

From Coal to Clean

Provincial highlights and recommendations

Worldwide, an increasing number of countries, utilities and financial institutions are putting coal in the rear-view mirror. They are driven by climate action, the demand for cleaner air and the poor economics of coal.

While the health impacts of air pollution and the greenhouse gas (GHG) emissions from coal are far higher than any other power source, there are readily available, abundant, cost-effective alternatives to coal-fired generation. This makes coal-fired electricity both uniquely harmful and unnecessary. The phase-out of coal is also happening in the context of countries committing to a net-zero economy by 2050, which would require a net-zero electricity grid by 2035 in developed countries.

The structural transition away from coal power generation is most advanced in economies that are part of the Organization for Economic Co-operation and Development (OECD), where power plants have tended to be older, electricity demand is often relatively flat compared to developing economies, and climate policies or carbon pricing have been introduced. The lessons learned from this experience will need to be proactively shared internationally, particularly as non-OECD countries complete their pivot away from adding new coal power capacity and begin planning their own phase-out pathways. The energy crunch experienced

in China, India, Europe and elsewhere in October 2021 reinforces that policy-makers will need to develop approaches that are both robust in the face of potential short-term imbalances in supply and demand and capable of providing a longer-term framework that can consistently drive investment in clean generation.

From Coal to Clean focuses on Canada's progress in phasing out coal since the height of coal-fired power in Canada at the turn of the century — through the pioneering Ontario coal phase-out completed in 2014 and the 2030 phase-outs announced in 2015 and 2016 — and up to the dramatically accelerated Alberta phase-out that will see coal power eliminated in that province by the end of 2023, nearly 40 years ahead of the schedule in place at the start of 2015. It also takes stock of the current plans in the remaining three coal-burning provinces, acknowledges recent progress in policies and plans, and identifies opportunities for improvement. It shows that, **with the exception of New Brunswick, Canada is on track to phasing out coal by 2030.**

These findings are briefly outlined on the following pages. Read the complete report *From Coal to Clean: Canada's progress toward phasing out coal power* at www.pembina.org for full details of our research.



Key takeaways

Canada's policies, plans and actions to transition away from coal in this century have not been linear in momentum nor uniform across the country. The timelines for the transition have shifted forward in fits and starts and inconsistently from province to province. But this survey of Canada's route to ending coal-fired generation finds:

- A. While Canada's progress on coal phase-out started slowly in the early 2010s, **Ontario's pioneering action** laid a marker for the world as the single largest climate measure of its time in North America.
- B. The 40-year **acceleration of the coal phase-out in Alberta** (from an original forecast of 2061 to the current 2023), demonstrates the power of coal phase-out commitments and effective carbon pricing design.
- C. Key opportunities remain for **further accelerating the coal phase-out**:
 - **Saskatchewan** is already taking advantage of its strong portfolio of lower-emitting generation to achieve reductions in advance of its 2030 phase-out and has opportunities remaining to accelerate and deepen its progress.
 - **Nova Scotia** — after initially insisting that coal must be in use beyond 2030, and receiving such exemption from the federal government — has accepted the feasibility of the 2030 phase-out and must now lock in its implementation plan.
 - **New Brunswick** is pursuing leeway to continue using coal well past 2030, which would single the province out as a clear laggard on coal emissions and undermine Canada's global leadership in phasing out coal.
- D. To build towards a net-zero grid by 2035, provinces should **replace coal with non-emitting generation options** instead of new unabated gas-fired generation, to avoid losing about half of the GHG reductions from coal phase out.
- E. Learnings gained from achievements and failings over the last six years of rapid policy development have charted a **path for phasing out coal reliably, equitably and cost effectively**.

A. Ontario's pioneering coal phase-out

Ontario announced its commitment to phase out coal power in 2003. By 2014, Ontario had ceased burning coal for power, resulting in “the single largest greenhouse gas reduction measure in North America.” Meanwhile, Canadian federal policy efforts started in 2012 with a regulation on emissions intensity from coal-fired generation, effectively requiring units to retire or limit emissions through carbon capture and storage once they have reached about 50 years of

life. This would have allowed ten units in Canada to continue without any GHG abatement into the 2030s, eight of which could continue into the 2040s. The final two plants — both in Alberta — would not be subject to the standard until the end of 2055 and 2061. This was the status quo as of the beginning of 2015, but the transition away from coal was about to speed up dramatically.

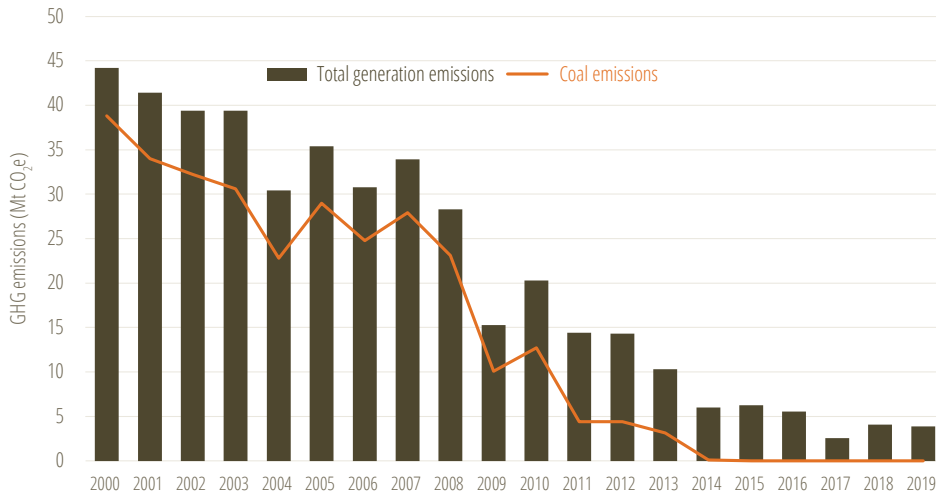


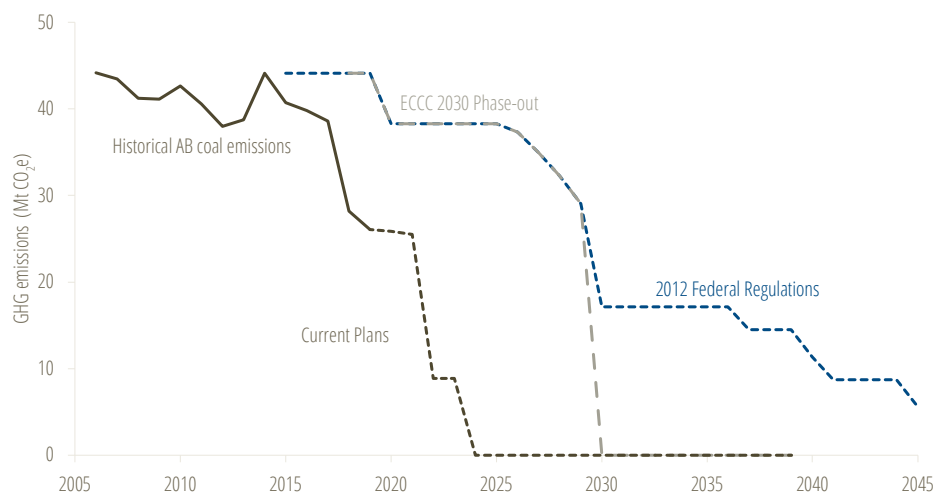
Figure ES 1. Coal and total electricity generation emissions in Ontario

B. Alberta's accelerated phase-out

In 2015 Alberta announced a 2030 coal phase-out, which was complemented with a sector-wide carbon pricing benchmark. This was later supported by an update of the federal coal emissions standard to implement a nation-wide coal phase-out commitment by the end of 2029. The cumulative result of these policies is a sharp, year-over-year fall in coal generation in Alberta. Once political certainty around the policies

was secured, utilities hastened their plans to phase out coal, so much so that Alberta will cease to use coal for power by the end of 2023. These retirement and conversion announcements by utilities have accelerated the coal phase-out by nearly four decades relative to the trajectory in place at the start of 2015 as shown in Figure ES 2.

Figure ES 2. Projected GHG emissions from coal-fired power under progressive policy scenarios in place since 2015



C. Accelerating the phase-out: Saskatchewan, Nova Scotia and New Brunswick

The other three coal provinces — Saskatchewan, Nova Scotia, and New Brunswick — did not follow the same trajectory as Alberta. Each province has sought an equivalency agreement with the federal government to afford them flexibility in running coal plants beyond the strict schedules of the federal 2030 phase-out. Moreover, none of these provinces has adopted carbon pricing approaches that are as effective as the Alberta approach for reducing coal power in favour of lower-emitting generation.

However, despite securing equivalency agreements in 2018, both Saskatchewan and Nova Scotia have more recently accelerated their transitions. Saskatchewan began to reduce operation at its coal plants beginning in 2019 and is planning to phase out all unabated coal emissions (i.e. coal power without carbon capture)

by 2030. In 2020, the Nova Scotia government relinquished its early insistence on extending coal power, announcing a 2030 phase-out. This leaves only New Brunswick with plans to continue coal power beyond 2030, seeking an equivalency agreement from the federal government to do so. This would undermine Canada’s clear commitment to the world to end unabated coal-fired generation by 2030.

These recent announcements, along with additional feasible measures to move away from coal more quickly, offer an “accelerated transition” opportunity across the provinces. Realizing the accelerated transition potential across Canada would avoid 437 Mt of coal power GHG emissions by 2030, when compared against the 2012 Federal Regulations trajectory in place as of the start of 2015.

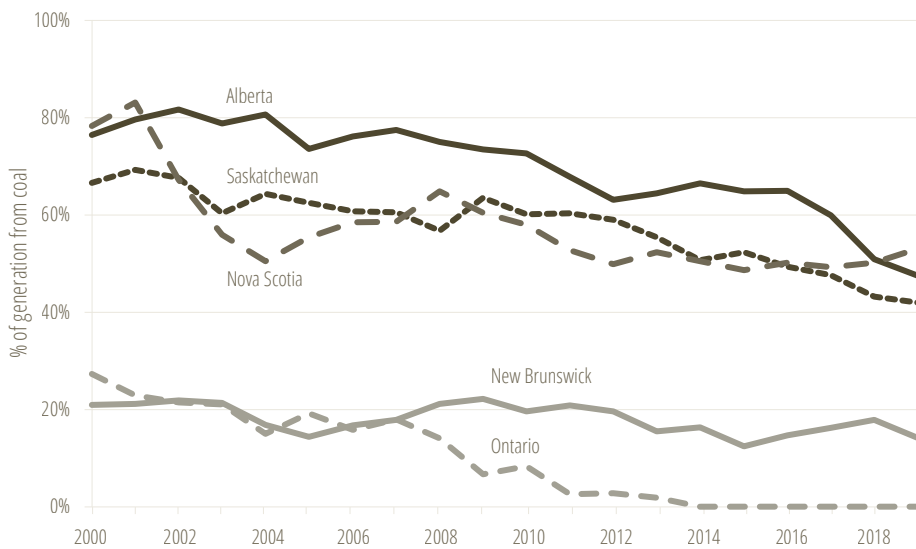
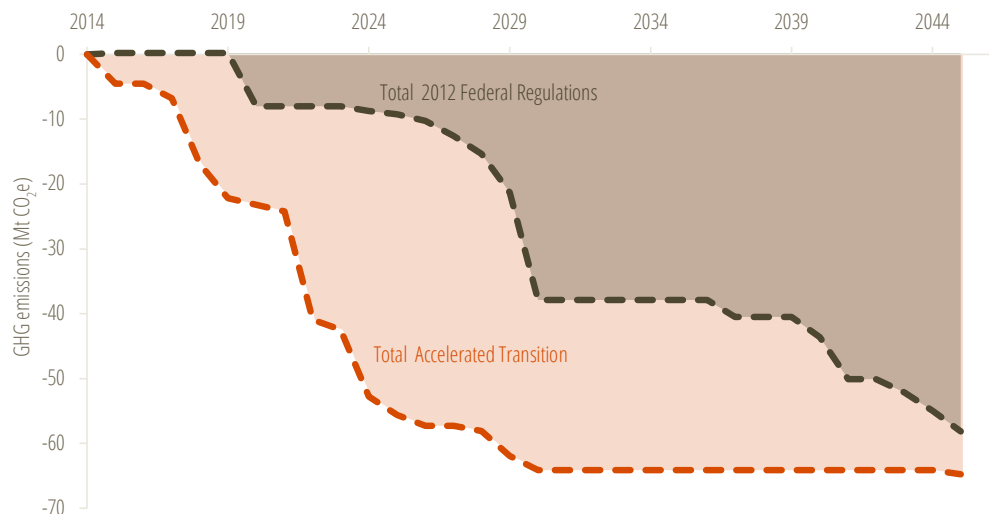


Figure ES 3. Trajectory of coal generation in major coal provinces over the past two decades

Figure ES 4. An accelerated transition across Canada would see 437 fewer megatonnes of coal power GHG emissions than would have resulted under the trajectory in place at the start of 2015



D. Avoiding gas emissions lock-in and progressing to a net-zero grid by 2035

As coal plants are retired across the country over the next decade, the investments made in replacement capacity will result in facilities and infrastructure that will last for decades to come. To achieve a net-zero grid by 2035 (necessary to meet Canada's target of a net-zero economy by 2050), these investments must support rapid decarbonization. Moreover, the ultimate GHG reductions from the coal phase-out could be significantly undone depending on the technologies that replace coal (see figure below).

If coal is replaced by unabated combined-cycle gas generation, the net emissions reductions are cut by 41%. Locking into new, unabated gas-fired power will only make it more expensive for utilities and ratepayers to absorb the inevitable transition to net-zero grids, with the risk of stranding recently invested capital. Fortunately, Canada has a wealth of potential in non-emitting generation technologies that support the carbon-competitiveness of our transitioning grids.

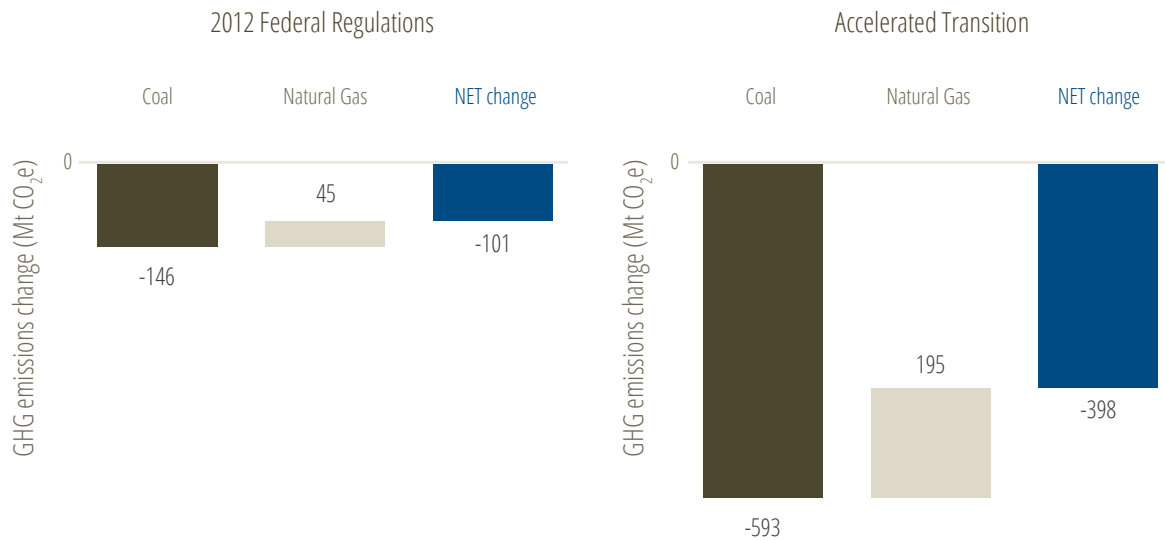


Figure ES 5. Using natural gas to replace coal will partly undo the benefits of the phase-out under both the 2012 Federal Regulations and Accelerated Transition scenarios

E. Recommendations for accelerating a net-zero transition

Canada's largely successful phase-out of coal presents several lessons that can also be applied to further decarbonization of the grid and to ensure the accelerated full phase-out of coal. In particular, it highlights the need for policy certainty, stringent regulations, and effective engagement of stakeholders. To support the urgent complete transition of Canada's grid from coal to clean, the following actions are needed:

Net-zero grid by 2035

There is a need for clear clean electricity standards and long-term policy certainty by the federal and provincial governments to ensure that investments are directed toward non-emitting generation sources and rapid grid decarbonization solutions.

Effective sector-wide carbon pricing

Policy reforms or schedules that aim toward applying the full price signal across all generation types will help to ensure that the low-hanging fruit of coal emissions reductions is fully harvested as early as possible, and that investments are made in additional emissions reduction and zero-emissions technologies.

Stringent protocols for protecting federal coal regulations against weakening via equivalency agreements

Greater diligence and transparency is needed in protecting the federal GHG regulations from being weakened by Canadian Environmental Protection Act equivalency agreements. The federal government must be more transparent around the assumptions, inputs and outputs of its equivalency assessment model; and acknowledge that the co-benefits — such as avoided mortality, avoided asthma days, and avoided hospitalizations — are undermined by equivalency agreements

Provincial infrastructure and modernization of regulations

As the coal provinces grapple with the structural and economic challenges of a coal phase-out and transition to a clean electricity grid, they need to direct efforts towards planning for a reliable and affordable electricity system, which would also require federal support. These efforts include modernizing regulations and utility business models; support for piloting and deploying storage; building interprovincial transmission; modelling grid optimization for GHG reductions and costs; enabling corporate procurement of renewable energy; and supporting community-owned generation.

Data transparency and accessibility

Provinces should improve their unit generation and emissions data availability and make this data public in an accessible online format. The federal government could assist in this regard by endeavouring to match the aggregation of data achieved by the U.S. Energy Information Administration. Transparency is necessary to enable scrutiny by civil society and to question the conclusory decisions of government or utility decision-makers.

Equitable transition

As jobs and communities shift to achieve a net-zero economy, federal and provincial policies will play a central role in ensuring an equitable transition. While affected workers and communities require transparent and early signals from the government, at a minimum, to provide stability and time to plan and engage in the process, people-centered just transition legislation is needed to ensure that they have a voice in shaping the policies and pathways for transition.