Global transport outlook to 2050

Targets and scenarios for a low-carbon transport sector

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- IEA Mobility Model (MoMo)
- ETP 2012 analysis
  - Transport sector outlooks
  - CO_2 mitigation potential
  - Costing out the scenarios
- Transport technology outlooks and needs
  - Global Fuel Economy Initiative (GFEI)
  - Electric Vehicles Initiative (EVI)
  - Mobility modeling
- Conclusions

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IEA Mobility Model (MoMo)

- Simulation of global transport energy use, emissions and materials use and costs
  - Multiple scenarios and projections to 2050
  - Applied hypotheses on GDP and population growth, travel demand, vehicle technologies and fuel shares, techno-economic parametres (*e.g.* fuel economy and cost)
- 29 regions (continued expansion)
- Significant data on technologies and fuel pathways
  - full evaluation of GHG emissions life cycle
  - cost valuation: vehicles, fuels, infrastructure
  - section on material requirements for LDV manufacturing

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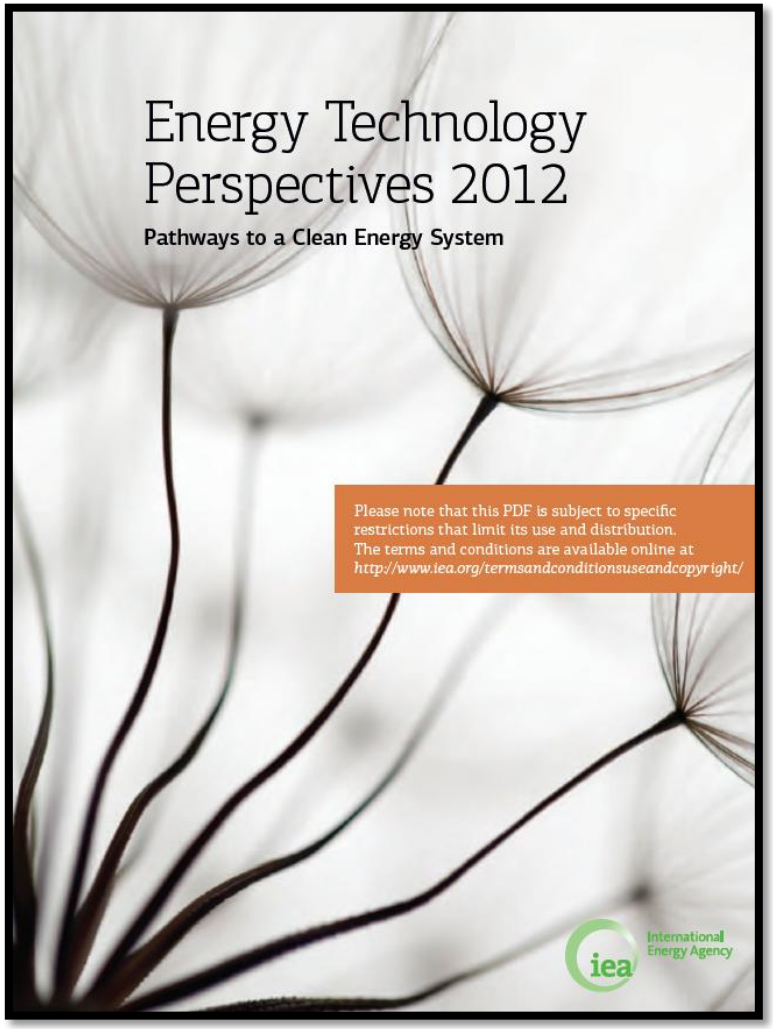
Coverage of transport modes

- 2-3 wheelers
- Light duty vehicles
  - internal combustion
  - hybrids / plug-in hybrids
  - fuel cell vehicles
  - electric vehicles
- Heavy duty vehicles
  - passenger (minibuses, buses, BRT and intercity buses)
  - freight (medium and heavy trucks)
- Rail
  - passenger and freight
  - HSR (added in 2012)
- Air / Water transport

ETP 2012



Scenarios to 2050

- 6°C (6DS): business-as-usual scenario, no further uptake of energy/climate policy
- 4°C (4DS): expected 'normal' scenario, incorporating announced policies
- 2°C (2DS): pathways to a clean energy system

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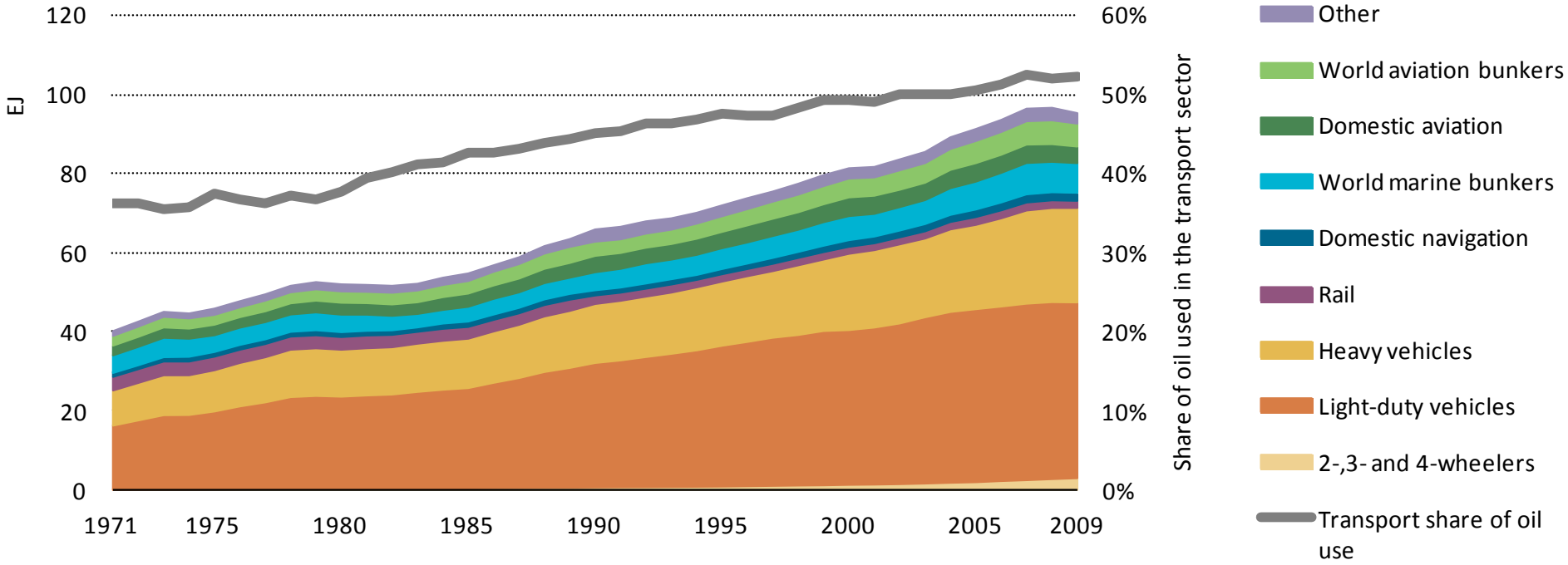
Historic trends

World transport energy use has doubled in past 30 years



Light-duty vehicles continue to drive growth, while road freight and air travel also increased rapidly in last decade.

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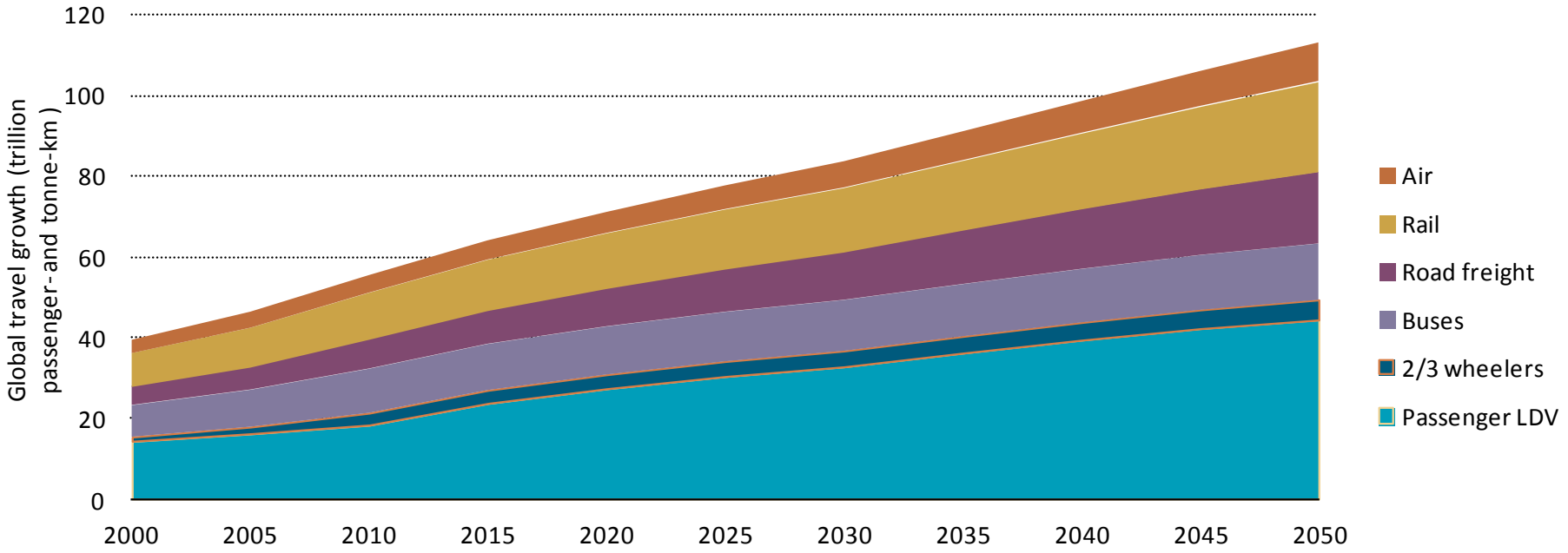
ETP 2012 transport outlook to 2050

Passenger and freight travel by mode in the ETP 6DS/4DS



With no dedicated policies, road travel likely to double by 2050, with most growth coming from passenger light-duty vehicles in developing countries.

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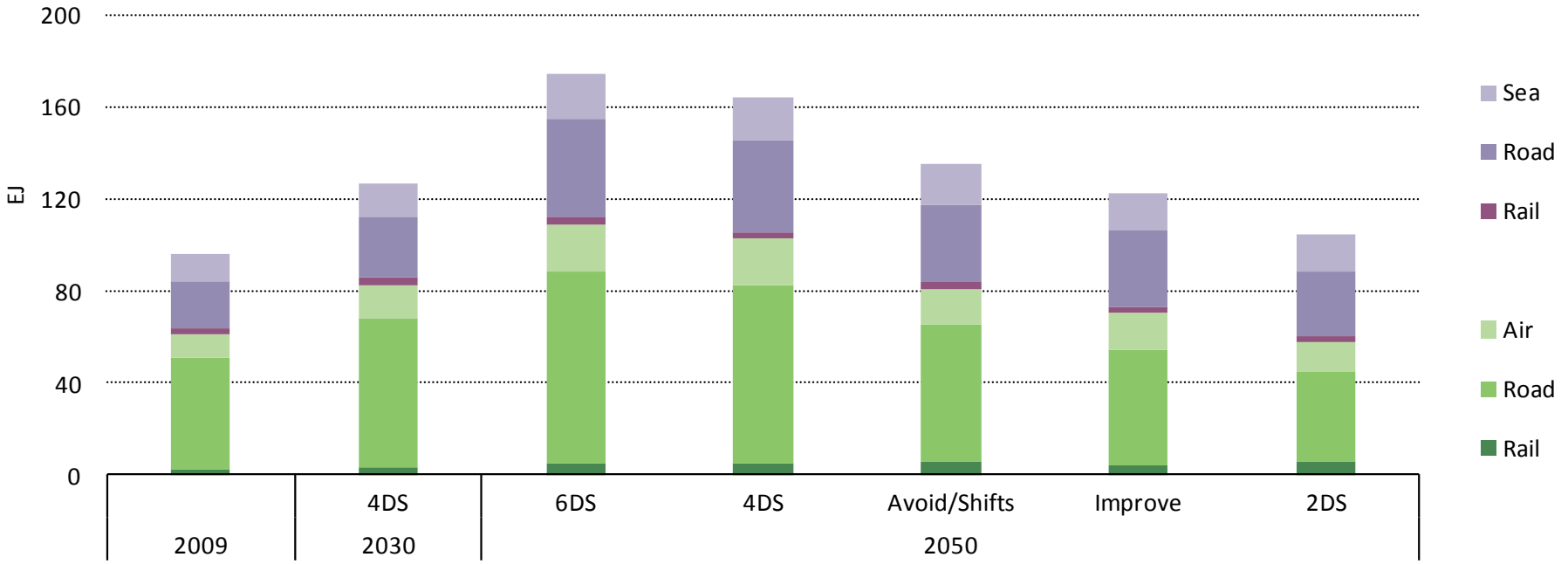
ETP 2012 transport outlook to 2050

Transport energy use by mode in the ETP scenarios



Energy use could increase as much as 70% by 2050 if no further policies are adopted in support of efficiency, alternative vehicles/fuels and modal shifting.

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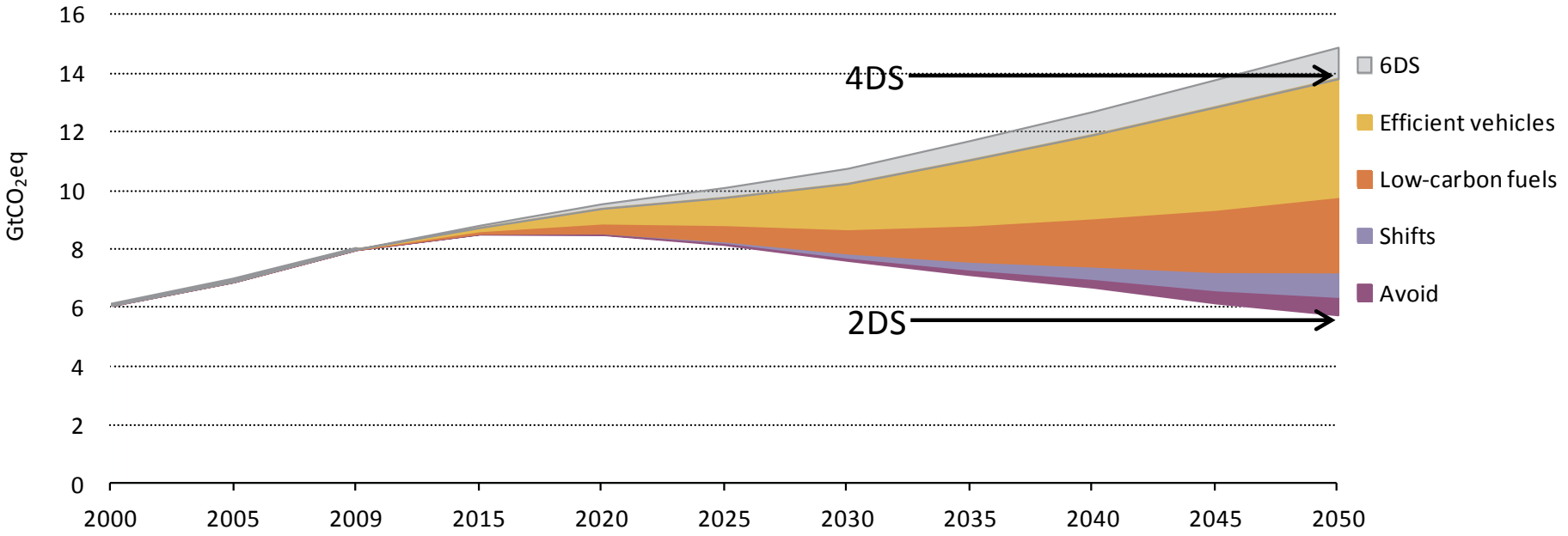
ETP 2012 transport outlook to 2050

Efficient vehicles and alternative fuels key to achieve 2DS



An 'avoid, shift and improve' approach is the most cost effective to reach 2DS objectives

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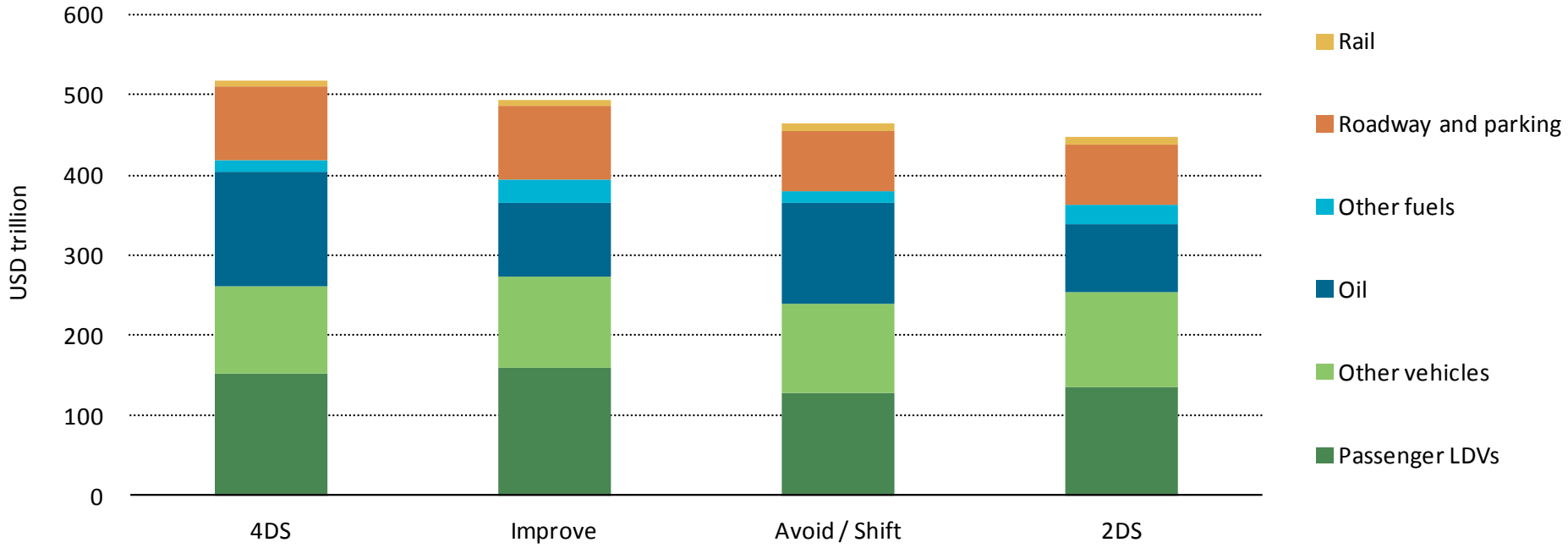
Mitigation strategies cost comparison

Global transport expenditure estimates to 2050



The 2DS 'avoid, shift and improve' scenario has potential to reduce global transport expenditures by as much as USD 70 trillion (~15% over 4DS).

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Technologies for transport

Outlooks, needs and IEA initiatives

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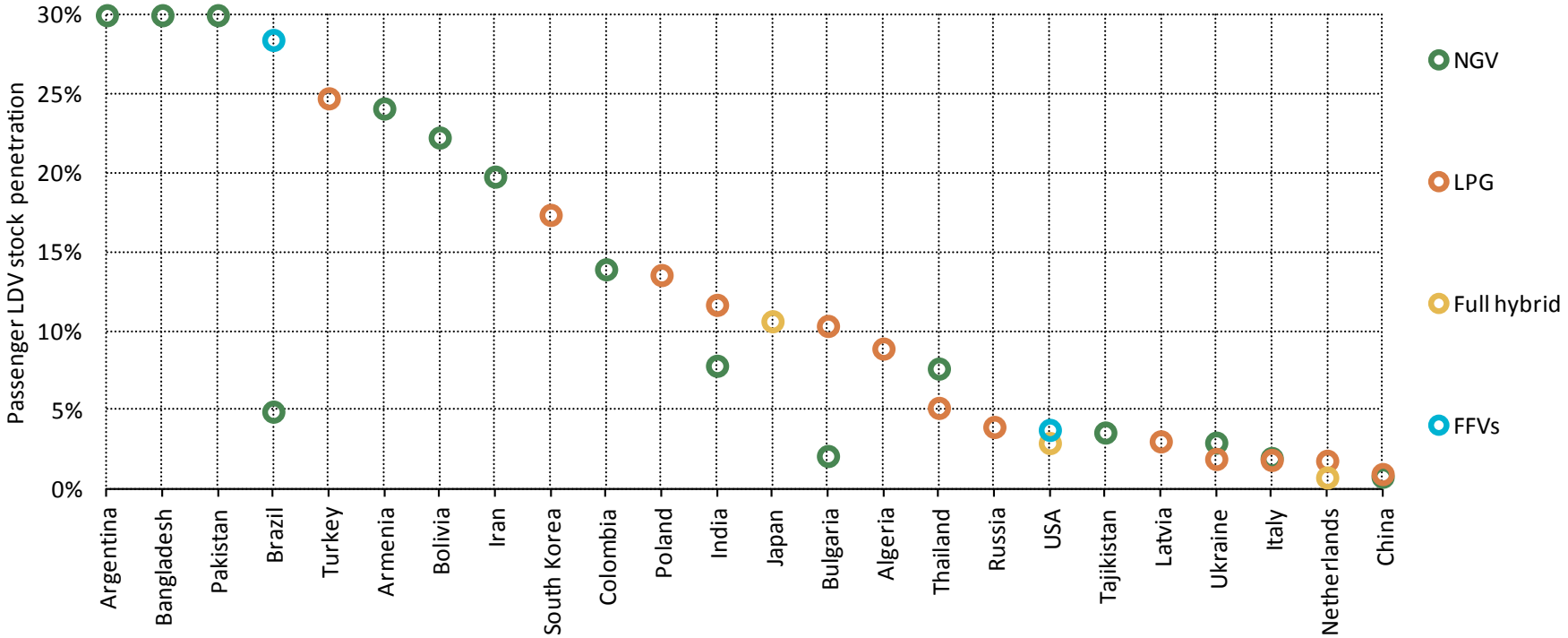
Transport technologies in the 2DS

Share of alternative vehicle technologies in 2010



Alternative vehicles still represent a small share of total LDV stocks.

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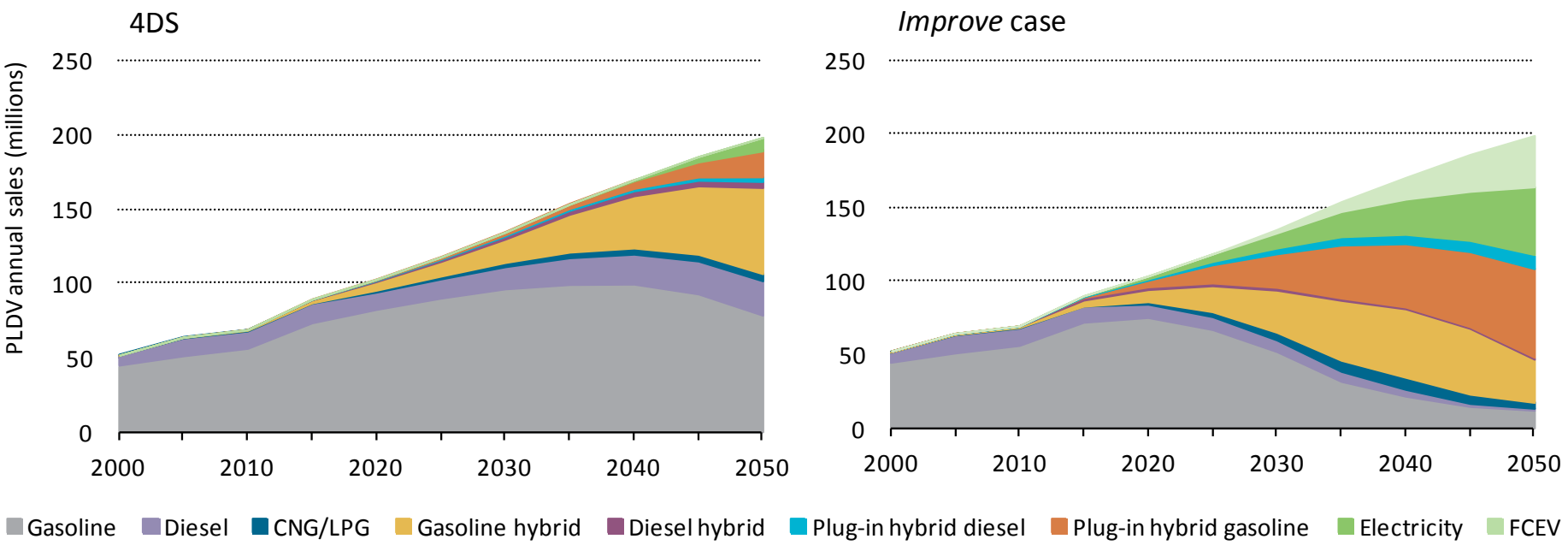
Transport technologies in the 2DS

Share of alternative LDV sales in 2050 (4DS vs Improve)



In order to reach 2DS objectives, sales of non-conventional vehicles and fuels need to increase rapidly beyond 2015.

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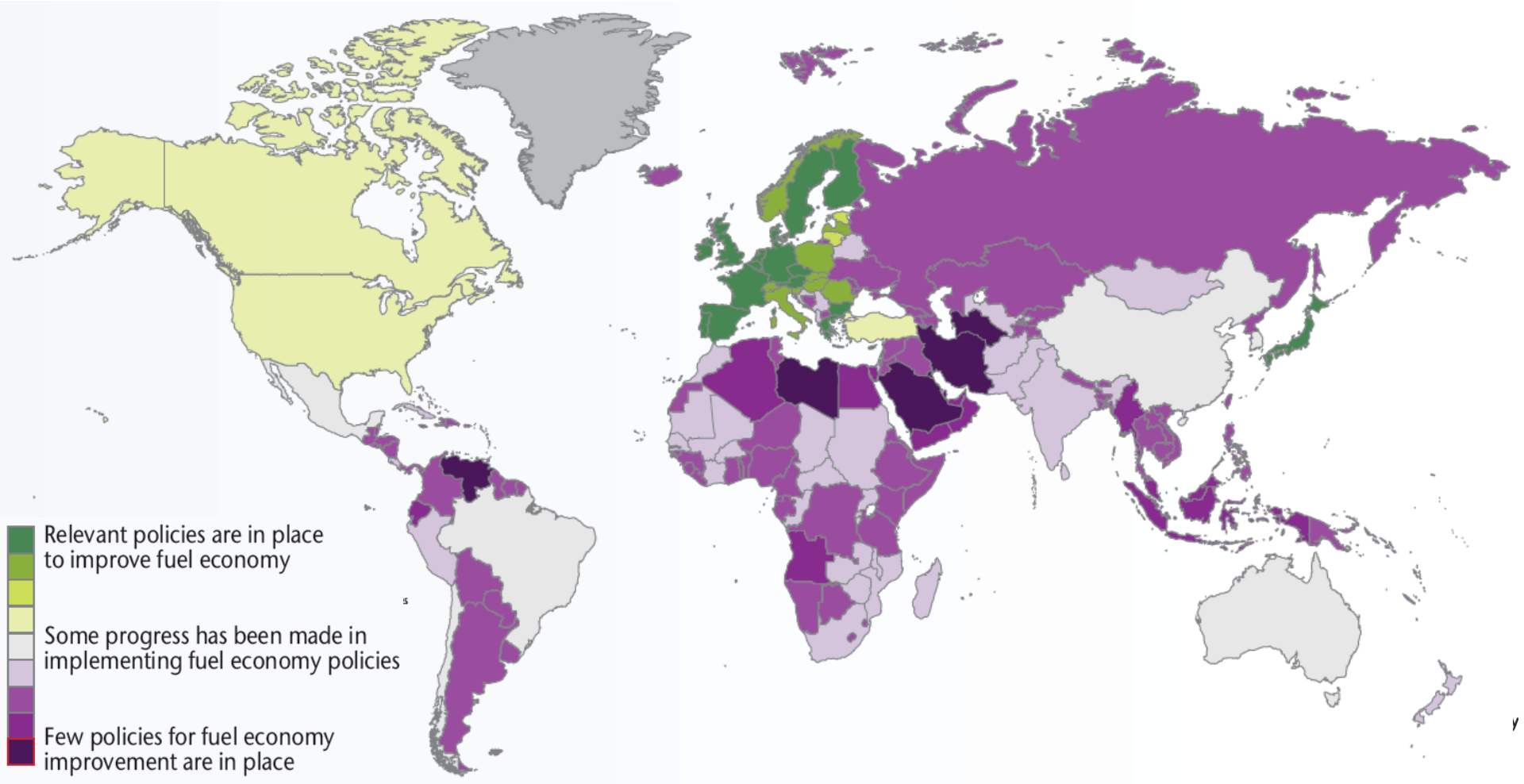
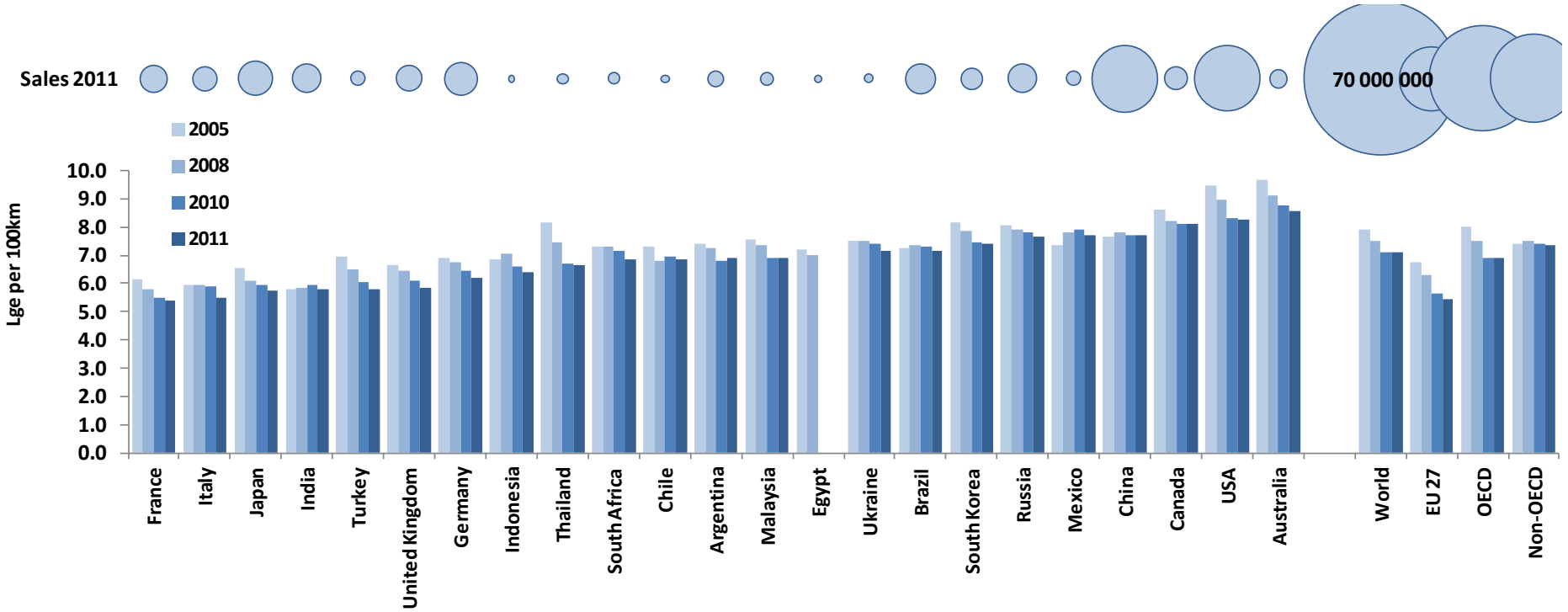
GFEI: status and potentials

Fuel economy readiness index status



GFEI: status and potentials



- Significant fuel economy improvement if policies are in place
- Size shift vs. technology evolution moderates Non-OECD improvement
- Growth of markets with worse fuel economy affects global trend

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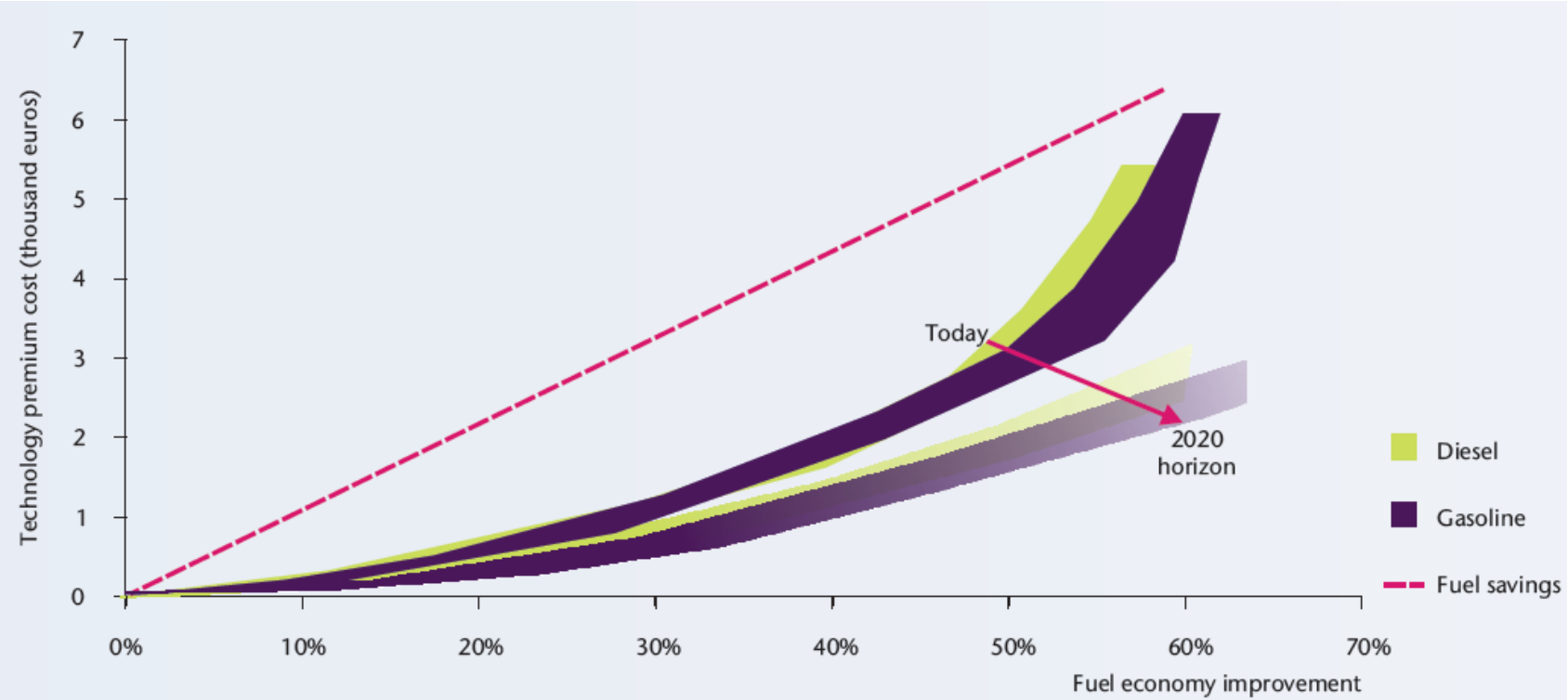
GFEI: status and potentials

Fuel economy potentials and costs



Source: IEA analysis based on TNO, 2009 and ICCT, 2012.

Note: Fuel savings over the lifetime of the vehicle are calculated based on 150 000 kms, for a base fuel economy of 8L/100km, with a fuel price of EUR 1 per litre (USD 4.7 per gallon), with no rebound effect as fuel economy improves.

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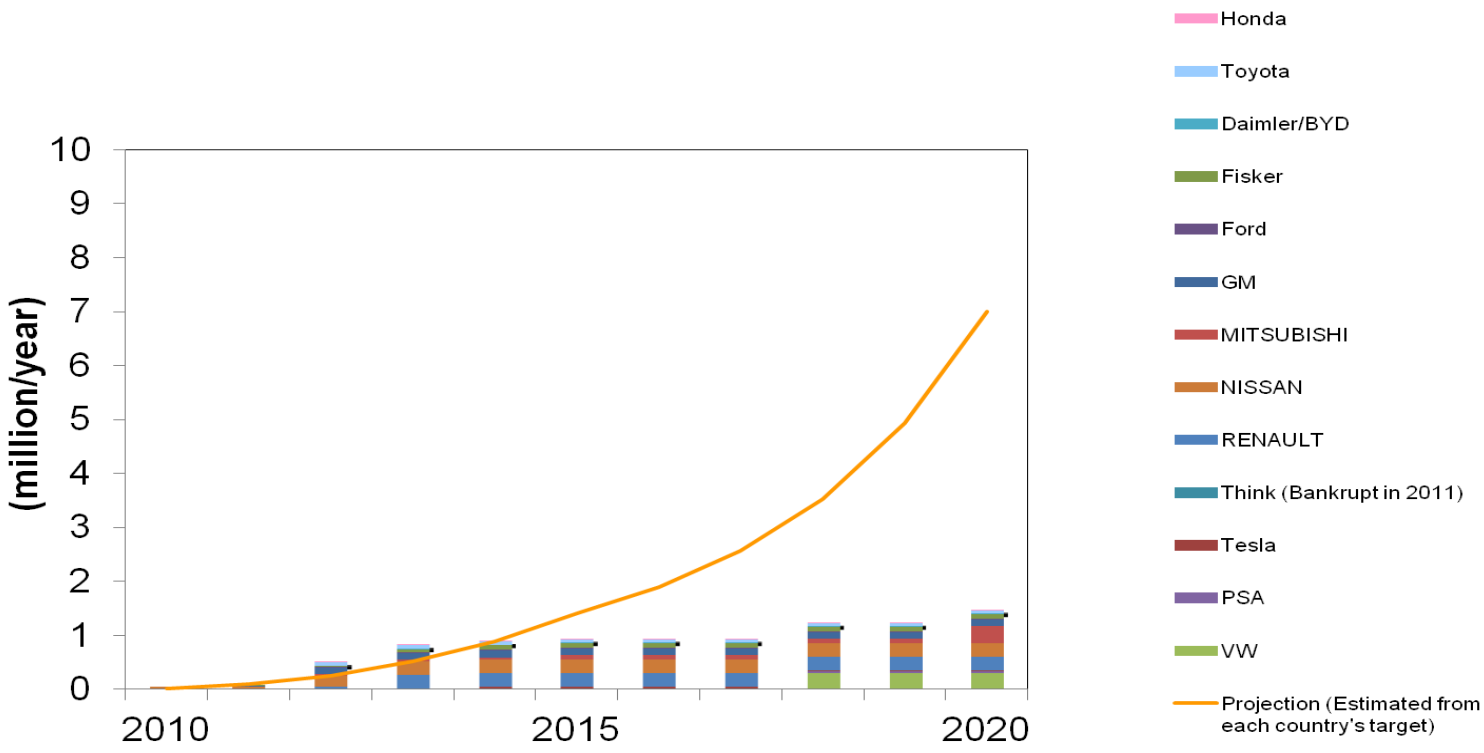
EVI: status and outlook

Electric vehicles: realities and targets



EV vehicle sales need to double every year to reach 2020 targets.

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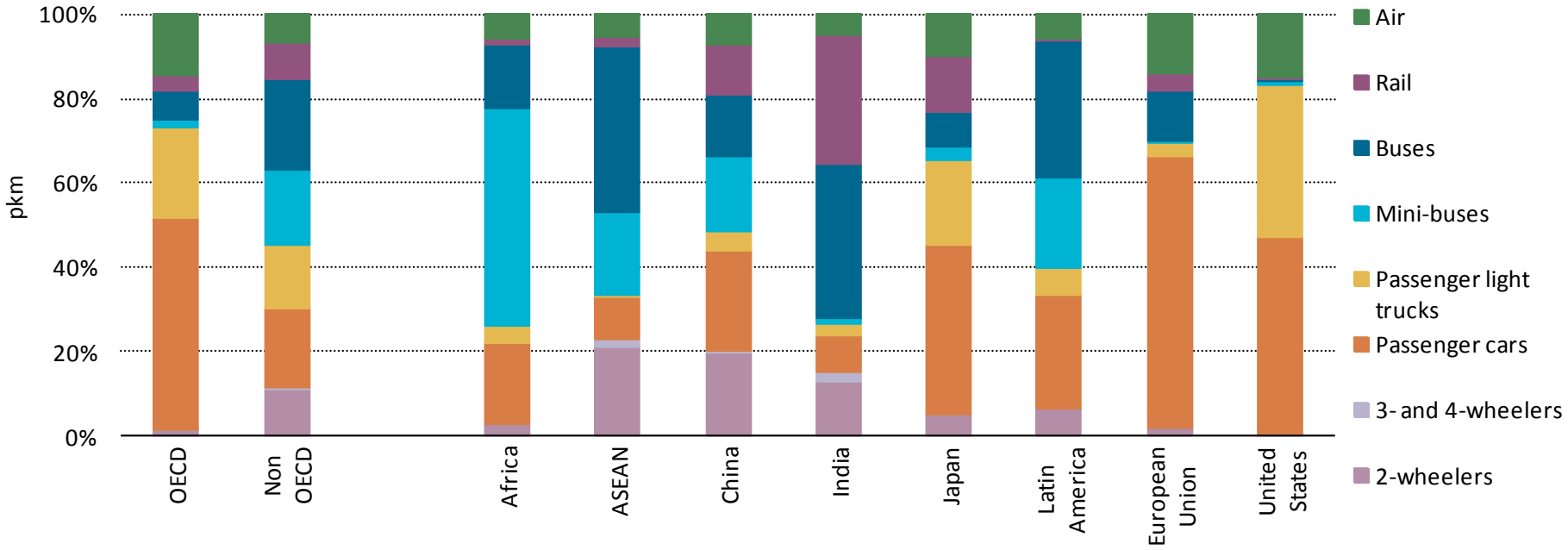
Mobility trends and potential

Passenger mode share estimates (2009)



Modal data is limited in most countries but is critical to analysis of transport sector trends and potentials.

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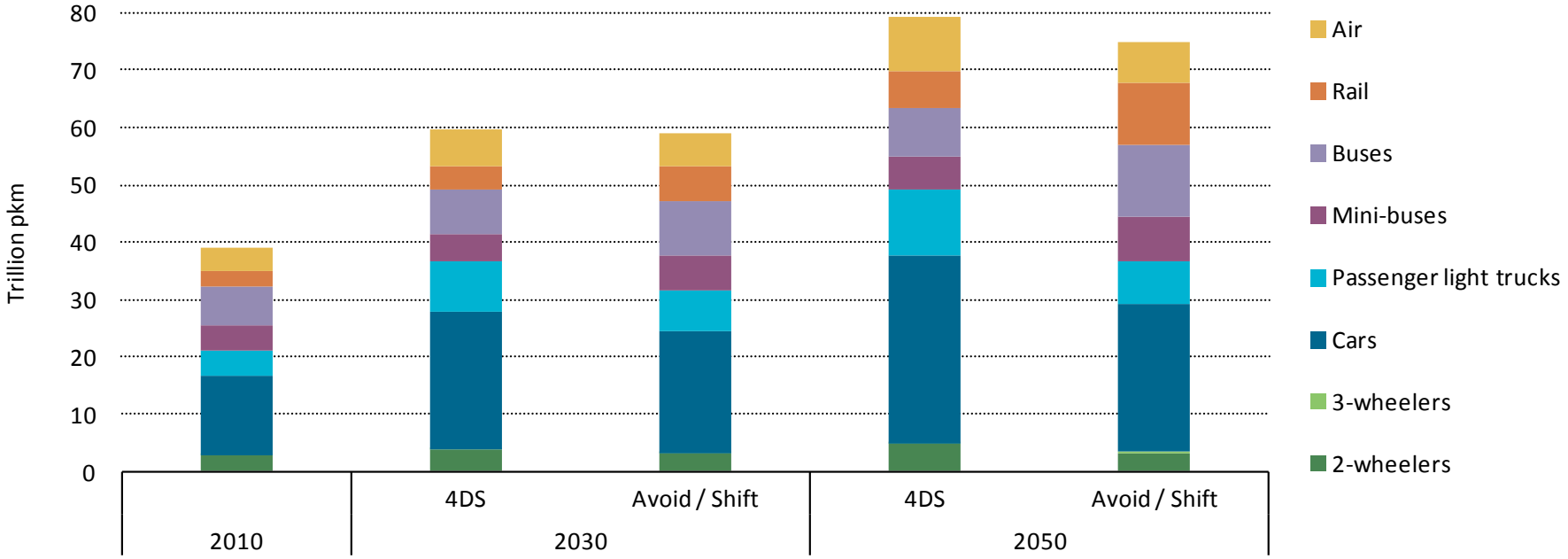
Mobility trends and potential

Modal shares in the ETP 2012 'Avoid/Shift' analysis



ETP 'Avoid/Shift ' analysis demonstrates the potential to reduce energy and emissions to 2050 through marginal changes in travel.

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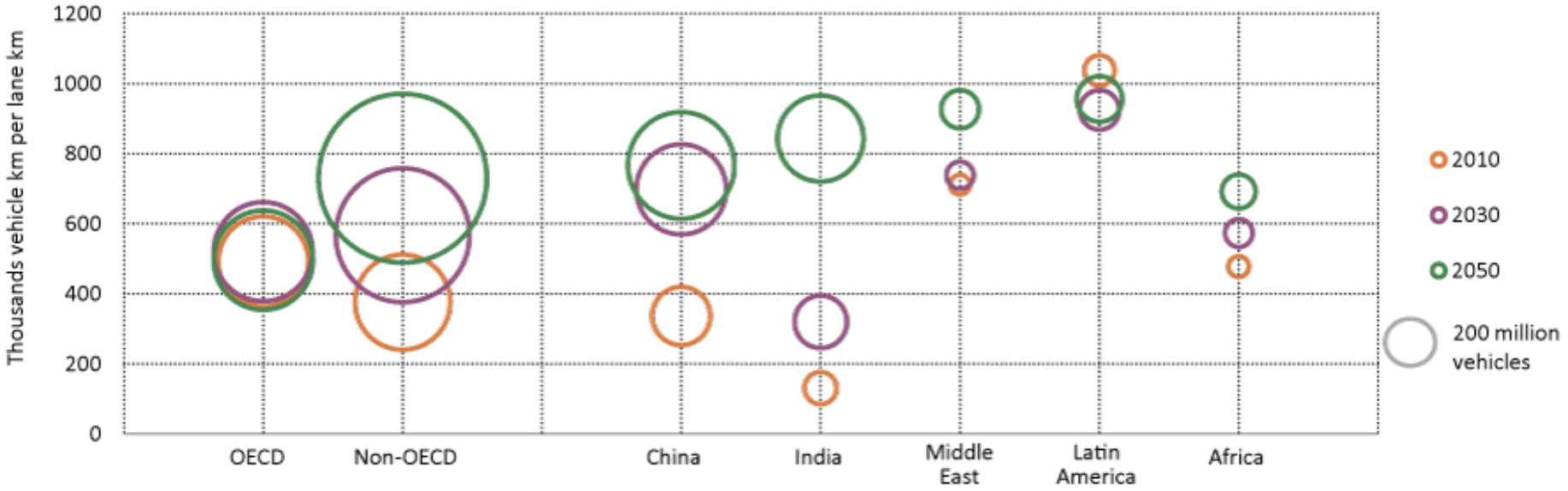
Infrastructure: technical solutions?

Average expected road-occupancy levels (national level)



Travel under the 4DS and 2DS is expected to increase road occupancy levels. Technologies could play a role in improving travel flows – and consequently reduce energy losses, emissions and social costs.

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Looking forward

Technical questions and areas of needed research

Next steps and R&D needs

- Improved mobility requires understanding of mobility needs:
  - How do/will/could people and goods move about?
  - How can efficiencies be improved?
  - How can technology assist travel choices and movement?
  - How will urban context change transport needs?
- Transport system is complex:
  - One solution not a panacea – multiple approaches needed: infrastructure/technology/policy interface
  - Need to think outside the box from within the box – define solutions through innovation for context

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Conclusions

- ‘Avoid, shift and improve’ approach most cost effective to achieve 2DS objectives
- Significant energy savings and emissions reduction possible through fuel economy improvement. Learning curves, costs and availability are key.
- Modal shifts can play large role in improving transport sector (costs, energy, emissions, time, etc)
- Technology priorities should address how to move people and goods efficiently in an energy-, time- and budget- constrained world

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Thank you!

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