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The Man Made Global Warming - Energetic Scenarios

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Abstract: In many international meetings, energy saving programs have been suggested against the man made global warming effects, produced by the consumptions of the fossil derived energies. The FDE (Fossil Derived Energies) consumptions are due to the world's consumers whose number grows at a mean rate of 0.062 billion units /year: this growing number asks a greater number of goods to be consumed. The saving energy programs fail because the consumptions of goods demand provokes a growth of the production that is of the FDE burned. The MMGW (Man Made Global Warming) continues to grow and a catastrophic geostorm is in charge. In addition the FDE reserves continue to be eroded by the consumptions. A substitutive energetic economy, no IRG (Infrared reflecting Gases) producer, is the proposal to be discussed. To built this energetic economy takes time and it could be delayed when the atmosphere memory effect is considered. The substitutive energetic economy could have the following properties: prompt to match the MMGW, able to produce the equivalent of an intense saving energy program without reducing the consumptions, a competitive price of the energy offered to the consumers, a low investment cost at the year 2018. 11.3% of the world's population consumes 30% of FDE with a per capita FDE consumed of 5.1 TEP (Ton of Equivalent Petroleum) /year. The remaining 88.7% consumes the 70% of FDE/year. The MMGW is, then produced as a global effect. A comparative analysis of the hypothetical scenarios which can be considered has been made. The less delayed against MMGW effects of long duration and economically sustainable resulted hard solar wind energy producer system, when the produced energy is consumable on demand. Either the electrolytic hydrogen gas production or the hydrostorage have been successfully tested to transform the stochastic into on demand consumable energy. Going on with the analysis of the HSW (Hard Solar Wind) stored energy supply, an equivalent energy saving of 27.7% (2017-2117) without diminishing the consumptions of goods and a mean low price of the equivalent petroleum barrel substituted, 42 USD/barrel have been obtained.

Keywords: Fossil Derived Energies, Man Made Global Warming, Infrared Reflecting Gases, Normal Cubic Meter, Hard Solar Wind, Low Cost Strategy, Ton of Equivalent Petroleum

1. Introduction

The planetary development, at the year 2018 is sustained for 85% by the FDE energies (coal, natural gas, oil), 10% by hydroelectricity, 5% atomic energy, main contributions.

The FDE burned produce IRG which are pumped in the atmosphere whose infrared reflecting power augments. In so doing the earth' surface temperature augments and hard climatic effects happen, MMGW [1].

The FDE consumed depend from the number of the earth's population; this number continues to grow at a mean rate of 0.062 billion units/year. The preasumed economically exploitable FDE reserves have been estimated 1228 billion TEP at the year 2017 [3].

Before the year 2080 the FDE will have a not sustainable price USD/TEP and they will be almost exhausted. The socio economic effects of this situation will be warned already around the year 2030 (MIT-USA, 1980).

2. Method

2.1. Excess IRG in Atmosphere

The IRG excess stays in the atmosphere for more than a century. Then all the IRG pumped in the atmosphere in the time period 1981-2081 are summed as an excess. The distribution of the excess IRG in the atmosphere (1956-2181) is shown in table 1 (see also table 2).

Table 1. *Excess IRG in the atmosphere (weight) man made global warming.*

1	2	3	4
1956-1981	331	331	+ 13
1981-2017	784	1115	+ 43
2017-2047	916	2031	+ 79
2047-2081	1264-331	2964	+ 115.5
2081-2117	-784	2211	+ 86
2117-2147	-916	1294	+ 50
2147-2181	-1294	0	0

Column 1 Time, years
Column 2 Excess of IRG in atmosphere distribution x 10^9 ton (negative numbers indicate the excess IRG exhausted after one century)
Column 3 Total excess of IRG in atmosphere x 10^9 ton
Column 4 Column 3/2566; 2566 billion tons are the carbon dioxide weight in the atmosphere. It regulates the surface earth's mean temperature around 15°C. The added IRG modify the atmosphere Infrared Reflectivity, and the earth' surface temperature augments; the catastrophic planetary geostorm is in charge and it will explode with a multiplicative self effect.

In preparing table 1 the following hypothesis have been made:

a) the sea absorbs 50% of the IRG excess produced
b) the IRG excess absorbed by the green plantation is negligible
c) the excess carbon dioxide produced is enhanced by a factor 1.2, to take into account of the added NOx IRG produced (airplanes, agriculture)
d) from each TEP of FDE burned in air 3.14 ton of carbon dioxide are produced

2.2. The Fossil Derived Energies Consumed

In table 2 are shown the FDE consumed from 1956 to 2081 (preasumed FDE exhaustion year) when the mean earth's population grow rate is 0.062 billion units/year and the mean FDE per capita consumed is 2.16 TEP/year (year 2017).

Table 2. *FDE consumed from 1956.*

1	2	3	4
1956-1981	(5.39+8.7) x0.5x25	176	1644
1981-2017	(8.7+14.45) x0.5x36	416	1228
2017-2047	(14.45+18) x0.5x30	486	742
2047-2081	(18+21.46) x0.5x34	671	71

Column 1 Time, years
Column 2 FDE consumed x10^9 TEP
Column 3 FDE consumed x10^9 TEP
Column 4 FDE reserves x10^9 TEP

Several proposals of energy saving have been presented at international meetings: all have failed. Nevertheless the MMGW augments its effects, while the FDE reserves continue to be eroded by the planetary consumptions (wars included).

2.3. The Substitutive Energetic Economy

On the frame here presented, the substitutive planetary energetic economy could be considered, sustained by no infrared reflecting gas emitters low cost energies.

Table 3. *Substitutive planetary energetic economy.*

Environment air conditioning – heat pump	Electricity
Cooking - Electric induction plates	Electricity
Environment and street light – low electricity consumed lamps	Electricity
Private transportation	
Electric city car	Electricity
Electric road car	Electricity
Hybrid car	Fuel
Hydrogen car (electrolytic hydrogen)	Electricity
Motorcycles	Fuel-Electricity
Lorries	Fuel-Electricity
Other applications	Fuel
Collective transportation	
Citybus	Fuel-Electricity
Roadbus	Fuel-Electricity
Airplane	Fuel
Boat	Fuel
Industry and services consumptions	
Hydrogen for industrial uses	Electricity
Energy consumptions	Fuel - Electricity

From table 3 it follows that the substitutive energetic economy consumes mainly electricity. The fuels require electricity to produce electrolytic hydrogen which is made to react with carbonium which could be derived from coal. Then synthetic liquid fuels are available as substitute of the oil derived fuels. There are consumptions sectors which will continue to consume liquid fuels*.

2.4. The Man Made Global Warming

The MMGW produces hard climatic effects which can not be cancelled. The atmosphere memory has already stored an excess of IRG which at the year 2017 was 1115 billion ton, 43% of the atmosphere carbon dioxide weight (table 1). This excess IRG continues to stay in the atmosphere and is added to the other IRG excess (table 1). The expectation that a substitutive energetic economy, which corrects the MMGW, could be organized in a short time is far from the reality, as well as the convinction that the climatic change, produced by the MMGW, has to be sustained as the price to be payed for the development. More hard effects have to be expected, when the IRG growth is near to double the carbon dioxide of the atmosphere (table 1); the explosion of a selfsustained catastrophic planetary geostorm will continue longer the FDE exhaustion time, with hard socio economic consequences to be payed [1].

*There are 10000 billion Ton of Equivalent geological Coal [3]; the percent exploitable and the cost of these earth's reserves are not known. From the harvest of energetic biomass, cultivated in the allowed surface area between the wind convertors (short rotation cultivated energetic biomass like brooms) can be obtained several billion litres/year of liquid synthetic fuels (subsitute of oil derived fuels) to be consumed for an indefinite time length (carbonium from energetic biomass 25% weight).

2.5. IRG Excess in Atmosphere When Stored hard Solar Is in Progress

In table 4 is shown the IRG excess in atmosphere when stored hard solar proliferation is in progress**

Table 4. *IRG excess in atmosphere when stored hard solar is in progress.*

1	2	3	4	5	6
1956-1981		176	331	331	+13
1981-2017		416	784	1115	+43
2017-2047	84.5	401	756	1871	+73
2047-2081	394	277	-331+522	2061	+80
2081-2117	719	-	-784	1277	+50
2117-2147	763	-	-756	522	+20
2147-2181	884	-	-522	0	0

**other energetic productions no IRG emitters have been tested too by assuming hypotethic performances of the convertors and supposed valid energy reserves. They have expectation time more delayed against MMGW, and when proliferation is considered, a probable fuel shortage in the short medium term or too high cost.

Column 1 Time, years
Column 2 Substitutive energy produced by stored hard solar x10^9 TEP
Column 3 FDE consumed x10^9 TEP
Column 4 IRG added x10^9 ton
Column 5 Total IRG excess in the atmosphere x10^9 ton
Column 6% of total carbon dioxide in the atmosphere

At the year 2017 there are 1115 billion ton of IRG excess in the atmosphere which can not be cancelled, because produced before the year 2022 (assumed year of HSW).

In the start assumed hypothesis, the IRG excess in atmosphere is reduced of 1997 billion ton in the time period 2017-2117 with the effect of 27.7% equivalent energy saving program (per year from 2017 to 2117) without reducing the consumptions. The IRG excess continues to exist also later the year 2081 (atmosphere memory). Table 4 shows the more ready action against MMGW feasible by avoiding to waste money and to reduce the number of jobs.

2.6. The Substitutive Energy to Sustain the Consumptions on the Globe

To sustain the consumptions, when the FDE reserves are exhausted are necessary time, great investments and hard transformation of the habits (table 3) which will be favoured when a safe and low cost planetary perspective will be offered. On these directions many research efforts are made on the world on the engineering of energetic devices, consuming energies no IRG emitters (hard solar-atomic fusion).

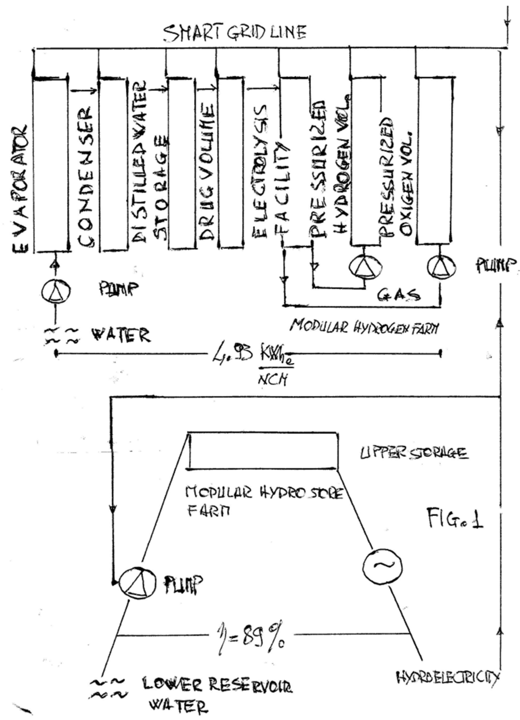

Figure 1. *Diagram of the modular hydrogen stored farm and of the modular hydrostored farm.*

A proliferation to produce substitutive energy requires time, proved convertors and a market of sustainable and stable prices of the energy offered. Several authors [2] have considered the perspectives of hard solar more advanced of other competitors to produce the energy of the economy of table 3. These analysis, dated 1980, could not take advantage from the experiences aquired after this date, with a running which tested the decommission time lenght of hard solar technologies, and renews the role of wind convertors as the most suited for economic hard solar proliferation to produce huge energy quantities. To consume on demand the stochastic energy, produced by terrestrial hard solar wind convertors, two main methods have been tested:

a hydrogen production (Figure 1)

b hydro storage (Figure 1)

When hydrogen is produced hard solar stochastic electricity is consumed on demand as a gas (from which electricity can be again obtained) when hydro storage is used, the hard solar stochastic electricity is consumed on demand as hydro electricity (Figure 1). Hard solar is a proved energetic technology, it can consume, as a fuel, the abundant silicates reserves of the earth's crust or easily 100% recyclable materials of which it can be made, in proliferation consumes the minimum prohibited areas, do not produces dangerous wastes, the stochastic energy produced can be transformed in energy on demand consumed; it is almost innocuos.

These properties suggest to verify the economic frame on which competitive energy prices can be obtained and the contribution against MMGW.

2.7. Low Cost Strategy Operative from Year 2022

In table 5 is the energy produced, 26 x10^9 TEP/year in the regime phase, when the low cost strategy is operative from year 2022 (see also the Appendix).*

Table 5. *Substitutive energy no IRG emitter from stored hard solar low cost strategy operative from 2022.*

1	2	3	4	5	6	7
1981-2017						1228
2017-2047	43465	84.5	514	76	0.13	836
2047-2072	81501	247	330	49	0.082	613
2072-2097	119837	409	293	43	0.073	613
2097-2122	157873	572	276	41	0.069	613
2122-2147	152144	650	234	34	0.058	613

Column 1 Time, years
Column 2 Total expenses x10^9 USD (see Appendix)
Column 3 Consumable on demand energy produced x10^9 TEP
Column 4 Market price of substitutive TEP produced, which pay the expenses of column 2 USD/TEP
Column 5 Market price of the equivalent oil barrel produced USD/barrel
Column 6 Market price of the electricity produced USD/KWhe
Column 7 FDE reserves x10^9 TEP

*Year 2100, 12.6 x10^9 (population) x 2.2 (per capita consumptions) = 27.72 x 10^9 TEP/year – 1.7 x10^9 TEP/year (hydroelectricity) = 26 x10^9 TEP/year to be produced.

The total expenses sustained in the transition time period 2022-2147 year (554820 x10^9 USD, table 5) can be payed with a mean equivalent barrel price of 42 USD/barrel, while after the year 2147 at lower price as 34 USD/barrel and lower. This mean price is stable and very low, it could sweep away the resistance of energy prices derived from other fuels and the hard solar could become the most favourable energy.

The effect of the low cost strategy is in the sequence C, C+R, C+2R, C+3R, 4R (see the Appendix). The hard solar here described exibits an efficiency of 32.8%, when energy consumed on demand is compared with the stochastic energy produced.

The abundance of the reserves (concrete or the reuse) allow to move far in the time the extinction of the material reserves; then stable energy prices have to be expected.**

**In the hypothesis that all the stakes of wind convertors are made of concrete the total concrete is (3500 ton/stake) 6.345 x10^{10} ton of which silicates derived materials 2.54 x10^{10} ton. 1% of the earth’s crust silicates reserves are 74.7 x10^{13} ton. Then to consume this 1% it has to be made 29400 decommissions of all stakes each one every 200 years. Better perspectives are offered by the stakes made of iron (abundant 100% recyclable material) [5].

2.8. The Oxygen Credit

In table 6 is valued the oxygen credit income derived from the market exchange of the pure electrolytic oxygen gas produced. This income can help to sustain the necessary expenses for managing, mainteinance, repair, surveillance, of the whole energetic system.

The hypothesis in table 6 are:

(1) mean number of jobs payed 0.35 job/MWep

(2) mean revenue per job 20000 USD/year (all included)

(3) market price of the oxygen gas 0.0565 USD/NCM

Table 6. *Oxygen credit.*

1	2	3	4	5	6
2022-2047	99412	1	4208	1404	8416000
2047-2072	290586	0.64	7890	2635	15780000
2072-2097	481761	0.56	11574	3865	23148000
2097-2122	672936	0.54	15256	5095	30512000
2122-2147	764700	0.47	15256	5095	30512000

Column 1 Time, years
Column 2 Oxygen produced $x10^9$ NCM
Column 3% of oxygen volume sold at a price of 0.0565 USD/NCM
Column 4 Added job cost $x10^9$ USD
Column 5 Added expenses $x10^9$ USD
Column 6 Max number of jobs payed (natural, artificial intelligences)

The water electrolysis is the best hydrogen plus oxygen producer when stochastic electricity has to be exploited. The electrolysis production has not a threshold.

3. Results

The low cost strategy is well tailored to HSW energetic system, and the cost of its construction can be self-sustained by the energy sold at a very low market price, without interrupt the energy supply.

LCS introduces an innovative economic method to save money. It regulates all the phases of:

(1) energetic and control components production
(2) construction in field
(3) management of the energy produced

The characteristic rate assumed for HSW energetic system is 4%/year, rate of all the short amortization time lenghts.

4. Conclusions

This work demonstrates that energy on demand, from stochastic energy obtained by proliferating hard solar terrestrial convertors, can sustain planetary consumptions, when the earth's population is 12.6 billion and the total energy per capita consumed is 2.2 TEP/year, for an indefinite time lenght with stable and competitive prices of the energy produced. All the investments, regulated by the low cost strategy, can be payed by the energy produced and sold at low market prices.

The low cost strategy, when applied to terrestrial hard solar, allows the energy production without interruption of the supplying in the programmed decommission phases. By using to advantage the oxygen credit can be payed the revenue of a mean 0.35 job/MWep for activities of managing, mainteinance, repair, surveillance to natural and artificial intelligences.

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Appendix

Appendix 1. Costs Assumed (All Included)

Energetic convertors	1.725 $x10^6$ USD/MWep
Bricks	80 USD/ton
Concrete	130 USD/ton
Stainless s.	1500 USD/ton
Iron	130 USD/ton
Smart grid	600000 USD/Km
Electrolytic facility	0.11 USD/NCM (production power)
Water elevators	25000 USD/MWe
Jobs mean revenue	20000 USD/job, year

Cost of Iron or concrete in wind stakes assumed 10% of the energetic convertors expenses

Appendix 2. On demand Energy Consumed from Stochastic Produced

a. total 26 $x10^9$ TEP/year, on demand
b. equivalent electricity 104000 $x10^9$ KWhe/year, consumed by the substitutive energetic economy of table 3 (4000 KWhe/TEP oil-thermoelectric equivalent)
c. from hydrogen stored hard solar 87%, 90480 $x10^9$ KWhe/year
d. from hydrostored hard solar 13% , 13520 $x10^9$ KWhe/year
e. hydrogen fuel to produce 90480 $x10^9$ KWhe/year by turbo convertors hydrogen fueled 61176 $x10^9$ NCM/year (1.479 KWhe/NCM)
f. stochastic electricity to produce 61176 $x10^9$ NCM/year of electrolytic hydrogen fuel 301498 $x10^9$ KWhe/year (4.93 KWhe/NCM)
g. hydro stored stochastic electricity to produce 13520 $x10^9$ KWhe/year on demand 15191 $x10^9$ KWhe/year, stochastic
h. total stochastic electricity to be produced 316789 $x10^9$ KWhe/year[1]
i. electricity produced by a 5 MWep wind unit 5 x 3900 x 0.95 x 0.95 x 0.99 = 17422762 KWhe/year (stochastic)[2]
j. number of wind convertors (planetary wind park)

18182479 units, 5 MWep each[3]

k. total wind power 90912394 MWep[4]

1. orders of magnitude
   a) hard solar total earth' surface involved: 90573394 x 1.74 = 157.5 million hectares (0.38% of the earth' surface area, 1.74 hectares/MWep)
   b) efficiency: (316879 x10^9) / (157.5 x10^6) x 4000 = 504 TEP / hec, year, stochastic, (104000 x10^9) / (157.5 x10^6) x 4000 = 165 TEP / hec, year, stochastic, on demand stored hard solar efficiency = 165 / 504 = 32.8%
2. 0.95 smart grid 0.95 up-down voltage 0.99 DC-AC, 3900 h/year at equivalent 5 MWep
3. the number of wind convertors in the regime long duration phase (18182479) is around 1% of the cars running on the earth's road now
4. equivalent to 20800000 MWe thermoelectric power

Appendix 3. Economy, Investments x10^9 USD

Energy producers	156824
Smart grid	24
Water elevators	292
Electrolytic facility	8411
Distilled water storage	1117
Condenser	300
Pressurized gas storages	6882
Others	10

I = Total Investment 173860 x10^9 USD

Total cost of concrete or of iron made stakes of wind convertors 15682 x10^9 USD

Appendix 4. The Low Cost Economic Strategy (LCS)

The expenses, table 5 column 2, are made of the sum of two numbers

C = I/4 = 43465 x10^9 USD

R = C-1117/4-6882/4-15682/4+78.45 x 25/4 = 38036 x10^9 USD

In R are subtracted the investments which have long amortization time as are the storage facilities and the stakes which sustain gondola and blades of a wind convertor. Amortization costs are added.

The time amortization lenght is 200 years for the wind stakes (hard mainteinance supposed), longer for the storage facilities.

Appendix 5. Oxygen Credit

(volume of hydrogen) x 0.5 x η x 0.0565

η =% of oxygen volume sold

Appendix 6. Diagram of the Modular Storage Facilities

In Figure 1 are the diagrams of the 11500 modular storage farms of the stored hard solar planetary facility spread on the earth's crust (many of them can be located in the outlying areas of towns, 87% hydrogen farms, 13% hydrostorage farms).

A SF captures the stochastic electricity from the smart grid planetary line, and in each SF there are all the facilities (reasumed in Figure 1) to control the production of the stored energy, in each of the two storage methods. The water in is equal to the water out (water conservation).

Appendix 7. Graphic Table of IRG Excess in Atmosphere

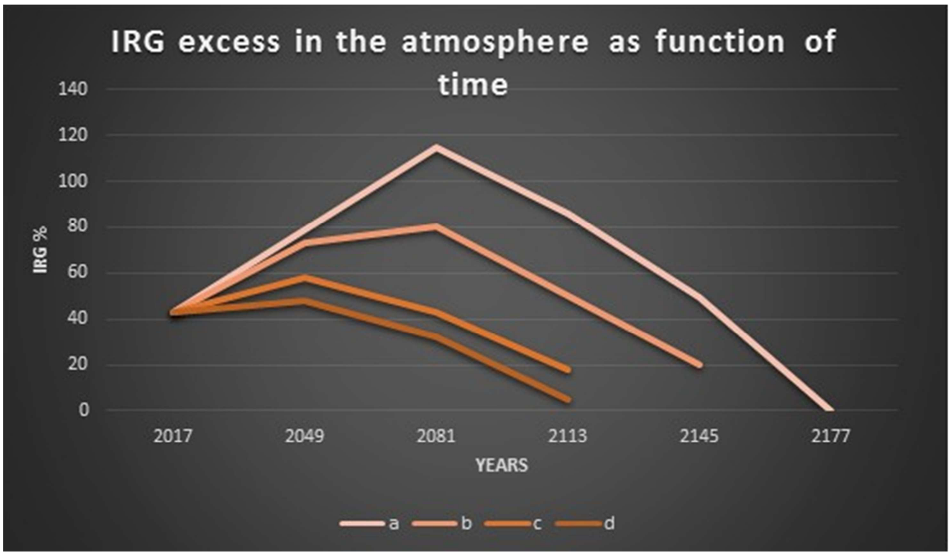

Figure 2. *The IRG excess in atmosphere (weigth, %).*

a. IRG excess due to the FDE consumed
b. Regime phase of the whole HSW energetic system after 100 years from start
c. After 50 years
d. After 25 years

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