

Getting Rid of CO₂

CO₂ is a major constituent of Greenhouse Gas. The volume of CO₂ in the atmosphere has been continuously increasing. It has been acting as a screen around the globe preventing reflection of the heat rays generated by the Sun on the surface of the earth. It has been identified as the main agent responsible for global warming. Scientists have been working to devise means for getting rid of CO₂.

CO₂ is produced by the burning of coal. It is not possible to clear CO₂ as long as coal is burnt. The best way to get out of CO₂ would be to find a substitute for coal. Various attempts are being made to find a suitable substitute for coal. A number of promising agents are already in the experimental stage. Some of them are fairly in advanced stage for application. However, it will take a long time to bring them at operational stage to compete effectively with coal as substitute. Among the substitute fuels being considered are natural gas, hydrogen and fuel cell.

It is necessary to consider some immediate measures moderating the growth of CO₂ in the short run. The short term solution can be worked from two sides. One, from the supply side and the other from the demand side.

On the supply side, reduction in the volume of emission of CO₂ reaching the atmosphere can be achieved firstly, by increasing efficiency in combustion of coal through technological change and operational improvement. It has been possible to generate more energy per unit of coal burnt through these measures.

Secondly, afforestation is a well recognized process for absorbing CO₂ during the growth of trees and plants. Considerable part of CO₂ is captured in what is known as sink in nature. They are the water bodies, ocean, lakes, tanks and even ponds dispersed all around the globe. The capacity of natural sinks is impaired by pollution of water bodies by human activities. The damage to the sinks can be repaired and the capacity of the sinks can be extended by concerted efforts of the human agents.

Thirdly, steps for capture of CO₂ after its generation through a number of measures. Storage of CO₂, termed as sequestration, in deep bed of geological structure can be used under pressure to push out methane or natural gas for practical use. The idea of sequestration of CO₂ in the, capture and storage of CO₂ in depth of ocean or in deep interior of earth is now being seriously considered by scientists. A number of projects are being executed with some degree of success. It is the technology designed to limit emission of CO₂ in the atmosphere. This is expected to buy time for conversion to a more eco-friendly non-fossil energy source. Geological storage of CO₂ is favoured to depth of at least 800 meters, where CO₂ becomes as dense as the brine is displaced at that depth. A number of experiments have shown that fluids like CO₂ which are less dense than water, can be stored safely. There is however a risk of leakage of CO from

its storage over long time. IPCC experts acknowledge that site monitoring may be required for very long periods. The challenge of detecting and addressing leaks is a large one. Long term liability issues associated with CO leakage remain to be resolved.

A switch-over from fossil fuels to renewable sources of energy is now being pursued widely across the countries. Wind power has gained acceptance by a large measure. Small hydel power being less damaging to ecology than the large dams has found acceptance by the people. Solar PV cells are now in use in dispersed areas in various countries.

Intensive use of energy in exploiting ground water for cultivation has been responsible for decline in the nature's capacity for storage of underground water. There is now greater appreciation that better use of surface water through rainwater harvesting can relieve the need for excessive exploitation of underground water.

As is evident from experiences, there are two ways in which the human agents, whose hands in the present state of affairs cannot be denied, can intervene to remedy the situation. Firstly, the scientists need to pay much greater attention to devise means to counter the damages caused by technology or human activities.

Science and technology have been the harbinger of prosperity for mankind. Such advances, it was seldom realized, could result in major disasters later. Innovations in science are often followed by adverse impacts that could not be foreseen earlier. History of science abounds of such examples. Science progresses through finding means to meet the challenge of the adversity. Sooner or later some solution is found to the problem identified by the scientists. But never in history had it taken the scientists as much time to identify the role of the Greenhouse Gases contributing to global warming. It took more than two centuries to realize that the planet earth had entered into a phase where some of the processes in nature turned out to be irreversible. The scientists lost nearly three decades to reach a consensus about the role of human agents in the phenomenon of global warming that was superimposed over the nature's long cycle of geo-climatic nature. Several approaches as referred earlier are now being followed by scientists to remedy the situation. The pace of development has however been much too slow in relation to the urgency of the situation.

There are reasons to hold that the tardiness in the emergence of appropriate technologies has not been due to any lack of interest on the part of the scientists, but due to factors beyond their control. Adoption of any new technology in the society does not depend on its superiority over the established ones in technical terms alone. It has to be economically cost-effective to attract entrepreneurs to invest on it. If the market system was truly free so that any entrepreneur had equal opportunities to access it compete with others on equal terms, the technology would adopted by one or more of them. Such conditions are rare in modern industrial society where the market is dominated by a small number of large monopoly enterprises in most of the sectors. The latter can adopt the new technology for itself if it does not imply radical restructuring of

its own infrastructure. If it is otherwise, they will resist the new technology by all means. This is evident in the automobile industry. Transport is the biggest user of energy after industry. It contributes to generation of CO₂ in a big way through combustion of hydrocarbon in the engines. Various means have already been devised to substitute for combustion of fossil fuel in IC engines. Hybrid diesel-cum-battery operated vehicles are now in advanced stage of research. Fuel cells are also being fitted on automobiles to supplement the existing source of energy for driving. It is still in experimental stage

The search for an alternative fuel for cars has been pursued over more than a decade, many projects being sponsored by the manufacturers of automobiles themselves. It is a general experience that every year, in the annual international exhibitions of automobiles, all the big manufacturers present models of cars of exotic varieties of innovative nature. Some of them are hybrid variety run on electricity charges batteries, some equipped with fuel cell and hydrogen as basic fuel. Public is assured every time that the commercial version is to be launched very soon. Such promises are yet to be fulfilled.

There remains much to be stated on the demand side. On the demand side for management of CO, there is an overwhelming need to change the life-style based on energy intensive products and activities. Various measures for saving of energy in production of commodities and services for human needs have to be adopted.

All demand for products in a society can be traced ultimately to individual consumers living in it. CO₂ is generated in the process of production in industry. In the textbook of economic theory it is argued that in a market economy, it is the consumer who determines which goods are to be produced by the manufacturers to satisfy his or her demand. The consumers are supposed to be sovereign in a competitive economy. This is no longer true in the modern industrial society where big monopoly organizations are the dominant players in the market. In this kind of market, the big producers not only manufacture commodities but also manufacture demand for the commodities by the consumers. The big producers have under their control the powerful instrument of the media through which they can continually persuade the consumers to purchase their products. Appearance of new products through the efforts of the producers is to be welcome always. But when the market is heavily loaded in favour of the big producers, there is no way of knowing if such products were not eco-friendly as it turned out in the case of Coca Cola in India.

Consumers are to be educated about the need for restraining demand for goods and services that utilize fossil fuels generating CO₂. Wherever possible, services of alternative sources of energy like Solar Photo-Voltaic Cells, Wind mills, hydel and bio-mass generated energy could be used. There are ways of saving energy even when generated by fossil fuels. By way of illustration we may cite CFL and LED units that reduce the demand on energy significantly. Researchers are engaged in many countries including India searching means for meeting human needs avoiding generation of Greenhouse Gases as CO₂ and methane in the process. Many of the alternative sources of energy and heat can be fruitfully utilized when there is awareness among the people

about the impending danger of the global warming. An enlightened population would be more willing to accept a change in their life-style to meet the challenge of the climate change. The scientists have the responsibility to generate such awareness.

~Prof. Deb Kumar Bose