

Automobile production in Canada and implications for Canada's 2025 passenger vehicle greenhouse gas standards

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1. Introduction

The current U.S. regulations for passenger vehicle greenhouse gas (GHG) and fuel efficiency were finalized in 2012 and called for cars and light trucks collectively to achieve a projected fuel economy level of 54.5 mpg by 2025.¹ On April 2, 2018 the U.S. Environmental Protection Agency (EPA) announced² that this regulation was “not appropriate and should be revised.” We expect the EPA and U.S. Department

of Transportation (DOT) to issue a proposed rulemaking later this year with weakened 2025 requirements.

Canada's regulation incorporates the U.S. EPA rule by reference and thus would have its standards rollback automatically as soon as any adjustments are made to the U.S. program. With Canada having a long history of harmonizing its vehicle and fuel regulations with the U.S., the probable rollback of U.S. vehicle GHG standards will immediately trigger a decision point for the Canadian government: continue the policy of aligning with the U.S. and thus weaken its own 2025 regulation; or, break regulatory ties with the U.S. by maintaining the stringency of the current 2025 standards.

California, which has both a progressive political culture and serious air pollution issues in many of its cities, has announced³ that it will stick with

the original target for 2025. Thirteen other states, plus the District of Columbia (hereafter, “CA+13”), have opted to follow California's lead on vehicle emissions standard in lieu of those at the federal level. These states include: Connecticut, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and Delaware, plus Washington, DC.

Altogether, there were roughly 6.2 million passenger vehicles sold in California and the other 13 states in 2016. Adding an additional 1.9 million vehicles sold in Canada, this combined bloc of 8.1 million units represents roughly 41% of the total market for cars and light trucks in the U.S.-Canadian market (19.8 million vehicles).

This paper analyzes the Canadian vehicle manufacturing market and sales patterns to illuminate the possible impacts if Canada weakens its greenhouse gas emission standards in order to align with the U.S. federal government or maintains its existing standards and aligns with California and,

1 Using EPA and NHTSA laboratory calculations, the 2025 emissions/fuel economy target is often stated as 54.5 mpg. However, the target is sensitive to the car-truck sales mix and, moreover, is roughly one-third above the mileage actually experienced by drivers due to the testing regime and a variety of credits. Changes in car-truck mix have already caused the 54.5 mpg target to fall to about 50, corresponding to about 38 mpg in actual driving. Note that in this paper we separate trucks into car-like trucks (“CLTs” or “crossovers” built on car platforms) and true (i.e., framed) trucks (TTs) built on truck-only platforms.

2 US. Environmental Protection Agency, “EPA Administrator Pruitt: GHG Emissions Standards for Cars and Light Trucks Should Be Revised,” news release, April 2, 2018. <https://www.epa.gov/newsreleases/epa-administrator-pruitt-ghg-emissions-standards-cars-and-light-trucks-should-be>

3 California Air Resource Board, “CARB Chair Issues Response to EPA press release on weakening vehicle standards,” news release, April 2, 2018. <https://www2.arb.ca.gov/news/carb-chair-issues-response-epa-press-release-weakening-vehicle-standards>

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most likely, 13 other U.S. states and the District of Columbia.

2. Research questions and methodology

Canada's pending regulatory alignment decision could potentially have impacts on its domestic auto manufacturing sector. This market assessment is centered around addressing the following research questions in order to better inform policymakers and other stakeholders about the potential impacts to Canada's manufacturing base if the country elects to maintain the stringency requirements in its current 2025 GHG vehicle standards.

1. What is a current snapshot of Canada's automobile manufacturing sector? Where are the assembly plants located in Canada? What are the brands and models being produced, and what are their market prospects over the next few years?
2. For the models produced in Canada, where are these vehicles sold in the U.S. if we break the country into two distinct sales geographies: California and the thirteen Section 177 states (CA+13 states) versus the remaining 36 states?
3. For the models produced in Canada, what brands and models are popular in the CA+13 states?
4. For the models produced in Canada, is there any difference in the fuel economy of the top-selling vehicles in the CA+13 states as compared to the rest of the country?

To explore these questions, we used the following methodology for our analysis.

1. We acquired vehicle production data by manufacturer, brand, and assembly plant location for every model that is produced

Table 1. Vehicles assembled in Canada, 2017

Vehicle model assembled in Canada	Location of assembly plant in Canada	Assembled only in Canada?	Vehicle type
Chrysler 300	Brampton	Yes	Luxury car
Dodge Challenger	Brampton	Yes	Muscle car
Dodge Charger	Brampton	Yes	Muscle car
Chrysler Pacifica	Windsor	Yes	Minivan
Ford Edge	Oakville	Yes	Crossover
Lincoln MKX	Oakville	Yes	Crossover
Chevrolet Equinox	Ingersoll	No	Crossover
Toyota Corolla	Cambridge	No	Midsized car
Honda Civic	Alliston	No	Small car
Honda CR-V	Alliston	No	Crossover
Toyota RAV 4	Woodstock	No	Crossover
Lexus RX350	Cambridge	Yes	Crossover

in Canada. For this analysis, we procured data from IHS Markit, which is North America's leading aggregator of sales, registration, and production data.

2. Given project resource constraints, we were unable to precisely track the ultimate sales location of the actual vehicle models that are produced in Canada. As a simplification, we make the following assumption:

Vehicles produced in Canada are sold in both Canada and the U.S. *For those that are sold in the U.S., we assume that the distribution of sales of the actual Canadian-made vehicles is exactly the same as the overall distribution of sales for those vehicle models, in terms of sales in the CA+13 states versus the rest of the U.S.*

3. For the fuel economy analysis, we used values from www.fueleconomy.gov.

3. Auto production in Canada

Ontario has seven operating car and/or light truck assembly plants in

2018, assembling the twelve⁴ vehicle models summarized in Table 1. While in recent years most automakers have been reducing their Canada footprint in favor of producing in lower-cost Mexico, auto manufacturing remains an important industry in Canada, accounting for a substantial share of the nation's exports to its North American Free Trade Agreement (NAFTA) partners and beyond. All of the twelve models are cars or car-like trucks (CLTs or "crossovers"); Canada assembles no true trucks.⁵ Note that five of the vehicles assembled in Canada are also assembled in the U.S. and/or Mexico.

Table 2 displays how many of each of the 12 models that are partly or wholly

4 We have not included the Dodge Grand Caravan, as FCA's product plans call for this model to be terminated by 2019. We have also excluded the Ford Flex and Lincoln MKT, as they are low-volume and, based on Ford's product plans, likely to terminate by 2020. In addition, a modest number of Cadillac XTS and Chevy Impala models are built in Oshawa, but GM's product plan suggests that production there will likely terminate in 2020 and 2019, respectively.

5 As we will see, this could briefly change at Oshawa under a temporary arrangement with Unifor as part of the changeover for the T1xx update of the Silverado and Sierra.

assembled in Canada⁶ were sold in 2016 or registered in the U.S. during the 12 months ending August 2017.⁷ Adding the not-quite-comparable⁸ second and fourth columns results in a total of roughly 2.6 million units of the 12 models sold in the U.S. or Canada. Of those, about 800,000 (or 31%) were sold by the “Detroit Three” (i.e., General Motors, Ford, and Fiat Chrysler Automobiles) and the rest (69%) by Toyota⁹ or Honda.

Note the difference in vehicle types and market appeal of the vehicles offered by the Detroit Three versus those offered by Honda and Toyota (including Lexus). The latter are leaders in their segments; the RX350 (and its associated hybrid version) is Lexus’s best-selling North American model. While small cars are lately losing some market share, the Toyota Corolla and Honda Civic remain the two best-selling cars in their segment. Their sales prospects are bright, so they and other vehicles on the same platforms offer the best opportunity for new investment in Canada. Finally, these models in particular, and their brands in general, enjoy their highest market share in the CA+13 states.

The new Chevrolet Equinox is a very popular model and, while it is not the best-selling crossover in its class, it is likely to continue to do well. However, increased production at the Ingersoll plant is less likely than it is to occur at

Table 2. Registration and sales totals for the 12 vehicle models produced in Canada

Vehicle model assembled in Canada	Units registered in the U.S. (Sept 2016 - Aug. 2017)	Units assembled in Canada and sold in the U.S. (2016)	Units sold in Canada (2016)
Chrysler 300	49,827	53,241	3,662
Dodge Challenger	66,021	64,433	3,158
Dodge Charger	90,824	95,437	3,738
Chrysler Pacifica	110,282	62,366	2,650
Ford Edge	135,802	134,588	20,517
Lincoln MKX	30,941	30,967	3,551
Chevrolet Equinox	268,806	188,164	19,197
Toyota Corolla	355,176	191,050	45,626
Honda Civic	360,514	162,231	64,551
Honda CR-V	377,248	181,079	44,789
Toyota RAV 4	390,864	277,513	49,103
Lexus RX350	100,764	104,446	8,147
TOTAL, 12 models	2,317,069	1,545,516	268,689

Honda and Toyota’s Canadian facilities, as Equinox is now being assembled at two plants in Mexico.

The Charger and Challenger models offered by Fiat Chrysler Automobiles (FCA) from its Brampton plant remain popular with consumers favoring muscle cars, with combined sales similar to those for Ford’s Mustang and GM’s Chevrolet Camaro.¹⁰ But like most Detroit Three vehicles, with the exception of pickup trucks, they are not popular in the CA+13 states (see Table 4, below). Moreover, FCA’s Brampton vehicles are on a mature platform, the LY, that itself is only a modest reworking of the old LX. FCA intends eventually to move some or all of these vehicles to its Giorgio Platform, which is the basis

for the Alfa Romeo Giulia now being sold. A move to Giorgio would allow FCA to spread development costs over up to five vehicles that could share this design architecture. The five include a rumored return of the Barracuda and/or the Hornet, and the 300 could also move to this platform.¹¹ These plans will be updated in 2018 when FCA rolls out its latest long-term product plan. However, in the past FCA has cancelled new vehicle programs when a shortage of capital looms, as it would do again if the market slows significantly and/or if it seeks to tidy up its balance sheet for a spinoff or sale.

The Pacifica is new and has sold relatively well, although its high sticker price may have caused limited sales volume. The cheaper Dodge Grand Caravan continues to be built in Windsor (and indeed has just been updated to meet U.S. safety requirements), but the planned end of Grand Caravan production in 2019 could

6 “Wholly assembled in Canada” is with respect to sales in the North American market. Some of the 12 are also built elsewhere in and for non-NAFTA markets.

7 We are using the terms “sales” and “registrations” interchangeably. Our data, acquired from IHS Markit, cover new vehicles registered for the first time in the 12-month period September 2016 through August 2017.

8 The 4th column shows Canadian sales for 2016, while the 2nd column shows U.S. registrations for a period that is eight months more recent. This is why there is some discrepancy in the numbers.

9 Lexus is the luxury vehicle division of Toyota.

10 See Patrick Rall, “Ford Mustang Beats Chevrolet Camaro, Dodge Challenger to Claim 2016 Title,” TorqueNews, January 4, 2017. <https://www.torquenews.com/106/ford-mustang-beats-chevrolet-camaro-dodge-challenger-claim-2016-title>. Sports car aficionados tend to compare only 2-door models, but in fact a high proportion of (four-door) Chargers are also muscle cars. Fully one-third of those sold in 2016 had a V8 engine, the same proportion of V8s as Mustang.

11 Alternatively, the 300 could be terminated or moved to front wheel drive and share the platform used by the Chrysler Pacifica and potentially be built alongside it in Windsor.

increase sales of the Pacifica. Still, the Windsor plant will not be full, and two larger crossovers could be built at the plant on FCA's Compact Wide Platform (which is also the basis for the Pacifica). These crossovers have been tentatively named the Chrysler 400 and 700 and could represent additional volume for the Windsor plant.

The Brampton facility is in some danger after the current Unifor contract expires (in 2020), for several reasons:

1. Sales of its current product line are stagnant or declining and are focused on brands (Chrysler and Dodge) and market segments (large cars) that are falling out of favor.
2. FCA is in a more precarious financial position than many of its competitors, and cost-cutting and/or a merger with another automaker are possible, either of which could shake up its vehicle line-up plans.

While the Brampton plant has received some investment (most recently in its paint shop), it is a relatively mature facility. Moreover, its location in an upscale part of suburban Toronto may mean that FCA could be tempted to close it and sell the land for quick earnings and a positive entry on their balance-sheet.¹²

¹² If FCA has the money to go forward with the full Giorgio platform in North America, it will need two full assembly plants for it, one for the up-to-five car models and one for the next-generation Jeep Grand Cherokee and Grand Wagoneer. Ironically, its Jefferson North plant, which builds today's Grand Cherokee, could be a victim of its own success. FCA cannot afford to lose Grand Cherokee sales, and might therefore opt to run the current model right up to when a retooled plant—Brampton, Toledo, Warren, or a new plant—is ready. This possibility is very much on the radar of Michigan's auto retention/attraction professionals.

4. Where in the United States the vehicles made in Canada are sold

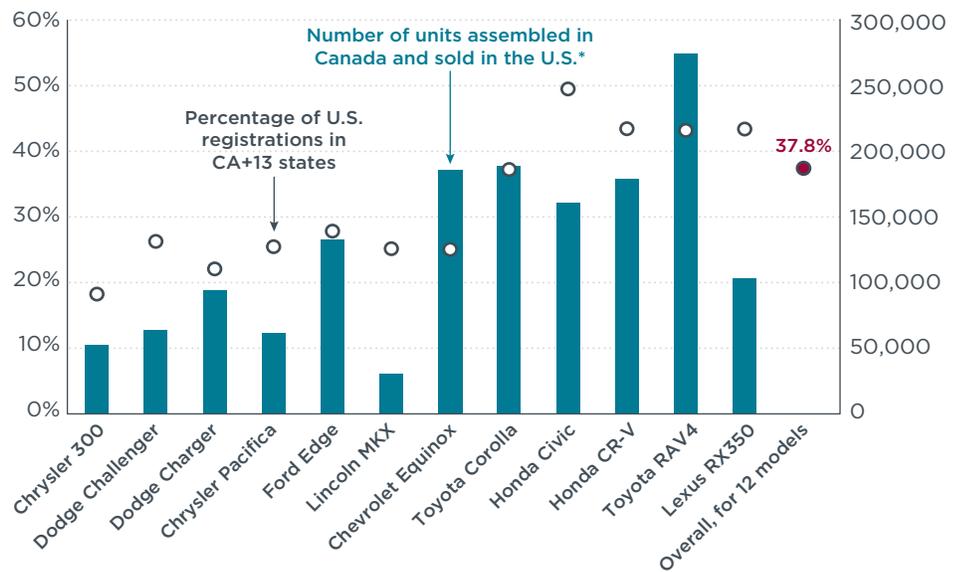
To shed light on Canada's decision about whether to align with the U.S. federal standard or, instead, with the likely CA+13 standard, the study team commissioned sales data by geography for the 12 models from IHS Markit. The IHS data are summarized in Figure 1.

At the highest level, the results seem clear: the seven Detroit Three-made models sell less than average in the CA+13 states, while the Toyota and Honda models sell better. All told, the twelve vehicle models produced in Canada do better in CA+13, but not by a great deal—37.8% of their sales are in those markets. This figure is only slightly higher than total sales in the CA+13 states, which represent 34.8% of vehicle sales in the U.S. However, as Figure 2 illustrates, the popularity of vehicles brands sold in the CA+13

states differs markedly from those sold in the other 36 U.S. states.

As shown in the red column, 44% of total U.S. sales of the Toyota Corolla, Honda Civic, Honda CR-V, Toyota RAV 4, and Lexus RX 350 are in the CA+13 states. In contrast, the combined market share of Honda, Toyota, and Lexus in the U.S. is 24%. For the Detroit Three, these two percentages are roughly reversed. GM, Ford, and FCA have a combined market share of 44% in the U.S., while only 25% of the seven models that these three automakers produce in Canada are sold in the CA+13 states.

Figure 3 compares the fuel economy and total U.S. sales of the seven models produced by the Detroit Three compared to the five models made by Toyota and Honda. As shown, the fuel economy values for the seven Detroit Three models range from about 19 to 23 miles per gallon (mpg) and have a sales-weighted average of 21 mpg. The



* Note: the CA+13 states account for 34.8% of total U.S. registrations

Figure 1. The 12 models produced in Canada and their share of vehicle registrations in the CA+13 states

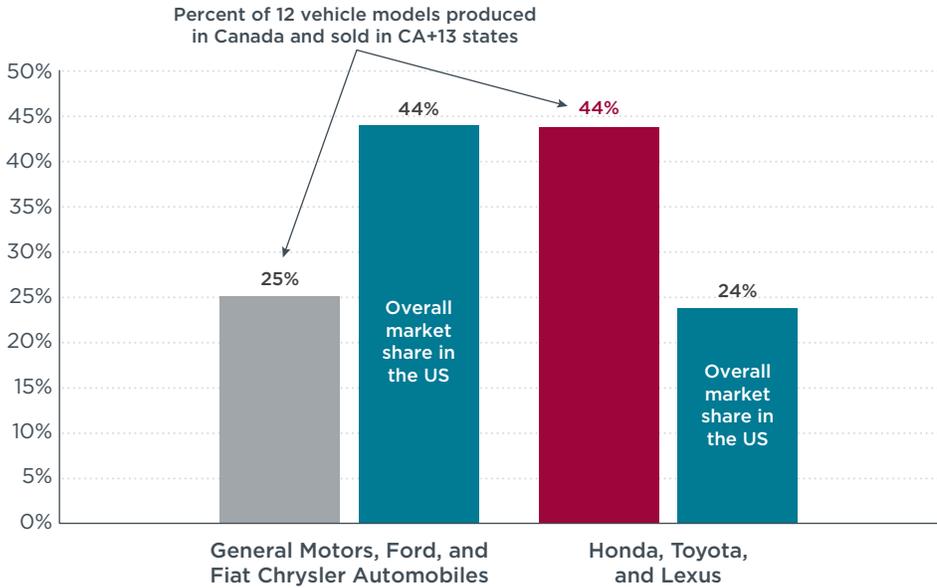
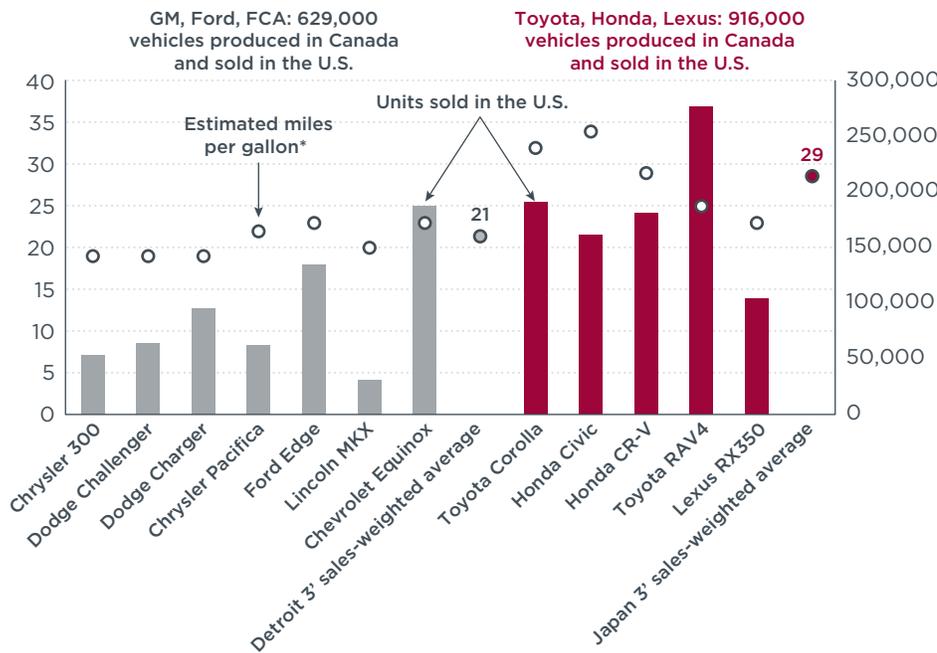


Figure 2. GM, Ford, and FCA versus Honda, Toyota, and Lexus: their combined market shares in the CA+13 states compared to the U.S. overall



*STICKER fuel economy values taken from www.fueleconomy.gov

Figure 3. GM, Ford, and FCA versus Honda, Toyota, and Lexus: fuel economy ratings and total U.S. sales of the 12 vehicle models produced in Canada

five models from the two Japanese manufacturers have fuel economy values ranging from roughly 23 to 34 mpg, with a sales-weighted average

of 29 mpg. The Toyota and Honda models have sales-weighted average fuel economy that is 34% higher than the Detroit Three vehicles.

5. Summary and policy implications

The following are the key takeaways from this market assessment:

1. The combined vehicle sales in Canada, California and the 13 states that have adopted California vehicle emissions standards make up 41% of total vehicles sold in the U.S. and Canada.
2. Canada has seven production plants that produce 12 vehicle models. When looking at total sales of these 12 vehicle models in the U.S., the CA+13 states account for about 38% of these vehicle sales. This is only slightly higher than the overall market share of the CA+13 states, which is about 34% of total U.S. sales.
3. The five Toyota and Honda vehicle models that are produced in Canada are much more popular than the seven “Detroit Three” (i.e., GM, Ford, and FCA) models in the CA+13 states. Canada-made Toyota and Honda vehicles are almost twice as likely to be in sold in the CA+13 states than the vehicles made in Canada by the Detroit Three.
4. The Toyota and Honda vehicles manufactured in Canada have a sales-weighted average fuel economy (29 mpg) that is nearly 35% higher than their Detroit Three counterparts (21 mpg).

We can make several policy-relevant conclusions from this study. This analysis strongly suggests that from both an economic and environmental perspective it would be most beneficial for Canada to maintain its current 2025 GHG standards for passenger vehicles rather than remaining aligned with a weakened U.S. federal government regulation. The advantages of

Canada maintaining the current 2025 stringency levels include:

1. Maintaining regulatory solidarity with California and the Section 177 states. With the imminent roll back of the U.S. federal GHG and fuel efficiency standards, there could be a bifurcated regulatory situation in which there are two separate regulations facing manufacturers: the weakened EPA/DOT federal regulation versus California's regulation, which is likely to remain at current stringency levels. Given the auto industry's strong preference

to sell the same vehicle models across Canada and the U.S., this Canada-CA+13 regulatory alliance could motivate automakers to simply sell the higher efficiency models required in Canada and the CA+13 states in the remaining 36 U.S. states. Thus, the current 2025 regulation would be the de facto standards for the entire U.S.-Canadian market.

2. Retaining support for the domestic manufacturing base by upholding vehicle GHG standards that promote the types of higher efficiency vehicles that are more

prevalent in the Canadian auto industry.

3. Putting Canada in a stronger position to meet its 2030 climate commitments, as vehicle GHG standards are a cornerstone of the strategy to reduce GHG emissions from the transport sector.

4. Keeping Canada competitive in global markets, since other major markets such as China and Europe are implementing aggressive GHG regulations and zero emission vehicle policies, which are accelerating the prevalence of high efficiency and electric drive vehicles.