SHORT COMMENTARY

A remedy to global warming and the energy crisis

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We are living in an era of tremendous technological innovation, development, and prosperity, all of which are fuelled by energy. Since the 1860s, the industrial revolution and exponential urbanisation have resulted in a huge increase in carbonaceous emissions into the atmosphere, which has contributed to the majority of the unprecedented global warming over the previous decade. Smog hanging over cities is the most visible and well-known kind of air pollution that has become a common occurrence.

As a result, CO_2 accumulated as carbohydrates by photosynthesis over millions of years is being restored to the atmosphere at an alarming rate. These activities have had a significant influence on the natural carbon cycle, which is no longer sufficient to maintain the carbon balance throughout the many environmental sectors. The concentration of CO_2 in the Earth's atmosphere is rising dramatically faster than at any other time in Earth's history, and this phenomenon is projected to have a significant impact on the Earth's climate as well as human civilization. As a result, it is correctly predicted that the oil era would end long before the Earth runs out of oil, due to emission restrictions governing the use of fossil fuels. CO_2 emissions come from a variety of sources, which can be classed as fixed, mobile, or natural. The power production and manufacturing sectors provide the majority of CO_2 emissions to the environment.

The flue gas stream from coal and natural gas power generation consists mostly of gases such as nitrogen, CO_2, water vapour, oxygen, soot, CO, nitrogen oxides, and sulphur oxide. Such activities have pushed enough CO_2 into the atmosphere during the last 150 years to drive the atmospheric CO_2 level above the lethal 400 ppm line. Due to the presence of water vapour and all contaminants, which are likely to decompose/poison most catalysts and reduce the efficiency of CO_2 conversion, no conventional methods have been established to successfully convert CO_2 from these streams. To combat global warming, a number of actions must be implemented, ranging from private houses to large-scale enterprises. The "carbon footprint" (the amount of CO_2 a person is responsible for releasing into the environment) can be reduced on a personal level by engaging in activities such as driving and flying less, recycling, using energy-efficient equipment, and so on.

To address the threat of global warming on a bigger scale, governments are adopting steps to control CO_2 and other greenhouse gas emissions. The Paris meeting, also known as COP21 was the annual meeting of the Conference of Parties (COP) to the Framework Convention on Climate Change of the United Nations (UNFCC). During COP21, policy professionals, scientists, and climate economics from 118 countries voluntarily agreed to take action. To tackle climate change, with the ultimate objective of limiting the post-industrial world temperature rise to less than 2 degrees Celsius. Another approach is to levy taxes on carbon emissions or raise gasoline taxes, so that individuals and businesses have stronger incentives to conserve energy and pollute less.

The EPA (United States Environmental Protection Agency) has enacted numerous laws known as a "clean power plan" to limit carbon emissions from power facilities. In 2015, the Obama administration in the United States created a plan to reduce CO_2 emissions from electricity producers. A few other governments attempted to implement a comprehensive set of climate solutions, such as increasing renewable energy usage, increasing vehicle fuel efficiency, developing a clean energy economy with the help of fundamental science and translational technology, limiting carbon emissions through the implementation of a carbon tax, reducing tropical deforestation, and so on.

Although the above mentioned large- and/or small-scale measures can aid in pollution control, they are insufficient to address the problem caused by exponential urbanisation. Aside from all of these measures, the scientific community is already working to regulate excess CO_2 through technologies such as collecting and sequestration. However, these technologies have significant limitations due to saturation/permanency constraints in CO_2 capture or sequestration. As a result, the ultimate solution that does not impede industrial expansion and urbanisation is the efficient conversion of CO_2 into fuels, chemical feedstock, concrete, home items, and anything else that may be utilised in our daily lives.

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