Existing options to sustaine planetary economy

Year 2081 the fossil derived energies, exibit, already from several years, high market price which is unable to sustaine the planetary economy.

The excess of infrared reflecting gases in the atmosphere has raised to +153%, while in the year 2019 it was + 77.5%.

The world population number continue to grow at mean rate of 0.062 billion/year.

The probable total consumed energy by the 11.5 billion humans 27.7 billion TEP/year;

1.7 billions TEP/year from hydroelectricity

26 billions TEP/year to be produced to substitute the fossil consumed energies and to avoid the collapse of the planetary economy.

The equivalent electricity of 26 billions TEP/year is 104000 billions KWhe/year which have to be consumed has it, liquid and gaseous fuels, electricity.

The substutive electricity will be produced by the planetary proliferation of new energetic convertors.

The proliferation 20800000 MWe of the thermoelectric convertors has the proliferation of 90912394 MWep of wind power convertors will produce 104000 billions KWhe/year consumable.

The energetic options will ask time and organization.

Analysis of the options

Fission U238 fueled nuclear convertors proliferation (416000 MWe/year)

Mean time of costs amortization 50 years

Nuclear fuel reserves 12.5 million/ton of U238 conversion efficiency 39 KWe/gr of U238

2022-2072 $(10400/50 + 104000)/2 \times 50 \times 10^9 = 2625000 \times 10^9$ KWhe

Fuel consumed 67000×10^9 gr

Fuel reserves 12500×10^9 gr

The U238 fuel reserves are exausted 9 years after 2022, time lenght in which have been builted 3744 convertors 1000 MWe each

Wind power convertors proliferation (1818 MWep/year)

Mean time of costs amortization 50 years, planetary economic strategy operative (ref. 1)

Organization of a planetary security grid, excluded

Equivalent energy reserve 34000×10^{14} TEP (see appendix)

These reserves are around 15000 times a hypotetical energy reserves of fission breeder uranium-plutonium fusion deuterium-tritium convertors proliferated at the thermoelectric power of 20800000 MWe (ref.2)

Ref. 1 R. Visentin The man made… published 2018 Ajep USA

Ref. 2 A. McDonald Energy in a finite world IIASA-Austria 1981

Appendix: Material composition of the solyd litosphere fraction of the earth crust (first 16 km)

Volume: 12.56 (216-214.3)/3 x 10^{18} mc=100.117 x 10^{18} mc

Total weight: 2.7 ton/mc x 7.117 x 10^{18}=19.22 x 10^{18} ton

Emerged surfaces 6.41 x 10^{18} ton

Material composition of the litosphere emerged areas

	x 10^{18} ton
Oxygen	2.173
Silicium	1.904
Aluminum	1.36
Iron	0.95
Copper	0.046

Material composition of a 5 MWep wind convertor

Gondola total weight 1200 ton, 60% iron and 40% copper

Blades number 3 total weight 432 ton, 100% aluminum

Stake made of a concrete 3500 ton (40% silicium)

Stake made of iron 3400 ton, 100% iron

Total wind convertors 18182394 (ref. 1)

Stakes

20% made of concrete, 80% made of iron

Material composition of the whole wind energetic system

	x 10^{9} ton
Silicium	12.72
Iron 1 gondolas	13.09
Iron 2 stakes	61.82
Aluminum	7.85
Copper	8.73

Reuse

A – the time interval between two consecutive substitution of the stake, 200 years

B – in each recycling process 1% of the material weight is lost

	x 10^{6} ton/year	mean life of the wind system 1% of the material reserves has been consumed x 10^{9} years
Silicium	63.6	0.3
Total iron	8.33	0.38
Aluminum	3.14	4.33
Copper	3.5	0.131