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# REVIEWING THE FISCAL AND DISTRIBUTIONAL ANALYSIS OF THE FEDERAL CARBON PRICING SYSTEM



OFFICE OF THE PARLIAMENTARY BUDGET OFFICER  
BUREAU DU DIRECTEUR PARLEMENTAIRE DU BUDGET

The Parliamentary Budget Officer (PBO) supports Parliament by providing economic and financial analysis for the purposes of raising the quality of parliamentary debate and promoting greater budget transparency and accountability.

This report provides an update fiscal and distributional analysis of implementing a federal carbon pricing system.

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# Executive Summary

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The federal carbon pollution pricing “backstop” system is based on the *Greenhouse Gas Pollution Pricing Act*, adopted on June 21, 2018. It has two components: a charge on fossil fuels, and a regulatory system for large industry, known as the “output-based pricing system” (OBPS).<sup>1</sup>

The backstop will apply in provinces and territories that do not have adequate climate pricing plans of their own that meet federal standards. They are Saskatchewan, Manitoba, Ontario and New Brunswick, starting in April 2019, and Yukon and Nunavut, as of July 2019. The federal output-based pricing system will be implemented in Prince Edward Island.<sup>2</sup>

As a result of Alberta's May 30, 2019 repeal of its carbon levy, Alberta is covered by the federal fuel charge starting since January 2020.<sup>3</sup> The federal government announced that the proposed provincial fuel charge in New Brunswick will replace the federal fuel charge starting from April 2020.<sup>4,5</sup>

In this report, PBO updates the estimates by using the most recent data released by Statistics Canada (input-output tables, provincial physical flow accounts for GHG emissions), Canada Energy Regulator (future energy uses), and Environment Canada (projected sectoral GHG emissions). In comparison with the previous report, PBO also considers the carbon revenues and costs embedded in the sales taxes (GST, PST or HST).

## **Aggregate federal revenue**

PBO estimates that the federal government will directly collect \$2.81 billion in carbon pricing revenues in 2019-20 from Alberta, Saskatchewan, Manitoba, Ontario and New Brunswick. Most of these revenues will be generated through the fuel charge and the balance will be generated by output-based pricing.<sup>6</sup> In addition, the GST levied on top of the federal carbon price represents another potential source of federal revenue. The provincial revenues would be raised through PST on carbon pricing.

By 2022-23, direct carbon pricing revenues will reach an estimated \$8.27 billion. In this report, we assume the fuel charge rate remains at \$50 per tonne after 2022-23, at which point revenues begin to decrease due to cleaner electricity generation, declining oil and gas emissions and decreasing use of diesel and motor gasoline (Summary Table 1).

**Summary Table 1** Estimated federal direct and indirect revenues of carbon pricing

| <i>\$ millions</i>            | <b>2019-20</b> | <b>2020-21</b> | <b>2021-22</b> | <b>2022-23</b> | <b>2023-24</b> | <b>2024-25</b> |
|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Total fuel charge proceeds    | 2,599          | 4,841          | 6,390          | 7,837          | 7,788          | 7,727          |
| Total OBPS                    | 213            | 270            | 350            | 436            | 432            | 430            |
| <b>Total direct revenue</b>   | <b>2,811</b>   | <b>5,111</b>   | <b>6,740</b>   | <b>8,272</b>   | <b>8,220</b>   | <b>8,157</b>   |
| GST revenue on carbon pricing | 99             | 179            | 235            | 290            | 289            | 288            |
| <b>Total all revenue</b>      | <b>2,910</b>   | <b>5,290</b>   | <b>6,975</b>   | <b>8,563</b>   | <b>8,509</b>   | <b>8,445</b>   |
| Carbon price (\$/tonne)       | 20             | 30             | 40             | 50             | 50             | 50             |

Source: PBO calculations.

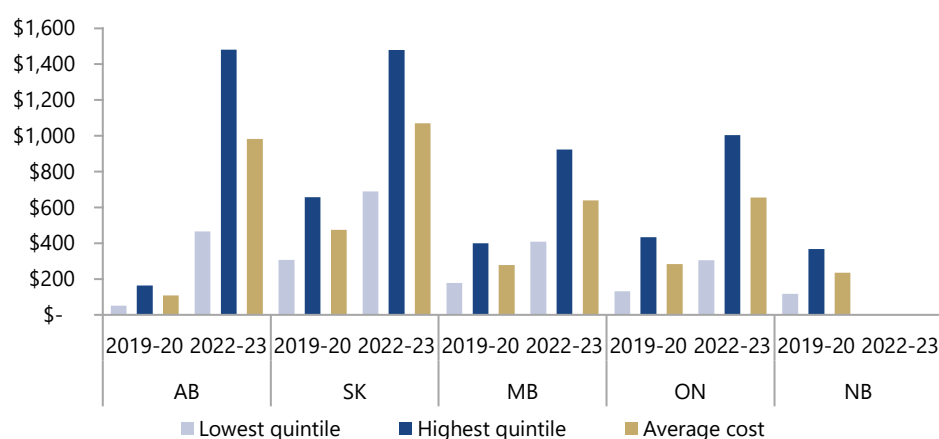
Note: Totals may not add due to rounding. These estimates cover Ontario, New Brunswick, Manitoba, Saskatchewan and Alberta.

### Gross household costs

Households will bear the majority of the cost of the federal pricing system. Regions using more carbon-intensive energy sources will have higher costs per household (Summary Figure 1).

PBO estimates that Saskatchewan households will incur the highest average annual cost, starting at \$475 in 2019-20 and reaching \$1,070 in 2022-23. Costs in Saskatchewan are roughly twice the average household cost in New Brunswick.<sup>7</sup>

**Summary Figure 1** Household costs of carbon pricing before rebate



Source: PBO calculations.

Notes: These costs include the GST and PST portion of the carbon prices. For Alberta, PBO only considers the cost related to the fuel charge. Estimates for Alberta reflect a carbon pollution price of \$20 per tonne of carbon dioxide equivalent (CO<sub>2</sub>e), effective January 1, 2020. New Brunswick's proposed fuel charge would replace the federal fuel charge in 2020-2021.

## Net household carbon pricing transfers

The carbon pricing system is revenue neutral at the federal level, so any federal revenues generated under the system will be returned to the province or territory in which they are generated.<sup>8,9</sup> Households will receive 90 per cent of the revenues raised from the fuel charge proceeds via a direct federal rebate.<sup>10,11</sup>

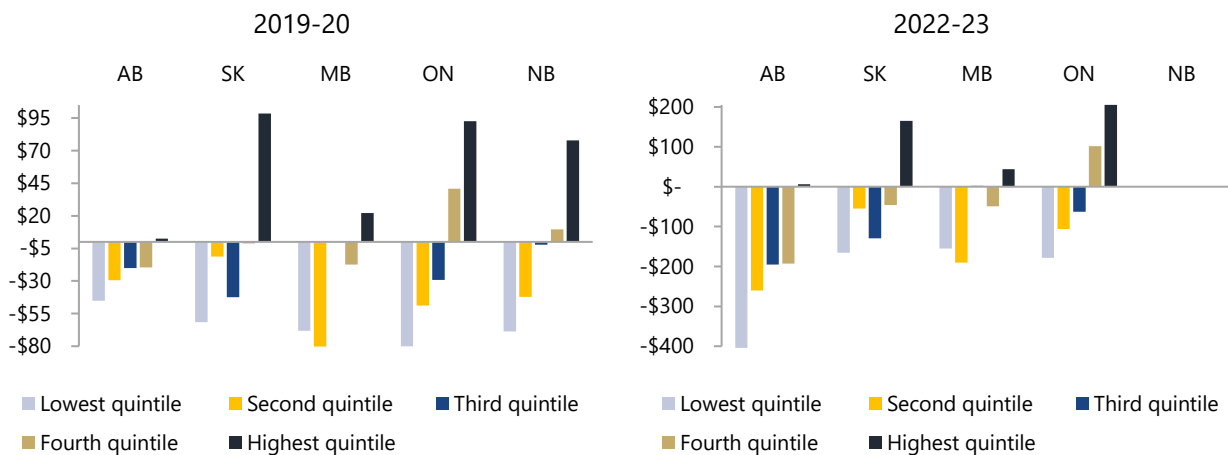
Similar to the results of our May 2019 report, we estimate that most households will receive higher transfers than amounts paid in fuel charges (Summary Figure 2). Unlike our May report, these figures account for the additional provincial and federal sales taxes resulting from increasing fuel charges, so households generally receive smaller net transfers than in our prior estimate.<sup>12</sup>

This analysis presents results for Alberta for the first time. PBO estimates that nearly all Alberta households will receive higher transfers than amounts paid in fuel charges. That being said, our analysis examines only federal fuel charges and excludes costs under Alberta's Technology Innovation and Emissions Reduction (TIER) regulations for large industrial emitters.<sup>13</sup>

In all provinces, the net benefits of the federal carbon pricing system are broadly progressive by income group. That is, lower income households will receive larger net transfers than higher income households.<sup>14</sup>

Summary Figure 2

## Quintile distribution of household carbon cost net of rebate



Source: PBO calculations.

Notes: Negative cost means rebates exceed the gross household carbon costs.

New Brunswick's proposed fuel charge would replace the federal fuel charge in 2020-2021.

# 1. Introduction

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On October 23, 2018, the Government of Canada announced details of a carbon pricing system for Canada, including where and when it would apply. The federal carbon pollution pricing “backstop” system is based on the *Greenhouse Gas Pollution Pricing Act*, adopted on June 21, 2018.<sup>15</sup>

The system will apply only in provinces and territories that do not have climate pricing plans of their own that meet federal standards. Alberta, Manitoba, New Brunswick, Ontario, Prince Edward Island, Saskatchewan, Nunavut and Yukon will be subject to elements of the federal backstop.<sup>16,17,18,19,20,21</sup>

This federal backstop is composed of two elements: a carbon levy and an output-based pricing system. PBO assumes that the cost of federal carbon pricing is “passed through” to the final consumer of the product through an increase in the sale price of the energy or non-energy products.<sup>22,23</sup>

The cost of the residential and private transport energy consumption represents the direct household carbon cost. The carbon cost embodied in non-energy goods and services is the indirect household emission cost.

The federal government has stated that the carbon pricing system will be revenue neutral, with any direct revenues generated under the system staying in the province or territory where they are generated.

The federal government will return the revenue from the carbon levy, directly to individuals and families, through proposed Climate Action Incentive payments. It will also return a portion of proceeds to particularly affected sectors in other jurisdictions that do not meet the Canada-wide federal standard for reducing carbon pollution (that is, Ontario, New Brunswick, Manitoba, Saskatchewan and Alberta).

Revenue generated from the OBPS in Ontario, New Brunswick, Manitoba and Saskatchewan will also be returned to the province of origin. Given that these proceeds would only be realized in 2020, the Government will decide later how to return the proceeds in these provinces.<sup>24</sup>

This report uses the federal carbon policy parameters to update the estimated household carbon costs. In this exercise, PBO considers the carbon cost after applying the federal and provincial tax sales.

Also, PBO estimates the distribution of carbon costs net of rebates across all families in Ontario, New Brunswick, Manitoba, Saskatchewan and Alberta, and reports results by household income quintile.

## 2. Results

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For the previous fiscal and distributional analysis of the federal carbon pricing, PBO developed a multi-step model that simulates carbon costs to households of the federal backstop system between 2019 and 2024 for five income quintiles in Saskatchewan, Manitoba, Ontario and New Brunswick.<sup>25,26</sup>

In this report, PBO updates the estimates by using the most recent data released by Statistics Canada (input-output tables, provincial physical flow accounts for GHG emissions), Canada Energy Regulator (future energy uses), and Environment and Climate Change Canada (projected sectoral GHG emissions). We also include Alberta given the province's decision following the May 2019 provincial election. In comparison with the previous report, PBO also considers the carbon costs embedded in the sales taxes (GST, PST or HST)

The model estimates three main components of the federal carbon pricing system:

1. The carbon revenue collected by the federal government.
2. The distribution of the gross carbon costs from energy and non-energy purchases.
3. The distribution of net costs under the federal rebate system to households.

Each component is discussed below.

### 2.1. Federal revenue of carbon pricing

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PBO estimates that the federal government will collect \$2.81 billion in direct carbon pricing revenues in 2019-20. Most of the revenues (\$2.6 billion) will be generated through the fuel charge; the remaining amount, roughly \$213 million, will be generated by output-based pricing. PBO estimates that these revenues will increase to \$8.27 billion by 2022-23. Proceeds from the fuel charge will account for \$7.84 billion and OBPS the rest (Table 2-1).

In addition, PBO estimates that the federal government will collect \$99 million from GST on carbon pricing in 2019-20. This amount will triple by 2022-23 (Table 2-1).

Ontario, the most populous province under the carbon pricing regime, will generate just over 68 per cent (\$1.9 billion) of the total federal revenues in 2019-20. This share will decrease to 56 per cent in subsequent years but will remain the largest share across provinces (Table 2-1).



In Alberta, the federal government will generate \$246 million from the fuel charge proceed in the last quarter of fiscal year 2019-2020. This revenue will reach \$2.38 billion in 2022-23, the second-largest amount after Ontario.

In all five provinces, PBO estimates that total OBPS revenue will amount to about \$214 million in 2019-20, or 7.3 per cent of total revenue. This amount will more than double by 2022-23, (5.1 per cent of total federal carbon pricing revenue). More than 40 per cent of the OPBS revenue will be collected in Saskatchewan (Table 2-1).<sup>27</sup>

**Table 2-1 Estimated revenue of carbon pricing**

|       |                            | <i>\$ millions</i> | <b>2019-20</b> | <b>2020-21</b> | <b>2021-22</b> | <b>2022-23</b> | <b>2023-24</b> | <b>2024-25</b> |
|-------|----------------------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| AB    | Fuel charge proceeds       |                    | 246            | 1,466          | 1,942          | 2,381          | 2,376          | 2,367          |
|       | OBPS                       |                    | -              | -              | -              | -              | -              | -              |
|       | GST revenue                |                    | 8              | 49             | 65             | 80             | 80             | 80             |
|       | All revenue                |                    | 254            | 1,515          | 2,007          | 2,461          | 2,456          | 2,447          |
| SK    | Fuel charge proceeds       |                    | 248            | 371            | 491            | 599            | 597            | 591            |
|       | OBPS                       |                    | 100            | 133            | 168            | 195            | 183            | 182            |
|       | GST revenue                |                    | 10             | 14             | 19             | 23             | 23             | 23             |
|       | All revenue                |                    | 358            | 519            | 678            | 816            | 802            | 795            |
| MB    | Fuel charge proceeds       |                    | 191            | 287            | 378            | 458            | 451            | 446            |
|       | OBPS                       |                    | 4              | 7              | 9              | 10             | 10             | 10             |
|       | GST revenue                |                    | 6              | 9              | 12             | 15             | 15             | 14             |
|       | All revenue                |                    | 201            | 303            | 399            | 484            | 476            | 471            |
| ON    | Fuel charge proceeds       |                    | 1,822          | 2,716          | 3,578          | 4,399          | 4,364          | 4,324          |
|       | OBPS                       |                    | 85             | 130            | 174            | 231            | 239            | 237            |
|       | GST revenue                |                    | 71             | 106            | 140            | 173            | 172            | 171            |
|       | All revenue                |                    | 1,977          | 2,952          | 3,892          | 4,802          | 4,775          | 4,732          |
| NB    | Fuel charge proceeds       |                    | 93             | -              | -              | -              | -              | -              |
|       | OBPS                       |                    | 23             | -              | -              | -              | -              | -              |
|       | GST revenue                |                    | 3              | -              | -              | -              | -              | -              |
|       | All revenue                |                    | 119            | -              | -              | -              | -              | -              |
| Total | Total Fuel charge proceeds |                    | 2,599          | 4,841          | 6,390          | 7,837          | 7,788          | 7,727          |
|       | Total OBPS                 |                    | 213            | 270            | 350            | 436            | 432            | 430            |
|       | Total direct revenue       |                    | 2,811          | 5,111          | 6,740          | 8,272          | 8,220          | 8,157          |
|       | GST revenue                |                    | 99             | 179            | 235            | 290            | 289            | 288            |
|       | Total all revenue          |                    | 2,910          | 5,290          | 6,975          | 8,563          | 8,509          | 8,445          |

Source: PBO calculations.

Note: Totals may not add due to rounding. OBPS revenue could be generated either by the federal government or by the firms themselves. Small industrial facilities that emit fewer than 50,000 tonnes of CO<sub>2</sub>, but which compete against facilities exceeding the limit, will also be given the option of participating in the OBPS and trading emission credits with big emitters.

After 2022-23, the revenues in the five provinces will slightly decrease. Since the fuel charge rate will remain at \$50 per tonne in nominal terms, the decline in revenues is mainly explained by the reduction in emissions. Emission reductions are caused by many factors, including cleaner electricity generation, declining oil and gas emission and decreasing use of diesel and motor gasoline for transportation.<sup>28</sup>

## 2.2. Household Cost of the Carbon Pricing

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Federal carbon pricing revenues will come largely from households through the consumption of energy used in residential activities (such as heating fuel and electricity) and in private transport (such as motor gasoline, diesel and lubricants) and the consumption of non-energy products.<sup>29</sup> If, as we expect, the carbon levy is charged on the industrial use of the combustible fuels, we assume that these industries will pass the cost of the levy through to the price of any downstream good and service.<sup>30</sup>

Among the five provinces, Saskatchewan households will have the highest average annual gross carbon costs in 2019-20 at \$475. By 2022-23, these average annual costs will more than double to \$1,070.

Households in Alberta will face the second-highest gross cost after 2019-20 even without including costs related to TIER regulations. By only accounting for the last quarter of 2019-20, the average cost is \$109. It will increase to \$983 in 2022-23.

New Brunswick households will have the second lowest average cost in 2019-20 at \$235. After excluding New Brunswick from the federal carbon system in 2020, the lowest average cost will be in Manitoba at \$409 in 2020-21 (Table 2-2).

The heterogeneous distribution of carbon costs across provinces demonstrates differences in the sectoral emission intensities. Provinces with higher costs generally rely on power sources that have higher intensities of GHG emissions.

**Table 2-2 Quintile distribution of household gross carbon cost**

|    | \$ CAN           | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 |
|----|------------------|---------|---------|---------|---------|---------|---------|
| AB | Lowest quintile  | 52      | 303     | 388     | 467     | 457     | 450     |
|    | Second quintile  | 88      | 515     | 662     | 800     | 784     | 772     |
|    | Third quintile   | 107     | 628     | 807     | 973     | 953     | 937     |
|    | Fourth quintile  | 131     | 769     | 988     | 1,193   | 1,169   | 1,150   |
|    | Highest quintile | 164     | 960     | 1,230   | 1,482   | 1,450   | 1,427   |
|    | Average          | 109     | 635     | 815     | 983     | 962     | 947     |
| SK | Lowest quintile  | 306     | 443     | 575     | 690     | 673     | 661     |
|    | Second quintile  | 386     | 560     | 727     | 876     | 857     | 841     |
|    | Third quintile   | 416     | 602     | 780     | 937     | 915     | 898     |
|    | Fourth quintile  | 509     | 738     | 958     | 1,153   | 1,126   | 1,105   |
|    | Highest quintile | 657     | 950     | 1,233   | 1,479   | 1,443   | 1,415   |
|    | Average          | 475     | 688     | 891     | 1,070   | 1,045   | 1,025   |
| MB | Lowest quintile  | 178     | 262     | 340     | 408     | 399     | 390     |
|    | Second quintile  | 191     | 282     | 366     | 440     | 429     | 420     |
|    | Third quintile   | 300     | 443     | 575     | 693     | 677     | 662     |
|    | Fourth quintile  | 319     | 470     | 610     | 735     | 718     | 703     |
|    | Highest quintile | 400     | 590     | 766     | 923     | 901     | 882     |
|    | Average          | 277     | 409     | 531     | 640     | 625     | 612     |
| ON | Lowest quintile  | 132     | 193     | 250     | 304     | 298     | 292     |
|    | Second quintile  | 192     | 282     | 366     | 447     | 438     | 429     |
|    | Third quintile   | 257     | 377     | 489     | 597     | 585     | 573     |
|    | Fourth quintile  | 352     | 515     | 668     | 814     | 799     | 782     |
|    | Highest quintile | 434     | 635     | 824     | 1004    | 984     | 963     |
|    | Average          | 284     | 416     | 538     | 656     | 643     | 629     |
| NB | Lowest quintile  | 117     | -       | -       | -       | -       | -       |
|    | Second quintile  | 170     | -       | -       | -       | -       | -       |
|    | Third quintile   | 243     | -       | -       | -       | -       | -       |
|    | Fourth quintile  | 277     | -       | -       | -       | -       | -       |
|    | Highest quintile | 367     | -       | -       | -       | -       | -       |
|    | Average          | 235     | -       | -       | -       | -       | -       |

Source: PBO calculations from the national and provincial accounts provided by Statistics Canada, energy accounts provided by the National Energy Board, and physical flow accounts provided by the Environment Canada.

Note: These costs include the GST and PST portion of the carbon prices.

PBO also examined the distribution of gross carbon costs across household income groups. We found that costs will vary based on household characteristics. As a rule of thumb, larger and higher income households consume more, and as a result will bear higher costs (Table 2-2).

PBO estimates that households in the top income quintile, or top fifth of the income distribution, will pay more than two or three times the gross carbon charge amounts of lower income households, which typically have fewer members and consume less. For example, the lowest quintile households in Alberta will be subject to a gross cost of \$467 in 2022-23, compared to \$1,482 for those in the highest income quintile (Table 2-2).

It should be noted that this analysis is based on gross amounts, that is, prior to any transfers back to households. They represent only one side of the federal carbon pricing regime. The federal government has stated that the carbon pricing system will be revenue neutral; any revenues generated under the system will stay in the province or territory where they are generated.

In the following section, we estimate the distribution of costs from carbon pricing net of rebates across all family groups in Alberta, Saskatchewan, Manitoba, Ontario and New Brunswick. We report results by household income quintile.

## 2.3. Distribution of net costs under the federal rebate system to households

The Government of Canada has stated that it will return the proceeds from the fuel charge directly to individuals and families, through proposed Climate Action Incentive payments, as well as to particularly affected sectors in Alberta, Saskatchewan, Manitoba, Ontario and New Brunswick. The federal government, however, has not yet announced the way in which it will return OBPS revenue in these provinces (Table 2-3).<sup>31,32</sup>

**Table 2-3** Projected federal proceeds returned to households and sectors

| <i>\$ millions</i>                        | <b>2019-20</b> | <b>2020-21</b> | <b>2021-22</b> | <b>2022-23</b> | <b>2023-24</b> | <b>2024-25</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|
| Projected payment for households          | 2,339          | 4,357          | 5,751          | 7,053          | 7,009          | 6,955          |
| Support for particularly affected sectors | 260            | 484            | 639            | 784            | 779            | 773            |
| Projected total federal proceeds return   | 2,599          | 4,841          | 6,390          | 7,837          | 7,788          | 7,727          |

Source: PBO calculations based on guidance from Finance Canada and the Government's initial estimates of total Climate Action Incentive payments.

In the PBO's baseline scenario, households receive 90 per cent of the revenues raised from carbon pricing (except those from large final emitters under OBPS). PBO's assumption is based on guidance from Finance Canada and the Government's initial estimates of total Climate Action Incentive payments for the four provinces.<sup>33,34</sup>

Thus, in this scenario, the projected payment to households would amount to \$2.34 billion in 2019-20, 90 per cent of projected total federal revenue of \$2.6 billion. Payments to households are projected to reach \$7.05 billion in 2022-23.

The remaining amounts (around \$260 million in 2019-20 and \$784 million in 2022-23) will be provided to support particularly affected sectors, including small and medium-sized enterprises (SMEs) and municipalities, universities, colleges, schools and hospitals, non-profit organizations, and Indigenous communities.

Table 2-4 shows that most households will receive higher transfers than amounts paid in fuel charges. They will therefore be better off on a net basis because the rebate exceeds the household carbon cost. These results are consistent with the results of our May 2019 report. However, by now accounting for the carbon cost embedded in the provincial and federal sales taxes, fewer households will be categorized as better off, on a net basis, in comparison with the analysis in the previous report.<sup>35</sup>

In the case of Alberta, almost every household receives annual rebates from the federal government that compensate for the carbon levy because we only account for the federal fuel charge and we exclude the TIER regulations from costing.<sup>36</sup>

**Table 2-4** Quintile distribution of household net carbon cost

|           |                  | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 |
|-----------|------------------|---------|---------|---------|---------|---------|---------|
| <b>AB</b> | Lowest quintile  | -45     | -263    | -341    | -404    | -396    | -380    |
|           | Second quintile  | -29     | -174    | -222    | -260    | -253    | -240    |
|           | Third quintile   | -20     | -120    | -167    | -195    | -188    | -173    |
|           | Fourth quintile  | -20     | -119    | -168    | -193    | -183    | -174    |
|           | Highest quintile | 2       | 8       | -5      | 6       | 3       | 6       |
| <b>SK</b> | Lowest quintile  | -62     | -102    | -138    | -165    | -166    | -159    |
|           | Second quintile  | -11     | -29     | -43     | -54     | -62     | -57     |
|           | Third quintile   | -42     | -78     | -108    | -129    | -132    | -120    |
|           | Fourth quintile  | -1      | -19     | -33     | -46     | -55     | -54     |
|           | Highest quintile | 98      | 120     | 143     | 165     | 148     | 148     |
| <b>MB</b> | Lowest quintile  | -68     | -102    | -132    | -155    | -149    | -143    |
|           | Second quintile  | -80     | -121    | -159    | -191    | -186    | -182    |
|           | Third quintile   | 1       | -4      | -5      | 2       | 5       | 7       |
|           | Fourth quintile  | -17     | -31     | -42     | -49     | -47     | -47     |
|           | Highest quintile | 22      | 27      | 33      | 44      | 43      | 42      |
| <b>ON</b> | Lowest quintile  | -80     | -115    | -149    | -179    | -172    | -167    |
|           | Second quintile  | -49     | -71     | -91     | -106    | -104    | -100    |
|           | Third quintile   | -29     | -43     | -55     | -63     | -59     | -56     |
|           | Fourth quintile  | 41      | 61      | 80      | 102     | 102     | 100     |
|           | Highest quintile | 92      | 134     | 174     | 215     | 212     | 208     |
| <b>NB</b> | Lowest quintile  | -69     | -       | -       | -       | -       | -       |
|           | Second quintile  | -42     | -       | -       | -       | -       | -       |
|           | Third quintile   | -2      | -       | -       | -       | -       | -       |
|           | Fourth quintile  | 10      | -       | -       | -       | -       | -       |
|           | Highest quintile | 78      | -       | -       | -       | -       | -       |

Source: PBO calculations.

Note: Negative cost means rebates exceed the gross household carbon costs.

The household's structure influences this cost distribution since the federal rebates are solely based on family composition. The federal incentive payment is designed so the amount for the first adult of a household will be double the amount for the second adult, and four times the amount for a child.<sup>37</sup>

Thus, a household composed of only adults will receive higher payments per person than one with children. This adjustment reflects the fact that while the consumption needs of a household increase as the household gets larger, it is not a one-for-one relationship.

## References

- Alexeeva-Talebi, V. (2011). Cost pass-through of the EU emissions allowances: Examining the European petroleum markets. *Energy Economics*, S75-S83.
- Canada Energy Regulator. (2019). Canada's Energy Future 2019: Energy Supply and Demand Projections to 2040. Retrieved from <https://www.cer-rec.gc.ca/nrg/ntgrtd/ftr/2019/index-eng.html>
- Canada Revenue Agency (2019). Carbon pollution pricing – what you need to know. Retrieved from <https://www.canada.ca/en/revenue-agency/campaigns/pollution-pricing.html>
- Department of Finance Canada (2018). Backgrounder: Ensuring Transparency. Retrieved from [https://www.fin.gc.ca/n18/data/18-097\\_2-eng.asp](https://www.fin.gc.ca/n18/data/18-097_2-eng.asp)
- Department of Finance Canada (2019). Department of Finance Canada Proposes Refinements to the Federal Carbon Pollution Pricing System. Retrieved from <https://www.fin.gc.ca/n19/19-023-eng.asp>
- Department of Finance Canada (2019). Backgrounder: Proposed Application of the Federal Carbon Pollution Pricing System in Alberta. Retrieved from <https://www.canada.ca/en/department-finance/news/2019/06/backgrounder-proposed-application-of-the-federal-carbon-pollution-pricing-system-in-alberta.html>
- Department of Finance Canada (2019). Government Announces Climate Action Incentive Payment Amounts for 2020. Retrieved from <https://www.fin.gc.ca/n19/19-107-eng.asp>
- Environment and Climate Change Canada (2017). Greenhouse Gas Reporting Program (GHGRP) - Facility Greenhouse Gas (GHG) Data. Retrieved from <https://open.canada.ca/data/en/dataset/a8ba14b7-7f23-462a-bdbb-83b0ef629823>
- Environment and Climate Change Canada. (2017). Pricing carbon pollution in Canada: how it will work. Retrieved from [https://www.canada.ca/en/environment-climate-change/news/2017/05/pricing\\_carbon\\_pollutionincanadahowitwillwork.html](https://www.canada.ca/en/environment-climate-change/news/2017/05/pricing_carbon_pollutionincanadahowitwillwork.html)
- Environment and Climate Change Canada (2018). GHG Emissions By Province and Economic Sector. Retrieved from [http://data.ec.gc.ca/data/substances/monitor/canada-s-greenhouse-gas-emissions-projections/current\\_projections\\_actuelles/GHG-GES/detailed\\_GHG\\_emissions\\_GES\\_detaillees.csv](http://data.ec.gc.ca/data/substances/monitor/canada-s-greenhouse-gas-emissions-projections/current_projections_actuelles/GHG-GES/detailed_GHG_emissions_GES_detaillees.csv)
- Environment and Climate Change Canada (2018). Update on the output-based pricing system: technical backgrounder. Retrieved from <https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/pricing-carbon-pollution/output-based-pricing-system-technical-backgrounder.html>
- Environment and Climate Change Canada (2019). National Inventory Report 1990–2017: Greenhouse Gas Sources and Sinks in Canada. Retrieved from <https://unfccc.int/documents/194925>
- Environment and Climate Change Canada (2019). New Brunswick's government to put a price on carbon pollution from fuels, next year. Retrieved from

<https://www.canada.ca/en/environment-climate-change/news/2019/12/new-brunswicks-government-to-put-a-price-on-carbon-pollution-from-fuels-next-year.html>

Environment and Climate Change Canada. (2019). Use of proceeds from the federal Output-Based Pricing System. Retrieved from <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/use-of-proceeds.html>

Environment and natural resources. (2018). Canada's greenhouse gas and air pollutant emissions projections. Retrieved from [http://publications.gc.ca/collections/collection\\_2018/eccc/En1-78-2018-eng.pdf](http://publications.gc.ca/collections/collection_2018/eccc/En1-78-2018-eng.pdf)

Environment and natural resources (2018). Fall 2018 update: Estimated impacts of the federal pollution pricing system. Retrieved from <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/fall-2018-update-estimated-impacts-federal-pollution-pricing-system.html>

Fabra, N., & Reguant, M. (2014). Pass-Through of Emissions Costs in Electricity Markets. *American Economic Review*, 2872-2899.

Justice Laws Website (2018). Greenhouse Gas Pollution Pricing Act. Retrieved from <https://laws-lois.justice.gc.ca/eng/acts/G-11.55/page-1.html>

Miller, N., Osborne, M., & Sheu, G. (2017). Pass-through in a concentrated industry: empirical evidence and regulatory implications. *RAND Journal of Economics*, 69-93.

Sawyer, D. (2018). Federal Carbon Price Impacts on Households in Alberta, Saskatchewan and Ontario. EnviroEconomics Inc.. Retrieved from <https://www.enviroeconomics.org/single-post/2018/09/21/Federal-Carbon-Price-Impacts-on-Households-in-Alberta-Saskatchewan-and-Ontario>

Statistics Canada. Table 25-10-0062-01 Household energy consumption, by household income, Canada and provinces. Retrieved from <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510006201>

Statistics Canada. Table 11-10-0223-01 Household spending by household income quintile, Canada, regions and provinces. Retrieved from <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1110022301>

Statistics Canada. Table 38-10-0097-01 Physical flow account for greenhouse gas emissions. Retrieved from <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810009701>

Statistics Canada. Table 36-10-0478-01 Supply and use tables, detail level, provincial and territorial (x 1,000). Retrieved from [https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3610047801&request\\_locale=en](https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3610047801&request_locale=en)



# Notes

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1. Justice Laws Website (2018). Greenhouse Gas Pollution Pricing Act. Retrieved from <https://laws-lois.justice.gc.ca/eng/acts/G-11.55/page-1.html>
2. Canada Revenue Agency (2019). Carbon pollution pricing – what you need to know. Retrieved from <https://www.canada.ca/en/revenue-agency/campaigns/pollution-pricing.html>
3. Department of Finance Canada (2019). Backgrounder: Proposed Application of the Federal Carbon Pollution Pricing System in Alberta. Retrieved from <https://www.canada.ca/en/department-finance/news/2019/06/backgrounder-proposed-application-of-the-federal-carbon-pollution-pricing-system-in-alberta.html>
4. The proposed system for large industrial emitters in New Brunswick is still being reviewed by the federal government.
5. Environment and Climate Change Canada (2019). New Brunswick's government to put a price on carbon pollution from fuels, next year. Retrieved from <https://www.canada.ca/en/environment-climate-change/news/2019/12/new-brunswicks-government-to-put-a-price-on-carbon-pollution-from-fuels-next-year.html>
6. We assume that the Government will sell the total of emission credits. However, the OBPS credits could be tradable across firms. Thus, firms could generate a percentage of revenue.
7. Since the federal fuel charge will be applied in Alberta starting from January 2020, PBO only considers the last quarter of the fiscal year 2019-2020 in our estimate.
8. The Government of Canada will return the proceeds from the fuel charge directly to individuals and families, through proposed Climate Action Incentive payments, as well as to particularly affected sectors in Saskatchewan, Manitoba, Ontario, and New Brunswick. The federal government has not yet decided on the approach to return the OBPS revenue in these provinces.
9. Department of Finance Canada (2018). Backgrounder: Ensuring Transparency. Retrieved from [https://www.fin.gc.ca/n18/data/18-097\\_2-eng.asp](https://www.fin.gc.ca/n18/data/18-097_2-eng.asp)
10. The remaining amounts will be provided to support particularly affected sectors including small and medium-sized enterprises (SMEs) and the municipalities, universities, colleges, schools and hospitals, non-profit organizations, and Indigenous communities.
11. The rebate was calculated based on our estimates of the fuel charge proceeds instead of the federal government announcement of rebates in 2020 because the government could likely adjust the repayment of 2021 to compensate for uncovered projected revenues in 2020. By doing so, we likely avoid a mismatch between the cost estimates and the rebate estimates, which gives a clearer picture of what the net tax distribution should be.

12. For more details, see [the fiscal and distributional analysis of the federal carbon pricing system report](#) published in May 2019.
13. PBO will expand the analysis to look at carbon pricing cost more broadly by including all provincial policies in a future work.
14. We exclude Yukon and Nunavut from our distributional analysis because of a lack of data.
15. Environment and Climate Change Canada. (2019). Government of Canada announces plans to provide support for energy-efficient projects and equipment in small- and medium-sized businesses. Retrieved from <https://www.canada.ca/en/environment-climate-change/news/2019/05/government-of-canada-announces-plans-to-provide-support-for-energy-efficient-projects-and-equipment-in-small--and-medium-sized-businesses.html>
16. Ibid. note 2.
17. Department of Finance Canada (2019). Department of Finance Canada Proposes Refinements to the Federal Carbon Pollution Pricing System. Retrieved from <https://www.fin.gc.ca/n19/19-023-eng.asp>
18. As a result of Alberta's May 30, 2019 repeal of its carbon levy, Alberta now only partially meets federal benchmark stringency requirements and will be subject to the federal fuel charge starting from January 2020. The big emitters in Alberta will not be subject to the federal "backstop" output-based carbon pollution pricing system. The Government of Canada announced that Alberta's carbon-pricing system that charges large emitters (TIER) meets the federal government's stringency requirements.
19. Ibid. note 3.
20. The federal government announced that the proposed provincial fuel charge in New Brunswick will replace the federal fuel charge starting from April 2020. The proposed system for large industrial emitters is still being reviewed by the federal government. Retrieved from <https://www.canada.ca/en/environment-climate-change/news/2019/12/new-brunswicks-government-to-put-a-price-on-carbon-pollution-from-fuels-next-year.html>
21. Since the federal government will only apply the output-based pricing system in Prince Edward Island and the provincial government will implement its own carbon pricing, we do not consider the fiscal and distributional analysis in this province.
22. Ibid. note 9.
23. Ibid. note 12.
24. Environment and Climate Change Canada. (2019). Use of proceeds from the federal Output-Based Pricing System. Retrieved from <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/use-of-proceeds.html>
25. For more details, see the model description in Appendix A of the fiscal and distributional analysis of the federal carbon pricing system report published in May 2019. Some adjustments have recently been made in the model in order better to fit the real sectoral GHG emissions.

26. A quintile divides the population into five income groups each representing 20 per cent, or one fifth, of the population.
27. Carbon-intensive industrial sectors in Saskatchewan include oil and gas extraction.
28. For a more detailed explanation, please read the subsection 2.1. of the fiscal and distributional analysis of the federal carbon pricing system report published in May 2019.
29. The remaining revenue will be generated by exports.
30. Alexeeva-Talebi (2011) measures the pass-through of the carbon allowance costs on unleaded petrol retail prices during the trial phase of the EU ETS from 2005 to 2007. Their estimates are consistent with the complete pass-through potential. Fabra and Reguant (2014) use data from the Spanish wholesale electricity market covering the period in which the European cap-and-trade program for carbon emissions was introduced. They found that emission costs are almost fully passed through to electricity prices. Miller et al. (2017) study the effect of the market-based CO<sub>2</sub> regulation on Portland cement industry. The latter accounts for roughly 5 per cent of global anthropogenic CO<sub>2</sub> emissions. They found that the fuel cost changes, because of the regulations, are more than completely passed through to cement prices.
31. Ibid. note 9.
32. Facilities under OPBS will not report or pay until mid-2020. The actual amount of proceeds available to be invested from OPBS in 2019 will thus not be known until late 2020.
33. Ibid. note 9.
34. Ibid. note 10.
35. Ibid. note 12.
36. Ibid. note 13.
37. Department of Finance Canada (2019). Government Announces Climate Action Incentive Payment Amounts for 2020. Retrieved from <https://www.fin.gc.ca/n19/19-107-eng.asp>