Heat as A Cause of the Global Climate Warming

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ABSTRACTS: *Experimental-statistical equations are proposed for calculating the results of fossil fuel combustion. The calculation is illustrated by the example of fuel combustion by engines of a Boeing series aircraft.   The main supplier of energy to the ecological system of Planet Earth is the Sun. Mankind produces about 1% of the thermal energy that comes from the Sun to the Earth's surface in one hour. It is expedient to reduce Global Warming by 1.5 - 2.0 degrees by installing a "Solar Umbrella" in the stratosphere - a filter for infrared (thermal) radiation from the Sun*

KEYWORDS: global warming, thermodynamics, heat, thermal energy production, sun umbrella.

INTRODUCTION

Production of Thermal Energy
Chemical reactions can elapse with absorb heat (endothermic) or release heat (exothermic). One of the founders of thermochemistry Hermann Hess[1] formulated its Laws in the first half of the 19th century. Heat producers are only interested in exothermic reactions. Reference books have been compiled for a long time, in which data on the heating value of fuel are collected. These data are used in the design and operation of Thermal and Nuclear power plants, internal combustion engines, and so on. In the first half of the 20th century, methods of experimental-statistical modeling began to be created, which made it possible to move from a qualitative description of the results of an experiment (observations) to an analytical description in the form of equations.

The combination of thermochemistry methods and experimental-statistical modeling made it possible to propose equations for calculating the amount of heat generated during the combustion (oxidation) of fossil fuels and the chemical compound of the fuel in terms of the amount of heat produced[2, 3]. Fuel of organic nature releases heat in the course of the oxidation reactions called burning. Quite another nature is possessed by nuclear fuel, the employment of which   to produce heat and electric power was only mastered in the second half of the 20th century. Nuclear fuel releases energy as a result of fission of the nuclei of uranium-235, a uranium isotope.

The primary reason for the use of any type of fuel is **the production of thermal energy.** Combustion of a carbon-containing fuel is a process of oxidizing the oxidizable components of the fuel by the

atmospheric oxygen (23.2% by mass). The products of burning a carbon-containing fuel are **hea**t, and carbon dioxide (CO_2), and water (H_2O), when a hydrocarbon is burned.As it is clear from equations oxidation of hydrocarbon fuels and the Law of Conservation of Mass, weight of gaseous discharge from the engines of cars, aircrafts and ships, and from power-production plants, especially from thermal power plants, exceeds the weight of the fossil fuel..To calculate the mass of carbon dioxide and water discharged into the atmosphere when burning 1 ton (t) of fuel, as well as the mass of oxygen consumed from the air to oxidize 1 ton of hydrocarbon fuel, we can use the equations below. The equations hold true within a sufficiently wide range of the fuel compositions burned, and represent regression models obtained by processing the data of stoichiometric calculation. In calculating, it was assumed that going out of the chemical reaction of the fuel oxidation amounts to 100%. In the case of coal being burned we shell assume that it is anthracite, which is practically one hundred percent carbon. It should be noted that the dependent variable is a dimensionless value since it defines the number of tons of the reactant product or reagent formed by burning a ton of fuel.

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$$CO_2 = 0.03664 * C_\% \qquad (1)$$

Where $C_\%$ is the percent content of carbon in a ton of fuel ($C_\%$ varies from 0 to 100%).
The multiple correlation coefficient[4] $R^2 = 1,0000$; standard deviation[5] $s = \pm 0,0001$.
The mass of water result the oxidation of a ton of **hydrocarbon** fuel is

$$H_2O = 8.937 - 0.0894 * C_\% \qquad (2)$$
$$R^2 = 0.9999, . \quad s = \pm 0.003$$

The mass of oxygen consumed to oxidize one ton of hydrocarbon fuel amounts to:

$$O_2 = 7.941 - 0.05278 * C_\% - 4.5 * 10^{-4}/H_\% \qquad (3.1)$$
Where $H_\%$ is the percent content of hydrogen in a ton of fuel.

$$R^2 = 0.9999, . \quad s = \pm 0.001$$

If we assume that hydrocarbon fuel contains only carbon and hydrogen, then equation (3.1) can be simplified

$$O_2 = 7.941 - 0.05278 * C_\% - 4.5 * 10^{-4}/(100 - C_\%) \qquad (3.2)$$
Since the air contains 23.2% oxygen by mass of air used to oxidize 1 ton of hydrocarbon fuel amount to:

$$Air = 34.2 - 0.2276 * C_\% - 1.94 * 10^{-3}/H_\% \qquad (4)$$
$$R^2 = 0.9999, . \quad s = \pm 0.001$$

And finally, the main point: the amount of **heat generated** at burning one ton of hydrocarbon fuel. Since anthracite is, in fact, carbone and the "average value" of its heating value amounts to 29500 kJ/kg, heating value of 100% hydrogen amounts to 141790 kJ/kg, we can calculate the **heating value** of the hydrocarbon fuel using the following formul

$$HV, kJ/kg = 295 * C_\% + 1417.9 * (100 - C_\%) = 141790 - 1122.9 * C_\% \qquad (5)$$
For reference: heating value of natural uranium amounts to 500,000,000 kJ/kg (215,550,000

BTU/lb).

EXAMPLE OF USING EQUATIONS (1) - (5)

The Boeing 737-800 passenger aircraft burns 5.7 tons of fuel per hour. The fuel for this aircraft is a mixture of hydrocarbons, the molecule on average contains 12 carbon atoms and 26 hydrogen atoms. The molecular weight of such a molecule is 170.33 grams. That is, such a molecule contains 85.25% carbon and 14.75% hydrogen.

Using equations (1 - 5), we find that **in one hour** a Boeing 737-800:
Produce thermal energy to heat the environment, 262613746 kJ = 262.61 GJ

Release as waste: 3.124 ton of **carbon dioxide**,
$\qquad\qquad\qquad$ 1.316 ton of **water**.
Therefore, Boeing 737-800 **consume** frome air
$\qquad\qquad\qquad$ 3.441 ton of **oxygen**.

To this end will pass through the combustion chambers of engines and will heat up to $1000\text{-}2400^0$ C 14.797 ton of air. If you multiply the above numerics by the amount of planes landing and taking off from the airport of a large city, it will become clear to you why it is somewhat warmer in the airport area than in an open field, the sky frowns more often, it rains more often, and also why it is a little more difficult to breathe.

GREENHOUSE GASES" AND GLOBAL WARMING

Mankind has learned to burn fuel to produce **thermal energy**. The science of **thermodynamics** also arose, which is translated from Greek as the **work of heat**. In recent decades, there has been a widespread view of the role of "greenhouse gases" in the Global Climate **Warming** of planet Earth. Since it is generally accepted that among the "greenhouse gases" 80% is carbon dioxide, thereafter will talk only about it.This point of view does not correspond to the laws that science has established over the past 400-500 years of its existence and has not been confirmed experimentally. And this leads to a large number of misunderstandings when trying to justify and apply it. I will limit myself to just a few examples.

a. The average person inhales the oxygen of the air, and exhales 30 g/h = 0.03 kg/h of carbon dioxide. Since there are 24 hours in a day, and 365 days in a year, a person exhales approximately 263 kg/year of carbon dioxide. As of April 2017 7.5 billion people lived on Planet Earth. Consequently, in 2017, humanity exhaled 1,972,500,000,000 kg of carbon dioxide, i.e. 1,972,500,000 ton = 1,972,5 Megatons of carbon dioxide. And humanity continues to breathe. Maybe this is the reason for the Global Climate Warming, and it's time to stop breathing in order to save life on Earth?

b. It is claimed that the Arctic glaciers are melting due to increased carbon dioxide emissions into the atmosphere.The concentration of carbon dioxide in the air of a large city, such as New York, where not only people, but also internal combustion engines exhale carbon dioxide, is guaranteed to exceed 10 times the concentration of carbon dioxide in the air of the Arctic, where there are almost no people or cars. But the Arctic glaciers for some reason are melting at a catastrophic rate. Does anyone remember in what year in New York from the high concentration of carbon dioxide in the air melted

the last glacier?

c. Newsmans claim that the task of the world community is to reduce carbon emissions to "zero". Carbon in nature exists in three crystallographic modifications, differing only in the structure of the crystal lattice: coal, diamond and graphite. I ask newsmans to indicate the airfield where diamonds fly out of the exit nozzle of the aircraft.

HOW TO STOP GLOBAL WARMING
The axiomatics of the proposed technical solution has been known for thousands of years. It is described in Encyclopedias and textbooks. Let me briefly remind you of it.

a. The main source providing energy supply to Planet Earth is the Sun [6].
The solar constant is the amount of energy the Sun releases per unit area directly exposed to sunlight. The solar constant is approximately 1368 W/m2 (watts per square meter) at a distance of one astronomical unit from the Sun (that is, on or near Earth).Sunlight on the Earth's surface is attenuated by the Earth's atmosphere, so less power (about 1000 W/m2) reaches the surface in cloudless weather, when the Sun is near the zenith. Recall that the Earth's atmosphere also includes carbon dioxide, one of the main components of "greenhouse gases".Sunlight in the Earth's upper atmosphere consists (by total energy) of approximately 50% infrared radiation, 40% visible light, and 10% ultraviolet radiation.We accept that only infrared (thermal) radiation heats the Earth's surface. Let us estimate how much thermal energy is delivered to the Earth's surface per year. Taking into account the fact that the "Sun is near the zenith" for approximately 1 hour per day, the amount of heat per square meter of the Earth's surface is 500:24 = 20.9 kWh/m2. The surface area of the Planet Earth is 510072000 km^2 (510.072*10^12 m2) [7]. Therefore, the amount of heat entering the total surface of the Earth is 510.072*10^{12}*20,9

$= 10635.0012*10^{12}$ kWh $= 10635.0012*1012*3.6*10^6$ J $=$
$=38286*10^{12}*10^6$ kJ $= 38286*10^6$ TJ.

Previously [3], we estimated the amount of heat produced by mankind from all types of fuel. In 2000 mankind produced 412*10^6 TJ of thermal energy. This amounted to 1.08% of the amount of thermal energy that the Sun supplied to the Earth. I remind you that this is provided that the Sun is at its zenith for only one hour a day.

b. On Planet Earth, a unique system capture and accumulating the energy of the Sun has arisen. This system is called **Life**. In the journal NATURE, an article on the fossil genome indicates the estimated time of the origin of **life** on Earth: 3 billion years ago. All these years, living organisms: bacteria, protozoa, mosses, fungi, plants, inhabitants of the sea, animals accumulated the energy of the Sun and turned it into fossil fuels.

c. The First Law of Thermodynamics says "Energy does not arise and does not disappear. It only changes from one form to another." The initial form of the **thermal** energy produced by humanity is farther transformed into mechanical, electrical, and so on. Carbon dioxide is not a form of energy, so thermal energy cannot be converted to carbon dioxide, and carbon dioxide cannot be converted to thermal energy.

The efficiency of Thermal Power Plants does not exceed 41%. This means that 41% of the heat released during fuel combustion is converted into electrical energy. And 59% of the thermal energy released during fuel combustion goes directly to heating the environment. The situation with Nuclear Power Plants is even worse. Only 33% of the thermal energy released during nuclear decay is transformed into electrical energy, but 67% goes directly to heating the environment. By the way, this does not generate carbon dioxide.A similar thing happens during the transition of thermal energy to mechanical energy in internal combustion engines. Considerable part of thermal energy goes to heat the environment.

d.Solar energy enters the energy system of the Planet Earth constantly, day and night. The First Law of Thermodynamics leaves no hope that the total amount of energy entering the ecological system of the Planet Earth, both from the Sun and from heat energy produced by mankind, will be able to be limited by the technology of converting energy from one type to another. In other words, stop Global Warming. Solar panels, biofuels, geothermal energy, tidal energy, and so on are all forms of energy that have already flowed into the energy system of Planet Earth. **By transforming energy from one form into another, it is impossible to reduce its total constantly increasing amount.** Or, as the summation rule in arithmetic says: the sum does not change from changing the places of the terms.

POSSIBLE SOLUTIONS TO THE PROBLEM OF GLOBAL WARMING.
There are two options for solving the problem of Global Warming.

a.To fix at the "zero" level the amount of thermal energy produced by humanity entering the Eco-system of Planet Earth. To do this, stop all power plants, all internal combustion engines, all nuclear reactors and engines, all metal smelting enterprises, all wars, and so on. But this will reduce (see paragraph 4.1.) only by 1% the total amount of thermal energy supplied to the Earth by mankind and the Sun.

b.To limit the amount of thermal energy entering the Ecosystem of Planet Earth from the Sun by an amount that reduces the average annual temperature at the surface of Planet Earth by 1.5 - 2 degrees Celsius. That is, to reduce the amount of thermal energy entering the Earth's surface during the year by $(617 \div 823) * 10^6$ TJ.

To do this, it is necessary to erectt in the stratosphere a "Sun Umbrella" - a filter of the frequency emitted by the Sun, which is responsible for Global Warming. If it is thermal infrared radiation, then such a heat filter can be water, which perfectly delays infrared radiation. Naturally, such a "Sun Umbrella" should be erect accordingry with certain rules and restrictions over selected areas of Planet Earth.

By the way, volcanologists note that in recent decades the number of volcanic eruptions and tsunamis (volcanic eruptions at the bottom of the ocean) has increased markedly. Maybe this confirms my point of view about the role of the First Law of Thermodynamics in Global Warming?

CONCLUSIONS

1. Discussing Global Climate Warming without even mentioning the Sun and the production of thermal energy by mankind is at least not logical.

2. Thermochemistry and experimental-statistical models make it possible to calculate the amount of heat produced and waste from its production: carbon dioxide and water, as well as the amount of air oxygen used.
3. It is possible to stop global warming only by reducing the amount of heat entering the ecological system of Planet Earth from the Sun.
4. The function of the filter of excess solar radiation can be performed by the "Sun Umbrella"..

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