Reference scenario Transport

PROLIBIC workshop

18/09/2012

Structure

- Main assumptions of Reference Scenario (REF)
- Evolution of transport emissions in Belgium in REF
- Decomposition analysis CO_2
- Evolution external cost of transport
- Conclusions

Description of Reference Scenario (REF)

- PLANET model (v3.2)

  Update REF scenario (SFP Mobility & Transport / PROLIBIC)

  - Macroeconomic and socio-demographic hypotheses
  - Transport data: calibration on a more recent year (2008). Update of origin and destination matrix for passenger and freight transport
  - Freight transport, the use of the NST 2007 classification;
  - Costs of vehicles
  - Emission factors and environmental costs ⇦ E-motion model

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Description of Reference Scenario (REF)

- E-motion model
  - Penetration of alternative motor fuel and vehicle technologies ⇦ LIMOBEL-project / Milieuverkenning 2030
  - Biofuels minor adjustments updated historic numbers up to 2010
  - Update NO_x emission factors of euro 5 en 6 diesel cars
    - NO_x euro 5 = average of euro 2 and 3
    - NO_x euro 6 = 0.08 g/km
  - Update energy consumption factor electric cars
    - Correction factor 1.25

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Description of Reference Scenario (REF)

- Indirect emissions
  - LIMOBEL / BIOSES project
  - IEA projection gas supply in EU
    - Drop of EU gas from 70% (2005) to 25% (2030)
  - Biofuels only first generation
  - Electricity production gradual phasing out of nuclear energy
    - 2030: 40% gas, 32% coal, 25% renewable energy and 3% gasoil

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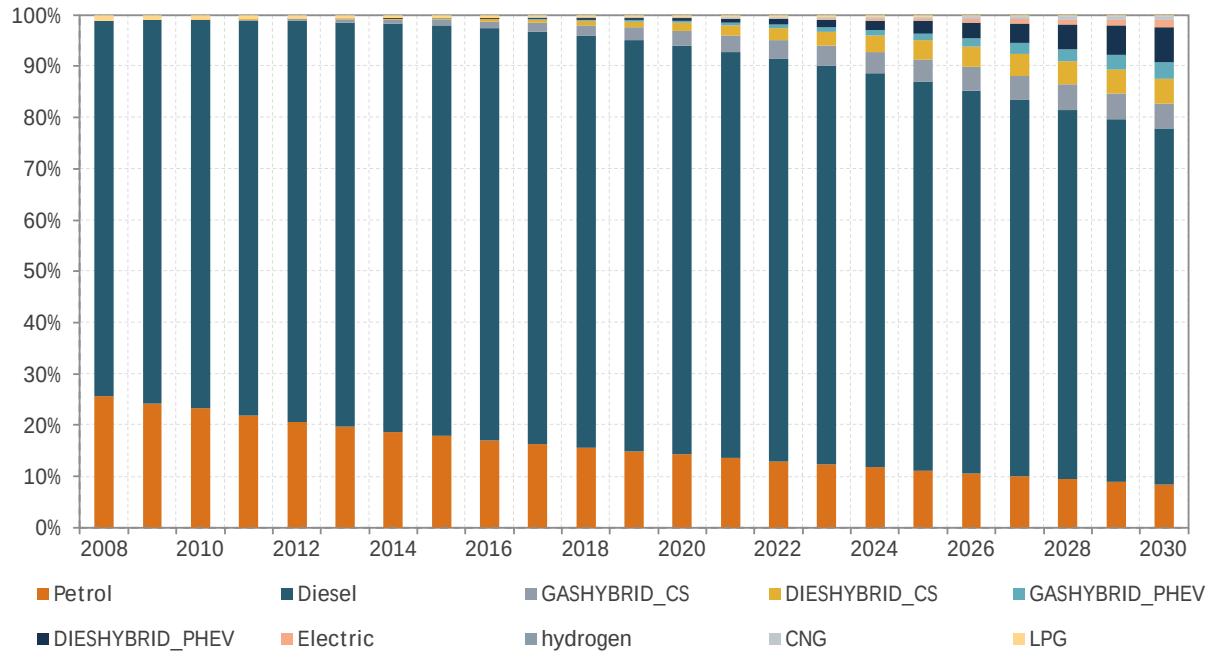
Repartition types of cars in vehicle-km (REF)



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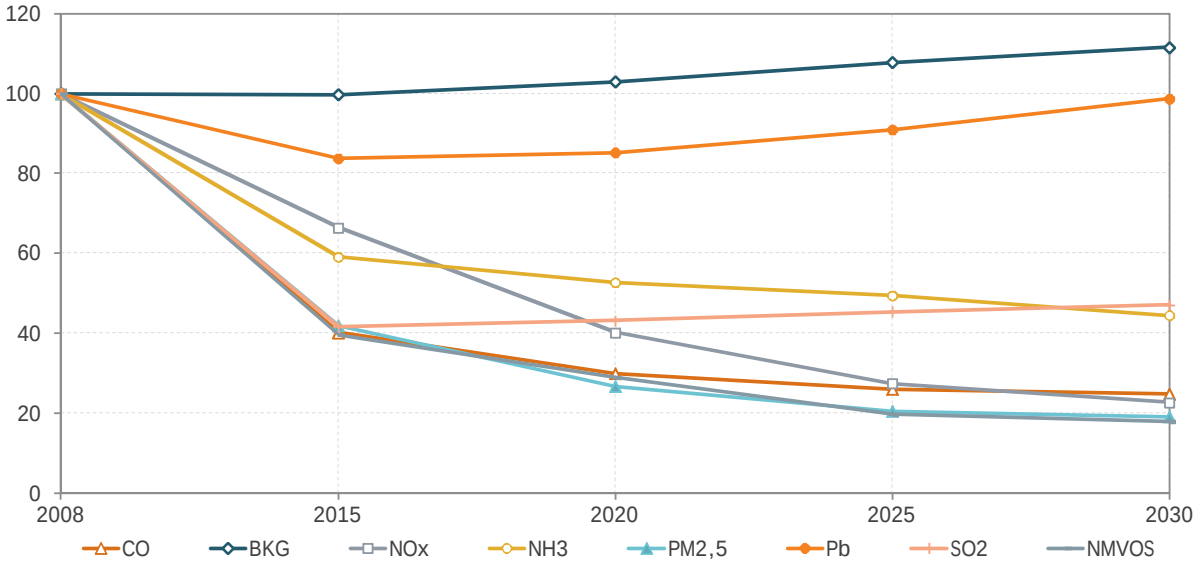
Evolution exhaust emissions transport (REF)

2008=100

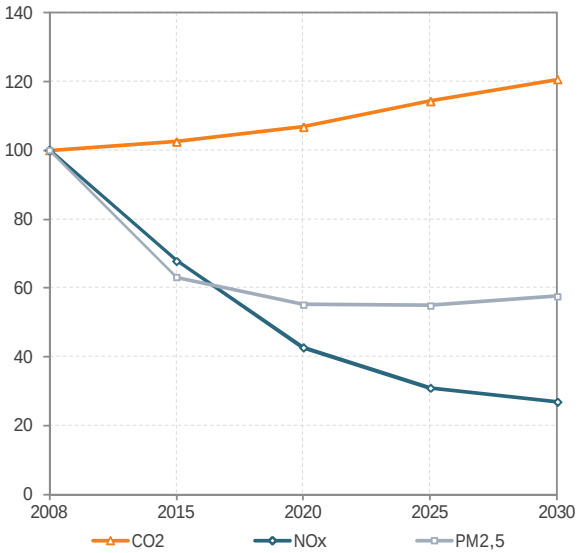


Transport : road, rail, IWW

Evolution total emissions transport in REF

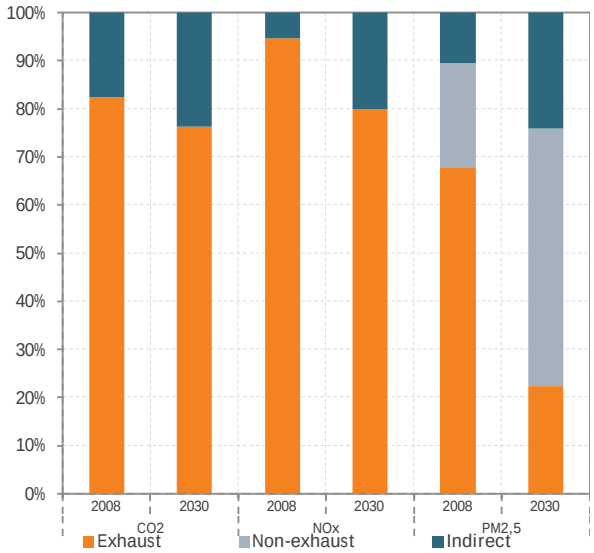
Total CO_2, NO_x and PM2,5 emissions of passenger and freight transport in Belgium (road, rail, IWW)

2008=100



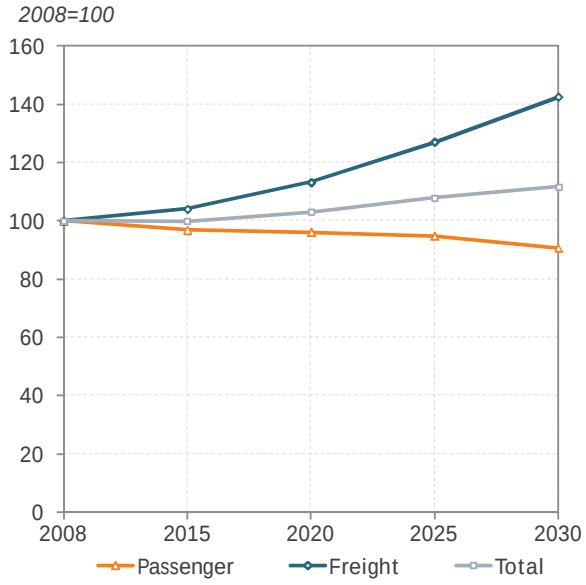
Share of exhaust, non exhaust and indirect emissions in total CO_2, NO_x and PM2,5 emissions

%

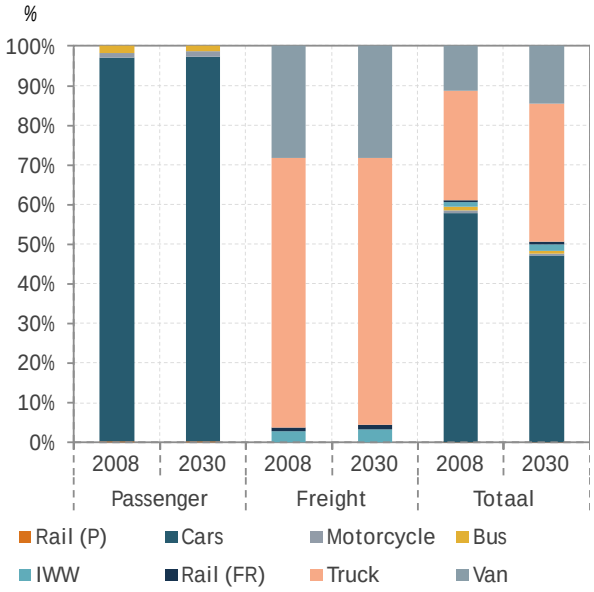


CO_2 exhaust emissions transport in REF

Evolution of CO_2 exhaust emissions of passenger and freight transport in Belgium (road, rail, IWW)

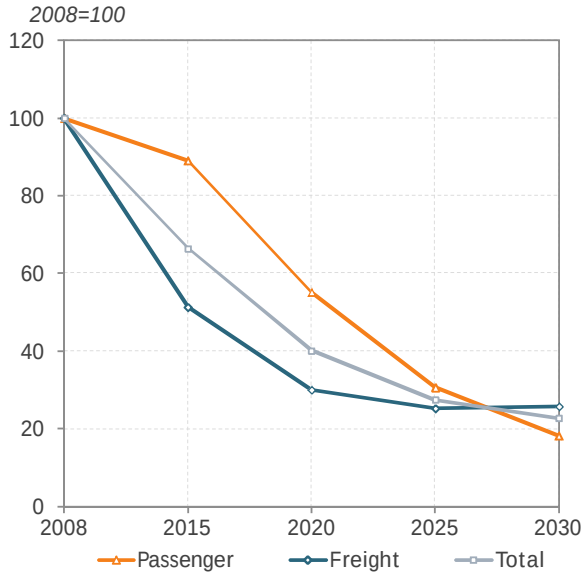


Evolution of the modal share of CO_2 exhaust emissions of passenger and freight transport

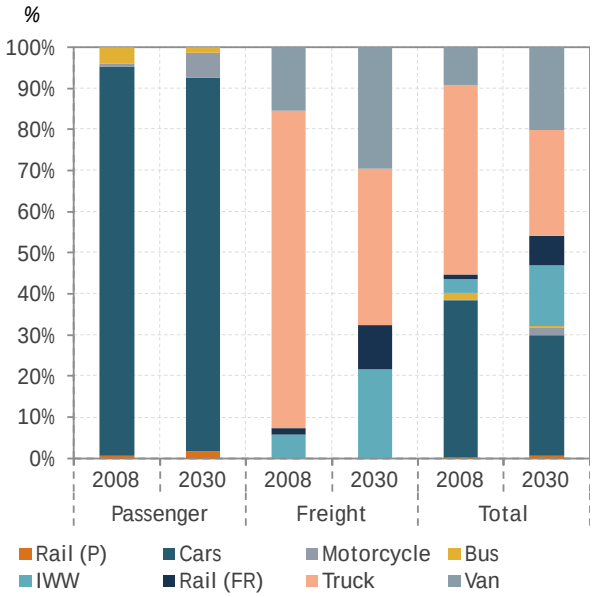


NO_x exhaust emissions transport in REF

Evolution of NO_x exhaust emissions of passenger and freight transport in Belgium (road, rail, IWW)

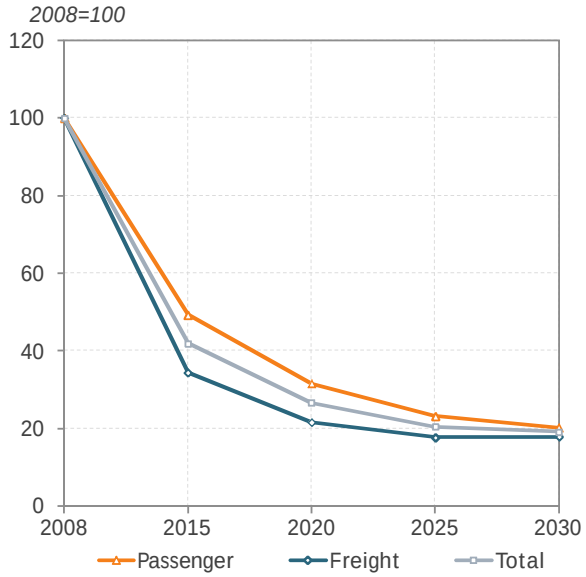


Evolution of the modal share of NO_x exhaust emissions of passenger and freight transport

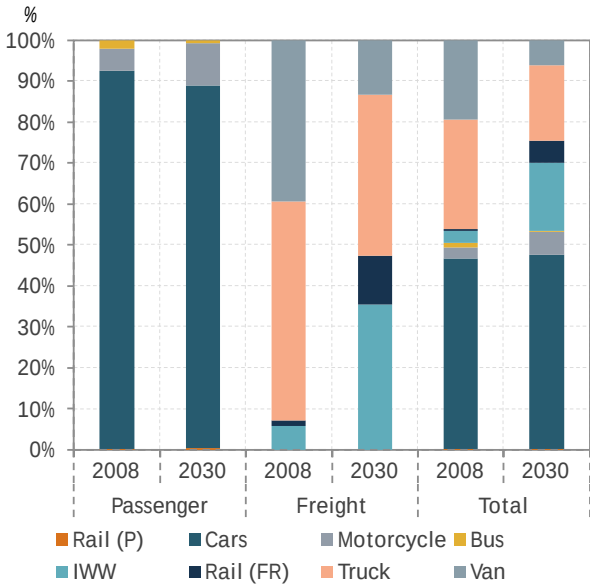


$PM_{2.5}$ exhaust emissions transport in REF

Evolution of $PM_{2.5}$ exhaust emissions of passenger and freight transport in Belgium (road, rail, IWW)



Evolution of the modal share of $PM_{2.5}$ exhaust emissions of passenger and freight transport



Decomposition analysis

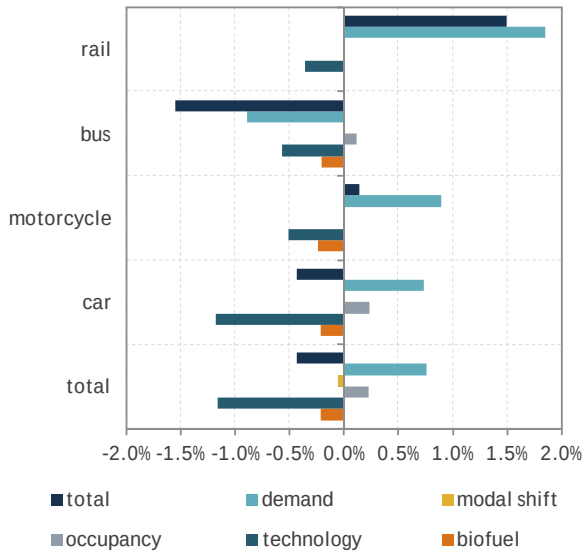
- Evolution of CO_2 exhaust emissions in REF
- 5 effects:
  - changes in transport demand (demand)
  - changes in the modal choice (modal shift)
  - changes in the number of persons or tonnes per vehicle (occupation/load);
  - technological changes (technology)
  - Changes in the share of biofuels (biofuel).
- For passenger cars technological changes decomposed into:
  - the changes in fuel technology (fuel shift)
  - changes in engine size (size shift)
  - changes in emission abatement technology/fuel efficiency.

Decomposition analysis

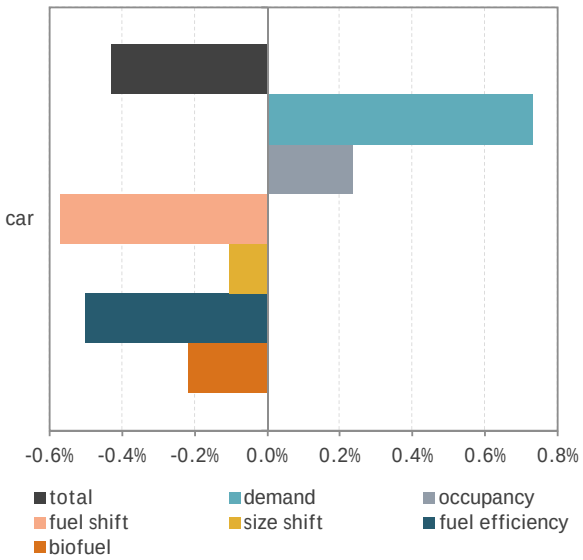
- Average growth rate in order to enable comparison with historic figures
- Contribution of the different 'effects' in percentage points

Decomposition analysis

Evolution of CO_2 exhaust emissions by passenger transport (2008-2030)

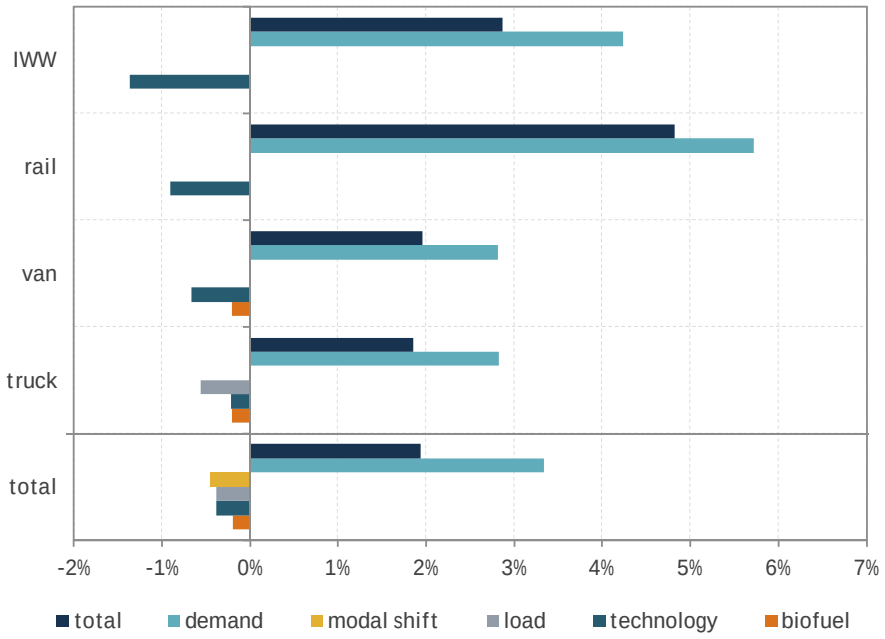


Evolution of CO_2 exhaust emissions by passenger cars (2008-2030)



Decomposition analysis

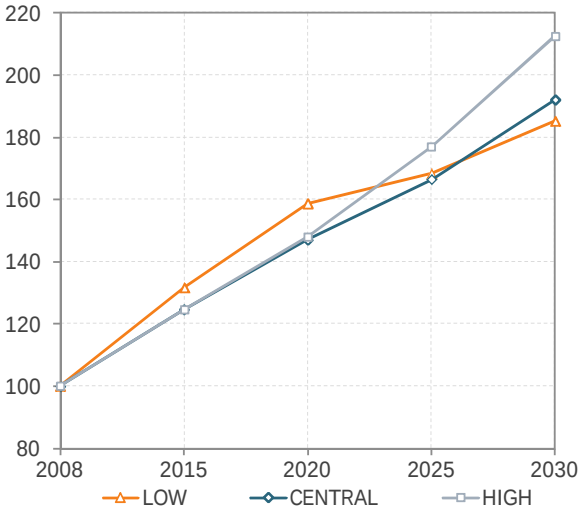
Evolution of CO_2 exhaust emissions by freight transport (2008-2030)



Evolution external cost of transport in REF

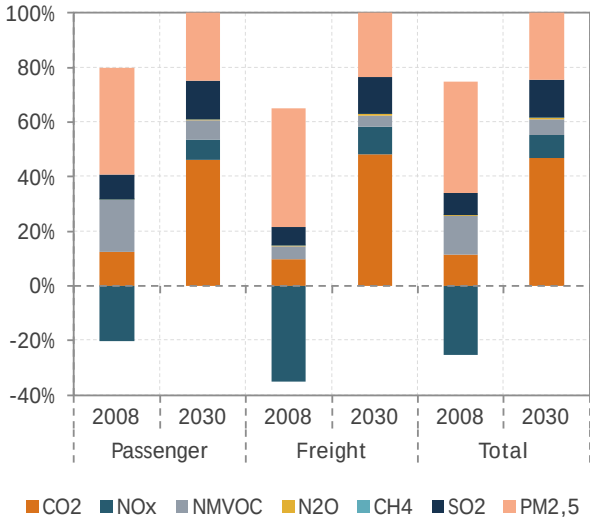
Evolution external cost of total emissions

2008=100



Evolution of the pollutant's share in external cost of total emissions – LOW

%



Conclusions REF

- Decrease of most pollutants ⇔ CO_2 & Pb
- Increasing importance indirect emissions (CO_2, NO_x, $PM_{2.5}$)
- Increasing importance non-exhaust emissions ($PM_{2.5}$)
- CO_2:
  - Passenger transport: technological changes and increased biofuel blending counter increasing transport demand and decreasing occupancy
  - Freight transport: not the case
- NO_x / $PM_{2.5}$: technological changes and increased biofuel blending counter increasing transport demand and decreasing occupancy

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Conclusions REF

- External cost
  - Depends on the valuation of damage cost of CO_2
  - Increase by 85-115%
  - In 2030 CO_2 main pollutant

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