



सत्यमेव जयते

GOVERNMENT OF INDIA  
MINISTRY OF HOUSING AND URBAN AFFAIRS



# INDIA TRANSPORT ENERGY OUTLOOK 2050



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# Impacting sustainable development at scale with data, integrated analysis, and strategic outreach

## **TRANSFORMATIONS**

Low-carbon Economy

Energy Transitions

Power Markets

Industrial Sustainability

Sustainable Livelihoods

## **QUALITY OF LIFE**

Clean Air

Sustainable Water

Sustainable Food Systems

Sustainable Cooling

Sustainable Mobility

## **ENABLERS**

Sustainable Finance

Technology Futures

Circular Economy

Climate Resilience

International Cooperation

**200+**

Multidisciplinary team

**320+**

Peer-reviewed publications

**160+**

Instances of increased data transparency

**460+**

Roundtables & conferences

**22**

Indian states engaged

**110+**

Bilateral & multilateral initiatives promoted

## **SPECIAL INITIATIVES**

CEEW Centre for Energy  
Finance

Powering  
Livelihoods

Emerging Economies

UP State Office

# Structure

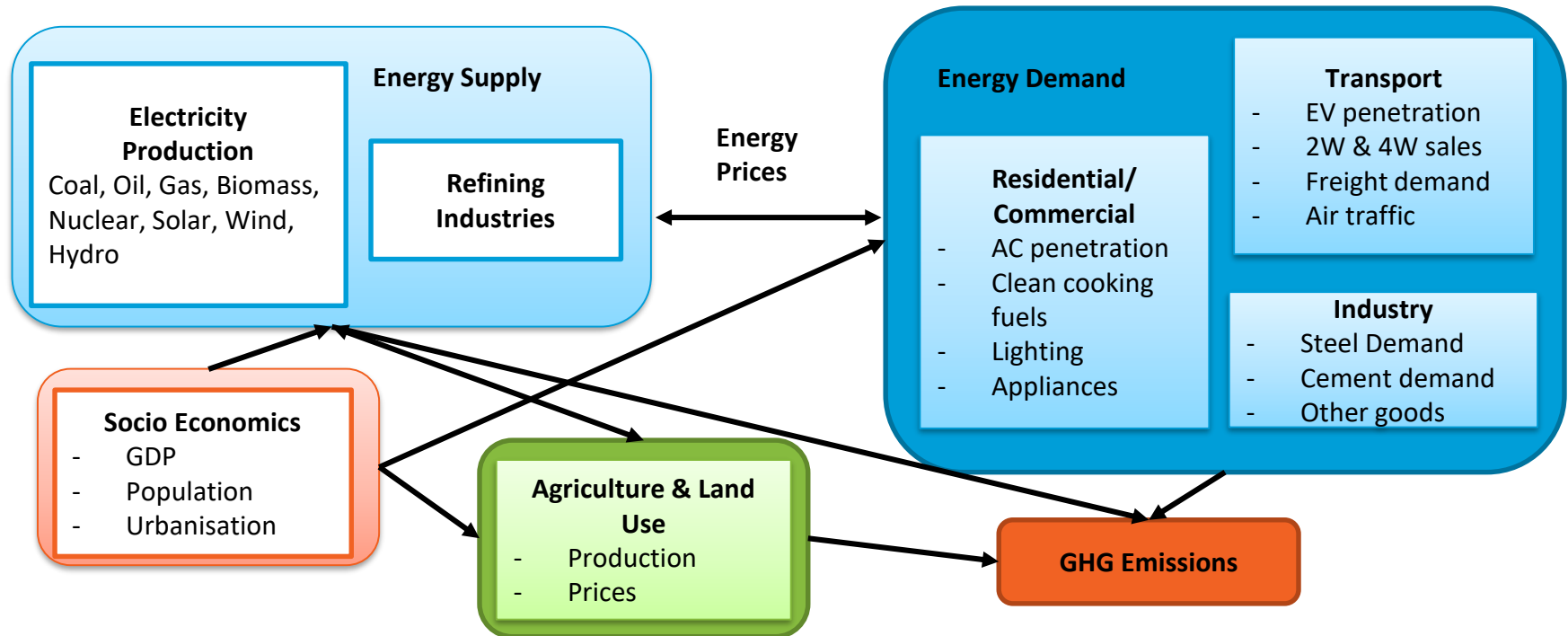
**GCAM model**

**Assumptions**

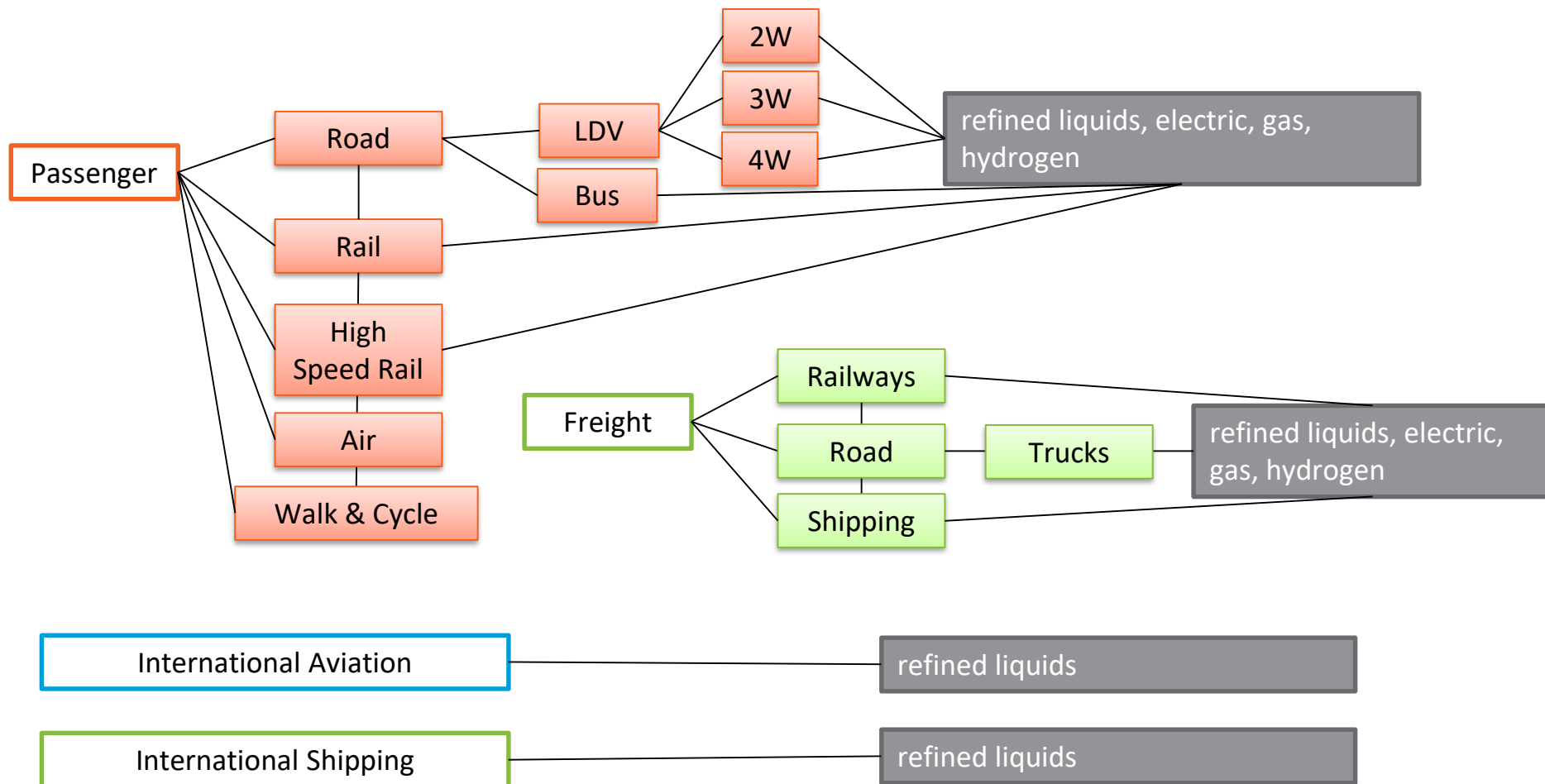
**BPKM and modal share**

**EV penetration and emissions**

# Outline of the Global Change Analysis Model (GCAM)



# Transport sector - Structure



# ASSUMPTIONS

- Energy calibrated to IEA energy balances
  - Survival curves for all vehicle types by IIT-Delhi, Urban emissions.info
  - Efficiency improvement for various technologies: based on historical trends
  - Model takes into account the value of time travel and income for choice between modes
- 
- Electric cars reach cost parity with petrol cars by 2030
  - Natural gas price: follows the US shale gas discovery



Cost represents Total Cost of Ownership (TCO)

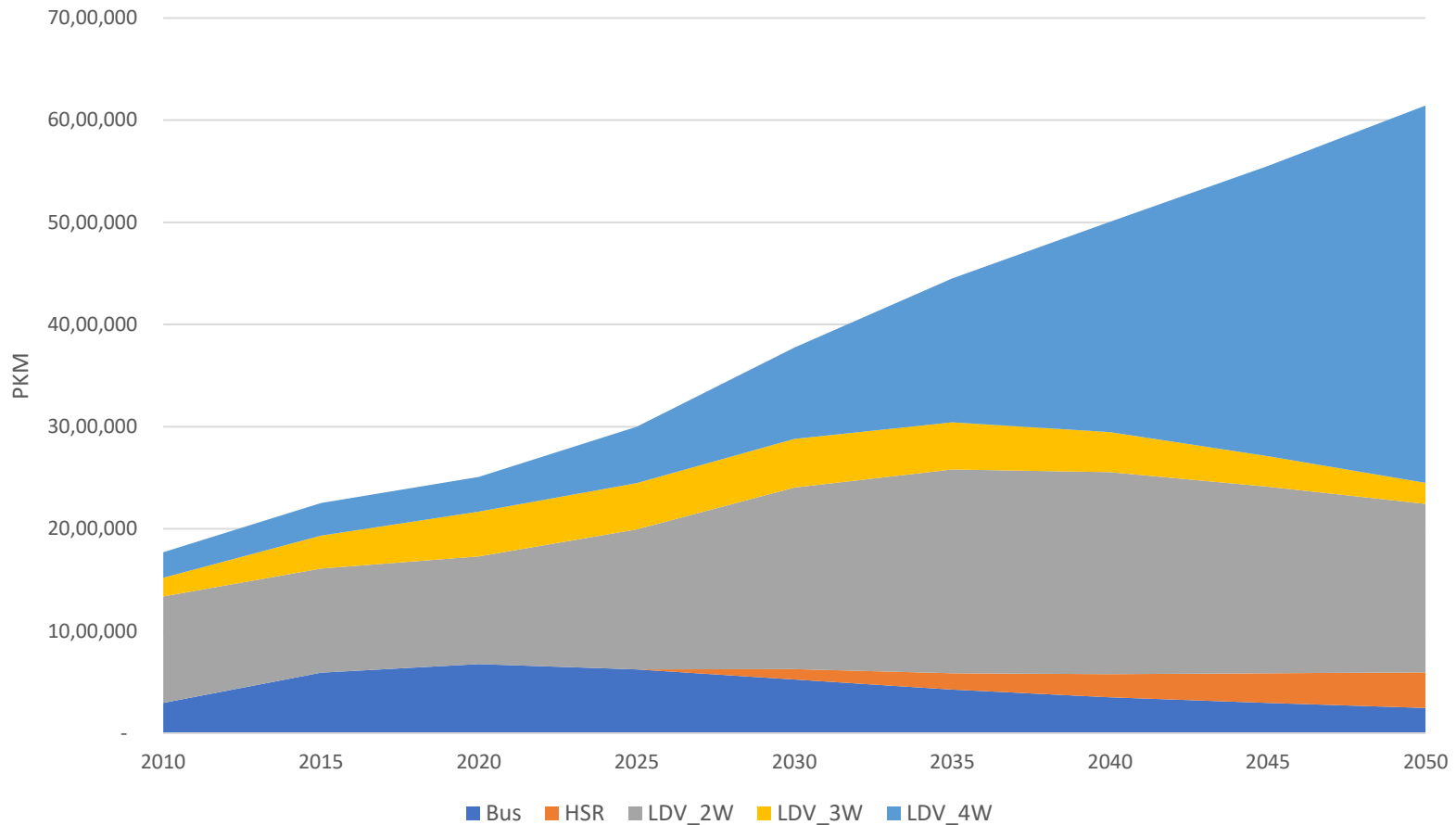


Cost is a weighted average of TCO and capital cost

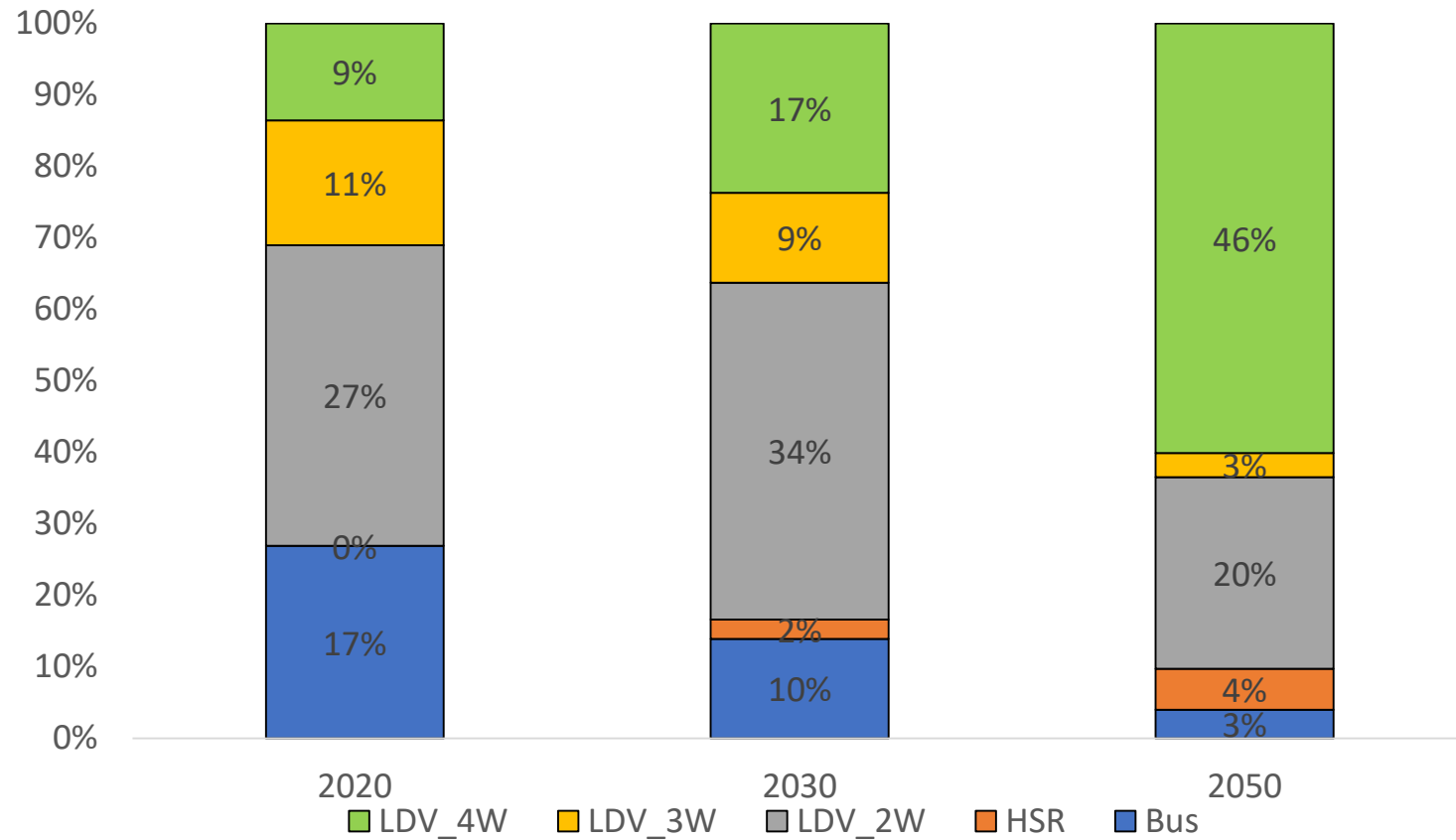


Cost is a weighted average of TCO and capital cost

# BAU Passenger travel demand will grow by > 3x in 2050 compared to 2010



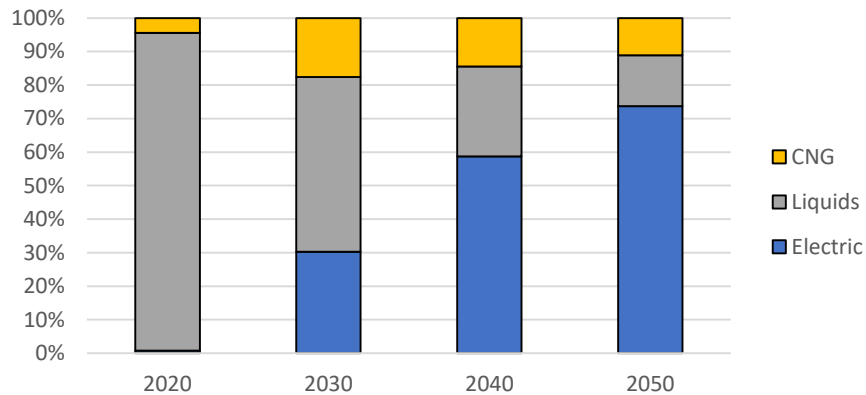
# The increase in the passenger demand will skew the modal share towards four-wheelers



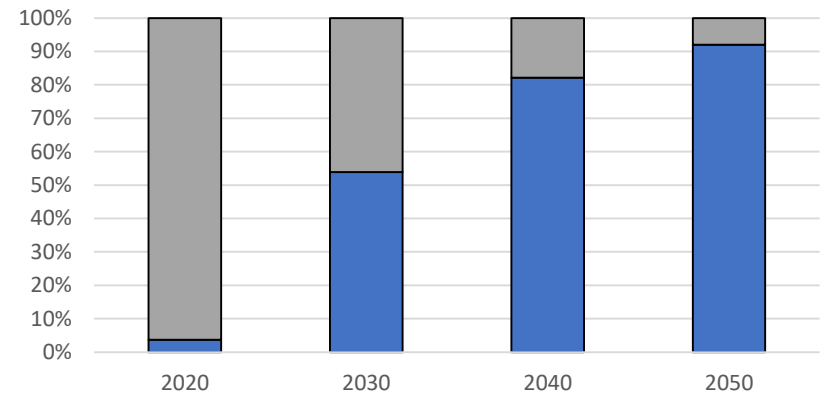


# EV penetration is likely faster in the smaller vehicle segments; pushed in M&HDVs

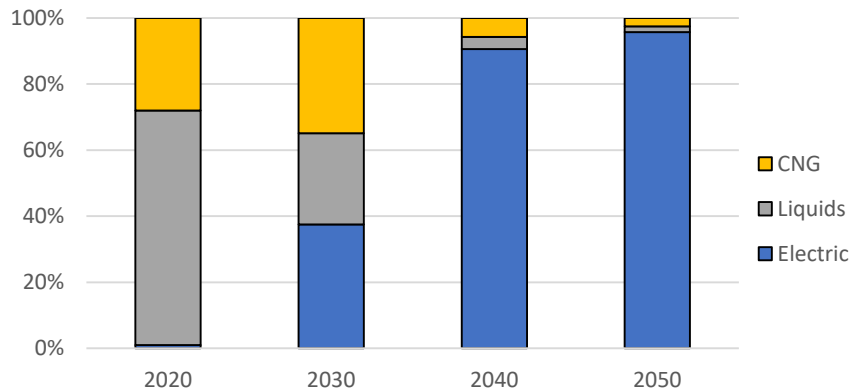
4W



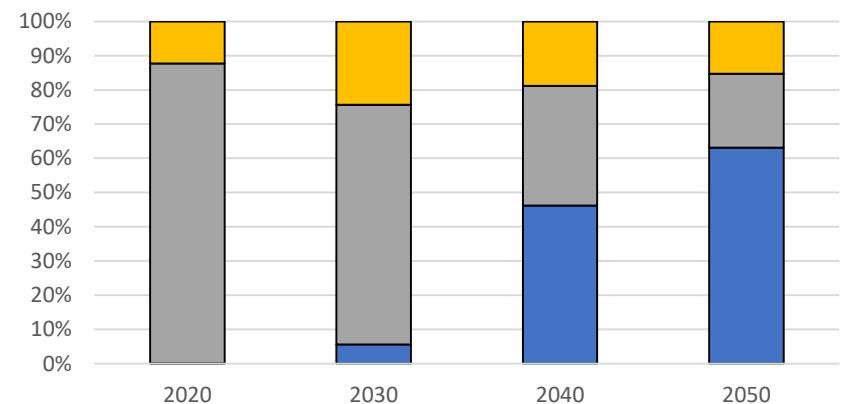
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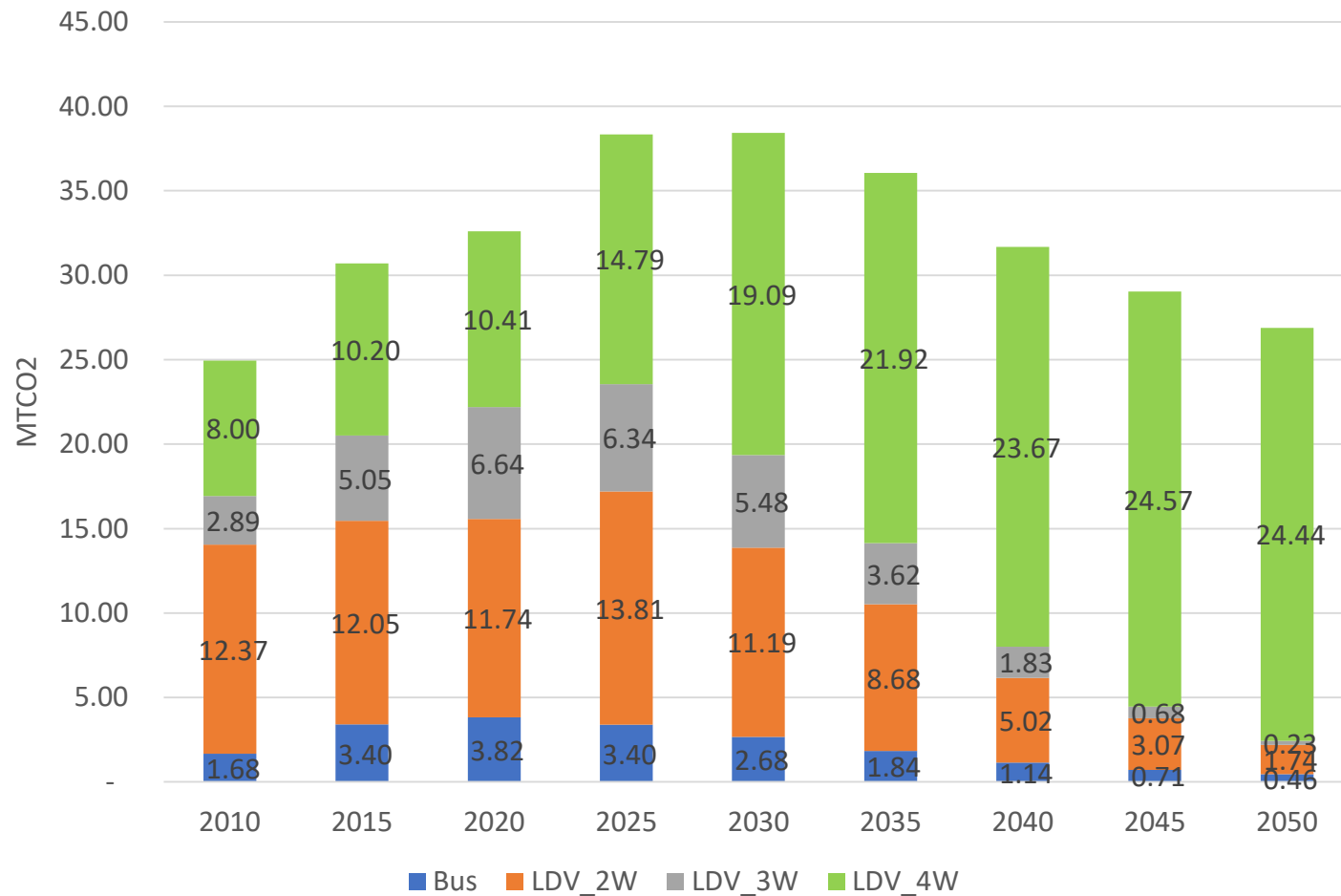
3W



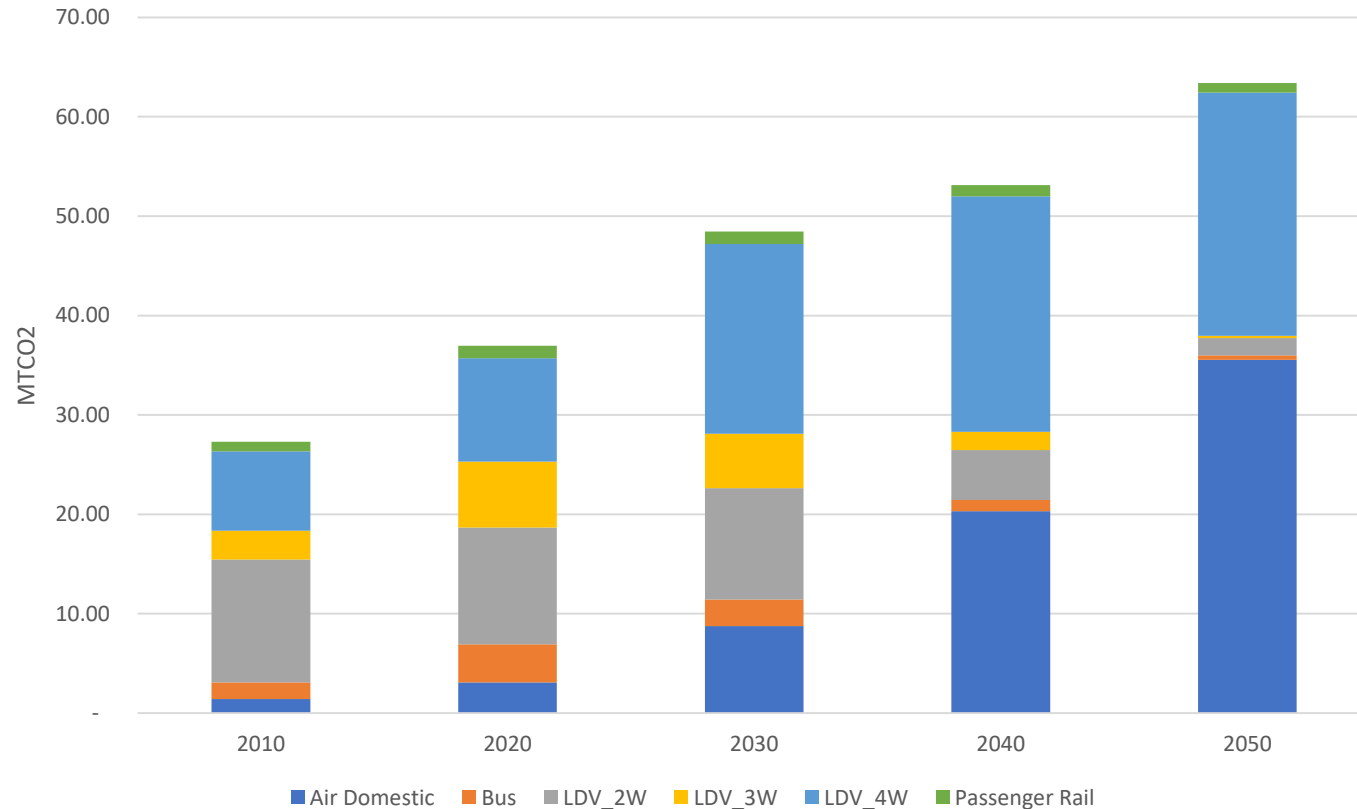
Bus



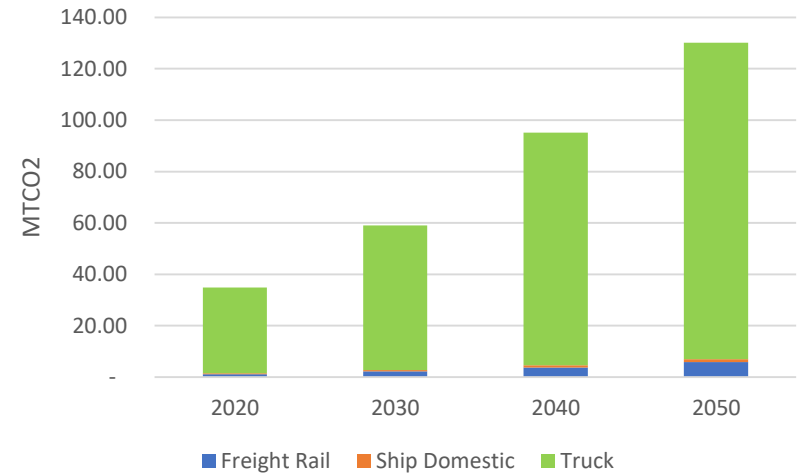
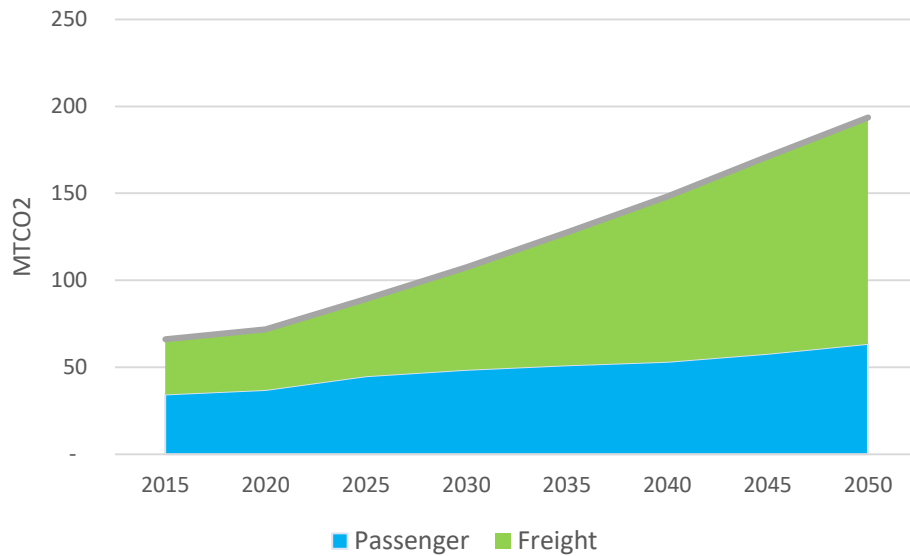
# Owing to EV penetration, GHG emissions will peak till 2030 and then decline



# The share of emissions will be highest from domestic air travel



# Emissions from the trucking sector keeps increasing



# Conclusions

To achieve net-zero by 2070, it will be imperative to -

- The share of electric cars in car sales must reach **84%** by 2070
- The share of biofuel blend in oil for cars, trucks, and airlines must touch **84%** by 2070
- Coal use in the industrial sector must peak by 2040 and reduce by **97%** between 2040 and 2065; Hydrogen share in total industrial energy use must increase to **15%** by 2050 and **19%** by 2070
- Coal-based power generation must peak by 2040 and reduce by **99%** between 2040 and 2060
  - Solar-based electricity generation capacity must increase to 1689 GW by 2050 and to 5,630 GW by 2070
  - Wind-based electricity generation capacity much increase to 557 GW by 2050 and 1792 GW by 2070
  - Nuclear-based electricity generation capacity must increase to 68 GW by 2050 and to 225 GW by 2070

# A TOUGH TRILEMMA FACES EVERY DEVELOPING COUNTRY'S GROWTH CHOICES.

What On Earth!™

CÉEWS  
THE COUNCIL

## THE BALANCING ACT



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# THANK YOU

**For details**

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