



Treasury Board of Canada
Secrétariat

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du Canada

Canada

**Greening Government Strategy
for On-Road Fleets**

**Webinar Presentation for the
Canadian Institute of Procurement and
Materiel Management**

October 27, 2021

TBS - Centre for Greening Government (CGG)

www.canada.ca/greening-government
www.canada.ca/gouvernement-vert

Presenters

- **Chris Lindberg**, Senior Analyst, Fleet Lead, Centre for Greening Government, Treasury Board of Canada Secretariat
- **Craig Miller**, Senior Officer (Greening Government Operations), Fuel Diversification Division, Low-Carbon Energy Sector, Clean Fuels Branch, Natural Resources Canada
- **Yves Madore**, Analyst, Fleet, Centre for Greening Government, Treasury Board of Canada Secretariat
- **Cristina Martinez**, National Fleet Advisor, Procurement, Contracting and Contributions Branch, Parks Canada
- **Yves Riel**, Strategic J4/DND Fleet Management 2-4, Strategic Joint Staff, Canadian Armed Forces

Presentation Overview

1. Greening Government Strategy Overview (TBS Centre for Greening Government)

- Policy context
- Greening Government Strategy
- On-road fleet commitments

2. Zero Emission Vehicles 101 (NRCan Greening Government Operations)

- Hybrids and Zero Emission Vehicles
- Charging Stations
- Tips

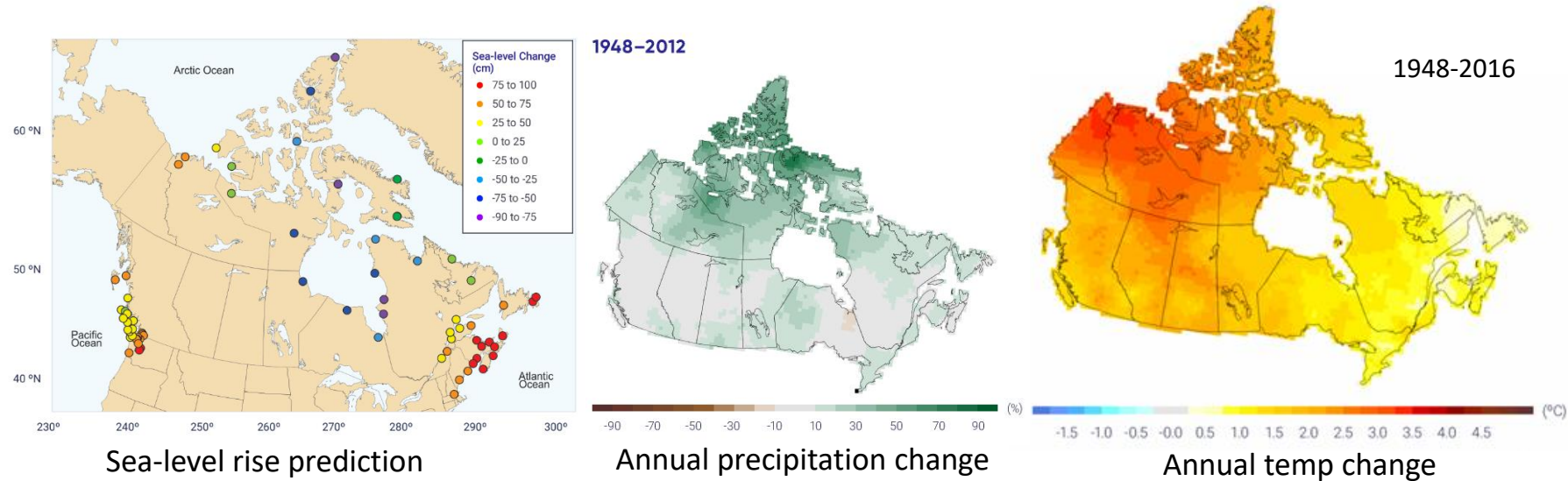
3. Procurement Challenges and Solutions (TBS Centre for Greening Government)

- Progress to date
- Challenges and solutions to greening
- Market and total cost of ownership analysis
- 2021-22 Green vehicle availability and requirements
- Achievability of the 2030 target

4. Panel Discussion: Green Vehicle Procurement and EV Charging Stations

5. Closing Thoughts and Q&A

In Canada and abroad, the effects of climate change are evident



The science is clear that human activities are driving unprecedented changes in the Earth's climate, which pose significant risks to human health, security, biodiversity and economic growth

- Canada has warmed by **1.7°C** between 1948 and 2016, about 2 times the global average
- Northern Canada has warmed by **2.3°C**, about 3 times the global average
- Across Canada we are experiencing more extreme heat, less snow and sea ice cover, increased coastal erosion, thinning glaciers, thawing permafrost, warming and acidifying oceans

Acting on climate change will reduce risks and create economic opportunities and jobs for Canadians

Canada is committed to global leadership on climate change, including greening government operations



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

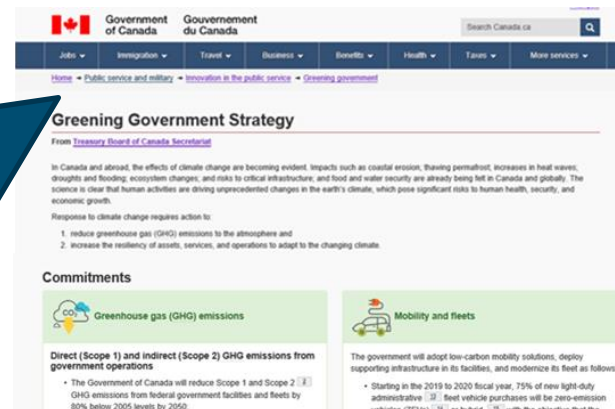
Keep the global temperature increase to well below 2 degrees Celsius and take action to adapt

2020: Canada's enhanced climate plan targets net zero carbon by 2050 and includes greening government commitments



FSDS: Reduce GHG emissions from Federal operations

2020: Updated Greening Government Strategy Net zero carbon and climate resilient operations by 2050



2018: Updated Policy on Green Procurement



The Greening Government Strategy: An ambitious agenda for action

Objective

In-line with:



Strategy (GGS)
developed to
get there:

Implementation:

Performance:

❖ Net-zero, green & climate resilient government operations

- ❖ 40% reduction of emissions by 2025 (*for RP and conventional fleet*)
- ❖ Net-zero by 2050 (*for all RP, fleet and procurement*)

ALIGN POLICIES, ENGAGE PARTNERS

REAL PROPERTY
(RP)



MOBILITY and
FLEET



PROCUREMENT
and CLEAN
TECHNOLOGIES



CLIMATE
RESILIENCE



MEASURE PERFORMANCE

- TBS providing direction, guidance and Greening Government Fund
- Expert depts. providing support

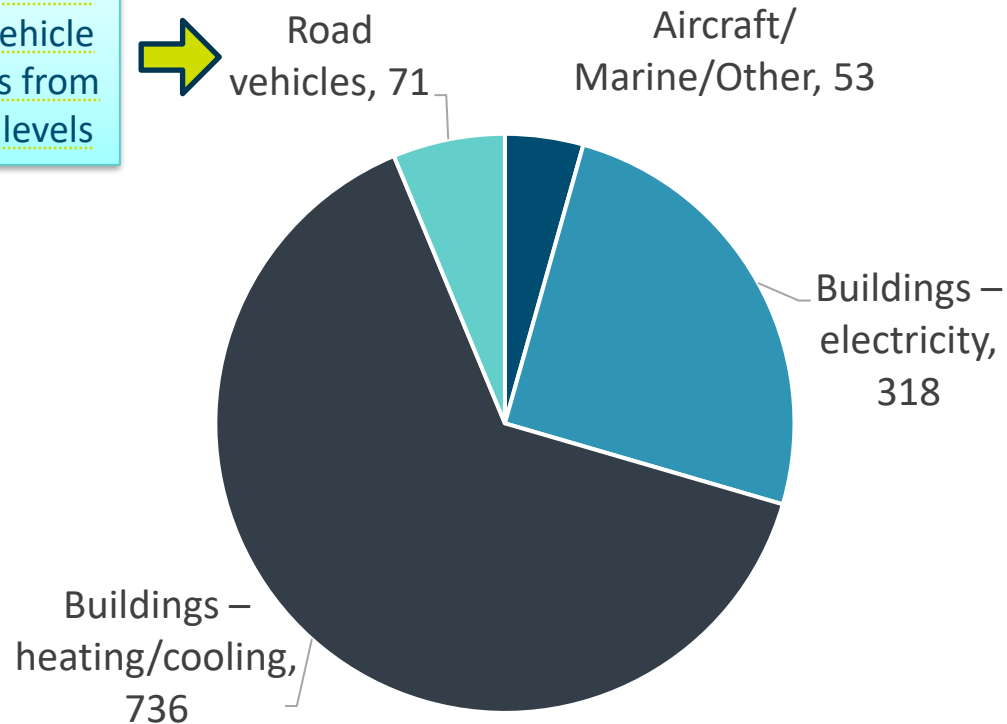
DEPARTMENTS TAKING ACTION

34.6% reduction in GHG emissions for buildings/conventional fleet

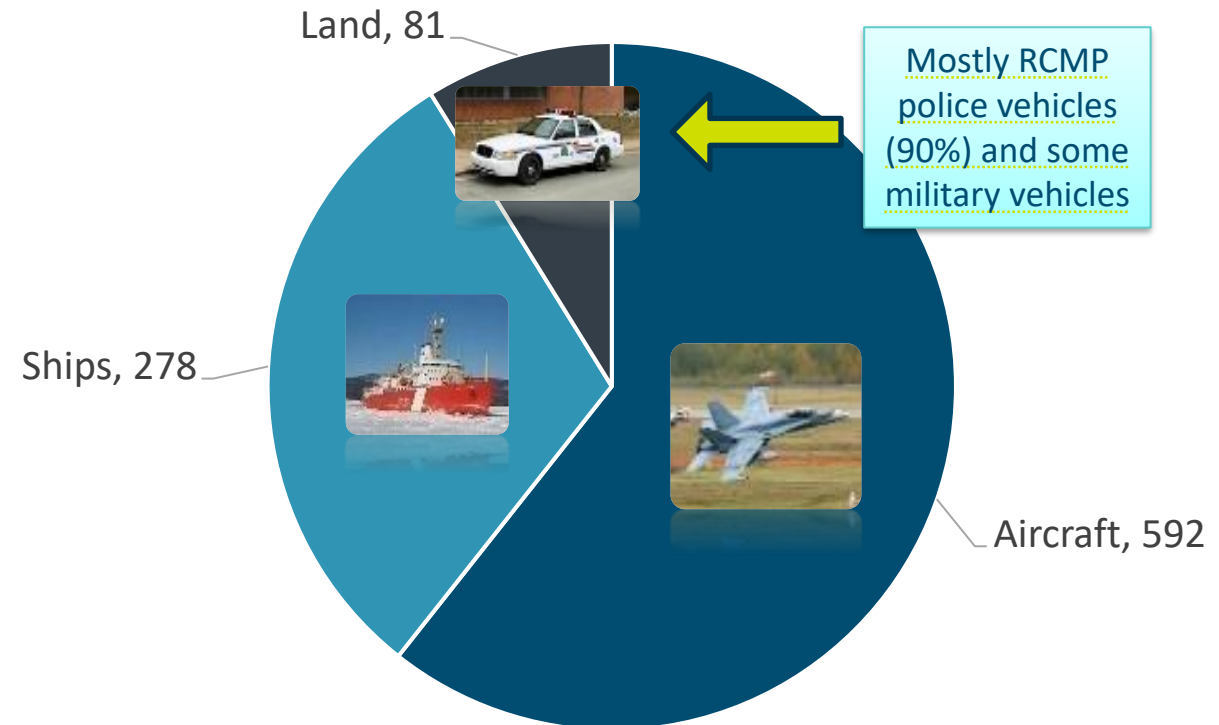
Sources of all federal emissions 2019-20

Buildings and Conventional Fleet 1,177 kt (Scope 1-2)

35% reduction
in road vehicle
emissions from
2005-06 levels



National Safety and Security Fleet 951 kt (Scope 1)



The GoC owns 30,000 buildings, 20,000 engineering assets, 30,000 fleet and buys over \$18B/year
– largest asset owner and public procurer in Canada

Note: All numbers in kilotonnes (kt) of carbon dioxide equivalent

Conventional fleet procurement commitments



On-road fleet

- 75% of unmodified light-duty vehicle purchases¹ must be zero emission vehicles² (ZEVs) or hybrids, with the objective that the light-duty fleet comprises at least 80% ZEVs by 2030. Priority is to be given to purchasing ZEVs.
- 100% of new executive vehicle purchases will be ZEVs or hybrids.
- Fleet management will be optimized to achieve the targets, including by exploring options for commercial vehicles, assessing ZEV charging infrastructure needs and applying telematics to analyze vehicle usage data on vehicles scheduled to be replaced.

¹ Categories 3 and 4, as defined in Treasury Board guidance, where more than one option per vehicle group is available and considers operational feasibility.

² ZEVs include battery electric, plug-in hybrid and hydrogen fuel cell vehicles.

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Zero-Emission Vehicles 101

NRCan GGO Fleets – October 2021

Canada

Overview

- NRCan Background
- What are ZEVs
- Types of ZEVs
- Emissions?
- Charging 101
- Charging Stations
- Range
- Tips



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NRCan Background

- To support the Greening Government Strategy (GGS), NRCan's Greening Government Fleets Program offers federal departments and agencies a turnkey solution to inform how best to green their fleet.
- Through the deployment of on-board telematics, the Program collects real-time utilization data to identify opportunities and provide recommendations for right-sizing, assess fleet vehicles for ZEV and hybrid suitability and fuel switching, and make recommendations for the planning of charging infrastructure.



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NRCan Background

- 14 Federal Departments and Agencies
- **2,954** vehicles assessed to date
 - 1,307 Lower carbon alternatives
 - 225 Underutilized vehicles
- Potential reduction of **2,512** tons of CO₂ emissions annually
- Potential reduction of **995,299L** of fuel annually
- Potential total cost of ownership savings of over **\$8,000,000**



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What Are Zero-Emission Vehicles (ZEVs)?



PHEV

Plug-In Hybrid Electric Vehicle



BEV

Battery Electric Vehicle



FCEV

Fuel Cell Electric Vehicle

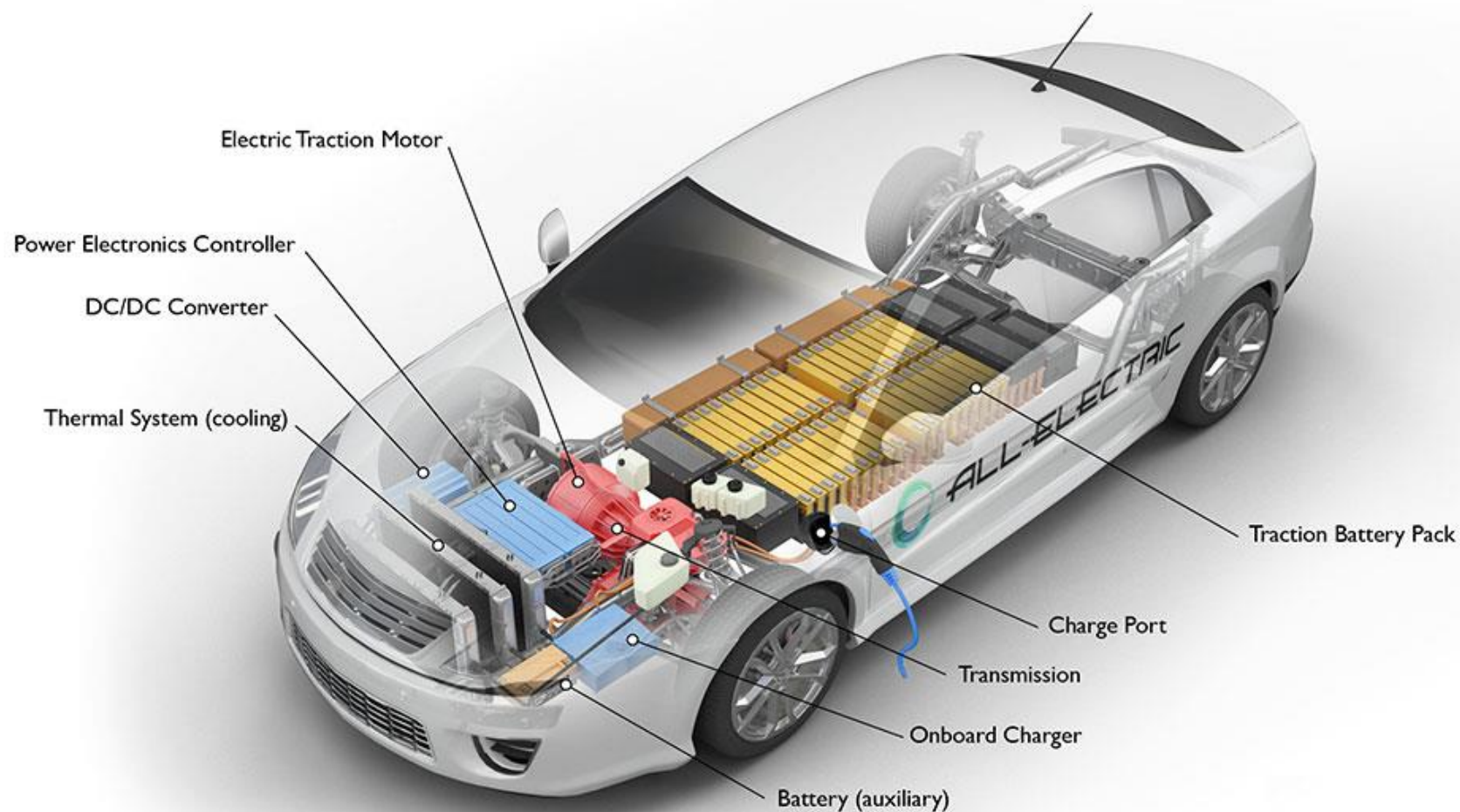


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Battery-Electric Vehicle



afdc.energy.gov

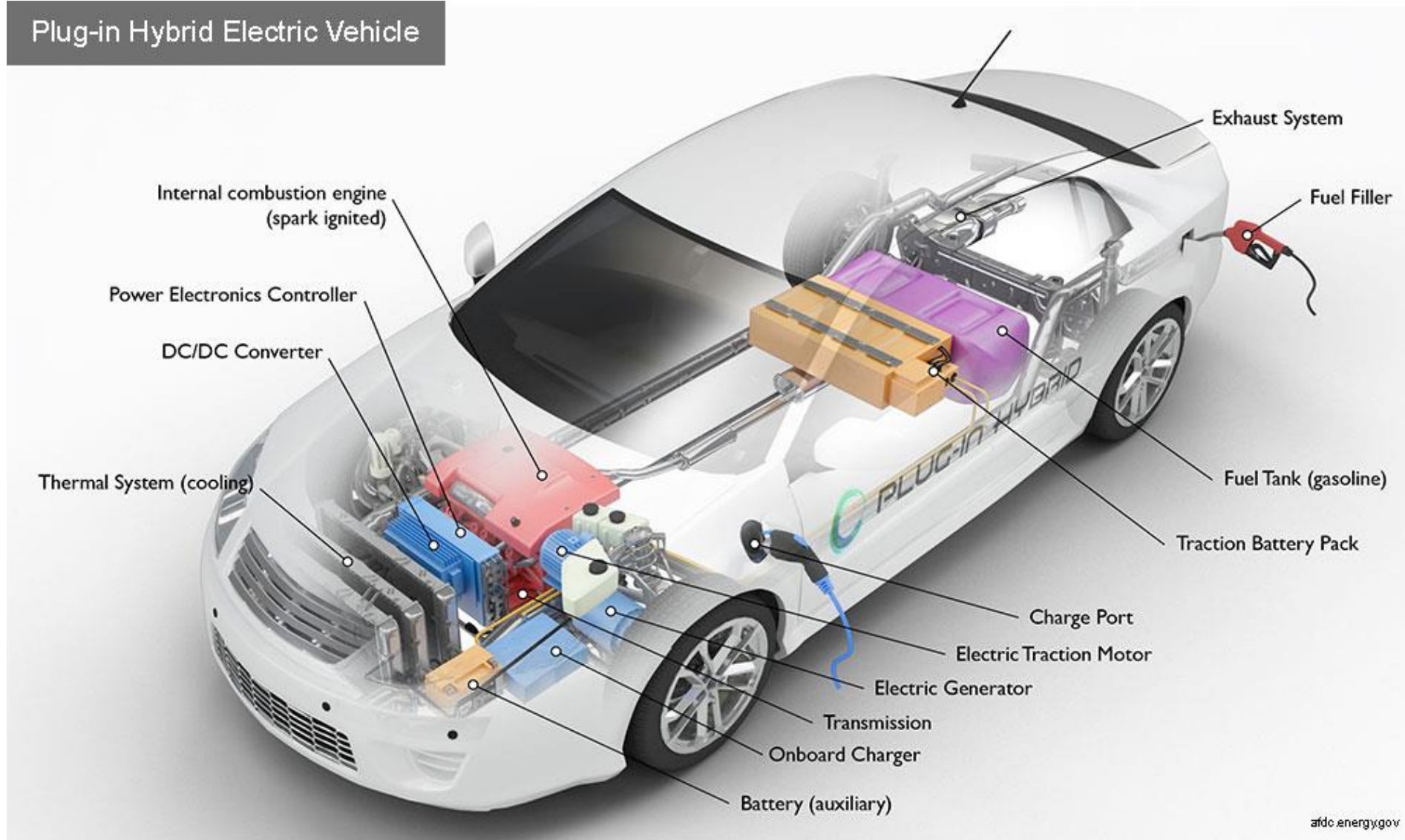


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Plug-in Hybrid Electric Vehicle

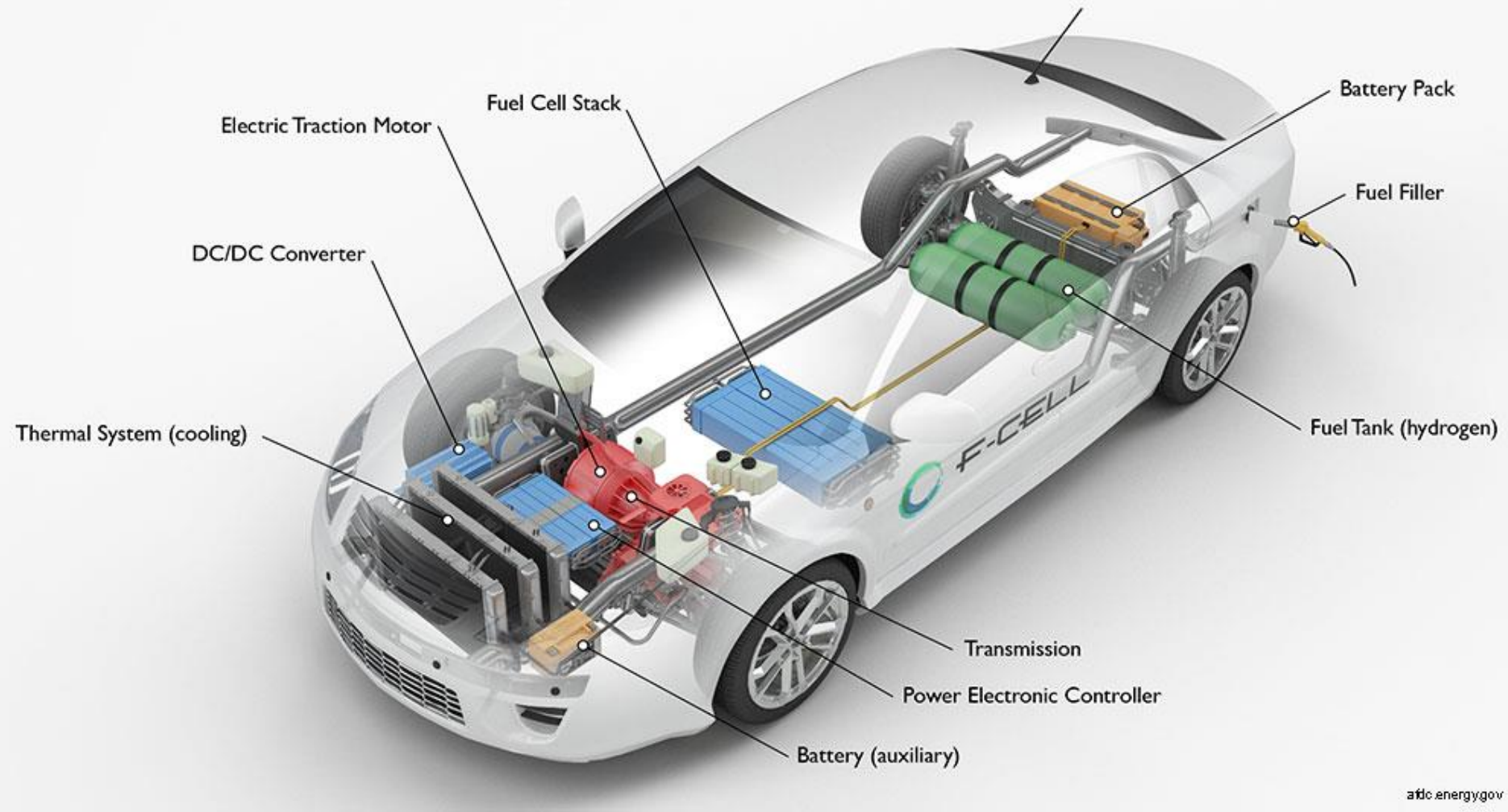


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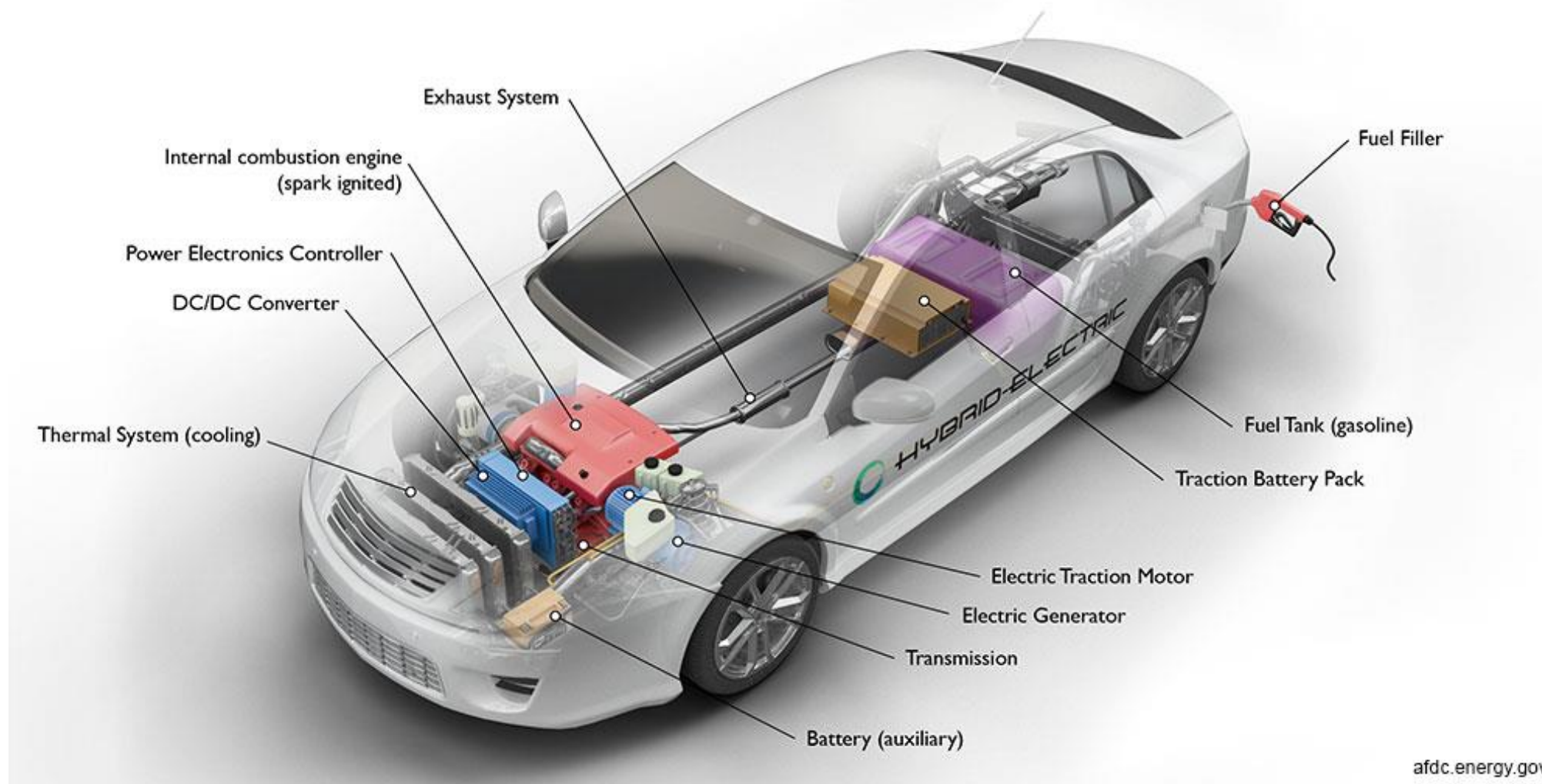
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Hydrogen Fuel Cell Vehicle



Hybrid Electric Vehicle

NOT A ZEV




















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Emissions

		 CONVENTIONAL	 HYBRID	 PLUG-IN HYBRID	 ALL-ELECTRIC
SOURCES OF ENERGY					
CONSUMPTION					
EMISSIONS					 NO EMISSION



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Charging 101

- **Level 1** – 120v: 8 km of driving range per hour.
- **Level 2** – 240v: 30 to 50 km of driving range per hour
- **Level 3 (DC Fast)** – \geq 480v: more than 100 km of driving range per hour



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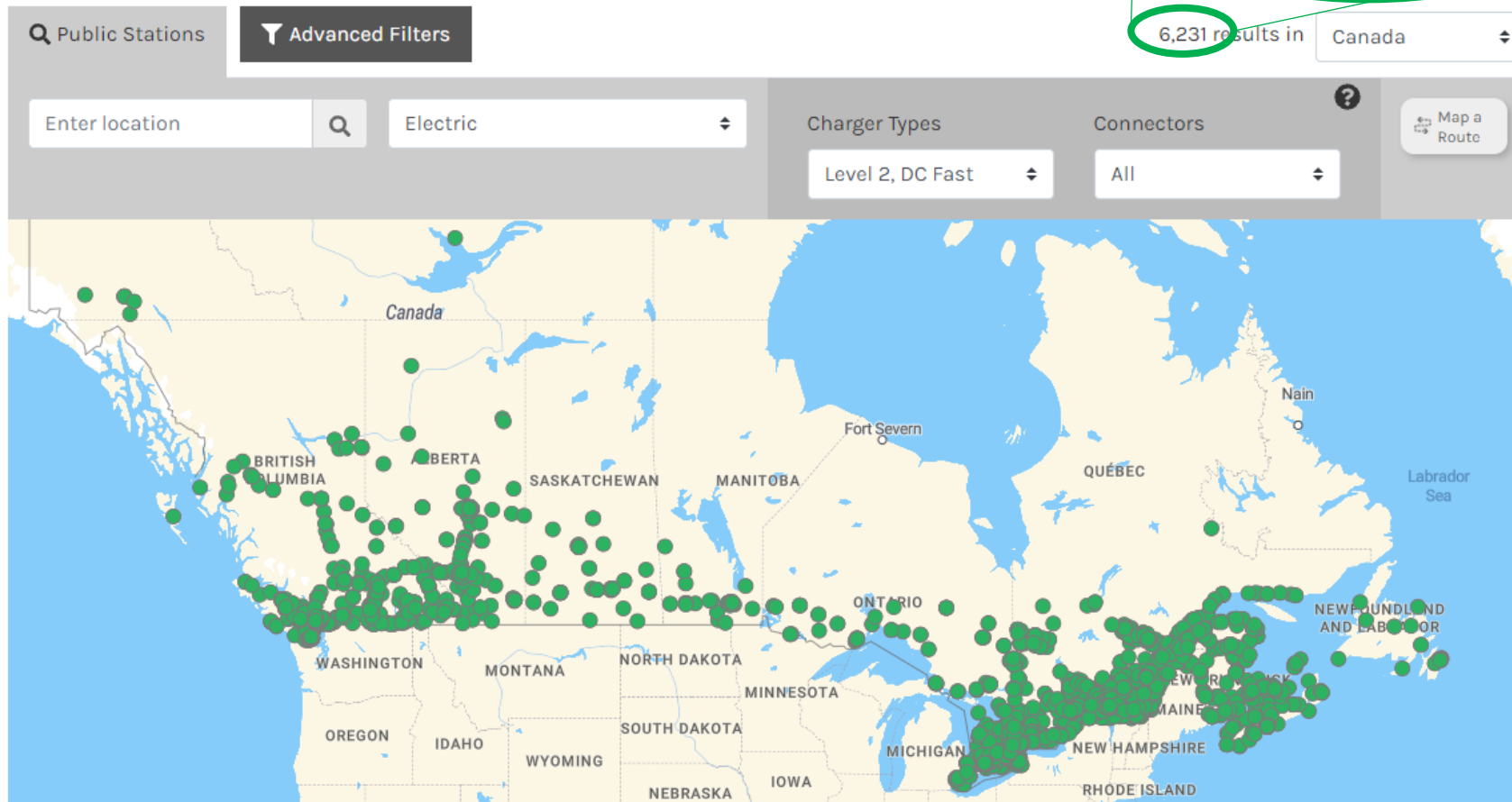
The Ideal Buildout

- Short Answer – It depends!
- Defining a “long” dwell time: ≥ 8 hrs for PHEVs, ≥ 16 hrs for BEVs
- L1 adequate for most PHEVs that dwell in-depot overnight.
- With the exception of low-utilization duty cycles, an L2 should be on-site to accommodate BEVs – roughly 3-7 hours for full charge.
- # of stations/ports contingent on # of EVs, staggering of dwell times, and operational requirements.



Charging Stations

6,231



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Range

2021 Model Year

Electric only ranges:

PHEV: 24 km – 203 km

BEV: 151 km – 652 km

As published in the NRCan Fuel
Consumption Guide

EcoDriving Online:

<https://solutions.ca/ecodriving/en/story.html>



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Tips

- Plug in to charge overnight
- Prepare for winter driving by pre-heating the cabin to extend the range by 10%-15%
- -18°C = 29% and 19% range reduction for BEVs and ICEs respectively
- Park in shade on hot days



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Progress to date with greening conventional light-duty fleet

Greening rapidly where options are available

- Focus is on unmodified vehicles purchases where HEV and/or ZEV options are available that meet operational requirements
- In 2020-2021, green options were available for 13 of 50 federal vehicle specifications, covering ~40% of federal purchases
- Limited options for vans, pick-up trucks and four-wheel drive vehicles

~17,000 light-duty vehicles in the conventional fleet, including ~13,500 unmodified vehicles

- Federal government also operates >3,000 commercial vehicles and >11,500 national safety and security light duty vehicles (mostly RCMP vehicles)

On track for greening targets

- In 2020-2021, >80% of new, unmodified light duty vehicle purchases were HEVs or ZEVs (where suitable HEV and/or ZEV options were available)
- On March 31, 2021 the conventional light-duty fleet was comprised of 6% HEVs (~1,100 vehicles) and 2.5% ZEVs (~450 vehicles)

Composition of the unmodified light duty fleet

Vehicle type	Percent of fleet	Availability of HEV and ZEV options in federal standing offer	Percent that are HEVs or ZEVs (As of March 31, 2020)
Passenger cars	17%	High for HEVs Medium for ZEVs	27%
Multi-purpose vehicles (SUVs, crossovers)	24%	Medium for HEVs Low for ZEVs	14%
Vans	24%	Very low	2%
Pick-up Trucks	35%	Very low	1%

Greening Challenges and Solutions

Common challenges:

- Lack of HEV/ZEV market options for many of the vehicle types used by the federal government (e.g. vans, pick-up trucks, police vehicles)
- Where options exist, there can be issues with manufacturer availability and/or ability to deliver vehicles for when they are needed
- Initial cost premium for green compared to capital budget and program needs
- Employee awareness & education of green options and suitability
- Costs and logistics for installation and/or access to charging infrastructure

Working collaboratively to advance solutions

- Ongoing engagement of senior decision-makers and chief financial officers
- Enhancing procurement process to include more HEV & ZEV options (e.g. manufacturer engagement; segmenting electric vehicles by range; bids evaluated based on fuel and carbon costs)
- Enhancing communications (e.g. promoting green low-bid list)
- Funding for pilot projects (e.g. electric buses & trucks; ZEV police and security vehicles)
- Guidance and insights for fleet managers (e.g. total cost of ownership)

Common Operational Concerns

- Vehicle not suitable for operational road conditions (e.g. off-road, gravel roads)
- Insufficient charging or refueling infrastructure for the vehicle location (in a particular region or workplace)
- No service centres (e.g. dealership) that can support the HEV/ZEV vehicle within 100km of vehicle location
- Vehicle configuration not suitable for requirements (e.g. cargo or passenger space)
- Anxiety about performance of new technology

Greening Government Fund

PURPOSE

To provide funding for departments to explore and share innovative approaches to reducing greenhouse gas (GHG) emissions (Scope 1,2 and 3) in federal operations. Project funding comes from departments and agencies that generate more than 1 kilotonne of GHGs per year from air travel.

OBJECTIVE

To support and share the results of projects which:

- are projected to result in GHG emission reductions;
- have a high potential for replicability; and
- pursue emissions solutions in difficult-to-reduce areas

<https://www.canada.ca/en/treasury-board-secretariat/services/innovation/greening-government/greening-gov-fund.html>

https://www.gcpeia.gc.ca/wiki/Greening_Government_Fund

	On-Road Fleet Projects Funded
Cycle 1 (beginning FY 2019- 2020)	Title: AAFC Purchase of Two Electric Tractors (\$204,400 over 1 year)
	Title: GAC Carpooling App (\$62,000 over 2 years)
Cycle 2 (beginning FY 2020- 2021)	Title: ECCC Electric Shuttle Buses (\$453,215 over 1 year)
	Title: NRCan Enabling Portfolio-wide Deep Retrofits of Buildings and Facilitating Low-Carbon Fleets through Additions to the RETScreen Software (\$800,000 over 3 years)
Cycle 3 (beginning FY 2022- 2023)	Title: GAC Hybrid 20 Feet Cube-Truck and Electric Commercial Cargo Vans (\$420,000 over 2 years)
	Title: ISED Greening Government – Measurement Canada Heavy-Duty Truck Fleet Replacement Proposal (\$1,323,000 over 3 years)
	Title: NRCan/ RCMP Deploying Zero-Emission and Clean Fuel Powered National Safety & Security Vehicles - From Assessment to Replication (\$600,000 over 3 years)

Market Analysis: Rapid expansion and increasing affordability

Increasing availability

- During 2020-21 there were **25 HEV and ZEV options (models and variants) in 15 different vehicle specification codes** available to federal fleet managers through the standing offer.
- For 2021-22 there are **62 ZEV and HEV options available through the standing offer in 22 different vehicle specification codes**
- Expect **more than 100 new HEV and ZEV options** to enter the market over the next 3-4 years, including pick-up trucks, vans and buses.
- EV **ranges of >400km** becoming common

Increasing affordability

- **Initial cost parity of ZEVs with conventional vehicles projected when battery costs <\$100 kWh.**
 - Larger vehicles with larger battery packs and higher price points are likely to achieve cost parity sooner than smaller vehicles
 - Electric vehicle initial cost parity with conventional vehicles is likely between 2024–2025 for shorter-range and 2026–2028 for longer-range vehicles.
- **Lifecycle / total cost of ownership parity exists for some vehicles already;** anticipated for remaining vehicles between 2022-2026



Total Cost of Ownership (TCO) analysis

Assessed two years of federal purchases, fuel efficiency data, market trends and analysis

- Compared average purchase cost for each vehicle specification and green powertrain type against conventional vehicle
- Calculated total cost of ownership = Initial capital cost **plus** seven years of operations (fuel costs, carbon levy, maintenance costs) **minus** residual value after depreciation.
- Assumed 7 years of operation at 20,000km/yr. with gas \$1.25/L, electricity \$0.13/kwh, an average carbon levy of \$95/ton (2022 to 2028), average Cdn. maintenance costs, and 70% depreciation after 7 years

Average estimated TCO was lower for all powertrains despite significantly higher initial purchase cost

- Estimate cumulative total savings of >\$2 million over 7 years from federal purchases of HEVs and ZEVs between 2019 and 2021 compared to purchasing conventional vehicles
- Analysis suggests that fleet capital budgets need to increase in the short term – with more than equivalent savings in operations and maintenance
- By 2025, anticipate there will be little or no initial capital cost premium for ZEVs compared to conventional vehicles

Powertrain Type	Initial Capital Cost	Annual Fuel Costs	Annual Emissions & Carbon Levy	Annual Maintenance Costs	Depreciation rate	TCO after 7 years
Hybrid (HEV)	+ 24%	- 31%	- 31%	Same	Same as conventional	-2%
Plug-in Hybrid (PHEV)	+ 59%	- 59%	- 73%	- 30%		-13%
Battery electric (BEV)	+ 96% (41-107%)	- 82%	- 100%	- 50%		-14%

2021-22 Light-Duty Green Vehicle Procurement Requirements

- Each year the TBS CGG determines which federal vehicle purchases will be publicly reported under the 75% target for that fiscal year. This assessment is done with input from NRCan's GGO for fleets program, TBS's OCG and PSPC and considers:
 - The current and historical HEV and ZEV bids received from manufacturers in the Government Motor Vehicle Ordering Guide (GMVOG);
 - The initial capital cost and estimated total cost of ownership of the vehicles;
 - Relevant reports and insights on vehicle performance and reliability; and
 - The availability of vehicles in the Canadian market.
- For FY 2021-22, federal Category 3 and 4 vehicle purchases in eighteen vehicle specification codes will be publicly reported for the target. This is an increase from eight codes in 2020-21.
- Each department is expected to meet or exceed the 75% target for their total purchases in these eighteen codes. Priority is to be given to purchasing ZEVs and fleet managers are expected to thoroughly assess their operational requirements before determining that a ZEV is not suitable.
- The price premiums for the HEVs and ZEVs in the GMVOG are modest over the lifetime of the vehicle and would not generally be considered a valid reason for not achieving the target. Most specification codes have at least one green vehicle option whose estimated total cost of ownership is lower than the equivalent low-bid conventional vehicle for that specification.
- For more information: https://www.gcpcedia.gc.ca/wiki/Mobility_and_Fleet

Specification codes that will be reported for the 75% purchase target in FY 2021-22

D00 – Int. Sedans: 2WD
D01 – Int. Sedans: 4X4/AWD
D30 – Comp. Sedans: 2WD
D31 – Comp. Sedans: 4X4/AWD
H00 – Int. Station Wagons: 2WD
H01 – Int. Station Wagons: 4X4/AWD
H50 – Sm. Station Wagons: 2WD
H51 – Sm. Station Wagons: AWD
1H50R (RCMP) – Sm. station wagon 2WD
G40 – Sm. Crossovers: 2WD
G41 – Sm. Crossovers: 4X4/AWD
L40 – Sm. Utility Trucks: 2WD
L41 – Sm. Utility Trucks – 4X4/AWD
L61 - Utility Trucks: 4X4/AWD
M60 - Mini-vans: 2WD
M61 - Mini-vans: AWD
N20 - Pick-up truck – Compact Size
Q11 - Pick-up Trucks – Crew Cab – 4X4

Achievability of the 2030 target

80% ZEV light-duty fleet by 2030 should be achievable and affordable based on projected sector growth and reduction in costs over the next 3-4 years

- By 2024-2025, ZEV options should be available for most of the GoC light-duty fleet needs.
- Total cost of ownership is already lower for most ZEVs purchased by the GoC. BEVs initial capital cost is expected to become equivalent to conventional vehicles by 2024-25 for short range vehicles and between 2026-2028 for long range vehicles.
- To achieve the target, starting no later than 2024-2025 at least 80% of new purchases will need to be ZEVs (based on a 7 year ownership cycle)

Recognizing GoC leadership

- ✓ PSPC enhancements to the 2021-2022 vehicle procurement process to bring in more green options for light-duty and commercial vehicles
- ✓ NRCan Greening Government Operations ongoing support for telematics and EVSE installation
- ✓ Green Fleet Purchases (as of March 31, 2021)
 - ✓ DND has the most ZEVs (197) which is >3% of their fleet
 - ✓ Four departments' fleets are more than 12% ZEV: TC, PSPC, PHAC and CRA
 - ✓ 11 departments reported >85% HEV or ZEV unmodified purchases in 2020-2021

Panel Discussion: Green Vehicle Procurement and EV Charging Stations

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CGG Perspective on Electric Vehicle Charging Stations (EVCS)

To implement the Greening Government Strategy, departments need to ensure the availability of appropriate charging infrastructure and/or services to meet the operational needs of their fleets.

- Electric vehicle charging stations installed for the federal fleet must prioritize the charging of federal vehicles.
- Departments are also encouraged to promote greener, low-carbon commuting alternatives for employees, such as walking, biking, public transit, carpooling or ZEVs.

Departments may consider providing employee and/or public access to electric vehicle charging services to encourage greener commuting. There is currently no formal government-wide policy on this: the decision is at the discretion of each custodian department and will vary based on factors such as:

- resource availability and other priorities
- the location
- the nature of the custodianship of their facilities (e.g. leased or owned)
- the local availability of green transportation options and charging services

If a Department decides to make EVCS available to employees and/or the public then it's recommended that they charge a fee for this service based on usage that is comparable to market rates in the community.

- E.g. some departments have smart charging devices that are managed by a third-party service provider who controls access to the equipment and charges users directly for the service.

TOOLS

- [Electric Charging and Alternative Fuelling Stations Locator](#)
- NRCan Electric Vehicle Supply Equipment – Procurement Preparedness Guide



Parks
Canada

Parcs
Canada

Canada

Greening Fleet

Parks Canada Context and Considerations





Context

- 3378 vehicles owned (and 195 vehicles rented to support seasonal operations)
 - 1746 light-duty vehicles (67% of which are pickup trucks)
 - 209 medium and heavy trucks
 - 279 trailers
 - 313 industrial equipment
 - 249 boats
 - 582 other equipment (UTVs, snowmobiles, mowers, etc.)
- Locations vary greatly: Urban; Rural; Remote; Extremely remote.
- Parks Canada employs a decentralized fleet management model
 - 33 Senior managers across the country fully accountable for operations including fleet management.
 - Fleet management delegated to local Operations Asset Manager or Coordinator.
- 1 National Fleet Advisor



Key Takeaways – Greening Fleet

1. Internal Oversight – The Parks Canada Pre-Authorized Vehicle List
 - 1.1 Review the GMVOG using 2 lenses: greening and operational needs to produce the pre-authorized list.
 - 1.2 Executive Director level approval is required to purchase vehicles **not** on the pre-authorized list.
2. Frequent Communications re Greening Targets and Performance – ALL management levels
 - 2.1 From Senior Managers to local Middle Managers via direct reports
 - Middle managers know operations best. If they understand the reasons behind the targets and get the message from their direct supervisor that this is important, they will work on plans to achieve the targets.
 - 2.2 From National Fleet Advisor to Senior Management
 - To create awareness among senior management re greening targets and our performance.
 - 2.3 From National Fleet Advisor to local Middle Managers and support staff.
 - Provide timely info; Listen to what they have to say; Remind them of targets; Pilot projects.

Contact: cristina.martinez@pc.gc.ca 780.883.0517



National
Defence

Défense
nationale

Webinar on greening the federal fleet for CIPMM



M. Yves Riel Strat J4 Tn 2-4, DND Fleet Management

Accelerating ZEV procurement

- DND established a very aggressive strategy for our Defense Energy & Environment Strategy (DEES), however we also modified the target to “Procurement” rather than “Percent of the fleet” because “percentage of the fleet” is not a stable target

TARGET 6

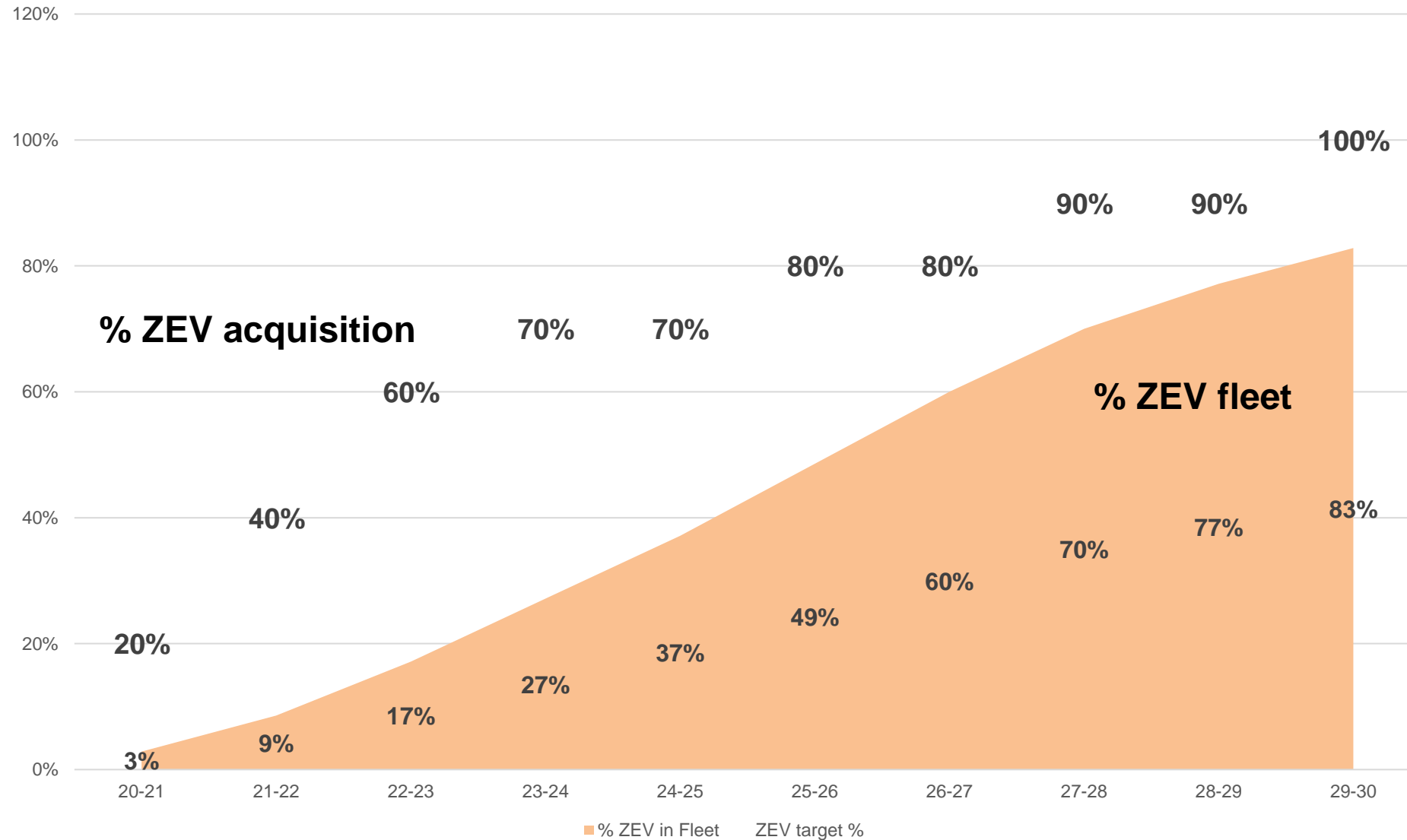
100% of DND commercial light-duty vehicle fleet purchases will be zero-emission vehicles (ZEVs) or hybrid when available, with a ZEV procurement target of 50% by 2023

When the Target for fleet was first established, we did not expect some vehicle type to be added then removed from the Government Motor Vehicle Ordering Guide (GMVOG). When vehicles are added or removed from the catalog, it affects the percentage of Hybrid and ZEV, which in turns makes the value fluctuate up and down.

30% Fleet Target surpassed for the last two years, however should we include the Pick-up trucks and Cross-over vehicles that were just added last fall, we would be below target by more than 10%

Canada

Webinar on greening the federal fleet for CIPMM





Electric Vehicle Charging stations

- We at DND have been working in close cooperation with our Infrastructure department, however no significant money has been marked for charging stations yet.
- We installed charging stations in some Québec locations.
- Many challenges, every time we think we finally have a solution, something else pops up and it is back to the drawing board, e.g.
 - Many of our bases are old and dating to before the computer era, with aging power grids that are already maxed out.
 - Real property organisation is saying, development strategy is looking at 10 years plus just to meet today's demand.
 - Employee use of charging stations discussed, but many other priorities take precedence to this subject.
- Some questions being explored:
 - Who will be paying for all the upgrades?
 - Will the power grid on our oldest bases be able to support the increase demand?
 - Who will be responsible to coordinate the installation of the charging stations?
 - What is the best options when deciding what type of charging stations to instal?
 - Is there a company that can support our needs Canada Wide?

Example: Québec Sector

- Working with "Circuit Électrique" to install and operate charging stations in Québec Garrisons
- Fleet vehicles have been assigned a device with a chip to activate the charger
- Chargers can be used by anyone with a "Circuit Électrique" card, however, access to some chargers is restricted to DND Fleet for security reasons.
- Electricity cost covered by Real Property for onsite charging and by Transportation budget for off-site charging.
- A directive is in place prohibiting personnel from charging on the 110v outlets.



To summarise;

We at DND are very proud of the result from our Fleet Managers. Even through a pandemic and a vehicle shortage, 85% of all vehicle with a green Option are HEV and 55% ZEV

As long as the industry and infrastructure can support us, we are confident we can reach the 80% green fleet by 2030

	18-19	19-20	20-21	Target	REMARKS
EV acquisition	97%	83%	85%	100%(DND) 75% (GoC)	Limited by industry offer
ZEV acquisition	43%	49%	55%	35% (20-21) 40% (21-22) 50% (22-23)	Achieved but limited by industry offer
ZEV Fleet*	5%	11%	13%	80% (2030)	ZEV acquisition target starting 2023 will need to be aggressive to meet the 2030 80% fleet target
EV Fleet*	27%	33%	34%	20% (2020)	DEES 2017-2020 achieved

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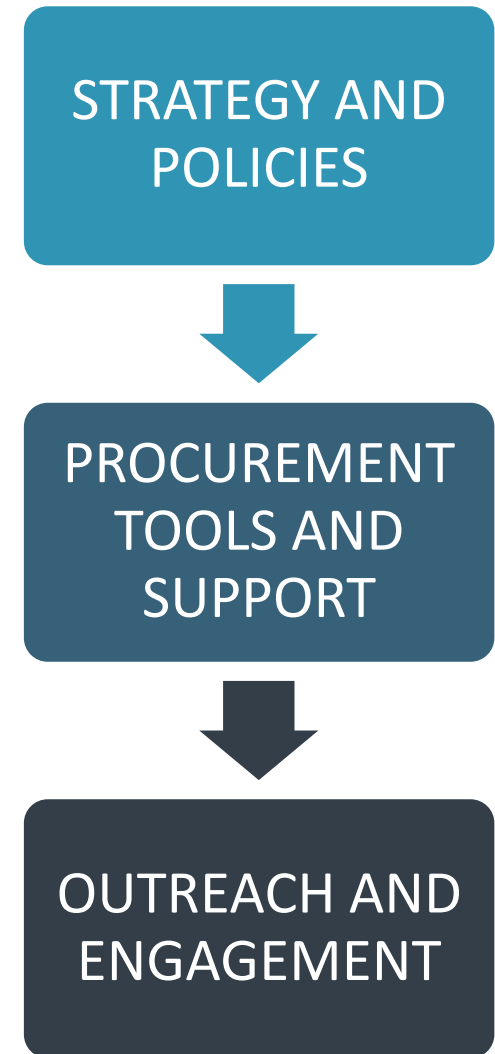
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- **Yves Madore**, Analyst, Fleet, Centre for Greening Government, Treasury Board of Canada Secretariat
- **Cristina Martinez**, National Fleet Advisor, Procurement, Contracting and Contributions Branch, Parks Canada
- **Yves Riel**, Strategic J4/DND Fleet Management 2-4, Strategic Joint Staff, Canadian Armed Forces

Closing Thoughts and Questions and Answers

Departments and fleet managers are encouraged to take a proactive, comprehensive approach, e.g.

- Aligning internal policies and processes to ensure prioritization of ZEV and HEV purchases.
- Investing in robust charging infrastructure and systems.
- Optimizing fleet size and vehicle size (e.g. telematics, right-sizing).
- Engaging and educating employees on costs, benefits and considerations for ZEVs.
- Planning for increased capital purchase costs in the short-term offset by reduced operations and maintenance costs over the life of the vehicle.
- Striving to finalize budgets and place orders early in the year to secure access and ensure delivery of vehicles when needed.
- Developing purchase forecasts that can be used to signal demand for green vehicles and help secure supply from manufacturers.
- Maintaining and analysing data in fleet management information systems to assess needs, opportunities and total costs of ownership.



Thank You!

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Helpful Links

- Federal [Greening Government site](#)
- Awareness and information guides
 - [AVÉQ](#)
 - [NRCan](#)
 - [Plug'n Drive](#)
 - [CAA](#)
- Fuel use and GHG emissions data
 - [NRCan](#)
- Driver training
 - [Stantec/ NRCan ecoDriving online](#)