

CARBON PRICING AS A CLIMATE MITIGATION TOOL: UNDERSTANDING THE LEGISLATIVE FRAMEWORK

Professor Sharon Mascher
Faculty of Law, University of Calgary

42% of Canadians see climate change as a national emergency: poll

BY CORMAC MAC SWEENEY
POSTED AUG 12, 2019 11:37 AM EDT LAST UPDATED AUG 12, 2019 AT 11:38 AM EDT



NATIONAL



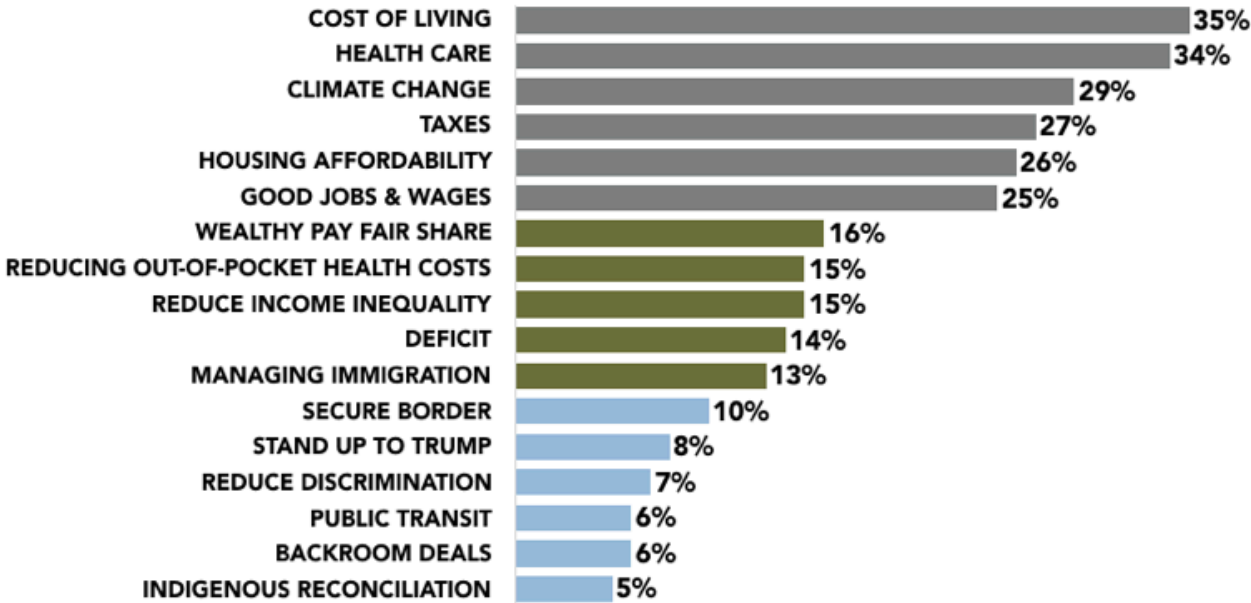
A global warming sign. GETTY IMAGES

A new poll shows most Canadians believe climate change is currently a national emergency, or will become one soon.

“Forty-two per cent of Canadians would now describe climate change as an emergency,” David Coletto with Abacus Data, explained.

“Another 20 per cent say that it’s not yet an emergency but they think it will be one in the next few years.”

TOP 3 ISSUES IMPACTING YOUR VOTE



Thinking to the next election, which THREE issues are most likely to impact how you will vote?

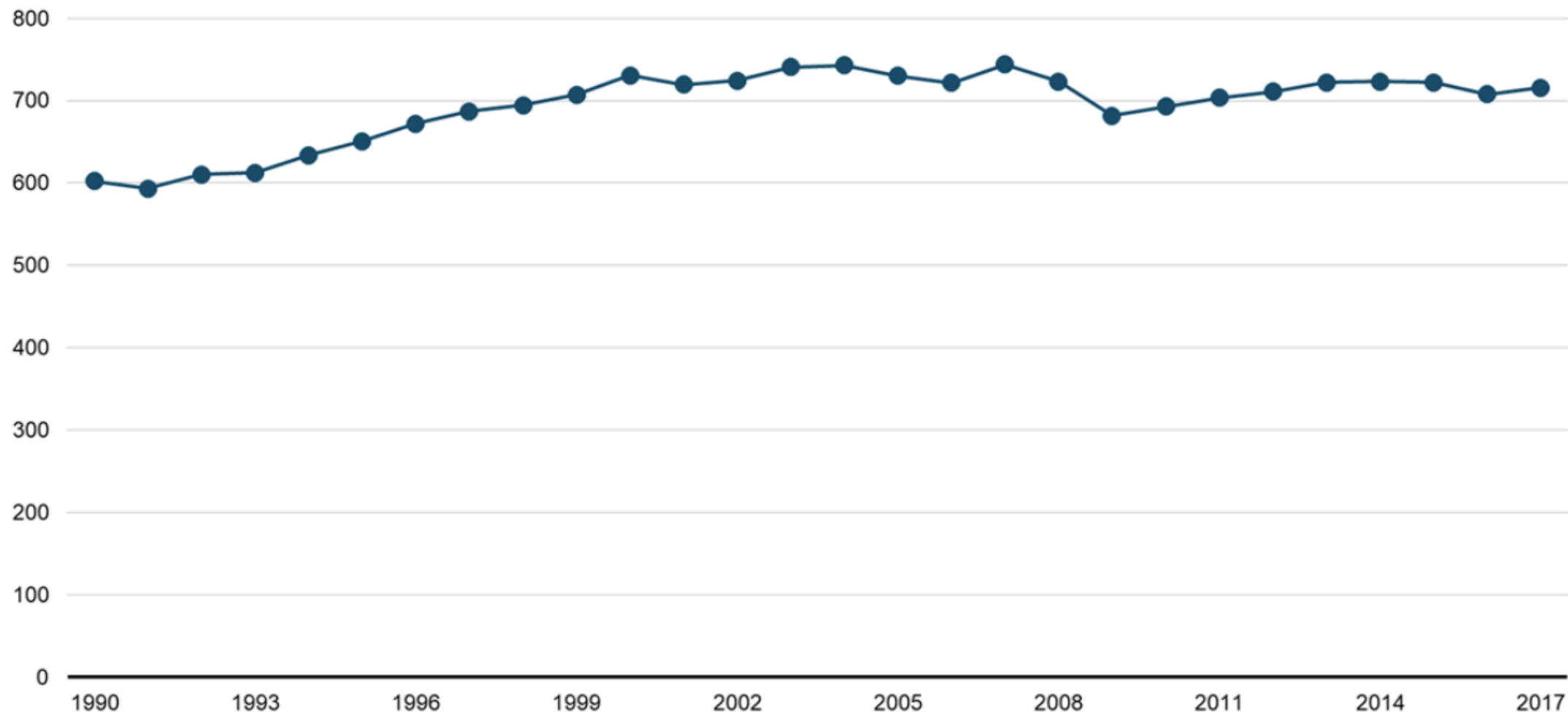
OUTLINE:

- I. Canada's Emission Profile and Reduction Commitments
- II. Choices of legal / regulatory /policy tools to reduce GHG emissions
- III. The theory of carbon pricing
- IV. International experience with carbon pricing
- V. Pan-Canadian carbon pricing framework
 - a) Existing carbon pricing systems
 - b) Pan-Canadian carbon pricing framework
 - c) Pan-Canadian backstop

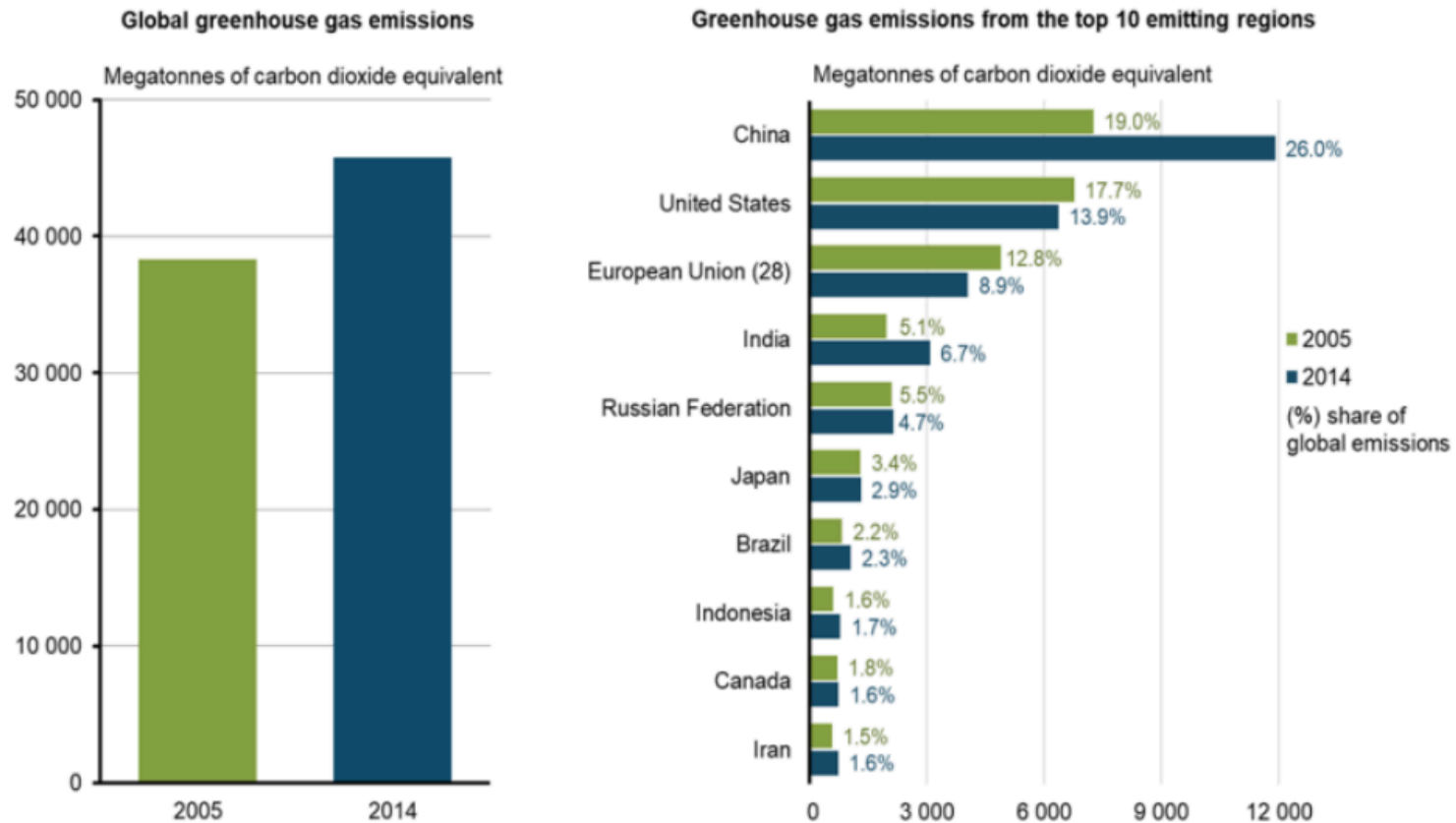
I. CANADA'S EMISSIONS PROFILE AND REDUCTION COMMITMENTS

Greenhouse gas emissions, Canada, 1990 to 2017

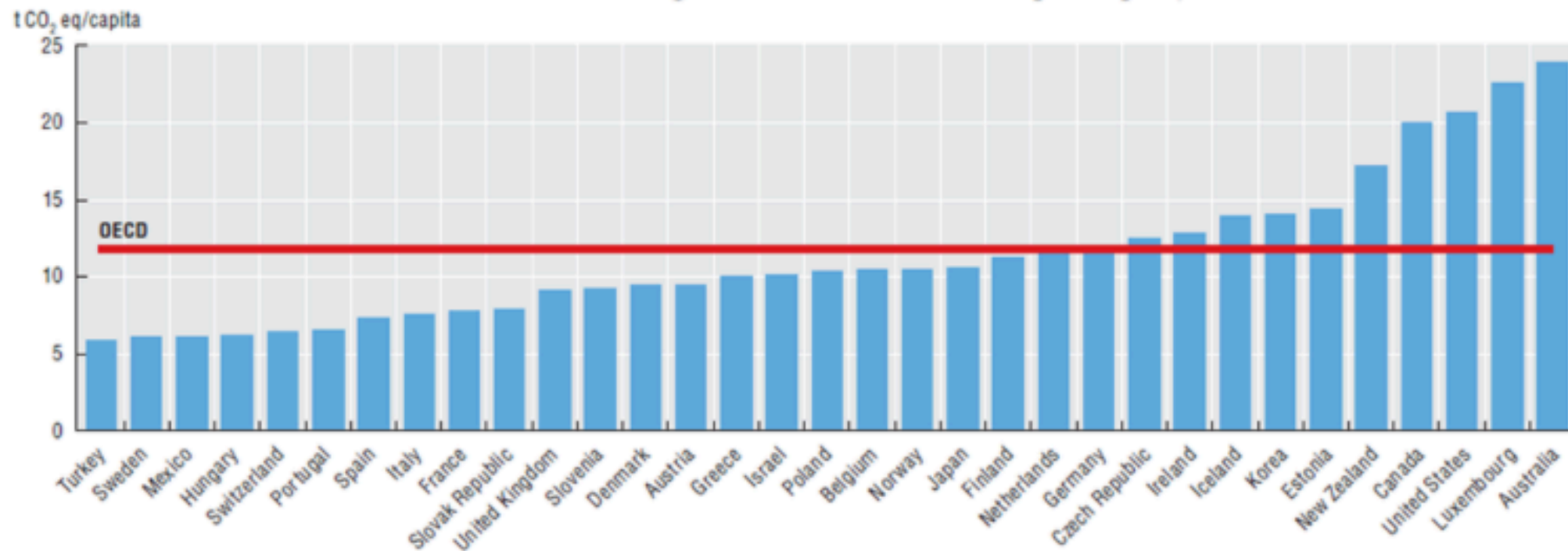
Megatonnes of carbon dioxide equivalent



Greenhouse gas emissions for the world and top 10 emitting countries and regions, ¹ 2005 and 2014



Greenhouse gas emission intensities per capita, 2012



Source: OECD (2014), "Greenhouse gas Emissions by Source", OECD Environment Statistics (database); UNFCCC (2014), Greenhouse Gas Inventory Data.


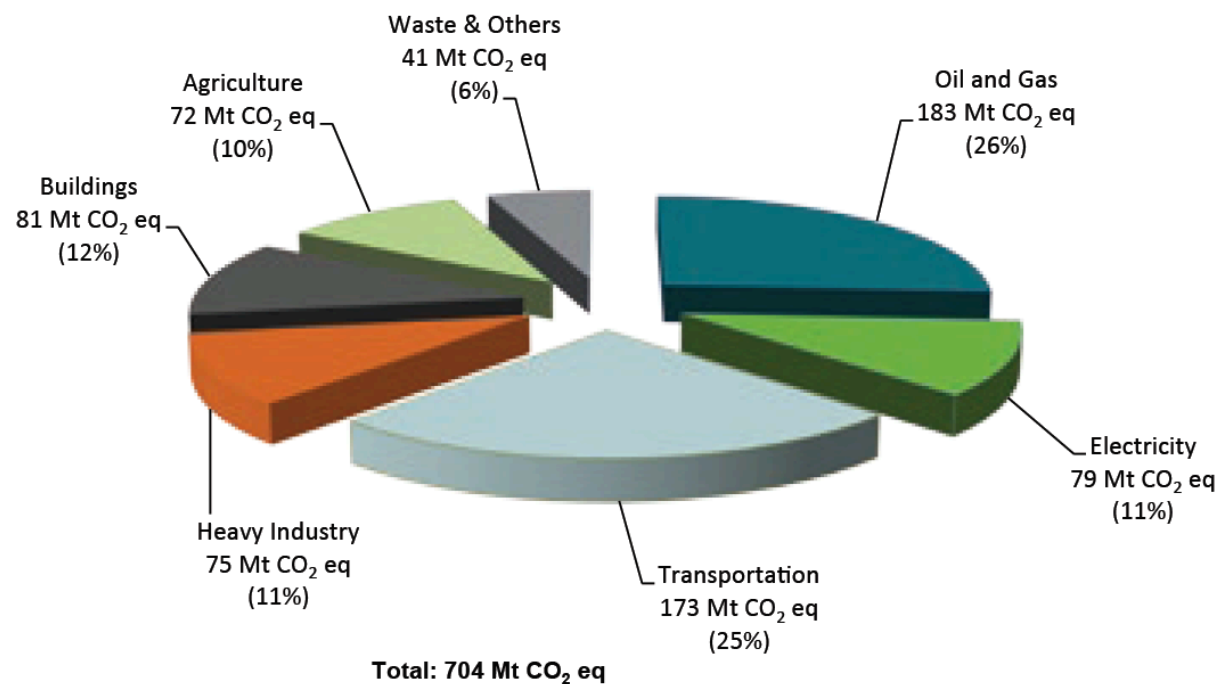
StatLink  <http://dx.doi.org/10.1787/888933261683>

Figure S-8 **Breakdown of Canada's Emissions by Economic Sector (2016)**



Note: Totals may not add up due to rounding.

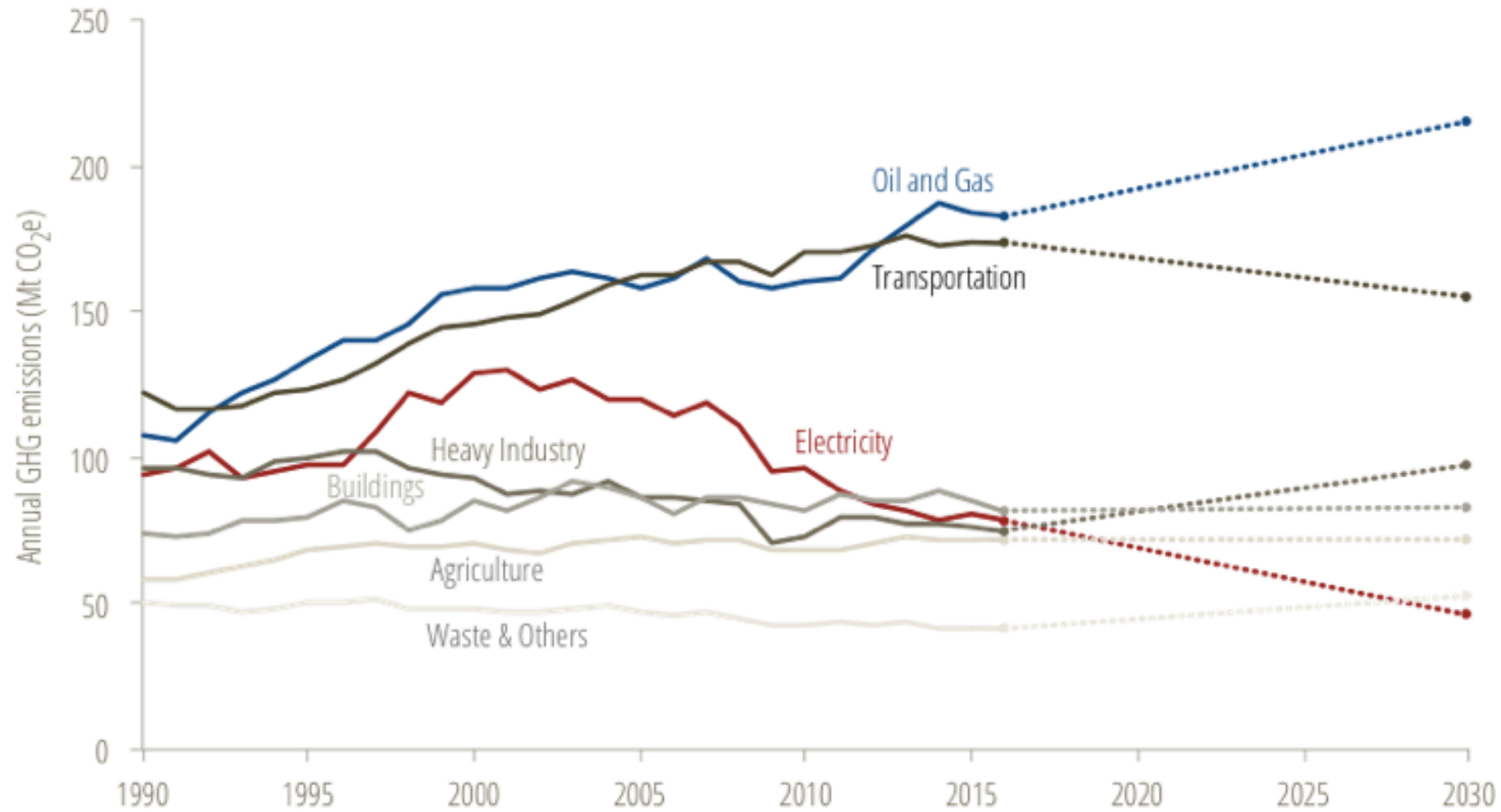
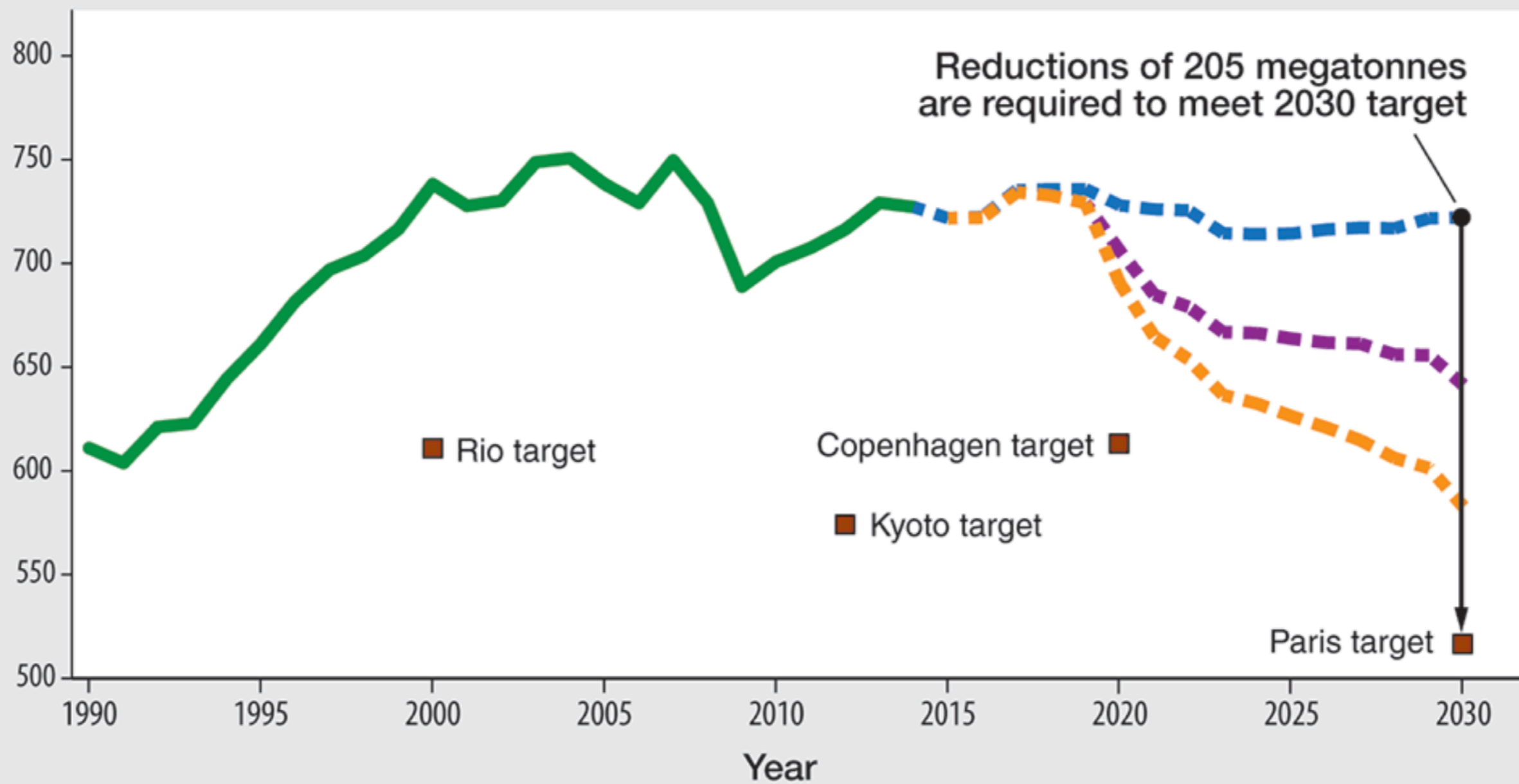


Figure 5 — Historical GHG emissions by economic sector, with projections to 2030.

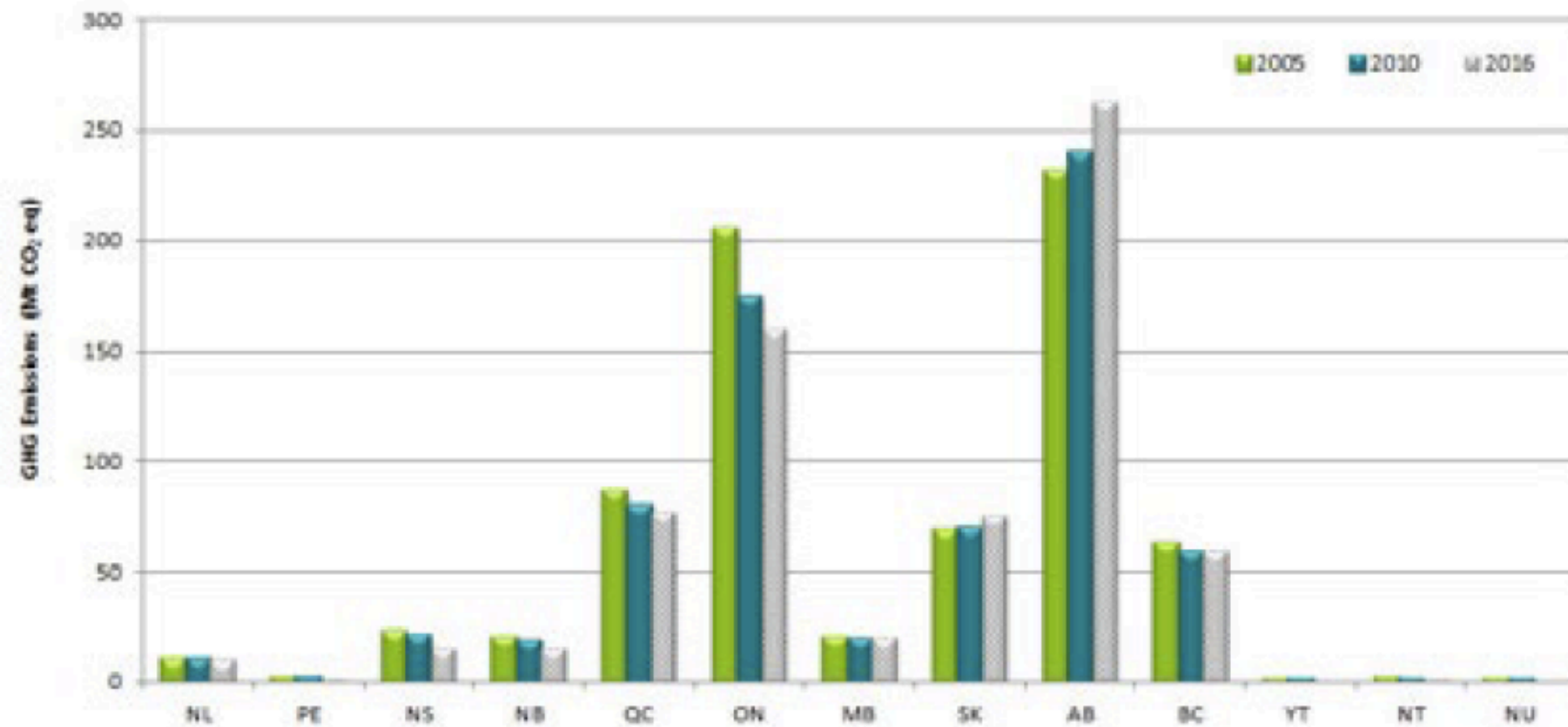
**CANADA'S 2017 NATIONALLY DETERMINED
CONTRIBUTION SUBMISSION
TO THE UNITED NATIONS FRAMEWORK
CONVENTION ON CLIMATE CHANGE**

To contribute to the achievement of the Paris Agreement, Canada is committed to reduce greenhouse gas emissions by 30 percent below 2005 levels by 2030. In addition to addressing gases covered under the UNFCCC, Canada is taking action to reduce black carbon – a short-lived climate pollutant of particular significance in the Arctic due to its contribution to Arctic warming. In Canada, the Arctic has already warmed by 2.2 degrees between 1948 and 2013.

Greenhouse gas emissions (in megatonnes)



Emissions by Province in 2005, 2010 and 2016



II. CHOICES OF LEGAL / REGULATORY / POLICY TOOLS TO REDUCE GHG EMISSIONS



- a) Direct regulation
- b) Incentives and rebates
- c) Market-based carbon pricing mechanisms
- d) Approval processes that incorporate climate change considerations

*Not mutually exclusive

A) DIRECT REGULATION: STANDARDS/PHASE-OUTS/PROHIBITIONS/LEGISLATED EMISSIONS LIMITS

- regulations under the *Canadian Environmental Protection Act* (six Kyoto GHGs listed as “toxic substances” in 2005)
 - Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations (SOR/2013-24)
 - Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations (SOR/2010-201)
 - Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity (SOR/2018-261)
 - Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations (including carbon capture and storage incentives) (SOR/2012-167)
 - Renewable Fuels Regulations (SOR/2010-189)
 - proposed Clean Fuel Standard (liquid stream 2022 and gaseous and solid fuels 2023)
 - Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector)(SOR/2018-66)
 - * Ozone-depleting Substances and Halocarbon Alternatives Regulations (SOR/2016-137)

B) INCENTIVES/REBATES

- federal targets for zero-emission vehicles (ZEV) reaching 10% of light-duty vehicles (LDV) sales per year by 2025, 30% by 2030 and 100% by 2040
 - Zero-Emission Vehicle Infrastructure Program
 - Zero-Emission Vehicle rebates (fed) plus some provinces
- Energy Efficiency Alberta
 - solar PV rebates (no longer accepting applications)
 - business energy efficiency incentives
 - green loan guarantee program
 - home improvement rebates

C) MARKET-BASED CARBON PRICING MECHANISMS

- (i) Carbon tax / levy
- (ii) Cap-and-trade systems
- (iii) Baseline and credit systems
- (iv) Hybrid systems

(I) CARBON TAX / LEVY

a fixed fee per tonne of GHG emissions (tCO₂e)

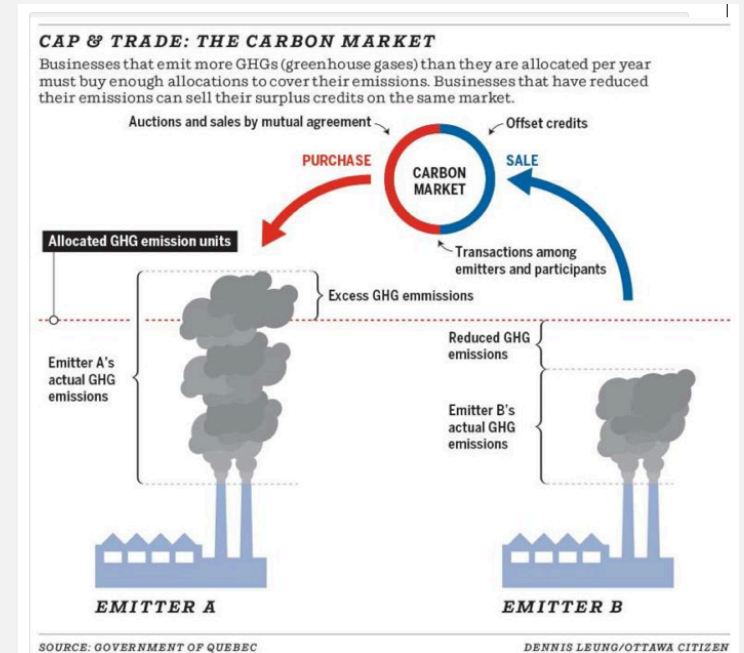
revenue raised is either be rebated (revenue neutral) or used to fund green initiatives

every tCO₂e exposed to carbon price



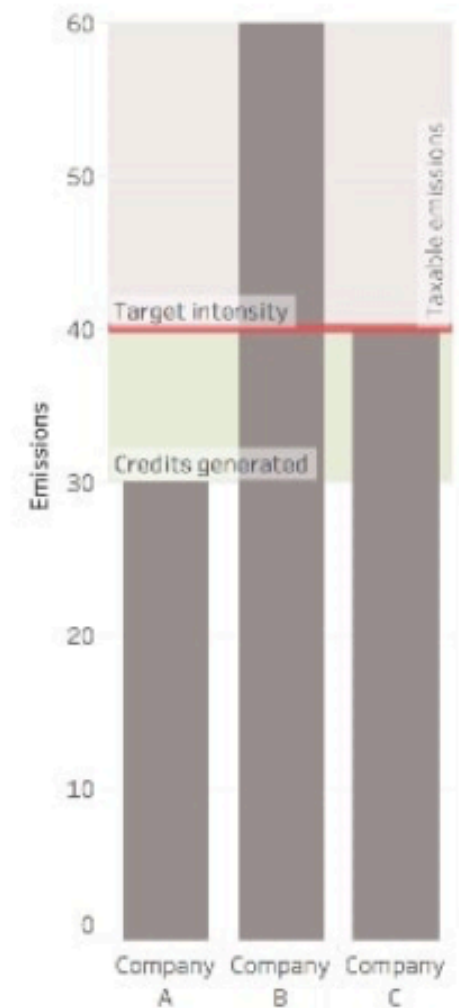
(II) CAP-AND-TRADE SYSTEM

- overall **cap** set on all ghg emissions from covered sectors; the cap declines over time
- allowances permitting one tonne of GHG emissions in an amount equal to the cap are auctioned or given to entities within the covered sectors
- at the end of each reporting period, each entity within a sector covered by the system must remit an one allowance for each tonne of GHG emitted
- Covered entities can **trade** (buy and sell) allowances, creating an incentive to cut emissions where most cost-effective ways
- entities not covered by the system who reduce GHG emissions below business as usual may be able to generate **offsets** to sell covered entities



(III) BASELINE AND CREDIT OR OUTPUT BASED PRICING SYSTEM (OPBS)

- covered entities must reduce **emissions-intensity per unit of production** by a specified percentage to reach an emissions-intensity target
- covered entities may be able to meet their emissions intensity target through various compliance options including:
 - on-site emissions intensity reductions;
 - purchasing credits from other covered entities who have reduced below the target;
 - purchasing offsets generated by an entity outside the system who has reduced emissions below business as usual; or
 - paying into a fund at a fixed rate



DIFFERENCES BETWEEN THESE THREE MARKET-BASED MECHANISMS?

- Carbon tax: fixed price; no cap on emissions; no flexibility; absent exemptions
pretty straight forward; every tonne of CO₂e directly exposed to carbon price
- Cap-and-trade: overall cap on emissions; no fixed price; flexibility to acquire allowances or offsets from others who may more efficiently reduce emissions; every tonne of CO₂e directly exposed to carbon price unless allowances given away for free
- Baseline-and-credit: no cap on emissions; focused on emissions-intensity and so no incentive to reduce overall production; only emissions over the target exposed directly to price; maximum price is fixed by cost of paying into fund

III. THE ECONOMIC THEORY OF CARBON PRICING

III. THE THEORY OF CARBON PRICING

- Approach to reduce greenhouse gas emissions (with carbon as a proxy) that uses market mechanisms by setting a price that creates a financial incentive for polluters to reduce emissions or emissions intensity.
- GOALS:
 - internalize cost of emitting GHGs (addressing market failure of unpriced externality)
 - behavior change (consumers, businesses, and investors);
 - technological innovation;
 - allow flexibility if trading and offsets available
 - implements the polluter pays principle

ECONOMISTS' STATEMENT ON CARBON DIVIDENDS

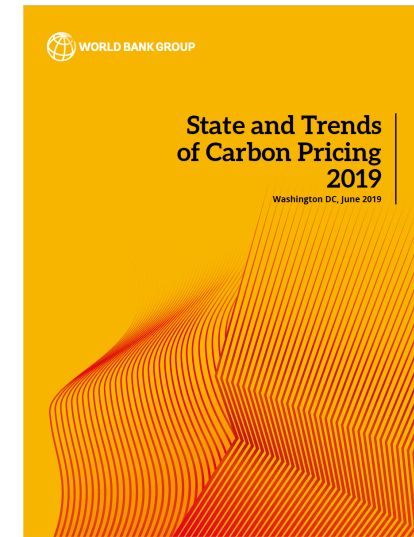
The Largest Public Statement of Economists in History

CPLC · January 17, 2019

- I. A carbon tax offers the most cost-effective lever to reduce carbon emissions at the scale and speed that is necessary. By correcting a well-known market failure, a carbon tax will send a powerful price signal that harnesses the invisible hand of the marketplace to steer economic actors towards a low-carbon future.
- II. A carbon tax should increase every year until emissions reductions goals are met and be revenue neutral to avoid debates over the size of government. A consistently rising carbon price will encourage technological innovation and large-scale infrastructure development. It will also accelerate the diffusion of carbon-efficient goods and services.
- III. A sufficiently robust and gradually rising carbon tax will replace the need for various carbon regulations that are less efficient. Substituting a price signal for cumbersome regulations will promote economic growth and provide the regulatory certainty companies need for long-term investment in clean-energy alternatives.
- V. To maximize the fairness and political viability of a rising carbon tax, all the revenue should be returned directly to U.S. citizens through equal lump-sum rebates. The majority of American families, including the most vulnerable, will benefit financially by receiving more in "carbon dividends" than they pay in increased energy prices.

IV. INTERNATIONAL EXPERIENCE WITH CARBON PRICING

IV. INTERNATIONAL EXPERIENCE WITH CARBON PRICINGWORLD



Countries are committed to using carbon pricing to meet national climate targets. Of the 185 Parties that have submitted their Nationally Determined Contributions (NDCs) to the Paris Agreement, 96—representing 55 percent of global GHG emissions—have stated that they are planning or considering the use of carbon pricing as a tool to meet their commitments. That is an increase of eight Parties from last year.

Senators to unveil carbon tax bill to generate \$2.5 trillion in 10 years

Timothy Gardner

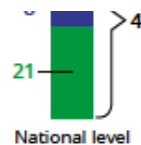
4 MIN READ



WASHINGTON (Reuters) - Two Democratic U.S. senators will unveil a bill on Thursday to curb climate change by slapping a fee on oil, natural gas and coal and delivering most of the revenues to low- and middle-income Americans, one of the lawmakers said.



FILE PHOTO: Wind turbines generate power at the Lorraine Windpark Project in Lorraine, Texas U.S. August 24, 2018. REUTERS/Nick Oxford/File Photo



Republican climate hawk Francis Rooney to introduce carbon tax bill that cuts payroll taxes

by Josh Siegel | July 24, 2019 09:36 AM



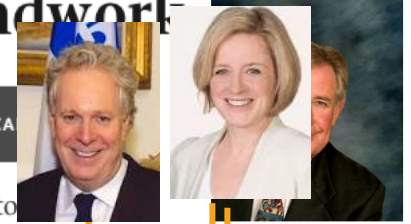
State and Trends of Carbon Pricing 2019

Washington DC, June 2019

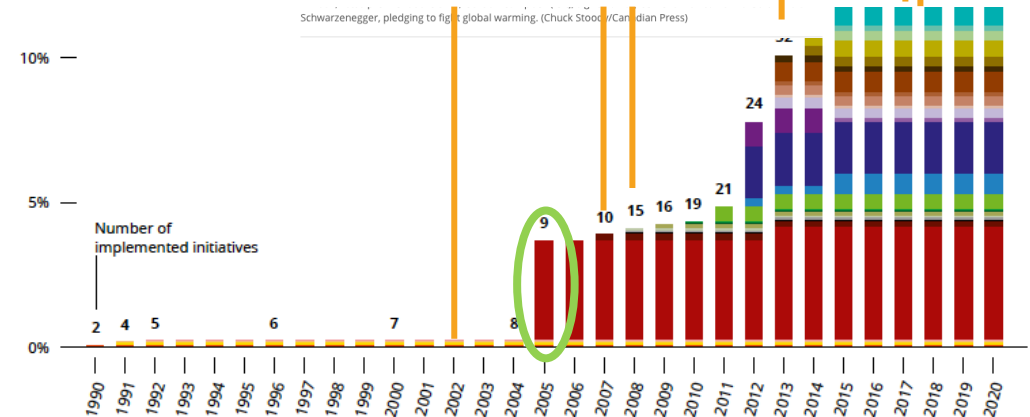
Figure 2 / Regional, national and subnational carbon pricing initiatives: share of global emissions covered

Klein lays Kyoto-battle groundwork

JILL MAHONEY > AND STEVEN CHASE >
EDMONTON AND OTTAWA
PUBLISHED NOVEMBER 20, 2002



As well, the bill would enshrine the province's "made-in-Alberta" plan to reduce greenhouse-gas emissions more slowly than would occur under Kyoto, while relying on as-yet undeveloped technology. Eventually, it would lead to negotiated emissions targets and an emissions-trading system for industry.



- Finland carbon tax (1990 →)
- Poland carbon tax (1990 →)
- Norway carbon tax (1991 →)
- Sweden carbon tax (1991 →)
- Denmark carbon tax (1992 →)
- Slovenia carbon tax (1996 →)
- Estonia carbon tax (2000 →)
- Latvia carbon tax (2004 →)
- EU ETS (2005 →)
- Alberta CCIR (2007 →)
- Switzerland ETS (2008 →)
- New Zealand ETS (2008 →)
- Switzerland carbon tax (2008 →)
- Liechtenstein carbon tax (2008 →)
- BC carbon tax (2008 →)
- RGGI (2009 →)
- Iceland carbon tax (2010 →)
- Tokyo CaT (2010 →)
- Ireland carbon tax (2010 →)
- Ukraine carbon tax (2011 →)
- Saitama ETS (2011 →)
- California CaT (2012 →)
- Japan carbon tax (2012 →)
- Australia CPM (2012 - 2014)
- Quebec CaT (2013 →)
- Kazakhstan ETS (2013 →)
- UK carbon price floor (2013 →)
- Shenzhen pilot ETS (2013 →)
- Shanghai pilot ETS (2013 →)
- Beijing pilot ETS (2013 →)
- Guangdong pilot ETS (2013 →)
- Tianjin pilot ETS (2013 →)
- France carbon tax (2014 →)
- Mexico carbon tax (2014 →)
- Spain carbon tax (2014 →)
- Hubei pilot ETS (2014 →)
- Chongqing pilot ETS (2014 →)
- Korea ETS (2015 →)
- Portugal carbon tax (2015 →)
- BC GGIRCA (2016 →)
- Australia ERF Safeguard Mechanism (2016 →)
- Fujian pilot ETS (2016 →)
- Washington CAR (2017 →)
- Ontario CaT (2017 - 2018)
- Alberta carbon tax (2017 →)
- Chile carbon tax (2017 →)
- Colombia carbon tax (2017 →)
- Massachusetts ETS (2018 →)
- Argentina carbon tax (2018 →)
- Canada federal OBPS (2019 →)
- Singapore carbon tax (2019 →)
- Nova Scotia CaT (2019 →)
- Saskatchewan OBPS (2019 →)
- Newfoundland and Labrador carbon tax (2019 →)
- Newfoundland and Labrador PSS (2019 →)
- Canada federal fuel charge (2019 →)
- Prince Edward Island carbon tax (2019 →)
- South Africa carbon tax (2019 →)
- China national ETS (2020 →)

V. PAN-CANADIAN CARBON PRICING FRAMEWORK

(a) Existing Carbon Pricing Systems

BC CARBON TAX

Overview

- explicit price on each tCO₂e resulting from combustion of fossil fuels purchased or used within province and combustibles (peat and tires) used to produce energy or heat
 - excludes fuel that is: sold/exported outside BC; used for interjurisdictional rail, air or marine travel; purchased on First Nations land by First Nations individual/band; used for farming purposes

Outside BC's pricing system: non-combustion emissions associated with agriculture, landfills, forestry, industry and natural gas production (including process and fugitive emissions)

Coverage: ~ 70% of total BC GHG emissions

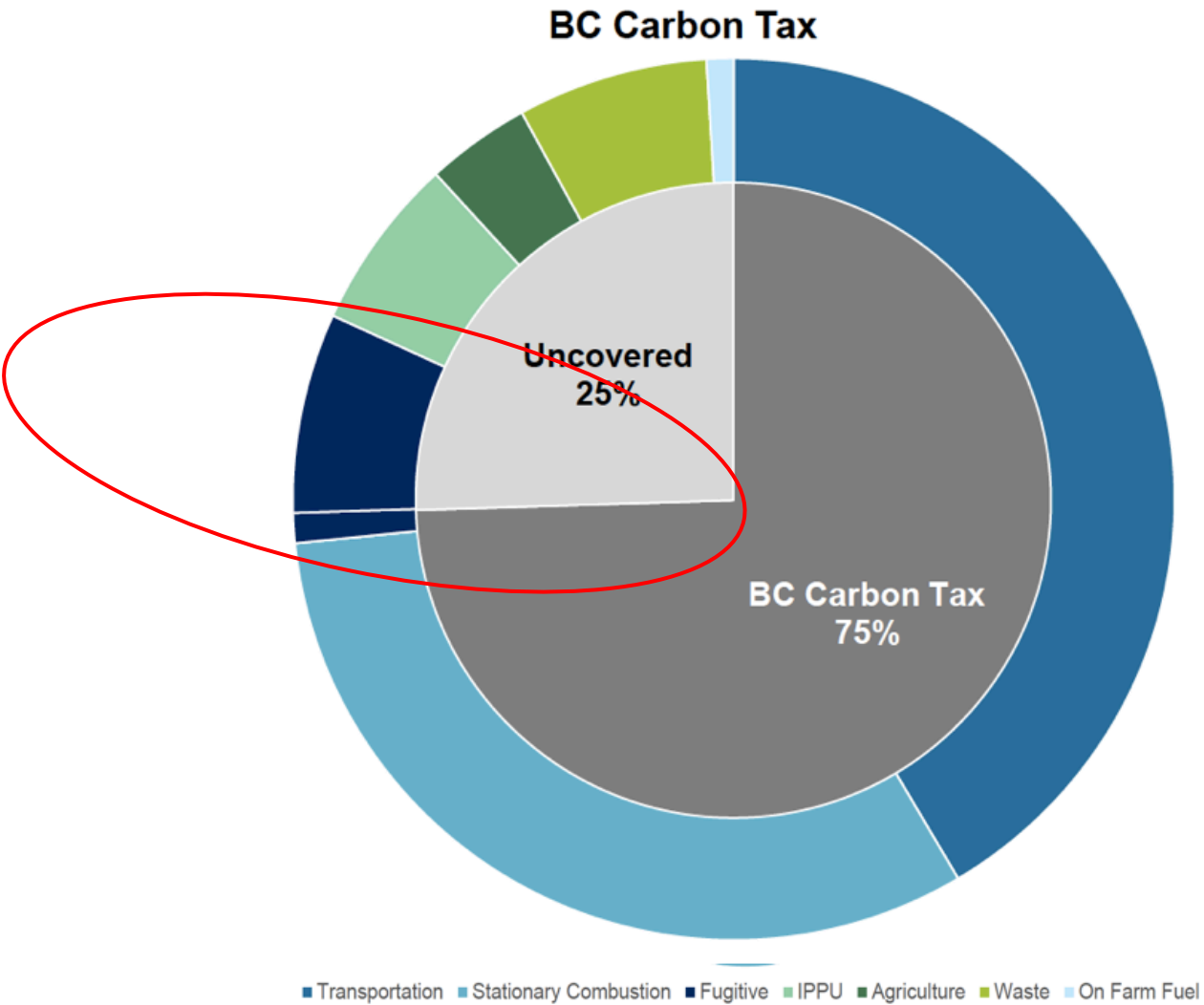
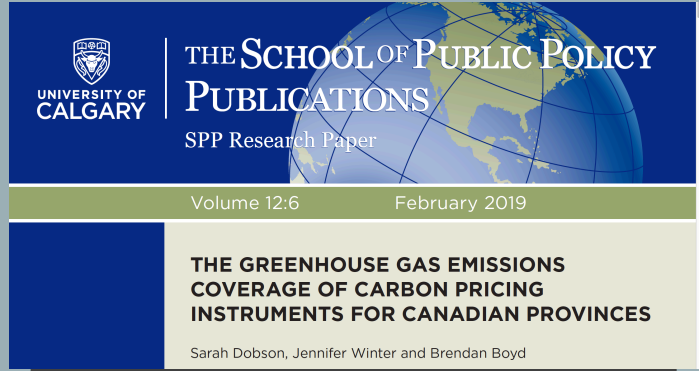
Price: commenced at \$10/tCO₂e in 2008; \$40/tCO₂e in 2019; rising by \$5/t/CO₂e \$50/tCO₂e in 2021 (currently 8.89¢/L on gasoline)

Compliance options: consume less fossil fuels or pay carbon price

Treatment of emission intensive trade exposed sectors: agricultural use of gasoline/diesel exempt; 80% for commercial greenhouses

Revenue: revenue neutral (2008-2017); revenue recycling and climate change related initiatives (2018 -)

British Columbia Total Emissions, 2015: 60,909 kt



**Greenhouse Gas Industrial Reporting and Control Act SBC 2014 - emissions-intensity ‘limit’ for liquified natural gas (LNG) operations*

QUEBEC CAP- AND-TRADE

Overview

- Decreasing cap on overall emissions from industrial facilities; electricity sector and natural gas distributors with annual emissions > 25,000 tCO₂e; electricity generated outside Quebec; fuel distributors
- Exempts: aviation/marine fuel; hydrocarbons transformed through chemical processes; and biomass

Outside Quebec's cap-and-trade system: agriculture; waste management; forestry; emitters below 25,000 tCO₂e

Coverage: ~ 81% of total Quebec GHG emissions

Price: price floor and ceiling increasing over time; auction price Aug 14, 2019 \$19.77

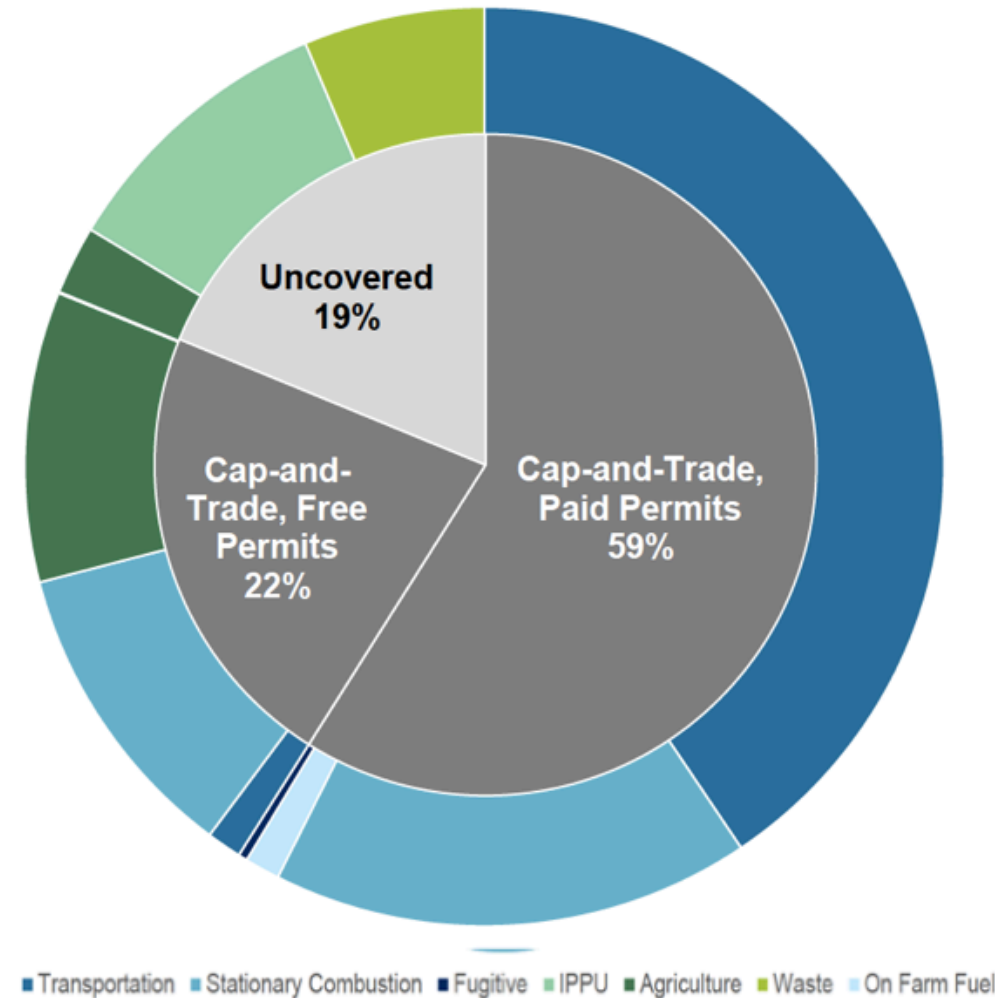
Compliance Options: purchase allowances at auction or from market and/or offset credits (up to 8%) from within linked Quebec and California system

Treatment of emission intensive trade exposed sectors: specified sectors eligible for free allowances (declining over time)

Revenue: all revenues paid into Quebec Green Fund to fund Climate Action Plan

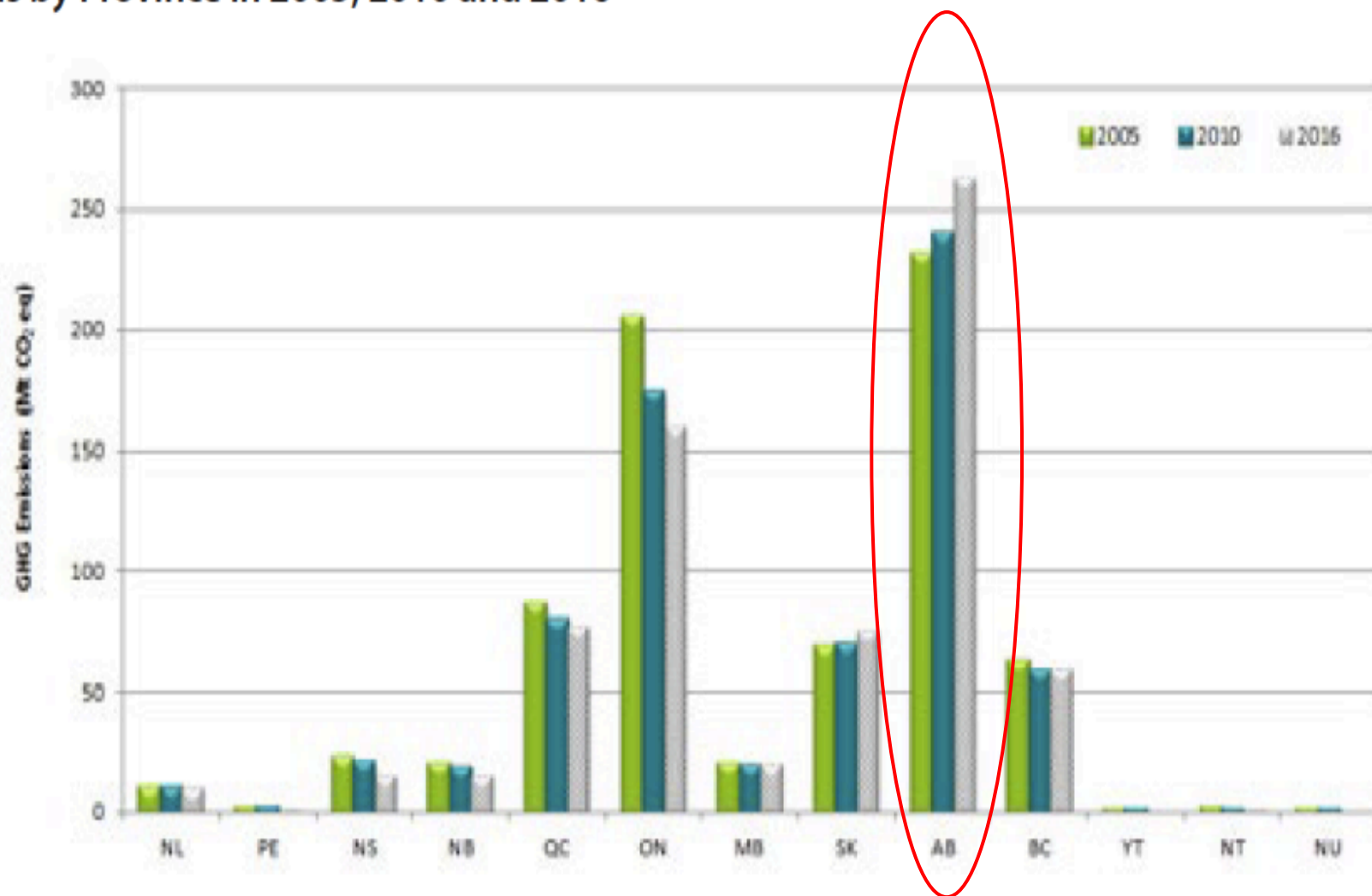
Quebec Total Emissions, 2015: 80,133 kt

QC Cap-and-Trade Program

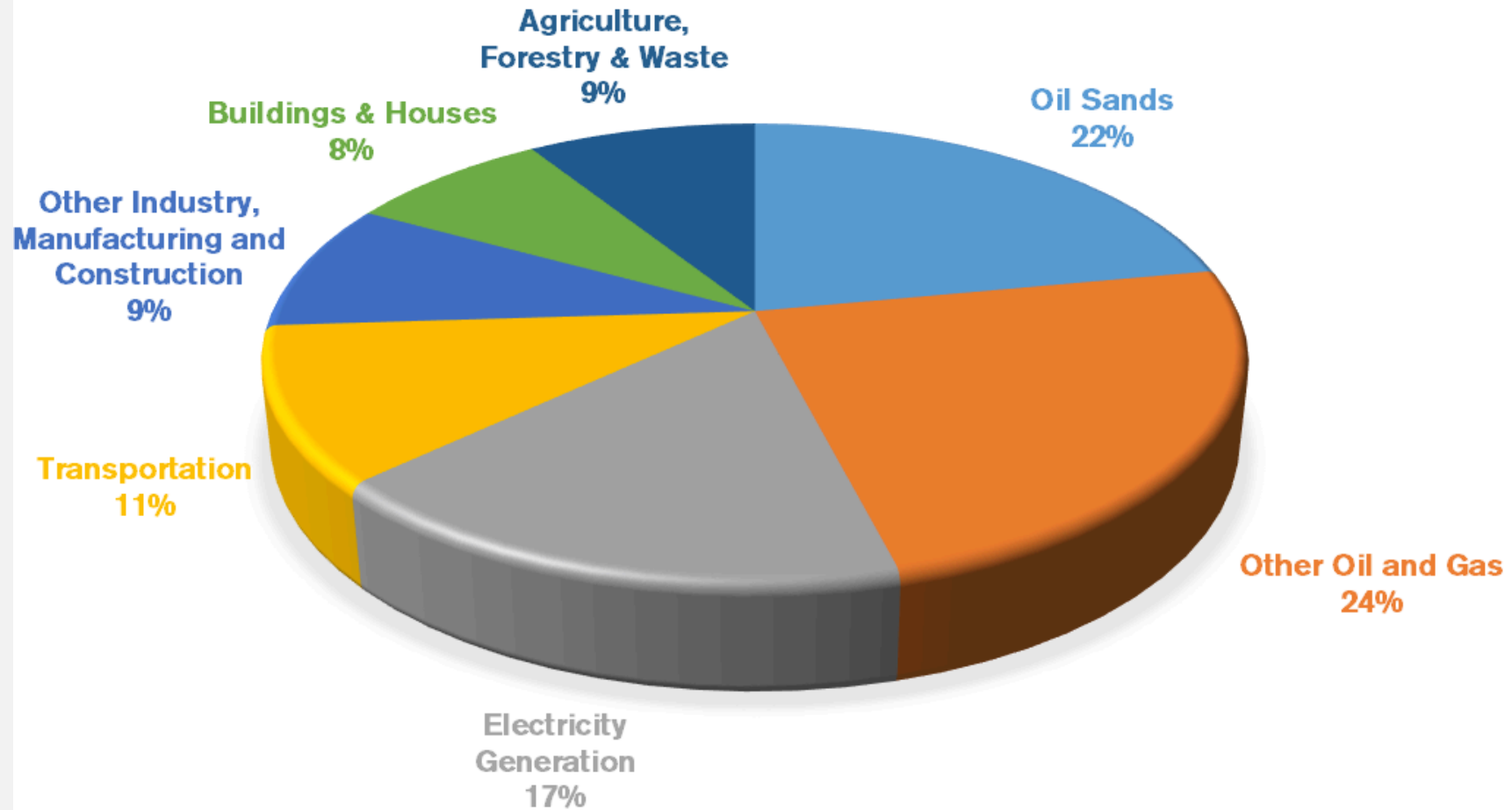


Alberta

Emissions by Province in 2005, 2010 and 2016



2013 ALBERTA GHG EMISSIONS



Source: [Environmental and Climate Change Canada](#)

ALBERTA'S CARBON PRICING SYSTEM

Overview: 2 Parts

1) Carbon levy: imposed a direct price on each tonne of CO₂ equivalent (tCO₂e) resulting from the combustion of fossil fuel

2) Output-based pricing system (OPBA) under the Carbon Competitiveness Incentive Regulation (CCIR) applies to facilities with annual emissions of 100,000 tCO₂e or higher with emissions-intensity product-based benchmarks; includes industrial process emissions, indirect emissions from facility imports of heat, electricity, methane and nitrous oxide emissions; no cap on production or overall emissions but annual 1% tightening of benchmarks commencing 2020. Those who operate under their benchmark receive a credit; those who exceed their benchmark must bring themselves into compliance

Exempt from carbon levy: exported fuel; fuel for interjurisdictional travel; fuel not combusted; fuel used for farming purposes; until 2023, conventional oil and gas producers of marked fuel (fuel eligible for tax exemption under Fuel Act) not subject to the CCIR; heating fuels subject to the CCIR

Outside Alberta's CCIR: non-combustion emissions associated with forestry and agriculture, non-combustion emissions from facilities emitting <100,000 tCO₂e/year (unless opt-in to CCIR)

Coverage: carbon levy and OBA system together covered ~70% of total Alberta GHG emissions (OPBS covering ~50%)

Price: OBPS no explicit carbon price; ceiling price established by cost of contributing to Climate Change and Emissions Management Fund (CCEMF) (currently \$30/tCO₂e); Carbon levy \$30/tCO₂e in January 2018 (equivalent to 6.73¢/L of gasoline)

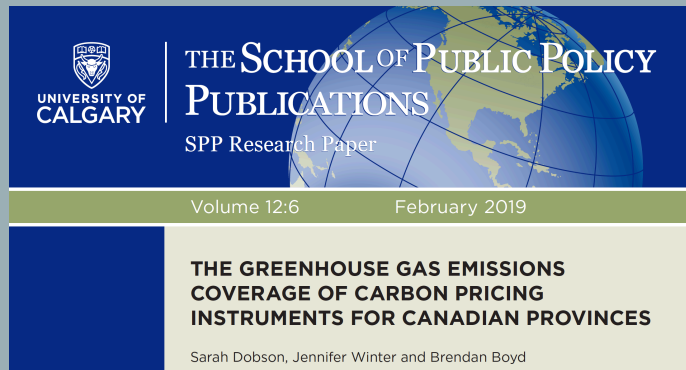
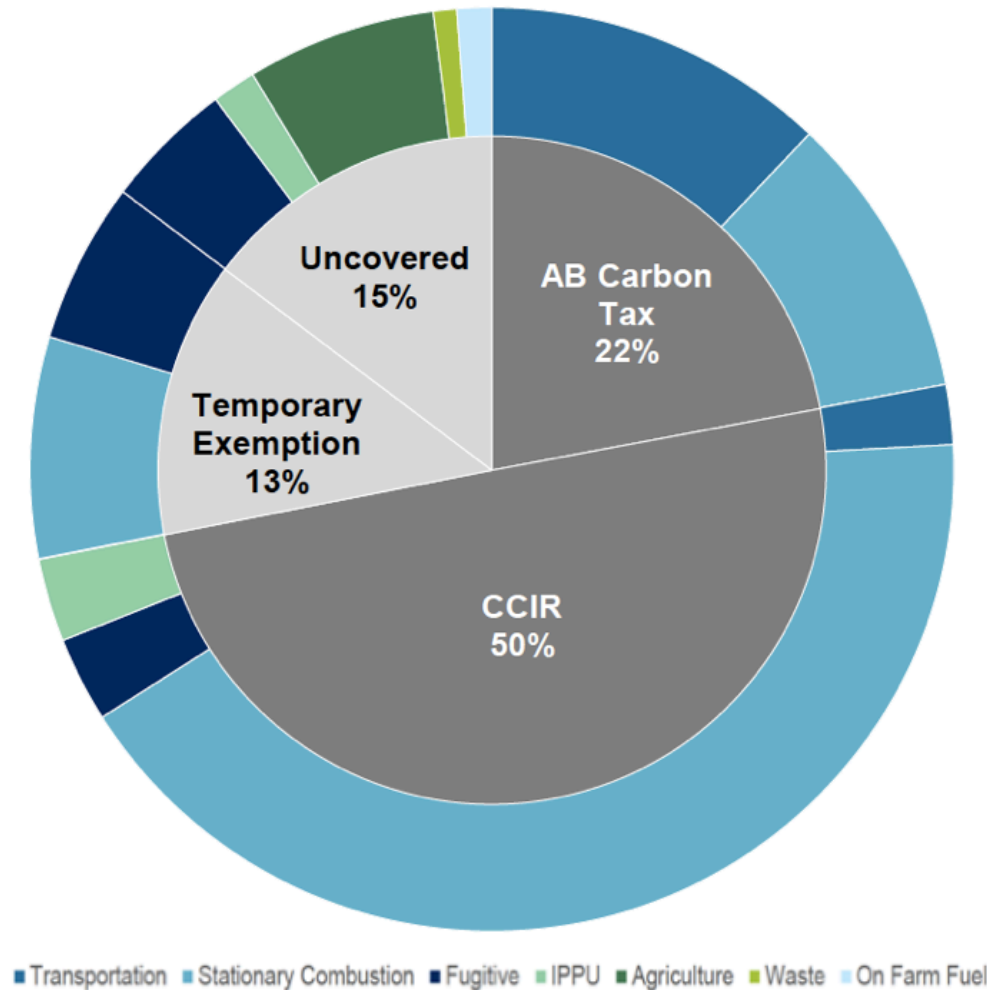
Compliance Options: reduce emissions intensity to meet benchmark; purchase emission performance credits in the market and Alberta-based offset credits; or pay into the CCEMF

Treatment of emission intensive trade exposed sectors: only emissions intensity the exceeds the benchmark directly exposed to carbon price; benchmark further reduced (to 90% or 100% of the production-weighted average) when a risk of carbon leakage; **opt-in measures** extend the special treatment to facilities not covered by the OBPS if they are in direct competition with a regulated facility or highly EITE

Revenue: revenues used for mitigation adaptation initiatives; revenue recycling; adjustments to cap electricity rates; R&D

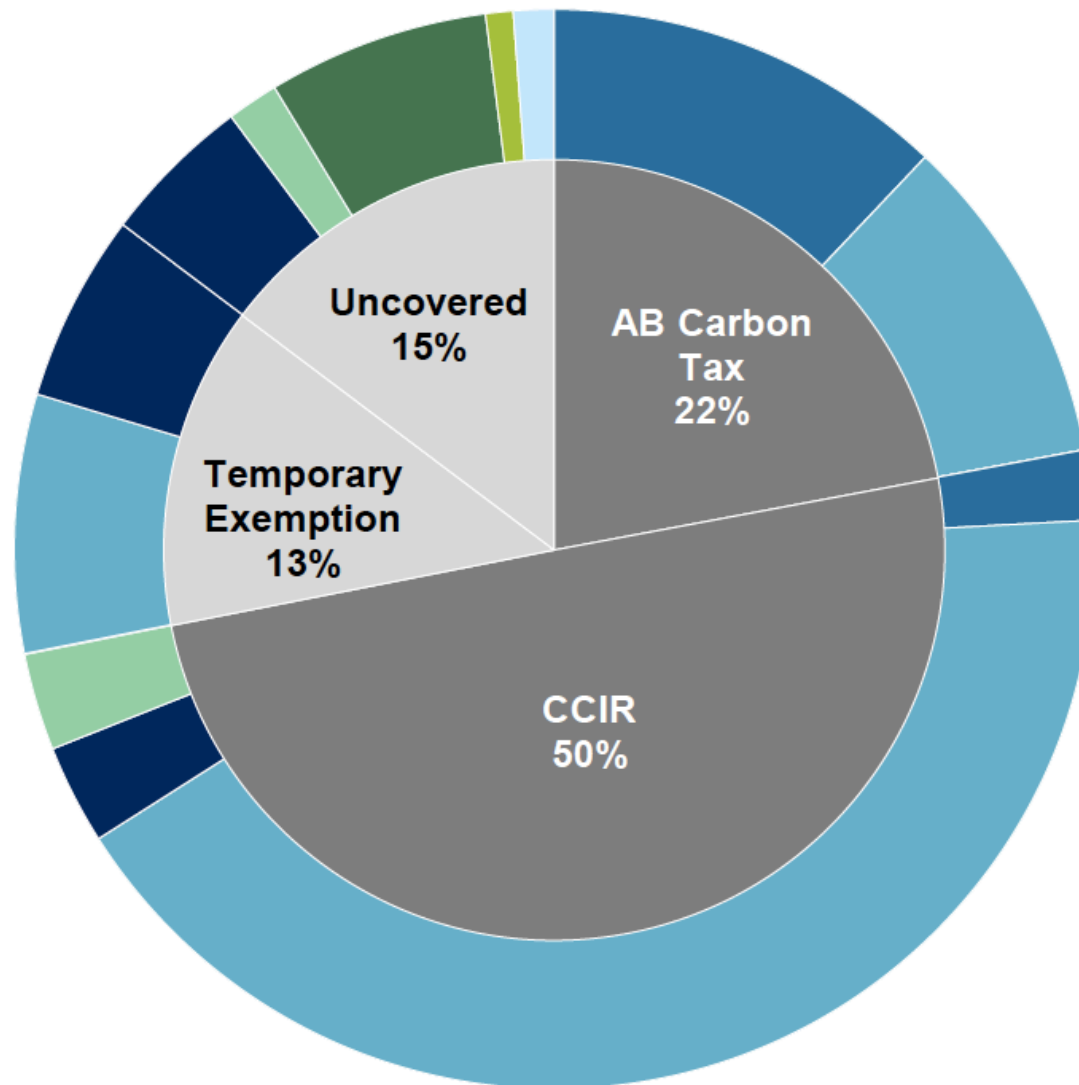
Alberta Total Emissions, 2015: 274,142 kt

AB Carbon Tax & Output-Based Pricing



Alberta Total Emissions, 2015: 274,142 kt

AB Carbon Tax & Output-Based Pricing



V. PAN-CANADIAN CARBON PRICING FRAMEWORK

(b) Pan-Canadian Framework

PAN-CANADIAN FRAMEWORK



Newfoundland
Labrador

Prince
Edward
Island
CANADA

NOVA SCOTIA

New Brunswick
CANADA

Québec

Ontario

Manitoba

Pillars of the Framework

The Pan-Canadian Framework has four main pillars: pricing carbon pollution; complementary measures to further reduce emissions across the economy; measures to adapt to the impacts of climate change and build resilience; and actions to accelerate innovation, support clean technology, and create jobs. Together, these interrelated pillars form a comprehensive plan.

and Climate Change

Canada's Plan to Address Climate
Change and Grow the Economy

Government of
Northwest Territories
Territoires du Nord-Ouest

Nunavut

Canada

The Pan-Canadian Framework builds on the leadership shown and actions taken individually and collectively by the provinces and territories, including through the Declaration of the Premiers adopted at the Quebec Summit on Climate Change in 2015. To note, the province of Saskatchewan has decided not to adopt the Pan-Canadian Framework at this time. The federal government has committed to ensuring that the provinces and territories have the flexibility to design their own policies and programs to meet emission-reductions targets, supported by federal investments in infrastructure, specific emission-reduction opportunities and clean technologies. This flexibility enables governments to move forward and to collaborate on shared priorities while respecting each jurisdiction's needs and plans, including the need to ensure the continued competitiveness and viability of businesses.

PAN-CANADIAN FRAMEWORK



on Clean Growth and Climate Change

Canada's Plan to Address Climate
Change and Grow the Economy

Federal Carbon Pricing Benchmark

All jurisdictions will have carbon pricing by 2018

At a minimum, carbon pricing should apply to substantively the same source as British Columbia's carbon tax.

Jurisdictions can implement (i) an explicit price-based system (a carbon tax like British Columbia or a carbon levy and performance-based emissions system like in Alberta or (iii) a cap-and-trade system (eg Ontario and Quebec)

For jurisdictions with an explicit price-based system, the carbon price should start at a minimum of \$10 per tonne in 2018 and rise by \$10 per year to \$50 per tonne in 2022. Provinces with cap-and-trade need (i) a 2030 emissions-reduction target equal to or greater than Canada's 30 percent reduction target and (ii) declining (more stringent) annual caps to at least 2022 that correspond, at a minimum, to the projected emissions reductions resulting from the carbon price that year in price-based systems.

Revenue remains in the jurisdiction of origin

Federal backstop

Five-year review

PAN-CANADIAN FRAMEWORK



on Clean Growth and Climate Change

Canada's Plan to Address Climate
Change and Grow the Economy

V. PAN-CANADIAN CARBON PRICING FRAMEWORK

(c) Federal Backstop

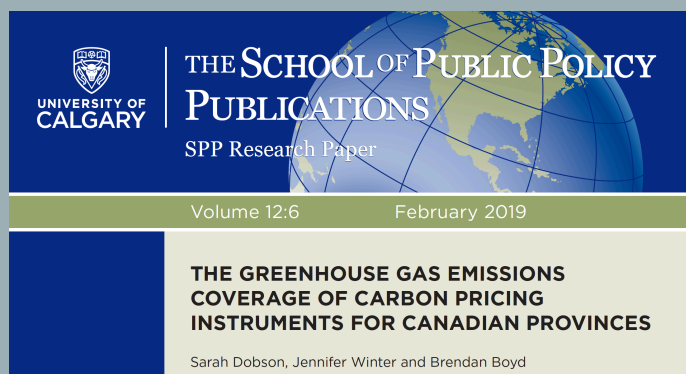
FEDERAL BACKSTOP

Canada's *Greenhouse Gas Pollution Pricing Act* 2019

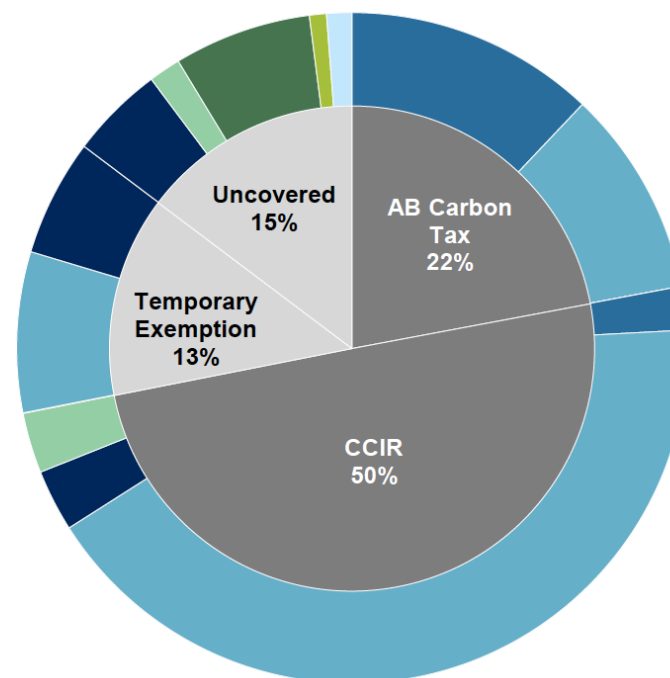
Two Parts:

- 1) Fuel charge on certain producers, distributors, and importers of carbon-based fuels
- 2) OBA system with emission intensity limits for large industrial emitters of GHGs. Those that operate within their limit get a credit. Those that exceed it must pay a charge.

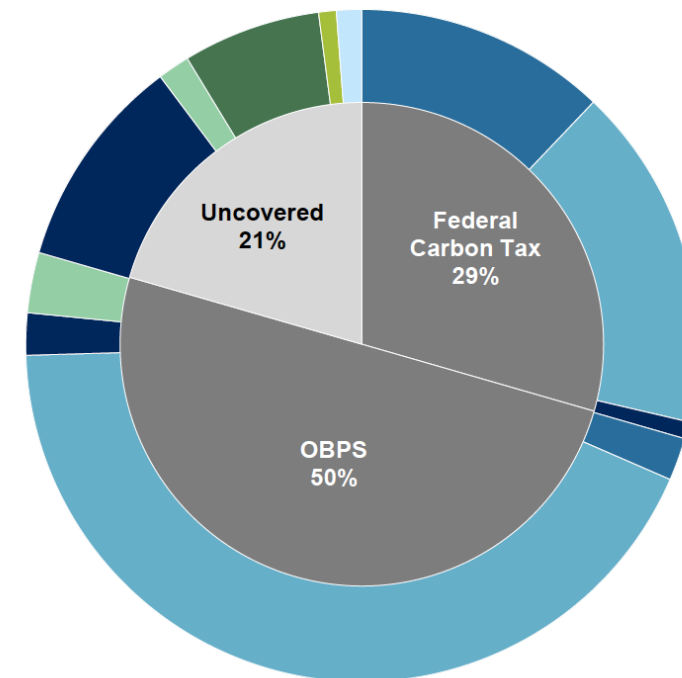
* The net revenues from these measures are returned to the province of origin or to certain other persons. The *Act* serves as a backstop and applies in provinces and territories that have not adopted sufficiently stringent carbon pricing mechanisms.



AB Carbon Tax & Output-Based Pricing



Federal Backstop



■ Transportation ■ Stationary Combustion ■ Fugitive ■ IPPU ■ Agriculture ■ Waste ■ On Farm Fuel

CURRENT CARBON PRICING SYSTEMS

Provincial systems apply in British Columbia, Quebec, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. The governments in these jurisdictions are either already implementing or are on track to implement carbon pollution pricing systems that meet the federal benchmark.

The federal fuel charge has taken effect in Saskatchewan, Ontario, Manitoba, and New Brunswick. The federal fuel charge **will also apply in Alberta beginning in 2020.** The federal government will monitor any proposed changes to Alberta's large industrial emitter system, and will undertake another benchmark assessment once sufficient details about the new system for large emitters are available. The Government is also open to working with the Government of Alberta to determine the most appropriate treatment of small oil and gas facilities under carbon-pricing.

The federal pricing system for industry applies in Ontario, Manitoba, New Brunswick, Prince Edward Island, and partially in Saskatchewan. Saskatchewan has proposed a pricing system for some of its industries; the federal system fills in the gaps in that province by covering the electricity and natural gas transmission pipeline sectors.



Government
of Canada

Gouvernement
du Canada



COFFEE AND THEN QUESTIONS