UNIVERSITY OF CALGARY

THE SCHOOL OF PUBLIC POLICY
SPP Communiqué

Volume 8 • Issue 10
June 2016

WHO IS GETTING A CARBON-TAX REBATE?

Jennifer Winter and Sarah Dobson

SUMMARY

With its 2016 budget, the Government of Alberta laid out the basic details of the carbon tax rebate. The rebate is constructed to increase based on household size, and will decrease with income after a pre-set cutoff. The government has stated six in 10 households will be eligible for a full rebate, with an additional six per cent receiving a partial rebate.

This paper examines the income distribution of Albertans, to determine how the rebate and income cutoffs affect different types of Alberta families. Using easily available data from Statistics Canada, we shed light on the question of who will receive a carbon-tax rebate.

Based on 2013 data on median incomes, single-parent families, elderly families and single Albertans are all groups where a majority of households will receive rebates. In some cases, it appears well over 50 per cent of those groups will receive a full rebate. However, fewer than 50 per cent of Alberta families that are couples (with and without children) will receive a rebate.

Still, even those that get a rebate will not necessarily exactly break even against the additional costs they incur from a carbon tax. Interestingly, the lowest-income households, which are most likely to qualify for a rebate, appear to be in a position where they will receive a larger refund than they will pay in carbon taxes. For households where incomes fall in the middle of the provincial distribution, the data suggest that the rebate will come close to compensating for additional costs of the carbon tax, although it may fall slightly short.

The analysis presented below is a first pass at a very important question facing Albertans. When data from the 2016 census becomes available, we will be much better able to evaluate which Albertans will be eligible for the rebate. The census will enable a more precise evaluation of whether the rebate matches the government's 66 per cent goal.

The Alberta government tabled its 2016/17 budget on April 14th, and a big question on people's minds (or at least our minds) was what the government intended to do with the carbon-tax revenue. When the carbon tax was announced in November 2015, one of the components was a household rebate, although who would get it and how much the rebate would be was not explicitly defined. The budget (and the subsequent Bill 20) has cleared things up somewhat, but we are sure people still want to know exactly *who* will get a rebate.

According to the government's website,[1] six in 10 Alberta households will be eligible for the full rebate, and an additional six per cent of households will receive a partial rebate. The rebate schedule (eligibility is determined by 2015 income tax filings[2]) is detailed in Table 1.

TABLE 1 ALBERTA GOVERNMENT CARBON-TAX REBATE SCHEDULE

	2017	2018
Benefit Amounts		
First adult	$200	$300
Spouse or equivalent	$100	$150
Child (maximum of four)	$30	$45
Phase-Out Thresholds (Family Net Income*)		
Single	$47,500	$47,500
Couple	$95,000	$95,000
Families	$95,000	$95,000
Income at Which Rebate is Fully Phased Out (Family Net Income*)		
Single	$51,250	$55,000
Couple	$100,000	$103,750
Couple with two children	$101,500	$106,000
Couple with four children	$103,000	$108,250

Source: Alberta Government website, "Carbon levy and rebates," http://www.alberta.ca/climate-carbon-pricing.cfm.

Note: The government appears to be defining "family net income" as income before taxes but after standard deductions (CPP, EI, etc.). See: Alberta government website, "Alberta Family Employment Tax Credit," http://www.alberta.ca/alberta-family-employment-tax-credit.cfm.

So, will 60 per cent of Alberta households receive a full rebate? It's not clear, and you may also be surprised at who will be getting these cheques. Let's break Albertans' income down by deciles to have a look (Table 2) at what may happen in 2017. In Table 2 below, we detail average income and the upper income limit using total-income statistics[3] for Alberta in 2013, the latest year for which data is available. It is worthwhile to note again that the eligibility for

[1] Alberta Government website, "Carbon levy and rebates," http://www.alberta.ca/climate-carbon-pricing.cfm.

[2] There is some ambiguity about what exactly determines the income criteria. The government website explaining the carbon tax suggests the rebate will be based on 2015 tax returns, whereas Bill 20 (Climate Leadership Implementation Act) only refers to income in a non-specified taxation year. This implies rebates will be based on income tax returns from two years prior to the year in which the rebate is received, e.g., rebates in 2018 will be based on 2016 income tax filings.

[3] Total income is not the same as the family net income used to determine the carbon-tax rebates. The difference between the two is that net income is total income less deductions such as CPP, EI and pension contributions. As such, total income is higher than net income, but the difference is probably small (in the five per cent range), so total income is a reasonable approximation of net income. Moreover, increases in wages between 2013 and 2015 may offset some of this difference.

the carbon tax rebate is based on household income as reported on 2015 income tax returns. A lot has changed in the province between 2013 and 2015 and there have been both upward and downward pressures on income. As it is very probable that Alberta's income distribution has shifted, the numbers reported below are only an approximation of the actual eligibility thresholds.

If we look at Albertans overall, the upper income limit for the sixth decile is $100,000. This matches the threshold at which the rebate is fully phased out for a couple with no children. So if all Alberta households were couples with no children then approximately 60 per cent would be eligible to receive a full or partial rebate of the carbon tax. This is within the ballpark of the government's promise but not quite there.

Of course, not all households in Alberta are couples with no children. To get a more accurate picture of who is eligible for the rebate we next consider the income thresholds by type of household. The upper income limit of the sixth decile for people not in an economic family (effectively single people without children or other dependents) is $52,200 for the sixth decile, slightly above the government's cut-off for fully phasing out the rebate. Average income for the sixth decile is $46,500, indicating that about 55 per cent of single Albertans will receive a full rebate, and five per cent of single Albertans will receive a partial rebate. For families – including couples with and without children – the eligibility rate is far lower. The upper income limit of the fifth decile for families is $107,300, suggesting that fewer than 50 per cent of all families in Alberta will be eligible for a full or partial rebate. This is well below the province's promise of 66 per cent.

TABLE 2 AVERAGE INCOME AND UPPER INCOME LIMITS FOR ALBERTA BASED ON TOTAL INCOME (2013 CONSTANT DOLLARS)

	Economic Families		Persons Not in an Economic Family		All	
	Average Income	Upper Income Limit	Average Income	Upper Income Limit	Average Income	Upper Income Limit
Lowest decile	$29,600	$41,600	$2,900	$8,000	$11,800	$22,800
Second decile	$51,100	$60,200	$14,700	$19,500	$29,000	$36,500
Third decile	$67,300	$74,900	$22,200	$23,700	$43,800	$51,800
Fourth decile	$84,800	$92,900	$27,200	$32,300	$58,000	$65,200
Fifth decile	$100,200	$107,300	$36,800	$41,400	$73,800	$83,400
Sixth decile	$115,900	$126,900	$46,500	$52,200	$91,800	$100,000
Seventh decile	$140,800	$156,100	$56,500	$61,800	$109,800	$120,700
Eighth decile	$167,500	$182,600	$71,100	$82,100	$138,900	$157,700
Ninth decile	$200,700	$224,400	$91,000	$104,400	$177,400	$201,200
Highest decile	$339,200	Not reported	$144,000	Not reported	$296,700	Not reported

Source: CANSIM Table 206-0031.

Note: "Economic family" refers to "a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law, adoption or a foster relationship"; "persons not in an economic family" refers to "a person living either alone or with others to whom he or she is unrelated, such as roommates or a lodger"; and "all" is both groups.

Unfortunately, the numbers given in Table 2 leave a lot to be desired. After all, there are a lot of different socio-economic groups hidden in the descriptors "economic family" and "persons not in an economic family." A single CEO of an oil and gas company is quite different from

a single pensioner, and single parents are often in a different economic situation than couples (with or without children). Luckily, there are data that can help break this down some more. Table 3, below, shows average and median total income for different family types in Alberta in 2013. Looking at median incomes tells us whether 50 per cent of each group is above or below the rebate threshold.

Some interesting patterns are observable from the data presented in Table 3. First, as implied earlier, over 50 per cent of families in Alberta are not eligible for the rebate, as the median income of $107,300 is greater than even the most forgiving threshold of a couple with four children at $103,000. Second, a substantial number of elderly families are below the threshold, as the median income for elderly families is $63,100. Next, non-elderly families in Alberta tend to be higher income, with the exception of lone-parent families and other non-elderly families. A majority of couples and couples with children will not be eligible for the rebate. A significant number (likely far more than a majority) of single-parent families will receive a full rebate. Other clear beneficiaries are single individuals.

TABLE 3 AVERAGE AND MEDIAN TOTAL INCOME AND FAMILY COUNTS BY FAMILY TYPE (2013 CONSTANT DOLLARS)

Family Type	Average Total Income	Median Total Income	Number of Families (000s)	Number of Persons (000s)
Economic families and persons not in an economic family	$103,100	$83,400	1,630	3,955
Economic families	$129,700	$107,300	1,076	3,402
Elderly families	$84,700	$63,100	156	338
Elderly couples	$82,200	$61,900	131	262
Other elderly families	$97,900	$92,200	25	76
Non-elderly families	$137,400	$114,400	920	3,064
Couples	$124,200	$104,800	294	588
Couples with children	$150,000	$125,800	358	1,602
Couples with other relatives	$193,700	$174,100	112	433
Lone-parent families	$67,600	$54,200	43	135
Other non-elderly families	$102,400	$89,800	113	307
Persons not in an economic family	$51,300	$41,400	553	553
Elderly persons not in an economic family	$37,000	$26,000	100	100
Non-elderly persons not in an economic family	$54,400	$46,400	453	453

Source: CANSIM Table 206-0011.

Note: "Economic family" refers to "a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law, adoption or a foster relationship"; "persons not in an economic family" refers to "a person living either alone or with others to whom he or she is unrelated, such as roommates or a lodger"; "elderly" refers to a person 65 years or older; and "elderly families" refers to families where the major income earner is 65 years old or older.

The thresholds chosen by the government seem to make sense, given the goal of providing a rebate to 60 per cent of Alberta households. And making the decision based on total income rather than anticipated energy use is a clear and easy way to calculate the rebates. However, it is not clear whether the rebate will be enough to fully compensate households in Alberta from the expected increases in costs associated with the carbon tax. Our calculations —

based on the methodology from a recent paper[4] but updated with 2013 household emissions and expenditure data — suggest costs for the average household in Alberta will be $350 with a $20 per tonne tax and $525 with a $30 per tonne tax. The way the rebate is structured, only a family with four or more people will come close to "breaking even," assuming they qualify.

Our estimate of an average household cost of $525 with a $30 per tonne carbon tax is very close to the government estimate of $540. As before, however, there are a lot of different households hidden in this average, all of which will be differentially impacted by a carbon tax. Energy consumption of a low-income single individual living alone will differ from that of a low-income family, which in turn will differ from that of a middle-income single individual or family. Unfortunately, a lack of data means that we cannot drill down on the differential impact of the carbon tax by household size. However, we can approximate the differential impact of the carbon tax by income using Statistics Canada data on household expenditures by income quintile.

Table 4 shows household expenditures on natural gas, electricity, and fuel for vehicles and tools by income level in 2013. Not surprisingly, expenditures on energy increase with income. Unfortunately we do not have matching data on emissions by income level. Rather, we only have average emissions by household. As a first approximation, we assume these emissions are representative of households in the third income quintile, and that household emissions in the other quintiles change at a one-to-one ratio with expenditures. For example, we assume that if household expenditures on fuel for vehicles and tools doubles, then emissions also double.[5] Our calculated summary of emissions by income quintile is provided in Table 5.

TABLE 4 HOUSEHOLD EXPENDITURES ON NATURAL GAS, ELECTRICITY AND MOTOR VEHICLE FUEL (2013 CONSTANT DOLLARS)

	Lowest quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Electricity for principal accommodation	$841	$1,113	$1,465	$1,538	$1,766
Natural gas for principal accommodation	$561	$808	$1,092	$1,108	$1,384
Gas and other fuels (all vehicles and tools)	$1,477	$2,646	$2,725	$2,750	$3,751

Source: CANSIM Table 203-0022.

[4] See Sarah Dobson and Jennifer Winter, "The Case for a Carbon Tax in Alberta," University of Calgary *School of Public Policy Research Paper* 8, 40 (November 2015).

[5] This is a reasonable assumption for expenditures on fuel for vehicles and tools as there is no fixed component to the household expenditures. That is, if expenditures double then the quantity of the fuel consumed also doubles. The assumption is not accurate for expenditures on electricity and natural gas as monthly bills have a fixed-cost component to cover distribution and administration charges that is independent of quantity consumed. This implies that if expenditures increase (decrease) by a factor of "X," then consumption will increase (decrease) by a factor greater than "X." Assuming a one-to-one relationship between expenditures and carbon emissions will therefore underestimate the increase in emissions (and the corresponding carbon-tax increase) for the fourth- and fifth-quintile households, as well as underestimate the decrease in emissions (and the corresponding tax decrease) for first- and second-quintile households. As an alternative to this assumption we also completed calculations assuming fixed costs of $300 per year for electricity expenditures and $420 per year for natural gas expenditures. These results are available on request.

TABLE 5 ESTIMATED 2013 HOUSEHOLD EMISSIONS (IN TONNES) FROM NATURAL GAS, ELECTRICITY AND MOTOR VEHICLE FUEL

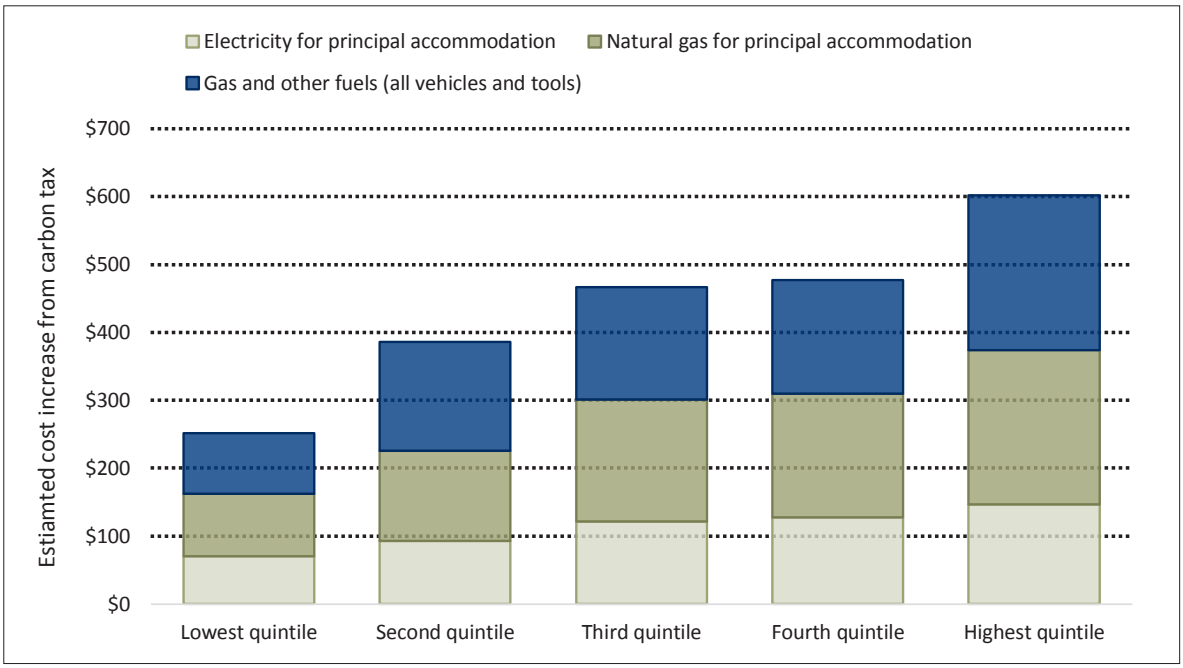
	Lowest quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Electricity for principal accommodation	2.33	3.08	4.06	4.26	4.89
Natural gas for principal accommodation	3.07	4.42	5.98	6.07	7.58
Gas and other fuels (all vehicles and tools)	2.99	5.35	5.51	5.56	7.58

Source: Authors' calculations using data from: (1) Natural Resources Canada, Comprehensive Energy Use Database; (2) Alberta Energy Electricity Statistics; (3) Alberta Utilities Commission, Annual Electricity Data Collection; and (4) Environment Canada, National Inventory Report 2014.

Note: Third-quintile household emissions for "natural gas for principal accommodation" and "gas and other fuels (all vehicles and tools)" are taken from Natural Resources Canada, Comprehensive Energy Use Database. Third-quintile emissions for "electricity for principal accommodation" are calculated using data on average household electricity consumption in Alberta, total electricity generation, and total greenhouse gas emissions from electricity generation. Carbon-emission estimates for the remaining quintiles are calculated assuming a one-to-one relationship between carbon emissions and household expenditures.

As summarized in the figure below, our calculations suggest the annual direct cost of the carbon tax will range from $254 for households in the lowest income quintile to over $600 per year for households in the highest income quintile. In addition, only households in the highest income quintile are expected to incur total direct carbon-tax costs that exceed the amount of the rebate ($540). Households will incur additional indirect costs — from higher prices for food, for example — but these are likely to be small relative to the direct costs. This suggests that households in the first and second income quintiles, which are most likely to receive the full rebate, will likely be made better off after accounting for both the costs of the carbon tax and the rebate. Households in the third income quintile may not be made strictly better off but they should come close to breaking even.

FIGURE 1 ESTIMATED COST OF CARBON TAX BY INCOME LEVEL



Source: Authors' calculations based on (1) CANSIM Table 203-0022; (2) Natural Resources Canada, Comprehensive Energy Use Database; (3) Alberta Energy Electricity Statistics; (4) Alberta Utilities Commission, Annual Electricity Data Collection; and (5) Environment Canada, National Inventory Report 2014.

Looking at the cost of the carbon tax by income quintile provides a more promising assessment of the government's proposed household rebate. Although our calculations are only approximate, they suggest that virtually all of the families (two or more adults) that are eligible for the rebate will at least break even on the tax. Similarly, the rebate should come close to covering the full costs of the tax for single adults in the lowest income quintile. More accurate calculations require better data on household energy consumption and emissions by income level and household type. Given the growing national interest in carbon pricing, and concerns about the differential impact on low- and middle-income families, it would be valuable for the federal government to track these data going forward.

About the Author

Jennifer Winter is an Assistant Professor of Economics and Director of Energy and Environmental Policy at The School of Public Policy, University of Calgary. Her research is focused on the effects of government regulation and policy on the development of natural resources and energy, and the consequences and trade-offs of energy development. Jennifer is actively engaged in increasing public understanding of energy and environmental issues, and was recognized for this with a 2014 Young Women in Energy Award.

Sarah Dobson (PhD) is a Research Associate in the Energy and Environmental Policy area at The School of Public Policy. Her research interests are focused on studying the design, implementation and evaluation of energy and environmental regulatory policy. In prior work Sarah has considered such issues as the welfare implications of climate change policy, and the optimal design of regulatory policy to take into account the tradeoff between the economic benefits of resource development and the ecological consequences of management decisions. Sarah holds a PhD and MSc in Agricultural and Resource Economics from the University of California, Berkeley.