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

- 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

- 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)

Road = 86.7%
Rail = 12.9%
Air = 0.4%
Source: 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

![Graph showing the total number of on-road vehicles](chart)

**Total number of on road vehicles**

- **GDP growth 6%**
- **GDP growth 8%**

Source: TERI study “Energy Efficiency and Climate Change considerations for on-road transport in Asia” for ADB (2006)
Implications for India's Energy Security

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

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<tr>
<th>Avoid</th>
<th>Shift</th>
<th>Improve</th>
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<td>✫ Reduce travel demand through integration of urban and transport planning and use of IT.</td>
<td>✫ Reduce fuel consumed per passenger or freight kilometer traveled through modal shift</td>
<td>✫ 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</td>
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Interventions for reduction in energy consumption and CO₂ emissions

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

Source: National Energy Map for India: Technology Vision 2030
Reduction in Energy Consumption - Different Interventions

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**

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<td>Integrate land use &amp; transport planning</td>
<td>Suggests early introduction of fuel economy standards</td>
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<tr>
<td>Invest in and promote public transport &amp; encourage Non Motorized modes</td>
<td>Promotes investments in high capacity public transport systems</td>
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<td>Develop transport projects focused on equitable allocation of road space</td>
<td>Suggests Introducing transport pricing measures to influence purchase of vehicles on the basis of their energy efficiency</td>
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<td>Promote Clean Vehicles</td>
<td>Encourages setting up of demonstration centers to take up recycling of vehicles, especially two wheelers</td>
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<td>Raise resources through Innovative financing means</td>
<td>Encourages energy R &amp; D in Indian railways</td>
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<td>Build capacities</td>
<td>Promotes use of coastal shipping and inland waterways, encourage rail based movement instead of long distance road based movement</td>
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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