Canada's ZEV Policy Handbook: Research Brief

Summary

Achieving Canada's long-term greenhouse gas (GHG) reduction targets likely requires widespread adoption of zero-emission vehicles (ZEVs). While some ZEVs are already available in Canada, strong policies are needed to induce a substantial transition to low-carbon mobility. Consequently, various levels of government in Canada have begun implementing policies to support ZEV adoption.

The purpose of the ZEV Policy Handbook[1] is to help stakeholders understand what ZEV policies are available, and to evaluate these policies according to several criteria in light GHG reduction targets.

Specifically, the Handbook:

- Identifies policy options to support ZEV adoption in Canada
- Evaluates policies against five criteria
- Demonstrates effective policy packages that could achieve a 2040 ZEV sales target of 40% of new vehicles, consistent with Canada's GHG reduction targets

What are zero-emission vehicles?

ZEVs are vehicles with a propulsion system that can operate without producing GHG emissions or other air pollutants at the tailpipe. They include:

- Battery Electric Vehicles – BEVs run solely on electricity
- Plug-in Hybrid Vehicles – PHEVs run primarily on electricity but are equipped with an internal combustion engine for range extension
- Hydrogen Fuel Cell Vehicles – HFCVs are powered by hydrogen fuel

What policies are available to increase ZEV adoption?

A range of policies are available to encourage or require the adoption of ZEVs, as shown in Table 1. Demand-focused policies encourage consumers to purchase ZEVs, whereas supply-focused policies encourage or require suppliers such as automakers to make ZEVs available to consumers.

Table 1: Key ZEV-supportive policies

Policy	Description
Demand-focused	
Financial incentives	Reduce ZEV and infrastructure costs through subsidies, rebates, waived user fees or tax exemptions
HOV lane access	Unrestricted access to high-occupancy vehicle (HOV) lanes
Public charging	Provide access to charging away from home
Building codes	Require charging access in new buildings
Carbon pricing	Increase price of fuels that generate carbon emissions through carbon tax or cap-and-trade
Supply-focused	
ZEV mandate	Require automakers to sell a minimum share of ZEVs
Vehicle emission standard (VES)	Specify a required maximum level of tailpipe emissions for light-duty vehicles (LDV)
Clean fuel standard	Require fuel suppliers to reduce the carbon intensity of the fuels they sell with credits for alternative fuels consumption including electricity and hydrogen

[1] *Canada's ZEV Policy Handbook* is available through START's website at https://sustainabletransport.ca

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The Handbook reviews these policies as they are currently implemented in Canada, and also according to a more stringent specification. Each policy is evaluated against five criteria:

- Effectiveness: How does a given policy impact ZEV new market share in 2040?
- Cost-effectiveness: What is the direct government expenditure for each ZEV adopted?
- Public support: Is there public support for this policy?
- Simplicity: How straightforward is the policy to implement and administer?
- Transformational signal: Does the policy provide a durable signal to stimulate investment in ZEVs now and in the decades to come?

What policy packages could achieve a 40% ZEV sales target?

There are multiple policy pathways that can be effective in the long-term, as demonstrated among regions that lead global ZEV sales, notably Norway and California. We characterize three policy packages that policymakers could implement to achieve the levels of ZEV uptake needed to achieve Canada's longer-term climate targets (i.e., 40% of ZEV sales by 2040):

- a demand-focused policy package that includes national long-term incentives of $6,000 per ZEV for 20 years;
- a supply-focused package centred on a national ZEV mandate of 40% by 2040; and
- a supply-focused package with a strengthened national vehicle emission standard.

All three packages also include increased public charging deployment and electric vehicle-friendly building codes adopted in all provinces.

What does the evaluation tell us?

The ZEV Policy Handbook identifies the following key policy insights for Canada:

1. Current policies are unlikely to encourage sufficient ZEV adoption to achieve Canada's climate mitigation targets.
2. Only three types of strong, national policies are likely to have a large impact on ZEV sales, while being reasonably acceptable to the public: financial incentives ($6,000 per ZEV for 20 years), a ZEV mandate (requiring 40% ZEVs by 2040), or a vehicle emissions standard (decreasing fleet emissions to 71 gCO_2e per km by 2040).
3. Strong financial incentives are simple to implement but come at a high (direct) cost to government. This cost may cause some public opposition in the long-term.
4. A strong ZEV mandate provides the highest certainty of effectiveness and a strong transformational signal at little (direct) cost to government. However, it is complex to administer and may be opposed by some incumbent automakers.
5. A strong vehicle emission standard is likely simpler to implement than a ZEV mandate because it builds on existing policy. However, the impact on ZEV market share is uncertain due to the variety of compliance options available to automakers.

The full report provides more details about this research and is available from the START website at https://sustainabletransport.ca. For questions about this research, please contact Dr. Jonn Axsen at jaxsen@sfu.ca.

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