

Climate change mitigation and adaptation: An Indian perspective

S. Kumar
Professor and Dean
School of Environment, Resources and Development
Asian Institute of Technology
Thailand

February 14, 2008
Kobe, Japan

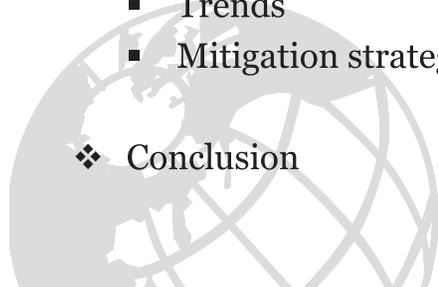


Content

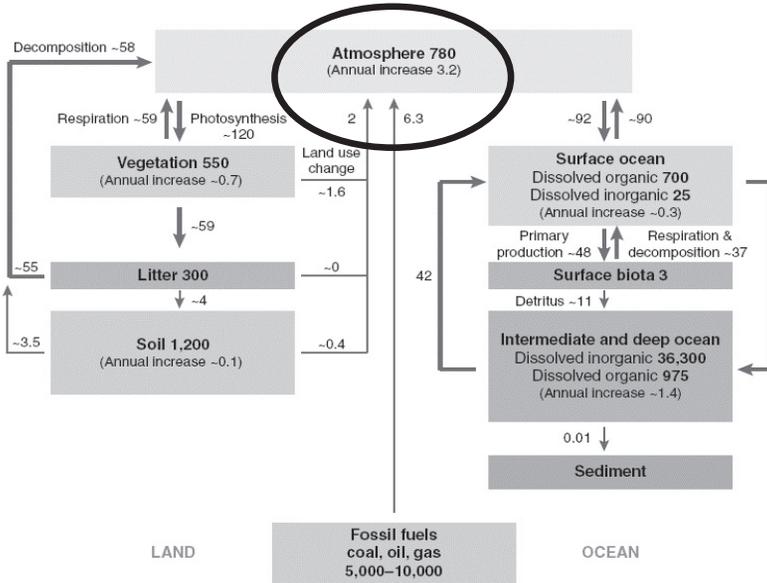
- ❖ India's energy use and its implications to greenhouse gas emissions
 - Economic and related indicators
 - Greenhouse gas emissions contribution

- ❖ Efforts to address climate change mitigation issues
 - Trends
 - Mitigation strategies

- ❖ Conclusion



The global carbon cycle and reservoirs



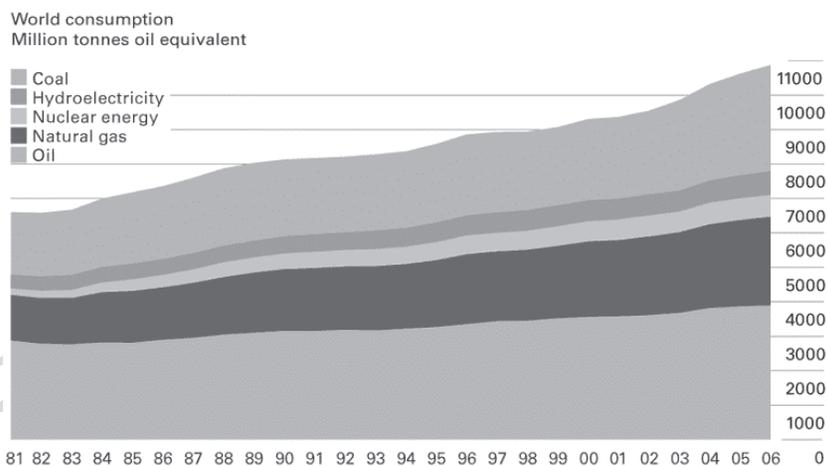
The global carbon cycle in the 1990s. Units are PgC or PgC year⁻¹.

Source: Houghton, 2007

1 Pg = 10¹² kg

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World primary energy consumption (1981 – 2006)

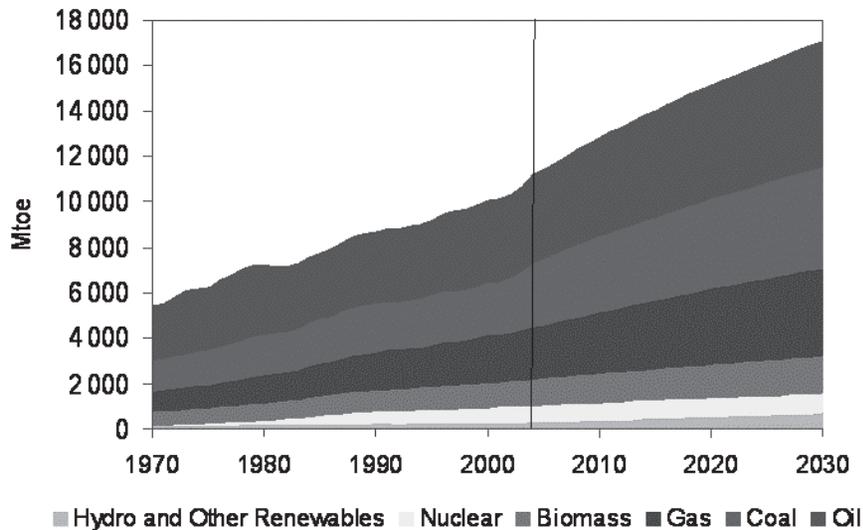


World primary energy consumption grew more slowly in 2006 but growth remained just above the 10-year average. Oil was the slowest-growing fuel, while coal was the fastest-growing. Although oil remains the world's leading energy source, it has lost market share to coal and natural gas in the past decade.

BP Statistical Review of World Energy 2007

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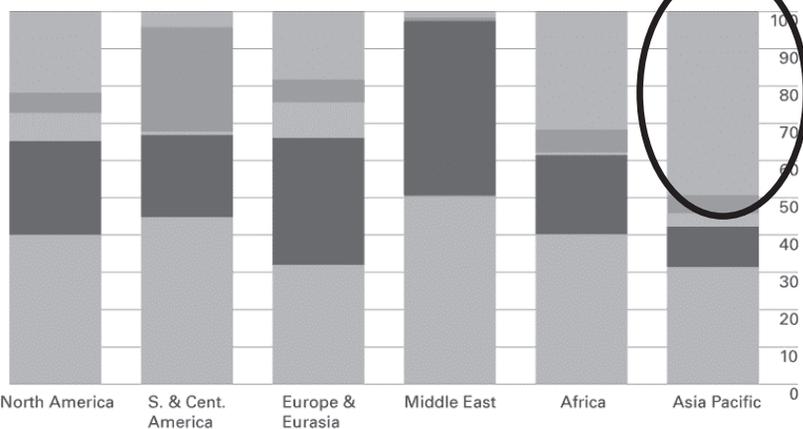
World primary energy demand (1970 – 2030)



World Energy Outlook, 2006 5

Regional primary energy consumption share - 2006

Regional consumption pattern 2006
Percentage



Oil remains the leading energy source in all regions except Asia Pacific and Europe & Eurasia. Coal dominates in the Asia Pacific region, while natural gas is the leading fuel in Europe & Eurasia. The Asia Pacific region accounted for two-thirds of global energy consumption growth last year.

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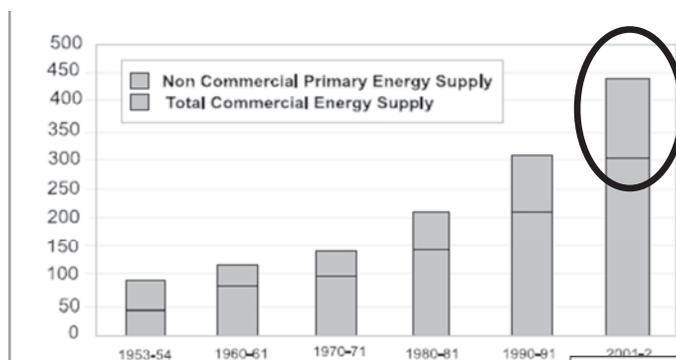
INDIA: Selected Indicators

- ❖ **Land area:** 3.29 million square kilometers
- ❖ **Population:** 1,027 million (2001).
- ❖ **Population growth rate:** 1.93 per cent (1991 - 2001)
- ❖ **Population density:** 324 persons per square kilometre
- ❖ **Life expectancy:** 60.4 years, male: 61.8 years, female: 59 years
- ❖ **Literacy rate:** 65.38 per cent

Source: India Business Equity Foundation, 2008

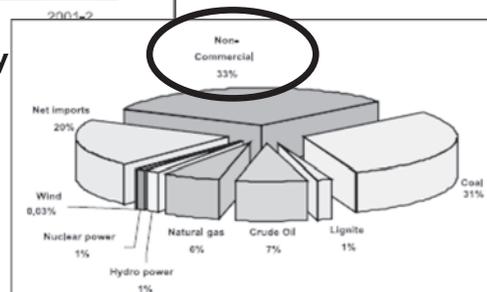
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India's primary energy supply (1953 – 2002)



Decade trend of total primary energy Consumption (Mtoe)

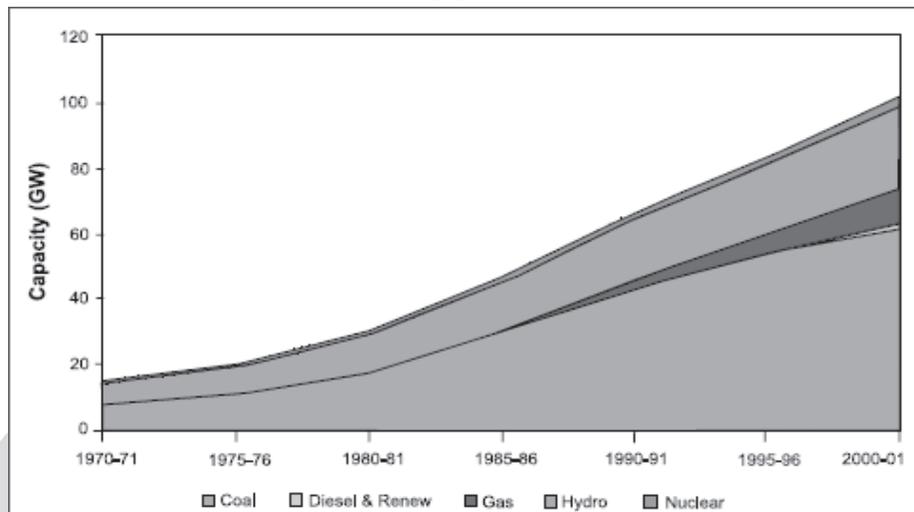
Share in primary energy Supply (2001-2002)



Source: India's National Communication to UNFCCC, 2004

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India's electricity generation capacity and share (1970 – 2001)



Power Generation Capacity

Source: India's National Communication to UNFCCC, 2004

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India's primary energy requirement (2006 – 2032)

Projections for Total Primary Commercial Energy Requirements

(Mt of Oil Equivalent)

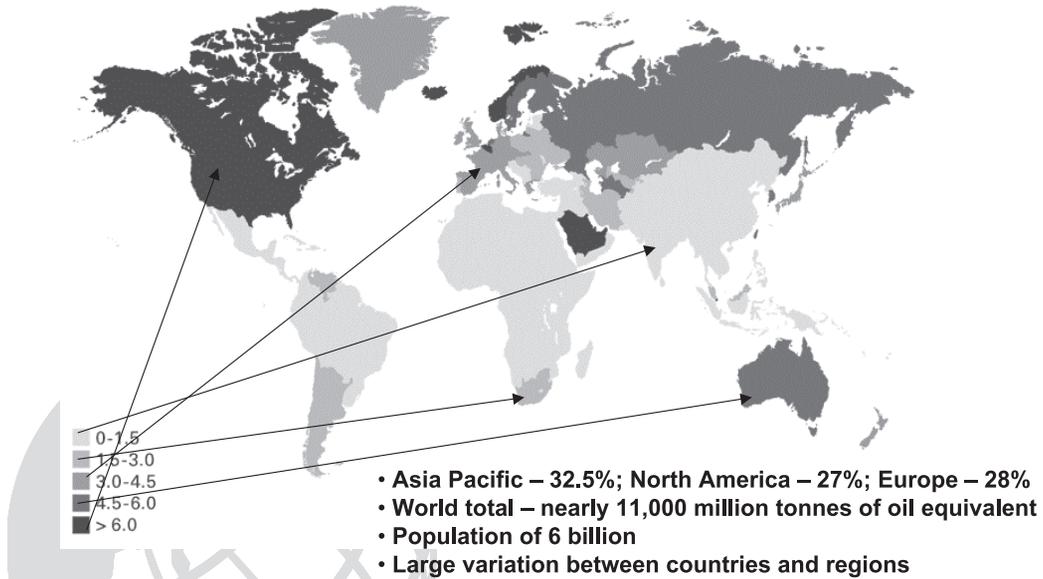
Year	Population in millions	GDP (Rs. in Billion @1993-94 prices)		TPCES (Mtoe) 1 GDP Growth Rate		TPCES (Mtoe) 2 GDP Growth Rate	
		8%	9%	8%	9%	8%	9%
		2006-07	1114	17839	18171	389	397
2011-12	1197	26211	27958	521	551	537	570
2016-17	1275	38513	43017	684	748	732	807
2021-22	1347	56588	66187	898	1015	998	1142
2026-27	1411	83145	101837	1166	1360	1361	1617
2031-32	1468	122170	156689	1514	1823	1856	2289

Integrated Energy Policy, Planning Commission, 2006

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Primary energy consumption per capita

Consumption per capita 2006
Tonnes oil equivalent



BP Statistical Review of World Energy 2007

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Selected energy indicators (2003)

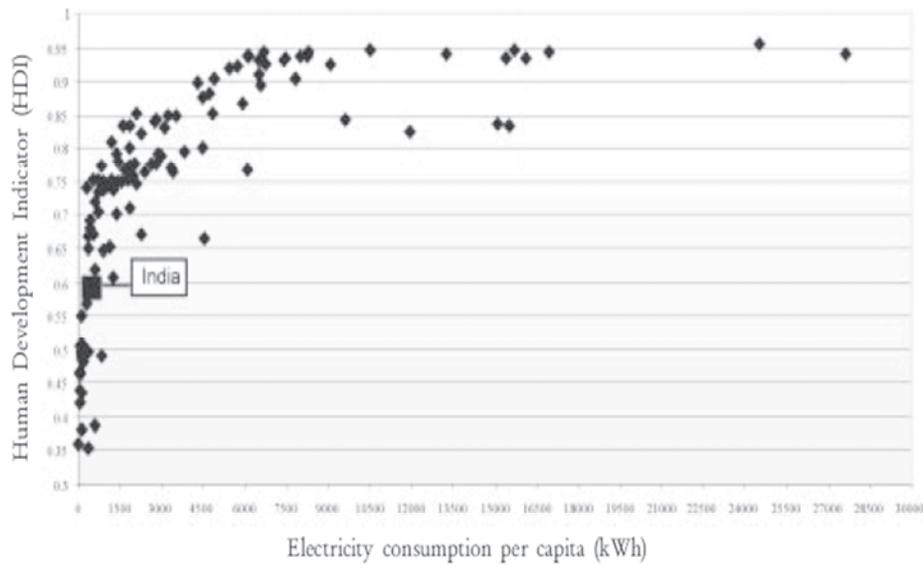
Region/Country	GDP Per Capita-PPP (US \$ 2000)	TPES Per Capita (kgoe)	TPES/GDP (kgoe/\$-2000 PPP)	Electricity Consumption Per Capita (kWh)
China	4838	1090	0.23	1379
Australia	28295	5630	0.20	10640
Brazil	7359	1094	0.15	1934
Denmark	29082	3852	0.13	6599
Germany	25271	4210	0.17	6898
India*	2732	439	0.16	553
Indonesia	3175	753	0.24	440
Netherlands	27124	4983	0.18	6748
Saudi Arabia	12494	5805	0.46	6481
Sweden	27869	5751	0.21	15397
United Kingdom	26944	3906	0.14	6231
United States	35487	7835	0.22	13066
Japan	26636	4052	0.15	7816
World	7868	1688	0.21	2429

TPES: Total Primary Energy Supply

Integrated Energy Policy, Planning Commission, 2006

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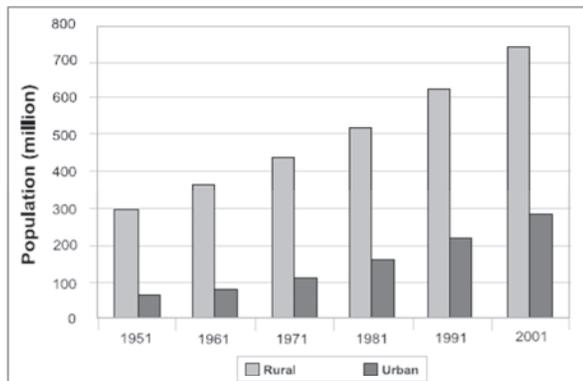
Human Development Index



UNDP, 2004

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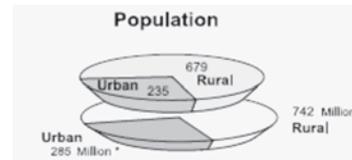
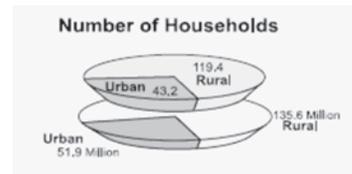
India: Rural – Urban population



Rural – Urban population profile of India

Urban – 19% in 1965 to 28% in 2000

Legend: 1994 (light grey), 2000 (dark grey)



Source: Census 2001

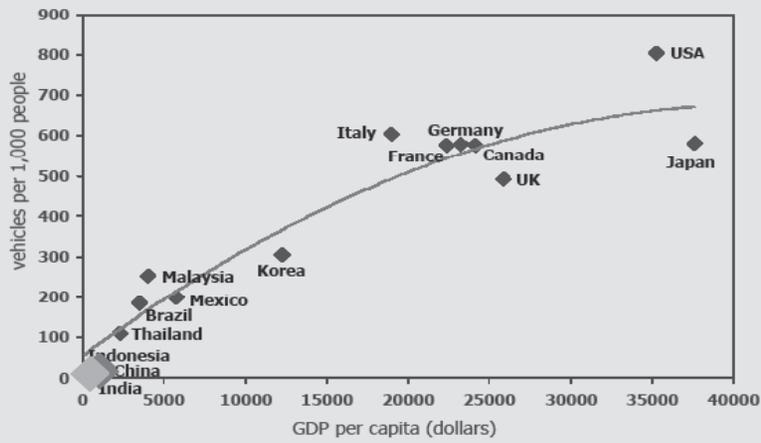
Source: India's National Communication to UNFCCC, 2004

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India: Vehicle Ownership

World Energy Outlook 2006

Vehicle Ownership, 2004

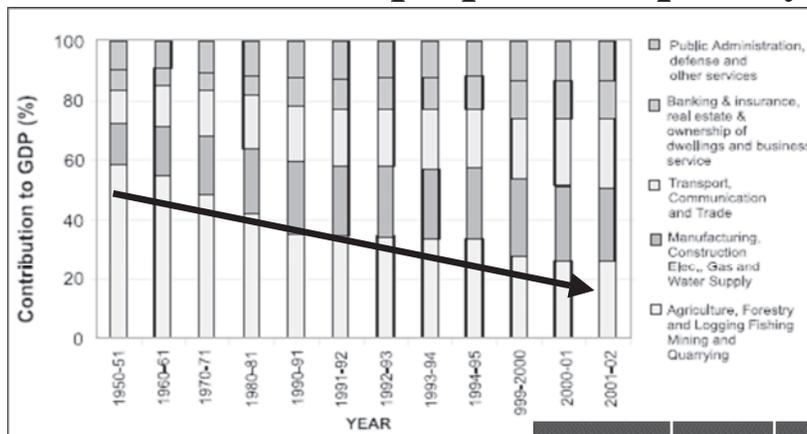


The potential for increased vehicle ownership in emerging markets, in particular China and India, is huge

F. Birol, 2007

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India: GDP and people below poverty line



Sector wise contribution to GDP

Percentage of people below poverty line

Year	Rural	Urban	Total
1973-1974	56.44	49.01	54.88
1977-1978	53.07	45.24	51.32
1983	45.65	40.79	44.48
1987-1988	39.09	38.20	38.86
1993-1994	37.27	32.36	35.97
1999-2000	27.0	23.62	26.10

Source: India's National Communication to UNFCCC, 2004

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Indian Economy: Selected Indicators

- ❖ India has joined the elite club of 12 countries with a trillion dollar economy
- ❖ FDI inflows have jumped by almost three times to US\$ 15.7 billion in 2006-07 as against US\$ 5.5 billion in 2005-06.
- ❖ India recorded the world's largest sales of mobile phones in the third quarter of 2007, selling 24.5 million mobiles phones during June-September 2007 accounting for 8.5 per cent total world-wide sales.
- ❖ Manufacturing growth rate estimated at 11.3 per cent.
- ❖ 9.2 per cent GDP growth rate estimated in 2006-07. Average growth for last three years is 8.6 per cent.

Source: India Business Equity Foundation, 2008

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Trade: India and Japan

- ❖ India has overtaken China for the first time as the most attractive business destination for long-term Japanese investments, according to a survey by Japan Bank for International Cooperation (JBIC).
- ❖ Bilateral trade figures increasing from US\$ 3.7 billion in 2002-03 to US\$ 6.5 billion in 2005-06, rising further to US\$ 7.5 billion in 2006-07,
- ❖ Indian imports from Japan were worth US\$ 4.6 billion in 2006-07 compared to US\$ 4 billion in 2005-06.
- ❖ Exports from India to Japan were worth US\$ 2.8 billion in 2006-07 compared to US\$ 2.4 billion in 2005-06.

Source: India Brand Equity Foundation, 2008

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