State and Provincial Programs to Price Carbon and the Role of Energy Efficiency

ACEEE Webinar

January 3, 2019

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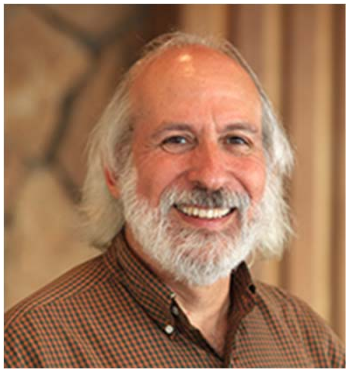
The American Council for an Energy-Efficient Economy is a nonprofit 501(c)(3) founded in 1980. We act as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors.

Our research explores economic impacts, financing options, behavior changes, program design, and utility planning, as well as US national, state, & local policy.

Our work is made possible by foundation funding, contracts, government grants, and conference revenue.

Webinar Speakers



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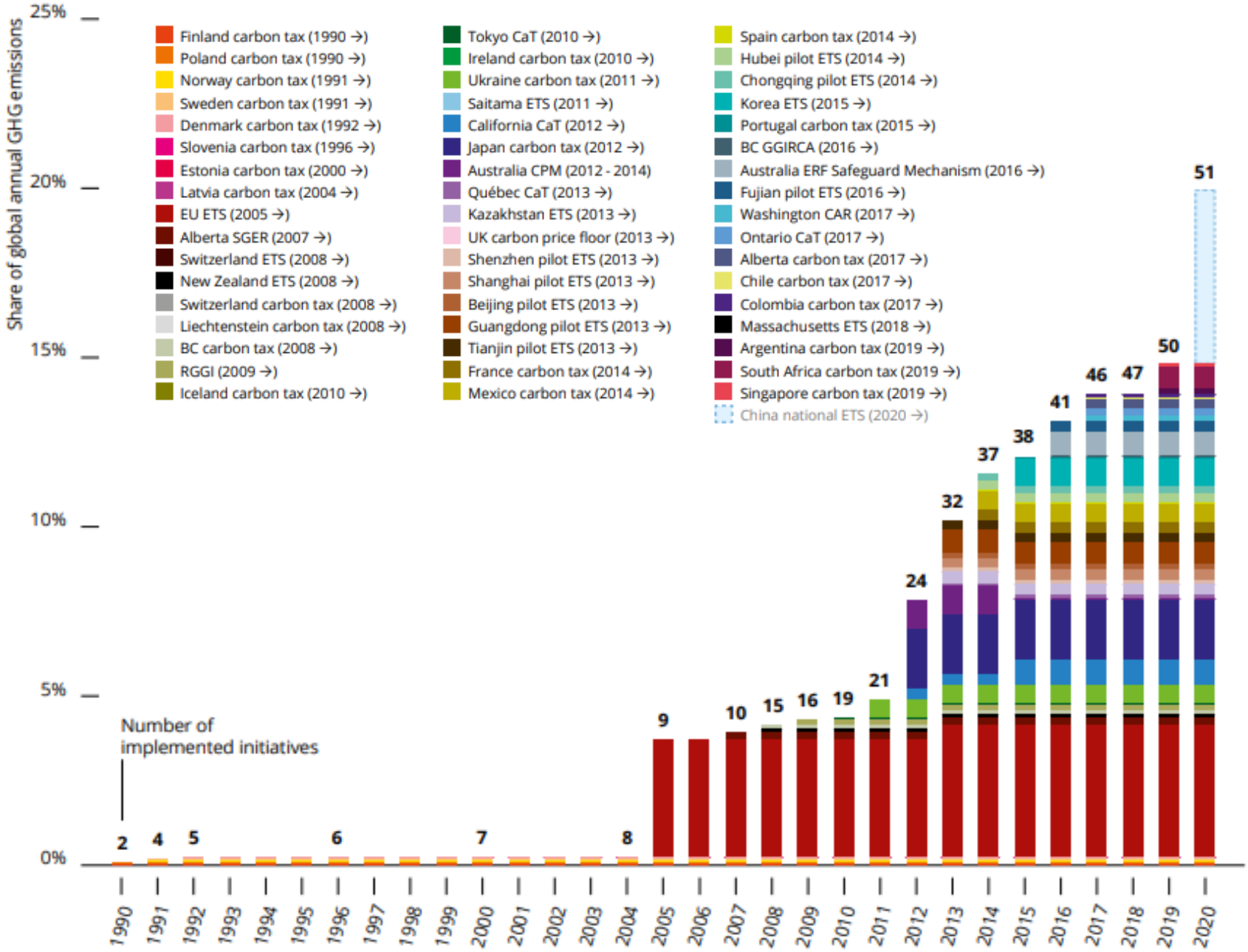
Regional, national, and subnational carbon pricing initiatives
Source: World Bank 2018

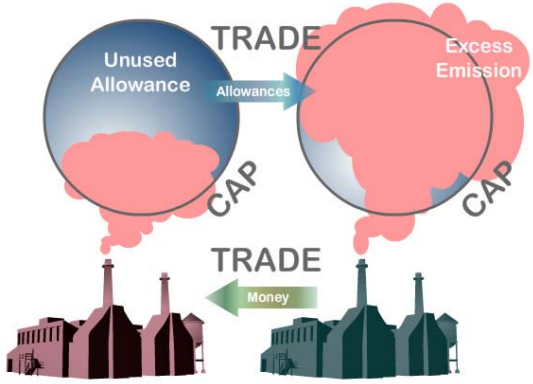


Pricing GHG Emissions

- Two major approaches in use

  - Carbon tax (sometimes called a fee or levy)
    - Fee known, impact not known

  - Cap-and-trade system
    - Impact known, cost not known



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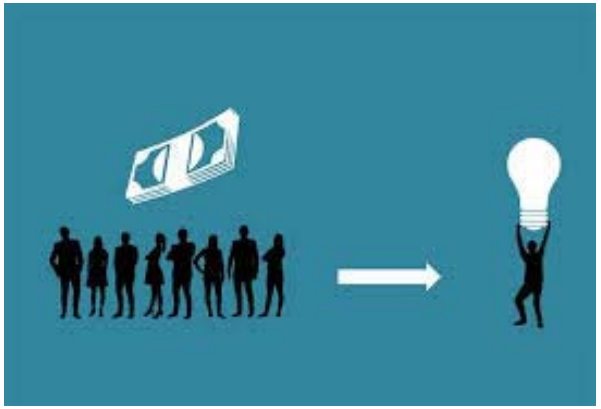
Effect on Energy Efficiency

- Carbon pricing affects energy efficiency in two prominent ways
  - Improve economics of efficiency
  - Invest funds in efficiency programs



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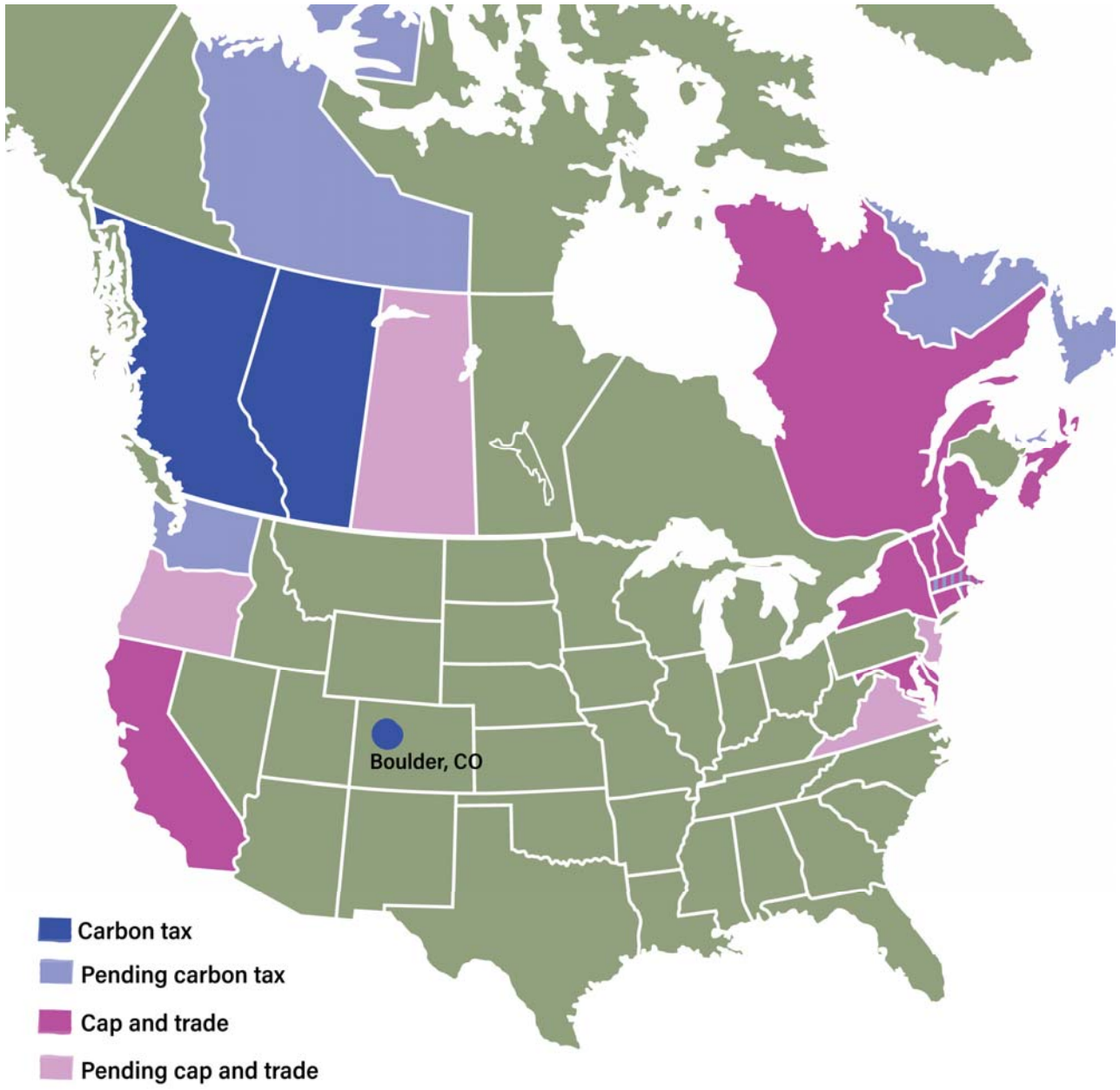
Key Features

- Sectors covered
- Fee or cap amount
- Escalation
- Exemptions
- Use of funds



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States and provinces with current and pending carbon taxes and cap-and-trade programs. *Source:* ACEEE

Current US carbon taxes and cap-and-trade programs

State or city	Type of program	Year program began	What is covered?	Price in 2018 (US $/MT CO_2)	Use of funds for energy efficiency (EE)
Regional Greenhouse Gas Initiative(RGGI) involving nine northeastern states	Cap and trade	2009	CO_2 emissions from power sector	$4.18–4.96	More than 50% of revenues invested in EE
California	Cap and trade	2013	CO_2 emissions from power and transportation sectors and natural gas use	~$15	Some funds allocated to EE
Boulder, CO	Carbon tax	2007	Electricity	$0.0003–0.0049/kWh, varying by sector	Most funds spent on EE and renewable energy

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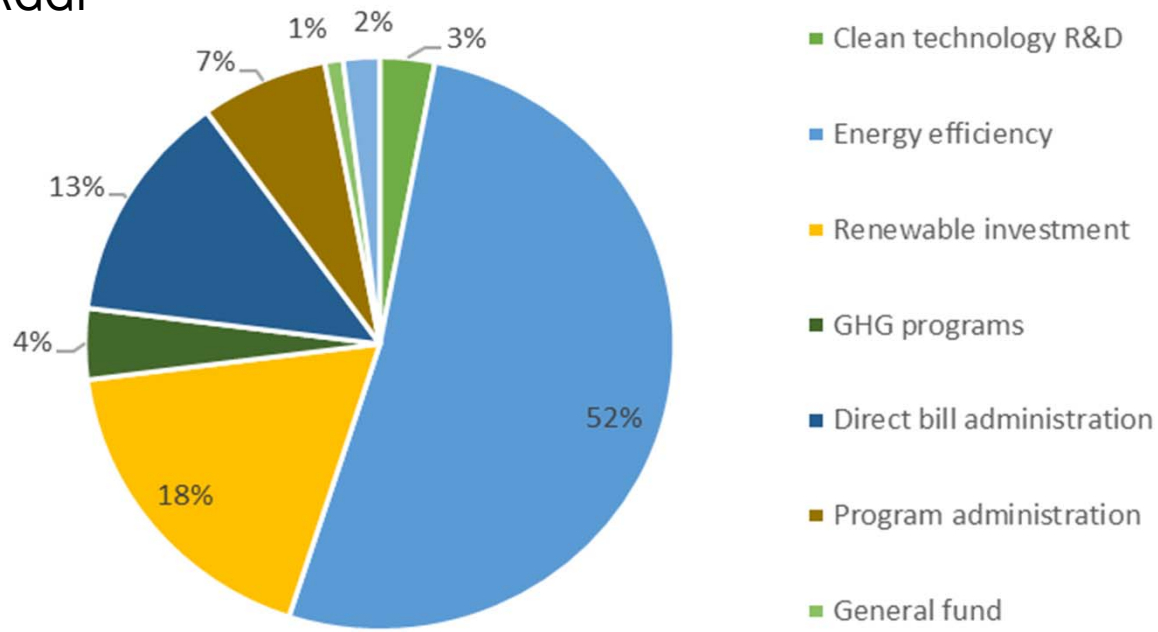
RGGI Program

Program Features	RGGI details
When it began	2009
Current scope	Power sector CO_2 emissions
Cap	45% below 2005 levels by 2020; additional 30% reduction in regional cap between 2020 and 2030
Covers	Fossil fuel generators ≥ 25 MW (currently 168 facilities)
Linkages	New England, NY, MD, DE; NJ and VA are in process of linking
Allowance distribution	90% offered in quarterly regional auctions, single clearing price
Offsets	Up to 3.3% of a power plant's compliance obligation for each control period (five eligible project categories, including EE)
Price predictability and cost containment	Cost Containment Reserve, minimum reserve price and in 2021, Emissions Containment Reserve will have states withhold allowance if prices fall below $6.

RGGI: Role of Energy Efficiency

- **Invest proceeds:** 2009-2017 auctions resulted in ~$3 billion in revenue; states invested more than half of proceeds into EE programs.
- **Variety of EE programs:** utility programs, state green banks, and programs run by state energy offices offering incentives, technical support, and financing.
- **Complementary policies:** energy efficiency resource standards (EERS), building energy codes, state government–led initiatives, transportation and land-use policies and appliance standards.
- **ACEEE Scorecard:** 6 of 9 RGGI states ranked in top 10.



RGGI proceeds spending during compliance period 3 (2015–2017) for all RGGI states.
Source: Hibbard et al. 2018.

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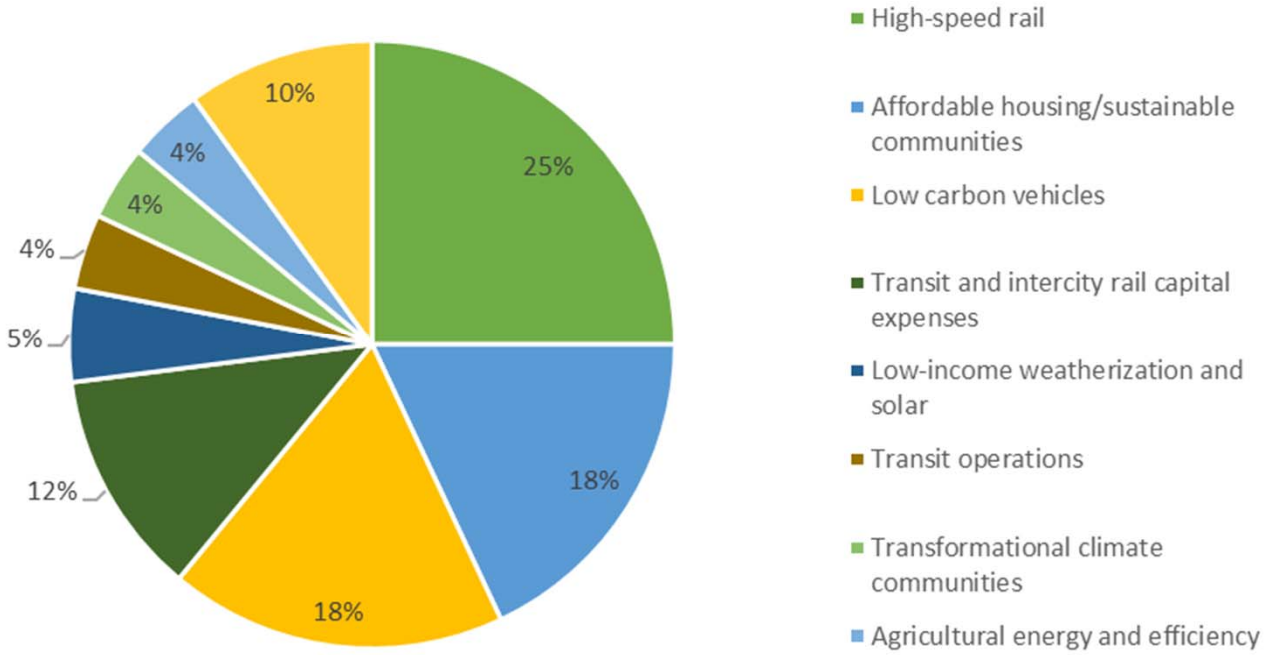
California Program

Program Features	California details
When it began	2013
Current scope	Six GHGs in the power and industrial sectors plus natural gas and transportation fuels; covers about 85% of GHG emissions.
Cap	40% below 1990 levels by 2030
Covers	Covers entities emitting > 25,000 MT; mandatory reporting for entities emitting > 10,000 MT
Linkages	California and Quebec are linked
Allowance distribution	Industry 90% distributed for free; utilities free but must auction off to benefit ratepayers; transportation through auction.
Offsets	Up to 8% of compliance obligations but will decline in 2021.
Price predictability and cost containment	Price floor of $10/ton in 2012, rising 5%/year plus inflation. Reserve allowances provide a soft price ceiling.

California: Role of Energy Efficiency

- **Invest proceeds:** from 2013–2017 ~$3.6 billion of auction revenues were appropriated for programs; ~9% invested in low-income weatherization and agricultural efficiency; ~60% invested in public transit and alternative vehicles.
- **Complementary policies:** EERS, building energy codes, state government–led initiatives, transportation and land-use policies and appliance standards.
- **ACEEE Scorecard:** CA ranked number 2.



Allocations of California cap-and-trade revenues, 2013–2017.
Source: Taylor 2017.

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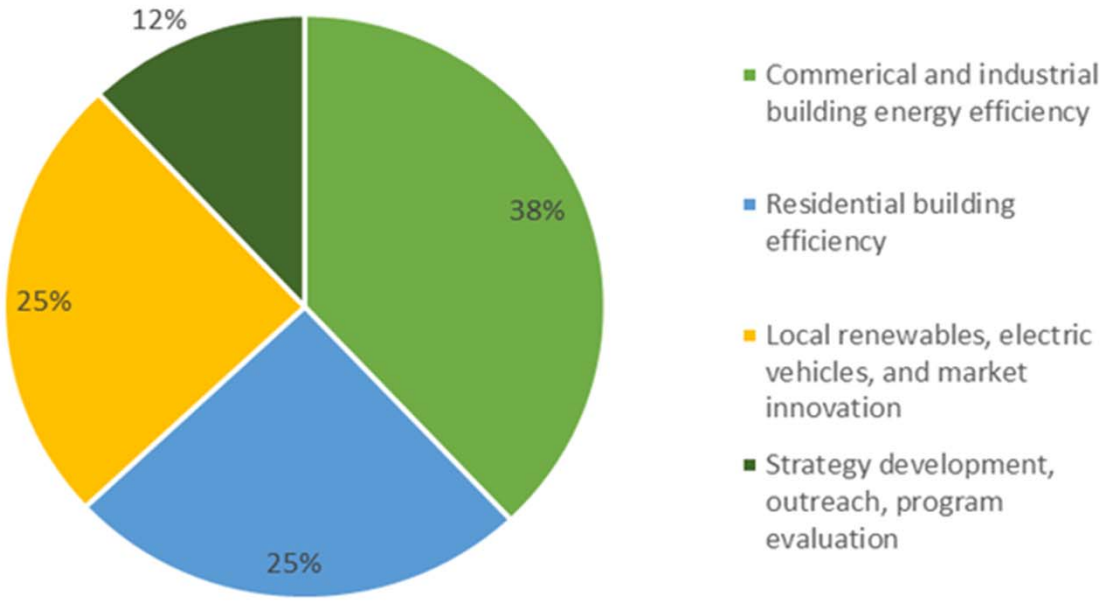
Boulder, CO Program

Program Features	Boulder, CO details
When it began	2007
Covers	Electricity
2018 Fee/MT CO_2	~$0.0003–0.0049/kWh, varying by sector
Escalation	None planned; fee authorized through 2023
Exemptions	Wind power
Collection mechanism	Tax collected by local electric company as part of electric bill.
Uses of funds	Implementation of Boulder Climate Action Plan, including investments in public education, public transit, energy audits, and rebates for EE improvements to homes and businesses.

Boulder, CO: Role of Energy Efficiency

- **Invest proceeds:** 63% to EE; 25% to renewable energy, electric vehicles, and market innovation.
- **Variety of EE programs:** EnergySmart, SmartRegs, pilot programs, programs for commercial properties.
- **Complementary policies:** EERS, building energy codes, benchmarking, transportation and land-use policies.
- **ACEEE Scorecard:** CO ranked number 14.



Average annual allocation of revenues from Boulder's carbon tax.
Source: City of Boulder 2018.

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Pending Proposals

- Washington
- Massachusetts
- Oregon
- Hawaii
- Rhode Island
- Alaska
- New York
- Vermont
- District of Columbia
- Transportation and Climate Initiative

Implications for Energy Efficiency

1. Carbon price improves the economics for EE investments.
2. Funds from a carbon price can be invested in EE.
3. A variety of mechanisms can be used to invest in efficiency programs.
4. Complementary policies can further EE progress.

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Thank you

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Carbon Pricing in Canada

Implications for Energy Efficiency

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January 3rd, 2019

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The National Voice

for an Energy Efficient Economy

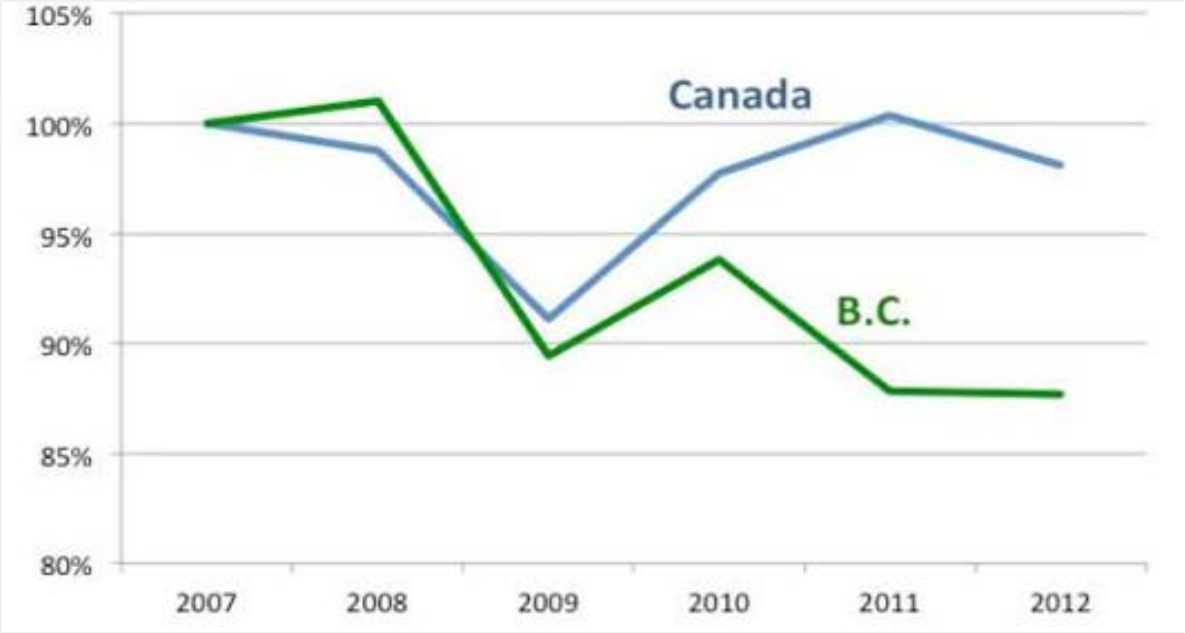
British Columbia

Carbon Tax introduced in 2008

Revenues used for personal/corporate tax decreases

C$15 /tonne rising to C$30/tonne

Comparison of petroleum consumption in British Columbia and in Canada as a whole, 2007–2012.



Source: Durning and Bauman 2014.

Table 2. Results of evaluations of British Columbia's carbon tax

Source	Method	Results
British Columbia (2008)	Numerical simulation model with technological detail	5% reduction in GHG emissions
Beck et al. (2015)	Computable general equilibrium model	8.5% reduction in GHG emissions
Elgie and McClay (2013)	Difference-in-difference with no additional controls	18.8% reduction in per capita sales of petroleum fuels subject to the tax
Elgie and McClay (2013)	Difference-in-difference with no additional controls	9% reduction in per capita GHG emissions (data to 2011 only)
Rivers and Schaufele (2012)	Difference-in-difference with controls	11–17% reduction in per capita gasoline sales
Gulati and Gholami (2015)	Difference-in-difference with controls	15% reduction in residential natural gas demand; 67% reduction in commercial natural gas demand
Bernard, Guenther, and Kichian (2014)	Time series analysis	7% reduction in per capita gasoline sales

Source: ACEEE

CleanBC Climate Plan

Increase tax to $35/tonne in 2018 towards $50/tonne in 2021

Invest proceeds: some revenues above $30/tonne will be used for industrial energy efficiency & clean energy programs (details unclear)

Complementary policies: Energy Step Code, affordable housing upgrades, strategic electrification, ZEV mandate

Alberta

2007

$15/tonne carbon fee for emissions intensity above facility baseline

Paid into “technology fund” that supported industrial emission reductions

Alberta

2017

Industrial “carbon competitiveness incentive”

$30/tonne climate levy for household energy use and transport

Revenues used for direct rebates, small business tax cuts, and clean energy programs

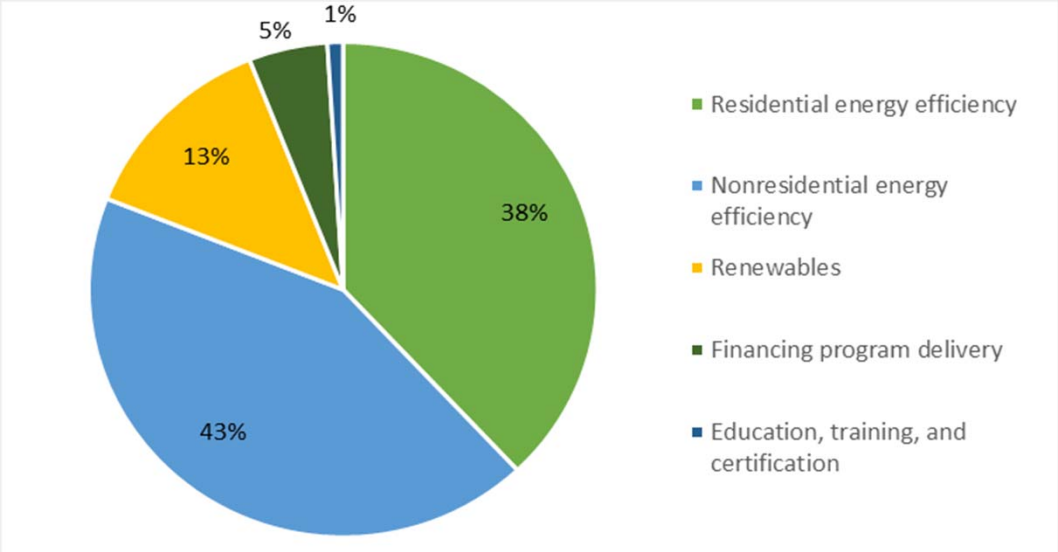
Alberta: Role of Energy Efficiency

Invest proceeds: Roughly half of funds support public transit, innovation research, infrastructure and energy efficiency programs

Efficiency Programs: Energy Efficiency Alberta created in 2017 with C$149 M budget in 2018/19.

Emissions Reductions Alberta funds industrial projects

Complementary Policies: PACE financing



Planned Energy Efficiency Alberta 2018–19 spending by program area. *Source:* Energy Efficiency Alberta 2018a.

Québec

2007

1 cent/litre tax on petroleum companies to fund public transit

2013

Joined cap and trade program with California

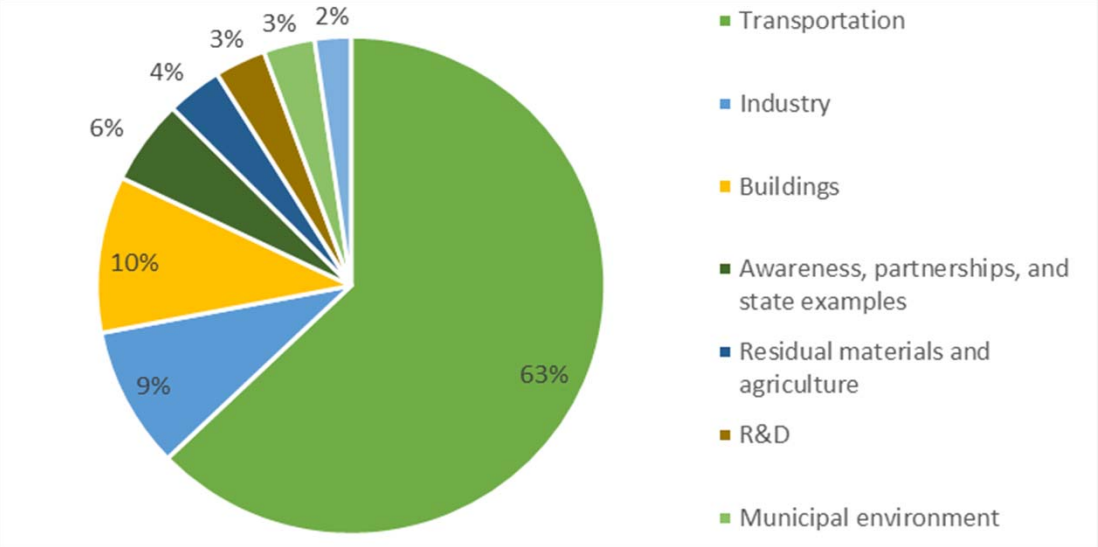
Québec: Role of Energy Efficiency

Invest proceeds: 90% of auction revenues invested in strategies to reduce emissions governed through "green fund"

Efficiency Programs: Transition énergétique Québec created in 2017.

Develops a "master plan" incorporating utilities & government agencies.

Complementary Policies:
Include building energy benchmarking, building code updates, prohibiting oil heating systems by 2028, ZEV mandate



Planned allocation of Quebec cap-and-trade funds, 2013–2020.
Source: Ministry of Sustainable Development, Environment and the Fight Against Climate Change 2017

Ontario

2017

Cap and trade program

Green Ontario Fund created to spend cap and trade auction revenues

2018

New government cancelled cap and trade & Green Ontario Fund programs

National

All provinces must implement carbon price by 2019

A “backstop” of $20/tonne carbon tax ramping up $10/year

& “output based allocation” system for large industry

Support for Efficiency

Low—Carbon Economy Fund

Federal programs in MUSH and small business sectors in ”backstop” provinces?

Provincial/Territorial Strategies

Early Leaders – BC, Alberta, Québec

Opponents / "Backstop" – Ontario, Saskatchewan, Manitoba, New Brunswick

Voluntary Federal Backstop – Yukon, Nunavut, PEI (industry)

New Systems – Nova Scotia, PEI, Newfoundland, NWT

Nova Scotia

Cap and trade system starting in 2019

Reductions 45-50% below 2005 levels by 2030

Free allocations of 75-90% of allowances

Auction with minimum price & “green fund”

Carbon Pricing and Energy Efficiency

1. Early leaders demonstrate that carbon pricing reduces fossil fuel use and raises revenue for energy efficiency investment

2. Political consensus is possible, but difficult

3. New organizational models to administer revenues (TEQ, Energy Efficiency Alberta, Green Ontario Fund, Efficiency BC)

Efficiency Canada

Conclusions and Recommendations

- Either a carbon tax or cap and trade can be effective to reduce energy use and carbon emissions without harming the local economy.
- Carbon-pricing policies are more effective at achieving emissions and economic benefits if a share of revenue is used to fund EE programs and other strategies to reduce emissions.
- Complementary policies, such as building codes, equipment standards, transportation policies and establishing EE savings targets, are useful for meeting long-term emissions targets.
- More policy research is needed evaluating current and emerging programs.

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Q&A

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ACEEE. 2019. "State and Provincial Efforts to Put a Price on Greenhouse Gas Emissions, with Implications for Energy Efficiency." https://aceee.org/white-paper/carbon-tax-010319