# Transport and Climate Change- Perspectives from India

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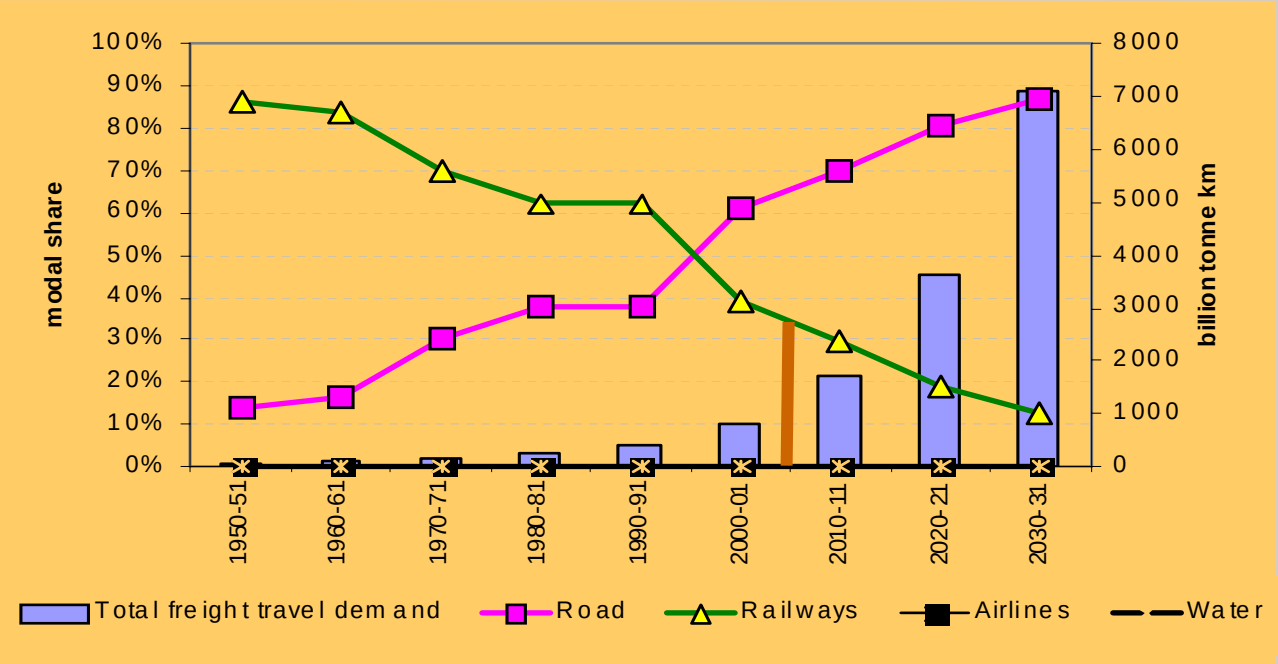
# *Energy Consumption in Transport Sector*

- The transport sector accounted for 17.66%(36 MTOE) of the total commercial energy consumed in the country(204.08 MTOE)
- The sector was the second largest consumer of commercial energy after the industry sector that consumed 42.3%(86.33 MTOE) of energy.
- The transport sector had the largest share (35%) in petroleum consumption.

*Source: TERI Energy Data Directory and Year Book(TEDDY,2007)*

# *Freight Traffic: Inter Modal Share*




**Road = 55%**

**Rail = 34%**

**Coastal shipping = 6.8%**

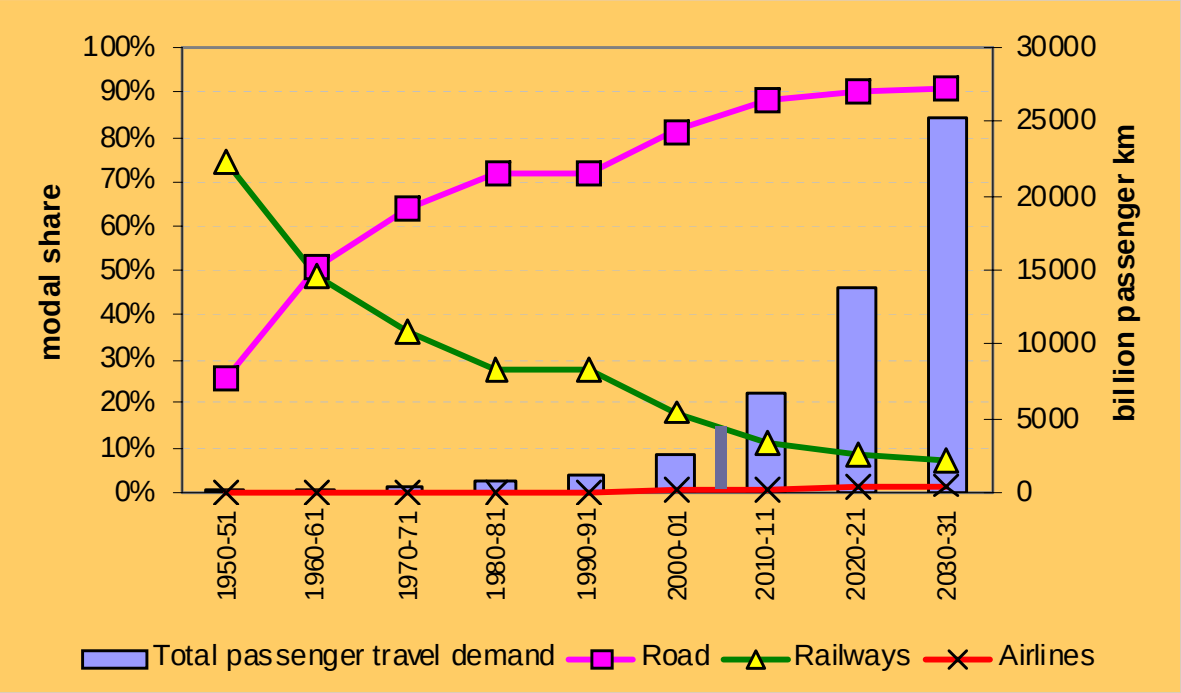
**Pipeline = 4%**

**IWT = 0.28%**

- Continuous erosion in the share of Railways in freight movement and increase in share of less fuel efficient road transport

- Road transport is the most dominant mode of transport. Over 60% of freight were moved by road in 2004-05 (Planning Commission, 2007)

# *Passenger Traffic: Inter Modal Share*




**Road = 86.7%**

**Rail = 12.9%**

**Air= 0.4%**

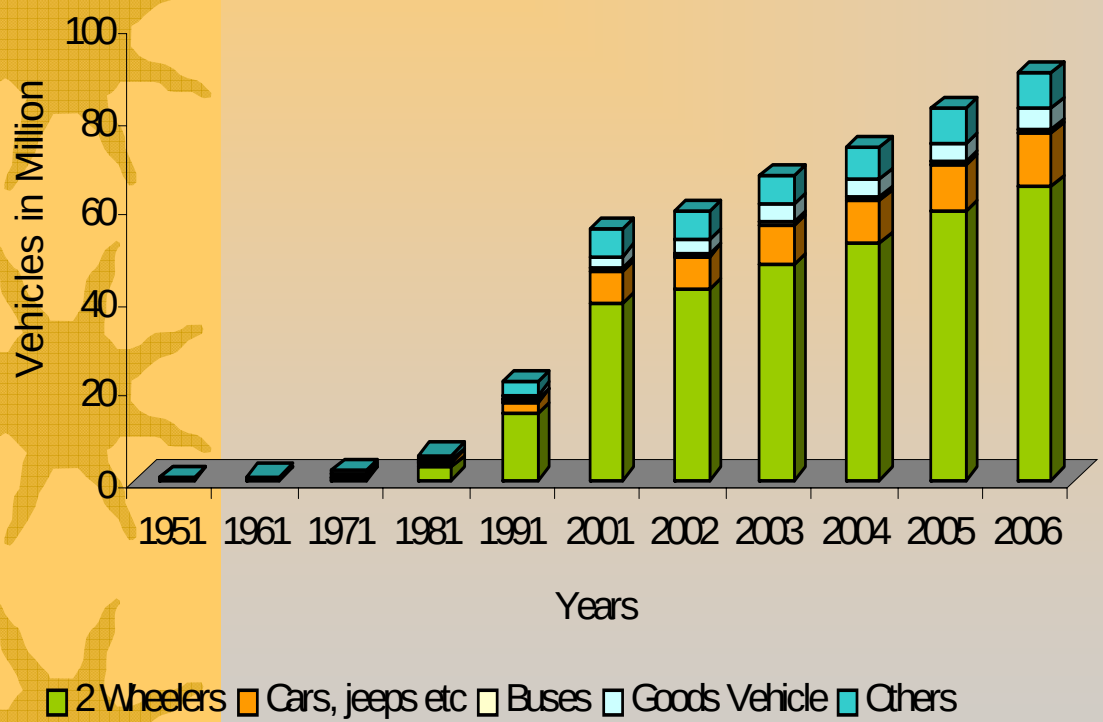
**Source: Planning Commission,2007**

- Substantial shift from rail to road
- Road transport is the most dominant mode of transport. Over 85% of passengers are moved by road in 2004-05 (Planning Commission, 2007)

# *Urban Transport in India*

- 28% of the total population in urban India; projected to grow to 33% percent by 2025 and over 50% by 2050.
- 5161 cities; 35 of them are million plus. 80-90million plus cities by 2030 and 120 by 2050 .
- Most million plus cities are urban sprawls with increasing travel demand and growing reliance on personal vehicles
- The smaller cities lack public transport facilities resulting in growing reliance on personal vehicles.

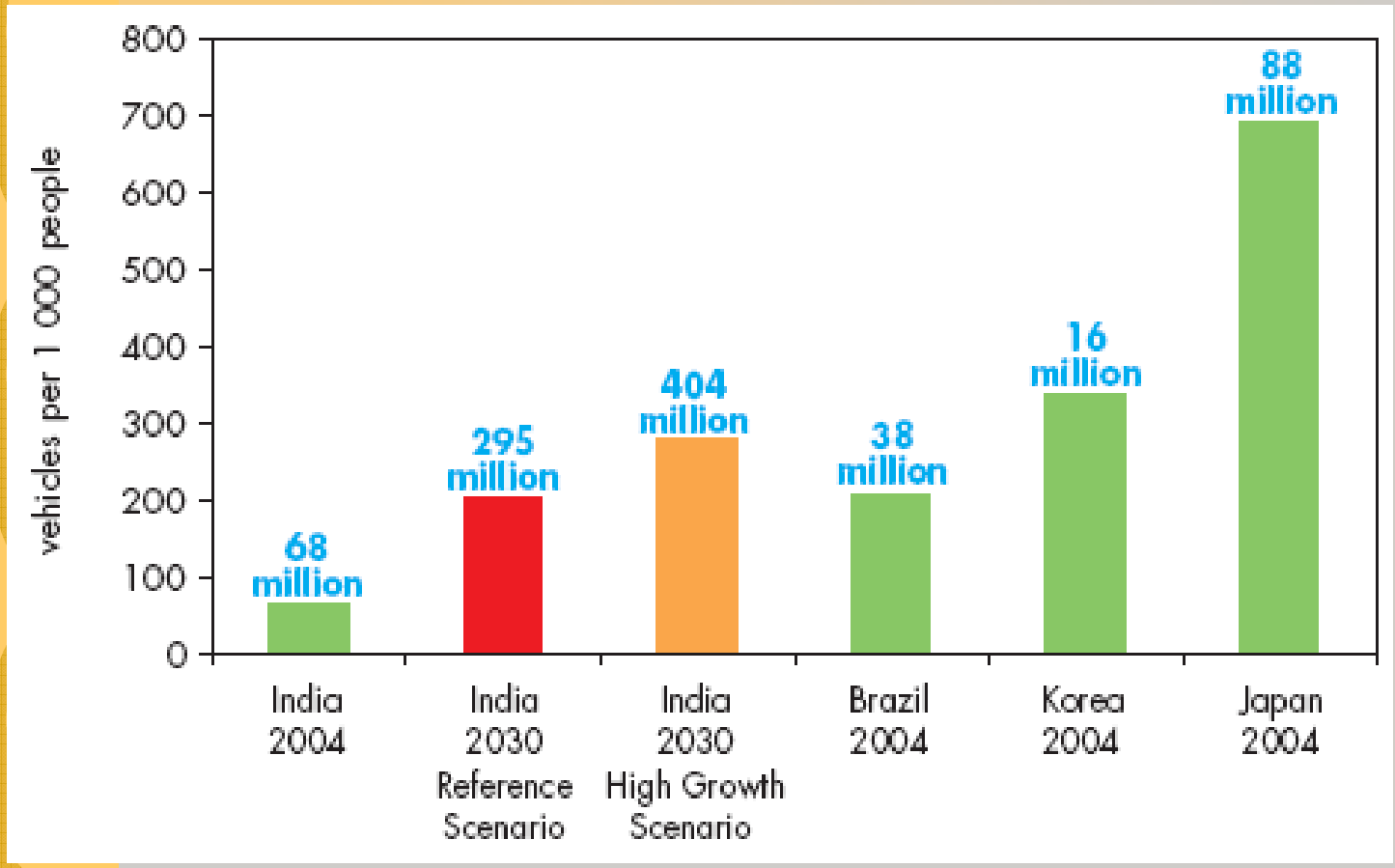
# Growth in Number of Motor Vehicles




- Over 1/3rd of the total vehicles in 35 million +cities
- Second tier cities show greater increase in vehicle population

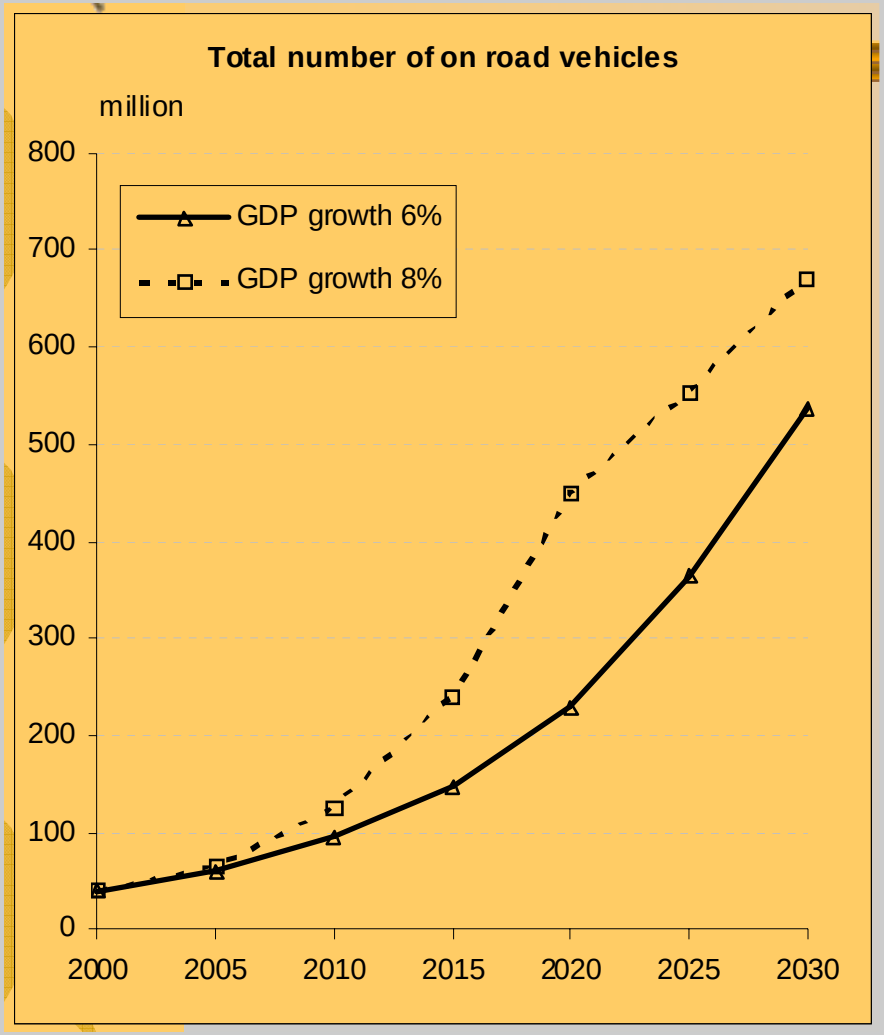
Source: Road Transport Year Book 2006-07; Ministry of Shipping, Road Transport and Highways, Government of India, 2009.

# *India's Vehicle Ownership and Stock in the reference and High Growth Scenario Compared with Select Countries*



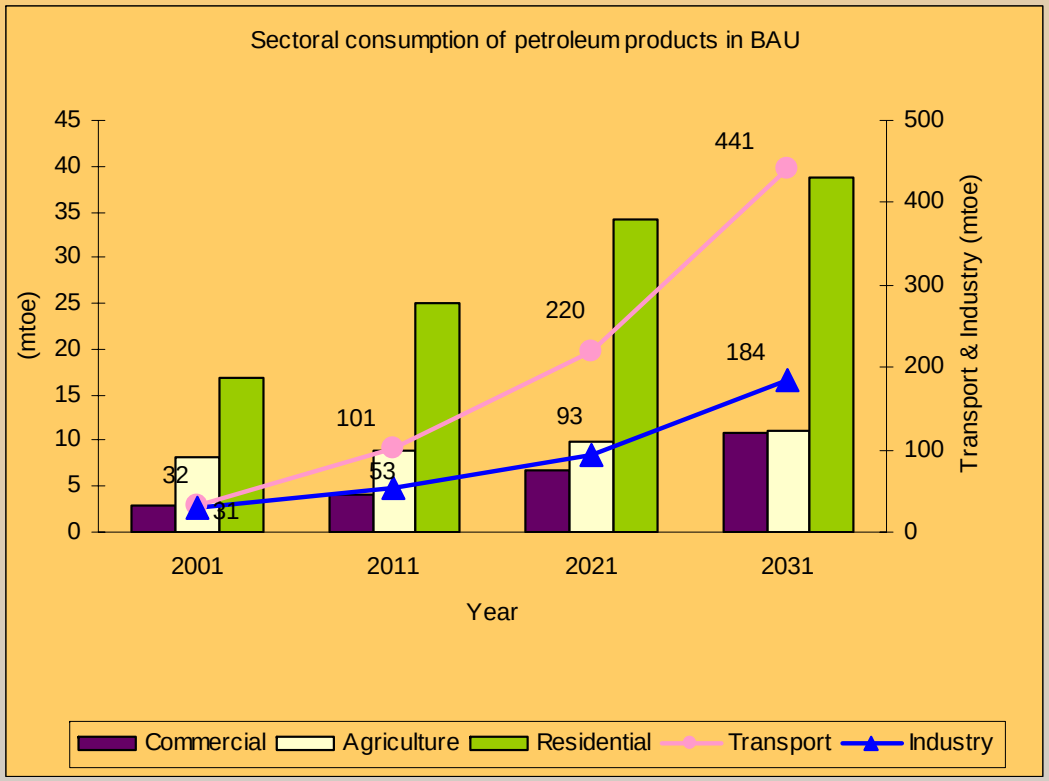

Source: WEO, 2007

# Growth in GDP and Vehicles




Source: TERI study "Energy Efficiency and Climate Change considerations for on-road transport in Asia" for ADB (2006)

# *Implications for India's Energy Security*




Source:PSA/2006/3, "National Energy Map for India, Technology Vision 2030", Study by TERI for Office of the Principal Adviser to the Government of India.

Transport-Second largest consumer of energy (18%) after industry (42%)

Largest consumer of petroleum products (35%) -*Petroleum fuels 98% and electricity 2%*

Share of transport in petroleum consumption to increase from 51% in 2006-07 to 64% in 2030

Oil import dependency to increase from 76% of 141mt to 93% of 731mt by 2031.

Limited fuel switching options for transport sector

# *Other Concerns*

- Equity and access
- Deteriorating air quality and increasing noise pollution
- Congestion resulting in fuel wastage and road rage
- Increasing road related morbidity and mortality

# *ADB Action Plan for GhG reduction and enhancement of Co-benefits*

| Avoid | Shift | Improve |
|---|---|---|

- **Reduce travel demand through integration of urban and transport planning and use of IT.**
- **Reduce fuel consumed per passenger or freight kilometer traveled through modal shift**
- **Establish and implement fuel efficiency standards for new vehicles**
- **Massively increase the use of GhG-friendly biofuels for on-road transport**
- **Improve fuel efficiency in existing vehicles**

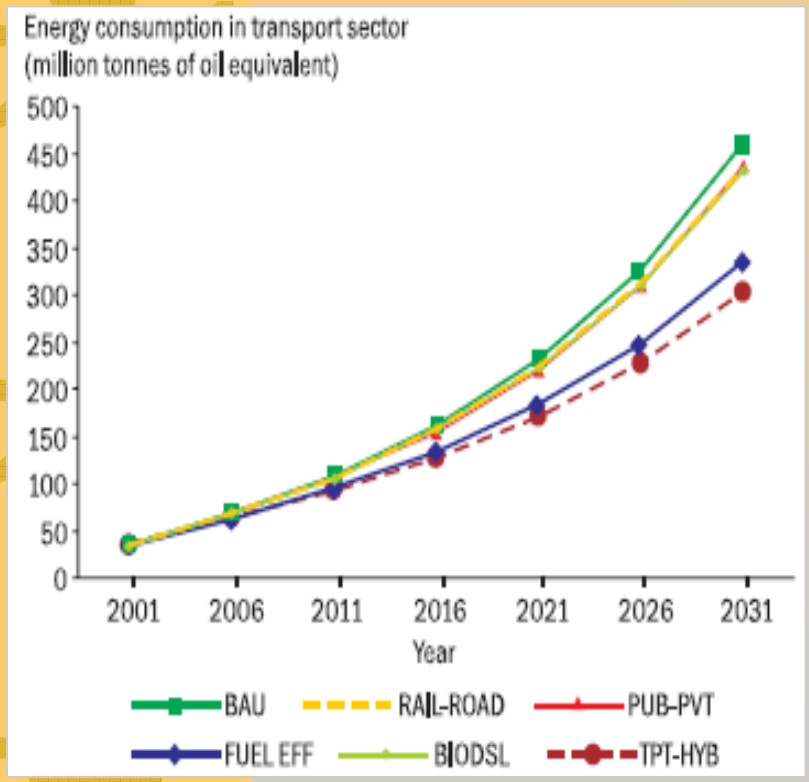
# *Interventions for reduction in energy consumption and $CO_2$ emissions*

| Scenario | *Description* |
|---|---|
| Enhanced share of public transport | Share of public transport modes to increase to 60% in 2036. |
| Increased share of rail in passenger and freight movement vis-à-vis road | Railway freight share to increase from 37% in 2001 to 50% in 2036.<br>Railway passenger share to increase from 23% in 2001 to 35% in 2036.<br>Share of electric traction to increase for rail passenger and freight to 80%. |
| Fuel efficiency improvements | Fuel efficiency of all existing motorized transport modes to increase by 50% from 2001 to 2036. |
| Use of bio-diesel in transport | Enhanced penetration of bio-diesel by 65 Mtoe by 2036. |
| Transport sector hybrid | Incorporates all the above-mentioned scenarios, in addition to those in the BAU. |

Mtoe – million tonnes of oil equivalent

Source: National Energy Map for India: Technology Vision 2030

# Reduction in Energy Consumption- Different Interventions

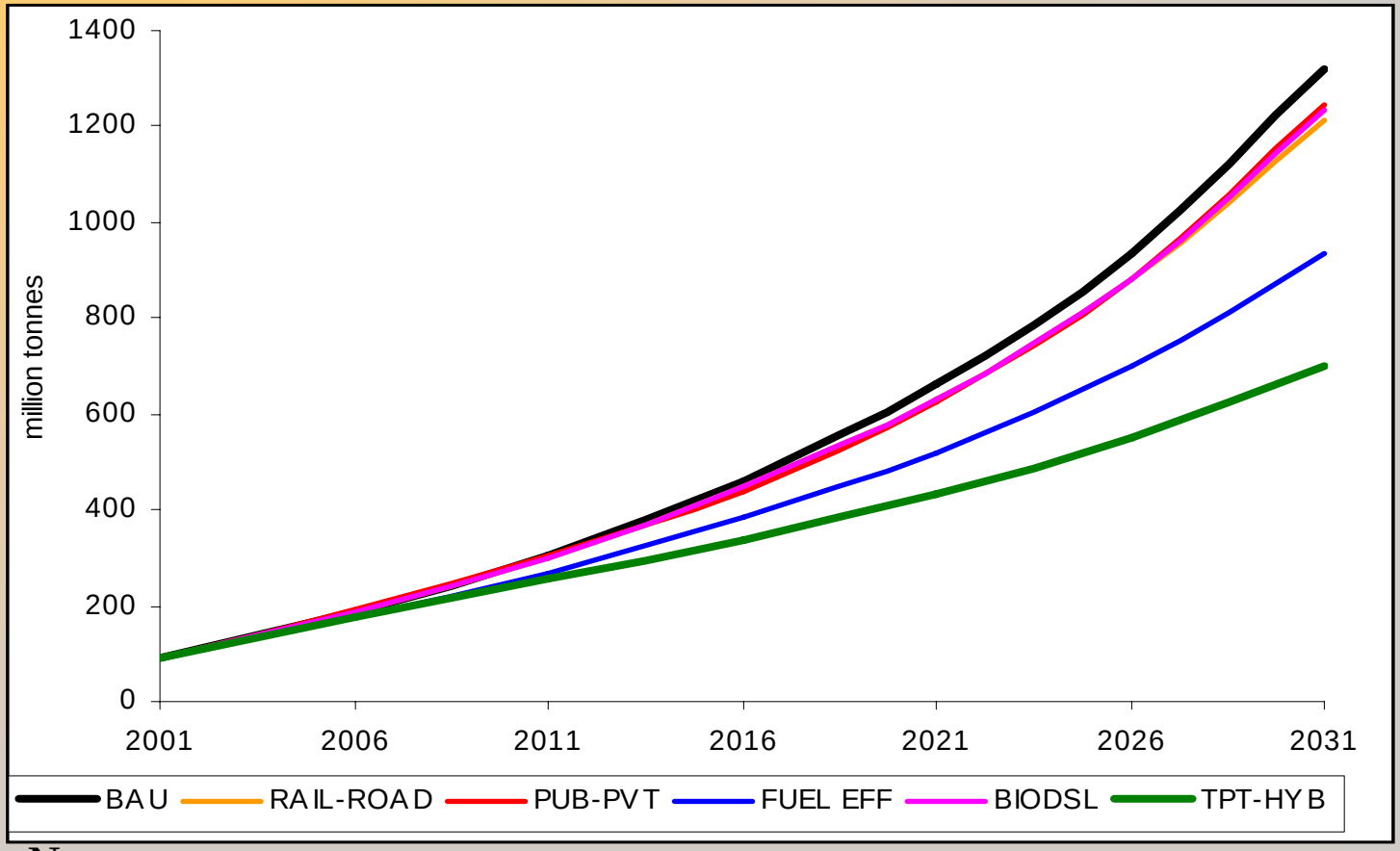



| Scenario | 2001 | 2006 | 2011 | 2016 | 2021 | 2026 | 2031 |
|---|---|---|---|---|---|---|---|
| BAU | 34 | 67 | 106 | 161 | 231 | 328 | 461 |
| RAIL-ROAD | 34 | 67 | 105 | 158 | 223 | 312 | 430 |
| PUB-PVT | 34 | 68 | 107 | 154 | 219 | 310 | 436 |
| FUEL EFF | 34 | 63 | 94 | 135 | 184 | 249 | 336 |
| BIODSL | 34 | 67 | 104 | 157 | 222 | 310 | 433 |
| TPT-HYB | 34 | 64 | 94 | 126 | 171 | 228 | 302 |

BAU - business-as-usual; Mtoe - million tonnes of oil equivalent

Source: National Energy Map for India: Technology Vision 2030

# *Reduction in $CO_2$ Emissions from Transport Sector (in million tonnes) –Different Interventions*




Notes:

1. Calculated for interventions suggested in earlier slide using IPCC emission factors
2. Does not include the emissions from electricity use in transport

# *Important Recommendations from Recent Policies in transport sector in India*

| National Urban Transport Policy (NUTP,2006) | National Mission for Sustainable habitat |
|---|---|
| **Integrate land use & transport planning** | **Suggests early introduction of fuel economy standards .** |
| **Invest in and promote public transport & encourage Non Motorized modes** | **Promotes investments in high capacity public transport systems** |
| **Develop transport projects focused on equitable allocation of road space** | **Suggests Introducing transport pricing measures to influence purchase of vehicles on the basis of their energy efficiency** |
| **Promote Clean Vehicles** | **Encourages setting up of demonstration centers to take up recycling of vehicles, especially two wheelers** |
| **Raise resources through Innovative financing means** | **Encourages energy R &D in Indian railways** |
| **Build capacities** | **Promotes use of coastal shipping and inland waterways, encourage rail based movement instead of long distance road based movement** |

# *Way Forward-National Action*

- **Fuel economy standards being set**
- **Integration of land-use and transport being encouraged**
- **Every JNNURM city required to develop a Comprehensive Mobility Plan**
- **Funding for transport linked to compliance with NUTP**
- **Investment on public transport and NMT stepped up**
  - **-Every million plus city to plan for mass transit**
  - **-9 cities introducing BRT and 6 Metro Rail**
- **Integrated transport plan to promote coastal shipping and water ways**
- **Increased allocations for augmenting rail capacity**

**India is committed to ensure that growth in transport is on a low carbon path.**

# *Barriers*

- Massive funding requirements –Estimates range from 27bn.$ for 63 cities to 40bn $ for 35 million plus cities.
- Fragmented responsibility
- Capacity at city / municipal levels to conceive and implement projects
- Focus on physical infrastructure
- Lack of standardisation and replicability
- Inadequate infrastructure

# *Way Forward- International Action-Financing*

- Improve coordination between multilateral and bilateral funding agencies
- Move from project financing to programme funding
- Look beyond CDM and fund projects and NAMAs with potential for CO2 reduction
- Factor in co-benefits

# *International Action-Transfer of Technology & Capacity Building*

- Transfer technology at affordable costs
- Build capacity to use new technology
- Promote partnerships and platforms to share knowledge and best practices
- Build capacity to conceive, implement and manage transport systems.

*Thank You*