

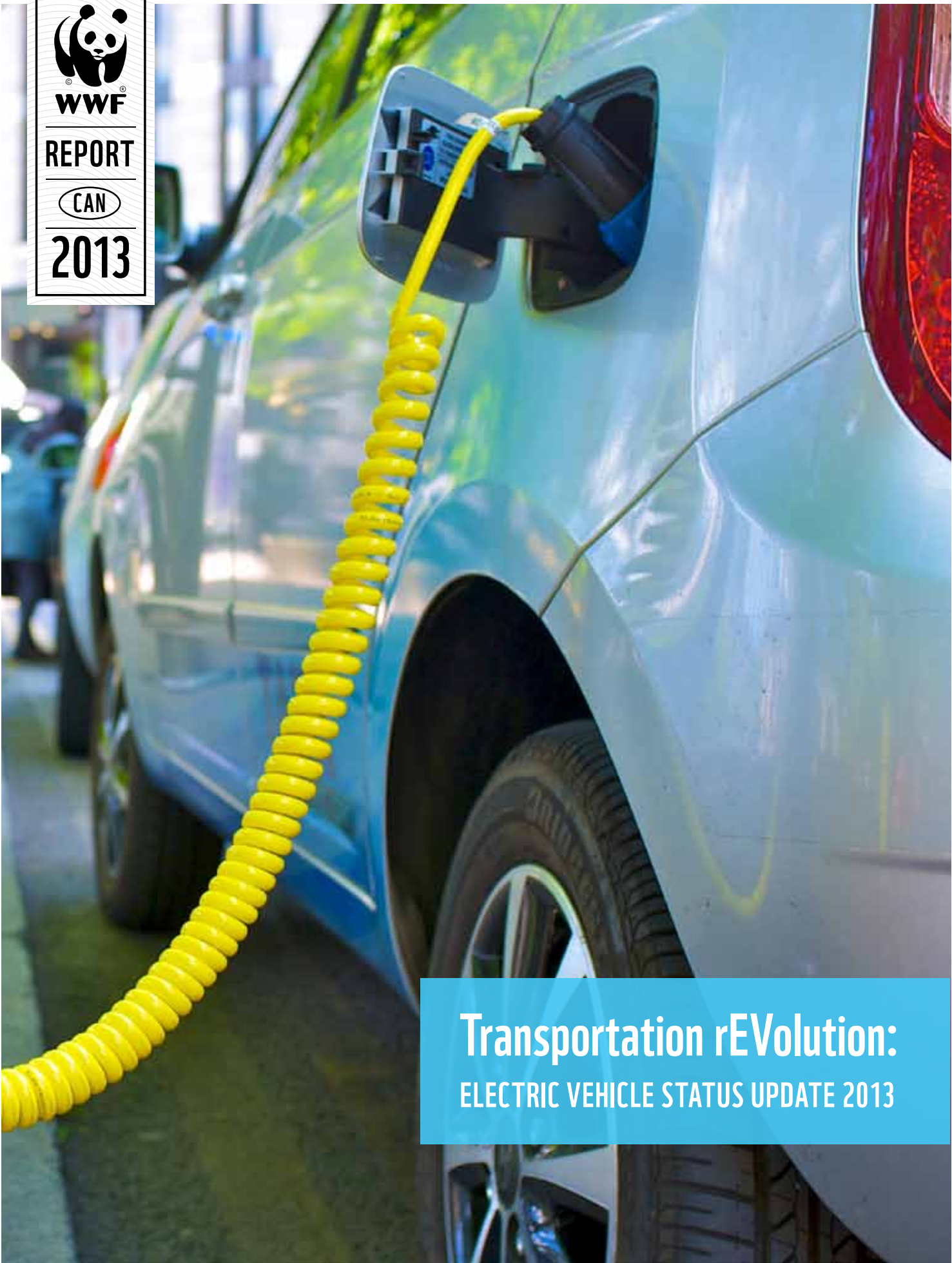


WWF

REPORT

CAN

2013

A close-up photograph of a blue electric vehicle (EV) parked outdoors. A bright yellow charging cable is plugged into the car's charging port, which is located on the rear side. The cable is coiled and extends towards the bottom left of the frame. The car's body is a light blue color, and its rear wheel is visible. The background is slightly blurred, showing a paved area and some greenery.

Transportation rEVolution:

ELECTRIC VEHICLE STATUS UPDATE 2013

CONTENTS

Introduction	3
Measuring Progress	4
National Overview	5
Comparative Pricing	6
Charging Infrastructure	8
Public Awareness and Experience	10
Available EV Models	11
Environmental Benefits	12
Summary of Ratings	14

WWF-Canada would like to recognize the McLean Foundation and the Ontario Trillium Foundation for their generous support of our sustainable transportation work. The Ontario Trillium Foundation is an agency of the Government of Ontario. Front cover photo © 2013 / WWF-Canada



Published in November 2013 • WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

INTRODUCTION

Curbing climate change means drastically reducing greenhouse gas emissions. In Canada, 28 per cent of those emissions comes from transportation, and one of the biggest culprits is the car. That's why WWF is promoting the switch to electric vehicles (EVs). EVs are far more efficient than conventional cars. And if the electricity that powers them comes from renewable sources—as it does across much of the country—the benefits are even greater.

In 2012, WWF set a goal: to see 600,000 electric vehicles on Canadian roads by 2020. Yes, it's an aggressive target, but our research shows that it's also realistic if stakeholders collectively take action. To achieve it, we need to address key barriers to create the following conditions:

- **Comparative Pricing**—Price is no longer a barrier for consumers to choose an EV over a conventional vehicle.
- **Charging Infrastructure**—Barriers to home charging are mitigated and EV drivers have access to charging infrastructure through 30,000 workplace or public locations by 2020.
- **Public Awareness and Experience**—Canadians believe that EVs are a viable option for their lifestyle.
- **Available EV Models**—Canadians have access to a full range of electric vehicles to rent, buy or share.

- **Environmental benefits**—Increased production of renewable electricity further improves the benefits of EVs

One year into our campaign, we've produced our inaugural status update to evaluate Canada's progress.



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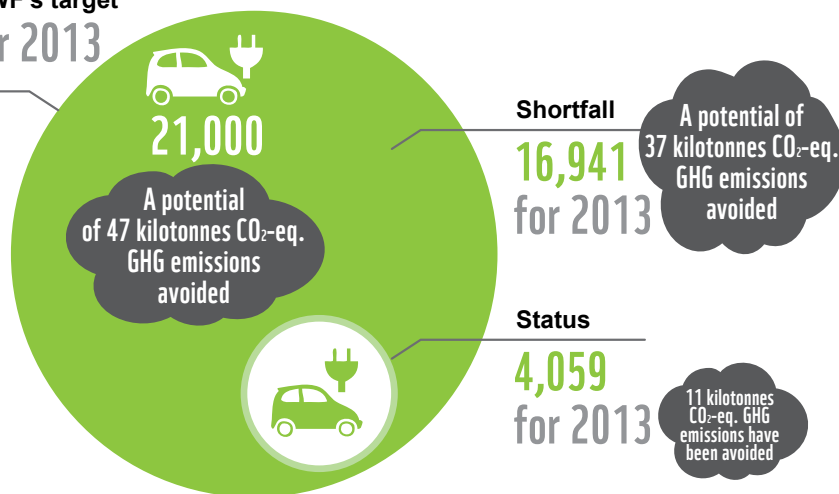
MEASURING PROGRESS

So how quick are Canadians to adopt electric vehicles? Over the past year, EV sales have increased nearly 150 per cent.¹ Several provinces continue to offer attractive incentives for purchasing EVs, while charging infrastructure has grown. That's good news.

However, Canada could do better. EV sales aren't as strong as WWF believes they could be. This means Canada has missed out on the opportunity to reduce national greenhouse gas emissions by the equivalent of 37 kilotonnes of CO₂ this year²—a gap that will grow the longer it takes for EV sales to achieve their full potential.

CANADA

WWF's target
for 2013



Slow growth is not due to a failure in technology. Although greater battery range will make pure EVs more practical for individuals and businesses that drive long distances, other jurisdictions are already seeing a much higher rate of uptake than WWF proposed was possible last year.

This status update examines how Canada stands on a number of metrics that influence EV adoption—price, charging infrastructure, awareness, options, and environmental benefits—using the following grading system:

- **Powered Up**—Among the leaders
- **Charging**—Showing good progress but lagging behind global leaders
- **Energy Needed**—Progress is lacking
- **Data Deficient**—There is not enough information to evaluate progress

Our status update also compares Canada's progress with leading jurisdictions and looks at the high uptake of EVs in certain Canadian regions to identify best practices that should be mimicked across the country.

NATIONAL OVERVIEW

Let's start by comparing Canada with California and Norway—two jurisdictions leading the world in EV adoption. Even in the adoption hubs of Ontario, Quebec, and B.C., proportional EV numbers lag significantly behind California and Norway.

CANADA

EVs on the road

4,059 

Total conventional vehicles on the road

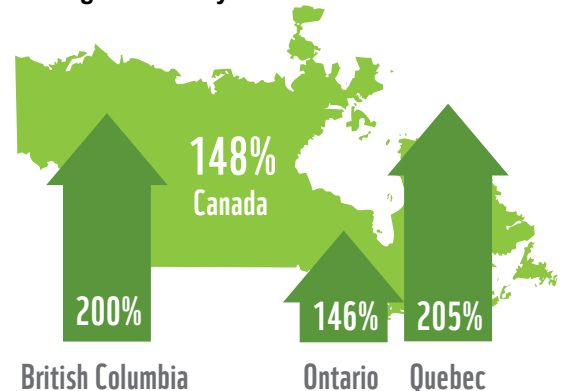
20,300,000 

EV sales

Canada	0.32%	1 : 314
BC	0.56%	1 : 177
ON	0.34%	1 : 296
QC	0.47%	1 : 214
Other	0.07%	1 : 1424

11 kilotonnes CO₂-eq. GHG emissions avoided

% EV growth this year



Target

600,000 EVs by 2020



Target

1% of vehicle sales are electric by 2013

NORWAY EV global leader³

EVs on the road

14,462 

EV sales

3.10%

Total conventional vehicles on the road

2,400,000 

Target

200,000 EVs by 2020



CALIFORNIA EV global leader⁴

EVs on the road

33,418 

EV sales

2.90%

Total conventional vehicles on the road

19,600,000 

Target

1,500,000 EVs by 2025



Provincial data provided from Governments of Ontario, B.C., and Quebec in September 2013

Meanwhile, the total number of EVs on Canadian roads as of August 2013 is less than 20 per cent of WWF's target. In the pages that follow, we discuss some of the reasons for that shortfall and also recognize the areas where Canada as a whole and various provinces have seen good progress this year.

COMPARATIVE PRICING



Goal:

- Price is no longer a barrier for consumers to choose an EV over a conventional vehicle.



Status:

- Charging.



Successes:

- Ontario, Quebec, and B.C. offer EV buyers incentives of up to \$8,500.
- B.C.'s carbon tax means EV drivers will save even more money on operations compared with conventional gas-powered vehicles.



Threats:

- B.C.'s incentive program is currently set to expire on March 31, 2014.



Needs Improvement:

- Canadians outside B.C., Ontario, and Quebec do not have access to incentives to buy EVs.
- Governments need to investigate other opportunities to internalize the environmental costs of conventional vehicles through mechanisms such as carbon taxes.

With prices starting around \$30,000 (not including incentives), EVs are already an affordable option for some Canadians. Although they do cost more up front than their conventional counterparts, they are far cheaper to run. Over time, fuel savings can compensate for the higher purchase price. When you add in the current incentives in Ontario, B.C., and Quebec, that payback period can be as little as two years, depending on how often the vehicle is driven.⁵ Despite this, we know that sticker price is the single-largest barrier preventing Canadians from buying electric vehicles.⁶

Let's compare that with Norway, where EVs account for 3.1 per cent of car sales. The high rate of EV uptake there has often been attributed to pricing policies, including petroleum prices that are more than double those in Canada, and a tax on vehicles based on their carbon emissions. Additionally, the Norwegian government offers EV drivers free parking in major cities and access to high-occupancy lanes, helping to make EVs an attractive choice. The value of Norwegian incentives has been estimated to save EV owners between \$3,000 – \$8,000 USD per year.⁷

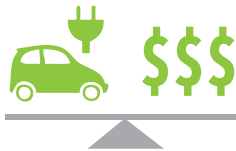
Here at home, governments in Ontario, B.C., and Quebec have introduced significant purchase incentives. Not surprisingly, these provinces account for the majority (97%) of EV sales in Canada. While these incentives fall short of

Norway's, they are comparable to those offered in California, another global leader in EV adoption.

Until economies of scale bring down the cost of the EV technology, incentives are a crucial factor in driving EV growth. Therefore, the threat that B.C. may discontinue its incentives could hurt EV adoption.

RECOMMENDATIONS:

1. **B.C., Ontario, and Quebec should continue to offer their incentive programs.**
2. **Other provinces should introduce similar incentives for buying EVs.**
3. **The federal and provincial governments should introduce other programs to reduce the price barrier to EVs.**



In addition to financial incentives, Canada and provinces should consider other opportunities to make EVs more financially attractive. One possibility is increasing the cost of running a gas-powered car by implementing a carbon tax as British Columbia has done. This tax reflects the environmental costs created by burning carbon-based fuels. Another possibility is to introduce a “fee-bate” program that offers a rebate to consumers who buy low-emitting vehicles and imposes fees on high-emitting ones.



CHARGING INFRASTRUCTURE



Goal:

- Barriers to home charging are mitigated and EV drivers have access to charging infrastructure through 30,000 workplace or public locations by 2020.



Status:

- Charging.



Successes:

- Over 1,000 public charging locations in Canada driven largely by programs in B.C. and Quebec.
- Hydro-Québec's le Circuit électrique program has recruited nearly 50 businesses, municipalities, and organizations that have agreed to install charging stations in their parking lots.
- Provincial support in B.C. has led to the installation of 475 charging stations in under a year.



Needs Improvement:

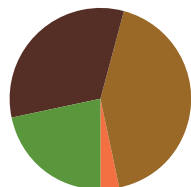
- Few charging options exist for people without garages (a group that includes many condo owners, renters, and homeowners who rely on on-street parking).
- In provinces where governments or utilities have not provided leadership, growth in the number of charging stations has been slow.
- The DC charging stations required for fast charging are few and far between.
- Few workplaces offer charging stations for employees.

This year has seen a leap in the number of public charging stations across the country. This increase can be attributed to provincial funding programs in B.C., government and utility leadership in Quebec, and leadership by businesses across Canada.

While growth in charging infrastructure has been good, there are still areas for improvement. Many people living in residential buildings face major barriers to charging, and most workplaces do not offer charging stations for employee use. Furthermore, new developments are not being built to accommodate charging infrastructure, so installing it later will require costly upgrades. Finally, the fast chargers needed for longer highway trips can be found in only a few areas of Canada.

WWF TARGET
30,000 workplace
and public charging
stations by 2020

EV charging points active by 8/2013



245 Ontario
362 Quebec
475 BC
37 Other provinces

4150 California
4029 Norway

Over 1000
public charging
stations in Canada,
led by programs in
BC and Quebec

	Canada	Ontario	Quebec	B.C.	Other Provinces	California	Norway
Cars: Stations	4:1	7:1	5:1	1:1	3:1	8:1	4:1

Provincial and American
data provided by FleetCarma
(<http://www.fleetcarma.com>)
in September 2013

Research has shown that the recommended ratio of electric vehicles to public charging stations range from 12:1 to 3:1.⁸ While it might appear that Canada has more than enough public chargers for the number of EVs on the road, this situation is necessary in the early days of adoption: consumers hesitate to buy EVs unless they see that governments, utilities, and businesses have invested in charging infrastructure.

It is also worth noting that the majority of charging stations have been installed in provinces where either the government or utilities provided support and coordination. The extraordinary growth we saw this year was due primarily to B.C.'s infrastructure program. However, without the launch of similar plans in other provinces, it is doubtful we can expect the same level of increase next year. This is an area where greater leadership by provincial governments and utilities is needed to continue infrastructure development.

RECOMMENDATIONS:

4. Provincial governments and utilities should develop new infrastructure programs that encourage the installation of charging stations in workplaces and certain public areas.
5. Provinces and municipalities should change building codes and by-laws respectively to require the installation of charging stations in new buildings.

Government Leadership: B.C.'s Clean Energy Vehicle (CEV) Infrastructure Deployment Program aims to support the installation of more than 500 level 2 charging stations and 13 DC fast-charging stations by providing funding to municipalities and businesses.

Utility Leadership: Hydro-Québec partnered with businesses, municipalities, and organizations to create Canada's first network of public charging stations, le Circuit électrique. To date, le Circuit électrique boasts more than 200 charging stations and almost 50 partners across the province.

PUBLIC AWARENESS AND EXPERIENCE



Goal:

- Canadians believe that EVs are a viable option for their lifestyle.



Status:

- Energy Needed.



Successes:

- More than 50 per cent of Canadians report knowing something about electric vehicles.



Threats:

- Only 28 per cent of Canadians think that EVs are a viable option.



Needs Improvement:

- Only 7 per cent of Canadians have seen, driven or ridden in an EV.

In September 2012, WWF surveyed Canadians to assess their familiarity with EVs⁹. This survey showed that while there was a good level of awareness of these vehicles, the majority of people had never seen one. Few thought it would be a viable option for their lifestyle in the near future. This baseline research shows that there is a long way to go in raising awareness and giving Canadians hands-on experience with electric cars.

We expect that as more EV models reach the market and more public charging infrastructure is installed, general awareness will grow as well. WWF plans to conduct a follow-up survey to assess this in time for our next EV status update in fall 2014.



53% 56% 50% 52%
Canada Ontario Quebec B.C.



of Canadians have some awareness of an EV,
as of 9/2012



7% 5% 3% 8%
Canada Ontario Quebec B.C.



of Canadians have experience with driving, riding in, or seeing an EV,
as of 9/2012



28% 28% 36% 27%
Canada Ontario Quebec B.C.



of Canadians believe that EVs are currently, or nearly, viable,
as of 9/2012

RECOMMENDATIONS:

6. Employers, manufacturers, NGOs, and car-sharing and rental companies increase opportunities for Canadians to try out EVs.

AVAILABLE EV MODELS



Goal:

- Canadians have access to a full range of EVs to rent, buy, or share.



Status:

- Charging.



Successes:

- 9 different EV options are currently available in Canada.



Needs Improvement:

- Canadians do not have access to all North American EV models.

The number of EV models on the Canadian market has more than doubled over the past year. Nine options are now available, and with manufacturers planning to introduce more in 2014, the range of choice will expand even further. While most EVs continue to be smaller cars, this year has brought a few larger-sized cars to market, including the Tesla S sedan and the Ford C-Max PHEV CUV.

Unfortunately, not all EVs available in other jurisdictions are being sold in Canada. Provinces could encourage manufacturers to bring vehicles such as the Toyota Rav 4 EV and the Honda Fit EV to their region by either following California's lead by setting zero-emission vehicle sales requirements¹⁰ or following Norway's lead in creating market conditions where EV sales flourish.

As more models hit the Canadian market and as more dealerships put EVs on their lots, WWF expects options to continue expanding.

WWF TARGET
All North American models will be available in Canada by 2015

Models available in 2013



RECOMMENDATIONS:

7. More dealerships should have EVs available for customers to test drive, supported by salespeople knowledgeable about EVs.

ENVIRONMENTAL BENEFITS



Goal:

- Increased production of renewable electricity further improves the benefits of EVs.



Status:

- Charging (status varies by region based on electricity generation).



Successes:

- In most provinces, EVs produce 60 to 80 per cent fewer greenhouse gas emissions over their life cycle than conventional cars.¹³



Needs Improvement:

- EVs have fewer environmental benefits in provinces that rely on fossil fuels to generate electricity.

Because EVs are inherently more efficient than conventional vehicles, they produce fewer total greenhouse gas emissions even if the electricity that powers them is generated using fossil fuels. When EVs are powered by clean electricity, the environmental benefits are greater still.

Overall, Canada has a much greener electricity grid than most countries. However, Alberta, Saskatchewan, and Nova Scotia continue to rely on fossil fuels such as coal. Shifting to cleaner sources such as hydro, wind, or solar energy would enhance the environmental benefits of EVs in those provinces. WWF's goal is to reach 100 per cent renewable energy by 2050.¹⁴



Meanwhile, car manufacturers can shrink the environmental footprint of EVs still further by enacting clear stewardship plans for battery manufacturing, reuse, and recycling. Mining and processing many of the metals used in batteries comes at a high environmental cost, so reusing and recycling batteries at the end of their lifespan minimizes that cost.

Finally, EVs are just one part of the solution to cutting transportation emissions in Canada. While they are a better alternative to conventional vehicles for trips where personal vehicles are the only viable option, governments should enact sustainable transportation policies that encourage public transit and active forms of transportation wherever possible.



Canadians who live in a region that uses fossil fuels to generate electricity could consider complementing their EV purchase with an investment in renewable energy—either by installing a renewable energy system themselves or by purchasing electricity from a green energy supplier.

RECOMMENDATIONS:

- 8. Provincial governments should set targets and introduce plans to increase renewable electricity generation.**
- 9. Manufacturers should have a stewardship system in place to collect, reuse, and recycle batteries from EVs as they reach their end of life.**



SUMMARY OF RATINGS



Pricing

charging



Practicality

charging



**Awareness and
experience**

energy needed



Model options

charging



**Environmental
benefits**

charging



SUMMARY OF RECOMMENDATIONS

1. B.C., Ontario, and Quebec should continue to offer their incentive programs.
2. Other provinces should introduce similar incentives for buying EVs.
3. Federal and provincial governments should introduce other programs to reduce the price barrier to EVs.
4. Provincial governments and utilities should develop new infrastructure programs that encourage the installation of charging stations in workplaces and certain public areas.
5. Provinces and municipalities should change building codes and by-laws respectively to require the installation of charging stations in new buildings.
6. Employers, manufacturers, NGOs, and car-sharing and rental companies should increase opportunities for Canadians to try out electric vehicles.
7. More dealerships should have EVs available for customers to test drive, supported by salespeople knowledgeable about EVs.
8. Provincial governments should set targets and introduce plans to increase renewable electricity generation.
9. Manufacturers should have a stewardship system in place to collect, reuse, and recycle batteries from EVs as they reach their end of life.

ENDNOTES

1. Comparing EV numbers in August 2013 to August 2012. Numbers compiled from a number of sources including DesRosiers Automotive Consultants, goodcarbadcar.com, and Matthew Klippenstein (greencarreports.com)
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Transportation by the Numbers

28%

Transportation is the single-most significant contributor to GHG emissions in Canada, accounting for 28% of the total emissions in 2009.

35%

Road transportation emissions have increased by 35 per cent since 1990, second only to GHG emissions growth from the Canadian oil sands industry



270 grams

The average private automobile emits 270 grams of CO₂-equivalent emissions per passenger kilometre travelled

65%

Light-duty vehicles make up 65 per cent of road transportation emissions



Why we are here.

We are creating solutions to the most serious conservation challenges facing our planet, helping people and nature thrive.

wwf.ca