Reports of the Commissioner of the Environment and Sustainable Development to the Parliament of Canada

The Zero Emission Vehicle Infrastructure Program— Natural Resources Canada

Report 8



Independent Auditor's Report | 2023



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At a Glance

Overall message

The federal government has called for all new vehicles sold in Canada to be zero-emission vehicles by 2035, making reliable electric vehicle charging across the country a necessity. Natural Resources Canada is responsible for delivering the Zero Emission Vehicle Infrastructure Program, which funds the deployment of electric vehicle charging infrastructure in Canada. The private sector and other levels of government also have important roles to play.

Overall, Natural Resources Canada has increased the number of charging ports for electric vehicles and is on track for meeting its target of installing 33,500 charging ports by 2026. However, we found flaws in the program's design. Important aspects were missing from the department's approach—specifically, the department did not collect and use data to identify gaps and to determine charging locations based on the needs of communities. It also did not establish targets for underserved areas or prioritize locations that are unlikely to be addressed by other organizations, such as other levels of government or the private sector. Many areas of the country still lacked access to public charging stations, and we found that there were limited plans for how or when underserved areas, including rural, remote, and Indigenous communities and lower-income areas, would have access to charging stations.

The program design is meant to promote investments in charging infrastructure and did not factor in measures that would ensure the continued reliability of charging ports beyond being operational at the time of installation. The location of and access to charging stations with operational ports directly affects whether Canadians have the confidence to buy electric vehicles.

A large gap remains between the current number of charging ports and those needed by 2035. Natural Resources Canada is not solely responsible for funding all charging ports, but it needs to coordinate and collaborate with partners, such as provinces, territories, utility companies, municipalities, and the private sector. Together, they need to strategically address the gap in charging infrastructure by leveraging investments and deciding where to locate charging stations to best meet the needs of Canadians.

Key facts and findings



- In Canada's 2030 Emissions Reduction Plan: Clean Air, Strong Economy, the Government of Canada outlined a mandatory 100% zero-emission vehicle sales target by 2035 for all new light-duty vehicles.
- In Canada, 51% of the emissions from the transportation sector come from light-duty vehicles. The transportation sector as a whole accounted for approximately 22% of greenhouse gas emissions in 2021.
- As of July 2023, 33,887 electric vehicle charging ports had been funded and were either completed or under development. The department was positioned to meet the program's 33,500-port target.
- Based on the program's funding agreements, 87% of the funded charging ports were in Ontario, British Columbia, and Quebec, and 13% were in the other provinces, the Northwest Territories, and Yukon.
- The program also included a shared target between Natural Resources Canada and the Canada Infrastructure Bank for an additional 50,000 charging ports to be installed by March 2029.

See Recommendations and Responses at the end of this report.

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Introduction

Background

Zero Emission Vehicle Infrastructure Program

- In 2021, the Government of Canada committed to reducing 8.1 greenhouse gas emissions by 40% to 45% below 2005 levels by 2030. The transportation sector as a whole accounted for approximately 22% of Canada's greenhouse gas emissions in 2021. Just over half of the emissions from the transportation sector in 2021 (51%) came from light-duty vehicles—passenger cars and trucks (Exhibit 8.1). Electrifying Canada's vehicles is key to reducing emissions from the transportation sector. A multifaceted approach is needed to meet Canada's climate change targets, such as shifting to new or improved technologies and transitioning away from vehicles to other modes of transportation, such as walking, cycling, and public transit.
- The 2015 United Nations Climate Change Conference in Paris 8.2 led to Canada and 194 parties adopting the Paris Agreement, a key international commitment to reducing greenhouse gas emissions. The Government of Canada committed to a mandatory 100% zero-emission vehicle sales target by 2035 for all new light-duty vehicles. According to the Government of Canada's definition, a zero-emission vehicle must have the potential to operate without producing tailpipe emissions. Canada's 2030 Emissions Reduction Plan: Clean Air, Strong Economy outlines the annually increasing requirements toward the 100% target, including that at least 20% of vehicle sales be zero-emission vehicles by 2026 and at least 60% by 2030.
- Canada's Action Plan for Clean On-Road Transportation points to challenges in meeting these ambitious targets. One of these challenges is the need to install more charging infrastructure so Canadians have confidence that they will have sufficient access to charging ports where and when needed during their travels.

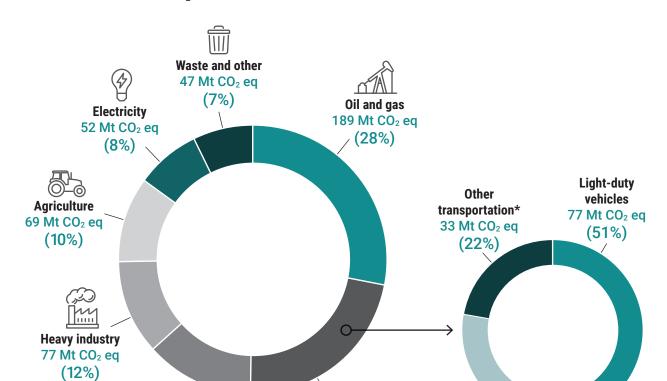


Exhibit 8.1—Greenhouse gas emissions from the transportation sector (in megatonnes of carbon dioxide equivalent, Mt CO₂ eq, rounded) compared with other sectors in Canada in 2021

Transportation

150 Mt CO₂ eq

(22%)

To this effect, in 2016, Natural Resources Canada implemented the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative. The initiative's objective was to invest in green infrastructure by funding electric vehicle fast charging stations along core routes and highways to help Canadians feel more confident in transitioning to zero-emission vehicles. Budget 2016 and Budget 2017 provided a total of \$88.5 million over 6 years to establish a coast-to-coast network along core routes and highways. In March 2022, the department stopped accepting project applications to the initiative. The projects have until March 2024 to be completed. To complement this initiative, in 2019, the department launched the Zero Emission Vehicle Infrastructure Program, which aims to install electric vehicle charging infrastructure where Canadians live, work, and play. By supporting the transition to zero-emission vehicles, the program enables the reduction of greenhouse gases.

Heavy-duty vehicles

40 Mt CO₂ eq

(27%)

Buildings

87 Mt CO₂ eq

(13%)

^{*} Other transportation includes domestic aviation, domestic navigation, railways, propane and natural gas vehicles, and off-road vehicles. Source: Data from National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada, Environment and Climate Change Canada, 2023

- 8.5 All charging infrastructure projects funded by the program are to be completed by 31 March 2029. The program delivers funding to install electric vehicle charging stations and hydrogen refuelling stations at the following types of parking locations:
 - public places—can be publicly or privately owned and can include street parking, parking areas at service stations (including along highways), retail, restaurants, arenas, libraries, and medical offices
 - workplaces—intended for all employees during work hours and may be open to the public outside of working hours
 - parking locations for on-road vehicle fleets—composed of parking spaces for multiple light-, medium-, or heavy-duty vehicles that are managed by common ownership or leased by an organization and used in support of operations and activities
 - multi-unit residential buildings—a multi-dwelling building with a common entrance and a minimum of 3 storeys above ground or a footprint greater than 600 square metres
- 8.6 The funding for charging infrastructure projects under the program is delivered through cost-sharing contribution agreements with funding recipients. For projects that meet technology eligibility requirements, the program can fund up to 50% of the total cost of a project and up to a maximum of \$10 million per project. For Indigenous-led projects, the program can fund up to 75% of the total cost of a project to a maximum of \$2 million per project. Natural Resources Canada also uses third-party delivery organizations to further distribute program funds for smaller projects that include fewer than 20 charging ports or a value of less than \$100,000. For third-party delivery organizations, the program's contribution can be up to 50% of a project cost.
- 8.7 Since 2019, Natural Resources Canada has completed 5 requests for proposals for project submissions. Two more requests for proposals were launched in 2022; the terms of the contribution agreements with many recipients were under negotiation at the time of our audit. In 2023, the department also launched 2 continuous application intake processes for project submissions for third-party delivery organizations and for Indigenous-led organizations.

Roles and responsibilities

8.8 Natural Resources Canada delivers programs to assist Canadians and businesses with transitioning to zero-emission vehicles. The department is responsible for administering programs and initiatives that fund charging infrastructure. The Transportation and Fuels Decarbonization Programs Branch administers the Zero Emission Vehicle Infrastructure Program.

Definitions

- 8.9 In the report, we define key terms as follows:
 - Charging station—Equipment or a device that supplies electricity to charge an electric vehicle. A charging station can have multiple charging ports.
 - Charging port—An outlet used to charge a vehicle. One charging port provides power to charge 1 vehicle at a time.
 - Zero-emission vehicle—Vehicles that can operate without producing tailpipe emissions and include battery electric, plug-in hybrid electric, and hydrogen fuel cell electric vehicles.

The charging stations funded and installed under the Zero Emission Vehicle Infrastructure Program have either level 2 or level 3 (fast charging) ports. The different types of charging stations have distinct features and purposes (Exhibit 8.2).

Exhibit 8.2—Charging stations funded and installed under the Zero Emission Vehicle Infrastructure Program have level 2 and level 3 ports

	Alternating current (AC) provides electricity to a vehicle via level 1 and level 2 charging ports Direct current (DC) charging ports provide electricity to a vehicle		
	Level 1	Level 2	at a fast rate Level 3 or direct current fast charger
Input voltage and current	120 volt AC 12 to 16 amperes	208 to 240 volt AC 15 to 80 amperes	480 to 920 volt DC 40 to 500 amperes
Charge power	1.4 to 1.9 kilowatts	3.1 to 19.2 kilowatts	20 to 350 kilowatts
Time to charge*	8 to 30 hours	4 to 10 hours	10 to 30 minutes
Typical uses	Home charging	Charging at businesses, multi-unit residential buildings, and public spaces	Charging at dedicated stations, in public spaces, in commercial fleet areas, and along highways
		Zero Emission Vehicle I	nfrastructure Program

^{*} The times shown are estimates and assume an 80% charging level. Time to charge depends on variables such as vehicle, battery, charging port, temperatures, and tire pressure.

Source: Data from Natural Resources Canada

Funding

8.10 Natural Resources Canada received funding for the deployment of electric vehicle charging stations in 2019, 2020, and 2022 for the Zero Emission Vehicle Infrastructure Program (Exhibit 8.3). Deployment includes activities in support of the initial capital investment, such as analysis, construction, equipment purchase, installation, and connection.

Exhibit 8.3—Zero Emission Vehicle Infrastructure Program funding

Funding announcement	Amount of funding	Electric vehicle target	Timeline
Budget 2019	\$130 million	20,000 charging ports	All charging ports and hydrogen refuelling stations installed by 31 March 2026
Fall Economic Statement 2020	\$150 million	13,500 additional charging ports	All charging ports and hydrogen refuelling stations installed by 31 March 2026
Budget 2022	\$400 million	50,000 additional charging ports shared with the Canada Infrastructure Bank	All charging ports and hydrogen refuelling stations installed by 31 March 2029

Source: 2021–22 and 2022–23 departmental plans, Natural Resources Canada; Achieving a Sustainable Future: Federal Sustainable Development Strategy 2022 to 2026; and the Zero Emission Vehicle Infrastructure Program website

> 8.11 In Canada's 2030 Emissions Reduction Plan: Clean Air, Strong Economy and in Budget 2022, the federal government committed to contributing funding to deploy 50,000 new zero-emission vehicle charging ports and hydrogen refuelling stations. The target of deploying 50,000 additional charging ports and hydrogen refuelling stations is shared between the Zero Emission Vehicle Infrastructure Program and the Canada Infrastructure Bank, which was directed in the 2030 plan to commit \$500 million from existing funds toward achieving this target. The Canada Infrastructure Bank's Charging and Hydrogen Refuelling Infrastructure Initiative aims to accelerate the private sector's rollout of revenue-generating and large-scale electric vehicle charging stations and hydrogen refuelling stations that are in the public interest. The total combined funding for the program and the Canada Infrastructure Bank's initiative is \$1.2 billion.

Zero-emission vehicle sales

> 8.12 In recent years, the sales of electric vehicles in Canada have grown rapidly. While electric vehicles represented only 2.9% (56,165) of all new light-duty vehicle sales in 2019, this number grew to 5.2% (86,032) in 2021 and 8.2% (123,562) in 2022. British Columbia, Quebec,

and Ontario are the 3 largest provinces by population and were the 3 provinces with the largest fleet of zero-emission vehicles on the road in 2021 (Exhibit 8.4).

Zero-emission vehicle **Populations in Canada** fleet size in Canada Other provinces **British Columbia** and territories 12,114 5.4 million (5%)(14%)Ontario Ontario 14.9 million Quebec -60,325 (39%)8.6 million (24%)Ouebec 110,574 (22%)(45%)**British Columbia** Other provinces and territories 9.5 million 65,568 (25%)

Exhibit 8.4—Zero-emission vehicle fleet size and populations in Canada in 2021

Note: Data for British Columbia includes the Northwest Territories, Nunavut, and Yukon, which have very low levels of electric vehicle sales. Sources: Data from Statistics Canada and Transport Canada

Focus of the audit

(26%)

- This audit focused on whether Natural Resources Canada 8.13 designed and implemented the Zero Emission Vehicle Infrastructure Program to support the funding and installation of accessible and reliable electric vehicle charging infrastructure for light-duty vehicles throughout Canada.
- 8.14 This audit is important because increasing the use of zero-emission vehicles will help Canada to achieve its climate change targets. However, a key barrier to more Canadians switching to zero-emission vehicles has been not having enough access to charging stations throughout the country.
- The Zero Emission Vehicle Infrastructure Program contributes to the United Nations' Sustainable Development Goal 9 (Industry, Innovation and Infrastructure) and Goal 13 (Climate Action). The program also contributes to the 2022–2026 Federal Sustainable Development Strategy's Goal 9 ("foster innovation and green infrastructure in

Canada") and Goal 13 ("take action on climate change and its impacts"). Zero-emission vehicles in the federal administrative fleet are the subject of the Commissioner of the Environment and Sustainable Development's 2023 report on departmental progress in implementing sustainable development strategies.

8.16 More details about the audit objective, scope, approach, and criteria are in **About the Audit** at the end of this report.

Findings and Recommendations

Natural Resources Canada achieved progress by increasing charging infrastructure

Why this finding matters

8.17 This finding matters because increasing the availability of and access to charging infrastructure across Canada is important so that drivers can charge their electric vehicles regardless of route and destination.

Context

8.18 In order to inform the Zero Emission Vehicle Infrastructure Program and future program developments, Natural Resources Canada commissioned a study to estimate Canada's overall charging infrastructure needs to support the country's electric vehicle fleet size at 5-year intervals, from 2025 to 2050. This estimate was based on the Government of Canada's target to have 100% of new light-duty vehicle sales be zero-emission vehicles by 2035. The result of the study was released in the 2022 report that Dunsky Energy + Climate Advisors submitted to Natural Resources Canada—Canada's Public Charging Infrastructure Needs: Updated Projections. It included 2 scenarios reflecting the difference in public charging needs and that were based on the extent to which Canadians have access to charging in multi-unit residential buildings throughout Canada. In the high access to home charging scenario, where, by 2030, multi-unit residential buildings offer access to 1,302,000 electric vehicle charging ports, the study estimated that there will need to be 195,000 public charging ports to meet the projected demand. However, in the low access to home charging scenario, where multi-unit residential buildings offer access to 152,000 electric vehicle charging ports, the study concluded that there will need to be 201,000 public charging ports.

8.19 In either scenario, although the charging ports can be funded and installed both by the private and public sectors, there is a large gap between the needed numbers of public electric vehicle charging ports by 2030 and the 33,500 ports to be funded by the program and the additional 50,000 ports to be funded by the program and the Canada Infrastructure Bank. It is acknowledged that the private sector and provinces have also started to provide charging infrastructure. At the time of this audit, there were over 21,000 public charging ports in operation throughout Canada. If the number of charging ports does not keep pace with the zero-emission vehicle sales targets, there is a risk that these targets will be unachievable.

On track toward the target of 33,500 electric vehicle charging ports

Findings



Build resilient infrastructure, promote sustainable industrialization and foster innovation

Source: United Nations



Take urgent action to combat climate change and its impacts

Source: United Nations

- 8.20 Between June 2019 and July 2023, Natural Resources Canada held 9 requests for proposals for funding under the Zero Emission Vehicle Infrastructure Program. We found that between June 2019 and July 2023, Natural Resources Canada had signed contribution agreements for 353 projects for funding through the first 6 requests for proposals. This represented a total of 33,887 funded charging ports: 31,582 (93%) were level 2 charging ports and 2,305 (7%) were level 3 direct current fast charging ports. The 353 funded projects were at different stages of completion:
 - There were 110 (31%) projects that were fully completed with a total of 4,283 electric vehicle charging ports in operation.
 - There were 243 (69%) projects that were either partially completed or in progress, representing a total of 29,604 electric vehicle charging ports. Of these, 2,371 were in operation, and the remaining 27,233 were scheduled to be completed gradually by March 2026 within their specific timelines in accordance with their signed contribution agreements.

Overall, there were 6,654 (20%) electric vehicle charging ports funded by the program in operation. The installation of the program-funded charging ports contributes toward the United Nations' Sustainable Development Goal 9 (Industry, Innovation and Infrastructure) and Goal 13 (Climate Action).

Because of the coronavirus disease (COVID-19)1 pandemic, Natural Resources Canada anticipated project delays and allowed funding recipients up to 12-month extensions to complete projects delayed by causes outside of the recipients' control. The department checked funding recipients' progress quarterly to identify any concerns

Coronavirus disease (COVID-19)—The disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

with meeting program contribution agreement timelines. According to the department's data, of the 329 projects with contribution agreements signed through the first 5 requests for proposals, 96 (29%) required timeline extensions for completion. The delayed projects represented a total of 12,626 electric vehicle charging ports. The average extension length was 7 months above the initial time specified in the contribution agreements, which ranged from 18 to 30 months for completion. Examples of the causes of delays included supply chain issues that limited the availability of equipment, the lack of qualified workers such as electricians, and extreme weather events.

Natural Resources Canada had a limited strategic approach and lacked specific targets, such as for underserved areas and for its portion of the 50,000-charging-port target

Why this finding matters

8.22 This finding matters because all drivers across Canada will be affected by the Government of Canada's mandate that 100% of new light-duty vehicle sales be zero-emission vehicles by 2035. This change could cause challenges for lower-income Canadians, those living in older multi-unit residential buildings where costly retrofits may be needed to install charging ports, and those living in areas where there is currently limited charging infrastructure.

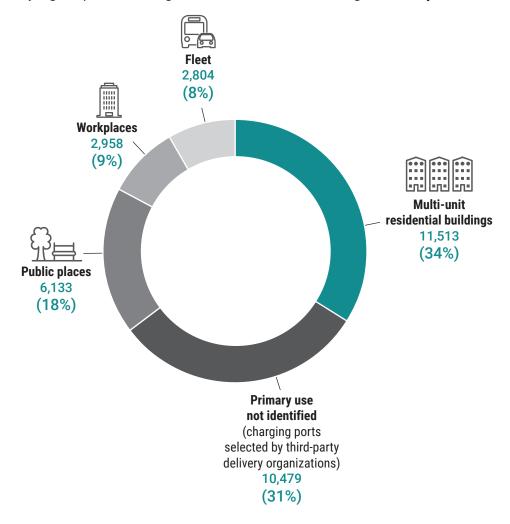
Majority of funding for projects in Ontario, British Columbia, and Quebec

Findings

We found that Natural Resources Canada provided 8.23 \$265.9 million in funding for 353 projects for charging infrastructure between June 2019 and July 2023. On the basis of the signed contribution agreements, 29,407 (87%) of the funded charging ports were in Ontario, British Columbia, and Quebec, and 4,480 (13%) were in the other provinces, the Northwest Territories, and Yukon. Funding for projects in the 3 provinces totalled about \$228.4 million (86% of total funding), while funding for projects in the other provinces and territories except Nunavut was about \$37.5 million (14% of total funding). No applications for funding were received from Nunavut. Nunavut's communities, as well as many northern off-grid communities elsewhere in Canada, rely heavily on diesel generators for their electricity needs. The emissions generated through the use of diesel offset the benefits of using a zero-emission vehicle. The federal government has committed to supporting cleaner power solutions in communities that currently rely on diesel.

8.24 We found that as of July 2023, the largest share of the charging ports funded by the Zero Emission Vehicle Infrastructure Program were located at multi-unit residential buildings (Exhibit 8.5).

Exhibit 8.5—The largest share of the charging ports selected for Zero Emission Vehicle Infrastructure Program funding (in operation and in progress) were serving multi-unit residential buildings as of July 2023



Note: Public places include street parking and parking areas at service stations, retail stores, restaurants, arenas, libraries, and medical offices.

Source: Data from Natural Resources Canada

Limited strategic approach and no definition of "underserved area"

8.25 While the Zero Emission Vehicle Infrastructure Program is intended to provide charging infrastructure for all Canadians where they live, work, and play, we found that the department did not take sufficient steps to ensure that all geographical areas would benefit from the program's funding.

- 8.26 We found that Natural Resources Canada established a national target under the program for charging infrastructure, but it did not establish specific targets such as for underserved areas, which would help to ensure the equitable distribution of charging infrastructure across the country. We also found that the department had not defined what an "underserved area" is under the program. The program documentation did not define this term, nor did it identify and prioritize specific geographical areas that need more electric vehicle charging infrastructure. In addition, the project assessment process did not include weighted criteria to favour projects in rural, remote, and northern areas or other areas, such as lower-income communities that may have significant gaps in charging infrastructure.
- 8.27 The program can fund projects in an area only if it receives an application for funding for that area. We found that there is a risk that some areas with limited or no charging infrastructure (such as Nunavut) will not benefit from the program because they lack project proponents willing or positioned to apply to the program or because they face technical challenges because of the source of their electricity. We found that Natural Resources Canada engaged and coordinated with provinces and territories through requests for proposals that allocated funding to third-party delivery organizations. Of the 27 delivery organizations that received funding, 13 were with provincial and territorial governments and utility companies across Canada. However, despite this work, there were opportunities to improve coordination with the provinces and territories in order to better use federal funding to target areas where others may not invest in charging infrastructure. Ongoing collaboration between stakeholders will be required.
- Since the launch of the program in 2019, the department did, however, take steps to better serve some areas. For example, the first 2 requests for proposals prioritized public places, workplaces, parking locations for on-road vehicle fleets, and multi-unit residential buildings. In April 2023, the department launched a continuous-intake request for proposals targeted at charging infrastructure projects in Indigenous communities. The program's funding limit for projects led by Indigenous organizations was also increased from 50% to 75% of eligible project costs. The department's planned outcome is to increase Indigenous-led projects by 5% each program year. Since 2019, 6 Indigenous-led projects (1 in 2020 and 5 in 2022) were selected for funding, providing a total of 138 electric vehicle charging ports in Indigenous communities. Since January 2023, 1 Indigenous-led third-party delivery organization was also delivering program funding to Indigenous communities. The introduction of the third-party delivery model in 2020 helped to fund charging infrastructure projects for various communities because this model helps local organizations to access funding for smaller projects.

8.29 In March 2023, Natural Resources Canada commissioned a study to identify regional needs in charging infrastructure over time across Canada. The study is expected to be completed by the end of 2023. This study could help the department to identify and prioritize underserved areas.

Recommendation

8.30 Natural Resources Canada should clearly define "underserved areas," establish specific targets, and use a more strategic approach with criteria that prioritizes electric vehicle charging projects across Canada in areas where others may not invest in charging infrastructure or where there are significant gaps in coverage. This approach could help to ensure that all areas across Canada would benefit from the Zero Emission Vehicle Infrastructure Program's funding.

The department's response. Agreed.

See Recommendations and Responses at the end of this report for detailed responses.

Unclear division of Natural Resources Canada's portion of the 50,000-charging-port target shared with the Canada Infrastructure Bank

Findings

8.31 Budget 2022 announced a target of deploying 50,000 new zero-emission vehicle charging ports and hydrogen refuelling stations by 31 March 2029. The deployment is shared between Natural Resources Canada, through the Zero Emission Vehicle Infrastructure Program, and the Canada Infrastructure Bank. We found that Natural Resources Canada had not identified what portion of the 50,000 charging ports it would be responsible for funding. The department and the Canada Infrastructure Bank established a framework for collaboration to support the deployment. The 2 entities agreed to work collaboratively on project evaluation, information sharing, and communications coordination. However, there was a lack of details on how the target will be shared between Natural Resources Canada and the Canada Infrastructure Bank. By not being clear on the portion of the 50,000 new charging ports it will be responsible for, the department is not being transparent for the results it expects to achieve.

Recommendation

8.32 In order to improve transparency and accountability for results, Natural Resources Canada should determine what portion the Zero Emission Vehicle Infrastructure Program will support of the 50,000 zero-emission vehicle charging port target that the department shares with the Canada Infrastructure Bank.

The department's response. Agreed.

See Recommendations and Responses at the end of this report for detailed responses.

Natural Resources Canada's data collection and reporting on program outcomes did not inform stakeholders of program effects

Why this finding matters

8.33 This finding matters because data is needed to strategically support the funding and installation of electric vehicle infrastructure to best meet the needs of communities and to support them in the transition to zero-emission vehicles.

Insufficient data collection and reporting on program outcomes

Findings

8.34 One of the Zero Emission Vehicle Infrastructure Program's key goals is to attract private investors to participate in the deployment of Canada's needed electrical charging infrastructure network. The program does this by reducing the financial risk taken by the private sector for the initial capital investment. To track progress on this outcome, the department established a performance indicator linked to funding from the private sector. However, when calculating the ratio of private sector funding for each program dollar invested, we found that in its calculation of private sector funding, Natural Resources Canada also included public sector funding. The sources of funding included provincial, territorial, and municipal governments and major utility companies that were either completely or partially government-owned. As such, the department's approach leads to overstating the private sector investments and the extent to which the program influenced private sector investments in charging infrastructure. We found that program funding of \$265.9 million between June 2019 and July 2023 resulted in \$461.1 million of additional investments in the same period toward electric vehicle charging infrastructure. The investments were a mix of private-sector funding and non-federal public-sector funding.

- 8.35 Although the department calculates a ratio of program funding to non-program investments, we found that the department did not have a clear target or method to determine when the program had met its objective of leveraging sufficient levels of investments from other investors—at which point it could start to reduce federal funding.
- One of the department's ultimate outcomes for the program 8.36 is to increase the use of charging ports in Canada. However, we found that this outcome was not being fully measured. For all projects, the department required data on usage of the electric vehicle charging ports for only the first week after a project started operating in order to verify project completion. For funding recipients that may be required to repay program contributions, the department also requested some information on use in support of repayment reports. Natural Resources Canada commissioned a study, the 2022 Snapshot of Canada's Electric Charging Network and Hydrogen Refuelling Stations for Light-Duty Vehicles. which contained information on charging stations' patterns of use. However, the study was not specific to charging ports funded through the program. As a result, the department did not have all the information required to determine whether the charging ports it funded were being used and were helping to increase the use of charging ports across Canada. The department plans to commission surveys every 2 years and to obtain additional information through annual industry studies in order to gather information on use. More fulsome information could help the department to understand how the program is increasing the use of charging ports and could help the department to identify gaps and address needs in charging infrastructure throughout Canada.
- 8.37 Another ultimate outcome of the program is to increase zero-emission vehicle sales by increasing the availability of charging ports throughout Canada. However, we found that attributing an increase in sales to the program was unrealistic given that, in addition to federal incentives for purchasing a zero-emission vehicle, half of the country's provinces and territories have other, overlapping rebate programs to increase sales of zero-emission vehicles. In addition, the department did not establish a clear baseline or target against which to measure this outcome. The department also did not collect information or conduct analysis to try to determine how much of the annual increase in zero-emission vehicle sales was directly attributed to the program.
- 8.38 We also found that Natural Resources Canada did not collect and publicly report on the program in a way that would help inform the public and stakeholders about the program's impact. Specifically, such data would help to show whether the program had increased access to charging stations where Canadians live, work, and play. This information could be used by the department to identify gaps and to respond to the electric vehicle infrastructure needs in these areas.

Recommendation

- 8.39 Natural Resources Canada should establish and use appropriate performance indicators along with
 - relevant and reliable data on the progress and results of the Zero Emission Vehicle Infrastructure Program to inform decisions, take action, and provide transparent reporting on the results of program funding contributions and performance of funded projects
 - · a collaborative approach with stakeholders, including in the exchange of information and data, to inform efforts to address the gap in electric vehicle charging infrastructure by 2030

The department's response. Agreed.

See **Recommendations and Responses** at the end of this report for detailed responses.

The program's design and processes did not assure Canadians of a reliable and convenient charging infrastructure

Why this finding matters

This finding matters because the funding and installation of 8.40 electric vehicle charging infrastructure, and its continued reliability, visibility, and convenience across Canada, are important to ensure access to charging infrastructure, a positive user experience, and public acceptance and motivation to purchase electric vehicles.

Context

- 8.41 Poor and failed charging experiences can be due to numerous types of malfunctions, such as a lack of Internet connectivity, a failed payment authorization, or broken equipment. Other factors include a charging port set to supply power at a lower level than expected or the charging port's access being blocked by construction or snow.
- 8.42 Some international jurisdictions, such as the United States, have developed performance standards or regulations on expected reliability or uptime requirements for public charging ports. These are meant to make it easier to charge vehicles and ensure the predictability and reliability of charging.

Little weight given to public charging ports' continued reliability or users' convenience in project selection criteria

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- 8.43 We found that the design of the Zero Emission Vehicle Infrastructure Program was focused on increasing the number of charging ports. As a result, the objectives, targets, reporting, and contribution agreements were designed to reflect this objective. The Zero Emission Vehicle Infrastructure Program is a funding program meant to promote investments, but given the program's focus on the initial capital investment, it was not designed to require the reliability of the charging ports beyond the initial first week of operation. Nonetheless, the reliability of charging ports has become an increasing concern. The department's due diligence process to ensure the success of the funded projects relied primarily on 2 mandatory requirements with respect to the reliability of the electric vehicle charging stations:
 - · that equipment be certified for use in Canada
 - that installation work comply with applicable building and electrical codes

The department awarded a few merit points for projects that included operations and maintenance plans in their proposals. The study that the department commissioned—the 2022 Snapshot of Canada's Electric Charging Network and Hydrogen Refuelling Stations for Light-Duty Vehicles—collected information on reliability estimates but not specifically for program-funded charging ports.

8.44 We also found that the department did not use significantly different criteria for rating projects aimed at different users. Charging ports intended for public use do not serve the same needs as those for multi-unit residential buildings, workplaces, or fleets. Some tailored criteria could have been used in the applications for each stream to help encourage project proponents to better meet the unique needs of their intended users. Furthermore, in assessing applications, we identified opportunities for Natural Resources Canada to more fully consider the users' experience. Examples of requirements and considerations to benefit users were included in the Quebec government's program to support the installation of public charging ports. These could be incorporated into the design of the program to the extent possible (Exhibit 8.6). The recommendation for this finding is found at paragraph 8.49.

Exhibit 8.6—Public charging station requirements and considerations used in Quebec that could be incorporated in the Zero Emission Vehicle Infrastructure Program for public charging infrastructure

Requirements in Quebec, not in the program	Other favourable considerations that the program could consider	Why this matters
 Allow for ease of payment and coordination of charging networks 	 Ensure accessibility to each port 24 hours a day, 7 days a week 	 To provide transparency on pricing and avoid unwanted fees
Clearly display pricing for charging and idling on the port or site	Be on a charging site near amenities, such as food service, stores or malls, tourist areas, lodging areas, or recreation areas	To provide conveniences while charging
	Be on a charging site where a bathroom and heated indoor area are accessible	
Allow charging even in the event of a loss of Internet connectivity	Ensure at least 2 charging ports per charging site	 To enable charging during outages in communications or when the network is not operational To increase likelihood of being able to charge when a charging port is not functioning
Be on a charging site that is adequately lit	Be on a charging site that is cleared of snow, and be equipped with a connector with protection from snow Provide 1 charging parking spot on site that is accessible to people with reduced mobility Be set up with a parking area that allows for the charging of a vehicle with a trailer or	 To offer better safety and security and to be able to charge in the winter or at night To accommodate users who have accessibility needs To be able to charge as planned at a functioning charging port suitable to the user's vehicle

Source: Based on information from Programme de soutien au secteur privé pour le déploiement de bornes de recharge rapide publiques : Guide du demandeur (private sector support program for the deployment of public fast-charging stations: applicant's guide)

Opportunities to incorporate international practices in the program's design

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- 8.45 We found that Natural Resources Canada incorporated feedback into the design of the Zero Emission Vehicle Infrastructure Program. The program's design was based on feedback received on the department's earlier program, the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative. The program design was also influenced by workshops in 2019 with stakeholders from government, utility companies, and industry. The department incorporated key takeaways from the 2019 workshops, such as using regularly recurring requests for proposals, focusing on applications with strong business cases, and including merit criteria for project applications that demonstrate readiness.
- 8 46 The department commissioned a mid-term review of the program in 2021. We found that the department incorporated some lessons learned from the review into the program's design. For example, the department considered the evolution of charging infrastructure technology and modified the minimum project requirements to specify that 2 fast charging ports (level 3) would be equivalent to the pre-existing minimum of 20 level 2 charging ports. We also found that several recommendations from the review report were not implemented or were still in progress. For example, the review recommended increasing the transparency of the project proposal assessment process by clarifying the weighting of each assessment criterion but that had not been acted on. Doing so, and clarifying the interpretation of each criterion, could help applicants better align their projects with the program's objectives.
- 8.47 We found that Natural Resources Canada incorporated some general practices into the design of the program, such as some public reporting and having a national target for charging ports, which were also used in countries such as Norway, the United Kingdom, and the United States. However, there were opportunities to consider additional, more strategic, practices of other countries in order to better support current and future electric vehicle drivers (Exhibit 8.7).
- Because charging infrastructure is a long-term investment, it is important that Natural Resources Canada work strategically with stakeholders to select locations and projects that best meet user considerations. We believe that to help support the continued transition to electric vehicles, it is important that program-funded charging stations be deployed in a way that will meet the needs of users and provide a positive user experience.

Exhibit 8.7—Charging infrastructure good practices from other countries that could be incorporated in the Zero Emission Vehicle Infrastructure Program for public charging infrastructure

Electric vehicle charging infrastructure practices	Where this is happening
Dedicated charging infrastructure programs	California has targeted programs to support lower-income or disadvantaged communities (including those that are disproportionally burdened by multiple sources of pollution) in gaining access to charging ports.
	Oslo, Norway, has dedicated investments to multi-unit residential buildings. It has spent about \$200 per parking space to make around 50,000 to 60,000 parking spaces at apartment buildings ready for electric vehicles. This approach reduced the need to invest in public charging and saved the government money.
	In the United Kingdom, local authorities apply for funds to be allocated to help ensure that all areas have an equitable chance of developing charging infrastructure.
Reliability	The United Kingdom (regulations) and the United States (standards) have minimum reliability requirements for the performance of charging stations (99% and 96% uptime, respectively).
	The United Kingdom is working with industry to have real-time data on charging stations to provide drivers with more information, including reliability.

Source: National Electric Vehicle Infrastructure Standards and Requirements, United States Department of Transportation, 2023; California Electric Vehicle Infrastructure Project Rebate Statistics Dashboard, California Energy Commission, News Story: £56 Million of Public and Industry Funding Electrifies Chargepoint Plans Across the Country, Government of the United Kingdom, 2023; The Public Charge Point Regulations 2023, Government of the United Kingdom, Taking Charge: The Électric Vehicle Infrastructure Strategy, Government of the United Kingdom, 2022; and the Norwegian Electric Vehicle Association

Recommendation

8.49 Natural Resources Canada should examine how the criteria to assess the Zero Emission Vehicle Infrastructure Program projects or how the program itself could be adjusted so that future funded public electric vehicle charging ports provide users with an increased level of convenience and confidence in the reliability of the program-funded charging stations. This should be done through the adoption of good practices from other countries and jurisdictions, such as improved data collection and minimum reliability standards for charging stations.

The department's response. Agreed.

See Recommendations and Responses at the end of this report for detailed responses.

Inefficient processes and delays in funding applications

Findings

- 8.50 We found that Natural Resources Canada used time-consuming and inefficient processes and systems in its day-to-day operations of the Zero Emission Vehicle Infrastructure Program. For example, the department was using predominantly manual processes to
 - submit, receive, and acknowledge receipt of project applications and other communications
 - document the review and approval of projects
 - · manage the delivery of the program, including the processing of repayment claims and repayment reports
 - track and report on projects in multiple systems

Manual processes required time-consuming data entries and data manipulation from staff and increased the risk of errors and delays.

- 8.51 We also found delays in the processing of program applications. Natural Resources Canada routinely did not meet its program service standard to communicate funding decisions to applicants within 100 calendar days of the close of the intake period. More specifically, for the request for proposals launched in May 2022, the department received 432 applications for electric vehicle charging projects by the end of the intake period in August 2022. At the end of February 2023, the department informed all project applicants of its funding decisions or the status of applications, such as being put aside due to budget restraints. For applicants, the delays meant a wait of more than 180 days from the end of the application intake period to when they were made aware of the department's decision. After the 180 days' wait, 146, or about 34% of project proposals, were put aside, and the applicants did not know when or whether the department would eventually fund their projects.
- 8.52 We found that to respond to these challenges in manual processes and delays, the department initiated steps in 2022 to adopt an information technology system with automated functions for the management of the program. An automated system could help staff manage the program more efficiently, which would benefit project proponents. At the time of our audit, the implementation of the system was still underway.

Recommendation

- 8.53 To reduce delays in making funding decisions and consequently delays in the installation and operation of electric vehicle charging infrastructure, Natural Resources Canada should
 - · complete the implementation of its automated information technology system to help manage the Zero Emission Vehicle Infrastructure Program
 - · streamline its application process to reduce delays in funding decisions

The department's response. Agreed.

See **Recommendations and Responses** at the end of this report for detailed responses.

Conclusion

- 8.54 We concluded that Natural Resources Canada's Zero Emission Vehicle Infrastructure Program supported the funding and installation of electric vehicle charging infrastructure for light-duty vehicles throughout many regions of Canada. However, there were opportunities to better use federal funding to target locations where access to charging infrastructure was limited and where private investors may not invest because these locations have lower electric vehicle use.
- 8.55 The department's approach to implementing the program did not include specific targets for funding charging infrastructure, such as for underserved areas. Furthermore, the program was not designed to focus on the continued reliability and convenience of the charging ports.

About the Audit

This independent assurance report was prepared by the Office of the Auditor General of Canada on the Zero Emission Vehicle Infrastructure Program. Our responsibility was to provide objective information, advice, and assurance to assist Parliament in its scrutiny of the government's management of resources and programs and to conclude on whether Natural Resources Canada complied in all significant respects with the applicable criteria.

All work in this audit was performed to a reasonable level of assurance in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3001-Direct Engagements, set out by the Chartered Professional Accountants of Canada (CPA Canada) in the CPA Canada Handbook-Assurance.

The Office of the Auditor General of Canada applies the Canadian Standard on Quality Management 1—Quality Management for Firms That Perform Audits or Reviews of Financial Statements, or Other Assurance or Related Services Engagements. This standard requires our office to design, implement, and operate a system of quality management, including policies or procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

In conducting the audit work, we complied with the independence and other ethical requirements of the relevant rules of professional conduct applicable to the practice of public accounting in Canada, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality, and professional behaviour.

In accordance with our regular audit process, we obtained the following from entity management:

- · confirmation of management's responsibility for the subject under audit
- · acknowledgement of the suitability of the criteria used in the audit
- · confirmation that all known information that has been requested, or that could affect the findings or audit conclusion, has been provided
- · confirmation that the audit report is factually accurate

Audit objective

The objective of this audit was to determine whether Natural Resources Canada designed and implemented the Zero Emission Vehicle Infrastructure Program to support the deployment of accessible and reliable electric vehicle charging infrastructure for light-duty vehicles throughout Canada.

Scope and approach

We examined

- whether the department designed the Zero Emission Vehicle Infrastructure Program to enable Canadians living in urban, rural, remote, or Indigenous communities to have access to reliable charging stations
- whether the department was on track to achieve program targets and intended outcomes by supporting the deployment of accessible and reliable electric vehicle charging ports for all light-duty electric vehicles throughout Canada

The following were not part of the audit scope:

- hydrogen refuelling stations
- the Canada Infrastructure Bank's Charging and Hydrogen Refuelling Infrastructure Initiative
- · charging infrastructure for medium-duty and heavy-duty vehicles

The audit approach included interviews with officials from Natural Resources Canada and stakeholders. We also analyzed processes, documents, and data from the department and from other information sources.

The Zero Emission Vehicle Infrastructure Program aligns with the United Nations' Sustainable Development Goal 9 (Industry, Innovation and Infrastructure) to "build resilient infrastructure, promote sustainable industrialization and foster innovation" and Goal 13 (Climate Action) to "take urgent action to combat climate change and its impacts." The program also aligns with the 2022-2026 Federal Sustainable Development Strategy's Goal 9 to "foster innovation and green infrastructure in Canada" and Goal 13 to "take action on climate change and its impacts."

Criteria

We used the following criteria to conclude against our audit objective:

Criteria	Sources
Natural Resources Canada designed the Zero Emission Vehicle Infrastructure Program to enable Canadians living in urban, rural, remote, or	Directive on Results, Treasury Board
	Directive on Transfer Payments, Treasury Board
Indigenous communities to have access to reliable	Policy on Transfer Payments, Treasury Board
charging stations.	Minister of Natural Resources Mandate Letter, 2021
	Minister of Natural Resources Mandate Letter, 2019
	Budget 2022: A Plan to Grow Our Economy and Make Life More Affordable
	Budget 2019: Investing in the Middle Class
	 Supporting Canadians and Fighting COVID-19: Fall Economic Statement 2020
	Fourth Annual Synthesis Report on the Status of the Implementation of the Pan-Canadian Framework on Clean Growth and Climate Change, 2021
	• 2022–23 Departmental Plan, Natural Resources Canada
	 Achieving a Sustainable Future: Federal Sustainable Development Strategy 2022 to 2026
	Departmental Sustainable Development Strategy 2020 to 2023, Natural Resources Canada
Natural Resources Canada is on track to achieve	Directive on Results, Treasury Board
Zero Emission Vehicle Infrastructure Program targets and intended outcomes by supporting the deployment of accessible and reliable electric vehicle charging ports for all new light-duty electric vehicles throughout Canada.	Directive on Transfer Payments, Treasury Board
	Policy on Transfer Payments, Treasury Board
	• 2022–23 Departmental Plan, Natural Resources Canada
	 Achieving a Sustainable Future: Federal Sustainable Development Strategy 2022–2026
	Departmental Sustainable Development Strategy 2020 to 2023, Natural Resources Canada

Period covered by the audit

The audit covered the period from 1 January 2019 to 1 June 2023, except for our analysis of the status of project funding, which extends to 28 July 2023. This is the period to which the audit conclusion applies.

Date of the report

We obtained sufficient and appropriate audit evidence on which to base our conclusion on 18 September 2023, in Ottawa, Canada.

Audit team

This audit was completed by a multidisciplinary team from across the Office of the Auditor General of Canada led by James McKenzie, Principal. The principal has overall responsibility for audit quality, including conducting the audit in accordance with professional standards, applicable legal and regulatory requirements, and the office's policies and system of quality management.

Recommendations and Responses

In the following table, the paragraph number preceding the recommendation indicates the location of the recommendation in the report.

Recommendation Response 8.30 Natural Resources Canada should clearly The department's response. Agreed. Natural define "underserved areas," establish specific Resources Canada is continually reviewing targets, and use a more strategic approach with research to better understand the underserved criteria that prioritizes electric vehicle charging areas or gaps in Canada's charging infrastructure. projects across Canada in areas where others may Based on this research, the Zero Emission Vehicle not invest in charging infrastructure or where there Infrastructure Program is currently focused on are significant gaps in coverage. This approach level 2 charging in multi-unit residential buildings, could help to ensure that all areas across Canada workplaces, and fleets. would benefit from the Zero Emission Vehicle The department's approach is adapting to reflect Infrastructure Program's funding. the evolving infrastructure needs across Canada. For example, the department is undertaking analysis of regional, provincial, territorial, and municipal needs regarding the amount and type of charging infrastructure required over time. The department's approach will continue to be informed through research, engagement (such as the Zero-Emission Vehicle Council), and the development of a gap map (such as a visual interactive tool designed to help identify Canada's charging infrastructure gaps). Based on this input, an updated approach to addressing charging infrastructure gaps and identifying targets focused on charger use types will be in place by mid to late 2024, to inform program funding decisions for the next request for proposals. **8.32** In order to improve transparency and The department's response. Agreed. Natural accountability for results, Natural Resources Resources Canada has worked with the Canada Canada should determine what portion the Zero Infrastructure Bank to confirm the proportion Emission Vehicle Infrastructure Program will of the 50,000 chargers and hydrogen refuelling support of the 50,000 zero-emission vehicle stations expected to be supported by Natural charging port target that the department shares Resources Canada's Zero Emission Vehicle with the Canada Infrastructure Bank. Infrastructure Program and the Canada Infrastructure Bank's Charging and Hydrogen Refuelling Infrastructure Initiative. To date, the Canada Infrastructure Bank announced funding for 2000 public fast chargers. The Canada Infrastructure Bank will announce its final

contributions by winter 2024.

Recommendation Response 8.39 Natural Resources Canada should establish The department's response. Agreed. Natural Resources Canada will work to update performance and use appropriate performance indicators indicators and collect relevant and reliable data to along with inform effective program tracking and reporting. relevant and reliable data on the progress Updated indicators will be identified by the end and results of the Zero Emission Vehicle of 2024. Infrastructure Program to inform decisions, take The department is implementing a client relations action, and provide transparent reporting on the management system, which will streamline results of program funding contributions and program information collection and improve performance of funded projects reporting efficiency. Transition to this system is · a collaborative approach with stakeholders, underway, with full implementation expected to be complete by the end of winter 2024. including in the exchange of information and data, to inform efforts to address the gap in The department will build on existing methods electric vehicle charging infrastructure by 2030 of communicating program results (such as the program website, the Electric Charging and Alternative Fuelling Stations Locator, the Open Maps data viewer, Government of Canada proactive disclosure, and the zero-emission vehicle infrastructure web portal). The department will make existing resources more accessible to increase awareness regarding program progress and existing gaps by providing links to resources and adding relevant metrics on the program website. Through the Zero-Emission Vehicle Council and engagement with stakeholders and other government representatives, the department will continue to work collaboratively with stakeholders to identify and improve metrics of communicating program achievements. 8.49 Natural Resources Canada should examine The department's response. Agreed. Natural Resources Canada is currently evaluating methods how the criteria to assess the Zero Emission to best address charger reliability and user Vehicle Infrastructure Program projects or how experience for public fast charging. Currently the program itself could be adjusted so that public fast charging represents only 20% of the future funded public electric vehicle charging Zero Emission Vehicle Infrastructure Program's ports provide users with an increased level of supported projects, with most remaining funds convenience and confidence in the reliability of the supporting level 2 private charging in multi-unit program-funded charging stations. This should be residential buildings, workplaces, and fleets.

done through the adoption of good practices from other countries and jurisdictions, such as improved data collection and minimum reliability standards for charging stations.

Efforts to address the reliability and user experience of public chargers funded by the program include developing indicators for reliability with the Zero-Emission Vehicle Council and collecting and monitoring available reliability data. Furthermore, the department is currently evaluating potential program changes to address long-term reliability and user experience challenges for public fast charging, such as monitoring and reporting, maintenance expenditures, and performance requirements. Timing of implementation of these changes are expected mid to late 2024, in advance of the next request for proposals.

Recommendation	Response
 8.53 To reduce delays in making funding decisions and consequently delays in the installation and operation of electric vehicle charging infrastructure, Natural Resources Canada should complete the implementation of its 	The department's response. Agreed. Natural Resources Canada is currently implementing a client relations management system to increase program efficiency and streamline application processes and data management. The system is expected to be in full operation by the end of
automated information technology system to help manage the Zero Emission Vehicle	winter 2024.
Infrastructure Program	The department will evaluate its application processes to find further efficiencies where
streamline its application process to reduce delays in funding decisions	possible before the launch of the next program call for proposals.

