

How to Control Global GHGs? A Radical Perspective



Dr. Mahendra Prasad*
Former Director
National Sugar Institute, Kanpur

***Presently at School of Engineering Sciences, Simon Fraser University, Burnaby
B.C., Canada**

There are a few fundamental remedial measures that are to be taken at the Global level to virtually eliminate greenhouse gases to reduce the warming of our environment. The policy and the actions are learned and framed from our experiences in other areas of successful exploitation of the techniques and regulations. The following are key-ideas that are to be transformed into giant-projects in all sectors wherever greenhouse gases are produced.

1. Tap the green house gases at the source appropriately in a suitable removable and replaceable container to prevent GHG going into the atmosphere.

Under this heading, it is proposed that we need to manufacture suitable containers that could be fitted into the boot space of the vehicle or an appropriate part of the body in which emitting gases will be stored. The container should be removable easily at GHG processing Plants to be set-up adjacent to the existing stations. The container will be fitted with pressure gauge and regulator that indicates whether the container is full or not. Thus it will become a routine work that when you do your petrol or diesel tank full, get your container filled with GHG removed and replaced which will be adjacent to the gas station (petrol pump). This procedure of handling container filled with GHG should be made mandatory.

The present system to decrease GHG caused by automobiles is done by the reduction of these gases within the engine and exhaust pipe by newer techniques. This methodology is analogous to a man eating a normal meal and making maximum blood and energy but minimum waste inside the body. This methodology of minimizing human waste is against nature. The production human waste from our body is reasonably fixed and we living being has to manage it and of course, we are doing it quite efficiently.

For other major GHG emitting sources such as chimney of the factories and thermal power plants, the authorities/ administrators/ managers have to make modification in chimney such that GHG can be collected and stored greenhouse gases can be transported to the GHG processing plant to be installed in the vicinity of petrol pumps. Alternatively, the factories or power plants may set-up their own GHG processing plants. In this write up these new ideas are spelled out. The actual work will involve the details of projects for the collection of a huge quantity of greenhouse gases at the source for which the concerned authorities, engineers and technologists will work out the project details responsible for commissioning and operation of GHG Processing plants.

We need to think GHG as a by-product of whatever sources we are generating from this. The by-product must be turned into a useful commercial product for the society to prevent the global warming of our environment.

Taping of GHG (greenhouse gases) at the source may invite critics to hear at first in our country but this is the thing that looks the most effective and sustainable way of decreasing GHG in the atmosphere. When we can build large sky-trains and large aeroplanes and rockets for mass transport and space travel and monitoring weather why can't we attach a container in the automobiles to store the produced gases after burning the fuel and relocate the container at processing plant of greenhouse gases? Are we not collecting the other waste at source and dumping it at appropriate places? Yes, we do. Therefore let us store the greenhouse gases at the source and convert GHG into useful building materials, chemicals, fuels, and polymers etc. imagine the implications of this kind of projects for huge job potential in the entire country. Even if we do this at lower scale our intention demonstrates to the world that it is indeed a sustainable positive step in our part to reduce the greenhouse gases in the environment.

2. Transportation of stored GHG to the processing plant station

The GHG Processing Plant Station (PPS) is to be commissioned adjacent to the petrol pump. The job of the GHG Processing Plant Station is to analyze and segregate the constituents such as gases, moisture, solid particulates and or any other substances present in the mixed GHG. The main objective of PPS will be to transforming GHG into useful products, for example, CO₂ may be converted to dry ice, it can also be converted to calcium carbonate, a useful building material, sulfur dioxide can be converted to inorganic chemicals, nitrous oxide can be used to prepare nitric acid and

nitrates and organic based gaseous products could be transformed into polymeric substances. All these chemicals and materials can find applications in laboratories and industries.

In general what is proposed here is to treat a huge amount of greenhouse gases produced in our country as a new raw material for a large-scale chemical industry. Such chemical industry does not require foreign assistance of three Ms-money, materials and manpower. Everything is indigenous. The net gains are multiples such as reduction of GHG, production of new chemical products, a large number of employment of technical and non-technical persons and saving of considerable amount of foreign exchange.

3. Transformation of different constituents of GHG into usable commercial commodities at all places wherever is the source of GHG.

These major steps are to be taken in all cities and places that emit greenhouse gases by administrative machineries of Central and State Governments in the country.

Air-pollution that causes environmental warming is a part of our way of life and one has to learn to live with it without getting its influence on our lifestyle. Our inventors have spent their time and labour and after struggling a lot we have vehicles for our conveniences. Therefore stopping or minimizing the uses of transport is not a reasonable solution, instead of finding an alternative to deal with greenhouse gases should be our goal. There are several approaches to reduce GHG caused by vehicles, for instance, battery operated vehicles, fuel cell operated vehicles and hybrid type vehicles. However, we are not yet successful to manufacture these kinds of vehicle for common people due to uneconomical reasons. Imagine a situation faced by our great grandfathers centuries ago of uncontrollable human-refuse prior to the development of an appropriate and satisfactory sanitation system. People would have been frustrated but they struggled a lot before reaching a practical and sustaining solution to handle the huge quantity of human waste. Today we are using the sanitary techniques developed by our forefathers to handle these kinds of human refuse on large scale in the whole world. Therefore, why not control the greenhouse gases at the source and let us not allow GHG to get into air/environment.

Is tapping green house gases at the source not a sustainable idea?

My idea of sustainable handling of a huge quantity of greenhouse gases produced in developed, being developed and other countries was conceived from the house-sanitation system that is working satisfactorily in every home, offices, and hotels etc.

Our present knowledge and understanding of chemistry, physics, and engineering of gas handling techniques are matured and robust to manage the emission, separation, and conversion to usable products of GHG produced at different sources in the world. It is anticipated that policy, regulations and the methodology worked out at Provincial and Central Government level will be able to control global warming without any kind of blame on anyone.

Paris Meeting on Global Environmental Warming: India's Contributions to Green House Gases & a Sustainable Approach

What is the most alarming? The most alarming thing that comes to my mind is the pressure technique applied to India to reduce GHG to the limit of 1.5 degree Celsius on the basis of its relatively larger contribution in the global arena. India is a big democratic nation of a multicultural population. In a country like this larger production of greenhouse gases is bound to come. It does not mean that in order to decrease the production of greenhouse gases the best option is the generation of power by nuclear power plants. The developed countries like Germany, United Kingdom, USA, and some European countries are working on sustainable energy resources seriously so that they can reduce or get rid of nuclear power plants based on fission technology. India is very rich in solar energy. So why can't we in India vigorously concentrate on harvesting solar electricity?

Economics of Nuclear and Solar Electricity

Most recently it was announced by the Government of India (Hindustan Times, dated December 24, 2015 pp-12) that six nuclear power plants will be commissioned at cost of \$150 b, that is expected to generate 63000 MW. Let us look at a glance the cost of this voluminous electricity by Si-solar cell technology. The cost of generating 63000MW by solar cell technology @Rs. 70 per watt turns out to be Rs. 4410×10^9 . This solar cell technology is quite robust and is expected to last at least 25 years without any further cost of material. Finance involved in six nuclear power plants, \$150 b, @Rs. 67 per \$1 converts to Rs. 10050×10^9 which is greater by a factor of 2.28. Moreover, India has to procure fissionable nuclear materials from different source against foreign exchange and that cost is added on the top of \$150b. there may be arguments, criticism, and discussion about the procurement of land area of for solar cell technology to generate power for which we have to work out the new methodology of commissioning solar panels without acquiring huge land area.

It is shown here with this simple calculation that in India where solar radiation and solar thermal energy is so huge that nuclear plant would not be economical. Remember that solar cell technology is cleaner than nuclear technology.