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400 ppm: Climate threshold crossed, but no solution in sight!

The Greenhouse Gases have reached 400 parts per million in the atmosphere but emissions keep growing and the political solution needed to curb them is still elusive.

Bonn, (Martin Khor*) - A key threshold measuring the march of global warming was crossed recently, when the concentration of carbon dioxide in the atmosphere topped 400 parts per million.

On 10 May scientists announced that 400.03 ppm had been measured at a climate-observing station in Hawaii that is often used as a benchmark. The global average is expected to cross the 400 ppm mark in the next year.

This means that for every one million molecules in the Earth's atmosphere, there are 400 molecules of carbon dioxide.

CO2 concentration in the air is linked to the Earth's temperature. The widely believed relationship is that the 450ppm level should not be crossed if global warming is to be below 2 degrees Celsius compared to pre-industrial revolution level of around 1750.

In fact more recently, some prominent scientists like James Hansen have found that crossing 350 ppm is already dangerous. In line with this, the existing CO2 in the atmosphere should be reduced --- though how this can be done is really unclear.

Already the impacts of climate change are being felt in dramatic ways in the increase in extreme weather events, ranging from higher rainfall and extensive flooding in Pakistan, China, Southeast Asia and United Kingdom, drought in parts of Africa and the United States, raging fires in Australia and Russia, and big storms or hurricanes in the Philippines, Central America and the United States.

How far worse will the situation be when more climate change is induced when the CO2 concentration increases from 400 ppm to 450 ppm and beyond?

The increase in concentration has been dramatic. In 1958, it was 315 ppm, and this rose to about 375 ppm in 2000 before jumping to 400 ppm now.

At this rate, we are on track not for a 2 degree but for a 3 to 5 degree increase in temperature by the end of the century – a catastrophe.

The present temperature is 0.8 degrees above the pre-industrial level and we are already seeing the major adverse effects. Imagine a 2 degree and worse a 4 degree world that our children and grandchildren will inherit.

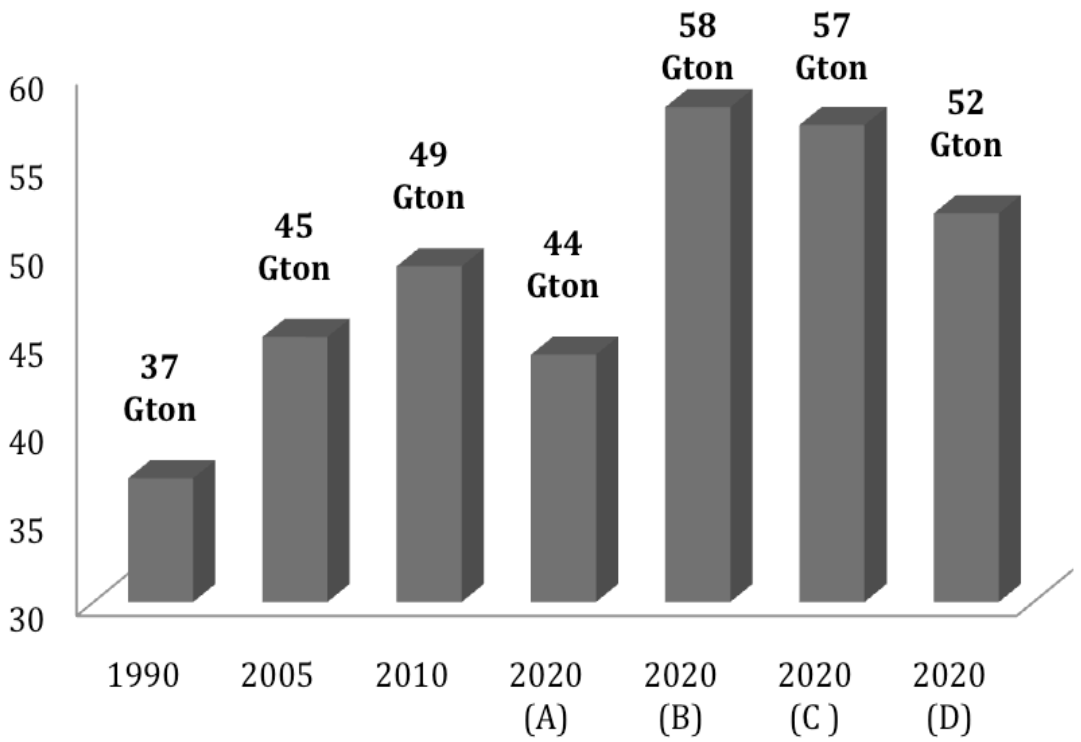
What needs to be done? Most importantly, the level of emissions has to be cut significantly.

The UN Environment Programme's 2012 report on "emissions gap", written by 55 scientists, shows that the total global emission in 2011 was 50 billion or giga tonnes (Gton) of CO2 equivalent (meaning CO2 plus other greenhouse gases like methane but expressed in terms of CO2).

The CO2 equivalent emission level has been rising rapidly; it was 40 Gton in 2000 before climbing to 50.1 Gton in 2011. This means that the annual global emission has risen by10 Gton or by 25% in just a decade.

The UNEP report estimates that if we are to keep the world's temperature to 2 degrees below the pre-industrial level, the annual global

Chart: Global Emissions, 1990-2010 and Scenarios for 2020



Notes: the above bars show levels of emission in GtonCO^{2}e (Gigaton of Carbon Dioxide equivalent). 1990, 2005, and 2010 bars show actual emission levels. The four bars on the right are scenarios of emission levels for year 2020:
(A): Level of emission that has to be reduced to, in order to be on a 2°C path;
(B): Business-As-Usual level (if there are no policy changes);
(C): Emission level if countries implement their lower-ambition pledges, and are subject to "lenient" accounting rules;
(D): Emission level if countries adopt higher-ambition pledges and are subject to "strict" accounting rules.
Source: The data is from and graph is adapted from UNEP *Emission Gap Report (2012)*.

emissions must be brought down to 44 Gton by 2020 and then continue to decrease.

However, if there are no policy changes (a business as usual scenario), the emissions are projected to rise to 58 Gton in 2020.

The good news is that governments of many countries have pledged to take actions to cut their emissions.

The bad news is that these pledges are not enough. In the best scenario (if governments succeed in keeping their best pledges and in the best conditions), the 2020 emission level will be 52 Gton.

That is way higher than the 44 Gton limit required to keep temperatures below the 2 degree level, though lower than business-as-usual.

And in the worst scenario (governments take actions but in the lower end of the range in their pledge, and with bad conditions), the 2020 emission level will be 57 Gton, which is almost the same as the business-as-usual level of 58 Gton.

In any case, the projected emissions in 2020 will miss the 2 degree boat. They are in line with boats going towards 3 to 5 degrees, in other words towards a climate disaster.

How to bring the emissions by 2020 down to 44 Gton?

The technical solutions are not that difficult to conceptualise. The UNEP report provides suggestions on cutting emissions through changes in buildings, transport and forestry practices and policies. To that can be added policies in energy, industry and agriculture.

The problem is the politics and costs of change. A global climate agreement is difficult to achieve because of differing perspectives on what is a fair distribution of effort and who will bear the costs.

Developing countries believe that the rich countries have a historical responsibility to take the lead in emissions cutting, and to pay (at least significantly) for the expenses incurred by developing countries in switching to low-carbon technologies and policies.

This historical responsibility is due to the fact that the developed countries are responsible for putting most of the CO2 in the atmosphere so far. They have grown rich partly because of their economies grew on the basis of cheap fossil fuels. And they have richer economies.

The developing countries fear that if they are to take on the full burden of changes, their economic growth will be affected and their development efforts will be diverted from food and health care and from economic development towards climate measures.

They thus want the rich countries to transfer funds and technology to support their switch to a climate-friendly growth path.

Developed countries on the other hand are reluctant to accept "historical responsibility", arguing that they cannot be held responsible for what their forefathers, in ignorance, did.

They are willing in theory to provide funds and technology. But in practice little funds and very little (if any) technology have been transferred to the developing countries.

The developed countries also want all countries (not only themselves) to sign on to the same type of obligations in emission cuts.

This is seen by developing countries to be contrary to the principles of equity and common but differentiated responsibilities that are central to the UN Climate Change Convention.

Thus the battle of principles and words have continued in the past few years, and the prospect that a comprehensive agreement will be signed by 2015 (the current deadline) is not bright.

While the science of what is happening to our climate is getting clearer, and the technical solutions as to how to curb emissions in various sectors are being developed, it is the politics of climate change that needs to be resolved.

There are no easy solutions even as the 400ppm threshold is being broken and as the world sprints towards the next threshold of 450ppm.

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