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The Implementation of COP21 Agreement in the Third World

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ABSTRACT

The so-called Third World must now start developing implementation strategies of the COP21 objectives. In both emerging economies and poor countries, CO2:s area rather high except some countries where CO2:s are very high. Thus, the energy reliance upon coal – wood or solid – as well as petroleum must be transformed somehow. Hydro power requires lots of water, which further global warming may deny – look at Venezuela today. Thus, major investments in wind, solar or/and nuclear power are called for, which will have to be partly financed by the COP21 superfund. Yet, implementing a major decarbonisation conflicts with the developmental goals of Third World countries whatever they may be: "catch-up", reducing poverty, UN development framework, etc. Implementation theory (Wildavsky, Sabatier) teaches us humbleness about the likelihood of goal fulfillment.

Key words: COP21 objectives, global decarbonisation, Third World countries, fossil fuel dependency, traditional renewables, implementation strategies, "sustainable economy", Stern, Wildavsky, Sabatier, Sachs**.**

INTRODUCTION

The Third World does not figure prominently in the global debate about CO2 emissions, with the exception of China and India. However, the CO2:s in the various countries is large enough to be counted in the implementation of Cop21, as all countries much fulfill the COP21 goals. The overall environmental degradation in several Third World countries has been much researched: the Amazonas, the Titicaca Lake and the Caribbean for instance in Latin America, Lake Chad and the endangered species in Africa as well as the Aral Lake, the pollution of Ganges, Mekong River, Yellow River and the Yangtze as well as the rain forest fires in Indonesia. Now, also the governments of Third World countries have bound themselves to respect the COP21 process for the 21rst century. It includes the following goal targets:

- Halting C02 emissions by 2018
- Reduce CO2 emissions from 2020
- Achieve CO2:s reduction by 40% in 2030
- Eliminate fossil fuels as energy sources by second half of 21rst century.

In this paper I will discuss whether these objectives are implementable by the governments of a few selected Third World governments. My argument is that the COP21 implementation will depend upon their country specific energy mix, but such an enormous reduction in emissions is hardly feasible, because it comes into contradiction with other desirable goals, like development.

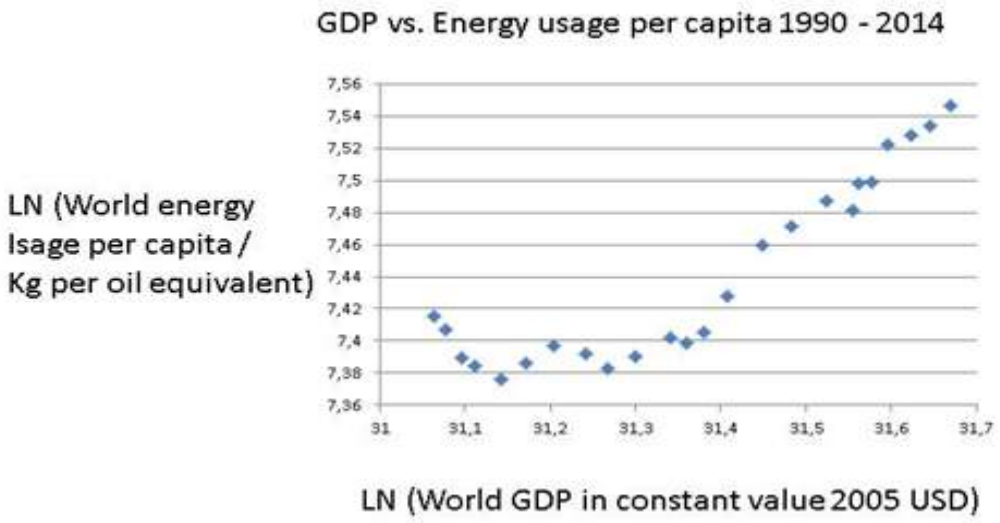
THEORY: THE OVERALL SITUATION

The COP21 approach to climate change targets almost exclusively the CO2 emissions, although the greenhouse gases also comprise the dangerous methane emissions, from gas leakages and meat production (cows, pigs) for example. The methane storage in the tundra and oceans could be released with global warming, increasing the threat to mankind several times over.

We will follow the COP21 and its goal of decarbonisation, meaning reducing fossil fuels as energy sources for economic activities in a broad sense. One must not forget that traditional renewables are also coal products resulting in CO2 emissions inter alia (wood, peat charcoal, and dung). Third World countries rely a lot upon wood coal and its derivatives when they are poor.

Figure 1 shows the overall dependency of mankind (per person) upon the energy sources that result in large CO2:s.

FIGURE 1. GDP – Energy consumption per capita 1990-2014 ($y = 0,26$; $R^2 = 0,81$)



Source: IEA: Key World Energy Statistics

Although the set of old OECD countries deliver much of the CO2:s, Asia is set of bypass them, especially if Japan and South Korea are placed in the Asian set. Typical of Third World countries is that they have lower CO2:s per capita than the mature economies, but they still must reduce their total emissions, which are sometimes considerable.

The COP21 objectives are for their implementation much impacted by two factors, namely

(1) <GDP-COP link, energy mix>

as they vary from one country to another. The following generalizations about decarbonisation hold starting from the two basic factors <GDP-COP link, energy mix> behind the country variation, to be mapped below:

- The more a country exclusive relies upon coal, the more difficult the COP21 transition
- The more a country relies exclusive upon oil and gas, substituting for coal, the less difficult it is
- The more a country has a diverse energy mix with considerable modern renewables, the better the prospects would be
- The more a country relies upon hydro power and atomic power, the more likely is a successful COP21 transformation
- The more a country relies upon solar, wind or geo-thermal power, the better it is from the point of view of COP21.

We will show with several examples below that emerging and poor Third World countries rely too much upon solids, petroleum and gas for arriving at a successful implementation of COP21.

FINDINGS

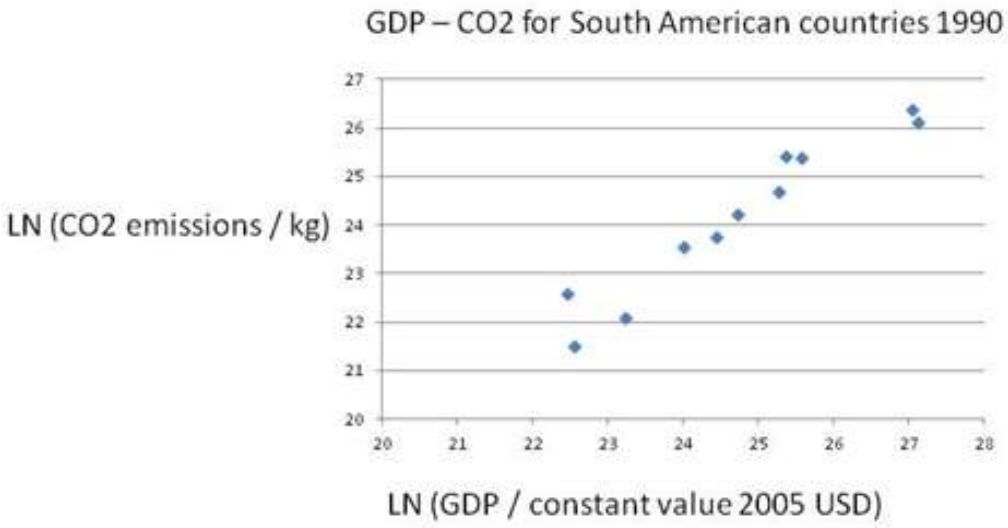
A) Latin America

Latin America has experienced a period of economic development for a few decades now, resulting in considerable rates of economic growth. It is true that countries have benefitted differently from this process, linked with the turn to democracy. But in any case, we may expect to find growing emissions of greenhouse gases, similar to what has been found on the global level and in Asian countries for example.

a) Total emission 1990

First, we examine the evidence about total CO2 emissions in 1990 and emissions per capita for 1990 as well. Figure 2 ranks these countries above according to total GDP and total CO2:s in 1990.

FIGURE 2. GDP and CO2 1990 ($y = 0,99x$, $R^2 = 0,93$)



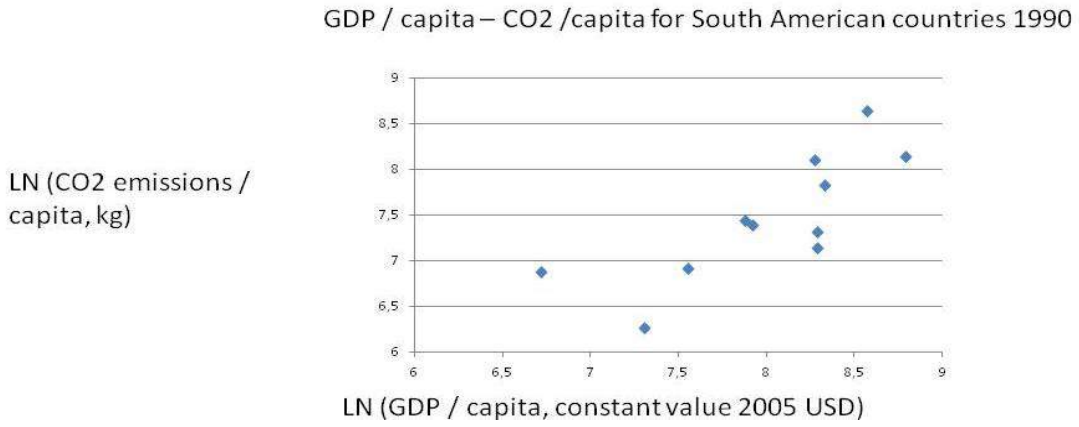
The countries with lowest total emissions of CO2 were: Paraguay, Uruguay and Bolivia, while the largest emitters included: Mexico, Brazil and Venezuela.

In terms of total CO2 emissions, the variation between countries stem from their level of economic development. The only exception is Paraguay, where emissions are higher than Bolivia, although the former is more poor than the latter. Most emissions are to be found in the two economic giants, Brazil and Mexico.

b) 1990: Emission/capita

Let us look at the 1990 emissions per capita, given in Figure 3. The pictures is slightly different from that of total emissions, as population size matters.

Figure 3. GDP/capita – emissions/capita (Y=0,88x, R2=0,61)

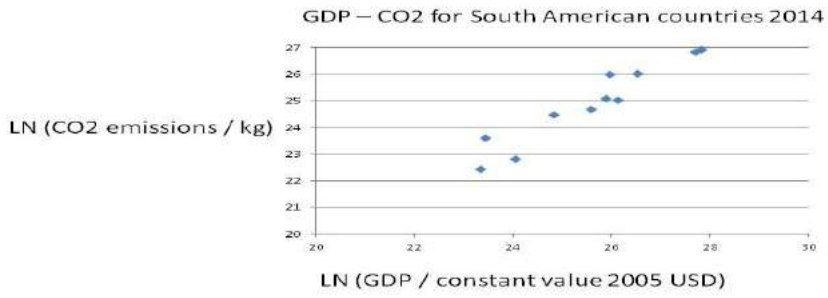


The per capita emissions of CO2 goes upwith GDP per capita, but not in a linear fashion. The lowest emissions/capite were to be found in Paraguay, Bolivia and Peru, whereas the highest per capita emissions were to be found in Venezuela, Mexico and Argentina.

c) Total emissions 2014

In 2014, after 24 of economic development, Latin American coutries have moved up considerably on the GDP scale, reflecting economic advances, especially in some of these countries. However, the missions of CO2 ave also moved to the right in Figure 4.

FIGURE 4. GDP-COP in Latin America 2014 (y = 0,9403x , R^2 = 0,9136)



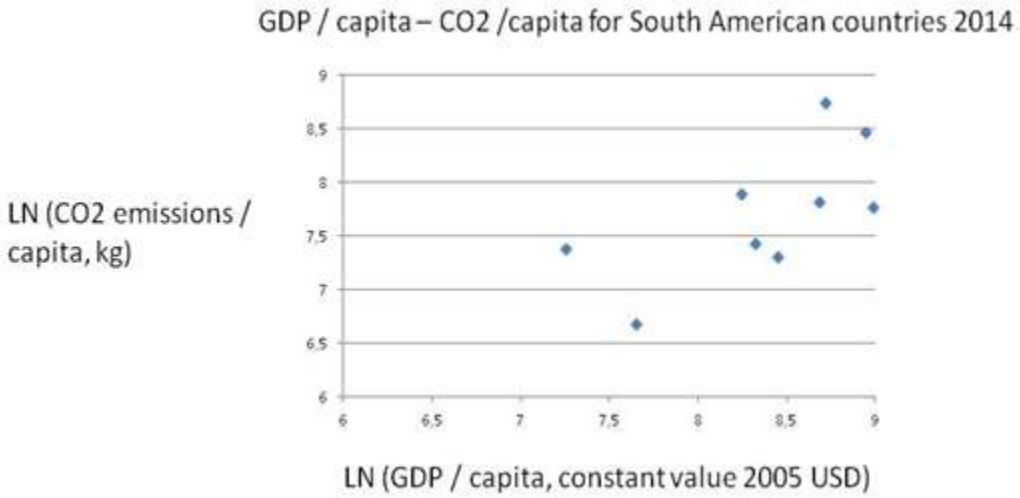
The countries with lowest total emissions of CO2 were: Paraguay, Uruguay and Bolivia, while the largest emitters included Brazil, Mexico and Argentina. We have to look especially at Uruguay, scoring surprisingly low with a fairly advanced economy.

The economig progress after 2000 has been conducive to more of CO2 emissions in all countries selected here. Thus, Latin America faces the same growth-emissions problematic as Asia, namely how to secure economic development while *reducing* CO2:s, according to CP21. One must be aware of that total emissions and emissions per capita generate very different country rankings.

It may be intersting also to look at the emissions per capita today (Figure 5).

d) Emissions/capita 2014

FIGURE 5. 2014: Emissions/capita (y = 0,73x, R^2 = 0,53)



The countries with lowest per capita emissions of CO2 were Paraguay, Colombia and Bolivia, while the largest emitters included Venezuela, Argentina and Chile in terms of CO2:s per capita.The patterns is a different one, although emissions/capita follows GDP/capita. Argentina just as Venezuela certainly has a CO2 problematic, although it does not rank high on total emissions. Taking population size into account changes the picture, but the 40% reduction goal still obtains whatever emission measue one employs.

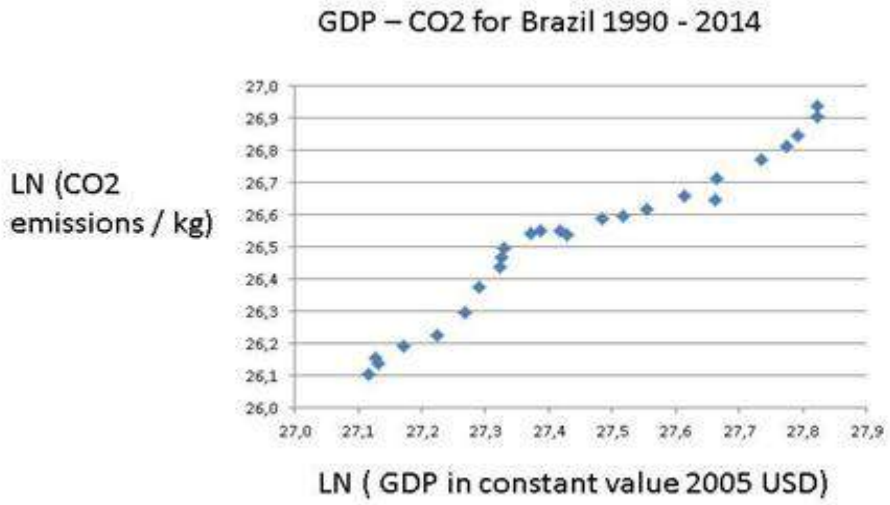
Countries

BRAZIL

Brazil has for a long time been in the forefront of environmental concerns. On the one hand, it has paved the way for an alternative to the oil dominance in transportation by developing a domestic biomass industry on large scale. The ethanol is derived from immense sugar plantations and it has reduced oil dependency, especially when international petrol prices have skyrocketed. On the other, there is the constant worry that Brazilian governments are ineffective in protecting the lungs of the Planet Earth, the giant rain forest in the Amazonas.

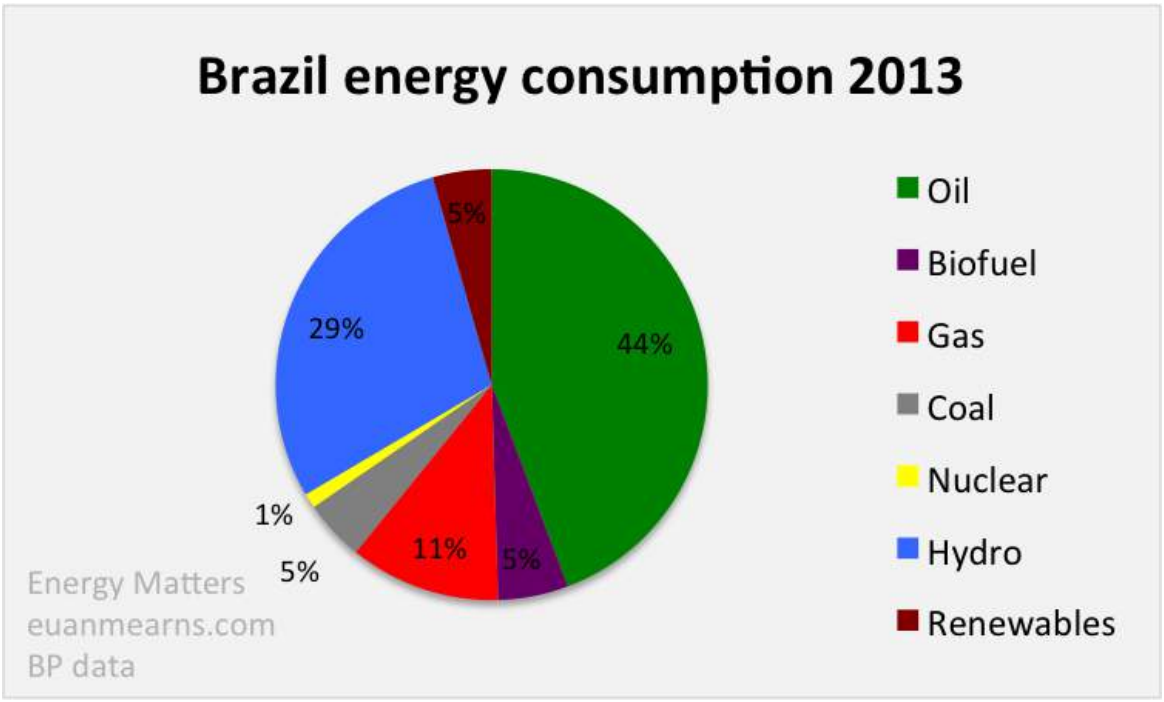
First, we may establish that Brazil produces much CO2:s, and this as a function its economic development (Figure 6).

FIGURE 6. GDP-CO2 in Brazil: y = 1,02x R^2 = 0,95



The trend in Brazil for CO2:s is like in Argentina up and up. When the burning of the rain forest is added, then Brazil is one of the largest CO2 emitter in the world. The country may reply that its energy mix and its huge forests decrease CO2:s by consuming carbon (Figure 7).

FIGURE 7. Energy mix of Brazil



Source: http://euanmearns.com/brazil-samba-energy/

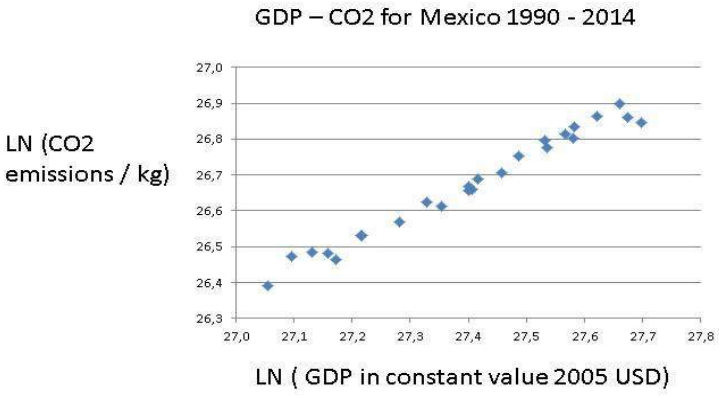
Hydroelectric power is massive in Brazil and capacity has grown steadily since 1965. However, hydro production has been down owing to late and light rains. Brazil is one of the few countries in the world where liquid biofuel production is significant: ethanol. Gas production in Brazil is significant, but Brazil has very little of coal production. In 2006, the discovery of vast oil resources in the sub-salt strata of the Santos Basin promised petroleum bonanza, but deep water and sub-salt setting has posed technical challenges and high costs. Brazil has 3 nuclear reactors, but nuclear provides merely 1% of primary energy.

One can hardly say that it will easy for Brazil to live up to its COP21 commitments, despite its comparatively low dependence upon fossil fuels. Its large hydro power supply is vulnerable to draught, as rivers dry up. And then one must add the political difficulties in managing the oil and gas reserves properly in giant enterprise Petrobas. The huge Mato Grosso could be used for renewable energy generation, wind and solar power.

MEXICO

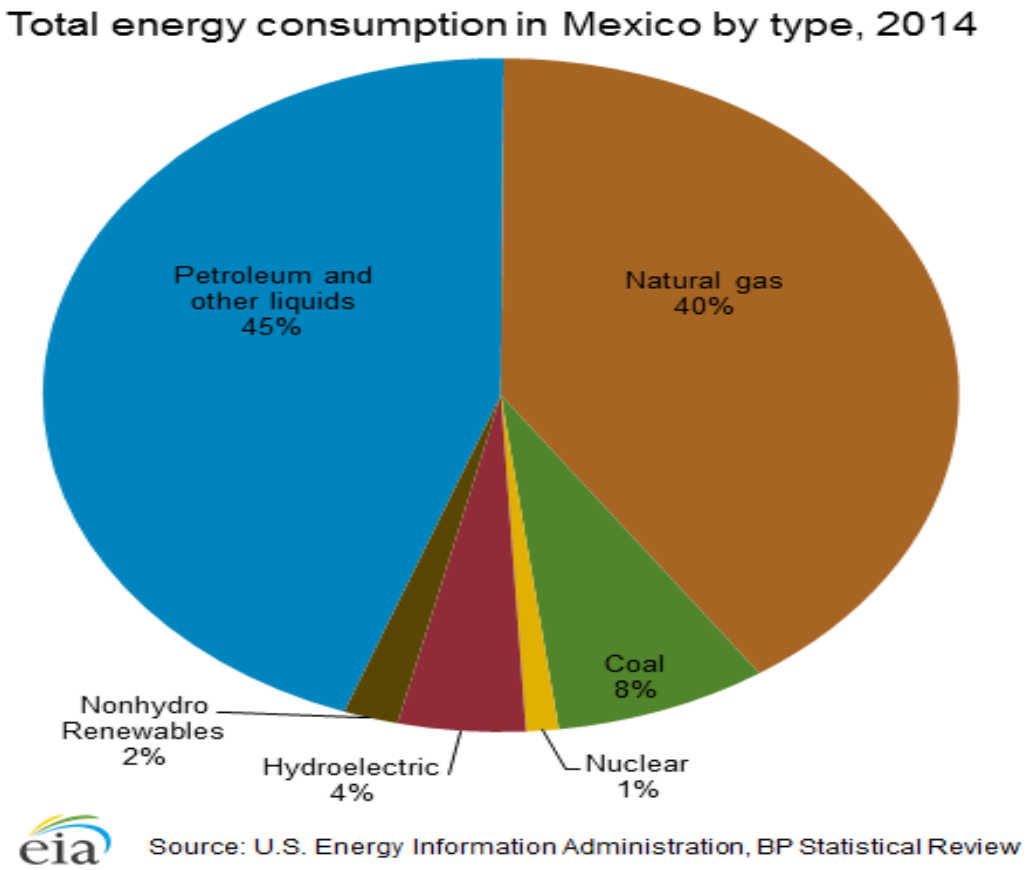
One would expect to find huge CO2 emissions in this large emerging economy with lots of oil production. Countries like the Gulf States have massive CO2:s because they drill and refine oil and natutal gas. For Mexico holds the following situation (Figure 8).

Figure 8. GDP-CO2 in Mexico: y = 0,77x; R^2 = 0,98



The close link between economic development and CO2 is discernable in the data, but the emissions growth seems to stagnate in the last years. This is of course a promising sign, whether it is the start of a COP21 inspired 40% reduction in CO2:s remains to be seen. I doubt so, but let us enquire into the energy mix of this huge country that is of enormous economic importance to both North and South America (Figure 9)

FIGURE 9. Energy mix for Mexico

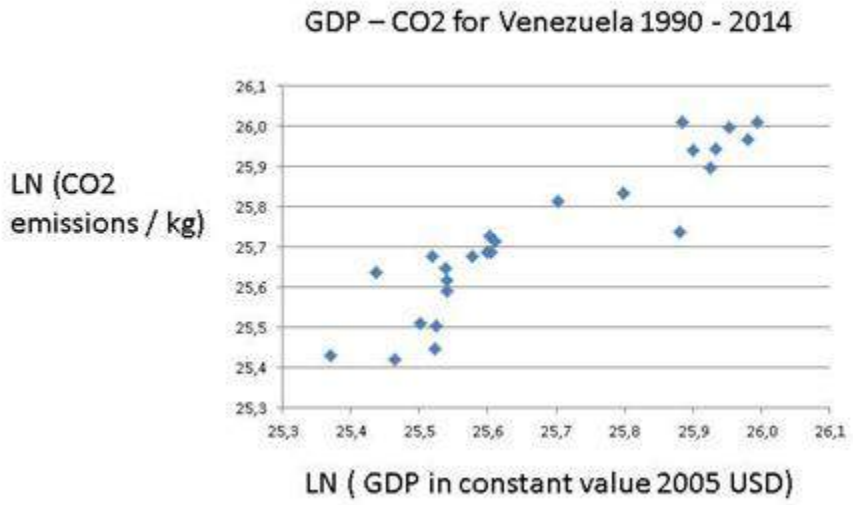


Few countries are so deependent upon fossil fuels as Mexico. One find the same patter with the Gulf States. The Mexican government must start now to reduce this dependency, by for instance eliminating coal and bringing down petreoleum, instead betting upon solar, wind and nuclear power. Mexico will face severe difficulties with the 40% reduction target in COP21. It has a fast growing population with many in poverty and an expanding industry sucking electricity. Can economic growth and decarbonisation go together here?

VENEZUELA

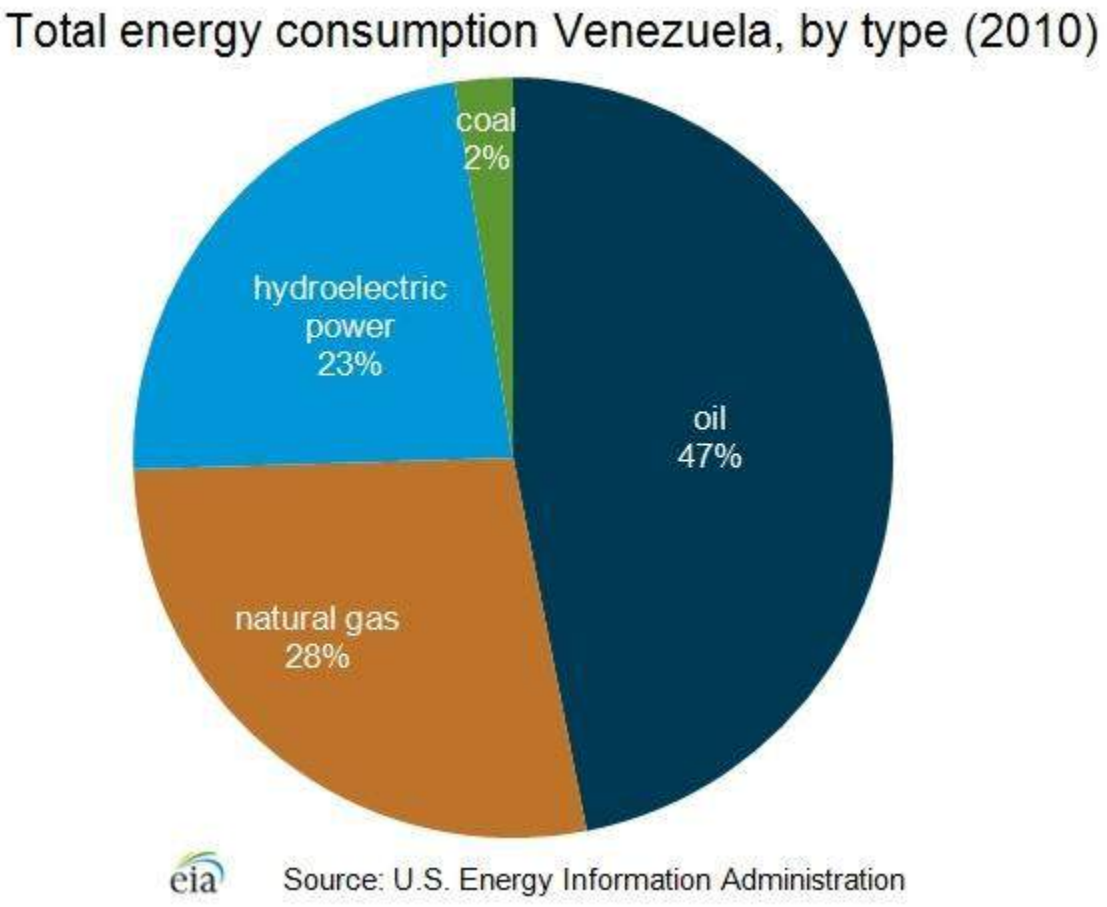
Energy is an interesting aspect of this nation, which is now in turmois because of the lack of it, despite the immense oil and gas resources of this country. Just as with otheroil producing countries, one expects the CO2:s to be quite substantial. Figure 10 confirms thiss expectation, but one may note many yearly ups and downs in reWhy this link is not a smooth one may be explained both by the energy mix and the volatile politics of Venezuela.

FIGURE 10. GDP-CO2: $y = 0,87x$; $R^2 = 0,85$



The dependency upon fossil fuels is high in Venezuela, but the country differens from Mexico in that it disposes of considerable hydro power.

FIGURE 11. Venezuela



Typical of Latin America is that several countries make use of hydro power to mitigate their dependency upon fossil fuels, mainly oil and natural gas. In the case of Venezuela, it is the water resources that have failed, causing such electricity chaos, resulting in loss of output and work. Strangely, the Venezuelan government has not taken any steps towards precaution, building back up generators based upon its massive oil and gas reserves. Perhaps the hope of a totally carbon free society is an illusion: What happens when water dries up for instance?

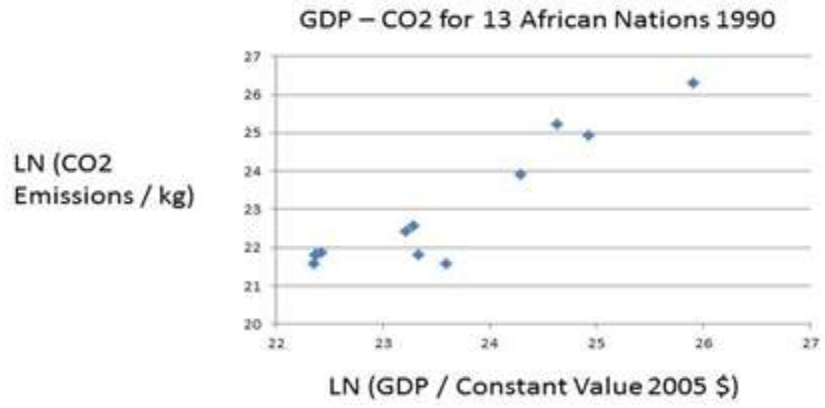
Summing Up: The exploitation of water power allows Latin American nations to reduce their dependency upon fossil fuels. Yet, global warming may threaten the access to plenty fresh water. Atomic power is used in some of these countries. Solar power could be the future in for instance Mexico, much too reliant upon oiland gas. Brazil uses modern renewables highly but still has much CO2 emissions. Uruguay and Chile appear to be best positioned for the COP21 implementation process.

(B) AFRICA

The purpose below is only to map energy related emissions for a few countries in order to get a glimpse at what African governments and societies face when starting to implement the COP21 Agreement. The African continent harbors two kinds of societies or economies. On the one hand there are emerging economies in the North and the South. On the other hand, there are poor countries in the stomach of Africa, many of which have been plagued by political instability and death from domestic violence.

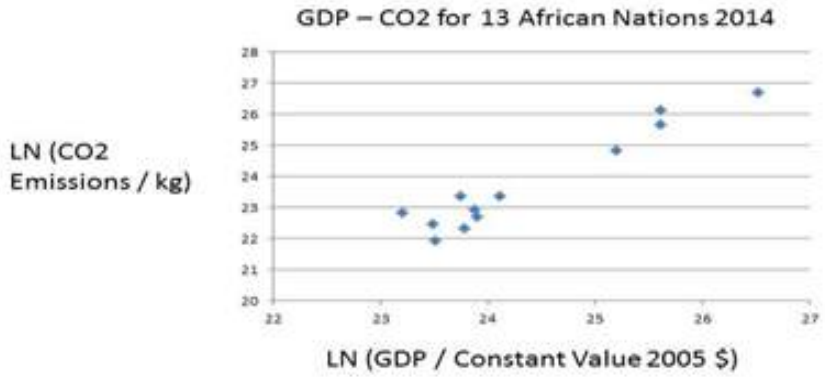
Figure 12 displays the connection between GDP and CO2:s around 1990 for a selection of African nations.

FIGURE 12. GDP-COP 1990 ($y = 1{,}34x$, $R^2 = 0{,}87$)



When we look at the same factors in 2014, the link has been strengthened considerably (Figure 13).

FIGURE 13. GDP-CO2 2014 (y = 1,47x, R^2 = 0,93)



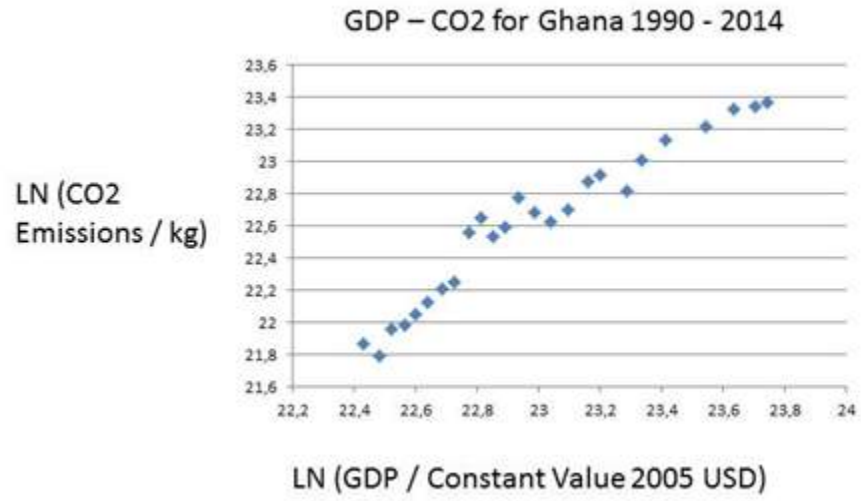
The finding is that African nations face the same problematic as countries on the other continents. They must reduce CO2:s while maintaining economic development. What this dilemma entails appears clearly when a few African nations are explored below according to the theoretical framework above.

Countries

GHANA

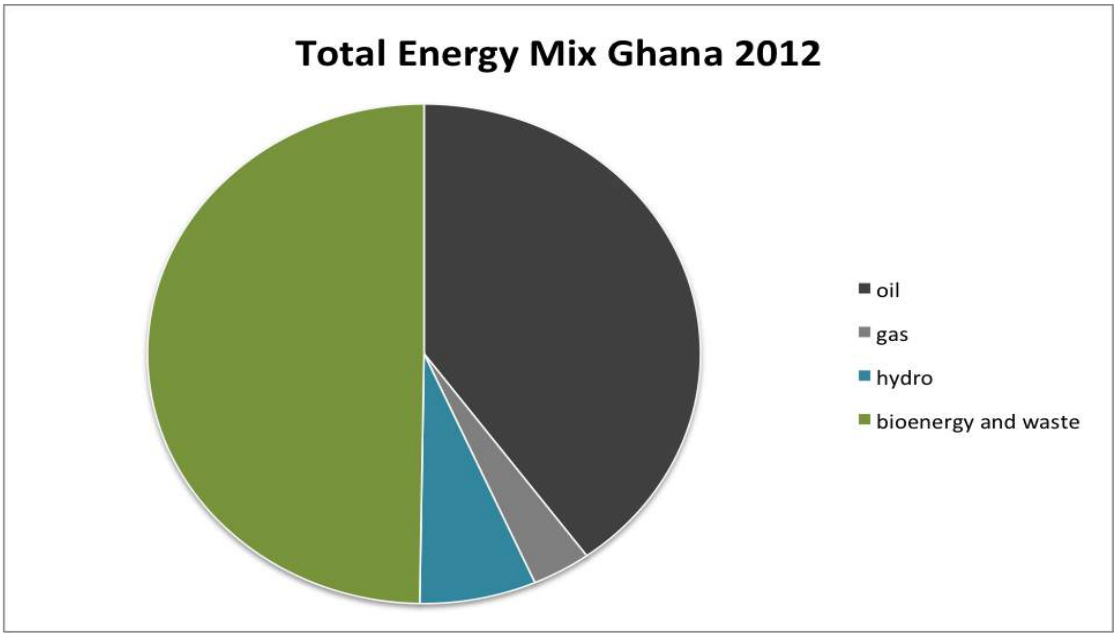
One of the promising nations in Africa is Ghana, housing both democracy and positive economic development. Figure 14 shows its GDP-CO2 picture for the last two decades, when things have gone well and peacefully.

Figure 14. Ghana: GDP-CO2: y = 1,17x, R^2 = 0,94



There is a very strong connection between GDP and CO2 emissions in Ghana. One would like to examine its energy mix in order to understand this. Figure 15 present the energy consumption pattern in Ghana.

FIGURE 15.

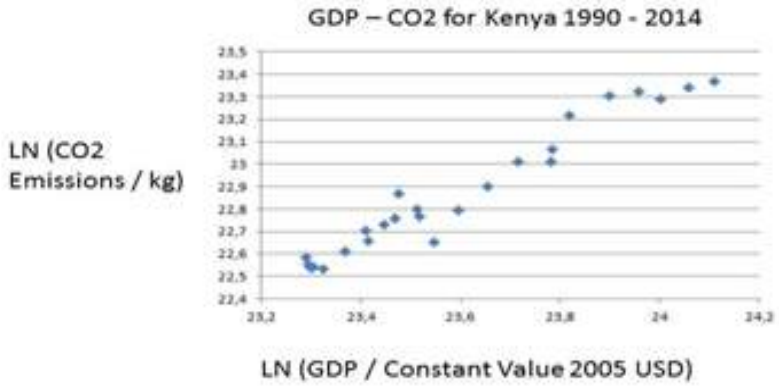


Source: http://climateanswers.info/2015/10/ghana-climate-and-energy-statistics/

Ghana needs both electricity and petrol. Figure shows that oil is used abundantl, but there is also much hydro power. Yet, 50 per cent of the power comes from bioenergy and waste, which is classified as renewables. These kinds of *traditional* renewables are to be found in almost all sub-saharan Africa countries. And they create large CO2 emissions,which is why there is this close link between GDP and CO2:s here. Look now at Kenya in Figure 16.

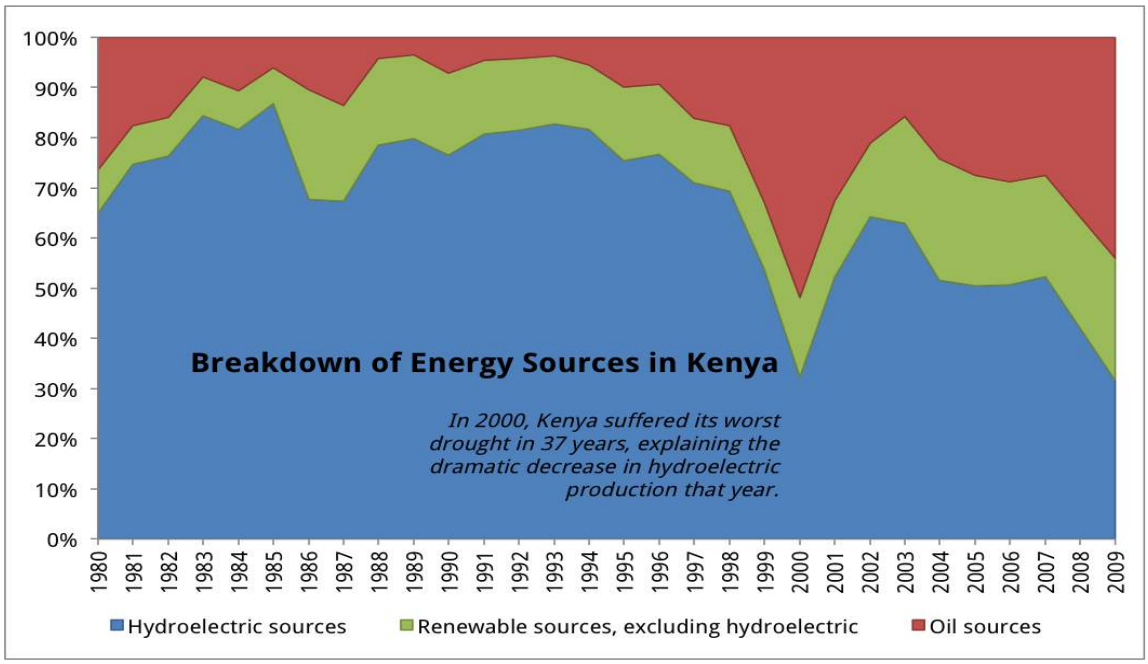
KENYA

FIGURE 16. Kenya: y = 1,08x, R^2 = 0,95



As a matter of fact, Kenya:s curve for GDP and CO2:s resembles that of Ghana, both countries experiencing economic progress. The basic energy resources are also the same: renewables, hydro and petroleum – see Figure 16.

FIGURE 16. Kenya: enrgy mix



Source: http://investeddevelopment.com/blog/2012/08/energy-in-kenya-and-the 6-potential-for-renewables/

However, these renewables are not all carbon neutral: charcoal and dung besides the normal renewables like solar, wind and thermal power.

One may expect that countries with the possession of big rivers resort to hydro power, like Senegal, Kongo, Angola and East African states

However, hydro power is nowhere dominant as general energy source. Many poor African nations employ traditional renewables that are far from carbon neutral. An example is the giant Democratic Republic of Congo, where wood and charcoal dominates very much. It is of course a matter of deforestation and desertification when woord and charcoal are used so heavily.

One mays speculate as to wht hydro power isnot more used in several African countries. One reason has already been mentioned, anarchy. Another is of course the enormous investments costs. Hydro power should be more used in countries like Nigeria, Angola and Kongo. But it is not without risks, namely water shortages.

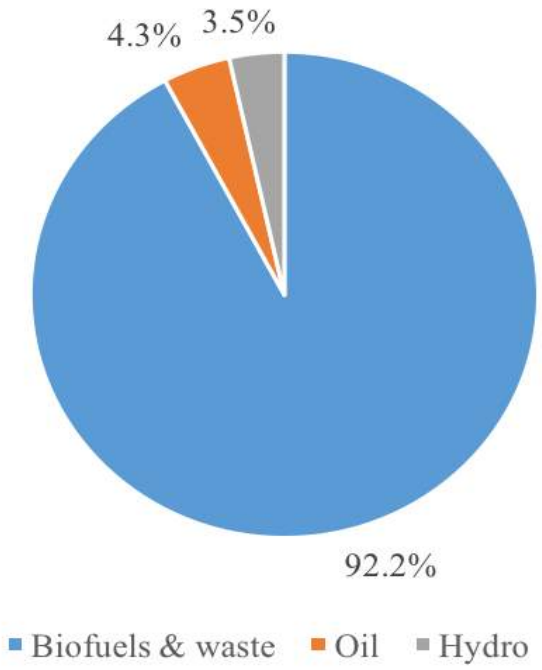
KONGO, DR

A general teent in the climate change debate is that renewables should be preferred over non-renewables. Yet, this statement must be strictly modified, as there are two fundamentally different renewables:

- Traditional renewables: wood, charcoal and dung. They are not carbon neutral. On the contrary, employing these renewables results in severe pollution, not only outside but also insidea household;
- New renewables: solar, wind, geo-thermal and wave energy that are indeed carbon neutral, at least at the stage of functioning.

In the poor African countries with about half the population in agriculture and small villages, traditional renewables constitute the major source of energy.

FIGURE 17. DR KONGO



Source: Democratic Republic of Congo - Energy Outlook, Kungliga Tekniska Hogskolan

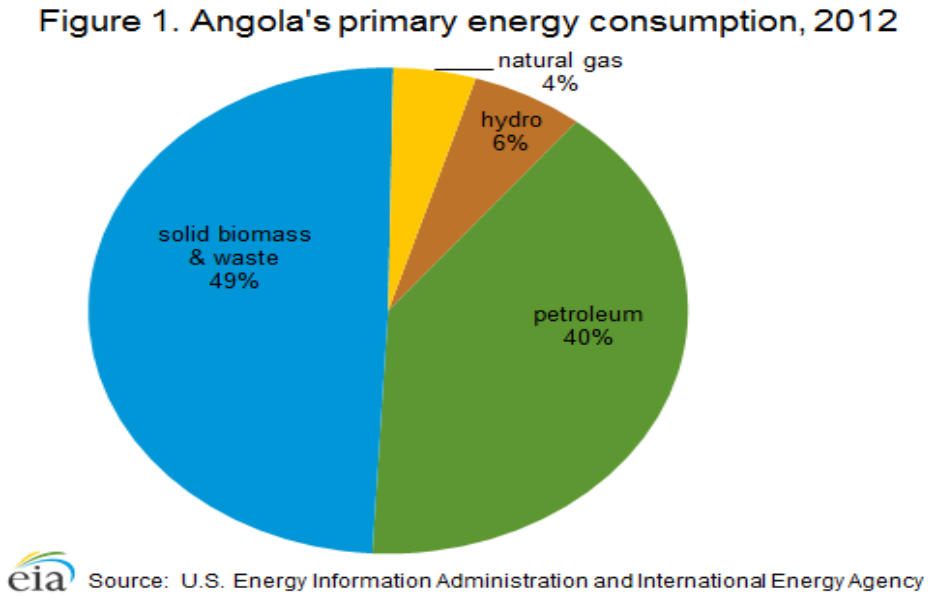
One notes how little of hydro power has been turned into electricity in Kongo, but economic development and political instability, civil war and anarchy do not go together normally. At the same, one may argue that an extensive build-up of hydro power stations would pose a severe challenge to the fragile environment in the centre of Africa. Kongo can now move directly to modern renewabes like solar power.

When we turn to the already industralised countries in North and South Africa, the energy patterns is entirely different from above. As many African countries have reached their ”take-off” stage, they need energy, especially electricity. Yet, the African scene is highly diverse, with on the one hand economic success stories and on the other hand the spread of anarchy and lawlessness. For the environment on the African continent, both energy exploitation and criminals’, rebels’ or terrorists’ activities are negative events all the time, resulting in poaching and loss of animal habitat. Let us look at the emissions-energy situation in a few countries that are stable: Egypt, Algeria and South Africa.

ANGOLA

This enormous reliance upon traditional renewables is to be found also in Angola and Nigeria, although both have access to both hydro power and fossil fuels. Figure 18 describes the energy mix for Angola.

FIGURE 18.

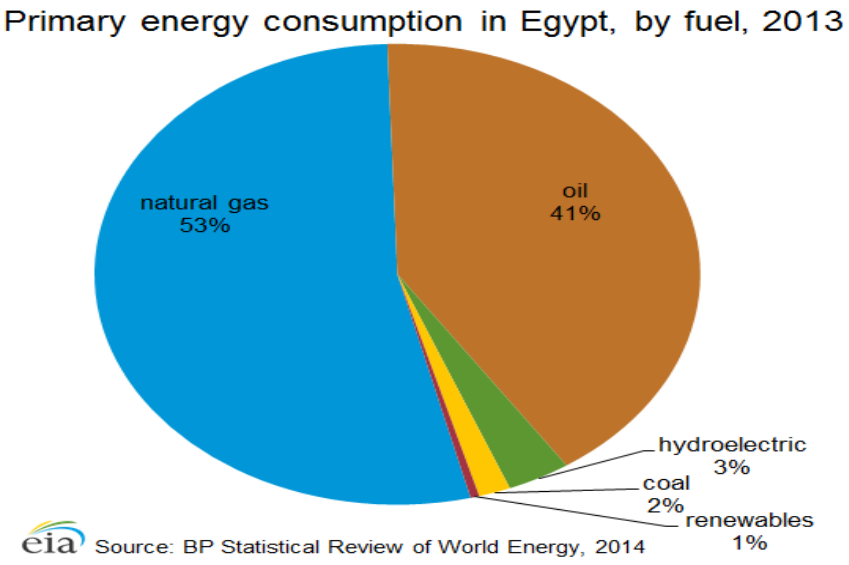


Angola like Kongo has suffered from long and terrible civi war. In the mass of poor villages, energy comes from wood, charcoal and dung – all with negative environmental consequences. Angola has immense fossil fuels – oil and gas, but the political elit family may prefer to export these resources instead of using them for electricity generation

EGYPT

Egypt has a huge population with high unemployment and mass poverty besides a certain level of political instability, resulting from religious conflicts. But surely it has electricity from inta giant Assuam dam and the Nile? No, it does not coult for much where most people live in the Nile delta (Figure 19).

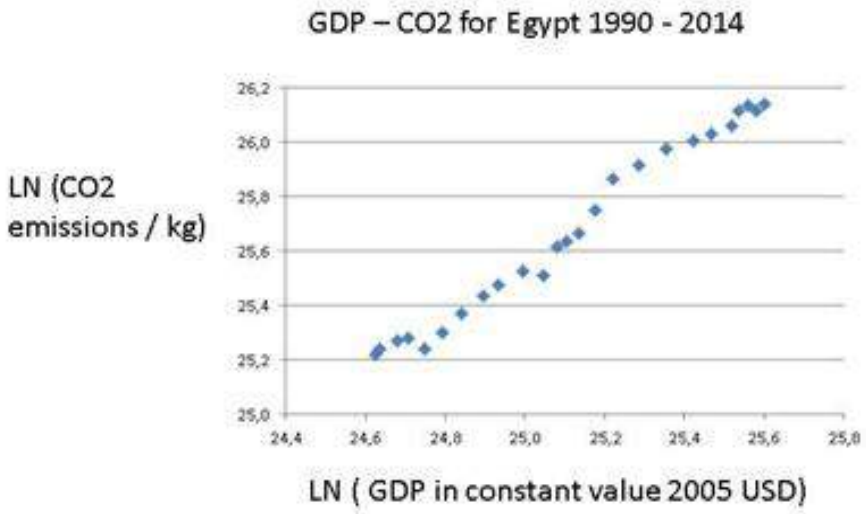
FIGURE 19.



The share of hydro power is stunning low for a country with one of largets rivers in the world. Actuallu, the water of the Nile is the source of interstate confrontation between Egypt, Sudan and Ethiopia.

As Egypt relies upon fossil fuels, it has massive CO2 emissions, the trend of which follows its GDP (Figure 20).

FIGURE 20. GDP-CO2 for Egypt: y = 1,02x; R^2 = 0,99

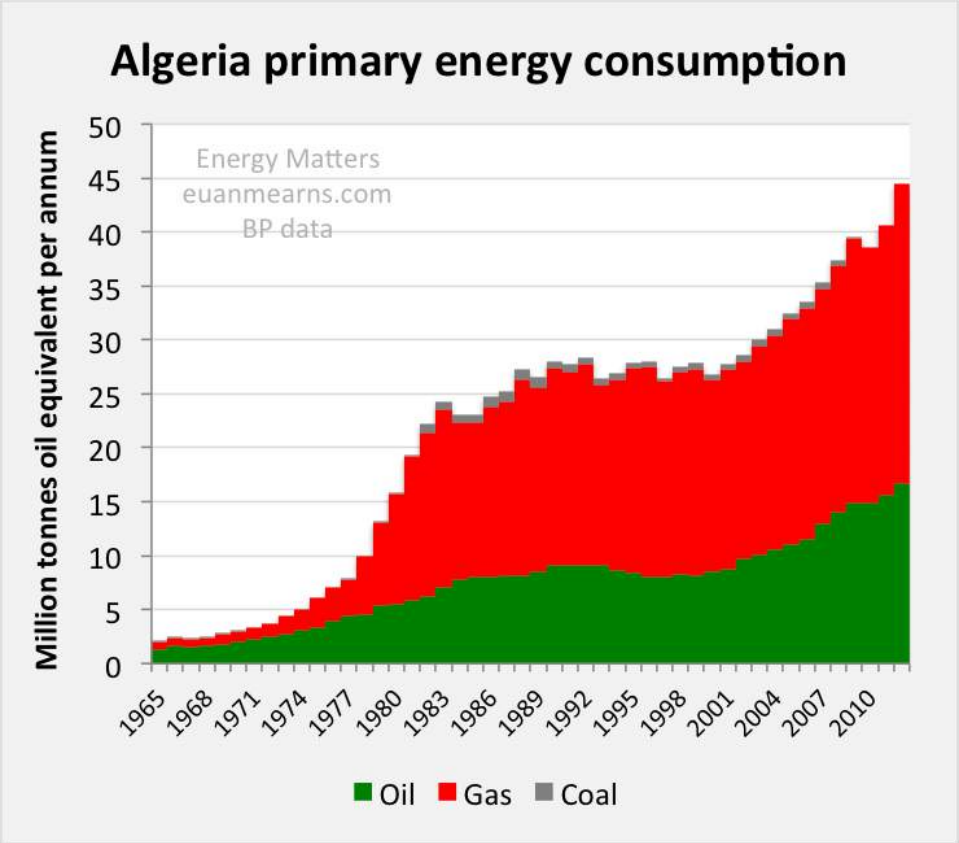


It will be very difficult for Egypt to make the COP21 transformation, at least without massive external support. But where to build huge solar power plants in a country with terrorism, threat or actual?

ALGERIA

Algeria ia a major exporter of natural gas and oil, Thus, we expect that it relies mainly on fossil fuels, like Mexico and the Gulf States. Figure 21 verifies this expectation.

FIGURE 21.



Source: http://euanmearns.com/post-peak-algeria/

Although Algeria may trust in the availability of future fossil fuels resources, it still faces the demand for a 40% reduction of its CO2 emissions. They have thus farfollowed the economic progress.

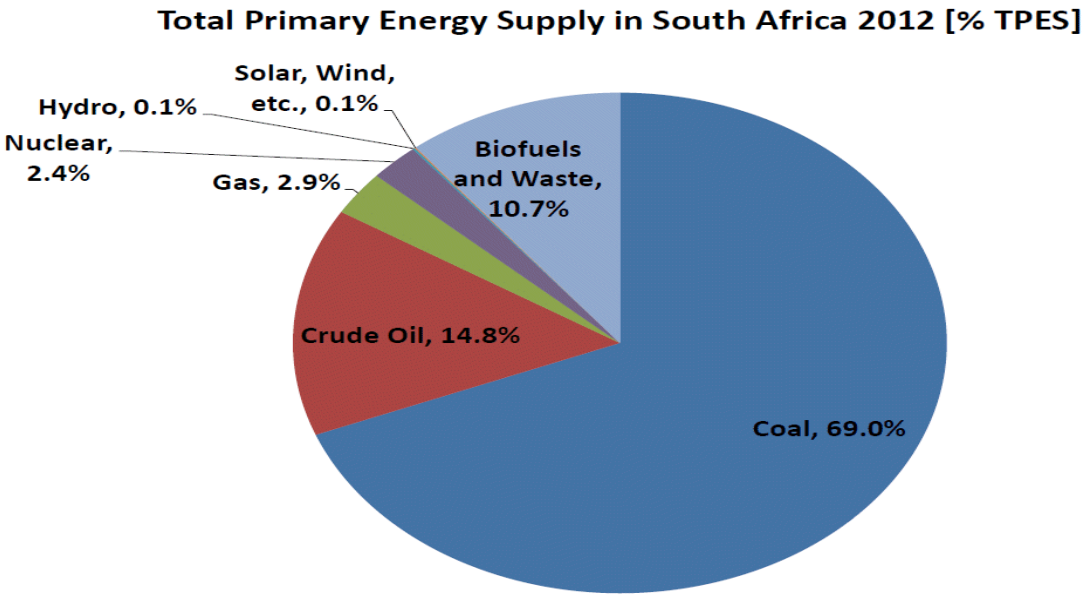
One would naturally suggest solar energy as a viable alternative to the heavy dependence upon fossil fuels in Algeria, given its immense Saharan territory. Yet, also Algeria has been plagued by the attacks of terrorists or looters.

The COP21 framework outlines the three main goals for the 21rst century in order to keep Planet Earth habitable. Thus, these 3 objectives are now accepted as desirable, but scholars now question whether they are feasible, at least without massive costs or economic decline and global depression (Sachs, 2015). A few countries are almost completely dependent upon coal. How will they implement the COP21 goals? Look at South Africa. Emissions are high, because South Africa uses a lot of coal to generate electricity. Decarbonisation will be difficult and costly. The reliance upon coal in this largest economy in Africa is stunning.

RSA

The RSA has a modern economy running on mainly coal (Figure 22). In transportation, it uses petroleum. This makes the RSA a major polluting nation. It wants to spread electricity to all shanti-towns, but with what energy source?

FIGURE 22. Energy consumption in RSA



Does the RSA have the resources and motivation to cut the coal consumption radically and move to solar energy for instance? Or could the RSA renege – the always available option in collective action endeavours.

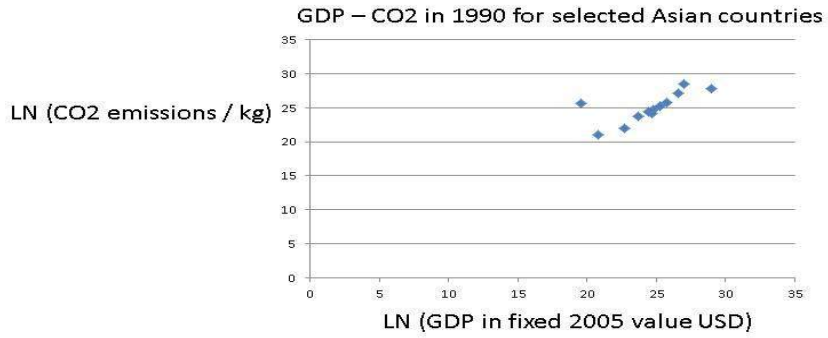
Summing Up: The African continent is so heavily dependent upon solids that implementing the COP21 objectives will prove exceedingly problematic, especially without support from the super fund. Some nations rely almost exclusively upon oil and gas or coal, whereas others depend upon wood, charcoal and dung. Hydro power is exploited, but will water suffice for instance in the Nile Delta that several countries share? Atomic power is completely lacking. The solar power plant is the only way out in order to reduce solids and oil and gas.

(C) ASIA

Climate change is extremely complex as a set of phenomena and a model of it needs to simplify in order to emphasize a few essential features. Here, I select the GDP, energy consumption and GHG emissions, especially the CO2 emissions. According to this model simplification, GDP requires enormous amounts of energy consumption in a wide sense that results in the emission of GHG:s, mainly about 70 per cent CO2:s. This model bypasses other sources of CO2:s from natural causes and concentrates only upon the so-called anthropogenic ones, as with COP21.One may of course look at the C2 from an overall biological perspective, analysing the incredible amounts that cycle all the time. The anthropogenic contribution of CO2 emissions is tiny in comparison, but according to the COP21 approach decisive for clime change.

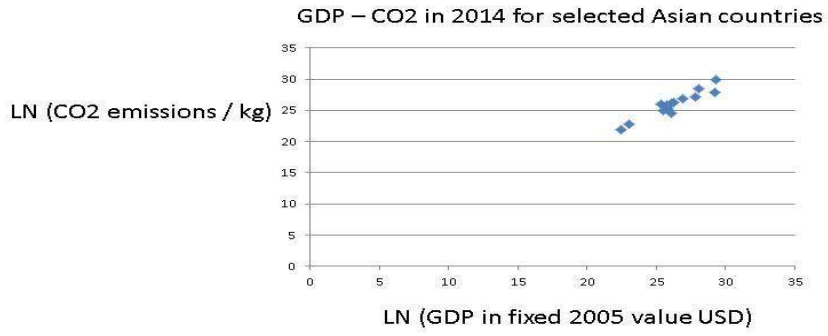
How, then about CP2 emissions in Asian countries from human activities, mainly of en economic import? Start with Figure 23.

Figure 23. The 1990 Situation: GDP and CO2 in Asian Countries (y = 0,60x, R^2 = 0,5)



The link between total CO2 emissions and overall GDP is to be found in the early 1990s for Asia, as the richer countries pollute more than the poorer ones. Yet, the connection is not very strong. Figure 24 shows how things developed during the two decades of mainly quick economic development and the spread of the Asian economic miracle from the 4 tigers to almost all Asian countries, especially the giants, viz China, India and Indonesia.

Figure 25. The 2014 Situation: GDP and CO2 in Asian Countries (y = 1,02x, R^2 = 0,91)



Today, the CO2 emissions are much larger for all Asian countries, following the increase in economic output, or GDP closely. These enormous emissions of CO2 put the Asian region in the top most polluted regions in the world, besides North America and The EU. The consequences are visible in the huge cities in Asia, where smog levels have skyrocketed, hurting the health of ordinary people, like in Delhi, Beijing and Bangkok, etc.

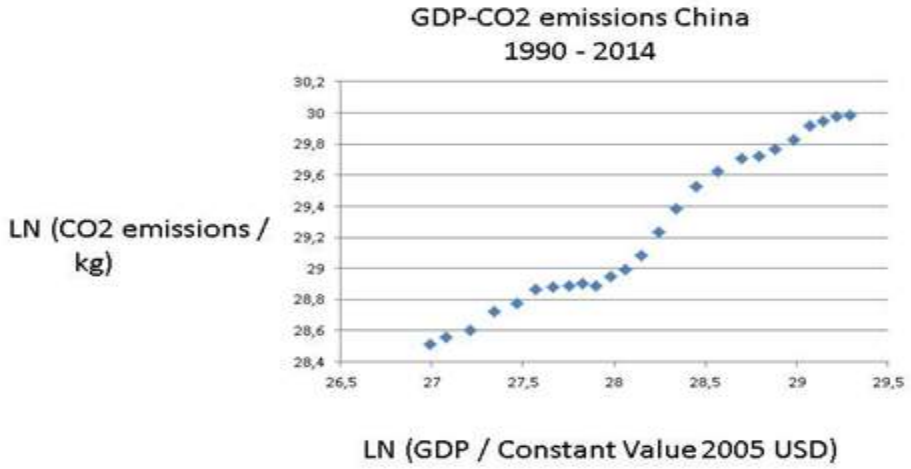
It has often been pointed out that practical environmentalism would be much in the self-interest of Asian peoples, but the reasons of environmental degradation in this region is not a lack of theoretical environmentalism in the minds of people but the clash between ecology and economic development or growth. The immense increase in both GDP per capita and emissions per capita in Figures 24 and 25 would have been impossible without the massive use of energy, i.e. fossil fuels.

Countries

China

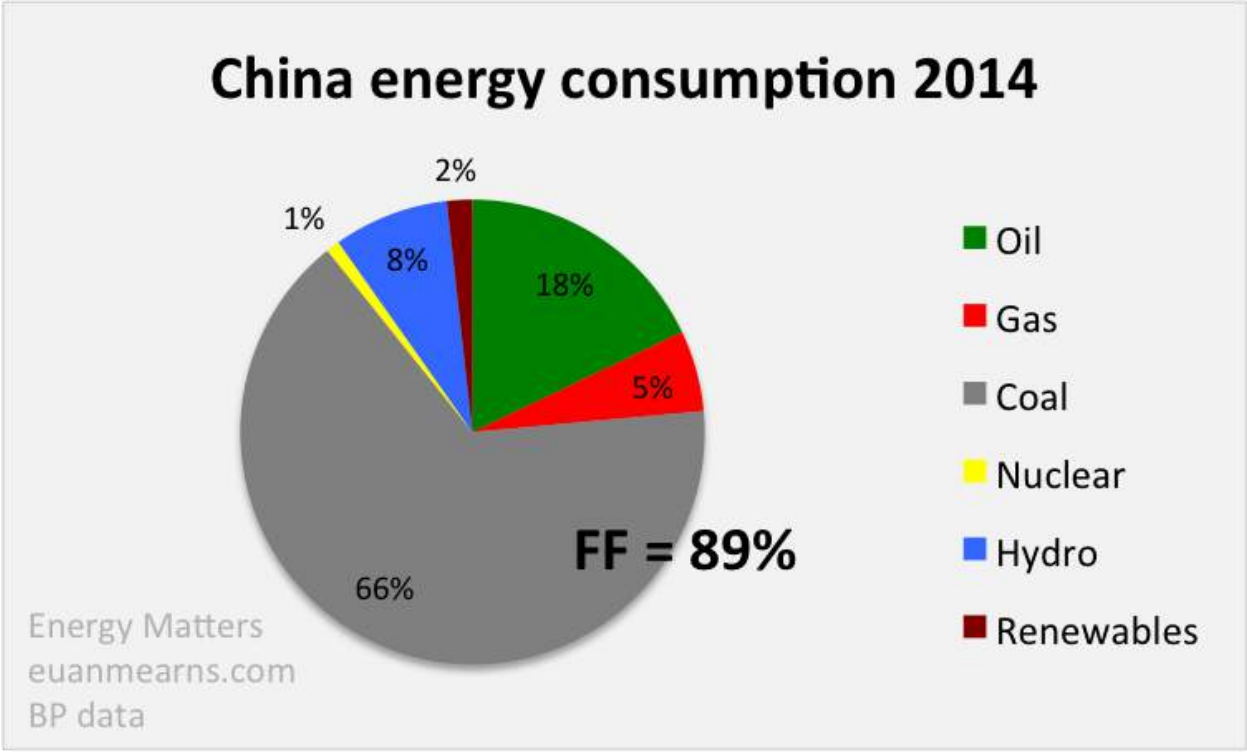
One finds that the emissions of CO2:s follows economic development closely in many countries, like China, South Koreas and most Latin American countries. The basic explanation is population growth and GDP growth – more people breathing and searching for higher life style. Take the case of China, whose emissions are the largest in the world, totally speaking (Figure 26). Interestingly, China has begun a fundamental change of its energy policy in 2015, reacting to mostly domestic demands for cleaner air and environment.

FIGURE 26. CHINA: LN (CO2/ Kg and LN (GDP / Constant Value 2005 USD) (y = 0,7x; R^2 = 0,97)



The sharp increase in CO2:s in China reflects not only the immensely rapid industrialization and urbanization of the last 30 years, but also its problematic energy mix (Figure 27), which is now up for overhaul.

FIGURE 27.



Source: http://euanmearns.com/china-post-industrial-revolution

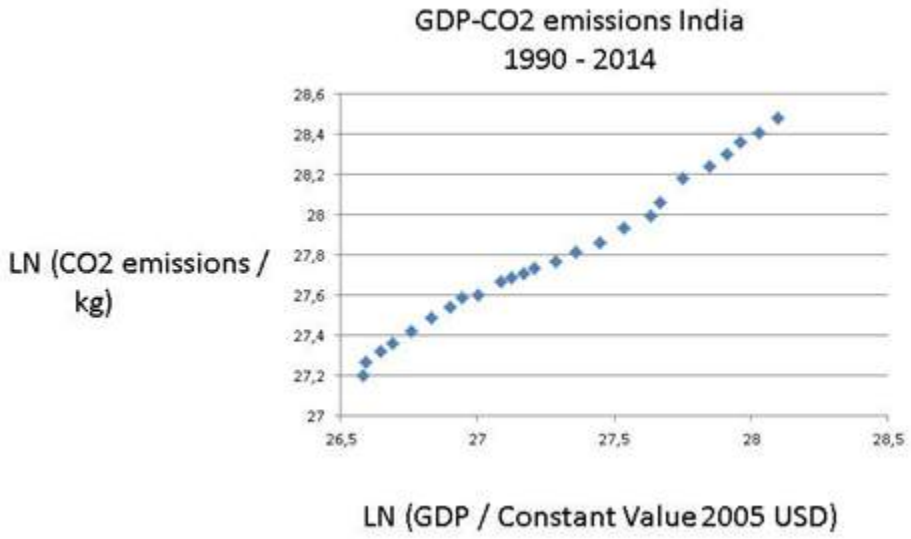
Almost 70 per cent of the energy consumption comes from the burning of coal with an additional 20 per cent from other fossil fuels. The role of nuclear and renewable energy sources with the exception of hydro power is very small indeed. This energy mix makes China very vulnerable to demands for radically cutting CO2 emissions: use other energy sources or massive installation of highly improved filters for carbon capture? It is true that China has turned to wind power, solar power and nuclear power massively recently, but the task of achieving a 40% reduction is enormous. China evidently hopes to respect its COP21 commitments while still enjoying an economic growth rate of above 5%, but it is realistic? New coal plants have actually been opened recently, replacing out-dated old ones in order to propel growth.

It should be pointed out that several small countries have much higher emissions per capita than China. This raises the enormously difficult problematic of fair cuts of emissions. Should the largest polluters per capita like the rich Gulf States cut most or the biggest aggregate polluters, like emerging economies China, India and Indonesia for instance? At COP21 this issue about redistribution was resolved by the creation of a super fund to assist energy transition and environment protection in developing counties, as proposed early by economist Stern (2007)

India

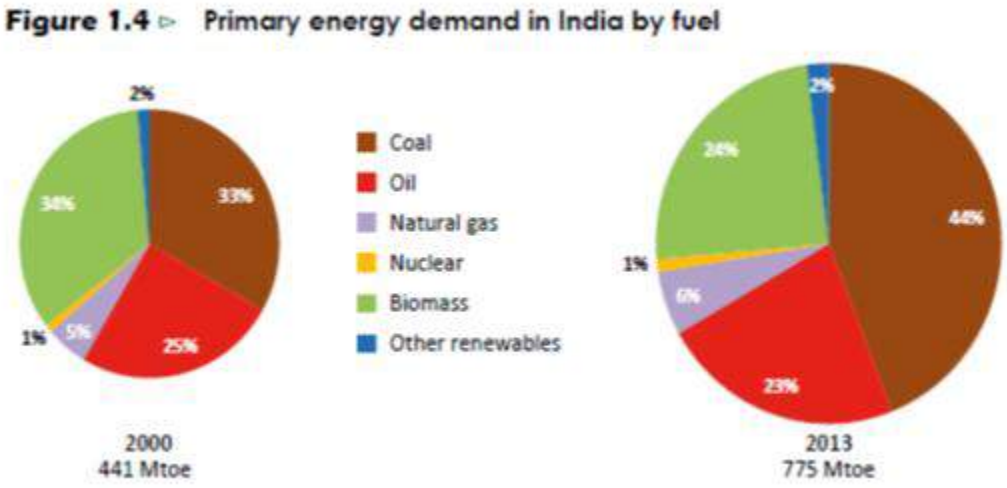
India is even more negative than China to cut CO2 emissions, as it is in an earlier stage of industrialization and urbanization. Figure 28 shows the close connection between emissions and GDP for this giant nation.

FIGURE 28. INDIA: LN (CO2/ Kg and LN (GDP / Constant Value 2005 USD)



India needs cheap energy for its industries, transportation and heating as well as air-conditioning, meaning it aims strongly at electrification. From where will this power come? India has water power and nuclear energy, but relies most upon coal, oil and gas as power source. It has strong ambitions for the future expansion of energy, but how is it to be generated, the world asks. India actually has one of smallest numbers for energy per capita, although it produces much energy totally. Figure 29 shows its energy mix where renewables play a bigger role than in China. However, the renewables in India may lead to deforestation and considerable pollution.

FIGURE 29.

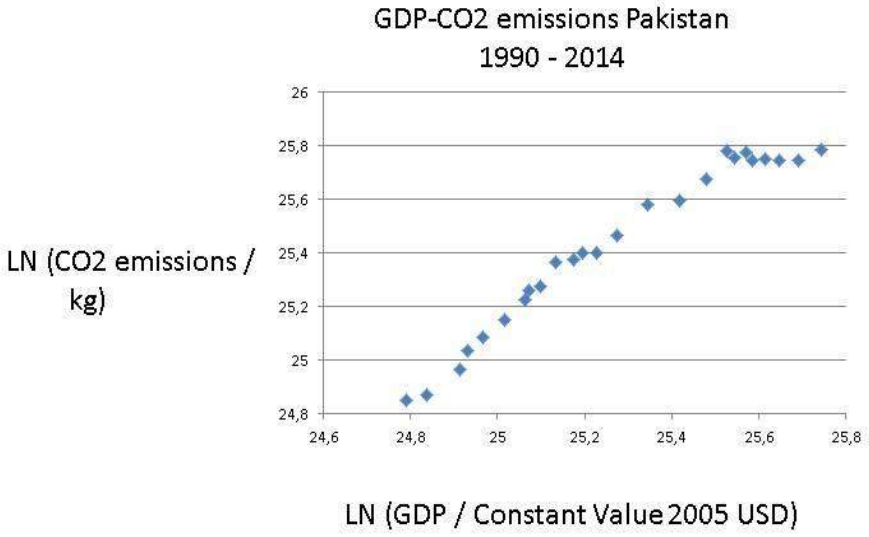


Source: http://www.eia.gov/beta/international/analysis.cfm?iso=IND

India needs especially electricity, as 300 million inhabitants lack access to it. The country is heavily dependent upon fossil fuels (70 per cent), although to a much less extent than China. Electricity can be generated by hydro power and nuclear power, both of which India employs. Yet, global warming reduces the capacity of hydro power – water shortages - and nuclear power meets with political resistance. Interestingly, India uses much biomass and waste for electricity production, which does not always reduce CO2 emissions. India's energy policy will be closely watched by other governments and NGO:s after 2018. The constant tension between the demand for economic growth on the one hand and environmental protection on the other hand is sharply portrayed in Ramesh (2015).

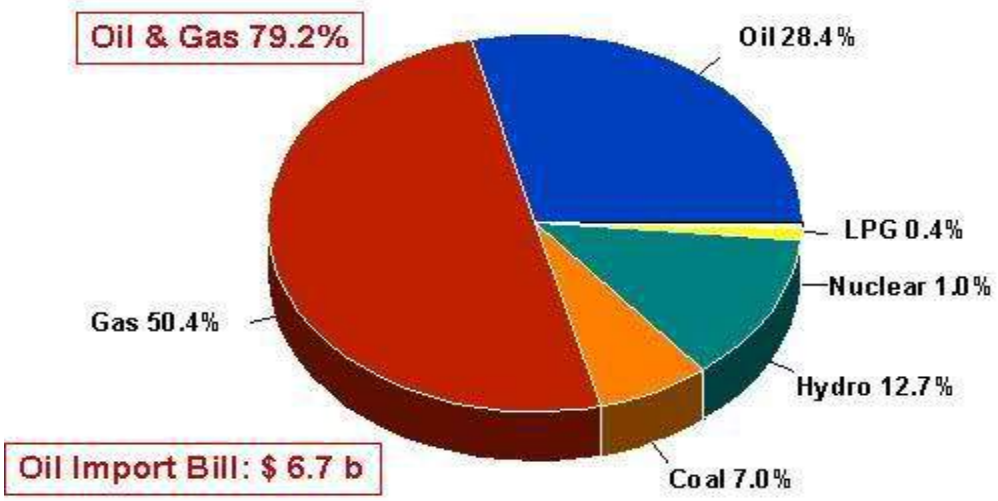
The same upward trend holds for another poor developing country with huge population, namely Pakistan (Figure 30).

FIGURE 30. PAKISTAN: LN (CO2 / Kg and LN (GDP / Constant Value 2005 USD) **(**y = 1,05x - 0,97; R^2 = 0,96)



The amount of CO2 emissions is high for Pakistan, viewed as aggregate. Pakistan is mainly reliant upon fossil fuels, but not coal among them (Figure 31). Actually, it has a rather mixed bag of energy sources.

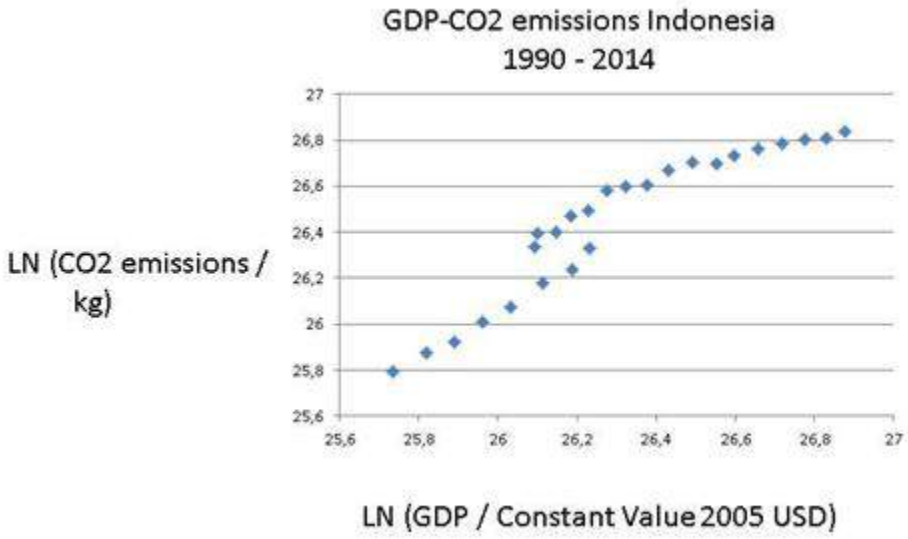
FIGURE 32. Pakistan Energy Consumption 2009 (by ShoXee: http://i27.tinypic.com/2h6cyag.jpg)



But Pakistan employs a considerable portion of hydropower – 13 per cent – and a minor portion of nuclear power. Can it further develop nuclear and hydro power, or start using solar power on a large scale,

One may guess correctly that countries that try hard to "catch-up" will have increasing emissions. This was true of China and South East Asian countries. Let us look at three more examples, like e.g. giant Indonesia – now the fourth largest emitter of CO2:s in the world (Figure 33).

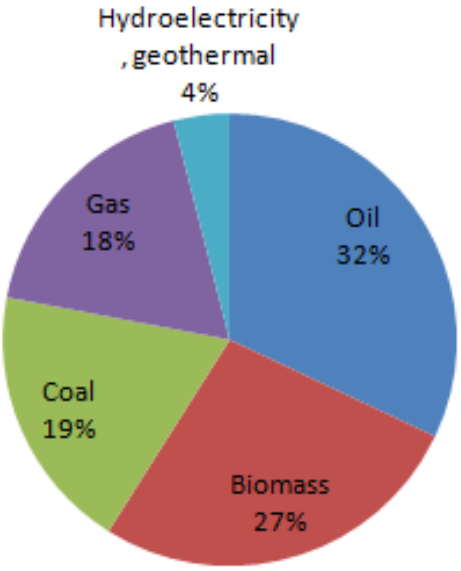
Figure 33. INDONESIA: LN (CO2 / Kg and LN (GDP / Constant Value 2005 USD)



Indonesia is a coming giant, both economically and sadly in terms of pollution. Figure 9 reminds of the upward trend for East Asia. However, matters are even worse for Indonesia, as the burning of the rain

forests on Kalimantan and Sumatra augments the CO2 emissions very much. Figure 34 presents the energy mix for this huge country in terms of population and territory.

FIGURE 34. INDONESIA: Energy mix



Distribution of Energy Consumption in Indonesia in 2009

Source: (http://missrifka.com/energy-issue/recent-energy-status-in-indonesia.html)

Only 4 per cent comes from hydro power with 70 per cent from fossil fuels and the remaining 27 per cent from biomass, which alas also pollutes. One can be sure that it is mostly a question of tradition renewables – wood, charcoal – and they pollute a lot.

Summing Up: South Asia, East Asia and South East Asia play a most critical role in the COP21 implementation process. They are responsible for almost 50 per cent of the CO2 emissions. And they plan to increase their energy consumption enormously in the next decades. They hope for carbon neutral energy sources, replacing solids and fossil fuels like oil and gas, turning to solar and atomic power. The investment needs are simply immense and quite unrealistic

CONCLUSIONS

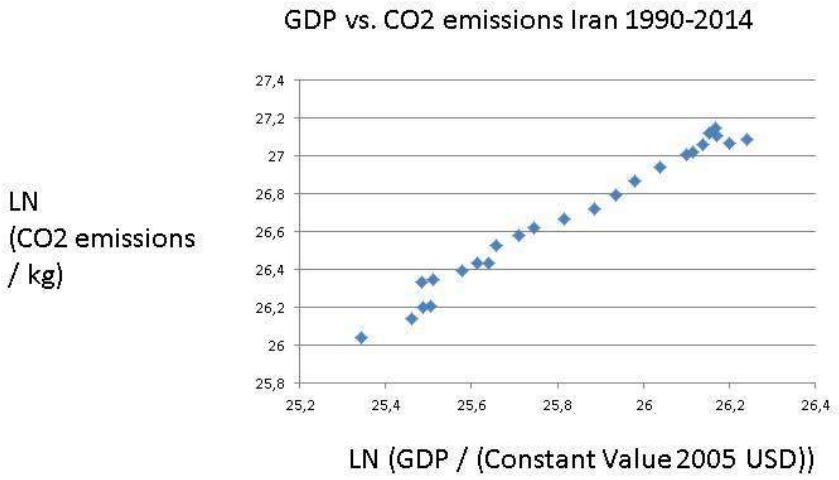
The COP21 objectives of decarbonisation must now be a major challenge for the Third World: How to substitute solids and fossil fuel energy with moderns renewables without loosing the capacity to proceed with economic development and poverty reduction? Perhaps coping with global warming and control the process to some extent is the greatest in this century, for other regions on the globe?!

With COP21, energy and emissions policy-making now becomes a question for international governance. It is supposed to go on for decades, involving country evaluation and soft control. Yet, the COP21 approach is a decentralised one, combined with international oversight, and the creation of a global warming fund with millions for support to poor countries and emerging economies (Stern, 2007).

Thus,eah government will struggle with the endemic implementation problems, as analysed in the theory of policy implementation (Wildavsky, 1979, 1987). Complete and successful implementation of policies is a figment of the imagination. Just look at Iran in order to understand the complexities of decarbonisation.

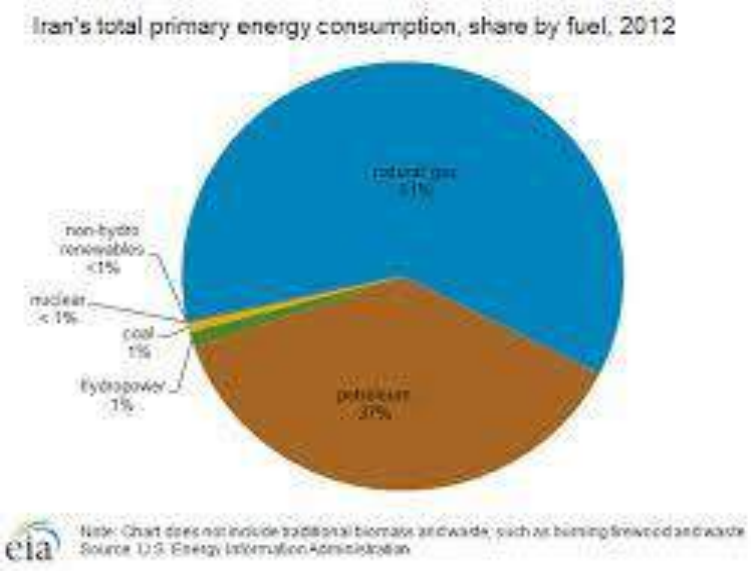
Countries may rely upon petroleum and gas mainly – see Iran (Figures 34 and 35). CO2 emissions have generally followed economic development in this giant country, although there seems to be a planning out recently, perhaps due to the international sanctions against its economy.

FIGURE 34. Iran (y = 1,2229x - 4,91; R^2 = 0,98)



Iran is together with Russia and Qatar the largest owner of natural gas deposits. But despite using coal in very small amounts, its CO2 emissions are high. Natural gas pollute less than oil and coal, but if released unburned it is very dangerous as a greenhouse gas.

FIGURE 35.



One understands why an emerging economy like Iran wants atomic power. It would allow them to sell their fossil fuels on the market. But the problems for international governance of this energy policy have been most costly in terms of transaction costs. Iran would defend their position with the economic growth argument (de Bruyn, 2012; Eriksson, 2013; Sachs, 2015).

Thus, the implementation of COP21 global goals will be made more difficult and perhaps unfeasible when:

1) Countries are almost totally reliant upon solids or fossil fuels

2) They have little experience of modern renewables but employ traditional renewables heavily

3) They lack hydro or nuclear power

4) They need massive financial and technological assistance to shift energy sources

5) Their state is weakly institutionalised and enforce the rule of law in such a bad manner that there are few principal-agent restriction upon governments

6) They suffer massive deaths for political violence in a anarchic condition.

It is not farfetched to state that the probability of implementation success for COP21 hinges not only upon the USA, Japan and the EU, but even more so upon the Third World, where conditions 1- 6 often apply.

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