IEA Bioenergy

European Commission

ADVANCED MOTOR FUELS
IEA-AMF
Technology Collaboration Programme on
Advanced Motor Fuels

The Contribution of Advanced Renewable Transport Fuels to Transport Decarbonisation in 2030 and beyond

ETIP Bioenergy SPM 9
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IEA Bioenergy

ADVANCED MOTOR FUELS
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Vision

to achieve a substantial bioenergy contribution to future global energy demands by accelerating the production and use of environmentally sound, socially accepted and cost-competitive bioenergy on a sustainable basis, thus providing increased security of supply whilst reducing greenhouse gas emissions from energy use

www.ieabioenergy.com

Vision

Advanced motor fuels, applicable to all modes of transport, significantly contribute to a sustainable society around the globe.

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Full picture based on joint expertise

Combined background

- TRL of fuel production pathways
- Availability of feedstock for fuel production
- Feedstock and fuel production costs
- Associated GHG emissions
- Applicability of fuels in engines
- The role of policy

Joint assessment

- Country-wise assessment of vehicle park evolution
- Implementation barriers
- Policy recommendations

Country-wise assessments

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Methodology

Countries covered

- Specific country assessments performed for:
  - **FINLAND** (a model case, previously executed)
  - **SWEDEN**
  - **GERMANY**
  - **USA**
  - **BRAZIL**

Input data

Delivered by country experts, based on stated policy

- Current vehicle park composition
- Fuel Standards and Sales of Different Fuel Types
- Projected Vehicle Sales per fuel type (and class)
- Expected Transport Work and Fuel Consumption
- Outlook on Biofuel Production and Raw Materials

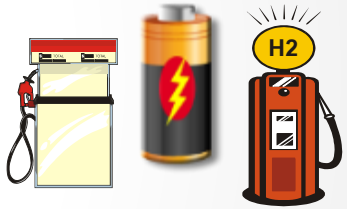


ALIISA model

- Finnish-made model for calculating transport fuel use and the associated CO2-emissions from road vehicles
- Main variables in the input data for each vehicle category:
  - Market share (%) of each fuel/energy option
  - Annual mileages, average or total
  - Specific fuel/energy consumption per vehicle category
- Stepwise calculation of changes in vehicle park composition to 2050

Options covered

- Vehicle categories:
  - Cars, Vans & LD Trucks, Buses, Medium & Heavy-Duty Trucks
- Vehicle powertrain/fuel options:
  - Petrol (SI), FFV (E85), Diesel (CI), CNG/LNG, PHEV(SI), PHEV(CI), BEV, H_2FCVEV
- Fuel/energy options:
  - Fossil petrol, fossil diesel
  - Ethanol, in E5/E10/E85/ED95
  - Bio/renewable diesel fuel(s)
  - Electricity, hydrogen



Country-wise assessments

Model case Finland

Finland in a nutshell

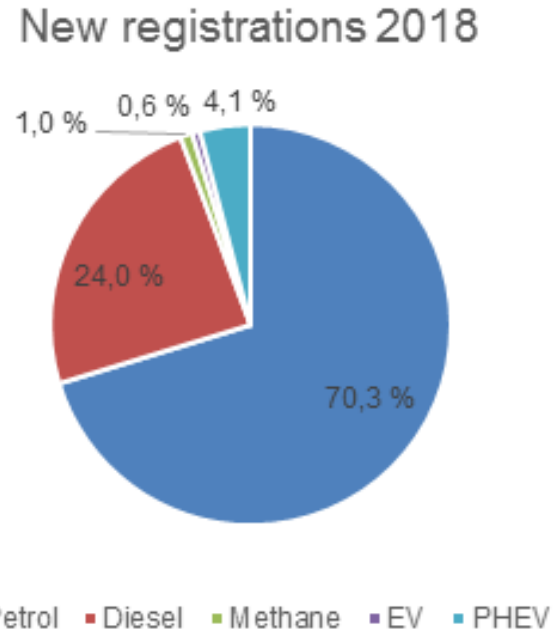
- Large, sparsely populated country
  - 338,000 km2, some 1400 km from North to South
  - Population appr. 5 million, 15 people/km2
  - Transport work per capita is high
- Large biomass resources but no oil or gas
  - 73 % of the land area is forest
  - The forest industry is important from the viewpoint of national economy
- Quite ambitious goals for decarbonizing the whole society
  - **Target to be carbon neutral by 2035**

New passenger car registrations 2018

Current passenger car fleet ~ 2.7 Mio
Total new registrations 2018: 120,000

It takes around 20 years to completely renew the passenger car fleet

Uptake of new vehicles alone will not be sufficient to reach the ambitious decarbonisation target

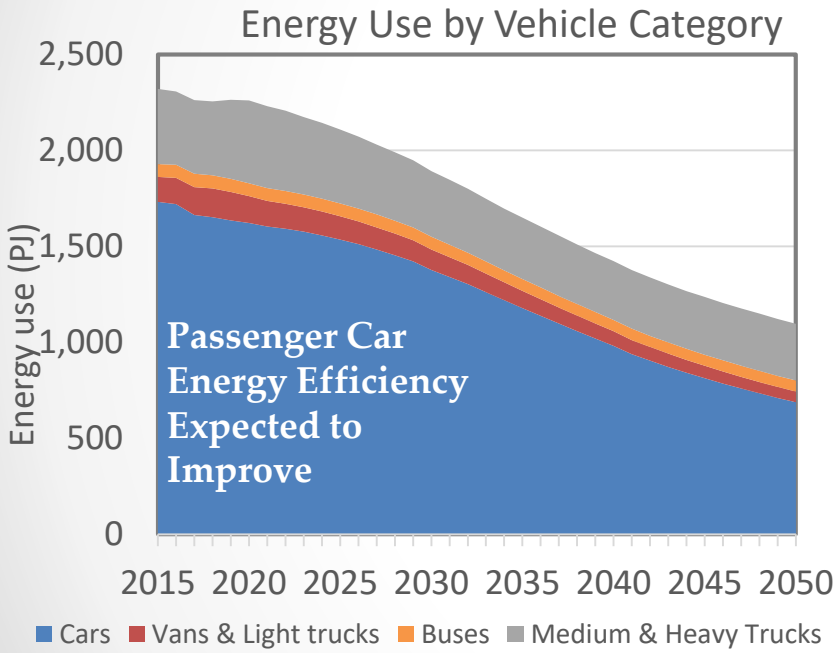


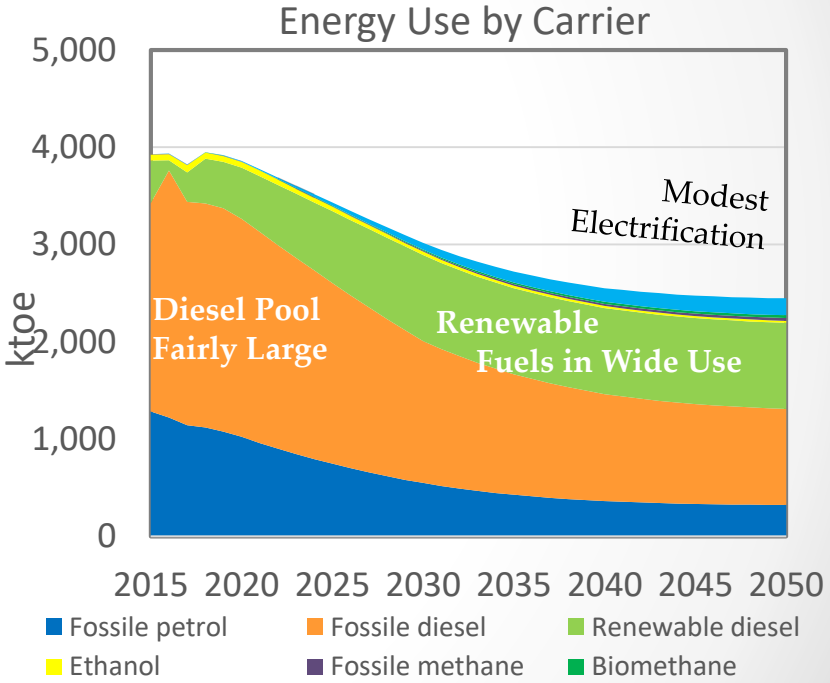
2016 national energy and climate strategy

The strategy for 2030 calls for a **50 % reduction of CO2 emissions from transport by 2030**, the reference year being 2005.

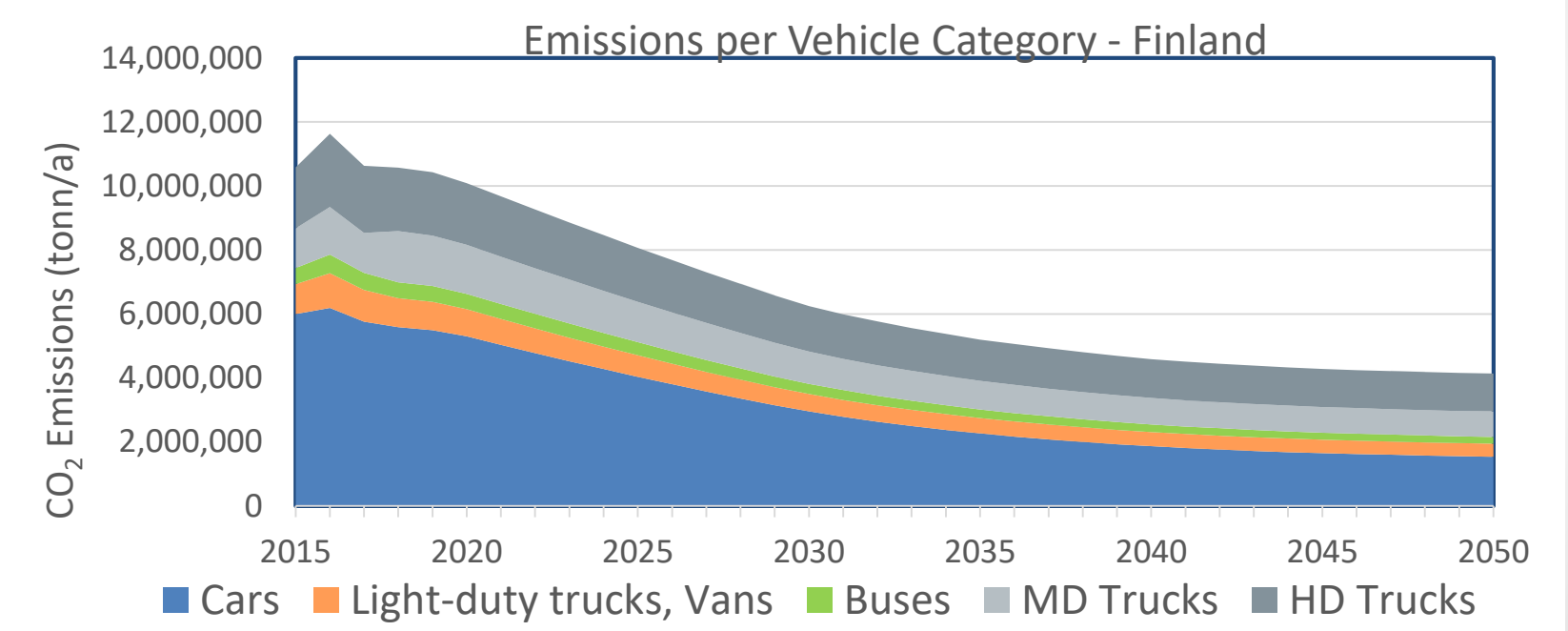
- Improving the energy efficiency of the transport system
- Improving the energy-efficiency of vehicles
- Replacing oil-based fossil fuels with **renewable and/or low emission alternatives**
  - Increasing the **physical share of biofuels** (energy content) to **30 %**
  - Expanding the refuelling infrastructure
  - Encouraging the uptake of alternative vehicles:
    - **250,000 electric vehicles**
    - 50,000 gas fuelled vehicles

Energy use of vehicle park





GHG emissions of vehicle park



Country-wise assessments

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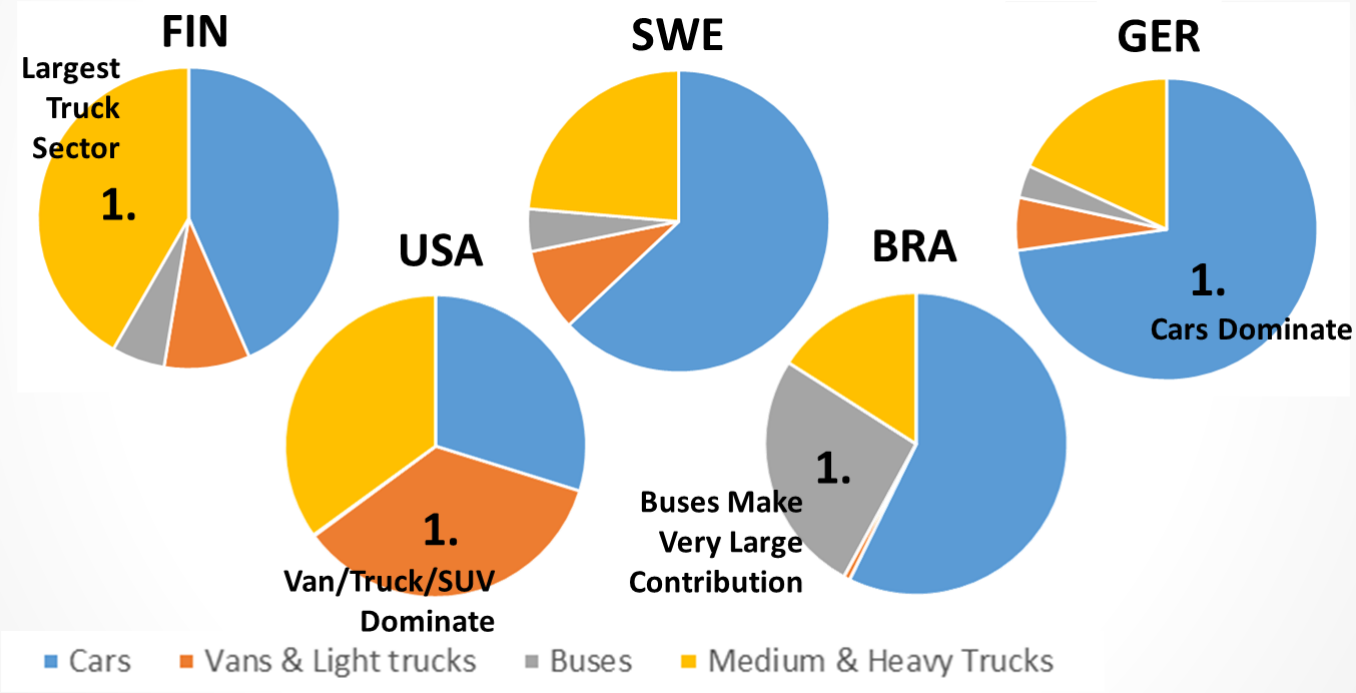
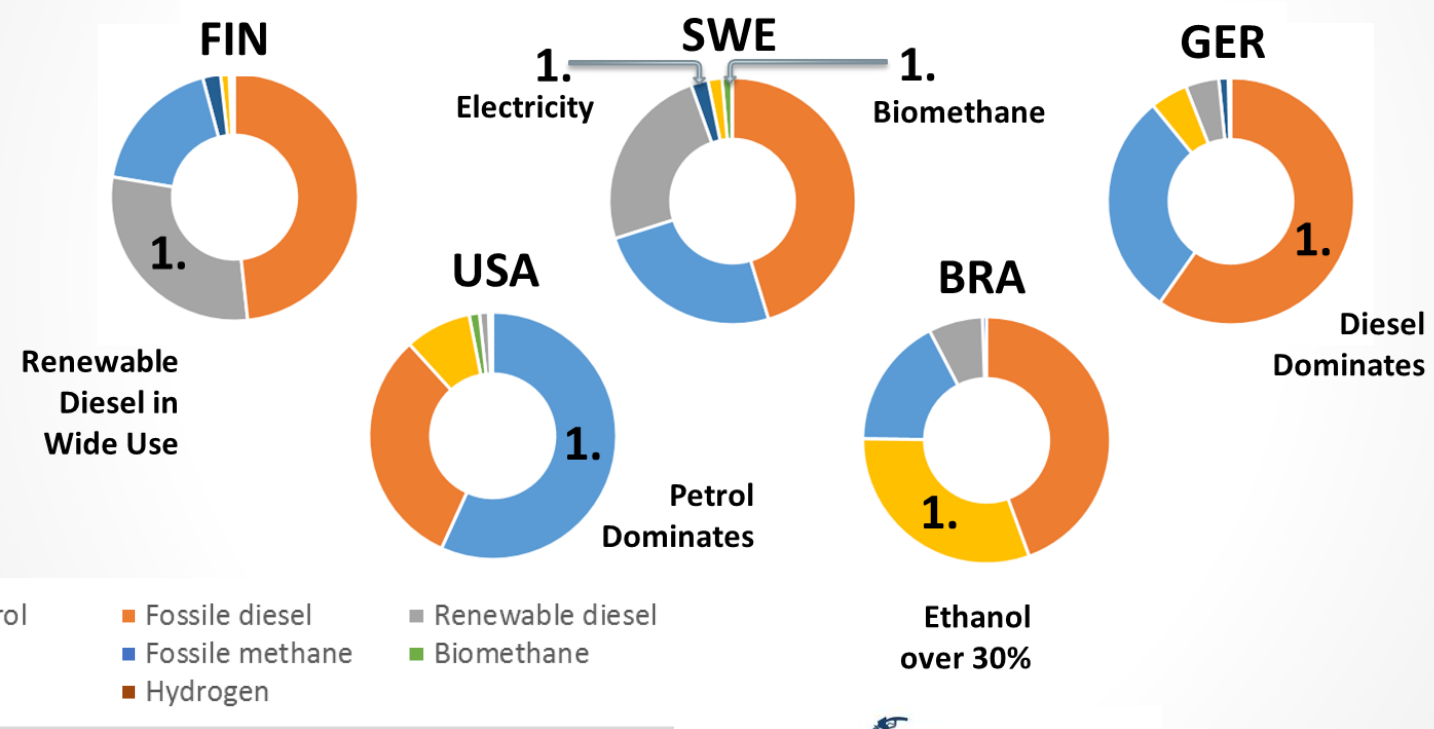
Country comparisons

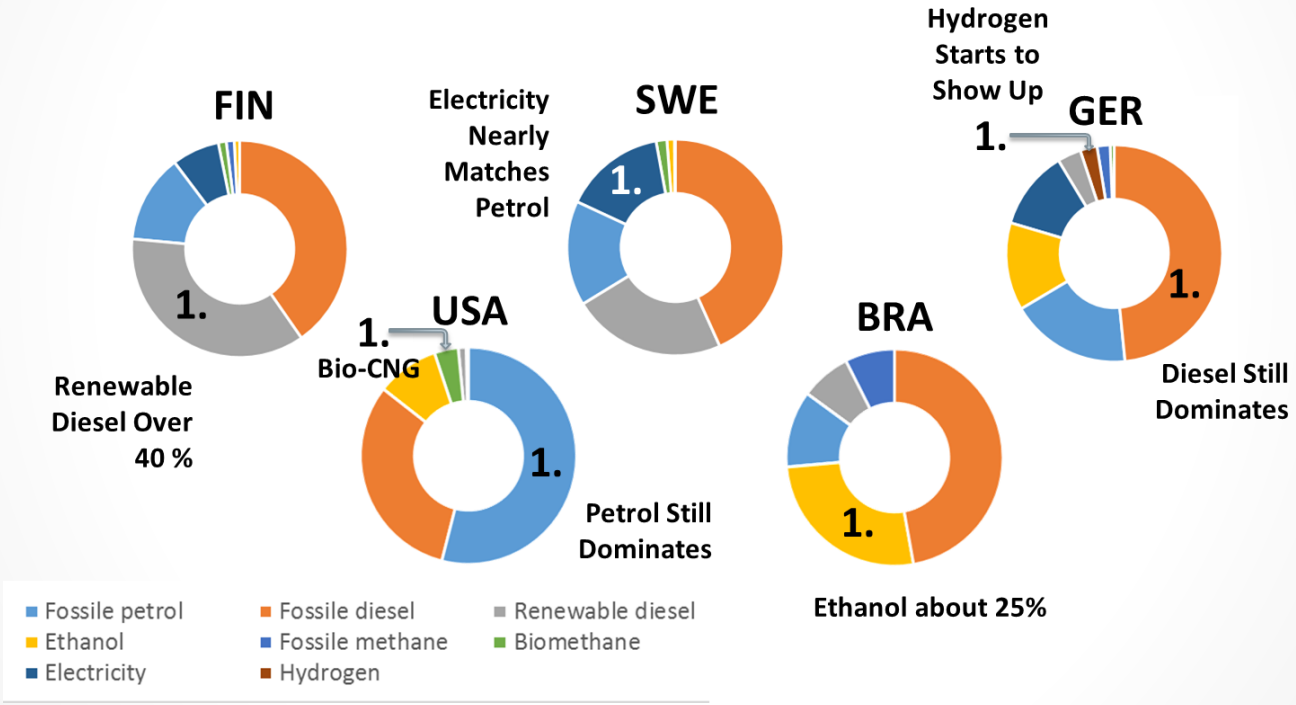
Energy Use per Vehicle Category – 2030

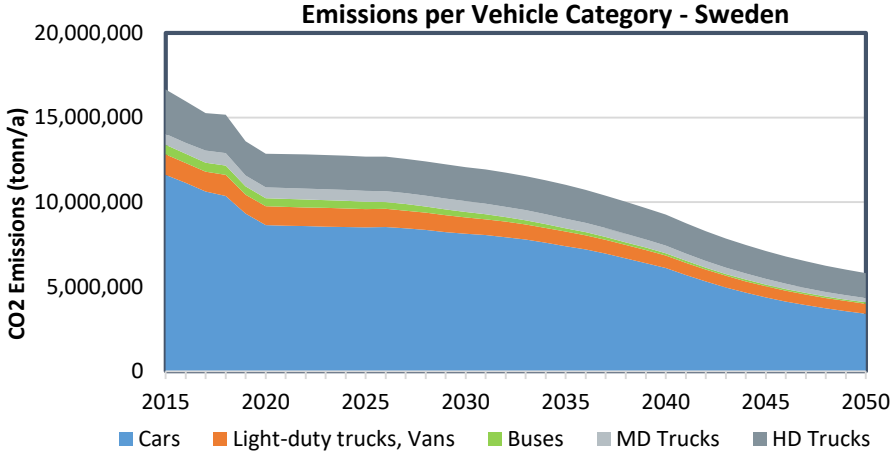


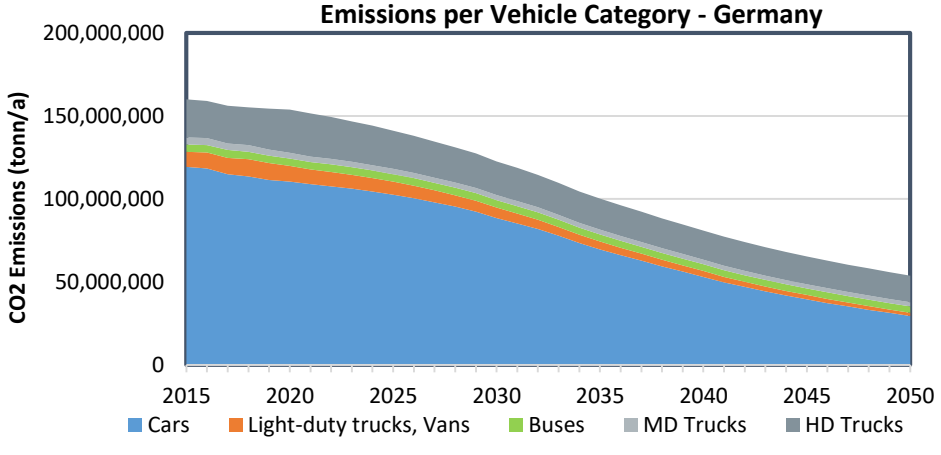
Energy Use per Carrier – 2030

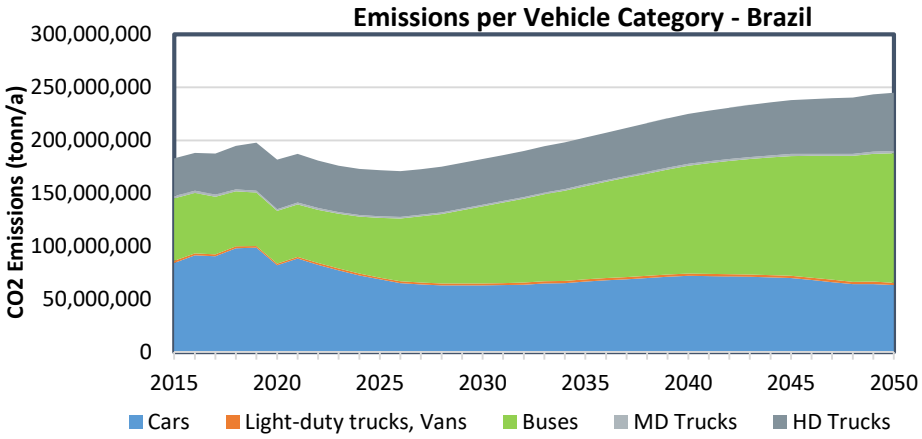


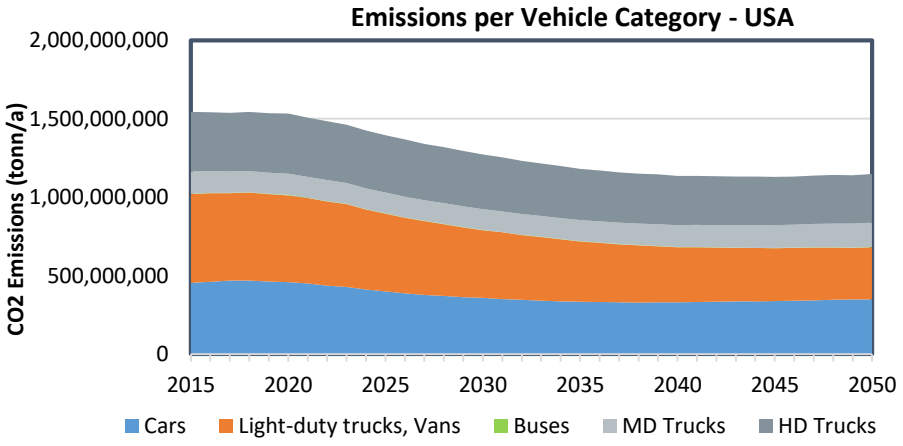
Energy Use per Carrier – 2050




Emissions per Vehicle Category - Sweden
CO2 Emissions (tonn/a)
20,000,000
15,000,000
10,000,000
5,000,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Cars
Light-duty trucks, Vans
Buses
MD Trucks
HD Trucks


Emissions per Vehicle Category - Germany
CO2 Emissions (tonn/a)
200,000,000
150,000,000
100,000,000
50,000,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Cars
Light-duty trucks, Vans
Buses
MD Trucks
HD Trucks


Emissions per Vehicle Category - Brazil
CO2 Emissions (tonn/a)
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Cars
Light-duty trucks, Vans
Buses
MD Trucks
HD Trucks


Emissions per Vehicle Category - USA
CO2 Emissions (tonn/a)
2,000,000,000
1,500,000,000
1,000,000,000
500,000,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Cars
Light-duty trucks, Vans
Buses
MD Trucks
HD Trucks

Overall Workshop Conclusions

- We are currently **NOT ON TRACK** to reach our GHG emission targets
- Evolution of national transport sector GHG emissions largely varies, from rising to relatively stable to decreasing, but even the decreasing ones are not in line with their ambitious targets
- We have to use **ALL AVAILABLE OPTIONS**
- Measures have to include:
  - Transport efficient society
  - Efficient vehicles
  - Renewable energy carriers
- Public acceptance of policy measures needed

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More information: https://iea-amf.org/content/news/TD-WS

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