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MEMORANDUM TO MINISTER

POTENTIAL FEDERAL/PROVINCIAL APPROACHES TO CARBON PRICING

(For Information)

PURPOSE

To provide you with the attached presentation on carbon pricing and preliminary options for action in collaboration with the provinces and territories.

SUMMARY

- The two main approaches to implement economy-wide carbon pricing are cap-and-trade systems and carbon taxes. A cap-and-trade system provides certainty of achieving a desired level of emission reductions, with the price of carbon being set by the market. Conversely, a carbon tax provides price certainty but allows the market to determine the resulting level of emission reductions.
- There are also options for more targeted approaches to carbon pricing that could apply to specific sectors or sources of emissions.
- A nationally consistent approach to carbon pricing with broad coverage of greenhouse gas emissions would provide a level playing field for industry and ensure that emission reductions are achieved at the lowest possible cost. The four largest provinces have already implemented carbon pricing measures or are in the process of doing so, so it will be important for the federal government to integrate provincial action into its plans to avoid duplication and unneeded complexity.
- Officials will be briefing you on carbon pricing and options for Canada on November 23. An advance copy of the briefing materials is attached.

Michael Martin
Deputy Minister
c.c. Siddika Mithani

Siddika Mithani
Associate Deputy Minister
c.c. Michael Martin

Environment Paper / Papier Bio-Logé

Attachment (1):

- *Deck: Potential federal/provincial approaches to carbon pricing, November 2015*



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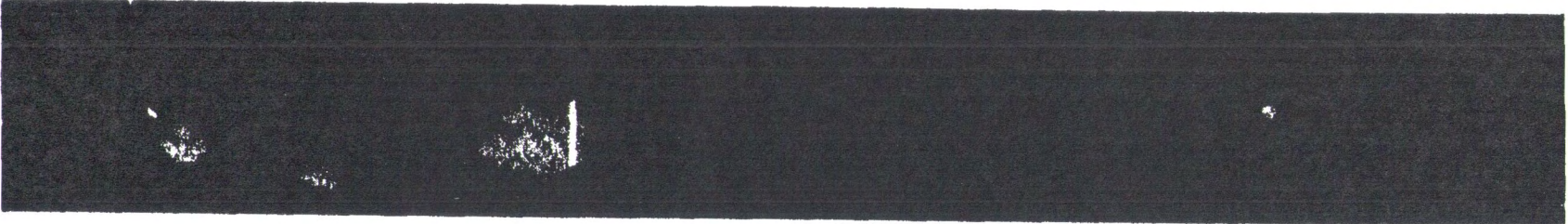
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POTENTIAL FEDERAL / PROVINCIAL APPROACHES TO CARBON PRICING

**Briefing of the Minister of the
Environment and Climate
Change**

November 2015

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Contents

- Carbon pricing: cap and trade, carbon taxes
- Provincial and international experience
- Research on carbon pricing and emissions reductions
- Options for integrated federal/provincial/territorial approaches



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Carbon pricing tools

- Two main policy tools to establish a national carbon price:
 - Cap-and-trade and Carbon tax
- Cap-and-trade provides certainty of achieving desired level of reductions
 - Carbon price set by the market
- Carbon tax provides price certainty
 - Level of emission reductions determined by the market
- Both
 - incent emissions reductions at the lowest cost
 - incent the same level of reductions at a given price
 - can raise significant revenue
- Can adjust either approach to meet specific emissions or price objectives
- Tax matters are the purview of the Minister of Finance



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Cap-and-trade: how it works

- Government sets annual limits on allowable emissions (“cap”)
 - Annual cap decreases over time towards desired level
- Government issues allowances equal to the cap at beginning of compliance period
 - Allowances may be distributed for free, auctioned, sold at fixed price or by a combination of approaches
 - Free allowances often used to address competitiveness concerns and to enable transition to a carbon price
 - Can be phased-out over time
- At end of each compliance period, regulated entities must submit one allowance (or other eligible unit) for each tonne of GHGs emitted
 - Creates incentive for covered entities to reduce their own emissions up to point where it becomes less expensive to purchase allowances from another entity (“trade”) than to continue in-house reductions
- Price of allowances (carbon price) will vary over time, depending on supply and demand



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Cap & trade versus carbon tax: considerations

- **Cap-and-trade**
 - Direct link to ultimate goal of emissions reductions
 - Ability to use free allocation of allowances to address competitiveness issues and carbon 'leakage'
 - Ability to link with other jurisdictions, lowering the overall cost of mitigation
 - Can also link to unregulated sectors via offsets
 - Can use price floors and ceilings to reduce price volatility – providing some of the stability of a tax

- **Carbon tax**
 - Cost predictability for affected entities; provides stable incentive to reduce emissions and adopt clean technologies
 - Exemptions could address competitiveness issues and carbon leakage
 - Simpler to develop, implement and administer
 - Avoids possibility of 'windfall' profits from over-allocation of free allowances under cap-and-trade



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Canadian and international experience

- Four Canadian provinces have carbon pricing planned or in place
 - Alberta: variant on cap-and-trade (focuses on emissions intensity not absolute emissions), for large industry and power plants only (under review)
 - BC: carbon tax at \$30/t, covering all fossil fuel use
 - Quebec: cap & trade covering fossil fuels, large industry; linked with California
 - Ontario: cap-and-trade planned for 2017, covering fossil fuels and large industry, linked with QC and California
- Significant experience with both tools internationally
 - Carbon taxes: first implemented in Nordic countries in early 1990s; now in place in 13 countries, with a wide range of prices
 - Cap-and-trade: in use for air pollution since 1990s; first implemented for GHGs in Europe in 2005; subnational systems in U.S., China, Japan; coverage and prices vary
- See Annex 1 for more detail



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Modeling of pricing and emissions reductions

- External modeling
 - Starting in 2015, meeting Canadian targets would require a carbon price, rising to \$100 by 2020; \$200-\$300/t by 2050
 - Delays in implementation significantly increase required price

- See Annex 2 for more detail



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Complementary measures

- Regardless of federal carbon pricing system, likely need complementary measures to meet ambitious target
 - To incent reductions in sectors/areas not covered by pricing
 - To counteract other barriers to reductions not fully addressed by pricing
- Existing GHG regulations should continue and could be tightened (Annex 4)
- Could develop additional, complementary regulations
 - Venting and fugitives regulations for oil and gas sector
 - Significant source; not suited to cap-and-trade because hard to quantify emissions
 - Regulate hydrofluorocarbons (HFCs)
 - Some HFCs many times more potent than carbon dioxide
 - Natural gas-fired electricity regulations
 - To ensure new units are built to desired performance level
- Also important to align investments in infrastructure, innovation and programs (e.g., technical assistance) with regulatory measures



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ANNEX 1: PROVINCIAL AND INTERNATIONAL EXPERIENCE



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Provincial carbon pricing regimes: Alberta

- 2007 Specified Gas Emitters Regulation
 - For facilities emitting >100 kt CO₂e/yr
 - Stringency and cost of compliance increased in 2015
 - Facilities required to reduce emission intensity in 2016 by 15% and in 2017 by 20% from baseline level or hold eligible compliance units for emissions above limit
 - Credits issued to facilities that do better than their targets
 - Offset credits issued for verified reductions in activities not subject to regulation
 - Technology fund credits sets de facto maximum price (\$15/t in 2015; \$20/t in 2016; \$30/t in 2017)
- Firms face cost only for marginal emissions beyond their targets; average cost for regulated entities is ~\$1.80/t (rising to ~6/t in 2017)
- Reviewing overall approach to climate change



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Provincial carbon pricing regimes: BC

- Carbon tax on fossil fuels implemented in 2008 (~70% of provincial emissions)
 - Phased-in over four years, beginning with a \$10/t price
 - Commitment to keep current tax rate of \$30/t until 2018
 - Revenue neutral: revenues used to reduce tax rates for individuals, small business, corporations
 - Additional tax subsidies to low-income families and rural residents
- Announced plans to develop baseline-and-credit trading system for liquified natural gas production and coal-fired electricity
- Consulting on climate strategy renewal: draft expected in Dec. 2015 and final in March 2016



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Provincial carbon pricing regimes: Quebec

- Economy-wide cap-and-trade regulation implemented in 2013
 - Industrial facilities >25 kt CO₂e per year)
 - Expanded in 2015 to cover fuel producers, distributors and importers
 - Now covers about 85% of emissions in the province

- Linked to California's cap-and-trade system
 - Quebec and California entities can use each other's units for compliance:
 - Allowances, offset credits, early action credits
 - Conduct joint auctions, operate a joint tracking system for allowances, cooperate on market surveillance and regulatory enforcement
 - Common carbon price in both jurisdictions
 - Clearing price in August 2015: US\$12.52 (CA\$16.39)

- Current projections indicate Quebec likely to be net importer of California units to 2030
 - Due to availability of lower cost reduction opportunities in California
 - Structure of economy and many subsidies and programs to support energy efficiency and emission reductions



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Provincial carbon pricing regimes: Ontario

- Developing cap-and-trade system similar to Quebec's
 - Covering industrial facilities, power plants, end-use fossil fuels
 - Free allocation to industry to address competitiveness
- Planning to link with Quebec and California, launch January 1st 2017
- Draft proposal for consultation released November 2015



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International cap & trade experience

- European Union Emissions Trading System (since 2005)
 - Covers power plants, industrial emitters, commercial airlines: ~45% of EU CO2 emissions
 - Allowances trading at ~\$12/t currently
- Regional Greenhouse Gas Initiative (RGGI) (since 2008)
 - Joint system managed by 9 U.S. states
 - Covers electricity generation; aims at reducing CO2 emissions to 45% below 2005 levels by 2020
 - Latest auction clearing price (Sept 2015) \$9/t
- California (since 2013)
 - Covers ~85% of GHG emissions
 - Linked with QC ; allowances traded at \$16.59/t in August 2015
- China
 - 7 regional and municipal pilot schemes launched in 2013 and 2014, testing different design features.
 - November 2015 spot prices ranged from \$2-\$9/t
 - In September 2015, China announced plans for a national ETS in 2017 for power generation and industrial sectors
- New Zealand (2008), Switzerland (2008), Australia (2012-14), Kazakhstan (2013), South Korea (2015)



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International carbon tax experience

Country	Rate*	Coverage
Finland (1990)	\$50/t (2013)	All fossil fuels
Sweden (1991)	\$223/t (2014)	All fossil fuels; exemption for electricity generation; industry pays ½ of tax
Norway (1991)	\$5-\$92/t (2014)	Covers ~55% of emissions; other emissions covered by EU ETS
Denmark (1992)	\$43/t (2014)	All fossil fuels; partial exemptions for sectors covered by EU ETS and for some other sectors
Costa Rica (1997)	3.5% tax	All fossil fuels
Switzerland (2008)	\$90/t (2014)	All fossil fuels except if used for energy; exemptions for EU ETS
Iceland (2010)	¾ of EU ETS allowance price	All fossil fuels
Ireland (2010)	\$28/t (2013)	Fossil fuels used by homes, offices, vehicles, farms; fill gaps in EU ETS
Japan (2012)	\$2.70./t (2014)	All fossil fuels
U.K. (2013)	\$21/t (2014)	Electricity generation
France (2014)	\$21/t	Fossil fuel consumption not covered by EU ETS
Mexico (2014)	\$13-67/t (2014)	All fossil fuels; only charged on carbon content beyond a natural gas benchmark; capped at 3% of sales price.
Chile (2014)	\$7/t	Large factories, power plants (~55% of emissions); starts 2018

*rates reported in USD or EUR converted to CAD at November 2015 exchange rate



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ANNEX 2: RESEARCH AND MODELING



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Reviews of carbon pricing effectiveness

- Ex-post studies have shown that carbon prices can be effective at curbing emissions
 - Impacts obviously depend on tax rate and exemptions
 - Most studies have not identified a robust link with negative economic or competitiveness impacts
- BC carbon tax
 - 2015 summary of seven studies: GHG emissions 5 to 15% below BAU; no statistically significant impact on economy (BC's economy actually grew more than rest of Canada)
- RGGI
 - Econometric study found annual reduction of 638 tonnes/thousand people from 2009-12
- California ETS
 - Covered emission fell by ~4% in first compliance year of 2013, while uncapped emissions increased slightly
- EU ETS
 - Review of 56 empirical studies found avg 3% reduction across all covered sectors and countries in 2005-07, with no evidence of strong negative economic impact
 - 2015 study: 86%-89% reductions from 2005-12 were due to 08/09 economic crisis, rather than ETS itself
- U.S. Sulphur dioxide allowance trading program
 - Longest-standing emissions trading program
 - Summary of economic research over 20-year period showed cost savings from 15-19%, compared to other possible approaches (command-and-control)
 - Program implementation costs significantly below ex-ante estimates

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ANNEX 3: CAP-AND-TRADE DESIGN



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Annex 4: Federal GHG regulations in place and under development

- Existing regulations
 - Light duty and heavy duty vehicles
 - Coal-fired electricity generation
 - Renewable fuels
 - Also: energy efficiency standards (NRCan)

- Regulations announced and under development
 - Methane from oil and gas
 - HFCs
 - Natural gas-fired electricity generation
 - Chemical and fertilizer production



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