Equity and the transition to a low carbon economy

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The CSE study

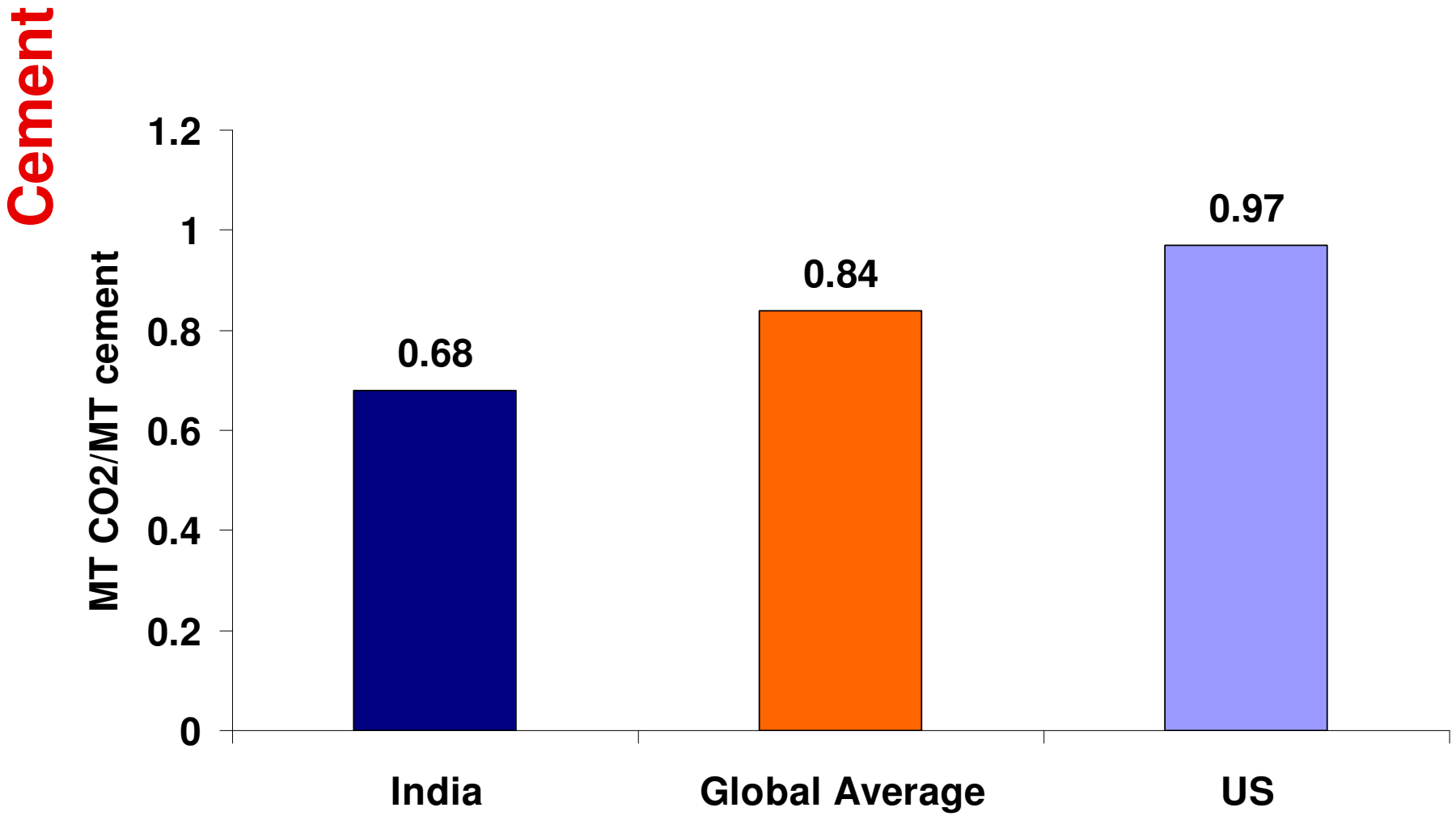
'Bottom-up' study to understand the potential to reduce GHG emissions in five most emissions-intensive industrial sectors – Steel, Aluminum, Paper, Fertilizer & Cement -- and the power sector

- Benchmarking energy efficiency and GHG emissions
- Future technology deployment pathways
- Cost of transition to low carbon economy

Benchmarking emissions

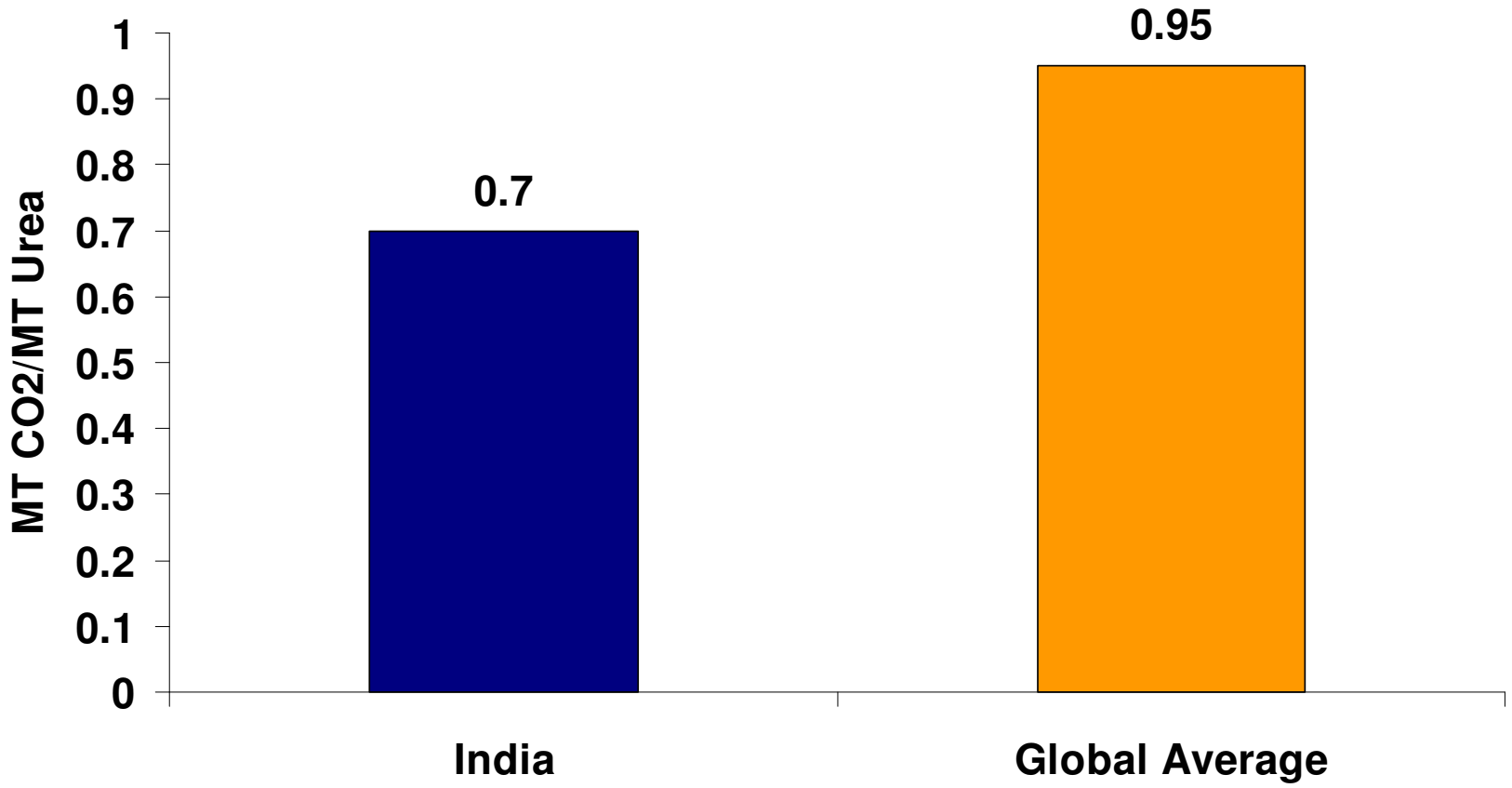
- **High level of efficiency and low emission intensity in many sectors – cement, fertilizer and aluminum**

CO_2 emissions



CO_2 emissions

Fertilizer



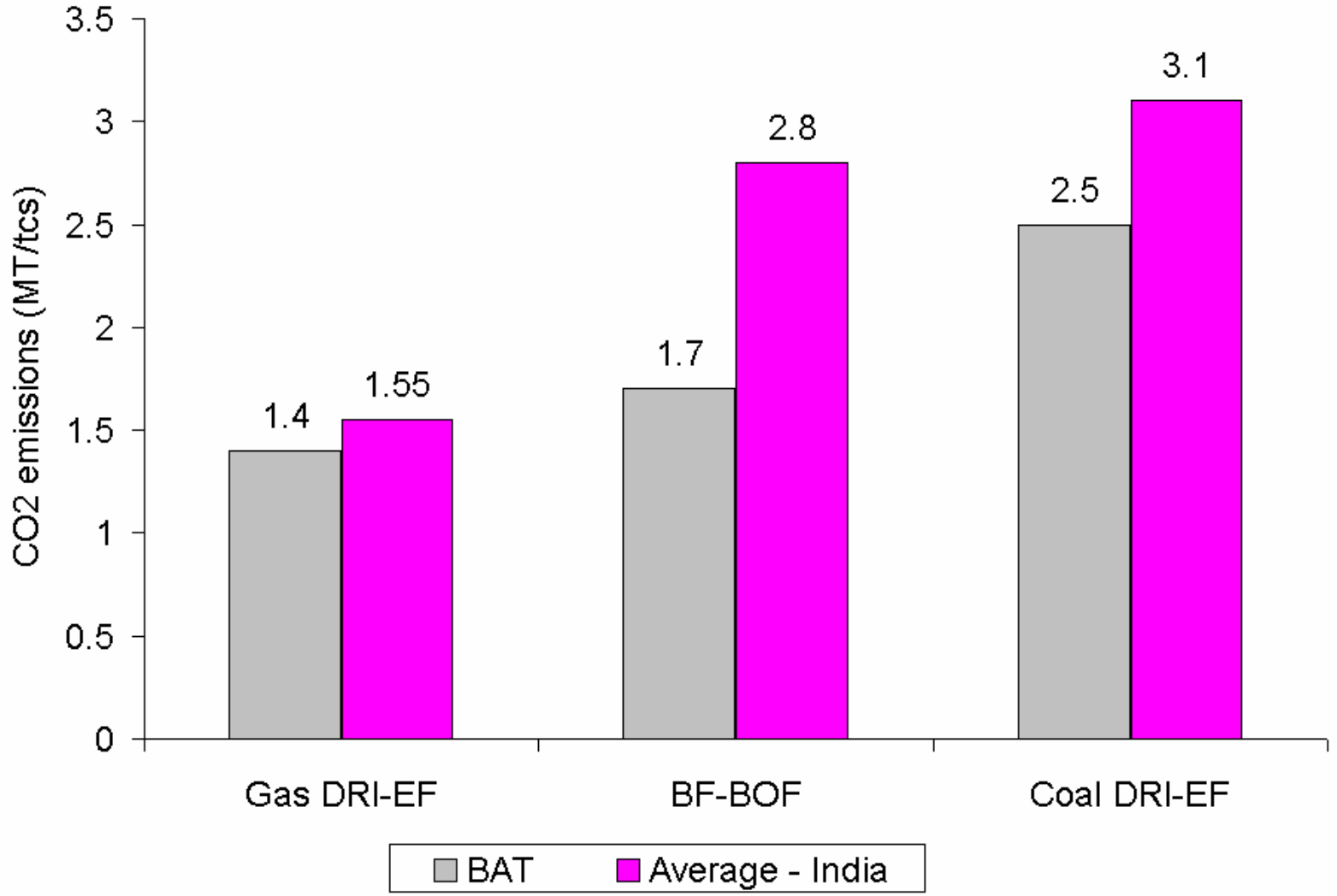
Benchmarking emissions

- High level of efficiency and low emission intensity in many sectors – Cement, Fertilizer and Aluminum

- **Potential to reduce emissions in others – steel and paper; cost of transition is high**

GHG emissions

Iron and Steel



Highest potential in BF-BOF; about 25% in coal DRI-EF

Benchmarking emissions

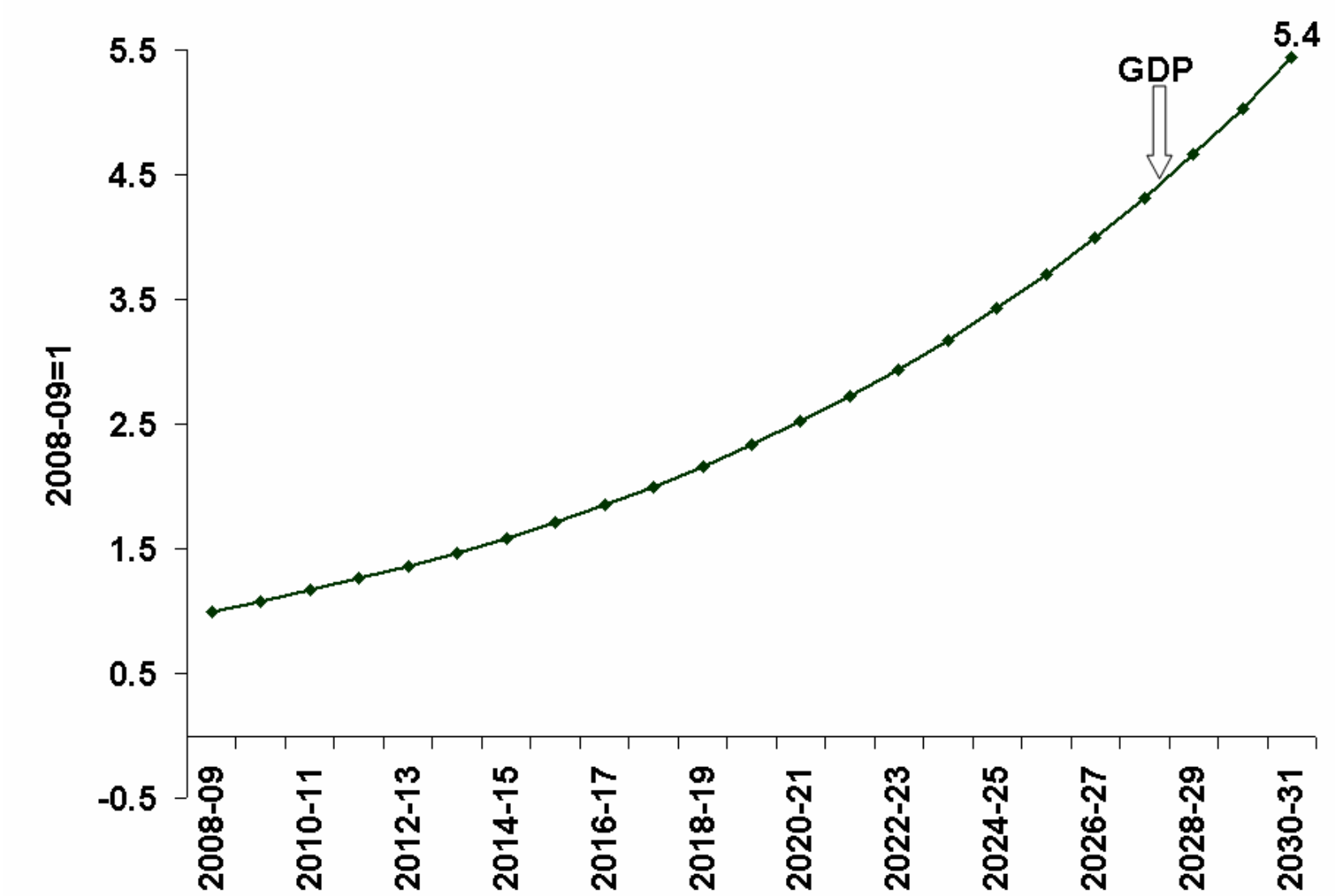
- High level of efficiency and low emission intensity in many sectors – Cement, Fertilizer and Aluminum
- Potential to reduce emissions in others – steel and paper; cost of transition is high
- **An ambitious RE programme:**
  - **20,000 MW solar by 2020**
  - **FIT for wind, biomass etc.**
  - **Tax on coal**
  - **15% RE by 2020**
  - **FIT will cost about $80-100 billion over the next 20 years**

Emissions will increase

- **India will need economic growth; even with aggressive mitigation action total emissions will increase.**
- **On track to meet emissions intensity target for 2020**

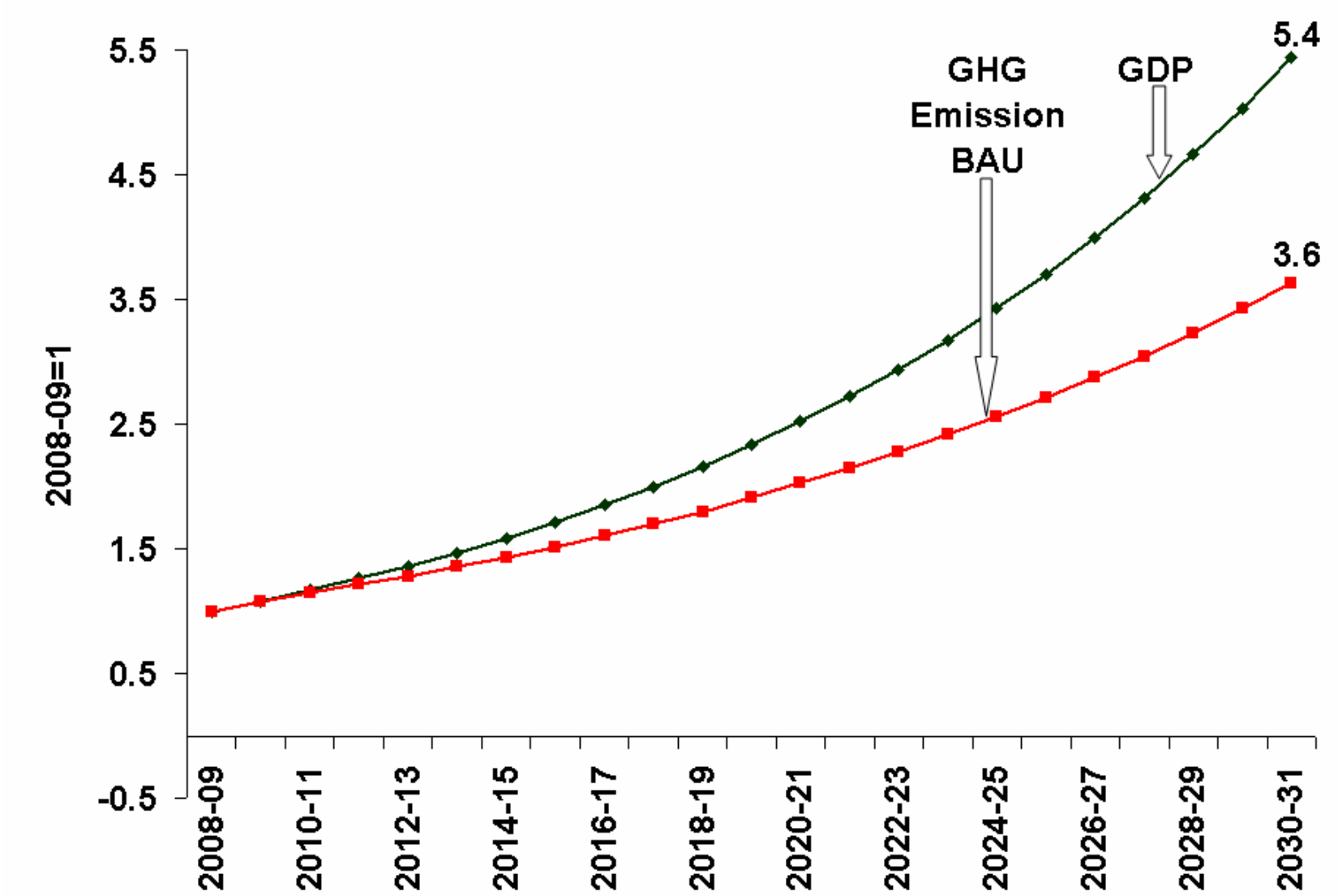
Emissions intensity of GDP

Low carbon growth



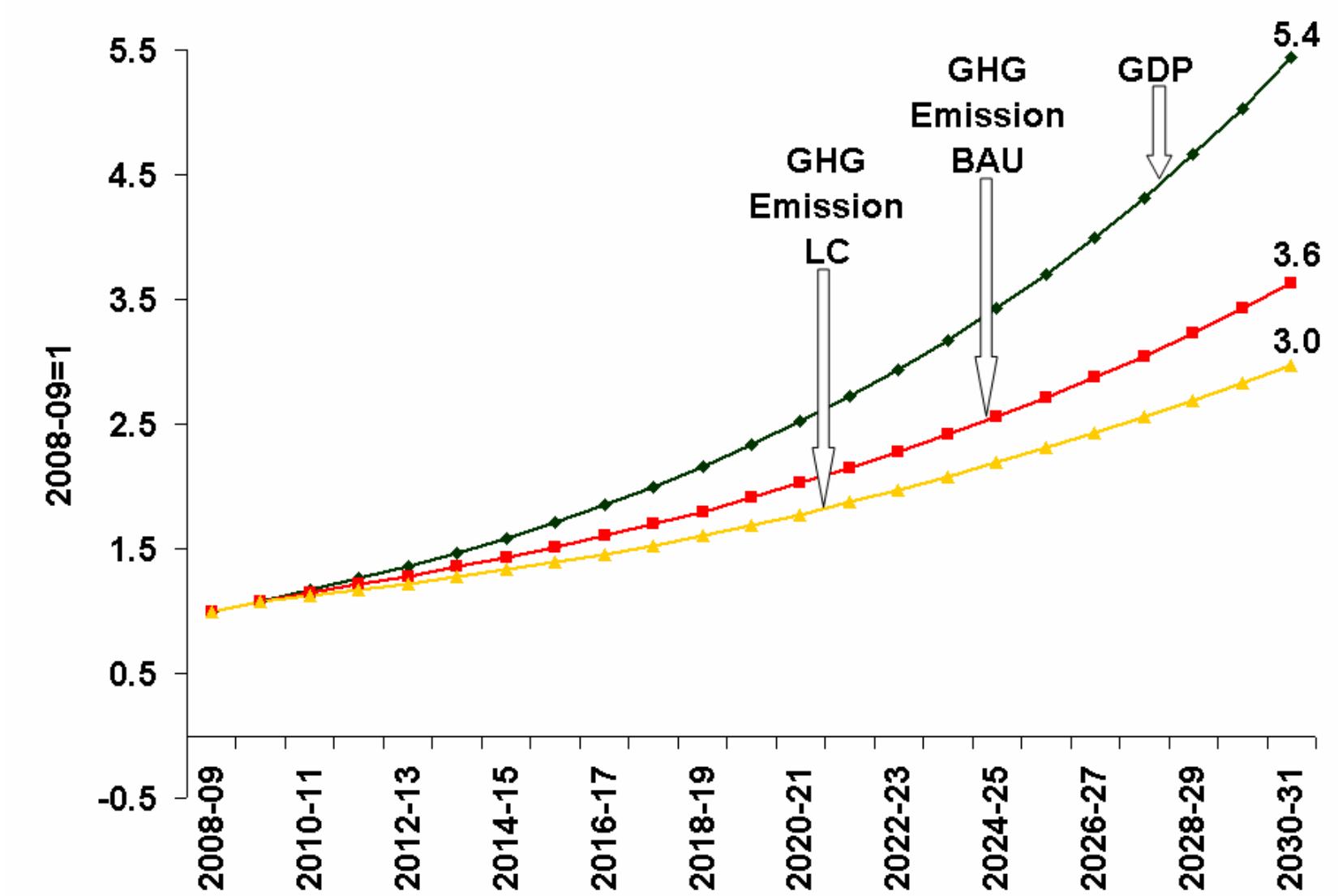
Emissions intensity of GDP

Low carbon growth



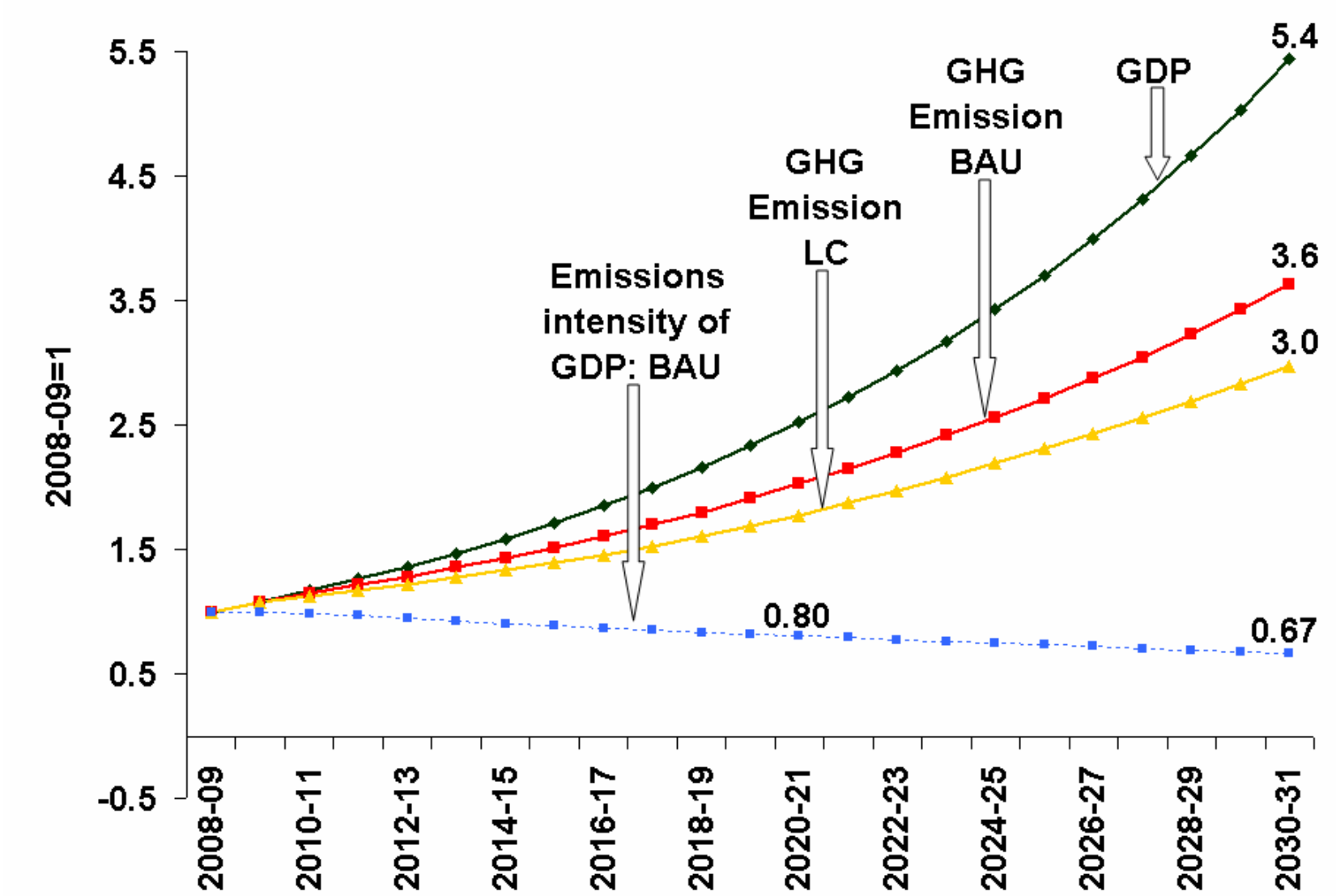
Emissions intensity of GDP

Low carbon growth



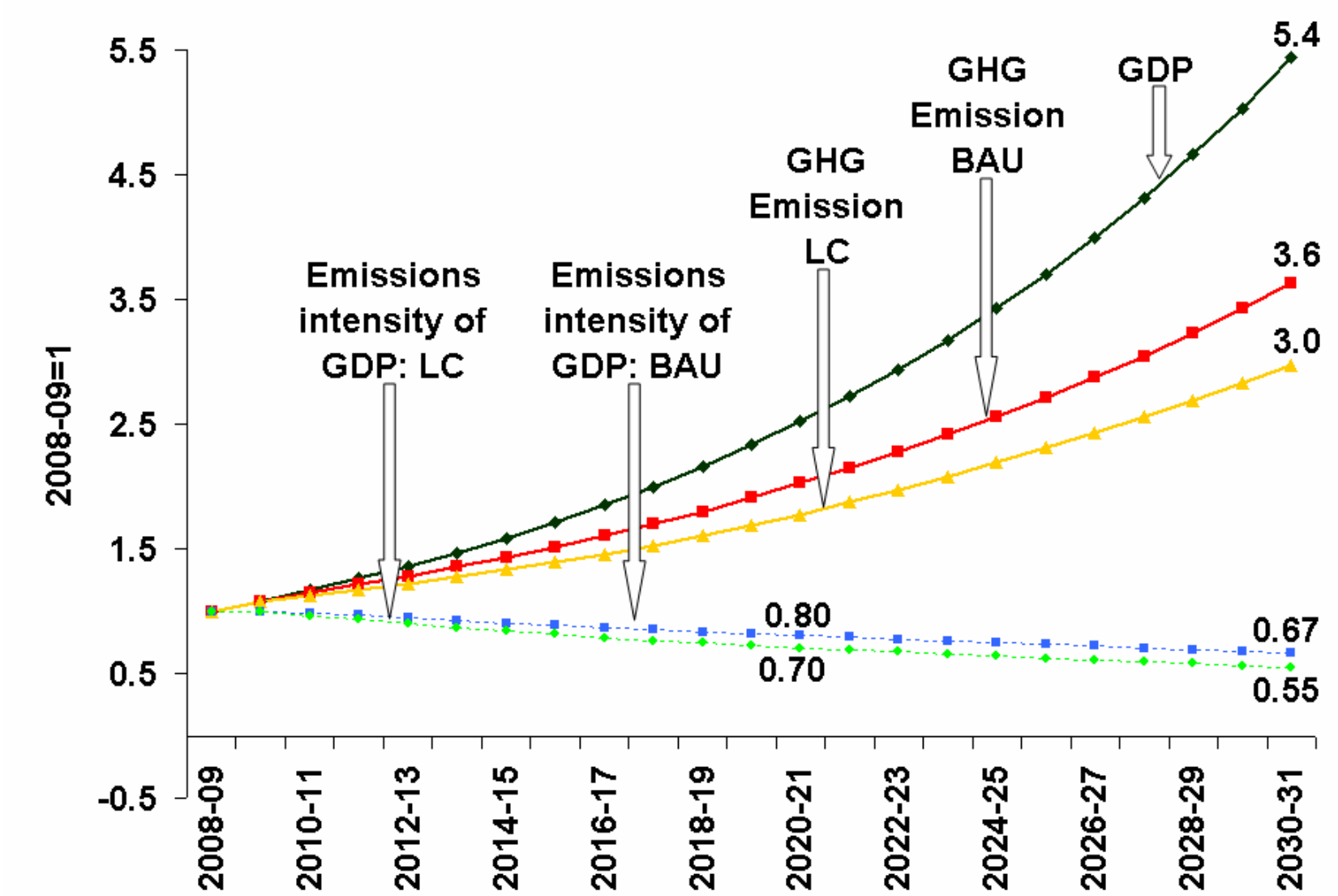
Emissions intensity of GDP

Low carbon growth



Emissions intensity of GDP

Low carbon growth



Benchmarking performance

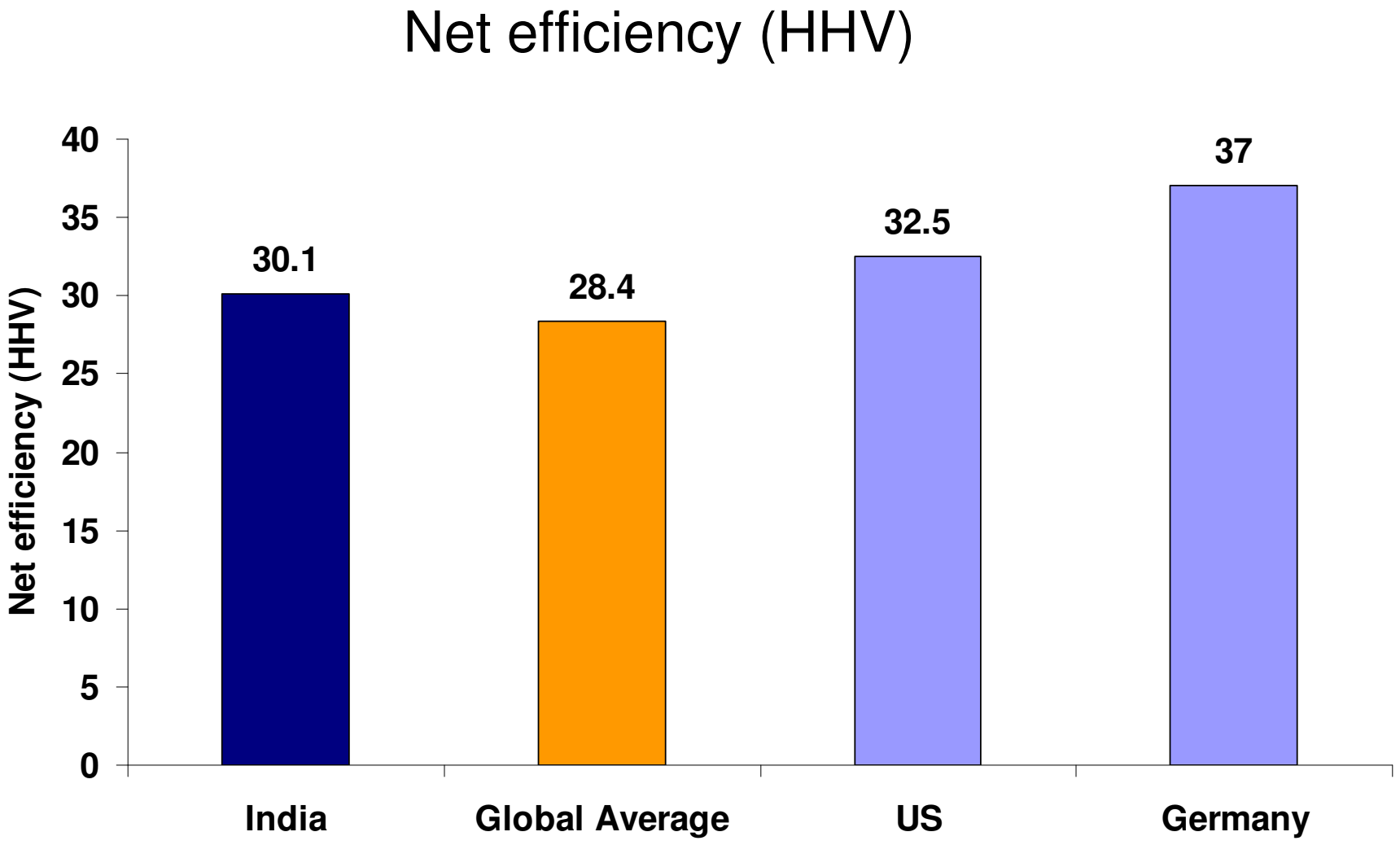
- India will need economic growth; even with aggressive mitigation action total emissions will increase.
- On track to meet emissions intensity target for 2020
- **We can do much more; but it will cost**

Power sector

Can make transition now before building carbon-based infrastructure but we will need a mechanism to pay for transition

Coal and lignite plants

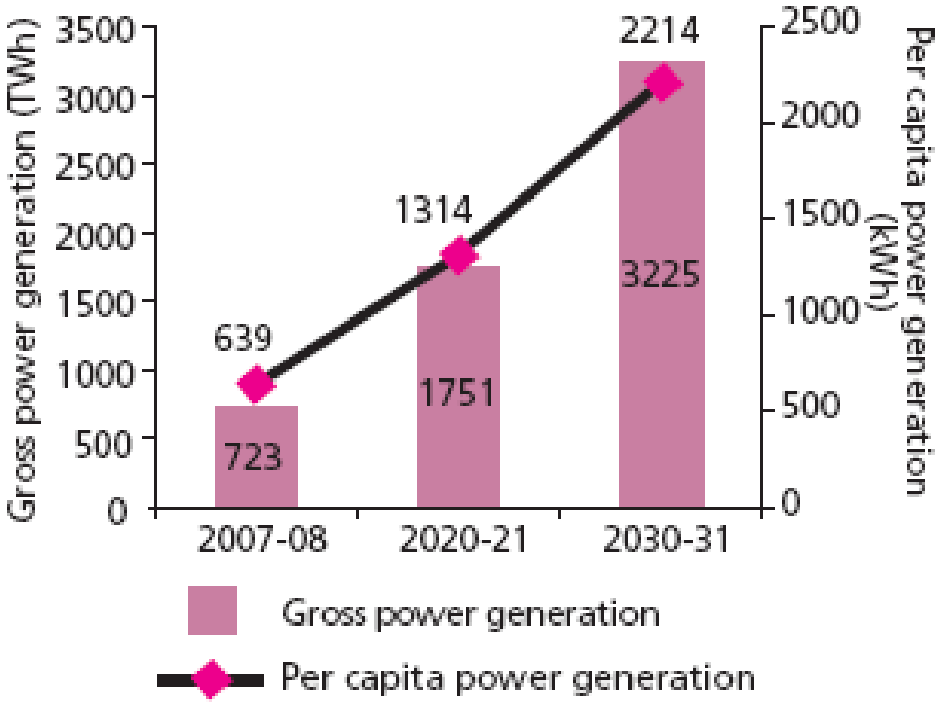
Power Sector



Power generation projection

Power Sector

- Falling elasticity between gross power generation and GDP; 8% growth rate



- *India's per capita gross power generation in 2030 about one-seventh of **current** per capita power generation in the US.*

Technology roadmap

Power Sector

- More gas
- Utilizing hydro and onshore wind potential
- More biomass – will require land
- Massive expansion in solar power, offshore wind
- **Rest from coal** - improved efficiency in existing stock; retire old stock, supercritical/ ultra-supercritical plants

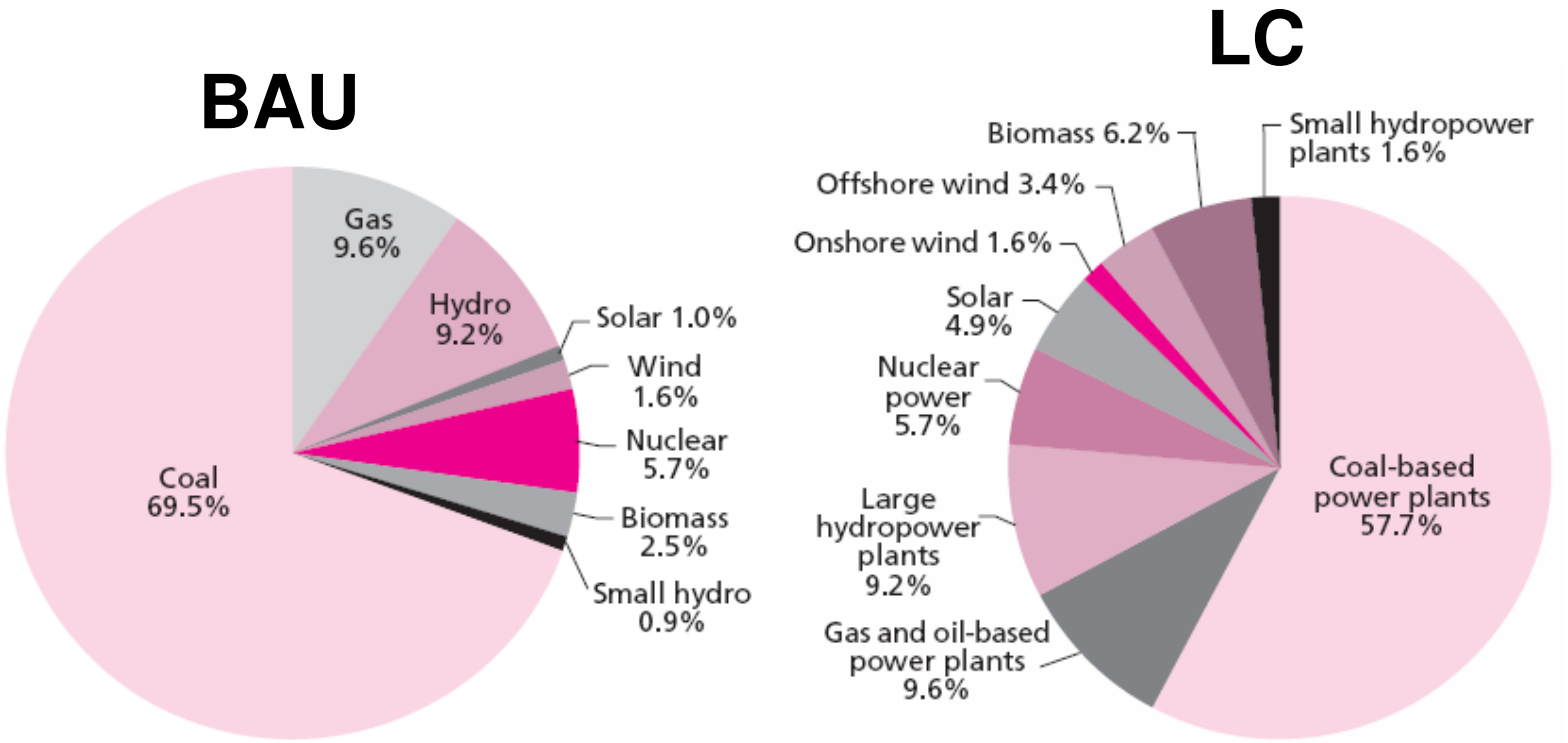
Installed capacity

Power Sector

	2008-09 (in MW)	2030-31 (in MW)	
		BAU	LC
Coal-based power plants	81,606	3,40,000	2,80,000
Gas & oil-based power plants	18,256	50,700	50,700
Large Hydropower plants	36,885	84,500	84,500
Nuclear power	4,120	30,000	30,000
Solar PV	0	10,000	55,000
Solar thermal (CSP)	0	4000 – without storage 2000 – with storage	7,500 – without storage 15,000 – with storage
Onshore wind	10,891	40,000	40,000
Offshore wind	0	0	50,000
Biomass	1,752	20,000	50,000
Small hydropower plants	2,430	8,000	15,000
Total	1,56,000	5,89,200	6,77,700

Power generation

Power Sector



Even with an ambitious programme for RE, India will be dependent on coal

The cost of cumulative emissions avoided of 3.4 billion MT CO_2 @ US $60/tonne CO_2

Conclusion

Low carbon growth

1. We have the opportunity to invest today in building a low carbon energy-industrial infrastructure
2. We can do more; but the cost of transition is high
3. With even a very ambitious mitigation programme, India will still need carbon space to grow
4. An agreement based on equity is essential:
    a. To secure rightful carbon space
    b. For a technological and financial deal to pay for transition

Challenge of the *New* Balance

Low carbon growth

Download the study at:

www.cseindia.org