

Progress from Coal to Clean

Comparing Canadian electric utilities' approaches
to energy transition

Grace Brown | Kaitlin Olmsted | Binu Jeyakumar

December 2021



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1. Introduction

Canada has a national target to phase out coal-fired generation by 2030. In 2018, the federal government finalized the *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations*, which limited the emissions from coal-fired generation, and ensured that unabated coal-fired generation could not operate beyond December 31, 2029.¹ In addition, Canada has committed to net-zero electricity sector emissions by 2035.² Rapid decarbonization of the electricity sector is critical to achieving Canada’s goal of a net-zero emissions economy by 2050 and puts the country in line with the International Energy Agency’s 2035 net-zero electricity sector emissions deadline for advanced economies.³

This report charts the progress made by utilities in Canada’s four remaining coal-burning provinces (Alberta, Saskatchewan, New Brunswick, and Nova Scotia) as they transition from coal to cleaner energy. It explains in detail the indicators used to evaluate utility transition approaches, provides data collection methodology, and presents a narrative of the differing approaches utilities are taking to complete this energy transition. Results are provided in a summary table (Table 1) and graphically (Figure 1, Figure 2, and Figure 3).

¹ Government of Canada, *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations* SOR/2012-167, Section 3 (1)

² Environment and Climate Change Canada, “Canada and the world move closer to powering past coal with more climate ambition at COP26,” news release, November 4, 2021.
<https://www.canada.ca/en/environment-climate-change/news/2021/11/canada-and-the-world-move-closer-to-powering-past-coal-with-more-climate-ambition-at-cop26.html>

³ *Net Zero by 2050: A Roadmap for the Global Energy Sector* (International Energy Agency, 2021), 20.
<https://iea.blob.core.windows.net/assets/0716bb9a-6138-4918-8023-cb24caa47794/NetZeroBy2050-ARoadmapfortheGlobalEnergySector.pdf>

Table 1. Summary of results for coal utilities

Canadian generation fleet	Provincial grid emissions intensity (kg CO ₂ e/MWh)	Current coal generation capacity (MW)	Unabated coal phase-out by 2030	Final year of operation of last unabated coal plant	Proportion of non-emitting capacity (MW)	Renewable energy capacity added (MW)	Net-zero goals	Data transparency
NB Power	260	450	*	2020 2030 2040*		98	2035 2050	1 of 3
Nova Scotia Power	710	1253	*	2020 2030 2039*		400 (+10 MW storage)	2035 2050	2 of 3
SaskPower	660	1530		2020 2029 2040		973	2035 2050	0 of 3
TransAlta	620	1264		2021 2030 2040		937 (+10 MW storage)	2035 2050	3 of 3
Heartland Generation		0		2021 2030 2040		0	2035 2050	1 of 3
Capital Power		1266		2023 2030 2040		266	2035 2050	3 of 3

Legend Yes No 100 MW coal generation capacity 100 MW non-emitting generation capacity * Province has 2030 coal phase-out mandate but utility plans have yet to reflect it

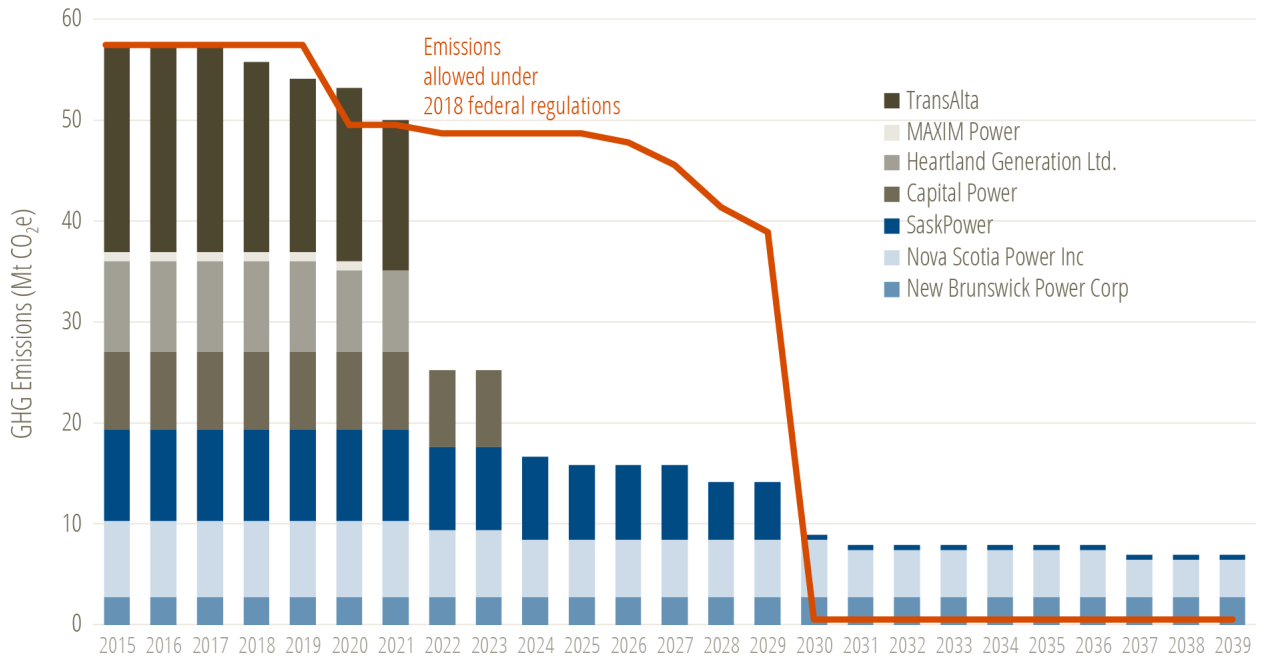


Figure 1. Greenhouse gas emissions from coal by year

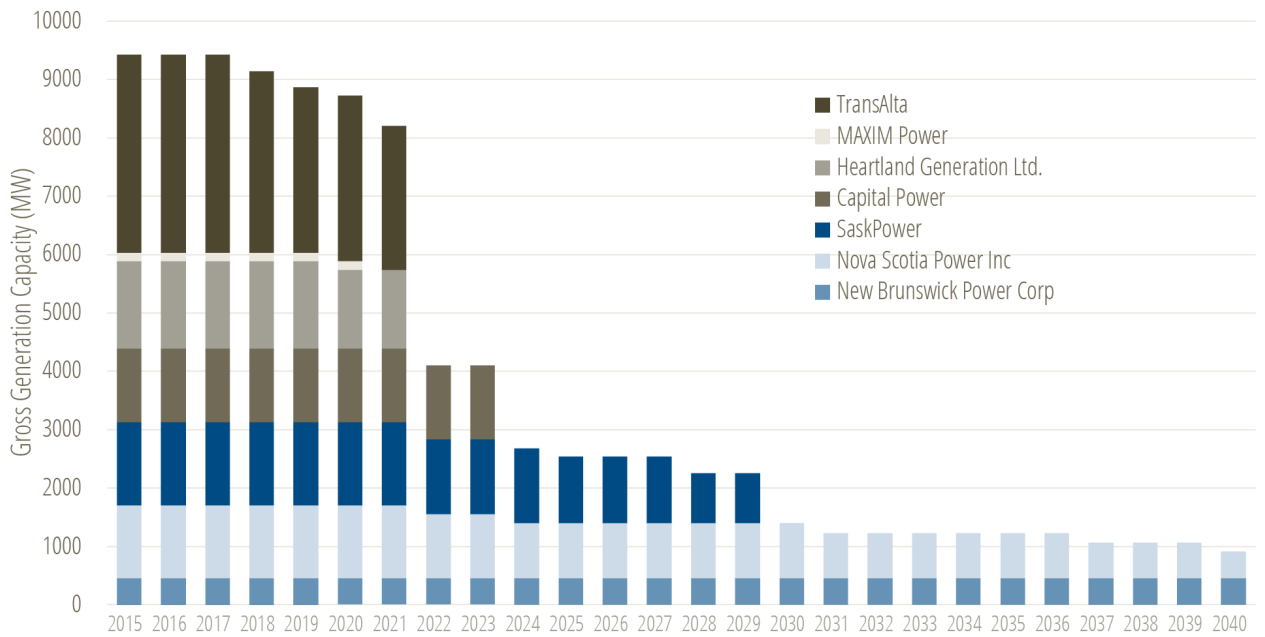


Figure 2. Unabated coal generation capacity by fleet

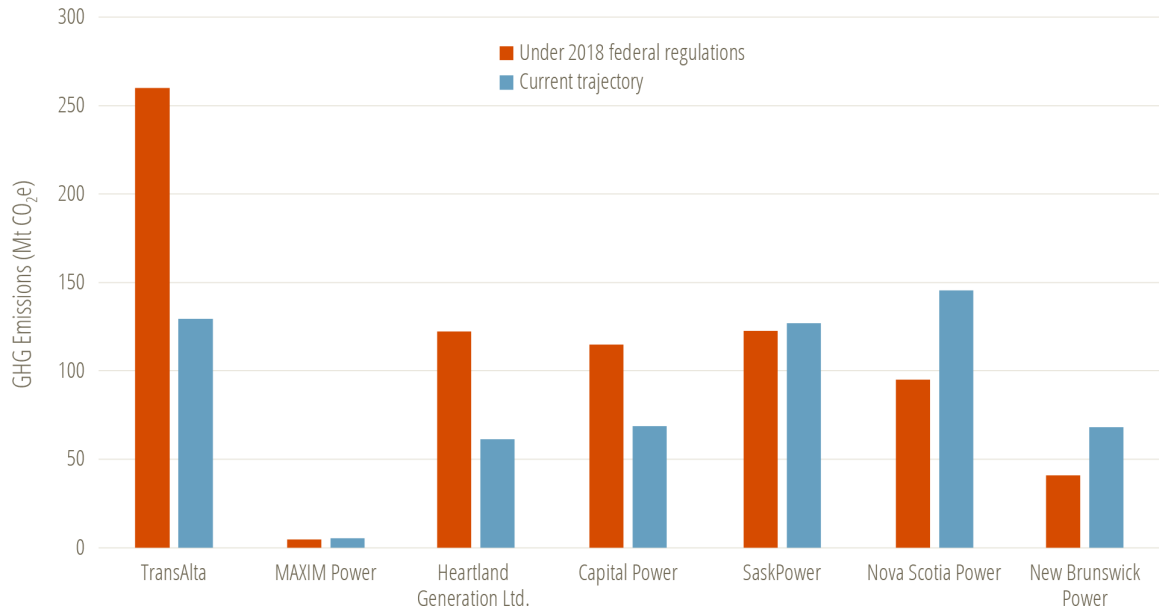


Figure 3. Total greenhouse gas emissions from coal facilities, 2015 to 2040, under 2018 regulations and under current trajectory

2. Comparison of approaches across utilities

Canadian coal-operating utilities have come a long way in reducing their reliance on coal power. Ontario set the stage for phasing out coal when it completed its off-coal transition in 2014. This undertaking by Canada’s most populous province has been referred to as “the single largest greenhouse gas reduction measure in North America.”⁴ Since then, utilities in Alberta have made the quickest transition, and will completely phase out coal by 2023. Utilities in other provinces are on varying trajectories toward potential accelerated coal phase-out and greater and more rapid deployment of renewable energy and storage technologies.

2.1 Coal phase-out

Aside from two exceptions, all utilities have adopted plans to phase out all coal in accordance with Canada’s 2018 federal coal regulations. On November 5, 2021, the Government of Nova Scotia committed to coal phase-out by 2030.⁵ To address this commitment, Nova Scotia Power has filed a plan that is currently under review by the Nova Scotia Utility and Review Board. Nova Scotia Power’s Integrated Resource Plan (IRP) Reference Scenario models coal retirement in 2039, and has yet to be updated.

On November 25, 2021, the federal government rejected New Brunswick’s bid for an equivalency agreement that would have allowed New Brunswick Power to continue operating the Belledune Generating Station past the 2030 federal deadline.⁶ New Brunswick Power’s IRP has yet to be updated to reflect this timeline, as the currently modelled scenarios include coal generation through 2040. More details on the rapidly changing dynamics of these two utilities are provided in Section 4.2.

⁴ Melissa Harris, Marisa Beck, and Ivetta Gerasimchuk, *The End of Coal: Ontario’s coal phase-out*, (International Institute for Sustainable Development, 2015), 1. <https://www.iisd.org/system/files/publications/end-of-coal-ontario-coal-phase-out.pdf>

⁵ Government of Nova Scotia, *Environmental Goals and Climate Change Reduction Act*, Bill No. 57. https://nslegislature.ca/legc/bills/64th_1st/3rd_read/b057.htm

⁶ Jacques Poitras, “No extension past 2030 for Belledune coal-fired power plant, Ottawa says,” *CBC News*, November 25, 2021. <https://www.cbc.ca/news/canada/new-brunswick/belledune-coal-plant-ottawa-1.6262023>

2.2 Generation technology

Alberta's utilities have primarily elected to convert coal units to burn natural gas, raising important questions around how the grid will eventually be decarbonized and what the future holds for the gas assets. Under current federal gas regulations, units converted to gas can operate longer if they run more efficiently.⁷ For example, Capital Power is converting Genesee Generating Station 3 to a supercritical-combustion gas plant.⁸ As supercritical facilities emit approximately 24% fewer GHGs than unabated coal plants, this plant would be allowed to operate indefinitely under the current federal gas regulations. This allowance may disincentivize future investment into non-emitting technologies. Heartland Generation is investing less upfront capital into their gas conversions, resulting in higher emissions intensities, but ultimately a shorter lifespan under the federal gas regulations.

Some utilities are also exploring innovative low-carbon technologies. Capital Power is considering carbon capture, utilization, and storage with carbon nanotubes, as well as opportunities to use hydrogen in their gas turbines.⁹ In the Atlantic provinces, utilities have elected to retire coal plants and replace that power with nuclear, renewable energy power purchase agreements, and imported hydropower.

2.3 Clean energy

Most utilities plan on investing in renewable energy and storage. Vertically integrated utilities such as Nova Scotia Power and New Brunswick Power have disclosed longer-term additions of renewable energy and storage up to 2030. However, the short-term investment plans of Capital Power, SaskPower, and TransAlta are more ambitious. Capital Power will add 266 MW of renewables to its fleet by 2022, SaskPower has committed to add 973 MW of renewable energy by 2024, and TransAlta is investing heavily in renewable energy while retiring its fossil fuel assets. The utility will add 937 MW of renewable energy and 10 MW of storage by 2025, making its Canadian fleet more than 60% non-emitting by that time.

⁷ Government of Canada, "Technical backgrounder: Federal regulations for electricity sector." <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/technical-backgrounder-regulations-2018.html>

⁸ Capital Power, "Genesee Generating Station 3." <https://www.capitalpower.com/operations/genesee-3/>

⁹ Capital Power, *Investor Day 2020: Investing in a low carbon future*, webinar, December 3, 2020. <https://www.capitalpower.com/wp-content/uploads/2020/12/2020-Capital-Power-Investor-Day.pdf>

While most utilities plan to own their renewable energy assets, New Brunswick Power is focusing on entering power purchase agreements to acquire renewable energy. Provincial and federal investments in transmission will also provide greater capacity for imports of zero-emitting hydropower for New Brunswick Power and Nova Scotia Power. Canada has committed to achieving a net-zero electric grid by 2035. However, at this rate, the Canada Energy Regulator’s Evolving Scenario forecasts a 90% non-emitting grid will not be reached until 2050.¹⁰

2.4 Net-zero goal

It is encouraging to see four of the six major coal-operating utilities commit to a net-zero by 2050 goal, the exceptions being New Brunswick Power and Heartland Generation. However, these timelines still fall short of Canada’s commitment to achieving net-zero electricity sector emissions by 2035, as well as the electricity sector emissions cuts for advanced economies called for by the International Energy Agency.¹¹ In addition, the United States, which has significant electricity trade with Canada, has a target for a zero-carbon electricity grid by 2035.¹² Utility plans to convert from GHG-emitting to non-emitting electricity generation sources are essential for operationalizing Canada’s net-zero goals.

2.5 Data transparency

Data transparency is crucial for building and maintaining customer trust. Access to utilities’ fossil fuel unit-level data is critical for monitoring emissions, as conversion decisions are made at the plant level. For most utilities, unit-level data was unavailable from public sources. Perhaps owing to the province’s decentralized electricity grid, more granular data was available for utilities in Alberta than for those in other provinces. For example, Capital Power provided detailed information on its generation

¹⁰ Canada Energy Regulator, “Canada’s Energy Future 2020: Energy Supply and Demand Projections to 2050.” <https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2020/index.html>

¹¹ International Energy Agency, *Net Zero by 2050: A Roadmap for the Global Energy Sector* (2021), 20. <https://iea.blob.core.windows.net/assets/0716bb9a-6138-4918-8023-cb24caa47794/NetZeroBy2050-ARoadmapfortheGlobalEnergySector.pdf>

¹² The White House, “Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies,” press release, April 22, 2021. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

assets, retirement schedules, and fleetwide emissions intensity, and made the information easily accessible to the public.

2.6 Just transition

The transition from coal to cleaner energy impacts the types, numbers, and locations of jobs available to utility workers. This report did not conduct a comprehensive comparison of transition supports offered across different utilities; rather, utility company approaches to a “just energy transition” were captured through semi-structured interviews with utility representatives. Many utilities are attempting to redeploy or re-allocate some of their workers from retiring coal units to repowered gas units, other new facilities, and mine reclamation. The bulk of available assistance comes not from utilities, but from provincial and federal support programs. Though there may be exceptions, publicly available data suggests little coordination between utilities and local communities has occurred regarding long-term, comprehensive planning for transition efforts.

3. Measuring progress

The following indicators were used to review the progress that coal-fired utilities are making in the transition away from coal. Further information on how indicator data was collected is available in the Methodology section.

- **Provincial grid emissions intensity** provides the province's total electricity sector carbon dioxide emissions for 2019 as reported in the National Inventory Report, 2021 Edition. This number shows the correlation between electricity sector emissions and coal production levels.
- **Currently coal generation capacity** shows how much of a utility's current capacity is tied to coal power as we approach the 2030 coal phase-out deadline. This number includes each utility's currently operating unabated coal and co-generation plants in Canada (foreign coal assets were excluded from this list) up to August 31, 2021. Capacity from the Sheerness Generating Station, which is co-owned by TransAlta and Heartland Generation, was attributed to Heartland Generation, the plant's operator.
- **Unabated coal phase-out by 2030** shows whether the utility has a plan to phase out unabated coal by December 31, 2029, in line with the Government of Canada's 2018 regulations. This indicator focuses on unabated coal (coal-fired power plants without any form of carbon capture technology).
- **Final year of operation of last unabated coal plant** shows utilities' plans to accelerate coal phase-out, end coal use at the 2030 federal deadline, or attempt to extend coal plant life beyond Canada's federal 2018 regulations. The year displayed indicates that all unabated coal plants will retire by December 31 of that year. Coal plants with carbon capture technology are not included in this indicator.
- **Proportion of non-emitting capacity (2021)** provides an overview of utilities' current non-emitting capacity as a percentage of total fleet generation capacity for all assets operating within Canada. Imported capacity from both emitting and non-emitting sources is excluded from this indicator. Non-emitting capacity includes renewable energy power purchase agreements (PPAs), as well as utility-owned wind, solar, nuclear, and hydroelectric power. While not a non-emitting energy source, biomass was also included in this calculation because it makes up a small percentage of generation capacity and is considered a renewable resource by the Canada Energy Regulator. Percentages were calculated manually based on publicly available utility data, which also allowed for more precise measurement

of the percentage of non-emitting capacity each utility has committed to add in future years. While generation is a more apt indicator for measuring the amount of power a grid gets from non-emitting sources, a lack of access to unit-level generation data made it impractical to analyze and compare generation across utilities. Because of this, capacity was chosen as an indicator of a utility's willingness to invest into renewable and non-emitting energy technologies. Pending additional electricity generation data availability, this measure will be updated in future releases.

- **Proportion of non-emitting capacity (future year)** provides an overview of utilities' stated commitments for non-emitting capacity as a percentage of total fleet generation capacity for all assets operating within Canada. The future year shown is the utility's furthest-looking future commitment as provided in their Annual Report or IRP. Imported capacity from both emitting and non-emitting sources is excluded from this indicator. Non-emitting capacity includes renewable energy PPAs, as well as utility-owned wind, solar, nuclear, and hydroelectric power. While not a non-emitting energy source, biomass was also included in this calculation because it makes up a small percentage of generation capacity and is considered a renewable resource by the Canada Energy Regulator. Percentages were calculated manually based on publicly available utility data. As with the current proportion of non-emitting MW capacity, generation is a more apt indicator for measuring the amount of power a grid gets from non-emitting sources. However, a lack of access to unit-level generation data made it impractical to analyze and compare generation across utilities. Because of this, capacity was chosen as an indicator of a utility's willingness to invest into renewable and non-emitting energy technologies instead of other fossil fuel assets.
- **Renewable energy capacity added by 2030** shows planned renewable energy investments for the next 10 years, or through the utility's furthest future commitment as provided in their Annual Report or Integrated Resource Plan. This number includes wind, solar, hydroelectric, and geothermal power sourced from embedded generation, community renewable energy projects, and independent power producers and PPAs located within the province. Firm energy storage commitments are also included as an item separate from the renewable energy total. Renewable energy imports were not included in this total.
- **Net-zero goal** shows if the utility has a publicly stated net-zero goal demonstrating alignment with the Government of Canada's target to achieve net-zero electricity sector emissions by 2035 and net-zero emissions by 2050.

- Because each utility faces its own unique challenges in achieving this goal, definitions of “net-zero” vary among utility companies.
- **Data transparency** provides insight into the availability and accessibility of updated and reliable data for each utility’s generation mix and assets. With an understanding that provincial requirements for data reporting vary, we reviewed the availability and accessibility of:
 - Unit-level generation and nameplate data, necessary for accurately measuring and modelling grid emissions intensity and fuel mix.
 - Fleetwide emissions intensity and unit-level emissions intensity data, necessary for analyzing emissions reduction.
 - Coal unit retirement schedules, necessary for understanding utility approaches to achieving provincial climate targets.
 - A people-focused **just transition plan** is essential for ensuring that energy veterans are not left behind in the energy transition. Because most utility transition plans are not publicly available, this was difficult to capture as an objective indicator. However, through interviews with utilities, we gained a subjective understanding of their approach to addressing affected workers and communities throughout the transition off coal power.

4. Methodology

4.1 Approach to data collection and analysis

To analyze **coal generation capacity** data, ownership and ownership percentages for each coal unit were confirmed to accurately assign the coal capacity. Coal plant and unit retirement dates were confirmed through publicly available utility news releases, newspaper articles, utility newsletters, and the utility's most recent IRP or Annual Report. Data was consolidated in a spreadsheet for each utility for each year between 2015 and 2039. Plants that were retired in Q1 or Q2 of 2021 were not included in the final tally.

To analyze the **proportion of non-emitting megawatt (MW) capacity (2021 and future year)** and **renewable energy capacity added by 2030**, the utility's fleet capacity was determined by considering all domestic energy sources, excluding energy imports. These values were obtained from utility websites, IRPs, and Annual Reports. Asset capacities were organized by category for coal, natural gas, diesel, fuel oil, solar, wind, hydroelectric, geothermal, nuclear, and storage. The amount of renewable energy each utility will add to its fleet was determined through information published in IRPs, Annual Reports, Annual Sustainability Reports, news articles, and press releases. Only renewable assets located in Canada were counted toward this total. The future-year proportion of non-emitting megawatt capacity is a calculation of the utility's current total fleet capacity, total current renewable energy capacity, and total projected renewable energy capacity.

Semi-structured 30- to 60-minute interviews were conducted with representatives from Capital Power, Heartland Generation, NB Power, NS Power, TransAlta, and SaskPower. Notes were taken during interviews, and the interviews were not recorded or transcribed. Pembina shared preliminary findings with utility representatives, who verified data collation and interpretation, as well as provided additional context on their worker and community transition plans and net-zero goals and definitions.

For Figure 1 and Figure 3, **coal GHG emissions** were calculated based on the retirement dates provided in the 2018 federal regulations with no equivalency agreements, as well as the current trajectory of coal unit retirement schedules. Coal GHG emissions were calculated using the same resources as coal generation capacity to maintain consistency. A capacity factor of 69% and emissions intensity of 1 t/MWh were used to model future GHG emissions. The model does not account for changes to the plant's

operations from now until retirement, nor previous changes (before 2021) that may have caused a plant’s GHG emissions to be reduced. Data was analyzed through Excel to create a summation of cumulative annual GHG emissions from 2015 through 2040 for both the “2018 federal regulations” and “current trajectory” scenarios. This model does not account for decreasing coal-fired generation or increasing fossil fuel generation from sources other than coal. It simply demonstrates the amount of GHG emissions saved by retiring or converting coal plants ahead of the 2030 federal target.

4.2 Data sources and assumptions

4.2.1 Summary table data

New Brunswick Power

Current coal generation capacity (MW)	Unabated coal phase-out by 2030	Final year of operation of last unabated coal plant	Current proportion of non-emitting capacity (MW)	2030 proportion of non-emitting capacity (MW)	Renewable energy capacity added by 2030 (MW)	Net-zero by 2050 goal	Data transparency
450 ¹³	N ¹⁴	2040 ¹⁵	47%*	49%*	98 ¹⁶	N	1 of 3

* Calculated value from multiple sources.

- NB Power’s IRP assumes that they will obtain an equivalency agreement and continue operating Belledune until the end of 2040. The Government of New Brunswick released a draft regulation for phasing out **coal-fired electricity generation**, including emissions caps through 2040.¹⁷ However, the federal government announced on November 25, 2021, that it will not sign an equivalency agreement that extends past 2030, effecting a 2030 coal phase-out for the province.

¹³ NB Power, “Thermal Tour.” <https://www.nbpower.com/en/about-us/learning/learn-about-electricity/thermal/thermal-tour/>

¹⁴ NB Power, *2020 Integrated Resource Plan: New Brunswick Power Corporation (2020)*, 11. <https://www.nbpower.com/media/1490323/2020-irp-en-2020-11-17.pdf>

¹⁵ NB Power, *2020 Integrated Resource Plan*, 11.

¹⁶ NB Power, *2020 Integrated Resource Plan*, 18-38.

¹⁷ New Brunswick Government, *Draft—Phasing Out of Coal-fired Electricity Generation Regulation—Climate Change Act*, 2021. <https://www2.gnb.ca/content/dam/gnb/Departments/eco-bce/pdf/pr/2021/06/21-083E.pdf>

- NB Power’s 2020 IRP forecasts that at least 75% of electricity requirements will be met by carbon-free sources over the next 20 years.¹⁸ The amount of **Renewable energy capacity added** includes commitments up to 2030 and values are updated up to June 30, 2021.
- Bayside Generation Station (natural gas/diesel fuel) was included as a fossil fuel asset when calculating **Proportion of non-emitting capacity by 2030**.¹⁹ The plant is set to retire in 2027, but NB Power has stated its intent to extend plant life to 2038.²⁰
 - As the Grandview (natural gas) and Grand Manan (diesel) generating stations will be retired prior to 2030, these plants were not included in the tally of future fossil fuel energy sources.²¹
 - Non-emitting energy capacities were obtained from the 2020 NB Power IRP.²² The Belledune and Coleson Cove plant capacities were obtained from the NB Power website.²³
 - According to the 2020 IRP, NB Power currently has 2,448 MW of import capacity. Energy imports were not included in the non-emitting energy capacity calculation.²⁴
 - NB Power’s IRP does not add more non-emitting energy capacity until after 2030. A solar penetration study conducted by Dunsky Energy Consulting predicted an additional 53 MW of solar could be added by 2030 to NB Power’s load.²⁵ This was not included in the total because it does not reflect a firm commitment from NB Power. Similarly, NB Power is considering the possibility of replacing coal-fired power with small modular reactors (SMRs). However, since NB Power has not made a defined commitment to implement SMRs due to cost and technological uncertainties, the potential implementation of SMRs was not considered in our calculation.²⁶
 - Capacity values for NB Power were confirmed by a NB Power utility representative and a representative from NB New Clear Free Solutions.

¹⁸ NB Power, *2020 Integrated Resource Plan*, 16.

¹⁹ NB Power, *2020 Integrated Resource Plan*, 63.

²⁰ NB Power, *2020 Integrated Resource Plan*, 38.

²¹ NB Power, *2020 Integrated Resource Plan*, 38.

²² NB Power, *2020 Integrated Resource Plan*, 37.

²³ NB Power, “Thermal Tour.”

²⁴ NB Power, *2020 Integrated Resource Plan*, 37.

²⁵ NB Power, *2020 Integrated Resource Plan*, 81.

²⁶ NB Power, *2020 Integrated Resource Plan*, 72.

- The NB Electricity Act sets a 40% **renewable energy** target. The act counts renewable resources from the Locally Owned Renewable Energy Projects that are Small Scale (LORESS) Program, the Large Industrial Renewable Energy Purchase Program, and renewable energy generated inside and outside of the province²⁷ Discrepancies between our calculations and the provincial calculations for non-emitting power percentages may result from our calculations not including the Large Industrial Renewable Energy Purchase Program, nor any renewable energy generated outside of and imported into the province.
- As of November 9, 2021, NB Power has not committed to a **net-zero goal**.
- NB Power has a history of worker redeployment from previous coal plant closures, particularly Grand Lake and Dalhousie. While a formal **just transition plan** has not been made public, NB Power expects to draw from previous experience providing worker redeployment and relocation assistance.

Nova Scotia Power

Current coal generation capacity (MW)	Unabated coal phase-out by 2030	Final year of operation of last unabated coal plant	Current proportion of non-emitting capacity (MW)	2030 proportion of non-emitting capacity (MW)	Renewable energy capacity added by 2030 (MW)	Net-zero by 2050 goal	Data transparency
1253 ²⁸	N ²⁹	2039 ³⁰	35%*	49%*	400 (+10MW of storage) ³¹	Y* ³²	2 of 3

* Calculated value from multiple sources.

- **Unabated coal phase-out by 2030 and Final year of operation of last unabated coal plant** were based on the NS Power IRP’s Reference Scenario (“2.0C”).³³ In response to the provincial government’s commitment to coal

²⁷ New Brunswick Government, *Electricity Act* O.C.2015-263. <http://laws.gnb.ca/en/ShowPdf/cr/2015-60.pdf>

²⁸ Nova Scotia Power, “How we make Electricity,” <https://www.nspower.ca/about-us/electricity/producing>

²⁹ Nova Scotia Power, *2020 Integrated Resource Plan* (2020), 79. https://irp.nspower.ca/files/key-documents/E3_NS-Power_2020_IRP_Report_final_Nov-27-2020.pdf

³⁰ Nova Scotia Power, *2020 Integrated Resource Plan*, 79.

³¹ Nova Scotia Power, *2020 Integrated Resource Plan Appendices A-N* (2020), 270.

https://irp.nspower.ca/files/key-documents/E3_NS-Power-2020-IRP-Report_Summary_Nov-27-2020.pdf

³² Nova Scotia Power, *2020 Integrated Resource Plan*, 50-51.

³³ Nova Scotia Power, *2020 Integrated Resource Plan* (2020), 91.

- phase-out by 2030, Nova Scotia Power filed an application for a 2022 Annual Capital Expenditure Plan that includes “capital projects to assist the Company in its plan to transition away from coal and achieve 80 percent renewables by 2030.”³⁴ While the IRP’s Mid-Electrification Scenario (“3.1C”) models a 2030 coal phase-out date,³⁵ the Reference Scenario has yet to be updated.
- The **Proportion of non-emitting capacity in 2030** calculation includes commitments up to the end of 2030, and updated as of June 30, 2021.
 - Non-emitting capacity values for NS Power’s current fleet were obtained from their website.³⁶ Contrary to our calculations, the website states the current fleet is only 30% non-emitting. Variations in coal capacity from publicly available data may account for this discrepancy. NS Power imports power across the NB-NS intertie and the Maritime Link, but the amount of current import capacity could not be confirmed.³⁷
 - NS Power will add 259MW of natural gas by the end of 2030, according to the 2020 IRP Reference Scenario.³⁸
 - The predicted Lingan Unit 2³⁹ and Trenton Unit 5⁴⁰ coal plant retirements were not included in the future fossil fuel capacity tally, as they will be closed prior to 2030. NS Power has stated its intent to increase renewable energy imports, dependent upon when interprovincial infrastructure projects are completed.⁴¹
 - To calculate **GHG emissions 2015-2040**, retirement dates of 2023 for Trenton 5⁴² and 2021 for Lingan Unit 2⁴³ were used. The retirement of Lingan Unit 2 retirement is contingent upon completion of the Muskrat Falls Maritime Link, scheduled by the end of 2021.⁴⁴

³⁴ Nova Scotia Power, “2022 Annual Capital Expenditure Plan,” November 26, 2021, 8. <https://uarb.novascotia.ca/fmi/webd/UARB15>

³⁵ Nova Scotia Power, *2020 Integrated Resource Plan* (2020), 91.

³⁶ Nova Scotia Power, “How we Make Electricity.”

³⁷ Nova Scotia Power, *2020 Integrated Resource Plan*, 60.

³⁸ Nova Scotia Power, *2020 Integrated Resource Plan Appendices A-N* (2020), 270.

³⁹ Nova Scotia Power, *2020 Integrated Resource Plan*, 60.

⁴⁰ Nova Scotia Power, *2020 Integrated Resource Plan*, 23.

⁴¹ Nova Scotia Power, *2020 Integrated Resource Plan*, 20-60.

⁴² Nova Scotia Power, *2020 Integrated Resource Plan*, 23.

⁴³ Nova Scotia Power, *2020 Integrated Resource Plan*, 60.

⁴⁴ Nalcor Power, “Two major achievements reached,” May 17, 2021. <https://muskratfalls.nalcorenergy.com/dam-safety-review-and-audit/>

- The 2020 IRP Reference Scenario states NS Power will achieve **net-zero emissions** by 2050. This will be achieved through reducing emissions and potentially through carbon offset credits. A 1.4 Mt emissions target is set for 2045, reducing to 0.5 Mt in 2050. However, the remaining 0.5 Mt will be offset by “other mechanisms”.⁴⁵
- According to utility representatives, NS Power is having internal discussions on creating a **just transition plan** for workers affected by the coal phase-out. The contents of these discussions have not been made public.

SaskPower

Current coal generation capacity (MW)	Unabated coal phase-out by 2030	Final year of operation of last unabated coal plant	Current proportion of non-emitting capacity (MW)	2024 proportion of non-emitting capacity (MW)	Renewable energy capacity added by 2024 (MW)	Net-zero by 2050 goal	Data transparency
1530*	Y ⁴⁶	2029 ⁴⁷	26%*	47%*	973*	Y ⁴⁸	0 of 3

* Calculated value from multiple sources.

- **Current coal generation capacity** values were obtained from the SaskPower website’s System Map.⁴⁹ Boundary Dam 3 was not included in this calculation of unabated coal units, as it has carbon capture and storage.
- 125 MW of hydroelectric imports from Manitoba were not included in the **Current proportion of non-emitting capacity** tally.⁵⁰ SaskPower states on their website they intend to reach 50% non-emitting energy by 2030.⁵¹ This discrepancy between our calculations is likely due to inclusion of hydroelectric imports.

⁴⁵ Nova Scotia Power, 2020 Integrated Resource Plan (2020), 50-51.

⁴⁶ SaskPower, *Renewing our Commitment: Corporate Responsibility and Sustainability Report (2019-2020)*, 12. <https://www.saskpower.com/about-us/Our-Company/Current-Reports>

⁴⁷ SaskPower, *Corporate Responsibility and Sustainability Report*, 12.

⁴⁸ SaskPower, *Corporate Responsibility and Sustainability Report*, 2.

⁴⁹ SaskPower, “System Map.” <https://www.saskpower.com/Our-Power-Future/Our-Electricity/Electrical-System/System-Map>

⁵⁰ SaskPower, *Corporate Responsibility and Sustainability Report*, 14.

⁵¹ SaskPower, “Our Strategic Direction.” <https://www.saskpower.com/about-us/our-company/our-strategic-direction>

- According to current publicly available records, SaskPower plans to build one new natural gas plant by 2024 (Great Plains Natural). All other fossil fuel sources remain the same.
- **Renewable energy capacity added by 2024**
 - SaskPower will add 20 MW of geothermal energy by 2023, with the potential for future additions, depending on the success of the 2023 demonstration project.⁵²
 - 200 MW from the Bekevar Wind Energy Project, announced in June 2021, was included in the tally.⁵³
 - SaskPower will add 190 MW of additional hydroelectric imports from Manitoba and is exploring other renewable energy import options.⁵⁴ Imported energy generated outside of the province was not included in our total.
- Empirical emissions for Boundary Dam 3 were calculated using 0.652 t/MWh and 79% capacity factor, based on the five-year average of real data from the coal model. The emissions intensity and capacity factor values are unique to Boundary Dam 3 and emissions intensity was calculated using net generation.
- SaskPower’s Sustainability Report cites a goal of **net-zero GHG emissions** by 2050.⁵⁵
- According to utility representatives, SaskPower is working with affected communities and the provincial government to support a **just transition** for coal workers and communities. Details and actions resulting from these discussions have not been made publicly available.

⁵² Geothermal Canada, “Saskatchewan, Canada-based DEEP Earth Energy Production Corp. Geothermal Project Ready for Final Feasibility Engineering,” media release, March 23, 2021.

<https://www.geothermalcanada.org/news/2021/3/23/saskatchewan-is-ready-for-final-geothermal-power-feasibility-engineering-53-day-large-volume-production-and-injection-test-successful-first-in-canada>

⁵³ SaskPower, “Bekevar Wind Energy Project to Generate 200MW of Clean, Renewable Energy in SE Saskatchewan,” media release, June 17, 2021. <https://www.saskpower.com/about-us/media-information/news-releases/2021/bekevar-wind-energy-project-to-generate-200-mw-of-clean-renewable-energy-in-se-saskatchewan>

⁵⁴ SaskPower, Corporate Responsibility and Sustainability Report, 14.

⁵⁵ SaskPower, Corporate Responsibility and Sustainability Report, 2.

TransAlta

Current coal generation capacity (MW)	Unabated coal phase-out by 2030	Final year of operation of last unabated coal plant	Current proportion of non-emitting capacity (MW)	2025 proportion of non-emitting capacity (MW)	Renewable energy capacity added by 2025 (MW)	Net-zero by 2050 goal	Data transparency
1264*	Y ⁵⁶	2021 ⁵⁷	44%*	59%*	937 (+10MW of storage) ⁵⁸	Y ⁵⁹	3 of 3

* Calculated value from multiple sources.

- Sundance 6 was fully converted to gas on January 31, 2021, and was not included in **Current coal generation capacity**.⁶⁰ Keephills Unit 2 was also not included in the calculation, as it was converted to gas on July 19, 2021.⁶¹ TransAlta’s remaining coal plants are scheduled for retirement or conversion to natural gas by the end of 2021, and were included in the tally. Capacity from the Sheerness Generating Station, which is co-owned by TransAlta and Heartland Generation, was attributed to Heartland Generation, the plant’s operator. All values are from TransAlta’s website⁶² and confirmed through the Alberta Electric System Operator (AESO).⁶³

⁵⁶ TransAlta, “2021+Sustainability Targets,” *2020 Annual Integrated Report (2020)*, M112. <https://transalta.com/wp-content/uploads/2021/03/2021-Sustainability-Targets.pdf>

⁵⁷ TransAlta, “2021+Sustainability Targets.”

⁵⁸ TransAlta, “Investor Day,” presentation, September 28, 2021. https://transalta.com/wp-content/uploads/2021/09/TransAlta_2021_Investor_Day.pdf. Canadian-sited renewable energy capacity confirmed via personal communication: Nancie Lefebvre, TransAlta, personal communication, September 30, 2021.

⁵⁹ TransAlta, “2021+Sustainability Targets.”

⁶⁰ TransAlta, “TransAlta Completes First Off-Coal Conversion and Achieves Major Milestone in Phase-out of Coal,” media release, January 31, 2021. <https://transalta.com/newsroom/news-releases/transalta-completes-first-off-coal-conversion-achieves-major-milestone-in-phase-out-of-coal/>

⁶¹ TransAlta, “TransAlta Completes Second Off-Coal Conversion--Another Major Milestone in its Phase-out of Coal,” media release, July 19, 2021. <https://transalta.com/newsroom/news-releases/transalta-completes-second-off-coal-conversion-another-major-milestone-in-its-phase-out-of-coal/>

⁶² TransAlta, “Plants in Operation.” <https://www.transalta.com/plants-operation/>

⁶³ Alberta Electric System Operator, “Current Supply Demand Report.” http://ets.aeso.ca/ets_web/ip/Market/Reports/CSDReportServlet

- **Proportion of non-emitting capacity**
 - Firm non-emitting energy commitments up to 2025 are included in this tally. Information is updated to November 9, 2021.
 - All GHG-emitting energy sources past 2021 are natural gas. Numbers are updated up to December 31, 2020.
 - The post-conversion natural gas unit capacities for Keephills Unit 2 and Keephills Unit 3 were assumed to remain the same as their current coal capacities.⁶⁴
- Firm commitments for renewable energy assets located in Canada up to 2025 are included in the **Renewable energy capacity added** tally. Information is updated to November 9, 2021.
- TransAlta’s 2021+ Sustainability Targets include achieving company-wide GHG reductions of 60% below 2015 levels by 2030 and reaching **carbon neutrality** by 2050.⁶⁵
- Empirical emissions for Keephills 3 were calculated using 0.820 t/MWh and 74 percent capacity factor. The emissions intensity was an assumed emissions intensity for a supercritical unit, and the capacity factor was obtained from Environment Alberta.
- TransAlta’s **just transition plan** is centered around supports provided by the Government of Alberta, as well as the company’s Off-Coal Agreement. Details of this agreement are not publicly available.

Heartland Generation

Current coal generation capacity (MW)	Unabated coal phase-out by 2030	Final year of operation of last unabated coal plant	Current proportion of non-emitting capacity (MW)	2030 proportion of non-emitting capacity (MW)	Renewable energy capacity added by 2030 (MW)	Net-zero by 2050 goal	Data transparency
0	Y ⁶⁶	2021	0% ⁶⁷	0%	0	N	1 of 3

⁶⁴ TransAlta, “TransAlta Board Approves Plan for Accelerating Transition to Clean Power in Alberta,” media release, April 19, 2017. <https://www.transalta.com/newsroom/news-releases/transalta-board-approves-plan-for-accelerating-transition-to-clean-power-in-alberta/>

⁶⁵ TransAlta, “2021+Sustainability Targets.”

⁶⁶ ATCO, *2018 Sustainability Report* (2018), 9. <https://www.atco.com/content/dam/web/about-us/investors/2018-sustainability-report.pdf>

⁶⁷ Heartland Generation, “Heartland Generation.” <https://www.heartlandgeneration.com/>

- Heartland Generation completed its off-coal transition on November 9, 2021,⁶⁸ becoming the first major utility in Alberta to stop burning coal.
- Capacity values for **proportion of non-emitting capacity** were obtained from the Heartland Generation website. The utility currently does not hold any renewable energy assets,⁶⁹ and as of June 30, 2021, Heartland does not have plans to add renewable energy generation capacity to their fleet.
- As of November 9, 2021, Heartland Generation does not have a **net-zero goal**.
- Heartland Generation does not have a publicly available **just transition plan**. It is the utility’s belief that they will be able to increase jobs in a zero-emission environment.⁷⁰

Capital Power

Current coal generation capacity (MW)	Unabated coal phase-out by 2030	Final year of operation of last unabated coal plant	Current proportion of non-emitting capacity (MW)	2022 proportion of non-emitting capacity (MW)	Renewable energy capacity added by 2022 (MW)	Net-zero by 2050 goal	Data transparency
1266 ⁷¹	Y ⁷²	2023 ⁷³	15% ⁷⁴	18%*	266*	Y ⁷⁵	3 of 3

* Calculated value from multiple sources.

- **Proportion of non-emitting capacity** values were obtained from Capital Power’s website.

⁶⁸ Heartland Generation, “Heartland Generation Announces Completion of Off-Coal Transitions at Battle River and Sheerness Generating Stations,” media announcement, November 9, 2021.

<https://www.heartlandgeneration.com/post/heartland-generation-announces-completion-of-off-coal-transitions-at-battle-river-and-sheerness-generating-stations>

⁶⁹ AESO, “AESO June 2021 Project List,” spreadsheet, June 2021.

⁷⁰ Dustin Owens, Heartland Generation, personal communication, September 8, 2021.

⁷¹ AESO, “Current Supply Demand Report,” June 3, 2021.

⁷² Capital Power, *Powering a Resilient Future: 2020 Climate Change Disclosure Report (2020)*, 9.

<https://www.capitalpower.com/sustainability/sustainability-reports/#reports>

⁷³ Capital Power, *Powering a Resilient Future*, 9.

⁷⁴ Capital Power, “Operations.” <https://www.capitalpower.com/operations/>

⁷⁵ Capital Power, “Capital Power accelerating plans towards a low carbon future,” news release, December 3, 2020. https://www.capitalpower.com/media/media_releases/capital-power-accelerating-plans-towards-a-low-carbon-future/

- Dual fuel plants were included in the coal capacity tally due to the inability to separate exact percentages of coal and natural gas. Values are updated up to June 30, 2021.
- Capital Power does not plan to retire any currently operating natural gas plants. When Genesee 1 and 2 are repowered, they will provide an additional 560MW of capacity in addition to current capacity, for a total of 1360MW net capacity.⁷⁶ The post-conversion natural gas unit capacity for Genesee 3 was assumed to remain the same as the current coal capacity.⁷⁷
- **Renewable energy capacity added** includes firm commitments from Capital Power up to 2022.⁷⁸ Only assets located in Canada were included in the tally, updated up to June 30, 2021.
- Capital Power’s 2020 Climate Change Disclosure Report states the utility will be **net carbon neutral** via physical solutions on natural gas assets and portfolio offsets between 2030 and 2050. The utility will achieve “physical decarbonization” between 2050 and 2070.⁷⁹ A December 2020 news release states Capital Power has a “target to be net carbon neutral before 2050.”⁸⁰
- Empirical emissions for Genesee 3 were calculated using 0.820 t/MWh and 84 percent capacity factor. The emissions intensity was an assumed emissions intensity for a supercritical unit, and the capacity factor was obtained from Environment Alberta.
- Capital Power does not have a publicly available **just transition plan**. Utility representatives stated that the company is taking a three-part approach to the transition by addressing impacted individual coal mining jobs, minimizing jobs lost in the transition from coal to gas plants, and developing plans based on Alberta’s current transition policies.

MAXIM Power

- MAXIM Power was excluded from this assessment. The utility currently has one remaining coal plant that operates at 9% capacity, which was deemed insignificant.

⁷⁶ Capital Power, “Genesee Generating Station 1&2.” <https://www.capitalpower.com/operations/genesee-1-2/>

⁷⁷ AESO, “Current Supply Demand Report,” July 12, 2021.

⁷⁸ Capital Power, *Powering a Resilient Future*, 4.

⁷⁹ Capital Power, *Powering a Resilient Future*, 5.

⁸⁰ Capital Power, “Capital Power accelerating plans towards a low carbon future.”

- MAXIM Power was included in the Unabated Coal Capacity model and the Coal GHG Emissions model to demonstrate overall trends in coal phase-out across Canada.

4.2.2 Graph data

Figure 1. Coal GHG emissions

This graph depicts each utility's coal GHG emissions from 2015 through 2039. The orange line shows the amount of coal GHG emissions that are allowed under the 2018 federal regulations. Projected GHG emissions were based on standard capacity factor and emissions intensity values, rather than measured values. Values are based on publicly stated retirement or conversion dates for each coal unit currently in operation. Emissions from the Sheerness Generating Station, which is co-owned by TransAlta and Heartland Generation, were attributed to Heartland Generation, the plant's operator.

Figure 2. Unabated coal generation capacity

This graph depicts the decline in unabated coal capacity from 2015 through 2039 for each coal-owning utility. Values are based on publicly stated retirement or conversion dates for each coal unit currently in operation. This number includes each utility's currently operating unabated coal and co-generation plants in Canada (foreign coal assets were excluded from this list) up to June 30, 2021. Operations data was obtained from utility company websites and the AESO. The value depicted includes plants that were converted or retired at any point in the year listed. Capacity from the Sheerness Generating Station, which is co-owned by TransAlta and Heartland Generation, was attributed to Heartland Generation, the plant's operator.

Figure 3. Total GHG emissions from coal facilities 2015 to 2040

This graph depicts each utility's projected cumulative coal GHG emissions from 2015 through 2040 as mandated under the 2018 federal regulations, as well as under their current coal phase-out trajectory. Projected GHG emissions were based on standard capacity factor and emissions intensity values, rather than measured values. Values are based on publicly stated retirement or conversion dates for each coal unit currently in operation. Saskatchewan's Boundary Dam Unit 3 with carbon capture and storage was included in this calculation. Empirical emissions for Boundary Dam 3 were calculated using 0.652 t/MWh and 79% capacity factor, based on the five-year average of real data from the coal model. The emissions intensity and capacity factor values are unique to Boundary Dam 3 and emissions intensity was calculated using net generation. Emissions from the Sheerness Generating Station, which is co-owned by TransAlta and

Heartland Generation, were attributed to Heartland Generation, the plant's operator. The year 2015 was used as the base year to examine the impacts of both the 2012 federal regulations and 2018 federal regulations on coal phase-out, as well as to demonstrate the amount of GHG emissions each utility is, or is not, saving from phasing out coal earlier than the 2018 federal regulations require.