Recommendations:

1. Use a technology neutral outcomes-based approach in developing policies that encourage low emissions vehicles for the heavy-duty transport sector. Ensure a fulsome life-cycle approach is used to determine emissions reductions versus tailpipe emissions alone.
2. Retool the Green Freight Program to provide significantly more funding – up to $1 billion. Ensure the program uses a technology neutral approach that includes heavy-duty trucks using low carbon intensity and renewable natural gas.
3. Retool public transit funding to include net zero emissions buses through the use of low carbon intensity and renewable natural gas in addition to use of hydrogen and battery electric buses. These technologies are complementary and are not competitors with battery electric buses.
4. Do not proceed with heavy duty vehicle sales mandates and ensure the United States Environmental Protection Agency does not implement regulations that do the same through unreasonable or ill-conceived technical restrictions.

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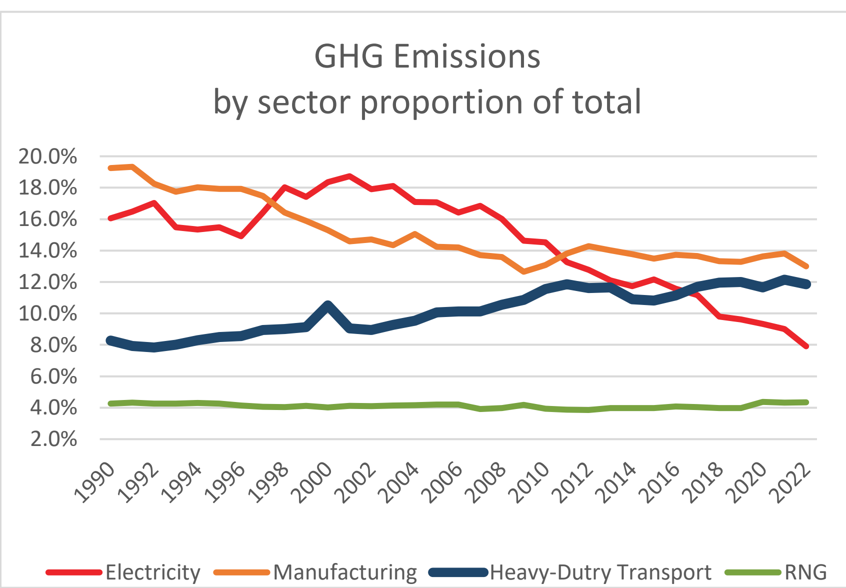
The Transport Project Canada (TTPC) is a member-based organization that supports cost-effective emissions reductions for Canadian fleets. TTPC's members represent a full value chain that covers the gamut from energy providers, equipment suppliers, consultants, to fleets. With a focus on gaseous fuels for transportation, TTPC's members primarily support market ready and proven technologies. For more than three decades, originally as the Canadian Natural Gas Vehicle Alliance and now as TTPC, our members have developed a wealth of experience and knowledge that is key to successful cost-effective emissions reductions for Canadian fleets.

The Emissions Reduction Challenge

The heavy-duty transport sector accounts for a significant proportion of transport emissions – 84 Mega Tonnes of annual Greenhouse Gas (GHG) emissions – and is an economically exposed sector. Gaseous fuel technologies are being used to reduce emissions in every segment of the heavy-duty transport sector – marine, rail, off-road and on-road vehicles. TTPC members are currently delivering at scale, commercial emissions reductions using liquefied natural (LNG) gas in Canada's marine sector and in Canada's on road trucking sector through the use of natural gas and low and negative carbon intensity gases. Development of related gaseous fuel technologies will continue to extend cost-effective emissions reductions opportunities for heavy-duty transport.

Gaseous fuel use in Canada's heavy-duty transport sector have already contributed significant emissions reductions. Transit agencies in Canada pioneered the use of natural gas vehicles in the late 1980s and are leading today with the use of negative carbon intensity Renewable Natural Gas (RNG) in providing net zero and greenhouse gas negative emissions. More recently Canada's refuse industry has embraced significant use of natural gas vehicles to reduce greenhouse gas emissions and are now piloting the use of RNG to support net zero emissions operations. A small number of leading Class 8 fleets have also led in the use of natural gas vehicles to reduce the emissions intensity of goods transportation in Canada. Using the Clean Fuel Regulation's default values, in total these natural gas vehicles are reducing GHG emissions by more than 80,000 tonnes each year. Using RNG in these vehicles would require approximately three percent of potential 2030 production and would increase GHG emissions reductions to more than 400,000 tonnes each year – equivalent to 133,000 electric cars. Similarly, leading Canadian marine fleets have been deploying LNG powered vessels for almost a decade. These have delivered both air quality improvements and GHG reductions, with fleets exploring options for additional emissions reductions with the use of low and negative carbon intensity gases for existing LNG vessels.



To date the federal government's approach to emissions reductions in the heavy-duty transport sector has fallen short of the challenge. To put this in context, according to the most recent National Inventory Report, transport is the second largest source of GHG emissions. While other emissions sources have increased modestly or declined, heavy duty transport emissions have increased by the largest rate of any segment – 1.8 percent between 2018 and 2022. Overall, the two largest sources of GHG emissions – including transport – accounted for more than half of Canada's total. Heavy-duty transport emissions alone account for almost the same proportion of the total as the third largest source – manufacturing and industrial processes. Progress has been made in reducing GHG emissions from the production of electricity and in manufacturing. Even light duty transport emissions have declined. Better policy approaches are required to tackle the challenges of reducing transport emissions.

Current emissions reductions policies are only indirectly aimed at the transport sector. These include the national retail carbon tax (and provincial variants) on diesel, the Clean Fuel Regulation, and United States Environmental Protection Agency vehicle emissions standards. In effect, federal policy has increased the cost of transport fuel, but has provided limited incentives or opportunities for fleets to take action to reduce emissions. This is a very important point when considering trade exposed economic sectors versus incentivizing consumer behaviour. Unfortunately, both the US EPA and Canadian federal government are now looking at mandates or regulatory rules that result in quasi mandates that require sales of zero emissions vehicles. A recent analysis of Canadian emissions reductions policy by the Fraser Institute, *The Economic Impact and GHG Effects of the Federal Government's Emissions Reduction Plan through 2030,* notes the following:

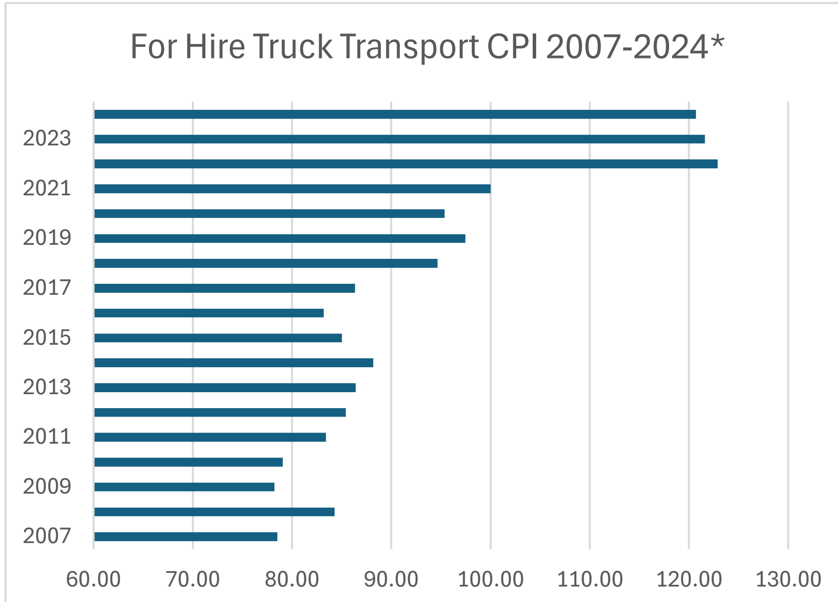
> *Carbon pricing is part of the federal policy mix, but the profusion of accompanying regulations, subsidies, and mandates undermines any economic efficiency attained by the emission charge and ensures the package as a whole will be relatively inefficient for what it accomplishes.*

The potential pitfalls in the case of transport policy have and will continue to significantly threaten the economic well-being of all Canadians.

Technical Challenges

Briefly, the challenge that all jurisdictions face in tackling emissions reductions in the heavy-duty transport sector are similar. First, availability of alternative technologies is limited. Current battery technologies present a difficult payload versus distance trade off that result in vehicles that can function, but that are incapable of working, which is to say: meeting the needs of commercial fleets. This is a real challenge for commercial fleets, both in terms of capital costs, but also in terms of labour costs if for example more vehicles and operators are required. Second, is the availability of energy. Based on annual diesel fuel sales, the transport sector in Canada consumes at least 600 Peta Joules of energy – which adjusted for efficiency is equivalent to 59 Terra Watt hours of electricity. That is greater than net electricity exports and represents a requirement for an additional 9 percent more electricity generation. That may not seem like much, but over the last 20-years total electricity generation has only increased by about half that amount. Canada's supply of hydrogen is quite limited, most is used in petroleum upgrading and refining; assuming electricity is used to produce the hydrogen this could require as much as 30 TWh of incremental electricity production. While theoretically there are zero emissions options, designing an effective sales mandate for heavy-duty transport applications is likely impossible.

Economic Risks



We know intuitively that the heavy-duty transport sector plays a very important role in our economy – delivering all the goods we consume. The recent pandemic and supply chain interruptions have highlighted the sector's importance. Certainly, inflation has been at the top of mind for many policy makers – and it looks like the problem has stopped getting worse – with overall costs increasing by almost 18 percent between 2018 and 2023. Increases in food prices lead in terms of concern – these account for the largest increase with the CPI basket at 27 percent. When it comes to commercial transport, diesel prices, a big driver of costs, rose by almost 34 percent – with retail carbon taxes accounting for nearly 14 percent of these increases. The retail carbon tax is contributing to higher costs for Canadians. For the heavy-duty transport sector it has added a total of $6.6 billion since 2018 – with less than 10 percent of this returned in the form of zero and low emissions vehicle deployment subsidies. It is worth noting that diesel consumption over the same period of time increased by 3 percent – undermining the argument that carbon taxes are changing consumption behaviour. For some in the heavy-duty transport sector the carbon tax hits the bottom line, but for most, it is simply a cost that is passed through to shippers – like for instance those involved in food and agriculture, who in turn either ate the cost or passed it along to Canadians.

A sales mandate or any emissions standard will also pass on costs, many of which will impact consumers. Under US EPA ligh- duty vehicle emissions regulations, manufacturers have been required to increase vehicle energy efficiency – including credits for selling electric vehicles – across all vehicles they sell into the market. Between 2018 and 2023, the average cost of a light duty vehicle purchased in Canada has increased by 33 percent. This trajectory has also produced reductions in light duty emissions by 10 MTs – on a per vehicle basis this works out to cost per tonne of GHG reduction of just under $4,000. This attribution of course is not reasonable – the point remains that to date efforts at reducing emissions have yet to result in lower costs for the purchase of vehicles.

Public transit vehicles were staked out as a beachhead for developing zero emissions technologies for heavy-duty transport. Again, based on federal subsidies offered and deployments to date, the cost per tonne of emissions reduction for transit buses is between $700 and $1,000 per tonne of GHG reduction. Transit bus purchase prices are $500,000 more than equivalent diesel units, while millions of dollars in additional electricity generations, distribution and charging stations round out the project costs. The cost of deploying battery electric and hydrogen buses is at least seven times greater than using low and negative carbon intensity renewable natural gas. The same holds true other heavy-duty vehicles.

Incenting a Technology Neutral Approach

While carbon pricing and restrictions on what can be sold in the market are a dubious policy approach, focusing on action today will produce results. The Clean Fuel Regulation (CFR), while not without its faults, is much closer to the right policy approach. The CFR is technology neutral with the aim of reducing carbon intensities; it also uses a life-cycle approach, so it captures real and total GHG emissions reductions. CFR creates mechanisms for fleets and shippers to demonstrate GHG reductions as well as a credit market wherein investments in new emissions reductions technologies can be monetized. When similar mechanisms were used elsewhere, particularly in the United States, cost-effective emissions reductions technologies were deployed. Gaseous fuel vehicles in particular figured quite prominently, with a rapid build out of RNG fuelling coupled with significant emissions reductions.

TTPC members endeavour to work with the federal government, both at the political and professional level, to provide insights into policy approaches that will deliver real and tangible emissions reductions in the heavy-duty transport sectors. We are committed to emissions reductions. The costs associated with heavy-duty transport are increased by the carbon tax, but not enough funding is being provided to the sector to develop and deploy low emissions alternatives. A more neutral approach is required – one that places a premium on delivering emissions reductions today and that uses a comparable life-cycle emissions model in determining emissions reductions achievements.