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Re: Notice of Intent to develop greenhouse gas regulations for electricity generation in Canada

Dear Ms. Mellow,

The Pembina Institute is grateful for the opportunity to submit to your department comments on the government's proposal to update and extend its greenhouse gas regulations covering the Canadian electricity sector. This letter constitutes the Pembina Institute's initial submission to the consultation process initiated by Environment and Climate Change Canada's (ECCC) recent Notice of Intent.¹

Though several important questions pertaining to the design and stringency of these forthcoming federal standards remain unresolved, we applaud the decision to accelerate Canada's coal phase-out and to promote the shift to cleaner sources of electricity across Canada. In general, we support the proposed amendments to the *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations* (SOR/2012-167) (referenced herein as 'the Regulations') issued under the *Canadian Environmental Protection Act, 1999* (CEPA). Equally, we recognize the significance of the government's intention to introduce new physical performance standards for coal-to-gas power plant conversions, as well as standalone regulatory requirements for natural gas-fired units. Together, and in tandem with other emissions reduction policies, these actions are essential to ensuring the effectiveness and credibility of the government's recently concluded Pan-Canadian Framework on Clean Growth and Climate Change (PCF).

The PCF must not only reduce annual greenhouse gas (GHG) emissions to the target level for 2030 (532 Mt), but must, in doing so, set the country on a clear path to decarbonization of the economy by mid-century. But meeting our 2030 climate target is not an end in itself: it is a means of establishing momentum along a trajectory of increasingly ambitious climate policy and increasingly constrained emissions budgets, culminating in near-zero emissions by 2050.

As the federal government moves forward with its agenda to address climate change and grow a cleaner economy, it will be crucial to ensure the robust implementation of all policies announced in the PCF. In the case of regulating to accelerate a national phase-out of coal-fired power, this means aligning new standards with the latest science and with Canada's formal mid-century low-GHG development strategy, according to which net emissions must fall at least 80% from their level in 2005 (i.e. from 748 Mt CO₂e to 149 Mt CO₂e in 2050).² Pursuing implementation with these considerations in mind is the surest path to

¹ "Notice of intent to develop greenhouse gas (GHG) regulations for electricity generation in Canada," *Canada Gazette*, Part I (December 17, 2016), Vol. 150, No. 51, pp. 4048-4050 (originally published in CEPA Environmental Registry on Nov. 21, 2016). <http://www.gazette.gc.ca/rp-pr/p1/2016/2016-12-17/pdf/g1-15051.pdf#page=3&file=.pdf>

² Environment and Climate Change Canada. *Canada's Mid-Century Long-Term Low-Greenhouse Gas Development Strategy* (2016). http://unfccc.int/focus/long-term_strategies/items/9971.php

securing solid health benefits, and reductions in related costs, for all Canadians. With these ends in mind, the Pembina Institute respectfully submits the following comments on the recently proposed changes to federal regulation of Canada's power sector.

Summary of the Pembina Institute's comments

1. We recommend the Government of Canada build on its commitment to 90% emissions-free power by 2030 by also committing to making the sector 100% emissions-free by 2050. Such a commitment would send a clear signal to the electricity sector about its role in Canada's decarbonization pathway and ensure infrastructure investment decisions are made with a clear understanding of Canada's long-term GHG trajectory, since it would make apparent the risk of stranded assets if companies and governments invest in gas-fired power plants that will have a lifespan beyond the middle of the century. Given that the electricity sector has commercially available zero-emission technologies, any further investment in fossil fuel technology for this sector should be undertaken only when there are no viable alternatives.
2. We recommend the Government of Canada work jointly with the provinces of Alberta, Saskatchewan, New Brunswick and Nova Scotia to produce and release provincially tailored schedules to achieve the predictable elimination of coal-fired power (or its environmental equivalent) by 2030. These schedules, preferably established in a stepwise fashion to avoid the simultaneous retirement of large portions of generation capacity, will be critical to ensuring grid stability, market predictability, and policy clarity for investors. Further, predictable schedules for an accelerated coal phase-out will equip federal and provincial governments to better support communities and municipalities in coping with effects on labour and employment.
3. In conjunction with the creation of federal-provincial timelines for a predictable, accelerated coal phase-out, we recommend the Government of Canada work with Alberta, Saskatchewan, New Brunswick and Nova Scotia to establish and implement provincial renewable energy targets to ensure low-emitting alternatives are prioritized as replacement generation.
4. We recommend the Government of Canada revise its definition of "useful life" for coal-fired electricity units from 50 years to 40 years of operation. In the case of units that were commissioned before 1980, and that would be immediately affected by a revision to the "useful life" definition, we recommend the federal government introduce an option for case-by-case delay of shut-down up to 2019.
5. We recommend the Government of Canada include a fixed end-date and enforcement clause in its regulations to ensure that all coal-to-gas converted units are phased-out within the 15 year grace period. More specifically, if coal-to-gas units are held to a less stringent emissions standard (i.e. 550 t CO₂e/GWh rather than 420 t CO₂e/GWh), we recommend that this be allowed for a maximum of 15 years from the unit phase-out date or until the year 2035, whichever comes first. An exception could be made for power plants that are scheduled to come offline in 2030 (as per the Institute's recommended coal phase-out schedule); we recommend these plants be allowed to operate at a less stringent emissions standard until the year 2040.
6. We recommend the Government of Canada commit to a mandatory review of performance standards established under the Regulations, either every five years or triggered by significant changes in the regulatory landscape (i.e. new climate policies, rate of technology change, etc), whichever comes first.

Linking electrification pathways and mid-century climate goals

In view of Canada's relatively high proportion of electricity generated from non-emitting sources (471 TWh, or 82% of total generation³), and of the significant federal and provincial actions already undertaken to reduce GHG emissions from the electricity sector, the Institute supports the Government of Canada's decision to ensure that 90% of electricity generated in 2030 is non-emitting.⁴ As the government pursues this "soft" (i.e. unlegislated) target, however, it must work to provide the public with a detailed electrification roadmap showing how specific actions will help to clean the national grid.

Supporting the transition to a cleaner electricity sector with an accelerated phase-out of coal-fired power will lay necessary groundwork for other important climate measures, including the electrification of key sectors such as transportation, buildings, and industry. All deep GHG mitigation analyses identify the electrification of most or all end-use applications across these sectors as a cornerstone of the overall policy architecture in a low-GHG economy. At the same time, Canada's mid-century emissions target implies that increased power demand resulting from policies of electrification be served by low-emitting or non-emitting sources, combined with an expanded role for distributed generation and energy efficiency. To set its electrification roadmap in the context of Canada's mid-century climate strategy, the government should therefore acknowledge the need for an electricity system that is 100% non-emitting by 2050. A commitment of this nature would complement the Government of Canada's existing commitment to support 90% emissions-free electricity by 2030.

Committing to 90% emissions-free by 2030 and 100% emissions-free by 2050 would send a clear signal to the electricity sector regarding its role in the low-carbon economy. It would also highlight the risk of stranded assets if companies and governments invest in gas-fired power plants that would have a lifespan beyond the middle of the century. Given that the electricity sector has commercially available zero-emission technologies, any further investment in fossil-fuel-based technology for this sector should be undertaken only when there are no viable alternatives.

Securing a successful accelerated phase-out through timelines and targets

Coal-fired power currently accounts for over 70% of sectoral GHG emissions (and over 8% of Canada's total emissions) while generating only around 10% of Canada's electricity. Given the availability and economic viability of cleaner-generating alternatives, it is essential that regulatory action to accelerate the phase-out of unabated⁵ coal power be vigorously pursued as the clear and comparatively straightforward emissions abatement opportunity that it is. In its current form, Canada's proposal to phase-out coal-fired power is in line with, but not leading, international policy trends and shifts in global energy markets.⁶ In particular, in the absence of shared federal-provincial timelines for a smooth, equitable and accelerated phase-out, the proposed Regulations will leave important health and emissions reductions opportunities on the table.

In assessing the government's commitment to an *accelerated* phase-out of coal-fired power, it is worth recalling the recent history of federal policy development in relation to electricity generation. When coal

³ Environment and Climate Change Canada, National Inventory Report 1990-2014: Greenhouse Gas Sources and Sinks in Canada, 2016, Part 3, Section A13.

⁴ Government of Canada News Release, "The Government of Canada accelerates investments in clean electricity," (Nov. 21, 2016). <http://news.gc.ca/web/article-en.do?nid=1157989&tp=1>

⁵ In this document, "unabated" or "traditional" coal means coal-fired generation that does not make use of carbon-capture-and-storage technology.

⁶ Binu Jeyakumar, Bora Plumtre, and Erin Flanagan. *Canada and coal at COP22*. Pembina Institute (November, 2016). <http://www.pembina.org/reports/canada-and-coal-at-cop22.pdf>

phase-out policy was first being considered at the federal level circa 2009, unofficial regulatory proposals (acquired through an Access to Information Request) would have subjected coal units to a carbon dioxide (CO₂) emissions performance standard of 375 t/GWh after 40 years of “useful life.”^{7,8} However, when Draft Regulations were officially released for comment in 2011, this time frame (along with the standard) had been relaxed by five years in response to industry intervention.⁹ Given that the finalized Regulations, as published and enacted in 2012, extended the definition of a plant’s “useful life” by an *additional* 5 years (thereby allowing existing units a full half-century of unabated operation), the current proposal to eliminate unabated coal by 2030 (and thus to lower the average end-of-life for traditional plants to approximately 40 years) represents only a slight change from the Draft Regulations and a return to the originally envisioned timeline.¹⁰ Of course, requiring existing coal units to meet the current performance standard by 2030 will still substantially curtail the expected lifespans (under current regulations) of the ten plants commissioned after 1985. But it will do little to achieve potential emissions reductions from Canada’s twenty-three other operational facilities.

Questions:

1. How, if at all, will the government seek to amend the Regulations’ definition of coal units’ “useful life”? Will it subtract a decade from its current meaning of 50 years, or will it maintain the current definition on the assumption that the life of all unabated coal facilities will be indirectly reduced (by the imposition of the performance requirement on all remaining operational plants in 2030) to a rough average of 40 years?
2. Will the Government of Canada work with the governments of Alberta, Saskatchewan, New Brunswick and Nova Scotia to develop a predictable schedule for coal plant closures, as well as to ensure that complementary measures – including provincial renewable energy targets – are developed and implemented?

We respectfully submit that the definition of “useful life” should be revised downwards in a measured fashion so as to clearly and equitably support the aim of eliminating unabated coal-fired power from the national energy mix by 2030. In seeking curtailment of the current standard for “useful life”, we recommend that the definition remain applicable to all new units (effectively preventing their deployment) and to all old units, subject to the implied changes that would result within the regulatory meaning of “old unit” from the modifications we suggest below. Specifically, we recommend that the subparagraph (a)(iii) meaning of “useful life” in section 2 of the Regulations be explicitly amended to mean 40 years after a coal unit’s commissioning date. Further, we urge that this general conception of a unit’s acceptable lifespan be applied as a guiding principle—along with the 2030 deadline for compliance with the standard—underlying the drafting of the proposed amendments to the Regulations.

We recommend the Government of Canada work jointly with the provinces of Alberta, Saskatchewan, New Brunswick and Nova Scotia to produce and release provincially tailored schedules to achieve the predictable elimination of coal-fired power (or its environmental equivalent) by 2030. These schedules, established in a stepwise fashion to avoid a situation in which too many coal units retire at the same time,

⁷ P.J. Partington, Tim Weis, and Matt Horne, “Weakening regulations could reduce their effectiveness by more than half,” Pembina Institute, Backgrounder (April, 2012) <https://www.pembina.org/reports/weakening-coal-regs-backgrounder.pdf>

⁸ According to the International Energy Agency, most coal-fired plants are built with the expectation of 25 to 30 years of unmodified operation, though it is standard procedure to extend a unit’s life to 40 years. However, most units must typically undergo significant refurbishment to keep operating past this age. See IEA Clean Coal Centre, “Life extension of coal-fired power plants,” (December 2005). <http://www.iea-coal.org.uk/documents/81405/5990/Life-extension-of-coal-fired-power-plants>.

⁹ RIAS, “14. Level of performance standard,” <http://www.gazette.gc.ca/rp-pr/p1/2011/2011-08-27/html/reg1-eng.html>

¹⁰ Astrid Kalkbrenner, “Cleaning Up Coal II,” ABlawg, University of Calgary, Faculty of Law (October 12, 2012). <http://ablawg.ca/2012/10/04/cleaning-up-coal-ii/> &

will help establish market predictability and send clear signals to investors. In conjunction with the creation of federal-provincial timelines for a predictable, accelerated coal phase-out, the Government of Canada should work with Alberta, Saskatchewan, New Brunswick and Nova Scotia to establish provincial renewable energy targets. This would bring Canada in line with policy trends in many U.S. and European jurisdictions. In the case of Alberta, its 5,000 MW renewable energy target increases certainty of the net environmental benefit of the government’s regulatory action to phase-out coal—in addition to reducing costs, spurring new investments, and promoting associated economic benefits.

To ensure fairness across regions with different resources and electricity supply mixes, and to account for the policy and economic contexts underlying the original investment decisions for plants of different ages, we recommend that coal units that are already past 40 years of operations not be required to shut down immediately, and be allowed to keep operating until the end of 2019. This adjustment, which would affect the coal units commissioned prior to 1980, translates into the following proposed schedule:

Table 1. Proposed phase-out schedule: coal-fired power plants commissioned prior to 1980

Unit Name	Prov.	Year commissioned	Capacity (MW)	End of economic life	Current allowed life (CEPA regs.)	Proposed end-of-life	Proposed lifespan
Battle River 3	AB	1969	150	2019	50	≤2019	48-50
Trenton 5	NS	1969	154	2019	50	≤2019	48-50
Boundary Dam 4	SK	1970	139	2019	49	≤2019	47-49
Sundance 1	AB	1970	280	2019	49	≤2019	47-49
HR Milner 1	AB	1972	150	2019	47	≤2019	45-47
Point Tupper 1	NS	1973	154	2019	46	≤2019	44-46
Boundary Dam 5	SK	1973	139	2019	46	≤2019	44-46
Sundance 2	AB	1973	280	2019	46	≤2019	44-46
Battle River 4	AB	1975	150	2025	50	≤2019	42-44
Sundance 3	AB	1976	407	2026	50	≤2019	41-43
Sundance 4	AB	1977	392	2027	50	≤2019	40-42
Sundance 5	AB	1978	392	2028	50	≤2019	39-41
Boundary Dam 6	SK	1978	284	2028	50	≤2019	39-41
Lingan 1	NS	1979	155	2029	50	2019	40

Note: This table only contains the proposed retirement year for coal units commissioned prior to 1980. It contains slight changes when compared to the previous schedule proposed by the Pembina Institute.¹¹ All coal units commissioned after 1980, not included in this table, retire after reaching 40 years of operation.

Figure 1 (below) shows the GHG pathways for Canada's power sector associated with four coal retirement schedules, assuming all phased-out coal power being replaced by two-thirds renewable energy and one-third new natural gas generation. The dark grey, solid orange, and dashed orange curves respectively illustrate the GHG pathways following the 2012 federal regulations, the announcement of a coal phase-out by 2030 in Alberta (November 2015), and the announcement of a federal phase-out by

¹¹ See the Pembina Institute’s full recommended schedule for a national phase-out of coal-fired power plants in *Building a Pan-Canadian Climate Plan: Policy options to meet or exceed Canada’s 2030 emissions target* (June 2016), 13. <http://www.pembina.org/reports/submission-pan-canadian-climate-change-working-groups.pdf>

2030 (November 2016). The blue curve illustrates the tremendous GHG benefits to be gained from the approach advanced by the Pembina Institute—namely, retiring coal-fired units after 40 years of service.

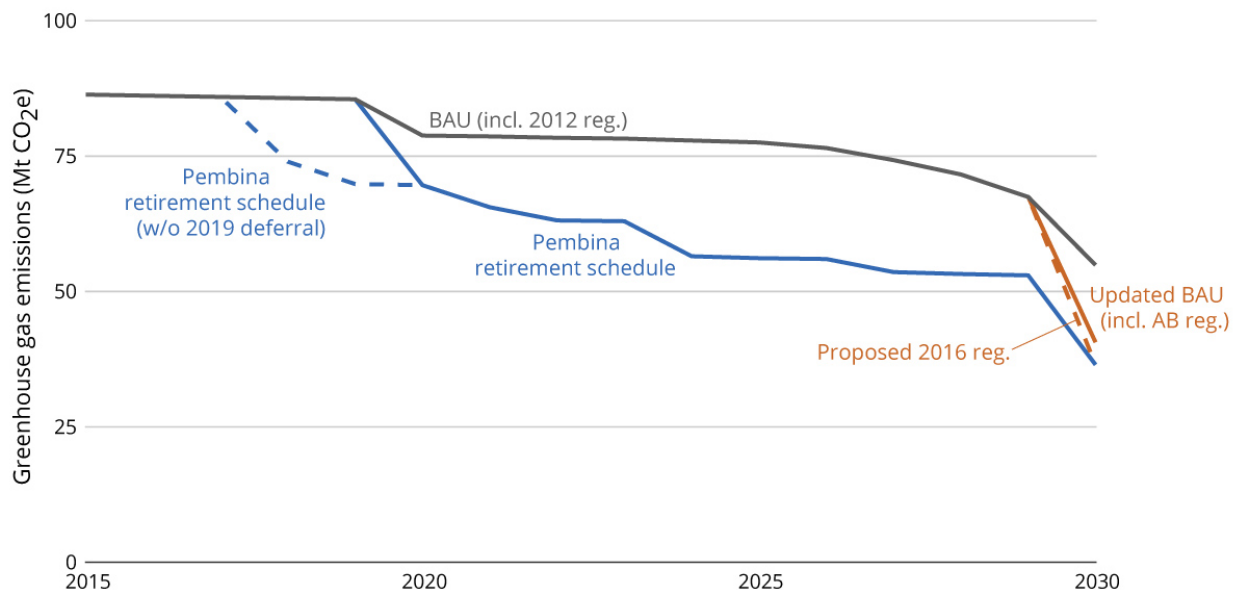


Figure 1. GHG emissions from the power sector in Canada under five coal retirement schedules

Notes: The business-as-usual (BAU) scenario (dark grey curve) illustrates the GHG pathway for Canada’s electricity sector under the 2012 CEPA regulation. The updated BAU scenario (solid orange curve) includes GHG reductions attributable to Alberta’s coal phase-out, announced in November 2015. The proposed 2016 regulations pathway (dashed orange curve) illustrates the incremental GHG benefit from the federal coal phase-out, announced in November 2016. The Pembina retirement schedule (solid blue curve) shows the GHG emissions reduction to be gained from coal-fired units being retired after 40 years of service, with the flexibility for coal units commissioned before 1980 to retire in 2019. Last, the dashed blue line shows the GHG pathway associated with the Pembina retirement schedule without the 2019 deferral for coal units commissioned prior to 1980. Nova Scotia’s predicted GHG emissions as negotiated under the Equivalency Agreement are included in all scenarios. All scenarios also assume a yearly 0.6% growth in electricity generation between 2015 and 2030, as employed by the National Energy Board in its Energy Futures publication.¹² Further, emissions from coal and natural gas are calculated using emissions factors respectively of 1,000 kg of CO₂e/ MWh and 420 kg of CO₂e/ MWh. Last, we assume the existing fossil fuel generation fleet continue operating at 2014 GHG emissions intensity, without units being retired or refurbished over the period.

This change would achieve substantial cumulative emissions reductions — approximately 174 to 201 Mt between today and 2030, significantly higher than the 4 Mt reduction enabled by the proposed regulation according to our calculations (see Figure 1).¹³ This significant decrease in unabated coal emissions will

¹² National Energy Board, Canada’s *Energy Future 2016: Update - Energy Supply and Demand Projections to 2040*, (2016). <http://www.neb-one.gc.ca/nrg/ntgrtd/ft/2016updt/index-eng.html>

¹³ The Government of Canada estimates the federal coal phase-out “will result in more than five megatonnes of reductions in GHG emissions, in 2030.” Pembina Institute in-house modeling calculates the incremental impact over the proposed regulation to be just over 4 Mt due to methodology and modeling assumptions (such as capacity factors employed). In our view this resides within the margin of error inherent to this type of modelling.

also yield tangible additional health benefits, including the avoidance of nearly 700 premature deaths and \$3.5 billion in costs to the public health system between today and 2035.¹⁴

Emission-intensity standards for coal- and natural gas-fired units

The need for long-term deep decarbonization raises the issue of why, in announcing its commitment to the regulatory phase-out of coal-fired power, the government chose to amend the timeframe by which the existing plant performance standard must be met, but not to strengthen the standard itself. In our June 2016 submission to Minister McKenna’s online consultation portal, the Institute made the case that the existing emissions performance standard based on “good-as-gas” (with respect to carbon dioxide emissions) should improve, because the emissions intensity of the most efficient gas-fired units (typically in the range of 350-375 tonnes per GWh) is now significantly lower than the 420 tonnes per GWh permitted in the existing regulations (and proposed as the basis for the new ones). In the U.S., the Clean Power Plan suggests existing natural gas combined cycle (NGCC) plants must meet a performance standard of 350 t/GWh by 2030.¹⁵

Although the original standard applied to coal units was chosen at least partly to ensure that plants continuing to operate beyond their useful lives would do so on the basis of a standard that was as “good-as-gas”, the deployment of higher-efficiency combined-cycle gas plants and other improvements in plant design have enabled CO₂ emissions efficiencies for natural gas-fired power below 420 kg/MWh. A comprehensive study of performance standards in the U.S. power sector (completed in 2009, before the original Regulations had been formulated) estimates that, on average, NGCC plants achieve an unabated CO₂ emissions rate between 344 and 379 kg/MWh.¹⁶ More recent findings from the U.S. National Energy Technology Laboratory suggests NGCC can reach emissions as low as 339 kg/MWh.¹⁷ Moreover, as previously mentioned, Canada’s 2011 Draft Regulations on coal-fired power originally stipulated a standard of 375 kg/MWh, which the subsequently published Regulatory Impact Analysis Statement (RIAS) argued was an appropriate mid-range rate accounting for what best-in-class natural gas could achieve, and what carbon capture and storage (CCS) could enable for new or end-of-life coal units in pursuit of compliance.¹⁸ Although we acknowledge that various factors—including fuel conversion efficiency, capacity factor, and location relative to sea level—affect plants’ performance, the case has so far not been made to Canadians that natural gas units are categorically unable to meet a more ambitious emission-intensity standard.

The performance standard retained for new gas-fired electricity should encourage the adoption of the best economically achievable technology, which is currently NGCC. More energy-efficient technology will enable significant additional GHG emissions reductions over the long run, ultimately making our 2030 and 2050 objectives more easily attainable.

With this in mind, it is also unclear why the government is proposing to set the emission-intensity limit for new natural gas-fired plants at the same level (or higher, in the case of smaller or converted units) as

¹⁴ It is Pembina’s estimate that the proposed regulations will only harvest approximately one third of the health and social benefits outlined in the report *Out with the coal, in with the new* (2016).

¹⁵ U.S. EPA, Clean Power Plan – Technical Summary for States. <https://web.archive.org/web/20170129051845/https://www3.epa.gov/airquality/cpptoolbox/technical-summary-for-states.pdf>

¹⁶ Edward S. Rubin, “A Performance Standards Approach to Reducing CO₂ Emissions from Electric Power Plants,” Pew Center on Global Climate Change, Coal Initiative Reports, White Paper Series (June, 2009), 7. <http://www.c2es.org/docUploads/Coal-Initiative-Series-Rubin.pdf>

¹⁷ US Department of Energy, National Energy Technology Laboratory, Office of Fossil Energy, “Life Cycle Analysis of Natural Gas Extraction and Power Generation,” p.32, (2014). https://www.netl.doe.gov/energy-analyses/temp/NaturalGasandPowerLCAModelDocumentationNG%20Report_052914.pdf

¹⁸ RIAS for existing regs, section 14. <http://www.gazette.gc.ca/rp-pr/p1/2011/2011-08-27/html/reg1-eng.html>

that for coal generation, and how it arrived at the specific proposal to allow fifteen years for coal-to-gas conversions. After all, natural gas is acknowledged as an acceptable substitute for coal-fired power at least partly because it is less polluting than coal when burned as a generating fuel. It should therefore be easier for natural gas plant operators to meet a more demanding standard. To achieve the ambition required of sound climate policy, we therefore ask that the ECCC consider updating and differentiating the emission-intensity limits applied to the different types of combustion engine.

Questions:

3. With respect to the new regulatory requirements being proposed for traditional coal-fired power plants, we respectfully request an elaboration of the reasons underlying the proposal to retain the emission-intensity standard used in the existing Regulations. Given that evidence (articulated above) exists to support a more stringent emissions performance standard for new natural gas assets, why did the Government of Canada not state its intention to set an improved standard for coal-fired power (that is, lowering it below 420 tonnes of CO₂/GWh)? What process, if any, did the government undertake to determine that it would maintain the existing, previously weakened, standard of 420 t/GWh?
4. Please clarify the proposal to implement a three-tier performance standard for natural gas-fired combustion engines (large, small, and converted). Why is the emission-intensity limit proposed for large natural gas-fired units (>100 MW) the same as that for coal-fired units when there is evidence showing new natural gas can be significantly more efficient? And what is the rationale for the less demanding limit of 500 t/GWh for smaller units (≤100 MW)?
5. Please provide a separate clarification of the proposal to allow boiler units converted from coal to natural gas a 15-year window (up to 2045) to comply with the proposed emission-intensity limit (of 420 t/GWh) applicable to conventional (i.e. new and modified) natural gas-fired units. What is the basis for a 15-year allowance to achieve compliance with the “regular” performance standard? Are there technical reasons to expect greater emissions from a converted unit over its useful life? What process did the government undertake to determine the interim emissions requirement of 550 t/GWh?

In the case of coal-fired generation, the Pembina Institute acknowledges that a tighter emissions standard will not substantially change unit operators’ incentives, insofar as the current standard of 420 t/GWh—once in effect—forces a decision either to close, to convert to a lower-emitting fuel (i.e. natural gas), or to invest in carbon-capture retrofits that render plant operations compliant with the emissions limit.¹⁹ However, in the case of new and modified natural gas-fired units, we urge the government to study the viability of achieving a stronger performance standard—and to justify the final intensity limits adopted. In the case of coal-to-gas conversions of existing boiler units, we ask that the government justify the proposal both for a weaker interim emissions requirement (550 t/GWh) and for the 15-year window/2045 deadline for units to achieve compliance with the base-level performance standard—that is, the standard that will be more or less immediately applied to new and modified large natural gas generators once the new regulations are officially issued.

The Institute acknowledges the intermediate benefits of enabling coal-to-gas conversions to happen in lieu of additional new gas capacity. However, when leniency on emissions-intensity limit is offered for coal-to-gas conversions, there is an increase in GHGs and air pollution compared to scenarios in which

¹⁹ The emission intensity standard for coal units can only be met with carbon capture and storage (CCS) technologies. It is the Pembina Institute’s view that only CCS *not* associated with enhanced oil recovery can achieve tangible, systemic GHG emissions reductions. On a life-cycle basis, using CCS to extract hydrocarbons will not deliver net GHG emissions reductions. We recommend the Government of Canada clarify its view on this matter to ensure the proposed compliance pathways result in net GHG reductions.

replacement generation is provided through new natural gas combined cycle units and renewables. Such an approach can only be justified if the conversion takes place earlier than the coal phase-out schedule.

Given the pace of technology development for non-emitting power facilities and the need to nearly decarbonize the economy by 2050 (and to achieve a 100% non-emitting electricity sector over this same period), the Government of Canada must send clear signals to prevent over-building and/or stranding of converted gas assets. Therefore, the Institute supports the proposed 15-year extension period, providing the federal regulations include a fixed end date and enforcement clauses to ensure that all coal-to-gas units will be phased-out within the 15-year grace period. More specifically, we recommend that if coal-to-gas units are held to a less stringent emissions standard, this be allowed for a maximum of 15 years from the time of conversion or until the year 2035, whichever comes first. An exception could be made for power plants that are scheduled to come offline in 2030 (as per the Institute's recommended coal phase-out schedule); in such cases, we recommend plants be allowed to operate at a less stringent emissions standard until the year 2040.²⁰

In reviewing the appropriate levels of the standards to be applied to new and modified natural gas-fired units (whether "large" or "small"), the government should also consider extending the performance requirements to existing units. Canadian provinces cumulatively operate 37 major power plants fuelled in whole or in part by natural gas, but the regulatory scheme as proposed runs the risk of doing little (or nothing) to address GHG emissions from these existing sources. This is a concern the government must take seriously if it truly wants 90% of Canadian electricity to be generated by carbon-free sources by 2030. Consequently, we strongly encourage the government to ensure that the standards for natural gas actually have an effect on the business-as-usual scenario for these sources of emissions. As coal-fired power is phased out, these sources will come to constitute the bulk of remaining CO₂ emissions in the electricity sector. The government should therefore examine what the potential impacts would be if it were to impose a deadline (e.g. 2030) for meeting the performance standards envisioned for new/modified natural gas-fired engines on existing units. For instance, given that simple cycle gas turbines routinely exceed a CO₂ emission-intensity of 500 t/GWh, would the imposition of more stringent performance standard on units of this kind affect the reliability of provincial grid systems (if any were to close)?

Ultimately, we hope the government will act now to establish a regulatory regime that is applicable to all natural gas-fired units, and that provides operators with increasing motivation over time for further reduction in emissions from gas plants, which, as noted, will soon become the primary source of emissions in Canada's electricity sector. Such action might prompt the deployment of CCS, or encourage offset emissions generated through the additional deployment of renewable energy. Should CCS technologies be used with gas plants, they should capture more than 90% of the emissions and be prevented from use in enhanced oil recovery (EOR) applications in order to achieve actual, verifiable carbon emissions reductions.

Questions:

6. Will the Government of Canada commit to reviewing its proposed emission-intensity limit for natural gas-fired plants in line with the most recent science on the efficiency of combined-cycle natural gas generators? Will it consider lowering this limit beyond what will be required of coal-fired plants in the post-2030 period (i.e. below 420 t/GWh) so as to motivate the uptake of CCS?
7. Given Canada's intention of achieving substantial GHG reductions over the long term, we recommend that ECCC consider the possibility of introducing a regular review process through which to gradually strengthen the adopted performance standard for natural gas-fired units. For

²⁰ We submit that emissions intensity standards should be met by the start of the stated years. For example, a target year of 2030 implies that the unit will meet the standard by December 31, 2029.

example, a five-year review cycle would allow for the periodic evaluation of technological and economic developments, and so provide a platform to assess the feasibility of lowering the standard(s) in line with Canada’s commitment to deep decarbonization. Will the Government of Canada clarify whether it intends to regularly review and, if appropriate, update its regulations for the electricity sector?

If the new regulatory standards applied to natural gas-fired plants are to reflect current science and encourage deeper emissions cuts, they must be strengthened—if not now, then soon. To that end we recommend the Government of Canada commit to a mandatory review of performance standards established under the Regulations, either every five years or triggered by significant changes in the regulatory landscape (i.e. new climate policies, rate of technology change, etc), whichever comes soonest.

Federal-provincial equivalency agreements and criteria air contaminants

Seizing the full potential of the emissions reductions from phasing out coal-fired power will require swift implementation of ECCC’s forthcoming regulations. It will also require an approach to regulatory design that enhances the protections afforded by existing instruments, such as the Base-level Industrial Emissions Requirements (BLIERs) governing the equipment of major emitters. The aim should be to strengthen, without duplication, existing physical standards and environmental outcomes. Accordingly, we ask that the government update its regulatory impact analysis statement to show how the benefits of the new regulations will be additional to what is already anticipated under a business-as-usual policy scenario, and how the new requirements will be incorporated into existing monitoring and compliance schemes. Clear communication of these elements should be provided to assist the electricity industry in adapting to the new regulatory landscape, and will help the environmental community better understand the anticipated benefits of the government’s November announcement.

Swift implementation, in turn, raises the prospect of negotiating an equivalency agreement with each province that seeks one. Nova Scotia, for example, has already indicated a wish to renegotiate its existing equivalency agreement under section 10 of CEPA.²¹ In light of the possibility that a stand-in provincial regime could be adopted—having been deemed to achieve an “equivalent” environmental outcome—even while resulting in a provincial extension of traditional coal-fired power beyond the 2030 federal deadline, it is essential that the federal government recognize that a national coal phase-out promises multiple improved health outcomes for Canadians. In doing so, it should acknowledge that these health outcomes are largely contingent on the avoidance of emissions of substances other than carbon dioxide.²² Still, history on this file suggests that the federal government is likely to contain its equivalency discussions with provinces to carbon dioxide alone.

Given that Minister McKenna’s remarks in November 2016 focused squarely on the health benefits of an accelerated coal phase-out to Canadians, federal-provincial negotiations must not conceive equivalency as hinging solely on avoided CO₂. Somewhat worryingly, there are already signs that this understanding of equivalency will be established as a precedent in Nova Scotia: when the province announced its commitment last November to implement a cap-and-trade system, and to join the federal effort to phase-out coal, it also stated its intention “to adopt a province-wide target that meets or exceeds Canada’s target of reducing emissions by 30 percent, from 2005 levels, by 2030.” While this aim is laudable in itself, our view is that it cannot encompass a complete and good faith understanding of equivalency, *if* the government’s intent in making the amended Regulations is to achieve *all* the benefits that would follow

²¹ “The Government of Canada announces plan with Nova Scotia to price carbon pollution and negotiate coal phase-out agreement” <http://bit.ly/2iAY5nw>

²² Benjamin Israël and Erin Flanagan, *Out with the coal, in with the new: National benefits of an accelerated phase-out of coal-fired power*, Pembina Institute (November 2016). <http://www.pembina.org/reports/out-with-the-coal-in-with-the-new-final-.pdf>

from taking coal-fired power offline nationally. We know this view is shared by many national and provincial health organizations representing doctors, nurses, public health professionals, public health advocates, and healthcare workers from across Canada.²³

While the premiers have the right to avoid regulatory duplication and to seek, in their own way, environmental outcomes equivalent to what federal regulations would prescribe under CEPA, the extent to which a provincial regulatory pathway may diverge from the “main road” established federally is not limitless. We therefore urge the federal government to ensure that the amended Regulations for coal-fired power, along with any new regulations for natural gas generation, provide for targeted reductions of (or separate emission-intensity limits for) the various air pollutants other than carbon dioxide.

Since equivalency agreements are established when provincial laws, “serv[ing] the same purpose and hav[ing] the same effect”²⁴ of any rules under CEPA, are in force, new federal regulations must clearly state a goal of reduced (and ultimately eliminated) emissions of *all* pollutants associated with burning coal. In particular, if the new federal regulatory requirements do not recognize and explicitly seek reductions in criteria air contaminants, or CACs (including particulate matters, sulphur and nitrogen oxides), as well as heavy metals such as mercury, we are concerned that equivalency agreements could then be sought and established purely with reference to the avoided CO₂ emissions that would have been achieved if the federal phase-out rules were in effect in a given province. The government should recognize that the full health and climate benefits projected from the discontinuation of coal-fired power depend on actual, physical, timely closures of these emission sources.

Questions:

8. In negotiating equivalency agreements with the provinces to accelerate coal phase-out and introduce performance standards for natural gas-fired electricity, will the federal government’s assessment of “equivalent environmental outcome” span pollutants other than carbon dioxide? Will it work to ensure that any and all equivalency agreements into which it enters will achieve equivalent reductions of *all* types of emission associated with coal-fired power, including CACs and mercury?
9. Please explain how the new regulations for coal- and natural gas-fired electricity will provide emissions reductions that are additional to the reductions of nitrogen oxide and sulphur dioxide emissions (2.065 Mt and 0.96 Mt, respectively)²⁵ that the government already expects to achieve through the Base-level Industrial Emissions Requirements, including the Multi-Sector Air Pollutants Regulations covering stationary engines (and the forthcoming final Guidelines for the Reduction of Nitrogen Oxide (NO_x) Emissions from Natural Gas-fuelled Stationary Combustion Turbines).²⁶

We urge the government to clarify how its regulations for coal and natural gas will complement and strengthen (rather than replicate) existing physical standards on industrial emitters. Operators of facilities

²³ See joint submission to this phase of consultation (regarding the Notice of Intent) from the Canadian Association of Physicians for the Environment, the Canadian Public Health Association, The Canadian Lung Association, The Asthma Society of Canada, the Registered Nurses Association of Canada, and others.

²⁴ Environment and Climate Change Canada, “Equivalency Agreements under the *Canadian Environmental Protection Act, 1999*” (last modified June 3rd, 2015). <https://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=DCDEC51D-1>

²⁵ Government of Canada, *Canada Gazette Part I*, “Multi-Sector Air Pollutants Regulations: Regulatory Impact Analysis Statement” (June 7, 2014), pp. 1321-1404. Accessed December 24, 2016: <http://www.gazette.gc.ca/rp-pr/p1/2014/2014-06-07/pdf/g1-14823.pdf>

²⁶ Environment and Climate Change Canada, “Summary of final and proposed instruments used to implement base-level industrial emission requirements (BLIERS)” (last modified June 29, 2016). <http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=138FDC7D-1>

and equipment already covered by BLIERS should be provided with a clear set of expectations as to how their allowable emissions profiles will change under the new regulatory regime.

Conclusion

The Pembina Institute supports the Pan-Canadian Framework on Clean Growth and Climate Change and the Government of Canada's Mid-Century Long-Term Low GHG Strategy. The electricity sector, with existing zero-emissions alternatives, can play a pivotal role in unlocking the scale of emissions reductions described in these two plans. The phase-out of coal power in particular represents the "low hanging fruit" of Canadian climate policy, and is an essential component of Canada's deep decarbonization pathway.

We appreciate the opportunity to comment on ECCC's Notice of Intent, and look forward to remaining engaged throughout the government's consultation process.

Yours sincerely,



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