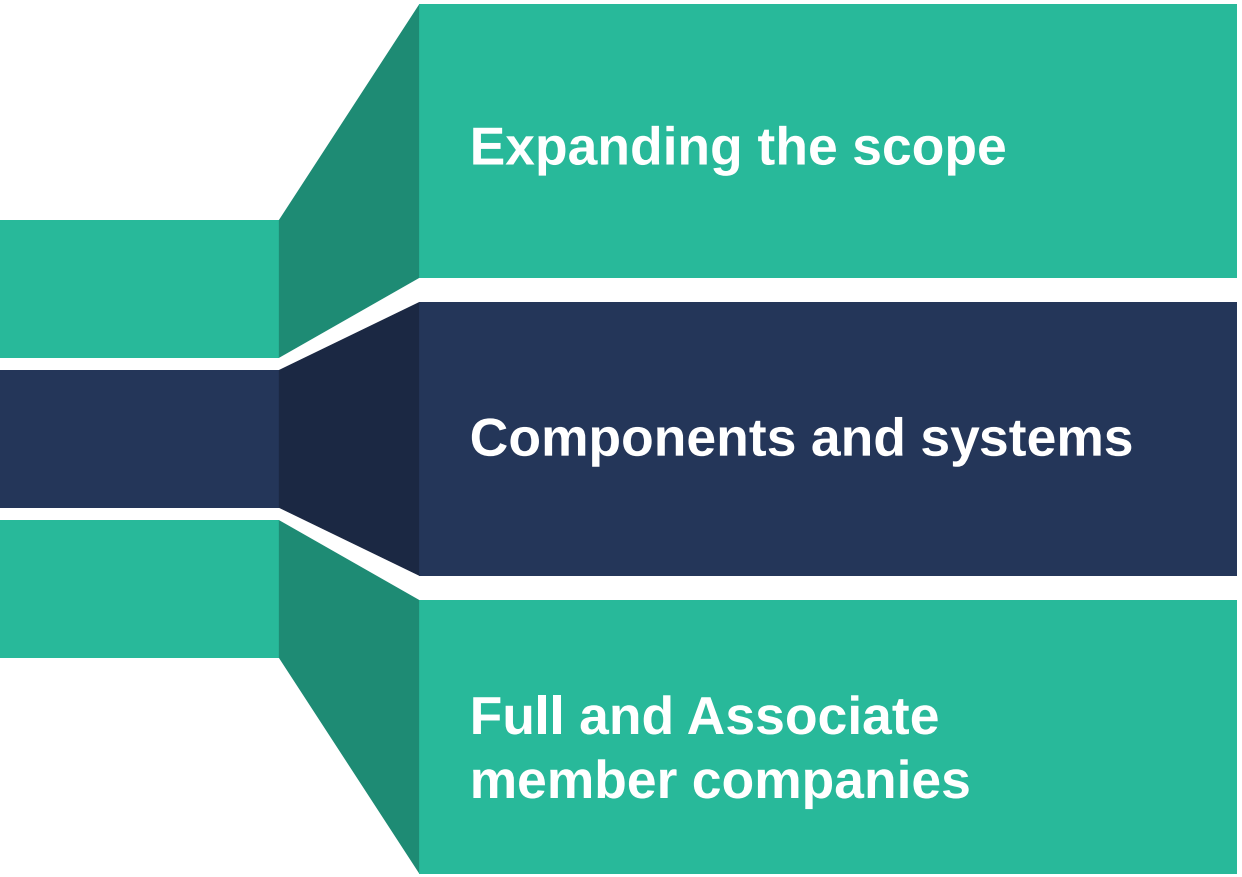
Panel Discussion: A Year in Review on Emissions, Fuels, and Propulsion

Dirk Bosteels, Executive Director AECC

AECC is now the Association for Emissions Control and Climate



- Air quality and **Climate** requirements
- Mobile and **Stationary** emissions sources
- Sustainable **components and systems**

- Catalysts
- Filters
- Adsorbers

- Fuel cells
- Electrolysers

EU Transparency Register #78711786419-61, consultative status with the UN Economic and Social Council (ECOSOC)

CONTENT

01 Update from EU institutions

- Outcome of 2024 EU elections
- Communications from new EU Commission
  - Competitiveness Compass
  - Clean Industrial Deal
  - Automotive Industry Action Plan

02 LDV and HDV emission standards

- Euro 7
- Upcoming LDV and HDV CO_2 reviews
- UNECE Automotive Life-cycle Assessment

2024 EU elections

- New European Commission
  - President Ms. U. von der Leyen re-elected (DE, EPP)
  - 26 Commissioners, including

Teresa Ribera Rodriguez (ES, S&D)
Executive Vice-President for Clean, Just and Competitive Transition

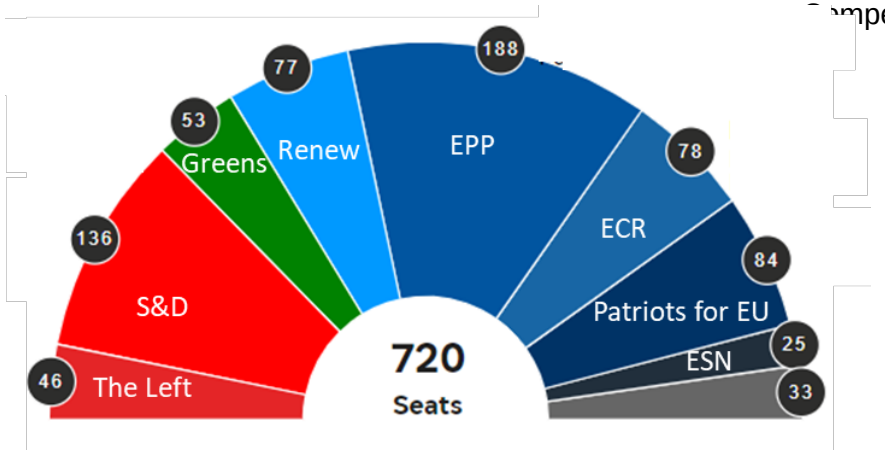
Stéphane Séjourné (FR, Renew)
Executive Vice-President for Prosperity and Industrial Strategy

Wopke Hoekstra (NL, EPP)
Commissioner for Climate, Net-Zero and Clean Growth

Apostolos Tzitzikostas (GR, EPP)
Commissioner for Sustainable Transport and Tourism

Jessika Roswall (SE, EPP)
Commissioner for Environment, Water Resilience and a Competitive Circular Economy

- New European Parliament
  - 8 political groups reflecting the full spectrum
- National elections in EU Member States



EU Competitiveness Compass

- European Commission publication of 29 January 2025
  - Strategic framework to steer the Commission's work
- Flagship initiatives for 3 transformational imperatives
  - Closing the innovation gap
  - Reducing excessive dependencies and increasing security
  - Roadmap for decarbonisation and competitiveness
    - Clean Industrial Deal (Q1 2025)
    - Strategic Dialogue on the future of the automotive industry and Industrial Action Plan (Q1 2025)
    - Action Plan on Affordable Energy (Q1 2025)
    - Sustainable Transport Investment Plan (Q3 2025)
    - Amendment of the Climate Law (2025)
    - Circular Economy Act (Q4 2026)

EU Clean Industrial Deal

- European Commission publication of 26 February 2025
- Overarching strategy for climate action and competitiveness
  - Focus on 2 sectors
  - Flagship actions for 6 business drivers including
    - Delegated act on low-carbon hydrogen (Q1 2025)
    - Strategic Projects under Critical Raw Materials Act (Q1 2025)
    - Circular Economy Act (Q4 2026)
  - Simplification as horizontal enabler
  - Implementation accross sectors includes
    - Automotive Industry Action Plan (Q1 2025)
    - Steel and Metals Action Plan (Q1 2025)
    - Chemicals Industry Package (Q4 2025)
    - Sustainable Transport Investment Plan (Q3 2025)

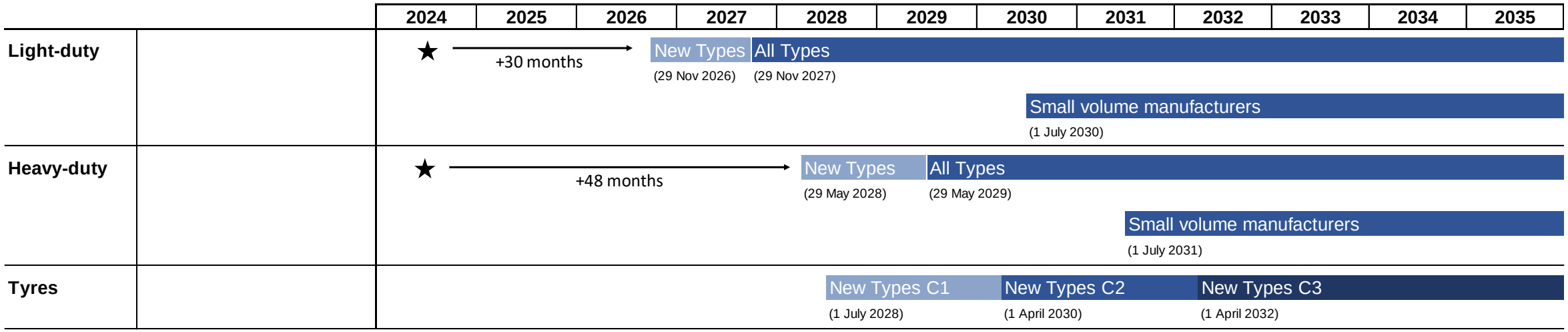
EU Automotive Industry Action Plan

- Preceded by Automotive Strategic Dialogue
  - High-level discussions with Commission President
  - 4 thematic work strands led by specific Commissioner
  - Public consultation – AECC published its vision paper

- Automotive Action Plan published on 5 March 2025 with five key areas
  - Innovation and digitalization
  - Clean mobility
    - 2025 CO_2 targets – will propose amendment to allow compliance over 2025-2027
    - 2035 CO_2 targets review – pulled forward from 2026 to Q3/Q4 2025
    - Greening Corporate Fleets – communication to be followed by proposal in Q4 2025
  - Competitiveness and supply chain resilience
  - Skills and social dimension
  - Level playing field and business environment

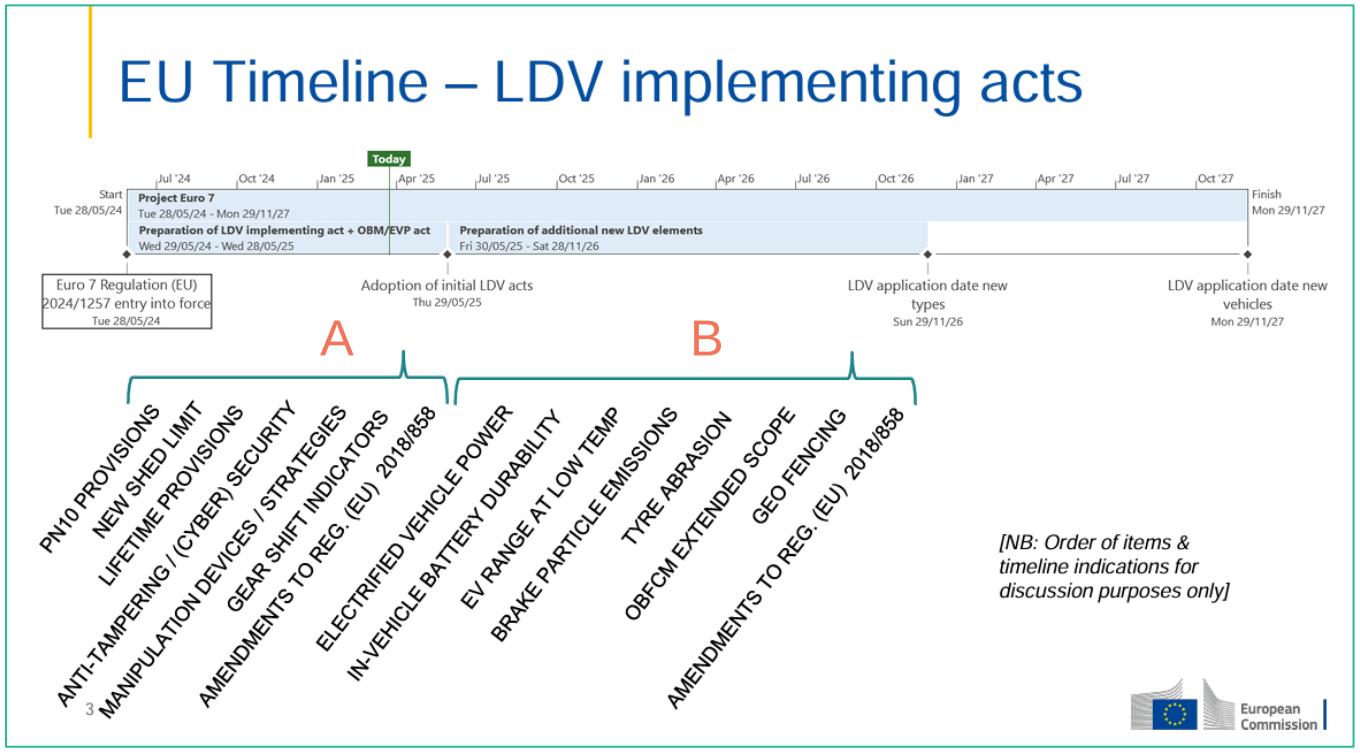
Euro 7 process is ongoing

- Euro 7 regulation published in EU Official Journal on 8 May 2024
- Implementing legislation being developed by European Commission
  - Drafting by European Commission's DG GROW and DG JRC
  - Consulting stakeholders in Advisory Group on Vehicle Emissions Standards (AGVES) meetings



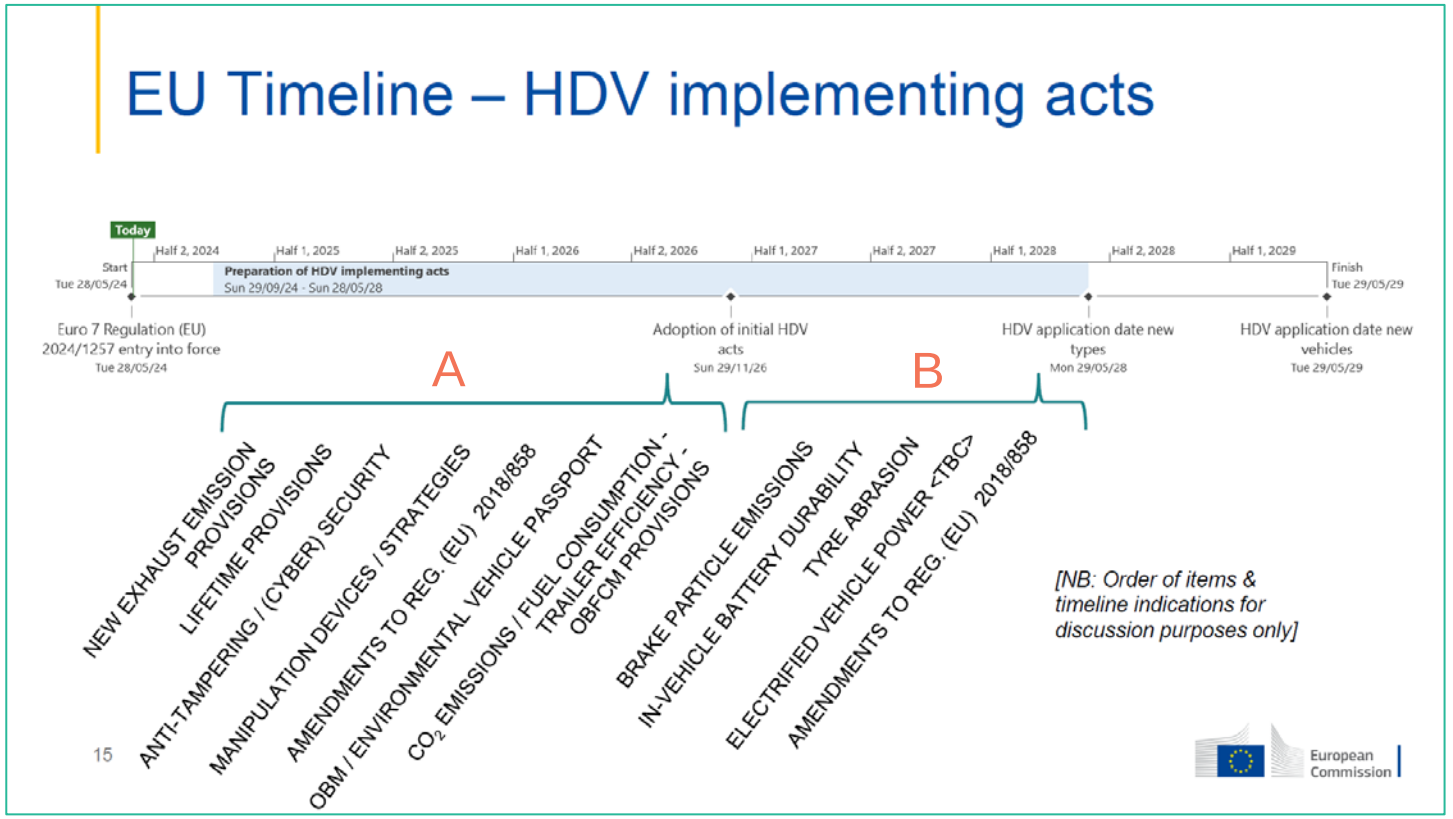
Euro 7 implementing legislation

- Focus is first on light-duty vehicles
  - Adoption of LDV implementing act and OBM/EVP act is targeted by 29 May 2025 (A)
  - Adoption of additional LDV elements is targeted by 29 November 2026 (B)
  - Euro 7 transposition into UN Regulations in parallel



Euro 7 implementing legislation

- Heavy-duty Vehicles
  - Adoption of initial HDV implementing act is targeted by 29 November 2026 (A)
  - Adoption of additional HDV elements is targeted the latest by 29 May 2028 (B)



Euro 7 for light-duty vehicles

- Limit values kept from Euro 6e
- Changes for Particulate Number (PN)
  - PN10 measurement procedure instead of PN23
  - PN10 limits apply to all vehicles, footnote for direct injection gasoline is deleted
- Test procedures kept from Euro 6e
  - Reference to UN Regulation No. 168, includes the PEMS error margins for NOx and PN in Annex 11
- Durability is extended
  - Main lifetime up to 160 000 km or 8 years
  - Additional lifetime up to 200 000 km or 10 years
    - With 1.2 durability multiplier for gaseous pollutant emissions

Table A11/2

Pollutant	*Mass of oxides of nitrogen (NO_X)*	*Number of particles (PN)*	*Mass of carbon monoxide (CO)*	*Mass of total hydrocarbons (THC)*	*Combined mass of total hydrocarbons and oxides of nitrogen (THC + NO_X)*
$Margin_{pollutant}$	0.10	0.34	*Not yet specified*	*Not yet specified*	*Not yet specified*

Euro 7 for heavy-duty vehicles

- Significant reduction of limit values
  - ~50% reduction for already regulated pollutants
  - New limits introduced for NH_3 and N_2O
- PN10 measurement procedure instead of PN23
- Test procedures nearly kept from Euro VI-E
  - MAW low power threshold is reduced from 10% to 6%
- Durability is extended
  - Main lifetime up to 300 000 km or 8 years (Cat. 1), 700 000 km or 12 years (Cat. 2)
  - Additional lifetime up to 375 000 km or 10 years (Cat. 1), 875 000 km or 15 years (Cat. 2)
    - Durability multiplier for gaseous pollutant emissions tbc by 31 December 2025

	WHSC/WHTC (/kWh)	RDE (/kWh)
NOx (mg)	200	260
PM (mg)	8	-
PN (10 nm, #)	$6x10^{11}$	$9x10^{11}$
CO (mg)	1500	1950
NMOG (mg)	80	105
NH_3 (mg)	60	85
CH_4 (mg)	500	650
N_2O (mg)	200	260

Cat. 1: N2, N3<16t, M3 <7.5t
Cat. 2: N3>16t and M3>7.5t

Euro 7 On-Board Monitoring (OBM)

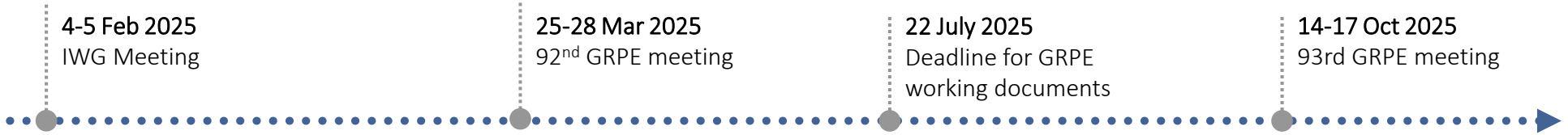
- Definition
  - Monitoring exhaust emissions
  - Detecting exhaust emission exceedances
  - Capable of communicating information together with the State of Health information off-board
- Capable of
  - Monitoring and registering all exhaust emissions of NOx, NH_3 & PM if there is a limit (not NH_3 for LDVs)
  - Detecting exceedances of 2.5 times the limit or higher
  - Communicating the data
    - Via the OBD port for roadworthiness tests and technical roadside inspections
    - Anonymously over the air for monitoring compliance of vehicle types
  - Triggering the driver warning system, to induce timely repairs, without preventing completing ongoing trip

Upcoming LDV & HDV CO_2 emissions reviews

- LD CO_2 emissions
  - Commission proposal amending Reg. (EU) 2017/1151
    - Adding vehicle category running exclusively on CO_2-neutral fuels
    - Discussions in TCMV on Euro 6 stopped, *expected to reconvene for Euro 7 following CO_2 review*
  - Regulation (EU) 2023/851
    - Article 7a – lifecycle assessment methodology by 31 December 2025
    - Article 14a – Progress report by 31 December 2025
    - Article 15 – Review of effectiveness and impact in 2026 (*pulled forward by Automotive Action Plan*)
- HD CO_2 emissions
  - Regulation (EU) 2024/1610 – Article 15
    - Assessment of sustainable renewable fuels by 31 December 2025
    - Review of effectiveness and impact by 31 December 2027, including
      - Role of carbon correction factor
      - Lifecycle assessment methodology
      - Methodology for registering vehicles running exclusively on CO_2-neutral fuels

Automotive Life-Cycle Assessment (A-LCA)

- UNECE timeline for drafting until GRPE adoption (WP.29 adoption to follow)



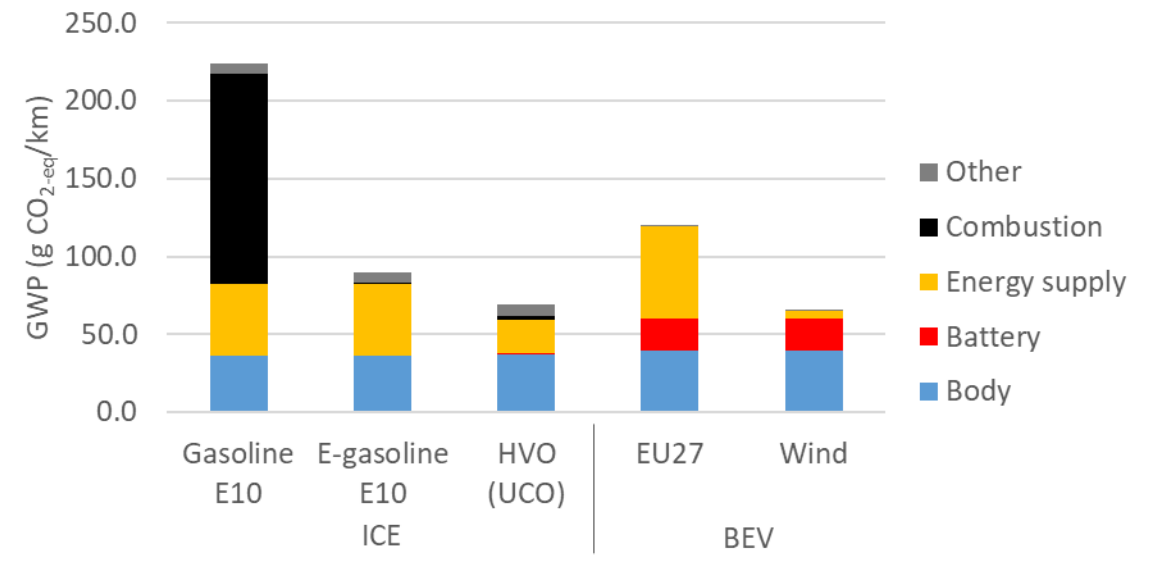
  - Highlights from IWG on A-LCA meeting 25 March 2025
    - Continued discussions on overarching principles
      - Levelling concept – new description of 4 levels depending on LCA study purpose agreed
      - Infrastructure emissions – modifications drafted to exclude infrastructure emissions, except for energy generation
      - Representative vehicle – agreed to include concept in draft text
    - Consolidated draft text
      - Submitted as informal document for 92nd GRPE session in March 2025
      - Several open points discussed but reporting chapter still empty

- EU Commission DG Clima is developing its LCA methodology for LDVs and HDVs in 2025-2026

AECC-IPA demonstrator vehicles

- Zero-impact pollutant emissions validated on sustainable renewable fuels
  - Ultra-low pollutant emissions beyond Euro 7 levels
- Life-cycle assessment (LCA) study (to be published)
  - All powertrains have low GHG emissions with renewable electricity/ fuel

Key assumptions
- GreenNCAP LCA methodology
- C-segment vehicle
- Production: 2024 global average
- Fuel/energy varied only in use phase
- Lifetime: 240k km, 16 years
- E-gasoline from wind & DAC
- HVO from Used Cooking Oil
- CO_{2eq} incl. CO_2, CH_4 and N_2O



THANK YOU!

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