

Climate Change Mitigation and Adaptation: An Indian Perspective

(Summary)

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1. India's energy use and its implications to greenhouse gas emissions

(1) Energy situation and economy of India

India has 3.29 million square kilometer land area in which over 10 billion people live. Its population growth rate remains as high as 2%, although the growth rate is slowing down recently. Its life expectancy is 60.4 years and literacy rate 65.38%, which are still low in comparison with those of developed countries.

Primary energy supply in India has increased by 4 times in recent 50 years. Coal and non-commercial energy account for around 30% share of energy supply in 2002.

India's electricity generation capacity has increased by 5 times in recent 30 years. 60% of its resources come from coal. India as well as China are coal producing countries and thus have incentives to keep using coal.

According to the study carried out by the Integrated Energy Policy Committee of the Planning Commission, if the population increases with about 350 million, and with a 8% of GDP growth rate, the total primary energy consumption is expected to increase by at least 4-fold.

However if primary energy consumption per capita is considered, India's one is still small. It is about 10% of that of Japan.

As in China, India has rural/urban divide. Even with the large-scale migration of people from villages to cities in the last 10 years, the share of urban population is only a third of the total population.

India's economic growth resulted in a shifting a way from the agricultural sector. Agriculture's share in the GDP has decreased from about 60% in the 1950s to only about 25% recently. The share of agriculture is taken up by the manufacturing, transport and other sectors. Energy use has been increasing as those sectors grow.

Although the poverty in India has decreased by more than 50% between 1973 and 2000, it is still high. The percentage of people below the poverty line is still on the order of about 25% of the population.

Economic indicators show that India's economy has boosted to join the elite club of 12 countries with a trillion dollar economy. The Foreign Direct Investment (FDI) inflows have also increased tremendously. Bilateral cooperation between Japan and India is also increasing. According to a survey by the Japan Bank for International Cooperation (JBIC), India has overtaken China as the most attractive business destination for long-term Japanese investments. Bilateral trade has been increasing both in terms of imports as well as exports, most of which are in IT sector.

(2) GHG emissions and future prospects

The size of India's economy is only 1.7% of the world and 17% of the world's population live there.

CO₂ emissions of India are 1.1 billion tons which are 4% of the world emissions.

60% of total GHG emissions in India are due to CO₂. Methane which mostly comes from agriculture has also large share and accounts for about 31% of total emissions.

Emissions vary according sectors. CO₂ is mostly emitted from electricity sector. CO₂ emission growth rate of electricity sector is much high in comparison with those of transport and other industry. Most electricity comes from coal-burning.

Although coal is still essential in India, the share of gas and oil which is often used in transport and other sectors also has been increasing.

There are several scenario analyses depending upon the type of fuel used, energy efficiency and the policies. CO₂ emissions are expected to increase to about 5.5 billion tons in a coal-dominated scenario, or to about 4 billion tons in a highly efficient scenario. This clearly indicates that one can easily have a 33% difference between the two extreme scenarios, which means that there is a lot of potential for technology transfer and efficient use of devices that obviously requires in most cases input and support from Japan and other developed countries. The CO₂ emissions in 2030 would be about 4 times in the current scenario.

2. India's stance on emissions and on climate change

India's stance on addressing climate change is somewhat similar to that of China. India has to promote CO₂ mitigation as well as sustainable development. Developing countries are facing huge challenges to promote economic development and to address global warming simultaneously.

Even though India, like China, has no responsibility to reduce GHG emissions in the Kyoto Protocol, India has been making many efforts.

The Energy Conservation Act passed in 2001, in which the Bureau of Energy Efficiency was set up to administer the act. Reforms in electricity and transport sector, and fuel-efficiency policy have been promoted.



India's CO₂ intensity which shows CO₂ emissions per GDP is still high in comparison with that of developed countries. However it means that there is much potential to reduce the emissions in the coming years. Chemical, electricity, and iron and steel industry have huge potential to reduce CO₂ emissions through adoption of high-efficient technology.

Just like in China India also has a high-level committee. National Plan of Action on Climate Change will be released in June 2008.

3. Characteristics of India's climate change strategies

As for renewable energy related issues, India is the first country and probably the only country that has a government federal ministry on renewable energy which was set in the mid-1980s.

In India, wind power generates about 6300 MW of electricity, and small hydro power about 2000 MW. Energy generations from agro residues or other waste-to-energy are also promoted. Solar thermal collectors have been set extensively. In February 2008, megawatt capacity grid interactive solar power plants (50MW) were established.

India is also active in CDM. India has the highest number of CDM projects, about 283 projects. These projects are in areas of energy efficiency, fuel switching, industrial processes, and municipal solid waste disposal. Its values are quite impressive here.

In transport sector, the government of India has been promoting the use of bio-fuels and will replace 10% of its transport fuels with environment friendly bio-fuels by 2018. Currently mixing ethanol extracted from sugarcane in petrol and also doping diesel with non-edible oils, like ones extracted from Jathropa, are adopted measures.

India sees hydrogen vehicles as important in public transport system for the long-term. India's largest automobile maker, Tata Motors is likely to launch the prototype of the world's cleanest vehicle that will run on hydrogen.

4. Conclusion

India is also quite vulnerable to an impact of global warming, sea level rise, since it is surrounded by two major oceans on either side. Although the number of storms may not change much, their intensities have become quite high causing huge disturbances.

Even in 2030, per capita energy consumption and per capita CO₂ emissions of India will be low. The government of India thinks that the emissions have to be compared on a per capita basis and there is a need to sustain and maintain the current growth pattern. More importantly, there is a high potential for CO₂ reduction in infrastructure development and core technology improvement, especially in fossil fuel area. Therefore technology transfer, investment, and other international supports are required in India.

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