

From Colombo to Copenhagen - A Road Map

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Part 2: The Cause: Burning of fossil fuel

The reason for the climate catastrophe is global warming. Global warming is the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century. Global surface temperature has increased 0.74 ± 0.18 degrees Centigrade during the last century and it will continue to increase to catastrophic proportions by the end of this century. The reason for global warming is increased concentration of Greenhouse Gases (GHG) in the atmosphere.

Greenhouse gases are gases in an atmosphere that absorb and emit radiation within the thermal infrared range and those gases greatly affect the temperature of the Earth; without them, Earth's surface would be on average about 33 degrees Centigrade colder than at present. Presence of GHGs in the atmosphere is important to maintain the global average temperature and this process is called the greenhouse effect. The main greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

The contribution to the greenhouse effect by a gas is affected by both the characteristics of the gas and its abundance. For example, on a molecule-for-molecule basis methane is about eight times as strong a greenhouse gas as carbon dioxide, but it is present in much smaller concentrations so that its total contribution is smaller. When these gases are ranked by their contribution to the greenhouse effect, the most important are: water vapor, which contributes 36–72%, carbon dioxide, which contributes 9–26%, methane, which contributes 4–9%, and ozone, which contributes 3–7%.

Greenhouse gases are needed to maintain the global temperature at a level that is habitable to the human being; however abnormal increases in GHG concentrations leads to an environment that is uninhabitable not only to human beings but to a large percentage of living organisms. Something extraordinary is happening in the atmosphere since the industrial revolution. Global atmospheric concentrations of CO₂, methane (CH₄) and nitrous oxide (N₂O) have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years.

Atmospheric concentrations of CO₂ (379 ppm) and CH₄ (1774 ppb) in 2005 has exceeded the natural range over the last 650,000 years. Global increases in CO₂ concentrations are due primarily to fossil fuel use, with land-use change providing another significant but smaller contribution. The observed increase in CH₄ concentration is predominantly due to agriculture and fossil fuel use. Methane growth rates have declined since the early 1990s, consistent with total emissions (sum of anthropogenic and natural sources) being nearly constant during this period. The increase in N₂O concentration is primarily due to agriculture. The share of different anthropogenic GHG in total emissions in 2004 in terms of CO₂ eq. is: fossil carbon 60%, bio carbon 17%, Methane 14%, and N₂O 8%.

While the carbon balance of the planet has been greatly modified by post industrial human activity, it is the 'fossil trigger' that introduced an increasing increment of 'new' carbon into the atmosphere. The fossil carbon stock on earth is estimated as 1,380,000 GtC whereas biotic carbon stock is 2,193 GtC. Due to post industrial human activity the amount of the carbon stock in the atmosphere and ocean surface

has increased by another 1720 GtC generating the scenarios/outcomes that are leading towards climate catastrophe.

Carbon is the basic element that anchors all organic substances, from fossil fuels to DNA. On Earth, carbon cycles through the land, ocean, atmosphere, and the Earth's interior in a major biogeochemical cycle. As Dr. Ranil Senanayake has highlighted, the global carbon cycle can be divided into two categories: the geological/ancient, which operates over large time scales (millions of years), and the biological/modern, which operates at shorter time scales (days to thousands of years); the value differential produced by the biotic and the fossil must be recognized. Biotic carbon operates on time frames of tens or hundreds of thousands of years whereas fossil carbon operates on time frames of tens or hundreds of millions years. Further, fossil carbon is not interactive with the living or biotic cycle. Fossil carbon entering the biotic cycle is the fundamental reason why there is an acceleration of the greenhouse effect. There is no way to compare carbon from oil and coal with carbon from a forest. One has a niche in the biotic cycle while the other doesn't.

Global GHG emissions due to human activities have grown since pre-industrial times with an increase of 70% between 1970 and 2004. Carbon dioxide is the most important anthropogenic GHG. Its annual emissions grew by about 80% between 1970 and 2004. Why is fossil carbon released into the atmosphere in such large volumes by human beings? In 2004, the energy supply accounted for about 26% of GHG emissions, industry 19%, transport 13% and agriculture 14%. Additionally, gases released from land-use change and forestry accounted for 17%, residential, commercial and service sectors 8% and waste 3%. The major sectors contributing to fossil fuel burning are power, transport, industry and agriculture. The energy demand in these sectors increased enormously both due to population growth and growth in per capita energy consumption. Over the last 150 years, the population of the world increased from 1.3 billion to 6.5 billion - a 500% increase and per capita energy consumption increased by 900% since the pre-industrial age: it is no wonder global warming is happening. How can our mother earth bear this burden?

The culprits for emitting fossil carbon into the atmosphere are fossil fuels. The CO₂ emission per kilo Watt hour (kWh) from coal is 915 g, fossil oil 650 g and natural gas 388 g. At present, through burning coal, fossil oil and natural gas human beings annually emits over 28 billion tons of CO₂ into the atmosphere. This has been on the rise since the beginning of the industrial age. The developed world is not in a position to maintain its massive infrastructure without burning fossil fuel. The developing world is continuing to build its fossil fuel based infrastructure as quickly as possible to reach the level of the developed world. Can we imagine a world without fossil fuel based infrastructure? The root cause of the climate catastrophe is modern human civilization's addiction to fossil fuel for power generation, transport, industry and agriculture. Human civilization has reached the end of the fossil fuel era; unfortunately, this is a reality that politicians, policy makers and the global citizenry are reluctant to accept.

There are less than 60 days left to UNFCCC - COP 15: The Copenhagen Climate Catastrophe summit which is to be held from 7-18 December. World Leaders previously met to discuss this issue fourteen times (Conference of Parties- COP) since the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. All fourteen summits held previously ended with world leaders chasing that elusive goal of a “permanent solution” - and failing; their efforts, however, did contribute to the addition of tons of Green House Gases (GHG) to the atmosphere. Preparatory meetings towards Copenhagen this year indicate that it too will fall well short of the target. The negotiating table seems to be nothing more than a massive talk fest, the sheer scale of which is only matched by its complete uselessness. The tug-of-war between the North and the South continues.

Is there any way forward?

Sri Lanka played a pioneering role in the world in showing it how to wipe out terrorism –something that the entire planet earlier thought was impossible; why doesn't it take a similar role in avoiding the Climate Catastrophe which at present looks as impossible as the eradication of terror? This article is an attempt to identify a role for Sri Lanka at the Copenhagen summit.

Unfortunately it looks like the Sri Lankan society is ignorant about the Climate Catastrophe. The politicians, policy makers and everyone in favor of, or silent on establishing coal power plants in Sri Lanka have failed to realize the gravity of the situation. The article 'From Colombo to Copenhagen - A Road Map' attempts to give a simple and brief outline on the jargon related to the Climate Catastrophe and recommends a possible role for Sri Lanka. It consists of four parts Part 1: The Problem; Part 2: The Cause; Part 3: The Solution; & Part 4: The Path