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Contributions to Keep the Atmosphere Balanced: Unsuitable-Reductions of HC and CO Emissions from Mobile-Sources, Using COBMA, Impact Atmospheric Balance.

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Abstract - Despite continuous reports and stark warnings, from authorized sources, global air pollution continues worsening and global temperature increasing. These facts motivated us to present in this paper, new contributions from our theoretical-practical work on gasoline **Combustion Optimization by Magnetic Action, (COBMA)** in mobile sources, started in 2008. So far, global implementation of electric cars, and important proven actions, have not succeeded. Consequently, there is a low probability of implementing globally the proven magnetic action. We are convinced that if enough proven actions are not promptly implemented, we will have very soon a problem of catastrophic dimensions, worse than that of the present pandemic. With the aggravation that once, the sensitive stable balance of the Earth-Atmosphere system become unstable there will not be any action to restore it. Therefore, we continue making contributions, attempting to present, through the condition of the Atmosphere balance, a more comprehensive view of the real Climate-Change problem, and to attract the attention of organizations leading the Earth´s environmental protection, to considering global implementation of **COBMA**, despite they are devoted to assisting the international agreements, supported on diplomatic promises that, so far, have not globally accomplished its main goals due to the political and socio-economic gaps between countries. That view is based on information analyses, from authoritative sources and our points of view from experience. Its purpose is to favour **global Climate-Change Comprehension**, unavoidable for **synergistic work** and consequent mitigation of the anthropogenic impact on the Climate system. These ideas characterize our papers. The main goal of this paper is to show, from fuel consumption records, and gases emissions results obtained in Cartagena, Colombia, April-November 2019, in a Renault-Steway car, that excessive HC and CO emissions reductions, by magnetic action are unsuitable; though reduce considerably fuel consumption also contribute to increase CO2 emissions impact to the atmosphere.

Keywords: Fuel Consumption, COBMA, International Agreements, Unsuitable Emissions Reductions, Global Comprehension, Synergistic Work, Mitigation.

1. Introduction

Atmosphere stable equilibrium and its composition stability over hundreds of millennia, confirm that balance conditions rule our universe [1]. *Therefore, pollutants Abatement from mobile sources under analogous chemical reactions must not impact the atmospheric balance.*

1.1 Reports and Statements Show That Global Implementation of Proven Feasible Actions Is Crucial.

The outcomes of the last UN Climate Change summit, COP26 (26th Conference of Parties) cannot be dismissed in a paper whose main purpose attempts to favoring gases emissions mitigation, according with the global purpose of tacking the Climate Change holding the global average earth temperature well below 2°C. Therefore, it is unavoidable to have COP26 Report as the context and main reference of this paper and consequently **COP26 Report and Statements Summary** must be its introductory start point.

1.2 COP26 Report and Other Reports and Statements Summary

UN Glasgow Summit November 1-13, 2021, with participation of all those who have important roles in the Climate Change-Air Pollution issue, is in practice a last call to world political leaders to accelerate accomplishments of the Paris Agreement goals, especially, holding the increase in the global average temperature to well below 2°C above pre-industrial

levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change. Moreover, it is a set of initiatives to accelerate started actions and procedures in favor of that and other goals, to control Climate Change, implementing the retake of other actions and precising and agreeing new goals integrated in a new agreement called the **Glasgow Pact** [2], that globalize the integration of Mitigation, Adaptation, Finance and Collaboration, as well as a position on phasing down unabated coal power, for the first time agreed by a COP. This summit is really a completion and reinforcement of the Paris Agreement. In summary, It Finalises Paris agreement keeping alive the global temperature goal, 1.5ºc above pre-industrial levels. Statements about COP26 goals of fundamental importance and whose implementation is crucial, among others, are: **More needs to be done. We need to act now, Accelerate the transition from coal to clean power, Accelerate the transition to zero emission vehicles** [3]**, We can only rise to the challenges of the climate crisis by working together** [4]

New reports and statements from authoritative sources as WHO [5], on continuous air pollution worsening, from NOAA [6], who reported global temperature increase; global average temperature over the land and ocean surfaces for November 2021 as 0.91°C (1.64°F) above the 20th century average of 12.9°C (55.2°F), the fourth highest for November since global temperature records began in 1880, and COP26 statement; **The world is currently not on track to limit global warming to 1.5 degrees** [7]**,** are highly worrisome and force real actions to be taken right now. These and other reports, especially **COP 26** Report and Statements have given us motivation and justification to follow in our experimental work and presenting our papers on **Contributions to Keep the Atmosphere Balanced**. In this paper the ideas presented in RTESE´20 145 and 149 papers are reinforced. These ideas are supported and extended through new evidence from authoritative sources and our points of view based on experimental work on gasoline Combustion Optimization by Magnetic Action, (**COBMA**) in mobile sources, started in 2008. In new results analysis from fuel consumption records, and gases emissions results; obtained in Cartagena, Colombia, April-November 2019, in a Renault-Steway car, using regular gasoline (Research Octane Number) RON 87, it is shown that unsuitable emissions reductions of the pollutants HC and CO by magnetic action, though abate Air Pollution and reduce fuel consumption, could contribute to increase CO2 emissions impact to the atmosphere.

2. Motivation and Justification of Contributions

Within the context of the environmental protection and motivated by **COP 26 outcomes** we consider very important to justify our contribution, presenting a short but concrete information about the updated status of air pollution and Climate Change Issue, and the status and evolution of **COBMA.** Those **COP 26** outcomes show that despite all efforts done by countries the Anthropogenic Climate Change has not been solved and there are missing crucial actions to be done soon, globally, and effectively; proven feasible actions to retake and accelerate, and new strategies to implement. Otherwise, current actions results will not be effective enough to achieve the worldwide needed global mitigation. Under all this context we identify, 10 possible causes that delay a global solution and justify even more this contribution.

2.1 Causes That Delay and Prevent a Global Solution of the Problem.

1. NDCs (Nationally Determined Contributions) have not been enough global effective.
2. Insufficient Global Implementation Proven Actions Within the Reach of All Countries.
3. Insufficient Mitigation Actions Facing the Increasing emissions of Pollutants.
4. Carbon Pricing Inefficacy in practice.
5. Insufficient practical integration of Science-Technology binomial.
6. A Deficient Global Comprehension of the Nature of Climate Change-Air Pollution.
7. Complexity of Climate Change-Air Pollution, dual in its nature and manifestations.
8. The slowness of transition from fossil fuel cars to electric cars [3]**.**
9. Insufficient Synergistic work [4]**.**
10. The slowness of transition to clean energies.

2.2 To achieve a goal that seems unattainable, a Simpler and Comprehensive View must be attempted.

All the updated statements and reports, especially COP26, encourage us to continue the contributions path but with a new approach; attempting to present, through the condition of Atmosphere balance, a more comprehensive view of the real Climate-Change problem. This view is based on information analyses, from authoritative sources and our points of view from experience. Its purpose is

to favour **global comprehension**, unavoidable for **synergistic work** and consequent mitigation of the anthropogenic impact on the Climate system.

A precise, clear, and short definition of the Air Pollution-Climate Change nature through proper words is indispensable for its **Global Comprehension** and consequently for **Synergistic work** to tackle the problem. The purpose of the present contribution and next ones are in fact, an attempt to present a more comprehensive view of the anthropogenic Air Pollution- Climate Change problem and to attract the attention of organizations leading the Earth´s environmental protection, to considering global implementation of **COBMA**

2.3 Air Pollutants cannot be reduced at will without risk of increasing Global Warming.

Climate Change and Air Pollution problems cannot be considered separately. They are inextricably and indissolubly linked as manifestations of a more general and real condition; excessive gases emissions from fossil fuels burning that threat to cause the rupture of the earth-atmosphere system balance. Climate Change and Air Pollution are usually considered separately and not in few times the great threat of Air Pollution is dismissed; However, they are two faces of the same reality: emissions in excess. Fossil fuels Burning **increases CO2 emissions** which increase natural **global warming which affects** climate and (NO and NO_2), (SO_2 and SO_3), CO and PM, EPA Major Air Pollutants. It is urgent and essential to abate continuously air pollution, CO2, and the other greenhouse gases (GHG) to innocuous and stable concentrations. Air Pollution and Climate-Change reinforce each other; the first threat directly people's health and the second people´s life and environment worldwide. Climate change mitigation actions can help to reduce air pollution, and air pollution abatement can control GHG and CO2 emissions but, **both actions must be performed carefully by experts that should know the principles of physics and chemistry ruling combustion processes and with a long experience in emissions control from mobile sources.** ***Excessive abatement could result in an inverse effect*** [8].

2.3.1 Nature of Air Pollution and Climate Change Problem from Authoritative Sources.

Nature of the anthropogenic environmental problem has been emphasized and specified in different ways by authoritative sources as WHO among others.

2.3.2 World Health Organization

1. Air pollution is one of the biggest environmental threats to human health, alongside climate change. Improving air quality can enhance climate change mitigation efforts, while reducing emissions will in turn improve air quality [9].

2. Air pollution, primarily the result of burning fossil fuels, which also drives climate change, causes 13 deaths per minute worldwide [10]**.**

2.3.3 Swedish Environmental Protection Agency

Emission sources for air pollutants and the greenhouse gases coincide, and there is great benefit in simultaneously cutting emissions of air pollutants and greenhouse gases. A combined strategy reduces the cost of counteracting both these threats to human and wellbeing of society"[11].

2.3.4 UN Environmental Programme

Policies That Tackle Climate and Air Pollution at The Same Time Can Raise Global Climate Ambition [12]**.**

3. Main Climate Change causes

Scientists have identified two types of Climate Change causes: Natural and human. Through analysis of records on indirect measures of climate they have found that the climate varies naturally over a wide range of time scales. However, its natural variations do not explain the unprecedent observed global warming since the 1950s. the probability that human activities have been the cause of that unprecedent global warming is practically a mathematical certainty [13].

3.1 Natural Causes

The natural processes that can explain the climate variation causes are: Changes in the Earth's Orbit and Rotation, Variations in Solar Activity, Changes in the Earth's Reflectivity, Volcanic Activity, Changes in Naturally Occurring

Carbon Dioxide Concentrations Changes in solar radiation or volcanic activity are estimated to have contributed less than plus or minus 0.1°C to total warming between 1890 and 2010.

3.2 Human Causes

Human Activities are increasingly influencing the climate and the earth's temperature by burning fossil fuels, cutting down forests and farming livestock. This adds enormous amounts of greenhouse gases to those naturally occurring in the atmosphere, increasing the greenhouse effect and global warming. Human activities have contributed substantially to climate change through Greenhouse Gas Emissions and Other Air Pollutants Emissions and Reflectivity or Absorption of the Sun's Energy by use of land. Anthropogenic emissions increase is critical and threat to unbalance the Earth´s Atmosphere.

3.2.1 CO2 Emissions Increase by Burning Fossil Fuels and Others Human Activities [14]

Household air pollution is generated by household fuel combustion, leading to indoor air pollution, and contributing to outdoor air pollution. Each year, close to 4 million people die prematurely from illness attributable to household air pollution from inefficient cooking practices using polluting stoves paired with solid fuels and kerosene. Household air pollution causes noncommunicable diseases including stroke, ischemic heart disease, chronic obstructive pulmonary disease (COPD) and lung cancer.

Close to half of deaths due to pneumonia among children under 5 years of age are caused by particulate matter (soot) inhaled from household air pollution. This makes this risk factor one of the largest environmental contributors to ill health [15].

At present, humans are putting an estimated 9.5 billion metric tons of carbon into the atmosphere each year by burning fossil fuels, and another 1.5 billion through deforestation and other land cover changes. Of this human-produced carbon, forests and other vegetation absorb around 3.2 billion metric tons per year, while the ocean absorbs about 2.5 billion metric tons per year. A net 5 billion metric tons of human-produced carbon remain in the atmosphere each year, raising the global average carbon dioxide concentration by about 2.3 parts per million per year. Since 1750, humans have increased the abundance of carbon dioxide in the atmosphere by nearly 50 percent. Burning fossil fuels, could be controlled with regulations limiting the use of the number of cars, politics favoring use of electric cars and other strategies. **Now the world has 7.9 billion inhabitants. In 2025 according to some world population projections, the population will be around 8.2 billion inhabitants** [16]**, and emissions of CO2 by burning fossil will also increase approximately to 10 billion metric tons per year without considering the increase due to cars production increase**. Emissions due to deforestation and other land cover changes will increase to approximately 2.7. The global average carbon dioxide concentrations will raise to approximately 2.5. Both emissions and concentration will increase if prompt effective actions are no taken right now. We do not know when we will reach the conditions of unstable equilibrium. We only know we are not far away of it.

3.2.2 CO2 Emissions Increase by Cars Production [17]

In 2021, there were 1.42 billion cars in operation worldwide, including 1.06 billion passenger cars and 363 million commercial vehicles. The 1.42 billion cars on the road emitted 2.23 billion metric tons (equivalent to 4.92 trillion pounds) of carbon dioxide into the atmosphere last year [18]**.** At the end of 2025 the total number of light cars will raise to 1.8 billion approximately. This will increase carbon dioxide in the atmosphere to approximately 2.8 billion metric tons of CO2. This added to other GHG gases and sources could unbalance the atmosphere. It is necessary to Implement actions as **COBMA** to reduce Air Pollution and Climate change while transition to electric cars and to clean energies is made. At the same time laws and rigorous regulations must be established to effective renovation or scraping of the old automotive park. Every year, around 27 million cars that reach the end of their useful life from around the world are recovered for recycling [19].This number must be increased.

98% of all automobiles on the road today are still powered by gasoline or diesel [18]

The idea of using electric motors to power cars dates since 1898. In the 60s, General Motors explored alternative power sources with several experimental vehicles, including the XP-883 gasoline/electric hybrid [20]. Since the construction of this hybrid urban car in 1969 by General Motors, with 2 motors; a gasoline motor for constant speed rides and an electric one to start and for short rides, both combined to provide a greater acceleration [21], up today, global production of electric cars has not succeeded and, therefore, its global implementation neither, for many complex reasons that is not worth the trouble to mention here. Implementation of renewal energies, and other important proven actions and

strategies have suffered similar fate, so far. However, in the last UN Climate Change summit, from 1-13 November 2021, in Glasgow, all those, who have starring roles in the Climate Change-Air Pollution issue, agreed through the so called COP 26 PACT, to accelerate transition to electric cars [22], to renewal energies [23], and to achieve Zero Vehicles Emissions. However, transition implies time to be achieved and therefore proven strategies should be implemented globally meanwhile. There was not any consideration of other strategies and actions as **COBMA**, proven efficient since the 1940´s, when magnetism obtained by electric current was used to improve combustion in the spitfire and mustang aircrafts and later in the 2 last decades in light cars using rare earth magnets [24].

Anthropogenic CO2 emissions increase is critical, and it is a threat to unbalance the Earth´s Atmosphere. Unbalancing factors as CO2 **emissions from mobile sources**, deforestation and others must be rigorously and strictly controlled, right now.

3.3 All Proven Feasible Actions to counteract Unbalancing Factors Must Be Globally Properly Implemented to Prevent a Problem of Catastrophic Dimensions.

Despite the implementation to great scale of emissions controllers and different type of devices and strategies to reduce the emissions of gases from mobile sources, billion tons of harmful gases whose concentrations make them lethal for the health are still being sent to the atmosphere. A very hard effort has been done in many countries to controlling air pollution. Restrictive among other measures, better plans of vehicles circulation, better fuels selection, obligatory use of catalytic converters and other devices has helped a lot to solve air pollution problem. Due to these devices, measures, and strategies billion tons of polluting agents have not been released to the atmosphere but, no device is so highly efficient to solve completely the problem alone or in a synergic connection with other because every action or device has its own drawbacks. Moreover, the continuous increase of the automotive park in many countries is evident and also the lack of renovation of the old one and many other conditions keep on contributing enormously to worsen Air pollution and Climate-Change because on one hand they increase the contaminants in the air and on the other hand limit strategies, actions, and controlling devices effectiveness **Therefore every device or proven action or strategy is important to be considered because it could help to save the planet.**

3.4 Global implementation of COBMA Could Counteract Unbalancing Factors

We have been working in the last 13 years in **COBMA** and proved efficient as it has been shown in our RTESE papers; with results from ADC [24], by a lab experiment [25], through criteria for designing, building and installing magnetic minimizers [26], explaining how a Magnetic Efficient Balanced (MEB) minimizer should be designed [27], showing the technical and economic feasibility of implementing globally a MEB [28]. Unfortunately, COBMA has been discredited because economic interests have prevailed before the interest of saving the planet and the difficulties involved in a precise scientific design, construction, installation and actualization of the devices, whose control should be in the hands of responsible institutions as we have explained in our papers. We hope there still be time left to retake this technique that is indispensable to counteract the main unbalancing factor of the carbon cycle while transitions to electric cars and clean energies are made. It could even help the implementation of COP26 PACT ZEV plan. [29] So, proven effective actions should not be dismissed however small its impact may seem

4. Main Goal

Saving fuel must be a consequence of emissions reduction, not the purpose.

The main goal of this paper is to show through analyses from report of gasoline consumption reduction for the 2019 period from April 4 –November 20, and emission tests results achieved for a Renault car in a Mechanic workshop in Cartagena in April 09/20 that HC and CO unsuitable emissions reductions by magnetic action, though reduce considerably fuel consumption also contribute to increase CO2 emissions impact to the atmosphere.

5. Measurements.

A Renault car was tested with two Single Day Tests (Idle Engine Speed); without the device and with it, installed and after traveling 6-7 Km. Carbon monoxide (CO) and hydrocarbons (HC) emissions results, shown in table 1 were obtained from a gas analyzer in the private auto mechanic workshop, Mekanos, in the city of Cartagena, Colombia, using standard gasoline RON (Research Octane Number) 87.

6. Tests and Consumption Records

6.1 Magnetic Unit Used for Tests.

Unit without hydraulic pre-treatment, built in Cartagena by Mekanos Mechanic Workshop, Fig 1a y 1b. It is very simple. Highly efficient, very easy to build; It is made of a PVC tube 4-5 cms long, diameter $\frac{3}{4}$ to1inches, a couple of Neodymium magnets; $19mm \times 13mm \times 3mm$, and a common glue, no more materials are needed, easy to install and with a straightforward design process. [27]

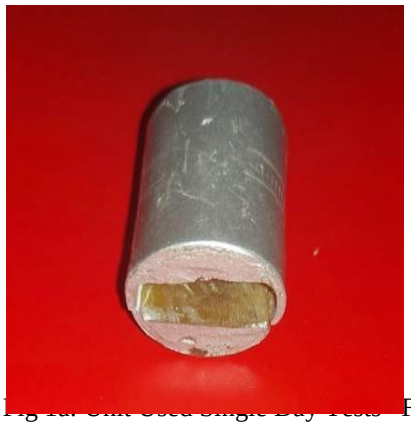

Fig 1a. Unit Used Single Day Tests Fig 1b. Nd Magnet (6500 Gauss)

Table1. Single Day Tests Results

Emissions	Renault 2012	
	Initial	Final
HC((PPM)	28	2
CO2(%)	12.1	13.3
CO (%)	0.32	0.00
O2(%)	2.19	1.85
Drive (Km)	0.00	6
Mileage (Km)	24351	24357
Magnetic Induction B= 6500 Gauss		

6.2 Single Day Tests Results

Single Day Tests Results were arranged according to table 1. They will be analyzed later in conclusions

6.3 Consumption Records

Consumption records were arranged according to table 2.

Table 2. Gasoline Consumption Record from April 13 to December 13 for Renault Dll 112 Car

Kilometres	**Gal**	**Cost**	**Date**	**Mileage**	**Consumption (Gal/km)**
24,357	9,5	$ 90.000,00	April 13/19	210	0,045
24,567	8,1	$ 77.000,00	May 4/19	222	0,036
24,789	8,97	$ 85.300,00	May 30/19	232	0,039
25,021	9	$ 86.000,00	June 13/19	254	0,035
25,275	5,18	$ 50.000,00	July 5/19	137	0,038
25,412	5,10	$ 50.000,00	July 16/19	120	0,043
25,532	6,23	$ 60.000,00	July 27/19	106	0,059
25,638	7,04	$ 72.500,00	August 10/19	166	0,042
25,804	6,53	$ 63.000,00	August 29/19	194	0,034
25,998	9,13	$ 88.000,00	September 4/19	214	0,043
26,212	8,4	$ 81.000,00	September 13/19	177	0,047
26,389	9,19	$ 89.000,00	October 8/19	232	0,040
26,621	8,82	$ 85.000,	October 25/19	221	0,040
26,842	9,18	$ 90.000,00	November20/19	191	0,048
27,033	8,27	$ 81.000,00	December 13/19		
				Average Consumption	0,042

7. Conclusions

No amount of experimentation can ever prove me right; a single experiment can prove me wrong [30]

1. According to the analysis of the results from Table 1, that were obtained with Mekanos´s Gas Analyzer, it is found that the magnetic minimizer of 6500 Gauss, installed in the Renault car is highly efficient to reduce CO and HC emissions obtaining drastic reductions of 100% and 93%, respectively but, an **unsuitable** increase of CO2 emissions concentrations of 10% relative to the initial CO2 emissions concentrations, for Single Day Test. Consequently, for this Renault car we cannot say that the magnetic minimizer behaves as a MEB. It is necessary to adjust the magnetic field induction **B** to a lower value to get an acceptable CO2 increase.

2. The design of a proper magnetic minimizer is a process that does not necessarily end with determination of magnetic induction B but one or more correlated test to fix the most precise and proper value of B, as was explained in RTESE previous papers, [26] [27], where the *procedure, in general terms was outlined as:* ***Initial Dimensioning of prototype→ Prototype Test→ Magnetic Induction Adjustment and Test if needed→ Final Dimensioning → Confirmation test.***

3. The previous conclusions confirm, as a fact, that CO and HC emissions cannot be reduced at will without increasing CO2 emissions beyond the international commitments [31]. In general, a decrease in CO leads to an increase in CO2 emissions [32], [33].

4. Results and conclusions suggest regulations policies for limiting reductions of CO and HC emissions from transport sector, when using any minimizer device or procedure. This would make easier the global reduction of CO2 emissions concentrations and help transport sector decarbonization. It is emphasized that regulations are not about standards maximum limits of CO, HC and other pollutants concentrations. They are about maximum allowed reductions of CO, HC and other pollutants emissions concentrations, using **MEB** minimizers or any other device or procedure [34]. New tests for different brands of cars are needed.

5. Average Consumption before installing the device was $\frac{0{,}084\text{Gal}}{\text{KM}}$. According to Table 2, Installation of the device decreased the previous value to an average value of $\frac{0{,}042\text{Gal}}{\text{KM}}$ yielding a total saving of approximately US 300.00 in 7 months and $\frac{\text{US\$ 43}}{\text{month}}$ as average monthly saving. This is an important saving. However, on the other hand the increase in CO2 emissions could not compensate it when considering its implications to what Global CO2 emissions increase would be. Global use of Magnetic minimizers purpose is not about saving fuel. It is about abating Air Pollution controlling CO2 emissions. Saving fuel must be a consequence, not the purpose.

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