

Policy Perspective: India

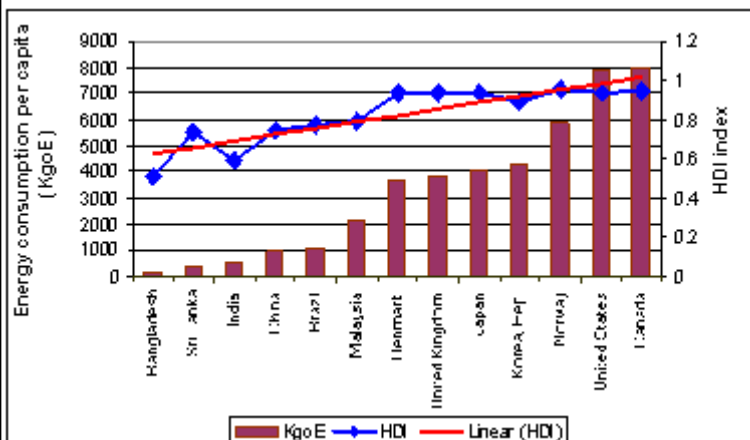


Role of coal in future global energy mix

IEA workshop Outlook for Coal Markets

S K Chand
Beijing, P.R. China, 14 April 2011

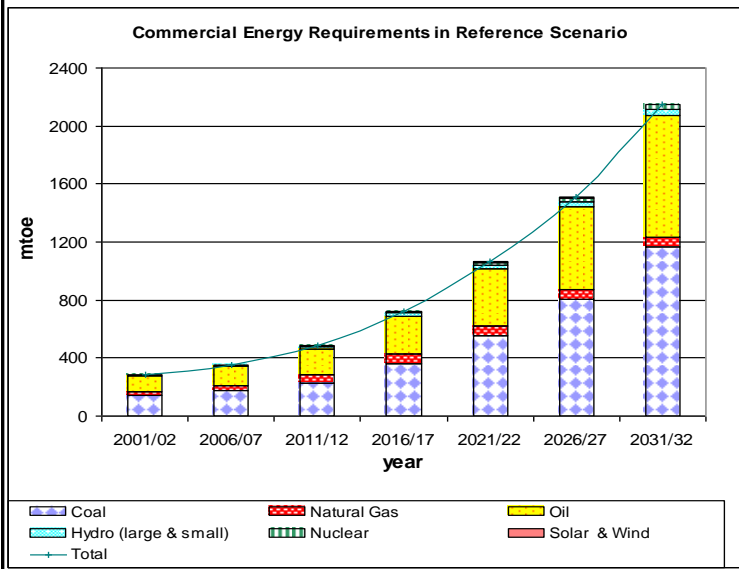
India Needs More Energy for Growth



Challenge:
Choosing appropriate technology and policy options for
•Meeting HDI goals and energy for all; a national priority

•Realizing high economic growth targets to address poverty

Sustaining Past Trends of Growth



Energy security:

Where will all the coal and oil come from?

Infrastructure:

How will all this energy be transported / handled?

Environment:

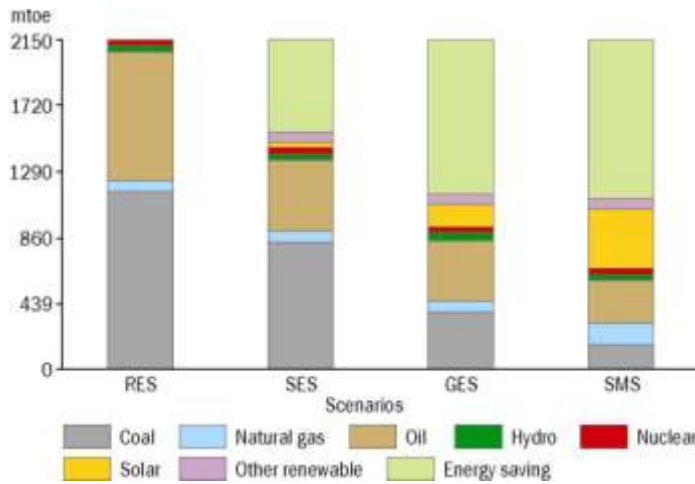
What will be the implications on local and global environment?

The Crystal Ball



| Scenario names | Storyline |
|-------------------------------------|--|
| Reference Energy Scenario (RES) | <ul style="list-style-type: none"> •Development continues along current paths with autonomous efficiency improvements •Increased use of renewable energy carrying on at the same pace •Defined policy priorities being implemented |
| Sustainable Energy Scenario (SES) | <ul style="list-style-type: none"> •Determined effort for efficiency improvements on supply and demand sides •Accelerated push for renewable energy, nuclear and new technologies •Energy Security concerns are paramount |
| Global Equity Scenario (GES) | <ul style="list-style-type: none"> •Honours the Prime Minister of India's commitment (India's per capita carbon emissions would never exceed those of the developed world assuming that developed world would be able to bring down its emissions to a level of 2 tonnes/capita by 2030 as indicated by IPCC AR4) |
| Stringent Mitigation Scenario (SMS) | <ul style="list-style-type: none"> •Extremely aggressive approach to energy self-sufficiency •Even more stringent emissions reductions |

Primary commercial energy supply-2031

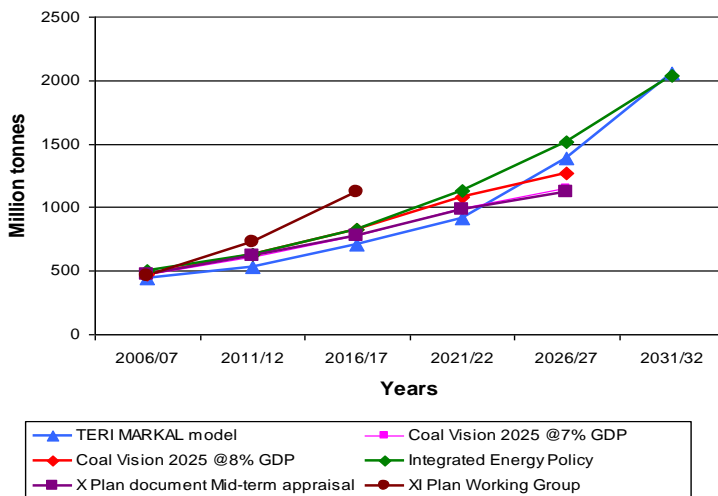


Coal Demand Estimates

(Million tonnes)



Estimates of coal demand for India



Varying parameters:
Results in different numbers

Long term projections:
By IEP and TERI, over 2 Bt by 2031/32

Trend of demand:
Sharp increase projected after 2016/17

Coal Demand Estimates

(Million tonnes)



| Sector | 2011/12 | 2016/17 |
|-------------------------|---------------|-------------|
| Power utilities | 483.00 | 750 |
| Power captive | 57.06 | 85 |
| Cement | 31.90 | 50 |
| Sponge iron & others* | 90.64 | 135 |
| Total non-coking | 662.60 | 1020 |
| Coking Steel | 68.50 | 105 |
| Total | 731.10 | 1125 |

Demand for Non-coking coal: 91% of overall demand

Share of coal for power: 74% for both periods

Long term demand: projected at over 2 billion tonnes by TERI and IEP

Source: Report of Working Group on Coal and Lignite - 11th Five Year Plan, Government of India

*use of non-coking coal in steel making

Power Generation Capacity 2011



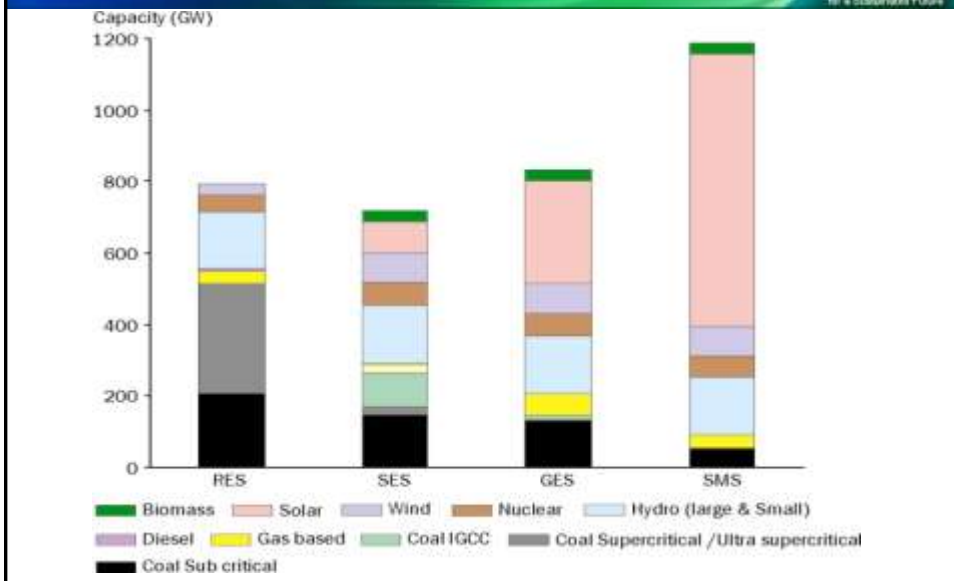
| Fuel | MW | %age |
|---------------|-----------|------|
| Total Thermal | 111324.48 | 65 |
| Coal | 92418.38 | 54 |
| Gas | 17706.35 | 10 |
| Oil | 1199.75 | <1 |
| Hydro | 37367.40 | 22 |
| Nuclear | 4780.00 | <3 |
| RES | 18454.52 | 11 |
| Total | 171926.40 | 100 |

Share of coal: 83% in thermal 54% overall

Coal demand for power: Over 450 MTPA in 2011

Long term projections: Power generation through coal remains dominant

Power Generation capacity mix 2031



Some Issues

- Only shallow coal deposits explored and exploited
- Underground mining thoroughly being ignored, share reduced to 10%, largely by bord and pillar
- Leftover extractable reserves very low: less than 40 Bt
- Ever increasing demand-supply gap
- Increasing import dependence; 142 million tonnes in 2011/12 against 83 million in 2010/11. In 20/21 it may increase to 269 million
- Lack of infrastructure to handle increased imports

Energy security; Coal security being compromised

Other issues



- Inefficient use of imported coal: power plants do not have proper blending facility
- Some small capacity old plants on sub-critical technology still remain in operation
- Quality deterioration endemic in open-pit operations, limited washing capacity
- Many private players have bought mines in other countries, government companies/ public sector companies have not been so successful

Thank you



Acknowledging major contribution by
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Modelling and Economic Analysis, TERI.