

Carbon Fee-and-Rebate Policy in Washington, D.C.

A Macroeconomic Analysis

August, 2017

STUDY BACKGROUND

At the request of the Chesapeake Climate Action Network (CCAN), the Center for Climate Strategies (CCS) conducted a macroeconomic-impact analysis of a proposal for the District of Columbia to put a price on all carbon emissions and recycle the revenue raised by carbon pricing back to residents, small businesses, and green investment initiatives through a carbon tax mechanism. CCAN is leading an initiative seeking passage of a carbon fee-and-rebate policy into law in the District of Columbia.

The specific design of this proposal is based on a carbon price starting at \$20 per ton of greenhouse gases emitted in the year 2019, and rising steadily by \$10 per ton each year until reaching \$150 per ton emitted in 2032.¹ The revenue collected from the fee, which would rise quickly to between \$400 million and \$600 million per year, would be immediately returned to D.C. residents and businesses through a) a direct cash rebate to residents, funded with 75% of the revenue; b) a green-investment program to seed and fund investments in efficiency throughout the city, funded with 20% of the revenue; and c) a business-cost abatement to help offset increases in the cost of doing business for D.C. enterprises, funded with the final 5% of the revenue.

This proposal is like other proposals developed around the United States, which have also conceived of a steadily rising price of \$10 per ton per year, with slightly different starting prices and upper limits. Many of these proposals have been characterized as having the potential to offer a powerful market-based mechanism to reduce greenhouse gas emissions through pricing those emissions, while allowing consumers and suppliers of energy to avoid the price through shifts to cleaner or zero-emissions sources. The policy's potential merits also include a simplicity of implementation and the prospect that the stimulus benefit of rebating the money to the economy can fully – or more than fully – offset the burden to the economy of the rising price of energy.

The purpose of this study was to determine the prospect of such a policy to reduce emissions and preserve or expand the economy, and to assist the leaders of the initiative in identifying the policy design that would work best for D.C.'s unique circumstances.

¹ For the purposes of this report, a ton is the amount of all greenhouse gas emissions equivalent in impact to a metric ton of carbon dioxide.

WHY DOES THE DISTRICT OF COLUMBIA NEED TO DO MORE ON CARBON?

The District of Columbia has ambitious goals to reduce greenhouse gas emissions 50% by 2032 relative to 2006 levels, reduce energy consumption 50% by 2032 relative to 2012 levels, and increase renewable energy use to until it constitutes 50% of the District's energy supply by 2032. The District's "Clean Energy DC" Plan shows that there has been substantial progress already, but that new programs and policies will be necessary to fully achieve D.C.'s energy and emissions goals. For example, the Plan shows that with recommended actions, D.C. is on track to achieve an 18% energy use reduction and a utilization of 32% renewable energy by 2032. And while the Plan lays out an ambitious roadmap for achieving its greenhouse gas reduction target, implementing the Plan's recommendations will require increased funding for deep energy retrofits of D.C.'s existing buildings and full implementation of current and proposed federal CAFÉ standards for cars and light-duty trucks.

Carbon pricing can be a significant contributor to meeting these goals, and can provide additional reductions if any D.C. polices or federal programs beyond the District's control underperform or are scaled back. A price on carbon will create an economic incentive to reduce emissions from the electricity, heating, and transportation sectors, and will also create a revenue stream that can be used to fund programs needed to implement complementary policies such as deep energy retrofits of D.C.'s existing buildings.

EXAMPLES OF CARBON PRICING ELSEWHERE

Carbon pricing exists in many states and countries throughout the world. In the U.S., the most robust carbon pricing programs exist in California and among the nine Northeastern and Mid-Atlantic states that make up the Regional Greenhouse Gas Initiative (RGGI). Boulder, Colorado also has a city-level carbon tax levied on electricity.

In neighboring Canada, British Columbia has had an economy-wide carbon fee levied on the greenhouse gas content of nearly all fuels purchased within the province since 2008. Studies have found that the carbon price led to a roughly 20% decline in usage of transportation fuels subject to the fee, even as the Province's economy grew faster than the rest of Canada.² Following British Columbia's lead, carbon prices have now been introduced in Alberta, Ontario, and Quebec, and the national government has proposed a national carbon price plan in 2018.

Globally, carbon prices also exist in Sweden, Switzerland, Denmark, France, the UK, South Korea, Japan, New Zealand, the European Union, and within several Chinese provinces.

In addition to these policies already in place, a handful of states have introduced carbon pricing proposals in state legislatures that are broadly like the policy being considered in Washington, D.C.. Similar economy-wide carbon fee-and-rebate proposals have been introduced in Massachusetts, Vermont, Rhode Island, New York, Washington State, Oregon, and California. Many of those states have also commissioned macroeconomic analyses of their proposed legislation using models designed by

² Elgie, Stewart, and Jessica McClay. 2013. "BC's Carbon Tax Shift Is Working Well after Four Years (Attention Ottawa)." *Canadian Public Policy* 39(2):1-10.

Regional Economic Models, Inc. (REMI), and, like this study, have found that steadily increasing the price of carbon can result in economic expansion and lower pollution.

KEY OUTCOMES OF A WASHINGTON, D.C. CARBON PRICE

Addressing Climate Change

Based on CCS analysis, greenhouse gas emissions from the use of electricity, natural gas, and home-heating fuel would fall 23% relative to a business-as-usual baseline by 2032. Transportation emissions would fall by approximately 6-10% of D.C.'s current level. These reductions are due to decreased energy consumption, a shift to cleaner power, investments in efficient equipment and buildings, and the adoption of more fuel-efficient vehicles and public transportation. Emissions would fall both in response to the carbon price and as a direct result of increased funding for green energy and energy-efficiency initiatives.

Boosting Income for District of Columbia Residents

Most of the carbon revenue raised would be returned to every D.C. resident through a monthly rebate. To ensure that the policy remains progressive in its impact and not burden low-income residents more heavily than others, those residents would be reimbursed at a slightly higher rate than other residents. The analysis projects that, by 2032, the policy would generate a rebate of \$160 per month for the average family of four, and \$277 per month for a low-income family of four. This gradually rising rebate would increase residents' support of the policy and stimulate the economy of the District, thereby increasing the policy's durability.

Cutting Costs for Businesses

A portion of the carbon revenue would be directed as operating-cost relief to small businesses. This will total \$30 million per year by 2032, thus enhancing the ability of local businesses to remain competitive in the region, reducing the pressure they might feel to move out of the district, and helping them to maintain a permanent and robust presence in the city.

Maintaining a Healthy Economy

A steady boost in net jobs would result from the policy, with over 500 more jobs in the District by 2032 than would exist without the policy. The construction sector would see especially positive job growth and revenue increases thanks to green investments. The retail, restaurant, and bar sectors would also prosper as consumers spend their rebate in consumer-facing sectors of the economy. Net changes to overall GDP, total output, and total value added in the D.C. economy remain virtually unchanged from the current business-as-usual economic growth projections. Economic growth, in other words, will continue even as emissions fall significantly.

The results indicate that this carbon pricing proposal can be a significant contributor to meeting D.C.'s sustainability goals, complementing D.C.'s existing clean energy policies. Further, because the price mechanism is stronger when energy is dirtier, a carbon price could actually provide additional carbon reductions if any D.C. policies or federal programs beyond the District's control underperform or are scaled back.

PROPOSED POLICY AND MECHANISM DESIGN

Starting in 2019, the proposed policy would establish a steadily rising price on economy-wide carbon emissions in the District, focusing on the electricity, heating, and transportation sectors, and recycle the revenue back into D.C.'s economy. For electricity and heating, energy sold in the District would be assessed for the carbon emissions associated with those fuels, and a steadily rising charge per ton would be assessed on that emissions count. For transportation, a gradually rising fee would be established for parking meters and commercial parking garages, and a variable excise tax/excise tax rebate for vehicles would be established based on each vehicle's fuel efficiency as it performs against the CAFE standard for its year. A direct fee on motor fuels was considered and rejected due to the high potential for "carbon leakage" (i.e. consumers shifting fuel purchases to Maryland or Virginia, rather than reducing demand) and because of its potential regressive effect on lower-income households.

All revenue raised by the carbon price would be recycled back into the District economy through direct cash rebates to D.C. households (75% of the revenue), green investments (20% of the revenue), and small business tax abatement (5% of the revenue).

The goal of the policy is to create a price signal for residents and businesses to adopt cleaner more efficient energy options, while leaving more money in the pockets of D.C. residents. There are a range of fee-avoidance options built into the policy to incentivize carbon reductions for residents and businesses. These options include energy efficiency, on-site distributed generation, community renewable energy options, switching to a competitive third-party clean energy supplier, using public transportation, and purchasing fuel efficient, hybrid, or electric vehicles. For D.C. residents, choosing less polluting energy options are estimated to decrease carbon emissions, lower carbon fee expenses, and increase an individual's net carbon rebate.

The price would apply to electricity as well as natural gas and fuel oil consumed in the city, and emissions linked to transportation, excluding public transportation. Due to a lack of primary energy producers in D.C., a carbon fee linked to energy consumption was assumed to be more administratively and economically efficient than a carbon cap-and-trade system, such as that in place in RGGI states.

Below is a more thorough description of the sectors analyzed.

- **Electricity** - The fee would apply to all suppliers of electricity, including the electric utility operating in the District—Pepco—and all competitive suppliers of electricity to end users. The fee is paid based on each company's electricity sales in the District, minus the sales for which the supplier has purchased renewable energy credits (RECs) or entered long-term contracts for clean energy.
- **Natural Gas** - The fee would apply to the local distribution company based on each cubic foot of natural gas sold to customers and based on the greenhouse emissions triggered by the burning of that gas.
- **Fuel oil** – The fee would apply to all fuel oil suppliers based on the greenhouse gases released by the burning of fuel oil used by their customers.
- **Transportation** - A gradually rising fee would be established for parking meters and commercial parking garages. there would be a variable excise tax/excise tax rebate for vehicles based on fuel efficiency relative to the federal Corporate Average Fuel Economy (CAFE) standard. Vehicles below the CAFE average would pay a larger excise tax based on how far below they are, and

more efficient vehicles would receive a rebate on the existing excise tax. Because the CAFE standard rises over time, this applies the price incentive to a progressively higher fuel efficiency. A direct fee on motor fuels was considered and rejected due to the high potential for leakage and its potential regressive effect on lower-income households.

From the perspective of protecting the prosperity of D.C. residents and businesses, it is very important that the policy return money collected via the carbon fee to the economy as quickly as possible – specifically in the same year as it is collected. This analysis assumed the revenue raised from the carbon price would be distributed as follows:

- **Direct cash rebate to households** – A full 75% of the revenue would be returned to every D.C. resident through a quarterly “rebate.” This rebate is a cash payment, with no limit on its use. For the purposes of establishing eligibility for a rebate, a District resident means a person eighteen (18) years of age or older who lives in the District of Columbia. Every resident who is a head of household with children or dependents under the age of 18 would have the rebate increased based on the number of children or dependents under 18 in residence, with each child adding the value of 0.5 of a standard rebate amount.
 - The rebate structure is weighted so that every resident receives a rebate.
 - Low-income residents are reimbursed at a higher rate than other District residents.
 - Of the total revenue rebated to residents, this policy distributes 85% of the revenue equally and to everyone, without regard to income.
 - It holds aside the remaining 15% to be distributed specifically and additionally to low-income households with incomes less than 200% of the Federal poverty line.
 - The threshold to receive the additional low-income portion of the rebate is approximately \$40,000 per year of income for a family of four.
- **Green investments** – 20% of the revenue is directed to greenhouse gas reduction programs, with a focus on energy efficiency and supporting greener buildings, as well as the installation or retrofit of HVAC and other large building systems.
- **Small business cost abatement** – 5% of the revenue is directed toward operating-cost relief for small businesses and was specifically targeted because it was assumed that small businesses would have less capacity to plan and less ability to make near-term changes to adapt to the policy impacts of the carbon price, relative to the larger D.C. business community.

STUDY METHODOLOGY

The greenhouse gas emissions reductions impact of the policy was projected using the Carbon Tax Assessment Model (CTAM), which was originally developed by the Washington State Department of Commerce. CTAM is a flexible open-source model that quantifies the greenhouse gas and fiscal impacts of a carbon fee on a state or region’s primary energy sectors. Originally designed to focus on Washington State, the tool is built for easy modification to represent the energy use levels, mix of sources of energy, carbon intensity of energy, and energy economics (the price and price-responsiveness) of other states or regions. CTAM was used to model how a rising carbon fee would change D.C.’s energy consumption, and how that would translate into changes in energy spending in D.C. and the revenue raised annually by the fee.

To model the District's energy system, CTAM was customized with D.C.-specific data using data from the U.S. Energy Information Administration, PJM Interconnection (the Regional Transmission Organization covering D.C. and much of the Mid-Atlantic region), D.C. agencies and the U.S. EPA.

These direct, policy-induced changes in spending and revenue use were then used as the basis for a study of the policy's impact on the broader economy. This broader impact analysis considers the indirect and induced changes that occur throughout all sectors of the D.C. economy as businesses, households and the government respond – not only to the fee itself, but also to the newfound money available from the rebates, investments and business-cost offsets. CCS completed this work using the Policy Insight+ macroeconomic model designed by Regional Economic Models, Inc. (REMI), a tool in wide use by numerous governments and institutions throughout the United States.

KEY RESULTS OF ANALYSIS

Emissions Reductions

The analysis projected that greenhouse gas emissions related to electricity, gas and heating oil use would fall 23% relative to the business-as-usual baseline, due to the combination of decreased energy consumption, a shift to cleaner electricity sources, efficiencies resulting from investments in efficient equipment and construction methods. Transportation emissions would fall by a smaller share – 6-10% of the 2013 baseline level – from the use of more fuel-efficient vehicles and public transportation.

Total energy use decreased under this policy, both in response to higher prices and as a direct result of increased funding for energy efficiency. This study assumed that while some households and businesses will take affirmative measures to consume cleaner energy by switching supply, the majority will seek efficiency of energy use through either investment in efficient technologies (such as advanced lighting, efficient appliances, or updated HVAC equipment) and efficient practices. The measurement of the size of this projected effect was carried out using the CTAM model, which allows for detailed considerations of how homes and businesses respond to changes in the prices of each of many different fuels, and uses real-world observations of how sensitive people and businesses typically are to changes in those prices.

Transportation sector emissions are also projected to fall, though the transportation sector is responsible for a small share of overall emissions. These emissions fall because of a shift to more efficient vehicles incentivized by the sliding excise tax, and a shift away from single-occupancy travel as the price of parking in D.C. rises at both meters and garages.

Notably, the policy does not call for a carbon price to be levied on transportation fuel sales. The district's transportation system is characterized by significant integration with Maryland and Virginia in a regional transportation network. Within this context, applying a carbon fee directly to transportation fuels was considered likely to drive demand to areas without the fee – shifting demand geographically rather than incentivizing a change to cleaner fuels or cleaner modes of transportation.

Instead, the policy and this analysis both rely on three other mechanisms to seek reductions in emissions through shifts to more efficient or cleaner-fuel vehicles, and through shifts to cleaner modes of transportation by comparison to the single-occupant vehicle trip. These three mechanisms are:

- An incremental price per hour, applied to parking meters. All D.C. parking meters currently cost \$2.30 per hour, and generate approximately \$40 million in revenue per year. This policy would add a gradually growing surcharge to that cost.
- An additional parking fee charged at all parking garages in the District of Columbia. This fee would be set at a level intended to collect the same amount of revenue as the surcharge applied to parking meters.
- An excise tax adjustment for all cars brought into the District. Unlike the parking charges, the excise tax adjustment would be revenue neutral.
 - The amount of excise tax charged for each vehicle (currently between 6 and 8 percent of assessed value) would be adjusted upward or downward based on whether a vehicle's projected emissions would exceed or fall below those of the federal CAFÉ standard for that year.
 - Purchasing a highly efficient plug-in hybrid could allow the buyer to avoid most or all the excise tax that they would otherwise owe, while purchasing a highly inefficient vehicle would increase the tax charged.

Utility-level response to the carbon fee

One important characteristic of this study is that it did not include a utility-level responsive effort to switch fuels used to generate electricity away from carbon-intensive fuels and to new low-carbon sources as a response to the carbon fee. If energy suppliers choose to source more of their energy from low-carbon or zero-carbon sources, either through on-site energy generation or direct purchasing, emissions would be projected to fall even more. The District's greenhouse gas emissions from electricity could likely fall by more than 23% if the utility-level response to this policy includes fuel switching to more clean energy due to the carbon price signal.

Revenue

As the carbon price gradually increases, so too will the amount of revenue generated by the policy. In year one of the policy, at \$20/ton, it is anticipated that a carbon price would raise roughly \$140 million in revenue. In 2032, at \$150/ton, it is anticipated that a carbon price would raise roughly \$600 million.

It is worth noting that revenue growth toward the end of the study period is slower than at the beginning, and total annual revenue peaks in 2029. There are several reasons for this. First, households and businesses respond to the carbon price by reducing energy consumption and making investments in more energy-efficient products. So, the larger fee per ton is offset to some extent by lower energy use. Second, the carbon fee works in tandem with D.C.'s Renewable Portfolio Standard (RPS), which sets an annually increasing minimum amount of D.C.'s electricity supply that must come from renewable sources. This policy would place a carbon price only on that portion of D.C.'s electricity sales for which electricity suppliers have not purchased renewable energy credits pursuant to the RPS. Thus, as the RPS eventually ramps up to 50% by 2032, the amount of electricity sales subject to a carbon price would fall correspondingly. As we get closer to 2032, D.C.'s electricity supply becomes cleaner and more efficient, which slows down the projected rate of revenue growth and eventually turns the revenue trend downward.

Rebates

As the revenue collected from the carbon price gradually increases, so would the quarterly rebate for residents. In year one of the policy, at \$20/ton, the average family of four would receive a monthly rebate of roughly \$43. For low-income families, who receive the regular rebate as well as a share of the 15% of rebate funds set aside specifically for this population, the size of the rebate would be higher – roughly \$74 per month. In 2032, at \$150/ton, the average family of four would receive a monthly rebate of roughly \$160. For low-income families, the size of the rebate would total roughly \$277 per month.

Due to the progressive structure of the rebate, the overall size of the rebate for low-income families is higher than for the average family in D.C.. According to data from the U.S. Census American Community Survey, this target group of relatively low-income households represents about 30% of D.C.'s total population, and ends up receiving just over 40% of all the rebated funds due to the weighted allocation of the rebate. As a result, this group benefits significantly – receiving on average three to four times as much in rebates as they would pay in fees.

The remaining 70% of the city's population, made up of all those in households with incomes over twice the federal poverty line, splits the remaining nearly-three-fifths of the revenue. Even with the smaller average rebate per month, this group is also better off, receiving on average 1.5 to 2 times as much in rebates as they pay in revenues.

The median household in this better-off category sits well above average for total income – somewhere around the 65th percentile, with a household income above \$100,000 per year – and is likely encountering this average effect of receiving more in rebates than the household would be paying in fees. Most D.C. residents would receive more in rebates than they would pay in carbon fees. Based on these factors, while energy spending is not perfectly linked to income levels, about a quarter of D.C.'s total population – likely made up primarily of those with household incomes above approximately \$150,000 per year – would face a risk of paying more in fees than they receive through the rebate. And anyone in that population group at risk of paying more would have ample opportunity to lower the amount that they pay by participating in one of D.C.'s energy efficiency or renewable energy programs.

Jobs

This carbon fee-and-rebate policy analysis projects a small but steady increase in D.C. jobs when compared to a scenario where no such policy exists. The average annual net jobs impact due to the fee-and-rebate policy starts at a growth of nearly 100 positions in 2019, rising to 525 new jobs by 2032. The D.C. Department of Employment Services reports that there were nearly 765,000 jobs in D.C. in 2014, and they project that jobs will grow at an annualized rate of 0.6% out to 2024³. While the overall change in employment is small relative to overall size of the District's economy (an increase of at most 0.1 percent in any given year), projected job impacts from the policy remained positive in all years of the analysis. This is a small but positive bump that signifies that the job growth the District is expecting without this policy will remain steady, unaffected despite a policy that could reduce greenhouse gas emissions by over a million metric tons per year.

³DC Department of Employment Services. "DISTRICT OF COLUMBIA LONG-TERM INDUSTRY PROJECTIONS, 2014 and projected 2024"

Furthermore, funds raised through the carbon price would re-circulate throughout the District economy through increased consumer spending, green investments, and small business tax abatement. As detailed above, residents overall would be better off under this policy, receiving hundreds of millions of dollars more per year through the rebate than they would pay in carbon fees. Based on historic spending patterns, residents would be most likely to spend that money in a broad range consumer-facing sectors of the economy, like retail, groceries, transportation, education, restaurants and a host of other sectors. D.C. does well even considering the expectation that 15-20% of the rebate would likely be spent outside of the District in Maryland, Virginia, and further afield – an external-spending figure which would characterize any program affecting household incomes. This consumer spending drives an induced second wave of economic stimulus as consumer-facing sectors grow and hire new employees.

Positive job growth from increased consumer spending appears to be particularly robust within the low-income sector. As discussed above, due to the progressive structure of the rebate, low-income residents would receive a disproportionately higher share of the carbon rebate revenue. The analysis projected that this group of households would direct their spending primarily to a subset of economic sectors covering food, clothing, housing, transportation, medical care, education and recreation, while de-emphasizing spending in sectors weighted substantially toward higher-income spending, such as foreign travel and new rather than used vehicle purchases. Because of both this concentration of rebate dollars to lower-income families and the direction of a significant funds to green investments, the largest job gains in the District are in the construction sector and in the retail and nightlife sectors. These sectors traditionally offer opportunities to lower-income households, and so these projected increases in employment portend a D.C. economy that creates more opportunities for upward mobility.

The sector in which the highest job gains are projected to occur is the construction sector, which would be driven primarily by the direct effect of investments in green programs, particularly energy efficiency projects and retrofits. This analysis projects that green job growth driven by this policy would start at about 100 positions in 2019, and reach 400 by 2032. Much of that is directly due to the direction of 20% of all revenue from the fee being directed to green investments. These investments also helped to lessen energy bill impacts by reducing energy consumption and thus exposure to the carbon price.

The utility sector is the only sector projected to encounter notable losses. This is due to the efficiency effect, which lowers the scale of demand (and thus of the expected scale of operations) for electricity and heating energy. However, this projection of utility-sector job losses is based upon the assumption that the utility takes no significant action to shift its mix of electricity supply to less carbon-intense sources in response to this policy. As a result, all the reductions come from consumer-driven efficiency and clean-energy measures – meaning a reduction in the total amount of energy consumed, and a reduction in the overall scale of the energy sector of the economy. By shifting to cleaner sources, however, the utility has the capacity to avoid the price mechanism driving this reduction in demand, and avoid the reduction in revenue and employment figures involved. Utility action to adopt a cleaner electricity-source mix could save most of the utility-sector jobs identified here, increasing overall employment in the district (and elsewhere) and driving greater indirect and induced economic gains around the region as a result.

Finally, funding spent on business tax abatement helps to lower the cost of doing business in the District and partially offsets increased operating costs that businesses would encounter because of the carbon price. The analysis considered two scenarios, both with and without some form of business tax abatement. Allocating some portion of the revenue to the business community proved to be an important factor in helping a carbon price produce positive job gains across the economy. This business

cost offset, while funded with only 5% of all the revenue collected, is projected to be instrumental in helping businesses continue to operate and grow in the District, and improves the ability of local businesses to maintain robust economic activity and remain competitive in the region. As a result, the GDP and employment these businesses generate stays in the District. Standing on its own, using 5% of revenue to reduce the costs of doing business in D.C. would alleviate those costs by as much as \$30 million per year District-wide. Businesses are projected to respond by adding 200 jobs to the rolls in response to this element alone, and the economy would do better by about \$20 million per year in GDP terms.

While raising the price of fossil fuels through a carbon price would increase energy prices in the short term, that impact would lessen over time as residents and businesses adjust to and plan for the carbon price. As the carbon price rises along a predictable trajectory, residents and businesses can make behavior changes and invest in energy efficiency and clean energy in the near-term to reduce their future exposure to the price. Rebates, green program funding, and complementary D.C. policies can accelerate that transition.

Economic Growth

We anticipate that this policy would keep the growing D.C. economy intact. Net changes to GDP, total output, and total value added in the D.C. economy are all reported at 0.1% or below (some positive, some negative) – in all cases, a figure so small as to functionally mean that the policy won't have any material effect on the size of the D.C. economy.

While the overall change in productivity of the economy is projected to stay the same, the impact on individual sectors was more variable. Below are some sectors which would see a growth in sales from this policy. Increased sales are driven primarily by increased consumer spending and other uses of revenue.

- Grocery and liquor stores will see a steady increase in sales of about \$10M-13M a year.
- Restaurants grow by a similar amount - \$12-15M in sales a year.
- Sales of consumer technology products would grow by up to \$20M a year.
- Demand for physician's, nursing and paramedic services would rise by over \$10M a year.
- Sales of internet, cable and cellular services would rise by a few million dollars each per year.
- Developers gain from green investments – reaching up to \$115M a year – targeted to deep energy retrofits. Lawmakers and implementing agencies will need to ensure that proper programs and oversight are in place to spend and evaluate these funds.

The only sector projected to encounter a notable decrease in sales was gasoline and diesel as energy use decreases in response to the transportation-related elements of the policy, on the order of \$30-48M in sales per year. While the largest single sector impact, it remains a change of less than 4% of projected sales.

Table ES-1 below details the projected direct impacts of this fee-and-rebate system.

Table ES-1: Direct Policy Impacts

DC Carbon Fee and Rebate Initiative Summary of Projected Outcomes														
<i>Scenario: \$20 per ton fee, rising \$10/year to \$150 per ton in 2032. 75% of revenue to progressive rebate, 20% to investment, 5% to small business tax abatement</i>														
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fee rate (dollars per ton of greenhouse gas emissions)	\$20	\$30	\$40	\$50	\$60	\$70	\$80	\$90	\$100	\$110	\$120	\$130	\$140	\$150
Total revenue generated (millions, 2015\$)	\$140.9	\$207.6	\$275.6	\$341.0	\$404.5	\$453.8	\$503.8	\$553.5	\$605.7	\$605.5	\$609.6	\$605.7	\$601.7	\$596.5
Total rebate to households (75% of all revenue, millions, 2015\$)	\$105.7	\$155.7	\$206.7	\$255.8	\$303.4	\$340.4	\$377.9	\$415.1	\$454.3	\$454.1	\$457.2	\$454.3	\$451.3	\$447.4
Total green investment (20% of all revenue, millions, 2015\$)	\$28.2	\$41.52	\$55.1	\$68.20	\$80.9	\$90.76	\$100.8	\$110.70	\$121.1	\$121.10	\$121.9	\$121.14	\$120.3	\$119.30
Total small business tax abatement (5% of all revenue, millions, 2015\$)	\$7.0	\$10.4	\$13.8	\$17.1	\$20.2	\$22.7	\$25.2	\$27.7	\$30.3	\$30.3	\$30.5	\$30.3	\$30.1	\$29.8
DC general monthly rebate (family of four, 2015\$)	\$43	\$63	\$82	\$101	\$118	\$131	\$144	\$157	\$170	\$169	\$168	\$166	\$163	\$160
Low-income monthly rebate (family of four, 2015\$)	\$74	\$108	\$142	\$174	\$204	\$227	\$249	\$271	\$294	\$291	\$290	\$286	\$282	\$277
Emissions Reductions	1.1%	3.2%	5.2%	7.5%	9.7%	12.1%	15.8%	17.9%	18.8%	19.7%	20.5%	21.3%	22.1%	22.8%

Figure 1 below shows net job gains from the carbon fee and rebate system versus the baseline.

Figure 1: Net Job Impacts

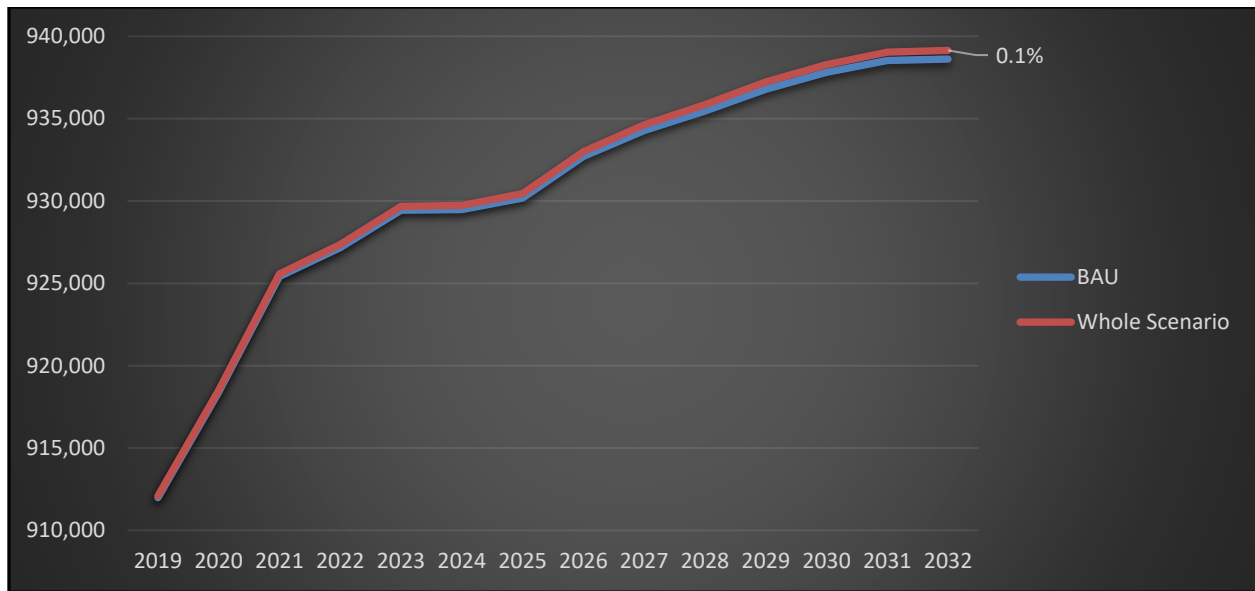


Figure 2 below shows net job gains from the carbon fee and rebate system under a variety of scenarios and conditions.

Figure 2: Net Job Impacts from Policy Elements, Summing to Top Line

