



GENERAL MOTORS  
CANADA

## **How Far is the Road to Paris?**

David Paterson

Vice President, Corporate and Environmental Affairs

# Three Questions:

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1. “Are we there yet?”
2. “Can we go any faster?”
3. “What is GM doing?”





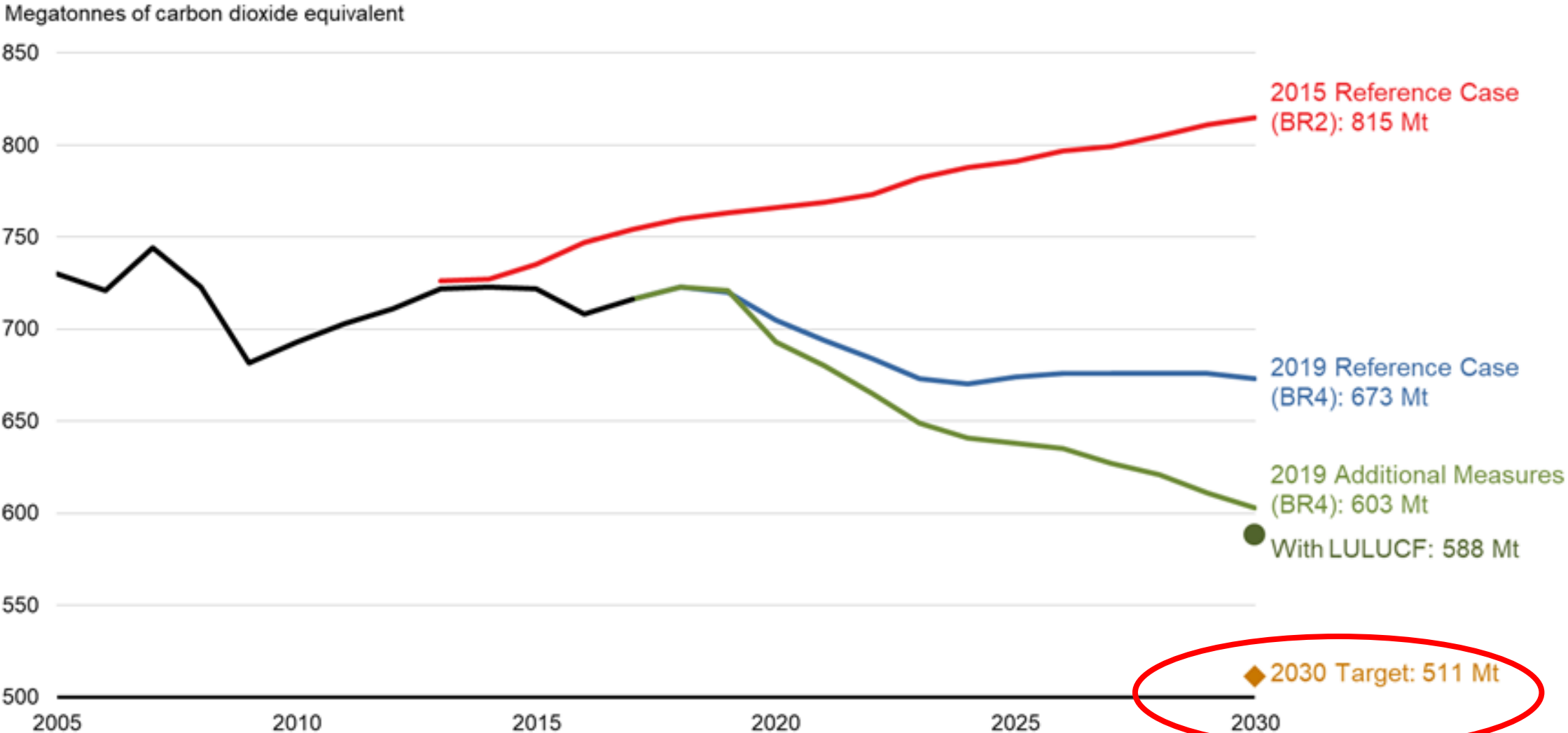
# **“Criteria” Emissions versus GHG**

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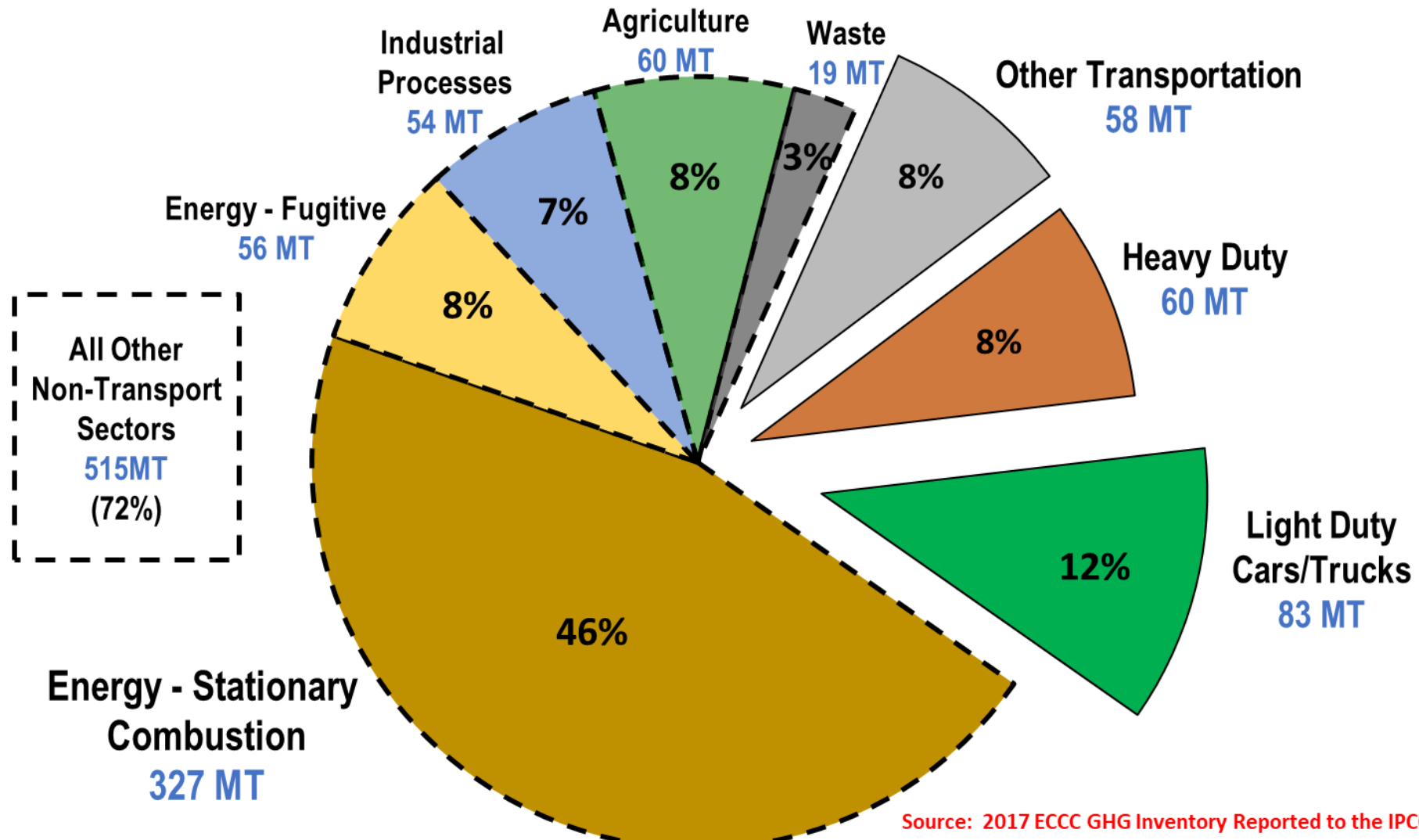
- 1) Nox and Sox “criteria emissions” – now largely eliminated
- 2) CO<sub>2</sub> and other GHG emissions – the big challenge



# Under the Paris Agreement, Canada committed to reducing its GHG emissions by 30% below 2005 levels by 2030



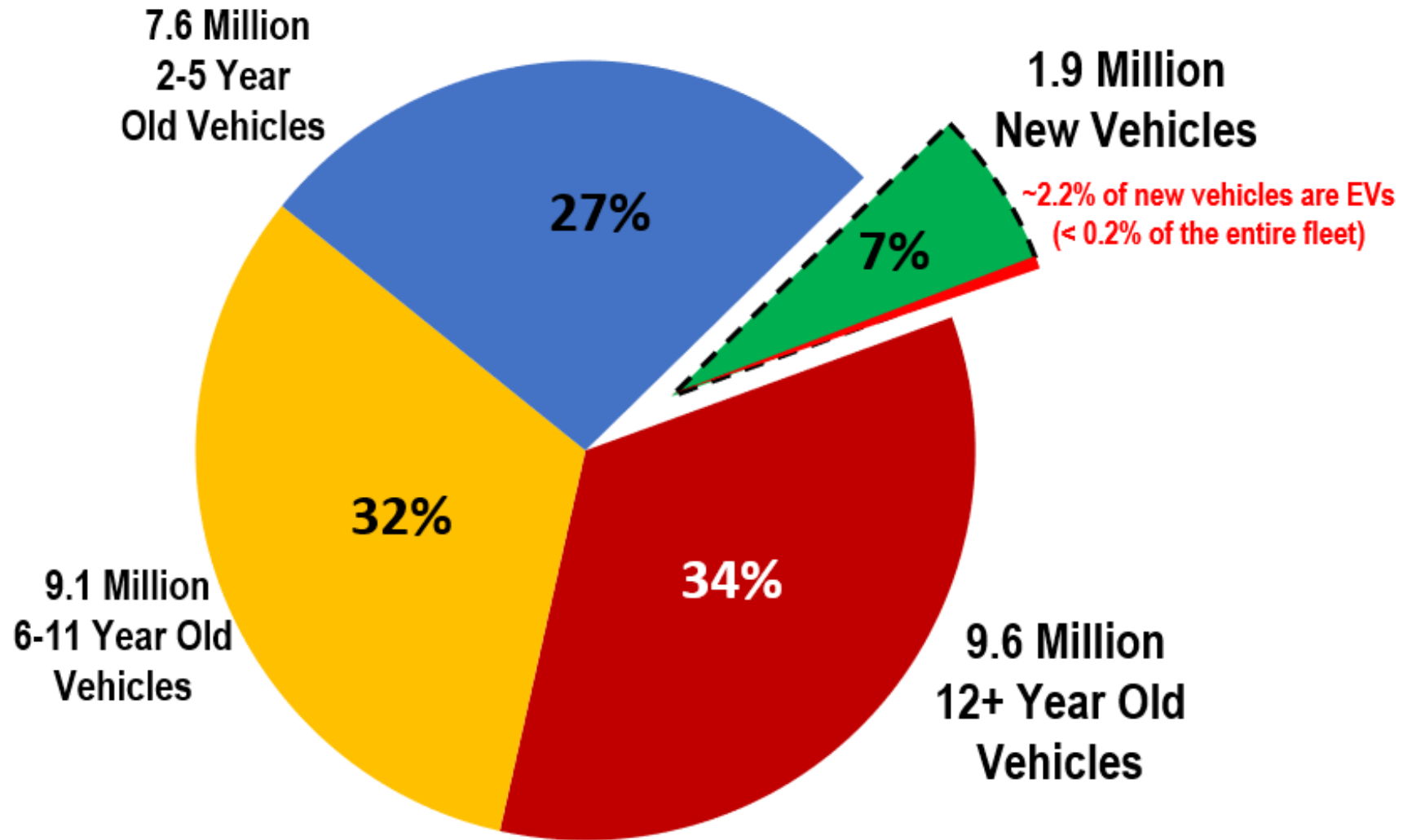
# Canada's Sources of GHG Emissions (at 2017)



Source: 2017 ECCC GHG Inventory Reported to the IPCC



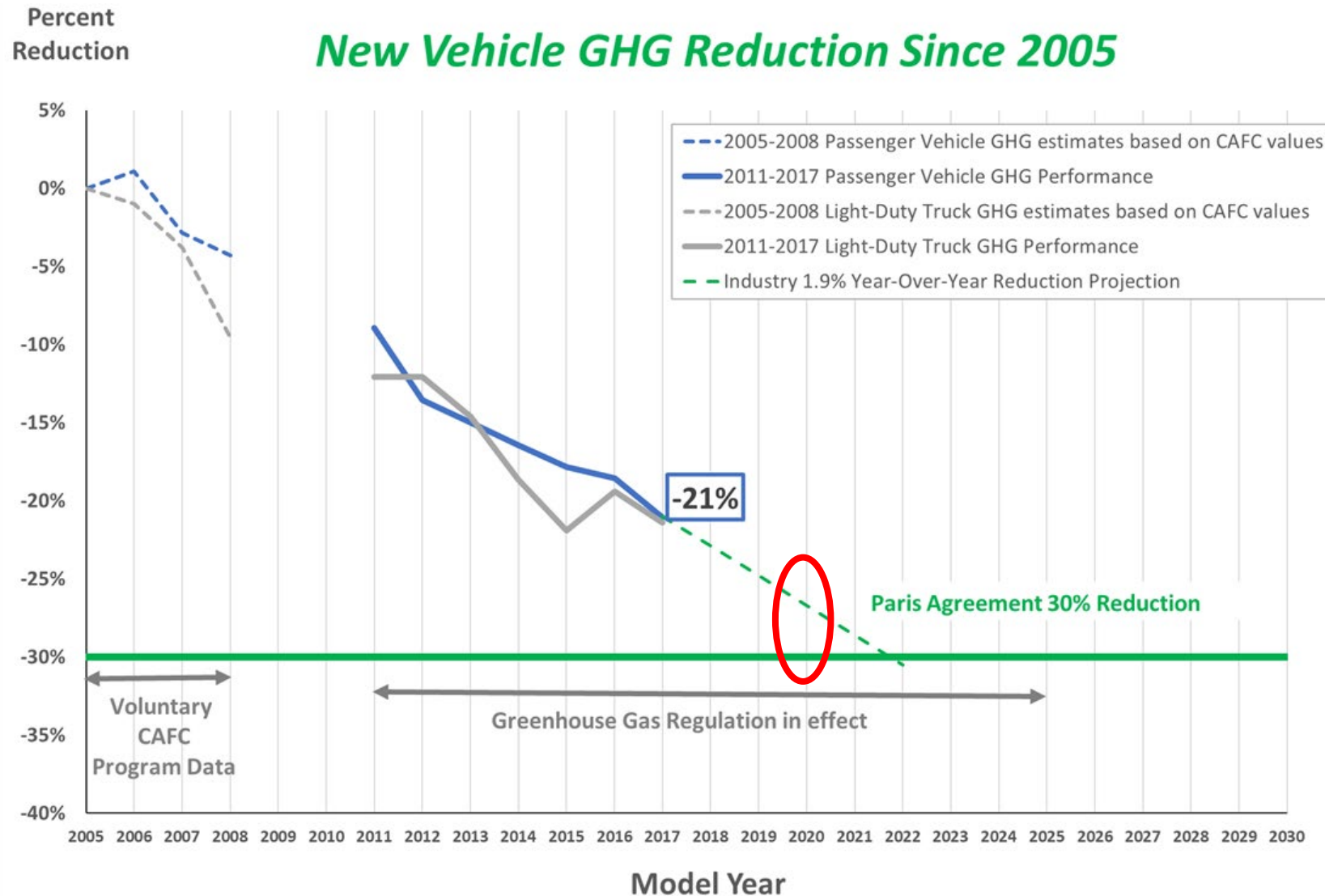
# 34% of Canada's Light Duty Vehicles are +12 Years Old



Source: POLK TVIO Vehicle Counts As Of Dec 31, 2018

# “Are We Almost There Yet?”

## New Vehicle GHG Reduction Since 2005





# Light Duty Technology Solutions

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## Higher Cost Advanced Technologies

Autonomous shared mobility

Hydrogen fuel cells

Full battery electric SUVs and pick-up trucks

BEVs with long range

Extended range plug-in battery  
/gasoline

Hybrids



## “Low-Hanging Fruit”:

Stop/start fuel saver

Aerodynamics & Light-weighting

Low rolling resistance tires

Cylinder deactivation

Fuel monitoring systems

Improved internal combustion engines  
and transmissions

Alternate bio fuels



# Summary Points

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- LDVs are **12%** of Canada's GHG sources
- New LDV GHG technology has improved over **21%** since 2005
- Other factors offset auto technology gains
- EVs offer accelerated GHG reduction and longer term carbon neutrality

***What policy options could then accelerate GHG reduction from Canada's LDV segment?***

# Can't We Go Any Faster?

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*Just regulate 'em! (e.g. 32" pants!)*

**Better public transportation**

**Increase fuel prices**

**Urban mobility advances**

**Lower GHG fuels**

**Charging infrastructure**

**Scrap older vehicles –  
incentives or licensing**

**Lower battery costs**

**Government & fleet  
purchases of advanced  
technology**

**Free parking and tolls**

**Consumer incentives for long-range ZEVs**





# Regulation in an Integrated Auto Industry

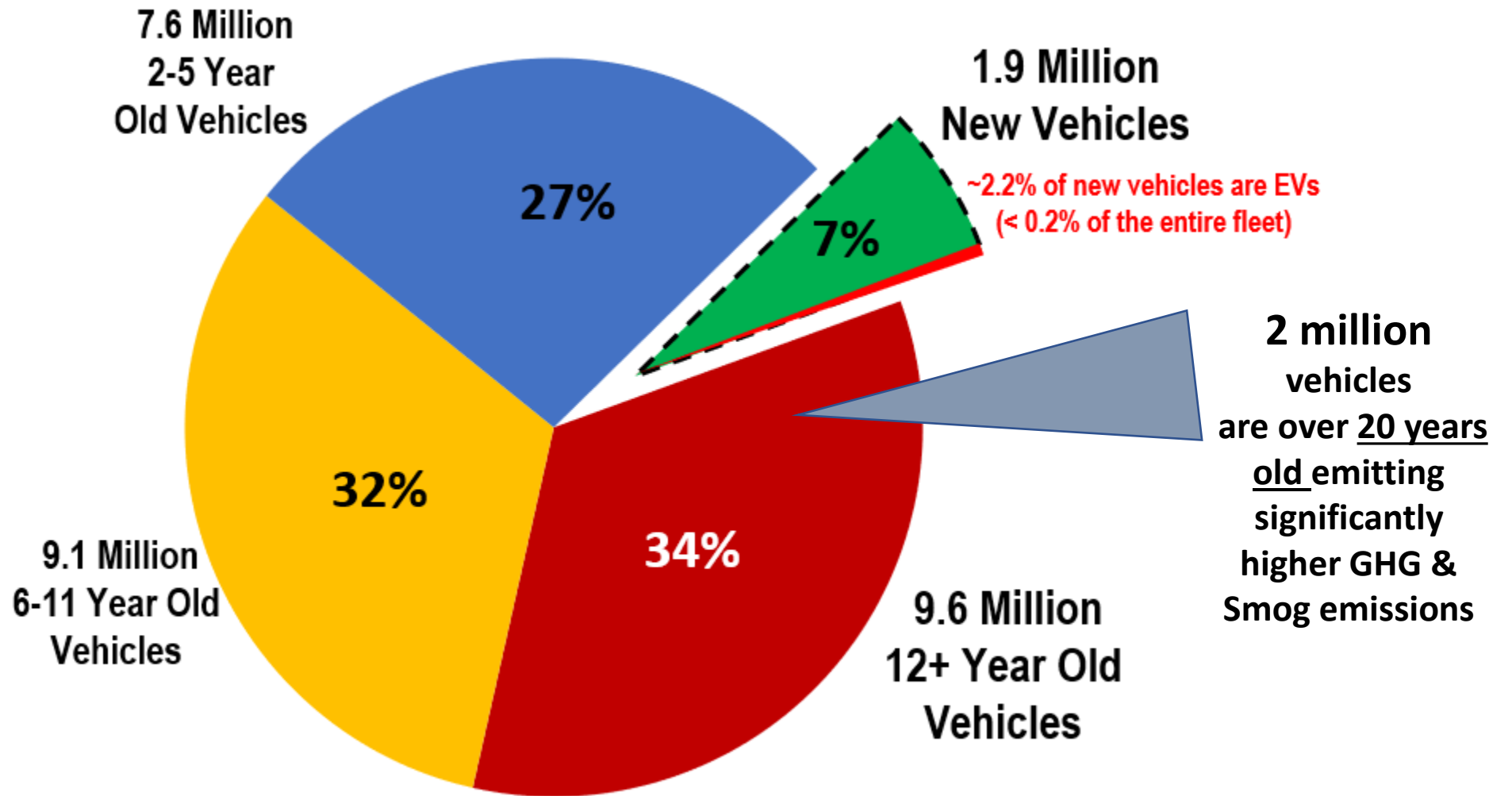
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Mid-term review of vehicle GHG regulations underway.

- 1) Integrated rules of origin – NAFTA
- 2) Integrated safety regulations
- 3) Integrated vehicle smog regulations
- 4) Integrated vehicle GHG regulations



## What If We Removed Vehicles > 20 Years Old?



Source: POLK TVIO Vehicle Counts As Of Dec 31, 2018





# What Role For Fuel Price and Fuel Quality?

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## Sample gasoline prices:

- Norway \$2.45 / litre
- Canada \$1.25 / litre



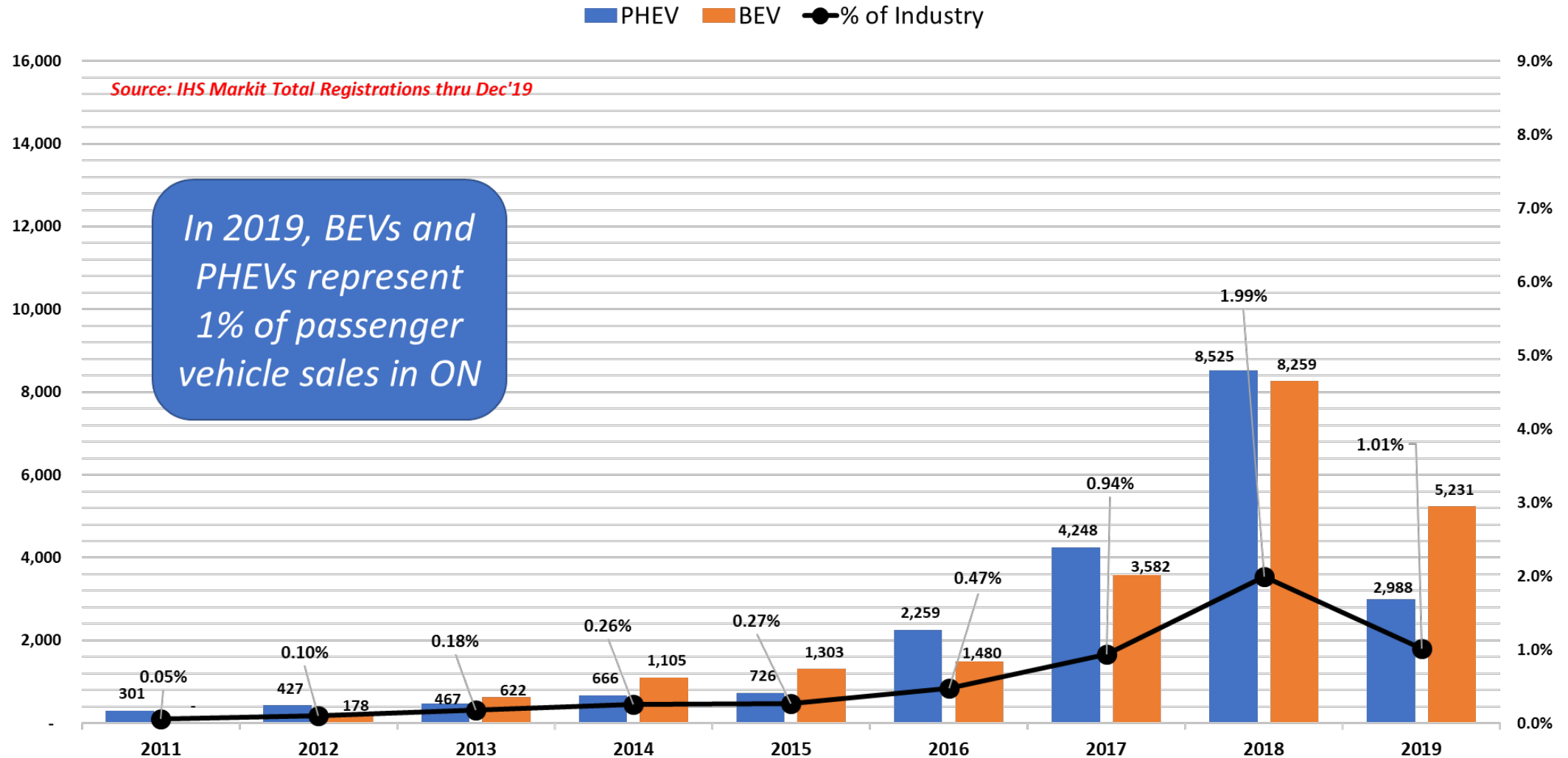
# Policy Options to Accelerate Electrification





# Consumer Incentives Still Drive EV Purchases

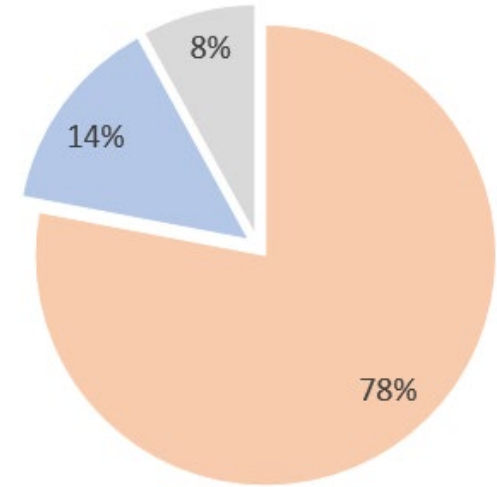
## Ontario - Total Plug-in Vehicle Sales



# Accessible EV Charging

■ Home ■ Work ■ Public/Hwy

- EV Owners charge their vehicles at **HOME**, at **WORK**, or at **PUBLIC / HIGHWAY** stations
- Consumers expect EV Charging to be as convenient as fueling a gas vehicle



## HOME:

- Easy charger purchase / install
- Enable EV to be a smart grid resource



## WORK:

- Workplace charging is available & easy



## PUBLIC/HWY:

- Easily find and use fast chargers
- Enable you to go anywhere in your EV



Bolt AV

# GM Ambition

- Zero Crashes
- Zero Emissions
- Zero Congestion



Cruise Origin



Bolt EV





# **Electric Vehicles**

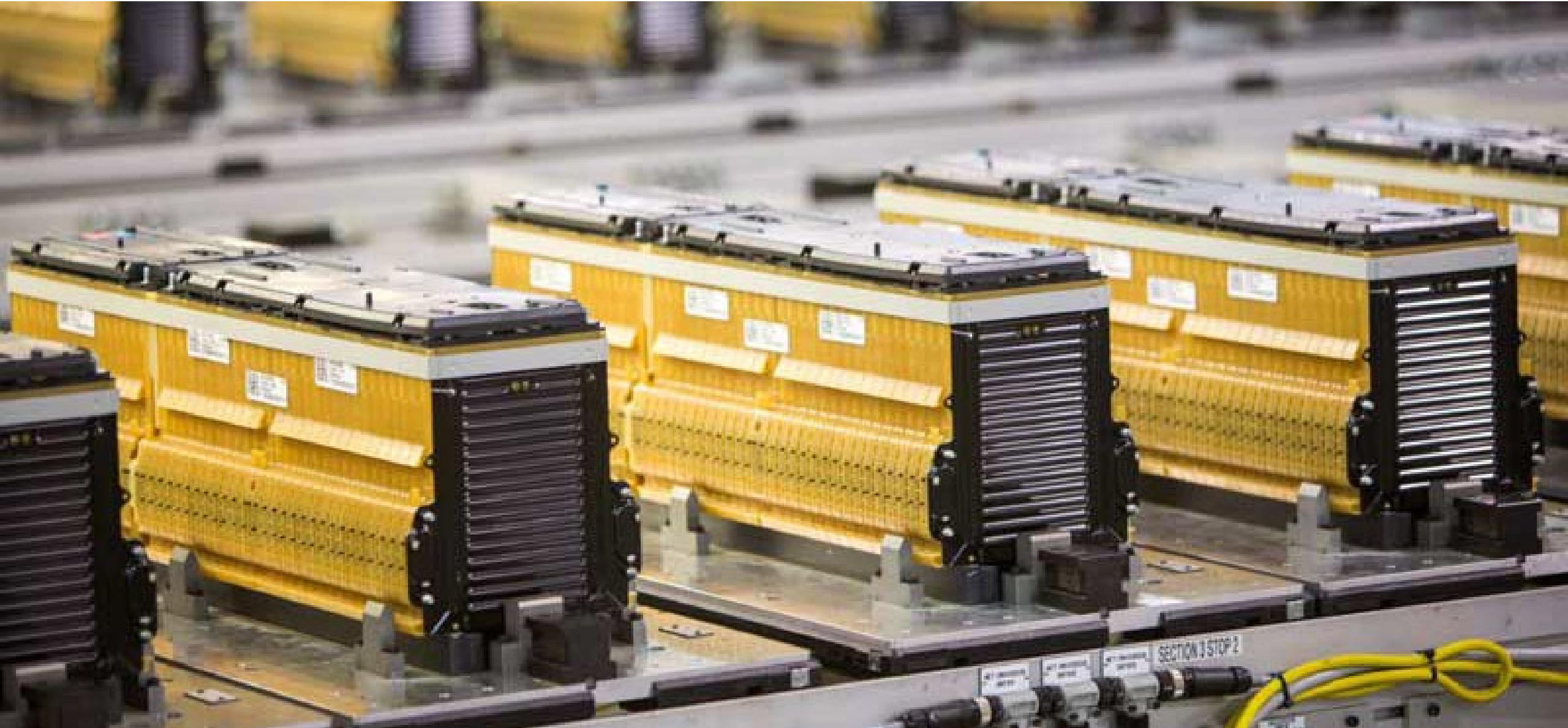
## **Ambitious BEV Strategy**

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*GM EV Week: March 2-8*

# **Reducing Battery Costs**

## ***GM & LG Chem US\$2.3 Billion Battery Joint Venture***



# Our electric future is now.



GENERAL MOTORS



# GMC

Introduces the GMC HUMMER EV



# Summary

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- New vehicles are > 21% improved for GHGs vs 2005
- But other factors can offset GHG gains
- There are policy options to accelerate progress beyond regulation
  - Study scrappage, fuel prices, EV/AV support policies
- GM is driving to an all electric future