

Impacts of Motorization in China  
and India on Global Warming  
*The Importance of Forecasts and  
Policy Measures*

Sanjay Marwah  
Japan International Transport Institute  
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# Outline

- Current CO<sub>2</sub> Emissions – Worldwide and Key Developing Countries
- Major Existing Models and Forecasts
  - Key Drivers of Motorization
- Indian Road Transportation Futures
  - Some Comparisons with China
- Future Impacts from Road Transportation in Developing Countries

# Emissions Profiles

	1	2	3	4	5	
	U.S.A.	China	Russia	Japan	India	EU-15
Share (%)	24.3	14.0	6.2	4.9	4.4	13.3

	1990	2000
China		
Energy consumption (1 million toe)	880	1,140
CO <sub>2</sub> emissions (1 million tCO <sub>2</sub> )	2,256	2,982
GDP (billion 1995 US\$ exch. rate)	398	1,041
GDP per energy unit (\$/K toe)	0.45	0.91
India		
Energy consumption (1 million toe)	365	517
CO <sub>2</sub> emissions (1 million tCO <sub>2</sub> )	595	974
GDP (billion 1995 US\$ exch. rate)	276	470
GDP per energy unit (\$/K toe)	0.76	0.91
Japan		
Energy consumption (1 million toe)	446	521
CO <sub>2</sub> emissions (1 million tCO <sub>2</sub> )	1,015	1,178
GDP (billion 1995 US\$ exch. rate)	4,925	5,684
GDP per energy unit (\$/K toe)	11.04	10.91

Source: IEA 2004

# Global Mobility Data

Region (Year 2000)	All Mode Activity (billion pkm)	PKm Bus	PKm per Capita	%LDVs	No. of LDVs (thous)	LDVs Occup. Rate
North America	8121	267	25603	82	192390	1.63
Pacific OECD	1836	134	12246	55	60492	1.50
Western Europe	5706	530	12483	70	188929	1.61
Central and Eastern Europe	703	142	6000	65	25928	1.75
Former Soviet Union	1243	315	4308	49	31857	1.92
Sub-Saharan Africa	1490	1194	2323	16	6260	2.50
Centrally Planned Asia	2443	1465	1754	15	7173	2.50
Latin America	3267	1446	6371	51	41083	2.50
Middle-East and North Africa	1990	910	5858	44	21492	2.50
Other Pacific Asia	3298	1935	6627	29	23901	2.37
South Asia	3204	2302	2376	11	8220	2.50

Source: Andreas Schafer, Global Passenger Mobility Data Set, Version 1.0, University of Cambridge, September 2005.

# Major Models and Forecasts

- WBCSD IEA/SMP Model
  - China CO<sub>2</sub> Emissions (well to wheel) in 2030
    - Transport Total – 986.3 megatons
    - Total Road Vehicles – 650.4 - (66%)
    - Light Duty Vehicles – 358.6 (36%)
  - India CO<sub>2</sub> Emissions (well to wheel) in 2030
    - Transport Total – 462.3 megatons
    - Total Road Vehicles – 376.3 (81%)
    - Light Duty Vehicles – 117.2 (25%)

*Advantage: Examines All Major Vehicle Modes, Production of Fuel, ASIF Identity Elements*

# Key Drivers

- Income Threshold
  - Affordability
  - Status Symbol
- Economic Growth
  - Higher Demand and More Activity
- Urbanization
- Indigenous Industry

# Infrastructure Growth – Facilitator or Constraint

- Existing Trends – Development of Roads
- Is Growth Possible to Support Projected Increases in Modes and Travel Activity?
  - Resources and Investment Required High
  - Planning and Coordination
  - Demand Management Difficult

# Indian Case – Past, Present, and Future

- Vehicle Utilization and Travel Patterns
  - Modal Split (Mode Substitution)
  - Skewed Distribution of Modes and Utilization
  - Fuel Consumption (Diesel Greater than Petroleum)
  - Majority of Population in Urban Areas Use Public Transport

# Indian Case – Past, Present, and Future

- Comparisons with China
  - Similarities in Concentration of Wealth and Travel
  - Differences in Economic and Political Organization and Development
  - Growth of Automobile Industries and Markets
    - Prospects May Be Better in India in Long-Term

# Indian Forecasts

- Current Estimate – 800 billion pkm (freight) and 2300 billion pkm (passenger)
  - The Decline of Rail to Road (Inter-city travel is area where air travel may rise)
- Travel Activity Estimates
  - Planning Commission: Increases of 5 Times for Freight and 4 Times for Passenger in 2020
  - TERI: Increases of 6-12 Times for Freight and 3 Times for Passenger by 2025
- Emissions Estimates
  - IEA – 201 MtCO<sub>2</sub> in 2030 (Projections of IEA past trends would see 150 Mt from road transportation)
  - Integrated Model – 500 MtCO<sub>2</sub> in 2030

# Comparisons of Future Impacts and Necessary Policy Dialogue

- Compare EU-15 Nations and Japan with Forecasts for China and India in Road Transportation Sector
- Japan and EU-15 Bound by Kyoto Protocol Up to 2010
- 2010 – China’s Level Exceeds Japan, Behind EU-15 (assuming no growth in later two); India Still Behind
- 2030 – China’s Forecasted Level Increased by More than Entire Japanese 2010 Emissions; India Still Behind Japan
- Costly Measures in Japan and EU-15 in This Sector Are Lost Due to Growth in Developing Nations
- China Has Become an Oil Importing Nation (India was already) -
  - Savings from Reduction in Fuel Consumption Critical for Development
- Urgent to Take Measures and Start Policy Dialogue

# Framework

- Questions about current mechanisms (CDM in Transportation)
- Facilitate technology transfer to developing nations
- Sorting problems with CDM in transportation
- Use of market mechanisms including emissions trading