5a

Aldrich, Joshua. December 14, 2018 (2018b). "Parkland County stands with Brazeau in support of oil, gas and ag industries." The Belleville Intelligencer. Last accessed August 7, 2019. https://www.intelligencer.ca/news/local-news/parkland-county-stands-with-brazeau-in-support-of-oil-gas-and-ag-industries/wcm/4bf1fec3-1420-4087-876a-2af35b3b341e

Aldrich, Joshua. January 4, 2019 (2019a). "Parkland County looks to expand its business platform." The Stony Plain Reporter. Last accessed August 7, 2019. https://www.stonyplainreporter.com/news/local-news/parkland-county-looks-to-expand-its-business-platform

Aldrich, Joshua. January 24, 2019 (2019b). "Province announces reconstruction project for Highway 628." The Spruce Grove Examiner. Last accessed August 7, 2019. https://www.sprucegroveexaminer.com/news/local-news/province-announces-reconstruction-project-for-highway-628

Aldrich, Joshua. March 15, 2019 (2019c). "Parkland County focused on investing in region." The Stony Plain Reporter. Last accessed August 7, 2019. https://www.stonyplainreporter.com/news/local-news/parkland-county-focused-on-investing-in-region

Aldrich, Joshua. April 14, 2019 (2019d). "Cannabis production bylaw delayed in Parkland County." The Stony Plain Reporter. Last accessed August 7, 2019. https://www.stonyplainreporter.com/news/local-news/cannabis-production-bylaw-delayed-in-parkland-county

Alook, Angele, Ian Hussey, and Nicole Hill. 2019. "Indigenous Gendered Experiences of Work in an Oil-Dependent, Rural Alberta Community." Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/indigenous_gendered_experiences_of_work

Anderson, Kristi, Tim Weis, Ben Thibault, Farrah Khan, Beth Nanni, and Noah Farber. 2013. "A Costly Diagnosis: Subsidizing Coal Power with Albertans' Health." The Pembina Foundation, The Asthma Society of Canada, The Canadian Association of Physicians for the Environment, The Lung Association, Alberta & Northwest Territories, and The Pembina Institute. Last accessed November 28, 2018. https://ab.lung.ca/sitewyze/files/costly-diagnosis.pdf

ATCO Ltd. 2018a. "2017 Annual Report." Last accessed November 28, 2018. https://www.atco.com/Investors/Documents/Annual-Reports/ATCO_2017_YE_AR.pdf

ATCO Ltd. 2018b. "2017 Consolidated Financial Statements." Last accessed November 28, 2018. https://www.atco.com/en-ca/about-us/investors/documents-filings.html

ATCO Ltd. 2019a. "2018 Annual Information Form." Last accessed October 15, 2019. https://www.atco.com/en-ca/about-us/investors/documents-filings.html

ATCO Ltd. 2019b. "2018 Sustainability Report." Last accessed October 15, 2019. https://www.atco.com/en-ca/about-us/investors/documents-filings.html

ATCO Ltd. 2019c. "2018 Consolidated Financial Statements." Last accessed October 15, 2019. https://www.atco.com/en-ca/about-us/investors/documents-filings.html

Balancing Pool. 2018. "Sundance PPA Terminations." Last accessed August 7, 2019. http://www.balancingpool.ca/power-purchase-arrangement-information/sundance-ppa-terminations/

Bloomberg New Energy Finance. 2018a. "Batteries boom enables world to get half of electricity from wind and solar by 2050." Last accessed August 7, 2019. https://about.bnef.com/blog/batteries-boom-enables-world-get-half-electricity-wind-solar-2050/

Bloomberg New Energy Finance. 2018b. "U.S. Coal Plant Retirements Near All-Time High." Last accessed August 7, 2019. https://about.bnef.com/blog/u-s-coal-plant-retirements-near-all-time-high/

Boston, Terry. September 30, 2016. "Letter to Premier Notley." Last accessed November 28, 2018. https://www.alberta.ca/documents/Electricity-Terry-Boston-Letter-to-Premier.pdf

Canadian Labour Congress (CLC). 2000. "Just Transition for Workers During Environmental Change." Last accessed November 28, 2018. https://digital.library.yorku.ca/yul-1121737/just-transition-workers-during-environmental-change/datastream/OBJ/download

Capital Power Corporation. 2018. "2017 Annual Report." Last accessed November 28, 2018. https://www.capitalpower.com/wp-content/uploads/2019/06/2017-Annual-Report.pdf

Capital Power Corporation. June 18, 2019 (2019a). "Capital Power accelerates plans for natural gas capability at the Genesee facility." Last accessed August 7, 2019. https://www.capitalpower.com/media/media_releases/capital-power-accelerates-plans-for-natural-gas-capability-at-the-genesee-facility/

Capital Power Corporation. 2019b. "Genesee 4 & 5." Last accessed October 15, 2019. https://www.capitalpower.com/operations/genesee-4-5/

Capital Power Corporation. 2019c. "2018 Annual Report." Last accessed October 15, 2019 https://www.capitalpower.com/wp-content/uploads/2019/06/2018-Annual-Report-1.pdf

Clancy, Clare. January 18, 2019 (2019a). "Highway twinning and overpass in Acheson to cost up to $105 million." Edmonton Journal. Last accessed August 7, 2019. https://edmontonjournal.com/news/local-news/highway-twinning-and-overpass-in-acheson-to-cost-up-to-105-million

Clancy, Clare. February 13, 2019 (2019b). "'Extraordinary': Less than half of Alberta's electricity was coal-powered in 2018, says province." Edmonton Journal. Last accessed August 7, 2019. https://edmontonjournal.com/news/politics/extraordinary-less-than-half-of-albertas-electricity-was-coal-powered-in-2018-says-province

Cook, Stephen David. June 28, 2019. "Edmonton-area counties get help from Ottawa for coal transition." CBC News. Last accessed August 7, 2019. https://www.cbc.ca/news/canada/edmonton/edmonton-area-counties-get-help-from-ottawa-for-coal-transition-1.5194823

Crooks, Ed and Joanna Kao. September 19, 2017. "The future of coal in seven charts." Financial Times. Last accessed November 28, 2018. https://www.ft.com/content/82f9087c-9cdd-11e7-8cd4-932067fbf946?emailId=5a579a1c1a5c1f0004bc377d&segmentId=7e94968a-a618-c46d-4d8b-6e2655e68320

Curry, Bill and Shawn McCarthy. December 12, 2011. "Canada formally abandons Kyoto Protocol on climate change." The Globe and Mail. Last accessed November 28, 2018. https://www.theglobeandmail.com/news/politics/canada-formally-abandons-kyoto-protocol-on-climate-change/article4180809/

Davies, Patrick. March 23, 2018. "Parkland County opts out of provincial funding." The Spruce Grove Examiner. Last accessed August 7, 2019. https://www.sprucegroveexaminer.com/2018/03/23/parkland-county-opts-out-of-provincial-funding/wcm/9820ac81-82b8-804e-3d97-f2b658ef1dc4

Dorow, Sara. 2015. "Gendering Energy Extraction in Fort McMurray." Pp. 275-292 in *Alberta Oil and the Decline of Democracy in Canada*, edited by Meenal Shrivastava and Lorna Stefanick. Edmonton: Athabasca University Press. Last accessed November 28, 2018. http://www.aupress.ca/books/120251/ebook/10_Shrivastava_Stefanick_2015-Alberta_Oil_and_the_Decline_of_Democracy_in_Canada.pdf

Ewart, Stephen. October 30, 2015. "TransAlta postpones Sundance 7 gas-fired power plant into next decade." Calgary Herald. Last accessed August 7, 2019. https://calgaryherald.com/business/energy/transalta-postpones-sundance-7-gas-fired-power-plant-into-next-decade

Fida, Kashmala. May 23, 2019. "Get ready to exhale – a Nordic spa is planned for just west of Edmonton." Star Edmonton. Last accessed August 7, 2019. https://www.thestar.com/edmonton/2019/05/23/get-ready-to-exhale-a-nordic-spa-is-planned-for-just-west-of-edmonton.html

French, Janet. August 8, 2017. "Parkland County protests power-agreement termination, loss of tax revenue." Edmonton Journal. Last accessed August 7, 2019. https://edmontonjournal.com/news/local-news/parkland-county-protests-power-agreement-termination-loss-of-tax-revenue

Government of Alberta. November 22, 2015 (2015a). "Climate Leadership Plan will protect Albertans' health, environment and economy." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=38885E74F7B63-A62D-D1D2-E7BCF6A98D616C09

Government of Alberta. November 22, 2015 (2015b). "Climate Leadership Plan speech." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=38886E9269850-A787-1C1E-A5C90ACF52A4DAE4

Government of Alberta. November 20, 2015 (2015c). "Climate Leadership: Report to Minister." Last accessed November 28, 2018. https://www.alberta.ca/documents/climate/climate-leadership-report-to-minister.pdf

Government of Alberta. November 23, 2016 (2016a). "Consumers to benefit from stable, reliable electricity market." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=44880BD97DCDC-D465-4922-25225F9F43B302C9

Government of Alberta. November 24, 2016 (2016b). "Alberta announces coal transition action." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=44889F421601C-0FF7-A694-74BB243C058EE588

Government of Alberta. 2016c. "Advisory Panel on Coal Communities." Last accessed November 28, 2018. https://www.alberta.ca/coal-communities.aspx

Government of Alberta. 2017a. "Electricity price protection." Last accessed November 28, 2018. https://www.alberta.ca/electricity-price-protection.aspx

Government of Alberta. September 11, 2017 (2017b). "Coal Community Transition Fund." Last accessed November 28, 2018. https://www.alberta.ca/coal-community-transition-fund.aspx

Government of Alberta. November 10, 2017 (2017c). "New transition supports for Alberta coal workers." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=48946866B1DC2-B873-AEB5-FC07E467C571A5AF

Government of Alberta. 2017d. "Support for workers affected by coal phase out." Last accessed November 28, 2018. https://www.alberta.ca/support-for-coal-workers.aspx

Government of Alberta. December 13, 2017 (2017e). "Alberta renewables auction record-setting success." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=511572D67D28E-C09C-E3E6-BA37A772B4C34AF6

Government of Alberta. March 24, 2017 (2017f). "New jobs, investments to come from renewables." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=4653114186F9D-D960-29D3-F989FD2E0A0F0DF6

Government of Alberta. 2017g. "Supporting Workers and Communities: Recommendations to the Government of Alberta." Last accessed November 28, 2018. https://www.alberta.ca/assets/documents/advisory-panel-coal-communities-recommendations.pdf

Government of Alberta. 2017h. "Community and Regional Economic Support (CARES) program." Last accessed November 28, 2018. https://www.alberta.ca/community-regional-economic-support-program.aspx

Government of Alberta. 2018a. "Electricity capacity market." Last accessed November 28, 2018. https://www.alberta.ca/electricity-capacity-market.aspx

Government of Alberta. March 15, 2018 (2018b). "Helping coal communities diversify." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=54590B0E0FC9A-A0C4-7860-C3B79E5673061864

Government of Alberta. April 4, 2018 (2018c). "Renewable energy to power new jobs, investment." Last accessed November 28, 2018. https://www.alberta.ca/release.cfm?xID=55695ADD3C996-CDCD-89D9-6A025089F93B3584

Government of Alberta. 2018d. "Putting power in the hands of communities." Last accessed January 15, 2019. https://www.alberta.ca/release.cfm?xID=620855BF8D8B3-9B90-88C9-FD9330F8A9406D44

Government of Alberta. 2018e. "Industry Profiles 2018: Mining and Oil and Gas Extraction Industry." Last accessed January 15, 2019. https://open.alberta.ca/dataset/f5a3586b-9fad-47a5-8741-e46cf5008d16/resource/9b026daf-1045-49bb-aad6-34996db59914/download/industry-profile-mining-oil-and-gas-extraction.pdf

Government of Alberta. 2019a. "Carbon tax repeal." Last accessed August 7, 2019. https://www.alberta.ca/carbon-tax-repeal.aspx

Government of Alberta. 2019b. "Electricity Market Review: Minister Savage." Last accessed August 7, 2019. https://www.alberta.ca/release.cfm?xID=640536EAB2F33-A5F7-C76A-BC0A71B5868A83FF

Government of Alberta. 2019c. "Seeking industry input on technology innovation." Last accessed August 7, 2019. https://www.alberta.ca/release.cfm?xID=6418473765D47-BA42-A94C-5E03931BBC669E65

Government of Alberta. 2019d. "Restoring certainty in the electricity system." Last accessed August 7, 2019. https://www.alberta.ca/release.cfm?xID=642387D0ECA3E-ED8E-6B02-885D35312EBBB3EE

Government of Alberta. 2019e. "Boosting job creators in Alberta." Last accessed October 15, 2019. https://www.alberta.ca/release.cfm?xID=646231F5FDE1C-E89C-B369-DDF55B3F61A77D6D

Government of Canada. September 5, 2012. "Harper Government Moves Forward on Tough Rules for Coal-Fired Electricity Sector." Last accessed November 28, 2018. http://www.ec.gc.ca/default.asp?lang=En&n=714D9AAE-1&news=4D34AE9B-1768-415D-A546-8CCF09010A23

Government of Canada. October 3, 2016 (2016a). "Government of Canada Announces Pan-Canadian Pricing on Carbon Pollution." Last accessed November 28, 2018. https://www.canada.ca/en/environment-climate-change/news/2016/10/government-canada-announces-canadian-pricing-carbon-pollution.html

Government of Canada. November 21, 2016 (2016b). "The Government of Canada accelerates investments in clean electricity." Last accessed November 28, 2018. https://www.canada.ca/en/environment-climate-change/news/2016/11/government-canada-accelerates-investments-clean-electricity.html

Government of Canada. November 16, 2017. "Canada and the UK launch a global alliance to phase out coal electricity." Last accessed November 28, 2018. https://www.canada.ca/en/environment-climate-change/news/2017/11/canada_calls_foraglobalalliancetophaseoutcoalelectricity.html

Government of Canada. April 25, 2018 (2018a). "Task Force: Just Transition for Canadian Coal Power Workers and Communities." Last accessed November 28, 2018. https://www.canada.ca/en/environment-climate-change/services/climate-change/task-force-just-transition.html

Government of Canada. April 26, 2018 (2018b). "Canada finalizes major commitment to reduce carbon pollution." Last accessed November 28, 2018. https://www.canada.ca/en/environment-climate-change/news/2018/04/canada-finalizes-major-commitment-to-reduce-carbon-pollution.html

Government of Canada. February 17, 2018 (2018c). "Regulations Limiting Carbon Dioxide Emissions from Natural Gas-Fired Generation of Electricity." Last accessed November 28, 2018. http://gazette.gc.ca/rp-pr/p1/2018/2018-02-17/html/reg4-eng.html

Government of Canada. June 27, 2018 (2018d). "Government of Canada announces funding agreements to give Albertans better access to jobs and training." Last accessed November 28, 2018. https://www.newswire.ca/news-releases/government-of-canada-announces-funding-agreements-to-give-albertans-better-access-to-jobs-and-training-686703851.html

Government of Canada. December 28, 2018 (2018e). "Aboriginal Skills and Employment Training Strategy." Last accessed January 15, 2019. https://www.canada.ca/en/employment-social-development/services/indigenous/asets.html

Government of Canada. December 12, 2018 (2018f). "Canada's coal power phase-out reaches another milestone." Last accessed January 15, 2019. https://www.canada.ca/en/environment-climate-change/news/2018/12/canadas-coal-power-phase-out-reaches-another-milestone.html

Government of Canada. March 11, 2019 (2019a). "Government of Canada welcomes report from Just Transition Task Force for Canadian Coal Power Workers and Communities." Last accessed August 7, 2019. https://www.newswire.ca/news-releases/government-of-canada-welcomes-report-from-just-transition-task-force-for-canadian-coal-power-workers-and-communities-882134855.html

Government of Canada. September 3, 2019 (2019b). "Government of Canada supports a just and fair coal energy transition for Alberta." Last accessed October 15, 2019. https://www.newswire.ca/news-releases/government-of-canada-supports-a-just-and-fair-coal-energy-transition-for-alberta-808745697.html

Graney, Emma. July 25, 2019. "'Conditions have changed': Government kills planned changes to Alberta's electricity market." Edmonton Journal. Last accessed August 7, 2019. https://edmontonjournal.com/news/politics/conditions-have-changed-government-kills-planned-changes-to-albertas-electricity-market

Herring, Jason. June 28, 2019. "Leduc, Parkland counties among recipients of federal coal transition handout." Edmonton Journal. Last accessed August 7, 2019. https://edmontonjournal.com/news/local-news/leduc-parkland-counties-among-recipients-of-federal-coal-transition-handout

Hussey, Ian. April 30, 2015. "Planks in the platforms: Comparing 11 key policy issues." Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/planks_in_the_platforms_comparing_11_key_policy_issues

Hussey, Ian. November 24, 2016. "Ten things to know about carbon pricing in Alberta." Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/ten_things_to_know_about_carbon_pricing_in_alberta

Hussey, Ian. February 22, 2017. "Five things to know about Alberta's oil sands emissions cap." Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/five_things_to_know_about_albertas_oil_sands_emissions_cap

Hussey, Ian and David W. Janzen. 2018. "What the Paris Agreement means for Alberta's Oil Sands Majors." Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/what_the_paris_agreement_means_for_albertas_oil_sands_majors

Institute for Energy Economics and Financial Analysis (IEEFA). November 13, 2018. "Westmoreland bankruptcy bonuses good news for company executives." Last accessed August 7, 2019. http://ieefa.org/westmoreland-bankruptcy-bonuses-good-news-for-company-executives/

International Labour Organization (ILO). 2015. "Guidelines for a just transition towards environmentally sustainable economies and societies for all." Last accessed November 28, 2018. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_432859.pdf

International Trade Union Confederation (ITUC). 2017. "Just Transition – Where are we now and what's next? A Guide to National Policies and International Climate Governance." Last accessed November 28, 2018. https://www.ituc-csi.org/just-transition-where-are-we-now

Israel, Benjamin, Kim Perrotta, Joe Vipond, Leigh Allard, and Vanessa Foran. 2016. "Breathing in the Benefits: How an accelerated coal phase-out can reduce health impacts and costs to Albertans." The Pembina Institute, The Asthma Society of Canada, The Canadian Association of Physicians for the Environment, and The Lung Association, Alberta & Northwest Territories. Last accessed November 28, 2018. https://www.pembina.org/pub/breathing-benefits

Jackson, Emma and Ian Hussey. May 4, 2017. "Gendering the downturn: Is the NDP doing enough for Alberta women?" Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/gendering_the_downturn

Jaremko, Deborah. December 6, 2017. "TransAlta accelerating coal phase-out with new $150 million natural gas pipeline." JWN. Last accessed August 7, 2019. https://www.jwnenergy.com/article/2017/12/transalta-accelerating-coal-phase-out-new-150-million-natural-gas-pipeline/

Jeyakumar, Binnu. 2016. "Job Growth in Clean Energy: Employment in Alberta's Emerging Renewables and Energy Efficiency Sectors." Pembina Institute. Last accessed August 7, 2019. https://www.pembina.org/reports/job-growth-in-clean-energy.pdf

Kent, Gordon. March 31, 2016. "Coal industry fighting Alberta plans to phase out power plants." Edmonton Journal. Last accessed August 7, 2019. http://edmontonjournal.com/business/energy/coal-industry-fighting-alberta-power-plans

Kent, Gordon. May 3, 2017. "Alberta's compensation to ATCO's electricity rivals an 'injustice' says company president." Edmonton Journal. Last accessed August 7, 2019. https://edmontonjournal.com/business/energy/albertas-compensation-to-atcos-electricity-rivals-an-injustice-says-company-president

Lahey, Kathleen A. 2015. "The Alberta Disadvantage: Gender, Taxation, and Income Inequality." Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/the_alberta_disadvantage

Lahey, Kathleen A. 2016. "Equal Worth: Designing Effective Pay Equity Laws for Alberta." Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/equal_worth

Lee, Marc. 2012. "BC's Legislated Greenhouse Gas Targets vs Natural Gas Development: The Good, the Bad and the Ugly." Canadian Centre for Policy Alternatives – BC Office. Last accessed August 7, 2019. https://www.policyalternatives.ca/natural-gas-ghgs

Lee, Marc. 2014. "A BC Framework for LNG, part one: the carbon benchmark." Canadian Centre for Policy Alternatives – BC Office. Last accessed August 7, 2019. https://www.policynote.ca/a-bc-framework-for-lng-part-one-the-carbon-benchmark/

Lee, Marc. 2015. "Looking under the hood of Alberta's new climate plan." Canadian Centre for Policy Alternatives. Last accessed August 7, 2019. http://behindthenumbers.ca/2015/11/24/looking-under-the-hood-at-albertas-new-climate-plan/

Lee, Marc. 2016. "Petronas' Pacific NorthWest LNG: Profile of a Carbon Bomb." Canadian Centre for Policy Alternatives. Last accessed August 7, 2019. http://behindthenumbers.ca/2016/02/25/petronas-pacific-northwest-lng-profile-of-a-carbon-bomb/

Lee, Marc. 2018. "Western Canada needs real climate action, not disingenuous arguments." Canadian Centre for Policy Alternatives. Last accessed August 7, 2019. http://behindthenumbers.ca/2018/02/26/western-canada-needs-real-climate-action-not-disingenuous-arguments/

Marr-Laing, Tom and Benjamin Thibault. 2015. "Early coal phase-out does not require compensation." Pembina Institute. Last accessed August 7, 2019. http://www.pembina.org/pub/early-coal-phase-out-does-not-require-compensation

McCarthy, Shawn. September 5, 2012. "Ottawa unveils new coal-fired plant emission rules." The Globe and Mail. Last accessed August 7, 2019. https://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/ottawa-unveils-new-coal-fired-plant-emissions-rules/article4522237/

McCarthy, Shawn. November 21, 2016. "Ottawa to phase out coal, aims for virtual elimination by 2030." The Globe and Mail. Last accessed August 7, 2019. https://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/ottawa-to-announce-coal-phase-out-aims-for-virtual-elimination-by-2030/article32953930/

McCarthy, Shawn. November 19, 2018 (2018a). "U.S. coal firm launches NAFTA suit against Alberta over coal phase-out." The Globe and Mail. Last accessed August 7, 2019. https://www.theglobeandmail.com/business/article-westmoreland-coal-launches-nafta-suit-against-alberta-over-coal-phase/

McCarthy, Shawn. November 27, 2018 (2018b). "Large greenhouse gas-emitting countries, including Canada, not on track to achieve Paris targets: UN agency." The Globe and Mail. Last accessed August 7, 2019. https://www.theglobeandmail.com/world/article-canada-most-of-the-largest-greenhouse-gas-emitting-countries-not-on/

McEwan, Travis. January 25, 2019. "Highway 628 improvement plans brings some relief to mother of crash victim." CBC News. Last accessed August 7, 2019. https://www.cbc.ca/news/canada/edmonton/highway-628-spruce-grove-construction-1.4994100

Mertins-Kirkwood, Hadrian. 2017. "Tracking Progress: Evaluating Government Plans and Actions to Reduce Greenhouse Gas Emissions in Canada." Canadian Centre for Policy Alternatives. Last accessed August 7, 2019. http://www.adaptingcanadianwork.ca/wp-content/uploads/2017/05/Tracking-Progress.pdf

Mertins-Kirkwood, Hadrian. 2018. "Making decarbonization work for workers: Policies for a just transition to a zero-carbon economy in Canada." Canadian Centre for Policy Alternatives. Last accessed August 7, 2019. https://www.policyalternatives.ca/publications/reports/making-decarbonization-work-workers

Mertins-Kirkwood, Hadrian and Ian Hussey. December 2019. "A top-down transition: A critical account of Canada's government-led phase-out of the coal sector." Pp. 172-197 in *Just Transitions: Social Justice in the Shift Towards a Low-Carbon World*, edited by Edouard Morena, Dunja Krause, and Dimitris Stevis. Pluto Press: London.

Meyer, Carl. November 21, 2018. "Morneau bets on new tax gift for wind and solar, also helps out oil and gas." National Observer. Last accessed August 7, 2019. https://www.nationalobserver.com/2018/11/21/news/morneau-bets-new-tax-gift-wind-and-solar-also-helps-out-oil-and-gas

Meyer, Carl. July 3, 2019. "Liberals' new power-plant rules leave electricity lobby feeling excluded." National Observer. Last accessed August 7, 2019. https://www.nationalobserver.com/2019/07/03/news/liberals-new-power-plant-rules-leave-electricity-lobby-feeling-excluded

Morgan, Geoffrey. May 10, 2017 (2017a). "Alberta could be coal-free years ahead of deadline as ATCO plans transition to natural gas by 2020." Financial Post. Last accessed August 7, 2019. http://business.financialpost.com/commodities/energy/alberta-could-be-coal-free-years-ahead-of-deadline-as-atco-plans-transition-to-natural-gas-by-2020

Morgan, Geoffrey. May 8, 2017 (2017b). "TransAlta to save $1.5 billion by converting coal-fired power plants to gas early." Financial Post. Last accessed August 7, 2019. https://business.financialpost.com/commodities/energy/transalta-to-save-1-5-billion-by-converting-coal-fired-power-plants-to-gas-early

Morgan, Jillian. January 21, 2019. "Alberta unveils first construction project under $1.6B plan to upgrade heavy load road network." On-Site Magazine. Last accessed August 7, 2019. https://www.on-sitemag.com/roads/alberta-unveils-first-construction-project-under-1-6b-plan-to-upgrade-heavy-load-road-network/1003961897/

National Energy Board (NEB). March 12, 2019. "Provincial and Territorial Energy Profiles – Alberta." Last accessed August 7, 2019. https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/ab-eng.html

Natural Resources Canada (NRC). September 12, 2018. "Electricity facts." Last accessed August 7, 2019. https://www.nrcan.gc.ca/energy/facts/electricity/20068

O'Shaughnessy, Sara and Goze Dogu. 2016. "The Gendered and Racialized Subjects of Alberta's Oil Boomtown." Pp. 263-296 in *First World Petro-Politics: The Political Ecology and Governance of Alberta*, edited by Laurie Adkin. Toronto: University of Toronto Press.

Parkland County. March 19, 2018. "County determines CCTF funding a poor use of taxpayer money, provides explanation why the municipality chose to not apply for the funding." Last accessed August 7, 2019. https://www.parklandcounty.com/Modules/News/index.aspx?feedId=1e2f540d-832a-4663-ac61-b25f4b46bca3,6dbbdf60-b846-4c8c-8d5d-916d5042d185,751d9bfa-fef1-4f2d-8753-b63088db86eb,7a1f0e42-7e33-4c5c-8d8d-ab4ad712eb81,736dfb9a-73ac-4f08-b064-96fa0fc9dc2b,2eda02fa-33a4-4ed6-84c8-9fa014932f0f,e08ea8e8-23f4-4a51-931f-b09b350779bd,13b628a7-40d5-4695-af74-f93ef0264074,96c2115f-1e6e-4f4f-bdb7-a20119b4c534&keyword=&date=03/01/2018&newsId=099852b9-9d4c-4d5f-a2d0-60a87813cf28

Parkland County. 2019. "Municipal Budget." Last accessed August 7, 2019. https://www.parklandcounty.com/en/county-office/Budget-and-Finance.aspx

Sharp, Alastair. February 27, 2019. "Alberta creeps closer to 2030 renewable energy target." National Observer. Last accessed August 7, 2019. https://www.nationalobserver.com/2019/02/27/news/alberta-creeps-closer-2030-renewable-energy-target

Stolte, Elise. April 26, 2019. "Carbon tax already pays dividends in cleaner Edmonton air." Edmonton Journal. Last accessed August 7, 2019. https://edmontonjournal.com/opinion/columnists/elise-stolte-whats-up-with-the-coal-phase-out

The Canadian Press. May 27, 2019. "Canadian Utilities is selling all its fossil-fuel power assets for $835 million." Edmonton Journal. Last accessed August 7, 2019. https://edmontonjournal.com/commodities/energy/canadian-utilities-selling-canadian-fossil-fuel-based-power-assets/wcm/73558e57-4335-4fc0-b18f-9e8ec297e788

Thibault, Benjamin and Andrew Read. March 2, 2016. "Fact checking the coal industry's 'information meetings.'" Pembina Institute. Last accessed August 7, 2019. http://www.pembina.org/blog/fact-checking-coal-industry-s-information-meetings

TransAlta Corporation. July 23, 2012 (2012a). "Independent arbitration panel validates TransAlta's operating practices and grants claim of force majeure on Sundance units 1 and 2." Last accessed August 7, 2019. https://www.transalta.com/newsroom/news-releases/independent-arbitration-panel-validates-transaltas-operating-practices-and-grants-claim-of-force-majeure-on-sundance-units-1-and-2/

TransAlta Corporation. October 26, 2012 (2012b). "TransAlta and MidAmerican Create New Partnership to Develop and Build Natural Gas-Fuelled Power Projects in Canada." Last accessed August 7, 2019. https://www.transalta.com/newsroom/news-releases/transalta-and-midamerican-create-new-partnership-to-develop-and-build-natural-gas-fueled-power-projects-in-canada/

TransAlta Corporation. January 27, 2014a. "TAMA Power Introduces Sundance 7: A Power Plant for the Future." Last accessed August 7, 2019. https://www.transalta.com/newsroom/news-releases/tama-power-introduces-sundance-7-a-power-plant-for-the-future/

TransAlta Corporation. 2014b. "Sundance 7 Open House Display." Last accessed August 7, 2019. https://www.transalta.com/sites/default/files/Sundance_7_Open_House_Displays-Project_Overview.pdf

TransAlta Corporation. February 5, 2016. "Sundance 7 Receives AUC Approval for Time Extension." Last accessed August 7, 2019. https://www.transalta.com/facilities/projects-in-development/sundance-7/

TransAlta Corporation. December 6, 2017. "TransAlta and Tidewater Midstream announce today a Letter of Intent to construct a Natural Gas Pipeline to TransAlta's Facilities." Last accessed August 7, 2019. https://www.transalta.com/newsroom/news-releases/transalta-tidewater-midstream-announce-today-letter-intent-construct-natural-gas-pipeline-transaltas-facilities/

TransAlta Corporation. February 2019 (2019a). "Coal to Gas Conversions Project, Newsletter No. 2." Last accessed August 7, 2019. https://www.transalta.com/wp-content/uploads/2019/02/CTG_Newsletter_No.2_February-2019.pdf

TransAlta Corporation. 2019b. "2018 Annual Integrated Report." Last accessed August 7, 2019. https://www.transalta.com/wp-content/uploads/2019/02/TAC2018_AnnualReport.pdf

United Nations Framework Convention on Climate Change (UNFCCC). 2015. "Paris Agreement." Last accessed August 7, 2019. https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf

United States Energy Information Administration (USEIA). June 4, 2019. "How much carbon dioxide is produced when different fuels are burned?" Last accessed August 7, 2019. https://www.eia.gov/tools/faqs/faq.php?id=73&t=11

Varcoe, Chris. March 29, 2018. "With electricity prices set to rise, agencies fight over mothballing coal-fired power plants." Calgary Herald. Last accessed August 7, 2019. https://calgaryherald.com/opinion/columnists/varcoe-electricity-agencies-in-fight-over-mothballing-of-coal-fired-power-plants

Varcoe, Chris. August 14, 2019. "As Alberta electricity generators switch to gas, power price cap comes under spotlight." Calgary Herald. Last accessed October 15, 2019. https://calgaryherald.com/business/energy/varcoe-as-alberta-alters-course-on-electricity-market-generators-plan-to-burn-gas-over-coal

Vriens, Lauren. 2018. "The End of Coal: Alberta's Coal Phase-Out." International Institute for Sustainable Development. Last accessed August 7, 2019. https://www.iisd.org/library/end-coal-albertas-coal-phase-out

Wallace, Rick. 2001. "The British Columbia Advantage: Lessons from Alberta on the Deregulation of the Electricity Industry." Parkland Institute. Last accessed August 7, 2019. https://www.parklandinstitute.ca/the_british_columbia_advantage

Wilt, James. January 17, 2017. "Six Handy Facts about Alberta's Coal Phase-Out." The Narwhal. Last accessed August 7, 2019. https://thenarwhal.ca/six-handy-facts-about-alberta-s-coal-phase-out/

Wilt, James. February 17, 2018. "Canada Is Replacing Coal With Natural Gas – And That's A Huge Problem." The Narwhal. Last accessed August 7, 2019. https://thenarwhal.ca/canada-replacing-coal-natural-gas-and-s-huge-problem/

Yourex-West, Heather. March 16, 2019. "Alberta coal communities fear becoming ghost towns with plan to shut plants down." Global News. Last accessed August 7, 2019. https://globalnews.ca/video/5064664/coal-towns-fear-becoming-ghost-towns-with-plan-to-shut-plants-down

1-12 Humanities Centre
University of Alberta
Edmonton, Alberta
T6G 2E5
Phone: 780.492.8558
Email: parkland@ualberta.ca
Website: www.parklandinstitute.ca

ISBN: 978-1-894949-70-5