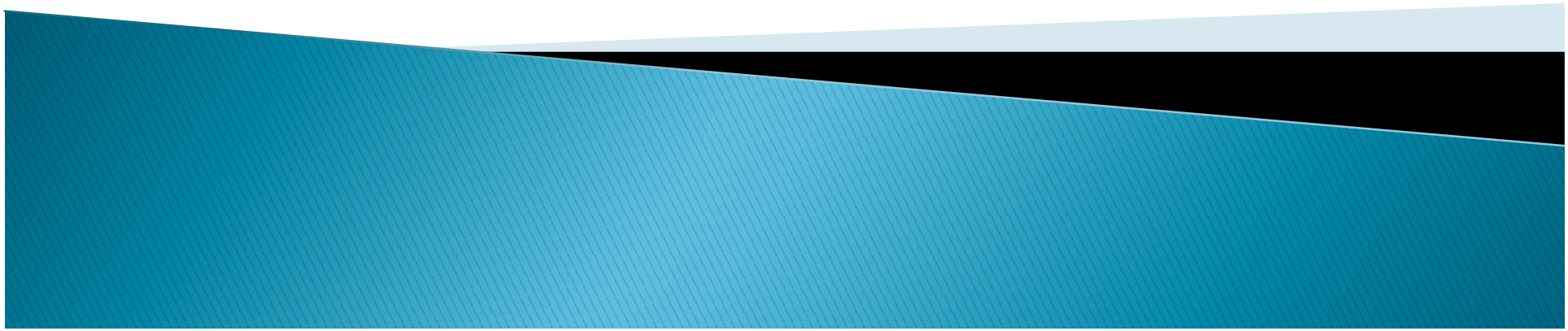
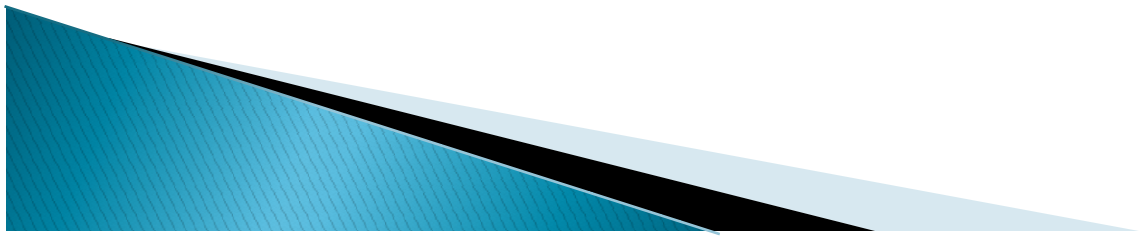
Global Challenges in Energy India & UK

S. K. Behura
Reena Dubey
Abdul Sami Nuamah
Joanna Lenthall
Anjireddy Bhavanam
Biplab K. Debnath
Manjula Das Ghatak

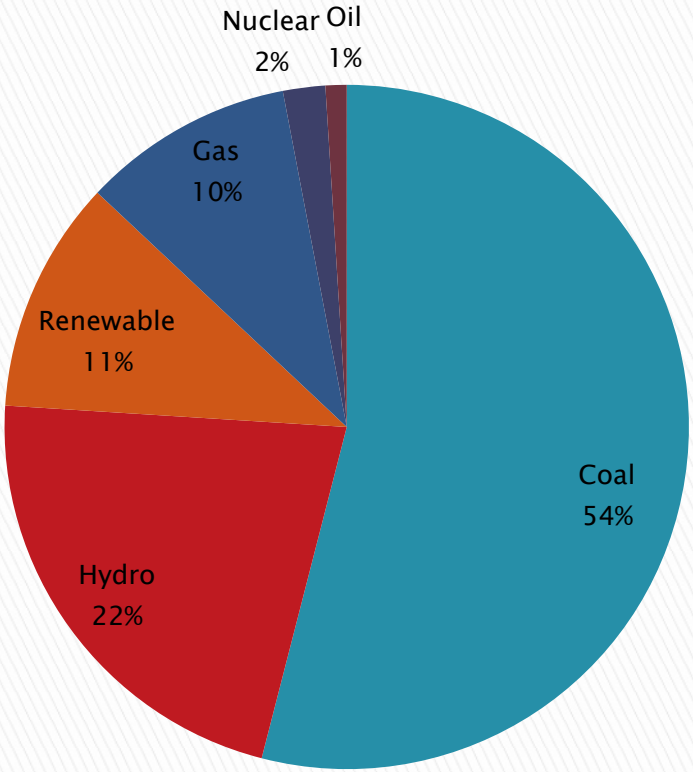


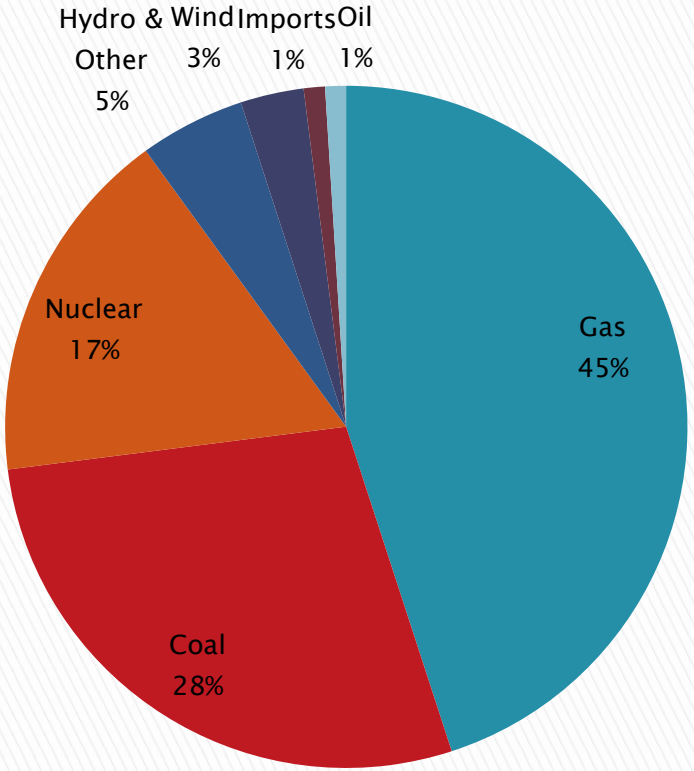
Outline

- Current Energy Scenarios
- Key Energy Issues
- Proposals for Improving Energy Supply in India and the UK
- Regional Case Study: Assam, India
- Regional Case Study: Greater London, UK



Current Energy Scenario





INDIA

UK

Key Energy Issues Nationally

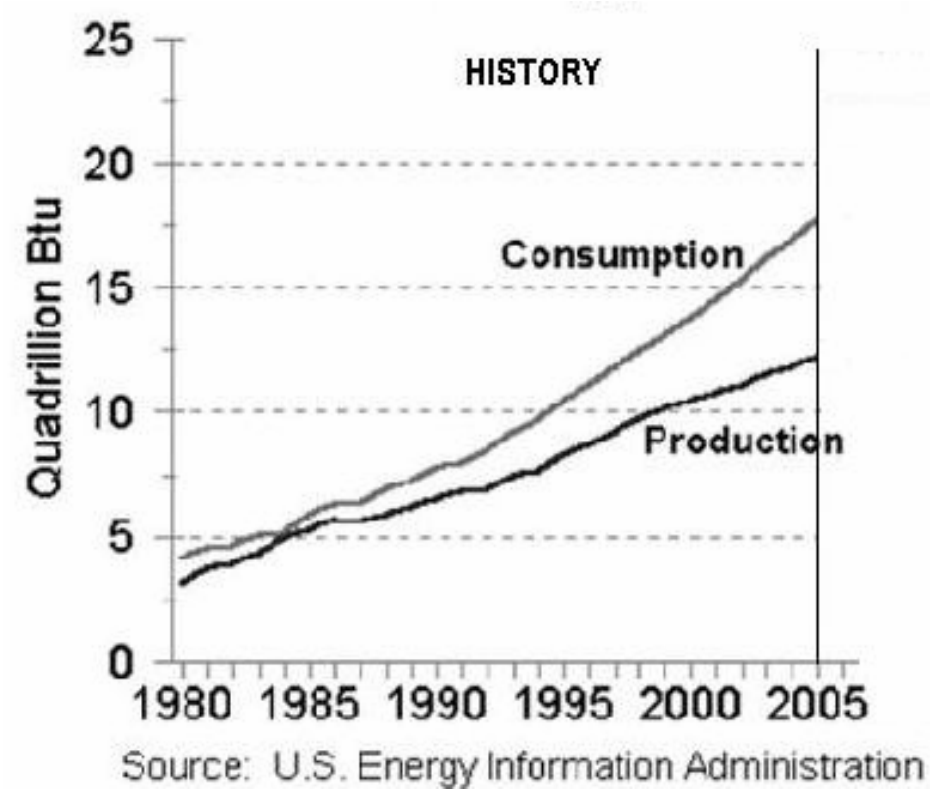
India

- Demand Exceeds Supply
  - 'Power for All by 2012'
- Lack of Provision
  - 57% without access to electricity
- Inefficient Industrial Processes
- High CO_2 Emissions
- Rapidly Developing Economy
- High Population growth
- Affordability of energy

UK

- De-commissioning of Old Power Plant
- CO_2 emissions targets
- Political Pressure for Energy Generation from Renewable Sources
- Energy Security
- Energy Poverty

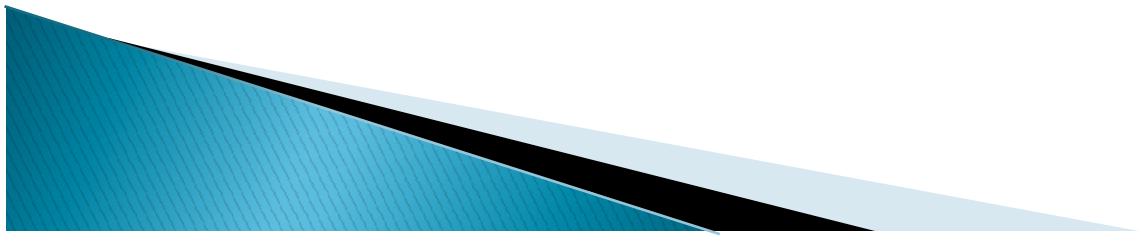
Proposals for India



- Current generating capacity for India is insufficient to meet the demand
- Widening gap between supply and demand
- Government Target of 78,000 MW of additional capacity to provide ‘Power for All by 2012’ is very unlikely to be met

Proposals for India

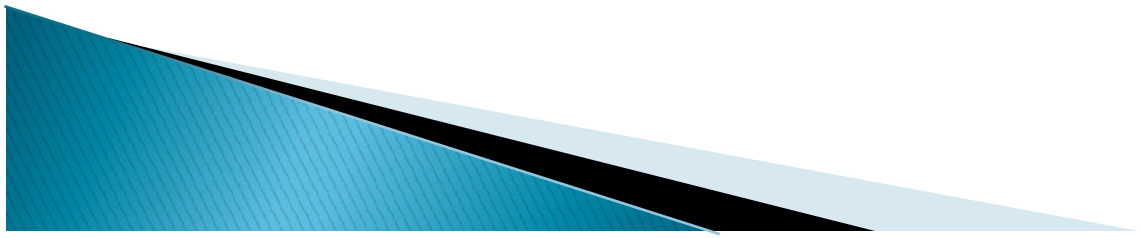
- Improvement of the centralised electricity generation system
  - More efficient coal power plants
  - Carbon Capture & Storage
  - More extensive network
- Increasing the use of alternative fuel sources
  - Renewables
  - Nuclear
- De-centralisation of generation for rural areas
  - Biomass Gasification
  - Solar-Thermal
  - Solar Photovoltaic
  - Hybrid Systems
- Increase in public awareness



Proposals for India

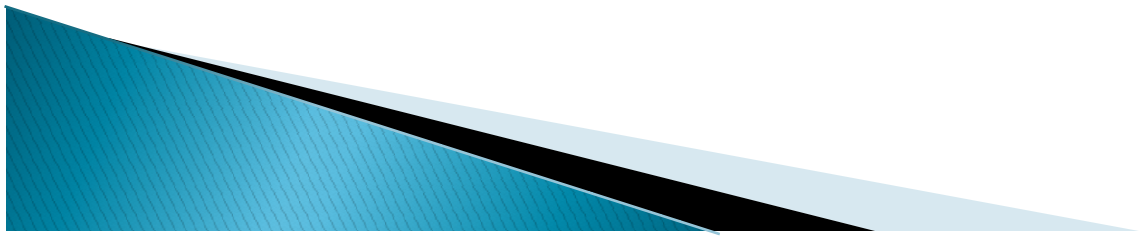
Renewable Source	Potential Generating Capacity (MWs)
Biomass	19,500
Solar	20,000
Wind	47,000
Small Hydro	15,000
Ocean Energy	50,000

- India has a huge potential for electricity generation from renewable sources
- Total potential of 152,000 MW far greater than the current supply capability.



Meeting India Energy gap

- 57% of Indian homes have no access to electricity
- 2.07 GW of energy gap currently
- It is estimated that an additional 3.4 GW gap of energy is expected by 2030.
- Therefore India needs a total capacity increase of 5.47GW
- If the electricity supply to rural areas is improved via this increase in supply we will see economic growth all across India



Proposals for India

Short term solution (<5yrs)

- Solar
- Natural gas
- Biomass
- Small hydro plant

Long term solution (2030)

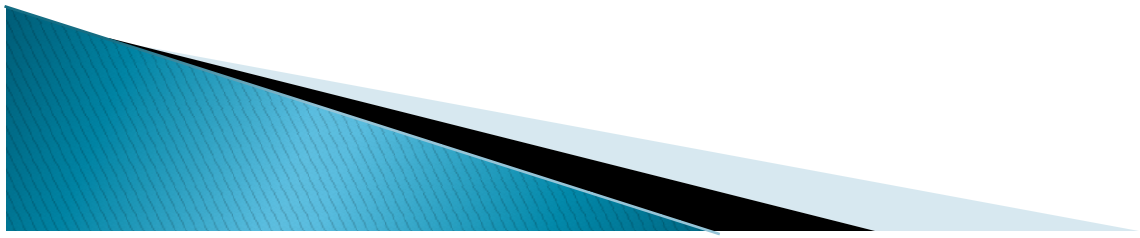
- Nuclear Plant
- Coal Plant with Carbon Capture & Storage
- Renewables
- Large hydro plant

Proposals for UK

- Loss of generating capacity through coal and nuclear plant decommissioning leaves a predicted shortfall in capacity of approximately 16 GW in 2030

- Alternative energy sources are required
  - Coal Power Plant with developed CCS
  - Combined Cycle Gas Plant (CCGT) – improved efficiency
  - New Nuclear builds
  - Renewable – biomass co-firing, wind, hydro

- Further development of technology is required in some cases



Proposals for UK

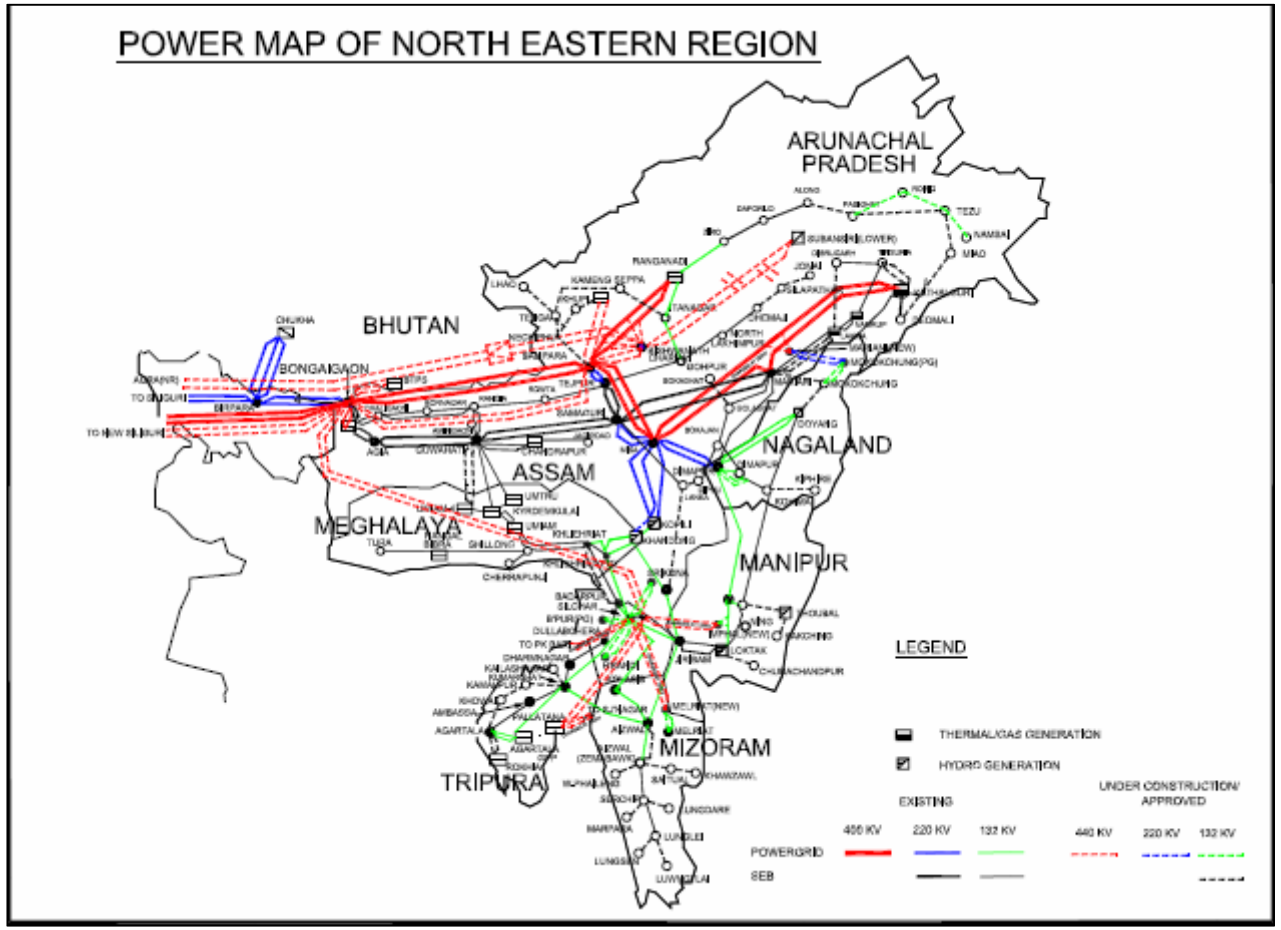
- In rural areas intermittent energy supply and lack of gas supply create problems

- De-centralisation of energy supply in these areas could help
  - Biomass gasification
  - Solar for heat and power
  - Combined Heat and Power (CHP)

Regional Case Study: Assam, India

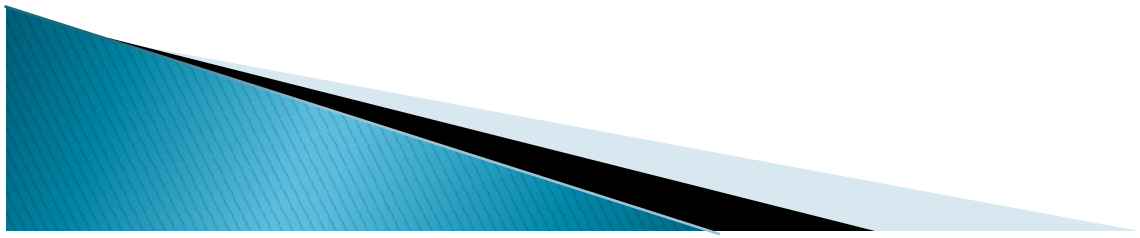
- Population: 31,169,272
- The gross domestic product of Assam was estimated at Rs. 5.78×10^7 in 2010.
- Average temperature is 30°C.
- Total installation capacity of power is 423.5 MW (31.03.2011).
- Deterioration of ecology due to deforestation to build mega hydro power plants.
- Elevated pollution with the increase in population and transportation.

Regional Case Study: Assam, India



Regional Case Study: Assam, India – Proposals

- Installation of
  - Micro hydal power plants
  - Solar power plants
  - Solar thermal-biomass hybrid power plants
  - Biomass gasification plants for combined heat and power
- Increase in the number of CNG powered vehicles

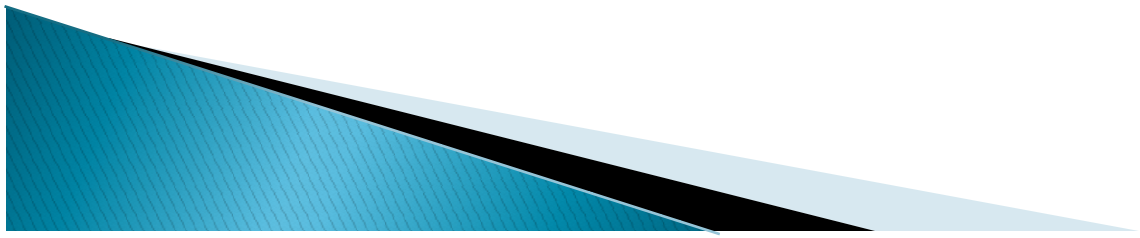


Regional Case Study: Greater London, UK

- Densely populated city with an approximate population of 7.8 million in 2009
- CO_2 emissions were recorded at 46,400 kilo tonnes in 2009
- Total electricity demand in 2009 was 41,814 GWh
- Increasing development and population growth is likely to lead to greater demand for electricity and further carbon dioxide emissions
- Large emissions from public transport
- Location creates problems for obtaining electricity supply locally

Regional Case Study: Greater London, UK – Proposals

- Additional supply network to cater for increased future demand
  - Import energy from other regions of the UK
  - Renewable sources where possible
- Encourage public transport to “go green” via utilisation of biofuels and electric vehicles
- Self-sufficient supply for London-based companies
  - Solar panels
  - Combined Heat and Power
- General increase in public awareness of energy savings
  - decreasing the demand through education
  - Smart Grids



Summary

- Both India and the UK face significant energy challenges
- The scale of the energy challenges differ dramatically
  - Power for all in India
  - De-carbonisation of the energy sector for UK
- To ensure security of supply in the long-term future renewable energies will play an important role – we must start now!