Global Warming: Apocalypse or Hoax.

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July 2006

Global warming has many aspects and while listening to individuals focal on this issue, it seems that everybody is using only those aspects that most fit their own argument, which often also support an economical interest. Since global warming is the result of many natural and unnatural phenomena, all those arguments have some validity.

However, in order to evaluate the man caused impact on global warming, one first should be aware of all natural aspects.

The physical status of the troposphere, the atmospheric layer harboring most living things and all human activities, is gaseous, which means that there are much less molecules per gallon, compared to matter in liquid or solid status and they are also very free to move. Dry air contains 78 % nitrogen (N_2), 21 % oxygen (O_2).1% argon (Ar), while water vapors varies from 0 % up to about 4 %. Then there are a number of minor other constituents, such as carbon dioxide, nitrous oxides, sulfur dioxide, hydrocarbons (petroleum gas vapors and methane) and dust particles.

All these molecules can either adsorb or release heat, received from the sun during the day or from the earth during the night. Pending their atomic structure, some molecules can store more energy than others and also have different atmospheric lifetimes, as some of them are part of the natural life recycling processes occurring in the earth's biosphere.

All life on earth depends on how autotrophic life (algae, plants), by using photosynthesis (energy from the sun) splits water into oxygen and hydrogen The hydrogen is used with carbon dioxide and reactive nitrogen to synthesize organic matter, while oxygen gas is released. Heterotrophic life will use this organic matter, not only to synthesize its own cell tissue, but also as an energy source, by breaking down the organic matter to release the energy stored in it. As hydrogen in this organic matter is released, oxygen is required, which results in the formation of water. This process is called biochemical oxidation.

The simplest way to look at all these recycling processes is to compare it with building a structure out of LEGO blocks, with mainly four essential block elements; Carbon, Hydrogen and Oxygen (water) and "Reactive Nitrogen", whereby the energy of the sun is used to put the structures together and this energy is released when the structures are taken apart.

Prior to the 20th century, reactive nitrogen blocks limited the different life structures, in spite of the fact that 78% of the air consist out of nitrogen gas. This form, due to its strong bond between the two atoms, is not available for life structures, but when broken down into individual atoms, "reactive nitrogen", they become an essential element for life. In nature this break down process occurs by bacteria living on the roots of plants and by lightning.

Scientist at the start of the 20th century, when one billion people were alive, were afraid that the natural processes to make reactive nitrogen, were not sufficient to grow food for the increasing human population. This fear was alleviated after Dr. Haber, a German Scientist, developed a process to synthesize ammonia (another form of reactive nitrogen) for which he received the Nobel Price in 1918.

Certainly this was a blessing for mankind, as it is presently estimated that 30% of the reactive nitrogen in the proteins making up a human body, originate from a fertilizer industry. However, it will also be a challenge for the future as most of the synthesized fertilizer (reactive nitrogen) will end up in the biosphere, where it will stimulate other, often less desirable, forms of life. This increased presence of reactive nitrogen will not only impact the Earth's biodiversity but also will have an impact on global warming.

The unnatural aspects causing global warming are the release of energy from organic matter using chemical oxidation. The ability to make fire undoubtedly changed the status of men on earth. While first wood was used as the energy source of this chemical oxidation (combustion), it later was augmented with peat, coal and during the past century with hydrocarbons (oil and gas), all forms of organic matter, formed in the past and stored (sequestered) in the earth's crust.

To release the energy in this 'sequestered' organic matter, oxygen is required for which air is used. This exposes nitrogen gas in the air to high temperatures and nitrous oxides are formed. Since the organic matter often also contains other elements, the result of this chemical oxidation (burning) process is besides carbon dioxide and nitrous oxide, other compounds and particles often causing air pollution and thereby effecting public health.

Although public health issues certainly are very important, they are not further addressed, in order to focus on the phenomena impacting global warming, mainly carbon dioxide, nitrous oxide and particles, responsible for the dimming of the sun.

The increase of carbon dioxide in the atmosphere, especially as the result of 'sequestered' carbon matter is well documented, but concentrations are still small, compared to the presence of nitrogen and oxygen gas. Its concentration is believed to have increased from 296 ppm (part per million) in 1900 to 345 ppm in 1988, a 16 % increase in 88 years.

The increase of reactive nitrogen is much more difficult to determine, as we are dealing with different reactive nitrogen compounds, not only in the atmosphere, but also in the soil and in water. However, with a global production of synthesized nitrogen fertilizer from 4 million tons in 1950 to 100 million tons in 2000 its increased presence in the biosphere should be obvious.

One reactive nitrogen compound in the atmosphere is nitrous oxide, a compound that not only adsorbs roughly 200 times more radiation as carbon dioxide, but also has an atmospheric lifetime longer then a century. Its atmospheric concentration increased from 300 ppb (parts per billion) in 1978 to 315 ppb in 2000, a 5 % increase in 22 years.

Any excess applied fertilizer, not directly used by the roots of plants, will either runoff with rain, penetrates the soil and gets into groundwater or is volatized and gets into the air.

Heterotrophic life, after breaking down organic matter, especially proteins, will reject carbon dioxide and urine. Urine is an organic form of reactive nitrogen, which quickly transforms into ammonia, again another form of reactive nitrogen. As one can smell ammonia, it also means that it gets into the air.

The urine in sewage, especially manure from CAFO (Confined Animal Feedlot Operations) becomes ammonia and if not oxidized and reduced into nitrogen gas, will either end up in open water or in the air. The fact that EPA does not consider nitrogenous waste pollution intended to be addressed in the Clean Water Act indicates the problems regulatory agencies have with how 'polluting' reactive nitrogen is, not only in our open waters, causing excessive algae and plant growth (eutrophication) but also in our atmosphere, where it causes "Green Rain". Rain containing fertilizer and responsible for the excessive grass and brush growth on land. This in turn, during periods of droughts, provides the fuel for the severe forest fires, we daily see on our TV screens. Fires no so severe that also large trees catch fires and when their root systems can not hold the soil, soil erosion will occur.

The lifecycle of oxygen is also very important, while created by autotrophic life splitting water molecules, it is essential for heterotrophic life, especially those higher form, who depend on lungs to transfer the oxygen into their blood, where it with the hydrogen split from the organic matter forms water again and together with the urea (reactive nitrogen) is rejected as urine.

The use of oxygen for chemical oxidation of sequestered carbon is enormous, not only for the convenient, but also extremely wasteful generation of electric energy and of course for the combustion engines in cars. Even a small car will use as much oxygen as 2000 people. One third of the oxygen presently produced originated from phytoplankton in the oceans, while two third comes for plants and trees on land.

With an increased concentration of carbon dioxide and 'reactive nitrogen' one could claim that this condition would result in more autotrophic life and thus more oxygen. This argument would be valid, if only also water would be available, which is not always the case.

Another fact, often overlooked, is that plant cells have two energy cycles, one is photosynthesis producing oxygen, while the other, very similar to the one used by heterotrophic, actually requires oxygen.

Open water containing algae during the day, will have high concentrations of dissolved oxygen, while during the night this concentration will drop.

All this raises another concern dealing with the dimming of the sun, when pollution particles in the air become a nucleus for water to condensate and become small mirrors, reflecting the sun rays. It is presently estimated, that where the air contains these particles, mainly above the industrialized world, half the impact of global warming is neutralized. What the impact is on photosynthesis, thus production of oxygen, is still an open question.

However, since these particles, are a public health hazard, regulations are introduces to reduce their presence, which if successful, consequently also will accelerate global warming. So will many alternative fuels, all claiming cleaner exhaust gasses.

Our present energy consumption clearly depend on the chemical oxidation of sequestered organic matter and combined with the yet unbridled increased use of synthesized fertilizer, which also requires huge amounts of energy, the nutrient enrichment of our biosphere inevitable will have its consequences, not only for the environment, like global warming and severe weather patterns, but also its biodiversity, especially micro organisms.

The need for alternative fuels is obvious, but when the release of energy depends on chemical oxidation (using air) it only will delay the inevitable. The solution therefore should be focused on how nature uses energy, i.e. by splitting water in hydrogen and oxygen. Hydrogen gas can be directly used in combustion engines to power transportation, while it also can create electricity in fuel cells to power our household electrical needs.

The later technology may not yet have been developed for economical application, but this will be achieved if our government would initiate and focus on a hydrogen-based energy program. Government intervention will be necessary as the present sequestered carbon based energy corporations will try to hold on to the power they now have.

This would take care of the use of sequestered organic matter, while education should take care of a better use of synthesized fertilizer. A good first step would be to force EPA to implement the Clean Water Act and not allow American rivers to be used as giant urinals.

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