

Society in Front of 2 Enemies: COVID-19 & Climate Collapse/Their Impact on Shipping Industry

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Abstract

This paper analyzed the impacts of Covid-19 in 2020 on: a) Global economy, b) Greek economy, c) Greek society and d) Shipping Industry. The impacts were grouped in negative and positive. Analyzed is also the impact of Climatic Change or rather Collapse by writing-down in a table the major hurricanes etc. since 1780 and the cyclone "Janus", which hit "Greece". We revised the principle of *Sustained Development*, and formed a model entering Environment in production function. We proposed the establishment of the "Sustainable City". A "digital citizen" emerged in our theory, and we showed his/her future needs in small robots, re-skilling and others. The coming global war will be over "data" prophesized. The firm decision of EU, to protect EU's environment by pouring millions of \in by issues of green bonds and other measures, presented.

Keywords

COVID-19 Negative & Positive Impacts, Climatic Change and Collapse, A Model with Environment as Factor, Sustainable Development, The Sustained City, The "Digital Citizen", EU Environmental Policy, Humanitarian Considerations

1. Introduction

Humanity is facing 3 strong enemies during peace. The 2 are the COVID-19 and the Climate collapse-CC. The third is not an enemy, but its possession will cause

¹1.5 m from COVID-19 (end 2020); ~1/2 m from main hurricanes & storms (**Appendix 1**).

a global war, i.e. the "data". Those killed by¹ the above two enemies approached by 20th November 2020 the 2 million! While COVID-19 is a newcomer, and in its second stronger wave in Nov. 2020, the unfolding of CC is almost 50 years old. The "Club of Rome", (founded in 1968²), rung the bell in 1972, for the risk coming from *polluting the global environment*!

Is really our climate an enemy"³? A regular information about climate's condition is provided by IPCC ("International panel on climate change")⁴, among many others. The CC process is as follows: when the oil, and other fossil fuels, burned⁵, release gases to atmosphere, mainly CO_2 , causing the "greenhouse effect⁶". This keeps planet's temperature inside atmosphere, warming - planet - up. The ice in the Poles melts, and uprises sea surface, so that *less land* to be available to Governments; but also more sea (Antarctic). The warming-up of the planet, helps fires, aided by the dry material laid-up in the woods, from the frequent hot summers with burning heats. Fires destroy remaining trees, which retained soil. More heavy and frequent rains cause the floods.

Humanity is a victim of its prior decisions, we believe, as it became a "life-sentence prisoner" of 2 main sources of energy: oil and coal (Figure 1).

As shown, oil is on top, with about a 32% share. Coal had about a 28% share (2011) with an *increased* consumption since 2002 and almost unchanged since 1986 (29%). More important is that coal's share in 2011 was higher since 1969 (not shown)! Natural gas had a share of about 24% (2011) against 20% in 1986. Renewables are *hardly* shown (light red). Moreover, total energy consumption increased by 64% in 25 years, indicating the global hunger for energy⁷... Coal was still, (in June 2020⁸), the single largest source of power generation with 36%!

In addition, the global CO_2 emissions rose from 29,745 tons to 34,169 (2009 - 2019), or ~15%. While OECD countries and EU reduced CO_2 emissions, from 12,508 tons to 12,012 (share in total: 35%), and from 3830 to 3330, non-OECD countries increased their emissions from 17,238 tons to 22,157 (2009-2019;

⁶A warming-up of the air surrounding earth due to the heat trapped.

⁷All strong nations flirt with ... nuclear weapons (Russia; Iran; N Korea; China etc.)!

⁸BP's CEO suggested using available methods & technologies: renewable energies, electrification, hydrogen, carbon (captured & stored), bioenergy. We thank BP for providing us freely and promptly its statistics on line.

²A "common concern about the future of humanity" (Dieren (editor) (1995)).

³Sun's ultraviolets rays cause skin cancer due to man-made holes in ozone layer... used to protect earth from sun's radiation. The holes are caused by all kinds of lead aerosols. Australia was hit in the past during summers.

⁴Established in 1988 by UN https://www.ipcc.ch/.

⁵Pollution occurs in: air, water, soil and sound (noise). It makes environment fatally-dirty for humans, plants, animals & other organisms. Meat, plastic containers, dirty-fish, eggs, yoghurt, cheese, breathing polluted air, drinking unclean water & radiation may cause cancer. We know that from Chernobyl (1986) & Fukushima (2011). The first killed from 4,000 to 60,000 depending on estimation. Fukushima accident killed (earthquake plus tsunami): 18,500. Pregnant women led to abortion due to Chernobyl, including Greeks. A... positive impact of Chernobyl was that certain Governments (e.g. Germany) looked for, other, than nuclear, sources of energy (e.g. Sun). The top 3 nuclear-energy-consuming countries in 2011 were: USA ~31%; France ~17%; Russian Fed. 6.5% (=54.5%) (source: BP statistical review, 2012). Of course, the use of nuclear energy for medical purposes has to continue.



Figure 1. World energy consumption, 1986-2011 (million tons of equivalent oil).

about 29%) (65% in total). The following countries increased their emissions: China (about 28%), India (+55%) and Russia (+6%), while USA reduced them (6%).

Moreover, diesel is mainly used to produce electricity, and boil the water of millions of central heatings⁹ worldwide¹⁰. This means that electricity must be produced by non-fossil fuels. Governments have to oblige *immediately new* houses and buildings to use gas.

Have we to move to smarter cities, chosen from the "Smart City Index" (IMD¹¹)? Athens got the... 99th position with Singapore, Helsinki and Zurich in the first 3 positions (2019; internet).

Our contribution, we believe, is in the matter of sustainable development where we made new assumptions, like the one introducing¹² environment's damage into production and profit functions; also, we added... sea as a factor of production in certain industries. Important is also that we assumed that resources are replaceable regardless if they are renewable, scarce, in extinction etc.

⁹GFC—global financial crisis (2008-2013)—proved a friend of the environment with "austerity programs" cutting down diesel consumption by 2.5 m blocs of flats and houses (Greece).

¹⁰Interesting is the history of fuels: gas (since 2002) challenged oil (dominant since 1940s when the famous "Diesel" engine invented); oil challenged coal (2002); steam (in 1910s) won the battle with wind (dominant since 1869)!

¹¹IMD compiles an index using 13,000 questionnaires over 109, called smart, cities, on a number of issues like health, safety, mobility, governance etc., brought-round by *technology...* (internet).

¹²Reviewing the 23 seminal papers in Pezzey & Toman (2002)'s volume we saw that environment is no where in the production functions mentioned. Indeed, we turned the attention from Consumption, utility and welfare maximization, technical progress, capital and labor and so on, to Production, influenced by the interview made with the Greek Professor at Harvard Business School.

or not. Society solves problems through "new" resources (like gas for oil; schist etc.).

1.1. Aim and Organization of Paper

This work aimed at showing: 1) The detrimental effects of the climate collapse-CC. 2) The adjustments required to *sustain* development and 3) the impacts (positive-negative) of *COVID*-19 on: global economy, Greek one, Greek society and Shipping industry. We formed a microeconomic model focusing exclusively on production function with... environment as a factor. Moreover, we analyzed the profile of what we named "digital-citizen"...

The paper is organized in 5 parts, after literature review. Part I, deals with the question: "what humanity has to sustain"? Part II, deals with COVID-19's indirect (*positive*) impacts on global economy/Greece. Part III, deals with COVID-19's indirect (*negative*) impacts on global economy/Greece. Part IV, deals with the climatic collapse in Globe, in EU and the relevant policies, and in Greece. Part V, deals with the... "digital citizen". Finally, we conclude.

1.2. Literature Review

Economists were aware of "sustainability", (defined below), since Malthus R. (in 1798), as he first worried about Britain's ability to feed an ever-increasing population with given land (Goulielmos, 2020). In 1865, Jevons W S (1835-1882) also questioned: "how Britain can *sustain* an increased energy consumption with a given supply of *coaR*."

Modern economists *ignored* sustainability. This is justified, as Economics, (1776), became a science by solving only 2 problems: "how *unlimited* needs can best be satisfied by *limited* means"; and "how *limited* resources can be best allocated among *unlimited* uses". In brief "what is" and not "what should be¹³"...! We believe that the 2 above mentioned economics—positive and normative—had to be one!

Moreover, economists believed in "diminishing returns to scale" (Agriculture), a theory due to Adam Smith! This "law" unfortunately over-shadowed the other two: "constant & *increasing returns to scale*" (Arthur, 1994), especially the last one. Economists believed that if resources are scarce, then their products will also be scarce (Pearce, 1992). Later (in 1940s) economists attempted to show how to grow GDP. Economic growth theories were strongly challenged by *environmentalists* (in 1972) warning that growth is limited!

Humans follow patterns, as Keyes wrote in 1936: when income increases, less

¹³The separation of economics in positive & normative did wrong to economics. The "old-style" welfare economics was due to Pigou (1877-1959) (in "Economics of Welfare" in 1920). Pareto (1848-1923) introduced (1906) the "Pareto Optimum", proving that *utility* is not countable. The great supporter of *positive* economics was Friedman M (1912-2006) (1953: "the methodology of *positive* economics", in essays in positive economics, University of Chicago Press). The modern economist of *normative* economics, and Harvard University professor, is Sen A. K. (1933) (1970: "Collective choice & social welfare", USA, Holden-Day). Interesting is Forbes in: "The remarkable rise of ESG", 11/07/2019 (ESG = Environment = Social = Governance).

is spent, proportionally, and more is saved (Goulielmos, 2018). Also, when income drops (or disappears) less is spent and saved. But less is also invested¹⁴, as the liberated factors of production from consumption, are fewer than those required to achieve a higher GDPt + 1. This is the capitalistic problem, marked out by Keynes, i.e. the deficiency *of effective (money) demand*. Hoarding brings death to Capitalism¹⁵!

Meadows et al. (1972) argued that the growth¹⁶ (of global economy) is limited (TLTG)...! They used a "computer simulation model" of world economy related to *natural environment*, assuming limits in: agricultural land and production (per land unit); the amount of extractable (non-renewable) resources, and the ability of environment to assimilate waste¹⁷. They concluded: world economy will reach its growth limit by 2072, but it was not a forecasting model!

Meadows et al., 20 years latter (1992), confirmed that global economy was beyond its growth limits (BTL)! This caused less controversy, as was considered a case of learning something from it, *especially economists*... Their 1972 limits to growth remained valid, requiring additional **strength**. Important is, however, that pollution came-out as a main concern...for the 1st time.

Common M (1995) pointed-out that 2 of the greatest problems, which humanity faced were *poverty*, and the *threats against natural environment*. Important is that Common held responsible... *economic activity*! Unfortunately, the *threats* at the time of Common, proved to be *attacks now* (2020). The "Brundtland report" of WCED¹⁸ (1987) *alarmed politicians, for the* 1st *time*, defining: "sustainable development"-SD (analyzed below).

IMO preoccupied¹⁹ to reduce pollution to air from ships' emissions (Goulielmos-Giziakis-Christodoulou, 2014b, July). Shipping also had to establish a global *levy scheme, as a solution* (Goulielmos-Giziakis-Christodoulou, 2014a, Feb.). Shipping discusses about a mechanical method to retain sulfur from maritime

¹⁸"World Commission on Environment & Development". "Our common future" (Pezzey & Toman (2002)).

¹⁴Classics assumed that those saved = those invested. Thus, it is not possible: St – 1 \neq It {1} & Yt = St – 1 + Ct \neq Ct + It {2}, where Yt = income; St – 1 = last year saving; Ct = consumption and It = investment. The rate of interest equalizes It with St – 1. Here there is no *demand deficiency*, causing unemployment. In Keynes investors \pm savers; they invest, if expect to earn something (net) above real rate of interest, for the whole life of investment! If I_t < S_{t-1} {3}, then Y_t < Yt₋₁ {4}. In Greece, in 2017, saving had a low share of 11% of GDP against 30% in Slovenia, Hungary and Czech Rep. ¹⁵Except for thieves.

¹⁶Harrod and Domar (in 1940s) produced a growth model, beyond theories of "distribution of income" (Ricardo in 1817), "wealth" (Joan Robinson in 1971) and "short run business cycles" (Keynes in 1936). The model assumed: a capital/output ratio Vt; a rate of interest; Savings St; Labor (increasing at N) and technical progress changing at L. Equality between St/Vt (warranted growth) (*) and Nt + Lt (natural one) provides the "golden age growth": everybody is *employed*. If dYt/dt {5} equals St/Vt {6}, where Ye is (expected) income, economy is balanced. Technical progress is assumed to boost employment, but this is dubious...We saw labor-saving technologies, and new ones, to cut-down employment... (*) This is the rate of growth of Yt, if St planned = It planned constantly. ¹⁷Ignoring recycling.

¹⁹Since 2005 IMO & MARPOL convention restricted emissions from ships *to specific limits.* The marine oxides & dioxides are: Sulfur (SOx), Carbon (CO₂) and Nitrogen (NOx). The EU MP Mrs. Deli K. argued that 940 m tons of CO_2 are emitted p.a. from ships or 2.5% of global figure (October, 2020).

fuel (the scrubber²⁰). Christodoulou (2018) focused on the potential use of 2 new environmental indices: CSI (Clean Shipping Index) and ESI (Environmental Ship Index) for the *improvement* of the *performance* of Maritime Transport. IMO (<u>http://www.imo.org</u>) adopted a GHG strategy in 2018, which set ambitious indeed targets such as to halve GHG emissions from ships by 2050/since 2008 and carbon intensity by 40% by 2030/since 2008...

Xiao et al. (2020) argued that the effort of carbon reduction is decreasing along the intensity of "fairness²¹ concern"-FC. Moreover, the optimal retail price, under a "revenue-sharing contract"-RSC, first decreases and then rises depending on FC intensity-FCI. On this last depends also the profit of a supply chain. If FCI is low, the RSC provides increased profit. If FCI is high, a centralized contract is more profitable. Finally, given the retailer's FC and the manufacturer's overconfidence²² attitude, the RSC provides increased profit for the first, given that FCI is high. Authors applied a mathematical and diagrammatic analysis to indicate the optimal contract selection problem given FC and manufacturer's overconfidence. FC acts negatively on carbon emissions, and the optimal carbon emission effort is high under a BC contract. The RSC is the optimal choice for a fairness-neutral manufacturer etc.

Summarizing, TLTG assumed that *a global disaster* will come from a global "lack of resources"²³, following the classics. BTL assumed that the *disaster* will come rather from *pollution*. TLTG took into account "family planning", but it could not take into account China's allowance for a 2nd child (2015).

2. Part I: What Humanity Has to Sustain?

2.1. The Sustainable City

Our opinion is to establish everywhere "sustainable cities"-SC. A SC is one having as an undiscussable pre-condition for those *living* and *working in there*, the elimination of the above mentioned 2—at least²⁴—enemies. This city, smart or not, will be at least humane... A SC has to establish, we believe, a center(s) to issue sustainability certificates for existing/new products, services²⁵, and *even planned actions*, in an obligatory way, following the steps of a "patent-approval office". An action is sustainable-SA, if its management, avoids the loss of life, human injury and damaging environment!

 20 A system to remove SO₂; they are open and closed. Water is used to wash—SO₂ gases—away. 21 Fairness is defined as total profit average.

²²This entails a belief that the knowledge of the decision-maker is more valuable than reality. i.e. as possessing a producing power and a dominant position vis-à-vis downstream retailers.

²³Ricardo D (1772-1823) also assumed it. But there are now the: *digital agriculture* or exactfarming (*), using drones. A. Smith too failed to vision the 1st industrial revolution in 1760 (& 1755-1790). (*) ExactFarming means the effective management of agricultural business, taking timely decisions by reducing risks. CC is going to take away 16% of agricultural production in EU by 2025!

 $^{^{24}\}mathrm{We}$ wanted to investigate also immigration and terrorism, but lack of space prevented us.

²⁵In a fire accident on "Scandinavian Star" F/B, 1990, put by a "disturbed" passenger, the fire-resistant doors between cabins closed automatically, as they should; but when doors were on fire, their *material* released poisonous gases, which killed the passengers! Were the doors approved for sustainability?

2.2. Sustainable Development-SD

SD required *all economies to* "satisfy, not only the needs, but also the... aspirations of existing generation, without *compromising* the needs and aspirations of future generations" (WCED: "Brundtland Report", 1987; rephrased). SD, we believe, is an effort of a *generational justice*, establishing rights on existing "development means-DM": i.e. a moral claim on them, for the sake of next generations. SD holds *responsible those living today (which is unfair)*! DMs are means of production left over from previous generations. SD's novel element is to care, in a specific way, for all humans coming after present generation. SD theory established a "generation-depositary", acting on behalf of next generations, we reckon!

It is fair, we believe, the present generation to care about only the next one, and the next one for the next one, and so on. When economists talk about DM, they mean products of manufacturing and craft industry. We understand that DM²⁶ delivered to present generation by the previous one, must be used with precaution, and wisdom, and in a such manner so that to be delivered intact, or even in a higher quantity, to next generation... *This is apparently in the area of utopia, if humans are greedy and selfish*! Epicureans (c. 300 BC) said: "Let us eat and drink... tomorrow we die"! A number of persons believe this even today. SD presupposes that DM are exhaustible, depending on use... SD thus is *a warning.* From the discussion so far, we understand that the bases of SD are *sentimental, moral* and depend on the *love* one feels for one's children.

Environmentalists observed that when a resource is used repeatedly in a high degree (over-exploited), and a product is over-produced, they reach extinction. Certain fish-types are best examples. However, 4 so far industrial revolutions did not prove that the depletion is true, though we saw some kinds of fish²⁷, animals, birds, plants etc. to disappear, or to become rare (in the state of extinction, as we say). Also, we saw beaches to lose their original color, after the invasions of millions of tourists (massive tourism). We saw also animals to die from lack of water etc. and people to immigrate. Managing environment is obviously required!

There is a less accurate knowledge—as always used to be, but improving—about the real existing quantity of DMs, like: oil, gas, other minerals, etc., below earth's surface²⁸, under sea's bottom²⁹, and ... even on near-by planets³⁰!

³⁰Moon can provide... water (NASA 2020).

²⁶Ancient Greeks said: "take measures, if you want to do a perfect job".

²⁷Fishers know that parent-fishes have to be allowed to bear little fishes before captured. Small fishes have to grow before captured too. EU legislation with surveillances made this clear.

²⁸New sources of oil & gas discovered worldwide after 1974 & 1979 oil crises (e.g. North Sea; Alaska etc.). Schist also appeared! E.g. clean electric power can be produced by *sea waves* ("World Council for Energy", 2020, Athens). Greece e.g. can produce 208 MWh p.a. from sea depths of 100m & 2 km from coast. More mature are the "*wind parks*" & "wind turbines". 175 wind turbines inside sea can provide electricity in 1/2m houses (case: Kent area, UK).

²⁹North-Sea-oil made Norway a rich country, and saved English pound. Greece and Cyprus search for oil and gas in Aegean Sea. This made Turkey jealous, and aggressive, especially for Cretan deposits, estimated by Turks as enough to supply Turkey for about 570 years...

Moreover, a new science developed, since 1982, following "Law of Sea" (UNCLOS II): "Marine Economics" dealing with... sea economy³¹. Worth noting is that sea economies cover 2/3 of the Globe! Thus, the depletion-danger went further away, since 1982, but pollution arrived stronger, and it meant to stay...!

2.3. Humanitarian Concerns in a SC

Normative economics had to care about people, if *their income is zero, we be-lieve*. Surplus products, excess food, products and medicines near expiry, defective items, excess clothing etc., why not be given free to persons in-need in the "(open) markets"? After writing the above, we read (01/11/2020) that a Greek "bank" established in 2015 under the name of "humanitarian bank", and did exactly the above, by providing shelter to 270 citizens and food to 1m, among other things.

Science invents new materials³², fuels, and technologies, and has speeded-up production... People increased *its dependence*³³: on alcohol, smoking, drugs, etc. More products (paints, products, etc.) are produced *ecologically, but their prices are high to be able to replace the non-ecological ones. Emphasis here is required to be put by all societies.*

Summarizing, societies, we believe, need to establish from now on, a number of "sustainable cities", focusing exclusively on "*sustainable citizen*". We do not foresee a possible lack of DM. The obvious enemy, which economies have to win, is CC. CC is the "situation where *climate kills its citizens*, from time to time, due to weather's revenge".

3. Part II: COVID-19's Indirect (Positive) Impacts on Global Economy/Greece (Table 1)

The measures taken for COVID-19 in a global scale was, in fact, an *experiment*, which provided valuable data. We know now the effect on environment of: restricted outdoor activities; lockdowns; less driving; limited visits; less use of air transport, limited tourism, fewer: marriages, parties, group entertainment, cruises, baptisms... and social gatherings. We know now what we should retain, in a very careful way, from the painful COVID-19 period... if it ends.

COVID-19 obliged societies to proceed *immediately* to more ... computerization, *digitalization*, *so that citizens to do things only from a distance*! In Greece, 50 interviewed CEOs agreed, in March, 2020, that COVID-19 speeded-up Governmental digitalization (BHMA magazine).

³²E.g. nylon!

³¹"Marine Affairs". Sea's economy deals with the *exploitation* etc. of sea resources beyond one's territorial waters and within its AOZ and continental shelf.

³³The number of existing gyms, suspended by Covid-19, rose before 2019; also, the number of doctors dealing with nutrition; dieticians; manufacturers of food supplements and vitamins, etc. People prefer less calories-food, more vitamins & less or no sugar. Human versatility is remarkable: we have now in-house dining or fine dining (Greece Oct. 2020) by delivery-services for wealthy customers up to 6 persons ...!

Table 1. Benefits derived, indirectly, by COVID-19 (2020-2021).

Reduction in oil production (up to 30%); improved environment, cutting 8% p.a. the demand for energy (i.e. 1.93 million less barrels of oil ³⁴ (June 2020)	It valued-up (in S&P 500) technology companies: Microsoft ³⁵ 19%; Apple 18%; also, Amazon ~14%; Google ~13%; Facebook (~7%) (=~71%); plus, an investment company; Visa; JPMorgan; Johnson & Johnson, Walmart, Salesforce (Cloud); Amgen (biotechnological industry) & Honeywell (manufacturer)	Increased: the sales of PC <i>s</i> ; means of tele-conferences; skypes; videos; e-mails; postal services & couriers; & take away services	<i>Increased: electronic</i> purchases via internet plus credit cards (+60%); food <i>deliveries</i> via internet; Mask production; admissions in private hospitals; needs for specific medical management
Intensified: phone banking (*); Internet banking (**) & mobile banking (***); (*) €16b spent in first 6 months (2020) in Greece (+13.4% since 2019) & €1b by tourists (-63%), by credit cards; helped by the system of no-pin & an increased €50 limit	Cargo air transport increased 30%	Increased demand for burial grounds & funeral services	Increased: the number & the activity of: barbers; hair dressers; nail caring; the demand of personal hygiene products; beauty products ~+14%; mini markets sales; home cleaning products (+21.2%) (Greece); sales of bicycles, electric cars ³⁶ , and other electric transport means
Rapid resort of Greek state to <i>digitalization (since March</i> 2020)	Wake-up of global millionaires (Soros, Gates, Buffet) proposing to pay increased taxes (IMF) (18/10/2020)! EU suspended austerity programs	Reduced pollution; increased investments in renewable sources of energy ³⁷ ; closure of lignite production by 2023 (Greece); reduction in electricity cost; Electricity in Greece costs €51/MHh (wholesale price), more than double that of Germany (€23) (June 2020)! Greece delayed to follow the "target model ³⁸ " of EU. Nuclear power was out of question due to country's…earthquake sensitivity…	Increased use of Cloud ³⁹ ; construction of data centers (Greece); Amazon established a web services center; increased digital immigrants; + optical fibers (11/10/2020); thousands of rapid etc. tests for COVID-19; intensity in producing batteries (European battery alliance)
It pushed societies (Greece) towards more computerization, & digitalization! In 3 years, Greek citizens will make all their contacts with the State via internet	(*) Banking transactions (90%) made through <i>electronic networks</i> : "ATMs", APS—"Automatic Payments System", "internet" & "mobile" in 2020 (1 st sem.; Greece); the number of bank-branches in Greece reduced by 2263 between 2010 and 2019 from 4097, not due only to COVID-19!	(**) Transactions valued €136.4b (+5% since 2019, 1 st sem.) (Greece)	(***) Transactions valued €6.9b (2020, 1 st semester) (+53% since 2019, 1 st sem.)! In Greece 2.7m users emerged, (1 st sem. 2020), (27% of total population), and 1 m plus in 6 months! Credit cards are in <i>close cooperation</i> <i>with mobile phones</i>

Source: various articles in weekly newspapers & magazines covering the first 9 months of 2020.

³⁴Produced by OPEC+ (source: Norwegian class.). "OPEC+" obtained 10 additional members (total 23); OPEC (1960) had 5 main original members-Governments: S Arabia, Iran, Iraq, Kuwait & Venezuela. OPEC+ produces ½ of global oil production of about 70m barrels p/d (at \$40 per barrel). Russia became a member too.

 35 In Feb. 2020 held the 1st position in S&P500 with ~\$1.43tr capitalization.

³⁶In Germany about 137,000 electric cars exist in 2020 against about 2000 in 2006, & 1 m by 2022... By 2030 28% of all cars will be electric in Germany, 29% in Europe and USA, & 38% in China. Germany subsidizes electric cars by €6000.

 $^{37^{\circ}}$ Akuo Energy Greece" spends \in 1b for renewable sources of energy in 5 years using: photovoltaic panels, similar aesthetic tiles/roofs on land & in sea; wind parks; 1 GW at \in 14/MW; energy storage (source: Conference by "Hellenic assoc. for energy economics", Oct. 2020, Athens).

³⁸In operation in Greece (01/11/20). EU is estimated to save €1b p.a. by opening electricity market to all suppliers & from outside EU borders. The model will establish electricity markets from which a nation can buy electricity in 3 different occasions (intraday etc.) as well forward.

³⁹Cloud brought... a "rain" of 14 investments in Greece of \in 1.8b. Microsoft spends \in 1b. Certain others (\in 386 m) focus on producing energy from Sun. The benefit in Greece from *digital state* will be \in 50b. A 2nd data center G-cloud needs about \in 24 m. The number of logins were about 59 m for Jan.-Sept. 2020 in Greece (15/10/2020).

An historian, (during "Athens Democracy Forum", Athens, Oct. 2020), mentioned that the coming ... global war will be on...data! In other words, societies enter into the *dynasty* of the algorithms, using artificially intelligent machines! Everybody's personal data will be known!

"Parachuters" fell from Greek sky on land of Salonica: "Pfizer" and "Cisco" establishing innovation centers on line; "IBM" (Infosys Finance); "Think Silicon of Applied Materials"; Microsoft (SoftoMotive: making robots); & Google. Greece entered⁴⁰ into the "Clean Network/5G clean path". Automated cars; clever tele-managed domestic devices; and effective crucial infrastructures are coming. Saving time by using clever machines, will allow us to copy Ancient Greeks, where Masters used slaves, and Masters promoted... philosophy. But slaves were real ones...Will machines be slaves or masters?

Turing A. (1912-1954)—an English mathematician etc.—is the father of computers. He was in charge of the multi-scientific team to un-crypt (1936) the German cryptographic machine "Enigma"! Important is that the machine *time* required, for revealing German code, which was changing every morning, was... 20 *years.* More important is that in 2017 the "Imperial War Museum" using: artificial intelligence, modern computers and programmers, broke "Enigma" code in 13 minutes... If time is money, computers brought-in so much! But this is not written down...

Greece established a Ministry of Digital Governance, and passed⁴¹ a law, (a code), (end-Sept. 2020), concerning country's transition to digitalization and 5G. Greece tries to copy Estonia in state electronics as many say... The target is to provide 5G to over 50% of Greek population by 2021; in line with the "Greek Organization of Telecommunications"-OTE, (using Eriksson's technology)... and with EU legislation.

The higher speed of transmission needs, however, safe data! 5G is 10 times faster than 4G (RAN compared with Core & open RAN). Globally, 5 companies pursue 5G: Huawei, ZTE, Samsung, Eriksson & Nokia. EU suggests to member-countries, for 5G, to prefer EU providers, but not excluding China...

4. Part III: COVID-19's Indirect (Negative) Impacts on Global Economy/Greece (Table 2)

COVID-19's Impact on Sea Transport

Shipping industry worth of about \$500b (the 9 top global fleets only) (end-April 2020)⁴², established an entire sector, mainly private, organized to transport oil and oil products over 120 years now. We mean tankers and oil-product carriers. Subsequently, LPG (liquefied petroleum gas; 1964) and LNG (liquefied natural gas; 1959; and mainly in 1970s) carriers (Stopford, 2009: p. 484) emerged.

⁴⁰Chinese reported that "Huawei" provides network services to more than 3b persons over 170 countries ("Dialogue for digital co-operation between China and EU", Sept. 2020)!

 $^{^{41}\}text{Providers}$ of radio-frequencies from 700 MHz, 2 GHz, 3.400 - 3.800 MHz and 26 GHz, costing ${\sim}{\in}367$ m, are needed.

⁴²Source: Vessels Values.

Table 2. The harmful effects of COVID-19, 2020-21.

In 8 months (2020), air passenger-kms fell by 80% (since 2019) & revenue by 95% for 11 EU companies (2 nd quarter 2020) source: IATA); 4 EU airlines lost €12.2b in 6 months (2020); industry reduced its working posts by 900,000 (FebSept. 2020); touristic period shrunk to 40 days (2020) for airlines; Airplanes became restaurants & bars on earth& deliver (airplane) food to homes (Singapore) (Oct. 2020) (source: IATA).	Car manufacturers lost 20% of their 2019 demand	It led people to hoard ⁴³ (2020); exhibitions & conferences suspended; Germany used to attract 410m visitors p.a. 2 nd in globe (after USA); up to 180 national & international exhibitions with €14.5b worth of business	Reduced seaborne trade by 1b tons according to Clarkson's, or about 11% (May 2020); about 6% is expected for 2020 Seaborne trade was over 9 b tons in 2019; other estimations stated that trade rose about 5% in July, while EU achieved 6% rise in its exports & 4% in its imports; USA achieved 11% in both; China achieved 9.5% rise in its exports (internet); WTO estimated trade to fall by 9.2%; 14.3% less trade (2020 2 nd q.); Europe -24% in exports and ~-22% in N. America
<i>Reduced</i> global population by 1.5 m; & those recovered from COVID-19 may not be free from further complications	Reduced demand for oil due to lock-downs; excess oil stored urgently in tankers, among others; a price-war between S. Arabia & Russia led to excess production; this led oil prices down (Spring 2020); the price of oil from Schist also dropped; Exxon exited the S&P 500 (end-August 2020), & from Dow Jones, while in 2009 held the 1 st position in capitalization (12 th in 2019), followed by Chevron in the 11 th position	Reduced investments by tourist industry; tourism in Greece used to provide 20% of GDP and to serve 30 m tourists (2019) against 6 m estimated (2020); all athletic endeavors suspended & Olympic Games in Tokyo for 2020 postponed;	Retail sales fell by 27% - 30% in 7 months (2020) in Greece; less €25b; big super markets lost 50% of their sales; less sales in cash & carry by 9.5% (FebMay 2020); restaurants, taverns, bars, hotels remained closed or had reduced hours, allowing distances between tables; cinemas, theaters, parades etc. were suspended in March and Nov. 2020
 Fall in GDP in 22 economies⁴⁴ from 1% (Taiwan) to 13% (Philippines) from 2019 to 2025 (IMF); USA GDP -30%; EU -4.4% (World Bank); 6 m people at the poverty limit 	Women and low - paid - workers working in services hit more hardly in USA (Fed. Res.); 20 m lost their jobs; ~8% unemployment	Global economies spent \$12tr. for the Pandemic (IMF); rise in the demand of pharmaceutical & medical supplies	In USA: 38,000 hotels closed-up (11/10/2020); 850,000 small firms closed (Womply platform.); 1.6 m hotel personnel unemployed; 36,000 chain-shops will be closed (like gyms, face beauty institutions, etc.); 216,000 less civil servants (USA)

Source: as in previous table.

International sea transport was seeking a "*green" fuel*. Recently, there are... 16 fuels already in the market, including ammonia, hydrogen, bioethanol etc., and 10 relevant technical systems⁴⁵. Shipping also considers... building electric ships and ships producing zero-emissions! It immediately built ice-breakers and ships ice-strengthened to serve Antarctic.

⁴³GFC led people to hoard, given capital controls. The amount hoarded was equal to the difference between people' money in bank deposits before capital controls and after. For Greece this was €20billion out of €40b.

⁴⁴The GDP in Eurozone will be reduced from 0.5% for Lithuania to 11% for Spain. Greece will have a -8% - 9% as Eurozone. *Italy* -8.5%; *France* -10%; *Germany near* -6%. *Source: ECB*, 01/11/2020. *The November*, 2020, *lockdowns are expected to increase these negative growth rates of the GDP.*

 $^{^{45}}A$ competition among fuel manufacturers! Some argue that more than 500 LNG carriers use LNG as fuel, out of ~27,700 ships globally. Given the 2020 "global Sulphur Cap" and the "CO₂ emissions-cutting-off".

Ship crews suffered from COVID-19, given that 25 persons, on average, work together at close distances, (using masks only in ports), and are obliged to reach ports in quarantine for loading/unloading, repairs or repatriations! Many crews *locked-out* of their family for 7 months or so.

Worth noting is the case of cruising ships! Recent the "Main Shift 6" CS, in Sept. 2020, cruising in Cretan waters, manned by 766, of which 12 found positive to virus in the 1st test, but not in the 2nd... Crew looked after 922 passengers. The famous "Queen Mary" in California and "Queen Elizabeth 2" in Dubai (since 2018) are sea hotels with 228 rooms and 13 restaurants... Inspections from classes etc. will be done from a distance, aided by drones.

5. Part IV: The Climate Collapse in Globe, EU and Greece 5.1. Global Cyclones

Threats to people we had from climate, appearing mainly in the form of faster coming *tropical cyclones* (hurricanes; storms etc.) (Graph 1) and of fires and floods all over the world, and par excellence in USA.

As shown, tropical cyclones are of 8 types (at least). "Cyclone" means the weather phenomenon where the winds blow in a $\kappa \dot{\nu} \kappa \lambda o \varsigma$ (cycle), where cyclone runs round a hole: the "eye". People in USA experienced hurricane Catrina⁴⁶ in 2005! Almost ½ a million deaths caused by the 24 major "climatic attacks" from 1780 to 2020 (**Appendix 1**). Notable is that till 1932, there were only 21 cyclones, but many more thereafter! Moreover, billions of dollars cost thousands of collapsed houses and damaged private cars, apart from the destruction of infrastructure! We counted almost \$500 billion damages due only to 10 Atlantic Ocean hurricanes (source: internet).

5.2. Cyclone "Janus": The Case of GREECE (Sept. 2020)

Greece resembles more... Egypt than its past self, obtaining deserts, lacking water at times, and planting rows of tropical trees. Date-palms e.g. are more suitable since some time in Greece, and planted in Athens since 2004, (on the occasion of Olympic Games), replacing poplar- and plane-trees.



Graph 1. Kinds of tropical cyclones. Source: author and Internet.

⁴⁶Bush administration spend \$105 billion for repairs & reconstructions; "Katrina" smashed-down 30 oil-platforms; closed-out 9 refineries! Followed by hurricanes Sally, Laura etc. Scientists counted 1616 tropical cyclones & 926 hurricanes so far... (internet).

Greece, in Sept. 2020, hit, for the 1st time, by the cyclone "Janus", with 4 - 5 dead. This caused rivers to jump over their bounds, forced by more than regular rain-water and violent winds. Janus brought over tons of mud, and hundreds of stones, burying entire cars... Fast winds dislocated and carried-away all removable objects, panels, cut-down electric poles etc., got-out trees, took-away fences, destroyed cultivations, eliminated animals, etc., smashed-down bridges, shallowed roads, and took - roofs - away.

"Stealing" from rivers part of their land, so that to build houses there, a time comes for rivers, using their increased, by heavy rain, waters, to claim their land back, not at all gently! Greek residents in the cities and villages deprived for days of *electric power, water* and *cell phones*, or phones, at the time they were most needed! Electricity poles, due to thunderbolts, burnt-out, or dropped-down by trees falling on them...

5.3. Cyclones' Impact Globally

Over 200 years of tropical cyclones brought-in 1.9 million dead⁴⁷ ... In addition, tropical cyclones in sea created large waves, heavy rains, floods and high winds, disrupting international sea transport and occasionally creating shipwrecks.

As shown in appendix 1, 24 + 3 main hurricanes and storms are recorded since 1780. Deaths due to them exceeded 453,000. Their damages cost \$345 billion... Since 1995 the annual number of cyclones in Atlantic Ocean is estimated as 87 ± 10 (internet sources). But the intensity, speed and duration of hurricanes increased since 1995 (US National Oceanic & Atmospheric Administration's national hurricane center, 2019)... due to climatic change...

Two million acres of woods destroyed in California - again - in 2020... Five hundred billion dollars p.a. (65% from private sector) are estimated to be needed to reverse USA's present course towards zero pollution by 2050⁴⁸.

Humanity had a chance, at the turn of the previous century, when engines constructed based on oil, while there were other alternatives (Arthur, 1994)! Surely this was rather early! Now is, however, rather late!

5.4. EU Policy to Stop CC

Commendable is the recent decision of the President of EU Commission, Mrs. Ursula von der Leyen, to protect EU environment. Consequently, German car manufacturers have to stop, at once, producing traditional car engines! We believe⁴⁹ that EU is firmly determined to upgrade EU environmental protection policy, and speed it-up this time.

⁴⁷Wikipedia, down/ed 21/09/2020.

⁴⁸Weekly journal "Kathimerini", 20/09/2020, p. 23.

⁴⁹EC submitted a law proposal, voted by a great majority, revising the EU system of monitoring, counting-down & verifying CO₂ emissions from international maritime transport. EC is pressing shipowners towards IMO's requirements for ships of 5000 GT and over. EC said that there is no clear landscape for knowing for sure how much shipping pollutes air with CO₂ emissions! It is true that shipping industry argues that shipping pollutes less vis-à-vis e.g. air industry, & dislikes measures increasing its operating cost.

She, in an action under the proverb, we reckon, "better late than never", announced⁵⁰, in her speech in European Parliament, the issue of ϵ 750 billion of "Green Bonds" to finance an EU "green growth". Creating also a hope for reducing gases to the atmosphere of Europe. Can one stone kill two birds? Growth and CC? Our world obviously built on a wrong assumption: *abundant, cheap* and *friendly* to environment, fuel: i.e. oil. But oil since 1973 is no more *abundant* or *cheap*⁵¹ or *friendly* ...The new EU plan aims at achieving an increased %, i.e. 55% reduction of pollution, (against previous 40%), up to 2030 (in EU), comparatively with the 1990 levels.

The EU climatic policy caused the immediate reaction of "European Union of Car Manufacturers" (ACEA), and especially that of... German car manufactures, who also called to stop immediately producing *traditional car engines*, and to reduce releases of CO_2 by $\frac{1}{2}$ by 2021! A clear "push" is towards electric cars etc., where, however, USA car manufacturers⁵² seem to be more competitive... USA car manufacturers plan to spend \$300b to prepare electric cars between 2025 and 2030.

The Green EU policy can be summarized in **Table 3**.

We all know that CC is accomplished eventually at an increasing momentum as time elapses, but a global unanimous front is still lacking, despite Kyoto and Paris summits! Who was more sensitive in avoiding climatic destruction worldwide (Table 4), judging by the funds devoted?

As shown, the funds devoted for *sustainable investments*, since 2012, increased by 2.3 times, reaching \$31 trillion in 2018. EU is a pioneer with a 46% share, followed by USA (39%).

The 27 EU ministries of environment agreed in $23^{rd}/10/20$ in Luxembourg for the *complete* and *final* elimination of CO₂ emissions (except Bulgaria). This on top of the "R&RF-Recovery & Resilience Facility", devoting funds from an EU budget for 2021-2027 of €1,074tr. EU means business on environment. In the case of shipping, EU was determined to "push" IMO⁵³ so that international shipping to enter into the "EU emissions trading system"—EU-ETS. The final aim of EU is to *reduce immediately* CO₂ emissions from large ships.

5.5. Our Model of an Optimal Treatment of the Environment

Ten top firms in USA achieved⁵⁴ (in 2018) a revenue of \$182b, of which \$71b was the value of emitted greenhouse gases (Scan 1)! So, if above firms were obliged to cut down emissions, they would have to abandon 39% of their revenue... In fact, state subsidized those firms, as it spent \$67b for the health of above companies' employees!

⁵⁰EU Commission, Plan for Clean Growth (2020)", with a view to mobilize funds for a "Recovery Fund" issuing Green bonds of €750b.

⁵¹Time when oil became 5 - 6 times dearer for the first time.

 $^{^{\}rm 52}Electric;$ saving almost 7 kgs of CO_2.

⁵³The International maritime organization-IMO (1982) (IMCO till 1958) is an UN organization with ~150 nations-members to decide on important matters of international sea transport. Greek shipowners maintain a high esteem for IMO.

⁵⁴Harvard Business School research run by Prof. Seraphim G, 18/10/2020, in weekly newspaper "Kathimerini".



Scan 1. Can Profits and Pollution "produce" together? Source: Reuters; modified.

Table 3. EU policy to prevent EU climatic collapse.

Actions 1 - 2	Actions 3 - 4	Action 5
Adoption of <i>clean energy technologies</i> , especially in: mass transport, stations of electric supply; cars to use hydrogen	Faster development & use of <i>renewable</i> <i>energy sources</i>	Initiating innovations in <i>saving energy</i> ; especially in public & private <i>buildings</i>
Speed-up broadband services & 5th generation networks; (antagonism appeared between USA and China over 5G networks & relevant technologies)	End of production of traditional car engines based on oil	

Source: EU Commission policy "Europe's next generation", 2020.

Nation or economic union	Value of Green investments 2012 (in trillion \$) % rounded		Value of Green investments 2018 (in trillion \$) % rounded	
EU	8.8	66	14.1	46
USA	3.7	28	12.0	39
Canada	0.6	4.5	2.2	7.2
Australia & N Zealand	0.2	1.5	1.7	5.54
Japan	0.01	0.1	0.7	2.3
Total	~13.3	~100	~31.0	~100

Table 4. Amounts spent for Green sustainable investments worldwide, 2012 and 2018.

We assume that: 1) In order to prevent CC, we will depend exclusively on global *production*-private or state⁵⁵; 2) Production to be done with 5 factors: Qi = f (Ci, Wi, Li, Si, Ei) {1}, where Qi is the production of the i_{th} firm, using inputs from C, W, L, S and E, i.e. capital, labor, land, ... sea, and... environment. 3) *Technical efficiency* is pre-supposed (microeconomic theory). As shown, Sea is a factor of production after 1982 "law of sea". Our innovation is also to insert... environment into the production function!

⁵⁵Matters of consumption (utility, welfare, maximization etc.) are ignored, because consumers will be supplied with clean products, if production is clean.

If Equation {1} has to get a specified form, then a Cobb-Douglas function, as simpler, or a CES one can be used. All inputs are essential, though sea may not enter into all productions. (4) There are no exhaustible resources. Even non-renewable resources, when finished, can be replaced by others (e.g. oil by schist and gas; dirty diesel electricity by clean, and so on). Maximizing {2} will be subject to cost minimization: C = C1P1 + W2P2 + L3P3 + S4P4 + E5P5 + fc) {3}; and adding $\lambda[Q^0-(AC1W1L1S1E1)]$ {4}, where P1-5 are the prices of the factors of production, fc is fixed cost, λ is a (positive) Langrage's multiplier ($\lambda = dQ/dC = 0$ {5}). Equations {3} and {4} have to be put equal to zero for cost minimization. Production is taken to be at a *prescribed* level (Q⁰). Deriving only one partial derivative from six, we get: $dC/dE = P5 - \lambda F5 = 0$ {6}, where F5 = P5 / λ {7}, which means to set the *marginal product* of environment⁵⁶ equal to its price (divided by λ).

We need prices for Sea and Environment. The Sea up to AOZ "belongs" to coastal state, and thus if a company exploits it and pays fees to the state, this will be the price of sea (e.g. license fee for fish-farming; aqua culture etc.). The price⁵⁷ of environment... is the *value of a unit quantity of GHG emission*.

Now, Profits = PQ – C {9}. Profits are the residual between revenue (quantity produced, and sold, times the unit (fixed) price P (in pure competition) and total cost C. Inserting in {9}, equations {1} and {3}, and setting partial derivatives to zero, with respect to the five inputs, we can get also for this for the environment: P * MPe - P5 = 0 {10} for profit maximization or cost minimization: P5 = P*MPe {11}. Equation {11} *means that environment can be polluted up to the point where the "value of its marginal product" equals its price* (= *the unit value of GHG emissions*). If a Government wishes to eliminate GHG pollution, then it has to place a tax equal to P5. This amount can be devoted subsequently to support state health system and environmental improvement.

6. Part V: The Digital Citizen-DC

Technology made the DC powerful and self-sufficient! Mobile phone-MP is now the instrument for *all banking transactions*. We all saw the "love affair" developed between DC and MP! MP became a "quasi-ticket" for all mass means of transport (plus a "mass transit transaction model")! Bio-data etc., stored in MPs, will make mobile transactions secure, and simpler, and preferred (77% of those asked in Greece responded positively). MP will soon show a *passport, identity card, birth certificate* and *driving license etc.* All documents will be stored-in and shown-up in a MP, authentically...

Academia is called to play an important role now: to provide re-skilling to people so that to avoid a replacement by a younger person (cheaper, computer-literate). Professionals in computers argued that their knowledge became ob-

⁵⁶Meaning the increase in the total quantity of GHG emissions by producing 1 additional unit of product.

⁵⁷A fee, starting from \$15 per metric ton of greenhouse gas (GHG) emission, legislated in USA in 2019 by the "Energy innovation and carbon dividend act" (EICDA).

solete more than 5 times in their life...! Society and academia have to focus also to, the between classes of ages, antagonism. By this we mean the cases, where 1 younger and cheaper employee can replace one expensive at his 40s!

More people move now into advanced ages (67+), requiring: home robots, medicines, more houses for the aged, physiotherapists, and services only from a distance to avoid... walking/driving. There is, obviously, no need for more nurseries and primary schools... Personal contacts will be rare, including that of Professors with their students. Interviews, conferences, dates and marriages etc. will be arranged only through social media.

Life will become more home-centered for a number of reasons, one being COVID-19, for the present 1 - 2 years, and another the danger to be killed (Paris 200 dead so far) or robbed, while in: streets, stadiums, subway/Metro, buses, coffee/restaurants, theaters etc. Always someone will attempt to steal one's credit card and wallet. *Credit cards will soon become... invisible and readable only by laser...*

The DC is: ego-centric. Social distancing will be maintained... as COVID-19 trained us. Voting from distance will be generalized. The DC will be equipped with a high technology, powerful, new *smart phone/mobile computer*. Schools will be closed-up, as an improved distance learning—resembling/simulating interactive actual classes and much better than today, will be more *convenient*. Libraries will become book-museums, as whatever one needs will be in the internet⁵⁸.

The DC, but also the present, is a tele-worker. The term "tele-" will accompany everything; tele-pay, tele-buy, tele-love, tele-teaching, tele-phoning etc.! 80% of firms adopted tele-working (25/10/2020), from 1% before covid-19, in Greece. The DC looks *constantly* on a screen (of his/her smart phone, tablet or computer), neither left or right, and everybody else is out of sight... One positive service smart phones and tablets will offer is to photo criminal happenings, disasters or car accidents⁵⁹...

Digitalization (coupled with AI) will be a more general trend, where intelligent machines will take-over, perhaps all, human jobs! Naturally, it will be beneficial if machines will cut-down human time spent in bureaucratic, boring, unproductive and time-consuming jobs...!

Citizens will demand devices for communication like smarter-smaller pocket-sized mobile phones/tablets. In addition: other social media, internets, advanced TV services (e.g. Netflix); improved home cinemas, biometrical watches etc. Also, people will ask for *faster cars*, better mass transportation and decent health services, especially for the aged. DC will look forwards for: 1) Voice recognition. 2) A small robot to carry-out most or all of the office-jobs. 3) A robot—a "home diagnostic unit"—of all usual analyses⁶⁰. 4) Personal information in 24 hours a day. Calls from 112 (emergency phone of state services for citizen's

⁵⁸A district attorney in Greece prosecuted people spreading fake news in social media for COVID-19.
⁵⁹Till replaced by Wi-Fi in mobile phones...

 $^{^{60}\}mathrm{At}$ the time of writing this we learned that a home test for COVID-19 is a reality.

protection); warnings from fire brigades; real time info about: floods, winds, earthquakes; list of broken-off roads and bridges with maps. 5) Provision of independent water and electricity at times when the permanent providers fail. 6) Advise to stay home or abandon it. 7) Available hospitals and phones. 8) Available ambulances and time of arrival. 9) A robot—home laboratory—measuring radiation, air pollution, water pollution, noise levels, etc. This may also manage *cleverly* home's electricity and gas consumption. Also, filtering incoming air, reduce humidity, and indicating where home's heating is lost. 10) A robot to tell owner about the state of his/her car, making the proper electronic tests. 11) *A robot to act as a personal secretary in cooperation with number* 2. Robots to save one's time, so that to have time to love more those one loves...

7. Conclusion

Humanity retarded to admit that its real enemy was not the *gradual depletion of DM*, which never came, or will come, in our opinion, but *the extreme bad weathers*! COVID-19 proved dangerous also, but only if it is here to stay! Hurricanes are with us since 1780 at least, killing more than 453,000 (**Appendix 1**). COVID-19 brought certain... *beneficial repercussions*, but also a number of negative impacts, which we presented.

Humanity has to retain and increase COVID-19's benefits, we believe, when and if virus goes away. Humanity was lucky in its unluckiness, as COVID-19 provided a *global experiment* of the effects that the use of less transport (private; air; buses etc.), the reduced consumption of energy, tele-working, tele-educating and tele-buying have brought in. It is remarkable that COVID-19 showed how a serious pollution can be eliminated!

Many by now realized in my country (households and shop keepers), that they have to buy a boat...and build a room in a high place. Moreover, house and shop windows and doors have now to be water resistant or, even better, *water proof*!

Everybody, we reckon, has to become familiar with "weather forces", *recognize* them, and *do* whatever is in one's power to avoid them! We all know that climate no more remained as we knew it certain decades ago. We all have experienced the ever-increasing number of summer days at round 40 degrees C and over for several weeks.

We have now to forget the world we knew, and seriously we have to build it afresh, i.e. to rebuild it absolutely friendly to its citizens! A sustainable city? Cities (=smart) as well houses (=clever) have to become *green*... All houses have to acquire independent (autonomous) energy from Sun, from winds or from a "home nuclear harmless water unit" ... we learned about a few years back.

Humans did 4 economic revolutions, which mainly concerned with faster quantity of production, under the threat of Malthus. Though humans is not proper to live in order *only* to eat, the poverty we see is not due to lack of means, but is due to lack of care for our neighbor.

Important conclusion was that companies profited by polluting the environ-

ment! So, they have to pass it to State till is zero. Our contribution, as mentioned, was to insert environment into production function, where it belongs, so that production can become eventually clean, and to produce zero GHG emissions.

A final conclusion is that we succeeded to transform climate from a friend to an enemy! This has to be reversed as soon as possible. Societies should not roll-over their responsibilities by considering weather accidents as *natural*... They are human-made. We showed the *enemies* of our society for which we have to fight. We showed also the future citizen—the digital one—somebody mobile phone addictive and isolated one from the rest. Do we want this type of personality? Technology is a curse and a blessing and we have to be careful. This paper traced-out the steps our society is taking and I am terrified if it takes the wrong direction. I am rather old to see it, but precaution is better than cure. Reject the trend for one to be in autarky from everybody else... from a distance.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix 1

We recorded-down the main tropical cyclones etc. (Table A1).

1780The "Gran" hurricane22.000NAtatic/Lesser AulilesNot known1990"Galveston" (hurricane)6000 6000Texas19161"Nancy" (typhoon)600Bangladesh1971"Mina" (typhoon)1000China62 dams fell1972"Tupital depression	Year	Name (type)	Dead	Nation/area	Cost/speed/damages
1900'Galveston' (hurricane)6000 12,000Texas1961'Nancy'' (typhoon)346 km/hour1975'Nina'' (typhoon)100,000China62 dams fell1975'Tip'' (typhoon storm)-Pacific310 km/hour1982Tropical depression -> enalth' kmrricane eventually1000Central America1982'Ting'' (typhoon storm)-Facific310 km/hour1982'Ting'' (typhoon storm)-Central America1984'Tohma'' (tropical storm)400Falligpines1994'Ting'' (typhoon)-Spacific; Australia1994'Tohm'' (turricane)-Queensland408 km/hour1995'Golivia'' (tropical cyclone)74Madagacar1994'Tohm'' (typical cyclone)1836USA (Louisiana: Missispip)properties: \$100 damages1995'Katria'' (hurricane)-USA-2005'Katria'' (hurricane)-USA-2016'Mara'' (tropical cyclone)-USA-2017'Mata'' (turricane)-USA-2018'Mara'' (turricane)-USA-2019'Mara'' (turricane)-USA-2010'Mara'' (turricane)-USA-2011'Mara'' (turricane)-USA-2012'Mara'' (turricane)-USA-2013'Mara'' (turricane)-USA-	1780	The "Great" hurricane	22,000	N Atlantic/Lesser Antilles	Not known
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2020/Nov. Goni Philippines 1 m evacuated; winds of 225 km/h.	2020/SeptOct.	Alex	9	France Nice-Italy	Rain fell in 4 hours instead of 6 months
	2020/Nov.	Goni		Philippines	1 m evacuated; winds of 225 km/h.

Table A1. A historical account of tropical cyclones, storms etc., 1780-2020.

Source: data from Wikipedia, downloaded 21/09/2020 for "tropical cyclones", except for the 3 last ones.