



Letter n°58

The Energy Transition (4). Policies implemented in major countries.

"Do not put a burden on your shoulders that exceeds your strength." Horace

Who are the main polluters?

- Since 1850, the United States has been responsible for 20% of cumulative emissions, China 11% and Russia 7%.
- Globally, China, now the largest polluter with more than 30% of emissions, was the only country in 2020 to record an increase in emissions due to a faster recovery of its economy. The United States is in second place with 15% of global emissions and the Indians are the 3rd largest polluters on the planet. The European Union is at 12%.
- Per capita, the Americans are the biggest polluters, producing 15 tons/year/capita of carbon dioxide, the Chinese 6.7 tons and the Europeans 5 tons. The goal for each is to fall to 2 tons.
- A wealth-based approach shows that the richest 10% of the planet produce 50% of global emissions.

Why is the energy transition imperative?

- Since 1990, according to the **IPCC**, global CO₂ emissions have exceeded those produced between the beginning of the industrial era and this date.
- Between 1990 and 2016, global emissions per capita decreased by less than 2% each year. However, a reduction of 9%/year is required to reach the goal of zero emissions by 2050.
- Also, disasters are multiplying and affecting all countries. According to a recent **UN** report, within 10 years, the planet could record more than 550 disasters annually - floods or extreme drought and heat waves - compared to 350 to 500 each of the last twenty years and 90 to 100/year between 1970 and 2000.

Is there an alternative to growth?

- It is difficult to ensure economic growth without emitting CO₂, but without growth, we will not be able to ensure the energy transition.
- How can we envisage stopping growth when electricity consumption is expected to double by 2040?
- How can we think about degrowth when a billion people still do not have reliable access to electricity?
And, we could multiply the examples.

To analyze the policies implemented in the major regions of the world, we will first consider the developed countries and then the emerging countries, bearing in mind the word of **Horace** quoted at the beginning of this Letter.

Developed countries:

Between 2007 and 2018, according to *Shellenberger* in a very interesting book, "*Apocalypse Never*," some developed countries experienced a significant drop in carbon emissions. This is true in Europe, with a 23% decrease in emissions, but it is less true in the United States where we see a stabilization.

Elsewhere, the worsening of greenhouse gas emissions is a fairly general phenomenon and, in fact, if developed countries have managed to stabilize their emissions, it is often as a result of the relocation of the most polluting industries.

A topical example is America. If we add the products consumed by the Americans but manufactured elsewhere, the emissions are 8% higher. In Britain, the same calculation results in 40% more emissions.

Let's take a closer look at the United States, Europe and the United Kingdom:

- *The United States:*

Reason for satisfaction, between 2000 and 2019, GDP/capita increased by 25% and energy consumption/capita decreased by 15%.

But, in 2021, coal production surpassed the peak of 2019 and, overall, the country was responsible for 22% of global emissions.

The United States continues to invest in fossil fuels. As one of the top three oil producers, along with Saudi Arabia and Russia, it has benefited greatly from the development of shale oil. But wells have a short lifespan, often five years, and extraction can impact the health of residents and the environment. In recent years, they have also developed gas extraction.

So what can be done to reduce emissions?

Transport is the main source of emissions and therefore efforts must be concentrated there, but biofuels will remain marginal (an estimated 5% of fuel supply).

To promote alternative energies, the United States has assets but the investments will be significant: While the United States has the advantage of having a lot of solar energy in California and the southwest, the development of solar energy is hampered by the lack of large local producers and the need to buy most of the components from the Chinese.

The price of solar panels has been divided by 10 in ten years but the American network would need to be unified in order to facilitate the circulation of electricity and be able to send solar-generated electricity via high-voltage lines.

Transferring clean energy involves new power cables, changing the entire US power grid, installation time and a 15% increase in the price of electricity according to *Bill Gates*. Then there is the problem of storage, because obviously solar production is high in summer but low in winter.

The United States also has the advantage of having strong winds in the Midwest and plenty of hydroelectricity near the Pacific coast. But, here again, we must be able to transport this energy.

- *Europe:*

Europe is the world's most committed region in the fight against climate change. It accounts for 1/5 of the world's GDP but for only 9% of CO2 emissions. Since 1990, GDP has increased by 50% but greenhouse gas emissions have been reduced by a quarter and, from 2000 to 2019, European energy consumption has decreased. This reduction can be compared with stability in the United States and, above all, a 370% growth in emissions in China.

In reality, if emissions have fallen by 30% since 1990, it is because many polluting activities have been relocated. If, over the last 20 years, the consumption of raw materials in Europe has been lower, it is because economies are more service-oriented.

Europe is at the forefront thanks to the increase in decarbonized electricity production and carbon pricing in industry. Fossil fuels represent 71% of the energy balance, against more than 80% on average worldwide but we are still far from the 2050 objective of zero carbon emissions.

The carbon offset market reached €1 billion in 2021, a significant increase but a pittance compared to emissions estimated at €115 billion. The European Parliament has just extended the "polluter pays" principle to the maritime and aviation sectors and banned sales of internal combustion cars from 2035. But we will have to go further. A second carbon market for buildings could be created, but some people are opposed to it because the purchasing power of households would be affected.

Beyond these reasons for satisfaction, coal production has, unfortunately, increased significantly in 2021 and since the war in Ukraine and the anxiousness to find an alternative to Russian hydrocarbons, many countries are stepping up coal mining, announcing investments to import LNG, reviving the exploitation of hydrocarbons, considering the use of American shale oil and not taking sufficient advantage of the situation to invest more in the renewable.

This is good news for companies like Peabody or Glencore, but bad news for the energy transition targets.

Europe has raised its decarbonisation targets and committed to reducing net CO2 emissions by at least 55% by 2030 compared to 1990 levels before achieving carbon neutrality by 2050. A 55% drop in emissions by 2030 means an average reduction of 8% each year compared to an observed rate of 1.5% over the past decade and if we talk about industrial relocations, emissions could increase. A conversion of the entire electricity grid to 0 carbon sources would increase electricity tariffs by 20%.

In Germany, the last nuclear reactors are expected to be shut down by the end of this year. Today, wind power accounts for just over 20% of electricity supply and while offshore wind is growing rapidly, onshore wind is now developing slowly. Solar energy is developing rapidly, but it does not contribute more than 10% of the electricity supply. The country is far from carbon neutrality.

- *The United Kingdom:*

In the United Kingdom, the share of renewable energy accounts for just over one-fifth of the energy mix. The focus is on wind, onshore and offshore, and nuclear, which produces only 17% of electricity. The United Kingdom is the world's 2nd largest producer of offshore wind after China. It has a fifth of the facilities, China has almost half. But Boris Johnson wants to multiply capacity fivefold by 2030. The cost is high, the United Kingdom is looking for 50 billion by 2030 to finance this energy transition and is trying to attract sovereign wealth funds from the Gulf countries.

Challenges for emerging countries:

In the fight against global warming, emerging countries have 4 handicaps: they are in the take-off phase, they serve as the world's industrial workshop, they are in debt and they do not have the financial means to invest in the transition.

Aid from developed countries is necessary, but it is insufficient.

- *Aid to emerging countries:*

Support for emerging countries is an issue, as climate-related disasters cause three times more relative losses in emerging countries than in developed countries.

UNCTAD reaffirms the target, agreed by the international community but never achieved, of 0.7% of GDP in official development assistance, as this would bring an additional \$150 billion to these emerging countries.

Developed countries had committed themselves to mobilizing \$100 billion per year from 2020 onwards but they are only at \$80 billion, possibly less, and, according to the *OECD*, the target will not be reached before 2023.

Some countries nevertheless managed to make progress in a short time, notably Vietnam. In four years, it has increased its electricity production from solar power from 1 to 11%. But such efforts remain isolated.

UNCTAD also calls for debt relief for emerging countries to enable greater investment in climate change.

It also advocates for a Tobin tax on financial transactions and a relaxation of patents.

It is not in favor of a carbon tax at the borders because it would penalise the export capacity of emerging countries, would be intended to preserve the competitiveness of European players and to finance the European recovery plan.

From an economic and stock market perspective, emerging countries likely to benefit from the energy transition are, like Bolivia, Mongolia, Congo and Chile, all producers of mineral resources essential to the transition.

- *China:*

In 2021, Chinese emissions increased by 4% and accounted for a quarter of the increase in global emissions. According to *the IEA*, China's steel and cement sectors alone generated more greenhouse gases than the European Union. China used more concrete in the first 16 years of the 21st century than the United States in the entire 20th century.

Pollution also comes from transport because the Chinese buy 25 million cars/year and maybe double of that in 10 years. China's transportation emissions have doubled in the last 10 years and increased 10-fold in 30 years.

However, China, the largest polluter on the planet, is also the leading investor in renewable energy and it invests more than all the countries combined.

In the short term, the government has sacrificed the goal of fighting pollution to prioritize growth and pursue poverty reduction, but Beijing defends itself by saying that the objectives of the energy transition will be met.

China has announced that it will not aim to cut emissions before 2030 because it has managed to lower the cost of a coal-fired power plant by 75% and is taking advantage of this competitive advantage. Between 2000 and 2018, it increased the amount of electricity produced from coal by threefold. That's more than the United States, Mexico and Canada combined. In early 2018 and mid-2019, the country built 35GW of coal-fired power plants and is again pushing coal mines to increase production. An additional 120 GW is expected to be built soon, equivalent to Europe's 150GW fleet.

Meanwhile, in nuclear power, capacity is expected to double by 2035. China will build 150 nuclear reactors at a cost of \$440 billion, more than the entire world has done in 35 years.

In wind power, China has added more wind turbines in 2021 than the rest of the world in five years. China owns 45% of the world's wind turbines. China is investing heavily in offshore wind turbines and will become the largest consumer by 2030. For her, the investment is useful because most of the major cities are coastal.

In solar, it is by far the leading producer for the components needed by the solar industry, with a market share close to 70%, and it has 72% of the world's solar panels, five times more capacity than the United States.

In electric cars, it produces nearly 70% of the world's batteries. For electric batteries, China has a production capacity of 350GW/h against 42GW/h for the United States, in second. But, the production of batteries consumes a lot of energy, especially coal used in the electricity production.

In summary, we can see the ambivalence of China, it is both the leading polluter and the leading country for investment in renewable energy.

- **India:**

India is the world's 3rd largest emitter of greenhouse gases, 2nd largest producer and 2nd largest consumer of coal in the world behind China, and has great ambitions in the development of green hydrogen to reduce its energy dependence and in solar energy of which it is the 5th largest producer.

Notwithstanding this implication, the Modi government does not wish to make any binding commitments even though, at the same time, of all the major countries, India, located in a tropical zone, is the most exposed to the harms of global warming and has 22 of the 30 most polluted cities in the world.

India, in the absence of a commitment from developed countries to provide \$1 trillion in renewable energy investments, refuses to commit to carbon neutrality before 2070. It refuses to phase out coal, anticipates a 50% increase in its emissions by 2040 because, in the meantime, cities will be home to 270 million people and industrialization will remain rapid.

The model followed by India and other countries is unsustainable because it requires subsidies, high-yielding seeds, plenty of fertilizers and pesticides, agricultural machinery and extensive land to amortize fixed costs and repay loans.

The land is impoverished by exploitation, groundwater is dried up, cancers are increasing with the widespread use of pesticides, monsoons are later each year and carry less water, and certain food products can no longer be exported because they are too damaged by fertilizers.

Apart from the climatic impact, the Green Revolution has led to the exclusion of small farmers due to lack of land and difficulty in accessing credit. And paradoxically, even though the country is achieving record production, there are more and more malnourished people. The green revolution does not prevent undernourishment. One in 3 undernourished children worldwide lives in India and, according to economist *Amartya Sen*, 40% of the population in India is malnourished. With Covid, it only took a few months for a large part of India's population to fall below the poverty line of \$1.90 a day.

The Indian Prime Minister says that 100% of Indians are connected to electricity but in reality, how many only have power for a few hours a week? India is theoretically in over-capacity thanks to the combination of coal and solar power plants but faces a transport problem. A third of Indians have problems with regular power supply. Faced with power cuts, aggravated by the recent heat wave, the country is increasing its coal production and is expected to produce more than 800 MT in 2022.

There is also the problem of water supply in villages and cities. Delhi has almost exhausted its resources and yet, water consumption in India hardly exceeds fifty m³/capita/year, far from the 1200 m³ recorded in the United States.

- **Africa:**

It accounts for 17% of the world's population but only 4 to 5% of greenhouse gas emissions because it is poorly industrialized and faces many challenges.

First of all, population growth: the working-age population will increase from 700 million to 1 billion in 2030 and an economic growth of 7% is needed to create enough jobs.

Secondly, the impact of global warming is particularly problematic because agricultural yields will be penalized. We must therefore help these countries. As in India for rice production, we have developed maize that is more drought-resistant, but we will have to invest heavily in irrigation.

Also, urbanization. 10 cities already have more than 5 million residents but this number will increase rapidly.

Finally, decarbonized or not, electricity production remains notoriously insufficient. For example, Congo has just over 90 million inhabitants, but its electricity capacity covers the equivalent of a city of 1 million in Europe.

Only a few rich countries, such as Saudi Arabia, can afford to move forward on their own and set ambitious targets for renewable energy. The 2030 target is 30% in alternative energies, especially in solar.

Conclusion: *"Humanity groans, half crushed under the weight of the progress it has made. It does not fully realize that its future depends on it. That it is up to it to determine first of all if it wants to continue to live."* Bergson page 338, The two sources of morality and religion.

From this Letter, we will remember that the world is not rich enough to afford the option of degrowth that would condemn hundreds of millions of people to destitution and probably kill more than nuclear power.

In recent years, we have witnessed a mutation of capitalism and a conversion of science to objectives that are more concerned with the ecological imperative. 7 conclusions can be distinguished from these developments:

Globally, we must, as a recent UN report points out, *"turn our collective complacency into action"*. The process of maturation is slow but the notion of world heritage of humanity to define nature is gradually taking shape alongside GDP, the traditional indicator of growth.

The carbon tax is accepted, the financing of renewable energies is perceived as one of the priorities of governments and the action must concern housing, agriculture, transport and industry. We must reorient growth, limit waste, promote the circular economy and recycling, favor short supply chains but in no case opt for degrowth.

Progress remains one of the keys to the energy transition and wealth creation is the only way to finance the necessary investments. To take just one example, only technological advances will improve the energy performance of cars.

At the national level, the countries of the South, Latin America, Africa, the Middle East and South-East Asia are the most affected by global warming. Rising sea levels will overwhelm Bangladesh, the Nile Delta and the Ganges will cause tens of millions of climate refugees and endemic famines in areas where food insecurity is already high.

All these upheavals will have geopolitical consequences, create tensions over the water supply on the Tibetan plateau and the Nile, and cause migration. It is difficult to know how the countries of the North will react to the influx of migrants and climate refugees? Will democracies be weakened? Will there be a multiplication of democracies?

At the same time, if investment in the energy transition is necessary, how can we forbid African countries, where electricity does not benefit the entire population, from not exploiting a hydrocarbon deposit that they find? How can poor countries such as Senegal or Egypt be prohibited from developing recent discoveries of gas fields?

In light of ambitious targets on emissions, a target of halving greenhouse gas emissions by 2050 has been expressed, but it is quite a challenge. The **IEA** considers it essential to reduce the use of coal by 50% within 10 years, but this seems unrealistic, because the demand for electricity will increase by 40% in the meantime and the development of renewable energies is lagging behind!

In terms of international trade, many blame globalization but maritime transport represents a little less than 3% of greenhouse gas emissions, that is to say barely more than the German economy, 2.2%. And, since 2020, progress has been made, with the sulfur content of ship's fuel limited to 0.5% against 3.5% until then.

Alternatives to hydrocarbons, such as hydrogen, are not yet effective and, when they are, the fleet will have to be renewed.

At the corporate level, production methods must evolve, the energy transition and the depreciation of assets such as mines or oil fields are gradually becoming necessary and this will penalize margins.

At the level of banks and management institutions, green finance has become one of the allocation criteria and pressure is mounting against banks that continue to finance fossil fuels.

At the household level, consumption patterns need to change. In emerging countries, natural disasters, as the *UN* warns, will force population displacement and push more than a hundred million people into poverty by 2030. In developed countries, mobility must be rethought because while everyone claims to be an environmentalist, at the same time the same people want to live in the countryside or go away for the weekends. Today, the transport sector is the largest emitter of CO2 ahead of industry and daily trips in France average 60 kilometres compared to 4 kilometres two centuries ago.

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