INDIA
Towards a Low Carbon Society

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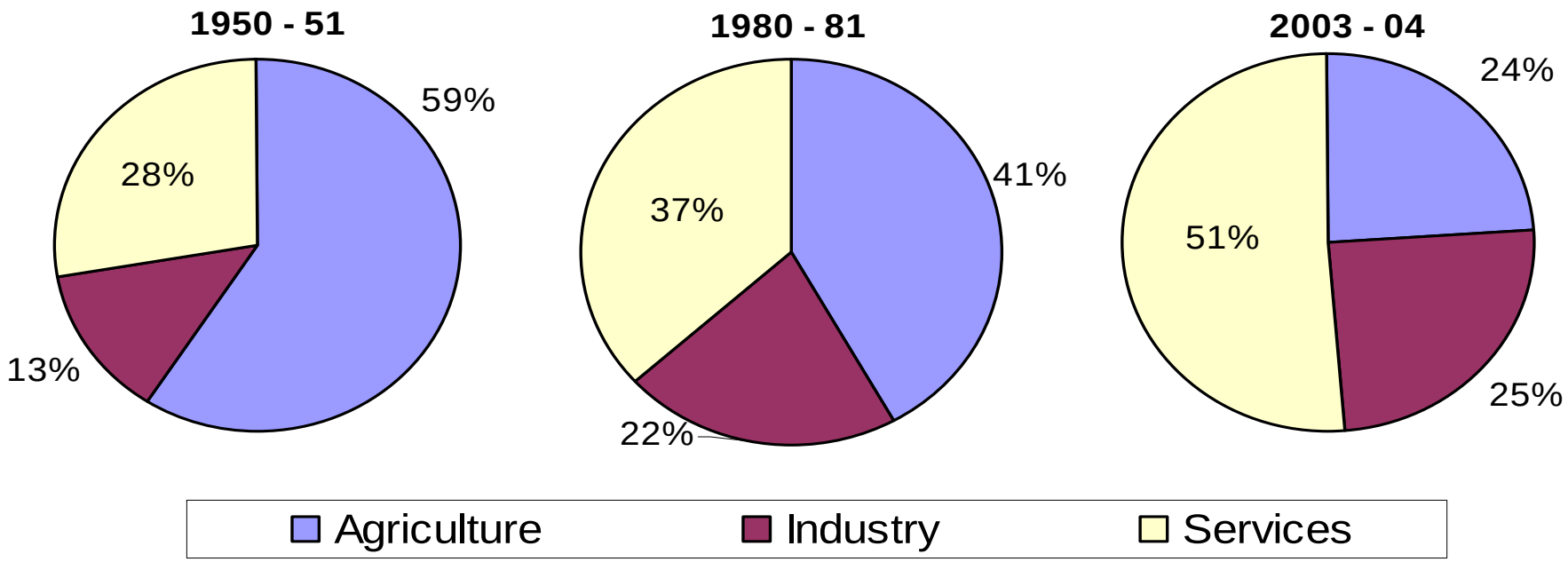
BACKGROUND

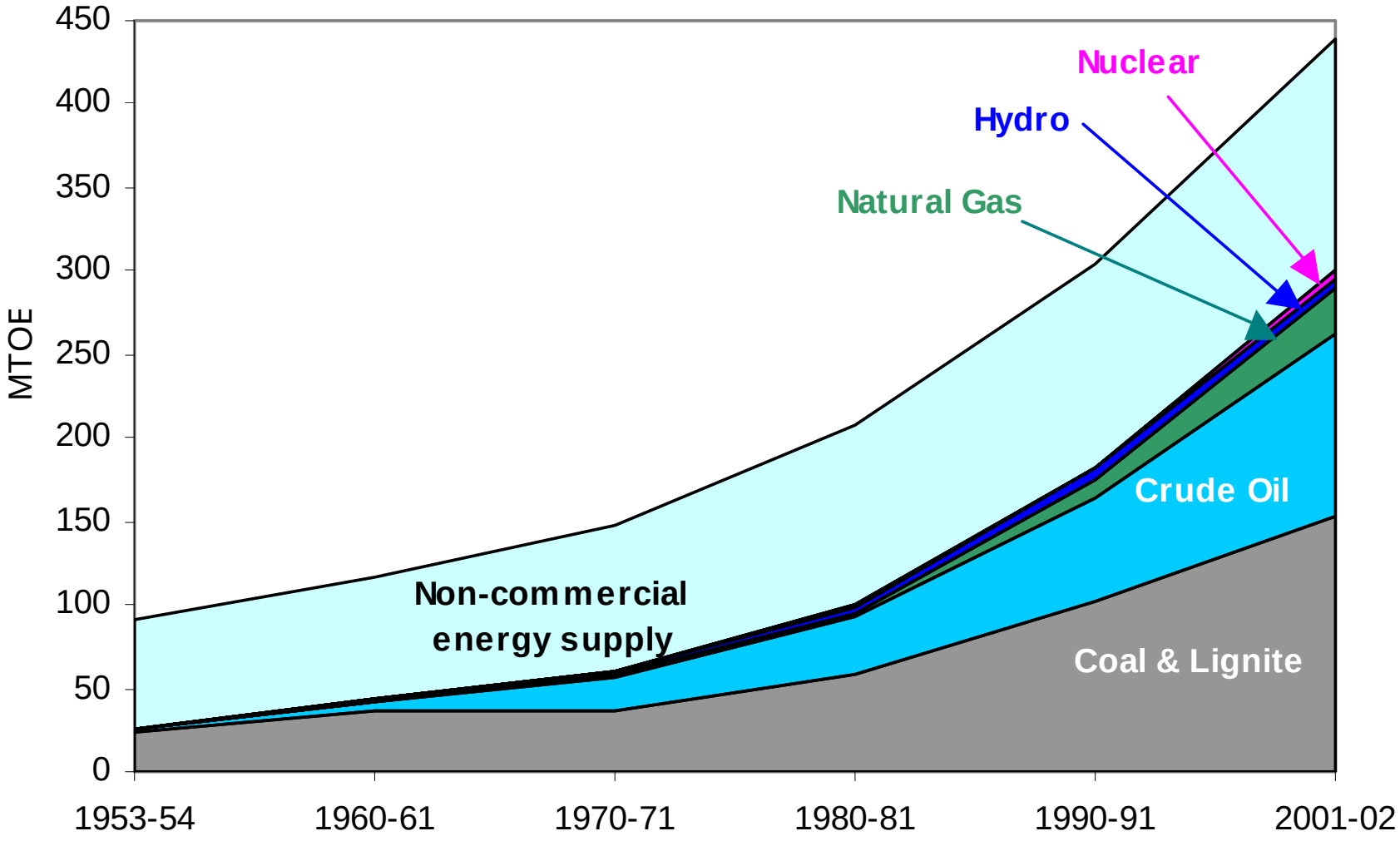
	2000	2005	2006	2007
Economy				
Population, total (millions)	1,015.9	1,094.58	1,109.81	1,123.32
Population growth (annual %)	1.7	1.4	1.4	1.2
Surface area (sq. km) (thousands)	3,287.3	3,287.3	3,287.3	3,287.3
Poverty headcount ratio at national poverty line (% of population)	28.6	..	..	..
GDP (current US$) (billions)	460.18	808.71	916.25	1,170.97
GDP growth (annual %)	4.0	9.2	9.7	9.0
GNI per capita, PPP (current international $)	1,510	2,210	2,470	2,740
Structure of Economy				
Agriculture, value added (% of GDP)	23.5	19	18.5	18
Industry, value added (% of GDP)	26.5	29	29	29
Services, etc., value added (% of GDP)	50	52	52.5	53
Exports of goods and services (% of GDP)	13	20	22	21
Imports of goods and services (% of GDP)	14	23	25	24
Gross capital formation (% of GDP)	24	35	36	38
Inflation, GDP deflator (annual %)	3.5	4.1	5.6	4.3

Sectoral Composition of India's GDP



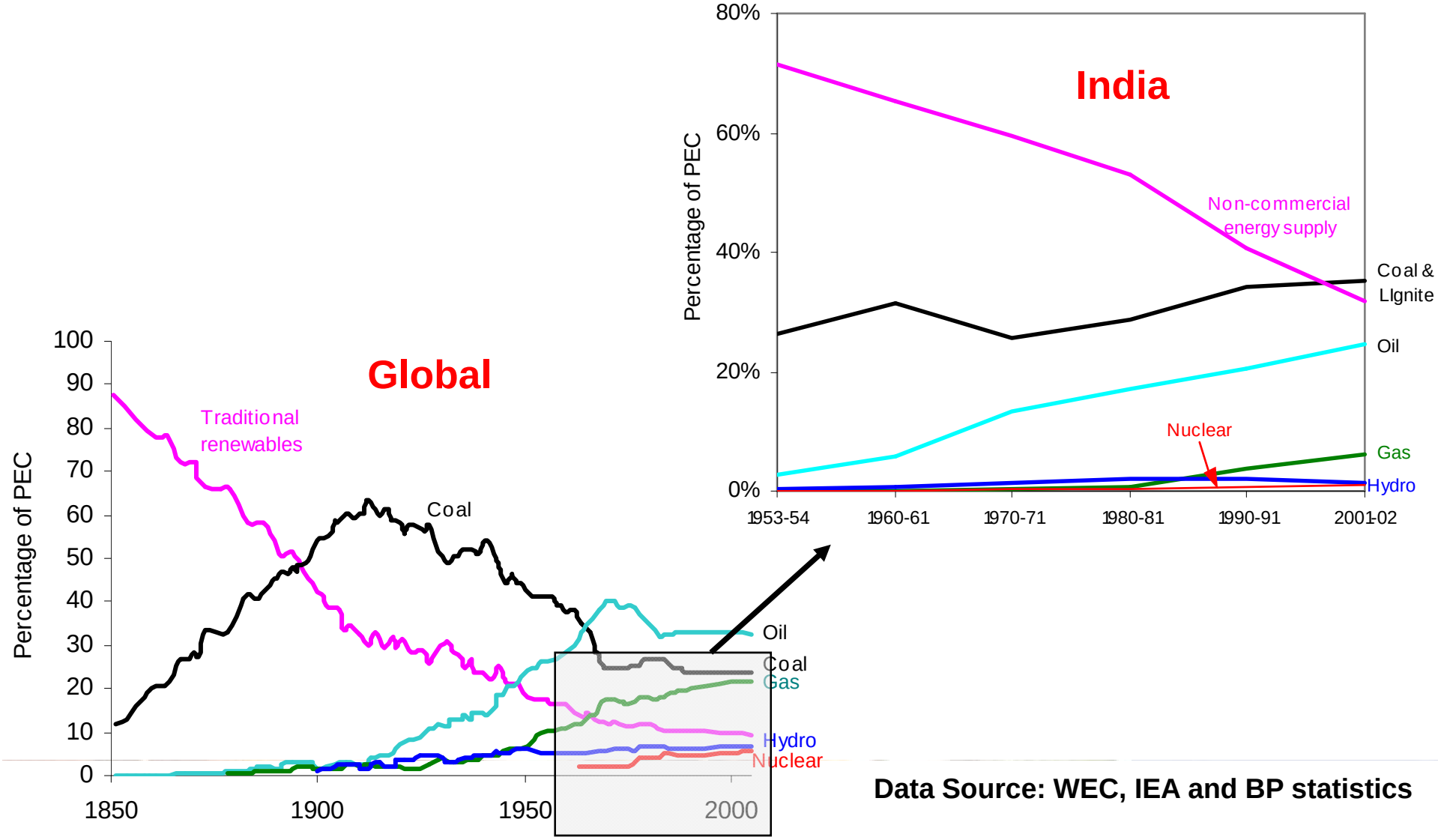
Data Source: CMIE and Economic Surveys of GoI

India Energy Mix



Data Source: CMIE, Planning Commission, GoI, IEA, BP statistics

Past Energy Transitions



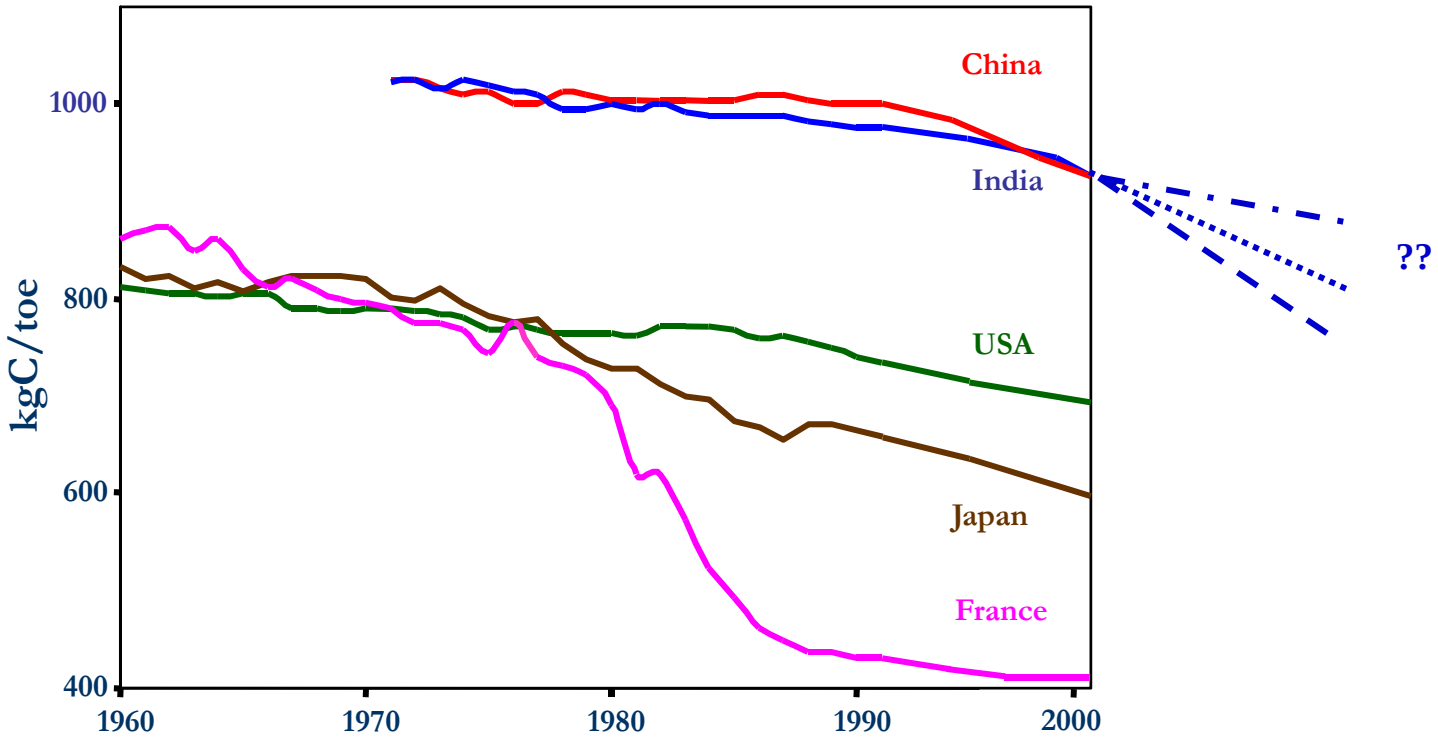
Data Source: WEC, IEA and BP statistics

India Emissions

Important contributors to India's CO2 equivalent GHG emissions in 2000

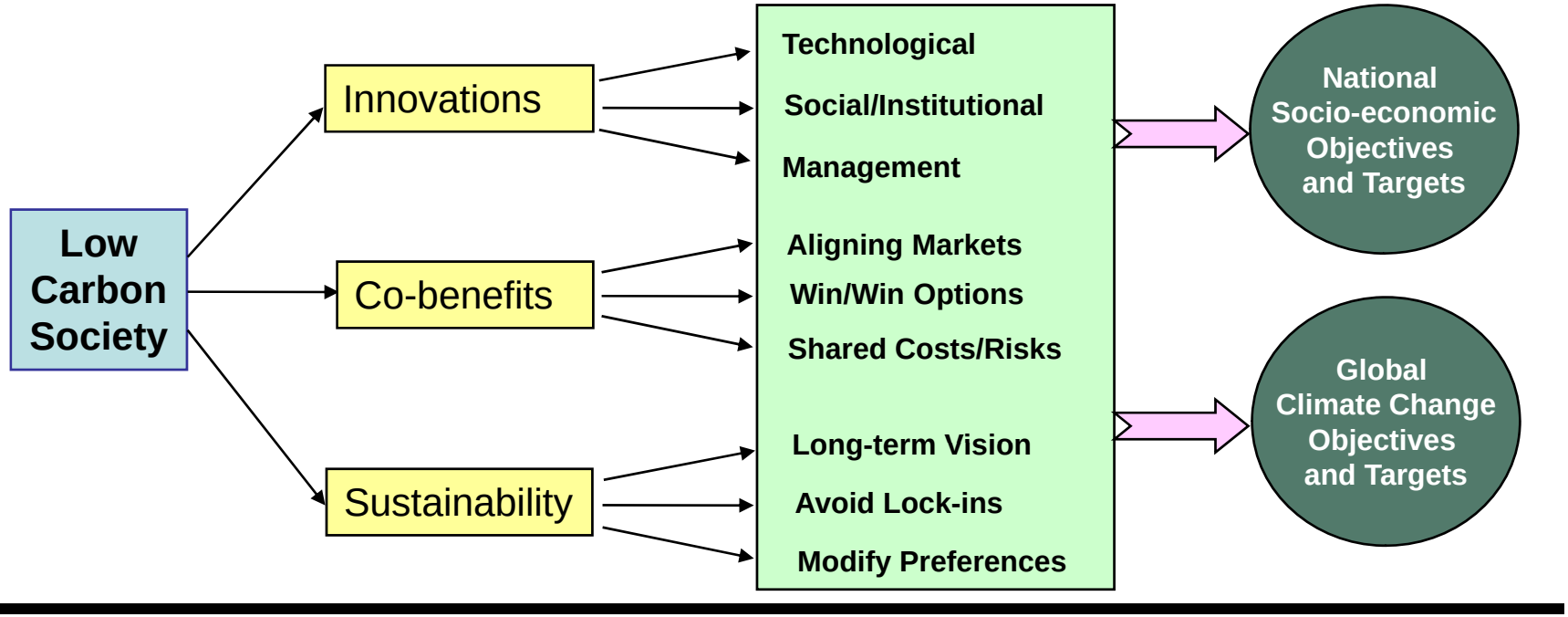
Source categories	Main emissions	Percentage share	Main emission sources
Coal based electricity	CO_2	29.9	50 large plants
Steel industry	CO_2	8.8	5 large plants
Cement industry	CO_2	5.1	50 large plants
Livestock related	CH_4, N_2O	12.6	Highly dispersed
Paddy cultivation	CH_4	6.6	Highly dispersed
Biomass consumption	CH_4, N_2O	5.2	Highly dispersed
Synthetic fertilizer use	N_2O	4.1	Highly dispersed
Transport sector	CO_2	9.5	Highly dispersed and mobile
Waste disposal	CH_4	3.8	40 large waste dumps
Other sources	CO_2, CH_4, N_2O	14.4	Varied and dispersed
All India (Tg)		1442[a]	As above

Decarbonization of Primary Energy



LCS for India

Low Carbon Society Roadmap



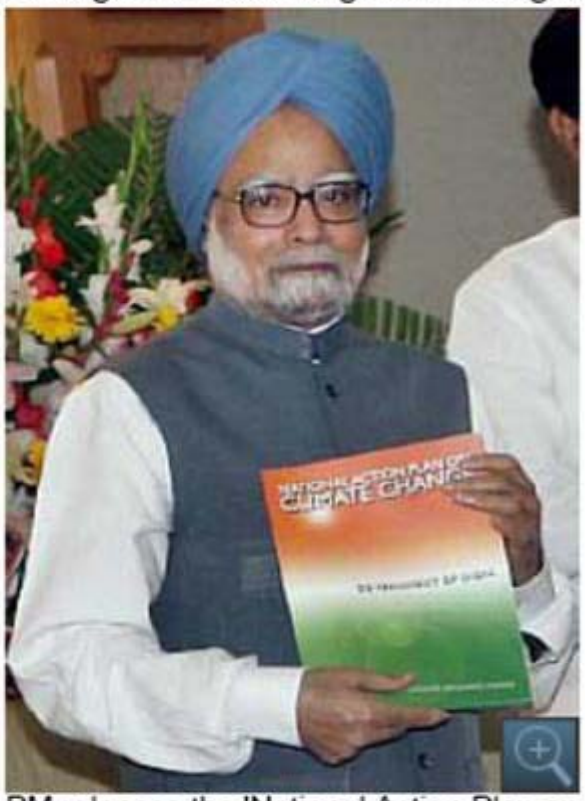
- Develop Roadmap to deliver global efficient frontier, balancing cost-effectiveness, equity and sustainability goals (UNFCCC)
- Specifics of the roadmap would differ across countries

Slide Source: Shukla, P. R. (2007)

India unveils National Action Plan on Climate Change

30 Jun 2008, 1545 hrs IST, PTI

NEW DELHI: India on Monday unveiled its climate change action plan which does not set target reduction of greenhouse gas emissions but seeks to promote sustainable development through use of clean technologies.



PM releases the 'National Action Plan on Climate Change' in New Delhi (PTI)

More Pictures

The National Action Plan on Climate Change categorically states that India's per capita greenhouse gas emissions will "at no point exceed that of developed countries."

The plan, unveiled by Prime Minister Manmohan Singh here, will be implemented thorough eight missions which represent multi-pronged, long-term and integrated strategies for achieving key goals in the context of climate change.

The document underlines that "India will engage actively in multilateral negotiations in the UN Framework Convention on Climate Change (UNFCC) in a positive, constructive and forward-looking manner."

"Our objective will be to establish an effective, cooperative and equitable global approach based on the principle of common but differentiated responsibilities and relative capabilities enshrined in the UNFCC," the plan document said.

Action plan for climate change

- National solar mission
  - Future energy source
  - Increase the share of solar energy in the energy mix
- Enhanced energy efficiency
  - Market (trading) – facilitating energy savings certificates trading among large energy intensive industries
  - Accelerating shift to energy efficient appliances through incentives,
  - finance DSM,
  - fiscal instruments to promote energy efficiency
- Sustainable habitat
  - Improvements in energy efficiency in buildings
    - Extension of energy building code ,
  - Management of solid waste (recycling and power generation from waste), &
  - Modal shift to public transport (better urban planning)

Action plan for climate change

- Water mission
  - Integrated management – conserve, minimize waste (improve water use efficiency by 20%)
- Mission for Green India
  - 33% forest cover (presently around 23%)

11th plan strategies (2007-12)

Energy	• Efforts to ensure that rural electrification does not focus on households but expands to agriculture • All households to be provided with clean cooking fuel at reasonable prices (for those who cannot afford, fuel-wood plantations within 1km of habitation) • Prices of energy to reflect true social cost (such a pricing system to be established in the 11th plan) • Appropriate policies to promote renewables by linking subsidies to outcomes rather than outlays • Special focus on wind power, solar applications, biomass gasification, biofuels development and other clean technologies • Distributed generation systems based on wood gasification with biogas plants for village energy security (such plants can provide clean fuel and electricity) • Program for biodiesel and biofuel to not compete with food production and therefore well-designed policies to be implemented • Focus to be on improving energy efficiency	Lower GHG emissions and local emissions; lower fossil fuel imports; reduced pressure on land, resources and ecosystems

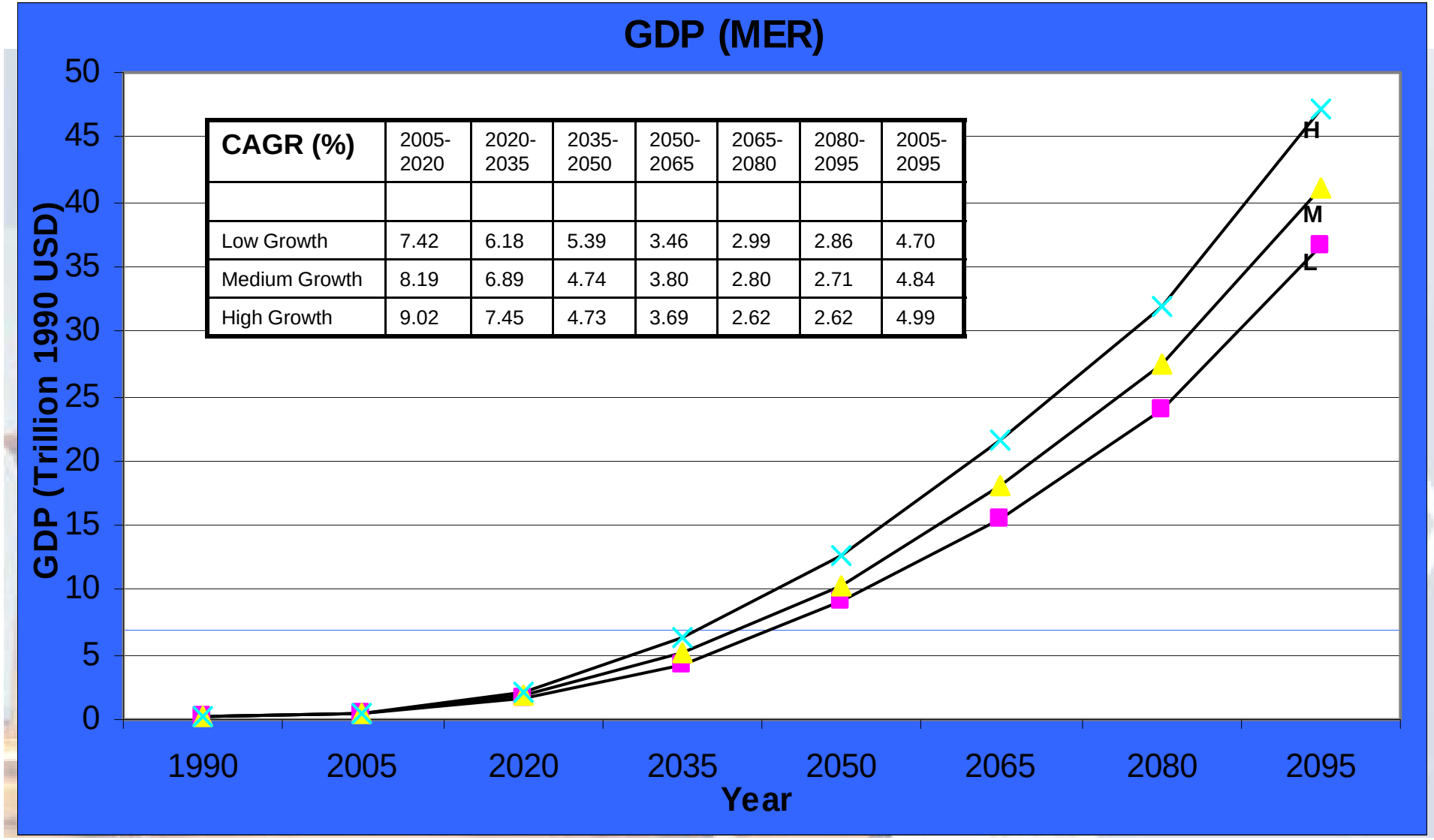
Linking MDGs & SD

Goal 7: Ensure environmental sustainability Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources Target 10: Halve by 2015 the proportion of people without sustainable access to safe drinking water Target11: Achieve by 2020 a significant improvement in the lives of at least 100 million slum dwellers	• Capacity addition of 16553 MW hydro, 3380 MW nuclear (out of the total of 78577 MW capacity addition) • Increase forest and tree cover by 5 percentage points (*22.8% of forest cover of the total land area with an annual change of 0.4% between 1990-2005)* • To treat all urban waste waters to clean rivers by 2011-12 • Increase energy efficiency by 20% by 2016-17 • Ensuring electricity connection to all villages and BPL households by 2009 & reliable power by the end of the plan [(*56% electrification rate (2000-05), 487.2 million population without electricity(2005))* • Ensure all – weather road connection to all habitations with population 1000 and above (500 and above in hilly and tribal areas) by 2009, and all significant habitations by 2015 • Connect every village by telephone and broadband connectivity by 2012 *[Telephone mainlines increased from 6 to 45 (per 1000 people, 1990-2005), cellular subscribers from 0 to 82 , internet users from 0 to 55 for the same period]* • Provide homestead sites to all by 2012 and step up the pace of house construction for rural poor to cover all the poor by 2016-17	• Lower GHG emissions and local emissions; lower fossil fuel imports; reduced pressure on land, resources and ecosystems

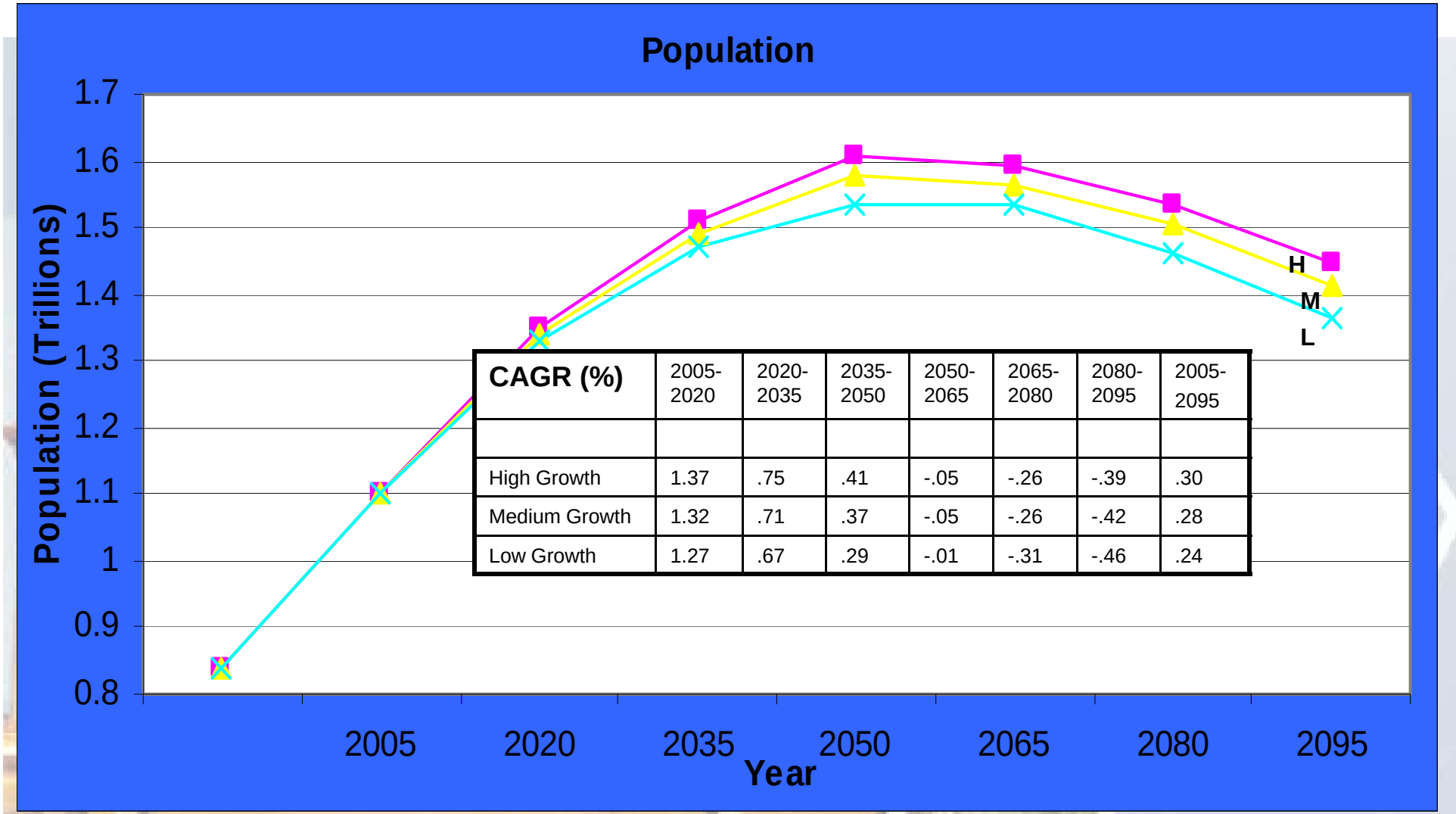
Focus areas

- Residential/Commercial sector
  - Green buildings
- Energy supply sector
  - Low carbon electricity
    - Renewables, solar, biomass
  - Local renewable resources
    - Using local renewables like biomass and solar, wind

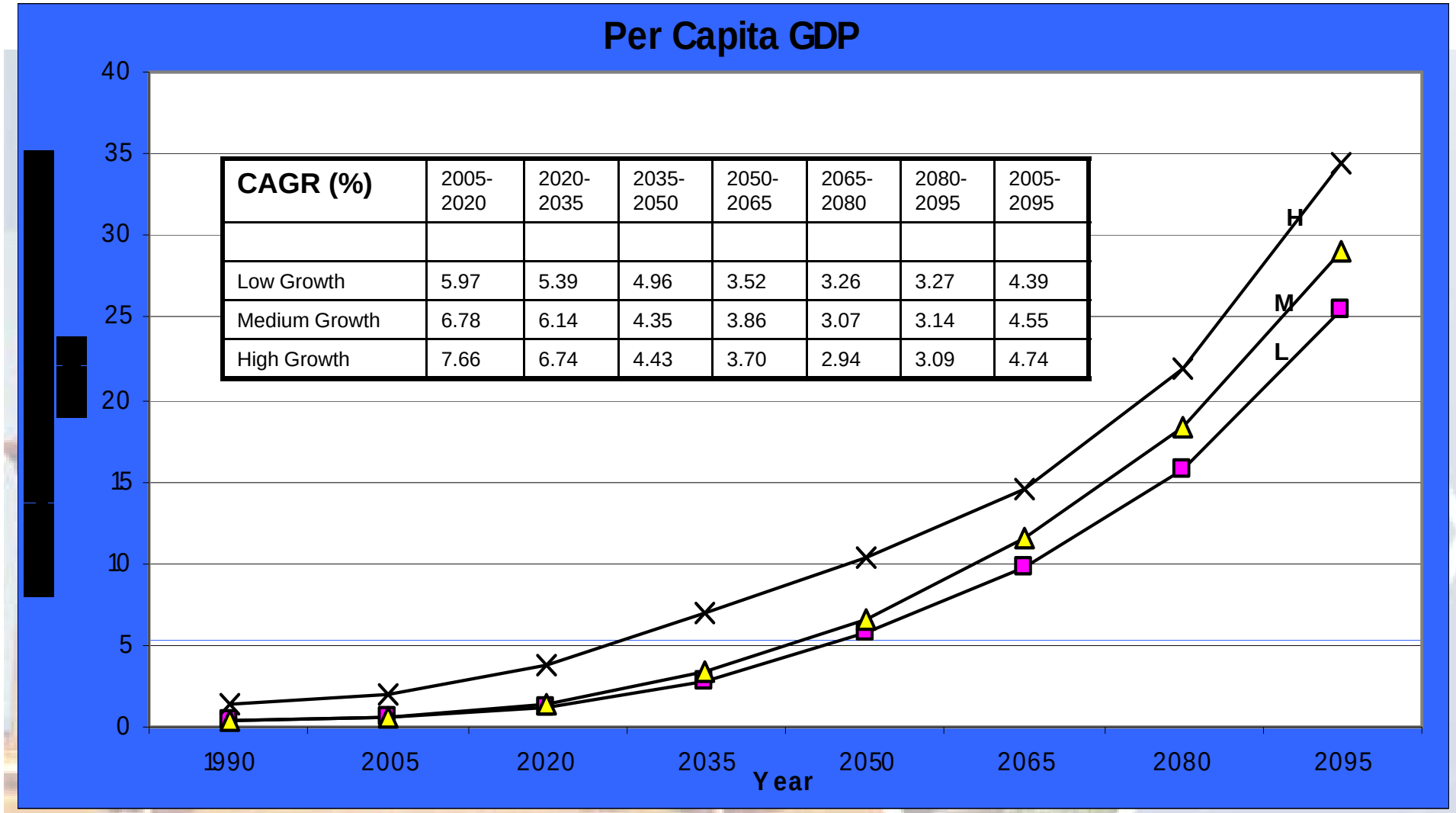
Towards the Future



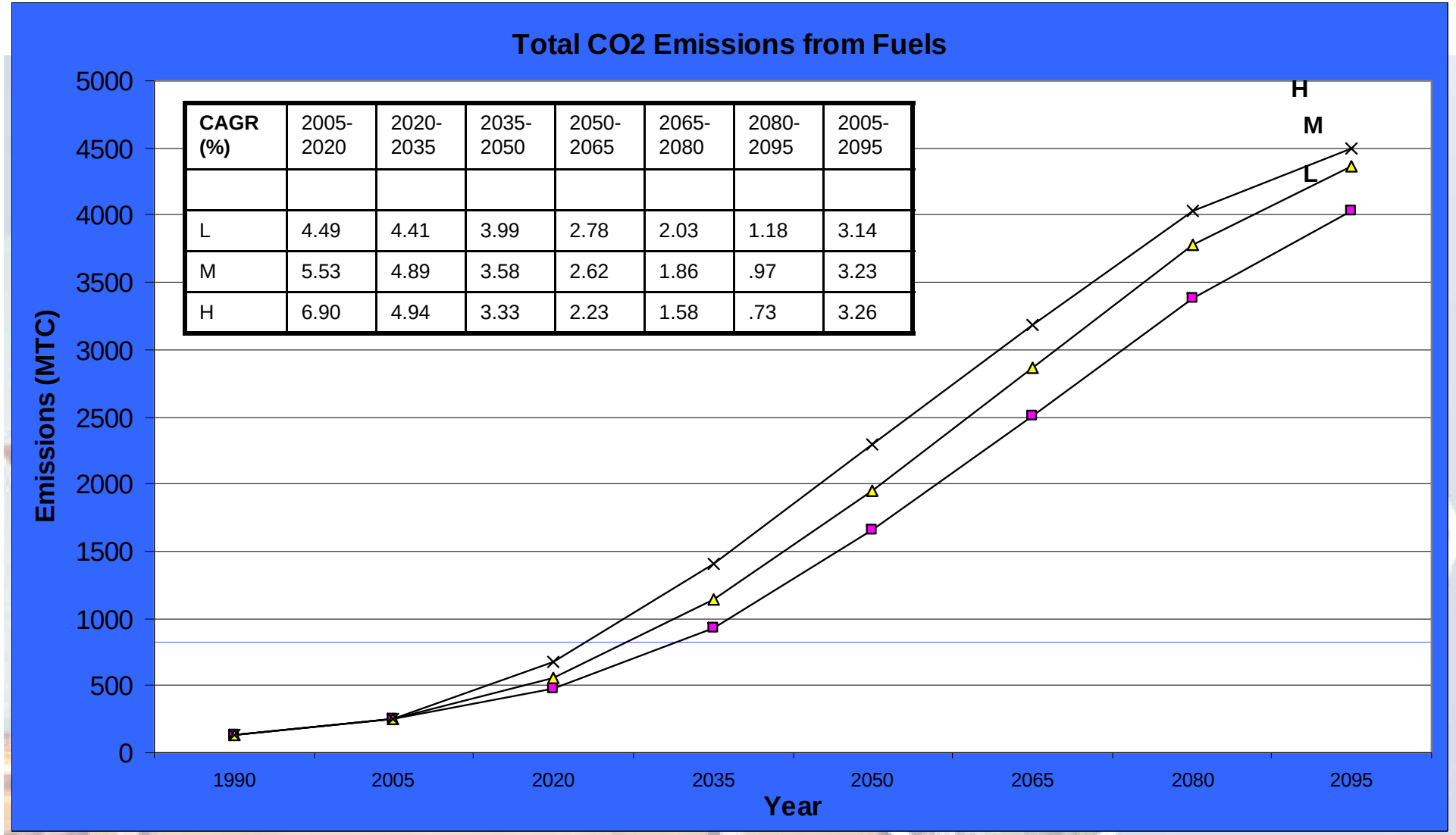
CAGR (%)	2005-2020	2020-2035	2035-2050	2050-2065	2065-2080	2080-2095	2005-2095
Low Growth	7.42	6.18	5.39	3.46	2.99	2.86	4.70
Medium Growth	8.19	6.89	4.74	3.80	2.80	2.71	4.84
High Growth	9.02	7.45	4.73	3.69	2.62	2.62	4.99



CAGR (%)	2005-2020	2020-2035	2035-2050	2050-2065	2065-2080	2080-2095	2005-2095
High Growth	1.37	.75	.41	-.05	-.26	-.39	.30
Medium Growth	1.32	.71	.37	-.05	-.26	-.42	.28
Low Growth	1.27	.67	.29	-.01	-.31	-.46	.24



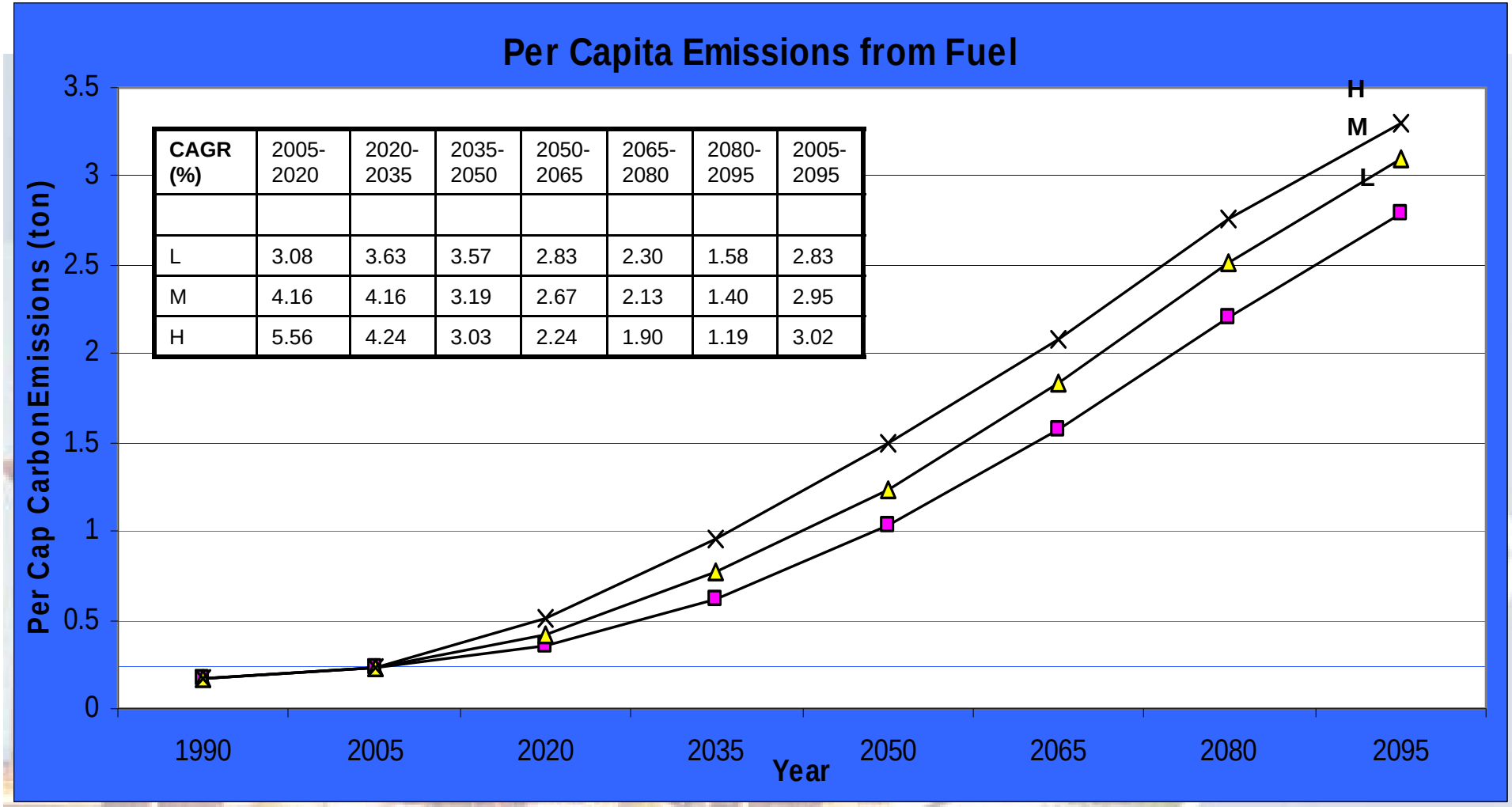
CAGR (%)	2005-2020	2020-2035	2035-2050	2050-2065	2065-2080	2080-2095	2005-2095
Low Growth	5.97	5.39	4.96	3.52	3.26	3.27	4.39
Medium Growth	6.78	6.14	4.35	3.86	3.07	3.14	4.55
High Growth	7.66	6.74	4.43	3.70	2.94	3.09	4.74



CAGR (%)	2005-2020	2020-2035	2035-2050	2050-2065	2065-2080	2080-2095	2005-2095
L	4.49	4.41	3.99	2.78	2.03	1.18	3.14
M	5.53	4.89	3.58	2.62	1.86	.97	3.23
H	6.90	4.94	3.33	2.23	1.58	.73	3.26

Per Capita Emissions from Fuel

CAGR (%)	2005-2020	2020-2035	2035-2050	2050-2065	2065-2080	2080-2095	2005-2095
L	3.08	3.63	3.57	2.83	2.30	1.58	2.83
M	4.16	4.16	3.19	2.67	2.13	1.40	2.95
H	5.56	4.24	3.03	2.24	1.90	1.19	3.02



Options for LCS

- Behavioral change- self enforced, command based, or market based
- Change in energy mix
- End use technologies
- Supply side technologies
- City plan/ urban structure

Discussion

- Sensitizing policy makers and public
- Prioritizing: economic development, public infrastructure development, environmental issues or specifically climate change issues
- Decision making and Implementation: centralized v/s decentralized
- Urban planning and development
- Synergies: SD with LCS

Thank You !