



California and Québec's ZEV mandates description

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1. Introduction

Emission reduction from the transportation sector are key to meeting Canada's Paris Climate targets. Zero emission vehicles (ZEV) offer an opportunity to achieve this goal but their adoption has been slow due to high costs, few model options and restricted availability. California set out to address these issues by introducing a Zero Emission Vehicle standard. The regulation requires automakers to sell a minimum number of ZEV or risk paying a fine to maintain their sales operations in the state. The policy first took effect in 2005 and has since been implemented in nine other states in the United States. Québec was the first and only jurisdiction outside the U.S. to have implemented its own version of the policy, which it introduced in 2016.

While the purpose of the policy is widely understood, its mechanisms are quite complex and confusing. We hope that the summary we have prepared will help make California and Québec's policies accessible to a wider audience.

The document is structured as follows:

1. Summary of California's ZEV standard starting on page 2.
2. Summary of Québec's ZEV standard starting on page 11.
3. Comparison of the two policies starting on page 17.

This document is not meant to be used as a legal reference. Navius Research cannot guarantee that its interpretation of the regulations is legally accurate.

Should you have any questions, please feel free to contact Barbar Moawad at Barbar@NaviusResearch.com.

2. California ZEV mandate

The California ZEV mandate was first introduced in 1990 and was destined to apply to vehicles sold in 1998¹. Its early implementation was halted by a combination of vehicle manufacturer lawsuits and intervention from the Bush administration². A diluted version of the policy was successfully re-introduced in the early 2000s and first applied to vehicles sold in 2005. The California Air Resources Board has full authority over the mandate's development and enforcement. The policy is currently in its third iteration (also referred to as CCR Section 1962.2), which is the version described in this memo.

The next four subsections will discuss:

- The credit generating mechanisms
- The policy's application to automakers
- Compliance and reporting requirements
- Penal provisions

2.1. Credit-generating mechanisms

Manufacturers either generate credits from compliant vehicle sales or by participating in activities that reduce transportation emissions. We will start with a review of compliant vehicle credit generation followed by a discussion of credit generating activities.

Compliant vehicles

California defines four types of compliant vehicles that each generate varying amounts of credit as shown in Table 1.

- **Zero-emission vehicles or ZEV** – vehicles that do not produce emissions during their operation. They include battery electric vehicles and hydrogen fuel cell vehicles.
- **Battery electric vehicles with extended range or BEVx** – vehicles that have a minimum externally charged electric range of 75 mi (121 km), and an internal

¹ California Air Resource Board. 2004. *Fact Sheet: 2003 Zero Emission Vehicle Program Changes*.

² The New York Times. 2002. *White House Joins Fight Against Electric Cars*.

combustion engine with the sole purpose of extending the range (as opposed to propelling the vehicle). They include certain plug-in hybrid vehicles.

- **Transitional zero emission vehicles or TZEV** – vehicles that produce low emissions during their operation. They include most plug-in hybrid electric vehicles and hydrogen combustion vehicles.
- **Neighbourhood electric vehicles or NEV** – zero-emission motor vehicles with speeds not exceeding 25 mi per hour (40 km per hour), with acceleration of 0 to 20 mi per hour (0 to 32 km per hour) in 6 seconds or less, and a minimum range of 25 mi (40 km). These include golf carts and neighbourhood electric vehicles.

More details on these vehicles are provided in the table below.

Table 1: Credit-generating vehicle types

Vehicle Type	Definition	Credit formula	Example
Zero-emission vehicles or ZEV	Vehicles that do not produce emissions during their operation. They include battery electric vehicles (e.g., Tesla Model 3, Nissan Leaf, BMW i3 BEV) and hydrogen fuel cell vehicles (e.g., Toyota Mirai, Honda Clarity HFCV, Hyundai Nexa).	$C_{ZEV} = (0.01 \times R) + 0.50$ where R is the electric range of the vehicle in mi based on both the UDDS and CARB method of estimating range. Maximum credits granted are 4.00 for new vehicles. A vehicle with an electric range less than 50 mi (80 km) does not qualify for credits.	Nissan Leaf 2018 has a range of 151 mi (243 km): $C_{Leaf} = (0.01 \times 151) + 0.50 = 2.01 \text{ credits}$ Tesla Model S 2018 has a range of 335 mi (539 km): $C_{Model\ S} = (0.01 \times 335) + 0.50 = 3.85 \text{ credits}$
Battery electric vehicles with extended range or BEVx	Vehicles that have a minimum externally charged electric range of 75 mi (121 km), and an internal combustion engine with the sole purpose of extending the range. They include certain plug-in hybrid vehicles (e.g., BMW i3 REX 94 Ah).	$C_{BEVx} = (0.01 \times R) + 0.50$ where R is the electric range of the motor vehicle in mi based on both the UDDS and CARB method of estimating range, and its minimum value is 75 mi (121 km). Maximum credits granted are 4.00 for new vehicles	BMW i3 REX 94 Ah 2018 has an electric-only range of 114 mi (183 km): $C_{i3\ REX\ 94\ Ah} = (0.01 \times 114) + 0.50 = 1.64 \text{ credits}$
Transitional zero emission vehicles or TZEV	Vehicles that produce low emissions during their operation. They include most plug-in hybrid electric vehicles (e.g., Chevrolet Volt, Mitsubishi Outlander PHEV, BMW 530e) and hydrogen combustion vehicles.	There are three range brackets for TZEV credit formulae: <ul style="list-style-type: none"> • $0 < R < 10 \text{ mi}$ $C_{TZEV} = 0$ • $16 < R < 80 \text{ mi}$ $C_{TZEV} = (0.01 \times R) + 0.3$ • $R > 80 \text{ mi}$ $C_{TZEV} = 1.10$ where R is the electric-only range of the motor vehicle in mi based on both the UDDS and CARB method of estimating range. An extra 0.2 credits are granted for vehicles with a minimum electric-only range of 10 mi that meet emission requirements specified by the U.S. Environmental Protection Agency	The Chevrolet Volt 2018 has an electric-only range of 53 mi: $C_{Volt} = (0.01 \times 53) + 0.30 = 0.83 \text{ plus } 0.2 \text{ credits assuming it complies with U.S. EPA requirements for a total of } 1.03 \text{ credits}$ McLaren P1 2015 has an electric-only range of 6.8 mi: $C_{P1} = 0$ receives no credits because the range is less than 10 mi

Vehicle Type	Definition	Credit formula	Example
Neighbourhood electric vehicles or NEV	Zero emission motor vehicles with maximum speeds below 25 mi per hour (40 km per hour), a 0 to 20 mi per hour (0 to 32 km per hour) acceleration in 6 seconds or less, and a minimum range of 25 mi (40 km). These include golf carts and neighbourhood electric vehicles (e.g., CanEV Might-E Truck)	New low-speed motor vehicles are granted 0.15 credits each: $C_{NEV} = 0.15$	CanEV Might-E Truck 2018 has a range of 56 mi: $C_{Might-E Truck} = 0.15$ credits

Transportation emission reduction activities³

California grants credits for four activities that are not related to the sale of compliant light duty vehicles. These include:

- Sale of ZEV and TZEV medium-duty vehicles:** Medium-duty vehicles that meet the definition of zero-emission vehicle or transitional zero emission vehicle generate credits using the same credit generating formulae for light duty ZEV and TZEV shown in Table 1 above.
- Advanced Technology Demonstration Programs:** Manufacturers can claim credits for up to 25 demonstration vehicles that are classified ZEV, BEVx, TZEV, or NEV. Demonstration vehicles are defined as vehicles that are not sold but used in deployment programs to evaluate early technologies on issues related to safety, infrastructure, fuel specifications, or public education.
- Transportation Systems:** Vehicles that were deployed between MY 2009 and 2017 in a shared intelligence or linkage to transit capacity received up to 6 credits in the previous iteration of this policy (ZEV mandate as specified in CCR Section 1962.1). Transportation systems credits can only be used to meet 10% or less of the requirements in the current iteration of the policy (CCR 1962.2).
- Federal vehicle emission over compliance:** Manufacturers that over comply with the U.S. national vehicle emission standard, as specified in the Code of Federal Regulations Title 40 Chapter i Part 600, by at least 2.0 gCO₂/mi (1.25 gCO₂/km) from model year 2018 to 2021 are eligible for the following amount of credits:

$$\frac{[(\text{Manufacturer U.S. passenger car and light duty truck sales}) \times (\text{gCO}_2/\text{mi below manufacturer GHG standard for a given model year})]}{(\text{Manufacturer GHG standard})}$$

³ Navius Research's own classification. California does not classify these activities as such.

for a given model year)

These credits are to be multiplied by a discounting factor for each of the four years as follows:

2018	2019	2020	2021
50%	50%	40%	30%

The sum of credits acquired in these four activities can be used to meet no more than 50% of a manufacturer's credit requirements in any given year.

2.2. Application to automakers

The policy differentiates between three sizes of automakers based on annual Californian sales. Size categories include small vehicle manufacturers (SVM), intermediate vehicle manufacturers (IVM), and large vehicle manufacturers (LVM), as defined below:

- **SVM** – manufacturers with average California sales **below 4,500** vehicles/yr
- **IVM** – manufacturers with average California sales **between 4,501 and 20,000** vehicles/yr
- **LVM** – manufacturers with average California sales **exceeding 20,001** vehicles/yr

Vehicle sales are calculated as the average of the three years preceding compliance years. These include the sales of passenger cars (e.g., compact cars, sedans, station wagons etc.) and light duty trucks (e.g., sport utility vehicles (SUV), class 2 pickup trucks, minivans etc.).

Example: if automaker X sold 17,000 model year (MY) 2015, 18,000 MY 2016, and 21,000 MY 2017 vehicles, then automaker X's average sales for model year 2018 is 18,667 vehicles for compliance purposes, which puts it in the intermediate vehicle manufacturer bucket.

In short, SVM's are not regulated, IVM's can have significant flexibility in which vehicle types they use to generate credits, while LVM's are more constrained. The next three sections describe how the policy applies to the three size buckets.

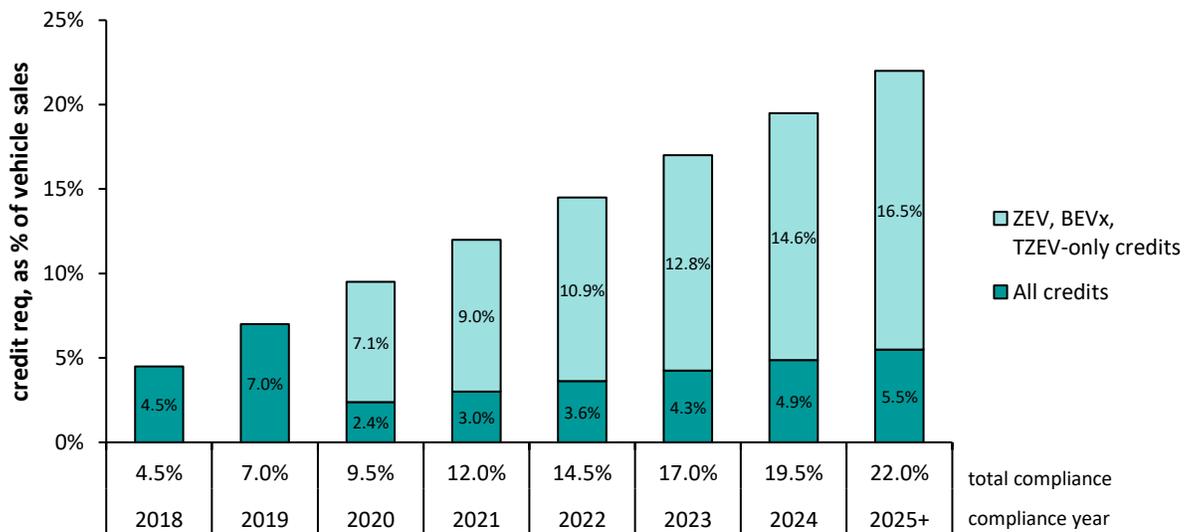
Small vehicle manufacturers requirements

Small vehicle manufacturers are exempt from the policy requirement. Any credits generated by SVM can be sold to IVM or LVM or banked for later use if the manufacturer anticipates moving into a larger size bracket.

Intermediate vehicle manufacturers requirements

Intermediate vehicle manufacturers are required to surrender an increasing amount of credits starting from MY 2018 going forward, as shown in Figure 3.

Figure 1: California IVM compliance requirements



* All credits include credits generated by ZEV, BEVx, TZEV, NEV, and discounted exceed credits from previous iterations of the policy.

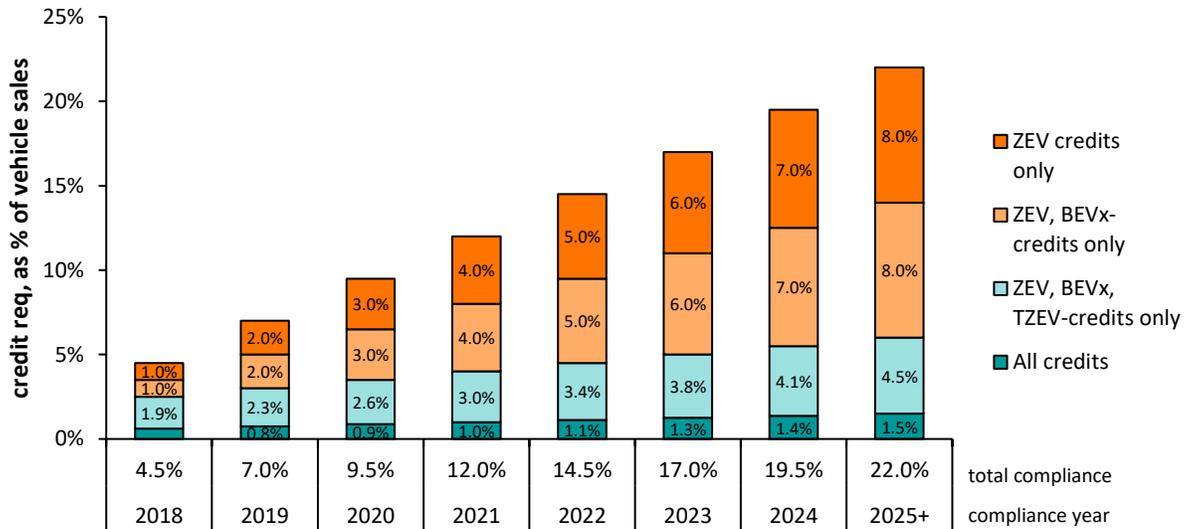
Starting in model year 2019, the policy restricts the number of credits that can be generated from the sale of NEV's and from discounted excess credit acquired in previous iterations of the policy.

Example: if automaker X sells an average of 15,000 vehicles per year for MY 2020-2022, then they are required to surrender 2,550 credits to comply in 2023. They can meet all of their requirement with credits generated from ZEV, BEVx, and TZEV, or up to 638 credits generated from NEV sales with the 1,912 remaining credits from ZEV, BEVx, and TZEV sales.

Large vehicle manufacturers requirements

Large vehicle manufacturers, like intermediate manufacturers, are required to surrender the same increasing amount of credits starting in MY 2018. However, they are more restricted by the type of credits they can use to comply with the requirement, as shown in Figure 4.

Figure 2: California LVM compliance requirements



* All credits include credits generated by ZEV, BEVx, TZEV, NEV, and discounted exceed credits from previous iterations of the policy; credits that can be met by all four categories for MY 2018 is 0.6%.

The policy requires that LVM produce most of their credits from the sale of ZEV, followed by the sale of BEVx and the remaining credits from the sale of TZEV, NEV, and from discounted excess credits acquired in previous iterations of the policy.

Example: if automaker X sells an average of 25,000 vehicles per year for MY 2018-2021, they are required to surrender 3,625 credits to comply in 2022. A minimum of 1,250 credits must be generated from the sale of ZEV (equivalent to 5% of total sales), with BEVx credits limited to a maximum of 2,375 credits (equivalent to 5% + 3.38% + 1.13% of total sales), TZEV credits to a maximum of 1,125 credits (equivalent to 3.38% + 1.13% of total sales) and NEV credits to a maximum of 281 credits (equivalent to 1.13% of total sales). Credits generated from the sale of ZEV can be used to meet the totality of the 3,625-credit requirement.

2.3. Other compliance requirements, monitoring, and enforcement⁴

The California policy devises multiple other requirements, monitoring provisions, and enforcement mechanisms, as summarized below:

- Automakers can replace their three-year sales average with sales in current compliance year (sales of MY 2018 vehicles for 2018 compliance instead of the average sales of MY 2015 to 2017 vehicles), if their sales dropped more than 30% in that year relative to the average of the three preceding years.

Example: if an LVM sold 50,000 MY 2015 to 2017 vehicles per year on average, and only sold 34,000 MY 2018 vehicles, then the manufacturer can base their minimum credit requirement on MY 2018 sales since 34,000 represents a drop of more than 30%.

- Automakers are re-classified into a different vehicle manufacturer size bracket if their average vehicle sales in the five years preceding compliance year are above or below their previous compliance year size bracket thresholds. IVM are not reclassified as LVM if their global revenues were below US\$40 billion in any of those five years.

Example: if an automaker X averaged sales of 20,500 vehicle/yr for MY 2017 to 2021, and its MY 2022 sales are above 20,000, and its global revenue exceeded US\$40 billion in each of those years, then it moves from the IVM to the LVM size bracket for compliance year 2022. Alternatively, if manufacturer Y averaged 19,000 vehicles/yr for MY 2019 to 2023 and its MY 2024 sales are below 20,000, and its sales did not drop by more than 30% in any of the years between 2019 and 2024, then manufacturer Y can be reclassified from LVM to IVM for compliance year 2024.

- Vehicle manufacturers can use discounted excess credits acquired in the previous iterations of the policy combined with NEV credits to satisfy up to 25% of the non-ZEV and BEVx requirements (i.e., 25% of all IVM credit requirements, 25% of all credits and ZEV, BEVx, TZEV-only credit requirements for LVM).
- IVM's who fail to surrender the required amount of credit in any given year can request up to three consecutive model years to make up a credit deficit if (i) they have sold ZEVs or TZEVs in the state, and (ii) they demonstrate a convincing plan to show how they intend to exceed credit requirement in these consecutive years.

⁴ Administrative compliance provisions could not be found in CCR Section 1962.2. Available here: https://www.arb.ca.gov/msprog/zevprog/zevregs/1962.2_Clean.pdf

Example: if manufacturer X is 150 credits short of compliance requirements in 2022 and was selling ZEVs and TZEVs in that year, it can request using MY 2023 to 2025 to meet the deficit if it can demonstrate that it will produce 150 excess credits during that period.

2.4. Penal provisions⁵

The California Air Resources Board has the authority to penalize manufacturers that fail to comply with the credit requirement up to \$5,000 per credit as per California's Health and Safety Code, Section 43211 (b).

Example: if automaker X is required to submit 3,500 credits in 2022 but only submits 3,250 credits, then automaker X is required to pay the California government up to $(3,500 - 3,250) \times \$5,000 = \$1,250,000$ for failing to comply.

⁵ Penalties for failing to meet administrative compliance requirements are not

3. Québec ZEV mandate

The Québec ZEV mandate was passed into law in October 2016 by the province's 41st legislation⁶. Automakers selling over 4,500 vehicles/yr in Québec were required to meet their first zero-emission vehicle credit quota in 2018. Battery electric vehicles, plug-in hybrid vehicles, hydrogen fuel cell vehicles, hydrogen combustion vehicles, and low-speed ZEV all generate varying credit values that can be surrendered to comply with the policy. The regulation shares much in common with the California ZEV mandate, on which it is based. Differences between the two policies are discussed in section 4.

The next four subsections will discuss:

- The credit generating mechanisms
- The policy's application to automakers
- Compliance and reporting requirements
- Penal provisions

3.1. Credit-generating mechanisms

Only compliant vehicles generate credits in the Québec policy. The regulation defines four complying vehicles types that each generate varying amounts of credits, as shown in Table 2. The four vehicle types are:

- **Zero-emission vehicles or ZEV** – vehicles that do not produce emissions during their operation. They include battery electric vehicles and hydrogen fuel cell vehicles.
- **Vehicle with range extender or VRE** – vehicles that have a minimum externally charged electric range of 121 km, and an internal combustion engine with the sole purpose of extending vehicle range. They include certain plug-in hybrid vehicles.
- **Low-emission vehicles or LEV** – vehicles that produce low emissions during their operation. They include most plug-in hybrid electric vehicles and hydrogen combustion vehicles.

⁶ Quebec Government. 2016. *Bill n°104 : An Act to increase the number of zero-emission motor vehicles in Québec in order to reduce greenhouse gas and other pollutant emissions*. Available from: <http://www.assnat.qc.ca/en/travaux-parlementaires/projets-loi/projet-loi-104-41-1.html>

- **Low-speed motor vehicles or LSV** – three or more-wheeled zero emission motor vehicles that reach a maximum speed between 32 and 40 km per hour in less than 1.6 km of distance and with a minimum driving range of 40 km. These include low-speed electric auto rickshaws, electric golf carts, and neighbourhood electric vehicles.

More details on these vehicles are provided in the table below.

Table 2: Credit-generating vehicle types

Vehicle Type	Definition	Credit formula	Example
Zero-emission vehicles or ZEV	Vehicles that do not produce emissions during their operation. They include battery electric vehicles (e.g., Tesla Model 3, Nissan Leaf, BMW i3 BEV) and hydrogen fuel cell vehicles (e.g., Toyota Mirai, Honda Clarity HFCV, Hyundai Tucson FCV).	$C_{ZEV} = (0.01 \times R \times 0.6214) + 0.50$ where R is the electric range of the vehicle in km based on both the UDDS and CARB method of estimating range. Maximum credits granted are 4.00 for new vehicles. A vehicle with a range less than 80.47 km does not qualify for credits.	Nissan Leaf 2018 has a range of 243 km: $C_{Leaf} = (0.01 \times 243 \times 0.6214) + 0.50 = 2.01 \text{ credits}$ Tesla Model S 2018 has a range of 539 km: $C_{Model\ S} = (0.01 \times 539 \times 0.6214) + 0.50 = 3.85 \text{ credits}$
Vehicles with range extender or VRE	Vehicles that have a minimum externally charged electric range of 121 km, and an internal combustion engine with the sole purpose of extending the range. They include certain plug-in hybrid vehicles (e.g., BMW i3 REx 94 Ah).	$C_{VRE} = (0.01 \times R \times 0.6214) + 0.50$ where R is the electric range of the motor vehicle in km based on both the UDDS and CARB method of estimating range, and its minimum value is 121 km. Maximum credits granted are 4.00 for new vehicles	BMW i3 REx 94 Ah 2018 has an electric-only range of 183 km: $C_{i3\ REx\ 94\ Ah} = (0.01 \times 183 \times 0.6214) + 0.50 = 1.64 \text{ credits}$
Low-emission vehicles or LEV	Vehicles that produce low emissions during their operation. They include most plug-in hybrid electric vehicles (e.g., Chevrolet Volt, Mitsubishi Outlander PHEV, BMW 530e) and hydrogen combustion vehicles.	LEV credit formulae vary with electric-only range R given to new vehicles as follows: <ul style="list-style-type: none"> • $0 < R < 16$ km $C_{LEV} = 0$ • $16 < R < 129$ km $C_{LEV} = (0.01 \times R \times 0.6214) + 0.3$ • $R > 129$ km $C_{LEV} = 1.10$ where R is the electric-only range of the motor vehicle in km based on	BMW i3 REx 60 Ah 2018 has an electric-only range of 118 km: $C_{Volt} = (0.01 \times 85 \times 0.6214) + 0.30 = 0.83 \text{ plus } 0.2 \text{ credits assuming it complies with U.S. EPA requirements for a total of } 1.03 \text{ credits}$ McLaren P1 2015 has an electric-only range of 11 km: $C_{P1} = 0 \text{ receives no credits because the}$

Vehicle Type	Definition	Credit formula	Example
		both the UDDS and CARB method of estimating range. An extra 0.2 credits are granted for vehicles with a minimum electric-only range of 16 km that meet emission requirements specified by the U.S. Environmental Protection Agency ⁷	<i>range is less than 16 km</i>
Low-speed motor vehicles or LSV	Three- or more wheeled zero emission motor vehicles that reaches a maximum speed between 32 and 40 km per hour in less than 1.6 km of distance and with a minimum driving range of 40 km. These include low-speed electric auto rickshaw, electric golf carts, and neighbourhood electric vehicles (e.g., CanEV Might-E Truck).	New low-speed motor vehicles are granted 0.15 credits each: $C_{LSV} = 0.15$	CanEV Might-E Truck 2018 has a range of 90 km: $C_{Might-E Truck} = 0.15$ credits

The Québec version also grants some credits to “reconditioned” vehicles, defined as conventional vehicles with less than 40,000 km mileage that are retrofitted into one of the four types of complying vehicles.

3.2. Application on automakers

The policy differentiates between three sizes of automakers, small vehicle manufacturers (SVM), intermediate vehicle manufacturers (IVM), and large vehicle manufacturers (LVM), as defined below:

- **SVM** – manufacturers with average Québec sales **below 4,500** vehicles
- **IVM** – manufacturers with average Québec sales **between 4,501 and 20,000** vehicles
- **LVM** – manufacturers with average Québec sales **exceeding 20,001** vehicles

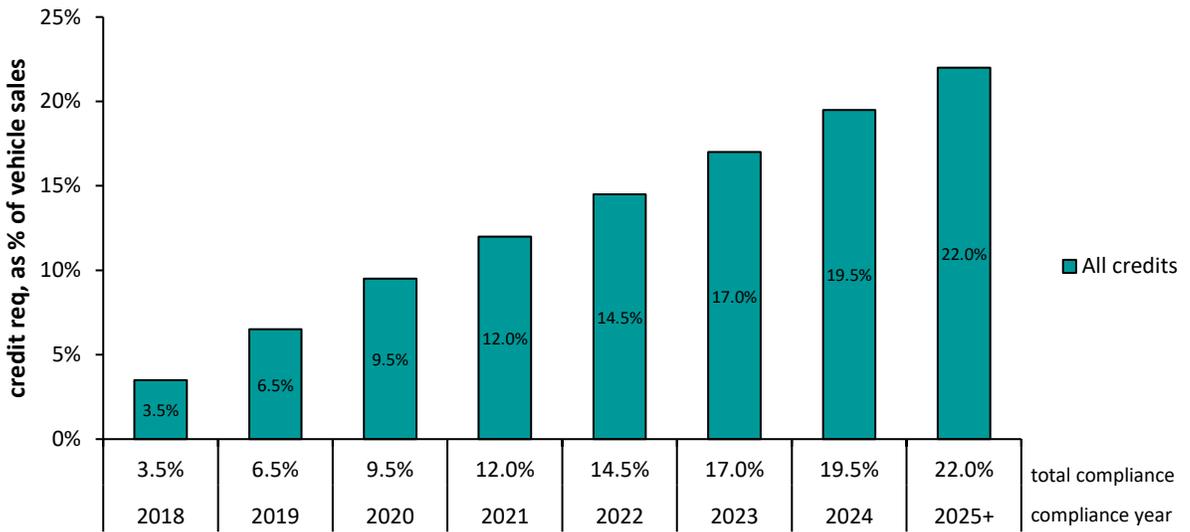
Vehicle sales calculated as the average of the three years preceding compliance years. These include the sales of any vehicles with gross vehicle weight rating less than

⁷ We think this might be a clause to encourage the sale of vehicles that are already being sold in the United States. This can only be confirmed with input from the Quebec government.

4,500 kg and that can carry up to nine persons (i.e. light-duty vehicles for personal transportation).

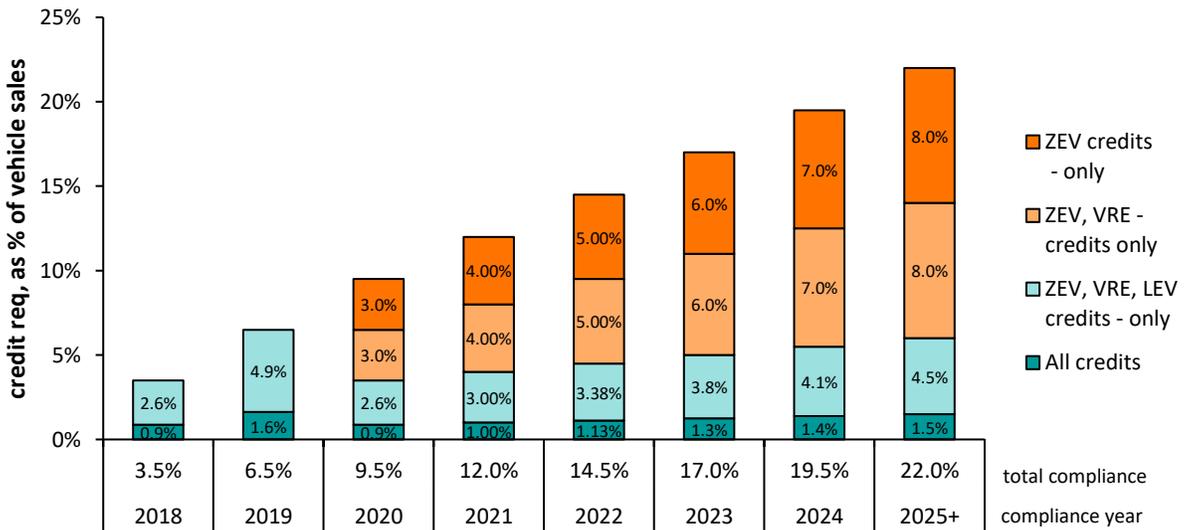
The application of the policy to the three size categories is much the same as in California: SVM's are not regulated, IVM's can use any of the allowed vehicle types to comply (Figure 3), and LVM's credit selection is more constrained; most LVM credits must come from the sale of ZEVs and VRE's (known as BEVx in the California policy) (Figure 4).

Figure 3: Québec IVM compliance requirements



* All credits include credits generated by ZEV, VRE, LEV, and LSV.

Figure 4: Québec LVM compliance requirements



* All credits include credits generated by ZEV, VRE, LEV, and LSV.

3.3. Other compliance requirements, monitoring, and enforcement

There are multiple other requirements, monitoring provisions, and enforcement mechanisms, as summarized below:

- Credits generated from the sale of “reconditioned” vehicles cannot exceed 30% of credits required for any given category⁸.
- Credits can be generated from “early action”. Complying vehicles sold in model years 2014, 2015, 2016, or 2017 can be used to meet up to 35% of 2018 to 2021 requirements and up to 25% of requirements in 2021 and thereafter.
- Automakers can replace their three-year sales average with sales in current compliance year (sales of MY 2018 vehicles for 2018 compliance instead of the average sales of MY 2015 to 2017 vehicles), if their sales dropped more than 30% in that year relative to the average of the three preceding years.
- Manufacturers can indefinitely use excess credit acquired in previous years to meet up to 25% of their current compliance year (i.e. credits from overcompliance do not expire).
- Vehicle manufacturers must inform the government of any credit purchases they make with details such as credit type (e.g., ZEV or LEV), price, date of purchase etc.
- Vehicle manufacturers must submit their compliance reports no later than September 1st of the next year (e.g., September 2019 for MY 2018 compliance). The Ministry is then required to inform the manufacturer on compliance requirements within 3 months of report submission, after which the manufacturer is given a 15-day period to comment.
- The government of Québec is required to issue a list of all eligible vehicles for compliance⁹ by May 1st following compliance year (e.g., May 2019 for MY 2018 compliance).
- The Ministry has the authority to investigate manufacturer if it suspects wrongdoing by granting a certificate of authority to an investigator.

⁸ Our interpretation of the policy. It is possible that the 30% limit applies to the sum of all vehicle types, in which case, “reconditioned” vehicles can exceed the 30% of a specific vehicle category. We can only confirm with Quebec government input.

⁹ List of vehicles eligible for MY 2018 compliance is provided here:
http://www.environnement.gouv.qc.ca/changementsclimatiques/vze/ListeVZE_admissibles.pdf

- The Ministry is required to release a compliance report on ZEV standard compliance by January 11th, 2021, and every 4 years thereafter.
- Manufacturers are required to maintain supporting documents that they have used for compliance reporting for up to 8 years.

3.4. Penal provisions

The zero-emission vehicle act and regulations grant Québec's Ministry of Environment the authority to penalize manufacturers for failing to comply with the regulation requirements and for failing to comply with administrative requirements, as shown below:

- Failure to comply with regulation's credit requirements: a charge of \$5,000 is applied to each credit short of compliance.
- Failure to comply with administrative requirements such as compliance report submission, failure to produce supporting documents within 8 years, or negligence to inform the Ministry of credit transfer can lead to charges from \$1,000 up to \$100,000 for a natural person, and \$3,000 to \$600,000 for companies.
- Natural persons can be fined from \$2,500 to \$250,000 for misleading or making false declarations to the Ministry, while companies can be fined from \$7,500 up to \$1,500,000.
- The Ministry holds the right to double the fine if the offense is repeated a second time and triple it if the fine is repeated three times or more.

4. Policy comparisons

The Québec policy is almost identical to the Californian version of the policy. Both policies place heavy emphasis on compliance with longer range ZEVs (i.e. not shorter-range PHEVs). Despite the similarities, it is difficult to say that the policies have the same stringency for a few reasons. Of note, Québec's policy applies the same definitions for vehicle manufacturer size, even though its auto market is a fifth the size of California's. In other words, more automakers would qualify as SVM's and IVM's in Québec. On the other hand, California's policy has some added flexibility with manufacturers' ability for cross-jurisdictional credit trade with the 10 other states that have adopted California's policy.

Other variations between the two policies can generally be explained by the different contexts under which they are implemented: California has had the policy for over 15 years, while Québec has just introduced it. Québec could also be mimicking the California policy for ease of compliance. We list the following major differences between the policies:

- While the names of complying vehicles differ, their definitions are almost identical. Zero-emission vehicles are called as such in both policies. California's battery electric vehicle with extended range (BEVx) becomes "motor vehicle with extended range (VRE)" in Québec. Transitional zero-emission vehicles are called low-emission vehicles (LEV) in Québec. Finally, neighbourhood electric vehicles do not only have a different name under the Québec policy, but also differ in their definition: in Québec low-speed vehicles, as they are called, specifically include three-wheeled vehicles (they must reach a maximum speed of 32 to 40 km per hour within 1.6 km)
- The Québec policy grants credits for "reconditioned" vehicles, with a maximum mileage of 40,000 km, i.e., those that are retrofitted with zero- or low-emission vehicle technologies.
- Québec does not grant credits for transportation emission reduction activities, as is the case with California
- California limits the amount of NEV-derived credits that intermediate vehicle manufacturers can use to meet their requirements, whereas that same type of credit (LSV credits) can meet up to 100% of Québec's IVM requirements
- The credit requirements differ from 2018 to 2020, after which they align almost perfectly. Québec's policy is more lenient during the first two years of introduction (3.5% and 6.5% in Québec versus 4.5% and 7% in California, in 2018 and 2019, respectively).

- The compliance credit constraints on LVM begin in 2020 under the Québec version of the policy, compared to 2018 in California.
- Québec allows manufacturers to indefinitely bank their credits for future use (it does limit the use of such credits to 25% of total compliance every year). We could not find any information on manufacturer's ability to bank credits generated after MY 2018 in California.
- Manufacturers are re-classified based on their average sales in the previous three consecutive years in Québec as opposed to the previous five consecutive years in California. Furthermore, California features a minimum global revenue of US\$40 billion-dollar requirement for an IVM to become an LVM even if the manufacturer exceeded the 20,000-vehicle sales threshold for the five consecutive-year period.
- California explicitly considers the sale of passenger cars and light duty trucks when calculating sales, while Québec considers the sale of vehicles with gross-weight below 4,500 kg. However, these are effectively the same thing. The California policy also grants credits for the sale of electric medium duty vehicles (e.g. these could be more than 4,500kg)
- California provides a flexibility mechanism that is not available in Québec for IVM's that fall short of compliance. The state's regulation lets manufacturers meet credits within three consecutive years of non-compliance if they can demonstrate how they plan to generate the excess credit required to close the deficit.