TRANSPORTATION

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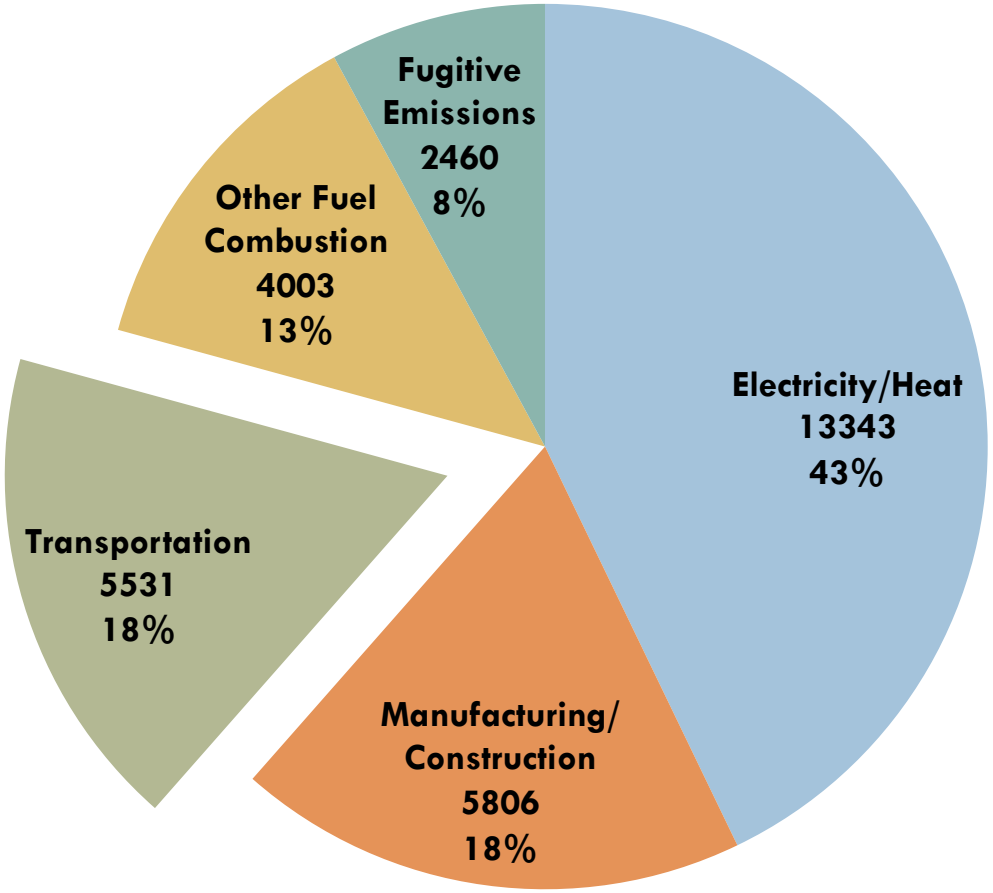
Transportation – Current State

- One of fastest growing end-use subsectors:
  - 5.5 $GtCO_2e$ in 2009, or 18% of total GHG emissions excluding LULUCF.
  - Increase in personal vehicle mobility drives growth in emissions:
    - Least efficient, most carbon intensive.

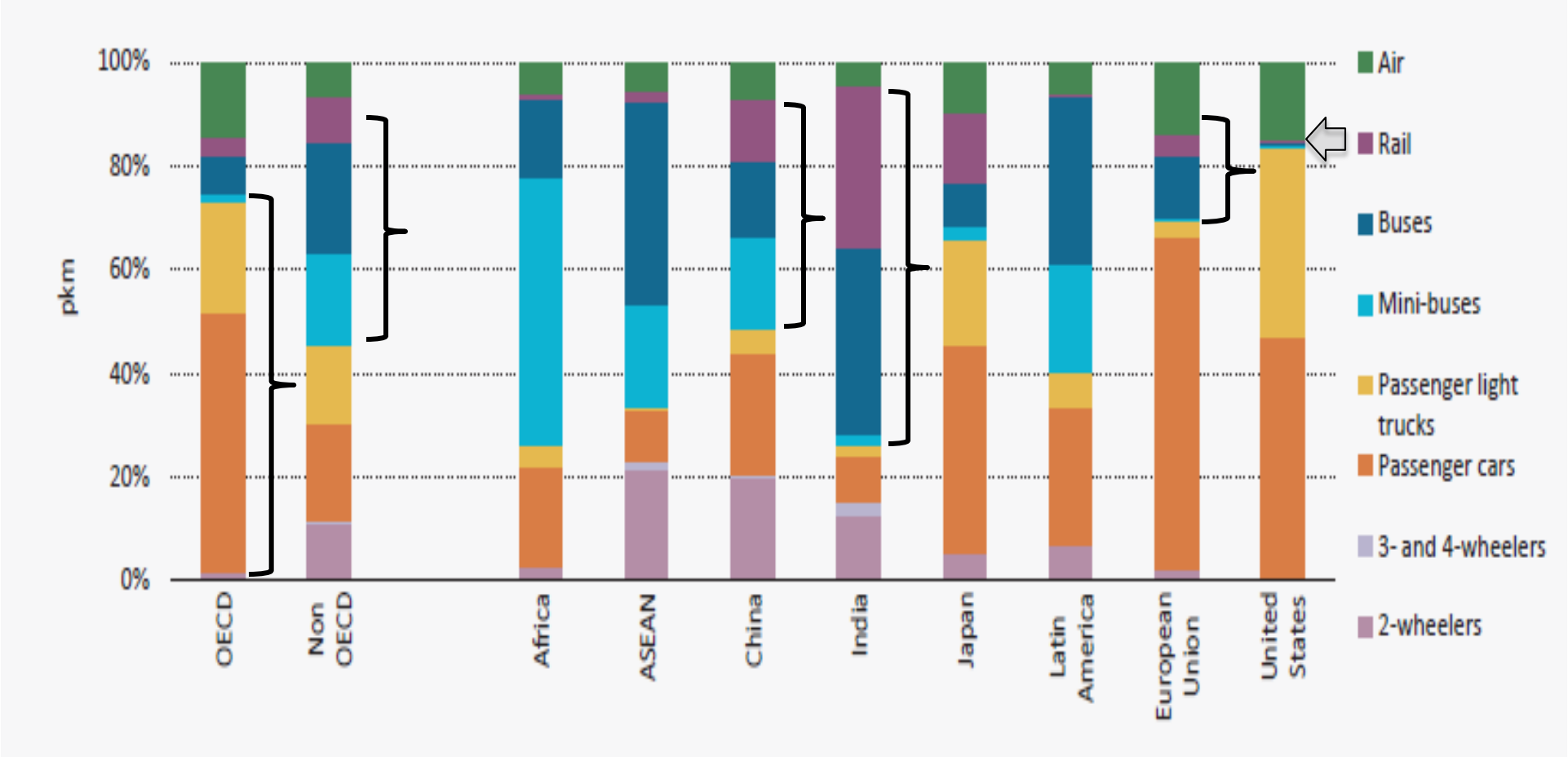
Transportation Emissions Share



Emissions are in $MtCO_2e$.

Source: CAIT 2009

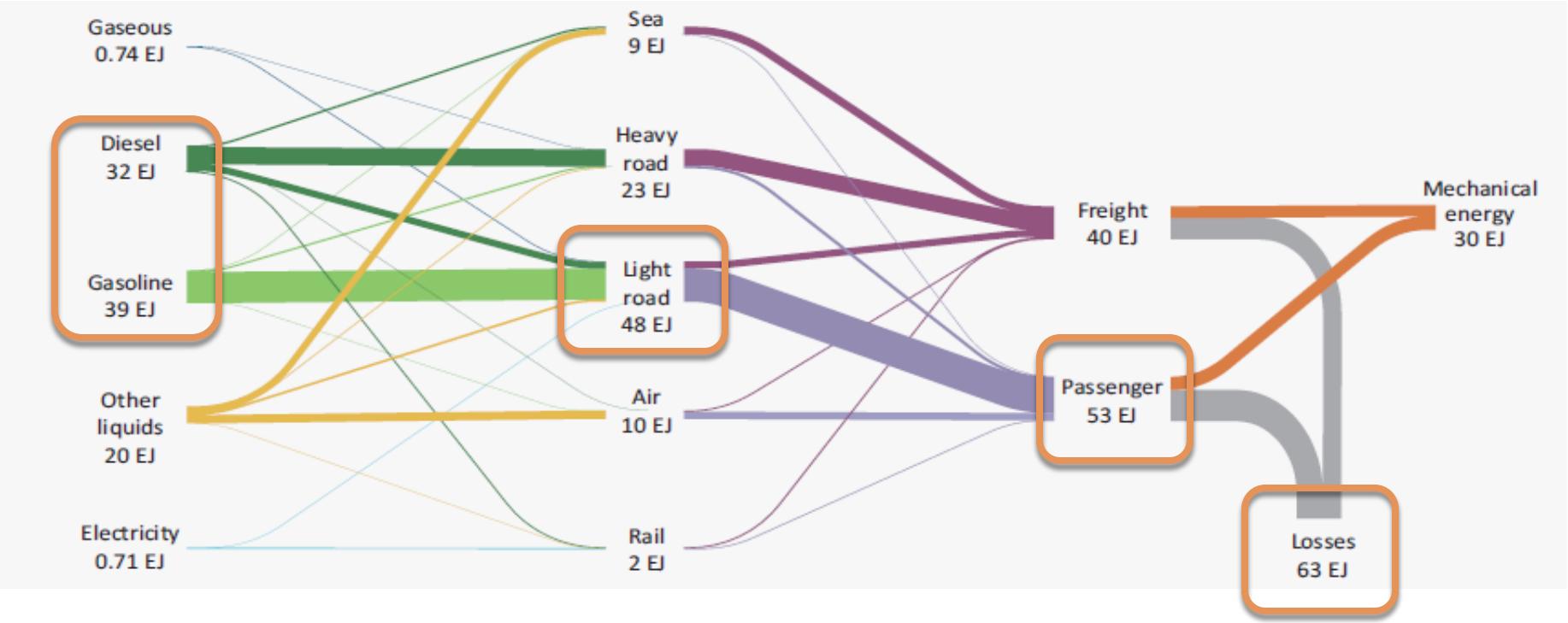
Transportation - Modal Breakdown



OECD/IEA, ETP 2012

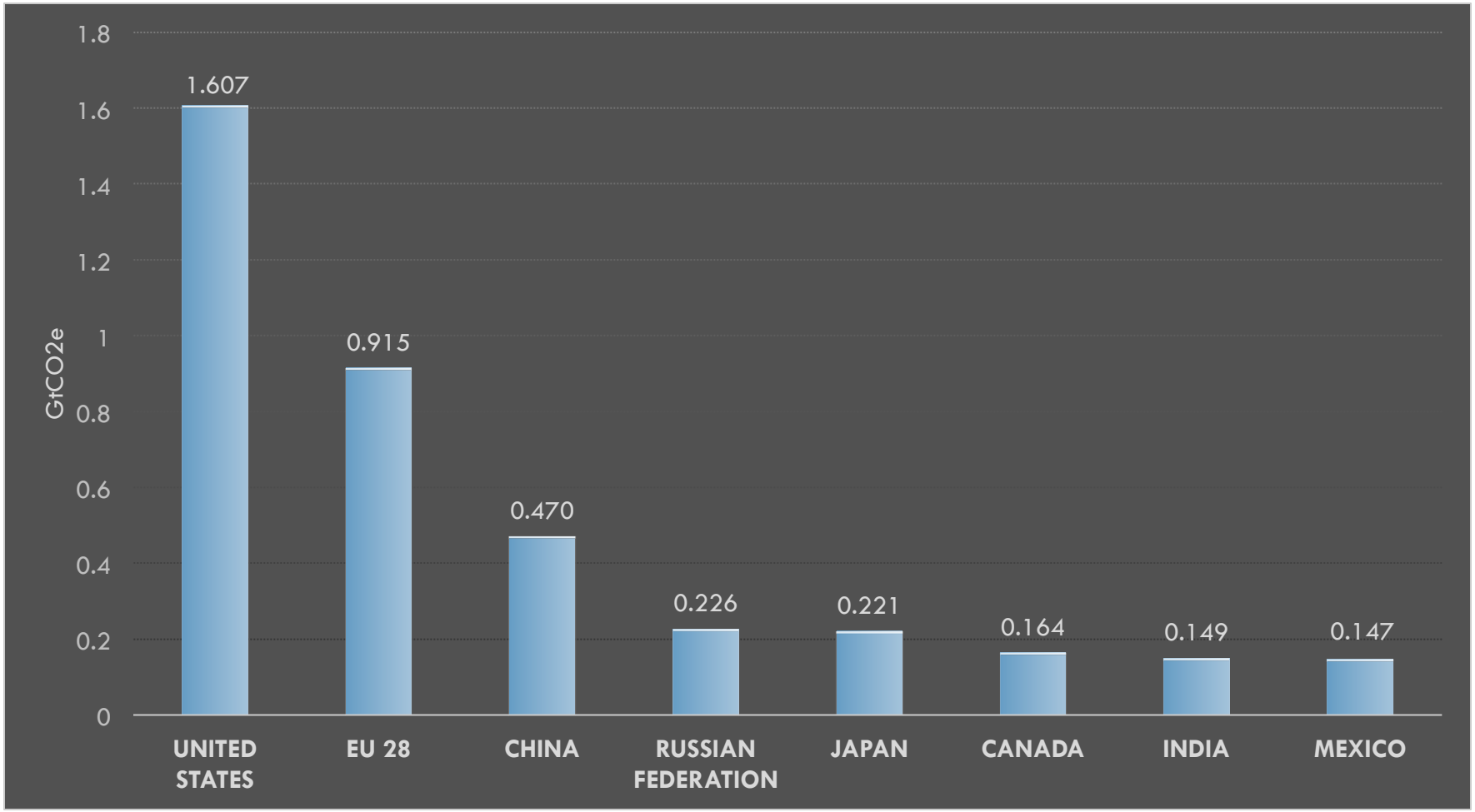
Transportation – Energy Mix

Figure 2: Final Energy Distribution in the Transport Sector, 2009



Source: OECD/IEA ETP 2012

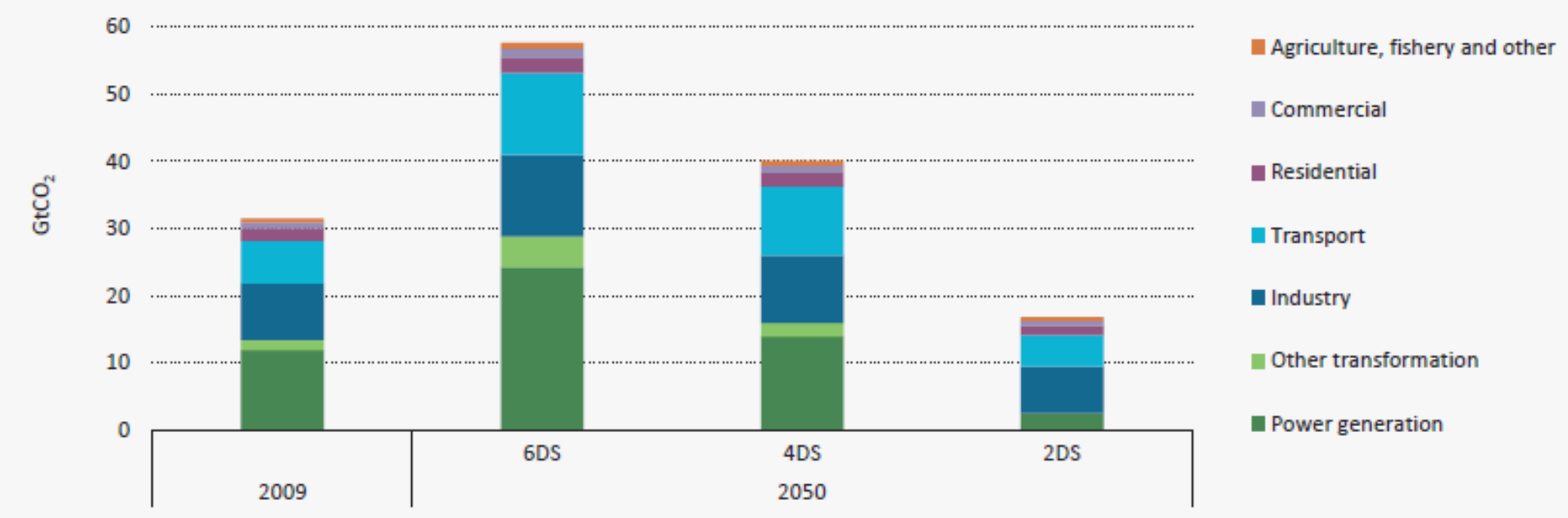
Transportation – Emissions by Country



CAIT 2009

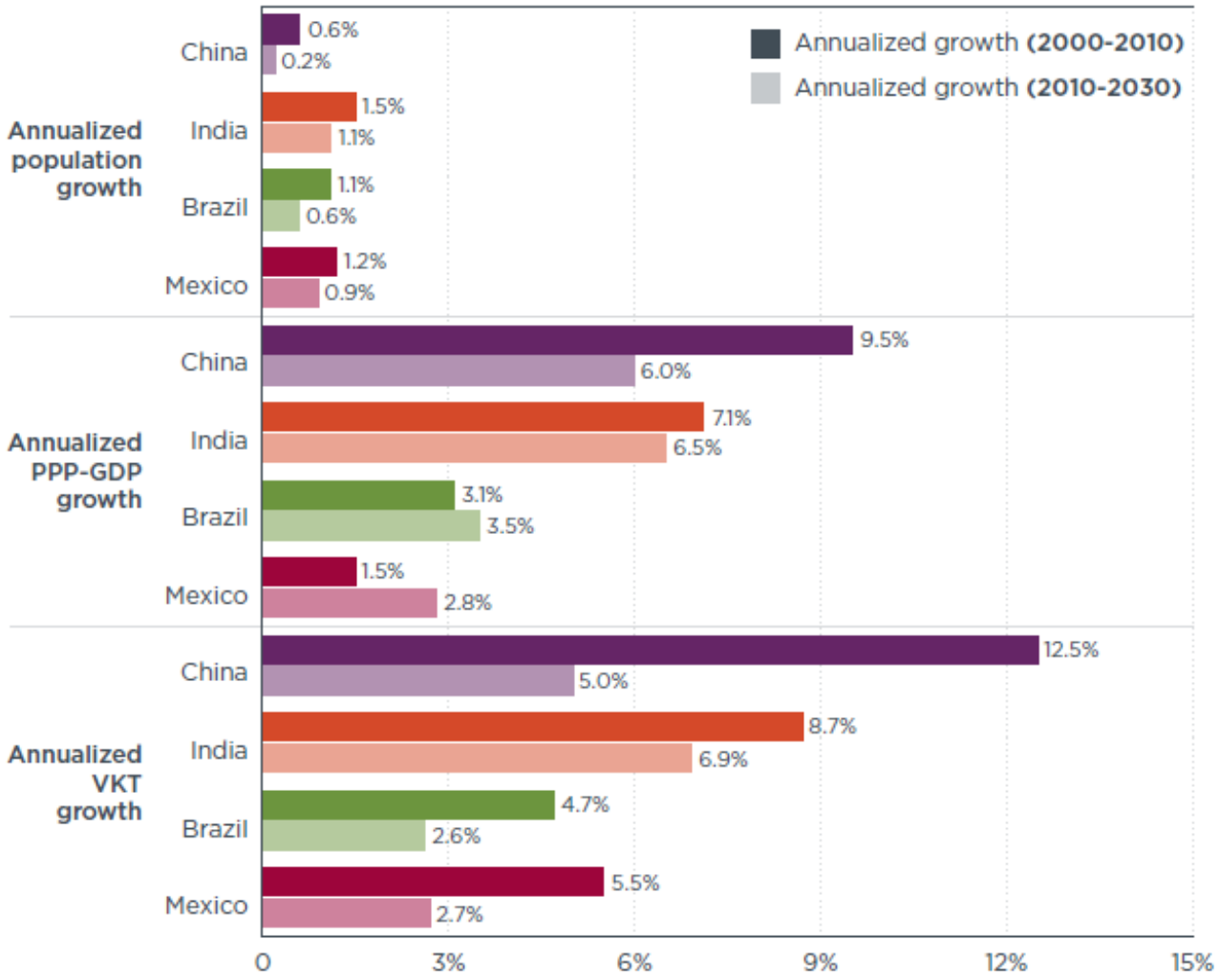
Transportation

Current, BAU, and 2DS scenarios



OECD/IEA, ETP 2012

Transportation- BRICS Trends

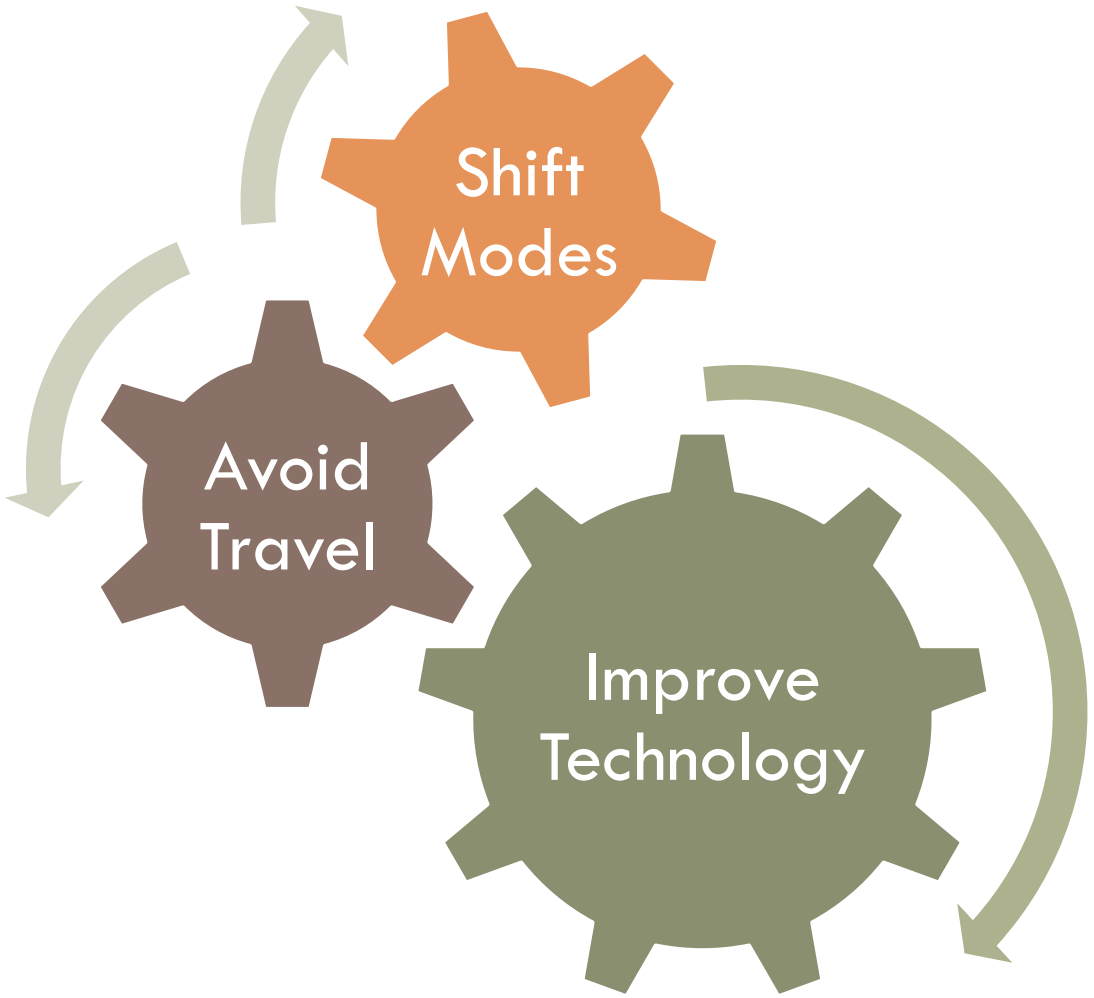


OECD/IEA, 2012

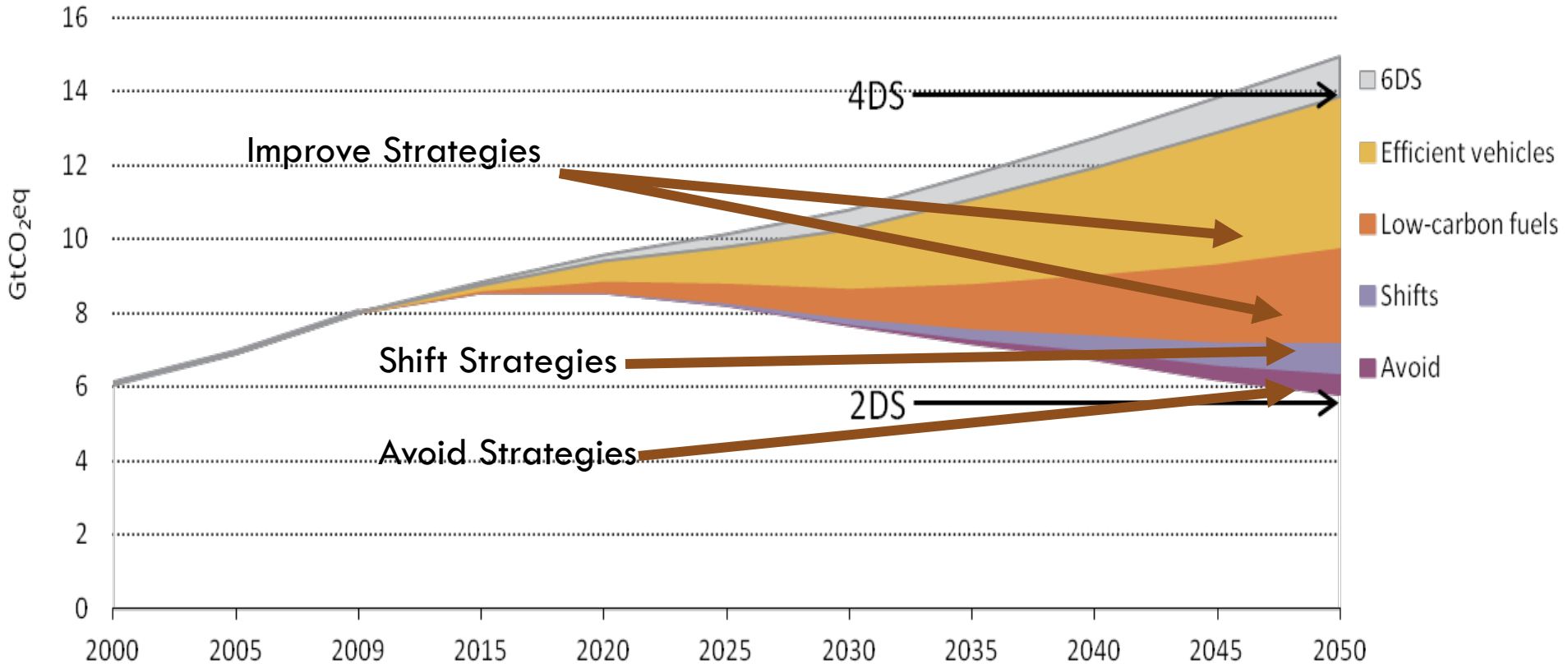
Transportation – Future Projections

- Projected growth in demand in developing countries for travel will determine magnitude:
  - Urban density and urbanization increase.
  - Global passenger and freight travel is expected to double from 2010 figures in the next 40 years.
  - Non-OECD member countries composing 90% of global travel increase.

Transportation-ASI framework



Emissions Reduction Needed to get to 2DS, 4DS by 2050



OECD/IEA, ETP 2012

Transportation - Avoid

- Reduce demand for carbon-intensive mobility:
  - Congestion and Distance-Based Pricing.
  - Less Carbon-Intensive Road Construction.
  - Emissions Calculators.

Transportation - Avoid

- **Barriers:**
  - Reduced access for low income groups.
  - Funding for Infrastructure Improvements.
  - Governance structure in-country.

Transportation - Avoid

- **Recommendations:**
  - **United States**
    - LEED-type certification for transportation infrastructure.
  - **China**
    - Public transport, urban planning, electric 2-wheeled vehicles.
  - **India**
    - Advocate low-carbon road and rail construction and maintenance, urban planning.

Transportation - Shift

- *Shifting* demand away from carbon intensive transport
  - Rail
  - BRT

Transportation - Shift

- **Barriers:**
  - Lack of investment (US), Market saturation (EU).
  - Shift is only highly effective in high density population areas.
  - Prevalence and increase of car culture.
  - Decentralized decision making (India, US).

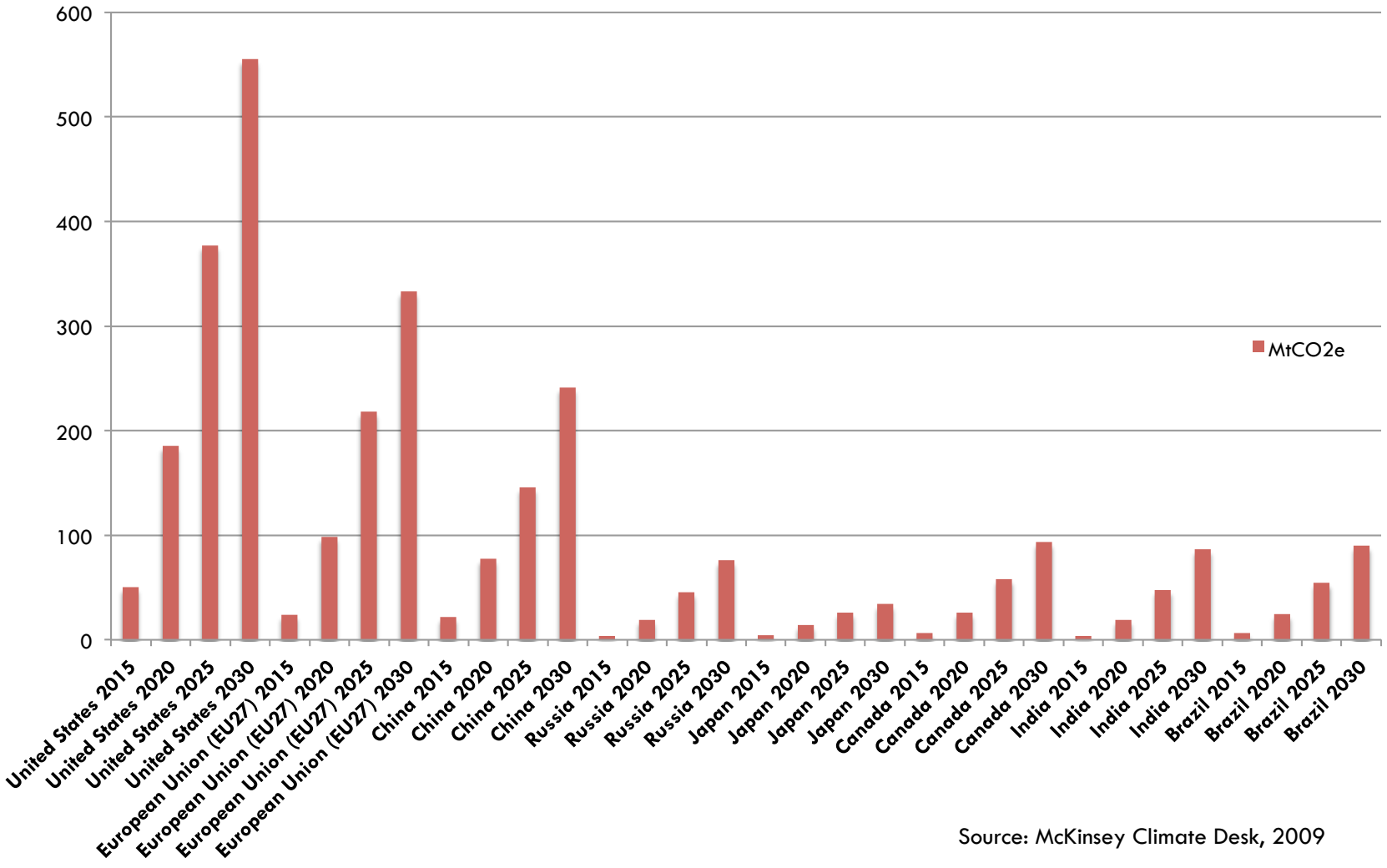
Transportation - Shift

- **Recommendations:**
  - **United States**
    - National transport hub system incorporating multi-modal travel.
  - **China**
    - Fiscal incentives (ex. tax breaks) promoting use of EV and alternative fuel technology and plug-in infrastructure.
  - **India**
    - Rail as the dominant form of freight.

Transportation - Improve

- The greatest GHG mitigation potential in the transport sector is achieved by improving transportation technologies, especially LDVs: **2.5 $GtCO_2e$ in 2030 and 7 $GtCO_2e$ in 2050**.
  - Improve fuel efficiency.
  - Increase use of alternative fuels.

LDV Improvements Reducing Emissions

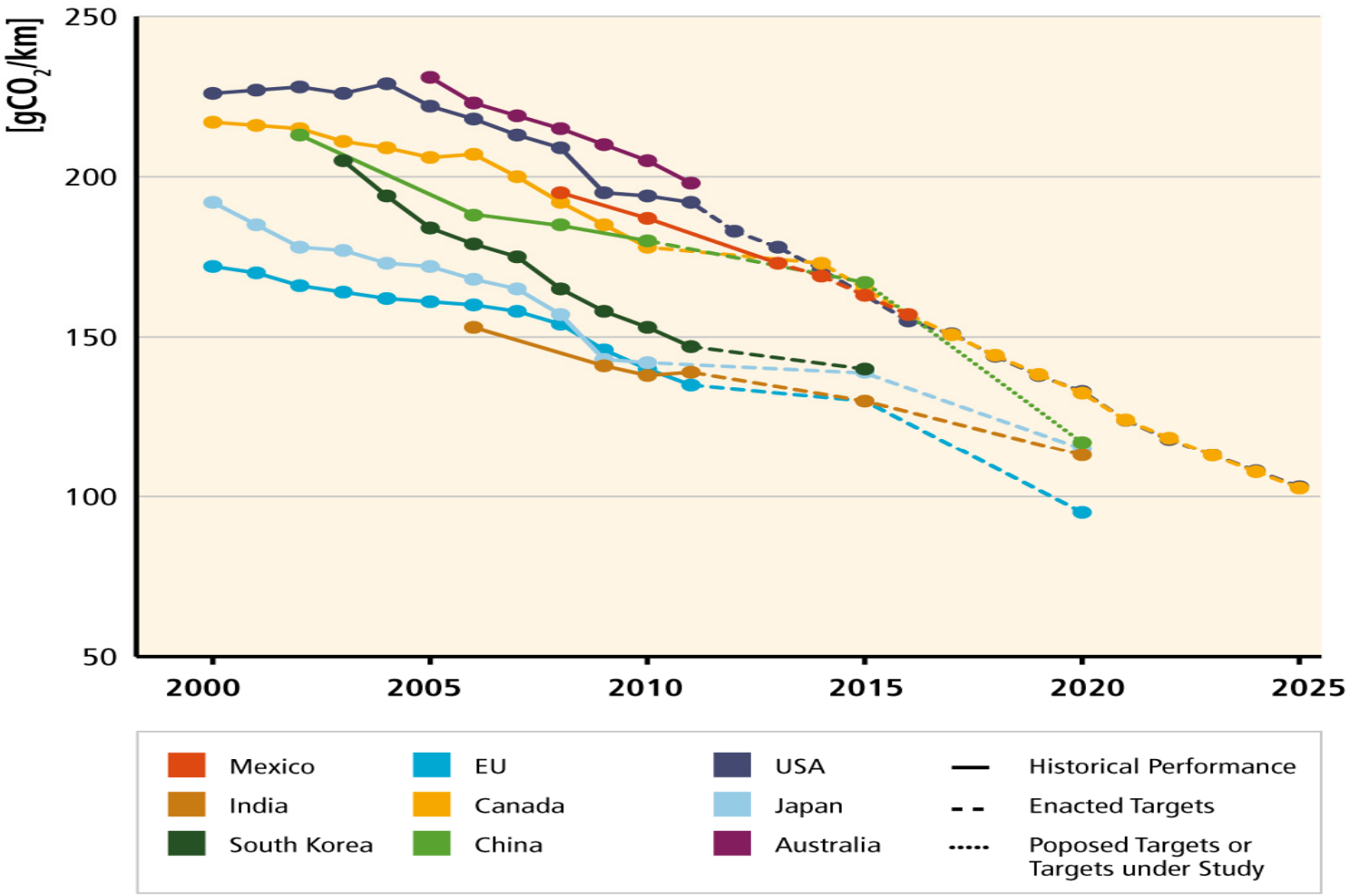


Source: McKinsey Climate Desk, 2009

Transportation - Improve

- **Barriers:**
  - Lack of political will for top-down regulation.
  - Uncertainty about operating cost reductions and split incentives (HDVs).
  - Lack of authority over international air & sea emissions.
  - Alternative fuels require extensive infrastructure investment.

LDV Emissions Reductions



Source: ICCT 2013

Transportation - Improve

- **Recommendations:**
  - Encourage alternative fuel use by increasing taxes on fossil fuel consumption and subsidizing EV charging infrastructure.
  - US:
    - Continue to increase LDV fuel economy standards and pursue aggressive standards for MDVs and HDVs.
  - EU:
    - Expand electric vehicle charging infrastructure.
  - China and India:
    - Encourage vehicle manufacturing joint-ventures and encourage the adoption of easily integrated alternative fuels.

Transport Summary

- Avoid and manage travel to reduce emissions and congestion:
  - Reduces emissions in dense urban areas.
- Shift to low carbon intensity modes such as BRT and rail:
  - Developing countries must maintain diverse modes.
- Improve transportation technologies to reduce emissions:
  - Energy security is improved as a result.