

Climate Policy and Affordability in Canada: Interactions and Policy Levers[‡]

Trevor Tombe
University of Calgary

Jennifer Winter*
University of Calgary &
Environment and Climate Change Canada

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*Remarks today are personal opinions and do not reflect the views of the Government of Canada or Environment and Climate Change Canada.

‡This analysis is based on Statistics Canada's Social Policy Simulation Database and Model (SPSD/M) version 30. The assumptions and calculations underlying the results were prepared by Trevor Tombe and Jennifer Winter, and the responsibility for the use and interpretation of these data is entirely that of the authors.

Climate policies and consumer affordability

- Many channels for climate policy to influence the price of transportation, housing, energy, etc.
 - Levy explicit charges (e.g., emissions pricing or gasoline taxes)
 - Regulatory measures raise costs of producing emissions-intensive goods
 - Promoting renewable electricity (likely) lowers electricity prices
 - Macro factors:
 - Transition costs (e.g., changing production or transportation systems) lower productivity
 - Necessary large 'green' capital investments may increase interest rates
 - Rising exchange rates hindering exports
- We focus on how emissions pricing affects affordability

Today's Talk

- Context: current concern about climate policy and affordability
- Why is affordability a concern?
- Quantifying the effect of emissions pricing on affordability of goods
 - What we buy
 - How prices change
 - Gross policy costs and ability to pay
 - Mitigating measures and net policy costs

Literature

- Growing literature on household costs and distributional consequences of emissions pricing in Canada
 - **Mechanical effect:** Ammar (2019, 2020); Barrington-Leigh et al. (2015); Cameron (2018); Moffatt et al. (2020); Parry and Mylonas (2018); Winter et al. (2023)
 - **GE/quasi-GE:** Ammar et al. (2022); Ammar, Laurin, and Sourang (2023); Beck et al. (2015); Dissou and Siddiqui (2014); Sawyer (2018)
- Energy affordability/energy poverty research is yes/no and correlational
 - Applies a rule of thumb (energy expenditure \geq 10% of income)
 - E.g., Das and Martiskainen (2022); Das et al. (2022); Riva et al. (2021)
- Net effect of the suite of climate policies is ambiguous (Scott et al. 2023; Winter 2024)

Current concern about climate
policy and affordability

Duelling narratives: how climate policy affects inflation and energy prices



Hon. Pierre Poilievre (Leader of the Opposition, CPC):

Mr. Speaker, after eight long miserable years of the Prime Minister, he is not worth the cost of energy.

In Nova Scotia, 2,800 people have had their power cut off, and today, the Nova Scotia government reported that 37% of Nova Scotians now live in energy poverty because of the Prime Minister's carbon tax, which he now wants to quadruple, up to 61¢ a litre.

Will the Prime Minister at least let his Atlantic caucus have a free vote on our motion to axe the tax and bring home lower prices?

Source: Canada, House of Commons. 2023. Debates (Hansard) No. 229—October 4, 2023 (44-1)—House of Commons of Canada [Debates (Hansard)].

<https://www.ourcommons.ca/DocumentViewer/en/44-1/house/sitting-229/hansard>.

Image credit: House of Commons of Canada.

Duelling narratives: how climate policy affects inflation and energy prices

Right Hon. Justin Trudeau (Prime Minister, Lib.):

Mr. Speaker, the Conservative Party refuses to understand that our plan to fight climate change is, above everything else, a plan on affordability.

Eight out of 10 Canadians are better off with this price on pollution in the jurisdictions where it has been brought in. This means that, even as we fight climate change, which is something Atlantic Canadians know all too well is important with hurricanes such as Fiona and the wildfires we saw this summer, we are putting more money back in the pockets of eight out of 10 Canadians.

This is how we fight climate change and support Canadians at the same time, while Conservatives want to take away cheques, such as the climate action incentive.



Source: Canada, House of Commons. (2023, October 4). Debates (Hansard) No. 229—October 4, 2023 (44-1)—House of Commons of Canada [Debates (Hansard)]. <https://www.ourcommons.ca/DocumentViewer/en/44-1/house/sitting-229/hansard>.

Image credit: House of Commons of Canada.

Atlantic pressure (September 2022)

September 2022

“We are deeply concerned about the affordability impacts of carbon pricing on households ... almost 40 per cent of Atlantic Canadians experience energy poverty... The increase to the costs of energy under the carbon price will amplify the inflationary pressures ... any discussion on carbon pricing should prioritize mitigating these impacts.”



Source: Houston, T. 2022. Letter to the Honourable Steven Guilbeault, Minister of Environment and Climate Change Canada, on Carbon Pricing in Atlantic Canada. September 1. Council of Atlantic Premiers. <https://cap-cpma.ca/letter-to-the-honourable-steven-guilbeault-minister-of-environment-and-climate-change-canada-on-carbon-pricing-in-atlantic-canada/>.

Image credit: PC Party of Nova Scotia.

Atlantic pressure (March 2023)



March 2023

“The Clean Fuel Regulations (CFR) are scheduled to come into force in July 2023 and will increase costs for Atlantic Canada ...

These increased costs will have a disproportionately negative impact on our region where increased costs will likely be passed on to consumers...

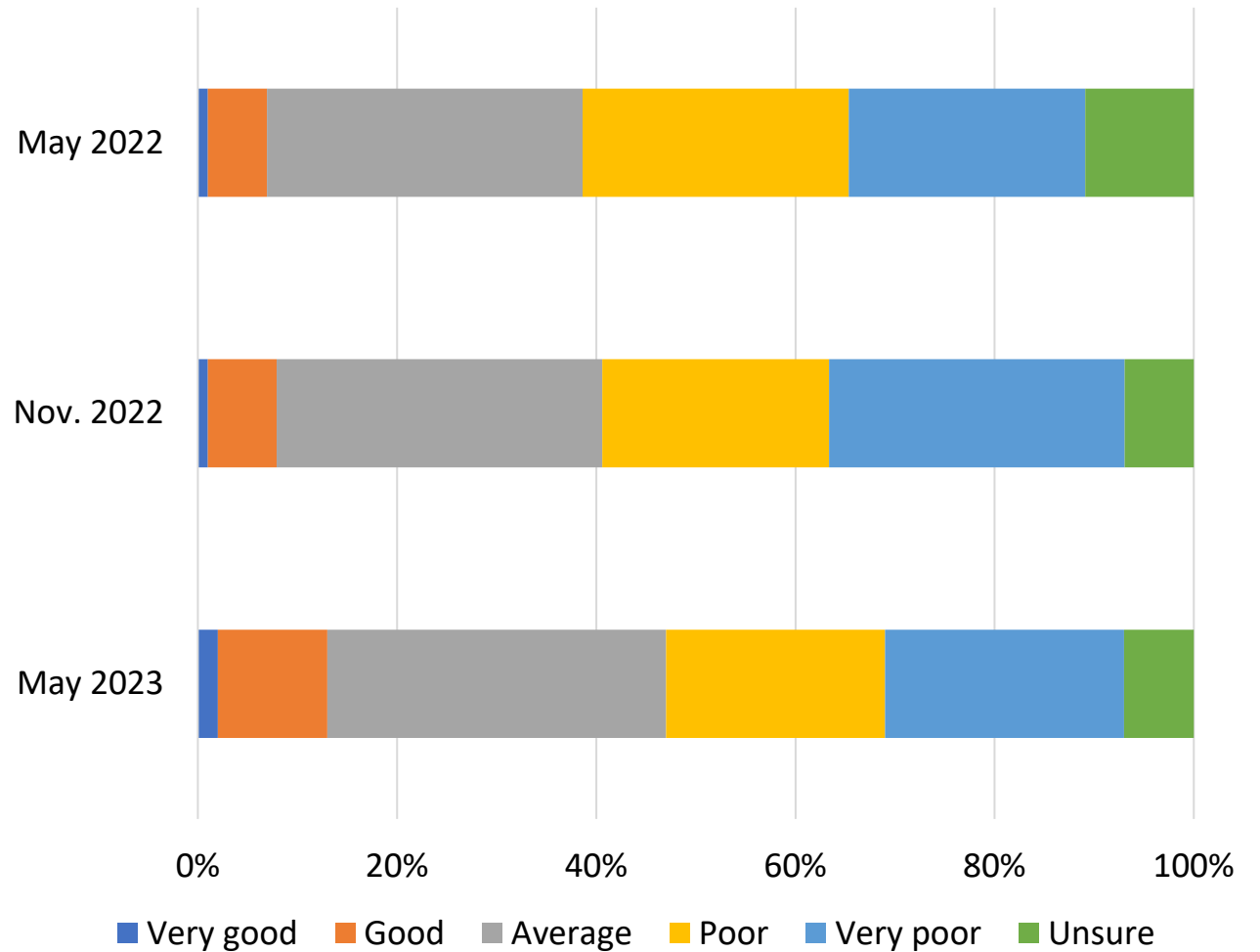
The increased costs for Atlantic Canadians will only serve to amplify already dramatically increased food prices and costs for energy, transportation and other essential goods and services, including regional health services.”

Source: Furey, A. 2023. Letter to Steven Guilbeault. March 28. Council of Atlantic Premiers. https://www.gov.nl.ca/exec/ias/files/CAP_Gas-Emissions-to-Minister-Guilbeault_032823.pdf.

Image credit: House of Assembly, Newfoundland and Labrador.

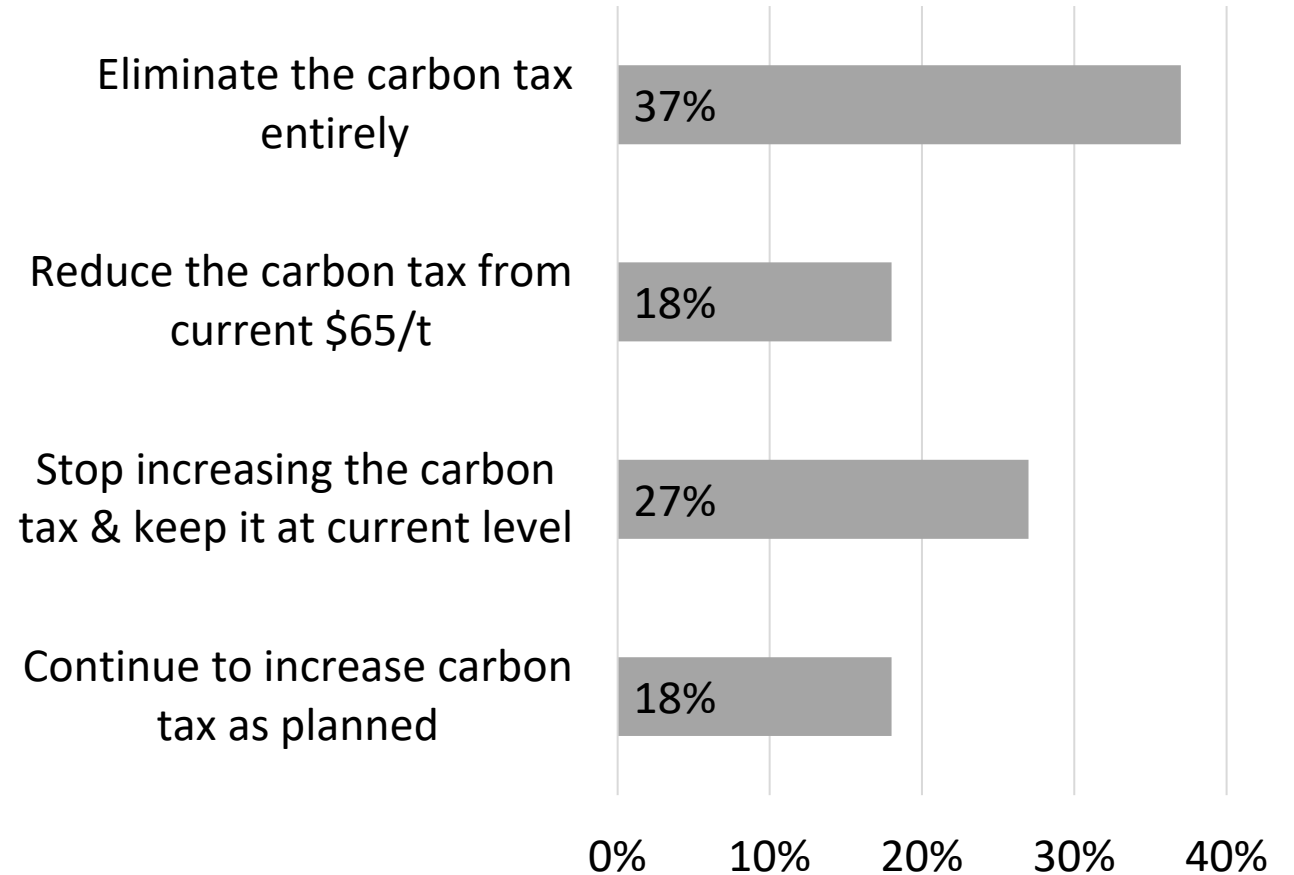
Energy affordability and climate in public opinion

“Do governments in Canada do a very good, good, average, poor or very poor job of ensuring energy is affordable as Canada works to meet its climate change targets?”

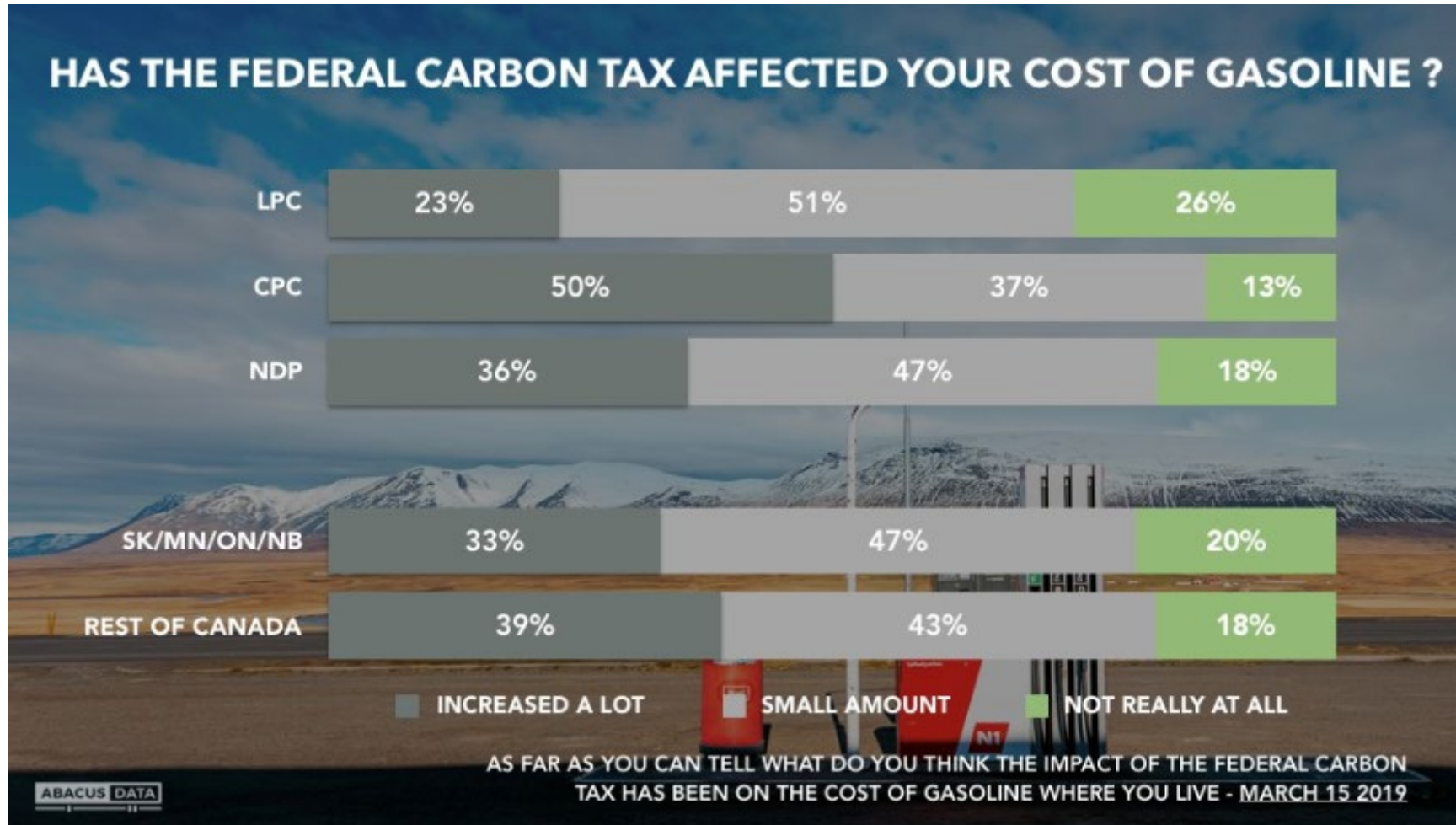


Emissions pricing is unpopular, tied to affordability

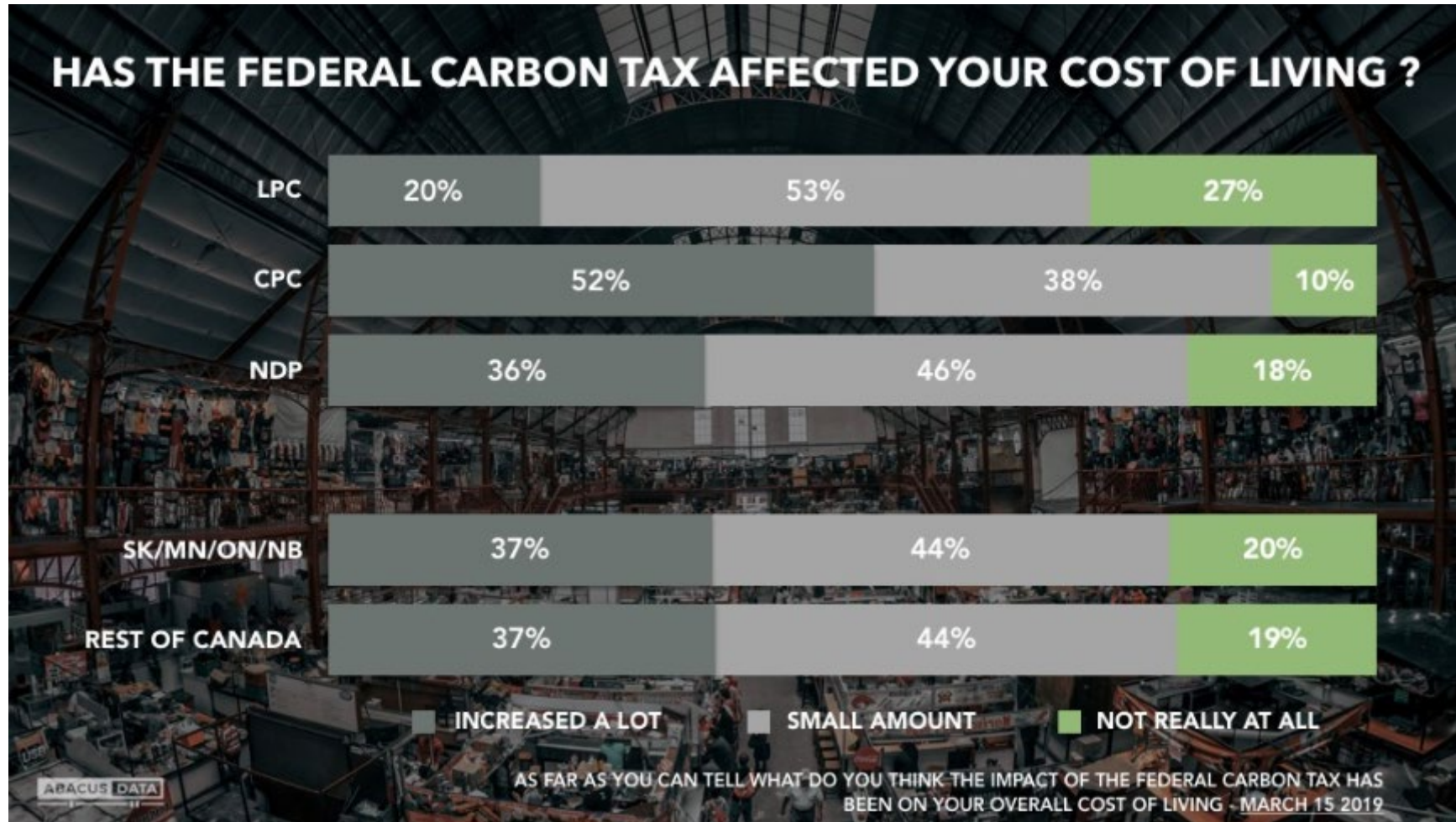
“Given that Canadians have been dealing with the rising costs of living, do you think the federal government should....”



This is not a new concern



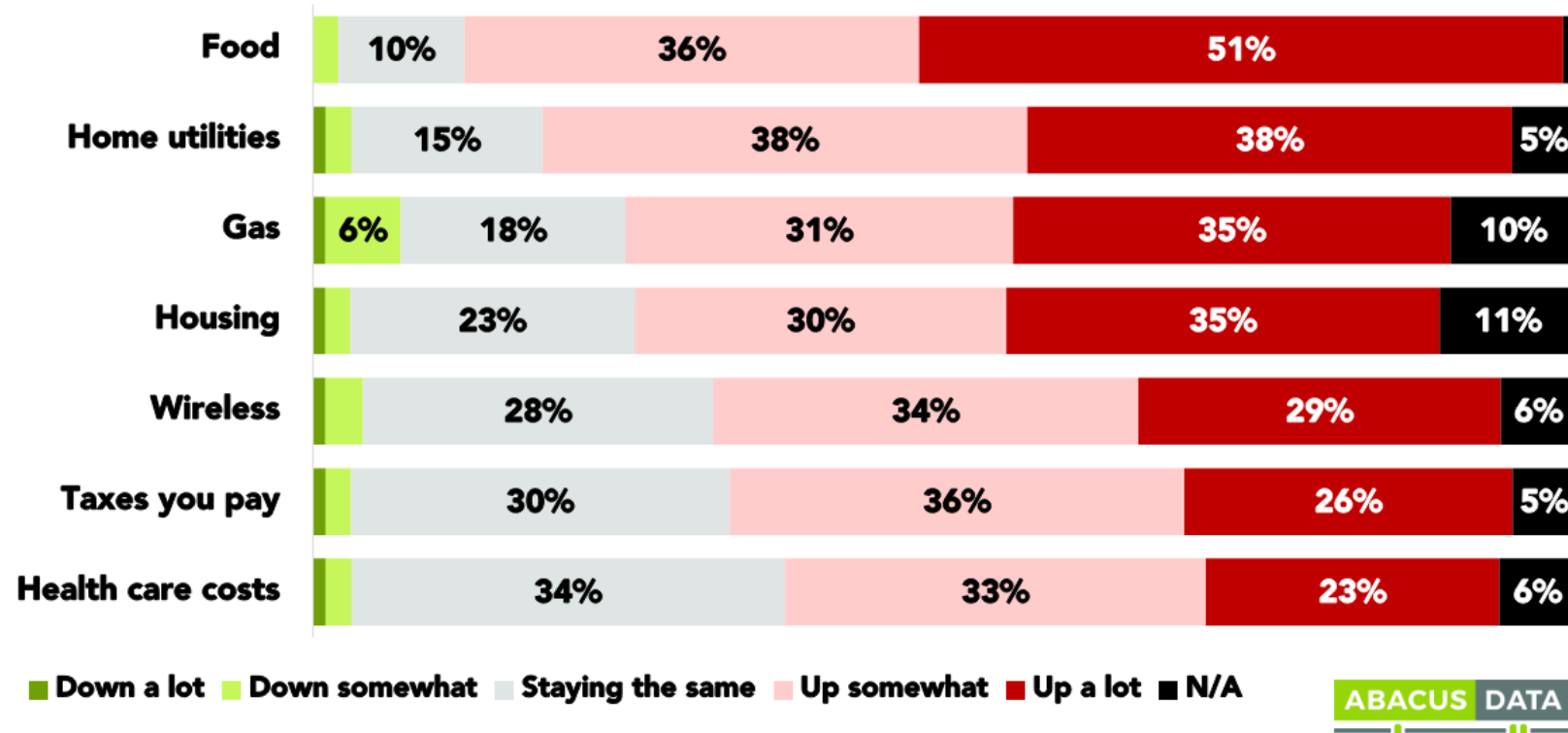
This is not a new concern



This is not just an energy problem

WHERE ARE PRICES GOING UP?

Over the past year, would you say the cost of the following things has been going down a lot, going down somewhat, staying about the same, going up somewhat, or going up a lot?

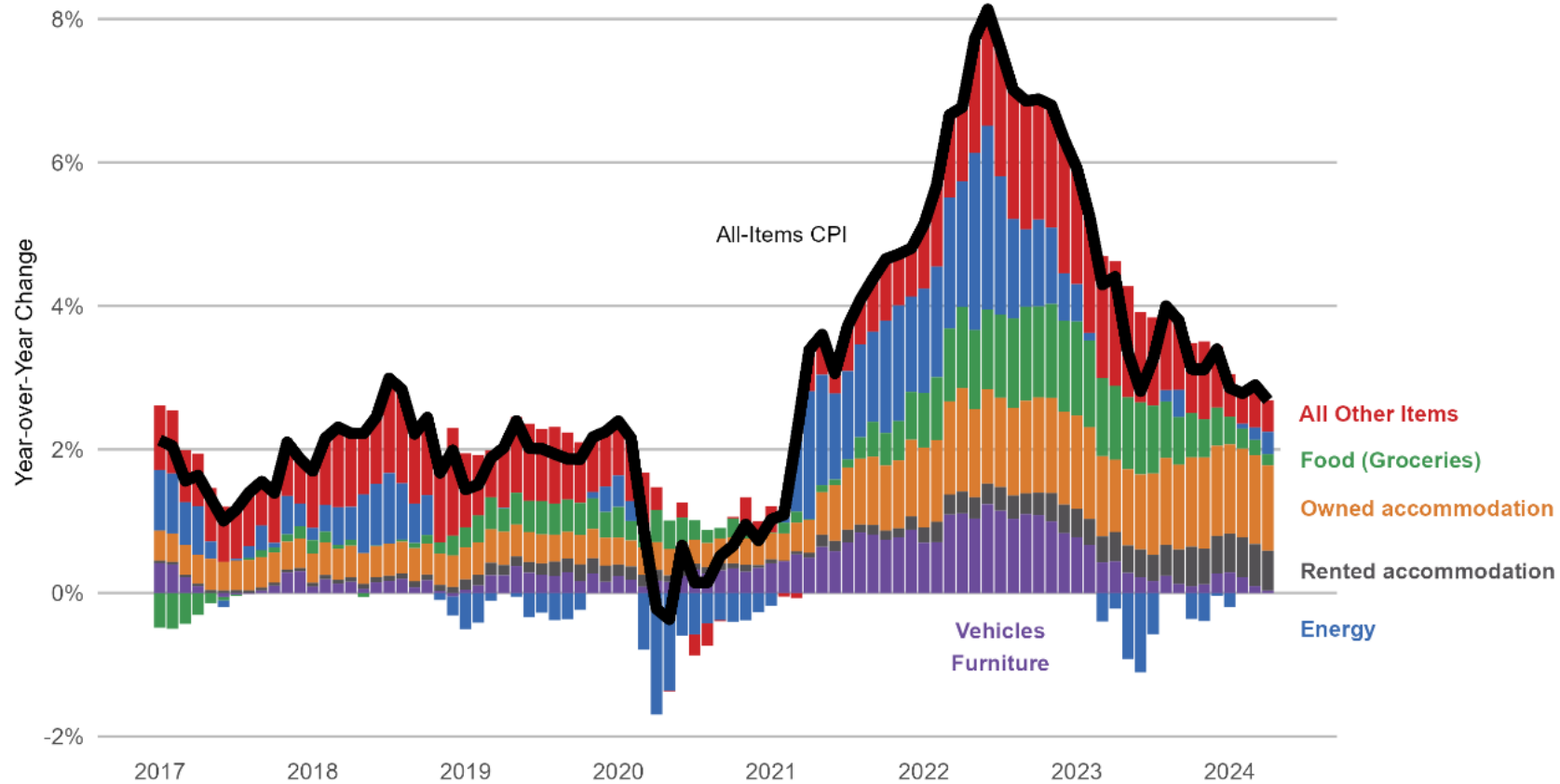


Source: Abacus Data. 2019. "The Affordability Equation" Broadbent Institute and Abacus Data, March.

https://assets.nationbuilder.com/broadbent/pages/7717/attachments/original/1592495152/The_Affordability_Equation_-_Report.pdf?1592495152.

Why is affordability a concern?

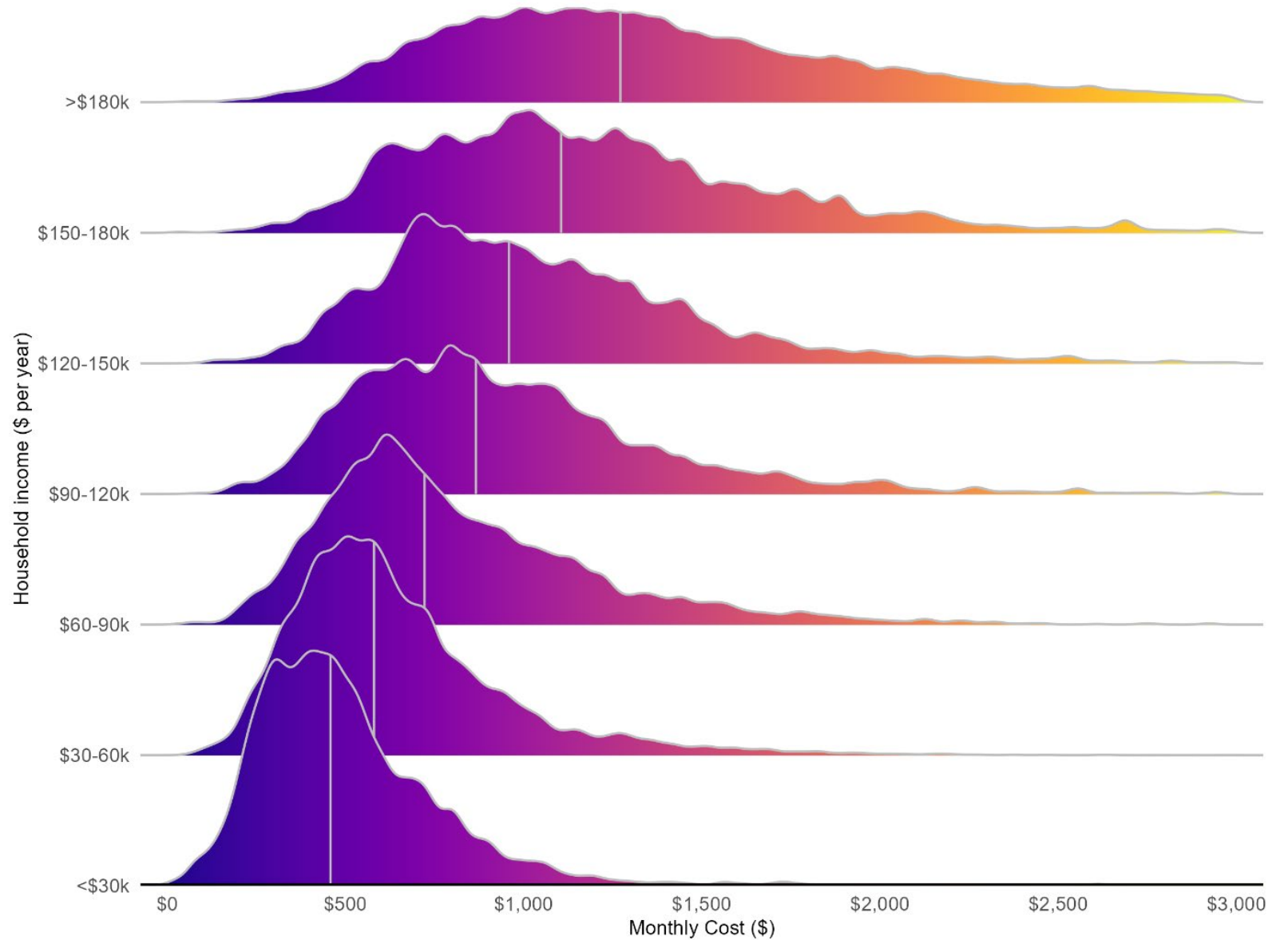
Selected products' contribution to Canada's inflation rate, 2017 to April 2024



Household type-specific inflation rates

Household Type	Year-over-year change as of...			
	All Consumer Prices		Contribution of Energy Items	
	June 2022	April 2024	June 2022	April 2024
All households	8.1	2.7	2.6	0.3
Highest income quintile	8.5	2.6	2.0	0.2
Lowest income quintile	7.5	3.1	2.2	0.3
Large urban area (>1m)	8.0	2.9	1.8	0.2
Rural area	9.1	2.2	3.3	0.4
Couple with children	8.5	2.6	2.1	0.2
Lone-parent household	7.9	2.7	2.8	0.3
One-person household	7.7	3.1	1.9	0.2
Homeowner with mortgage	8.6	2.9	2.1	0.2
Homeowner without mortgage	8.8	2.0	2.7	0.3
Renter	7.3	3.2	1.8	0.2
Head age 30 and under	7.9	2.9	1.9	0.2
Head age 65 and over	8.3	2.6	2.5	0.3

Monthly cost of consumer price changes, February 2020 to April 2024, by household income

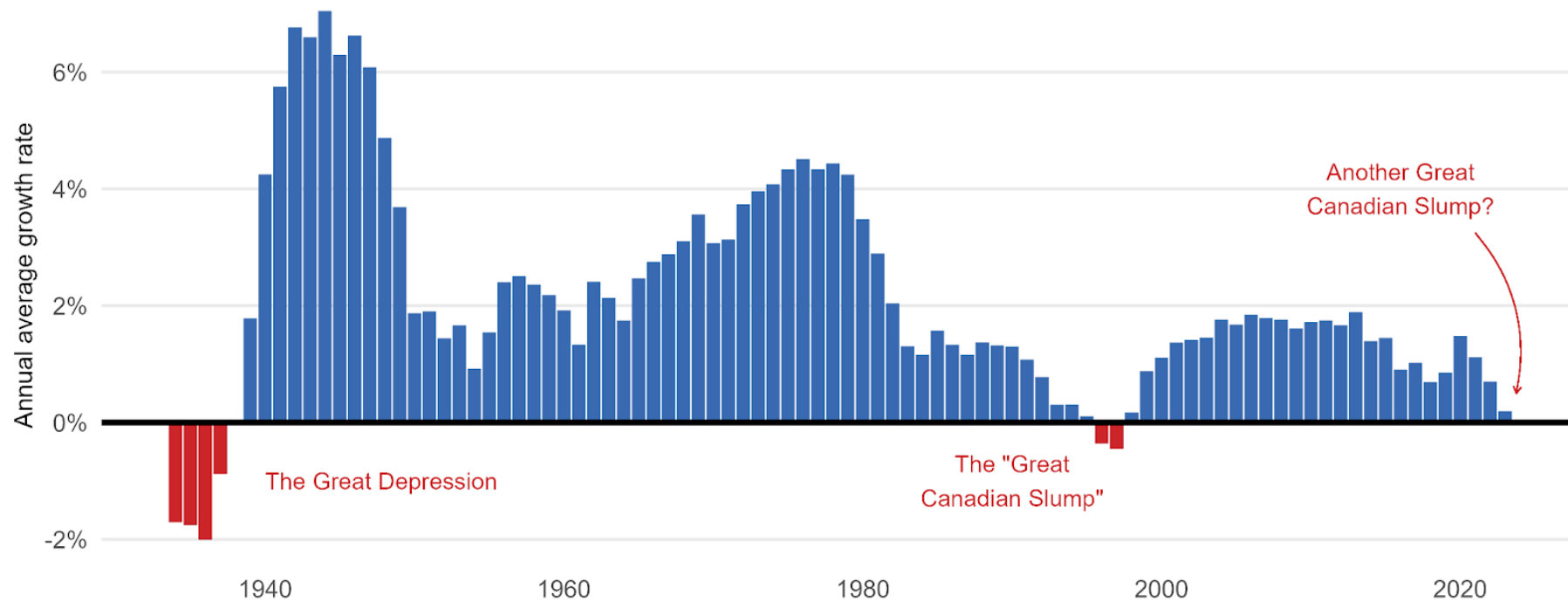


Source: calculations from Statistics Canada data table 18-10-0004-01 and SPSP/M version 30.
Based on region- and product-specific price changes. Median monthly costs are vertical gray lines.

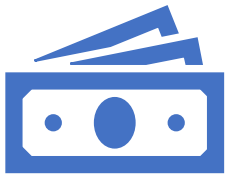
Slowing labour productivity and income growth

Real disposable income per capita growth (8-year moving average), 1926-2023

Source: Own calculations from several Statistics Canada data tables



Graph by @trevortombe



Quantifying the effect of emissions pricing

What we buy

How prices change

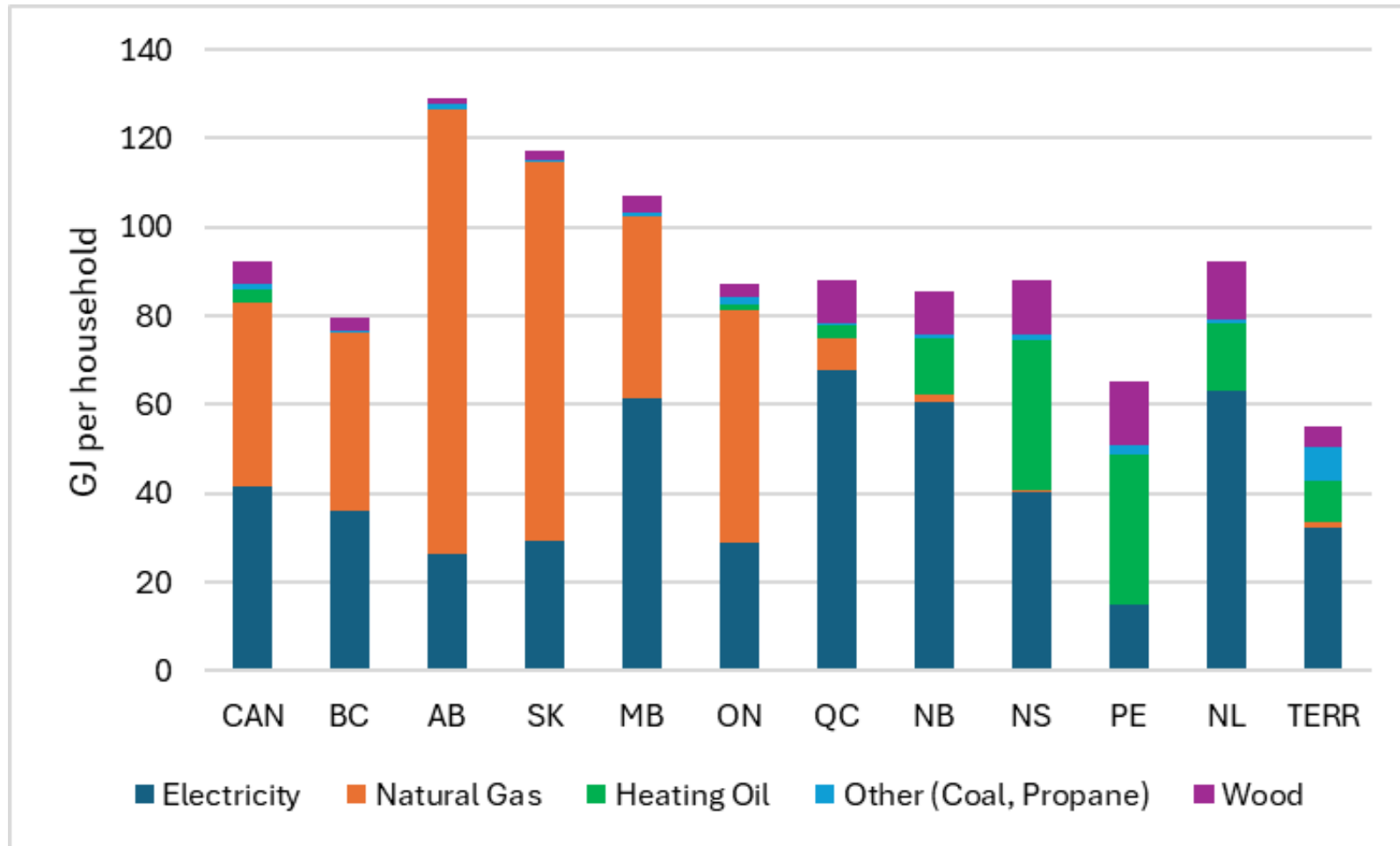
Gross policy costs and ability to pay

Mitigating measures and net policy costs

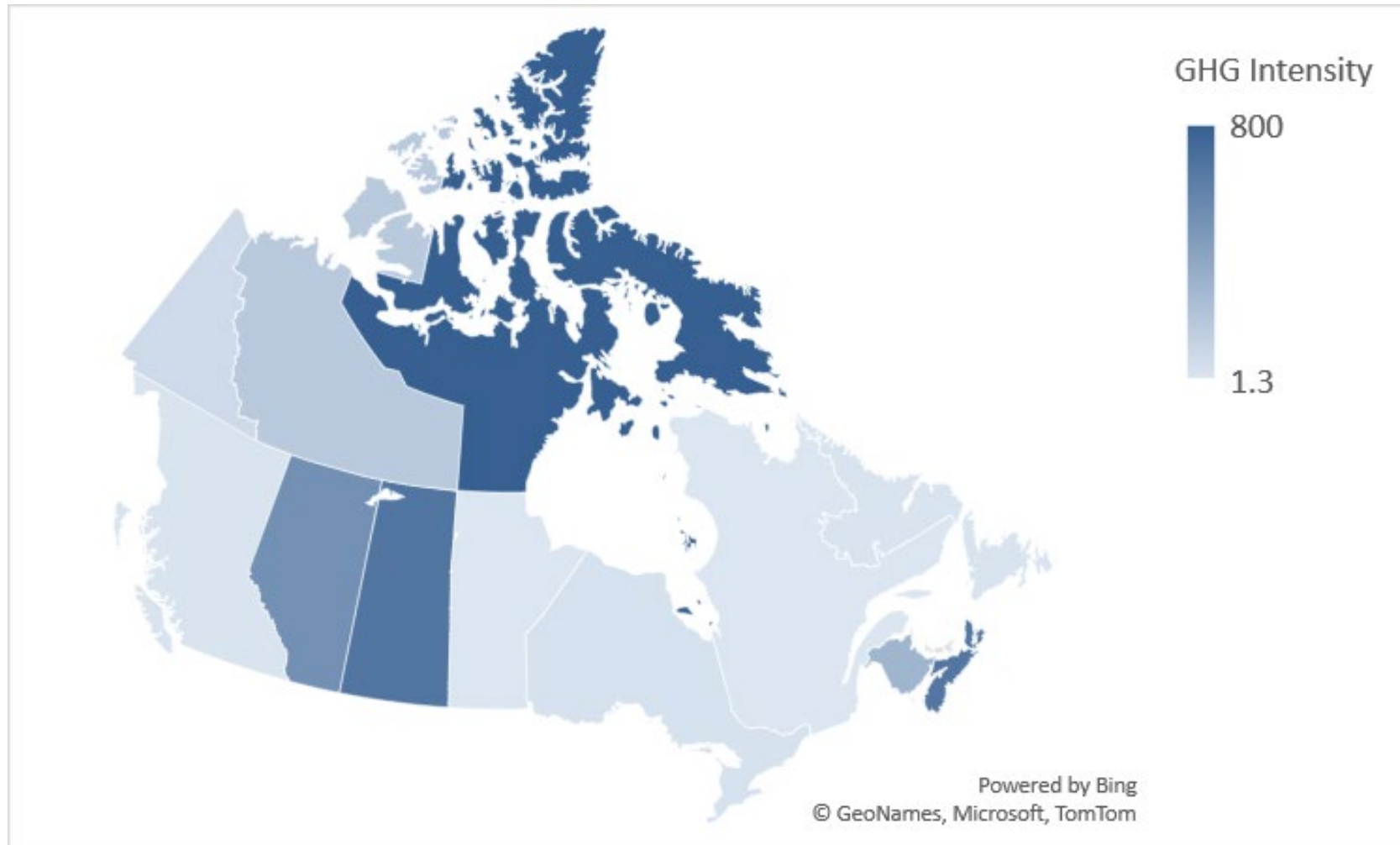
Average Household Expenditure Shares, by Province and Selected Items (2019)

Product	CAN	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Owned accommodation	16.9	18.5	16.7	14.4	14.4	18.4	15.0	12.3	13.2	11.9	13.1
Private transportation	16.3	15.7	17.5	18.1	18.2	15.5	16.3	20.6	17.1	19.3	19.3
Groceries	10.9	9.7	10.0	10.9	11.5	10.6	12.7	12.1	11.2	11.9	12.7
Household operations	7.9	7.7	8.2	8.6	7.7	7.9	7.6	9.2	9.2	10.1	8.6
Recreation	6.7	6.8	7.8	7.7	7.0	6.3	6.5	6.9	6.3	5.8	7.1
Rented accommodation	6.0	6.5	4.8	4.9	5.6	6.3	6.6	3.6	5.8	5.1	3.5
Clothing and footwear	4.8	4.8	4.5	4.1	4.5	4.9	5.2	4.4	4.5	4.5	5.0
Health care	4.0	4.1	3.9	4.1	4.4	3.3	5.1	5.0	4.4	4.7	4.2
Restaurants	4.0	4.0	4.2	3.8	3.7	3.9	4.3	4.2	4.0	4.4	3.4
Utilities	3.7	2.9	4.2	4.7	3.8	3.8	3.2	5.7	5.1	5.8	5.4
Furniture and equipment	3.6	3.3	3.2	3.4	3.7	3.8	3.6	4.0	3.6	3.5	3.4
Alcohol, tobacco, and cannabis	2.6	2.3	2.6	3.1	2.5	2.2	3.3	3.0	3.2	2.7	3.4
Education	2.5	3.0	2.1	2.0	2.3	2.9	1.6	1.5	2.8	1.8	1.5
Public transportation	2.1	2.7	2.1	1.6	2.0	2.3	1.7	1.0	1.8	1.7	1.9
All other expenditures	7.8	8.1	8.0	8.6	8.5	7.8	7.4	6.4	7.8	7.0	7.5

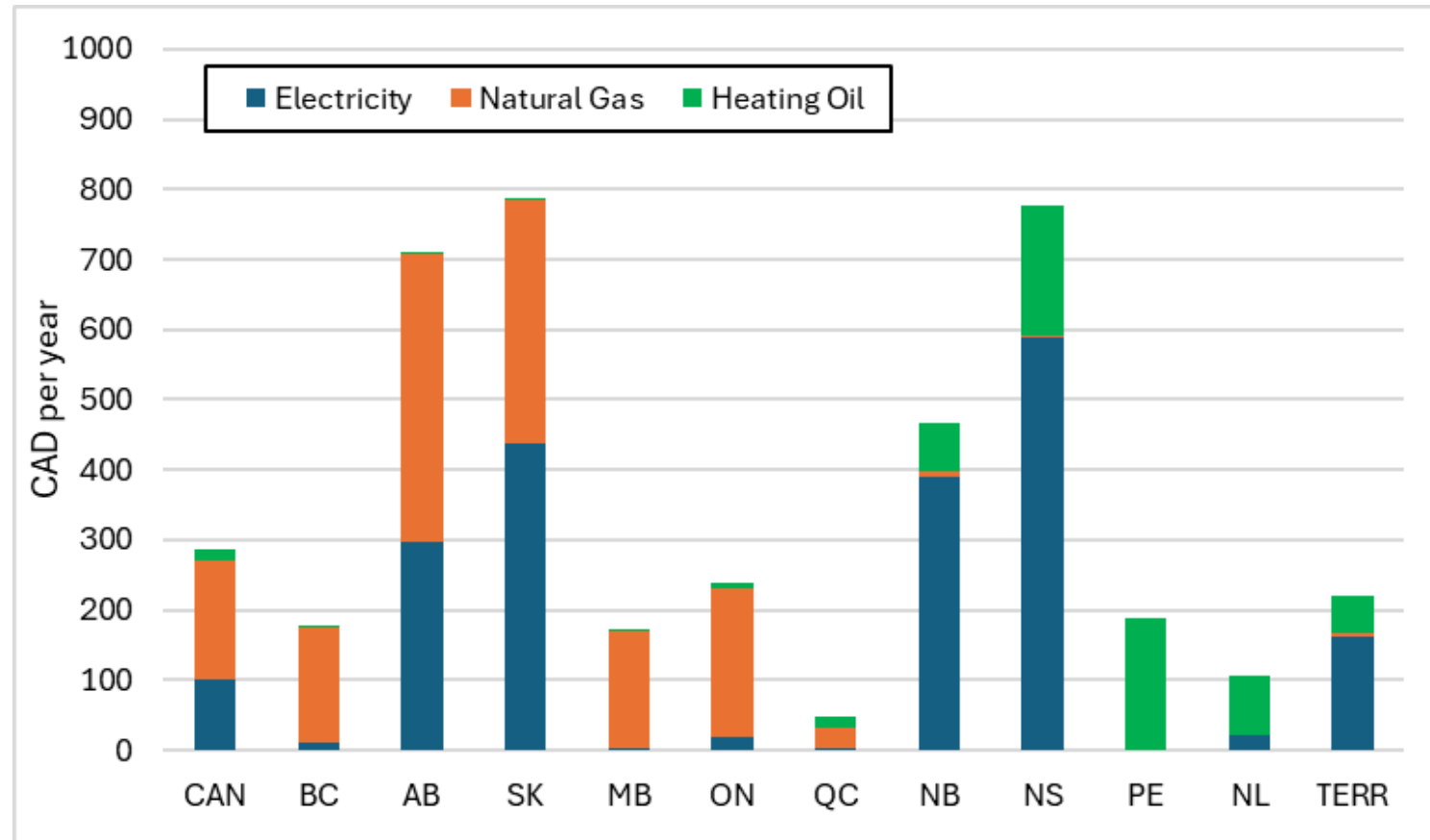
Average 2021 Residential Energy Consumption by Energy Type (GJ per household)

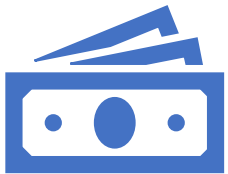


2021 Electricity Generation Emissions Intensity (g CO₂e/kWh)



Average potential household emissions price costs by energy type at \$80 per tonne





Quantifying the effect of emissions pricing

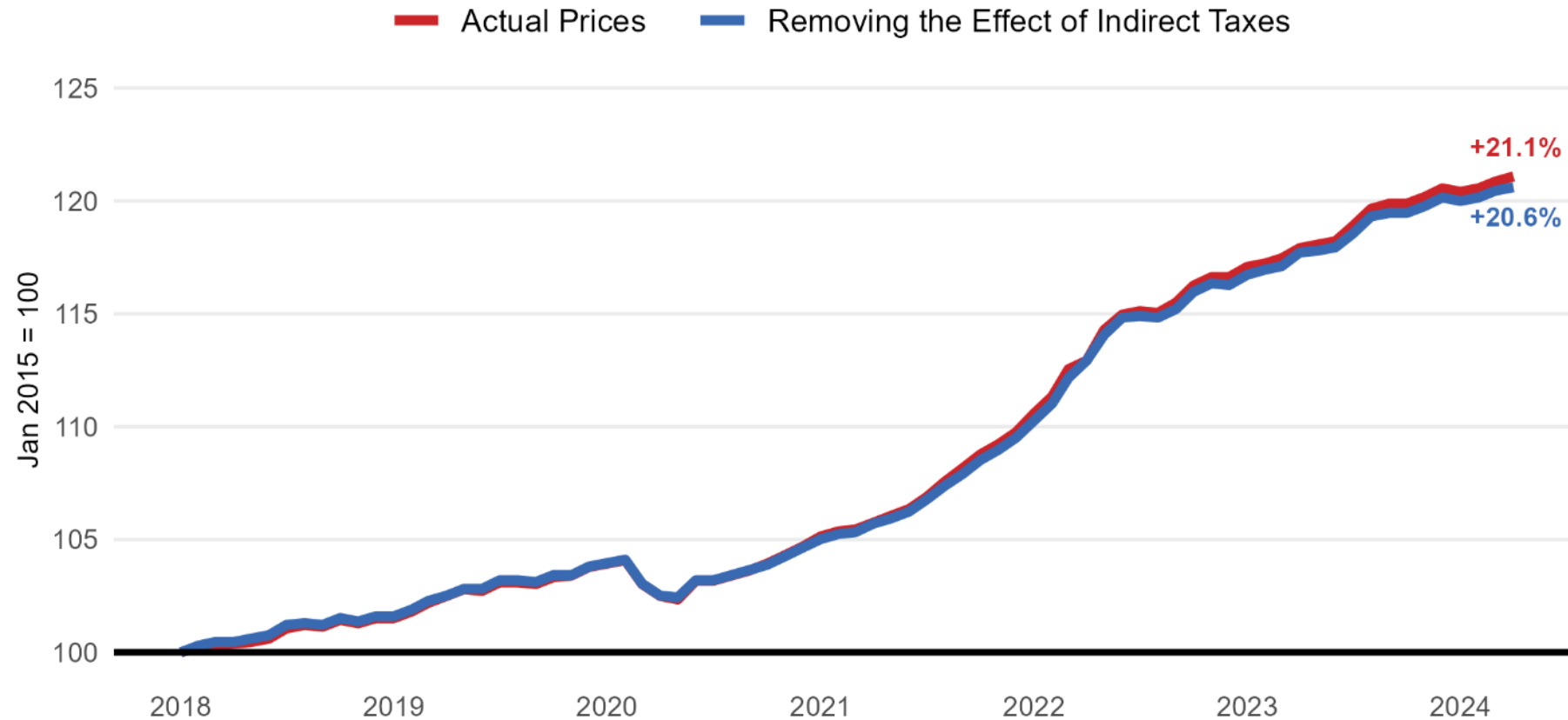
What we buy

How prices change

Gross policy costs and ability to pay

Mitigating measures and net policy costs

How prices change: effect of indirect tax increases on consumer prices in Canada, 2018 to April 2024

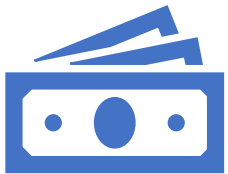


What are indirect costs?

- Costs embodied in the price of goods and services
- Use a model incorporating input-output linkages for households' purchasing choices
 - Inputs of inputs, inputs of inputs of inputs, etc. ...
 - Accounts for emissions embodied in purchases

Selected “effective carbon tax rates”, 2023

- Alcohol: +0.48%
- Food and beverages: +0.42%
- Restaurants: +0.20%
- Clothing and footwear: +0.19%
- ... and more! (Range between +0.07% and +1.74%)



Quantifying the effect of emissions pricing

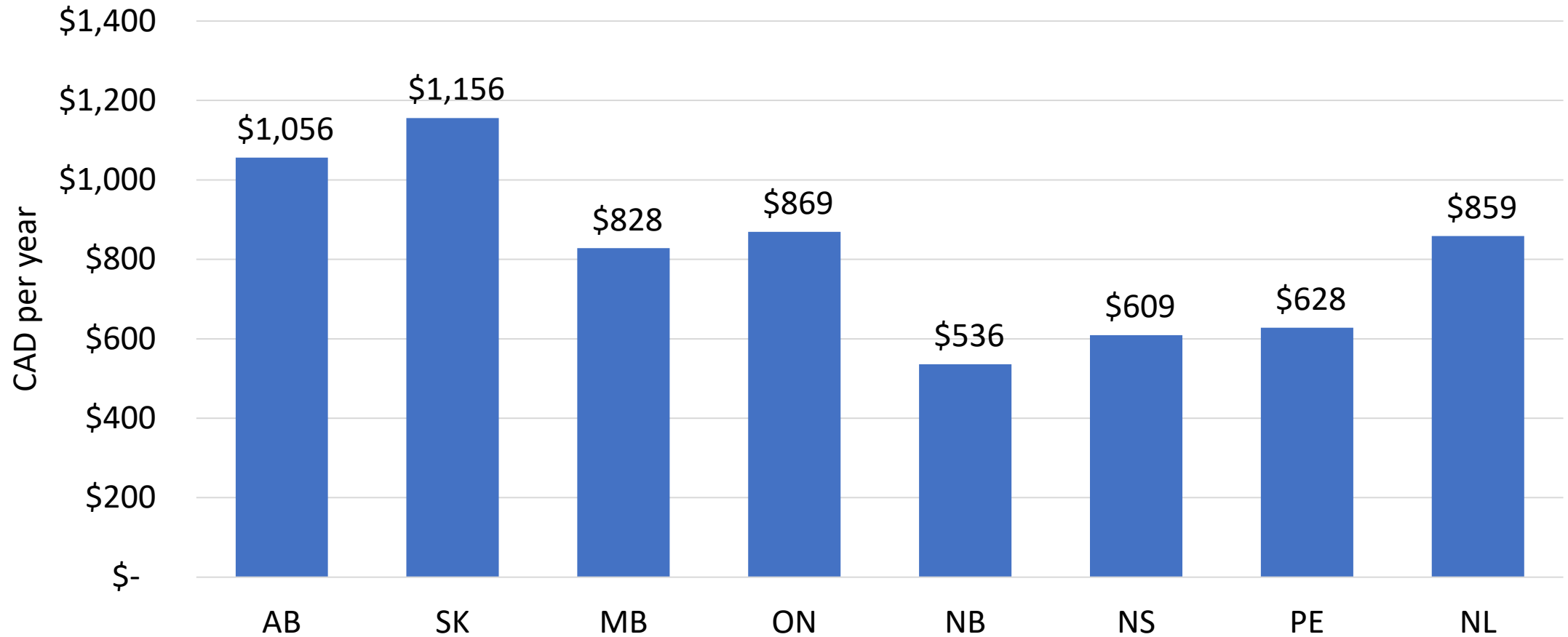
What we buy

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Gross policy costs and ability to pay

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Average gross household emissions pricing costs in 2024/25 (\$80/tonne)

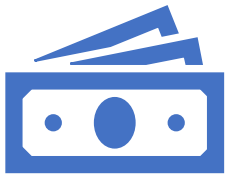


Gross Household Emissions Pricing Costs in Alberta, by Income Level (\$80/tonne)

Household Income	Dollars per Year	Share of Consumption	Share of Income
<\$30k	\$ 305	1.0%	2.9%
\$30-60k	\$ 586	1.5%	1.3%
\$60-90k	\$ 713	1.5%	1.0%
\$90-120k	\$ 884	1.6%	0.9%
\$120-150k	\$ 1,144	1.8%	0.8%
\$150-180k	\$ 1,292	1.7%	0.8%
>\$180k	\$ 1,611	1.8%	0.6%

Gross household costs in Alberta, by income and family type (\$80/tonne)

Household Income	Dollars per Year		Share of Consumption		Share of Income	
	No Kids	Kids	No Kids	Kids	No Kids	Kids
<\$30k	\$ 297	\$ 507	1.0%	1.1%	2.9%	2.3%
\$30-60k	\$ 568	\$ 772	1.5%	1.4%	1.3%	1.6%
\$60-90k	\$ 655	\$ 977	1.5%	1.7%	0.9%	1.3%
\$90-120k	\$ 816	\$ 1,092	1.6%	1.8%	0.8%	1.1%
\$120-150k	\$ 1,011	\$ 1,400	1.6%	2.0%	0.8%	1.0%
\$150-180k	\$ 1,123	\$ 1,611	1.6%	1.9%	0.7%	1.0%
>\$180k	\$ 1,434	\$ 1,897	1.7%	1.9%	0.5%	0.7%



Quantifying the effect of emissions pricing

What we buy

How prices change

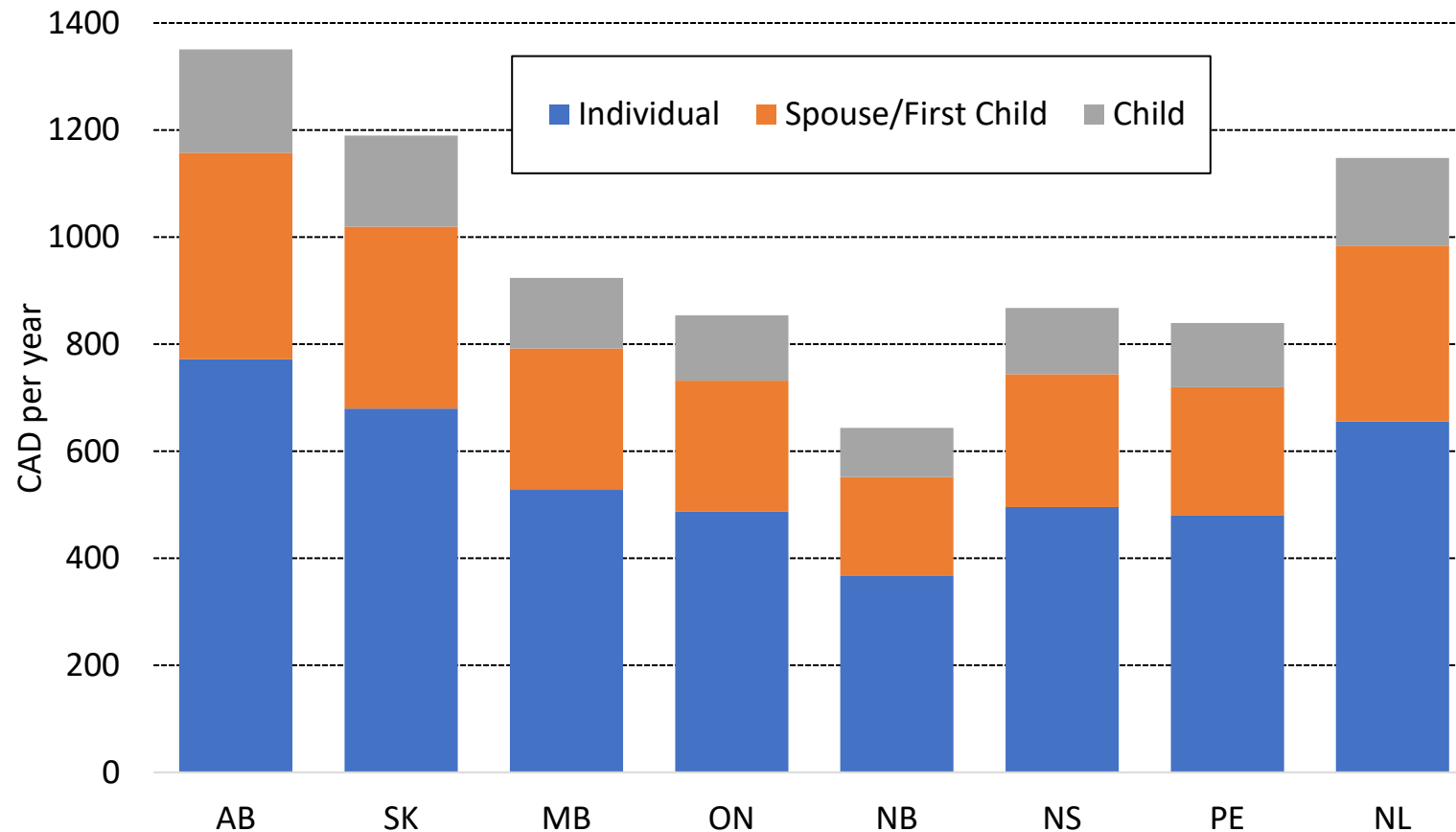
Gross policy costs and ability to pay

Mitigating measures and net policy costs

Two main cost-mitigation approaches

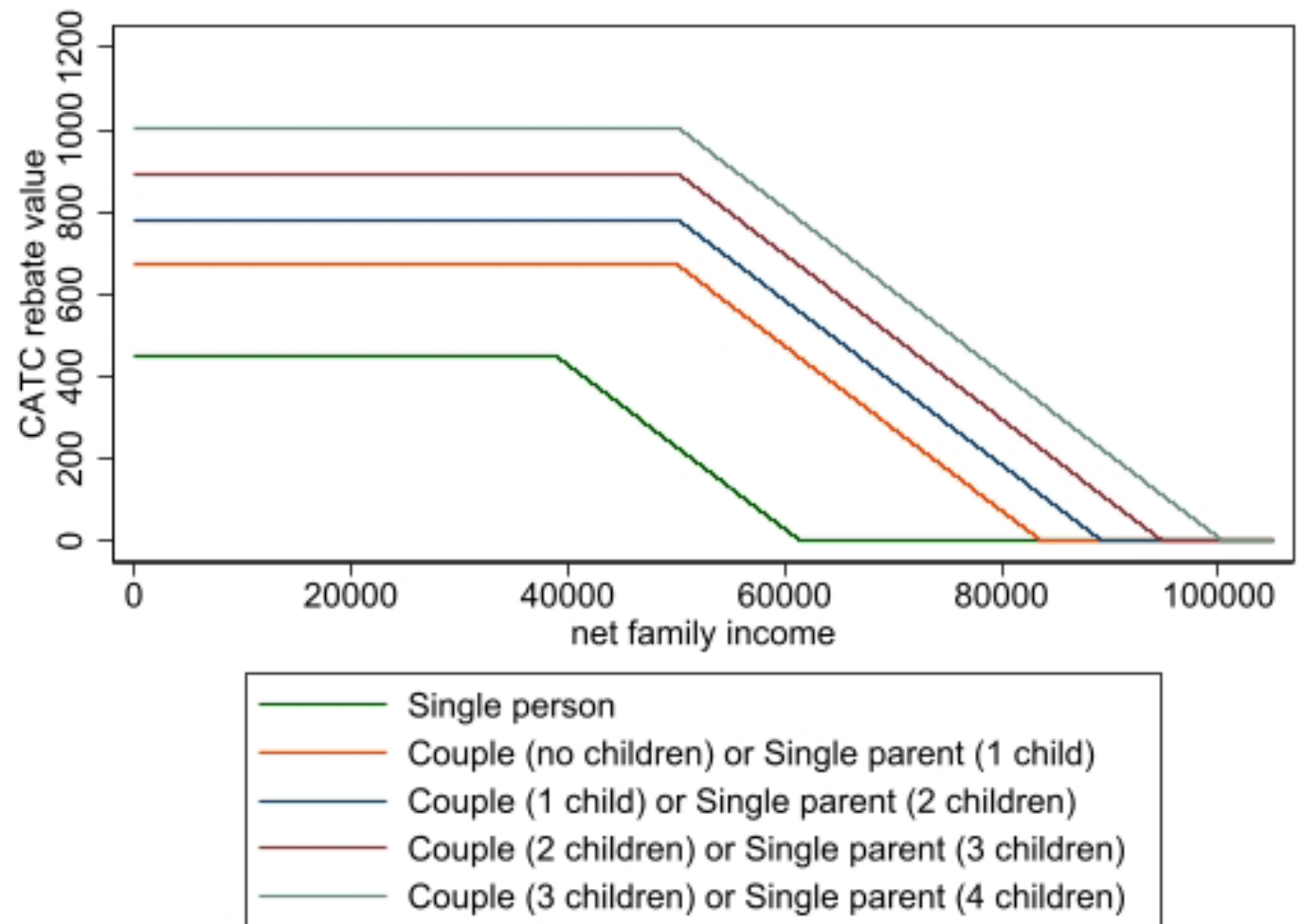
- Household rebates
 - Lump sum (e.g., Canada Carbon Rebate)
 - Means-tested (BC Climate Action Tax Credit)
- Large-emitter pricing systems
 - Cap and trade with free allocation of emissions permits (Quebec)
 - Output-based pricing (most provinces)

Canada Carbon Rebate, May 2023 to June 2024

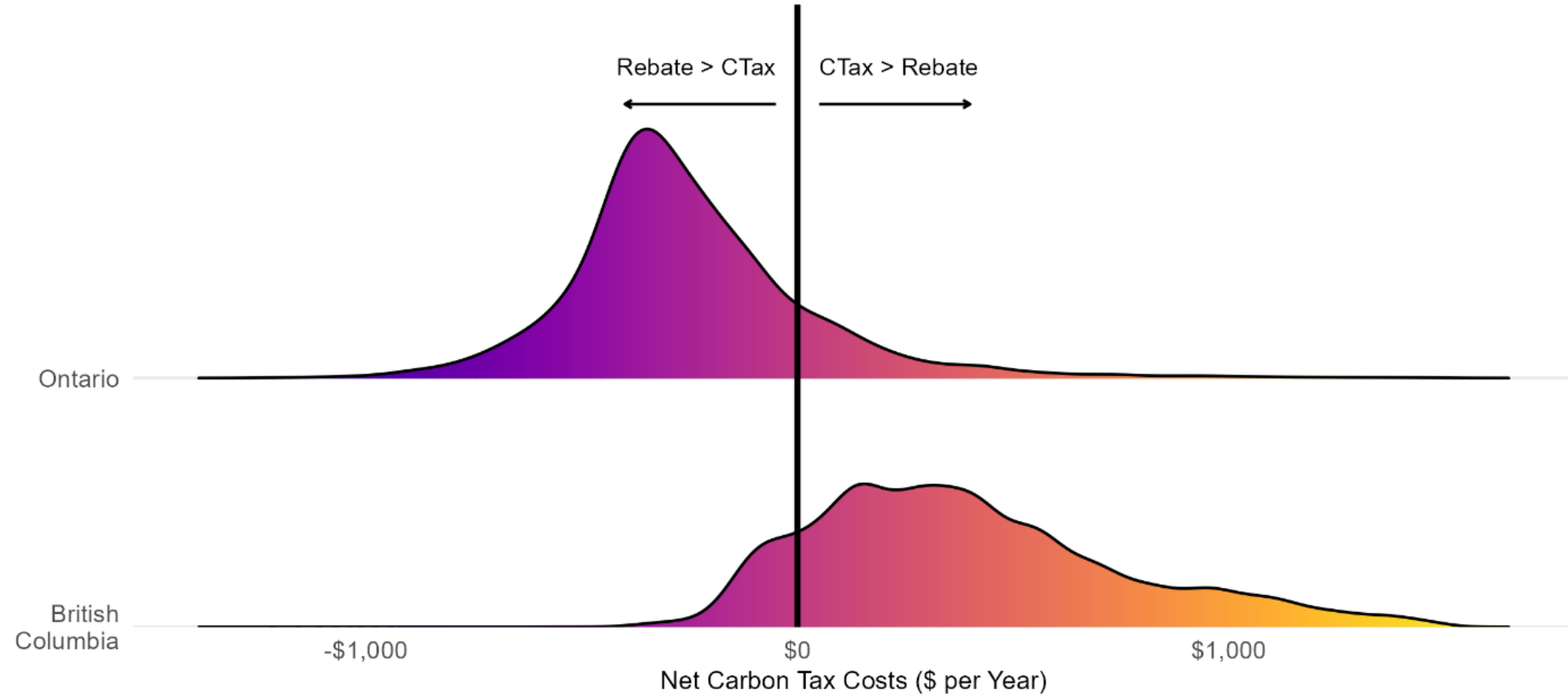


- Lump-sum quarterly payments
- 90% of within-province fuel charge revenue
- 10% rural top-up

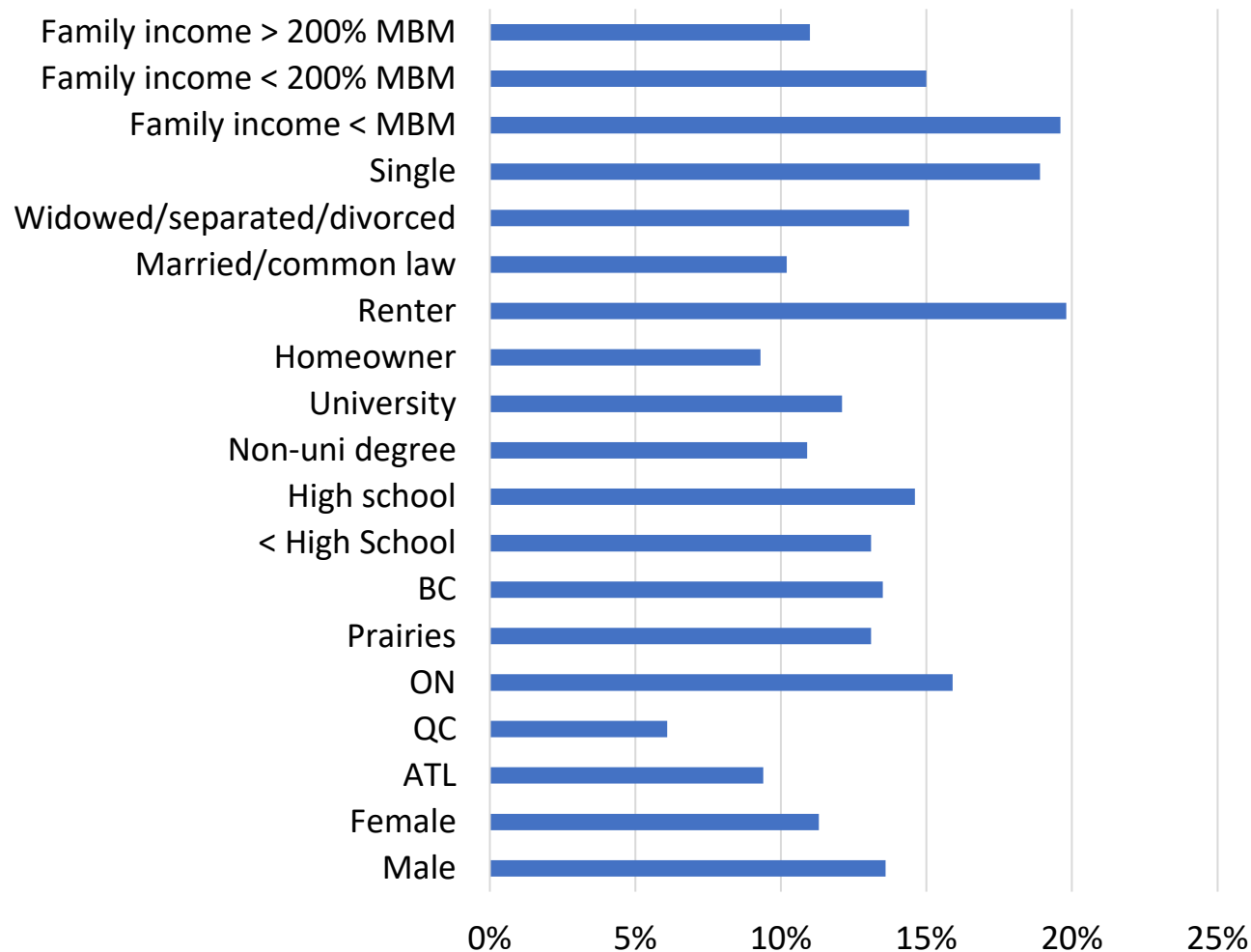
BC CATC
(July 2023 to
June 2024)



Net cost to BC and ON households, 2023



Share of Non-Tax-Filers by Socio-Economic Characteristics



- Approximately 10-12% of Canadians do not file a tax return and receive benefits.
- This is almost 20% of some socio-economic groups.

A (Brief) Primer on Production Decisions

- Firms produce output by using inputs
 - How firms combine inputs depends on the relative prices of inputs and production technologies available
- *How to produce* (intensive margin) and *how much to produce* (extensive margin) are separate decisions
- Emissions pricing raises cost of emissions-intensive inputs and increases cost of production
- Response to emissions pricing or emissions standards
 - Reduce production (lower output)
 - Change input mix
 - Abate (improve combustion efficiency, emissions control equipment, etc.)

What is an OBPS?

- The goal of emissions-intensive and trade-exposed (EITE) support policy is:
 - limit carbon leakage (preventing declines in output as a result of emissions pricing),
 - and maintain emissions reductions.
 - (lowering average costs of production while keeping the marginal cost of emissions constant)
- How?
 - Exempt certain sectors
 - Direct cash subsidies
 - Subsidize emissions-reducing technology investments
 - **Provide free emissions permits**
 - Subsidize based on historical or current emissions
 - Subsidize based on historical production or market share
 - Subsidize based on current production
 - Border tax adjustments

How emissions & output respond to policy

TABLE 1 **STYLIZED REPRESENTATION OF HOW EMISSIONS AND OUTPUT RESPOND TO POLICY**

	GHG Intensity	Total Output	Total GHGs
Price on GHGs	↓	↓	↓
Output Subsidy	No Effect	↑	↑
Both Combined – An OBA System	↓	↓*	↓*

* In practice, output subsidies in an OBA system are not likely to be so generous as to increase output above its pre-policy level. Thus, we note the overall effect of an OBA system is to shrink output. But, strictly speaking, the effect is ambiguous without explicit restrictions on the magnitude of the subsidy.

Deconstructing output subsidies & their effects

- Example: NG electricity
 - Benchmark (BE): 370 tonnes/GWh

$$\text{Free Allocation}_{f,s,t} = \sum_t [BE_{t,s} \times \text{Production}_{f,s,t,t}]$$

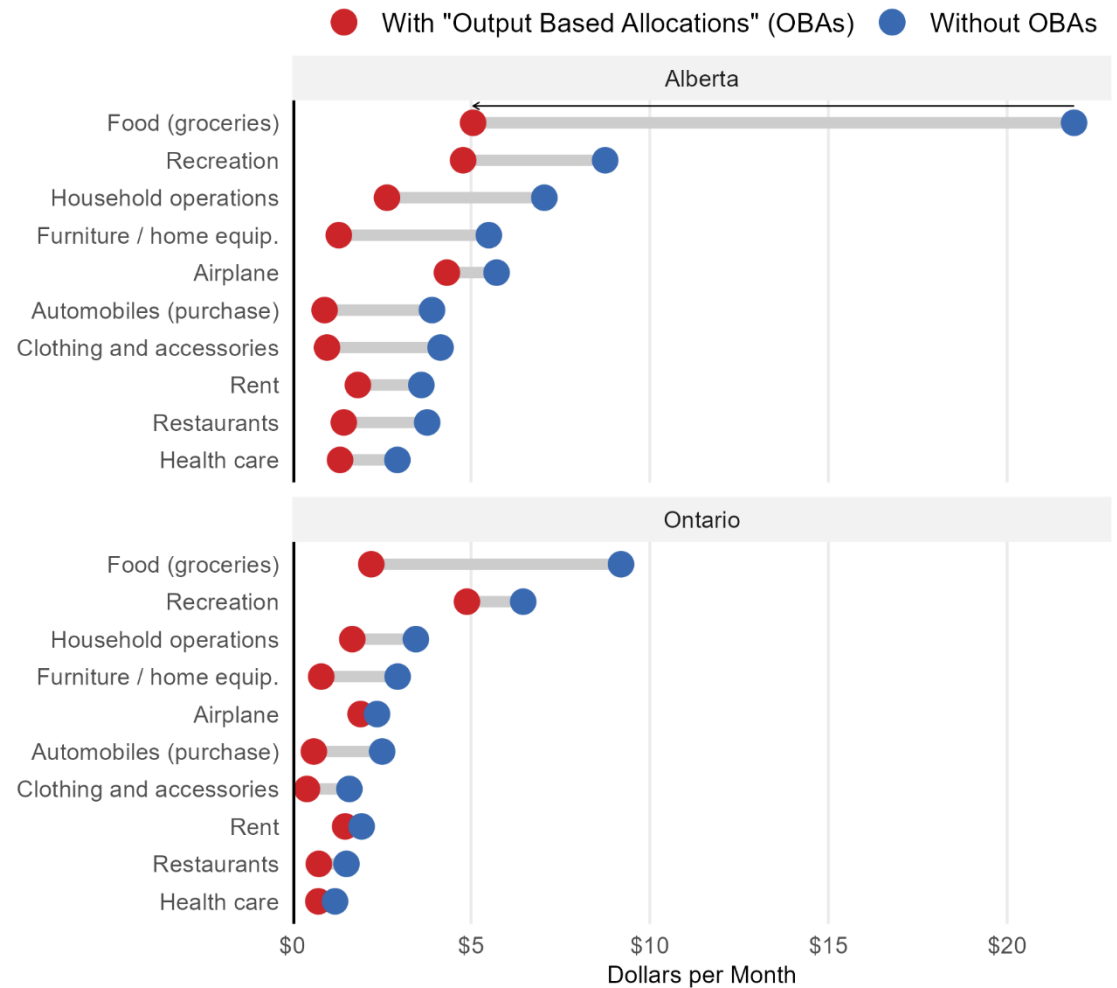
- Facility intensity: 400 tonnes/GWh
- Facility output: 1000 GWh
- Emissions price: \$50/t

- Facility emissions: 400,000 tonnes
- Increase in costs from emissions pricing (price x intensity x output): \$20,000,000
- Free allocation: 370,000 tonnes
- Value of free allocation: \$18,500,000
- Net increase in costs with OBA: \$1,500,000
- Revenue recycled: 92.5%
- Average cost of emissions: \$3.75/tonne
- Marginal cost of emissions: \$50/tonne

Large emitter systems mitigate indirect costs

Indirect costs of \$65/tonne

Average monthly indirect cost of carbon pricing, with and without output-based allocations to large emitters.



A tangent on competitiveness mechanisms relative to full pricing

	Exemptions	Output-based rebates or free permit allocations	Border carbon adjustments
Emissions reduction incentive	Limited.	Marginal incentive remains. Subsidy increases output and emissions. Mutes signal to end consumers.	Full incentive.
Marginal cost of emissions	Lower	No change.	No change.
Average cost of emissions	Lower	Lower.	No change.
Emissions intensity	No change.	Decreases.	Decreases.
Reduces leakage?	Yes, by lowering or removing cost effects for covered firms.	Yes, lowers average cost of emissions for domestic firms.	Fee on imports protects domestic firms from international competitors. Rebate on exports supports international competition by domestic firms.
Trade issues	Implicit subsidy, but unlikely to be substantive.	Could be challenged as subsidies or preferential treatment.	Risk of other countries' imposing retaliatory tariffs.
Costs	Foregone revenue.	Subsidizes output. Foregone revenue from full emissions pricing.	Raises revenue on imports. Foregone revenue from emissions pricing rebate on exports.
Administrative complexity	Low. Likely able to implement through tax system.	Medium. Requires firm- or facility-specific data.	High.

Conclusions

Adverse effects are (mostly) small

- Adverse effects of emissions pricing are overstated
 - Contribution to price level increase is ~0.4% since 2018
 - Gross costs are approximately 1-3% of income
- Significant differences in gross costs across products, provinces, family types, and income levels
 - Lower-income households and households with children have the most exposure to potential financial strain
- Both rebates and large-emitter pricing mitigate total policy burden
 - But those exposed to financial strain are less likely to file taxes

Caveats

- Our results are likely overestimates
 - We assume full pass-through of costs
 - We ignore behavioural changes
- All climate policies come with costs
 - Emissions pricing is likely the lowest-cost option per tonne abated
 - Emissions pricing is transparent

Saliency matters

- A lot!
- Are rebates the ‘best’ lever for addressing affordability?

Dear JENNIFER L WINTER:

The Canada Revenue Agency (CRA) sent you new mail online called:

Canada Carbon Rebate notice

This mail may require your attention.

Future research directions

- What are the general equilibrium effects of emissions pricing on households, and how do they change the distributional effects?
- What is the burden of emissions-reduction policies on vulnerable populations (e.g., non-taxfilers)?
- What are the distributional effects of other key emissions-mitigation policies like the *Clean Fuel Regulations* or the *Clean Electricity Regulations*?
- What are the distributional consequences of targeted energy-shifting or energy efficiency subsidy programs?
- Are current government energy affordability programs effective or meeting their stated goals? What are the distributional consequences?
- Can techniques rooted in the economics of inequality better assess energy affordability and equity issues?

Thank You!

jwinter@ucalgary.ca

www.jenniferwinter.ca