

## Global Rail and Energy Workshop

# Carbon Emission Reduction in India *Role of Transport Sector*

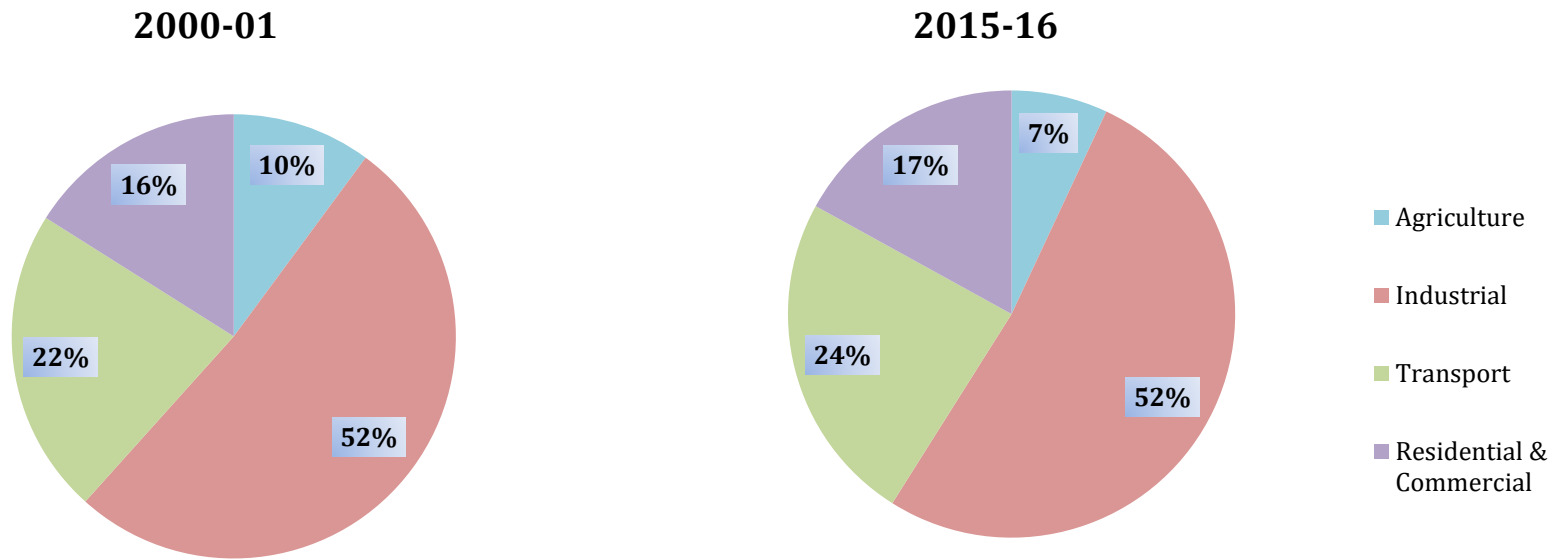


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24 September, 2018

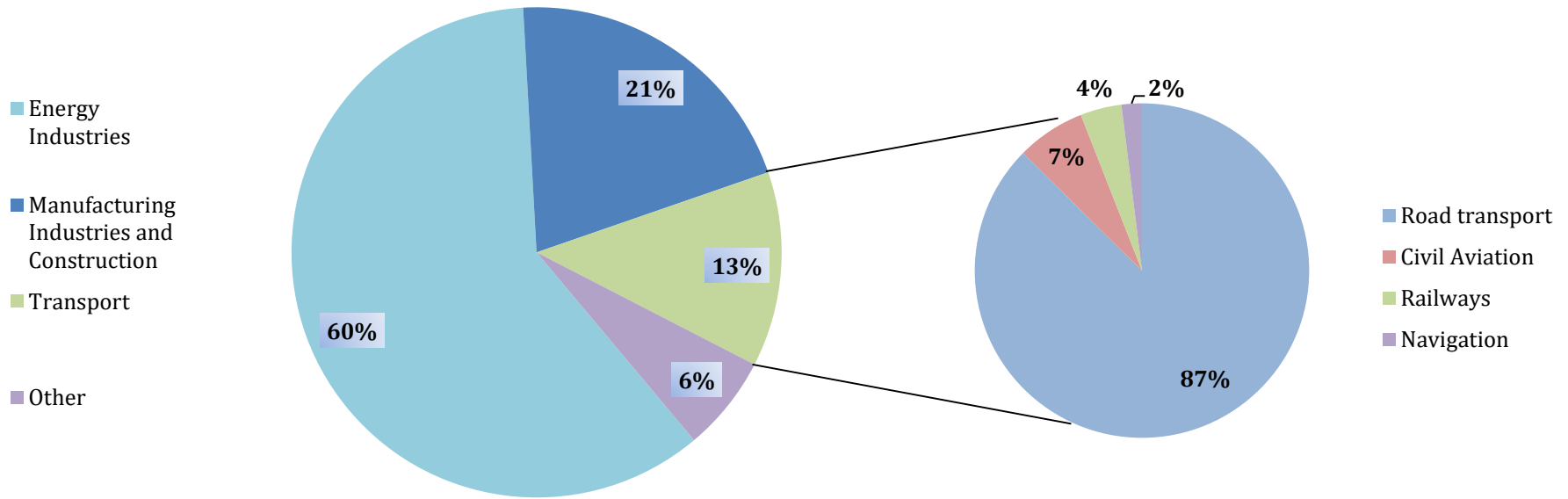
# Transport Sector: Energy Consumption



- India's total commercial energy demand grew from 150 MTOE in 2000-01 to 360 in 2015-16
- Presently, with a share of 24%, transport sector is the second largest energy consumer in the country
- The transport sector energy consumption grew at a CAGR of 7% between 2000 and 2016



# Emissions from Transport Sector

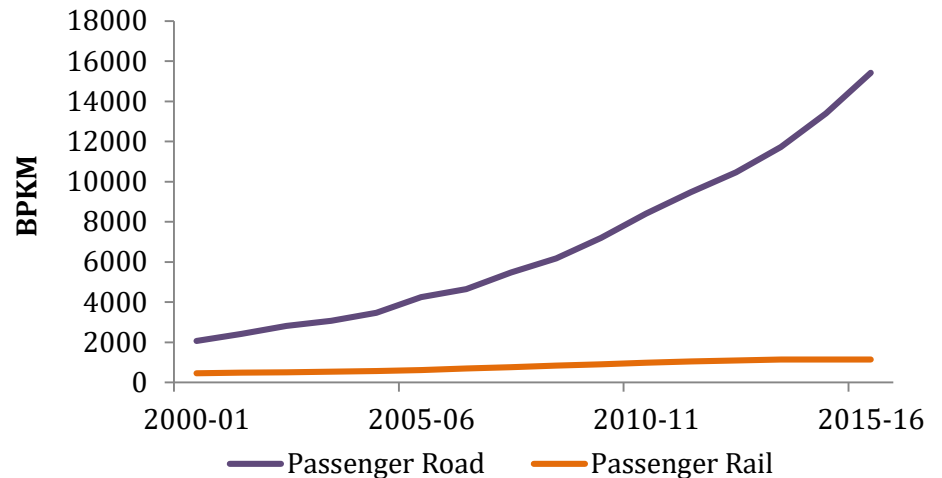
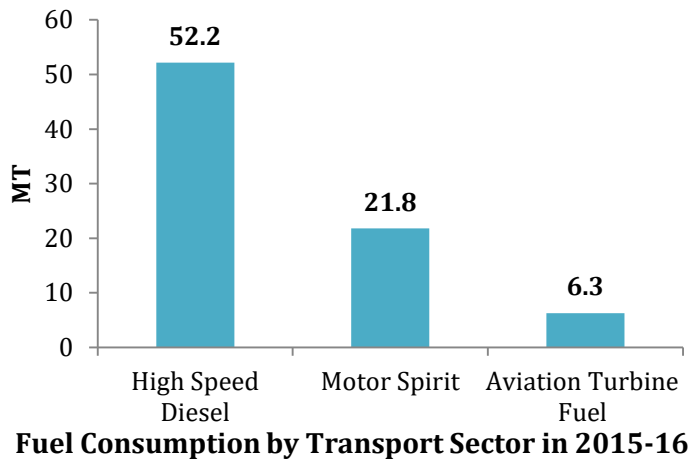


Transport sector accounts for 13% of the CO<sub>2</sub> emissions from fuel combustion in India of which 87% is by road transport

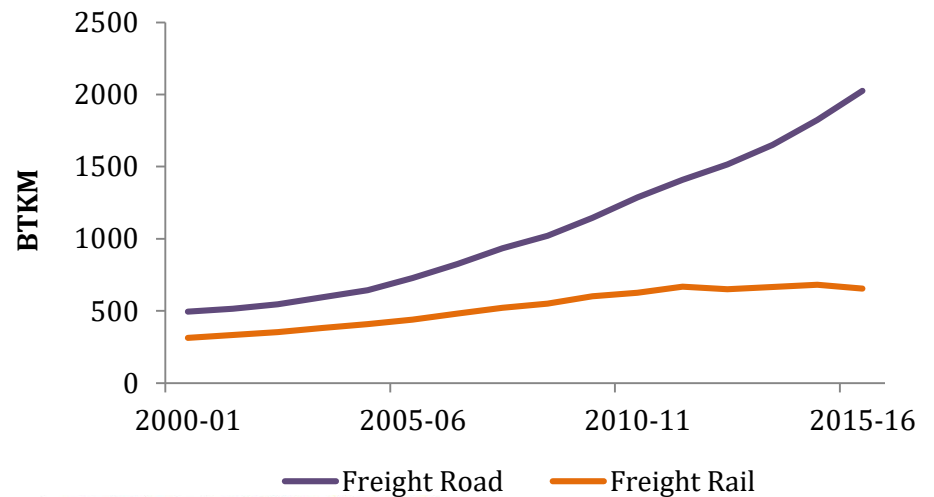


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# Rapid Motorization and Declining Share of Railways

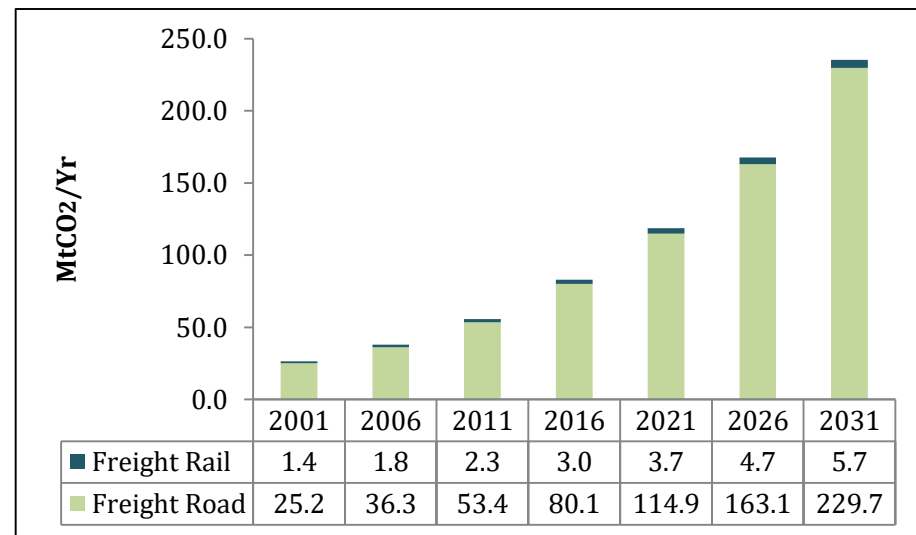
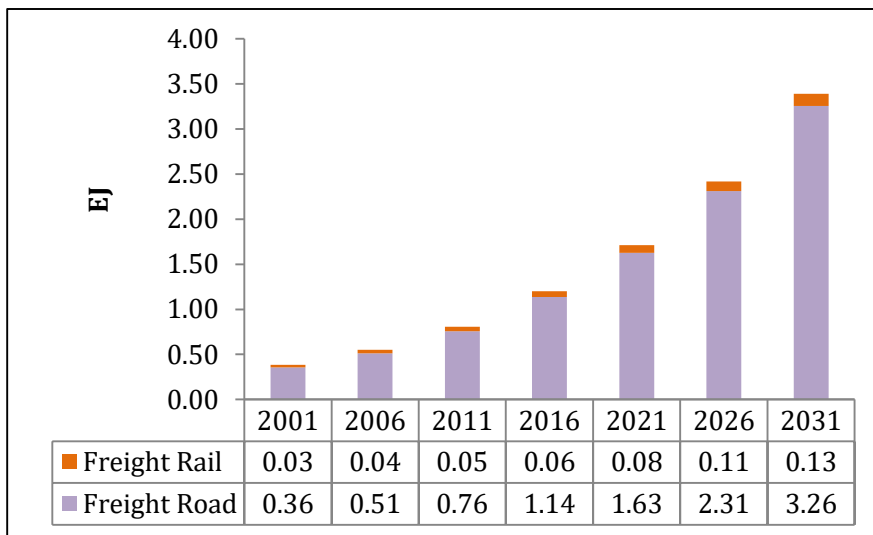
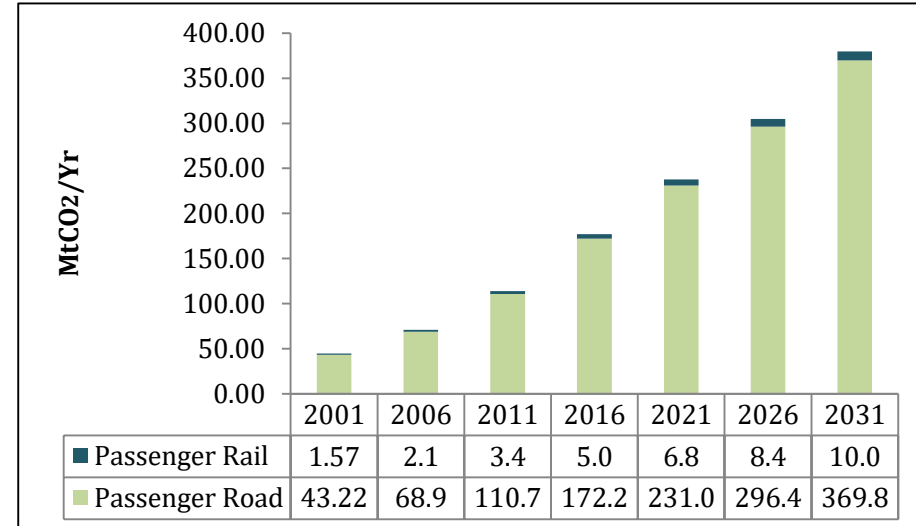
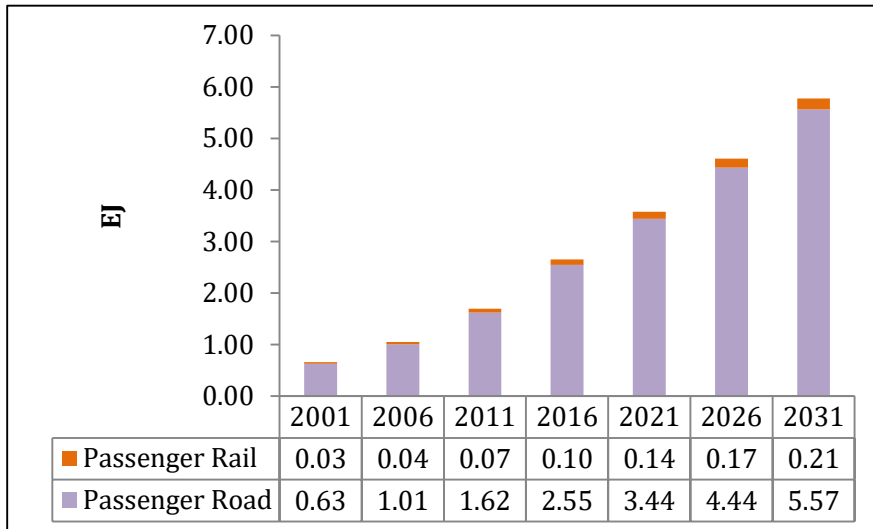


- Approximately 65% of transport fuel demand is met by High Speed Diesel
- The share of IR in passenger movement has declined from 14% in 2001 to 12% in 2016 and is expected to increase marginally to 13% by 2031
- The share of IR in freight movement has declined from 45% in 2001 to 37% in 2016 and is expected to decline further to 30% by 2031
- Rail consumes 75% to 90% less energy in freight traffic and 5% to 21% less energy in passenger traffic than roads



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# Implications on Energy and Emissions: BAU Scenario



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# Mitigation and Adaptation Strategies in Transport Sector

## Transport Sector Policies under NDCs

- Low carbon infrastructure and public transport systems
  - Commissioning of DFCs
  - Mass Rapid Transit System (MRTS), with a vision of moving 'people' rather than 'vehicles'
- Faster Adoption and Manufacturing of Hybrid & Electric Vehicles in India (FAME India)
- Vehicle Fuel Efficiency Program
- Improved Emission Standards: Switching from BS IV to BS VI
- National Policy on Biofuels under National Biodiesel Mission

## Key Initiatives by Indian Railways (IR)

- Introduction of **Dedicated Freight Corridors (DFCs)** for increasing share of Railways in total freight movement
- Capacity augmentation on all important routes
- Modal Shift towards railways with special focus on increasing share of **freight transport to 45% by 2030**
- **100% Electrification** of Railways

### *IR: Resource Efficient Transport System*

- *6 times more efficient in freight transport (per NTKM)*
- *2 times more efficient in passenger transport (per PKM)*



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# Electrification in Railways

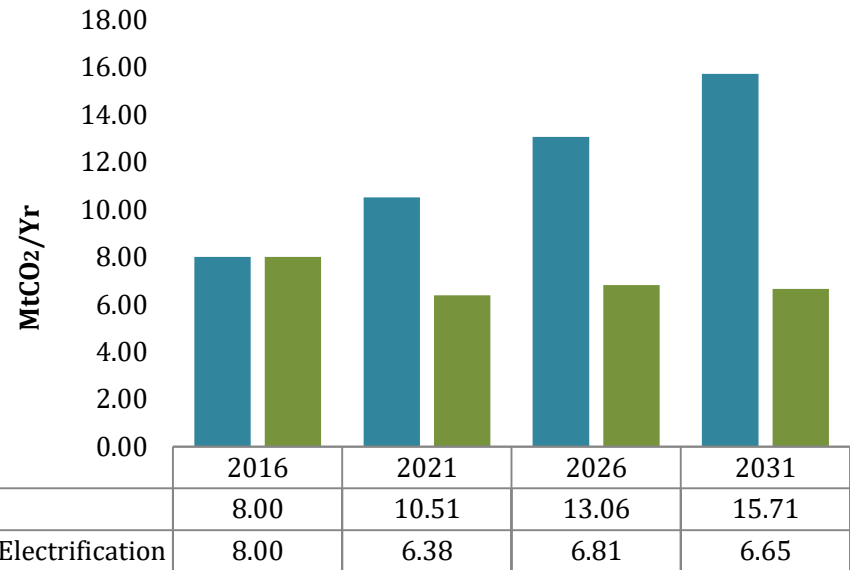
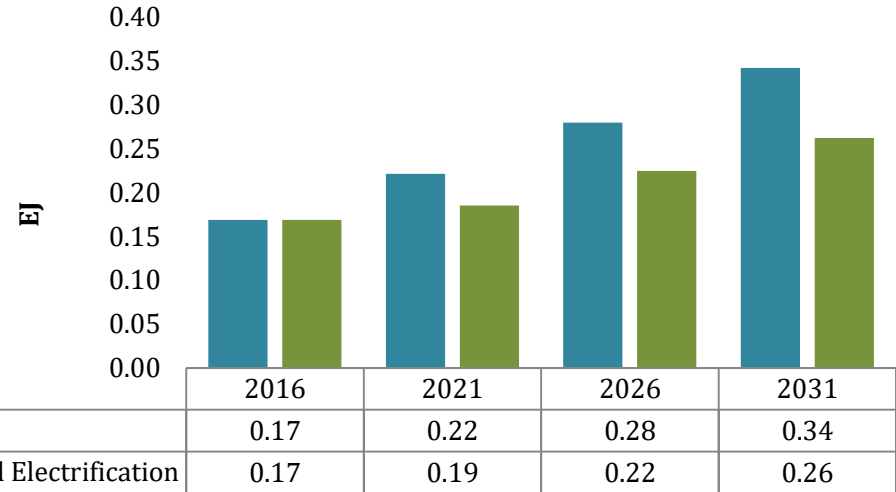
- Percent share of electric traction vs. diesel traction:

- **90% by 2021**
- **100% by 2030**

- By 2030, increased electrification can lead to 23% reduction in energy consumption by Indian Railways
- Subsequently, it can reduce CO<sub>2</sub> emissions by 58%

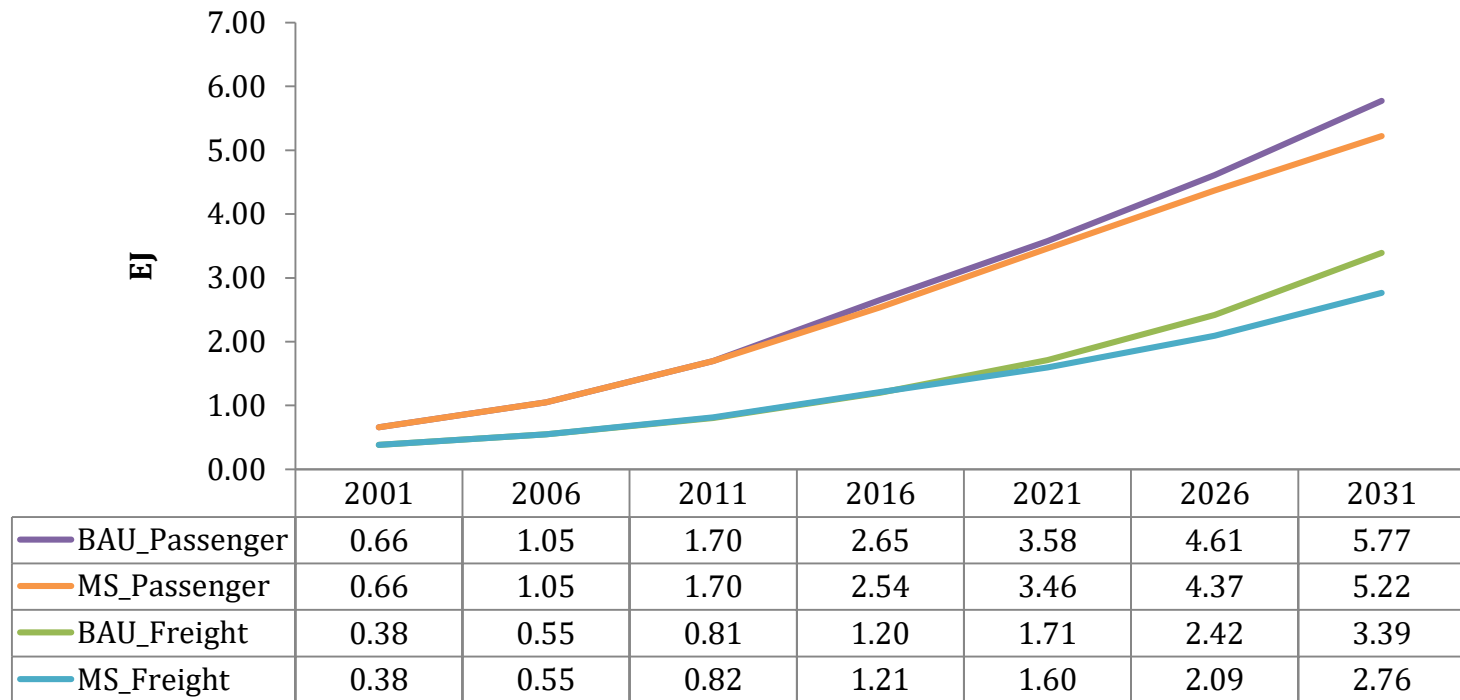
**Note:**

- Energy consumption by electrification in railways is 66 MJ as compared to 130 MJ by diesel per 1000 GTKM in passenger movement
- Energy consumption by electrification in railways is 23 MJ as compared to 70 MJ by diesel per 1000 GTKM in freight movement



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# Modal Shift and Reduction in Energy Consumption



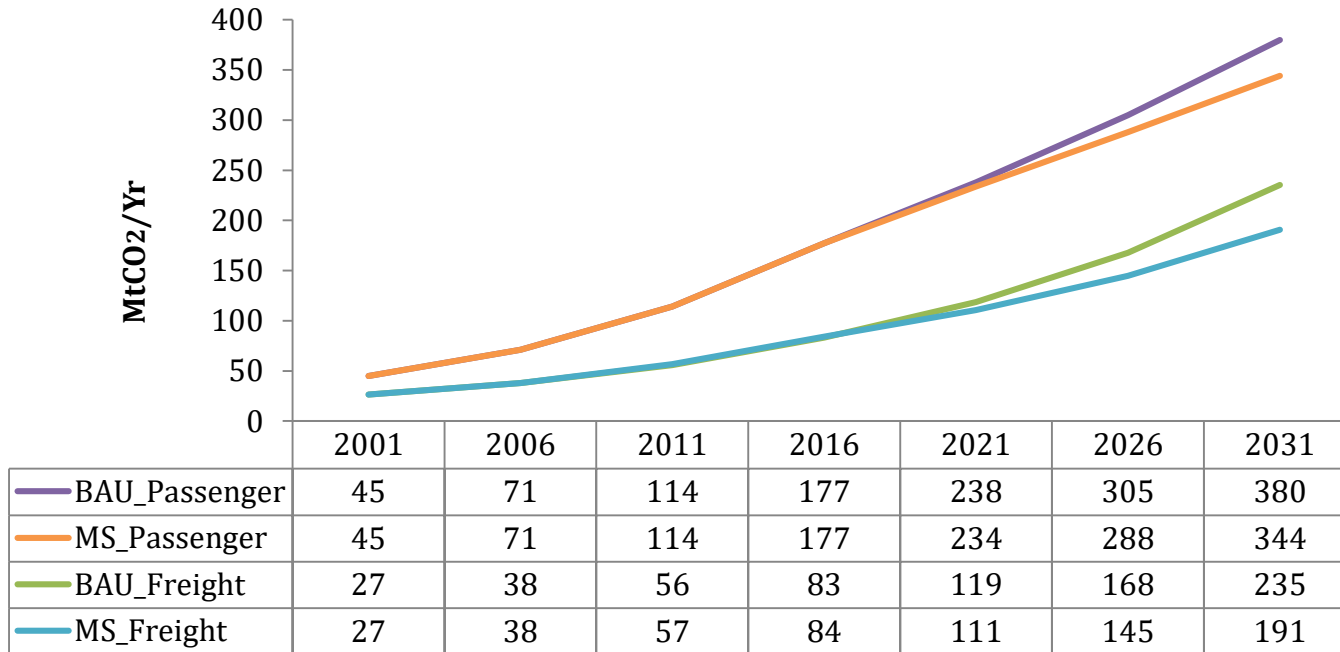
- By increasing the share of railways to 15% and 45% in passenger and freight movement, respectively can lead to 13% reduction in total energy consumption by 2031
- The increase in share of railways in total land transport will lead to 10% reduction in energy consumption by passenger transportation sector and 18% by freight transportation sector



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# Reduction in CO2 Emissions



By 2031, CO<sub>2</sub> emissions will reduce by 9% in passenger transportation and 19% in freight transportation



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# Future Strategies for Increasing Railways Share

## □ *Passenger*

- Focus on volumes by meeting the demand with improved asset utilization
- Increase passenger services in mid-distance segment 250-700 kilometers
  - Inter-city day travel with reduced transit time
  - Overnight services
  - Regional services with reduced transit time
- Rationalize fares with competitive pricing
- Decentralize
  - Demand-based services
  - Fixation of fares



# Future Strategies for Increasing Railways Share

## □ *Freight*

- Increase commodity basket
- Customer-oriented policies
  - Shift from policy of uniform general service wagon to specially designed wagons
  - Share terminal infrastructure development cost with captive customers
  - Improve and mechanize terminal facilities

## □ *Parcels and Smalls*

- Focus in the growing market with new customer oriented policies



# Future Strategies for Increasing Railways Share

## □ *Investment*

- Focus on small and medium and incremental investments for achieving quick results
  - Development of terminals
  - Capacity improvements by easing of curves, turnouts with higher speeds, yard and station layouts etc.
  - Modernize signaling, maintenance methods and new technologies giving fault free performance
  - Decentralize planning and capacity investments



# Future Strategies for Urban Transport System

## □ *Urban Transport Systems*

- Increase suburban and regional railway network for all one million plus cities
- Metro Railway network should complement regional rail network for intra-urban travel
- Strengthen public bus services integrated with rail-based systems
  - Electric buses and shuttles
- Focus on shared travel, shuttle services for point to point travel
- Strengthen intermediate public transport particularly in smaller cities and suburbs



# Thank You



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