



European  
Automobile  
Manufacturers  
Association

# Clean mobility

## Long-term powertrain options

**DRIVING FUTURE MOBILITY**  
EUROPEAN PARLIAMENT

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# AUTOMOTIVE INNOVATION

- **The 3 main drivers of automotive innovation**

Clean mobility



New mobility services



Smart mobility




## Our clean mobility objectives

- Mitigate impact of road transport on climate change by reducing **CO<sub>2</sub> emissions**
- Reduce direct and indirect **pollutant emissions**, starting with urban areas
- Develop **cutting-edge technology** that meets customer demand and fulfils regulatory requirements, while guaranteeing competitiveness in the long term

# WHAT WILL FUEL TOMORROW'S MOBILITY?

The 5 long-term principles of clean mobility

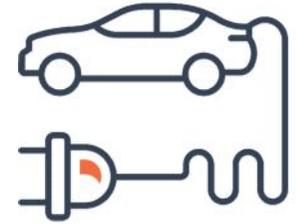
- 1. Powertrains will increasingly move towards low/zero CO<sub>2</sub>**
- 2. Newest vehicles in urban areas will emit low & zero pollutants**
- 3. Need wide array of options for long-distance travel**
  1. Plug-in hybrids, hybrids, fuel-cell vehicles and advanced ICEs
- 4. Combustion engine will remain relevant as a core component of PHEVs, HEVs and advanced ICE vehicles**
- 5. Data as the new fuel**
  - Connectivity will help to reduce emissions

# 1. POWERTRAINS



- **Different powertrain options for different needs**
  - Powertrain choice will be based on people's individual needs
    - For example, urban commute versus long-distance travel
- **Requires a wide array of powertrain options**
  - Europe's future powertrain portfolio will be more diversified than today's
    - Advanced internal combustion engines (ICEs), running on petrol, diesel or natural gas
    - Hybrid electric vehicles (HEVs)
    - Plug-in hybrid electric vehicles (PHEVs)
    - Full battery electric vehicles (BEVs)
  - Complemented by fuel-cell electric vehicles (FCEVs) in the long run
- **Diversity of options strengthens competitiveness of EU industry**

## 2. URBAN AREAS = ZERO EMISSIONS



- **Passenger cars, delivery trucks and buses will emit low and zero pollutant emissions in urban areas**
  - Dominant powertrains: PHEVs, BEVs and FCEVs
- **'Smart technology'**
  - Provides evidence of a vehicle's zero-emission capability before entering the inner city (eg based on charging state of the battery)
- **Challenges**
  - Further increase battery capacity and reduce powertrain costs at the same time
  - Availability of charging/refuelling infrastructure needs to increase dramatically

## 3. LONG-DISTANCE OPTIONS



- **Long-distance travel with cars and long-haul transport**
  - Will be dominated by PHEVs, HEVs and advanced ICE-propelled vehicles
  - BEVs not always an option for long distances
    - Especially in the case of long-haul trucks
  - FCEVs fuelled by green hydrogen may become long-distance option after 2030
  
- **Chemical energy carriers, such as liquid fuels**
  - Will remain relevant in the long term given their high energy density
  - Liquid fuels need to become increasingly sustainable
    - For example, by introducing synthetic fuels produced from renewable electricity

## 4. ICE WILL REMAIN RELEVANT

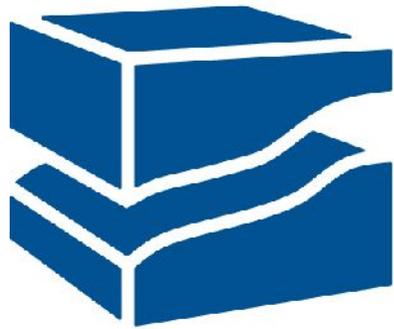


- **Combustion engine remains relevant in the long term, as a core component of PHEVs, HEVs, advanced ICEs**
  - Besides BEVs and FCEVs, PHEVs are ICE-equipped vehicles that are suitable for urban areas with access restrictions
- **Sustainable alternative fuels**
  - If produced from renewable sources, these also have the potential to further reduce greenhouse gas emissions in a well-to-wheel context
- **Biofuels only if strict and verifiable sustainability criteria are being applied**

# CONCLUSION

- **The future of fuels will embrace several powertrain options**
  - BEVs
  - FCEVs
  - HEVs
  - PHEVs
  - Advanced internal combustion engines
- **Clear move towards low/zero CO<sub>2</sub> emissions, but need to:**
  - Address costs / economies of scale of BEVs and FCEVs
  - Ensure EU-wide charging and refuelling network for all powertrain options

THANK YOU FOR YOUR ATTENTION



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