



Existing policies and current efforts to reduce GHG emissions of vehicles and the harmonisation of regulatory tools and CO₂ emission reduction targets

World Forum for Harmonization of Vehicle Regulations

Working Party on Pollution and Energy

Ninety-first session

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Global Fuel Economy Initiative



- Partnership between 6 organisations that promote research, discussion and action to improve fuel economy worldwide



- Established in 2010, it worked extensively to support extensively to support GFEI works globally to support vehicle fleet transformation to address the negative impacts of mobility on climate, energy demand, & air quality
- Core activities
 - Tracking progress: data gathering, modelling, data analysis
 - Capacity building: policy tools, organization of training events
 - Outreach: awareness raising, communication



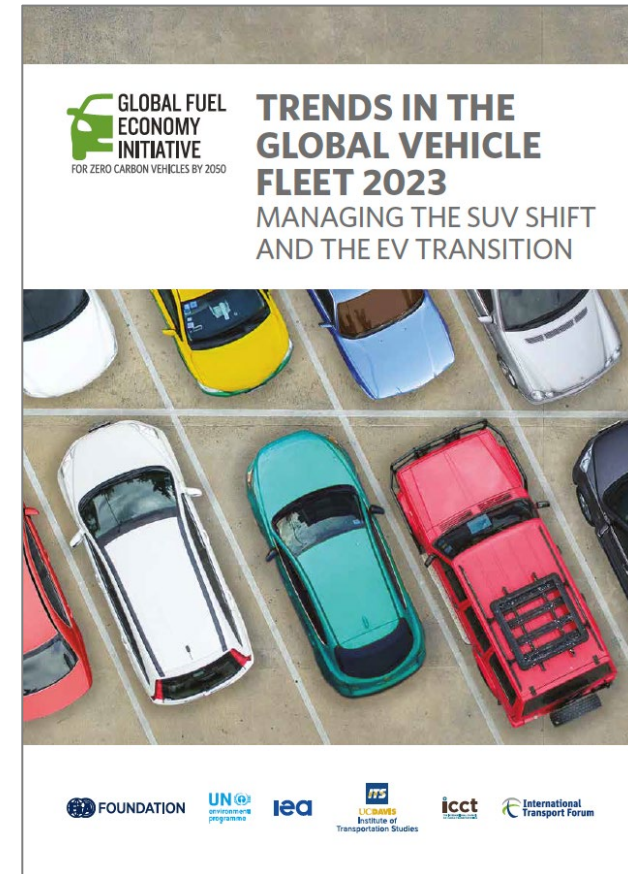
Today's session

- Opportunity to share findings from evidence collected over the years
- Aim is to contribute to international co-operation in addressing a challenges (energy use, CO₂ emissions from road transport) that have international relevance and need international solutions
- Happy to support UN efforts to harmonize the actions of nations in the attainment of common ends, namely climate change mitigation
- Thanks to GRPE Secretary and Chair for having sought our input to inform the work of the Working Party and the World Forum



Trends in the global vehicle fleet

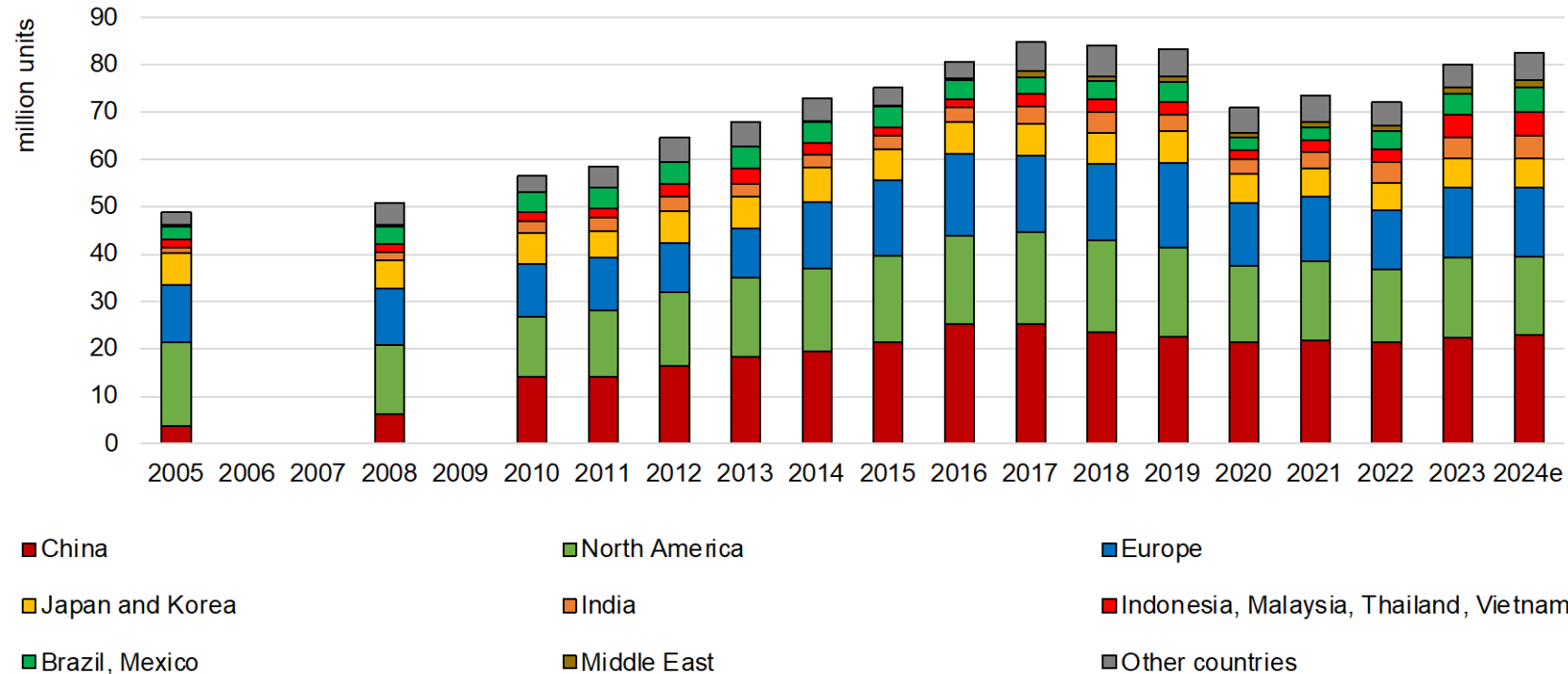
- Findings from a report released in November 2023, with targeted updates for today's session
- Latest update (sixth) of a benchmarking report examining the specific fuel consumption of light-duty vehicles
- Focus is on cars (M_1) and vans (N_1), but the scope of the GFEI work includes all road modes



<https://www.globalfueleconomy.org/data-and-research/publications/trends-in-the-global-vehicle-fleet-2023>



Global car market



Sources used here and in following graphs: [GFEI, 2023](#) up to 2022, combined with [IEA, 2024a](#), [IEA, 2024b](#) and [Allianz, 2024](#) for 2023 and 2024e

Worldwide, the sales of light-duty vehicles rose rapidly through 2017, and then slowed in 2020-2022 (disrupted by the Covid-19 pandemic in 2020), picking back up in 2023 at pre-Covid volumes



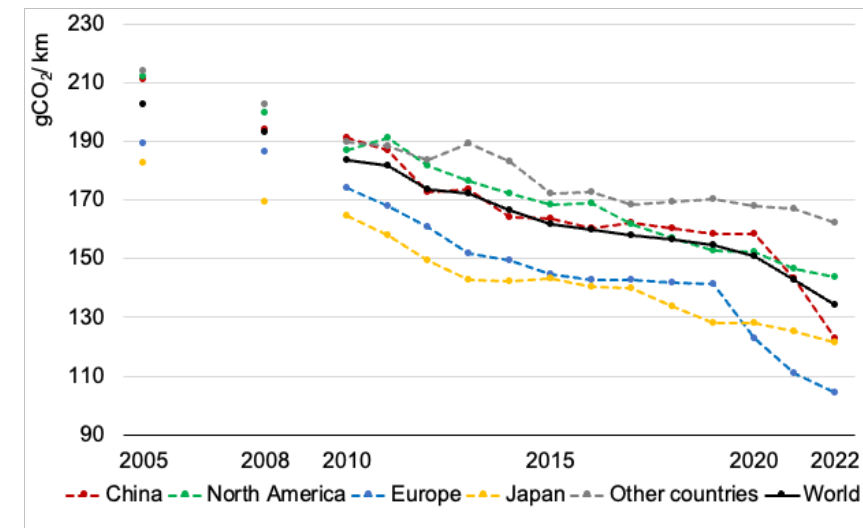
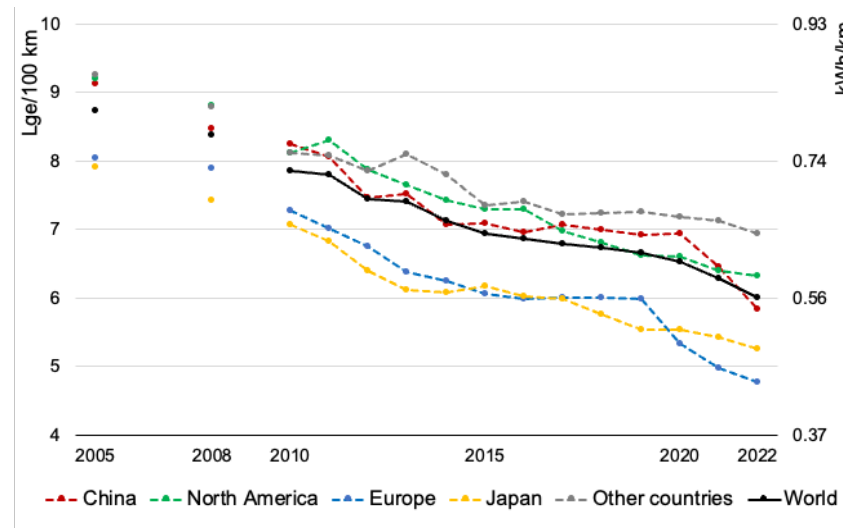
Global automotive market structure

- Recent market developments were characterized by two main trends:
 - SUV shift (decade-long trend)
 - Electrification (accelerating recently)
- Sales of SUVs are on par with conventional cars at a global level
- Increases took place in all global regions, including advanced economies and emerging markets
- Electrification – so far – has taken place mainly in advanced economies and China

Global fuel economy and CO₂/km



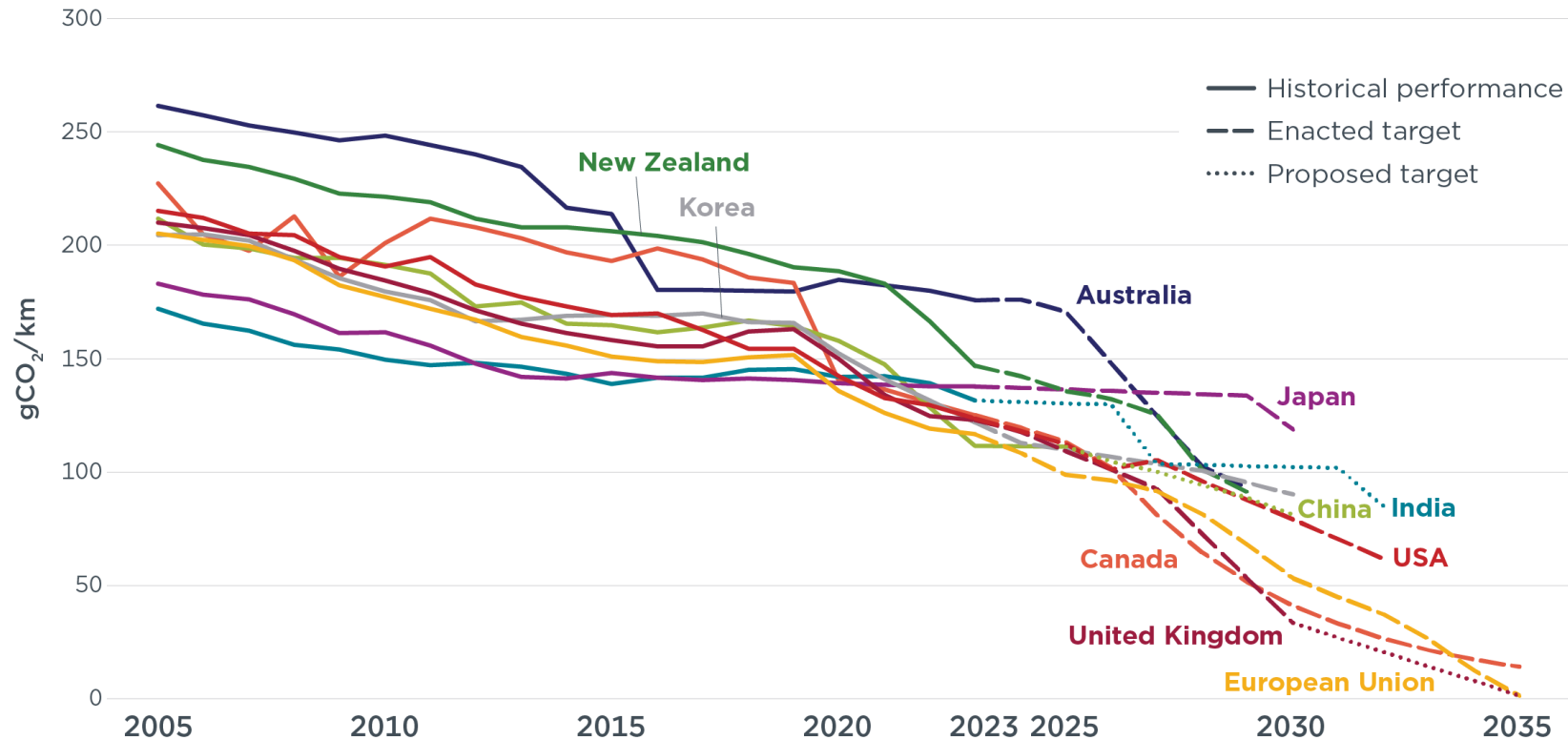
- The sales weighted specific energy consumption of LDVs decreased in all major car markets from 2019 to 2022, improving at an average yearly rate of 3.5% and reaching 6.0 Lge/100 km (WLTP) in 2022
- This is nearly a doubling of the average improvement rate observed between 2005 and 2019
- CO₂ emissions have declined even faster than specific energy consumption, at a rate of 2.5% per year between 2005 and 2022, and of 4.8% from 2019 to 2022
- 2023 and 2024 data are likely to continue to show rapid improvements, thanks to EV shares growing globally, despite stagnation in the EU, in 2024 vs. 2023, and also despite a continued shift to SUVs



Global fuel economy and CO₂/km



Light-duty vehicle gCO₂/km emission in WLTP for WP.29 Contracting Parties with fuel economy / CO₂ / GHG regulations and/or ZEV sales share requirements

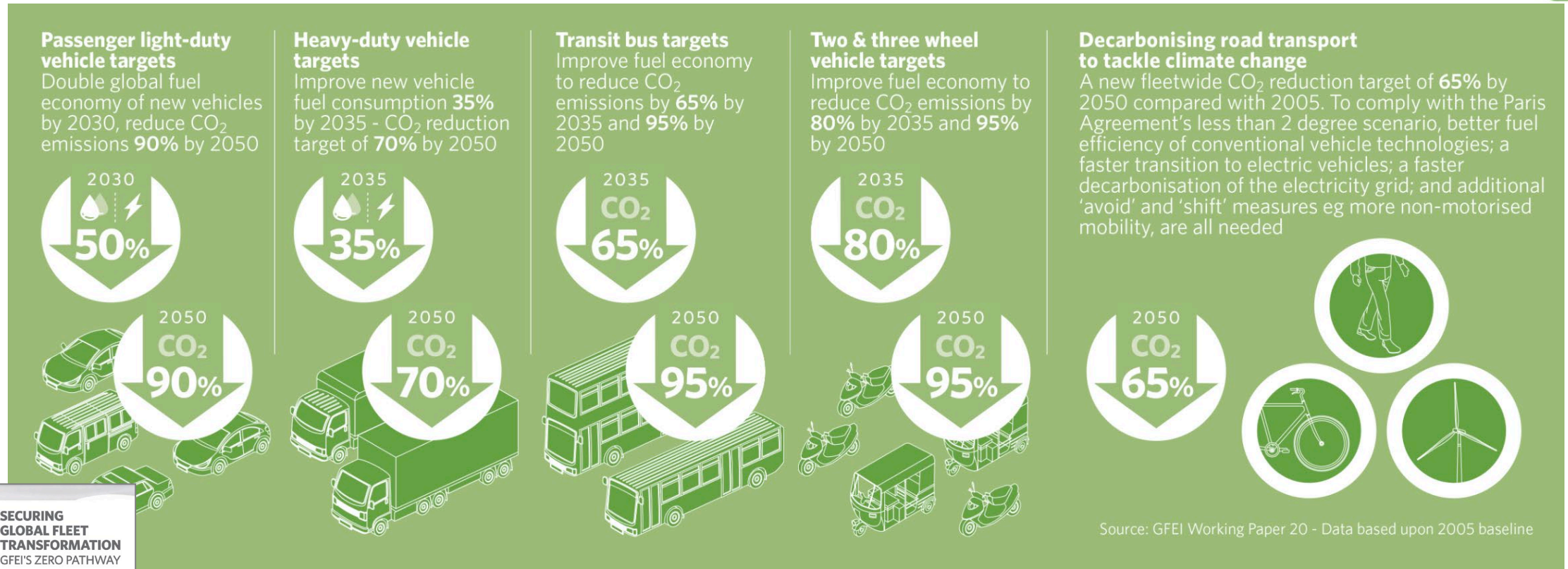


Note: China 2026-2030 targets are proposed for passenger cars but adopted for light commercial vehicles.

- Country-specific analysis on regulatory developments shows improvements across a wide-range of countries, including many – but not all – WP.29 Contracting Parties
- The countries shown here account for 90% of new vehicle sales across WP.29 Contracting Parties



Looking forward: GFEI global targets

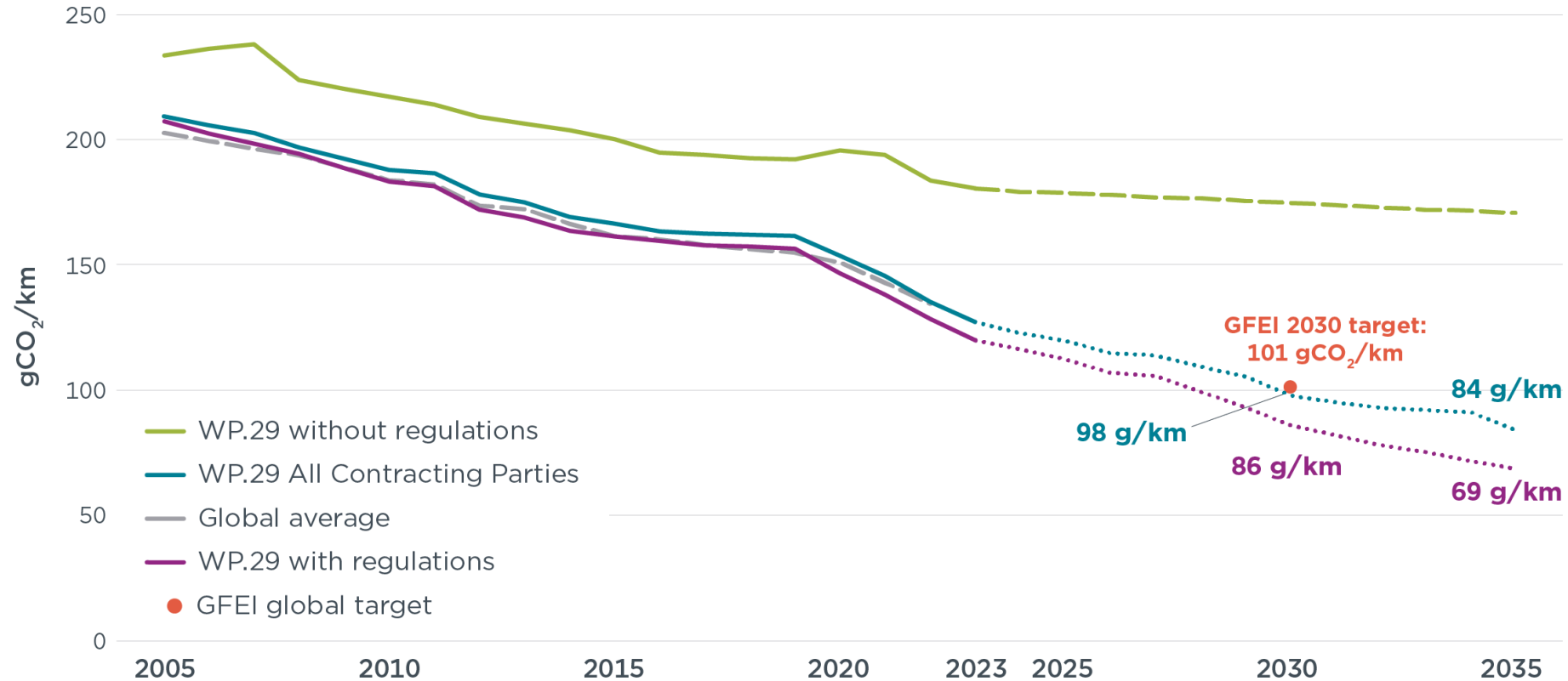


- GFEI's ZERO pathway report sets out key actions to secure this transformation to zero carbon vehicles by 2050
- Published in 2021, it the ZERO pathway sets targets that and meant to reflect ambitious but realistic and attainable improvements, covering all road transport modes

Global fuel economy and CO₂/km



Light-duty Vehicle CO₂ emissions performance in WLTP – WP.29 Contracting Parties under currently adopted policies versus the global average and the 2030 GFEI target



- WP.29 Contracting Parties with regulatory requirements, collectively, are projected to meet GFEI automotive (light duty) targets for 2030
- Contracting Parties without regulations will miss the GFEI target



Time for common action

- Countries that adopted regulatory requirements currently in very different circumstances (fuel prices/taxes, market segments, powertrains, vehicle manufacturing and energy profile)
- There are fundamental conditions (lower total cost of ownership vs. an unregulated benchmark) that result in net benefits, even with these differences
- Achieving the improvements foreseen in the GFEI 2030 target for M_1 and N_1 vehicles for all WP.29 Contracting Parties is achievable and beneficial
- This is also likely to be the case for each Contracting Party, individually
- Bridging differences across baseline values is possible adopting levels of ambition with consistent values in terms of % improvement (+ benchmarking and monitoring of progress)
- This would be fully aligned with the ITC call for action, and it would provide a relevant signal



Thank you



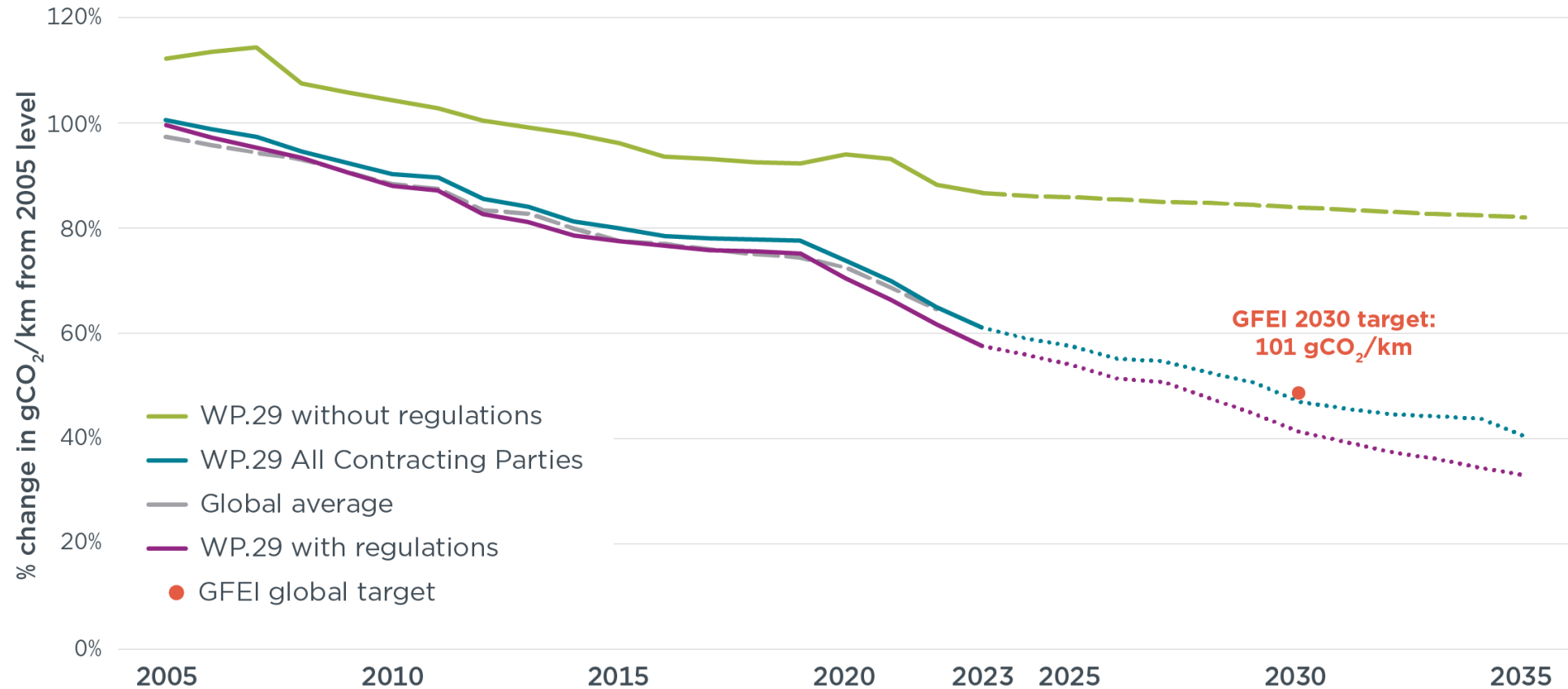
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Global fuel economy and CO₂/km



Light-duty vehicle relative change in gCO₂/km emission in WLTP for WP.29 Contracting Parties with fuel economy / CO₂ / GHG regulations and/or ZEV sales share requirements (*indexed*)



- WP.29 Contracting Parties with regulatory requirements, collectively, are projected to meet GFEI automotive (light duty) targets for 2030
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Methodological note: ICCT cycle conversions for gCO₂/km emissions



- **CAFE-WLTP, JC08-WLTP, and NEDC-WLTP** (*other than for EU and UK*): regression generated for gCO₂/km emissions using a simulation model of a mix of vehicles with advanced engine technologies and powertrains (ICCT [2014](#), [2014a](#))
- **NEDC-WLTP** (*for EU and UK*): conversion factors developed by the EU [Joint Research Center \(2023\)](#) and used by the EU for compliance purposes.
- **3P-WLTP to WLTP**: regression developed using EU laboratory test results for large sample of vehicles obtained from the UK certification agency ([ICCT 2021](#))

ICCT generic regression equation: $C2 = (a1 * DS + a2) * C1 + d1 * DS + d2$; DS: fleet diesel share

| C2 | C1 | a1 | a2 | d1 | d2 | Source |
|------|---------|--------|-------|--------|-------|---|
| WLTP | CAFE | 0.059 | 1.045 | -14.60 | 12.59 | ICCT 2014 , 2014a |
| WLTP | JC08 | -0.065 | 0.732 | -6.17 | 53.29 | ICCT 2014 , 2014a |
| WLTP | NEDC* | -0.049 | 0.898 | -3.75 | 28.06 | ICCT 2014 , 2014a |
| WLTP | 3p-WLTP | 0.088 | 0.864 | -13.06 | 26.84 | ICCT 2021 |

* other than for EU and UK

ICCT conversion factors for NEDC to WLTP (for EU and UK):

WLTP/NEDC ratio = 1.211 for cars; 1.288 for LCV ([JRC 2023](#))

Methodological note: Scenarios and projection assumptions



- For countries without standards: project gCO₂/km for future years assuming 0.5% baseline ICE efficiency improvement (based on ICCT's prior works for [EU](#) and [Indonesia](#); also aligns with [GFEI study](#))
- For countries with adopted/proposed standards:
 - *Adopted scenario*: future emissions based on the adopted targets only;* 0.5% emissions reduction assumed for the remaining future years without adopted targets, if any, through 2035.
 - *Adopted + proposed scenario*: future emissions based on adopted and proposed targets;* 0.5% emissions reduction assumed for the remaining future years without targets, if any, through 2035.
[For cars, China, India, and UK are the only countries with a mix of adopted and/or proposed targets; for LCVs, UK is the only one; for other countries, targets are all adopted]

* Annual gCO₂/km achieve the level of set targets, except for overcompliance in historical performance (e.g., for China and NZ cars in 2023) or lower stringency level (e.g., NZ LCV 2025 target) in which case, we assume whichever lesser between historical performance and official target for future years, and that OEMs will not make further improvements until stringency is higher for next target.