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

ACEEE Webinar

January 3, 2019
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

Steve Nadel
Executive Director
ACEEE

Cassandra Kubes
Research Manager, Health and Environment
ACEEE

Brendan Haley
Policy Director
Efficiency Canada
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
Effect on Energy Efficiency

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

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

<table>
<thead>
<tr>
<th>State or city</th>
<th>Type of program</th>
<th>Year program began</th>
<th>What is covered?</th>
<th>Price in 2018 (US $/MT CO₂)</th>
<th>Use of funds for energy efficiency (EE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Greenhouse Gas Initiative (RGGI) involving nine northeastern states</td>
<td>Cap and trade</td>
<td>2009</td>
<td>CO₂ emissions from power sector</td>
<td>$4.18–4.96</td>
<td>More than 50% of revenues invested in EE</td>
</tr>
<tr>
<td>California</td>
<td>Cap and trade</td>
<td>2013</td>
<td>CO₂ emissions from power and transportation sectors and natural gas use</td>
<td>~$15</td>
<td>Some funds allocated to EE</td>
</tr>
<tr>
<td>Boulder, CO</td>
<td>Carbon tax</td>
<td>2007</td>
<td>Electricity</td>
<td>$0.0003–0.0049/kWh, varying by sector</td>
<td>Most funds spent on EE and renewable energy</td>
</tr>
</tbody>
</table>
# RGGI Program

<table>
<thead>
<tr>
<th>Program Features</th>
<th>RGGI details</th>
</tr>
</thead>
<tbody>
<tr>
<td>When it began</td>
<td>2009</td>
</tr>
<tr>
<td>Current scope</td>
<td>Power sector CO₂ emissions</td>
</tr>
<tr>
<td>Cap</td>
<td>45% below 2005 levels by 2020; additional 30% reduction in regional cap between 2020 and 2030</td>
</tr>
<tr>
<td>Covers</td>
<td>Fossil fuel generators ≥ 25 MW (currently 168 facilities)</td>
</tr>
<tr>
<td>Linkages</td>
<td>New England, NY, MD, DE; NJ and VA are in process of linking</td>
</tr>
<tr>
<td>Allowance distribution</td>
<td>90% offered in quarterly regional auctions, single clearing price</td>
</tr>
<tr>
<td>Offsets</td>
<td>Up to 3.3% of a power plant’s compliance obligation for each control period (five eligible project categories, including EE)</td>
</tr>
<tr>
<td>Price predictability and cost containment</td>
<td>Cost Containment Reserve, minimum reserve price and in 2021, Emissions Containment Reserve will have states withhold allowance if prices fall below $6.</td>
</tr>
</tbody>
</table>
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.

---

## California Program

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

# Boulder, CO Program

<table>
<thead>
<tr>
<th>Program Features</th>
<th>Boulder, CO details</th>
</tr>
</thead>
<tbody>
<tr>
<td>When it began</td>
<td>2007</td>
</tr>
<tr>
<td>Covers</td>
<td>Electricity</td>
</tr>
<tr>
<td>2018 Fee/MT CO₂</td>
<td>~$0.0003–0.0049/kWh, varying by sector</td>
</tr>
<tr>
<td>Escalation</td>
<td>None planned; fee authorized through 2023</td>
</tr>
<tr>
<td>Exemptions</td>
<td>Wind power</td>
</tr>
<tr>
<td>Collection mechanism</td>
<td>Tax collected by local electric company as part of electric bill.</td>
</tr>
<tr>
<td>Uses of funds</td>
<td>Implementation of Boulder Climate Action Plan, including investments in public education, public transit, energy audits, and rebates for EE improvements to homes and businesses.</td>
</tr>
</tbody>
</table>
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.
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.
Thank you

Steve Nadel
Cassandra Kubes
ACEEE
Carbon Pricing in Canada

Implications for Energy Efficiency

ACEEE Webinar
January 3rd, 2019

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

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


Emissions Reductions Alberta funds industrial projects

Complementary Policies: PACE financing

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

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)
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.