



# *Transport, Energy and Environment - INDIA*

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**S Sundar**

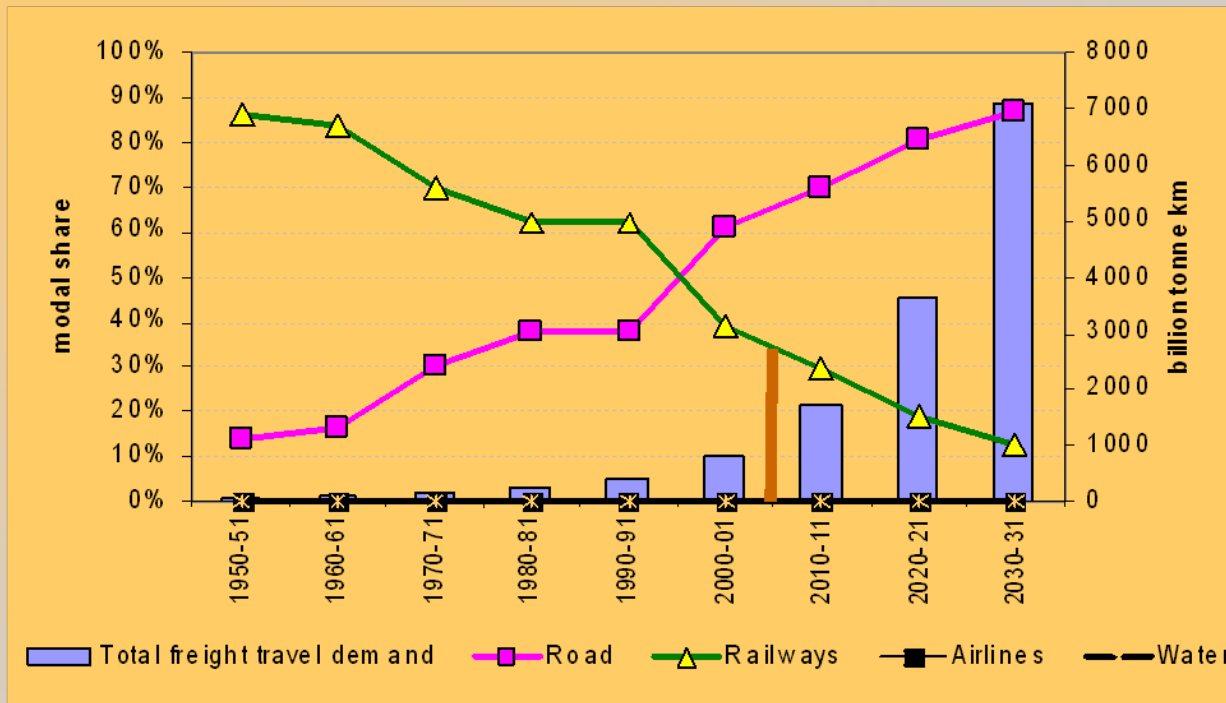
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**&**

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# Freight Traffic: Inter Modal Share



Road = 55%

Rail = 34%

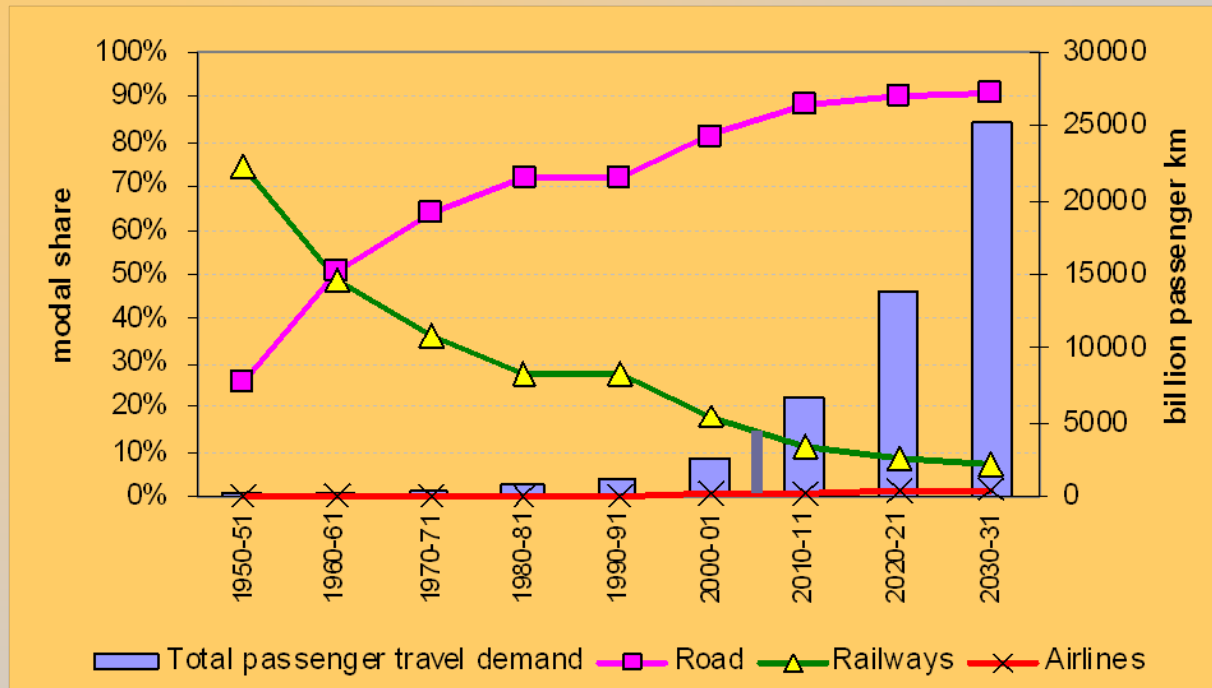
Coastal shipping = 6.8%

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%**

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



# Rural Connectivity

Total number of Habitations*	944922
Connected**	588255 (62.3%)
Unconnected	356667 (37.7%)

**GoI targets to connect all rural habitations by 2010**

\* A **Habitation** is a cluster of population, living in an area, the location of which does not change over time

\*\*Connectivity, by way of an All-weather Road (with necessary culverts and cross-drainage structures, which is operable throughout the year)

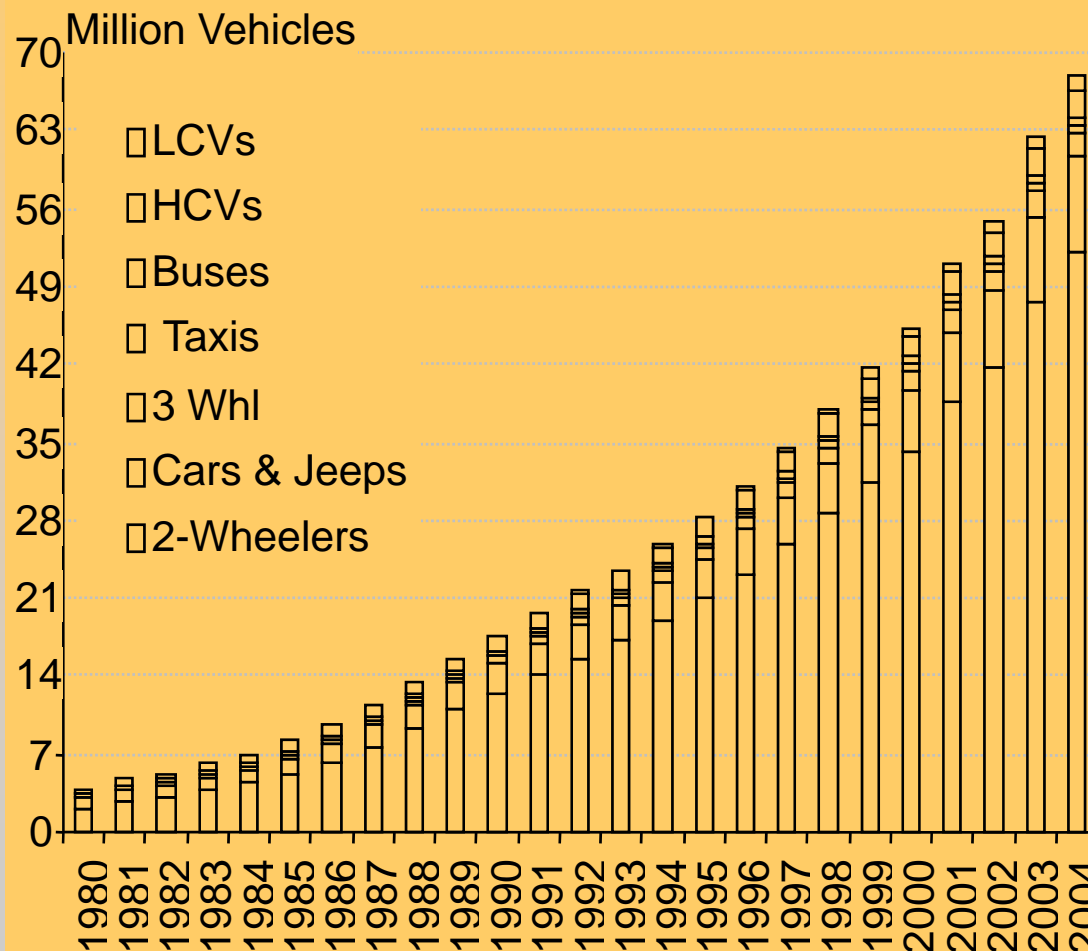


## The Urban Transport Scenario

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- ★ 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. 60-70 million plus cities by 2025 .
- ★ Most million plus cities are urban sprawls with increasing travel demand and growing reliance on personal vehicles

# Growth in Registered Number of Motor Vehicles

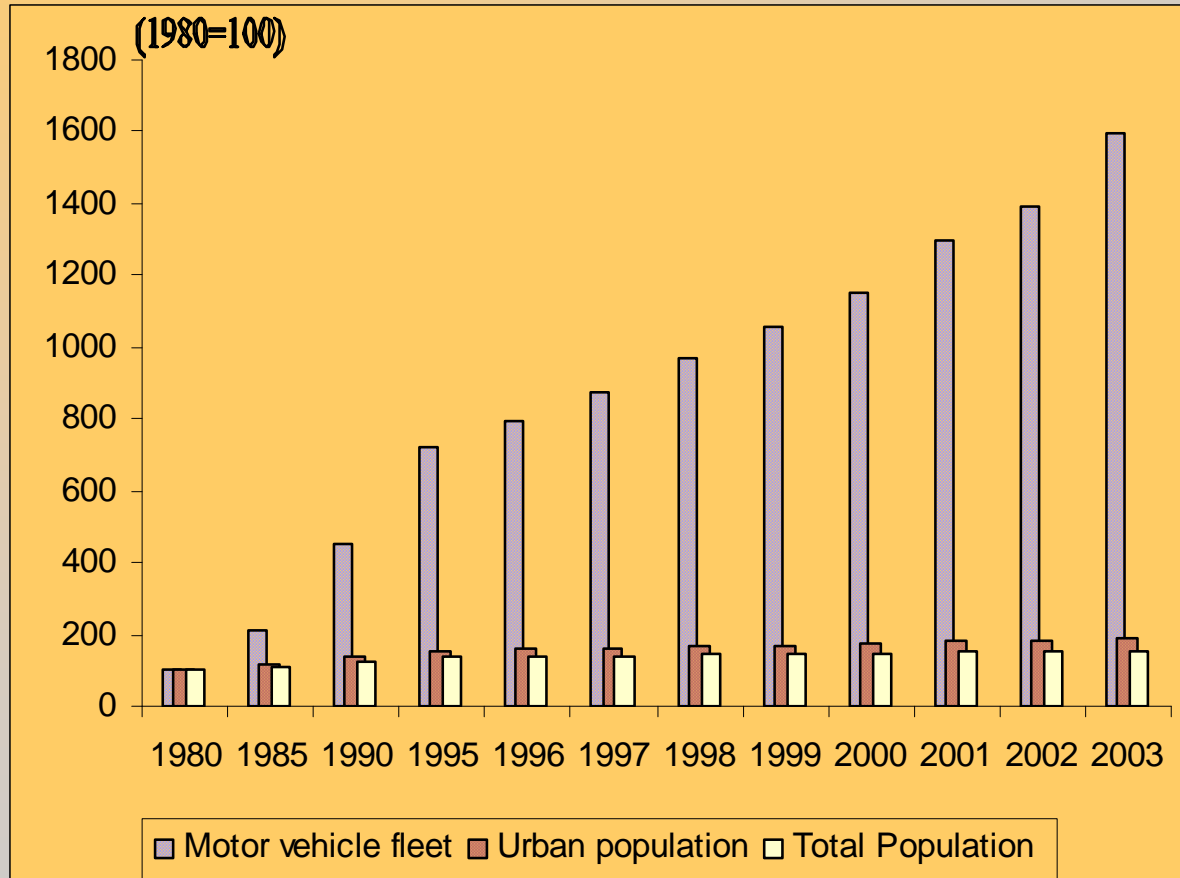


- Over 1/3<sup>rd</sup> of the total vehicles are registered in 35 cities (each over 1 million size)
- Most of the medium and small sized cities have very large number of 2-whs.
- Public transport vehicles are confined to only major cities

Source: Ministry of Road Transport and Highways, Govt. of India. "Motor Transport Statistics of India (various years)".



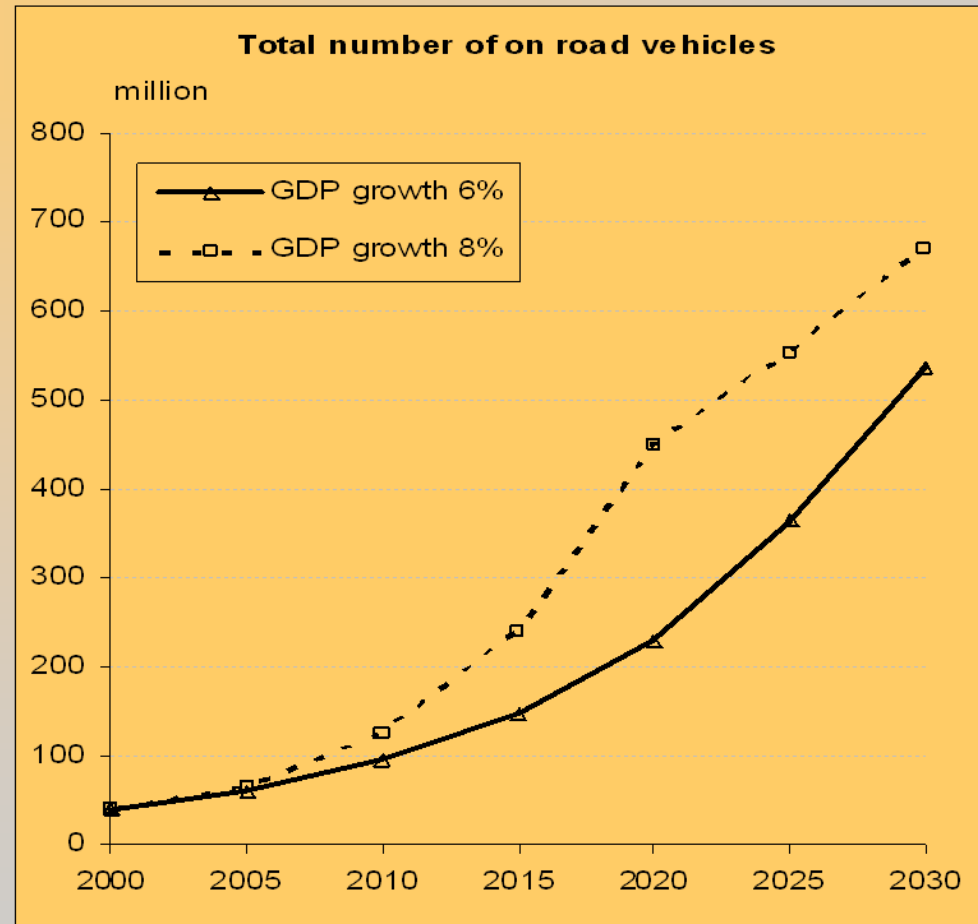
# Growth of Population, Urban Population and Motorization



- Population-size Almost Doubled
- Vehicles Increased 15-Times

Source: TERI, 2006

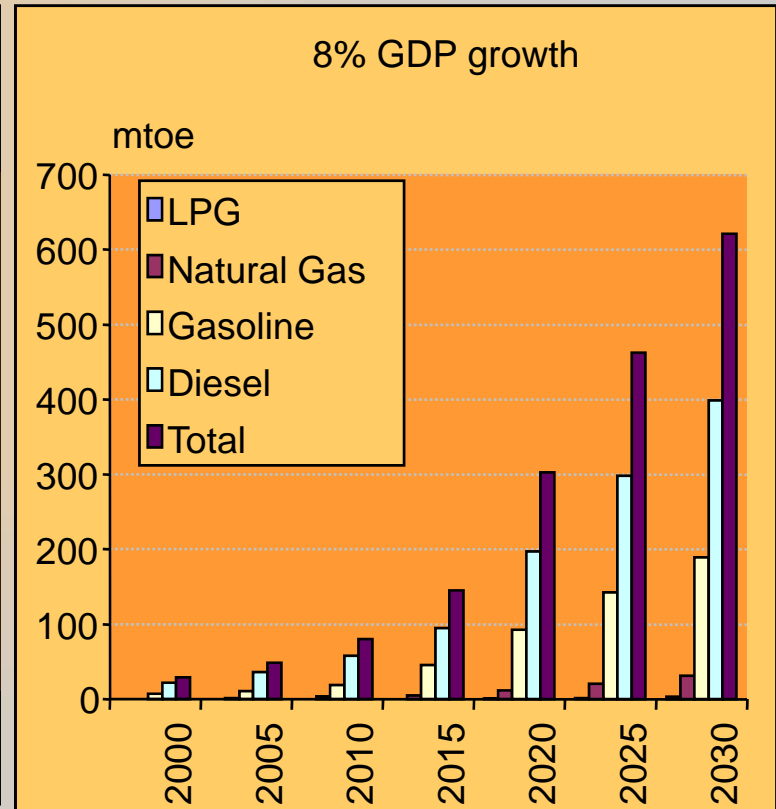
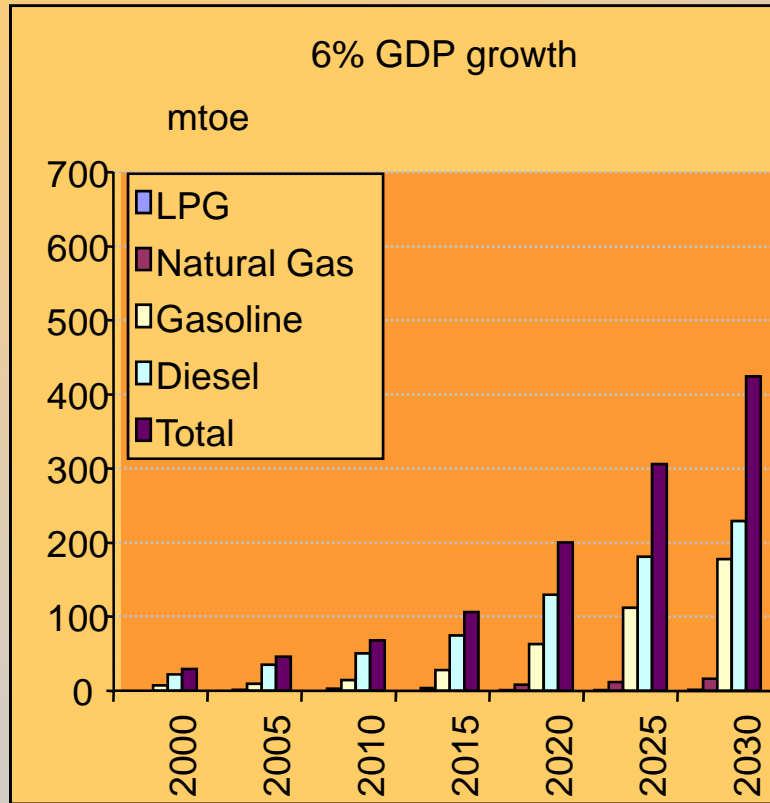
# Growth in GDP and Vehicles



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



# Growth in Fuel Demand

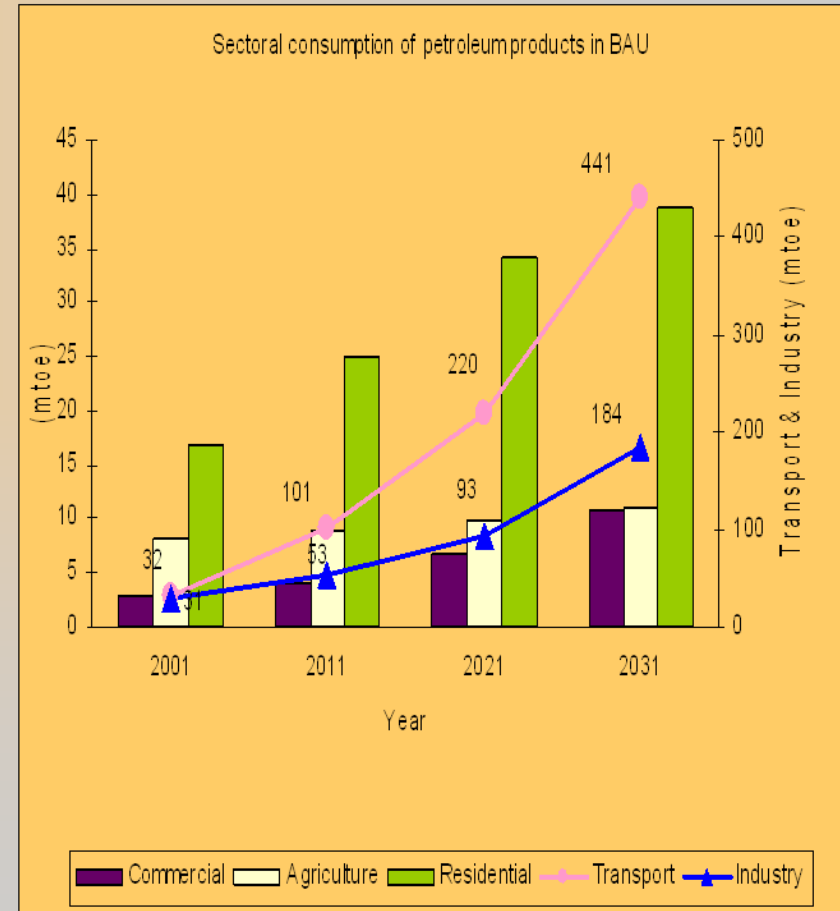


Source: TERI study "Energy Efficiency and Climate Change considerations for on-road transport in Asia" published by ADB (2006)

# Implications for India's Energy Security

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

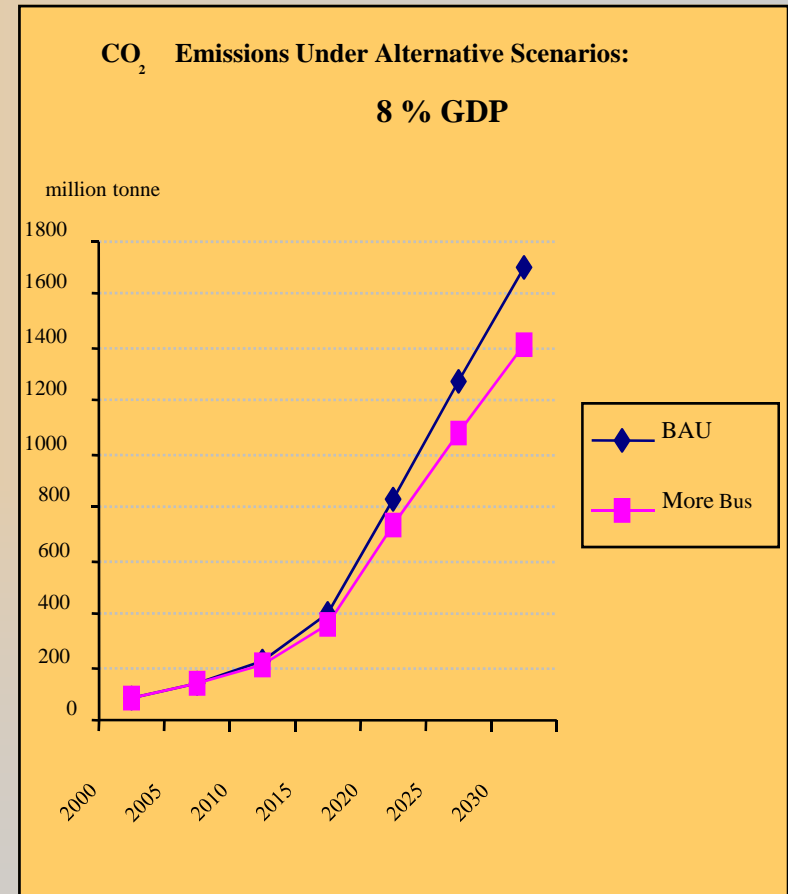
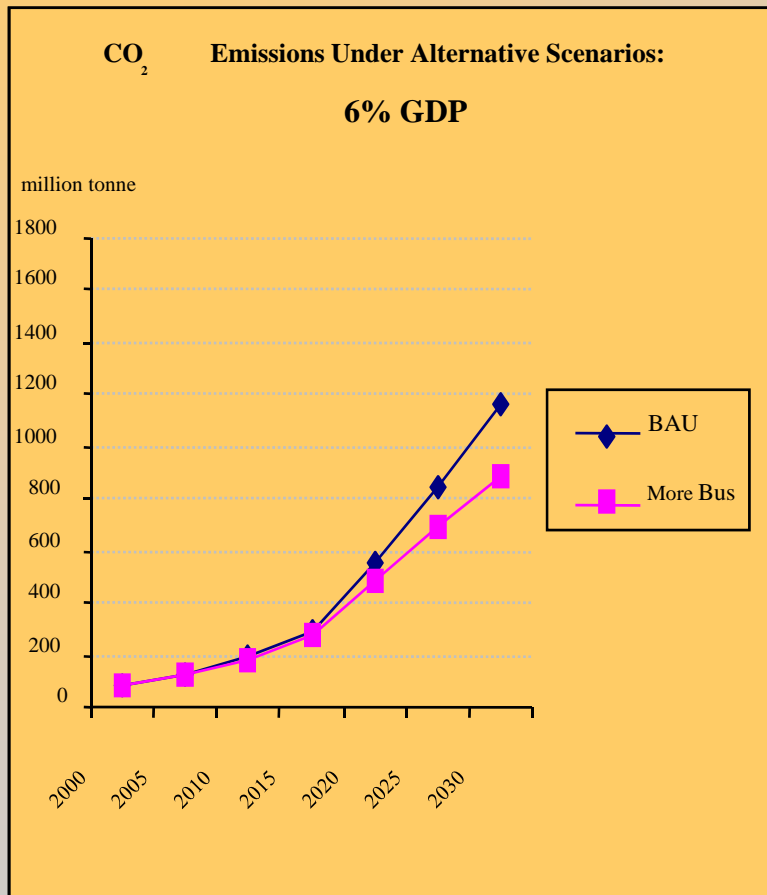
- ★ Largest consumer of petroleum products (35%)
  - Petroleum fuels 98% and electricity 2%
- ★ Share of transport in petroleum consumption to increase from 51% in 2006-07 to 64% in 2030
- ★ Oil import dependency to increase from 76% of 141mt to 93% of 731mt by 2031.
- ★ Limited fuel switching options for transport sector



Source: TERI 2006



# CO<sub>2</sub> Emissions Under Alternate Scenarios From Road Transport



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



## Current Policy Scenario

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- ★ Fuel efficiency improvements standards –yet to be introduced
- ★ Euro III standards in 11 cities; Euro III in rest of India & Euro IV in 11 cities only by 2010
- ★ Transport demand not managed in any Indian city
- ★ Public transport and NMT declining-
- ★ Fragmented responsibility
- ★ No urban transport policy in any state or city



## National Urban Transport Policy, 2006

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To ensure safe, affordable, acceptable, reliable and sustainable access to urban residents through initiatives such as :

- ★ Integrated land use and transport planning
- ★ Investing in rapid transport systems to encourage greater use of public transport
- ★ Emphasis on discouraging use of personal vehicles and encouraging NMT
- ★ Cities encouraged to draw up Comprehensive Mobility Plans and integrate land use with transport
- ★ Promoting PPPs  
Provides for financial support under JNNURM

# Potential for Energy Efficiency in the Transport Sector

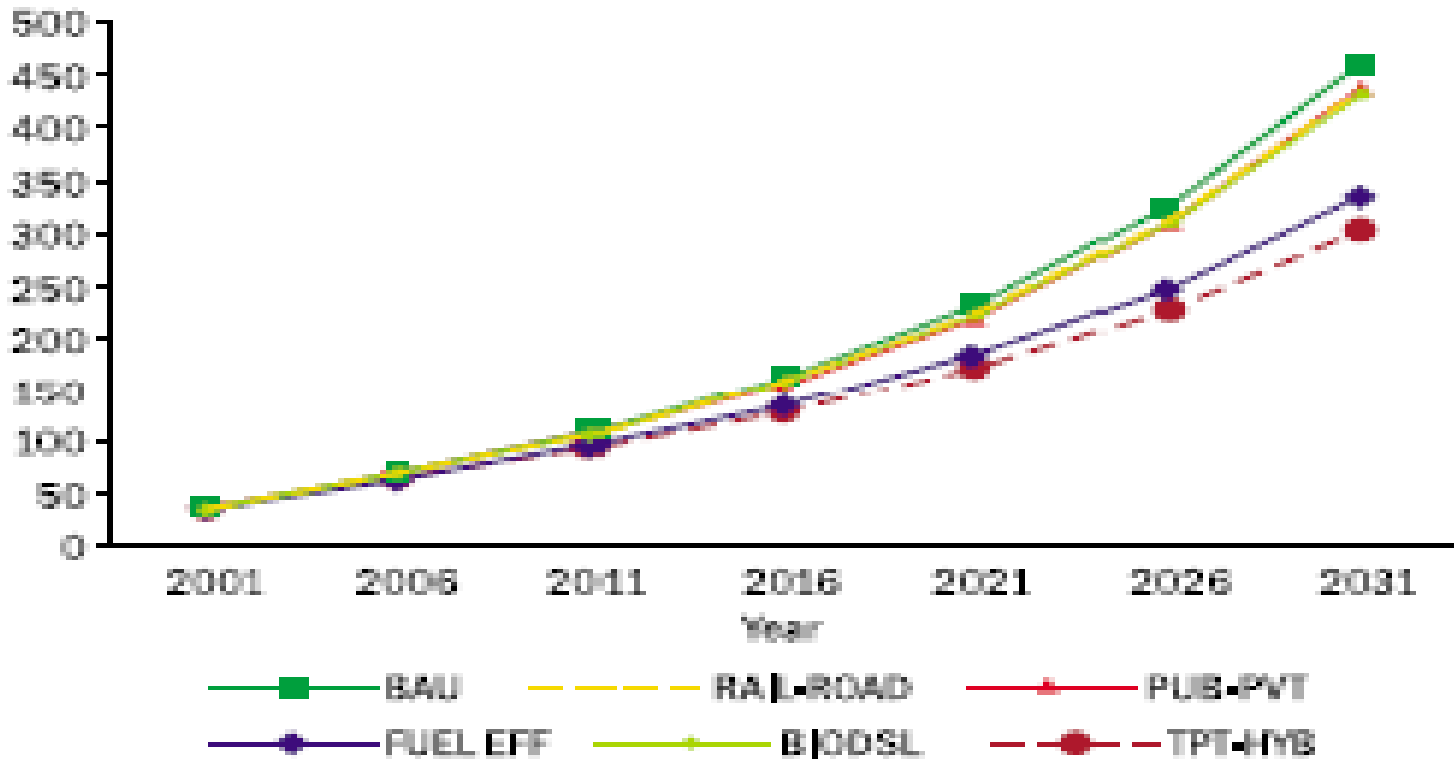
Scenario	Description
Enhanced share of public transport	Share of public transport modes to increase to 60% in 2036.
Increased share of rail in passenger and freight movement vis-à-vis road	Railway freight share to increase from 37% in 2001 to 50% in 2036. Railway passenger share to increase from 23% in 2001 to 35% in 2036. 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

# Energy Consumption in Transport Sector Across Scenarios


Energy consumption in transport sector  
(million tonnes of oil equivalent)-



Source: National Energy Map for India: Technology Vision 2030



## Energy Consumption in Transport Sector (in Mtoe) Across Scenarios



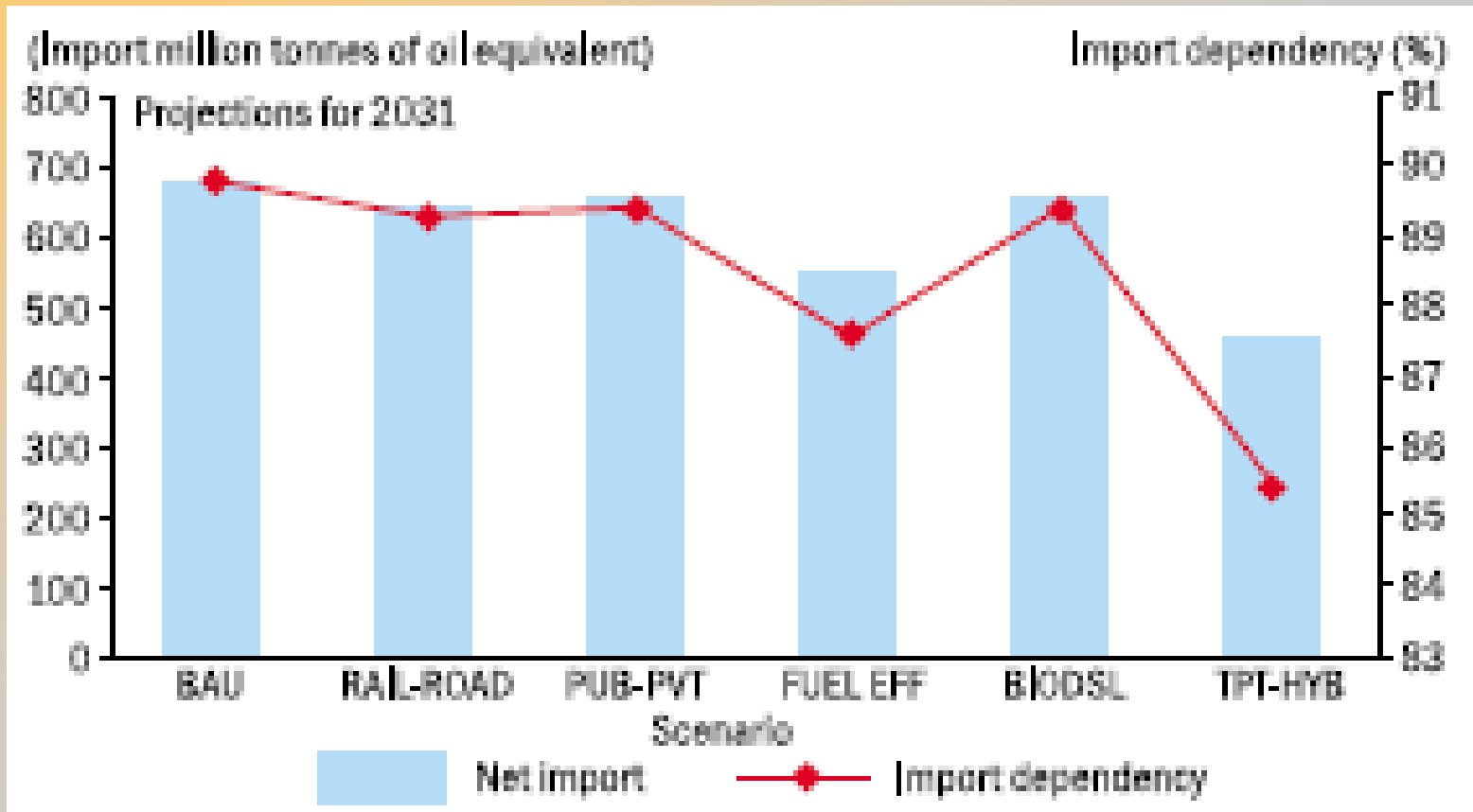
Scenario	2001	2006	2011	2016	2021	2026	2031
BAU	34	67	106	161	231	328	461
RAIL-ROAD	34	67	105	158	223	312	430
PUB-PVT	34	68	107	154	219	310	436
FUEL EFF	34	63	94	135	184	249	336
BIODSL	34	67	104	157	222	310	433
TPT-HYB	34	64	94	126	171	228	302

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

Source: National Energy Map for India: Technology Vision 2030



# Possible Reduction in Net Import and Import Dependency



2031

Source: National Energy Map for India: Technology Vision 2030





## Way Forward- National Action

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★ Formulate and **implement** an integrated policy to increase the share of the railways, water transport and pipeline in freight transport



★ Implement The National Urban Transport Policy

★ Vigorously promote alternate fuels

★ Introduce fuel efficiency improvements





## International Cooperation

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- ★ Explore International agreement on a common minimum standard for fuel efficiency
- ★ Encourage auto industry to employ best available engine technology and ECDs
- ★ Accelerate R&D in fuel efficiency improvement
- ★ Expedite commercial development of alternate fuels
- ★ Facilitate transfer of technology



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***Thank You***