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## MODULE 4 Developing Countries' Actions and Perspectives on Climate Change: A Case Study from India

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This module orients policymakers and researchers on a developing country's plans and initiatives taken in the context of international expectations or requirements with regard to climate change, with an example of case study from India.

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### India's energy challenge

More than 65% of the Indian population still lives in the villages, with agriculture being their main occupation. The rural communities mostly depend on traditional tools and methods for most of their regular activities. Also, 34.7% and 79.9% of the population live below the income level of \$1 and \$2 a day respectively. Sustained GDP growth of 8%–9% a year will enable India over the next 25 years to lift the bottom 40% of her citizens to an acceptable level of economic and social well being – this will require provision of modern energy to them. However, the following energy challenges need to be addressed.

- Some 600 million Indians –10% of the global population – live without electricity! Over 75% of household energy consumption is for the basic human need of cooking.
- Traditional biomass is the primary cooking fuel for over 700 million Indians
- Lack of access to commercial energy leads to illiteracy, gender inequality/disempowerment, high IMR and MMR, poor health and hence, a low HDI.

#### **Energy fact file**

India's share of the global commercial energy supply in 2005 was 3.7%. The top 5 countries consumed over 50%, led by the US at 22.2%; China at 14.7%; followed by Russia, Japan, and Germany. India's per capita commercial energy consumption is about 20% of the world average, 4% that of the US, and 28% that of China.

Total primary energy supply: 510 MTOE (2005/06)

Energy mix

Coal and lignite: 37.9%,  
Traditional biomass: 28.6%,  
Oil: 23.9%,  
Gas: 6.9%,  
Hydro: 1.7%  
Nuclear: .0%.

Primary commercial energy consumption: 365 MTOE (2005/06 )

SOURCE IEA, BP, and Planning Commission

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## Climate-change-related policies and actions

India accounts for only 4% of the global emissions, but the country's emissions are likely to become more significant in the coming decades. According to the IEA (International Energy Agency), developing countries will overtake the wealthy OECD (Organisation for Economic Co-operation and Development) member countries sometime around 2020 in annual carbon dioxide emissions. The IEA estimates that from 2005 to 2030, India and China alone will contribute 56% of the increase in projected worldwide emissions.

The government has set up a high-level advisory group on climate change – the Prime Minister's Council on Climate Change – which will coordinate the national action plans for assessment, adaptation and mitigation of climate change. In June 2008, the council released India's National Action Plan on Climate Change, which mentions eight specific missions including research and development of solar energy.

India's <b>Integrated Energy Policy 2006</b> : key GHG (greenhouse-gas-related) provisions
<ul style="list-style-type: none"> <li>• Energy efficiency in all sectors</li> <li>• Emphasis on mass transport</li> <li>• Emphasis on renewable, including biofuels and fuel plantations</li> <li>• Accelerated development of nuclear and hydropower technology missions for clean energy</li> <li>• Focused R&amp;D on several climate-change-related technologies</li> </ul>



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## Key policies and actions

- Reforming energy markets (Electricity Act 2005, Tariff Policy 2003, Petroleum & Natural Gas Regulatory Board Act 2006, etc.)
  - Removal of entry barriers and raising of competition in exploration, extraction, conversion, transmission and distribution of primary and secondary energy
  - Institution of price reform, with full competition at point of sale—net back pricing for non-traded energy if domestic market not competitive
  - Tax reform to promote optimal fuel choices.
  - Augmentation and diversification of energy options, sources and energy infrastructure: feed-in tariffs for renewable (solar, wind, biomass cogeneration)
  - Strengthening or introduction of independent regulation

- *Rural Electrification Policy 2006*  
Promotes renewable energy technologies where grid connectivity is not possible or cost-effective
- *Energy Conservation Act 2001*  
Aims to reduce specific energy consumption in different sectors, and sets up a specialized Bureau of Energy Efficiency to institutionalize energy-efficiency measures, monitoring, and measurement at plant and macro-levels
- *New and Renewable Energy Policy 2005*  
Promotes dependence on sustainable, renewable energy sources, accelerated deployment of renewable through indigenous design, development and manufacture
- *Biodiesel Purchase Policy*  
Mandates bio-diesel procurement by petroleum companies.
- *Ethanol blending of gasoline*  
Mandates 5% blending of ethanol with gasoline from 1 January 2003 in nine states and four union territories
- *Energy Conservation Building Code 2006*  
Mandatory energy-efficiency code for all buildings with > 500 kVA (kilovolt-ampere) connected load or conditioned floor area > 1000 m<sup>2</sup>
- *Bachat Lamp Yojana*  
Countrywide programme for replacement of incandescents by CFLs in households using CDM credits to equate purchase price; safe collection, and disposal of used CFLs.
- *50,000 MW hydroelectric initiative, 2003*  
A total of 162 hydel projects have been identified for project preparation and implementation.
- *Others*  
Promotion of solar thermals, solar PVs, wind, biomass gasifiers, biogas and manure management, promotion of fuel cells, energy recovery from urban wastes, etc.

## Adaptation to climate change

India is historically vulnerable to climate variability: floods, droughts, vector-borne disease, cyclones, ocean storm surges, etc. For over six decades, India has had large, nationally funded programmes to address climate variability and disasters. However, India's fiscal expenditure on programmes directly related to adaptation to climate variability was 2.63% of GDP in 2006/07.

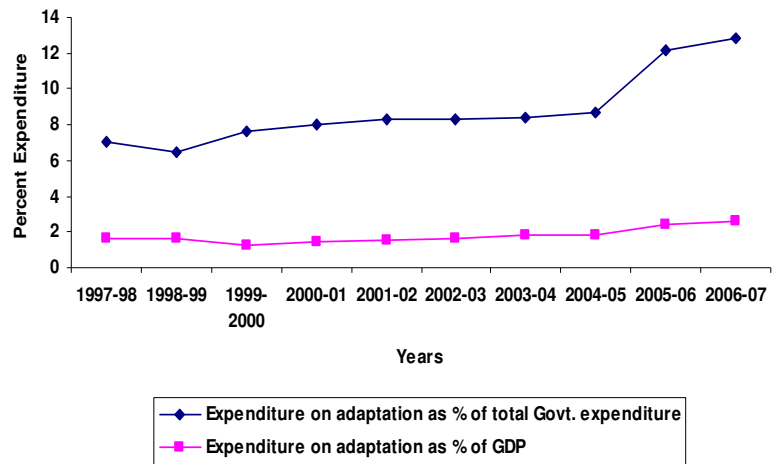
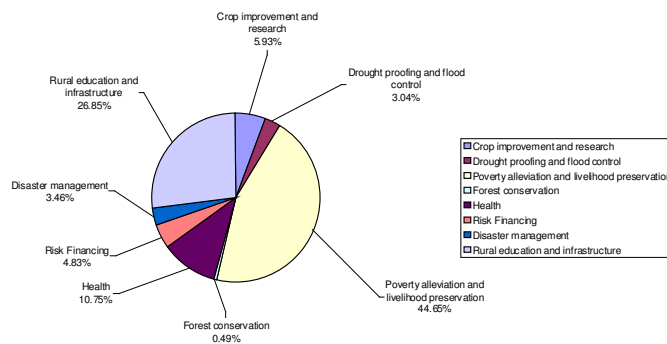


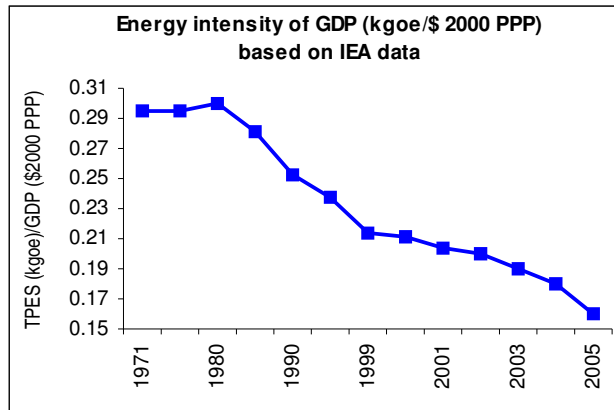
Fig.1 proportion of critical components in total adaptation expenditure - 2006-07



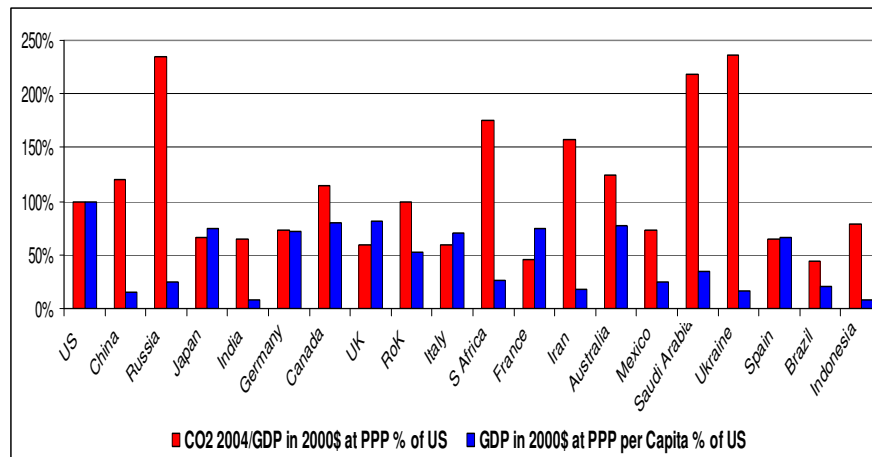
Proportion of critical components in total adaptation expenditure 2006/07

## Co-benefits of climate-change-related policies

The climate-related policies and actions have led to a decrease in the energy intensity (energy used per dollar of gross domestic product generated). The fossil fuel CO<sub>2</sub> intensity of the Indian economy in 2004 was the same as that of Japan, and better than that of Germany.



India's decreasing energy intensity



Comparison of the CO<sub>2</sub> intensity of various countries (2004)