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Nov. 15, 2010

Caroline Blais
Director, Electricity and Combustion
Environmental Stewardship Branch
Environment Canada
Gatineau, Québec
Sent by e-mail to: caroline.blais@ec.gc.ca

Re: Comments on proposed regulatory approach to coal-fired electricity generation

Dear Mme Blais,

Thank you for recently presenting to us Environment Canada's thinking on the way to implement former minister Prentice's proposed regulatory approach to coal-fired electricity. We appreciate your invitation to us to provide our perspective on this topic. We have detailed our views, analysis and recommendations in the appendix to this letter. We look forward to further discussions with you.

Sincerely,

M. J. Bramley

Matthew Bramley, Director, Climate Change

Tim Weis, Director, Renewable Energy and Efficiency Policy

CC: Steve McCauley, Michel Brazeau

Appendix

1. Overall concept

We strongly welcome the government's commitment in principle to put an end to conventional coal-fired electricity, as it is one of the largest sources of greenhouse gas (GHG) emissions and other air pollution in Canada. But reducing pollution from electricity generation also requires a massive scale-up in government support for renewable energy and for energy conservation and efficiency. Support for such a scale-up in the 2011 federal budget will be a key test of the government's seriousness about cleaning up our electricity system.

We believe that the proposed natural gas-based performance standard for coal-fired electricity is insufficiently stringent, for two reasons. First, it is incompatible with the government's commitment to ensure that 90 per cent of Canada's electricity is generated from zero-emitting sources by 2020.[1] Second, science shows we need to move as quickly as possible to zero GHG emissions. It is possible that natural gas may have some legitimate interim role as a transitional fuel (Pembina is currently studying this question and expects to have a clearer perspective in the near future), but this clearly does not go far enough to meeting either science-based goals or the Federal government's electricity targets. Replacing all our coal-fired capacity with only natural gas (or natural gas equivalent), over a 40–50 year time frame, would clearly be a missed opportunity to fully decarbonize Canada's electricity system.

In addition, allowing all coal-fired plants to operate without restriction — with no obligation to pay for the environmental damage that they cause — for 45 years is not consistent with the urgency of cutting Canada's GHG emissions. The government must address emissions from *all* coal-fired power generation, not just future or very old units. Under the current proposal, two-thirds of units currently operating will not be subject to the proposed performance standard until after 2020,[2] while nine existing units will continue operating past 2030 without constraint. Either a robust, broad-based carbon price, stringent performance standard applying to *all* existing units, or both, are needed to make adequate progress towards the government's national GHG target for 2020.

We strongly support the commitment to allow no use of offsets in complying with the proposed standard. There is too great a risk that the price of offsets will be too low to incent fuel switching away from coal. There is also a high risk that offsets will

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[1] Government of Canada, *Fifth National Communication on Climate Change: Actions to Meet Commitments Under the United Nations Framework Convention on Climate Change* (Ottawa, ON: Government of Canada, 2010), 41. Available online at http://unfccc.int/resource/docs/natc/can_nc5.pdf.

[2] Excluding units operated by Ontario Power Generation, all of which are scheduled to close before the end of 2014.

not represent genuine emission reductions.[3]

2. Level of natural gas-based performance standard
Minister Prentice announced that the proposed standard "will be based on parity with the emissions performance of high-efficiency natural gas generation."[4] We understand that Environment Canada originally intended this to mean a standard of 360 t CO_2e/GWh, but is now considering 420 t CO_2e/GWh.

A recent assessment of studies found that emissions rates for recently constructed natural gas combined-cycle plants are in the range of 344–379 t CO_2e/GWh, with an average of 367 t CO_2e/GWh.[5] Combined heat and power systems would result in even lower emissions, even if fueled by natural gas. If Environment Canada proceeds with a natural gas-based standard, we believe it should therefore be set at, at most, 360 t CO_2e/GWh.

3. End-of-life dates
Especially in light of our comments above on allowing unrestricted operation for 45 years, we are troubled by the suggestion in Environment Canada's backgrounder that: "Appropriate flexibilities where necessary would be considered in the process of developing the regulation, including with respect to the unique circumstances of certain units or classes of units in the determination of the end-of-life date."[6]

The minister made a clear commitment to a 45-year end of economic life in his June 23 speech, and we expect Environment Canada to stand by it, if not strengthen it.

4. New coal plants before 2015
In his June 23 speech, Minister Prentice committed to "guard against any rush to build non-compliant coal plants in the interim." In light of the urgency of moving to deep GHG reductions, new coal plants without CCS are unacceptable *now*. The minister's commitment must therefore be reflected in the regulation. The simplest way to do this would be to make the performance standard for new plants apply

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[3] P.J. Partington, *Comments on the Proposed Federal Offset System, "Canada's Offset System for Greenhouse Gases"* (Drayton Valley, AB: The Pembina Institute, 2009). Available online at http://www.pembina.org/pub/1868.
[4] Hon. Jim Prentice, *Announcement — Canada shows leadership on climate change and the environment,* address at National Press Theatre, 23/06/2010. Available online at http://www.ec.gc.ca/default.asp?lang=En&n=6F2DE1CA-1&news=BB5AC3DC-837A-406E-AD28-B92ED80F5A81.
[5] Edward Rubin, *Coal Initiative Reports: A Performance Standards Approach to Reducing CO_2 Emissions from Electric Power Plants* (Arlington, VA: Pew Center on Global Climate Change, 2009). Available online at http://www.pewclimate.org/publications/report/coal-initiative-series-performance-standards-approach-reducing-co2-emissions-ele.
[6] Environment Canada, *Key Elements of Proposed Regulatory Approach*, backgrounder, 20/08/2010. Available online at http://www.ec.gc.ca/default.asp?lang=En&n=714D9AAE-1&news=55D09108-5209-43B0-A9D1-347E1769C2A5.

immediately, not in 2015.

5. CCS-readiness

The minister's speech stated that "new coal-fired plants that incorporate carbon capture and storage technology will be exempt from the standard until 2025."

- Firstly, there is no convincing rationale for delay to 2025; CCS is not likely to be markedly less expensive in 2025 than earlier, so the anticipation of falling costs does not appear to be an adequate justification. Further, several states in the U.S. already require similar amounts of capture and storage from new plants *today*. These include California, Washington, Illinois and Montana.[7] For example, Illinois requires new coal plants to capture an increasing amount of emissions based on when they are scheduled to commence operation at time of construction. Units scheduled to open before 2016 must capture and store 50% of their emissions. 70% capture is required for plants opening in 2016 or 2017, while plants switching on after 2017 must capture 90% their emissions.[8] British Columbia currently requires that any new coal-fired power plant capture 100% of its emissions (and by 2016 will require all new and existing electricity generating facilities to have net zero emissions).[9] Clearly, waiting until 2025 to require a plant to capture roughly half of its emissions is unjustified.

- Should Environment Canada choose to proceed with this exemption, we understand the minister's commitment to mean that *some* CO_2 should be captured and stored from day one of a plant's operation.

- In addition, we recommend that the regulation require the amount of CO_2 captured and stored to increase in steps between startup and 2025 (and that the regulation disallow situations where the initial amount of CO_2 stored would not be increased until 2025).

- The regulation must give Environment Canada the power to legally enforce plants' plans or commitments to implement CCS during the period before 2025.

6. Biomass firing or co-firing

One potential means for units to comply with the proposed regulation is to co-fire biomass (typically woody biomass) with coal. Co-firing is a demonstrated

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[7] Rubin, 7.
[8] Illinois General Assembly, SB 1987, Sec. 1-10. Available online at http://www.ilga.gov/legislation/publicacts/95/PDF/095-1027.pdf.
[9] B.C. Legislature, *Greenhouse Gas Reduction (Emission Standards) Statures Amendment Act*, Bill 31-2008, Divisions 3–4. Available online at http://www.leg.bc.ca/38th4th/3rd_read/gov31-3.htm.

technology that can be integrated with most kinds of boilers with minimal modifications;[10] however, biomass co-firing at rates high enough to meet the gas standard is currently rare.[11] A more extensive retrofit to fire 100% biomass (known as "repowering") is another option currently being adopted at units in Europe and the U.S.[12]

In either case, the regulation will need to associate a deemed CO_2 emissions intensity to different categories of biomass. It will not be environmentally acceptable to deem that intensity to be zero, because the direct CO_2 emissions from burning biomass may not be fully offset by vegetation re-growth (particularly where land-use change occurs), and because there may be other significant emissions from the lifecycle of the biofuels, depending on the feedstock.[13] In particular, there is considerable concern about indirect emissions from land-use changes induced by crop-based biofuel production: these emissions must be taken into account in the deemed intensity factors for these fuels to ensure that the regulation realizes the full GHG reductions intended.

7. Emission reductions relative to business-as-usual

The central question of public interest with any regulations aimed at reducing emissions is the quantification of the emission reductions resulting. The only meaningful definition of the benefits of specific regulations is the extent to which they make a difference relative to a credible business-as-usual scenario — i.e., one without the regulations. Pembina therefore repeats the request that we have already made to Environment Canada that the department divulge its characterization of the scenarios with and without the proposed regulation in 2020, 2025 and 2030 at the individual plant level. Without this information, stakeholders cannot have confidence in the emission reductions that will be claimed in the Regulatory Impact Analysis Statement. We believe that transparency demands that Environment Canada validate those plant-level characterizations with stakeholders, and Pembina is eager to participate in that process.

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[10] Ausilio Bauen et al., *Bioenergy — a Sustainable and Reliable Energy Source: a review of status and prospects* (Paris, France: IEA Bioenergy, 2009). Available online at http://www.ieabioenergy.com/LibItem.aspx?id=6479.

[11] One example is Vasthamnsverket in Sweden, which has co-fired up to 70% wood pellets with coal (by mass). See Yimin Zhang et al., "Life Cycle Emissions and Cost of Producing Electricity from Coal, Natural Gas, and Wood Pellets," *Environmental Science and Technology* 44 (2010), Supporting Information.

[12] Ibid.

[13] Timothy Searchinger et al., "Fixing a Critical Climate Accounting Error," *Science* 326 (2009), 527–528. For a perspective on standard-setting for GHG emissions from biomass, see Judith Bates et al, *Minimising greenhouse gas emissions from biomass energy generation* (Bristol, UK: Environment Agency, 2009). Available online at http://www.environment-agency.gov.uk/static/documents/Research/Minimising_greenhouse_gas_emissions_from_biomass_energy__generation.pdf.