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CLIMATE CHANGE SCENARIO: AN APPROACH

Environmental Science

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ABSTRACT

Climate change due to GHG emissions from anthropogenic and natural activities has been a major concern of all people across the globe. Attention has been focused on the scientific studies to identify the threatening levels. Recent scientific evidences reaffirm that action to stop climate change must begin immediately to avoid irreversible damage. Next 10 to 15 years must bring about the global turn around in emissions in order to stay below the critical threshold of a global mean temperature rise by 2˚C. Increasing awareness of the dimensions and threat of climate change has elevated this issue to the top of the political agenda and brought about a powerful swell of public opinion demanding action. These series of developments put the emphasis on the United Nations system as a unique international institution with diverse capacities, which must be brought into a framework to provide a coherent strategic approach to support the international community in seeking solutions and implementing change. To keep the world below 2˚C temperature rises, emissions must drop to 44 bn tonnes CO2 equivalent by 2020. The world is already emitting 48 bn tonnes CO2 equivalent. In practical sense, the world has already run out of time. The need to keep the temperature rise to below 2˚C was fully realized and appreciated by leaders and experts when they met at Cancun.

INTRODUCTION

Greenhouse gas (GHG) emissions associated with the provision of energy services are a major cause of climate change. The IPCC 4th assessment report 2007, conclude that "most of the observed increase in global average temperature since the mid 20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations." [8] Concentrations of CO_2 have continued to grow since the report to about 390 ppm CO_2 or 39 % above pre industrial levels by the end of 2010. The global average temperature has increased by 0.76 ˚C (0.57 ˚C to 0.95 ˚C) between 1850 to 1899 and 2001 to 2005 and the warming trend has increased significantly over the last 50 years. While the current IPPCC special report on renewable energy sources and climate change mitigation focuses on the energy sector, forest clearing and burning and land use change and the release of non CO_2 gases from industry, commerce and agriculture also significantly contribute to global warming. [1]

An extensive review of long- term scenarios revealed that economic growth is expected to lead to a significantly increase in gross domestic product (GDP) [9]during the 21st century associated with a corresponding increase in the demand for energy services. Also carbon intensity (the amount of CO_2 emissions per unit of primary energy) is, with few exceptions, expected to decrease as well.[2] In addition to an investigation of potentially irreversible abrupt changes in the climate system the IPCC assessed the adverse impacts to such climate change (and the associated sea level rise and ocean acidification) on water supply, ecosystems, food security, human health and coastal settlements, the Cancun agreements (2010) call for limiting global average temperature rise, to not more than 2 ˚C above pre-industrial values and agreed to consider a goal of 1.5 C GHG concentrations would need to be in the range of 445 to 490 ppm CO_2 eq in order to be confident of achieving an equilibrium temperature increase of only 2˚C to 2.4˚C. this in turn implies that global emissions of CO_2 will need to decrease by 50 to 85 percent below 2000 level by 2050 and begin to decrease (rather than continuing current increase)no later than 2015.

Figure 1: Emission of Green House Gases

DRIVERS OF CARBON DIOXIDE EMISSIONS

Since about 1850 global use of fossil fuels (coal, oil and gas) has increased to dominate energy supply (fig. 1), both replacing many traditional uses of bio energy and providing new services. The rapid rise in fossil fuel combustion (including gas flaring) has produced a corresponding rapid growth in CO2 emissions.[3] The amount of carbon in fossil fuel reserves and resources (unconventional oil and gas resources as well as abundant coal) not yet burned has the potential to add quantities of CO2 to the atmosphere – if burned over coming centuries - that would exceed the range of any of the scenarios considered.

CANCUN CONFERENCE AND WAY FORWARD

The climate change conference at Cancun in November – December 2010 was expected to deliver a definite way forward on the basis of discussion which started at Bali in 2007. Cancun conference had basically two main agenda points:

- To decide on how much the industrialized country considered as the primary polluter would cut on emissions.
- To decide on the mitigation actions of the developing countries and how these would be supported with funds and technology.

INDIA'S SHIFTING APPROACH FOR CLIMATE CHANGE

Cancun conference observed a 180 shift in India's stand on climate change negotiations. While the rich countries refused to shift their stand on climate issue or provide funds India willingly offered to open itself up for scrutiny and emission commitments reducing its own time window and substantially and potentially increasing

development costs. [4]

In 2007 at Bali the developing world agreed to shoulder some responsibility and take voluntary actions to reduce their future emissions if the rich nations would enable them with finance and technology. In 2009 at Copenhagen, the developing world accepted that they would not wait for the funds or technology to come from the reluctant rich countries and will take appropriate domestic actions that will reduce their emission intensity by 20% to 25%. Now at Cancun India has said it is willing to turn its voluntary domestic actions into international commitments.

The sudden shift instance, explained by India's minister for environment as merely"nuancing", will entail cost will continue long after the dust has settled at Cancun. Short- term green market economics apart, the potential strain on development is a worry.[5]

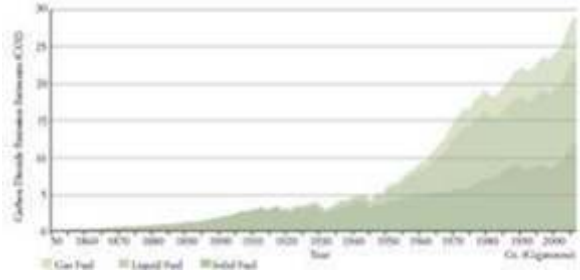

Figure 2: Global CO_2 emissions from fossils fuel burning, 1850 to 2007. Gas fuel includes flaring of natural gas. All emission estimates are expressed in Gega tonnes Co_2.

Data Source: (Boden and Marland, 2010).

INDIA'S APPROACH FOR CLIMATE CHANGE REGIME IN PRE-COPENHAGEN TIME-FRAME

The prime minister of India was deeply concerned about the climate change impacts and therefore setup the panel on climate change. It identified the stand for the historic climate change conference at Copenhagen, in December 2009. Details and concerns were as follows here.

India is severely impacted by climate change precisely at a time when it is confronted with huge development imperative. The panel stated: "We would, therefore, expect that the Copenhagen conference outcome, in December 2009, not only provides us with the space required for accelerated social and economic development, in order to eradicate widespread poverty, but also create a global regime which is supportive of our national endeavour's for ecologically sustainable development"

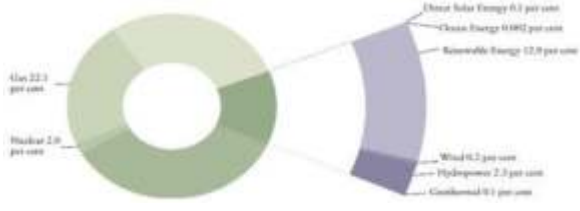

Figure 3: Shares of energy sources in total global primary energy supply in 2008 (492 EJ)

Data source: IEA (2010a).

IMPACT OF CANCUN AGREEMENT ON INDIA'S GROWTH

At a time when the rich world was ready to live without regard for the planet or science, India gave up its earlier stand, based on considered opinions.[6] Taking on binding commitments would seriously hamper its economic growth. It has a large number of poor who continue to live below global poverty levels without electricity.[7] Taking on emission reduction commitments would increase the cost of delivering power to the homes of 400 million living without it at the moment. It would reduce the resource at its disposal to elevate the poor out of darkness. India also faces the danger of reduction in food production by up to 30%, by 2020, under the business as usual scenario, as agreed at Cancun. India requires the atmospheric space to develop economically. The rich countries need to vacate the atmospheric space, permitting it and other poor countries to reach a level of economic health.

CONCLUSION

Role of engineers in mitigation and adaptation measure for climate change management has often remained unnoticed as all perspective studies are covered under the term 'scientific studies' which gives the impression that only scientists are key players. Searching for 'geo-engineering' solutions has been undertaken by the scientists at their level, but the lead role has gone to the engineers. Acceptance of geo-engineering options will depend on how practical they are found? As mitigation and adaptation measures have not found the solution for the global community to manage impact of climate change it can be considered reasonable that geo-engineering solutions will take centre stage.

A non-committal agreement at Cancun holds no discussion on IPR issues and funds from developed countries for mitigation, adaptation and buying timing through geo-engineering solutions will be the challenge for the engineering fraternity in each separate country.[10] The networking of professional institutions of engineers (India) has its national and global responsibility to lead by example. This is both 'a challenge' and 'an opportunity' to showcase its professional competence and leadership.

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