Climate: Facing up to 'red line'

The principal responsibility for keeping within the red line lies with the largest per capita emitters, while developing countries must do all possible to improve their GDP-to-emission ratios. There is plenty of scope for India and China to improve their carbon footprint, says **BHASKAR BALAKRISHNAN.**

As we approach the Copenhagen summit on climate change, there is now a significant consensus among the scientific and political community on a "red line" for climate change. This is the limit beyond which large-scale, irreversible and possibly catastrophic effects can take place in the world due to climate change.

The limit now accepted is a 2°C rise in average global temperature, which translates into a level of atmospheric greenhouse gas level of carbon dioxide equivalent of 450 ppmv (parts per million by volume). This implies that total emissions must be within 1000 GT (giga tonnes) of carbon-dioxide during 2000-2050. This target is extremely difficult to achieve. During 2000-2006 already some 234 GT were emitted.

Facing this red line, there is deep division between the developed and developing nations in the run-up to the Copenhagen summit later this year. It now seems likely that the summit would be able to achieve only modest results, perhaps agree on a few principles and give some impetus to continuing global negotiations. The principal responsibility for keeping within the red line lies with the largest per capita emitters, while developing countries must do all possible to improve their GDP to emission ratios.

EMISSION PATTERNS

Most of the greenhouse effect comes from carbon dioxide (CO_2, 72 per cent), with some amounts being contributed by methane (CH_4, 18 per cent), Nitrous Oxide (N_2O, 9 per cent), and much smaller amounts by other industrial chemicals with high global warming potential such as CFCs, SF6, etc. The present CO_2 level is 384 parts per million by volume (ppmv), rising at a rate of two ppmv per year. In the pre-industrial period, CO_2 levels have fluctuated between 190 and 290 ppmv for the past 400,000 years. Since 1900, the level has shot up sharply, due to emissions of CO_2 as a result of industrial energy production. Global average temperatures have already risen by about one to 1.5 degree Celsius over the past 60 years.

In order to remain within the identified global red line, experts agree that CO_2 emissions should be cut drastically with earliest possible implementation of cuts. The G8 leaders agreed to a cut of 50 per cent in emissions by 2050, but could not agree on the base year. Even with this scenario, it may not be possible to remain within the red line of 450 ppmv by 2050.

Unfortunately, the quickest natural processes by which CO_2 is absorbed is by dissolution (about 80 per cent of injected atmospheric CO_2) in the sea water of the earth's oceans with a time cycle of the order of 300 years. This process is too slow to deal with the rapid rise of CO_2 due to human activities since 1900. Ocean absorption also provokes other undesirable effects and is affected by temperature feedback. At the present rate, by 2033, we would have crossed the red line of 450 ppmv, before natural processes could make any significant impact.

At present, global CO_2 emissions are around 28 GT per year, which comes from China (6.1), the US (5.75), the EU (3.91), Russia (1.56), India (1.51), Japan (1.29), etc. In terms of per capita emissions, the list reads US (19 tonnes/year), Canada (16.7), Russia (10.9), Japan (10.1), South Korea(9.9), EU (7.8), China (4.2), India (1.4), etc. To illustrate the low per capita emission level of India, note that the per capita CO_2 emitted by one human being just on account of breathing alone is 0.3 tonnes per year!

If we look at the GDP intensity of CO_2 emissions — the GDP output per tonne of CO_2 emitted, the results are interesting. Among the major economies, Switzerland scores very high with $8902 per tonne CO_2, while France, which secures a large part of its energy from nuclear sources, has a figure of $5,373. Figures for other major emitters are China ($450), the US ($1936), the EU ($3896), Russia ($388), India ($497) and Japan ($3,663). These figures reveal clearly how much more can be done by countries with available technologies.

OPTIONS BEFORE INDIA, CHINA

Clearly, there is plenty of scope for major emitting countries, including India and China, to improve their carbon footprint by using present technologies, while meeting their GDP growth needs. If India were to use existing technology to raise carbon intensity of GDP from $497 to $2000, the present US level, it could reduce emissions by a factor of two while doubling its GDP.

To remain within the identified global red line, CO_2 emissions must be cut drastically and immediately.

India has been resisting pressures for targets for climate change actions it can undertake. It would make some sense to consider a target for carbon intensity for India of $2000 per tonne of CO_2 by the year 2030, provided access is available to technology and financing on reasonable terms. This target would not compromise its growth requirements, while encouraging green technology. A by-product of this target would be to drive India away from its crippling dependence on fossil fuels whose import burden is becoming unsustainable.

Such a target would need a multi-pronged effort at the national level, including technology and economic incentives, such as a carbon tax which could support low CO_2 intensity activities.

Unfortunately, government seems reluctant to bite the bullet and go in for a carbon tax perhaps due to the economic downturn. A carbon tax would stimulate consumers and producers to go in for green technology and ultimately make India more competitive globally, while making it a potential exporter of green technologies and related equipment and services.

There is growing recognition that the solution to our climate change problem has to be based on a multi-pronged approach. The key elements of this would be a major shift away from fossil-based fuels for commercial energy and transport, use of large-scale renewable energy, wind and solar energy, nuclear energy, biofuels, CO_2 removal and sequestration, and energy efficiency. This includes massive research and development to bring on stream, store and utilise such forms of energy on a commercial basis.

Fossil fuels represent a small fraction of solar energy trapped in biomass over millions of years. Wind, hydro and wave energy also are derived from solar energy. Large-scale nuclear energy brings with it the problem of storage of radioactive waste for thousands of years, an expensive proposition. For India, energy policy has an impact on survival.

SOLAR ENERGY POTENTIAL

The sun, a free nuclear reactor situated 160 million km away, showers India with 600,000 gigwatts (GW) of energy, about 4-7 kwh/square metre. Comparing this to our present production of 150 GW shows that using only a small part of this would solve our energy problems. Even with only 20 per cent efficiency solar photovoltaics can contribute significantly. The solar power mission of 20 GW by 2020 is welcome, but needs to be ramped up by a factor of five at least.

The government should move forward with much more and comprehensive incentives for solar power to consumers and producers at industrial and retail levels as has been done in many countries in Europe and East Asia.

In ancient days, we prayed to the Sun god Surya, the source of life and sustenance, whose blessings we receive in the form of ample energy. We need now to translate this prayer into refocusing our relationship with Surya as our main energy source.

(The author is former Ambassador to Cuba and Greece.
blfeedback@thehindu.co.in)