Can Societies Commit Suicide?

Jan-Erik Lane

(Professor Emeritus, UNIGE, Geneva, Switzerland)

Abstract: *Societies have to adapt to changes in the environment and its pressures. Human societies have for a long time enjoyed many degrees of freedom in relation to Nature, as both Planet Earth and the biological endowments of men and women have provided a set of opportunities for building societies and making humans the dominant species. Climate change changes all this, as Nature`s pressure restricts the degrees of freedom. What is now lurking is Hawking irreversibiity, i.e. global warming becoming unstoppable and through its tipping points destroying the degrees of freedom for life. He menace is the GHGs that societies produce. Failing to halt their advance would constitute suicide, as all is by now well-known.*

Keywords: *GHGs, decarbonisation, remedies, energy imperatives in rich and poor societies*

I. INTRODUCTION

The new theory of abrupt climate change, speaking of the risk of tipping points conducive irreversible global warming – a "hotspot Earth", is based on the model of a game against Nature from game theory. The future would hold two states: survival versus extinction for humanity. And two policy responses would cover on the one hand global coordination and country resilience on the other hand. Thus we have:

Diagram 1: Climate change as a game against Nature

Policy Response	NATURE: Human Survival	NATURE: Human Extinction
Global Coordination	A= P1XU1	B = P2XU2
Country Resilience	C= P3XU3	D= P4XU4

The COP21 Treaty is hopefully an example of A, but the probability of success is very uncertain, as B is still possible depending on how COP21 is implemented up to 2030. Countries like for instance the USA may opt for resilience, C, hoping it can develop own measures against the downplayed consequences of global warming, like levies. However, the likely outcome of resilience is D, it seems, according to several climate and earth scientists.

Holoscene, Anthroposcene and Nature`s Revenge

In the recent inquiry into climate change, "Trajectories of the Earth System in the Anthropocene", published 2018 edited by William C. Clark, we read:

"The Anthropocene is a proposed new geological epoch [1]based on the observation that human impacts on essential planetary processes have become so profound that they have driven the Earth out of the Holocene epoch in which agriculture, sedentary communities, and eventually, socially and technologically complex human societies developed."

The proposal that humans can avoid Hawking irreversibility is similar to the COP21 approach. The hope among these scholars is also tied to alternative A in Diagram 1. Despite dire warning about the future dismal state of Planet Earth threatening human survival, the authors state that the COP21 promises may save mankind, as long as they restrict global warming to + 2 degrees Celsius. I quote:

"This analysis implies that, even if the Paris Accord target of a 1.5 °C to 2.0 °C rise in temperature is met, we cannot exclude the risk that a cascade of feedbacks could push the Earth System irreversibly onto a "Hothouse Earth" pathway. The challenge that humanity faces is to create a "Stabilized Earth" pathway that steers the Earth System away from its current trajectory toward the threshold beyond which is Hothouse Earth. The human created Stabilized Earth pathway leads to a basin of attraction that is not likely to exist in the Earth System's stability landscape without human stewardship to create and maintain it. Creating such a pathway and basin of attraction requires a fundamental change in the role of humans on the planet. This stewardship role requires deliberate and sustained action to become an integral, adaptive part of Earth System dynamics, creating feedbacks that keep the system on a Stabilized Earth pathway."

This amounts to mere wishful thinking. Much more is needed to undo Hawking irreversibility. And realistic emissions policy must change the demand and supply of energy, which will have economic consequences.

Climate Change and its Tipping Points

Recently launched, climate and earth scientists now focus upon so-called tippng points as well as the great variability in temperature increases over the entire globe. The dramatic changes in the Arctic have made researchers focus upon the melting of the ice at the poles and Greenland and its repurcussions for global weather and the huge methane holdings in the permafrost from Alaska to Siberia, both on land and in ocean.

a) Tipping point 1: Arctic Sea ice; Expected to disappear around 2020, it will not increase sea levels dramatically due to the eqivalence between ice and water. But this will affect global oceans streams as well as global weather yet streams.

b) Tipping point 2: Greenland ice; Uncertainty when it will be gone – some say 1940, this will raise sea levels some 6 meters. Major city areas will inundated: Miami, Rio de Janeiro, Venice, Kairo-Alexandria, Mumbai, Hanoi, Shanghai, Tokyo and Singapore, for instance. It would further deteriorate oceans conveyor belt and the slow the global yet stream.

c) Tipping point 3: Antartica ice mass; this enormous mass of ice and glaciers would be finished by some 100-500 years, rising sea levels some 60-70 meters. Mankind stand to loose a lot of land all over the planet Earth – a true catastrophe.

d) Tipping point 4: constant heat increase with draught and potable water scarcity. This would reuce food availability and lead to millions of climate refugees from vunerable low level coastline countries and poor nations along the equator.

e) Tipping point 5: Methane emissions from the melting permafrost. This threat is so huge that mankind would never survive such a major release of a very potent GHG. But the probability is not known.

The idea of so-called tipping points is that it make concrete the Hawking notion of irreversibility.

When S. Hawking suggested that climate change was irreversible, he was met wih sharp citicism. The notion of an irreversible process of change comes from the theory of scientific laws of nature with their universality and empirical necessity. If global warmin is unstoppable or inevitable, then the survival of the human race is at stake.

The only way to reduce the speed of climate change, avoiding inevitability, is to stop pumping GHGs into the atmosphere. This requires inter alia:

i) immediate stop to coal and charcoal in poor countries;

ii) replacing fossil fuel enegy with solar panel parks of the Morroccan Quarzazate kind;

iii) initiate now large scale geo-engineering experiments to suck up CO2s or sequestrate CO2s..

Will these measures be taken by the UNFCCC or the G20 group of nations? Probably not. Why? Becaause of the ocean PD game involved. What matters to all countries and governments is access to *carbon intensve energy,* the culprint of the anthroposcene period.

Financial markets and insttutions have noz developef any anticpations about global warming and its effects, One circumstannce is the time horizon of different cimate change predictions that run from 10 years to hundreds of years. Thus, some climate scientists claim that societies will crumble in a ten years time period, whereas others say that the Earth will be ice and glacier free is some hundreds of years.

In any case, economic outpout must sooner or later start declining due to immense capita destruction and reduced labour productuvuty.

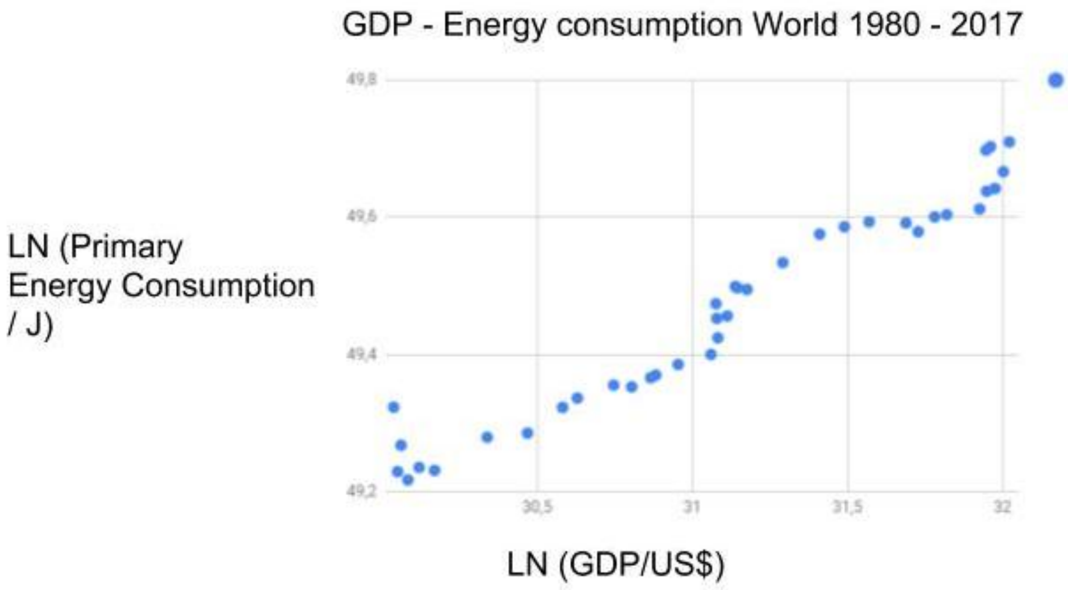
Energy: Rich Societies

The public and private sectors demand lots of energy to produce their goods and services. Energy, or the capacity to do work potentially or actually, is key in economic growth for enterprises and financula institutions in rich countries. And energy is absolutely essential in socio-econmic development in poor nations.

The central position of economic growth in rich countries and of socio-economic development in poor countries is much in consonance with basic human drives as well as with the logic of vibrant capitalism in the global market economy. Governments and politicians cherish economic growth, because it makes more policy-making possible.

In rich countries with an economy in balance more or less, domestically and internationally, the Baptiste Say perspective upon economic motivation entails the idea of balanced economic growth, supported strongly by financial markets. Even if real economic growth fluctuates, the emphasis upon yearly economic growth is typical of modern capitalism or the market economy, but so far it has necessitated a constant augmentation of energy. Figure 16 shows the tight relation between affluence and energy consumption.

Figure 16. Affuence and energy globally

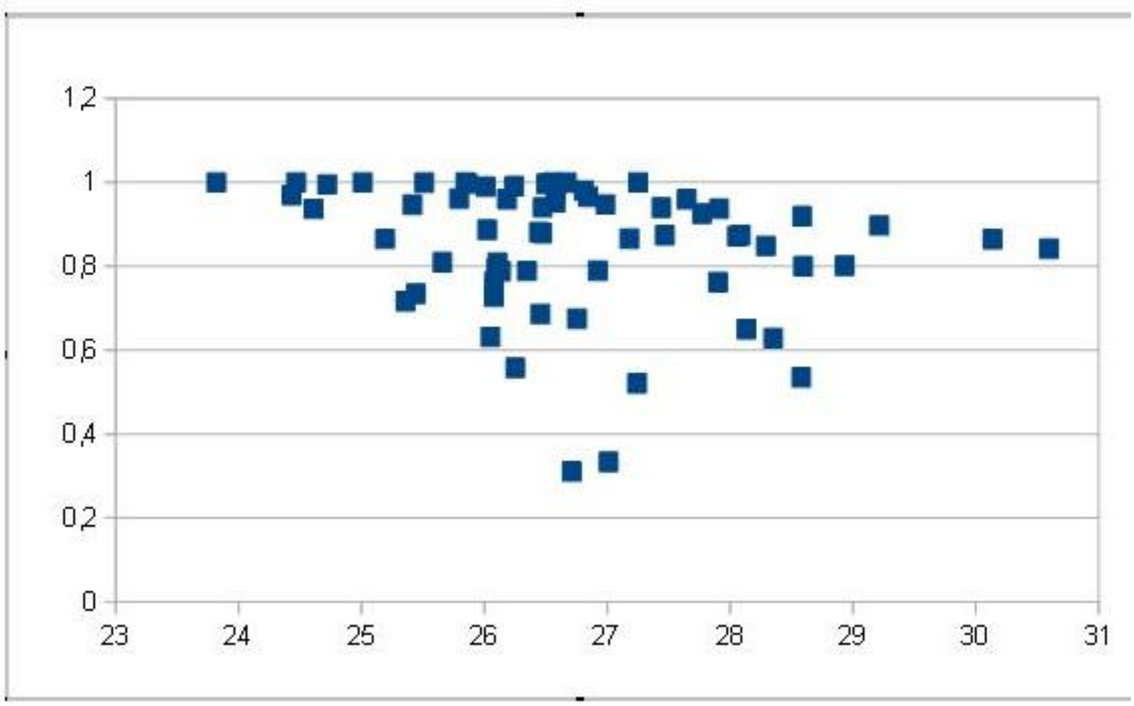


Note: R2 = 0.951

Sources: BP Statistical Review of World Energy
World Bank Data Indicators

Poor countries need much more energy, but of a new kind. They need assistance to move to modern renewables, as they will give up fossil fuel and charcoal, only if there is compensation by other new energy sources. The enormous demand for more and more of energy comes with a major drawback, namely the GHG emissions. Figure 17 has the picture for the carbon intensity of energy, resulting in CO2s.

Figure 17. Carbon intensity of energy (fossil fuels/all energy)



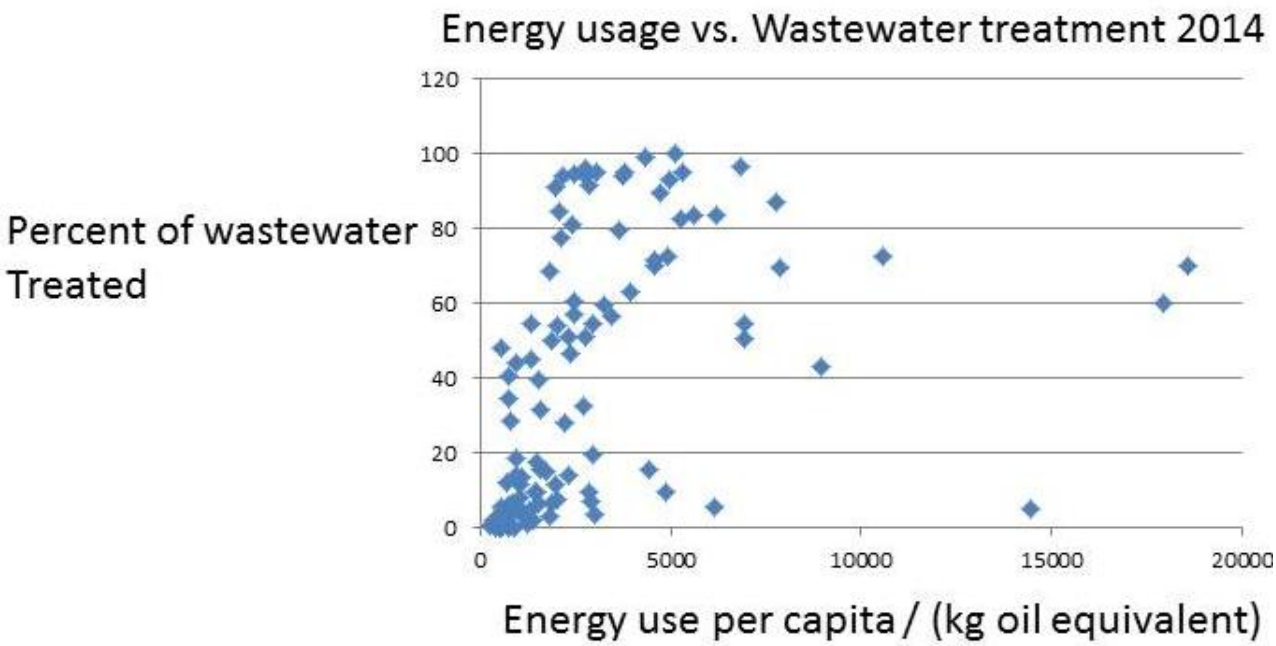
Sources: BP Statistical Review of World Energy
World Bank Data Indicators

Very few countrie score under 50 pr cent: Norway and Sweden, Switzerland, but several countries score 100% or close: The Gulf States, Algeria, former Soviet Union states = "STANS", Turkey, Mexico, etc.

Energy: Poor Societies

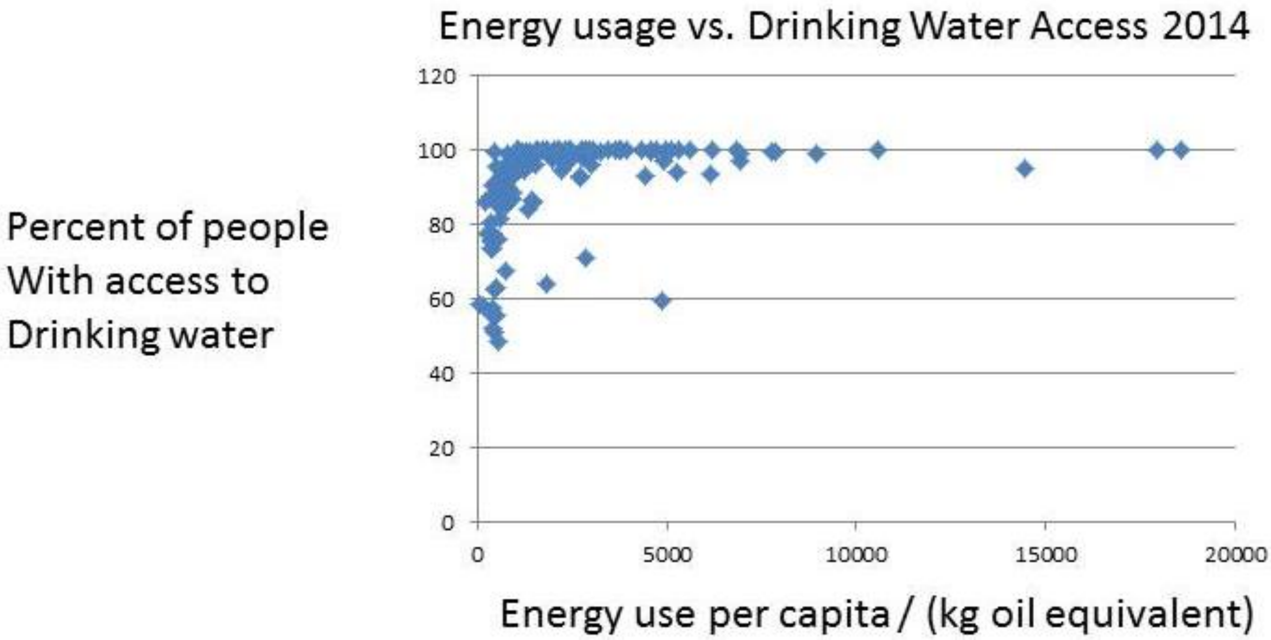
Look at the evidence about the positive effects of energy in the Figures below, linking energy consumption with human development indicators. The positive consequences of energy for quality of life and life opportunities, one understand the position of the Third World at the Paris meeting that decarbonisation must be combined with great econoic assistance to make fundamental energy transfrmation. The result was the promise of a giant Super Fund, but it is only a promise too.

Figure 1. Energy and water I



Source: Environmental Performance Index, Yale University, https://epi.envirocenter.yale. IEA Statistics © OECD/IEA 2014 (http://www.iea.org/stats/inde

Figure 2. Energy and water II



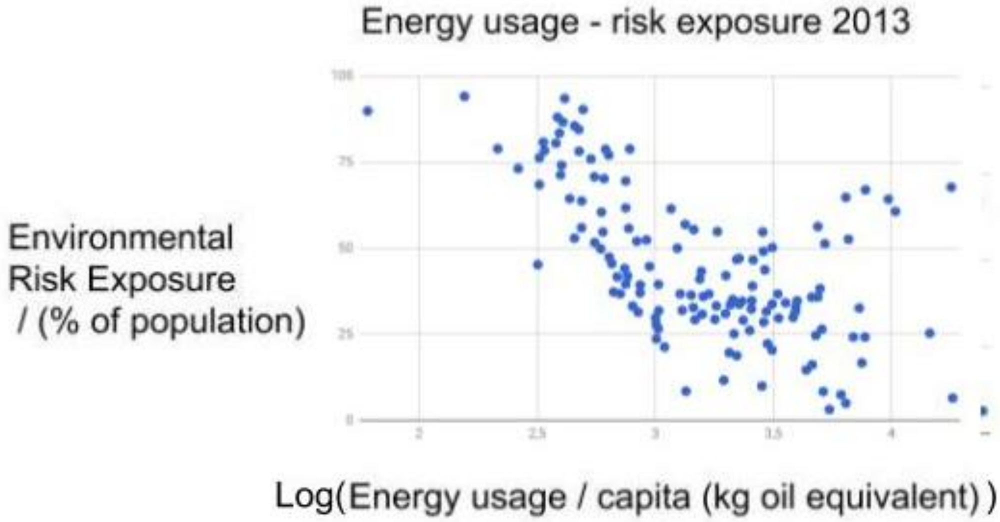
Source: Environmental Performance Index, Yale University, https://epi.envirocenter.yale. IEA Statistics © OECD/IEA 2014 (http://www.iea.org/stats/inde

The living conditions in the poor countries in Latin America, Africa and Asia as well as the Pacific reflects the low level of energy employed. This basic fact determines life opportunities in a most dramatic fashion. The low access to energy has consequences for the environment and the life situation of people, including health, schooling, work, food and potable water.

For instance, African countries are poor because they have too little energy. Thus, they have much less GHGs than Asia. Yet, they need the COP project of the UNFCCC to renew their energy sources and move from fossil fuels and traditional renewables to solar power. Hydro power depends upon water availability that shrinks with global warming.

African energy deficit is conducive to a dire environment with enormous damages and risks. Consider the following global figures. Figure 3 shows how low energy leads to am unsafe environmental.

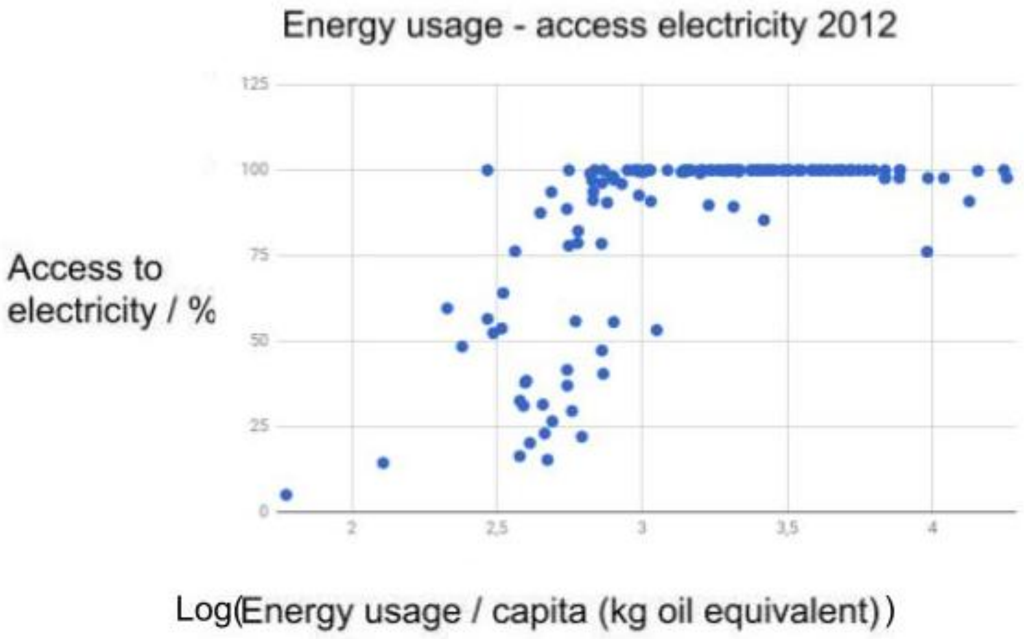
Figure 3. Energy and environmental risk exposure



Source: Environmental Performance Index, Yale University, https://epi.envirocenter.yale.
IEA Statistics © OECD/IEA 2014 (http://www.iea.org/stats/inde

Low energy use leads to poverty, malnutrition, deceases, lack of potable water, insufficient sanitation, etc. Typical of many Latin American, African and Asian nations is the lack of stable electricity, which hampers everything and reduces environmental viability. Figure 4 has the global picture.

Figure 4. Energy and electricity access



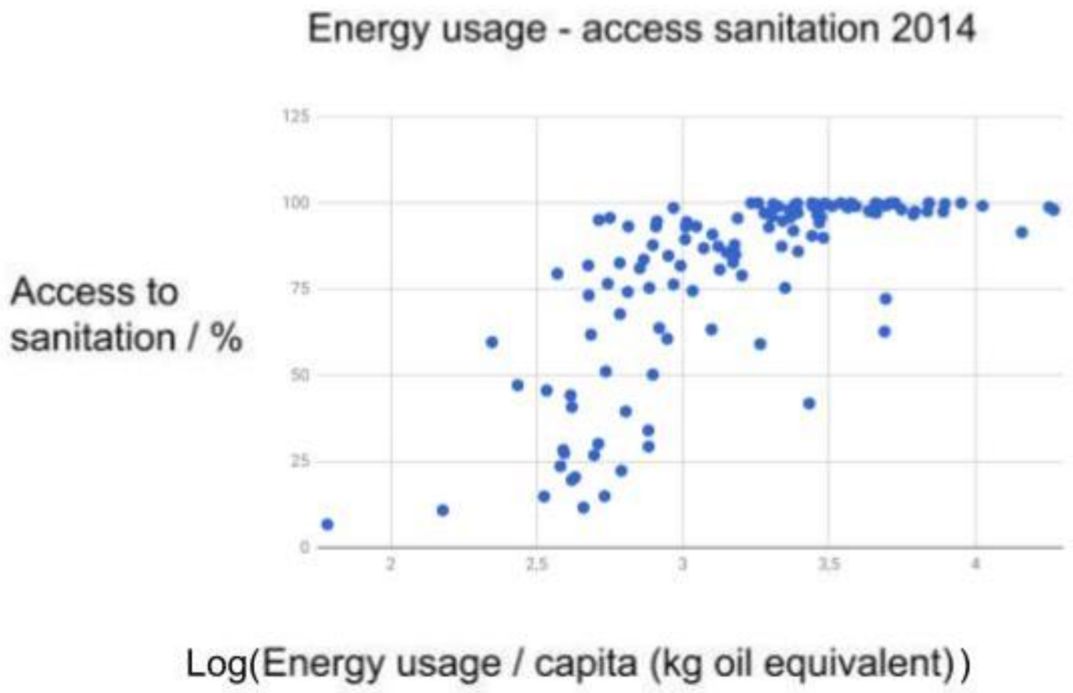
Source: Environmental Performance Index, Yale University, https://epi.envirocenter.yale.
IEA Statistics © OECD/IEA 2014 (http://www.iea.org/stats/inde

The access to safe and stable electricity is crucial for health, schools, food, water, etc. Figure 4 links energy with proper sanitation.

Especially, the rapidly growing African, Latn American and Asian mega-cities lack entirely proper sewage plants. Thus, dirty water is put into the big rivers where other cities downstream take their potable water.

The access to safe and stable electricity is crucial for health, schools, food, water, etc. Figure 5 links energy with proper sanitation.

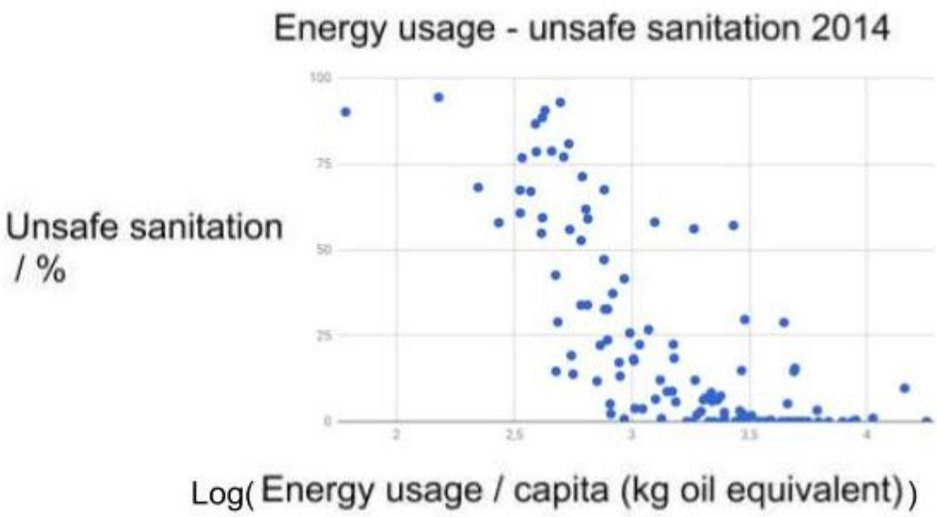
Figure 5. Sanitation and energy



Source: Environmental Performance Index, Yale University, https://epi.envirocenter.yale.
IEA Statistics © OECD/IEA 2014 (http://www.iea.org/stats/inde)

Figure 6 underscores the necessity of more energy in poor coutries for prper sanitation, without which the life of humans is "*salle*".

Figure 6. Energy and unsafe sanitation



Source: Environmental Performance Index, Yale University, https://epi.envirocenter.yale.
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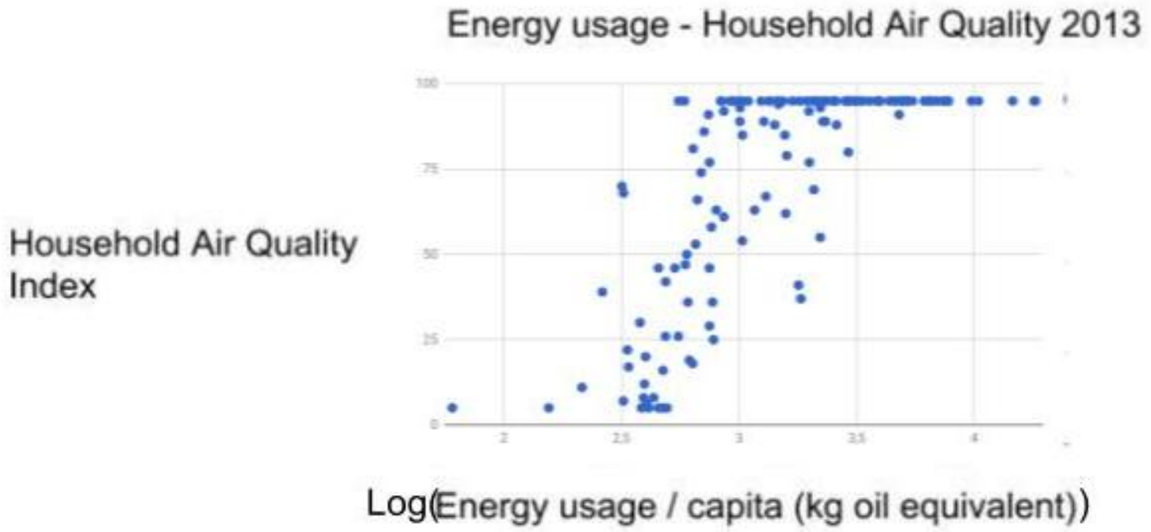
Air quality too depends upon energy access (Figure 7).

Figure 7. Energy and air quality



Source: Environmental Performance Index, Yale University, https://epi.envirocenter.yale.
IEA Statistics © OECD/IEA 2014 (http://www.iea.org/stats/inde)

Typical of many poor nations – Latin America, Africa, Asia - is the lack of predictable access to safe electricity, which hampers work and reduces environmental viability. The access to safe electricity is, it must be emphasized, absolutely central for health, schools, food, potaable water, etc. Given the lack of enough energy in poor countries, being conducive to the above bad living conditions, one understands the hopes of the poor countries for help with energy transformation, leading to better access to just energy!

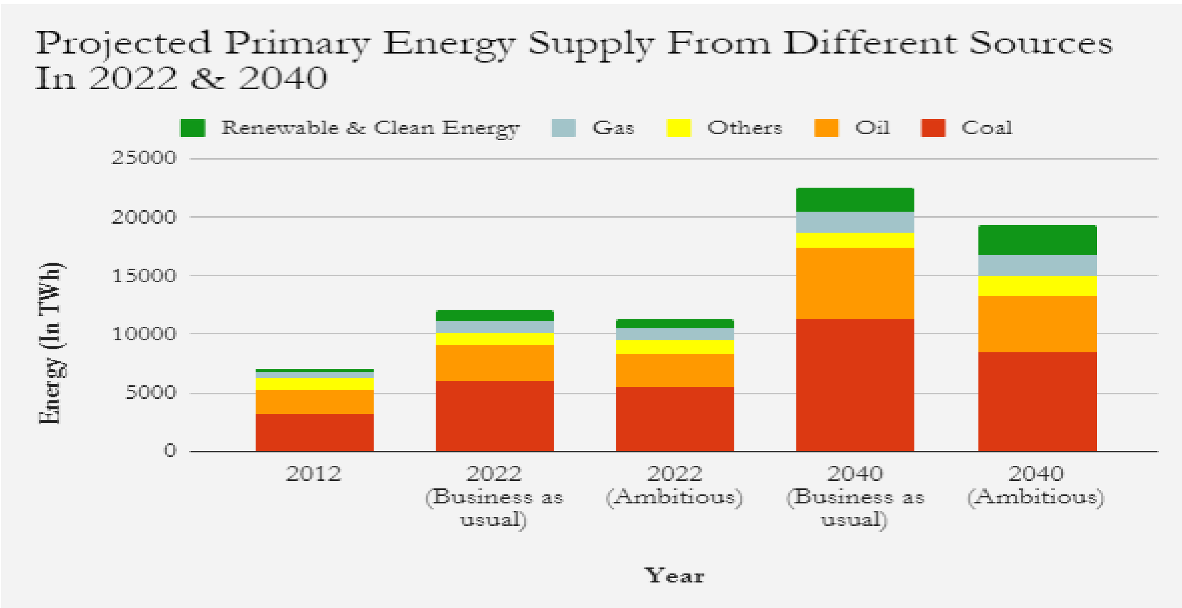
II. DECARBONISATION?

The decrbonisation goal of COP21 requires the support of the big countries in the world. But do they really aim at decarbonisation? We look at three examples here.

India

In Indian energy policies, it is emphasized that developmental goals take precedence over climate change considerations. Thus, all Indian household musst have access to electricity and only sustained rapid economic growth can reduce poverty. India has a “take-off” economy that delivers affluence for the first time since independence. But it is based on fossil fuels. India looks into other sources of energy, as long as socio-economic development is not hindered. Figure 8 shows the main features of India’s future planning.

Figure 8. India`s energy future

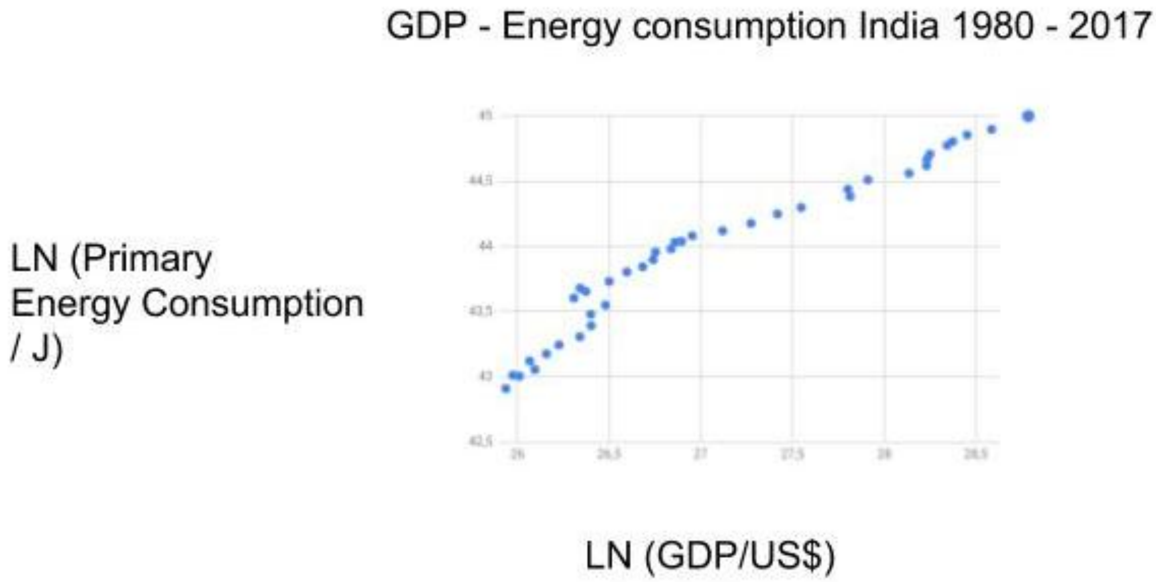


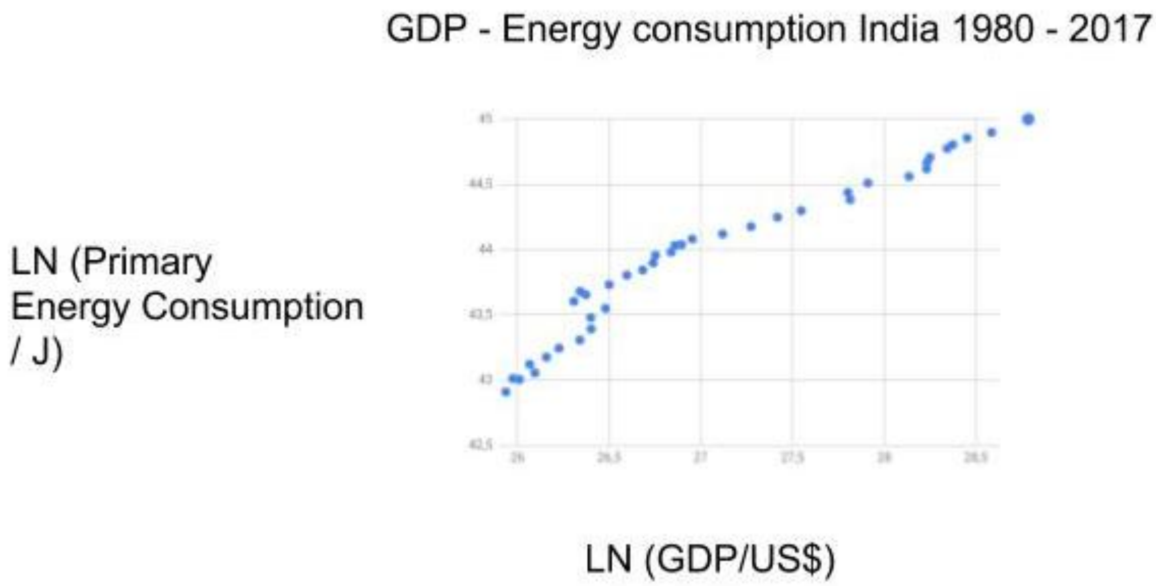
Source: https://scroll.in/article/843981/indias-new-energy-policy-draft-projects-coal-fired-capacity-will-double-by-2040-is-that-feasible

India has rapidly become a major CO2 emitter due to its high growth rates since 1990. It uses lots of coal, stone or wood. Charcoal is bad for households and results in forest destruction. India tries to broaaden its energy supply to modern renewables, like solar, wind and hydro power. Yet, it will remain stuck with fossil fuels for decades. It needs assistance from the COP21 project, especially for solar power parks. Building more dams is very risky, as global warming reduces water assets. Figure 7 indicates the India cannot meet its COP21 promises, as Ramesh (2015) underlines.

India shows the same close link betwee GDP and energy consumption (Figure 9).

Figure 9. GDP and energy in India





Note: $R2=0.94$

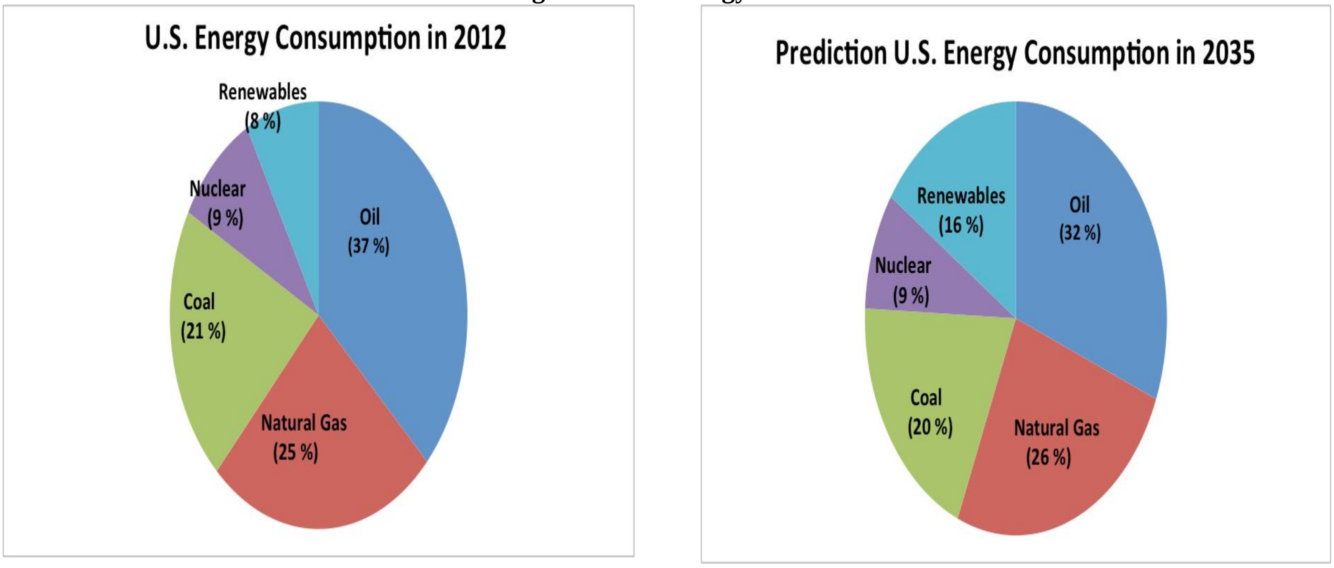
Sources: BP Statistical Review of World Energy
World Bank Data Indicators

Given this close connection between GDP and energy consumption in India, the risk is of course that further socio-economic developments will increase GHG emissions. India is hardly on the decarbomisation road.

USA

The US has reduced its CO2 emissions during the lats years, mainly by a shift to natural gas. Actually, several mature economies have been able to halt the rise of CO2 emissions, either by more energy efficiency or a shift to natural gas or renewables. Figure 10 captures some features in US energy plans.

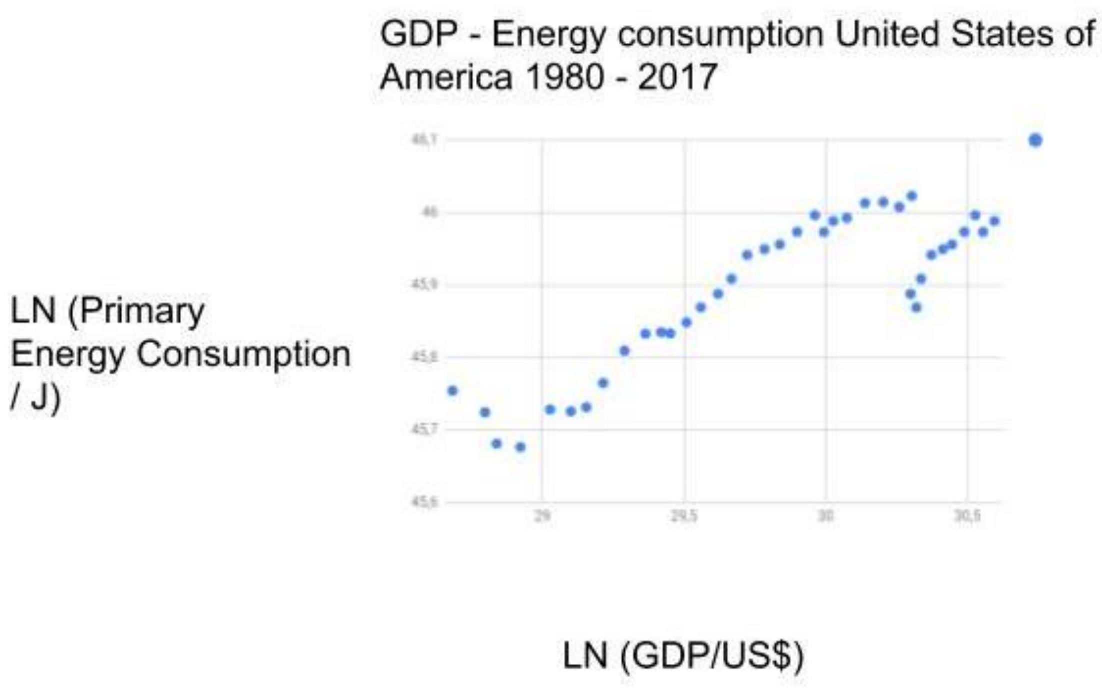
Figure 10. US energy future



Source: https://www.e-education.psu.edu/egee102/node/1930

Although the Figure 10 predicts a doubling of renewable energy, the dependency upon fossil fuels, including coal energy, will not bee much reduced. We are talking here about relative numbers, but if the US increases total amount of energy supply – fracking!, then there may even be more fossil fuels. The reduction in CO2s during recent years seems to be coming at a reduced rate. The hope is for economic growth without energy increases, but we are not there yet. And most countries demand more energy for the future.

Figure 11. GDP and energy for the USA



Note: R2 = 0.77

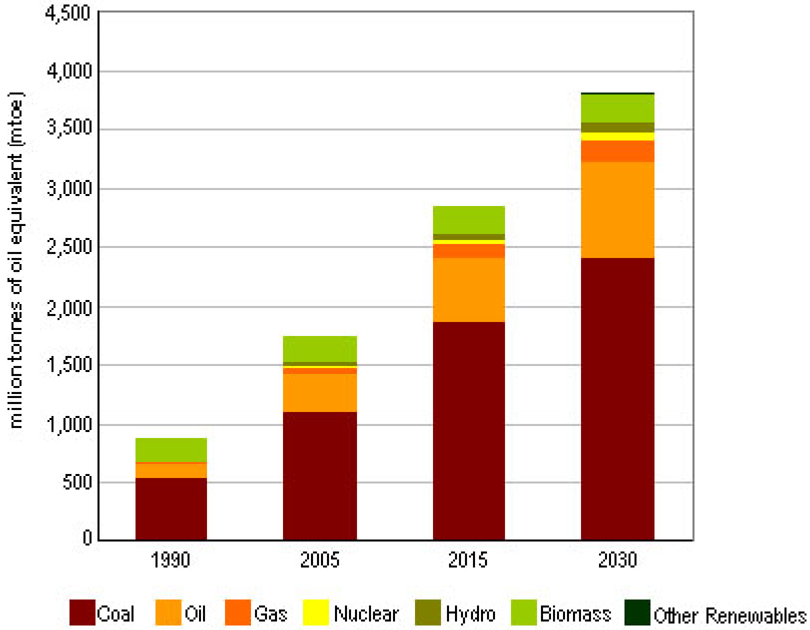
Sources: BP Statistical Review of World Energy
World Bank Data Indicators

Although the link between GDG and energy consumption id lress tight for he USA than India (Figure 11=, reflecting that economic growth in advanced countries can be achieved without energy increase, it is still the case that the US is not on the road towards major decarbonisation.

China

China now enters the First World, as it has long passed its "take-off" point in time around 1980 and has pursued a successful "catch-up" policy for a few decades. Its energy consumption, especially of fossil fuels, has skyrocketed with GDP, resulting in the largest CO2 emission globally. Figure 12 has a projection for China.

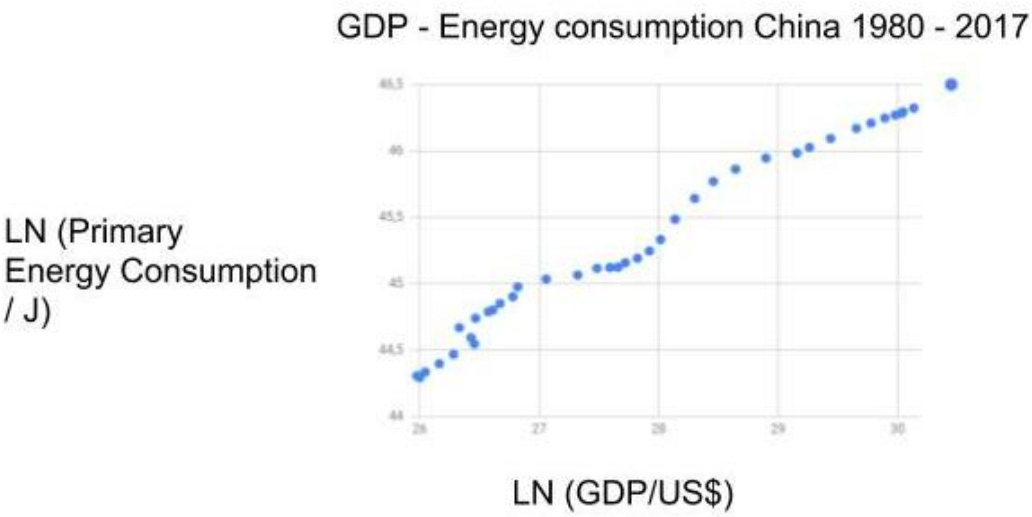
Figure 12. Energy projection for China



http://www.wrsc.org/attach_image/chinas-projected-energy-growth-fuel

Decarbonisation does not seem highly probable. Much hope was placed at a recent reduction in CO2s, but water shortages forced China to revert to coal in 2017 with attending augmentation of CO2s. China is investing in both renewables and atomic power, but it also plans for large energy increase in the coming decades with lots of energy consuming new projects (Figure 13)..

Figure 13. GDP and energy for China



Note: R2 = 0.98

Sources: BP Statistical Review of World Energy
World Bank Data Indicators

Such a close connection between GDP and energy consumtion in China imples that China must turn to renewables massively in order to comply with COP21 goals.

III. OCEAN GAMES OR GLOBAL CLUBS

The COP21 Treaty, or any other similar agreement, would have two parts:
i) reduction of CO2 emissions ina certain pace towards zero emissions at some future date;
ii) contributions to the Super Fund yearly according to some scheme and time table.

Both these two actions concern first and foremost the countries in the G20 group of nations, responsible for 70 per cent of the total CO2 emissions. Small poor nations can be left beside, as they pollute little and cannot be required to pay into the Super Fund.

Both i) and ii) are just promises, which the COP21 Secretariat or the UN cannot enforce, strictly speaking. When a country receives support the Super Fund, there is some leverage to force obedience. However, a big poor country may simply refuse decarbonisation, if no assistance is provided.

Decarbonisation is costly in the short run for all countries, as the must replace existing energy plants with new, hopefully renewable energy resources. Contriuting to the Super Fund is also costly in the short run. This sets up an interaction where a government may be tempted to defect from its promises to decarbonise or pay to the Super Fund.

A. *Stratey of poor nations: the N-1 problematic.* Poor or small nations will engage in opportunism with guile in order to avoid too large costs with the COP21 decarbonisation policy, pretending they matter very little for outcomes.
B. *Strategy of the rich country: the 1/N problematic.* Large or rich countries will find sacrifices that cannot be internalised as meaningless gifts to others, who may not be trusted to cooperate. Thus, the US reneged because it did not want to pay for decarbonisation in India.

The PD nature of interaction in a global CPR like the COP21 Treary is fragile, to say the least. What is lacking is the instruments of control, as Hobbes pointed out already 1651 in his Leviathan, saying: *"Not believing in force is the same as not believing in gravitation."*

Despite all propaganda about so-called *Energiwende,* Germany remain much dependent upon fossil fuels. High grade coal is imported from Russia and Colombia to add to its own low grade and dirtier coal, besides all the natural gas from Gazprom. At the same time, nuclear power are closing – all up to 2022. France is also closing nuclear plants, despite the fact that they could be used longer and made safer. Both countries should turn to solar power – see Table 1, but may be expected to burn biomass or biotrash, which emits CO2 inter alia.

Table 1. Number of Ouarzazate plants for 40 per cent reduction of CO2 in some giant countries (Note: Average of 250 - 300 days of sunshine used for all entries except Australia, Indonesia, and Mexico, where 300 - 350 was used).

Nation	Co2 reduction pledge / % of 2005 emissions	Number of gigantic solar plants needed (Ouarzazate)	Gigantic plants needed for 40 % reduction
United States	26 - 28[i]	2100	3200
China	none[ii]	0	3300
EU28	41 - 42	2300	2300
India	none[ii]	0	600
Japan	26	460	700
Brazil	43	180	170
Indonesia	29	120	170
Australia	26 – 28	130	190
Russia	none[iii]	0	940
Germany	49[iv]	550	450
France	37[v]	210	220
Sweden	42[v]	30	30
World	N/A	N/A	16000

Note: i) The United States has pulled out of the deal; ii) No absolute target; iii) Pledge is above current level, no reduction; iv) Upper limit dependent on receiving financial support; v) EU joint pledge of 40 % compared to 1990

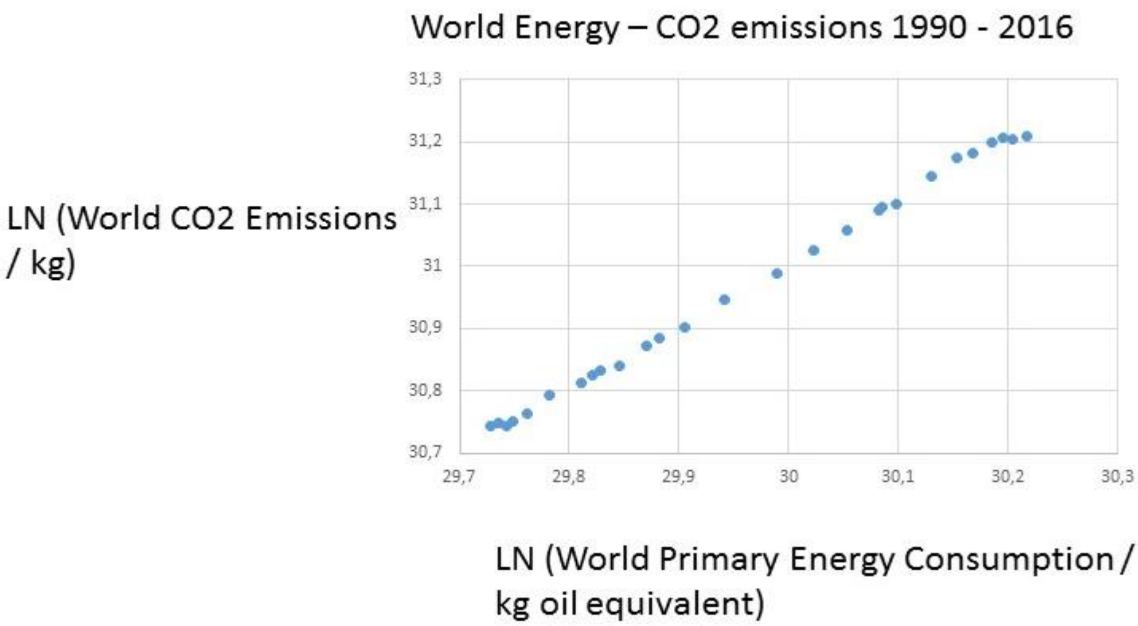
Stern's (2007, 2015) calls remain unanswered or perhaps not even heard by the decision-makers globally. The only remedies are avoiding coal and charcoal, replacing fossil suels with solar power and start large scale geoengineering. Otherwise, there will be dismal predicament with hunger, thirst, child morality, eco-emigrants at many places, fires in the Boreal forest as well as in the rain forest, agricultura failure, drought, enormous storms, and finally massive land iinundations. Can war be avoided in such a predicament?

The big unresolved issue in abrup climate change theory is the time horizon for the positiv feedbacks: arctic ice melting, melting of ice and glaciers on Greeland and Antactica, arrival of serious drought in various regions and the start of decline in food and potable water resources. The biggest unknown is though that methane bomb, which would kill makind if it goes off 100 per cent.

IV. CONCLUSION

The G20 group og nations fail to realise or recognize that all their attention and resources must be allocated to halting climate change. They believe in the wrong hypothesis that somehow global warming can be fixed and reject the true hypothesis that extinction of human is coming, sooner rather later, as long as nothing radical is done. The COP21 approach must be strengthened and implemented fully with the Superfund for energt transformation in the Third World. Otherwise, the constantlyincreasing demand for energy (Figure) will lead to Hawking irreversibility, i.e. sooietal suicide on Planet Earth.

Figure 14. Energy and CO2 emissions



The prospects for decarbonisation halting climate change seems grim, especially if abrupt climate change theory is correct. The crux of the matter is energy, which still comes with a high corbon intensity in most countries. Energy is the capacity to do work, which is the foundation of affluence.

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