

# The winners take it all

by

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Here are some politically incorrect observations stemming from the factual analysis of public data on some essential drivers of the world economy: energy resources, agricultural resources, demography and intellectual resources.

## 1. Fossil fuel is king

Global energy consumption comes at more than 80% from fossil resources: oil (33%), coal (28%) and gas (24%) (see table 1).

At the current rate of consumption, world fossil energy resources could disappear in 90 years. In other words, they could decrease in our and our children's lifetime and then disappear during our grandchildren's lifetime.

Therefore, access to energy will increasingly be a competitive lever. However, a mere 15 countries hold control over 80% of energy resources (see table 2):

- Three major countries: Russia, USA, China — 32%;
- Seven energy countries in the Middle East and Central Asia<sup>1</sup> — 28%;
- Five other countries: Canada, India, Australia, Venezuela, Nigeria — 20%.

The rest of the world (more than 100 countries) only accounts for 20% of the world's energy resources (i.e. an average of less than 1% per country), including Europe (with only 6%).

## 2. The war on global warming is off to a bad start (or even lost)

The outcome of the war on global warming, that is to say, against greenhouse gas emissions, is more dependent on the development of the world's coal-fired electricity production fleet (2,000 GW, equivalent to 30 times the French nuclear capacity of 63 GW) than on the debate between nuclear and renewable energies (since neither of them produces CO<sub>2</sub>, at least directly).

However, in the mix of fossil fuels, coal is the one for which stocks are the most important: 150 years of worldwide supply at the current consumption rate (see table 1), as opposed to oil and gas (closer to 50-60 years).

In addition, these coal reserves are located in countries which will likely want to use them in a context of scarcer long-term energy resources:

- Emerging countries which need them to support their economic growth: China, India, Indonesia, Russia...;
- Some Western countries which do not intend to deprive themselves of them: USA, Germany, Poland, Australia...

## 3. The energy mix, let alone the electricity mix, is not the only topic

Beyond the critical impact on the world's coal-fired electric production fleet (especially in China and India), the issue of electricity mix is far from being the only topic. Indeed, electricity represents only a moderate share of energy consumption (approximately 20%). The rest, which represents the majority, comes mainly from non-electric uses (petrol-powered transportation, agricultural machinery and fertilizers, household, tertiary or industrial gas heating...).

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<sup>1</sup> Iran, Saudi Arabia, Qatar, Iraq, United Arab Emirates, Turkmenistan and Kuwait.

- Table 1 -

Global primary energy consumption

2016

	Oil	Coal	Natural Gas	Hydro electricity	Nuclear Energy	Renewables	Total
Share of Global Primary Energy Consumption	33%	28%	24%	7%	4%	3%	100%
Global Proved Reserves / Annual consumption (years)	51	153	53	na	na	na	

- Table 2 -

Share of global proved reserves by energy source and country

2016

	Oil	Coal	Natural Gas	Hydro electricity	Nuclear Energy	Renewables	Total	Cumulated
1 Russia	6%	14%	17%	5%	8%	0%	11%	11%
2 United States	3%	22%	5%	7%	32%	20%	11%	22%
3 China	2%	21%	3%	29%	8%	21%	10%	32%
4 Iran	9%	0%	18%	0%	0%	0%	7%	39%
5 Venezuela	18%	0%	3%	2%	0%	0%	7%	46%
6 Saudi Arabia	16%	0%	5%	0%	0%	0%	6%	52%
7 Canada	10%	1%	1%	10%	4%	2%	5%	57%
8 Australia	0%	13%	2%	0%	0%	1%	4%	61%
9 Qatar	1%	0%	13%	0%	0%	0%	4%	65%
10 Iraq	9%	0%	2%	0%	0%	0%	3%	68%
11 India	0%	8%	1%	3%	1%	4%	3%	71%
12 United Arab Emirates	6%	0%	3%	0%	0%	0%	3%	74%
13 Turkmenistan	0%	0%	9%	0%	0%	0%	2%	76%
14 Kuwait	6%	0%	1%	0%	0%	0%	2%	79%
15 Nigeria	2%	0%	3%	0%	0%	0%	1%	80%
16 Germany	0%	3%	0%	1%	3%	9%	1%	81%
17 Kazakhstan	2%	2%	1%	0%	0%	0%	1%	83%
18 Brazil	1%	1%	0%	10%	1%	5%	1%	84%
19 Indonesia	0%	2%	2%	0%	0%	1%	1%	85%
20 Ukraine	0%	3%	0%	0%	3%	0%	1%	86%
21 France	0%	0%	0%	1%	15%	2%	1%	87%
22 Algeria	1%	0%	2%	0%	0%	0%	1%	88%
23 Poland	0%	2%	0%	0%	0%	1%	1%	88%
24 Norway	0%	0%	1%	4%	0%	0%	1%	89%
25 Turkey	0%	1%	0%	2%	0%	1%	0%	89%
Others (> 50)	8%	6%	9%	27%	24%	33%	11%	100%
Average share of others	0,2%	0,1%	0,2%	0,5%	0,5%	0,7%	0,2%	
Total Europe (28 countries)	0%	7%	1%	11%	32%	33%	6%	
<b>Total World</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	

Sources: BP, Estin & Co analyses

Can renewable energies solve the energy problem worldwide? Since their start (20 years ago), they have captured 3% of the global energy mix. At this rate, it would take 600 years to reach the 100% renewable energy mix that is sometimes mentioned.

The solution to the equation is mainly based on energy consumption (not necessarily electricity), which must be reduced significantly in order to last: reduce consumption from petrol transportation (road, sea, air), agriculture and nutrition (less cattle breeding), urban planning and major infrastructures, heating (more wood), housing (more insulation)...

#### **4. The winners take it all**

In this context, China is on the path to worldwide leadership (see tables 3 and 4):

- It has energy resources (10% worldwide: hydraulics, renewable energy, and, unfortunately, coal; plus a nuclear fleet which is under construction and which is superior to France's). It also has 10% of the world's agricultural resources<sup>2</sup> ;
- It has the largest market and the largest internal labor force (1 billion people in the middle classes in 2030). It remains the most competitive in terms of costs (thanks to inland China);
- It is already innovating more than the United States (1 million patents per year in China against 520 000 per year in the USA).

The USA will be number 2:

- They have energy resources (11% worldwide, with all types of primary energy: oil, gas, coal, hydraulic, nuclear, renewable energy);
- They have of 8% of the world's agricultural resources;
- They innovate, and get production made in China at more competitive costs.

Europe will not be a leading unified world power:

- It only has 6% of the energy resources (10-11% for the USA or China), and 4% of agricultural resources (8-10% for the USA or China);
- It innovates less than the USA or China (480 000 patents per year); cost competitiveness is low;
- It must bring together and coordinate 28 countries (27 after Brexit; without a common native language). And at least two of the main founding members, France and Germany, have diverging interests and positions on many subjects, particularly in terms of energy: "low carbon" (nuclear and hydraulic power, small cars...) against "carbon intensive" (coal and renewable electric energy, big cars...).

#### **5. So what? What should be done, and especially if one is European?**

For businesses, four perspectives from growth or risk axes must be taken into account:

- In all industries—accelerate the development in China and the USA;
- In the world of energy—focus on hydraulics and nuclear, and why not gas (less harmful as compared to coal and oil in terms of CO<sub>2</sub> emissions) including from Russia or the Middle East (Iran, Qatar, Turkmenistan...);
- In other sectors—support the evolution of industries and services towards less fossil fuel intensive uses, for example, in the automotive industry (more compact designs, lighter materials, more efficient engines, more innovative equipment<sup>3</sup>), in railway and urban transportation (underground, tram, pedestrian and bicycle routes), in energy services (industries, businesses, communities, individuals), in agriculture (crop cultivation rather than cattle farming, agricultural composting, forest exploitation...), in

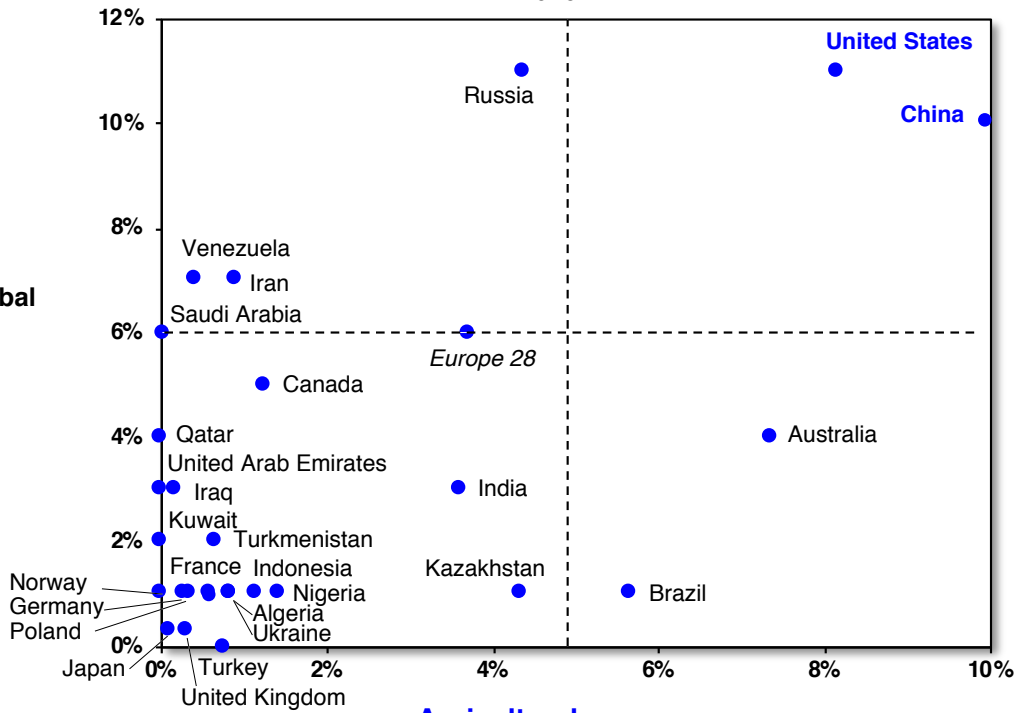
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<sup>2</sup> Expressed in % of agricultural areas

<sup>3</sup> Eg: "Stop-start" system, etc...

**- Table 3 -**  
**Energy and agricultural resources**  
 2016

**- Energy Resources -**  
**Share of total global proved reserves**  
 2016 (%)

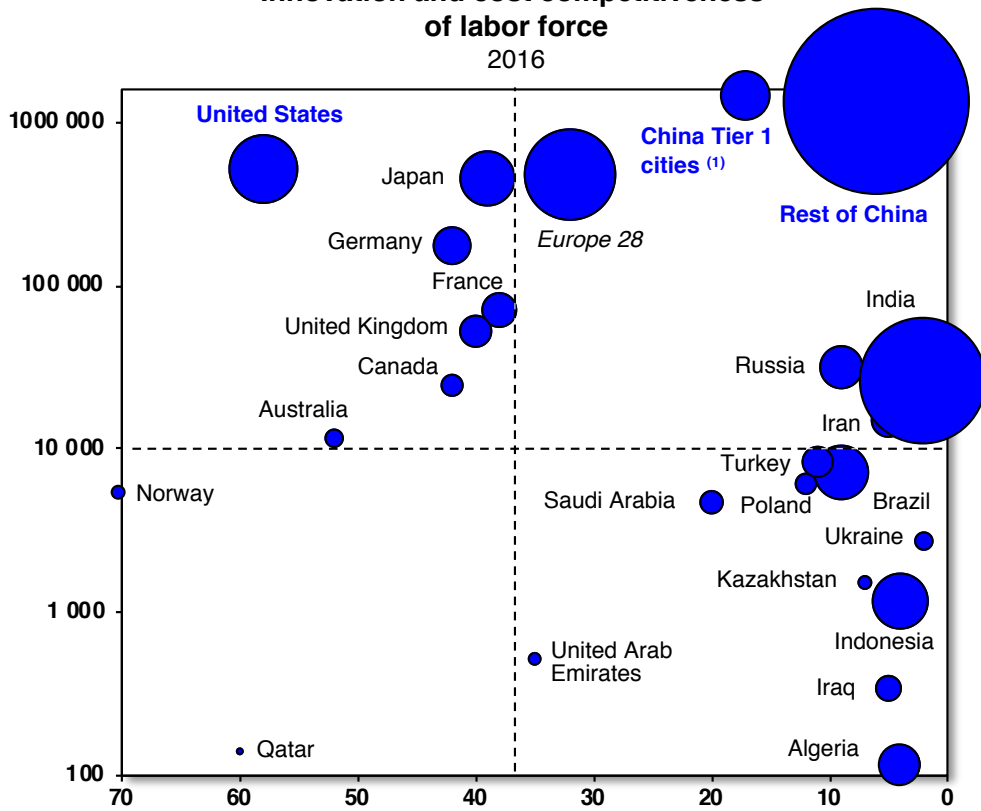


**- Agricultural resources -**  
**Agricultural land**

2016 (% of total global agricultural land area)

**- Table 4 -**  
**Innovation and cost competitiveness**  
**of labor force**  
 2016

**- Innovation -**  
**Number of patents**  
 2016  
 (log. scale, #)



**- Cost of labor force -**  
**GDP per capita**  
 2016 (k\$)

Size of the bubbles proportionate to the size of the middle class population in 2030

(1) Beijing, Shanghai, Guangzhou, Shenzhen ; The number of patents in China is represented as a whole (Tier 1 cities and rest of China)  
 Note: Data regarding patents not available for Venezuela, Turkmenistan and Kuwait  
 Sources: BP, WIPO, IMF, OECD, Worldbank, Estin & Co analyses and estimates

the fields of repair and maintenance, waste management and recycling, in local circular economies...

- And, in any case, anticipate (rather than suffer from) the consequences of global warming (sea level rise and accentuation of weather differentials between geographical areas, with, for example, the worsening of drought on the Mediterranean rim, and the consequences in terms of population migration, drinking water and sanitation services...).

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*Estin & Co is an international strategy consulting firm based in Paris, London, Zurich, New York and Shanghai. The firm assists CEOs and senior executives of European, North American and Asian corporations in the formulation and implementation of growth strategies, as well as managers of private equity funds in the analysis and valuation of their investments.*