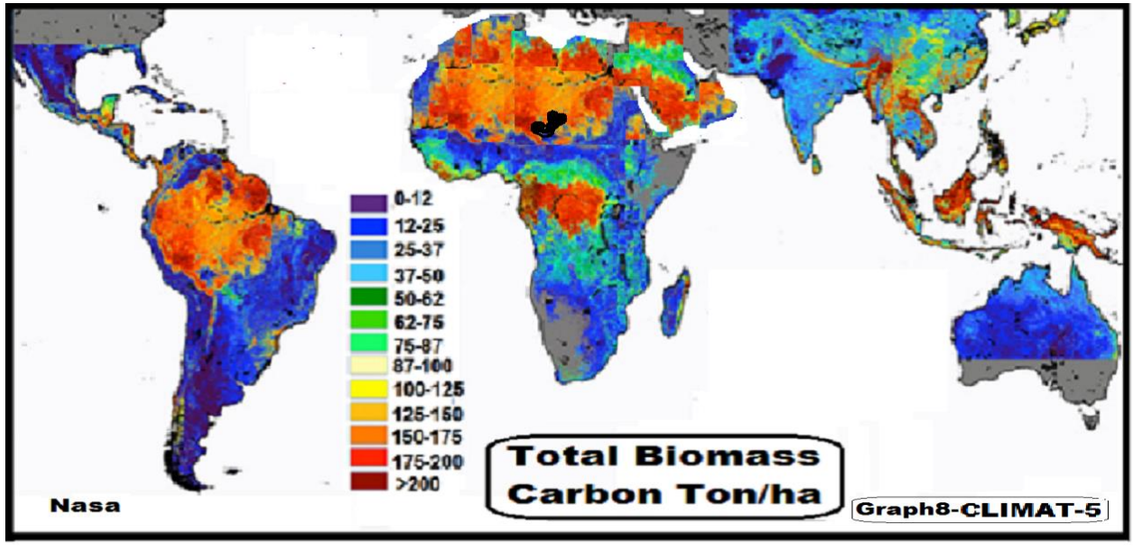
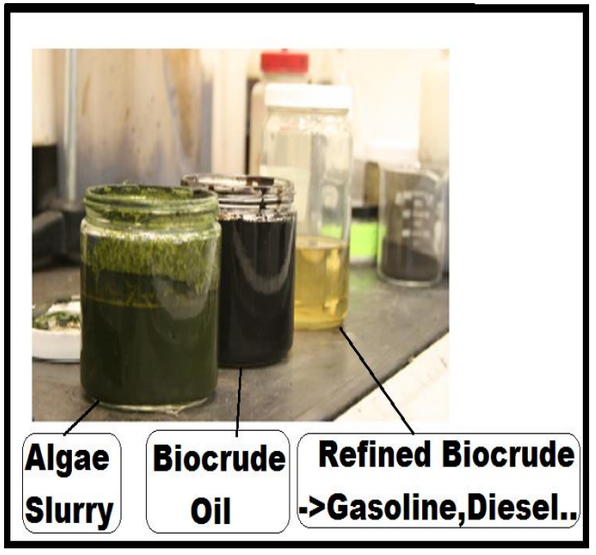
HOW TO AVOID A CLIMATE CATASTROPHE ?

1. SIGNIFICANTLY REDUCE CO2 EMISSIONS - HEAVY CO2 TAX AND AFTER 2050, REMOVE CO2-CUMUL FROM THE AIR : THE GREEN DEAL TACTIC.

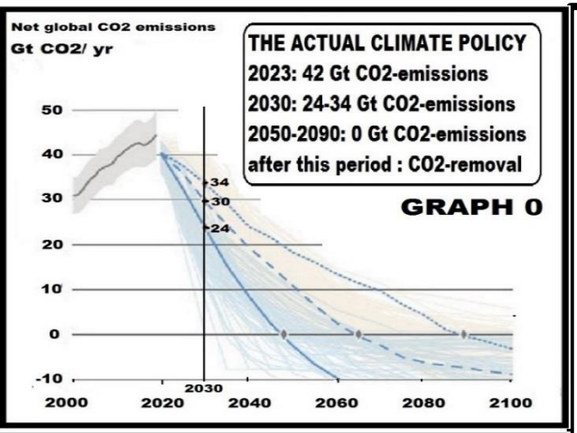
2.OR: FAST AND MASSIVE CO2 EXTRACTION FROM THE AIR VIA MILLIONS OF KM2 OF NEW TROPICAL FOREST - REPLACING MINERAL OIL WITH OIL FROM FLOATING ALGAE A.S.O. - NO CO2 TAX – DRASTIC ACTION.

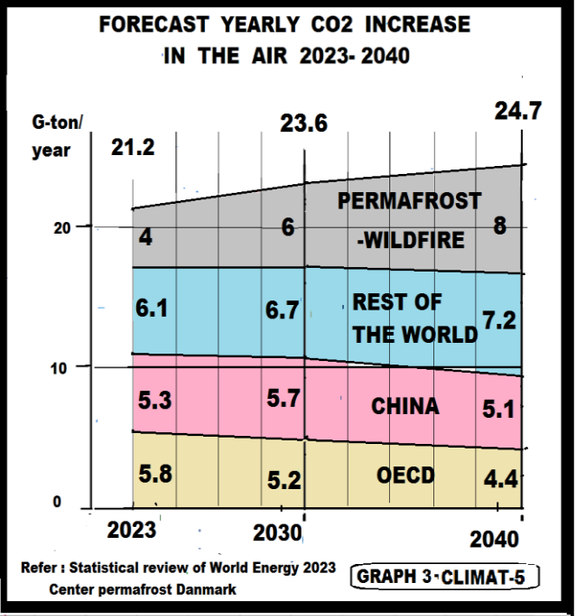


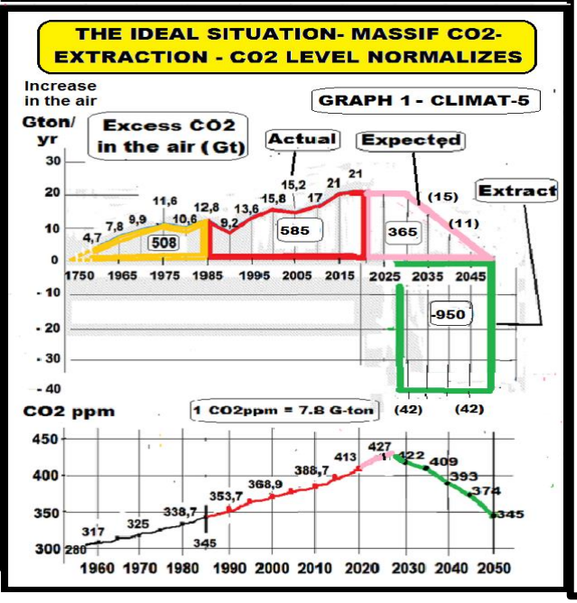


THE INCONVENIENT TRUTH NR 2 :THE CLIMATE CATASTROPHE IS FAST APPROACHING, BUT THE ACTUAL CLIMATE POLICY IS VERY WRONG

- CLIMAT-5 WITH 5 ACTIONPOINTS







COULD WE REDUCE AROUND 2030 CO2-EMISSIONS BY 30-50% ON A GLOBAL SCALE? 2

ANSWER FROM MANY PEOPLE: MAYBE IF THIS, IF THAT…

CORRECT VERY FIRM ANSWER IS : NO AND THE PROOF IS HERE

-Most Climatologists and experts are steering the climate sector in the wrong direction: claiming that annual CO2 emissions can be halved by 2030 compared to 2005 – with the intention of reaching zero emissions around 2050 – also removing several billion tons of CO2/ year from the air.

IPCC (UN climate organization)- Geneva April 4, 2023: "THE EVIDENCE IS CLEAR: THE TIME FOR ACTION IS NOW –WE CAN HALVE EMISSIONS BY 2030." The European Parliament has approved a law with a narrow majority, to reduce CO2 emissions by 47% at European level by 2030 compared to 2005 – half of the member states, even large ones as Germany and France, do not achieve this objective.

ANSWER ON THIS 1/ Let's start from correct accurate data: **STATISTICAL REVIEW OF WORLD ENERGY 2023** (graph 3 left)– 21 billion tons of CO2 are added to the air every year(42 G-tons are emitted but 1/2 of it is captured by oceans and increased plant growth).

The west (OECD countries) is FALLING by 1.5% / year–China is still rising until 2030, after which it will fall slightly– rest of the world is RISING by 1.4% / year – but non-human emissions from permafrost melting and forest fires are rising phenomenally and this is not even mentioned in almost all IPCC, Green Deal... documents – all CO2 savings are undone by this increase.

REDUCING ANNUAL CO2 EMISSIONS ON GLOBAL SCALE IS IMPOSSIBLE BY 2030 - IN LATER YEARS TOO – YEARLY CO2 EMISSIONS INCREASE.

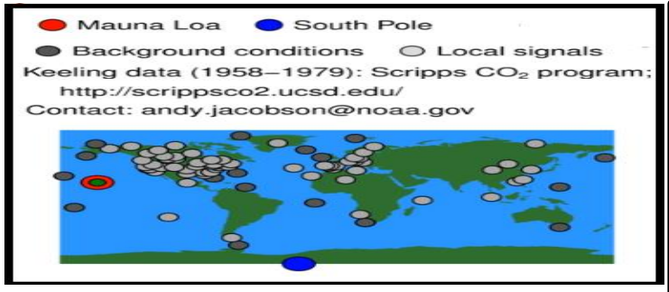
2/ Before 1985, the CO2 content in the air (345 ppm) was acceptable with a normal climate - in the 40 years that followed, about 600 G-ton of CO2 was added to the air causing the current climate chaos. 3-17-56 million years ago there was a similar CO2 injection by volcanoes – the temperature increase caused permafrost to melt – the thawed plant and animal remains rotted – released a mass of CO2 that was twice as much as the current CO2 in the air.

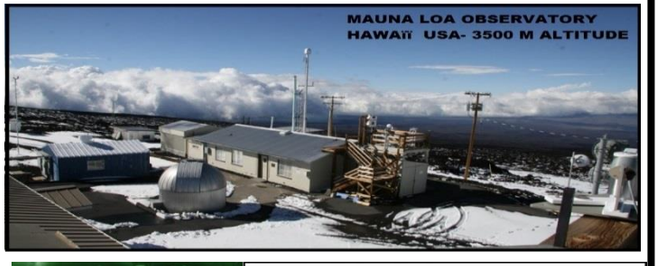
This caused a heat period of about 300,000 years with 20-40 m rise in sea level – the heat period of 56 million years ago was the worst because methane hydrates also melted at that time – 1/3 of all land animals became extinct. We are now moving in that direction at a rapid pace.

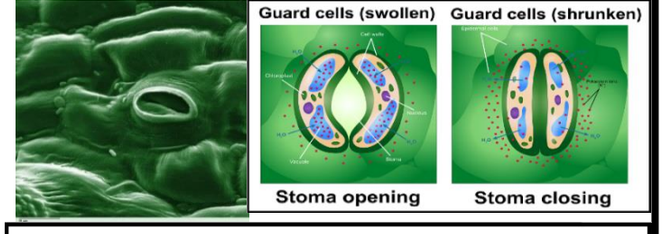
CAN WE STILL STOP A CLIMATE CATASTROPHE ? YES

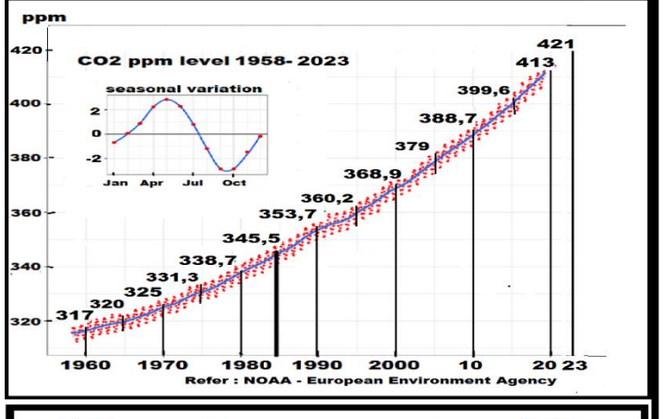
with totally different politics: current excess CO2 in the air is 97% CO2-cumul since 1985 and only 3% annual increase – a small decrease of this 3% has hardly any influence – it is the large CO2-cumul that should be reduced by at least **30 BILLION TONS OF CO2 /YEAR** – the champion in CO2-extraction is **TROPICAL FOREST** – millions of km2 are needed – but this solution is nowhere to find in the current documents of IPCC, Green Deal..... NOT SAVING BUT EXTRACTING WILL DO IT !!

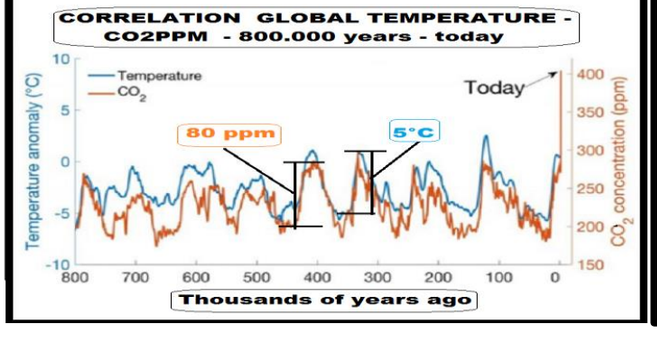
ACTION POINT 1 : CREATE A CLIMATE PLAN THAT AT LEAST WORKS











1A LET'S START WITH A CORRECT ANALYSIS : 2 THINGS AS BASE MATERIAL:

1/CO2-IN THE AIR expressed in % or ppm (part pro million)
2/CO2 quantity in the air, expressed in mass (ppm ⇔ G-ton)

1/EVOLUTION OF THE CO2 CONTENT IN THE AIR -HOW TO MEASURE IT

DEPENDS ON PLACE AND SEASON – OFFICIAL CO2 CONTENT IS AN AVERAGE.

There is 21% oxygen, 78% nitrogen in the air- the pre-industrial level CO2 was 0.028% CO2- 0.280 promille-280 ppm (parts per million) or 1 CO2 molecule at 3500-

- in 1985 before the big problems it was a viable 345 ppm
- early 2023: 420 ppm- much too high

–around 2030 440 ppm is predicted - around 2035 455 ppm- around 2040 470 ppm.

This single molecule is extremely important -stomas in a plant-hundreds per mm2 open and enter, capture this CO2. Solar energy gives binding CO2 +water => 6 CO_2+6 H_2O ➔ $C_6H_{12}O_6$ + 6 O_2 -- CO_2 molecule determines our climate CO_2 is a greenhouse gas- let the sun's rays through, stops reflected rays – without CO2 no life is possible – too much CO2 gives a hell on earth.

CO2 is measured in hundreds of places via CO2-devices such as CO2 measured for the covid pandemic -this gives always different results - but it was found that the value on the **Mauna Loa volcano, Hawaii** corresponds well with the average - therefore this serves as a reference value.

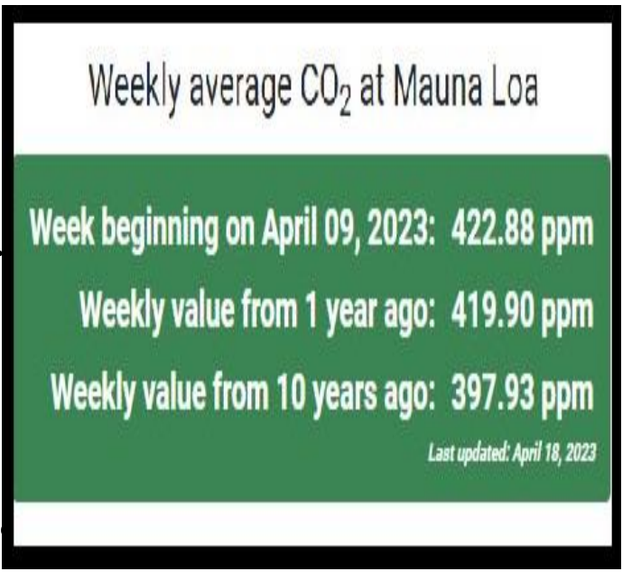
Wave pattern: from April to Oct, CO2 content drops sharply because of CO2 absorption by plant growth – from Oct to April the content rises because CO2 is released (plants wither). Official CO2 content is the average - there are strong waves at the North Pole, medium - moderate at the Equator - weak at the South Pole.

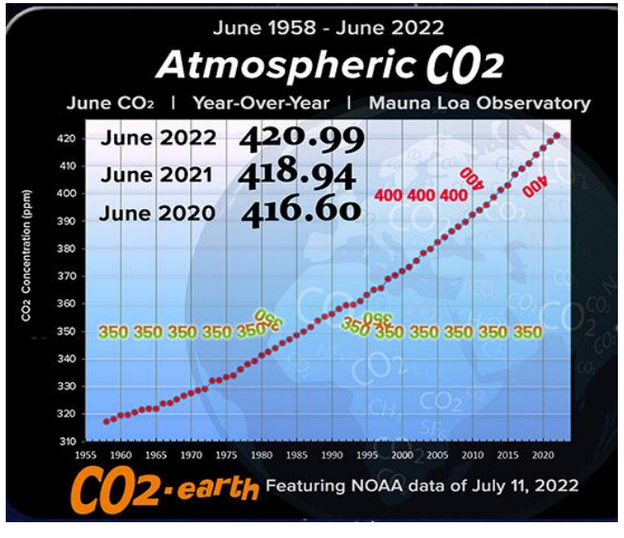
CO2 levels from prehistoric times were extracted from drill cores in the South Pole base Vostok- and other -2.7 M-year-old ice with air bubbles in which CO2ppm could be measured.

CO2PPM CONTENT :

ice age : 200 -moderate climate :280 –differ.: 80 > 1000 yr
1985 : 345 - dramatic in 2023 :420 –differ.: 75 40 yr

in pre-industrial times thousands of years came between ice age and temperate climate - similar CO2 increase has now been realized in 40 yr.





The layered structure of Earth's atmosphere is visible in this sunset view from the International Space Station.
Credit: Image Science & Analysis Laboratory, NASA Johnson Space Center

The annual CO2-ppm increase in the air fluctuates quite a bit over the different years as shown in the tables next:

Increase between April 2022-2023 : 2.98 ppm/ year (422.88 – 419.90)
between june 2021-2022 : 2.05 ppm
between june 2020-2021 : 2.34 ppm
the last 10 years : 2.50 ppm (422.88 – 397.93)/ 10
the last 5 years : 2.70 ppm
But an upward trend is clear.

2/CONVERSION MEASURE: Weight of 1 CO2-ppm in Billion Ton

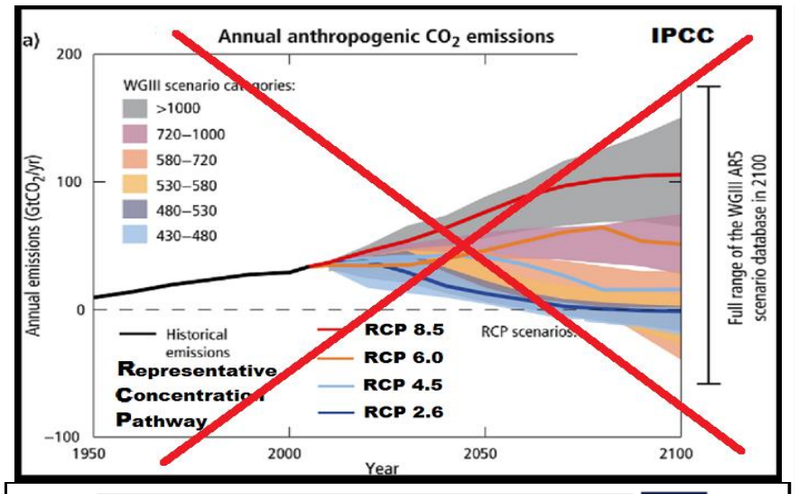
A/ What is the total weight of the atmosphere ?
Earth surface=510.0056 million km2 -(if earth was a perfect sphere D=12756 km– Surface=π.D2=511 M km2) or 5.100056.10^18 cm2 (1km2=10^10 cm2)-

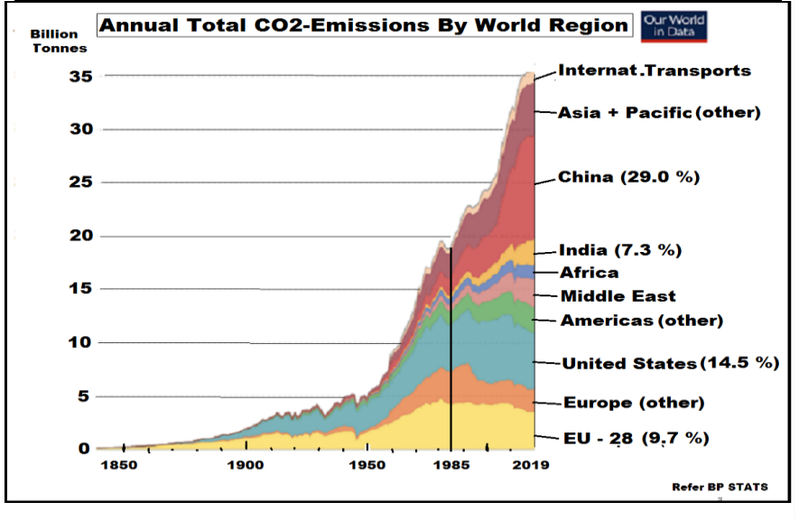
On 1 cm2 rests 1.007 kg mass (photo atmosphere ISS) : taking into account the country's mountainous character. Total atmosphere thus weighs 5.100056 X 1,007 10^18 kg=5.137 10^15 TON
1ppm=1/10^6 (1 millionth part).
1 ppm of air weighs 5.137.10^9 tons= **5.137 billion ton.**

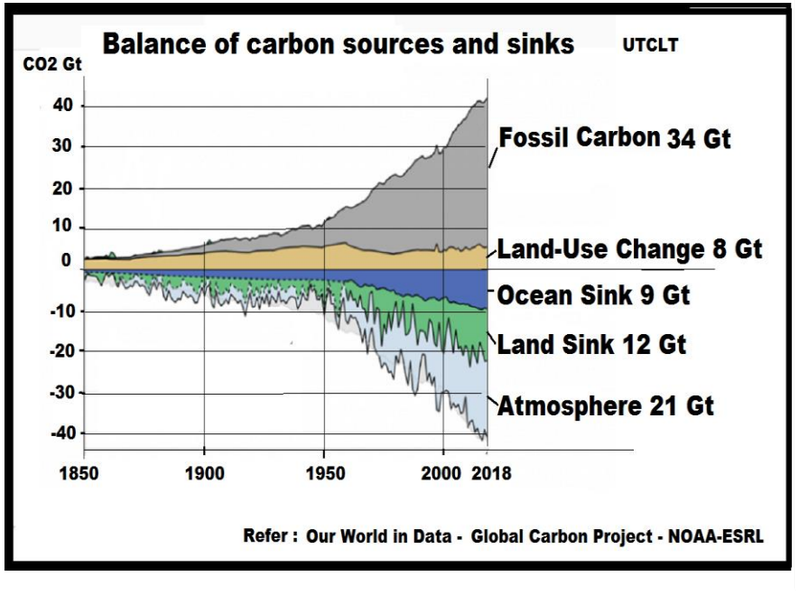
B/ But CO2 molecules weigh 52% heavier than air. Compare weight of the same number of molecules of air and CO2. (1 mole =6.022 x 10^23 molecules- number Avogadro).
1 mole CO2: 2x15.999 (O)+12.011(C)g = **44.0095 g**
1 mole air: mixture N2 =78,09 % O2 =20,95 %...
0.7809 X 28.014 (N2)+0.2095 X 32 (O2)g= 28.58 g
this gives with smaller fractions **28.97 g**

1 Mole CO2/1 Mole Air: 44.0095/28.97= **1.519**
(1 molecule of CO2 weighs almost 52% more than 1 average molecule of air)

C/ **1 ppm CO2 = 5.137 (air) x 1.519 G-ton= 7.80 billion Ton.**
In clear terms: each time a 1 CO2 ppm increase is measured 7.8 billion tons of CO2 has been added to the air - essential to know how much Gton of CO2 should be extracted from the air in order to have a normal CO2 content.







There are 2 aspects to the climate problem:

1/ annual CO2 emissions

2/ the now huge CO2-cumul since reference year 1985 when CO2 content in the air was considered acceptable.

First answer the question: which of the 2 has priority? If climate denial is not considered, the answer shows 2 visions.

VISION 1: ANNUAL CO2 EMISSIONS are the priority for the IPCC (United Nations climate body), GREEN DEAL, almost all climate organizations -on a global scale it should reach zero as soon as possible -good illustration is the RCP graph above left- humanity should reduce CO2 emissions according to the dark blue line - CO2-cumul in the air is presented as a fairly invisible detail at the bottom right - the CO2 extraction will then happen after 2050- a similar recent graph is on page 11 of this document.

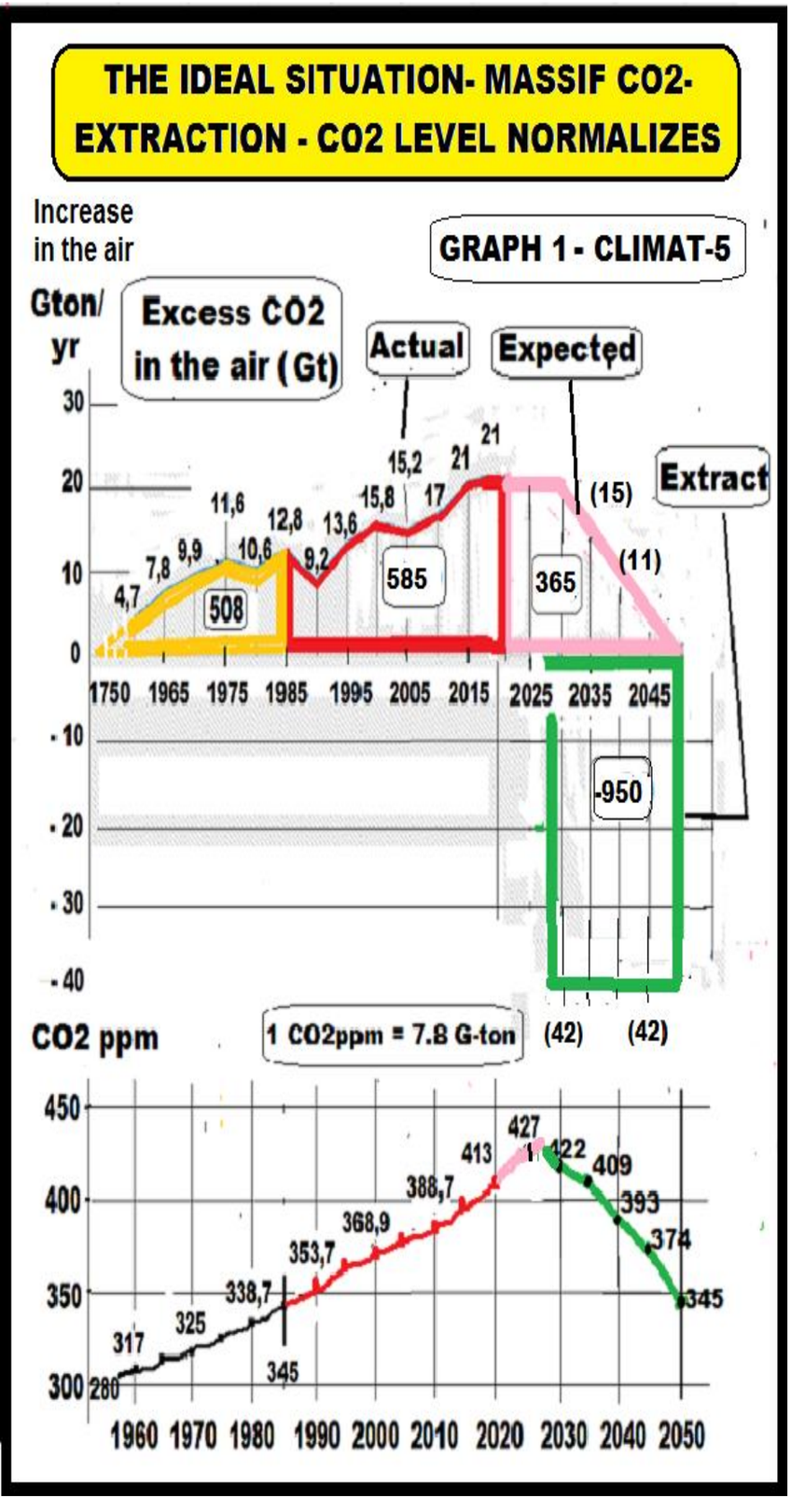
VISION 2: THE HUGE CO2 CUMUL IN THE AIR IS THE PRIORITY FOR CRITICS, RATIONAL THINKERS .... far from a detail- Graph No. 2 on the left: CO2 emissions before 1985 and beyond give a **HUGE INCREASE THAT IMMEDIATELY REPRESENTS THE GREATEST DANGER** -it is a time bomb -a similar CO2- surge thawed the permafrost 3-17-56 million years ago that contained 2 times as much CO2 stored in it as the then CO2 mass in the air- that caused a heat period of about 200,000 years each time.

The approach of both visions to stop the climate catastrophe is profoundly different -both are not at all right - it is extremely important to see **WHO IS RIGHT** - therefore it is better to paste figures on CO2-cumul after 1985 and create a CORRECT GRAPH.

IMPORTANT NOTE :a total of 42 billion tons of CO2/year is emitted – this does not remain completely up in the air: graph :reference NOAA- Our world in data

- fossil human CO2 emissions (+34 G-ton)
- melting permafrost+ forest fires (+8 G-tons)
- absorption by oceans (-9 G-tons)
- increased plant growth (-12 G-tons)

-ACCUMULATION IN THE AIR (- 21 G-ton).



1B MAKE A CORRECT GRAPH

which shows both CO2 content + associated mass in G-ton and therefore stands vertical not annual CO2 emissions but annual CO2 increase in the air.

1/What is **THE ANNUAL CO2 INCREASE IN THE AIR**?

On average, the CO2ppm increases by 2.7ppm/year – best to make an average - not to take unforeseen fluctuations like Covid19 into account e.g. 13.5 ppm over 5 years –this gives a mass:

2.7 ppm X 7.8 Gt/ppm ~ **21 Gt/yr.**

2/How much is the **CO2-CUMUL** in the air calculated from 1985 – then level stood at 345 -early 2023: 420 – difference 420-345 = 75 ppm –

equivalent mass: 75 x7.8 Gt = **585 Gt.**

The CO2-cumul is 28 times greater than the annual emissions.

3/ Projected increase : years 2023 to 2030 : 22 Gt/yr X 7

2030-2050 : a sharp decrease to zero in 2050 gives 20 X 21Gt/2

together 2023-2050 : 7 X 22 Gt + 20 X 21/2 ~ **365 Gt**.

4/ Excess in the air in 2050 : actual + precast 585 Gt + 365 Gt= **950 Gt**

to be extracted from the air in order to have a normal climate in 2050 (excess=0).

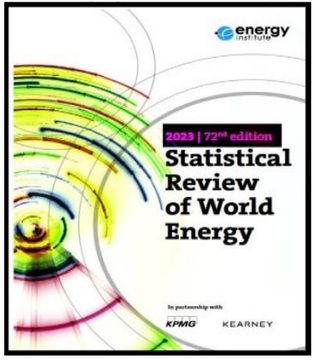
THE DOUBLE-GRAPH SHOWS HOW THE CLIMATE PROBLEM SHOULD BE SOLVED (IF THERE SHOULD BE LOGICAL THINKING):

CO2 extraction from the air should happen now (after a few years of preparatory work) - this would be from eg. 2028 every year ~ **42 Gt CO2/year (950Gt/22) from the air (green zone)**.

The CO2 content reaches a maximum of 430 around 2030 and then drops sharply- around 2050 all excess CO2 will disappear from the air – CO2 content at 345 = normal climate.

THE PINNACLE OF ALL THIS: a graph like this one that proofs the need of rapid, massive CO2-EXTRACTION **IS NOT PRESENT AT ALL IN TEXTS OF IPCC, GREEN DEAL, CLIMATE ORGANISATIONS… .**

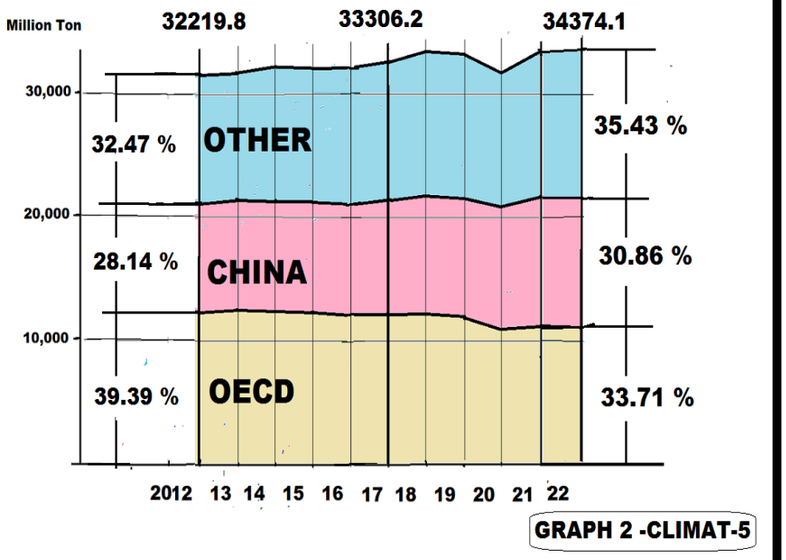
UNFORTUNATELY: CURRENT POLITICS DOESN'T MAKE SENSE AT ALL



Carbon Carbon dioxide emissions from energy

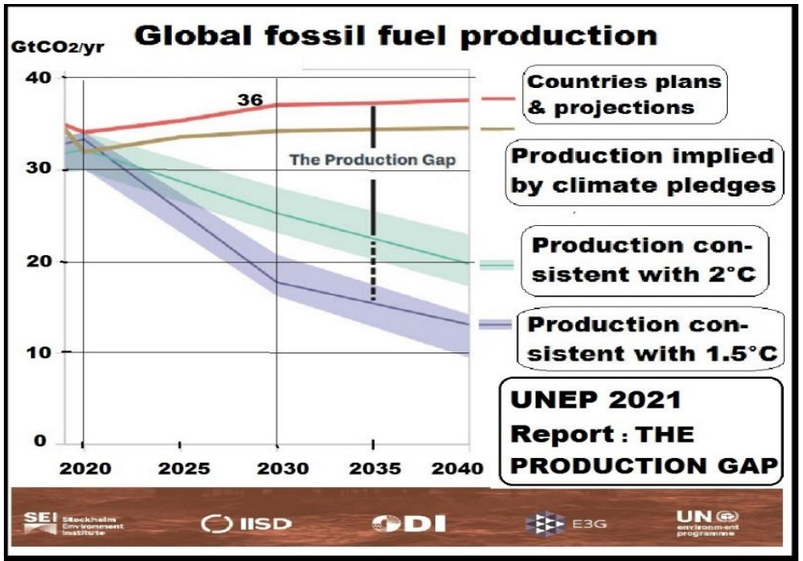
Million tonnes of carbon dioxide	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**2022**	Growth rate per annum 2022	Growth rate per annum 2012–22	Share 2022
US	5089.1	5246.6	5251.7	5137.5	5038.0	4978.8	5133.2	4981.6	4462.7	4768.4	**4825.8**	1.2%	-0.5%	14.0%
China	8977.6	9214.1	9235.5	9171.3	9014.6	9270.3	9610.7	9933.7	10130.9	10563.5	**10550.2**	-0.1%	1.6%	30.7%
China Hong Kong SAR	88.7	91.5	89.7	90.5	92.7	98.9	100.1	94.6	68.1	64.6	**58.1**	-10.1%	-4.2%	0.2%
India	1825.5	1892.6	2042.1	2109.8	2207.2	2283.8	2381.7	2407.3	2237.5	2464.7	**2595.8**	5.3%	3.6%	7.6%
Total World	**32219.8**	**32676.8**	**32779.0**	**32773.7**	**32818.0**	**33306.2**	**34013.9**	**34044.0**	**32284.9**	**34052.2**	**34374.1**	**0.9%**	**0.6%**	**100.0%**
of which: OECD	12691.5	12779.1	12559.3	12463.2	12385.8	12416.8	12502.3	12119.7	10857.8	11485.6	**11585.6**	0.9%	-0.9%	33.7%
Non-OECD	19528.3	19897.7	20219.7	20310.5	20432.2	20889.4	21511.6	21924.3	21427.0	22566.7	**22788.5**	1.0%	1.6%	66.3%
European Union#	3221.5	3148.2	2984.4	3046.0	3073.9	3118.6	3070.0	2930.7	2569.0	2742.8	**2725.4**	-0.6%	-1.7%	7.9%

CO2 emissions from energy by region 2012 - 2022



GRAPH 2 -CLIMAT-5

Source: Energy Institute -Statistical Review of World Energy 2023 p.14



1C : CORRECT PREDICTION OF ANNUAL CO2 EMISSIONS FOR THE FOLLOWING YEARS.

Most important source of information is the STATISTICAL REVIEW OF WORLD ENERGY 2023 (free download from Internet) emitted by Energy Institute formerly BP with very detailed data on fossil CO2 emissions in the world by various countries and regions, from 2012-2022 (on top shortened table-pg. 14).The document gives a good overview of energy consumption in the world by region and by country –

The UN released the **'UN Production Gap report 2021 CO2' that predicts for 2030 INCREASED EMISSIONS OF 36 GT from fossil fuels if the current emission trend is maintained.**

In order to make a good prediction of the annual CO2 emissions in the crucial next 10 years, we need to investigate **4 DIFFERENT SOURCES OF CO2 EMISSIONS**: in terms of human CO2 emissions, there are 3 groups of countries with own emission behavior.

a/Western world (OECD) decreasing -15% on 10 years- 2050 CO2-neutral
b/China: small increase -2060 CO2 neutral
c/rest of the world – quite increase +14% on 10 years (India 2070-CO2 neutral)

World CO2-emissions fossil fuels 2022 : 34. 37 Gt.

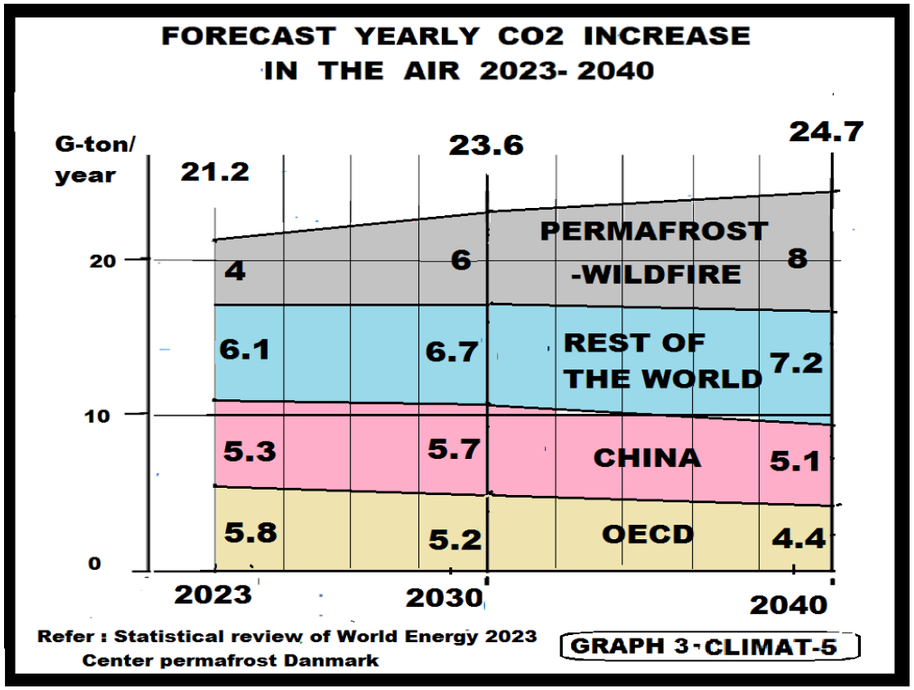
The 4. source of CO2-emissions is permafrost-thaw + wildfires: 8 Gt (pg 5+ 10)

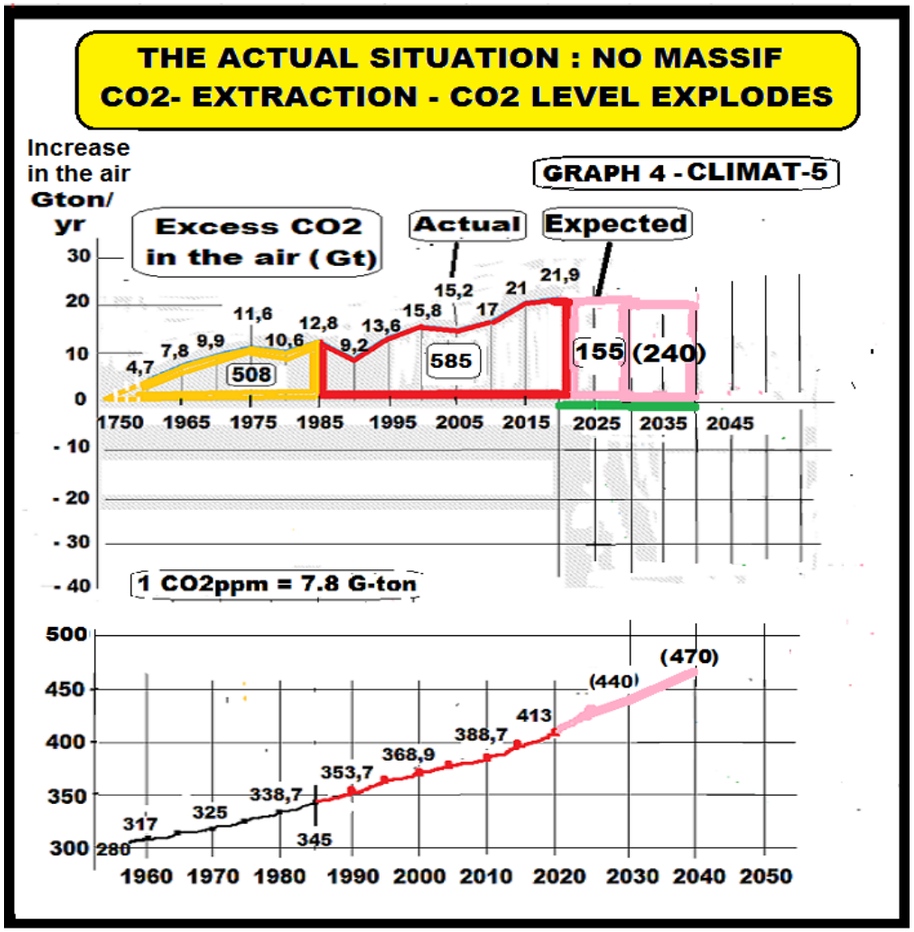
"Balance of carbon sources and sinks" total emissions 42 Gt- 34 Gt fossil +8 Gt permafrost- **21 GT STAYS IN THE AIR (50% TOTAL)** - rest 9 Gt absorbed by oceans + 12 Gt more plant grow)

Distribution of 21 Gt CO2 increase per year with 4 sources of emissions:

3 group countries 34.27 Gt+ permafrost 8 Gt – situation begin 2023:

OECD : 33 % of 34Gt - 1/2 remains in the air = **5.8 Gt**
China : 31 % of 34 Gt - 1/2 remains in the air = **5.3 Gt**
Other : 36 % of 34 Gt - 1/2 remains in the air = **6.1 Gt.**
Permafrost : 8 Gt - 1/2 remains in the air = **4 Gt.**





PRECAST 2030-2040 : hardly any human CO2 reduction- sharply rising emissions from PERMAFROST THAWING

Situation begin 2023: previous pg: (5.8 + 5.3 + 6.1 + 4) Gt = 21.2 Gt

FORECAST 2030-2040 OF THE 4 SOURCES OF CO2-EMISSION

1/OECD COUNTRIES : 15 % decrease in 10 years time – 1,5 % /year
– in 2030: 5,2 Gt (-10 % from end 2022)
- in 2040: 4,4 Gt (-15 % from 2030) -
objective was climate-neutral 2050: 0 Gt ?.
European Union (EU27) Fit for 55 plans: 47% less CO2 emissions in 2030 compared to 2005 gives **4.95** Gt OECD instead of **5.2** Gt -no real difference.

2/CHINA - in 2030: increase to 5.7 Gt - slight decrease after 2030
- objective: climate neutral in 2060.

3/REST OF THE WORLD in 2030: 6.7 Gt (+9.8 % from end 2022) -
in 2040: +14% from 2030 - India climate neutral in 2070.

4/ INCREASED EMISSIONS DUE TO TEMPERATURE RISE, especially PERMA-FROST THAW: every summer, 10-15 cm of permafrost thaws - CO2 emissions will reach some 16 Gt in 2040 (refer Cenperm Copenhagen) -1/2 remains in the air (8 Gt)- in 2030 halfway 4 Gt(2023) and 8 Gt(2040) this will give 6 Gt. Around 2037,average temperature increase will be 2°C– but in polar regions this will be X 2 : 4°C – strong permafrost thaw is the result.

AN INCREASE OF THE CO2-LEVEL IN THE AIR THAT NOTHING OR . NOBODY CAN EVER STOP - A COLOSSAL ERROR OF JUDGMENT

Annual total: in 2030 CO2 increase 23.6 Gt/year – increase 2023-2030 :~ **155 G**t
in 2040 24.7 Gt/year - increase 2030-2040 :~ **240 Gt**
CO2-level in the air INCREASES despite the numerous claims that CO2 neutrality will reduce CO2 levels in 2050 (it has only an impact on Western emissions – a minimal part of the total emissions).

ANNUAL INCREASE	TOTAL EXCES FROM 1985	CO2 CONTENT
in 1985	0 Gt	345 (normal)
in 2023: 21 Gt	585 Gt	420
in 2030: 22 Gt	740 Gt (+155 Gt/7 yrs)	**440** (1.5°C temp.rise~2029)
in 2035: 22 Gt	850 Gt (+110 Gt/5 yrs)	**455**
in 2040: 22 Gt	960 Gt (+110 Gt/5 yrs)	**470** (2°C temp.rise ~2037

(CO2 extraction: injection into empty oil fields e.g.not significant 1-2 Gt/yr)

PERMAFROST THAWING IS THE IGNITER OF CLIMATE DISASTERS

Mass carbon C+CO2 in the atmosphere 1 Gton C = 3,67 Gton CO2

Gton	Actual	Melting Permafrost 2 X Actual Mass	Melting Methane Hydrates 4 - 8 X Actual Mass
C	880	+1700	+ 3000 – 7000
CO2	3230	+6400	+ 11000 - 25000

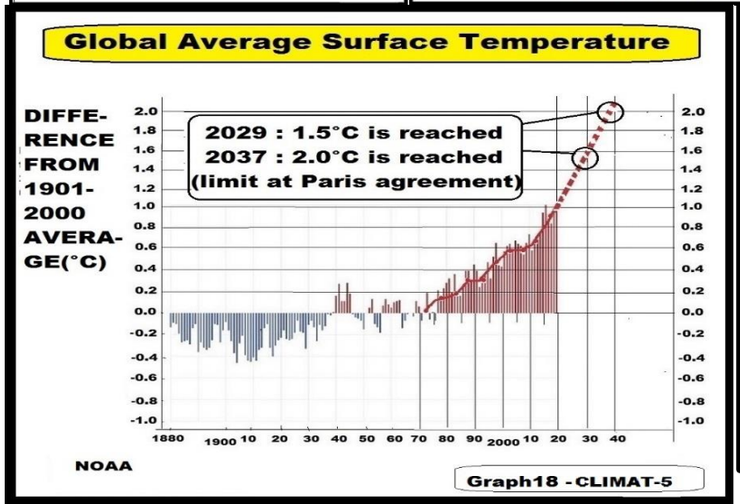
Ellesmere island - Northern Canada - 3 Million years ago

Tundra in the Russian republic of Komi: melting of permafrost ground could release the methane hydrates

refer: ITAR/TASS

Permafrost in the BATAGAIKA crater Yakutia - Eastern Siberia - hunderds meter thick

Refer Katie Orlinsky National Geographic



PALEONTOLOGISTS are best placed to estimate the danger of CO2-levels that will rise to 500 ppm in 2050 which we will experience if we continue the current climate policy -they examined 3 climate disasters: after CO2 outbreak followed an unstoppable permafrost thawing with massive CO2+ methane release - in Permafrost 2 X as much CO2 is stored as in the air.

1.HEAT PERIOD: 3 MILLION YEARS AGO:

- a volcano emitted large masses of CO2- permafrost melts- Heat period 200,000 years: **CO2ppm TO 350–450**. Sea level+22m In far North Canada, Ellesmere island: remains were found of tropical animals

2.HEAT PERIOD : 17 MILLION YEARS AGO

- hundreds of individual lava eruptions over 300,000 years- permafrost melts - **CO2ppm TO 400 – 500**– global temperature + 4°C- at the poles: +7-8°C - SEA LEVEL + 40 m.

3. HEAT PERIOD : 56 MILLION YEARS AGO:

- CO2 injection probably by comet impact -permafrost, peat soil, melts but now also methane hydrates and carbonates from the deep sea -1 G-ton carbon (3.6 Gt CO2) / year-for thousands of years- **CO2ppm TO 1000- 3300**.

Global temperature:23°C(now 16°C)- 1/3 of land animal species died out-dwarfism: a horse of 30 cm- Water temperature around Tanzania:34-36°C (now 28°C)- South Pole: 20°C - deep sea:10 – 15°C (normally near freezing point).

CURRENT :FATAL CO2-450ppm HAS ALREADY BEEN REACHED AROUND 2035

the RED LINE in the 3 heat periods is the Permafrost thaw and that will be made clear from 2030 on.

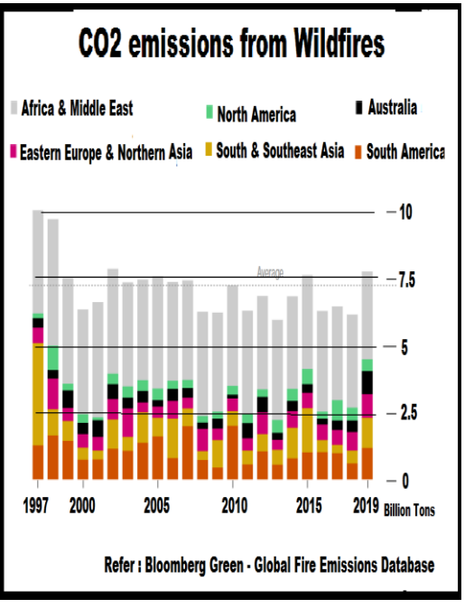
mankind is now very quickly chasing 6X more CO2 (21 Gt/yr) in the air against 3.6 Gt/yr in the3°heat period-Center for Permafrost(Cenperm)-Univ.Copenhagen–Denmark:methane is 25 X more potent greenhouse gas than CO2:

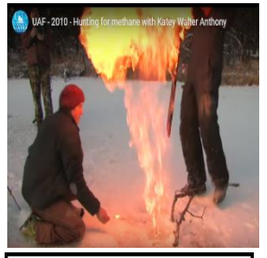
THAWING PERMAFROST RELEASES:

2011-2040 : 4-8 Gt CO2 equiv/yr CO2+CH4
2040-2100 : 12-19 Gt CO2 equiv/yr.

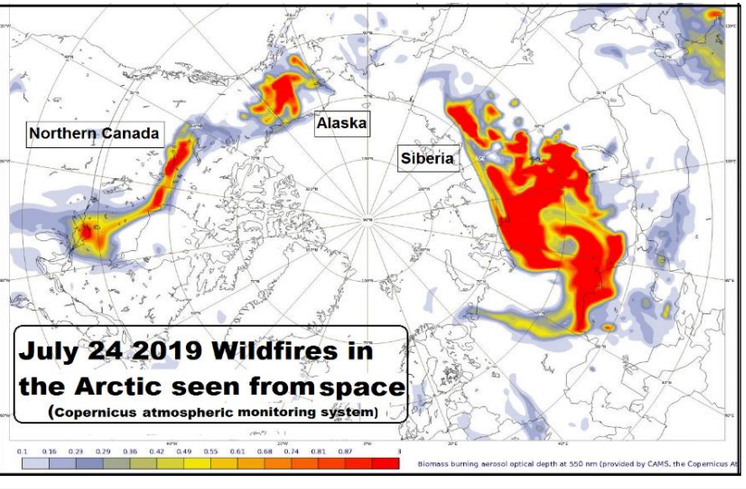
EVOLUTION OF AVERAGE SURFACE TEMPERATURE :

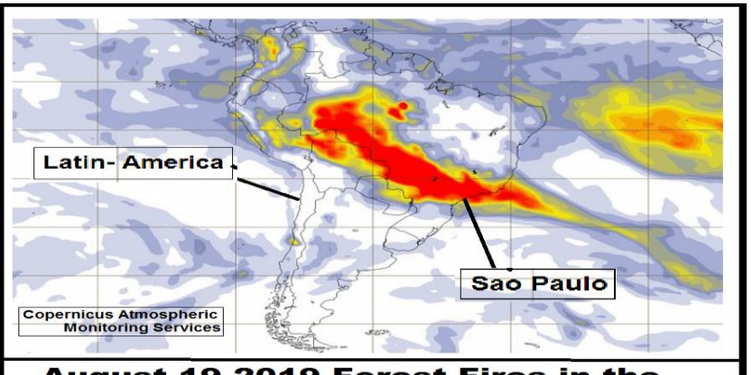
the average surface temperature between 1901-2000 serves as a basis (reference NOAA) – in 2022 they had 1.1 °C above it – continue the sloping line between 2010 and 2020, then the 1.5 ° warming will be reached around 2029 and the much-feared 2°C warming around 2037 – it is generally assumed that the 1.5° limit is unavoidable – the 2°C can be avoided provided that a radically different climate policy is implemented.





Aug 19 2019 glass rain water filled in Sao Paulo -Brazil - the smoke came from thousands km away and blew over the city





August 19 2019 Forest Fires in the states of Amazonas, Rondonia bring smoke 2700 km further, driven by strong winds, to Sao Paulo.

CO2 EMISSIONS FROM FOREST, PEATLAND-BURNING, CEMENT-PRODUCTION, PERMAFROST-MELTING

- 34 Gt Fossil emissions CO2 emissions: coal, oil and natural gas
- 1.5 Gt CEMENT PRODUCTION (55 % due to China).
- 6.8- 7.5 Gt FOREST AND PEATLAND FIRES .

The year 2019 gave a big boost : and in early 2020, the fires were in California, Brazil. worse than 2019.

AFRICA : 2.8 Gt: deforestation for firewood and new farmland, degrading existing land, being abandoned for decades.

AUSTRALIA: 2019: 0.41 Gt –60,000 km2 on fire including national parks

INDONESIA: 0.36 Gt: satellite system Copernicus detected abnormal very intense forest fires in September 2019, evidence that they were ignited, along with tens of thousands of years old underground peatlands, difficult to detect with high emissions.

BRAZIL: 0.39 G-ton in 2019: in 2020 even more– 80% of Brazil's CO2 emissions (0.44 Gt)– almost all forest fires ignited: 30,000km2.

ARCTIC : July 2019 Peatland in Siberia and Alaska burned for months with an unimaginable amount of heavy smoke, as seen from space **: THAWING PEAT LAYERS HUNDREDS OF METERS THICK- 5 MILLION KM2 (10 TIMES THE SIZE OF SPAIN**) - this is a chain reaction –the more CO2 is released, the faster the rest will follow.

ALASKA: by punching holes in the ice, methane is released that immediately gives a blowtorch with a lighter (picture left). Every year there are forest fires in savannas, grasslands, open forest but CO2 from this was usually absorbed - is now out of balance. - High temperatures and low ground humidity first provide the ideal conditions for ignition -Smoke is a source of black carbon, which precipitates on polar ice and accelerates melting.

EVOLUTION OF AVERAGE SURFACE TEMPERATURE :

the average surface temperature between 1901-2000 serves as a basis (reference NOAA) – in 2022 they had 1.1 °C above it – continue the sloping line between 2010 and 2020, then the 1.5 ° warming will be reached around 2029 and the much-feared 2°C warming around 2037 – it is generally assumed that the 1.5° limit is unavoidable – the 2°C can be avoided provided that a radically different climate policy is implemented.

ARCTIC: PERMAFROST THAW TURNS RUSSET GOLDEN TUNDRA INTO COLLAPSING, GRAY MUDDY BARREN GROUND.

Tundra in the polar region of Canada was long covered with cranberries, sedges, lichen… Abundant food for grizzly bears, karibous... This is now gradually a thing of the past. "How Thawing Permafrost Is Beginning to Transform the Arctic" ED STRUZIK Yale Environment YALE360 Published Yale School of the Environment (CONNECTICUT- USA) JAN 2020

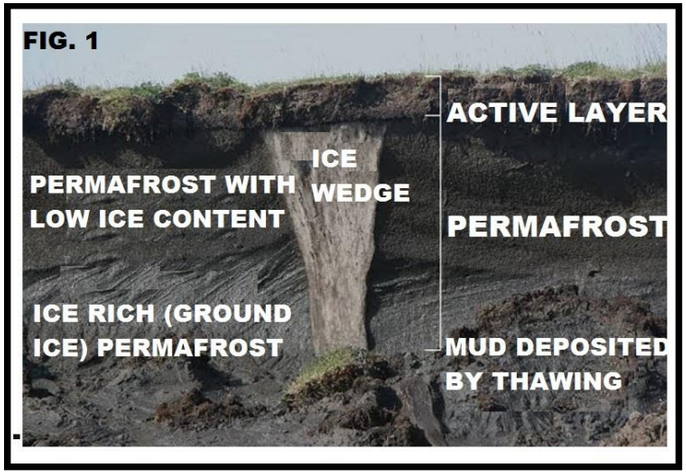


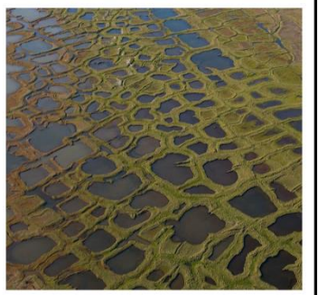
FIGURE 1 : ICE WEDGES COMPLETELY CHANGE THE LANDSCAPE: (refer Ice Wedge Wikipedia). Ice-wedge is a crack in the ground - a narrow or thin piece of ice 3–4 meters long at ground level, but extends widely underground to several meters. During the winter months, the water in the ground freezes and expands. Once temperatures reach −17°C or less, the ice acts as a solid, expands, forms cracks on the surface called ice wedges.

This process takes many years – ice wedges can grow to the size of swimming pools – and take on a polygon pattern. The cracks can also be filled with sand - are then called sand-wedges. Rapidly rising temperatures cause the ice to thaw and the **GROUND ABOVE IT THEN COLLAPSES .**

1. PERMAFROST SLUMP CANADIAN ARCTIC- YALE E360

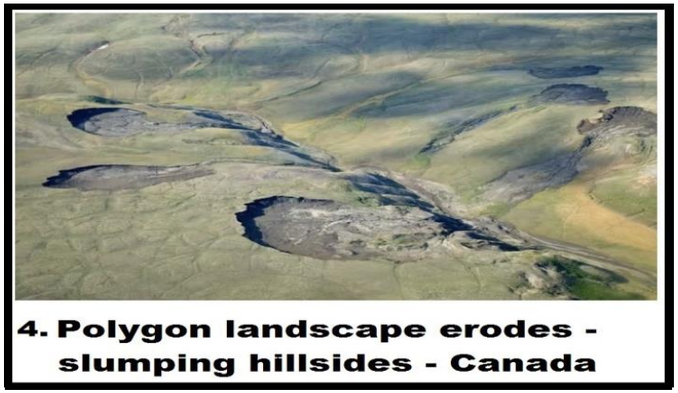
PHOTO 1 : SPORADIC COLLAPSE (SLUMP): Northern Canada :Beaufort Sea: crater, the size of a football stadium- thaw-subsidence, grey, muddy, barren ground in the middle of russet gold-coloured tundra – a well-known example is the 100 deep Batagaika crater in the Yana Stream Basin, Siberia.

2. Polygon -depressions formed by ice wedges - NW Canada - Emma.Pike Wikimedia



3. PERMAFROST COLLAPSE - THERMOKAST LAKES ALASKA

PHOTO 2-3: SLUMPS ARE NOW EVERYWHERE: CANADA, ALASKA, SIBERIA – Antoni Lewkowicz, geographer, permafrost expert Ottawa Univ surveyed Banks Island in Canada's far north: in 1984 there were only 60 active slumps – in 2013 already 4000 – in the following years he expects 30,000 new active slumps. Satellite data from Banks Island show that many lakes changed color: from blue with clear water to turquoise due to the sediments.



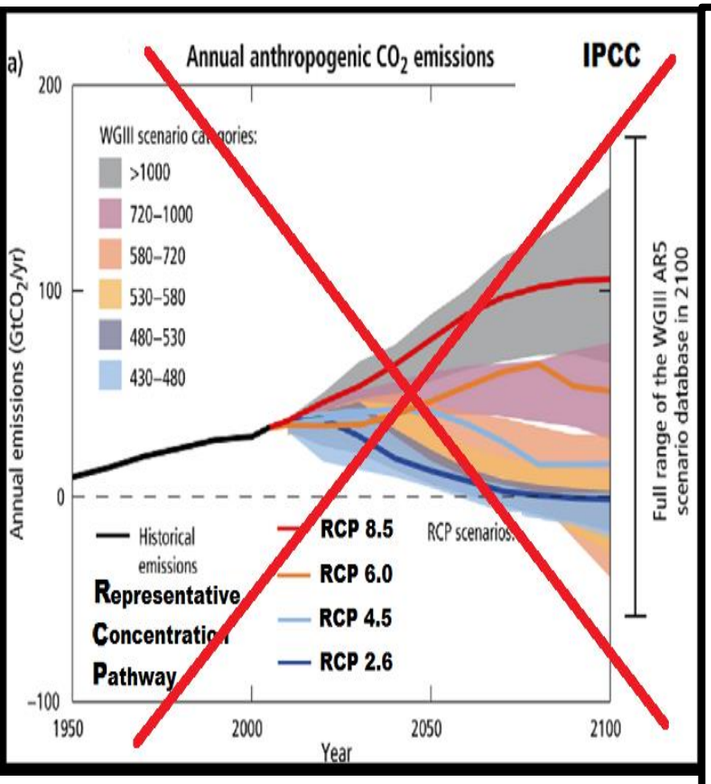
4. Polygon landscape erodes - slumping hillsides - Canada

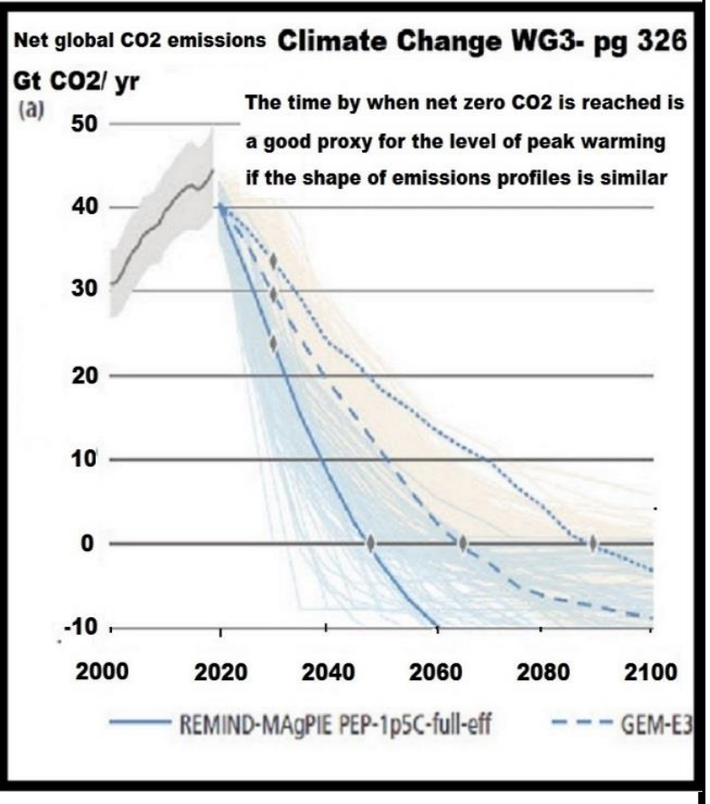
PHOTO 4: Slopes of hills are collapsing – even in the coldest places in the polar regions, permafrost is thawing at an increasing rate – some extremely hot summers + forest fires have a devastating effect. The disappearance of lakes – less water quality and water access threaten the indigenous population – degraded surfaces have increased by a factor 3 in the last 20 years in N-Siberia and N-Canada – buildings are collapsing.

In terms of climate: all organic matter from thousands of years is released – mud, silt, peat soil begin to rot – emit methane and CO2 – willows, shrubs that take the place of lichen, cranberries, etc. are no more food for karibous....

2 QUITE DIFFERENT VISIONS CLASH:

A DOGMATIC VISION AND A RATIONAL VISION





1/ IS IPCC, GREEN DEAL.. THE GUIDELINE ? A: YES, WITH 1 MAJOR EXCEPTION:

IPCC , UN agency for climate affairs consists of 3 working groups-WG 1 climate catastrophe- WG2 fossil fuels-WG3 remedies. Powerful climate denier organizations made working nearly impossible, which is why working groups imposed a diktat.

Working group 3 Mitigation (remedies) also imposed a dogma on "annual CO2 emissions are the big problem- CO2-cumul is a problem after 2050"- this thesis was a truth in 1985 when CO2-cumul =0 but in 2023 CO2-cumul is huge, the real danger-**AND THIS DOGMA IS WRONG NOW** -every dissenting idea is banned and every critic silenced- the entire climate sector is on a false track with immense consequences.

THE INCONVENIENT TRUTH 2: THE CLIMATE CATASTROPHE IS GETTING CLOSER, BUT THE ACTUAL POLICY IS VERY WRONG

2/ WHAT IS MOST IMPORTANT: CO2 CONTENT OR CO2 ANNUAL EMISSIONS ?

DOGMATIC VISION: labels CO2 ANNUAL EMISSIONS as the most important – should go to 0 as soon as possible – CO2-cumul is a matter after 2050 – this vision is not based on a physical fact, but rather on a DOGMA.

RATIONAL VISION : proves in this document that the CO2 CONTENT urgently needs to decrease (around 2030) to prevent a disaster :30-40 Gt CO2/year from the air as soon as possible- permafrost thaw then stops. These graphs and this logic are nowhere to be found in any text from IPCC WG3, Green Deal... Because they refute the dogma.

3/ Q: IS IT POSSIBLE TO HALVE ANNUAL CO2 EMISSIONS BY 2030? A: NOT AT ALL

According to current policy, CO2 annual emissions should halve by 2030 – but a correct graph graph3 shows that this is out of the question and that CO2 will be too high after 2035 and cause a disaster

– **EXPENSIVE SAVINGS – ROUNDS OF SAVINGS ESPECIALLY IN EUROPE HAVE LITTLE EFFECT ON A GLOBAL SCALE–CO2 EXTRACTIONS SHOULD HAVE ABSOLUTE PRIORITY.**

THE CAMP 1 OF THE **DOGMATISTS**

This is almost the entire climate sector: Green Deal, IPCC, climate organizations, amateur climatologists (national+ international), climate authors Bill Gates, Greta Thunberg...

Motive: The IPCC, Green Deal are prestigious organizations whose veracity in climate matters should not be questioned – they know better than the ordinary citizen: critical thinking is not necessary.

BUT IS THIS SO ???? 3 basic concepts circulate in the sector– corresponding to 3 working groups in the IPCC.

CONCEPT 1 A climate catastrophe is on the way
CONCEPT 2. impact , consequences of the climate chaos

CONCEPT 1 and 2 make sense – the whole sector needs to crack down on climate deniers and fossil energy companies that support denial.

CONCEPT 3.SAVING IN CO2 EMISSIONS SOLVES THE CLIMATE PROBLEM –VERY LIMITED CO2- EXTRACTION SUPPORTS THIS EFFORT.

THERE IS SOMETHING WRONG WITH CONCEPT 3: is in fact a dogma- data is adjusted to make it seem true- critical voices are silenced (these people find loopholes to make their voices heard).

As Dec. 2019 COP25 Madrid they put a note in the hands of Greta Thunberg "Large-scale CO2 extraction is a priority and tackling CO2 emissions at the source instead of saving CO2".

Compare with GALILEO GALILEII 500 years ago who proved Earth was NOT the center of our solar system- Roman inquisitors didn't even listen- and just like here: NO RESPONSE.

In mid-2022, IPCC 3° part in CLIMATE CHANGE 2022 –MITIGATION OF CLIMATE CHANGE WG3 working group 3- 2000 pages with basic motive: how 1.5°-2° C preventing (mitigate) warming. This document contains **truths** (there is a real threat of climate catastrophe and urgent action is needed) -but it also contains **serious lies** : the climate catastrophe can be avoided through heavy savings and CO2 extraction from the air after 2050-2060.

a/ How to find its way in 2000 pages of text ?-a good conclusion FAQ3.1- p385 :"Is CO2 extraction necessary to stop global warming?". Answer: "to stop the 1.5°C warming, extraction of **TOTAL 60- 680 Gt CO2 IS NEEDED BEFORE 2100**" (in clear terms: this small mass means :saving and a little bit extraction-certainly not massive 21-42Gt/yr) (detailed explanation on page 15).

These serious lies could be compared to inquisitors who 500 years ago would mobilize hundreds of pseudo-science writers to proclaim THE EARTH IS THE CENTER OF THE SOLAR SYSTEM AND THIS HAS THEREFORE BEEN CONCLUSIVELY PROVEN.

The IPCC WG3 has taken the entire sector hostage with its dogma- Green Deal, every climatologist, climate organization, climate author, political party.. will only be found clean when they adopt the dogma.

b/ **FIT FOR 55** European Union project: 47% less emissions by 2030 compared to 2005: let's calculate it (amounts of 'Our World in data')
CO2 emissions EU27 in 2005: 3.74 Gt – target in 2030 so 1.98 Gt- at the end of 2022, emissions were 2.72Gt - so they ask for 27% savings while the usual savings are 10% in the same period.
Emissions 2030 translated into mass: 1.98 Gt !-27%) instead of 2.45 Gt (-10%) – 0.5 Gt less emissions (0.25 Gt less CO2-cumul in the air)
For the entire OECD block, 5.2 Gt is foreseen in 2030 (graph3 p 8) with "fit for 55" this becomes 4.95 Gt – REALLY PEANUTS.

-DO WE HAVE TO CARRY ON LIKE THIS ? THE WHOLE DISCUSSION IS REALLY NOT A SMALL DETAIL. Instead of **AMATEURISH** and **DOGMATIC** thinking, it is better to think **RATIONALLY** and act **VIGOROUSLY.**

THE CAMP 2 OF **RATIONAL THINKERS**

A minority that is growing rapidly :critics, also within IPCC, some climate organizations, important scientific organizations.. **THEIR MOTIVE:**

FAST AND MASSIVE CO2 EXTRACTION (30-40 GT/YEAR) IS THE ONLY WAY TO REDUCE CO2 LEVELS IN THE AIR BY 2030.

Brilliant Article in 'Nature, scientific reports', by Prof. Em. Jorgen Randers and Ulrich Goluke,of BI Norwegian Business School, about cumul-CO2,the time bomb that triggers permafrost thaw and additional temperature rise.

"An earth system model shows selfcontained thawing of perma-frost even if all man-made GHG emissions stop in 2020"- Question p8: How much CO2 should be removed from the air from 2020 to stop this self-sustaining permafrost thawing ? **Answer: 33 GT CO2e/YEAR** (greenhouse gas= 0)

PNAS (US:Proceedings of the National Academy of Sciences –May 2021 **Permafrost carbon feedbacks threaten global climate goals** 'limit warming to 1.5 °C by **WIDESPREAD AND RAPID IMPLEMENTATION OF CO2 REMOVAL TECHNOLOGIES** ,which currently do not exist at scale".

- Mc Kinsey sustainability: 'Now the IPCC has recognized that carbon removals are critical to addressing climate change, it's time to act'
- Musk Foundation (XPRICE) for CO2 extraction systems.
- Internet: 'Why cumulative CO2 matters'

-Inside Climate News, climate organization: 'removing CO2 from the air only hope for fixing climate' (2016)..

- WWF (World Wildlife Fund) : a rare voice **:** rapid 20 Gt CO2-extraction.

-ALL OF INDIA BELONGS TO THIS CAMP: every call to reduce CO2 emissions is rightly answered: "Where does the climate misery come from? Of the enor-mous accumulation of CO2 in the air and that is what the industrialized countries have done, not us- take that directly out of the air"- they are right of course.

This camp is still quite weak - all the arguments so far have been just words -this document shows comprehensible graphs and solid figures - this is abso-lutely essential to convince: an eventual omission undermines its reason to exist.

THE REAL DANGER

YEARLY INCREASE IN THE AIR

If a figure could help 'THE REAL DANGER'

SMALL POT

annual CO2 growth in the air- 21Gt- is added to the bucket every year- in current politics, content should go to 0 as soon as possible (but objectively this is unfortunately completely impossible).

LARGE BUCKET

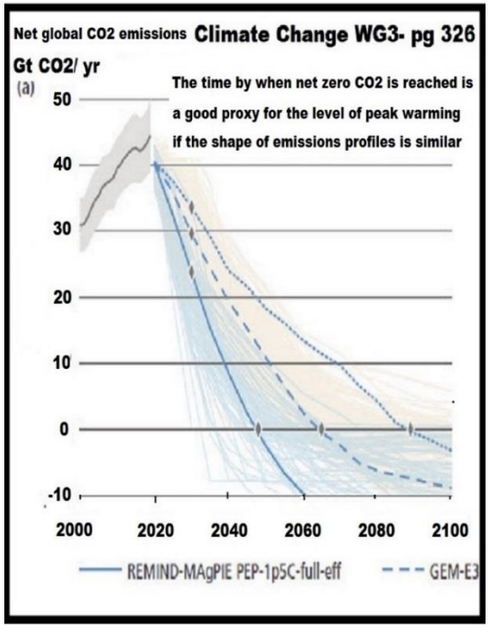
almost total amount of excess CO2 in the air- bucket is packed and in danger of overflowing- so that is the real danger-there is only one way to reduce it and that is to empty it as quickly as possible.

For rational thinkers, the packed bucket is the problem, for dogmatists, it's the small pot.

IN CLEAR LANGUAGE:

stopping climate catastrophe means reducing CO2 content in the air-is for the most part the accumu-lation of previous years-rapid and massive CO2 emissions from the air(30-42 Gt/year) is mandatory.

The Rational Thinkers should now impose a right policy on the IPCC working group3 - introduce a different style: People with decisiveness quickly launch a project of massive affordable CO2 extraction and realize a strong decrease in CO2-level around 2030.



TOTAL MISREPRESENTATIONS PLAGUE THE ENTIRE CLIMATE SECTOR 15

A nice example: Climate Change 2022-Mitigation of Climate Change **Working Group III Contribution to the 6. Assessment Report of the IPCC–contains 90% obvious truths but also 10% serious lies -IPCC Geneva april 4 2023 : "The evidence is clear: the time for action is now- we can halve emissions by 2030" p.385 Frequently asked questions 3.1 " Is it possible to stabilise warming without net negative CO2 and GHG emissions ?"**

A (shortened) :"Most likely in order to achieve 1.5°C of warming 80- 680 Gt net negative greenhouse gas emissions must be achieved by 2100 ".

Comment climat-5: This is a completely different order of magnitude then the massive 30-40 Gt CO2 extraction/year that should be achieved as soon as possible to reduce the CO2 content in the air around the year 2030 – this answer confirms the dogma : first get annual CO2 emissions to 0- then extract CO2-cumul - 80, 680 Gt are wrong amounts

THE IPCC IS BASED ON DOGMAS

DOGMA 1: is correct as a warning - greenhouse gas, especially CO2, is the cause of the actual climate chaos– a catastrophe is imminent

DOGMA 2: is correct to order a ban on all fossil fuels – the IPCC has faced heavy opposition from powerful climate deniers. (Exxon gave 30 M$ to an anti-climate coalition GCC– Cato was funded by Koch industries- CSE people against CO2 tax)

DOGMA 3. is **WRONG** to indicate the remedy- AR report IPCC WG 3 contains 2 gross lies a/ 30-50% less CO2 emissions around 2030 is possible b/reduction of the enormous CO2-cumul in the air can be passed on to next generations.

This is the **BIGGEST SCIENCE FRAUD OF THIS CENTURY -**situation in 1985 is completely different from the situation in 2023: a huge CO2-cumul 600 Gt has the same effect as CO2 eruptions of 3- 17 - 56 million years ago.

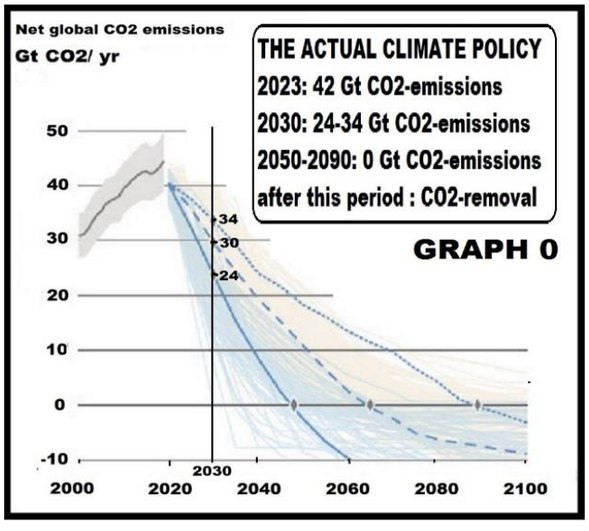
It is difficult to understand how hundreds of 'experts' cooperated with the report of Working Group 3.

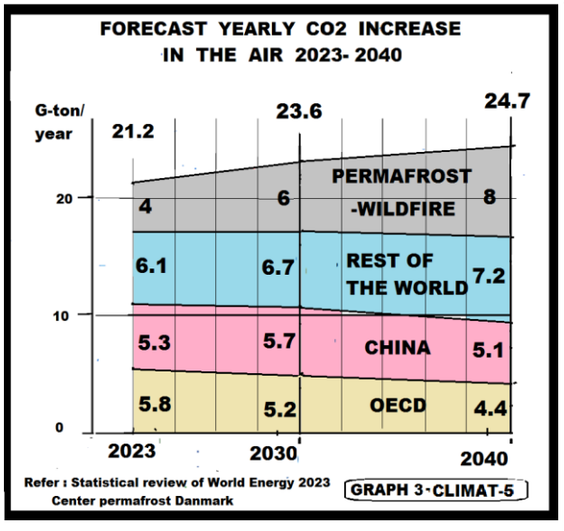
2 possibilities: 1.these 'experts' don't have **critical thinking skills**- are totally incapable of understanding the proposed dogmas don't make sense - critics are however more than enough to prove it.

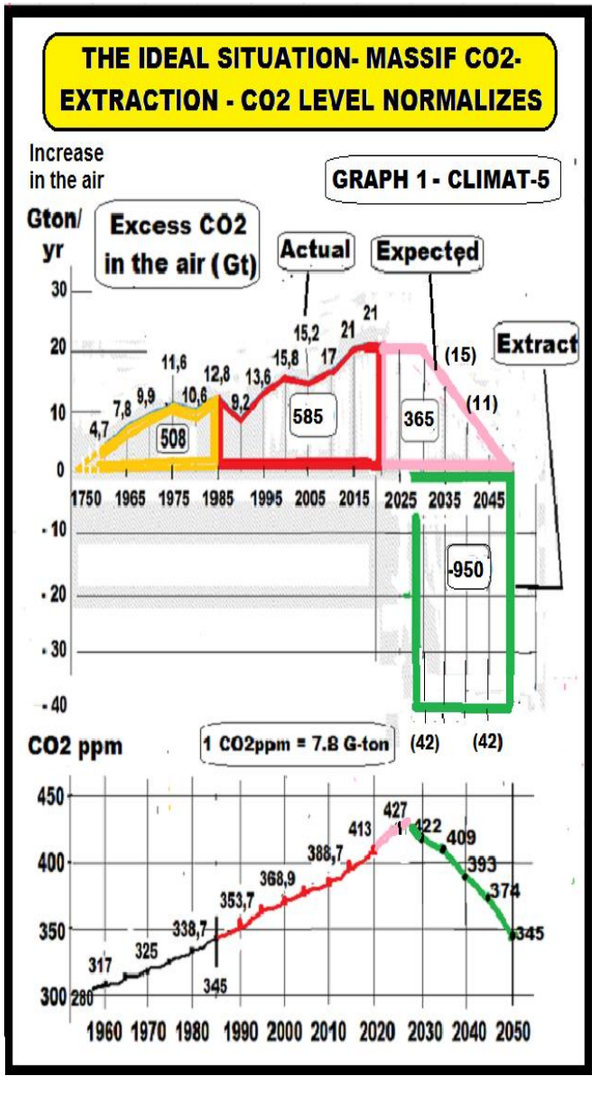
2. These experts don't have **conscience** – they do realize something is wrong, but if they speak out so openly, they risk being fired– or facing sanctions – walking in line is so much easier.

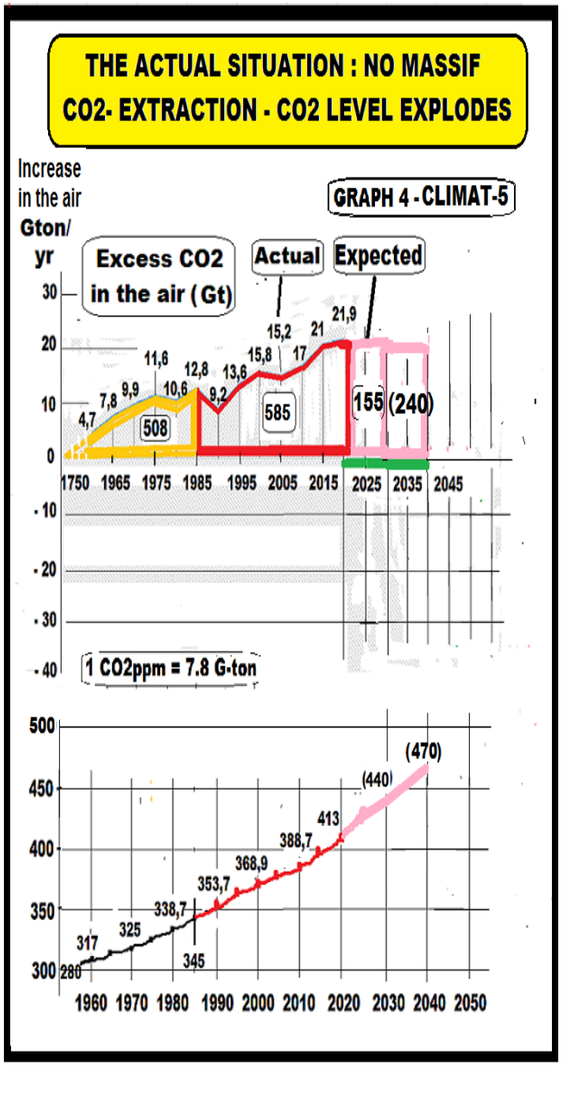
NON-PROFESSIONAL-CLIMATOLOGISTS such as Bill Gates, Greta Thunberg... leaders of climate organizations… they are enough to steer humanity in the wrong direction: they do not tell you CO2-cumul extraction should be a priority.

And humanity is the victim of everything – people have known for at least 20 years the Green Deal is tactically wrong and nothing has been done about it.









ONLY CORRECT REMEDY IS TO REDUCE THE CO2 LEVEL IN THE AIR, CERTAINLY AROUND 2030 –THIS CAN ONLY BE DONE BY RAPID MASSIVE CO2 EXTRACTION FROM THE AIR.

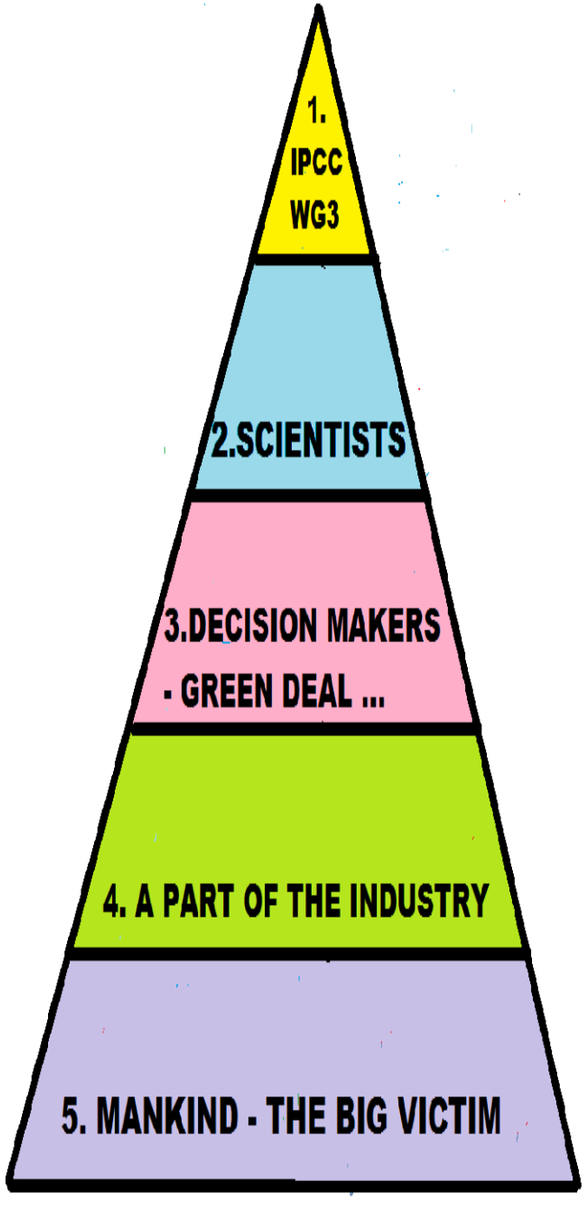
1. A CORRECT GRAPH does not show vertically the annual CO2 emissions in Gt but **ANNUAL CO2 GROWTH** (about 1/2 of the annual emissions)- and the ENORMOUS CO2-CUMUL since reference year 1985-the cause of the climate-misery-there is also only one solution: **LARGE-SCALE AFFORDABLE CO2 EXTRACTION (30-40 Gt/year)** as fast as possible – CO2 content will then decrease around 2030.

2.IN THE CURRENT CLIMATE POLICY, THERE IS NO MENTION OF RAPID LARGE-SCALE CO2 EXTRACTION in IPCC-WG3 +Green Deal there are many truths but also serious lies- it is claimed that "bringing annual CO2 emissions to zero and extracting CO2-cumul after 2050 is the right solution- or decrease in annual CO2 emissions also reduces the CO2 content in the air".

In fact the basis of these claims is the **BIGGEST SCIENCE FRAUD OF THIS CENTURY** – in reality, by the year 2030 there will be no question of halving or sharply reducing CO2 emissions ON A SOLELY IMPORTANT GLOBAL SCALE – the CO2 content in the air will take on disastrous values- the permafrost thaw is going wild, just like in heat periods of millions of years ago.

Hard to believe a few dictators in working group No.3 of the IPCC can hold almost the entire climate sector hostage- send the world in the wrong direction: **CRITICAL, RATIONAL, CONSCIENTIOUS THINKING** is apparently not on the agenda of so many people -when will there be a real climate plan instead of giving the appearance that people are doing so well when they eat less meat, aso. ?

WHO IS IMPLICATED IN THE WRONG CLIMATE POLICY ?



GRAPH19 - CLIMAT-5

The climate problem and its cause : it is human CO2 emissions – no doubt about this– remedies are the point of discussion : THE PYRAMID OF LIES shown on the left.

1. IPCC WORKING GROUP 3: THE BIG LIE FACTORY that originated the 2 big lies sending the entire climate sector in the wrong direction.

LIE 1 : It is possible to emit 30 to 50% less CO2 on a global scale in 2030 and 100 % less in 2050-60 with the necessary effort: save energy and pay high CO2 taxes.

LIE 2 : Phasing out the huge CO2-cumul from the air is definitely not a priority – it is a matter for the next generations, within some 25-35 years.

TRUTH 1 : 30-50 % reduction of CO2-emission in 2030 is nothing but dust in the eyes–truth is in the Statistical review of World Energy: it is impossible to reduce annual CO2 emissions around 2030 globally – they will increase.

TRUTH 2 : Paleontologists know best -the only way to avoid a climate catastrophe: massive rapid CO2 extraction reduces the CO2 content in the air- **OUR GENERATION HAS TO DO IT AND NOT THE NEXT ONE**.

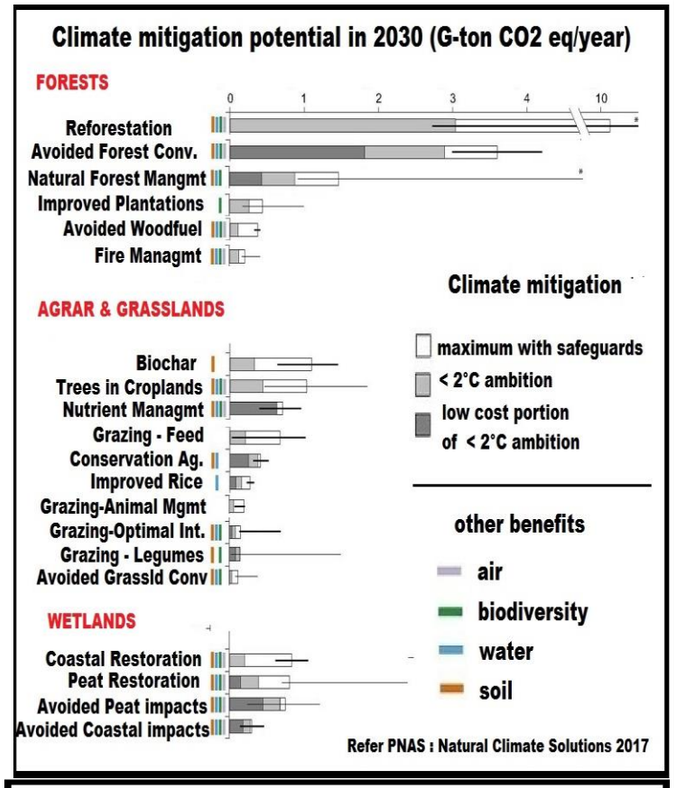
2. CLIMATOLOGISTS .... Scientists are supposed to pursue the truth – but the vast majority of climatologists are paid to spread the big lies –a minority are rational thinkers, incurruptible ones who expose the lies – who advocate rapid massive CO2- extraction.

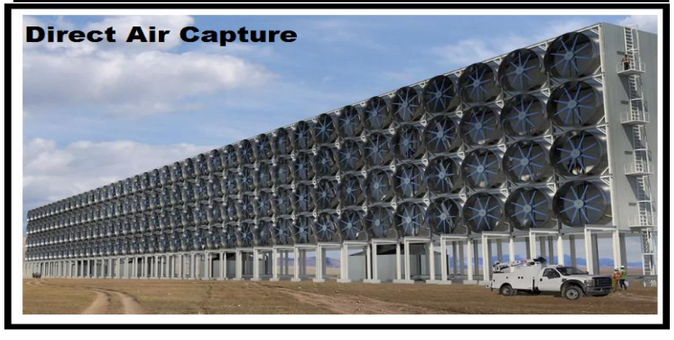
3. POLICYMAKERS, POLITICIANS, TOP CLIMATE ORGANIZATIONS... hide behind the excuse they are not scientists, they listen to experts – and so they are sending the entire climate sector in the wrong direction – and this is the highway to climate catastrophe

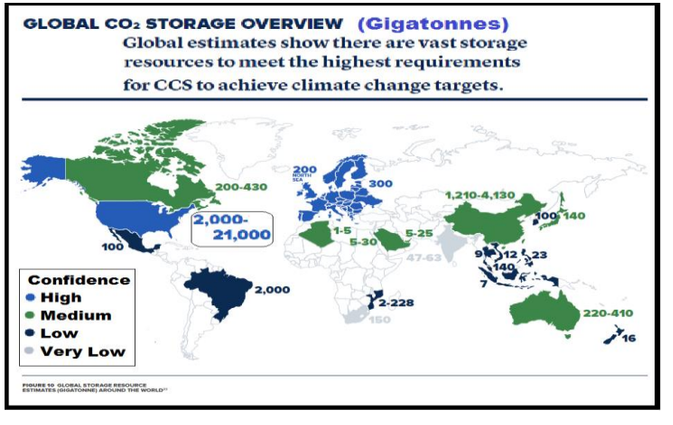
4. PART OF THE INDUSTRY is apparently not bothered by scruples -at the annual **CLIMATE COP**: COP27 and previous ones, lobbyists are abundant - the most important thing is getting assignments: planes, trains, process heat on hydrogen... Let the government and taxpayers pay for useless projects – Otherwise, the industry is desperately needed for the real solutions.

5. MANKIND is the big victim –suppose the wrong politics are continued and climate-expert Ph. Gingerich is right :within 200 years (6 generations) not a few tens of thousands die per year but millions because food production collapses –our grand.. grandchildren will then ask, "By 2025, our ancestors could have easily stopped the climate catastrophe –why didn't they do this ?" And Daddy or Mams answer: "because they listened to bullshit claiming bringing annual CO2 emissions to zero was the solution and mass CO2 extraction was a detail for later".

1D. HOW TO EXTRACT 30-42 G-ton CO2/YEAR FROM THE AIR, RAPIDLY







Decision makers should be persuaded large scale CO2 extraction is an urgent necessity in order to phasing out the accumulated CO2 in the air- in this way, CO2 levels in the air will start to fall around 2030- never exceed 435 ppm.

- But in 2023 there is still no valid affordable CO2 extraction plan.
- It isn't because there is no decent plan now that it would be impossible to conceive one:

-The task is NOT TO PRESENT A LIST of all possible extraction options (is abundant on the Internet, by the way)- that time is over.

An urgent task: FIND A CONCRETE SOLUTION:

- **1. remove 30-42 billion tons of CO2/year from the air**
- **2. A realistic and affordable plan- no 1000 -2000 B$/year eg.**
- **3. feasibility study, to put in the hands of engineering firms with experience in important projects**

The aim is to have a significant CO2 extraction by 2030, total min. 80 G-ton.

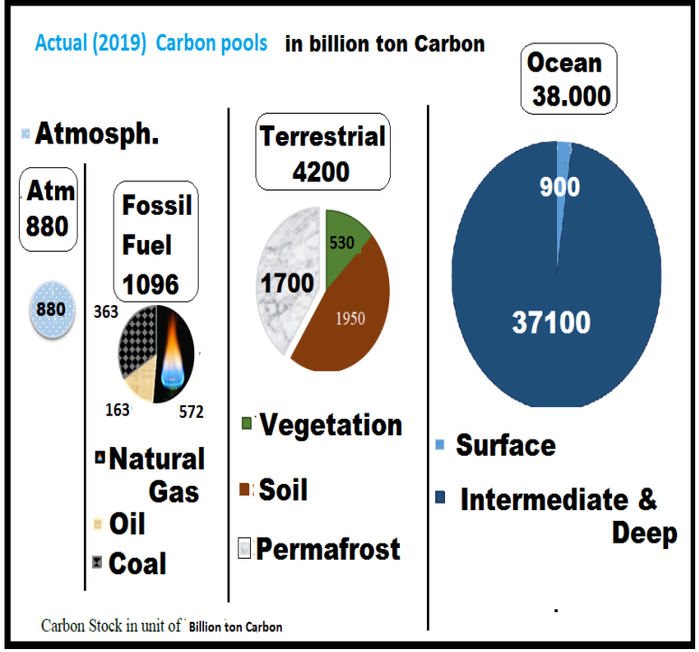
1°PLAN: HIGH-PRESSURE STORAGE IN EMPTY OIL AND GAS FIELDS:

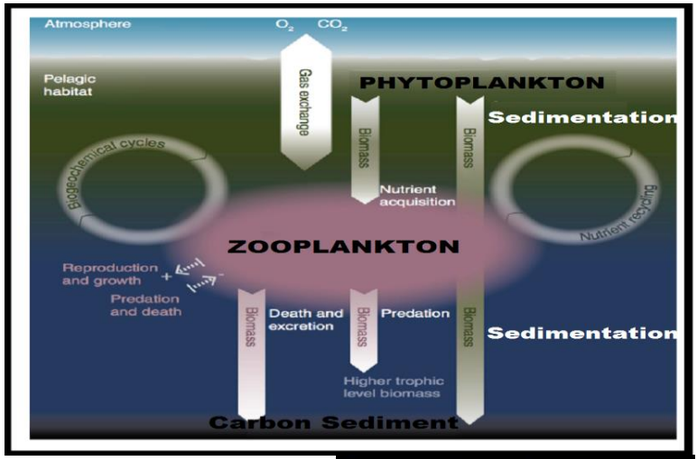
Widely cited :DAC-direct air capture: absorption via chemicals or attracting CO2 on charged electrodes surrounded by carbon nanotubes –at least 30 $/ton.

Once isolated, the CO2 has to be transported in containers and could be injected into abandoned oil and gas fields under high pressure: In the USA there are 3.2 Million abandoned oil and gas fields and 1 Million still active with a total potential 2,000 to 21,000 Gt of CO2 storage. Cost of collection, transportation, injection ~ 45-100 $/ton- US president Biden promises less than $100/ton by 2030.

42 G-ton annual extraction costs **1900- 4200 billion $-a totally impossible amount** - the defense spending of the whole world is 2240 billion $/year- for a country like UK (Great Britain) , the bill would certainly go to $200 billion/year. And who guarantees this gas is still in the ground after decades or hundreds of years– many boreholes have been made. Understandably, this plan is rejected by the IPCC.

2° PLAN : CAN PLANKTON STORE EXCESS CO2 IN THE HUGE STORAGE BARREL: THE OCEANS ?





Many kinds of zooplankton feed on particles of organic matter called marine snow

Refer tonaquatic/iStockphoto/Getty images

1000 billion tons of CO2 contain ~ 270 billion tons of carbon (1000 Gt/3.67) -Add 270 G-ton of carbon to the 38,000 G-ton stored in the oceans, is less than 1 % -does this matter? (graph)- 900 Gt of the 38,000 Gt is in surface-water- plankton doubles in volume every day.

-The 'Institute for peace and Security', Jason, Den Haag, Netherlands, made an overview of 8 studies in 'Plankton and Climate Change-can plankton save our planet?' – here is the synthesis.

– There are 2 general classes of plankton: the single-celled extremely small vegetal Phytoplankton and the larger animal Zooplankton, that has phytoplankton as food, large enough to be food for fish and whales– CO2-rich nutrients is absorbed and excreted at great depths– rapid vertical migration, hundreds of meters/hour: a carbon pump.

- In recent decades, oceans have absorbed more and more CO2 because of the large human emissions - at first sight a good thing but in reality not at all.

-The Leibniz Institute of Marine Sciences, Kiel, Germany, found Phytoplankton grew signifycantly in number due to higher temperatures, absorbing more CO2 but also increasing the acidity of the water. The zooplankton as well as other marine life, have calcium-carbonate-skeleton that dissolves in more acidic water (image: right shell)- higher temperature also reduces the oxygen content in water which has its influence on the Phytoplankton- the whole food cycle starts to suffer heavily.

-The fishing industry suffers very much in warmer waters, less in cold waters: water temperature rises, low-oxygen zones expand, water mass acidifies, water layers mix less, fish species differ in number...results in huge losses in the fishing industry (Arabian sea : + 2°C from 26°-> 28°C- south India: much lower yield).

-Water is like the land: the CO2- system is a fragile equilibrium- no CO2 means no life but too much CO2 destroys life - too much really does not have to be large volumes.

- We should better not introduce more CO2 into the oceans, whose life suffers greatly from higher temperatures. It is generally assumed that only 0.1-1% of CO2 captured by phyto-plankton ends up as sediment in the depths of the ocean.

Left : RED soil depleted of carbon
Right : DARK BROWN high carbon content
Refer : Rattan LAL

3° PLAN: THERE IS FAR TOO LITTLE CARBON IN THE SOIL

against too much in the air and ocean surface. Current agricultural techniques have degraded soil. Left photo shows how deep and widely dispersed the roots of natural grass go into the ground (2-5 m) and thus store carbon- compared to agricultural crops (10cm) -no till has clearly some advantages.

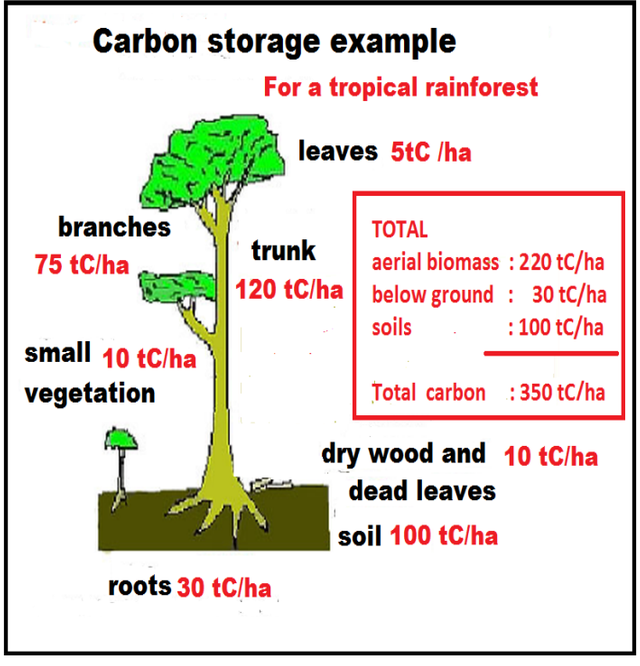
The tendency towards ever larger farms and less variety contrasts sharply with organic farming –the switch to organic farming in Sri Lanka on an ill-considered basis caused agricultural production to collapse –rice: – 30%, tea the main export product -18% – in Cuba, after the collapse of the Soviet empire in 1991, also stopped the fertilizers in agriculture – organic farming caused the average citizen to lose 5 to 7 kg of body weight.

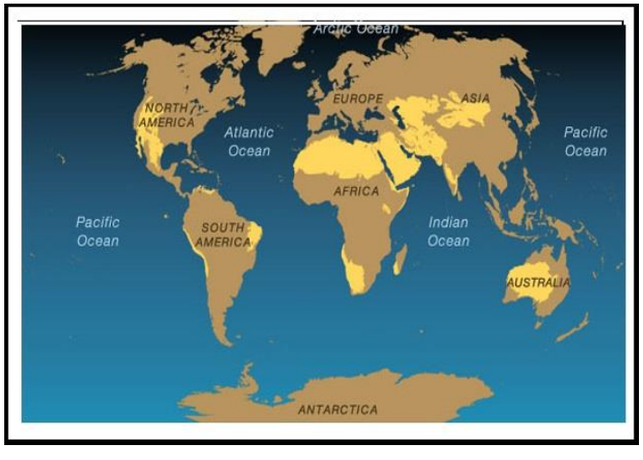
Organic farming could mean 40% less food production – 5 to 7 times more animal manure could replace fertilizer, but this requires drastically more livestock- the generally accepted opinion is the possibilities of CO_2 extraction are limited.

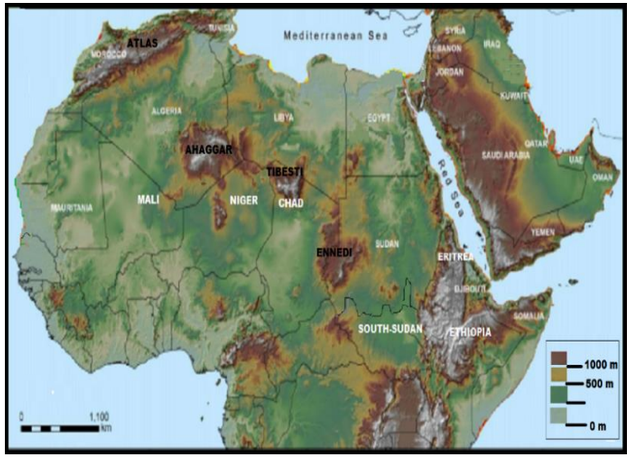
OTHER PLANS: Good synthesis of 7 extraction methods article: Columbia Climate School (New York USA) : 'Can Removing Carbon From the Atmosphere Save Us From Climate catastrophe?'

Some examples: - imitating a natural process: binding **basalt lava** with CO_2 gives carbonates that can be stored for millions of years.
– add alkaline minerals, such as olivine, to the ocean surface to improve CO_2 capture and combat ocean acidification
-- swamps, mangroves, seagrass now store 1/2 of the CO_2 that the oceans store – these are now threatened by pollution, drought and coastal development – better management can double their shelter – healthy wetlands provide protection from storms, better water quality and marine life.

The **MUSK FOUNDATION** has set up a competition with a Climate Foundation XPRIZE for the best CO_2 extraction methods.







In the scientific literature, many ideas are mentioned for CO2 extraction best summarized by the following: 'Science&Vie' N° 1226 Nov 2019 :**Climat : les forêts sont la meilleure arme contre le CO2- Yves Sciama** – the article is also on Internet (in French).

"After 30 years of research into the collection and storage of carbon, promises of the technology have not been fulfilled. We still can't extract CO2 from the air - unless at an unreasonable price -after that we are not sure if we can store the CO2.

THE ONLY THING THAT WORKS: TREES"

TREES are in any case an affordable way incredibly efficient, very cheap- to remove existing excess CO2 from the air -trees do not store a complete CO2 molecule but only the easily to stock carbon-a single tree 25 m high can store 6 tons of carbon or absorb 20 tons of CO2 -(a CO2 molecule is 73% oxygen- 27% carbon-1 ton carbon = > 3.67 t CO2)-

Summary table on page 16 also shows TREES are by far the preferred way to remove CO2 from the air- noticeably more than grassland, peatlands, swamps ....

Virtually all current Carbon Dioxide Removal (99.9% or 2 $GtCO_2$ per year) comes from conventional management of land, primarily via afforestation and reforestation.

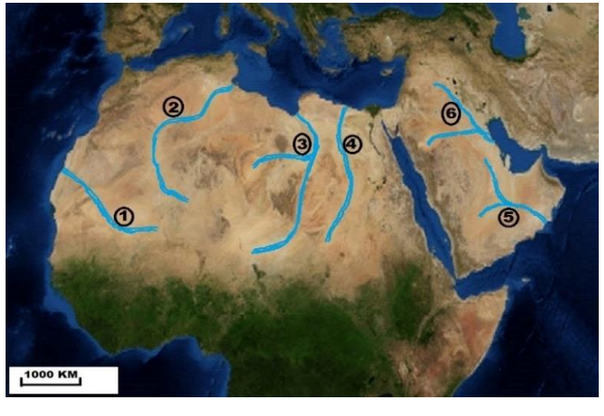
Tropical rainforest stores 3-5 times more CO2 than temperate forest. Finally, a tropical tree grows 12 months/year –tree in temperate regions only 6 months.

See box :carbon storage example:
100 m2 (1a)tropical forest fixes 3.5X 3.67t = 12.5 tons CO2
1 km2 (10,000 are)=>12.5 X10.000t=125 x10^3 tons CO2
1 Million km2 > 125 X 10^9 tons =125 Billion tonsCO2
7.5 Million km2 > 125 X 7.5 Gton =930 Billion tons of CO2
for comparison: surface USA:9.8 M km2–China : 9.6 M km2.

The aim is to store carbon permanently as in Amazon rainforest - newly planted tropical rainforest is not a MONOCULTURE FOR WOOD PRODUCTION - very negative experience happened in Portugal where very profitable Eucalyptus forests went up in flames in a few days of an unquenchable firestorm- no firefighter could approach the fire to 50 m— let alone extinguish it.

Other storage methods can extract the carbon from the air, but tropical rainforest has a major impact on the climate – trees continue to extract CO2 every year – wood and fruit production provide an income for millions of people – the costs for realization are therefore substantially lower


Southern Sahara : 100 Million years ago a rain forest



1 Million km2 absorbs 125 Gt CO2– 320,000 km2 absorbs ~ 40 Gt .
The assignment therefore: to transform a barren area of 300,000 km2 (60% of Spain with its 500,000 km2) every year in tropical rainforest.

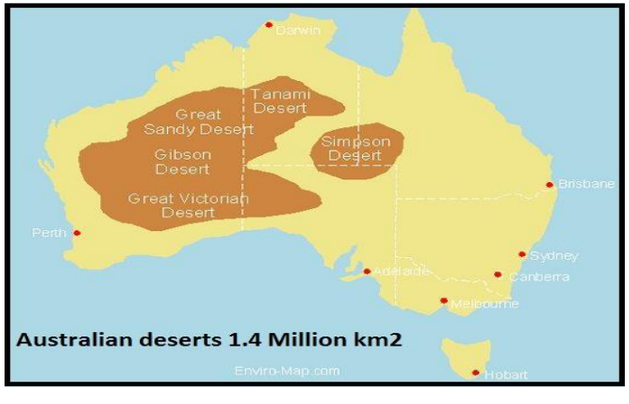
Can 7.5 M km2 be converted into tropical rainforest in existing land? Article :'Can trees solve the climate crisis? Unfortunately No' by 'Climate Interactive': **states that only 1 to 10% of accumulated CO2 can be extracted by tree planting on existing land** – ETH Zurich team first noted an exaggerated 2/3 of this total, which could never be located of course.

Reforestation of recently deforested tropical rainforest ? In the last 50 years, 1 million km2 of rainforest has been destroyed in South America for soybeans and 0.25 million km2 for palm oil in Indonesia and Malaysia – turning back the clock and finding an alternative to soybeans and palm oil will only yield 1.25 M km2 – we assume that recovery of deforested areas can still be increased to 2.5 M km2 – it should still be 7.5 M km2.

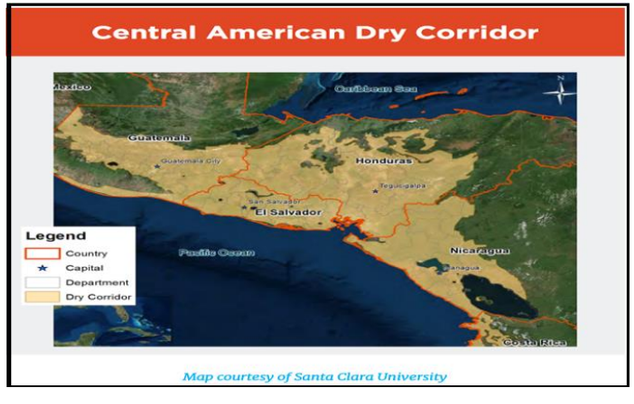
AND DESERTS ? Sahara and Arabian Desert are 12.4 Million km2- are not too far from the sea for the mass needed desalinated seawater – the Iranian desert is also close to the sea but is very mountainous – deserts such as Gobi in central Asia are far from the sea– Australian desert is only 1.4 M km2.

Therefore, Sahara+Arabian desert: 12.4 M km2- 20% of the wastelands are flat, suitable for agriculture- 20% is higher than 500 m, mountainous, should not be irrigated: increased precipitation creates moist soil and nature reserve - the remaining 60% is well suited for tree planting - the only thing the Sahara needs is water- the rest is there -channels follow trace of rivers, streams that existed 7000 years ago- normally-widened and deepened-water now goes up.

All surfaces could be irrigated via 6 irrigation channels: eg. No. 1 departs from the Atlantic Ocean- Nos 2,3 and 4 depart from the Mediterranean, No. 5 from the Arabian Sea and No. 6 from the Persian Gulf- some of these channels can branch into 2.

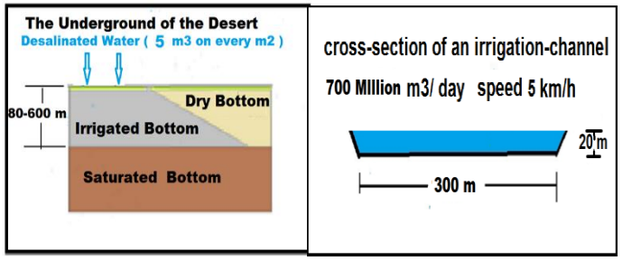


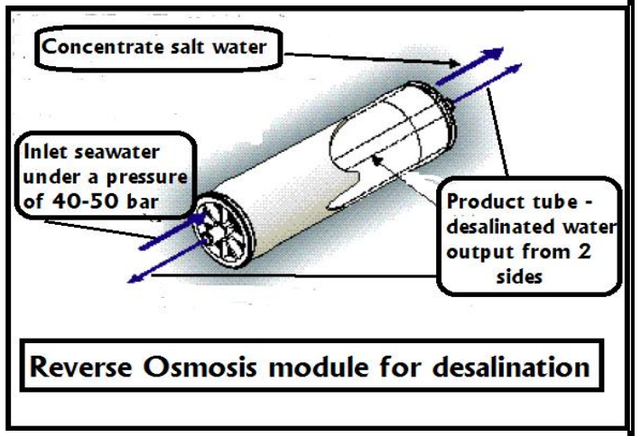
Australian deserts 1.4 Million km2

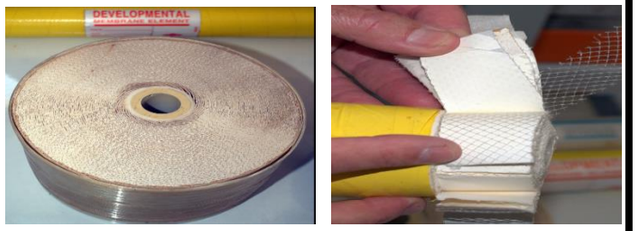


Map courtesy of Santa Clara University

1E.TRANSFORMATION OF SAHARA AND ARABIAN DESERT INTO TROPICAL RAINFOREST







Feasibility study of a project that costs only 1-2 $/ton of CO2 and gives some 100 Million people a good income - 300,000 km2 of new tropical rainforest every year

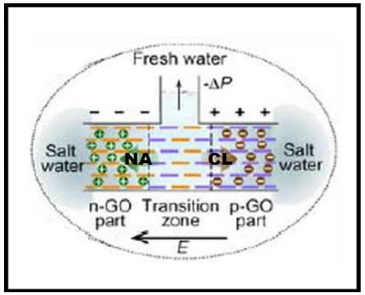
-Suppose the subsoil is completely saturated with desalinated seawater - no day-watering with pumped water - this is not a solution because groundwater around it drops sharply - In Eastern Morocco groundwater is at 5 m, Dubai 60 m - in the South of Egypt there are huge underground water reserves but this depletion is not a good idea- what is happening in Libya : everything that is taken from the underground reserves has to be reinjected later because the subsoil must be saturated with water – this is too crazy for words. .

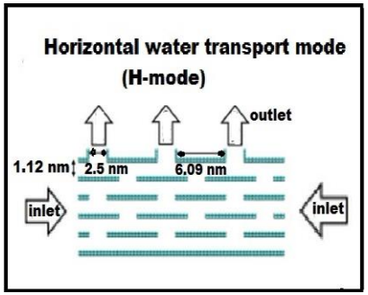
Suppose 5 m3 of water on each m2 surface, with 6 irrigation channels of 300 m wide- 20 m deep, 5 km/h, (300mX 20mX 5000 m/h X 24h=720 M m3/day) then this transports a mass of water of 720 million m3 per day, per channel–144 km2 (12 X 12 km)X 5 m ~720 M m3–144km2/day X 350 dg ~50,000 km2/channel .yr - the 6 channels together give 50,000 km2 X 6= 300,000 km2.

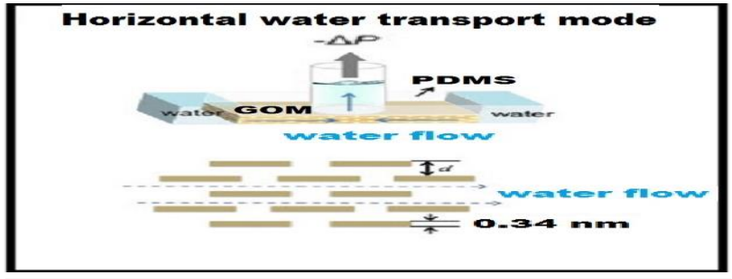
A.DESALINATION : Biggest challenge of the project: about 720 million m3 per day /channel – current Reverse Osmosis techniques are totally unsuitable for those quantities: seawater first passes through some filters – seawater is then pressed under 70-120 atm through spiral-shaped membrane into tubes of about 15 cm diameter –regular chlorine cleaning shortens life

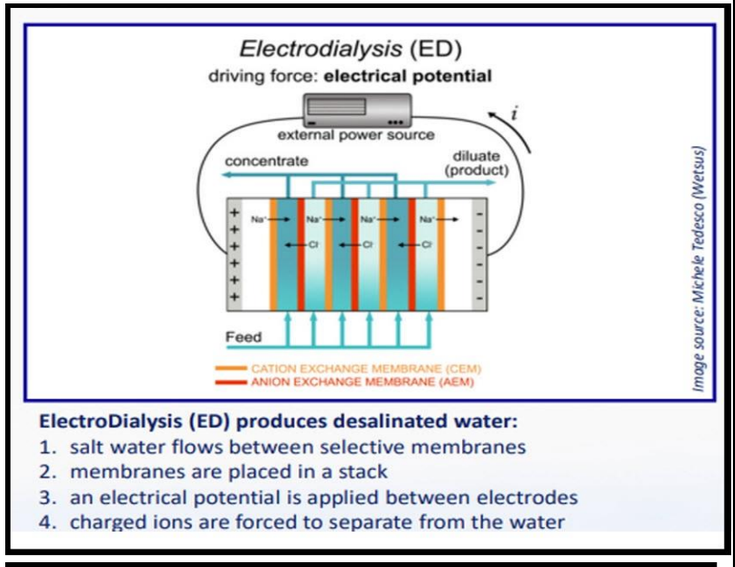
-Very high electricity consumption 3 - 5 Kwh/m3 -(impossible) cost price all included: **1.5 $/m3.** In concrete terms, this means that 4.2 billion m3/day (6 X 0.72 billion m3) seawater or 3X flow of the Mississipi (1.4 billion m3/day) through tubes of 15 cm diameter under 70-120 atm. pressure at a cost of 6 billion $/day or 2200 billion $/year – **this would immediately be the end of the story- FORGET IT.**

Most current desalination plants operate with reverse Osmosis - a total of 100 M m3/day of which 1/2 in Arab countries – in the proposed project 42 X as much is needed (4.2 Billion m3/day)- reverse osmosis falls very short here.



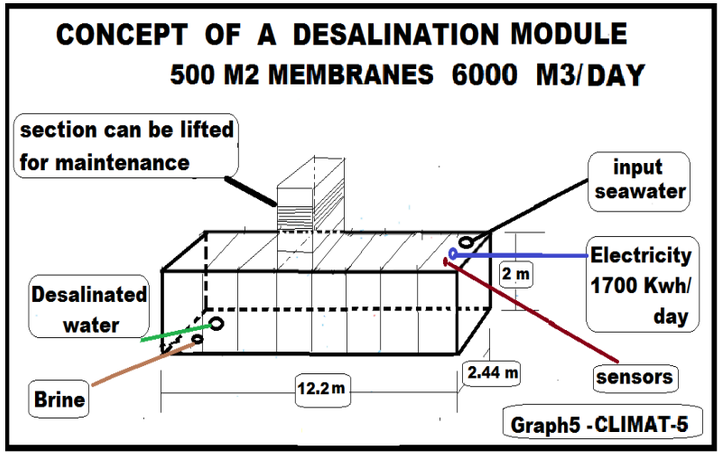






ElectroDialysis (ED) produces desalinated water:

1. salt water flows between selective membranes
2. membranes are placed in a stack
3. an electrical potential is applied between electrodes
4. charged ions are forced to separate from the water



THE GOOD NEWS: ON A LAB- AND PILOT-SCALE,MUCH BETTER EXISTS 24

Graphene-oxide membranes combined with **ELECTRODIALYSIS,** 3 V, give best results so far: **0.28 Kwh/m3- 12 m3/m2.day.bar-** (Reverse osmosis requires 3-5 Kwh/m3 or 11-18 times more). instead of huge pressures 70-120 atm rather electric low-voltage- seawater should first be grossly filtered before it is desalinated- desalination extracts necessary Ca +Fe– these are reintroduced.

On a **LAB**-scale : MIT,USA (Massachusetts Institute Technology) Dept.Materials Science and Engineering (DMSE) -UK-Univ Manchester–Chinese research teams (Beijing, Xiamen) produced the following article. 'Electric field induced ionic sieving at planar graphene oxide hetero-junctions for miniaturized water desalination'- from which the 3 figures

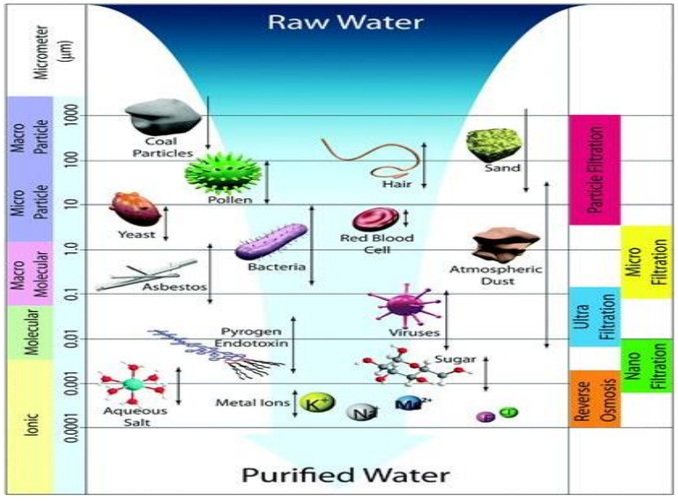
INDUSTRIAL Interest in Electrodialysis is growing: an exemple **"**REDstack is part of the international REvivED water consortium that carries out European water research. The consortium of 10 partners from 6 different European countries: Fujifilm Manufacturing (Netherlands, coordinator), Trunz Water Systems (Switzerland), Redstack (The Netherlands), Deukum (Germany), Phaesun (Germany), European Desalination Society (Italy), Palermo University (Italy), Ghent University (Belgium), Wetsus (The Netherlands), Aqua TT UETP (Ireland)

THE GOAL IS TO MAKE ELECTRODIALYSIS (ED) THE NEW STANDARD FOR SEAWATER DESALINATION. If the consortium succeeds competitive drinking water can be produced with significantly lower energy consumption compared to the latest reverse osmosis (RO) technology".

PUB (Singapore's National Water Agency) has a pilot electro-deionization plant and is planning an upgrade of this in its site Tuas.

-**HERE IS A VIRTUAL PROJECT <ED> ON AN INDUSTRIAL LEVEL**-take as standard dimensions eg.40 foot container: 12.2 m L X 2.44 m W X 2 m H – interior space 25 m2 surface filled with 20 graphene layers+ electrodialysis systems 500 m2 (25 m2 X 20)

- produce **6000 m3/day**-(500 m2 X 12 m3/m2)-
- electr. consumption 6000 m3/day X 0.28Kwh/m3=**1700 Kwh/day (pump 100 Kwh)**
- capacity (1800 Kwh/24 h) = 75 Kw.
- output on the other side : 90% desalinated water 10% brine, full of minerals
- A DESALINATION MODULE could best be divided into some 10 sections for maintenance –if sensors indicate a defect, such a section is lifted up and replaced or repaired –of course everything automated

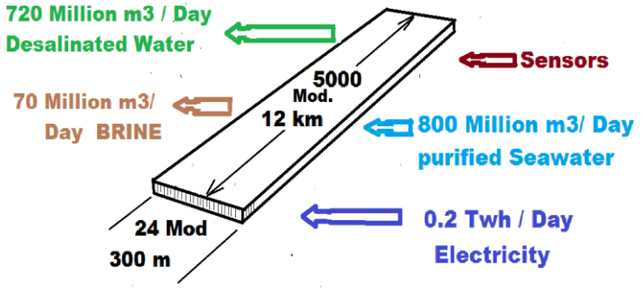


Desalination Plant Concept

120,000 Modules 40 feet container size

5000 Mod. in lenght 24 Mod. in depth

Container (12.2 m L 2.44 m B 2 m H)



Graph6 - CLIMAT-5

Chennai (South-East India) water from 360 km by train

What does a large-scale desalination plant look like? 25

120,000 on an assembly line produced desalination modules give 720 M3/day desalinated water (720,000,000/6000 = 120,000 modules)- practical configuration: long front of 5000 modules (12 km) and narrow width 24 modules (300 m) because drainage should be led under the bottom. Sum electrical consumption: 120,000 X 1700Kwh/day=200 Gwh/day or 0.2 Twh/day -75 Twh/year per channel (there are 6 channels).

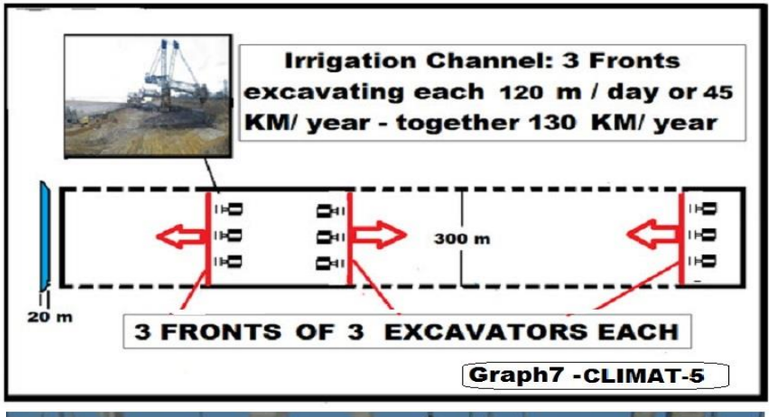
Worldwide, 700 Million people don't have access to sufficient fresh water – around 2030 this will be 1.8 billion – the whole world is awaiting large-scale affordable desalinated seawater, which the reverse osmosis system cannot provide.

Examples: **South Madagascar**: no rainfall since 4 years: several hundred desalination modules could be the solution.

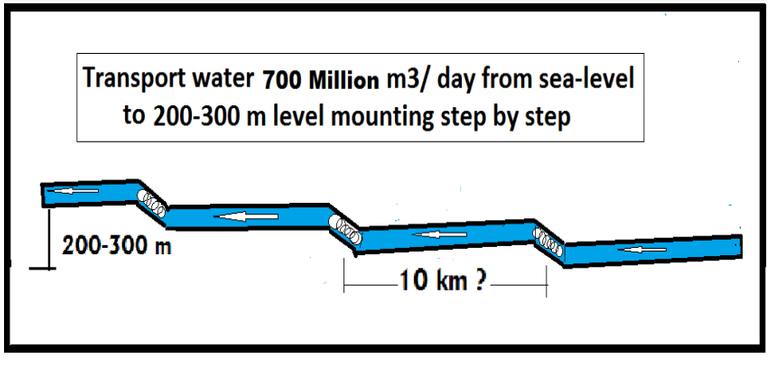
South-West USA: Mead-lake, Colorado river: now 25% of normal level.

Chennai (Madras) coastal city of Eastern India with 7 M inhabitants: Mid 2019 without water- 4 trains supplied 10,000 m3 of water every day over 360 km -2 desalination modules near the sea (2 X 6,000 m3/day) do just the same.

Tel Aviv Israel Recent 'large-scale' desalination plant provides 20% of Israel's water needs: 627,000 m3/day – cost 500 M$ – cited as one of the largest and most efficient RO (reverse osmosis) installations in the world. Suppose a series-produced desalination module would cost 10,000 $ - then this installation plant comes to 100 modules X 10,000 $ = 1 M $ or 500 X cheaper than the aforementioned cost price.



Archimedes-type screw water pump of some 3 m diameter - the UTCLT project would need bigger diameter.



B. DESALINATED WATER PUSHING UP INLAND

The channels follow the course of streams that ran in the region 7,000 years ago, quite visible from space- only now water will go from the sea to the interior.

Existing traces will be broadened and deepened to f.e. 300 m X 20 m with very large excavators of course : photo of such an excavator, in operation in an open-lignite mine in Germany, near Cologne.

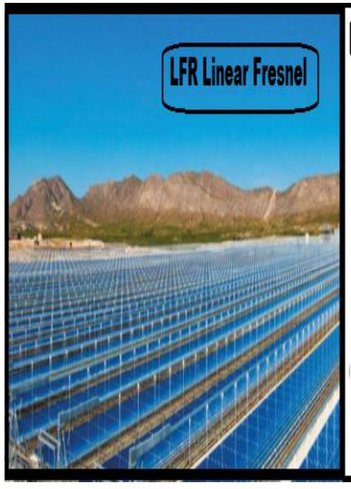
Evacuating sand instead of coal is almost the same for these machines -similar excavators working in iron ore mines in Australia process 10,000 m3 /h or 240,000 m3/day (24h/7d rhythm) - matter is transported via conveyor belt on trucks.

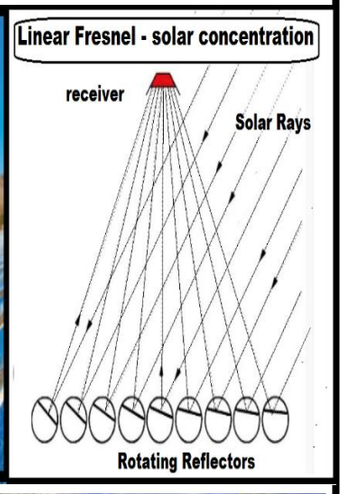
- An excavator at 120 m/day gives 300m X20m X120m= 0.72 M m3 a day - 3 excavators 3 X 0.24 Mm3= 0.72 M m3 dig the channel at 130 km / year (45 km/year. excavator).

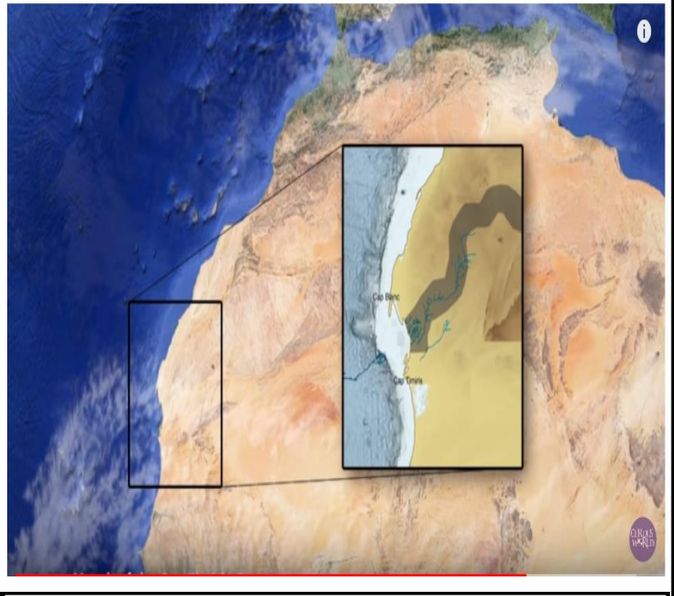
- A group of about 10 large excavators as shown in the photo can dig a channel at >130 km /year. Each of the 6 channels irrigates 50,000 km2 each year: a total of 300,000 km2 - which fix 42 billion tons of CO2/year. 50,000 km2/year per channel means 12km X 12km per day (144 km2 X 350).

- Side channels are also needed to allow the water to penetrate into the ground everywhere - the water should also be pushed up to a maximum of 500 m high-with eg. Archimedes screws

- By 2050, the desert will have been transformed into 60% rainforest, 20% agricultural land- 20% nature- 1000 Gt CO2 has been extracted.







NASA: Amazone forest is drying the last 20 years

C. HOW MUCH ENERGY IS NEEDED TO PUSH ALL THE WATER UPWARDS - WHERE DOES THIS ENERGY COME FROM ?

720 Million m3/day or 250 billion m3/year per canal is already a huge mass - (each channel is 3 X the flow of the Nile at the Assuan dam with its 250 Million m3/day)- but it also needs to be pushed up, sometimes up to about 500 m high inland but not higher, in steps of e.g. 5 or 10 m -Is that possible-if so, how much energy is needed annually-Just calculate.

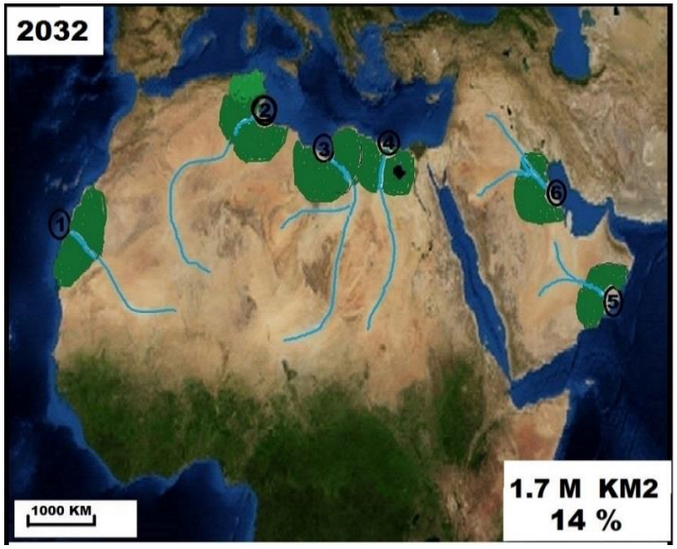
Starting from : how much energy is needed to lift 1 liter of water 1 m up= 10 Joule (1 Kwh = 3.6 Megajoules) 250 billion m3 of water 300 m up: 210 Twh (per year) detailed calculation is below

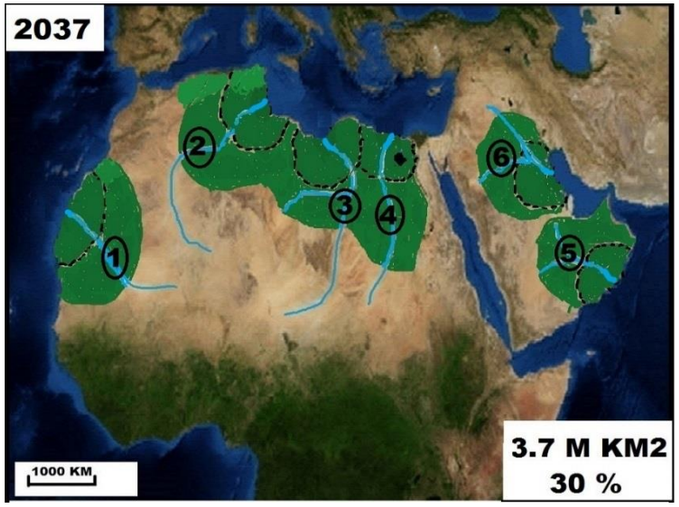
1 Joule (J)= 1 m/s2 X 1 m (kg.m^2/s^2) energy.
1 Kwh =1J X 60sec X 60min X 1000(kg.m2/s2)=3.6 MJ
1 Joule =1 Kwh /(3,6.10^6)=2,77 10^-7 Kwh.
1 kg water 1 m lift : E=mgh(mass X weigher X height)
1.10.1 kg.m2/s2=10 Joule=2,77 10^-6 Kwh.
1 m3 10 m lift : E=(2,77 10^-6).10^4 Kwh=2,77.10^-2Kwh.
250 billion m3=2.5.10^11 m3. (300 m=average :0-500m)
250 billion m3-300 m lift: E=30. (2,77.10^-2). (2,5.10^11)kwh =
210.10^9 Kwh= **210 Twh/ year** (1 Twh= 10^9 Kwh)
(Electricity consumption GB: 326 Twh/year-Netherlands:122 Twh/yr)

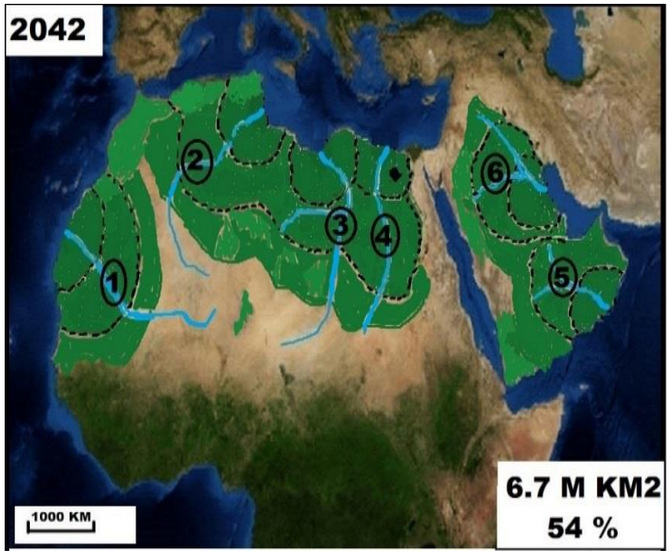
The 75 Twh/yr for desalination should be added: 210+75 ~ **300 Twh/year per canal.**

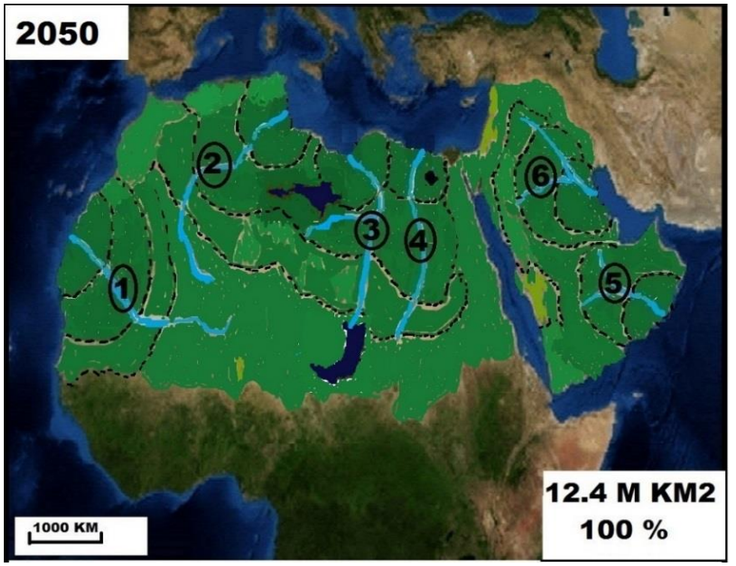
Ideal way for electricity production is solar concentration - Linear Fresnel is cheapest -sun and space in abundance: 12 km2 mirrors give 1 Twh/yr:
300 Twh X 12km2 ~=**3600 km2** area 60 km X 60 km

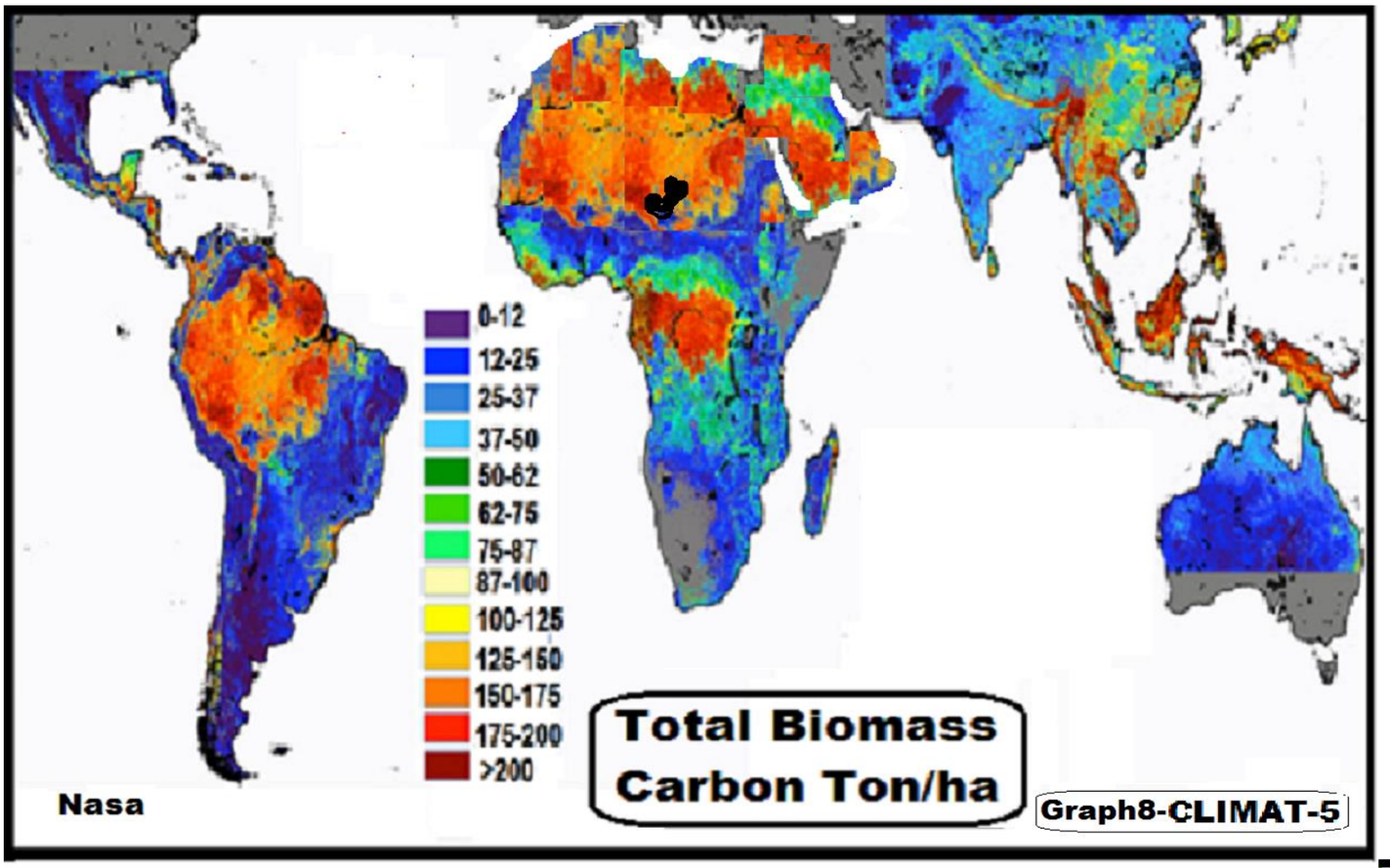
30% cheaper than other (parabolic trough or central receiver)-they fill the largest ground area -simpler construction. ~10 mirrors on the ground, east-west oriented, rotate slowly and direct the sunlight towards a receiver - the heated fluid in the receiver (water, salt) also produce electricity at night or sunless days what PV cells (Photo-Voltaic) can't do.

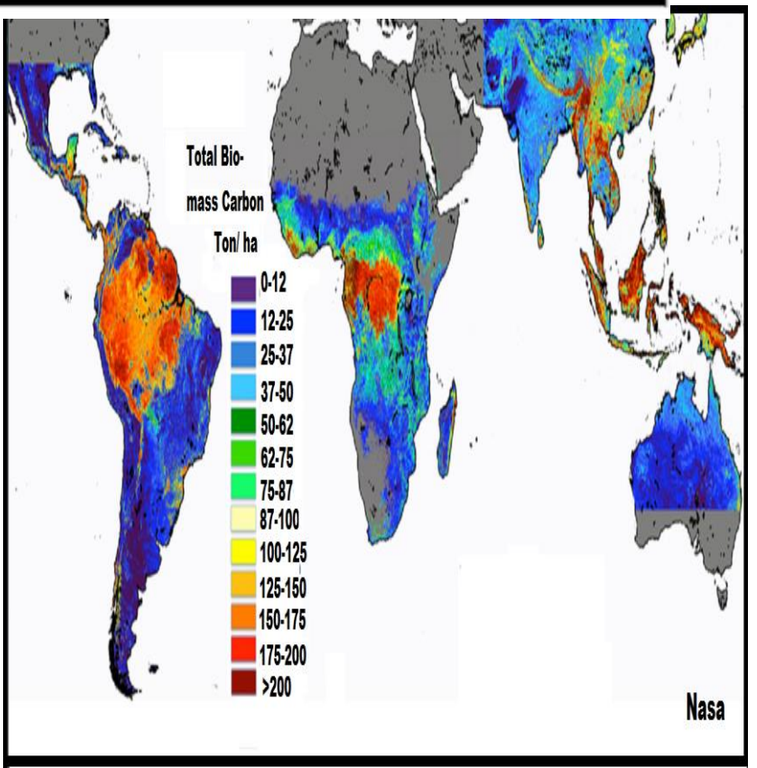

2032
1000 KM
1.7 M KM2
14 %


2037
1000 KM
3.7 M KM2
30 %


2042
1000 KM
6.7 M KM2
54 %

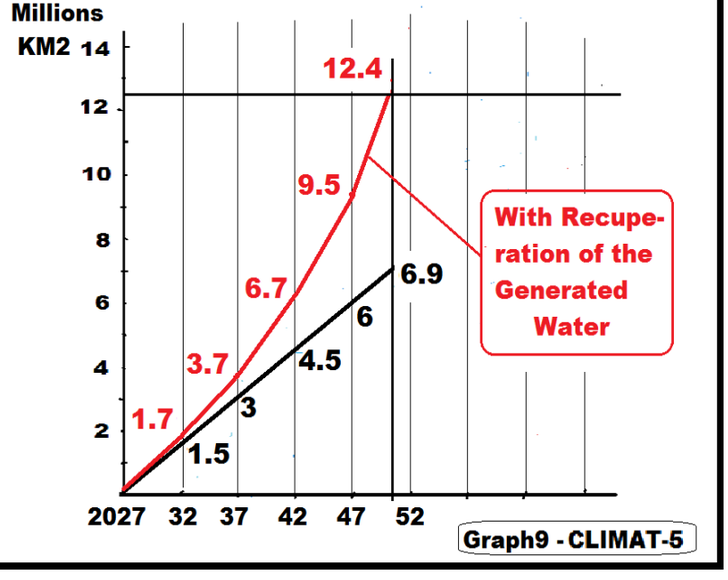

2050
1000 KM
12.4 M KM2
100 %


0-12
12-25
25-37
37-50
50-62
62-75
75-87
87-100
100-125
125-150
150-175
175-200
>200
Nasa
Total Biomass
Carbon Ton/ha
Graph8-CLIMAT-5


Total Bio-
mass Carbon
Ton/ ha
0-12
12-25
25-37
37-50
50-62
62-75
75-87
87-100
100-125
125-150
150-175
175-200
>200
Nasa

How much precipitation does a tropical forest produce ? Amazon basin is 7 M km2 in size – the river has a volume of 18 Billion m3/day – 1 M km2 forest gives 18 billion m3/7 = 2.6 Billion m3/day of precipitation.

TRANSFORMATION OF THE SAHARA AND THE ARAB DESERT INTO TROPICAL FOREST AND FARMING LAND



Graph9 - CLIMAT-5

D. AN IDEAL SCENARIO FOR THE TRANSFORMATION OF THE ARAB DESERTS IN RAINFOREST AND AGRICULTURAL LAND

2024 : green light after a thorough feasibility study and financing by industrialized countries and Arab countries + IMF.

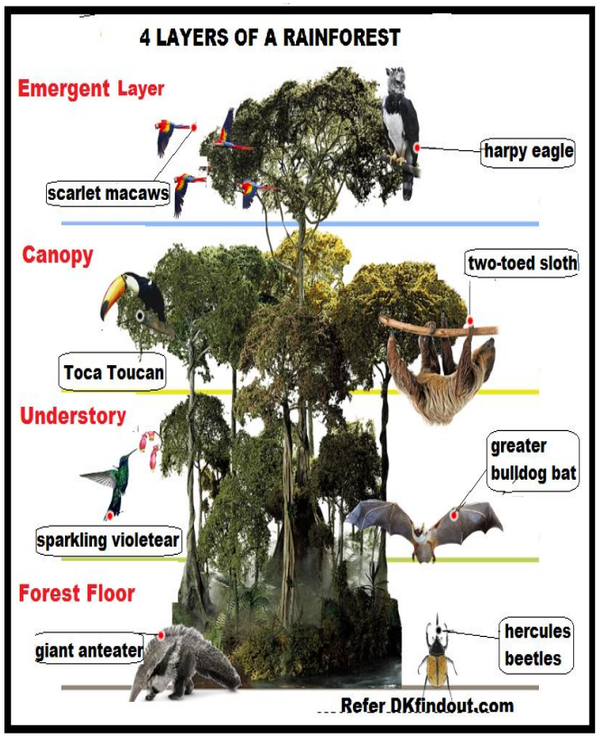
2028-29 : all detailed plans have been made – large-scale desalination plants are operational – all excavators, heavy trucks and other tools have been built – 6 solar-central-parks are operational –provide enough electricity to desalinate 0.7 billion m3 of water each and push it up hundreds of meters – a test project went well –staff is trained– no major surprises to be expected.

2029-2050 : The desalinated water is pushed up via routes of primary rivers that existed 7,000 years ago and that are widened and deepened, bridges are coming over- canals spread the water -but as soon as water comes to the surface planting starts.

Over time, perhaps years, the trees start to generate water –no drop goes to the sea -it is recuperated in the primary channels and pushed further upwards – as the whole project nears completion, the supply of desalinated water via primary channels stops - these take over their normal function as drainage channel.

The recovery of this tree-generated water is very important - at the end of the project this water mass is nearly the same amount as the original desalinated water supply (red line in graph).

A simulation of the progress in the transformation:
2032: 14% 1.7 Million km2 irrigated with 6 channels.
2037: 30% 3.7 Million km2.
2042: 54% 6.7 Million km2.
2050: 100% 12.4 Million km2 project completed.



Once desalinated water has been raised higher up through the main channels, it will completely saturate the subsoil via side channels –as soon as the water comes to the surface it is time for growing humus e.g. bamboo plants that are already 10-20 m in size after 1 year - some species can grow 20 cm per day in the growing season - crushing them gives humus.

The sand-coloured soil turns black – time for plantings. At a rhythm of 50,000 km2/ year.channel: 144 km2/day (12 km X 12 km)/ canal. For example, small plants are grown separately and then planted.

Sustainable woods. E.g. MERBAU - origin: South-East Asia: mature tree 30- 35 m, diameter 90 cm cost rough: 200 $/m3 – sawn: 450- 600 $/m3 – final buyer pays :3000 $/m3. MERANTI red- height 30- 40 m, diameter 50-90 cm, Afzelia, Accoya...

A classic rainforest consists of 4 layers

1. **(Emergent layer)** Top layer with scattered narrow trees: at least 60 m high – leaves are usually wide, evergreen hardwoods-

2. **(Canopy)** Closed canopy whose crowns touch other trees: main part of a forest- leaves are soft, oval, pointed-most life is in this layer -nutrition in abundance.

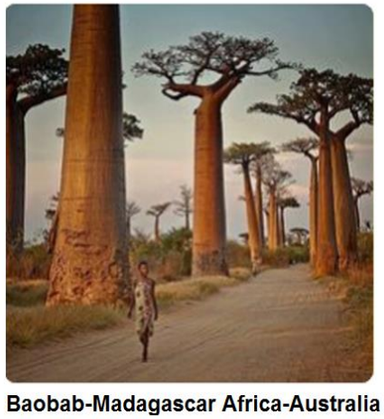
3. **(Understory)** Smaller trees (max 4 m), crowns do not touch each other- less sunshine :leaves quite large–many insects.

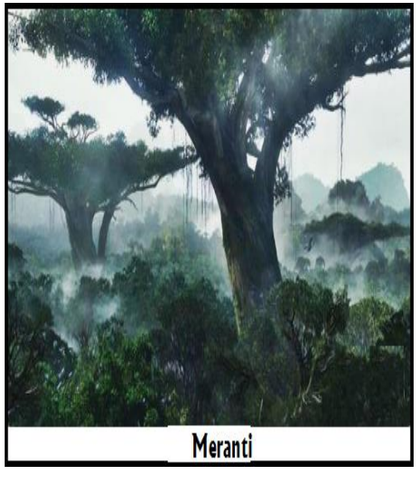
4. **(Forest floor)** Soil layer little sunlight-few plants, decay quickly.

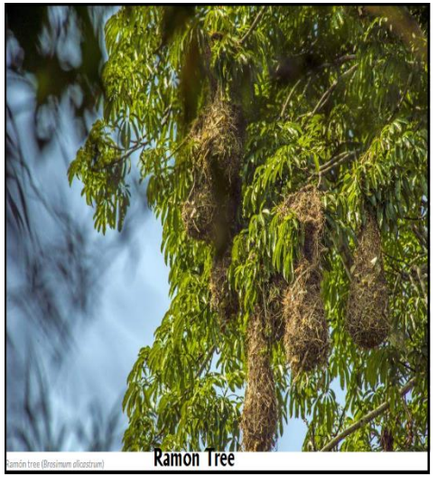
In the Arabian rainforest it would therefore be best to reconstruct these 3 upper layers with a wide variety of species – the indigenous population of the Amazon before 1500 used to remove the thickets – the forest then looked more like a park instead of a swamp full of venomous snakes– adult trees can also be cut down -instead of letting them die, then rotting and thus releasing the CO2 back.


Merbau


Maracuya


Baobab-Madagascar Africa-Australia


Meranti


Ramon Tree

The value of brine (10% total),
The mentioned quantities of desalinated seawater in the project are 0.7 Billion m3/day X 6 channels = 4.2 Billion m3/day or 1500 billion m3/year.
Minerals in 1 billion m3 of seawater :

NACL 26 M ton (yearprod.: 180 Mton. USA: 40 M ton China: 27 Mt) electrolyse 2 Nacl->2Na+ Cl2-
. **CL**: PVC, polyester, cleaning .
Na :soap,detergents– NaOH=caustic soda.

Mg Magnesium 1,3 M ton (1,3 kg/ m3)- (yearprod 1M ton–China 80%)
. alloy. Alu, refractory stone, fertiliser.
. In huge quantities .36 Kwh/kg by electrolysis -2,4 $/kg.
- K Potassium: 0.4 M ton (potassium).
- **Li** Lithium 80,000 tons (annual prod . 77,000 tons. batteries LIOH: 9 $/kg. Li:31 $/kg) –extraction process is up to 50% loss,
-
AU gold 13 kg (year prod 2800t). 60,000 $/kg.

E. FINANCIAL: ESTIMATED COSTS OF THE PROJECT

A/ INDUSTRIAL STATES

(mainly USA+ Europe + Japan..) that caused the CO2 problem are taking on the technological side of the project: assembly lines for desalination plants, excavators, trucks, 20,000 km2 solar concentration systems... estimated at **100- 200 billion $** (US Intervention Afghanistan:2500 billion $- world military expenditure :2240 B$/year).

B/ ARAB COUNTRIES + IMF

take on salary costs of e.g. 10 million workers at 5000 $/year- 50 billion $/year gives 500 billion $ in 10 years -after some 10 years newly created rainforest, agricultural land+ minerals from the brine will yield enough to greatly reduce the salary cost –it brings great prosperity to the region.
In 2030, there shouldn't be a single unemployed person anymore-1 job created generates 1 other - people have money for buying a home, comfort, vehicle..-now in the Arab world there are 50 million 15-24 year olds -30% are unemployed +hidden unemployment - Eritrea: military service 10 years -3 M refugees in Egypt, mainly from Sudan.

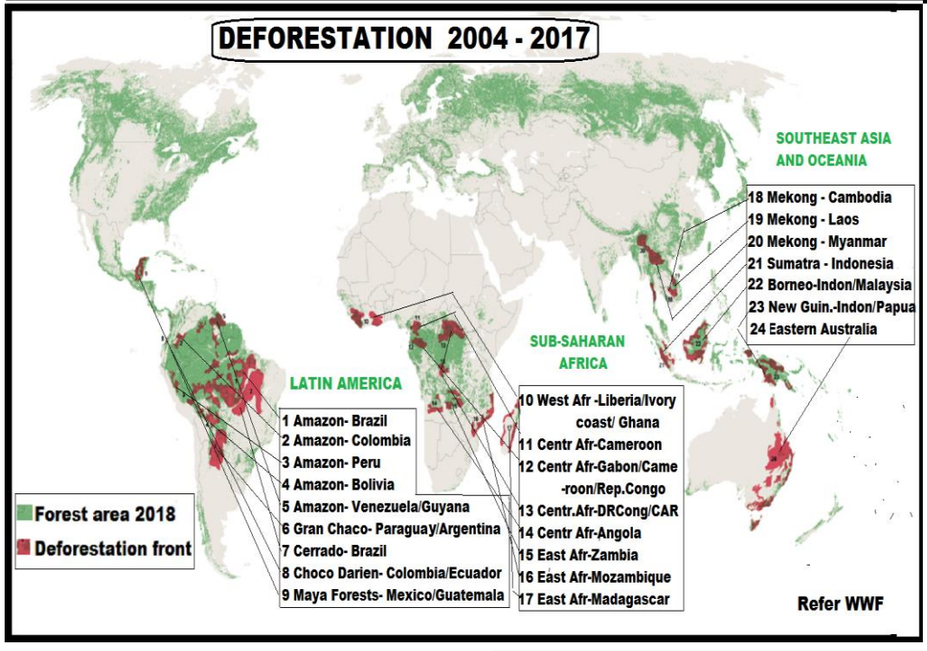
– Tunisia, Gaza Strip. Somalia: 70% unemployed- Lebanon: 3/4 in poverty- 60% unemployed- food prices, medicines X 6- currency 90% lost in value- intelligentsia moves away - Hezbollah in the South provides vital livelihood - 1.5 M Syrian refugees live in camps with UN support

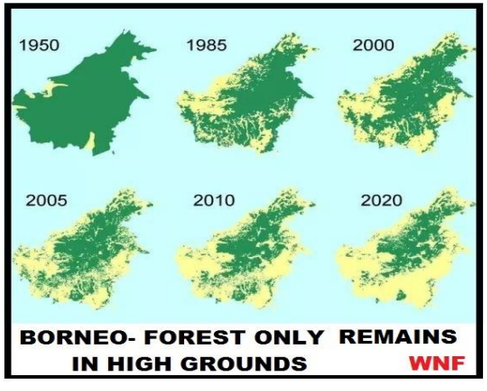
TOTAL COST OF THE PROJECT : 1000 -2000 BILLION $ TO EXTRACT 1000 BILLION TONS CO2 FROM THE AIR OR ONLY 1-2 $ PER TON

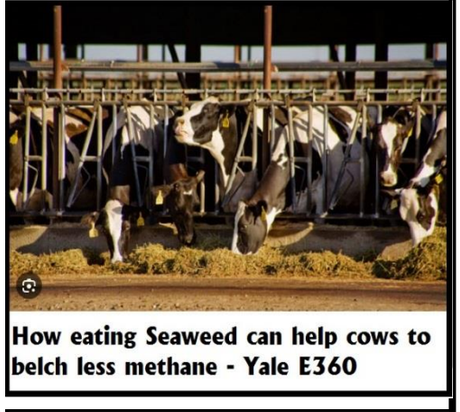
(50 X cheaper than ground injection at 45-100 $/ton) –first 5 years of preparation and a pilot project of e.g 10 km2. Independent of 42 G-ton annual CO2 extraction: the situation in the Arab region is critical: advancing desert –water level drops due to the water pumping–15 M unemployed–and what if mineral oil is mandatory replaced by algae-Biocrude.

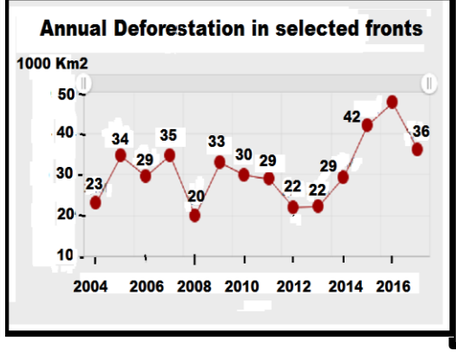
Conclusion : The project is really technically and financially feasible - moreover: the result is 7 M km2 tropical rainforest + 2 M km2 agricultural land – an income for about 1/3 of the Arab world.
IMF Intern.Monetary Fund could also make a substantial capital injection. The amount of money should always be in line with the economic mass – an increase in one implies an increase in the other–
NOT realizing such a project would be unacceptable considering the enormous benefits compared to the relatively low costs.

Add 300,000 km2 of tropical rainforest every year but elsewhere 40,000 km2/year is destroyed.






How eating Seaweed can help cows to belch less methane - Yale E360



6.4 % of the earth's surface is tropical rainforest–but this contains 1/2 of all species of plants + animals. The Amazon rainforest includes 2.5 million different species of insects, 1500 species of birds, 2000 fish species, 40,000 species of plants, 3000 species of fruit (we know 200).

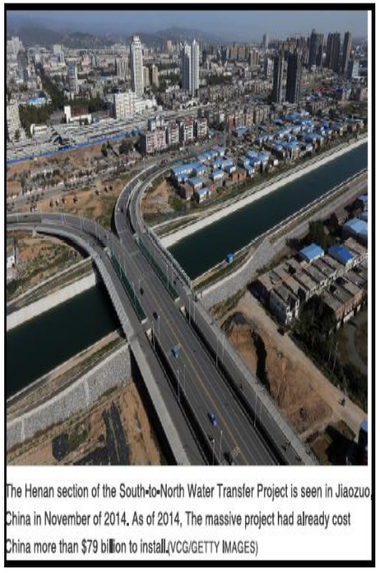
Originally, before human influence, there was **14.5 M km2** of tropical rain forest in the world (refer Rainforest Foundation Norway)- only **9.5 M km2** remains - 5.2 M km2 intact (55%) and 4.3 M km2 degraded:
Latin America 5.7 M km2 (60%), Africa 1.9 M km2 (20%),
Asia 1.53 M km2 (16 %), Oceania 0.36 M km2 (4%).

In Latin America, a huge amount has been lost to soy cultivation, grasslands and in South-East Asia to palm oil- in Borneo, only rainforest remains in the high mountains – world-scale cultivated surface between 1971 and 2021: palm oil from 0.03 to 0.29 M km2 and soybean from 0.30 to 1,295 M km2- combined expansion in surface of palm-oil and soybean : 0.26 +0.995 Mkm2 = 1.25 M km2 (UN data)

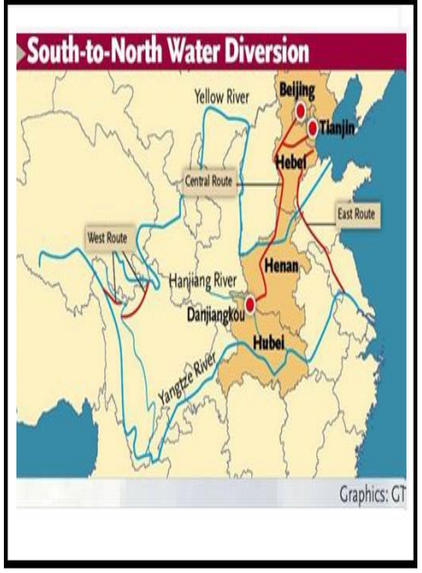
Turning back the clock and reforesting this 1.25 M km2 yields only 155 Gt CO2 extraction (1 M km2 tropical rainforest stores 125 Gt CO2 – 1.25 M km2 therefore stores 155 Gton CO2) – this is quite limited.

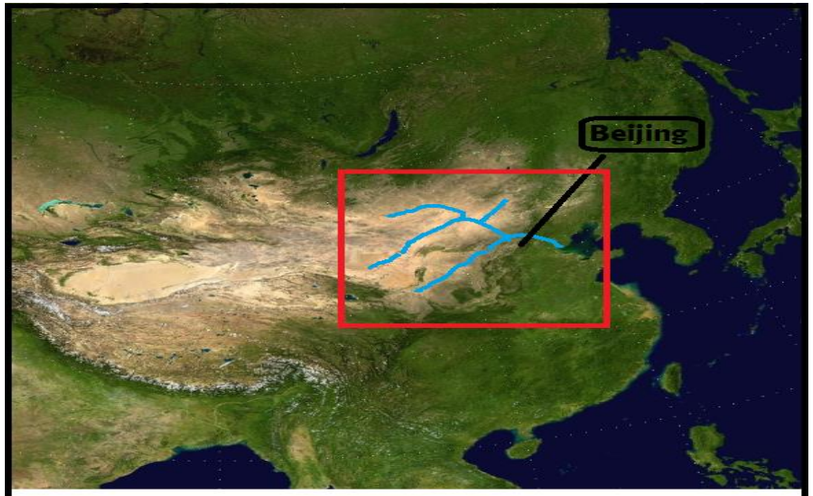
SOY in animal husbandry can be replaced by the abundantly growing brown algae, Sargassum, on floating islands between Africa and Latin America (sheep are now fed with it and do fine), by krill from Antarctica, by insect farming...
An equivalent of **PALM OIL**, which is found in so many foods, can also be grown from algae at sea – Borneo, Sumatra then regain tropical rainforest that can also be exploited economically very valuable.

What needs to be done in each case: deforestation: 40,000 km2/year, should radically stop because Amazon region is increasingly resembling a savannah. The climate in Europe is formed in Amazon- Europe's backyard- Southern Spain becomes desert.

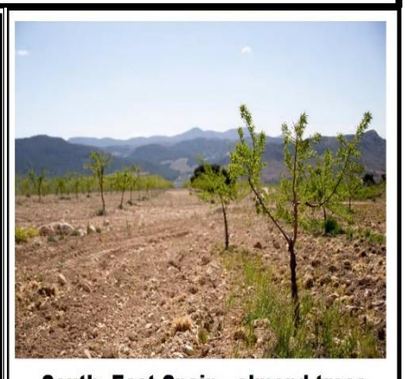


The Henan section of the South-to-North Water Transfer Project is seen in Jiaozuo China in November of 2014. As of 2014, The massive project had already cost China more than $79 billion to install.(VCG/GETTY IMAGES)





A better solution for a desert-progress in Northern China and Eastern Mongolia : big scale irrigation with desalinated seawater?



South- East Spain - almond trees

THE HIGH DEMAND FOR AFFORDABLE DESALINATED SEAWATER 33

Because seawater, desalinated via reverse osmosis, is 10 times more expensive than fresh water from normal sources, absurd things happen: in North-East China and elsewhere...

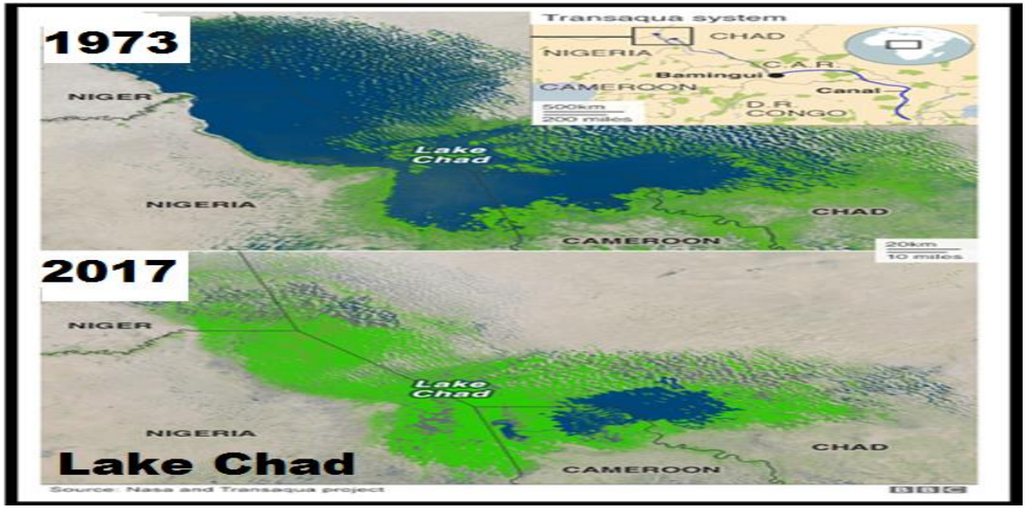
China: Beijing with 21 M inhabitants and Tianjin with 15.6 M inhabitants are close to the sea - but now there are huge infrastructure works to supply 120 M m3 /day of water from the south, due to water shortage (80 billion $)- 20,000 desalination modules could also deliver a planned 120 M m3/day at a much lower cost.
This effort could transform **2-3 million km2** into forest and agricultural land in the region, stop desertification and remove 200 Gt of CO2 from the air - China emits 31% of the world CO2.

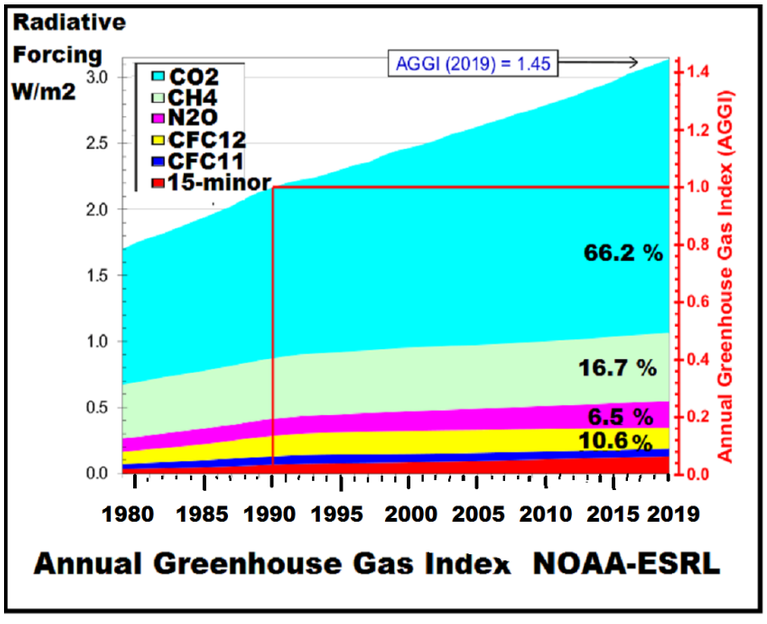
Spain : south dries out- affordable desalinated water changes a lot.

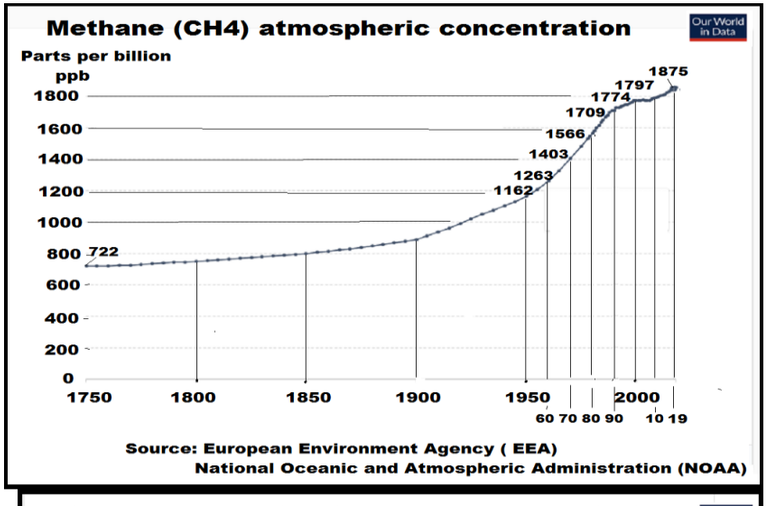
Coastal region California–fruit supplier USA – water level is 250 m deep–pumping up is unprofitable - farms are abandoned...

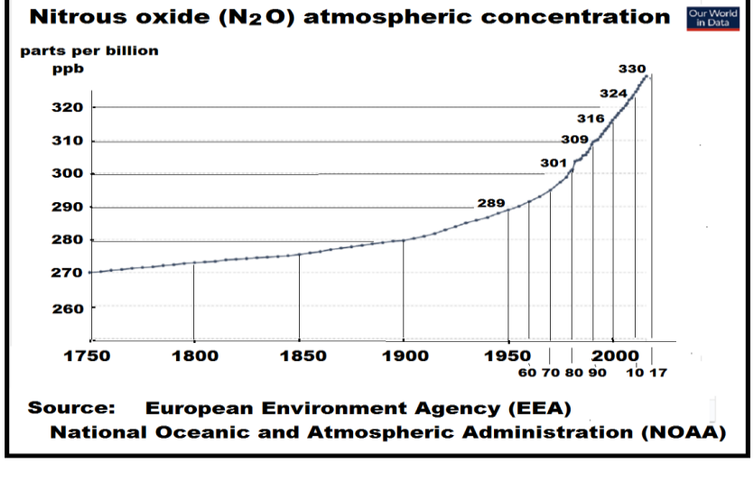
Somalia : 5.4 million people dependent on food aid 2017-18 dry seasons-large refugee flow- desalination plants +channels make a big difference. Famine caused 40,000 dead.

Northern Israel– water from Golan Heights that normally ends up in Jordan River to feed Dead Sea is used for agriculture in northern Israel–Jordan river +Dead Sea dry out-97% of pumped-up water in Gaza is undrinkable. The whole world is awaiting affordable desalinated water – the realization of the Sahara irrigation project with a new desalination method is a big change.









Greenhouse gases other than CO2 account for 34% of greenhouse effect. 34

CH4 -Methane (Graph: responsible for 16.7 % of the greenhouse effect)

molecule CH4 has 22 X more greenhouse effect than 1 molecule CO2- remains in the air for about 10 years after which - $CH_4 + 2O_2 > CO_2 + 2H_2O$ – conversion to CO2 and water vapor.

1 ppbmCH4 is equivalent to 2.85 Mt CH4 weight. Rise in air: 14.3 ppb/yr or 40 Mton/yr

Excess CH4 in the air since 1750:1153 ppb-3.28 Gt

Thawing permafrost is estimated to convert:

before 2040: 4-8 Gt CO2 equiv./year 1/2 CO2, 1/2 CH4

2040-2100 :12-19 Gt CO2 equiv./year

N2O - Nitrogen oxides (Graph: responsible for 6.5 % of the greenhouse effect)

are released 12 times as much as previously thought -are 300 times more effective than CO2 and remain in the air for more than 100 years - emitted by agriculture for 2/3: nitrogen-based fertilizers, not absorbed by plants, break down into the soil and thus emit nitrogen oxides.

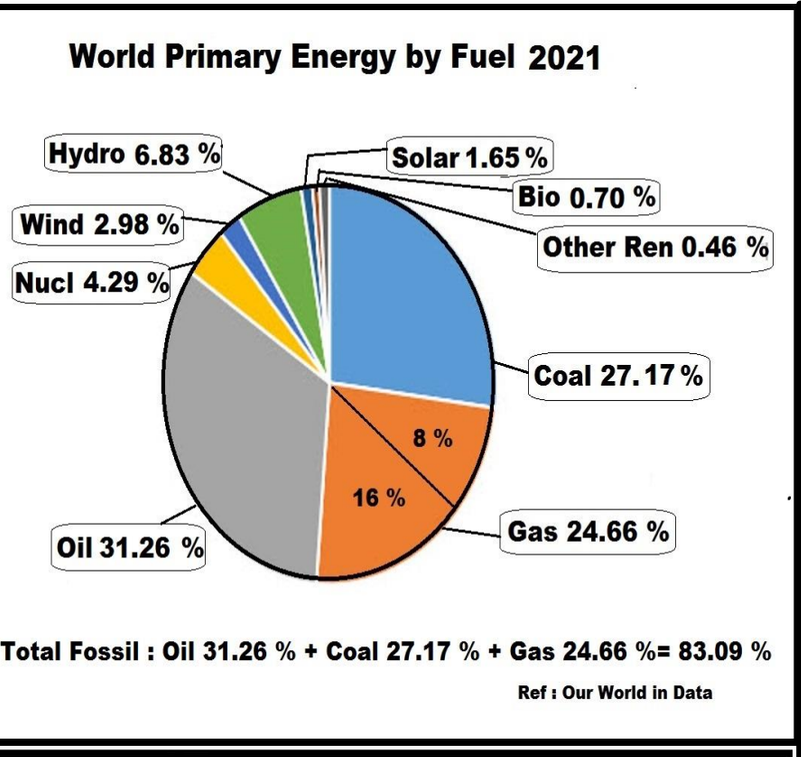
The level of nitrogen oxide in the air is measured in ppb (part pro BILLION) –

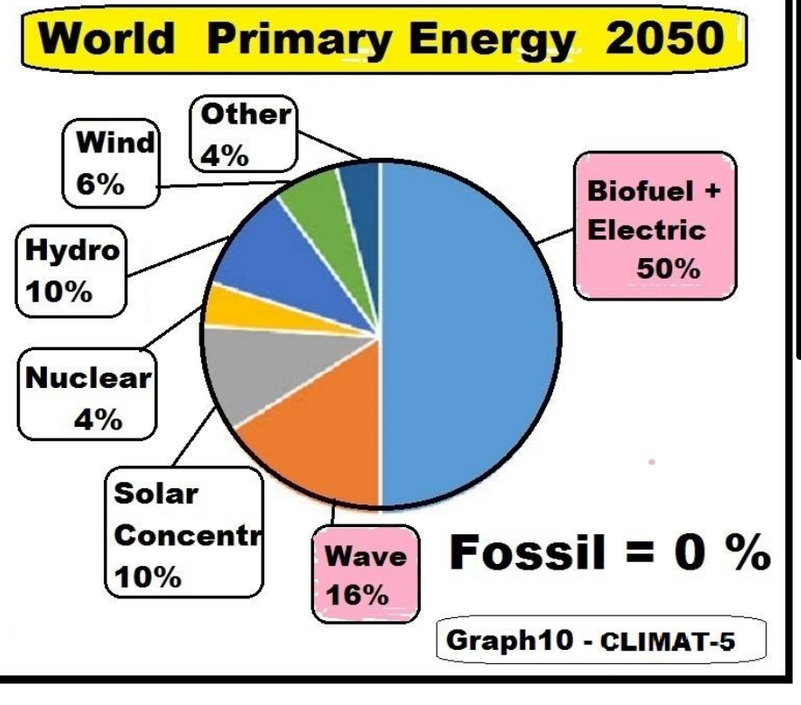
in 2017 there was 330 ppb of N2O in the air.

1ppbmN2O =7.78 Mton N2O. Rise in air: 0.8 ppb/yr or 6.22 Mton/yr

Excess N2O since 1750: 330-270=60 ppb (467 Mton)

N2O also destroys the ozone layer: The Montreal Protocol was successful in reducing hydrofluorocarbons (HFCs) –so better add N2O to the list.





MYTH1:100 % RENEWABLE ENERGY IS IMPOSSIBLE

In order to make world energy fossil-free by 2050, the current non-fossil part 17 % should be 100 %:at least 2 new forms of renewable energy could make a big difference.

1.OIL FROM SELF-GROWING ALGAE:

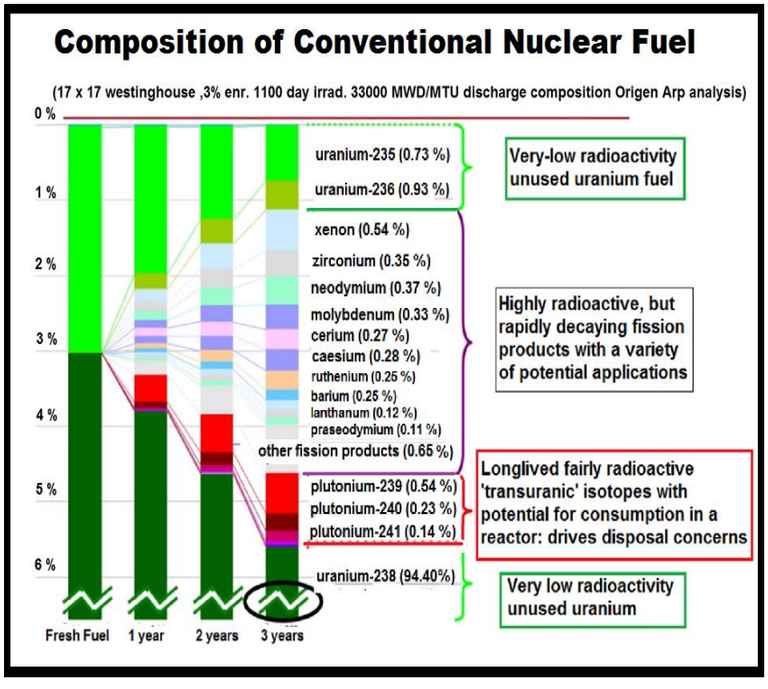
A normal world needs oil very much: for transport on land, at sea, in the air, heat, raw materials, petrochemicals. That electricity+ hydrogen could take over this function is nonsense –nobody believes an aircraft flying on hydrogen or electricity.

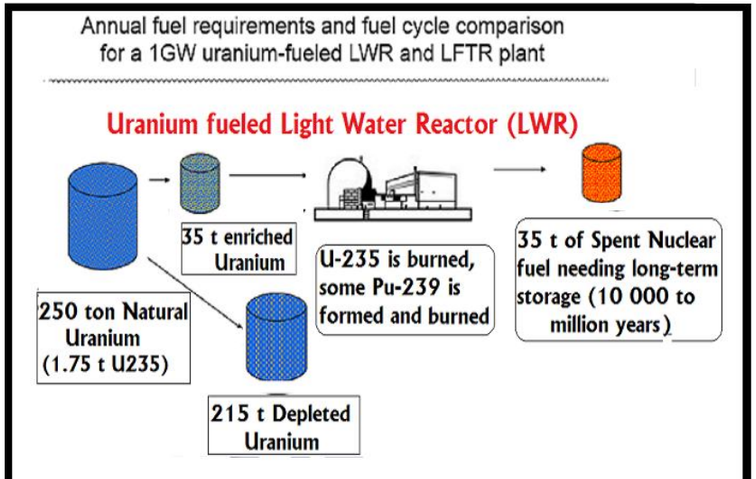
In the following images it has been shown that mineral oil can be replaced by oil from self-growing algae on floating islands: this biocrude should not only take over the 33% of mineral oil + part of natural gas (16%) but also produce electricity at peak and dead moments when nature, sun and wind, fall short.

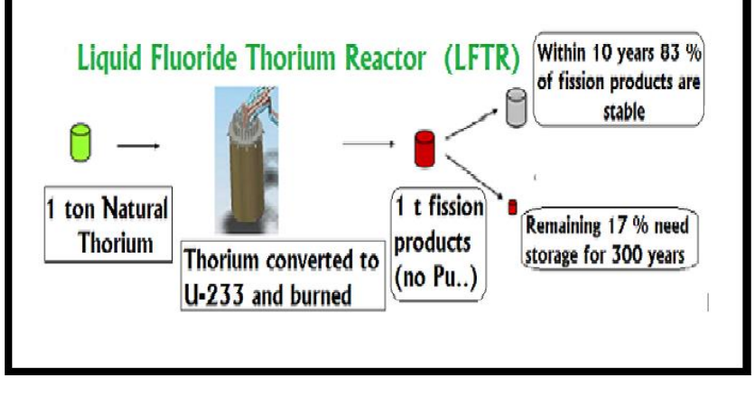
This biocrude therefore means about 1/2 of the total energy. Each region in the world is allocated its share of the oceans and produces its own oil and thus becomes completely independent in terms of energy.

2. SUN CONCENTRATION + WAVE ENERGY :

USA could transform 10 % of South-West desert, Nevada..into solar power plants.
Northern Europe, China, India... could fill the gap with large fields of buoys at sea: 200-1000 km2 in Western Ireland, China Sea, Indian Ocean – replacing all coal-fired power stations.







MYTH 2 : NUCLEAR POWER IS INEVITABLE 36

Current nuclear power plants are unsafe, unprofitable – an explanation: Natural Uranium contains 3 isotopes: 0.71% fissile U235 - 99.28% non-fissile U238 -for use in nuclear reactor, 0.71% U235 must be enriched to 3% via ultra-centrifuges.

Only this 3% U235 splits into the fuel rods- fast neutrons are released that split other atoms- velocity is controlled by cadmium rods- after 3 years the 3% U235 is still 1% (graph).

Reaction no longer runs well due to many fissile materials - rod is replaced -recovery of remaining 1 % U235 rarely happens: too polluting.

Infinitely better concept: Uranium in liquid salts in a melting bath of about 600 °C- there is continuous addition of new fuel and removal of fission products -a test- reactor in the USA ran fine for 2 years in the 1960s.

Such a type could never give a disaster like Chernobyl (with more than 100,000 dead– liquidators) - but was never put into production because nuclear submarines and fast breeders got all the attention. Some test reactors with liquid salts are running in China, India, Canada ... Thorium reactor is also of this type.

Nuclear reactors need 8 years of construction time (Hi-Tech) -South West England: Hinkley Point C'- 2 X 1.6 GW: year 2017-2025: 25 billion$ -7.8 B$/GW (4X THE COST OF RENEWABLE LOWTECH).

FUSION: project ITER (France): the Tokamak is a donut construction with superconducting materials +magnets that must contain plasma:Deuterium (D)+Tritium(T) at 150 M degrees °C Stable plasma can only be used by huge size magnets–there is a German project WendellStein 7X with much smaller magnets.

A. Very big problem: REPLACING MINERAL OIL

The current situation can impossibly continue like this: OPEC, organization of oil exporting countries, does not foresee a decrease at all in the demand for mineral oil on a global scale: until 2035, demand will rise 5 => 5.5 Gt-then capping.

Only Western countries reduce their demand - nobody believes in hydrogen or electricity-powered aircraft, not even western countries

Without oil our industry cannot function – but fossil fuels have to disappear – the solution? nobody is saying oil must also be mineral oil – it is perfectly possible to make something equivalent and even cheaper from algae that grow naturally on floating islands in tropical seas: CO2-neutral-3 liters of this gives 1 liter of 'biocrude'.

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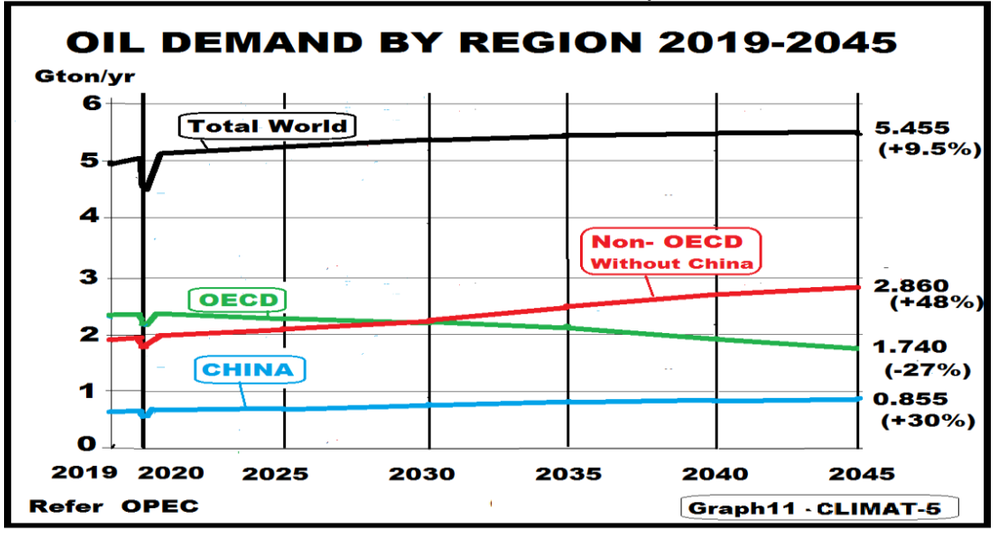
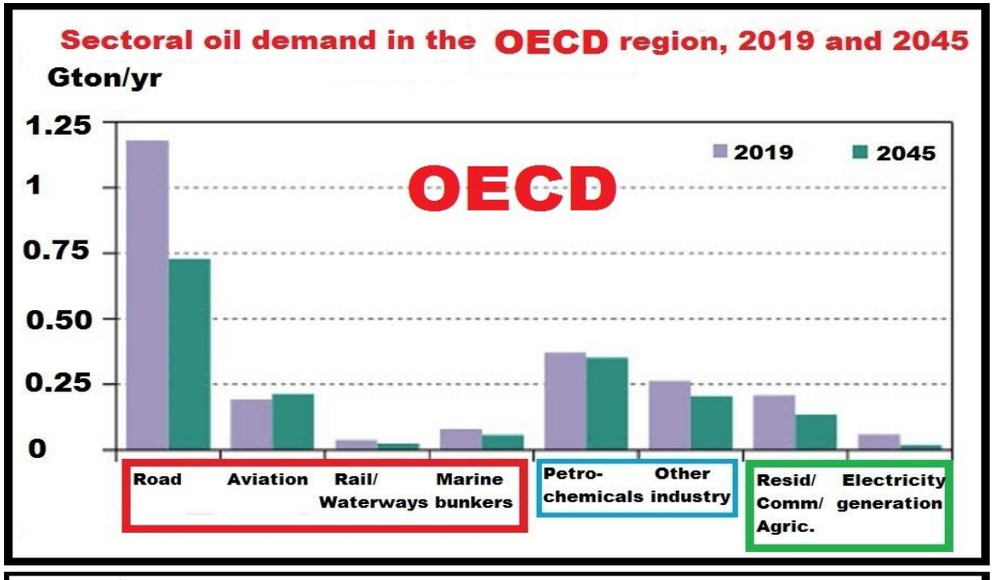
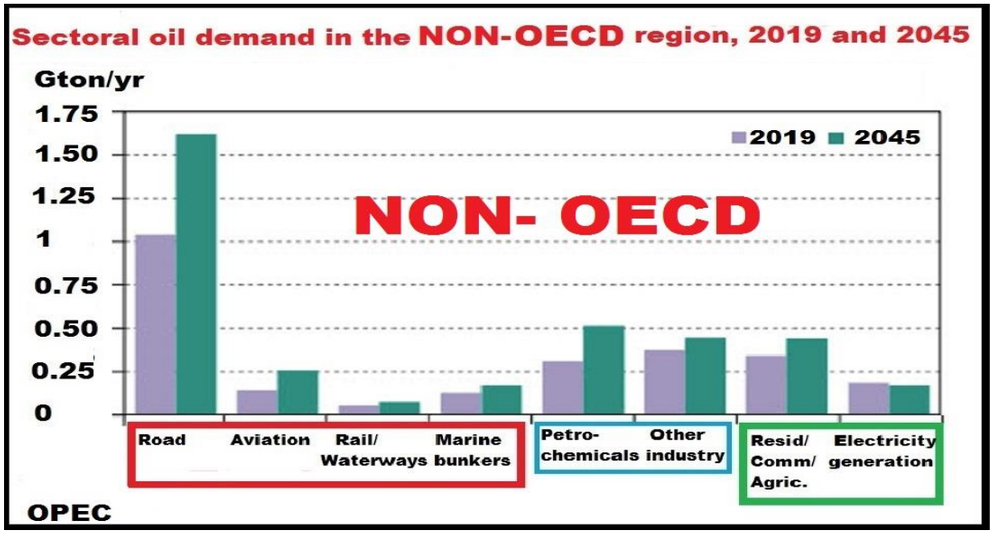
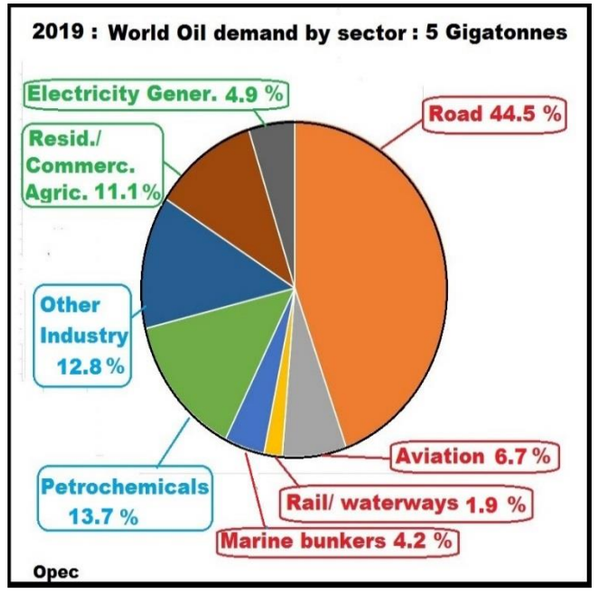
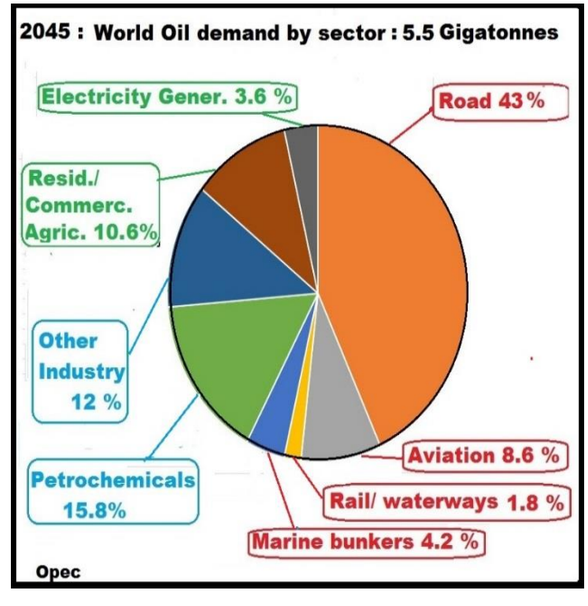


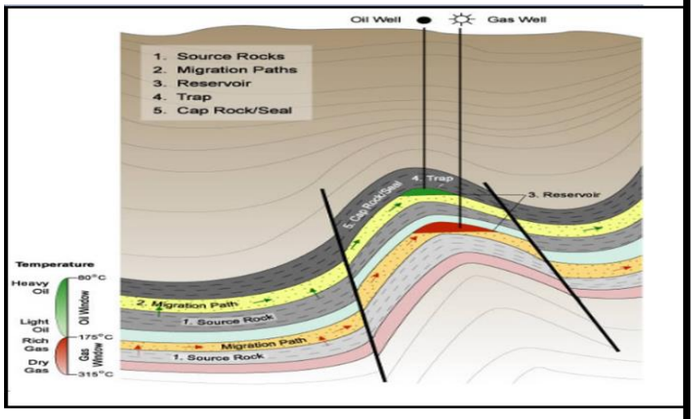




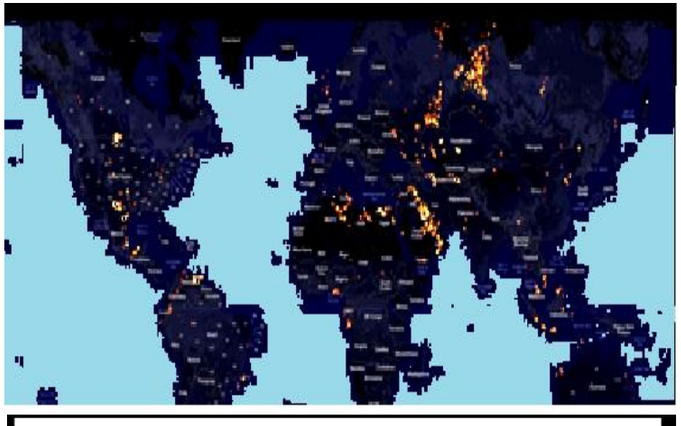


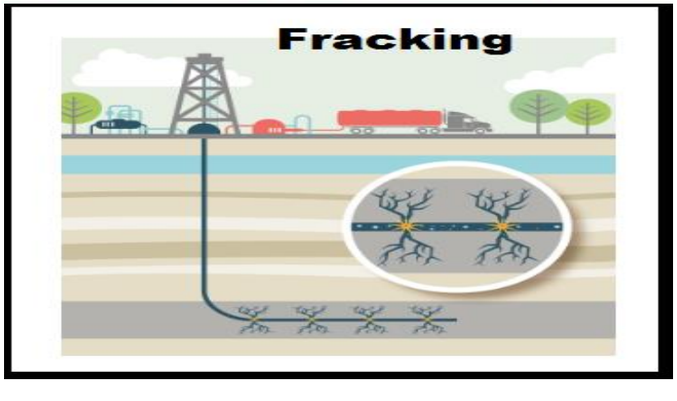


EVEN SEVERE CLIMATE DENIERS HAVE TO ADMIT THE END OF THE MINERAL OIL IS NEARING.



Component	Symbol	MOL Percent Crude Oil	Associated Gas	Wet Gas	Dry Gas
Methane	C_1	37.54	67.32	59.52	97.17
Ethane	C_2	9.67	17.66	5.36	1.89
Propane	C_3	6.95	8.95	4.71	0.29
i-Butane	i-C_4	1.44	1.29	2.03	0.13
n-Butane	n-C_4	3.93	2.91	2.39	0.12
i-Pentane	i-C_5	1.44	0.53	1.80	0.07
n-Pentane	n-C_5	1.41	0.41	1.61	0.05
Hexane	C_6	4.33	0.44	2.60	0.04
Heptanes Plus	C_{7+}	33.29	0.49	19.98	0.24
		100.00	100.00	100.00	100.00





Annual production 5 Gton (OPEC).
239 Gton oil current stock / 5 Gton = 50 yrs.
66 Gton tar-sand Canada+ Venezuela/5 Gt = 13 yrs

Oil= hydrocarbons – hydrogen and carbon atoms: the more atoms the heavier and more energy-rich: methane (C1), ethane(C2).. the heaviest have 66 and more C atoms (in table Heptanes plus =heavier than 7) formed from decomposed rest of plants and animals, compressed under high pressure and temperature

– low lying, T° 60°-80°C :**HEAVY OIL**
- deeper T° 80° -175°C :**MEDIUM + LIGHT OIL**
T°C above 175°C :**RICH GAS**
– becomes with time and above 315°C :**DRY GAS (methane).**

- Gases are mainly used in petrochemicals – Methane = > ammonia (fertilizer) - Ethane (C2H6) = >ethylene (plastics) Propane, Butane.

- Oil extraction is accompanied by enormous waste on gas: photo on the left is a composition of heat sources >1500 °C, flaring of gas, over several days (max 1 month)- of new sources or refineries –Suomi NPP satellite NOAA.

- **NEW HIGHLY POLLUTING EXTRACTION SOURCES: SHALE OIL AND TAR SANDS**

- SHALE OIL: under hard rock layers (shale), one finds oil and gas: drill pipe goes horzontal -injection of a mixture of water, sand and chemicals to break rock (fracking).
- Hundreds, thousands of boreholes require a lot of chemicals- (up to 30,000 m3 of water/ borehole that is contaminated discharged into deep layers)-with fracking,

in the state of Oklahoma USA, the injection of this wastewater into the subsurface has caused hundreds of earthquakes -5.8 on the Richter scale was typical- quite a bit of damage to buildings- methane escapes that is usually flared

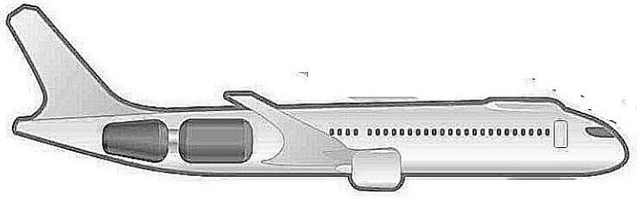
Quite understandably, fracking is radically banned in Europe – much of the ground water is pumped up from 2000 m depth, just the layers where the chemical substances are injected – in the USA quite a lot of drinking water has become contaminated.

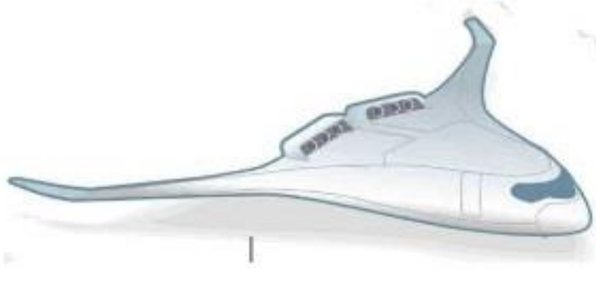
- **TAR SANDS**: mixed with soap material for separation of sand and oil: 90% of the inhabitants of Fort Mc Murray, Canada, die prematurely of cancer

Science & Vie n° 1263 -Dec 2022
HYDROGEN-POWERED AIRCRAFT:

studied at Airbus: where to store and how to load ? – rockets such as Ariane or SLS-Nasa get liquid hydrogen (-253°C) a few minutes before take-off –a similar loading operation in aircraft should happen quite far from the passengers.

Reservoirs at the back of the aircraft with heavy insulation still fit for smaller aircraft (100passengers) – for larger ones aircraft has to be reinvented :flying wings could then store 1600 m3 H2.





B. POSSIBLE NON-FOSSIL SUBSTITUTES MINERAL OIL:

1/ HYDROGEN CYCLE : MAJOR DOUBTS AND QUITE RIGHTLY SO.

'Science&Vie' N° 1239 Dec 2020 : 'Faut-il croire à la révolution hydrogène' - Should one believe in the hydrogen revolution?

Where is hydrogen expected?

1. Transport : train, truck, ship.
2. Industry: refining, chemicals, steel.
3. Electricity networks, solar and windmills.

-'green' hydrogen produced by green energy now costs 5-6 $/kg – grey hydrogen from methane only 2 $/kg. (Euronews.green:95% of the current hydrogen production is actually 'grey' - this emits about 3% of global CO2 emissions or 1 G-ton).

- France invests 7 billion $ before 2030, Germany 9 billion $ - China, Korea, Japan, California are also investing heavily.

-Hydrogen is energy-intensive- 40 Kwh/kg -3 X as much as oil (11,3-13Kwh/kg)

BUT THERE ARE MAJOR DISADVANTAGES

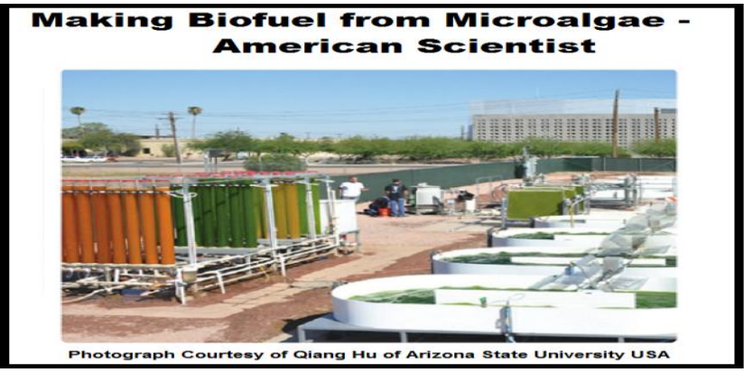
a/ efficiency electrolysis : 70% (water is a strong bond – much stronger than CH4 methane)
-an installation of alkaline electrolysis costs 1000 $/Kw
-alternative PEM 'Proton exchange membrane' with platinum 1300-1500 $/Kw – price reduction is foreseen - an electrical power plant of 0.4 GW on hydrogen costs 400 M$.

b/efficiency fuel cell for electricity generation: 50-60 % - total efficiency electrolysis + fuel cell 25-30% (electric car: 75%)

c/ storage reservoirs at 700 atm:large energy losses -too expensive for seasonal storage or long-distance transport –liquefaction: no way

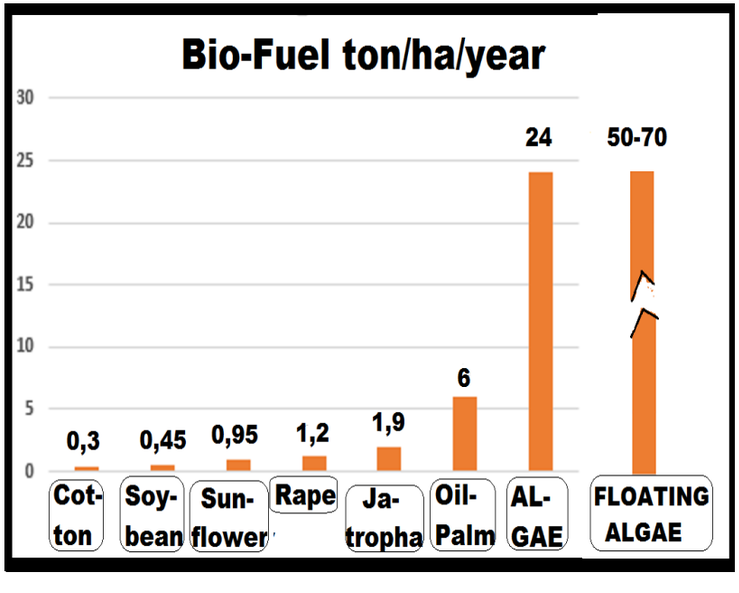
d/ mixing with natural gas ,max 5-10 % because hydrogen affects metal pipes -causes metal fatigue.

e/ always leaks (possibly with serious consequences) -hotter combustion gives more nitrogen oxides - flame is not really visible.- hydrogen is odorless.



The table lists the major differences between macroalgae and microlagae

Parameters	Macroalgae	Microalgae
Size	Macroalgae can reach sizes of up to 60 m in length (Mc Hugh 2003)	Microalgae are very small plant-like organisms (+/- 1 to 50 µm), which can be seen through a microscope
Physical structure	Macroalgae are composed of a thallus and sometimes a stem and a foot	Microalgae do not have roots, stems and leaves
Energy density	Medium	High
Biomass yield	Medium	High
Ease of cultivation	Macroalgae are cultured in natural environments such as ocean	Microalgae are cultured in photobioreactors or open ponds
Ease of harvesting	Easy	Difficult
Oil yield	Macroalgae produce only small amounts of lipids	Microalgae produce comparatively high amounts of lipids



OTHER POSSIBLE NON-FOSSIL SUBSTITUTES MINERAL OIL: 40

2/ **Electricity**: limited use-storage 200 $/kwh battery/ every 10 yr to replace- unrealistic to think process heat, ships, large tools.. could work on electricity.

3/ **Biofuel** from energy crops on land – very low yield – takes up fertile land. For example: if in Germany all agricultural land (120,000 km2) were filled with turnips (120 ton/km2/yr) this would still give only 15 M tons or 13 % of imported 113 M tons of oil –
EU : production rapeseed : 16.6 M ton
USA: 32,000 km2 gives 14 M tons of corn- ethanol = 5% of energy used in transport.
Brazil:7 M ton of corn ethanol-
S-O Asia: destroying tropical forest to produce biofuel from oil-palm ?

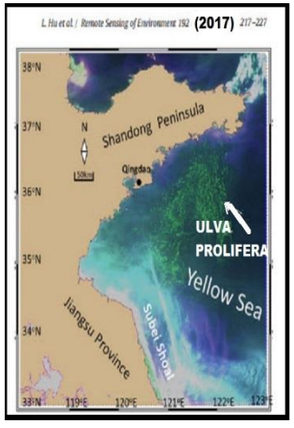
BIO-METHANOL : requires 2 X as much mass as diesel to develop the same power –this fuel costs at least 2 to 3 times as much as the current mineral oil.

4/ Biofuel from algae (choice between microalgae or macroalgae)

A/MICROALGAE :
Large growth, doubles in volume every day, but growing microalgae in the open sea is impossible: no sieve can capture the tiny cells – so culture in open ponds or photo-bioreactors that are transparent, glass or plastic -CO2 must be injected from some source.

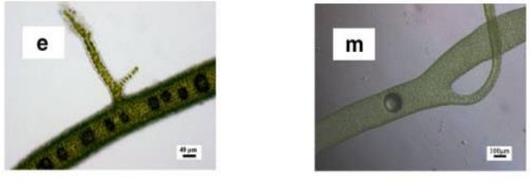
A lot was invested in the USA, also by the government: 4 million tons of biofuel for the year 2014 was proposed(100 tons/ha.yr at competitive price).

But not even 1 thousandth was achieved – only 'Synthetic Genomics' with Exxon and Craig Venter biotech still invests in genetically modified microalgae with double yield.

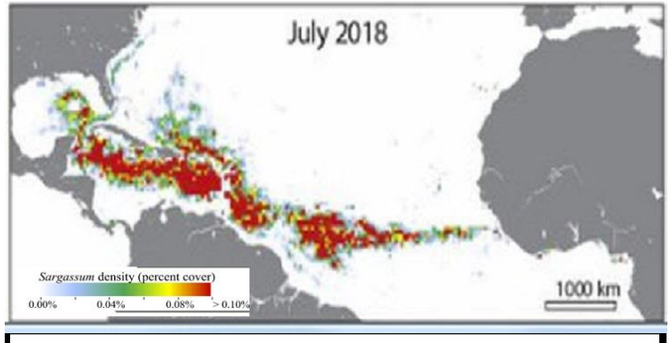


Rising green and golden seaweed tides : a menace or a resource

Green floating macroalgae



Ulva compressa : branch and air bubble **Ulva prolifera :** in the thallus



Scientist discover the biggest seaweed bloom in the world

Sargassum on Delray Beach in South Florida -May 2018 - Florida Atlantic University's Harbour Branch Oceano-graphic Institute

B/ MACRO-ALGAE (SEAWEED):

cultivation structures near coasts are possible but quite expensive - there is a promising alternative: in 2 places in the oceans there are **ISLANDS FLOATING RATHER SPECIAL SEAWEED** - absolutely not a temporary phenomenon - it overgrows tourist beaches.

A.Brown Sargassum (pelagic) Atlantic: Africa-central America.
B. Green Ulva Prolifera in the Yellow Sea, Chinese coast

They are both macroalgae with many bubbles filled with oxygen /air, which floats, not anchored to the seabed like the common species - they get a lot of sunlight and CO2 capture, which gives great growth and marine life. Every km2 of these macroalgae produces at least 6000 tons per year - (50-70 tons / ha. year) -

This is about 10 times as much as palm oil (graph pg 39) which requires heavy manipulations, with palm trees that have taken the place of tropical rainforest as in Borneo and Sumatra - floating algae, on the other hand, do not require a cultivation structure simply charging via purpose-built floating collection structures.

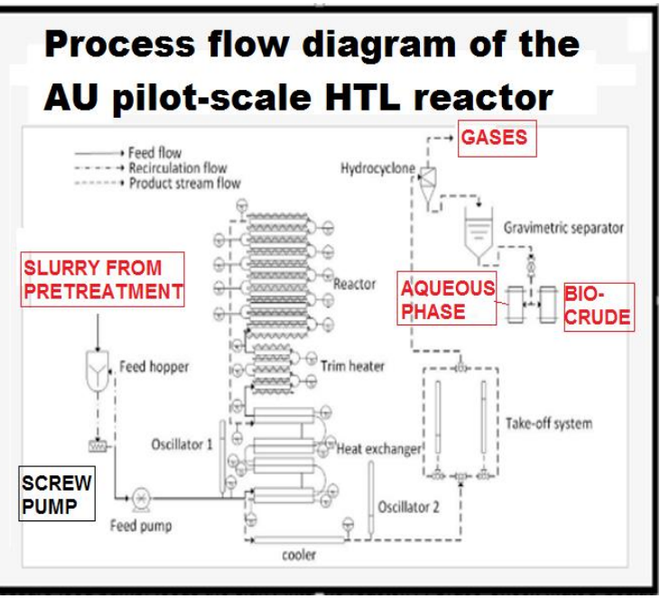
Transformation of macroalgae into Bio-crude:

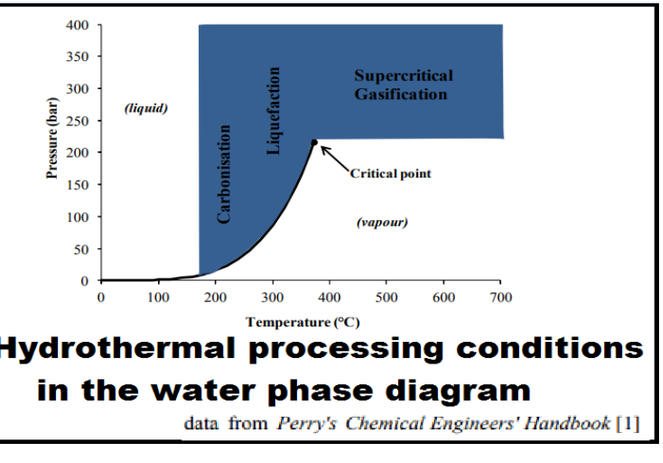
a/ PYROLYSIS

produces an unsuitable end result: contains too much oxygen- unacceptable for explosion engines.

b/ HYDROTHERMAL LIQUEFACTION (HTL),

much better, is able to process wet biomass (pre-drying would require a lot of energy), produces a liquid product with noticeably less oxygen. In nature, transformation from biomass to oil has taken about a million years under high pressure and temperature deep in the earth's soil –the HTL process mimics this in half an hour, but at the same high pressure + temperature (250-350 °C) in a water environment -PH degree serves as catalyst -water remains liquid-in supercritical state.





The transformation process in 3 steps:

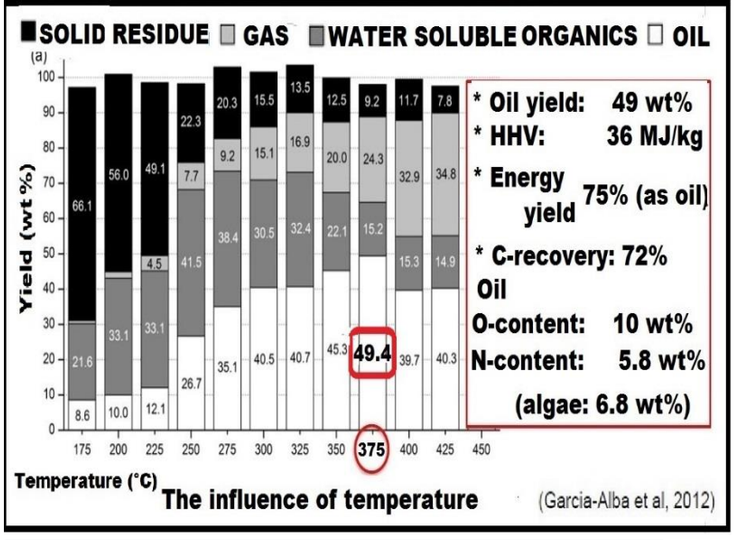
1. The algal biomass undergoes a number of **DE-POLIMERIZATION** reactions including hydrolysis, dehydration and de-carbonization to form water-soluble intermediates.

2. **RE-POLIMERIZATION** reactions including various condensation mechanisms give water-insoluble products : -biocrude, biochar, gases H2(hydrogen), CH4 (methane), CO (Carbon-monoxide) - a water-phase with soluble organic substances: alcohol, acids and phenols (for lignocellulose).

CONTINUOUS process: in an industrial environment bio-mass is constantly pressed into the reactor vessel via a screw pump or piston pump while finished products are discharged: Process with well-controlled pressure and temperature – the installation is more difficult to realize but industrially this is absolutely necessary.

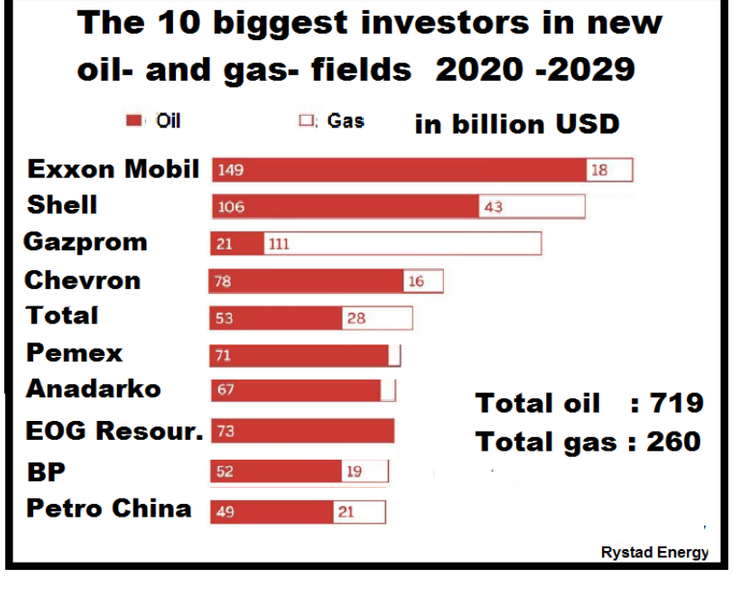
The HTL process in the supercritical point: higher temperature 400°C+ higher pressure 350 atm. removes most of the oxygen. But Nitrogen (N) and Sulphur (S) are important raw materials for algae growth – in biocrude, the result of the HTL process, high nitrogen values (5-8%) and slightly less sulphur (0.5–1.5%) are found. Nitrogen produces harmful nitrogen oxides when burned.

3. Complete extraction of nitrogen can only be done in a further step: **HYDROTREATING**, a saturation with hydrogen partly originating from water phase, in the presence of certain type of catalyst along with higher temperatures.



Some Major Categories of Petrochemical Products

Plastics	Lubricants	Process Chemicals
Carpeting	Pharmaceuticals	Rubber Goods
Adhesives	Cosmetics	Footwear
Paints		Detergents
Inks	Sealants	Fragrances
Solvents	Caulking Compounds	Fertilizers
Apparel	Fibers	Transparent Sheets
Tires		



These steps (HTL + hydrotreating) give a final product (bio-crude) that is ready for refining- carbon content of more than 60 % -energy content of bio-crude is in the order of 12.5 kwh/kg which is almost equal to that of mineral crude oil (11.6 -13 kwh/kg).

3 liters of wet green algae give 1 liter of biocrude - brown species gives noticeably less -contains NO SULFUR- unlimited renewal. Processing this oil of course produces CO2 - but the exact same amount of CO2 is food for algae.

15 Gton wet algae supplies 5 Gton bio-crude/ yr (world production) - if floating islands of green algae are created in all Oceans, or a total of 2.5 Million km2 (60 tons/ha.yr) **THEN IN 2040-2045 ALL MINERAL OIL WILL BE REPLACED**.

If the oil companies were to build large ships, rather large receptacles of at least 1 Million tons that load the algae- removing fish, turtles.. –then 40 Million tons of algae/day could give about 15 G-tons of algae /year or 5 G-ton biocrude.

– Full ships charge their cargo in reactors that are built in the vicinity on solid ground -about 100 such receptacle ships may perform the total world production -these constructions come in each of the 3 world oceans: Pacific, Atlantic and Indian Ocean - best avoid monocultures : use various types.

- But big oil companies could invest $700 billion in 4 new oil and gas fields before 2030 – this should be avoided by all means. US-President decided already a new oil-field in North- Alaska.

SYNTHESIS BIOCRUDE – "e-fuels"

Refer: Science et Vie n° 1268 May 2023
p.109 Carburants de synthèse

A pilot production unit was built in the North of Punta Arenas, Patagonia-Chile by consortium around Porsche, Siemens Energy, Exxon-Mobil.

The plant would produce 550 M liters of petrol before 2026- 12 similar installations are planned in the USA and Australia- objective 2$/liter of e-fuel.

Nearby wind turbines and solar energy provide electricity for the electrolysis hydrogen– CO_2 is extracted from the air–$2H_2+CO_2 \Rightarrow CH_3OH$ methanol -upgrade to C_7H_{14} (petrol).

Alternatively, Fisher-Tropsch process makes paraffins and after distillation gasoline.

Energetic balance: not brilliant-in electrolysis 40% is lost in heat- at higher t° (150°C) 10%.-1 kg of CO_2 removed from air: 1.5 Kwh -e-fuel: with 20 Kwh, the car goes 20 km – pure electric 20 Kwh: 100 km.

IMPACT CO_2-NEUTRAL OIL on industry, housing, transport

1. Guideline for climate-neutral homes in 2050:
A home that is not climate-neutral in 2050 no longer has a market value. This means in 2050 the higher incomes will live in climate-neutral homes and that lower incomes will not be able to pay for the transformation and will be heavily fined...

2. **Entire industry** should make great efforts to switch to hydrogen+ electricity-

3. **Transport**: there are petrol-powered passenger cars whose exhaust is so pure that it is purer than incoming air. Diesel-powered trucks also have additives to ward off harmful exhaust.

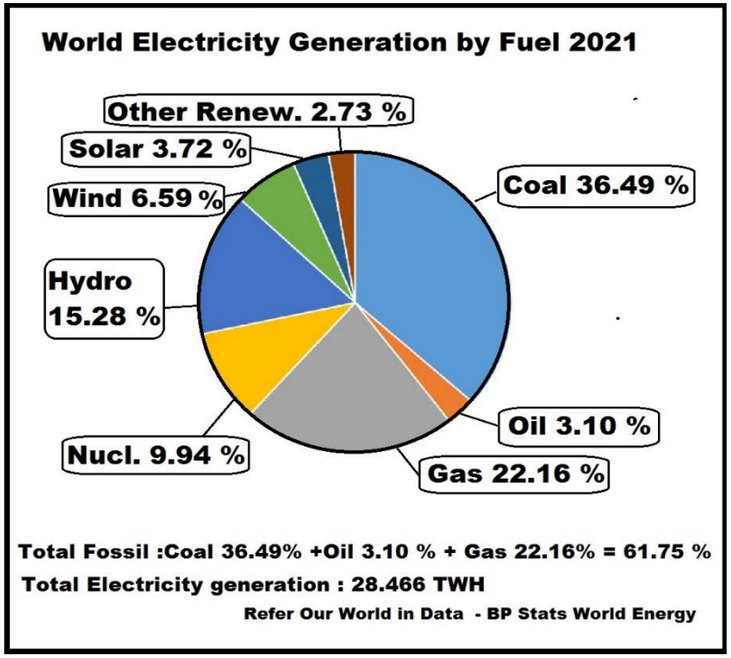
And suppose now all these sectors switch to Oil made from algae, CO_2-neutral – are these homes, industries, cars then CO_2-neutral- the transition to this biocrude oil is in many cases totally free of charge and effortless.

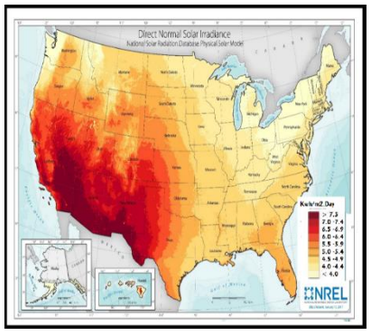
It is therefore no exaggeration to say that this biocrude oil, made from algae,could make up 1/2 of all fossil-free energy around 2050- for aircraft, ships, petrochemicals .. perhaps the only solution.

And what to do with all these directives in the Western countries that impose enormous investments for CO_2 neutrality, which are in fact totally useless – which is why the oil companies should be obliged to develop a pre-industrial installation with reactors and ship-gathering tanks for algae collection.

This should be operational around 2030 - after which the real large-scale production starts and at the same time makes an end to mineral oil after some 15 years.

Why should there be a CO_2 tax on consumers? Oil companies have sufficient resources to finance the conversion to biocrude – a government that collects CO_2 taxes from consumers to give it as a gift to the oil companies: this has no logic.





CLIMAT-5	Demand	Sun - Concentration			Wave	
USA	3700 Twh	South-West	40.000 km2	3300 Twh	330 km2	370 Twh
Europe	1800 Twh	South-Europe	6.000 km2	550 Twh	1.200 km2	1300 Twh
China	4800 Twh	Tibet	12.000 km2	1100 Twh	3.300 km2	3700 Twh
Rest World	7000 Twh		14.000 km2	1300 Twh	5.200 km2	5700 Twh
Total	17300 Twh		72.000 km2	6250 Twh	10.000 km2	11070 Twh

Replacing mineral oil by Biocrude from algae is not enough:

On a world-scale 62% of electricity is now generated by fossil fuels- coal for 36.50%, gas for 22.2%, oil 3.1% (China generates 62% - India 72% of electricity from coal).

It is not the intention that oil from algae takes over this whole fossil part - it can take over peak and dead moments in the electrical generation, which hydrogen gas can hardly do because the storage is virtually impossible.

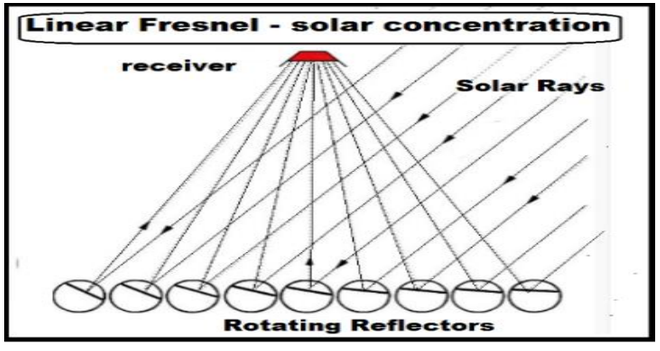
Other sources of electricity are necessary -Put a small country.. full of wind turbines and solar panels on all roofs, then one still comes up short - where does the missing renewable energy should come from to have electricity 100% fossil-free around 2050 ?

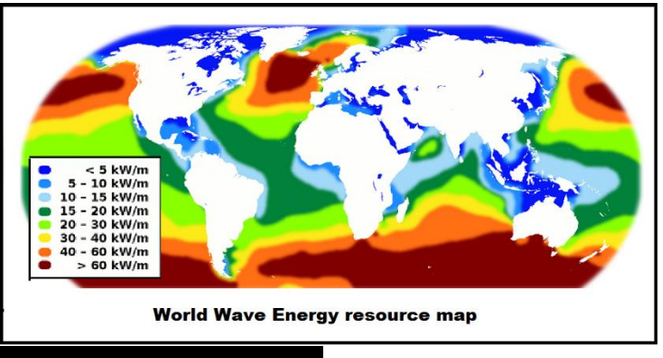
In 2021, the world generated 28,500 Twh electricity (Terawatt-hour 1 Tera=1000 Giga) of which 61% (or 17,300 Twh) fossil – these 17,300 Twh should be replaced but a strong growth until 2050 is expected :2 underestimated renewable energy sources : solar concentration and wave energy can make a big difference:

1/ SOLAR CONCENTRATION IN HOTTER REGIONS:

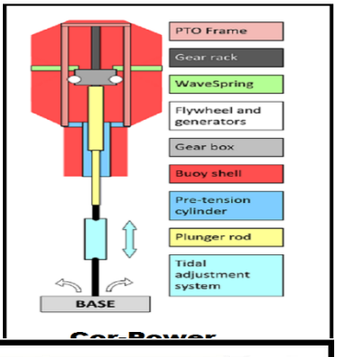
cost price is comparable to PV solar panels, but sun concentration also gives energy at night and sunless days by storing hot liquid.

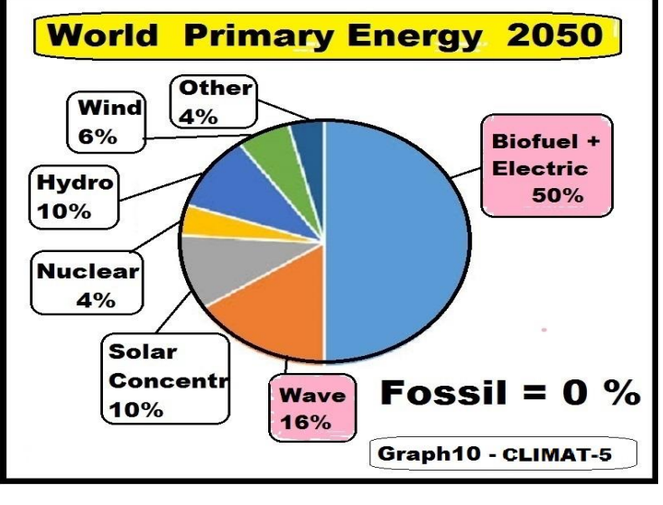
The USA could quite easily get their electricity 100% fossil-free on 10% of deserts Nevada. Solar concentration systems to install : 40,000 km2 give 3300 Twh – the most economical is Linear Fresnel (12 km2 delivers 1 Twh/year). Other regions in the world: Europe, China, India.. do not have enough with the solar concentration.





World Wave Energy resource map





2/WAVE ENERGY

(dark red places on world map). What deserts mean for the USA, the high waves south of Greenland and west of Ireland mean for Europe –Yellow sea for China – Indian Ocean for India… electricity tens of times more than needed. Waves are an inexhaustible source of renewable energy .

The vertical as well as the horizontal movements of the water give 3 times more energy than windturbines on the same surface - relatively unknown to the general public: the 4° branch of renewable energy: in addition to sun, wind, hydropower:

SCOTLAND IS WORLD PIONEER- all beginnings are difficult: most prototypes were massive, costly or not resistant to storms (Pelamis, Aquamarine..) and failed.

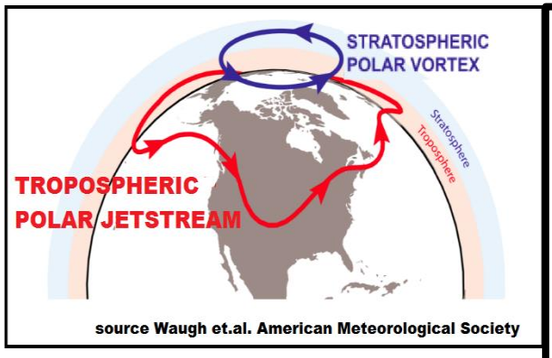
But the Swedish **COR-POWER** has a very solid project: an independent observer from GB “Corpower can become a real winner-their technology means a breakthrough“ :practical design, light, intended for 30m waves. Concretely: Buoy of 8 m diameter- 18 m long, weight 60 tons- moves several times per minute both horizontally and vertically in a sea that is almost constantly stormy with waves of 10-20 m–has an average power of 250 KW, electricity for 200 households - in clusters of 10-20 MW 1 km2 = > 0.3 GW (1.1 Twh)- available from 2025 on.

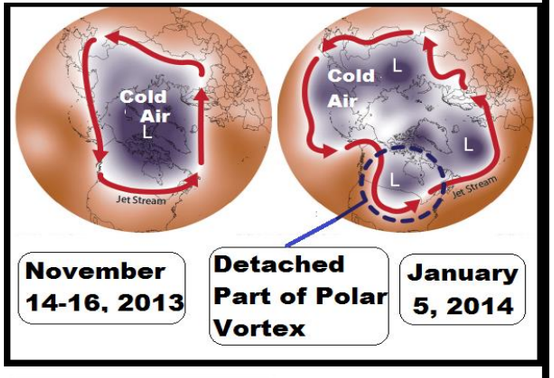
These buoys are NOT intended for calm seas- have 3 basic components:

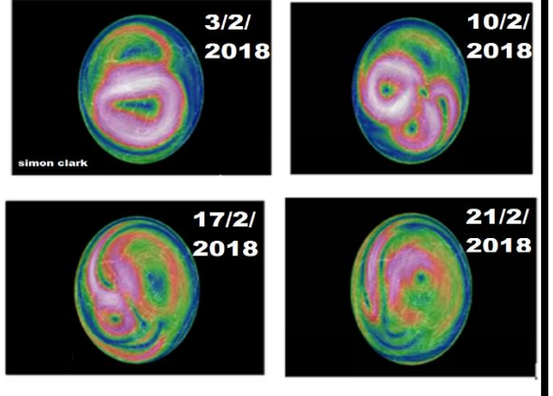
1.mooring line keeps the buoy in place-contains electric line.
2.Spring system moves the buoy synchronously with incoming wave
3.a control cabinet converts the linear movement into rotation.

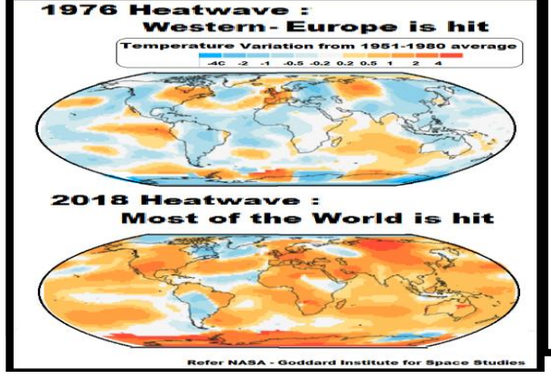
The full-scale tests at the Orkney Islands in northern Scotland are ongoing – the group-tests will follow.

THIS TYPE OF BUOY HAS THE POTENTIAL TO SUPPLY THE ENTIRE WORLD WITH ELECTRICITY.









-UN report: "2020 and beyond":90% of disasters are caused by the climate – damage : 520 billion $ per year- 26 million people driven into poverty- droughts in Latin America, Sub-Saharan Africa drive 140 million people to flee from now until 2050.

– Glaciologists explain: climate in northern hemisphere is formed above the North Pole - during the polar winter normally circulate at about 50 km altitude masses of cold winds (Polar vortex) at 250 km / h.

- In recent years, however, this zone has become very unstable because the North Pole is warming twice as fast as the rest of the world (1.7°C compared to 1°C)-'Arctic amplification' : less snow and ice brings in more sunlight, warmer oceans give off more heat - more clouds in winter temper the cold.

- At lower altitude and around 60° latitude, the 'Polar Jet Stream' circulates: jet stream, created by rising warm air and earth rotation -this determines the weather in Northern Hemisphere, heavily disturbed -disastrous

- On the brownish photos with red arrows: Nov.2013 the stable vortex + jet stream- Jan.2014 unstable Polar vortex pushes jet stream away. - March 2012 USA extremely cold air in Western-North-USA and S-E Canada: 30 °C on 22 March normal 0 °C)- all summer: very hot.

-2018 : Febr.4 photos unstable stratospheric Polar Vortex: changes direction, splits into 2 separate cycles: this mounts air pressure over the North Pole - huge temperature rise despite the dark winter.

- off the coast of North Greenland lies an old piece of sea ice, 4-20 m thick, continue frozen, considered untouchable also in summer - but in Feb. 2018 +6°C, 30°warmer than normal: experts see with consternation mobile thin ice sheets floating towards the sea – the first time ever.

- **Siberia Febr 2018** : 35 °C above normal. -Ellesmere island , Canada: year T°+ 3.6°C

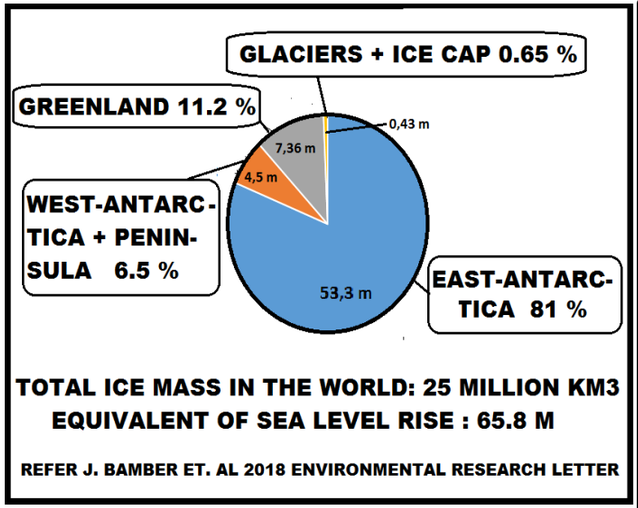
-**Greece**: forest fire destroys town of Attica by 80%: 74 dead

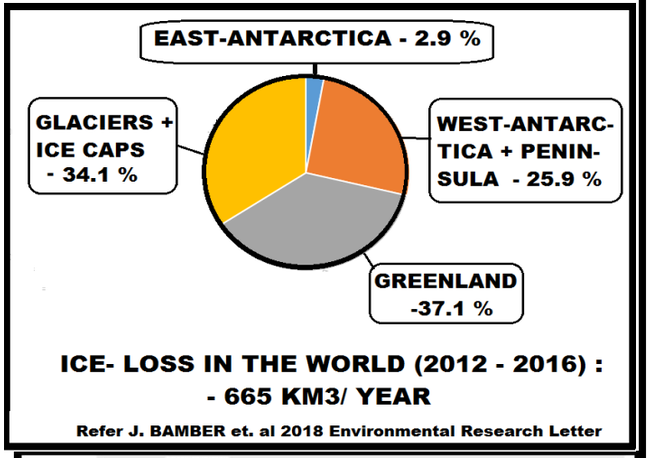
- **Northern Pakistan 50°C** - But at the same time violent cold waves elsewhere:-10°C in Germany

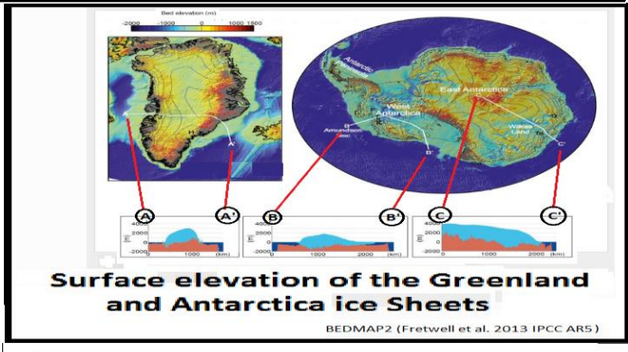
- numerous roofs in Bosnia-Herzegovina, Southern-Europe, collapsed due to heavy snowfall -storms in Romania - snow in Rome and top of Giza pyramid, Cairo.

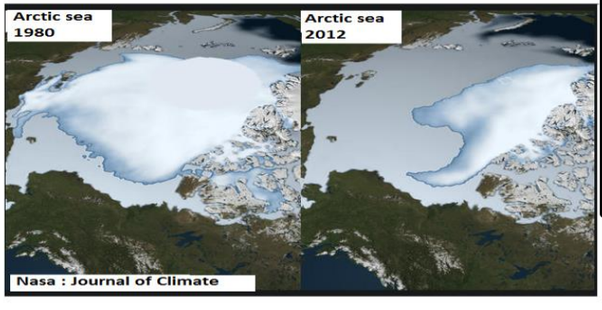
- Heat waves 1976 only in Western Europe –2018: whole world.

-**Hawaï 2023 :town Lahaina**: more than 100 dead in a devastating fire storm









A. ICE AND GLACIERS:

Satellite data (ALI) give a global worldview of the ice mass and annual loss graphs www.Antarcticglaciers.org. – They confirm local findings with 2 peculiarities

1. Glaciers and ice sheets (especially Arctic) are only 0.65% world ice mass but give 34% of the ice-loss

2. East Antarctic ice sheet accounts for 81% of the world's ice mass but represents approximately 3% of ice loss. If this mass were to melt, sea level would rise by 53 m, but it has an enormous 'stability', in each case now.

Switzerland: average T°+ 2°C	Number of glaciers	Volume	Area
in 1850	3000	130 km3	1735 km2
In 2017	1400	54 km3	890 km2

Remaining glaciers lose 1 km3 and 1 m thickness every year Since 2001, ice has disappeared 3 X as fast as last century. 56% electricity comes from glaciers

Ludwig Braun (68) Swiss glaciologist "For centuries, thousands of alpine glaciers have partially converted their layer of winter snow into ice. But since 1980 they lose that protective layer of snow in the summer and so the sun can get to the ice-they lose meters thickness/year from centuries-old ice mass

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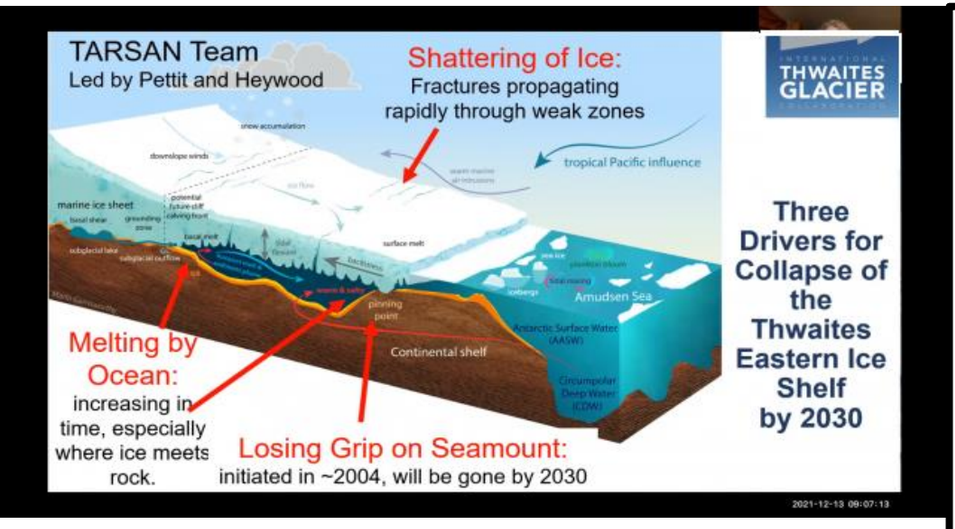
B. SEA LEVEL

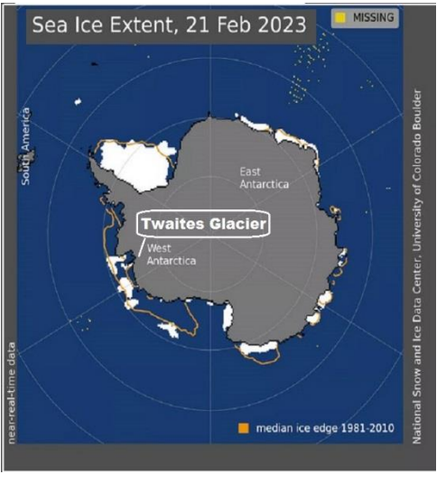
rises today by 3.3 mm/year (or 33 cm/century) -1/2 is due to melting of ice (1.8 mm/year) – rest is due to ocean warming – oceans absorb more than 90% of temperature rise caused by humans. International network of 3900 measuring points, up to 2 km under water, measures this T°: 40% faster warming than calculated.

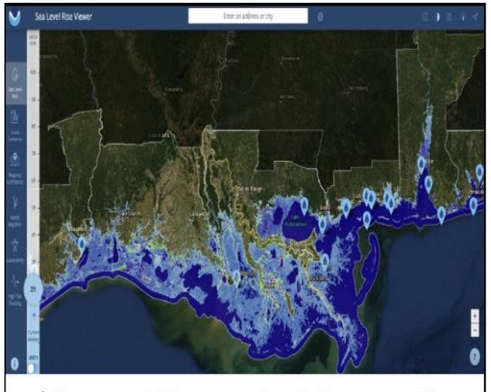
-NOAA: because of that warming, deadly, destructive storms are going further inland than before: 3 to 9 times more frequent than 50 years ago.

Bangladesh: loses 20% of its landmass within 30 years:25–30 M refugees – flooding every 5 years – formerly every 20 years.

In Miami, Florida USA, on some days water just comes out of the sewers and clears low-lying roads has nothing to do with precipitation but with rising sea level - only remedy: raising roads: 400 M$ budget.

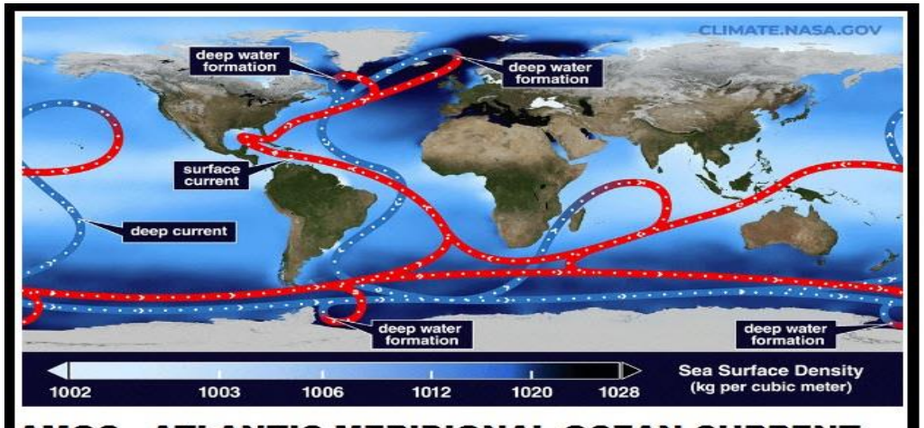






The unsettling new Louisiana costline

credit Screenshot NOAA



AMOC - ATLANTIC MERIDIONAL OCEAN CURRENT

Surface currents in red - deep sea currents in blue

(refer NASA/ GODDARD SPACE FLIGHT CENTER SCIENTIFIC VISUALISATION STUDIO)

C. DOOMSDAY GLACIER RAISES SEA LEVEL BY 50 CM

Thwaites glacier in West Antarctica, the largest glacier in Antarctica, 190,000 km2, the size of Great Britain, and a thickness of 800-1200 m, is very unstable.

The ice at the bottom of the glacier melts fairly quickly due to warming –cracks occur in the upper layer that quickly spread along soft zones – an undersea mountain still prevents the so-created sheet from floating in the sea but around 2030 this stop will collapse and the entire mass will plunge into the sea (the glacier is nicknamed: Doomsday Glacier) –this ice mass then becomes an iceberg in the Amundsen Sea.

SEA LEVEL RISES BY 50 CM IN A FEW MONTHS AROUND 2030

(1 m sea level = mass of 362 M km2 X 0.001 km=362,000 km3 –mass of the glacier 190,000 km2 X 1km = 190,000 km3–190,000 /362,000 ~ 0.5 m) - collapse could also cause a cascade of collapses in West Antarctica.

An intense 5-year study program, by about 100 researchers, mainly from the USA and the UK, with a budget of 50 M$, is the International Thwaites Glacier Collaboration (ITGC).

During each Antarctic summer, data is collected to monitor the disintegration of the ice sheet: hundreds of meters deep boreholes through the ice -a diving robot under the ice-sheet.

The ice in Greenland is also melting faster. But a 50 cm increase in sea level has serious consequences on e.g. coasts in Louisiana, Florida (USA), islands in the Pacific and Indian Ocean, Bangladesh.

D. THE ATLANTIC MERIDIONAL OCEAN CURRENT (AMOC),

of which the GulfStream (in the Atlantic Ocean) is a part, regulates the climate by sending warm tropical water, heavier, with greater salinity, northwards where it sinks –this cold water floats then southwards – but more ice injection in the North due to global warming slows down this cycle-

E. CORALS

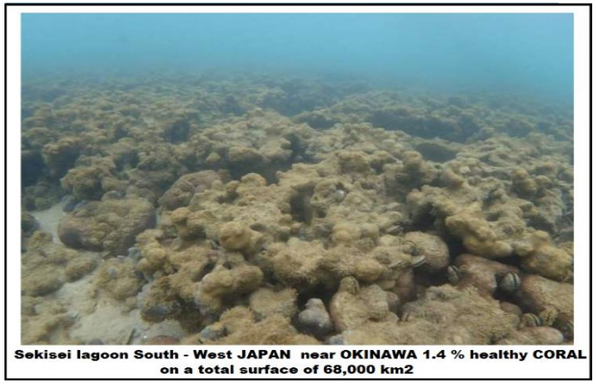
The current rhythm of ocean acidification by CO_2 is difficult to understand (report WMO World Meteorological Organization)- pH acidity has decreased since 1750 from 8.18 to 8.07 (-30 %).
Now the oceans absorb 1 /3 of the CO_2 emissions - but this is only 70 % of the volume of year 1750 – the more acidic the ocean the less absorption – in 2100 that would only be 20% according to WMO.

- Corals are found in only 0.7% of the sea surface, with shallow seabeds - but they are home to 25% of all life, especially fish, income for 500 million people -50 billion $/year. Enormous biodiversity of sponges a.s.o. gives antibiotics, anti-cancer + anti-Alzheimer's drugs (5000 $/ha).

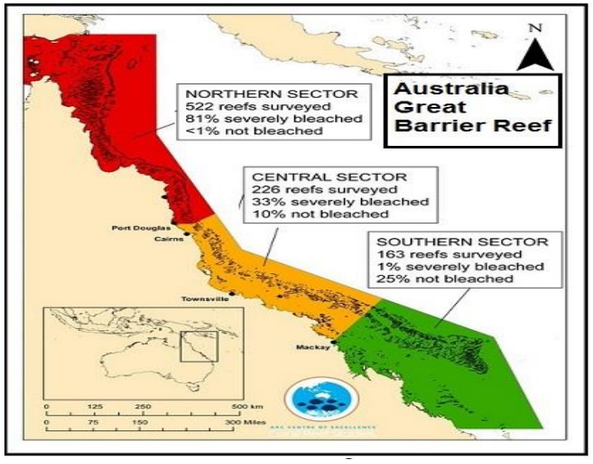
-Coral reefs are very fragile for temperature fluctuations - they live on single-cell algae –the temperature rises, then these algae become 'enemies' and are expelled - corals then lose color, nutrition -they fade and so the fish also lose their shelter and nutrition and disappear - If bleached corals cannot 'heal' within the following years, they die off-dead coral is then covered with algae turf.

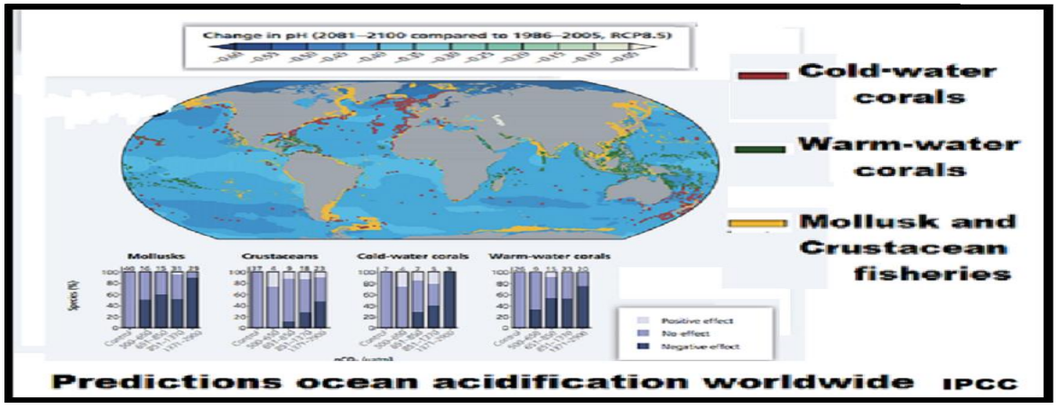
- The world has so far experienced 3 global coral bleaching periods: 1/El Niño 1998- 16 % affected
2/El Niño 2010 3/Global warming Oct 2015- some reefs hit for years in a row.

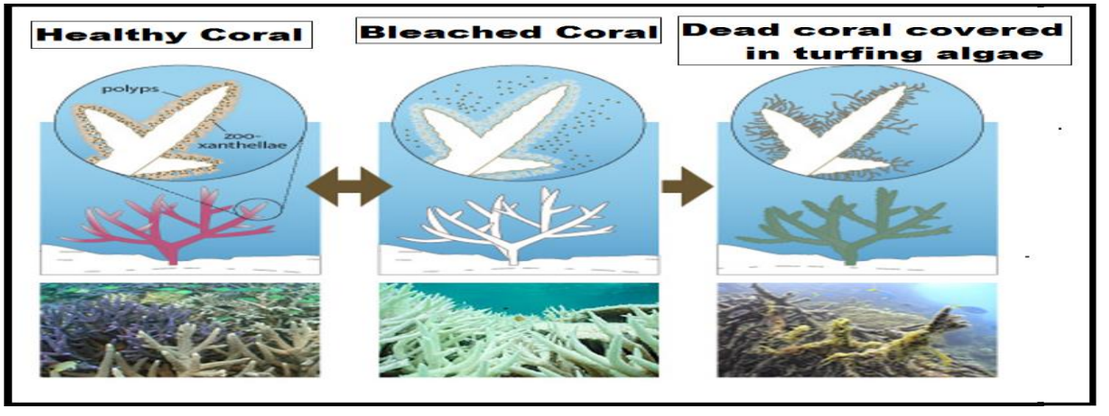
- End of 2015-beginning of 2016, 90% of all warm water corals were bleached – only cold-water corals have held up relatively well –on the IPCC world map cold-water corals are in red, the hot water corals in green.

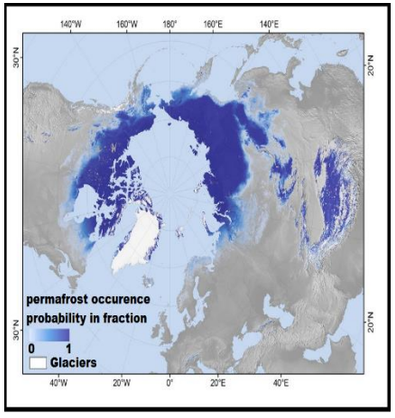


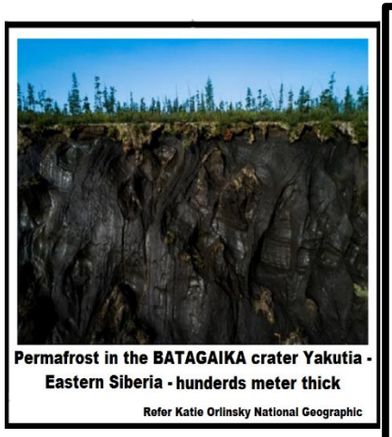
Sekisei lagoon South - West JAPAN near OKINAWA 1.4 % healthy CORAL on a total surface of 68,000 km2










Permafrost in the BATAGAIKA crater Yakutia - Eastern Siberia - hunderds meter thick

Refer Katie Orlinsky National Geographic

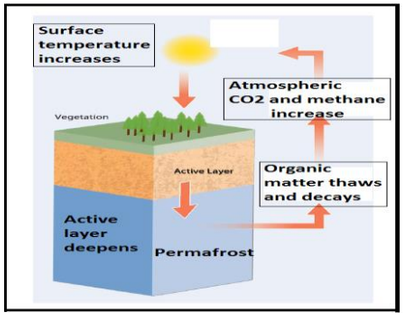
F.PERMAFROST

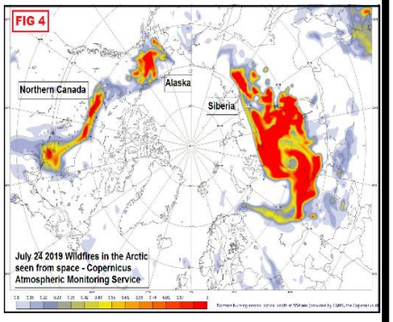
Soil, rock, organic matter below 0°C or to 0°C for at least 2 consecutive years. Under the active layer that is only frozen in cold season, lies the permanently frozen layer, hundreds of thousands of years old with plant remains and animal bones that have not completely decayed.

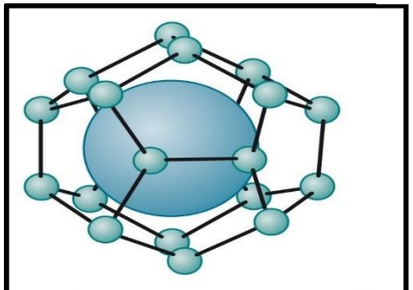
The continuous layer 350-650 m thick –discontinuous layer 1-1500 m in Siberia. There is 18.7 million km2 of permafrost: 65% in Eurasia and 35% in North America and Greenland, the South Pole and Tibet in China. July 2019 peat fires Siberia:2.5 Million km2.

Graph Carbon pools p17: amount of carbon bound in permafrost is 2 times greater (1700 Gt) than the current total mass of carbon in the atmosphere (880 Gt) -880 Gton C corresponds to 3.67X 880 Gton=3230 Gt CO2- (3230Gt/7.80Gt = 414 ppmCO2).

Center for Permafrost (Cenperm)- Univ. Copenhagen–Danmark :methane is a 25 times more potent greenhouse gas than CO2. Thawing permafrost is estimated to convert:
110-230 Gt CO2 eq.before 2040 (other sources mention 8 Gt CO2eq/yr).
Before 2040 : **4-8 Gt CO2 equiv/yr 1/2 CO2, 1/2 methane**
2040-2100 : **12-19 Gt CO2 equiv./yr**






CLATHRATE: the gas methane (large ball) enclosed in a cage of water molecules

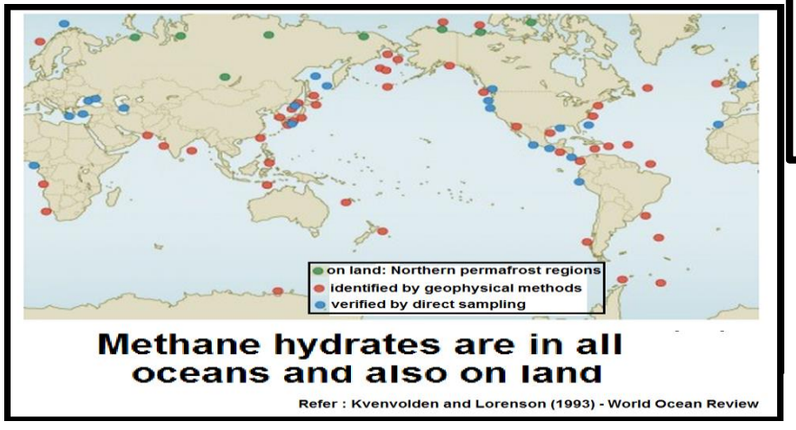

Near the coast of Oregon-North-West USA - a lump of Methane Hydrate looks like a piece of Ice

G. METHANE-HYDRATES:

water-cage around methane CH6O- How do they form ? Microbes decompose dead algae, marine animals and their droppings- this sinks down- only a tiny part of this material reaches the deep waters- so methane hydrates can only be found on bottom slopes, never deeper than 5000 m.

-To be stable they need cold and high pressure- methane hydrates are also found in shallow watering and over land in very cold regions with permafrost,

-These are still growing every day and finally form a huge 'carbon bomb' that can erupt in case of strong warming: they can mainly decompose in shallow waters and ocean zones up to 500 m deep, which warm up – Temperature rise of 1°C already releases masses of methane.



Methane hydrates are in all oceans and also on land

Refer : Kvenvolden and Lorenson (1993) - World Ocean Review

Mass carbon C+CO2 in the atmosphere 1 Gton C = 3,67 Gton CO2

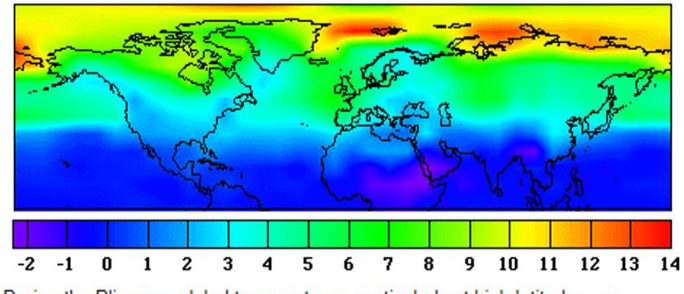
Gton	Actual	Melting Permafrost 2 X Actual Mass	Melting Methane Hydrates 4 - 8 X Actual Mass
C	880	+1700	+ 3000 – 7000
CO2	3230	+6400	+ 11000 - 25000

Could Subsea Methane Hydrates Be a Warming "Tipping Point"?

The authors of a recent paper in *Reviews of Geophysics* answer questions about the potential for subsea methane hydrates to contribute to global warming. (2017)

We estimate that seafloor emissions of hydrate-derived methane (most of which never reaches the atmosphere) is dwarfed by annual carbon dioxide emissions to the atmosphere from anthropogenic sources.

Ellesmere island - Northern Canada - 3 Million years ago



During the Pliocene, global temperatures, particularly at high latitudes, are believed to have been significantly warmer than today.

H. PALEONTOLOGISTS EXAMINED 3 HEAT PERIODS

If the current CO2 mass in the air is X (or 3230 Gton) then thawing of ice and permafrost will give 3 X give and melt methane hydrates-> 7-11 X

The reassuring articles of well-known institutions about the methane hydrates in deep waters: "in the short term no danger of massive release of methane hydrates" **ARE ONLY HALF TRUTH**.

At 2 heat periods, 3 million years and 16.9 million years ago, methane hydrates were indeed NOT released: sea level rose by as much as 20-40 m. If people had lived close to the coasts, they would have had to move – but everything was quite slow – people would have survived –with a repetition of these heat periods, 1-2 billion people would now have to move.

Heat period No.1: 3 Million years ago: Middle Pliocene -

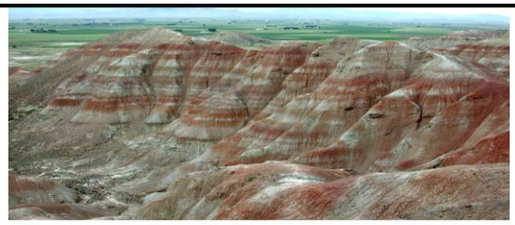
Heat period lasted 200,000 years: a volcano emitted large amounts of CO2: **CO2ppm to 350 – 450 ppm**. The temperature in high latitudes 8 to 10 °C higher, remained unchanged on the Equator (map)

Sea level +22 m (only ice left in East Antarctica) - In the far north of Canada, Ellesmere island, remains of tropical animals, tropical crops, forest fires were found. It took 300,000 years for the excess CO2 to be absorbed (by oceans).

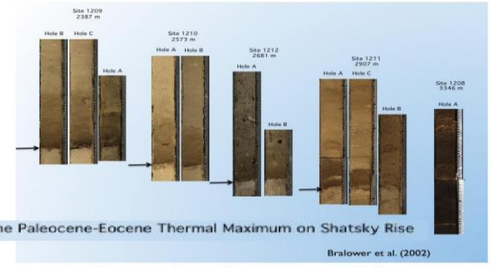
Heat period No.2: 16.9 Million years ago: the Miocene

In the West of the USA, hundreds of individual lava eruptions took place over a period of 300,000 years (the current CO2 emissions since 1750 are still 1000 times faster than this example).

CO2ppm abruptly went to 400 –500 ppm – global temperature+ 4°C-at the poles:+7-8°C **– SEA LEVEL + 40 m** –ice level at a minimum at higher latitudes- East Antarctic ice sheet shrank sharply. Reforestation then took place.

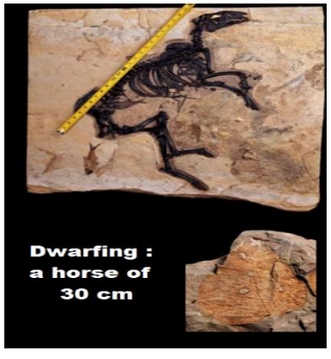


Big Horn Basin,Wyoming USA deposits of 56 Million Years ago by rivers and on floodplains - contain fossil record of early primates and leaves (Peter Wilf)



Cores taken in the Pacific Ocean - the arrow indicates the change of the color of the sediment due to acidification

A Paleoceanographer holds a replica of a sediment core : white plankton shells vanished from the seafloor shifting from white to red.



But paleontologists have detected **MELTING METHANE HYDRATES** after massive release of **53** CO_2 by ice+ permafrost thaw:

Heat period No.3 : 56 Million years ago: Paleocene Eocene Thermal Maximum PETM

Not to be confused with asteroid impact 65 M years ago, dinosaur-killer. Before this heat eruption started, the earth was already quite warm- no ice sheets and sea level was much higher than now -then came 2 pulses.

- First short pulse about 1000 years by CO_2 injection perhaps by comet impact –oceans stored heat - situation 'normalized' seemingly several thousand years – in fact there was a chain reaction: permafrost, peat soil, methane hydrates from the deep sea caused methane and CO_2 to rise.

- **A 2.unusually powerful pulse**, the real PETM, started- 3000-7000 Gton of carbon in the atmosphere for 3,000 to 20,000 years by **DISSOLVING METHANE HYDRATES AND CARBONATES**. Average 1 Gton carbon (3.6 Gton CO_2/year-sediments of white -> brown-red.

CO_2ppm rose to 1000- 3300.

- Global temperature: 23 °C (now 16°C)- 1/3 of land animal species died out- dwarf- growth: a horse of 30 cm- Water temperature around Tanzania: 34-36°C (now 28°C)- around West-Africa: 37-38°C- South Pole: 20°C - deep sea: 10 – 15°C (normally 0°C).

Strong acidification 0.3pH : shellfish, corals disappeared - no plankton due to higher temperature and therefore no more fish, only bacteria and archea (micro-organismes bacteria like). Heat period lasted 200,000 years-

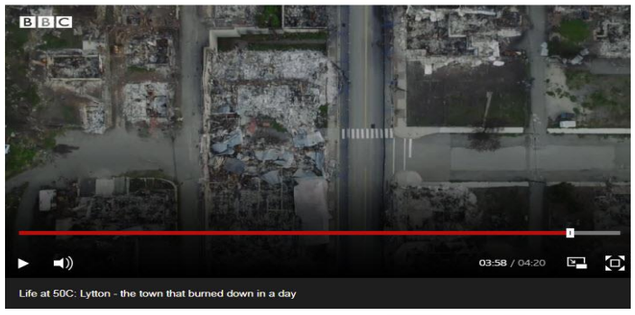
American scientists called it the "carbon bomb" being triggered by today's climate change through the irreversible destabilization of marine clathrates and/or permafrost thawing.' - download document:'56 million years ago a mysterious surge of carbon into the atmosphere'.

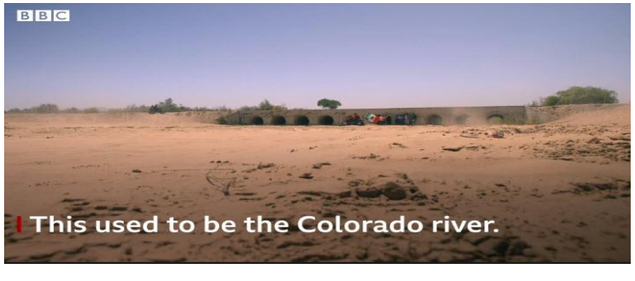
– There are great similarities between the current situation and 56 million years ago : huge mass of CO_2 released –big difference is the INCREDIBLE SPEED NOW: thousands of years then- now 600 Gt in 40 years and 400 Gt (2023-2030) in 17 years-of course oceans will first have to warm up, East Antarctic ice mass will have to thaw.

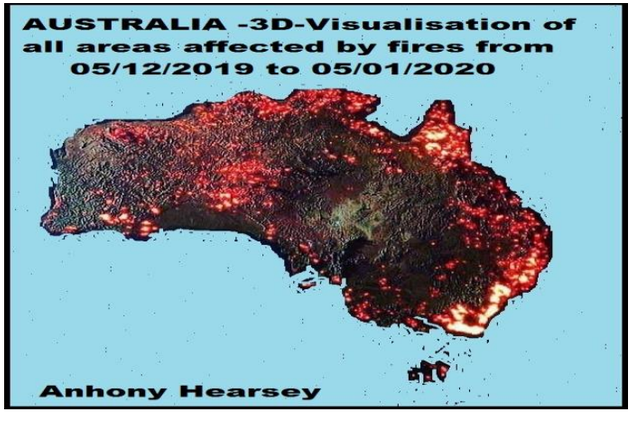
AMERICAN EXPERT PHILIP GINGERICH'S FINDINGS: AT THE CURRENT RATE OF EMISSIONS, WITHIN 200 YEARS CO_2 LEVELS WILL BE AT THE SAME LEVEL AS IN THE PETM.

I. To the attention of Climate Deniers: the BBC documentary : 'life at 50°C' - living with 50°C

The Canadian town that burned down in a day







1.Lytton, the town in South-West Canada, North East Vancouver that burned down in 15 minutes – a resident: 'we have been living here for a long time – I have seen a change in the ecosystem – less water –trees struggling against drought and heat stress – a by-product of climate change: heat, drought, wind..... one thing was missing: a spark". 3 days of record heat 49°C and on 30 June 2021 the spark was there: the mayor :' I noticed white smoke and within 15-20 minutes the whole city was engulfed in flames - 1000 people fled.- of course: we just keep building houses in straw, pile houses'.

2. Iraq, Diwamya province- there used to be water- we planted everything – this year was a very bad year – that's why people are leaving this region'

3.Kuwait: "temperature regularly goes to 50°C and more-from 2016 on we regularly recorded 50°C which we never experienced before –more and more parts of Kuwait are becoming desert"– the Middle East is warming 2 X as fast as the global average.

4. Mauritania: fleeing the wandering Sahara sand- in search of a better life- the town of Chinguetti was a thriving oasis with 20,000 inhabitants for generations- is now engulfed in sand – few remain – climate scientists say the Sahara is expanding, which makes life hard for local communities.

5. Mexico's fight for water : The Colorado stream (North-West Mexico) hasn't seen water for decades- dries out long before it reaches the sea – water now flows again after an agreement with the USA- the whole region is drier and hotter.

6. Australia: a suburb of Sydney became the hottest place on earth: 49°C– 3000 homes perished in a conflagration out of control– scientists say the risk of fires due to the weather is 30% higher than 100 years ago– residents move to the cooler Canberra.

UN Secretary-General COP27 Nov.2022: “The fight for a livable planet will be won or lost in this crucial 10 years - from now on - one thing is certain: giving up equals losing.

The world had the tools it needed to reduce greenhouse gas emissions, in clean energy and low-carbon technology, but they should be deployed quickly -time is running out."

J. OPEN LETTER TO THE SECRETARY-GENERAL OF UNITED NATIONS, MR ANTONIO GUTTERES,

Your appeal shows a genuine concern, but in documents of the IPCC Working Group 3 there are unforgivable mistakes –a decisive intervention is needed, especially when a new IPCC chairman has been elected in mid-July 2023.

1/ Anyone who thinks rationally. In climate matters, realizes a substantial reduction in annual CO2 emissions can only be achieved in 1/4 of the total : the Western countries .The rest of the world reduces little or nothing - the methane and CO2 emissions from melting permafrost are also rising sharply -**IT IS AN ILLUSION TO THINK TOTAL ANNUAL CO2 EMISSIONS CAN EVER BE SIGNIFICANTLY REDUCED AROUND THE YEAR 2030**–what IPCC, Green Deal.. suppose.

2/ Particularly bad is the denial of the **REALLY BIG PROBLEM: ENORMOUS CO2-CUMUL** –until 1985 the CO2 content in the air and climate could still be called normal –in 2023 we experience climate misery that has only one cause: a CO2-cumul in the air 30 times bigger than the annual growth, added since 1985. Similar CO2 emissions caused permafrost thaw 3-17-56 million years ago and heat periods – they are happening now- this should to be phased out urgently - but the climate sector presents this as A DETAIL, TO SOLVE AFTER 2050.

3/ The CO2 content in the air will reach catastrophic values with such wrong politics within 10-15 years- your current call is totally misplaced –it shouldn’t be: we are doing well- just step up a bit – it should be :

STOP- RETURN- A THOROUGHLY DIFFERENT POLICY , MUCH MORE EFFICIENT AND 10-20 TIMES CHEAPER.

4/ Critics within the IPCC denounced current politics- were silenced -in Dec 2019 COP25 in Madrid, they therefore put a note in the hands of Greta Thunberg to make their voices heard: ‘**RAPID MASS CO2 EXTRACTION FROM THE AIR AND DECREASE CO2 EMISSIONS AT SOURCE**'. This is exactly the message stated here – these vague guidelines are made very concrete here –transformation of millions of km2 of desert into tropical rainforest – replacement of mineral oil with biocrude from algae, wave energy and solar concentration to replace all coal-fired power stations..

IN 10 YEARS TIME ,THE CLIMATE PROBLEM IS SOLVED VIRTUALLY - **WE ARE THE LAST GENERATION THAT CAN STOP THE CLIMATE CATASTROPHE, BUT THAT WILL NOT HAPPEN WITH THE CURRENT WRONG POLITICS.**

5/ **CONCLUSION**: a new summit of the IPCC working group 3 introduces a correct policy as proposed by critics – so around the year 2030 CO2 levels in the air will start to decrease – around the year 2050 almost all energy will be fossil-free – absolutely no CO2 tax is needed for this. This is a global call for swift and powerful action.

DOGMATIC THINKING:

A good example: project ('X') submitted by a dozen REPUTABLE PRIVATE AND GOVERNMENT INSTITUTIONS, UNIVERSITIES- with a 'wrong' graph GRAPH0 as a guideline. This graph is nothing but the biggest science fraud of the century – which of course leads to the well-known wrong conclusions.

1.A sharp decrease in annual CO2 emissions is assumed (30-50% by 2030)

2. According to various scenarios, CO2 extraction of 2-10 Gt/year will occur at almost 100 $/ton – costing 200- 1000 billion $/year – ASSUMING THAT WESTERN COUNTRIES WILL PAY THIS– the rest of the world will find excuses to avoid these impossible costs.

3. WHAT IF SUBSTANTIAL REDUCTION IN ANNUAL CO2 EMISSIONS DOES NOT HAPPEN? –if the permafrost thaw... explodes due to ever-rising temperature ? **THE WHOLE CONCEPT IS BASED ON FALSE ASSUMPTIONS.**

RATIONAL THINKING

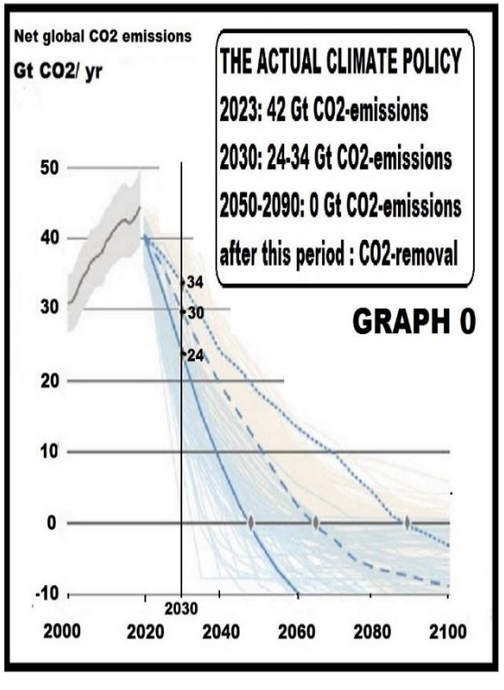
with a correct graph as a guide (Graph1)

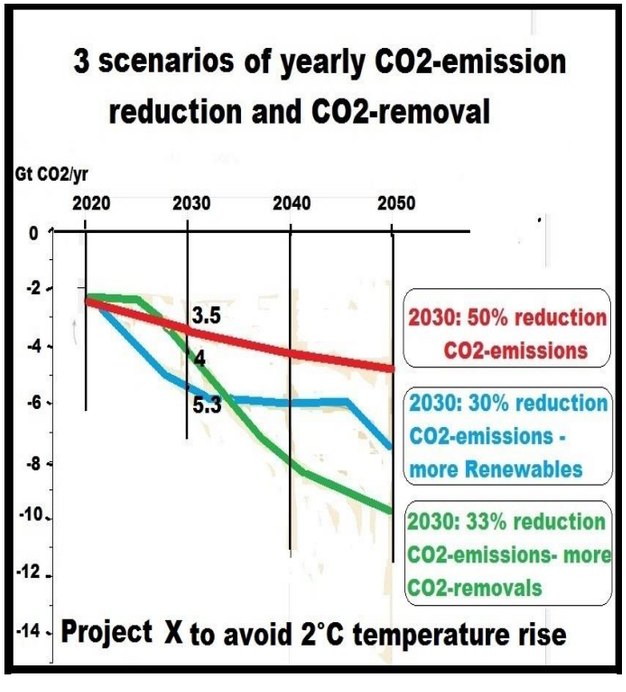
1, Every year 21 Gt of CO2 is added to the air – the chance that this amount will decrease significantly before 2030 is completely non- existent.

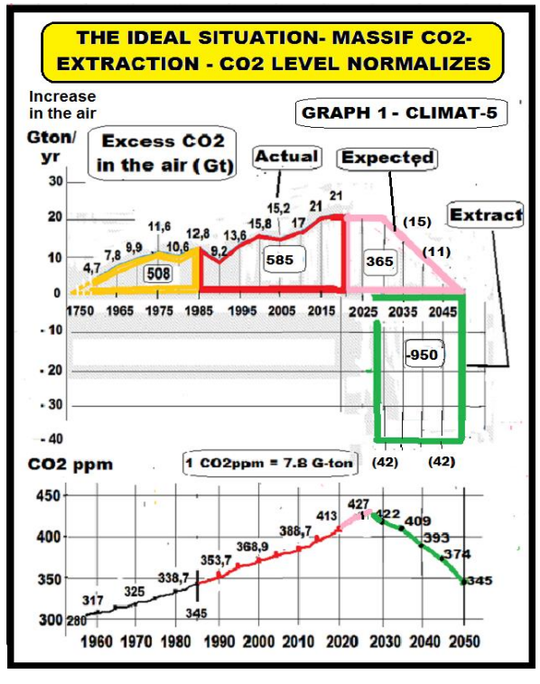
2.Before 1985, the climate was acceptable with CO2-ppm content of 345- since then about 600 Gt CO2 has been added to the air- the CO2 content in the air is therefore at alarm level 420 ppm and must therefore urgently decrease to avoid a repeat of 3-17-56 million years ago: a huge permafrost thaw that is in fact a chain reaction.

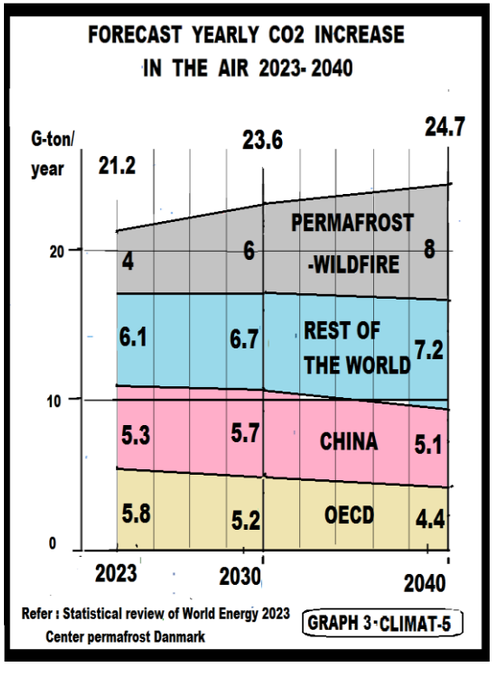
3. The only way to reduce this CO2 excess in the air is massive, fast, affordable CO2 extraction from the air –would be mandatory min. 30 Gt/year and should start to lower the CO2 content in the air around 2030 –10 Gt/year e.g. doesn't make any sense.

4. Planting tropical trees on harsh soil (deserts): 300,000 km2/year for about 20 years is the most efficient way – the project proposed here is affordable and realistic.









(POLITICAL) ACTION POINT 5 : A POWERFULL WORLD GOVERNMENT

1. In Ukraine, Lebanon, Somalia, Syria.. the population should not be told the climate is a priority - the climate is only one of the worst world problems - and other world problems can have a negative impact on the solution to the climate problem - Putin's invasion of Ukraine has affected the energy market in Europe, grain exports to Africa... thoroughly disrupted –psychopaths + climate deniers could take power- the tension around China-Taiwan also demands a lot of attention - military spending is on the rise - with a fascist president in the USA a real war is close - in large parts of the third world there is not the slightest livelihood among the population and this is their priority.

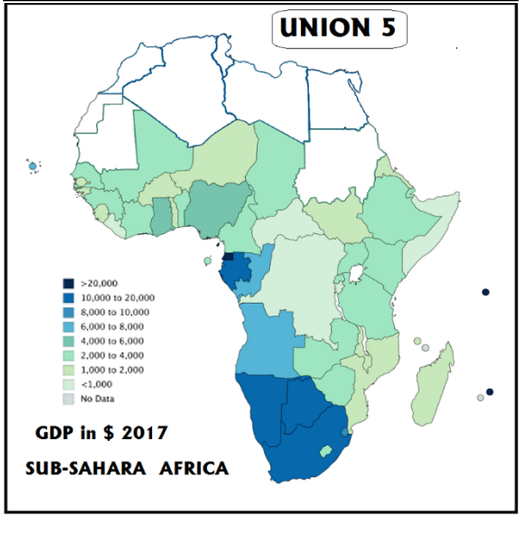
IT IS DANGEROUS TO ASSUME THE CLIMATE PROBLEM COULD BE SOLVED WITHOUT TAKING ANY NOTICE OF THE NUMEROUS OTHER WORLD PROBLEMS – therefore: an efficient world authority **THAT TACKLES ALL THE WORLD'S PROBLEMS** – including the climate problem – would have much greater resonance and support throughout the world – do something for all the people who are suffering and in return they will also support the climate cause.

2. In theory, the **UNITED NATIONS** are the body that tackles all the world's problems, but they have a serious flaw- everyone agrees on: AN URGENT REFORM OF THE UN IS NEEDED - the current UN with 195 countries and the Security Council as an intermediate level have proved totally powerless in Syria, Iraq, Afghanistan.

Good comment to illustrate this are Indian Prime Minister Modi's words to G20 foreign ministers Feb 2023 New Delhi "we must recognize that MULTILATERALISM is in crisis today". "The experience of recent years - financial crisis, climate change, pandemic, terrorism and war clearly shows the global governance has failed"- called on G20 countries to overcome their differences.

3. **HOW TO BUILD A POWERFUL WORLD AUTHORITY ?** Take the example of G20 (19 most important countries in the world +European Union). The G20 is clearly more decisive than the UN, but the G20 is only 2/3 of the world- **HOW DO THE OTHER 1/3 INTEGRATE?** Changing G20 to G195 makes no sense – best to find an intermediate solution– only logical solution :each of the 195 countries should commit themselves **TO INTEGRATE INTO A UNION SUCH AS THE EUROPEAN UNION**. The world authority is then the umbrella organization of these Unions- number certainly less than 20. Proposal has been made here to integrate the 195 countries according to ethnocultural criteria into 9 UNIONS - existing national borders do not always correspond to these criteria - illustrious example: Kurds

An important step in the right direction has already been taken at the G20 summit in sept 2023 by integrating the African union by unanimity, just as the European union – the other unions would better and logically follow suit – the G20 is intended as an economic consultative body – it would be better if politics and currency were also discussed and thus set in motion an evolution towards a **STRONG WORLD GOVERNMENT.**



4. The extremely important role of the various UNIONS in the WORLD:

quite instructive was the **GLOBALIST POWER TAKE OVER** by R,Reagan, Thatcher..from the 1980s, with the motto: the world is one big market- the cheapest counts even if it has to be supplied from far away- taxes are theft -CHINA industrialized quickly -but 1/2 of the inhabitants in USA, 1/3 in many Western countries were driven into poverty- the strong middle class, the largest population group disappeared- over and out with affordable higher education, affordable health care...such globalization makes a crucial mistake :politics, currency and economy are a 3-unit- only making the economy global without a world government, without a world currency can never work.

5. Globalism in the world is finished –the world one big market has shown its weaknesses with the Covid -crisis – has paralysed entire industries due to a shortage of vital electrical components- **NATIONALISM IS ON THE RISE** – but nationalism on the scale of a small country negates all the advantages of large scale – therefore better NATIONALISM ON A LARGE SCALE, **SCALE OF A UNION**– all vital industries, energy, nutrition.. under the Union's strong political control and not at all in the hands of multinationals behaving like the real powers of the world.

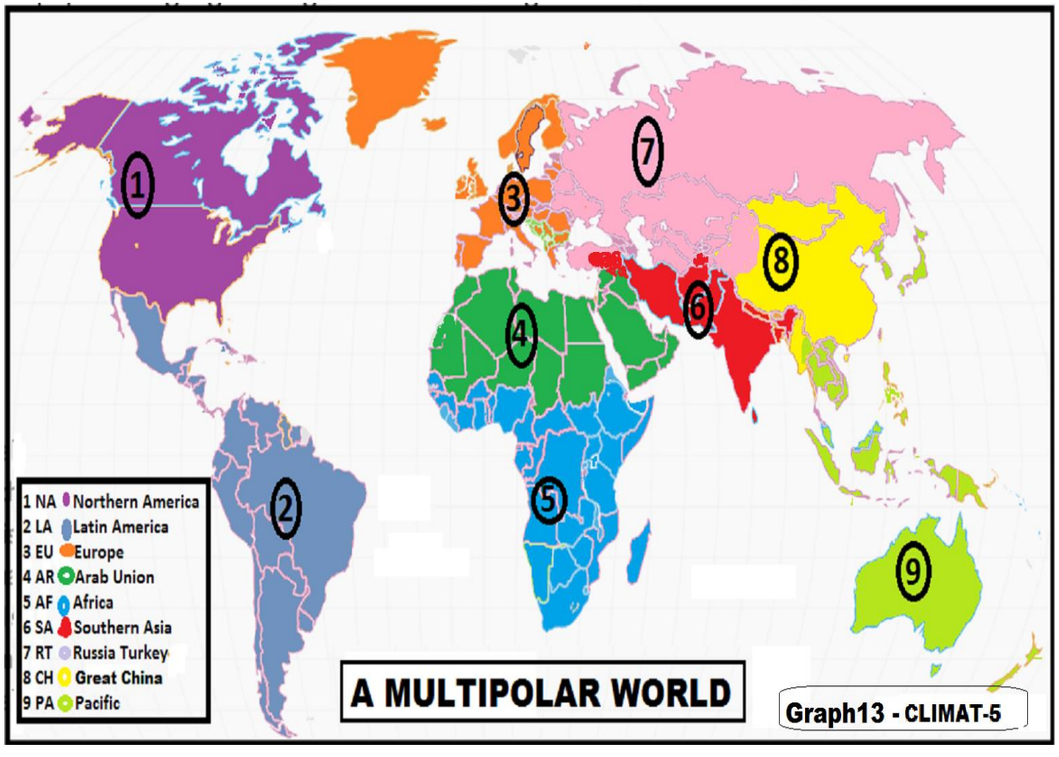
6. Every Union has a single currency, a unified economy, but each state must balance its budget – so better not to repeat countries like Spain, Greece... which, during the conversion to the Euro, had no transitional and protective measures and were at the mercy of the money vulture of powerful Northern European banks.

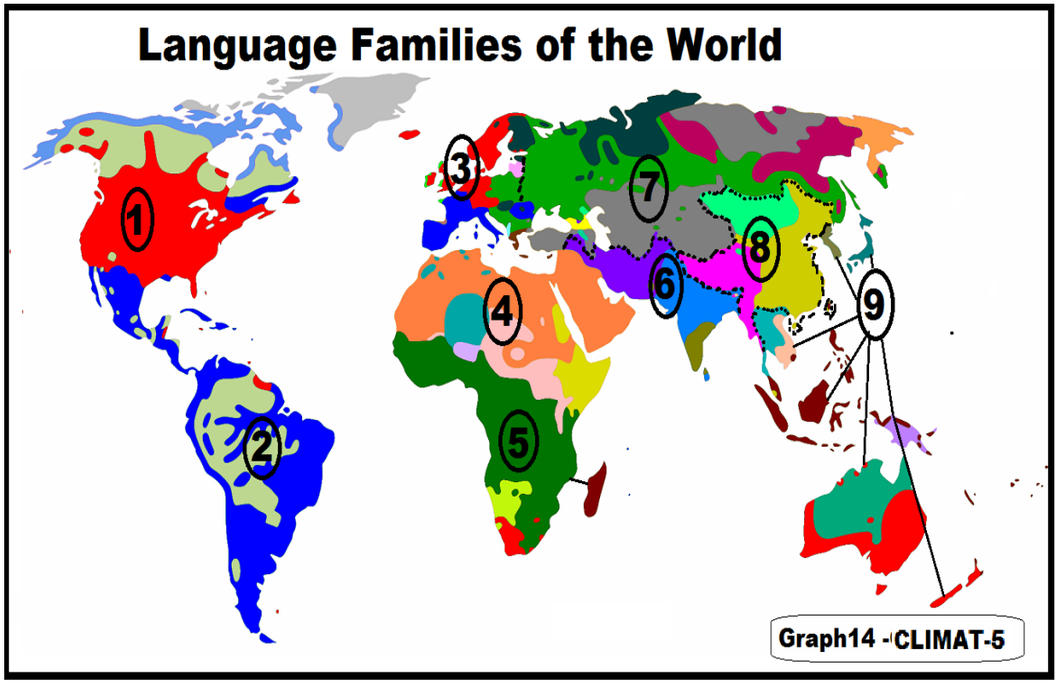
7. The **WORLD GOVERNMENT** is the **UMBRELLA ORGANIZATION OF THE UNIONS**, which deals only with world problems such as a ban on nuclear weapons, commodity prices, world currency, distribution of maritime rights...– the Unions maintain the internal order inside the Union , all on the base of a rule of law- at the top of a Union there will never be a psychopath.

8. At the IMF meeting in Paris in mid-June 2023, the urgent need emerged for a **JUST WORLD FINANCIAL ORDER** and an end of monopoly by the West -The WORLD FINANCIAL CRISIS IN 2008 (the Goldman-Sachs subprimes) was caused by deregulation - the mass of money was no longer in line with the economy - in 1929 the same thing happened - money was taken out of circulation and the economy paralyzed - now money was devalued with the result rising Real estate and rents- lower classes are once again the victim-easy prey of populist politicians.

9. Brics countries (40% of the world) demand a thorough redistribution of world power.

Blueprint of a new world order: integrate . 195 countries into 9 major Unions.





Like a dam against fascism, for a just distribution of power, for greater well-being: powerful great Unions, **ETHNIC-CULTURALLY** quite coherent, self-sufficient in basic nutrition,energy, basic industry, transport, chemistry, basic medicine.

No. 1 :North America: English as binder
No. 2 :Latin America: Spanish+ Portuguese as binder.
No. 3 :Europe: England is not a separate Union.
No. 4 :Arab countries :Israel is also among them- is not a European country as some want.

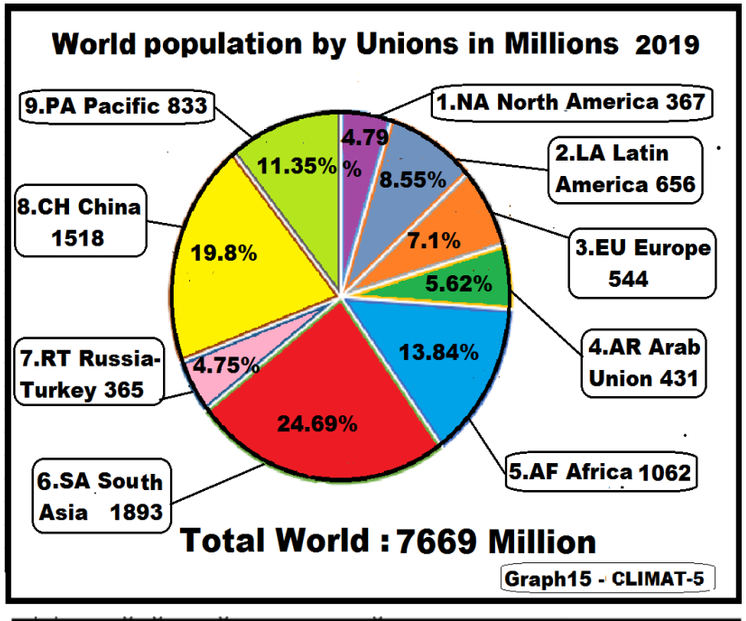
A symbolic file: 40 million Kurds, divided over 4 countries (Turkey, Syria, Iraq, Iran) who can end up in 3 different Unions-Kurds feel like one people –a unified Kurdistan is a part of South Asia as member of the Indo-Germanic language group.

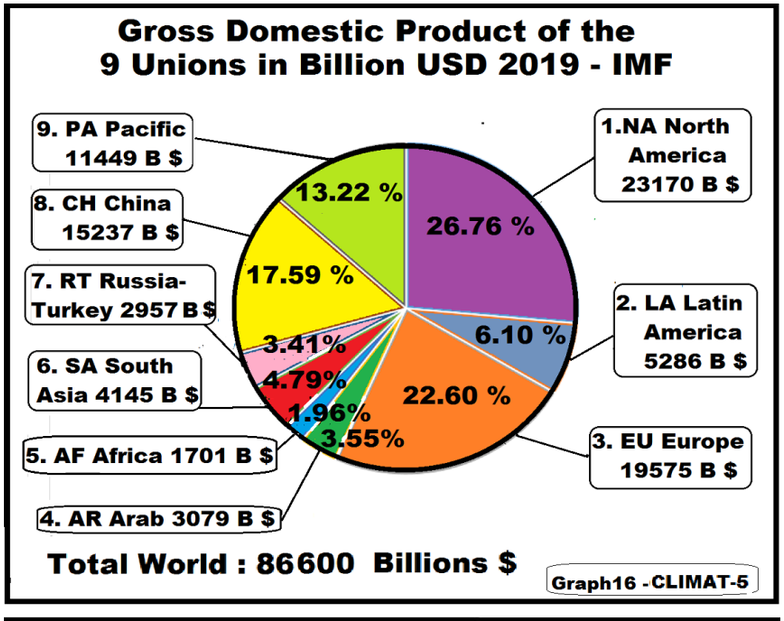
No 5: Africa south of Sahara– a Union stops all the wars that are now raging there –great economic growth ends poverty.
No. 6:South Asia: unified Kurdistan in the West to united Bengal in the East: Indo-Germanic languages except S-E India.
No. 7:Russia, with or without Ukraine, Western Turkey and all Turkish-related peoples.
No. 8: 'Greater China' with Taiwan, N-E India, Western Myanmar, Mongolia, but without Uighurs (East-.Turkestan)
No. 9:Japan, Koreas, Indochina, Thailand, Indonesia, Australia ..are not related people but are certainly not part of a 'Great China'.

A Union is economically, financially. a unity but politically there is more diversity - war Ukraine-Russia can thus be solved perfectly: in Russia a Navalny replaces Putin –Russia becomes a rule of law -in the democratic Russian-Turkish Union nr7 belongs a Ukraine that is **NOT** an EU or NATO member.

China-Taiwan conflict can be resolved according to these principles: Mongolia, most of Myanmar and Taiwan are part of Greater China, Union No 8- this is an economic, and a currency union but politically internally quite independent- in this Great China there are no political prisoners.

If all the Unions establish their authority, then the World Government with its 9 Unions will also take shape–but how many voting rights does each Union have?



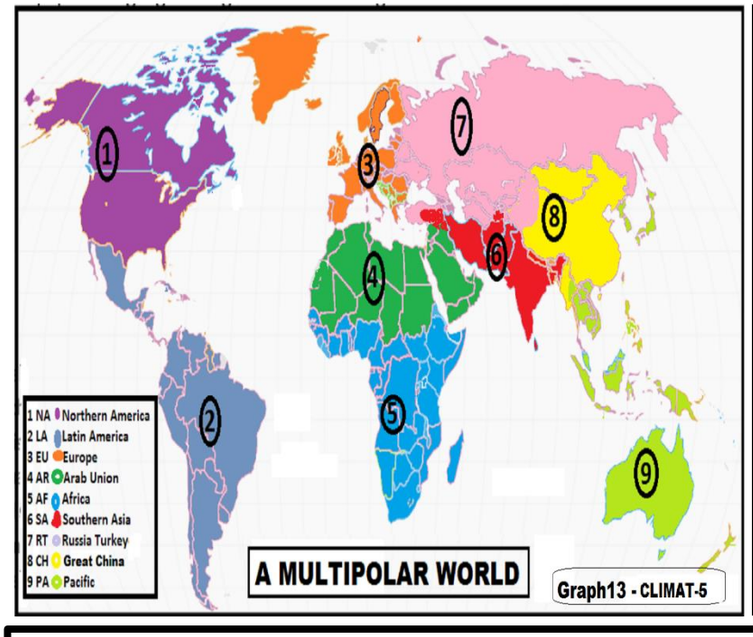


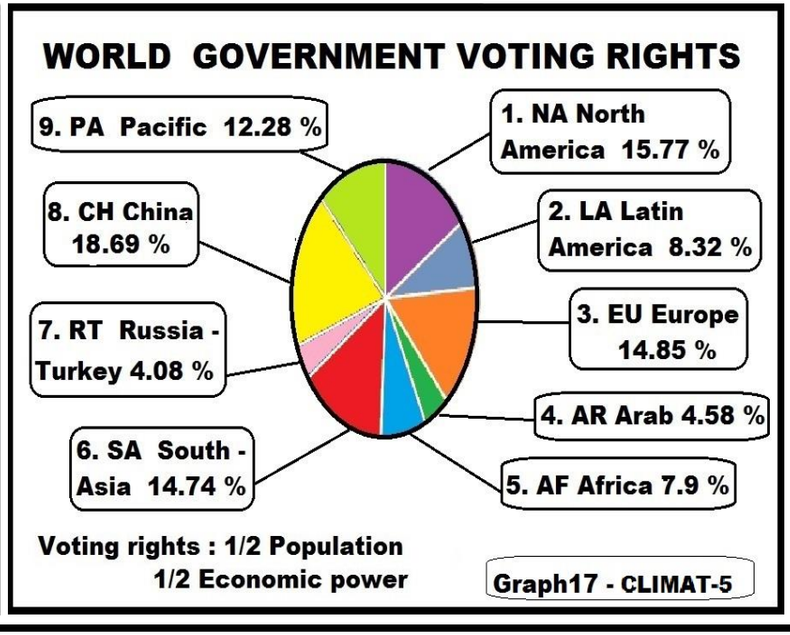
If population were to be taken as criterion, then e.g. Union No. 6 South Asia is a great power. If economic power (GDP gross domestic product) is a criterion, OECD countries dominate.

A reasonable compromise is the right to vote of each Union is half the population and half the economic power–without veto rights.

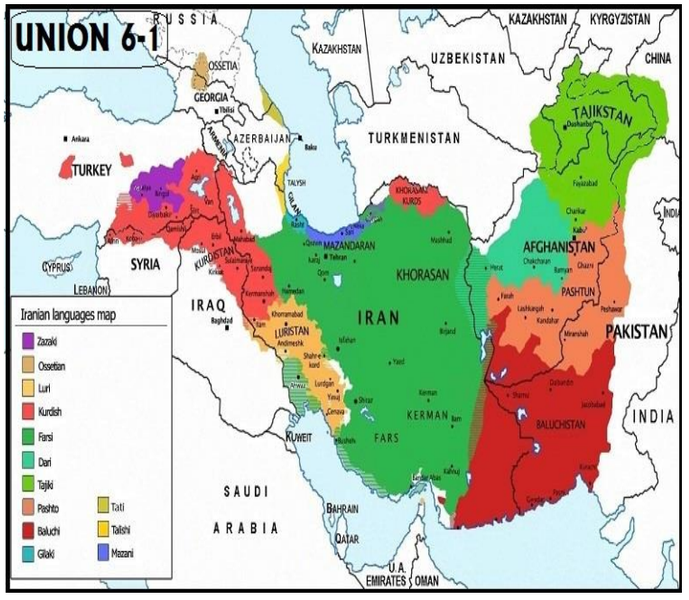
Fascist thinkers do not accept any authority above them–their principle is the law of the strongest- such thinking is not accepted in the proposed world order – actually there are 3 forms of fascism (black like the Nazis, red like Stalin-Mao, and jihadist Islam IS).

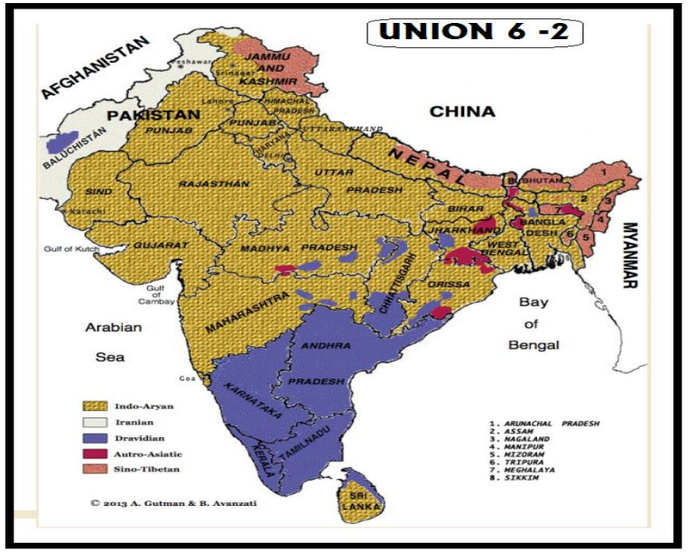
States such as Russia, North Korea may well be represented in the World Government as a state of their Union, but their right to vote will in each case be severely curtailed.

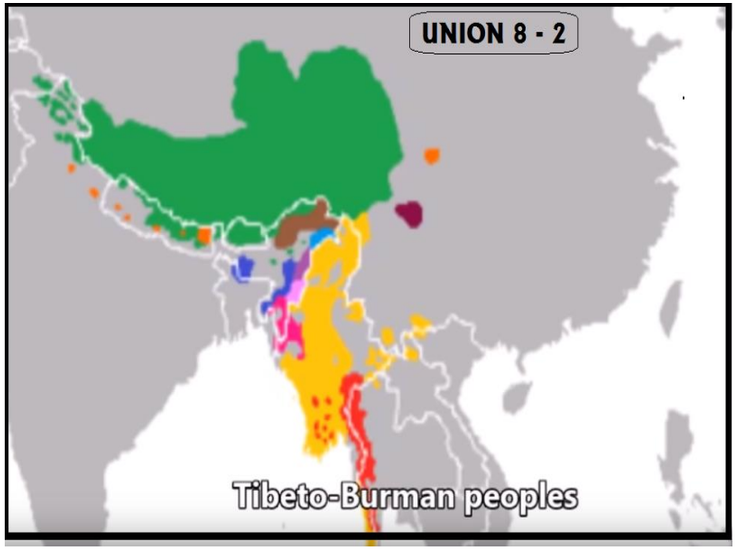


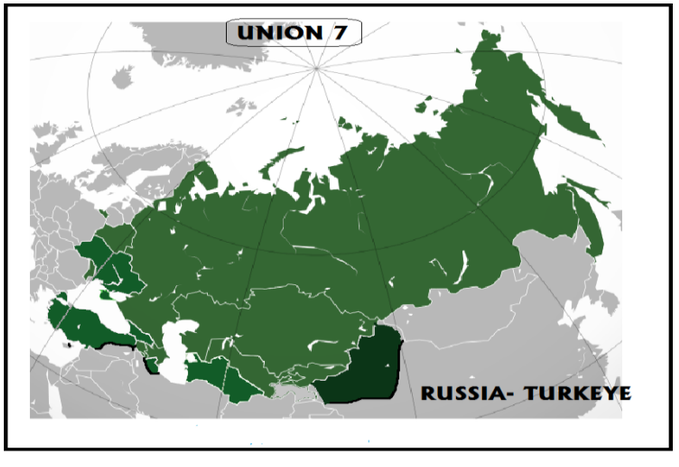


And if a country refuses to be part of a Union? The citizens of such a country do not have a valid identity card to travel to the rest of the world – don't have access to the world currency system... there is a serious risk this country becomes a hotbed of illegal activities - the Unions concerned will have to intervene.









- In 2008, a single country, the USA, was able to plunge the world into a financial crisis.
- The Western world has a financial monopoly while the economic power of the non-Western world is growing strongly.
- Multinationals behave like the real rulers of the world.
- All these things should come to an end.
- A world currency is the reflection of a world under strong management.
- A world constitution contains the principles of a RULE of LAW.
- There is no place for fascism.

SHORT CONTENT OF DOCUMENT CLIMATE-5

§1.p3- TOP PRIORITY: REDUCING CO2 LEVEL IN THE AIR BY 2030

Introduction: the history of the last 3 heat periods (3-17-56 million years ago) shows CO2 eruptions cause unstoppable permafrost thaw and finally cause the heat period -in its mild form it remains at sea level rise by 20-40 m - in worse form 56 M years ago, mankind has little chance of surviving.

The 600 billion tons of CO2 mankind now have released into the atmosphere since 1985 has the same catastrophic effect as the 3 natural CO2 emissions of million years ago- a rapid massive CO2 extraction (30-40 Gt/year) is therefore mandatory.

IPCC working group3, green-deal, climate organizations aso..advance wrong tactics, based on a dogma: the remedy to avoid a climate catastrophe is to achieve zero CO2 emissions on a world scale by 2050 and getting rid of the enormous CO2-cumul is a matter after 2050. But even a reduction in annual CO2 emissions on a world scale is completely unreal today –CO2 from permafrost thaw is also simply unstoppable–saving has no influence whatsoever on the enormous accumulation in the air.

This dogma is the **BIGGEST SCIENCE FRAUD OF THIS CENTURY**– 3 here presented graphs contradict clearly the dogma- the IPCC's WG 3 is the main source of this blatant lie that is sending the **WHOLE SECTOR INTO THE WRONG DIRECTION**- and thereby endangers humanity- particularly bad is the complicity of so many climatologists and experts.

THE CORRECT POLICY : RAPID LARGE-SCALE AFFORDABLE CO2 EXTRACTION (30-40 Gton/year) LOWERS THE CO2 –CONTENT IN THE AIR AROUND 2030- AROUND 2050 THE EXCESS CO2 IN THE AIR = 0.

How to realize in practice LARGE-SCALE AFFORDABLE CO2 EXTRACTION FROM THE AIR ? Every objective study gives **TREES as the UNSURPASSED CHAMPION** in CO2 storage -but it takes 7 million km2 of tropical rainforest and 300,000 km2 every year to store 30-40 Gton CO2/yr.

Transformation of Arabian deserts into tropical rainforest and agricultural land is technically and financially very feasible, although not the only solution -Western countries take on the technical side -Arab countries the workforce- affordable desalination of seawater is essential - this exists in lab phase and pilot plants.

§2.p35- BY 2050 100 % FOSSILFREE ENERGY

–supply of renewable should at least triple –solar and wind are insufficient- Hydrogen gas is not an alternative to mineral oil and natural gas – it cannot be stored cost-effectively-Oil made from highly productive algae on floating islands can replace the current mineral oil (and natural gas) -and be even cheaper -Oil companies make the investments –THIS BIOCRUDE could provide 1/2 of all fossil-free energy.

§3.p45- ALL ELECTRICITY FOSSIL FREE BY 2050.

Wave energy with buoys 20 m long in rough seas can provide 3 times as much energy on the same surface as wind turbines- together with **solar concentration**, the way to make all electricity fossil-free- **nowhere is there any CO2 tax -** Nuclear energy does not meet any needs.

§4.p47- URGENT MEASURES are very needed :20% of the world's population will be short of fresh water by 2030 – water reserves and affordable desalination systems must be deployed – the Amazon rainforest is about to turn into a dry savannah – forest fires in Greece, Hawaii-USA... with masses of dead : a real war situation... requires decisive action.

§5-p57 -Do’nt tell the people In Ukraine, Lebanon, Syria, Afghanistan....the climate is a priority- the climate is only one of the worst world problems-a **POWERFUL WORLD GOVERNMENT** that tackles **all major problems**, including the climate, will receive much more support worldwide - and the climate problem will thus be better addressed.

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