



# The background to GFEI's new targets

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# Analysis Context

- Analysis was carried out by the International Council on Clean Transportation (ICCT), in close coordination with the International Energy Agency (IEA) and with input from all GFEI partners
- The analysis supports the updating of existing targets and development of new targets that are appropriately ambitious, trackable, policy relevant, and easily communicated.
- We incorporate the latest information and provide a more robust characterization of on-road global transportation decarbonization potential by 2050.

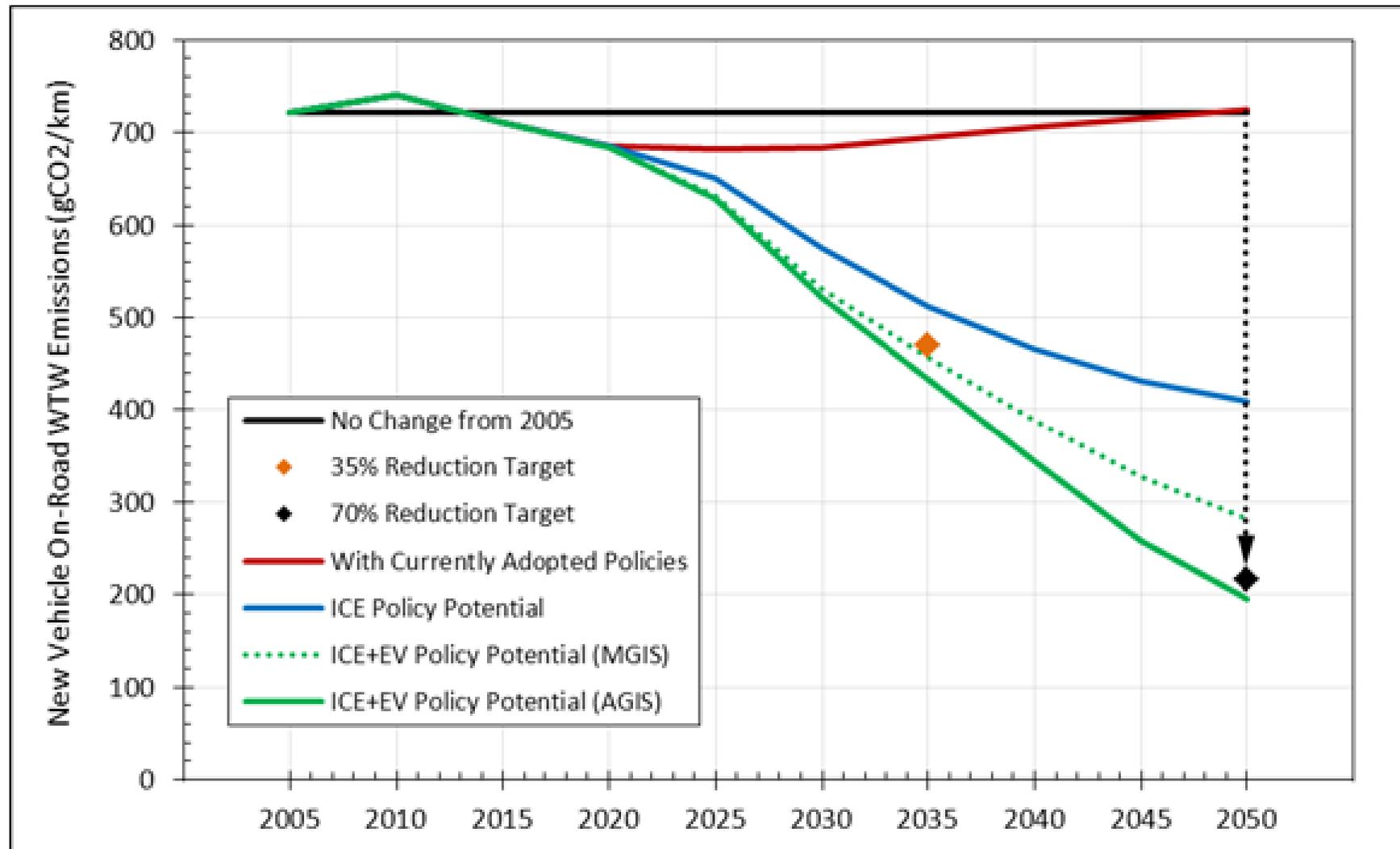
# Analysis Context (cont.)

- We explicitly consider the fuel economy potential of ICEVs and EVs and how these may combine depending on relative sales, electricity grid carbon intensity, etc.
- We re-examine existing near-term targets for new light duty passenger vehicles and new heavy duty freight vehicles
- We also propose new near-term targets for two and three wheeled vehicles and buses and new longer-term targets for all road transport classes.

# New GFEI Passenger LDV targets

- The GFEI partners reaffirm our target of doubling fuel economy of new passenger vehicles globally by 2030 (relative to 2005) through continued progress on combustion engine efficiency improvements plus the introduction of electric passenger vehicles
  - Also extend this target to a 50% reduction in new passenger vehicle per-kilometer CO<sub>2</sub> by 2030.
- We also establish a new passenger vehicle per-kilometer CO<sub>2</sub> reduction target for 2050 of 90%.
  - To achieve this target, combustion engine fuel consumption will need to improve by an average of 2.1% per year from 2020 to 2050
  - The global sales fraction of electric passenger vehicles will need to increase to 35% of sales in 2030 and 86% of sales in 2050

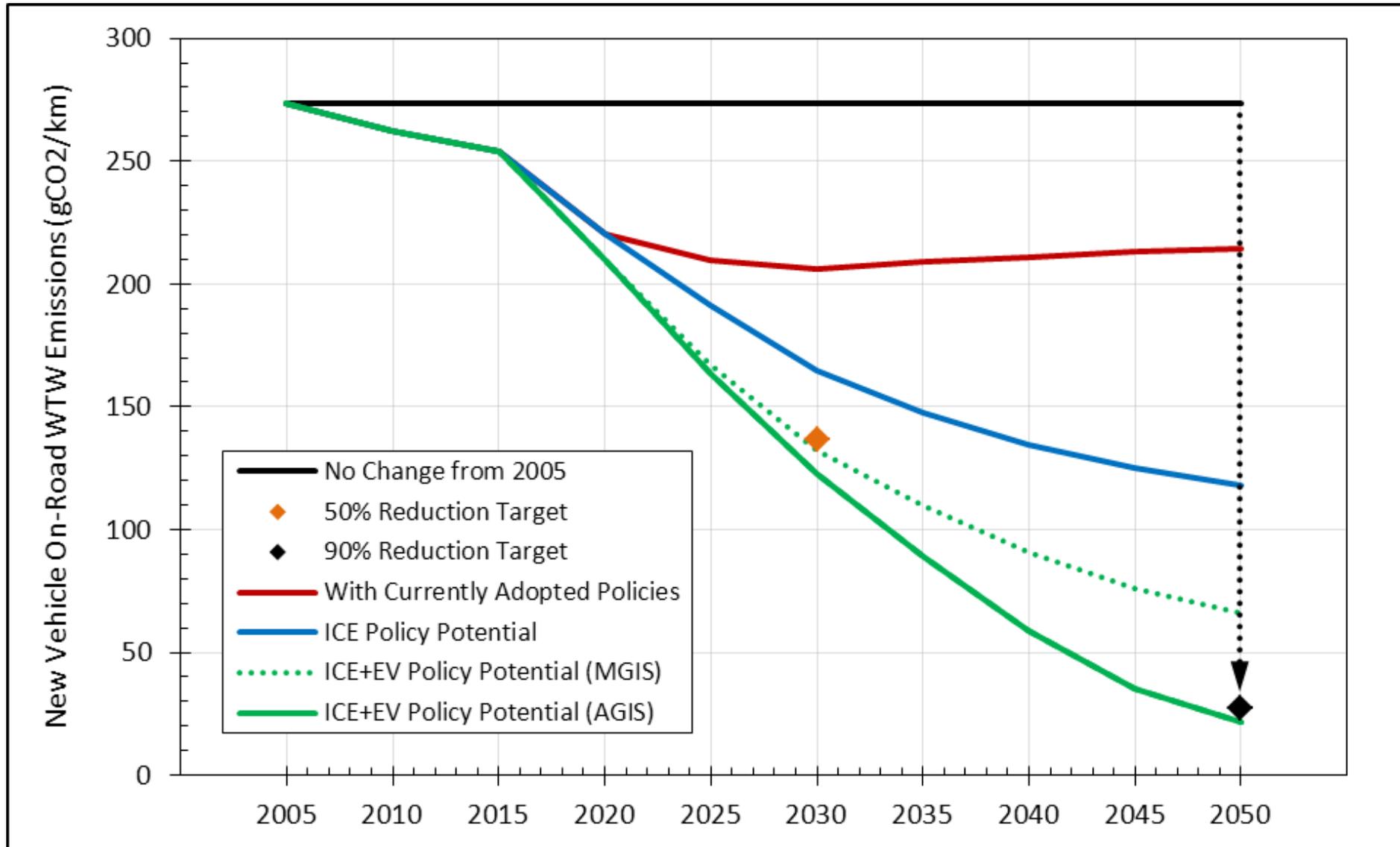
# On-Road WTW CO<sub>2</sub> Emissions for New LDVs



# Heavy duty (freight) trucks

- The GFEI partners reaffirm our target of cutting fuel consumption from new heavy duty trucks by 35% by 2035 (relative to 2005) through continued progress on combustion engine efficiency improvements plus the introduction of electric heavy duty trucks,
  - We extend this target to a 35% reduction in new heavy duty truck per-kilometer CO<sub>2</sub> by 2035
- We also establish a heavy duty truck per-kilometer CO<sub>2</sub> reduction target for 2050 of 70% (also relative to 2005).
  - To achieve this target, combustion engine fuel consumption will need to improve by an average of 1.7% per year from 2020 to 2050,
  - the global sales fraction of electric heavy duty trucks will need to increase to 19 % of sales in 2030 and 66% of sales in 2050,

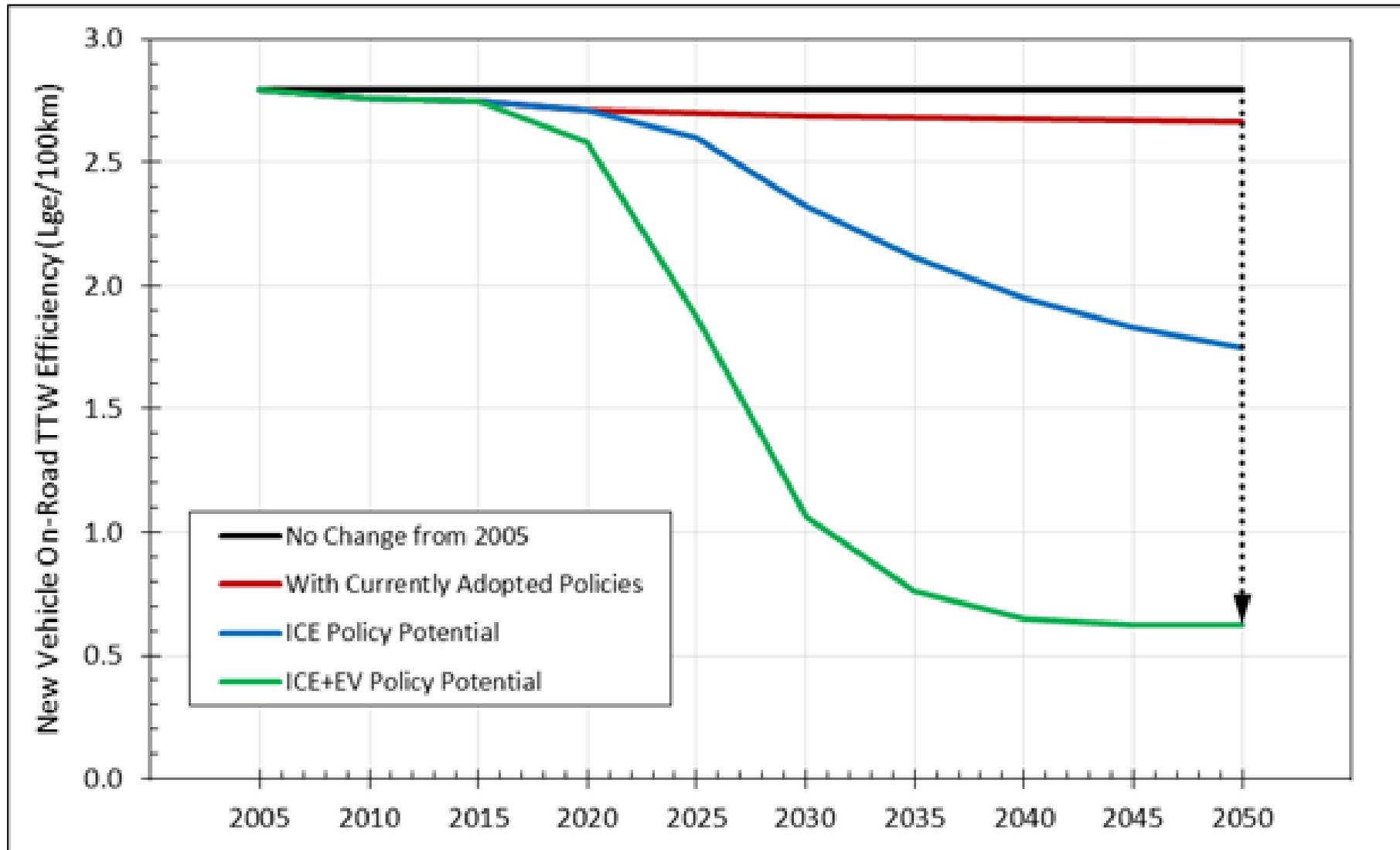
# On-Road WTW CO2 Emissions for New HDTs



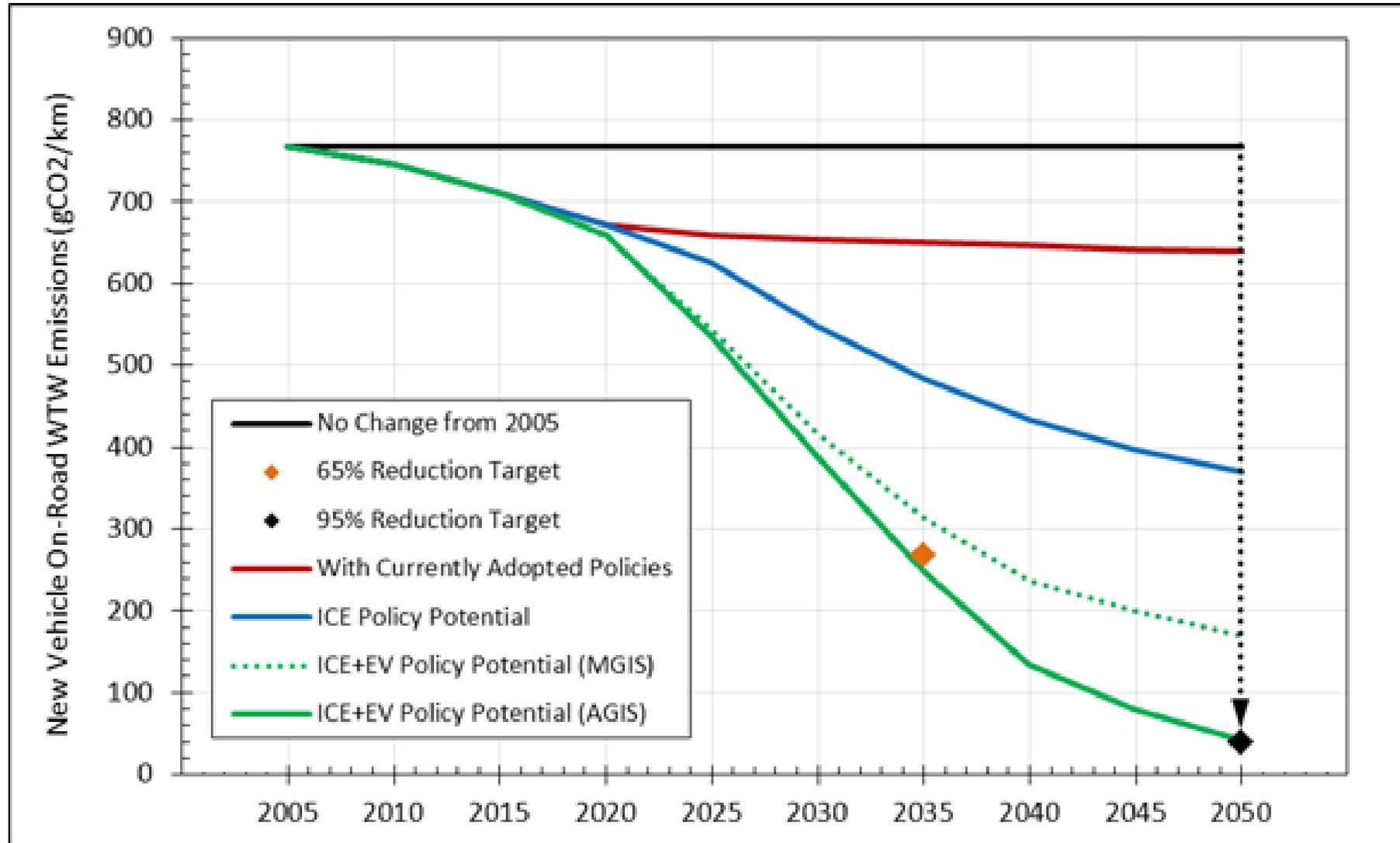
# Other modes...

- **Two and three wheelers:** reduce per-kilometer CO<sub>2</sub> emissions by 80% by 2035 and 95% by 2050 (both relative to 2005)
  - Fuel efficiency of ICE two and three wheelers will need to improve by 1.4% annual, 2020 to 2050
  - Global sales fraction of electric 2 and 3 wheelers will need to increase to 74% of sales in 2030 and 100% of sales in 2050.
- **Transit buses.** The GFEI partners establish new targets for urban buses to reduce per-kilometer CO<sub>2</sub> emissions by 65% by 2035 and 95% by 2050
  - Fuel efficiency of ICE buses will need to improve by 2.0% per year from 2020 to 2050
  - The global sales fraction of electric buses will need to increase to 37% of sales in 2030 and 93% of sales in 2050.

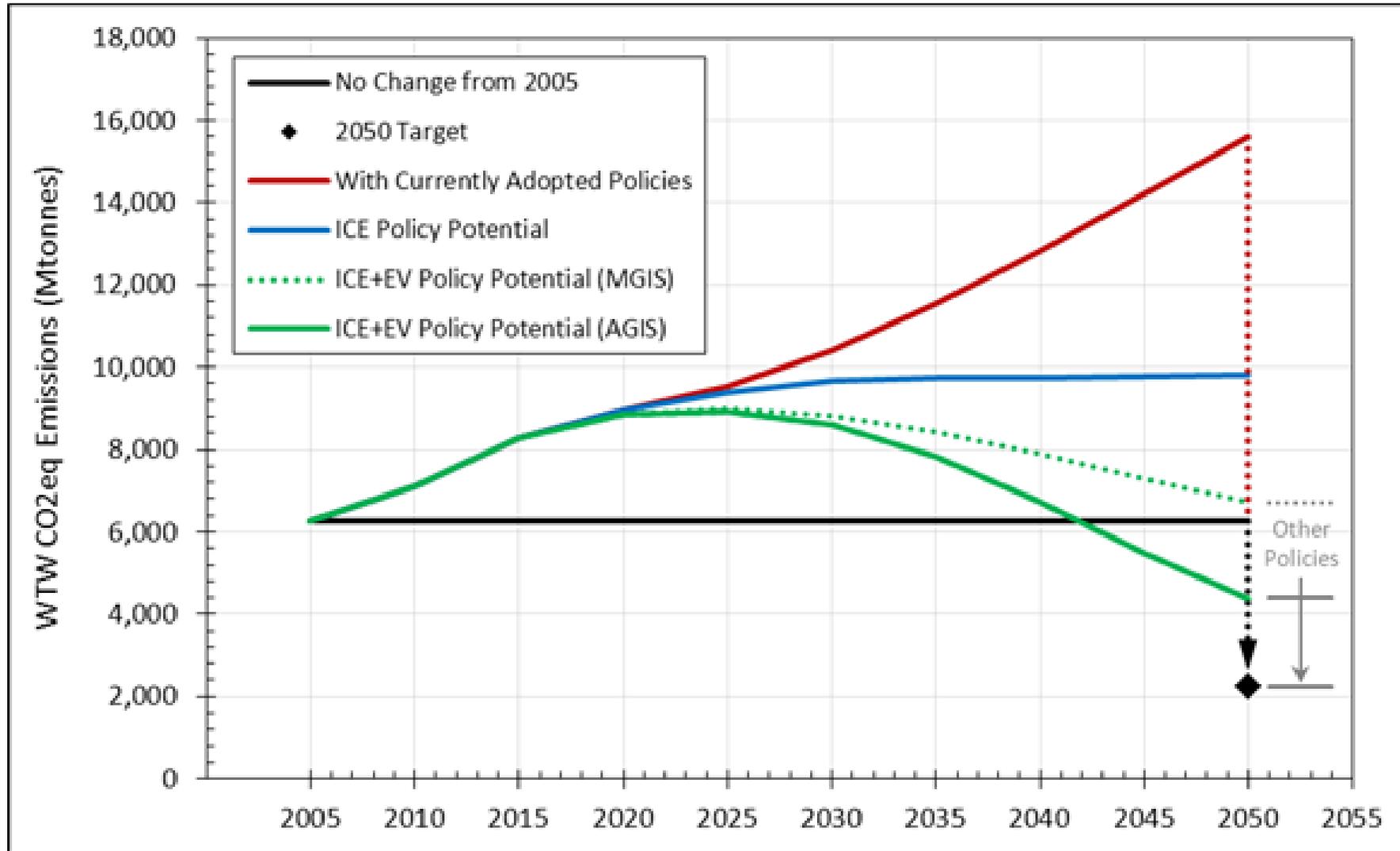
# On-Road CO2 Emissions for New 2/3 Wheelers



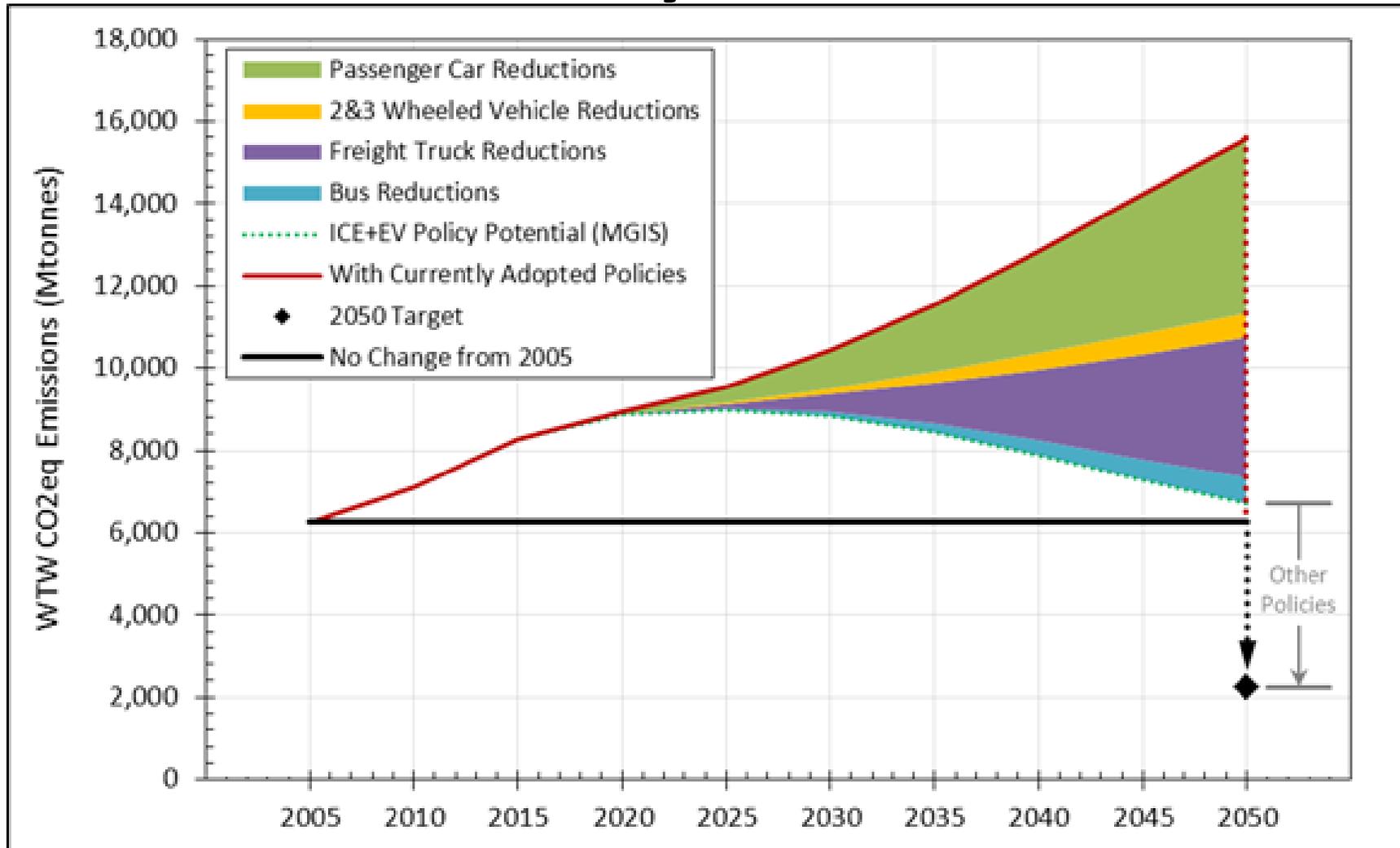
# On-Road CO<sub>2</sub> Emissions for New Transit Buses



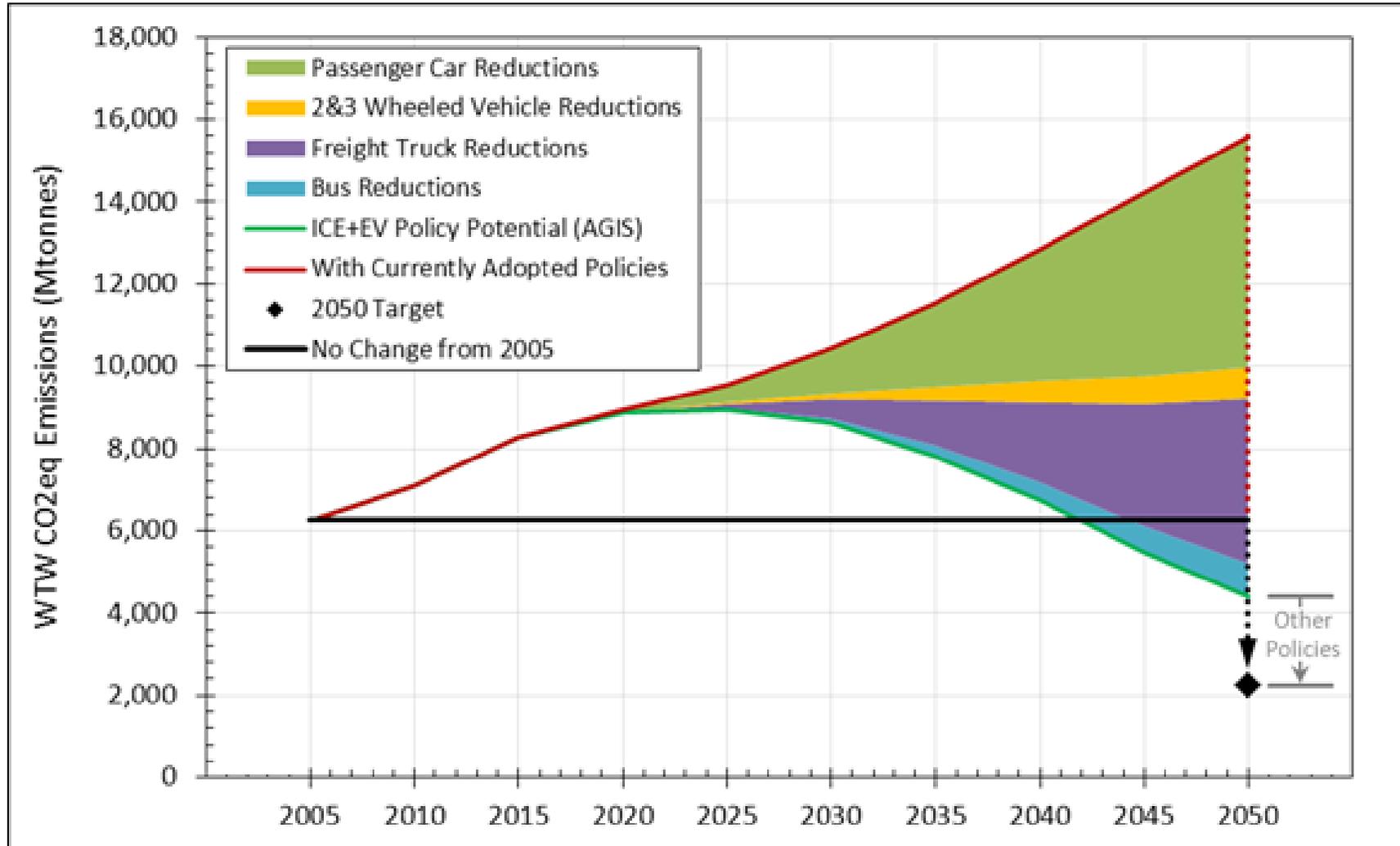
# Change in Global Fleetwide CO2 Emissions Over the Projection Period



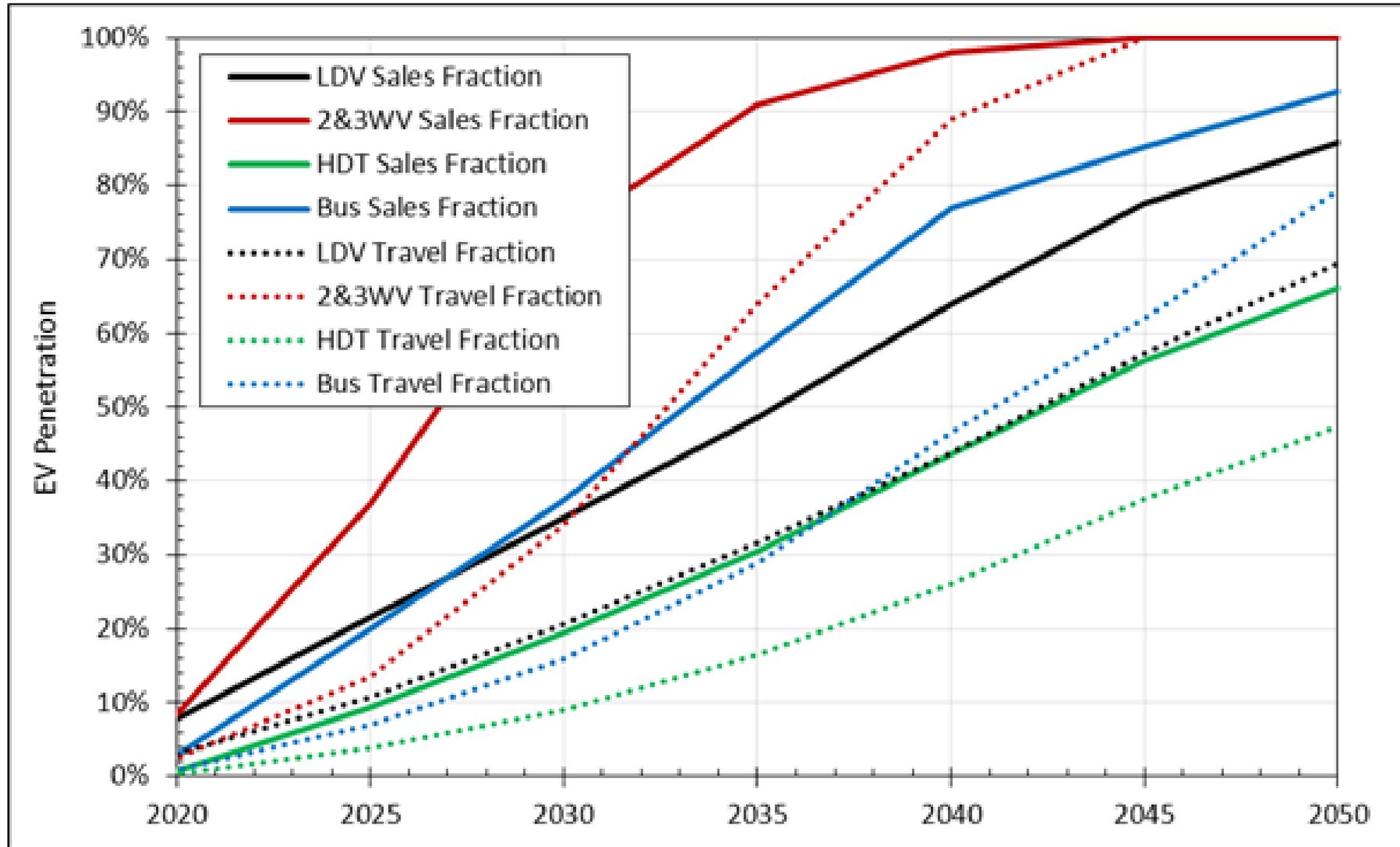
# Class-Specific CO2 Emission Reductions for the Moderate Grid Intensity Scenario



# Class-Specific CO2 Emission Reductions for the Aggressive Grid Intensity Scenario



# EV Market Penetration and Travel by Mode



# Concluding Thoughts

The GFEI partners recognize the importance of supporting government actions and policies that bring the transportation sector into compliance with the Paris Accord.

Based on our analysis, we reach the following conclusions:

- By 2050, per-kilometer CO<sub>2</sub> reduction targets for new vehicles of greater than 90% can be established for the LDV, 2WV and 3WV, and bus classes, assuming aggressive development of EV markets and aggressive decarbonization of the electricity grid.
- The corresponding reduction for new HDTs is lower at 70% due to the greater challenge of electrifying vehicle operations in the sector
- Decarbonizing the electricity grid becomes increasingly important post 2035 as EV sales approach or exceed 90% in all but the heavy duty truck sector.

# Concluding Thoughts (cont.)

- This analysis does not investigate measures capable of constraining growth in vehicle kilometers of travel (VKT), which is estimated to increase by a factor of 3.2 between 2005 and 2050.
- While not quantified in this analysis, it is important to recognize that introducing zero emissions vehicles, such as EVs, will also deliver major air quality benefits regardless of the level of grid decarbonization.
- This analysis looks at efficiency and emissions only through 2050, the trends set here would lead to deeper decarbonization thereafter.

# BACKUP SLIDES

# Analysis Basis

- Potential efficiency improvements are evaluated separately for internal combustion engine technology alone and internal combustion engine technology in combination with vehicle electrification.
  - In practice, electric vehicles include plug-in hybrid electric (PHEV), battery electric (BEV), and fuel cell (FCV) vehicles.
- This analysis does not intend to constrain this practical definition and views the entire range of such vehicles as important to achieving the defined targets.
  - However, since the analysis relied on the projected performance and sales of battery electric vehicles in combination with defined electricity grid CO<sub>2</sub> intensities to derive both average new vehicle and fleetwide performance goals, we refer to all such goals in terms of battery electric vehicle goals.
- It is, nevertheless, important to recognize that the stated goals may be achievable by a mix of PHEVs, BEVs, and FCVs as long as aggregate sales and performance are equivalent to the BEV-specific sales and performance cited in this report.

# Background

- GFEI recently decided to revisit and update existing targets
  - Expand its level of ambition as appropriate given ongoing developments in the vehicle fuel efficiency arena and the growing urgency around climate change.
- We also deem it desirable to expand the focus of GFEI goals to incorporate all road transportation vehicles,
  - And we now frame the group's ambitions in terms of both vehicle efficiency and greenhouse gas targets.
- It is in this context that the GFEI partners prepare to relaunch the GFEI targets.

# What targets are we setting?

- GFEI partners reaffirm our existing targets for *new* light and heavy duty vehicles in 2030 and 2035 respectively,
- We also establish more stringent 2050 targets for *new* light- and heavy-duty vehicles,
- We establish our first-ever targets for 2 and 3 wheeled vehicles and buses in 2035 and 2050,
- We compile all these targets into a vision for achieving major reductions in greenhouse gas emissions from the transportation sector by mid-century.
- We compare all targets to 2005 levels,
- We use a Well-to-wheel CO<sub>2</sub> metric with two grid decarbonization scenarios (MGIP=50% and AGIP=95%) CO<sub>2</sub> reduction by 2050