



India Scenarios



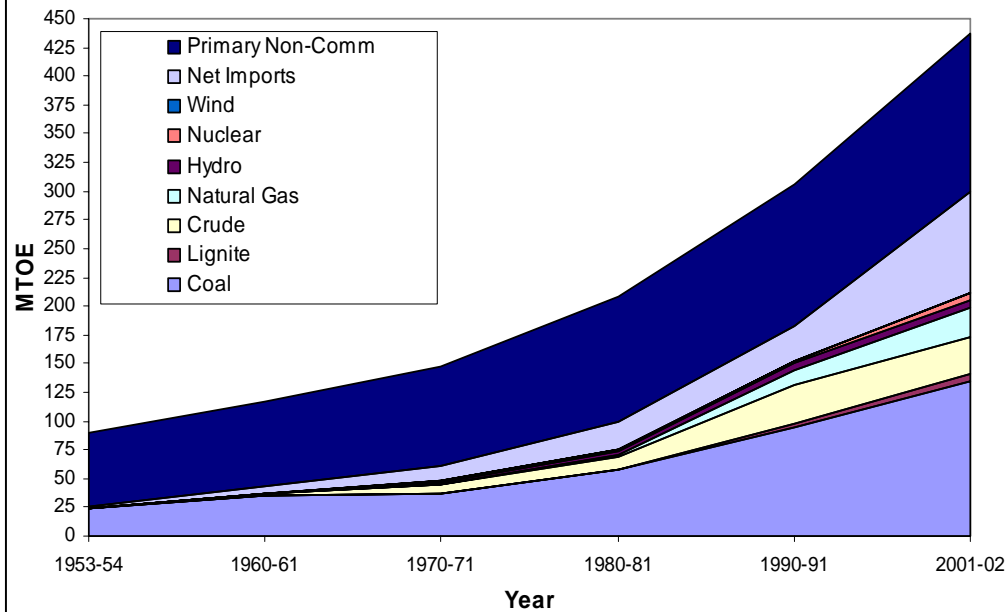
Presentation Structure



- Indian Energy Overview
- Scenario Description
- Modeling Assumptions
 - Population
 - GDP
 - Urbanization
- India 2050
- Indian Power Sector
 - Generation Capacities / Emissions: Base Case
 - SO₂ Regulation :

Indian Energy Overview

Trends in Supply of Primary Energy



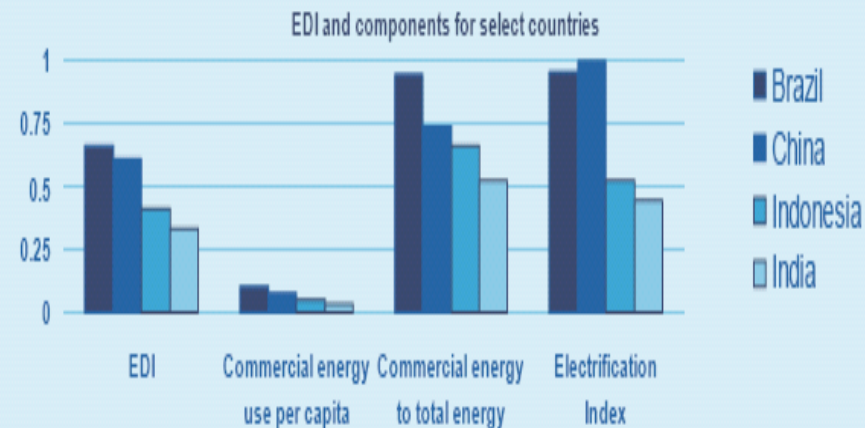
- Sixth largest consumer of energy
- 15 per cent of world population – 3 per cent of global energy consumption
- GDP growth rate for 2004-05: 6.9 per cent
 - Energy – GDP elasticity: 0.8 (approx.)

- Energy deficit
- Crude production stagnant at 33 MTPA
- Gas supply shortfall of 40 mmscmd (2004)

Source: Centre for Monitoring Indian Economy (CMIE)

India ranks a poor 53rd and fares very poorly in all three sub-indicators

EDI and components for select countries



Power Sector Overview

The installed capacity as on 30th June, 2006 stands at 126089 MW

	<i>Hydro</i>	<i>Thermal</i>				<i>Nuclear</i>	<i>Wind / RES</i>	<i>Total</i>
		<i>Coal</i>	<i>Gas</i>	<i>Diesel</i>	<i>Total</i>			
<i>State</i>	25461.2	38239.9	3499.8	604.6	42344.3	0.0	2567.5	70373.0
<i>Private</i>	1092.7	4241.4	5663.0	597.1	10501.5	0.0	3623.3	15217.5
<i>Central</i>	6172.0	26007.5	4419.0	0.0	30426.5	3900.0	0.0	40498.5
<i>Total</i>	32725.8	68488.8	13581.8	1201.8	83272.4	3900.0	6190.9	126089.0

Scenario Storylines



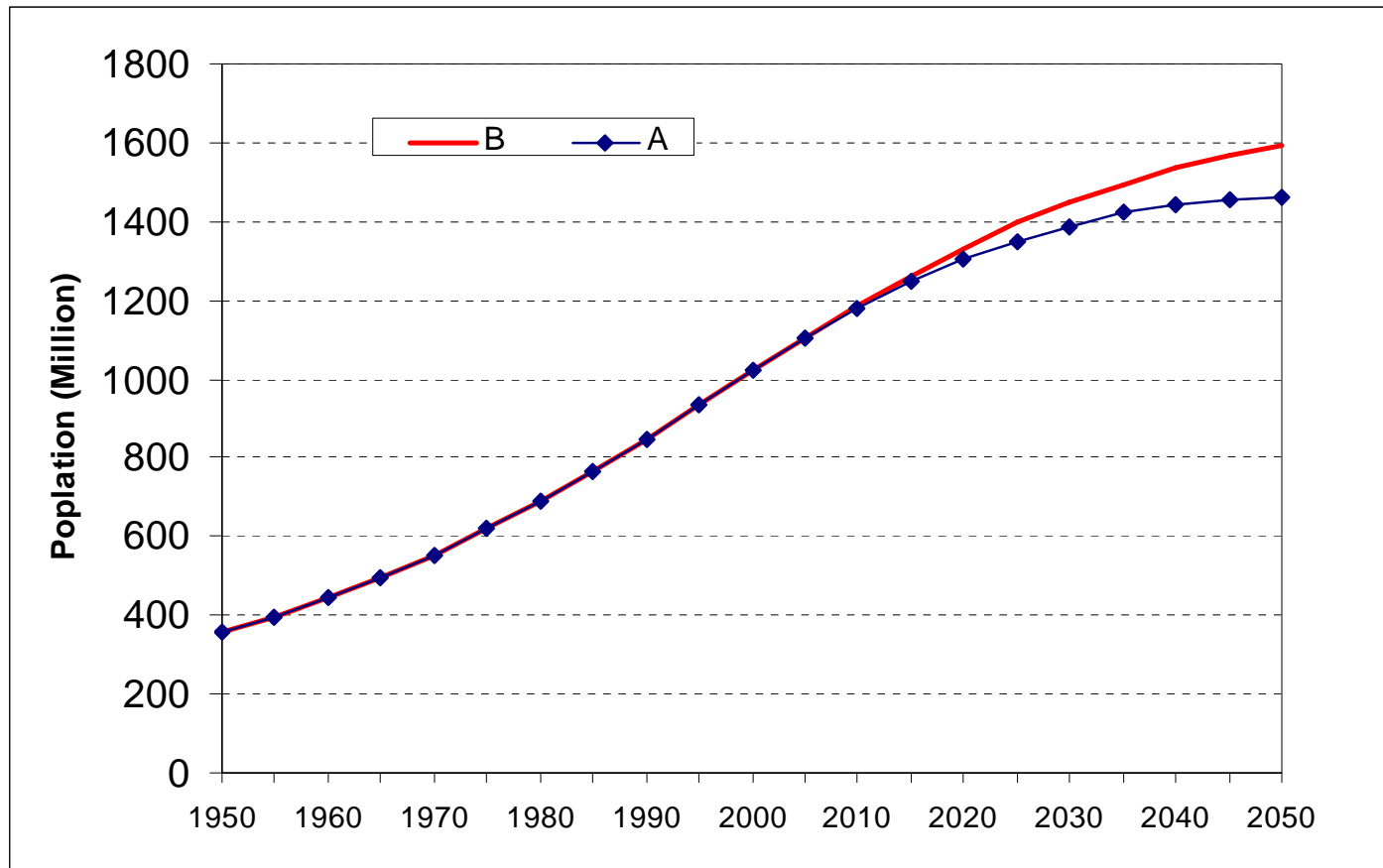
- Scenario A :
 - India, which policy makers are aspiring for characterized by high growth rates, rapidly improving demographic indicators, driven by economic reforms and high levels of social spending. Higher penetration of technologies and environmental consciousness amongst people.

Scenario Storylines (Cont.)



- Scenario B:
 - India, where a large part still resides in villages though demographic indicators have changed but still a long improvement to go. The economy dependent largely on the manufacturing sector.

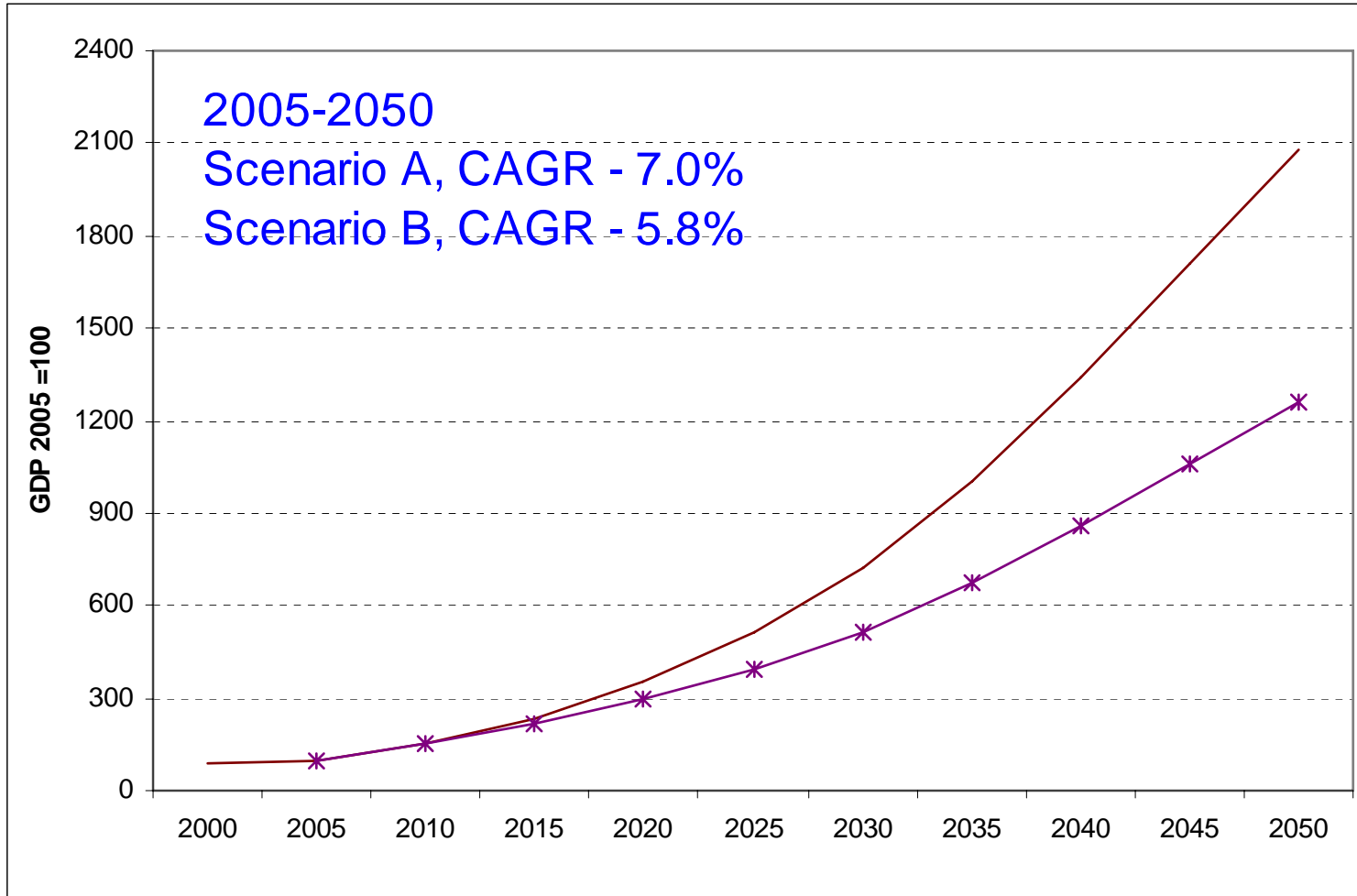
Population Projections of India



Scenario A : Own projections for a highly urbanized India

Scenario B : As per UN Population Projections

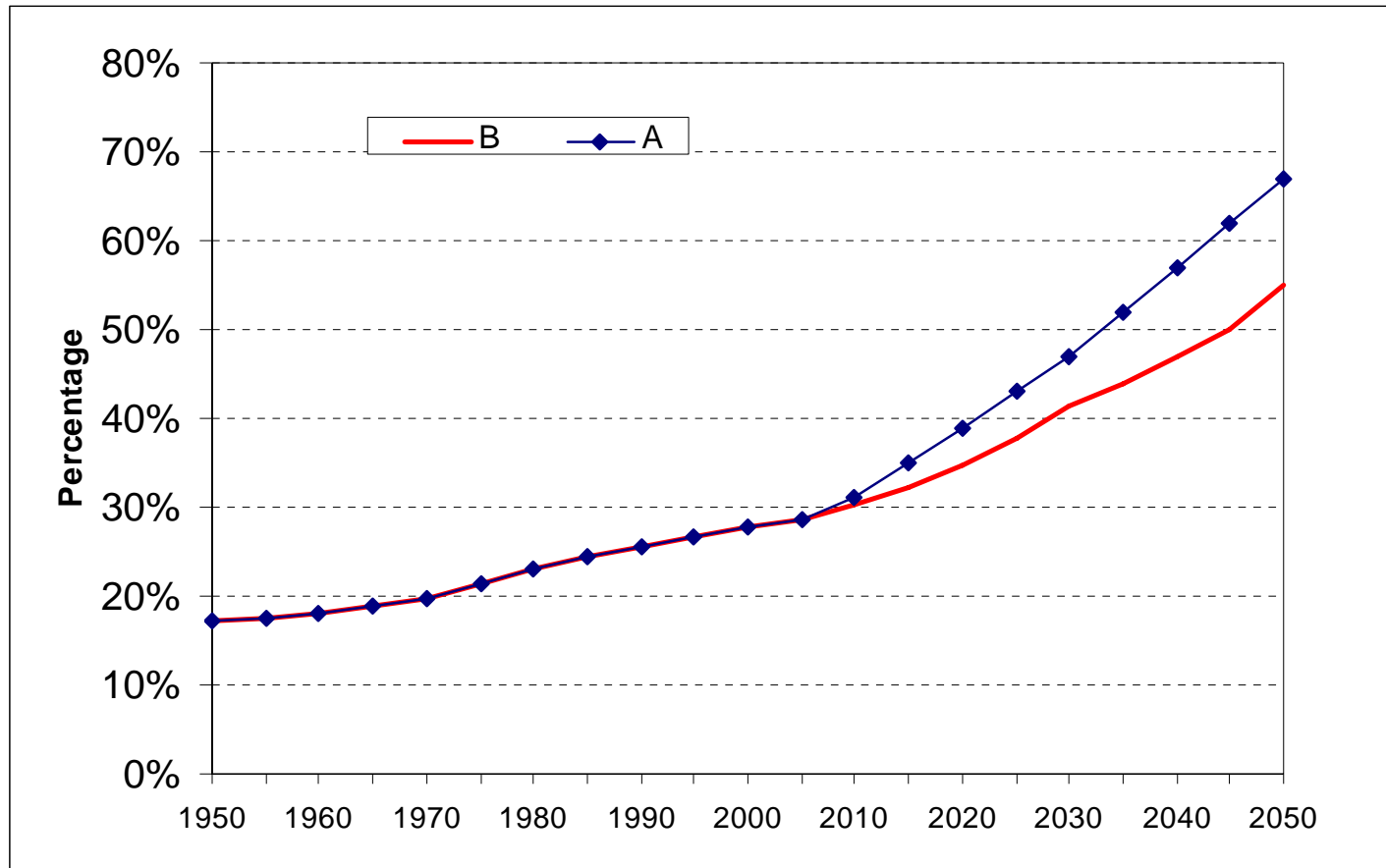
GDP Projections



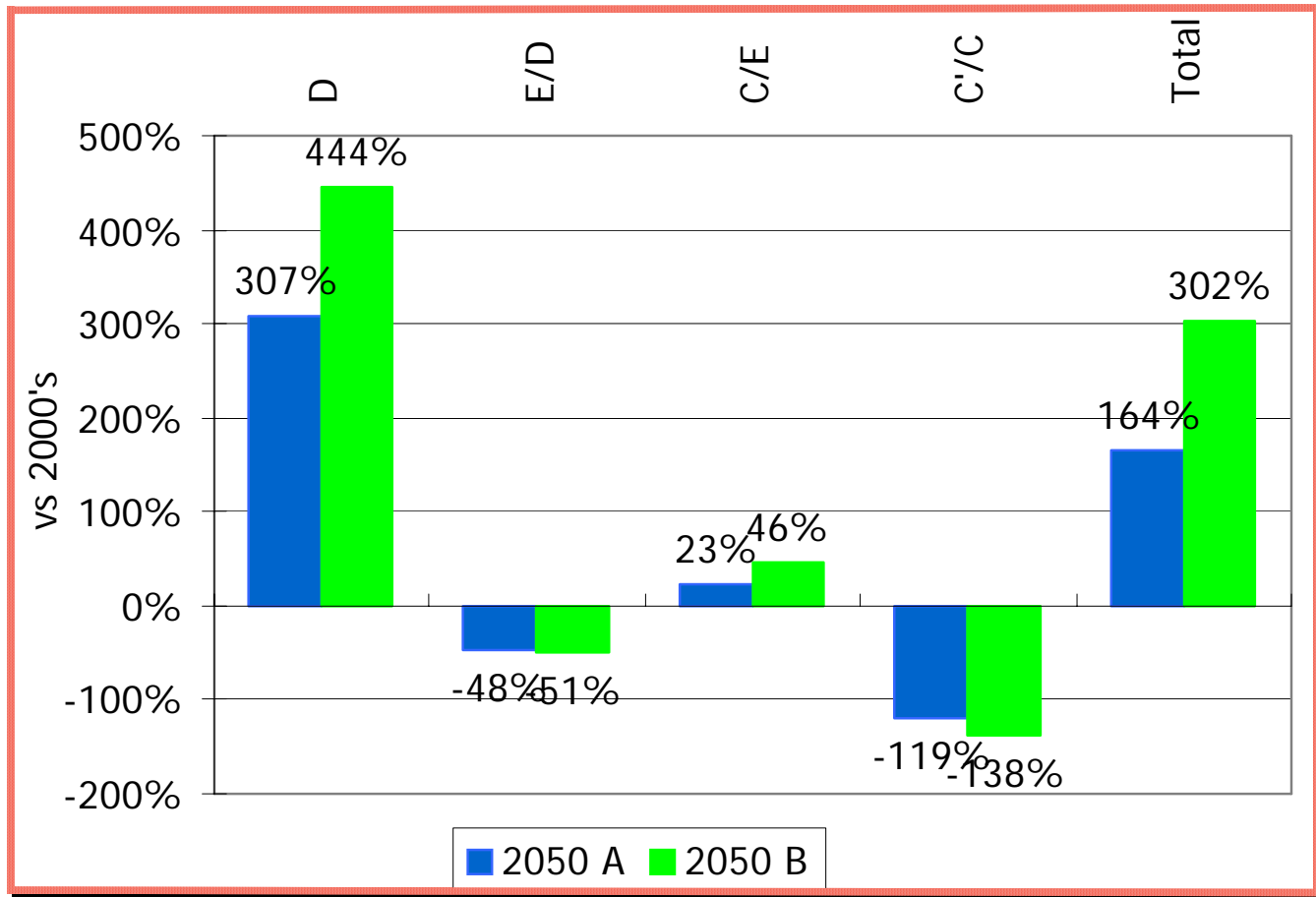
Scenario A : Assumes 8% CAGR till 2032 as per Planning Commission Estimates

Scenario B : Based on a more realistic estimation by the authors

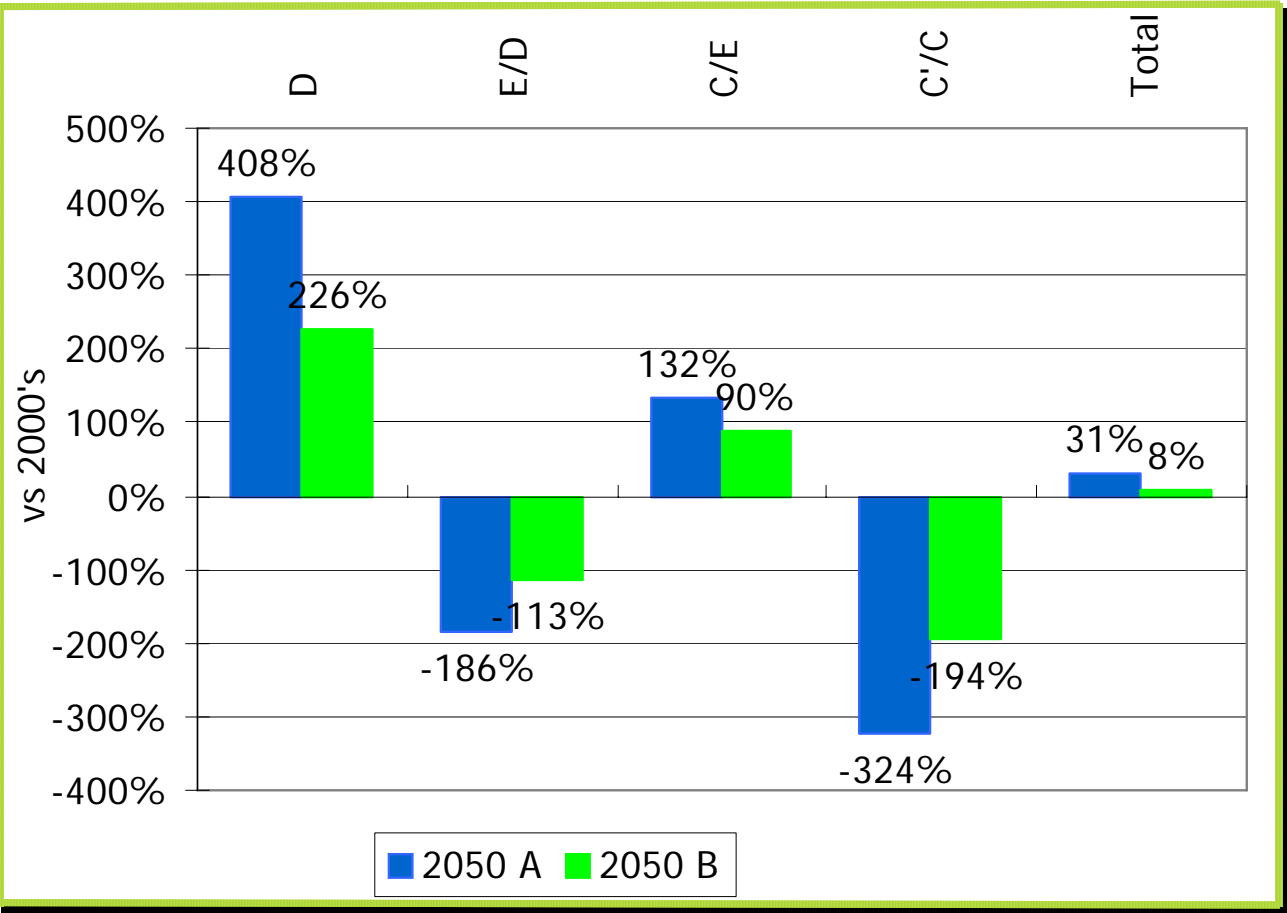
Level of Urbanization



India 2050 : Industrial Sector



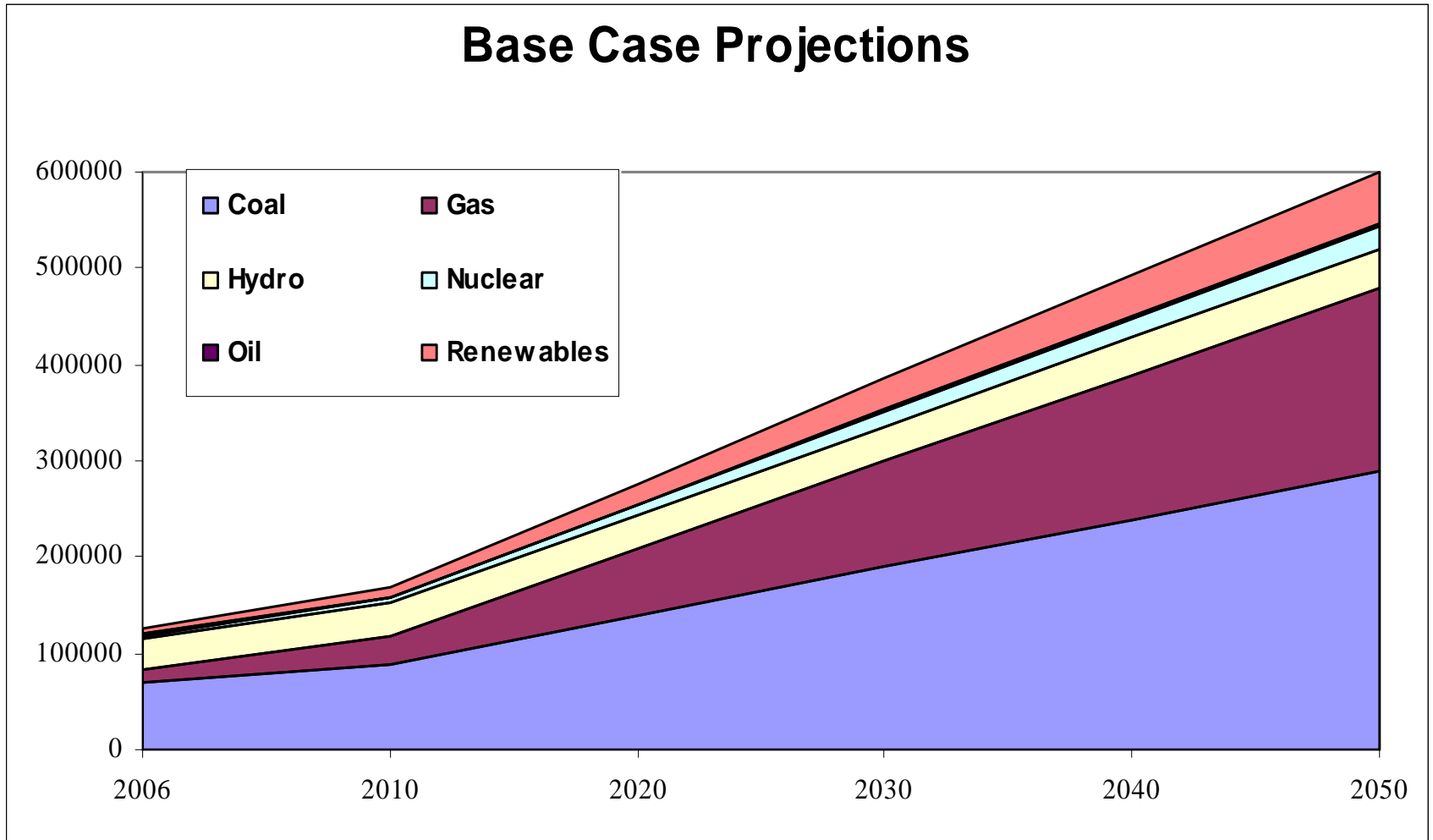
India 2050 : Residential Sector



Scenario Result

Scenarios ↓	Power generation capacity	RET based capacity	Biomass and cogeneration	Other renewables including solar, wind, geothermal and small hydro
Market Development	Increases from 112 GW to 6 times during 2000-2050	Increases from 2.3 percent to 9 percent during 2000-2050	Increases from 1 GW to 28 GW during 2000-2050	Share of wind 24 percent; biomass 24 percent and solar 31 percent amongst RETs generating capacity in 2050
MD-CC (Market development + Carbon constraint)	Increases from 112 GW to 650 GW during 2000-2050	Increases from 2.3 percent to 15 percent during 2000-2050	Increases from 1 GW to 78 GW during 2000-2050	Hydrogen plus fusion account for 16 percent of total power capacity by 2050

Base Case Scenario



Carbon Constraint Scenario

