The energy transition… towards what?

By

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The exceptional global economic growth of the past 70 years is today threatened by three strong factors. *The pressure induced on the middle classes*, which results in temptations of national withdrawal and protectionism. *The fight against climate change* linked to the use of fossil fuels which results – beyond energy savings and changes in the energy mix – in temptations to reduce global growth and relocate production. *The anticipation of a virtual disappearance of fossil fuels* and their impossible replacement in the required proportions by the year 2070, which can fundamentally challenge economic growth.

These three factors are linked. They produce inconsistent and non-consensual visions of the developments deemed necessary. The bigger countries have conflicting interests concerning them – geopolitical interests, availability of energy and agricultural resources, levels of industrial and technological development, internal political balances, etc. There is no strong, realistic, acceptable and shared vision of an arrival point, even intermediate, for each of the three, let alone the three together. It is therefore difficult to conduct coherent, concrete and ambitious policies on a global scale on these three themes.

Companies that invest opportunistically and with quick paybacks in activities linked to these strong "reactive" trends are admittedly right in the short term. But in the longer term, there is a risk that these trends will reverse if they are not sustainable due to the lack of consensus at the right level, economic and technological rationality, financial resources and results.

From the Club of Rome in 1972, through the Kyoto Protocol in 1997 and to the 24 successive COPs, the energy mix is dominated by fossil fuels (oil, gas, coal) and is evolving only marginally on a global scale. Increases in the CO_2 level and measured temperatures continue their linear progression without inflection. China is investing heavily[2] in the Silk Road Initiative while Europe is taxing air travel. Japan is reinvesting in nuclear power while Germany is abandoning it….

Which vision will prevail?

1. "Recent" history

The world economy has grown since 1946. At 5% per year (excluding inflation) over the period 1950-1970; at 3% over the period 1980-1990; at 3% over the period 2000-2018. This growth is shifting geographically. North America and Europe accounted for most of it until 1980. Japan represented a significant share in the 1970s and 1980s. China and emerging Asia accounted for 22% in the 1990s. Today, this share is 50% and will rise to almost 60% in the 2020s.

This growth is accompanied by a massive and continuous reduction in customs barriers. In the United States and Europe, duty paid on imports fell from an average of 6% in 1970 to 2% in 2016.

This is accompanied by a globalization of production chains. For example, Apple's iPhone X's design and manufacturing chain includes 16 steps, in 12 countries, through at least 17 subcontractors. This optimizes at the same time high-technology, quality, responsiveness and costs. This globalization increases productivity and the value of the resources used. This increase represents on average two-thirds of global economic growth (the other third comes from population growth).

[1] With the help of Julien Deleuze and the teams of Estin & Co based on an Estin & Co study

[2] US$1.3 trillion over the next 10 years

This resulted in a massive enhancement of the Western countries' populations over the period 1950-1980, less since then, with a major change in household consumption budgets. The massive decrease in the share of food and clothing spending by - 22 pts between 1960 and 2017 (made possible by globalization) has enabled increased spending on media, communications (mobile phones etc.), health and leisure, and to bear the increase in housing costs. Today it reflects in a massive enrichment – in turn – of the populations from emerging Asian countries.

2. Rationale for international trade

Let's recall that the first reason for international trade comes from the unequal distribution of resources (patents, know-how, modern industrial processes, energy sources, agricultural land, minerals, low-cost labour, etc.) and the competitiveness of economic players : 5 countries hold 67% of the patents worldwide, 7 countries represent 67% of total manufacturing production (France is not one of them), 10 countries represent 72% of all energy sources, 10 countries represent 54 % of agricultural land, 3 countries own 92% of rare earths… With only a few major exceptions (USA, China…), *they are rarely the same*.

There is no developed economy without international trade, which accounts for 60% of global GDP today.

3. The "push back" of the Western middle classes

In 2010, the Western middle classes accounted for 57% of middle classes worldwide. By 2030 their share will fall to almost 20%. They are no longer growing and only moderately getting richer. The emerging Asian middle classes represented 13% of the world middle classes in 2010. Today this share is 45% and will rise to 60% in 2030. Population growth represents only 8% of this evolution.

The barycentre of the world is shifting, and the purchasing power is adjusting. In an open world, there is no reason why Western populations should ultimately have greater purchasing power than Asian populations if education levels, technology, productivity and business competitiveness are the same.

Faced with this upheaval and these gradual adjustments – in both directions – we understand the temptation of national retreat for Western populations. However, a strong and widespread rise in customs barriers would have major effects on the Western countries which apply them, or which are affected by them.

Two examples:

- Western households' consumption structures are not sustainable if significant customs duties are applied to everyday imports of consumer products (clothing, food, household appliances, electronics, etc.). Households' purchasing power would be greatly reduced at the expense of discretionary communications and leisure spending and would become incompatible with housing and health spending.
- If the major Western players no longer have access to emerging markets, the stock markets' value would drop by around 35%. (This is the estimated share of the value of Western stock markets that comes on average from the growth of large Western groups in Asian markets).

In the short-term, such developments would increase economic pressure on the middle classes and provoke crises of all kinds.

In the long-term, if the pressure against international trade continues, a theoretically sustainable scenario is that of a multipolar world[3]: some large blocks, each consisting of a large state (large population, industrial scale effects, developed technologies, significant energy sources) associated with smaller countries with large amounts of energy, or mineral, or agricultural or technological resources; a strong fluidity of intra-block exchanges; weak between countries.

Is this a desirable scenario?

4. The fight against global warming

For at least 40 years, CO_2 emissions resulting in higher temperatures have been increasing linearly with the exploitation of fossil fuels linked to economic development.

Over the past twenty years neither the rate of energy consumption (as a function of economic development), nor the energy mix (to the detriment of fossil fuels) has significantly changed, despite government interventions and programmes or community efforts and businesses (energy savings, tax incentives, development of new renewable energies, etc.).

By way of comparison, the measures taken following the oil crisis of 1973 -1979 had led to a significant reduction in energy consumption compared to economic growth and the large-scale development of nuclear energy production facilities in several countries.

What are the facts of the problem?

Today China represents 23% of global CO_2 emissions, the United States 14%, and Europe 7%[4]. Nothing will happen on the scale necessary without consensus between these first two (or three) groups which have diverging interests. In addition, France and Germany have different energy policies. Europe therefore has no common position vis-à-vis the United States and China.

On an international level, intercontinental shipping and air transport account for less than 3% of CO_2 emissions. Reducing these transport methods have no direct impact on global warming, however they are participating in the current fight against globalization which can have a negative impact on global economic growth[5] – and therefore indirectly a positive on CO_2 emissions.

New renewable energies (wind, solar, etc.) cannot replace fossil fuels on a sufficient scale by 2050 regardless of their costs, and all the more so since wind energy requires a support of fossil fuels[6] to compensate its structural intermittence. No energy mix scenario foresees it, except to enter into a significant economic decline.

No new "clean" energy source is planned before 2050 (nuclear fusion, CO_2 capture from fossil energy, etc.). The only available source for this purpose, on a sufficient scale and not emitting CO_2 is nuclear energy[7]. Large countries have conflicting policies towards this energy; reduction of nuclear power plants in certain countries (Germany, etc.); investment or reinvestment in others (China, United Kingdom, India, Japan etc.).

The two realistic options to address this issue in 2050 are therefore either to develop nuclear energy massively or to adapt in a more or less prepared manner to climate change. The third option (which one hopes is unrealistic) is economic decrease – whether it be desired or a suffered.

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[3] Scenario made possible by the size of the world's population in 2030 and its level of economic development, compared to the scale effects necessary for large industrial processes and data processing. For example, the size of the only Chinese economy in 2030 will be the same as the entire global economy was in 2007.

[4] Europe to 15 without Russia

[5] Unless it leads to a shutdown in production or supply chains with high CO_2 emissions and a non-relocation of these chains; or a substitution of these chains by others less carbon emitting

[6] Where possible gas-based, which has less CO_2 emission than coal or oil

[7] Current fission technologies

5. The depletion of oil and gas energy by 2070

The experts' consensus is that there are 130 years of possible exploitation of coal reserves at the current production rate, 50 years for oil and gas reserves (including shale deposits); the peak of exploitation of oil and gas sources would be around 2030, with its end around 2070.

While this figure was regularly increased in the 80s and 90s (discoveries of new reserves, on-shore, then off-shore, then deep offshore, then shale oil... and regular improvement in farm productivity), it has only been so marginally since. Therefore, we can challenge it.

Furthermore, 70 years of additional shale oil reserves exist which are not taken into account by experts. They are located in many countries outside the United States and are considered unusable today for political reasons. This can change.

The question of discovering new alternative energies, "clean" or not, is the same as the one addressed in the previous chapter. There are none on an industrial scale and within the relevant time frame.

The two realistic options to meet this challenge by 2050-2070 – if we rely on experts' estimates concerning conventional sources – are therefore the intensive development of nuclear energy (again) or the systematic exploitation of oil and shale gas sources beyond the United States (however, this does not solve the CO_2 emissions problem). Once again, economic decline is an option, which we hope is unrealistic (as is the re-exploitation of coal mines or increased deforestation[8]).

6. Transient scenarios by 2050

Beyond the unbearable financial cost for Western economies without growth, it is understandable why few actions which are both concreted and with the right scale are undertaken at a global level on the subject. Possible coherent long-term scenarios integrating the three dimensions are non-consensual, or perceived as unattractive, or politically unacceptable. Let's mention three of them:

- *The pursuit of economic development and the globalization of trade*, the reduction in CO_2 emissions as a percentage of this development[9], the adaptation to generally moderate but possibly acute climate change in certain geographies. As far as current knowledge is concerned, this scenario only works with a significant development of nuclear energy and – more moderately – of new renewable energies.
- *The development of a multipolar world* with the continuation of a growth which is more diversified in terms of countries; reduced trade between countries or undergoing high customs levies; if in addition, some of these countries are climate-skeptics, the massive use of oil and shale gas by some, beyond the current sources, in addition to nuclear energy. This scenario includes the risk of massive impoverishment of medium-sized countries which are not included in these countries and do not have sufficient sources of energy. The divergences of interest confirmed between countries will slow any effective fight against global warming.
- *The significant slowdown in global economic growth,* or even its stagnation or decline, the rise in customs protections and the widespread and significant relocation of industrial and agricultural production, the increased and real control of CO_2 emissions, the accelerated development of new renewable energies to the detriment of fossil fuels (beyond all the scenarios currently envisaged). This scenario only works in the absence of economic growth (which is almost the case in Europe) and probably with a questioning of traditional market economies. It will not be possible to impose on large emerging countries wishing in turn to legitimately benefit from an economic take-off.

[8] Wood was one of the main sources of energy for several centuries before the intensive use of coal in the 18th century with the first Industrial Revolution. Today it still represents 10% of the world energy mix (behind oil at 31%, coal at 29% and gas at 21%)

[9] Energy management, changing behavior towards less carbon uses

Faced with those scenarios, it is easier to remain at the level of a partial diagnosis and general objectives than to implement a coordinated action programme to achieve a future situation that one hesitates to describe or for which there is no consensus.

And for companies, beyond short and medium-term trends, *long-term investments which are not based on any technical and economic rationality risk being with lost funds*.

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Estin & Co is an international strategy consulting firm based in Paris, London, Zurich, New York and Shanghai. The firm assists the management of major European, North American and Asian groups in their growth strategies, as well as private equity funds in the analysis and valuation of their investments.

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