WHAT IS HAPPENING WITH GAS

The Climate of a Recent Energy Crisis and the SE Mediterranean

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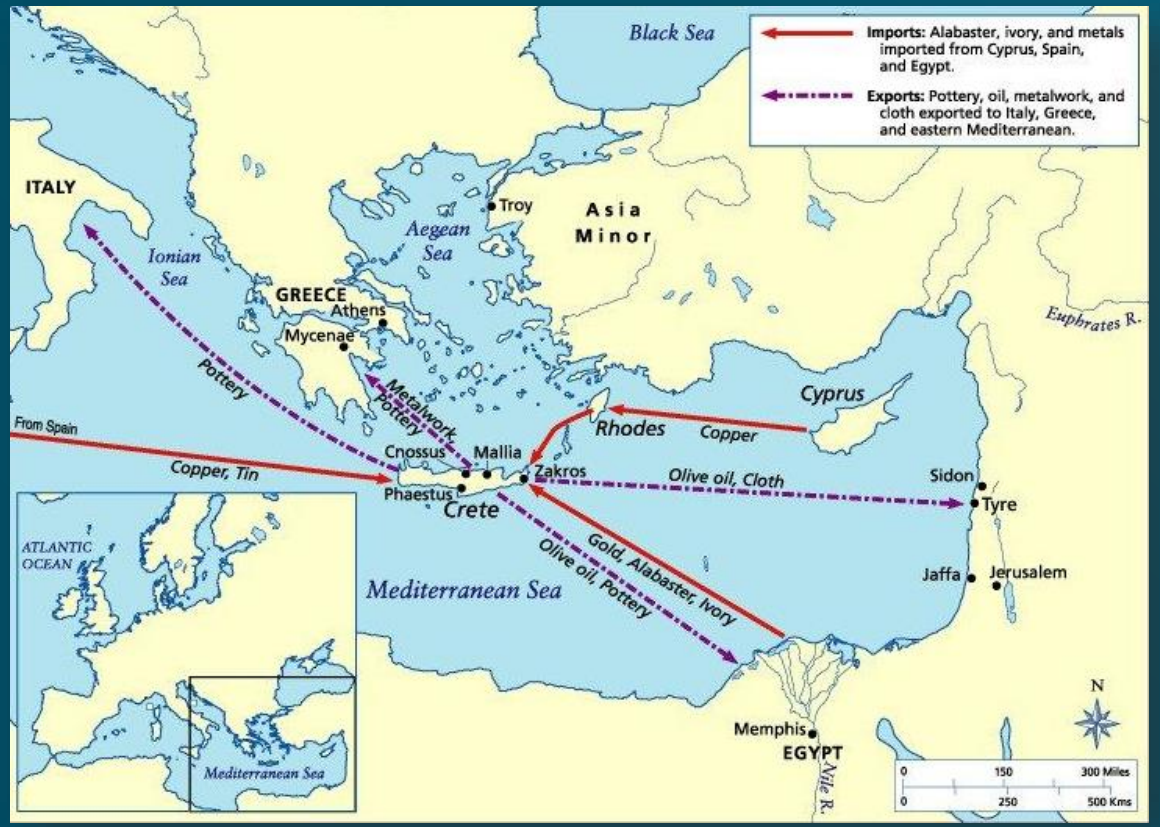
Minoan Mediterranean Trade, 1570 BC



Gas Mediterranean Trade, 2022 AC

WHAT IS HAPPENING WITH GAS

The price of the MWh of natural gas was skyrocketing in Europe even before the war.

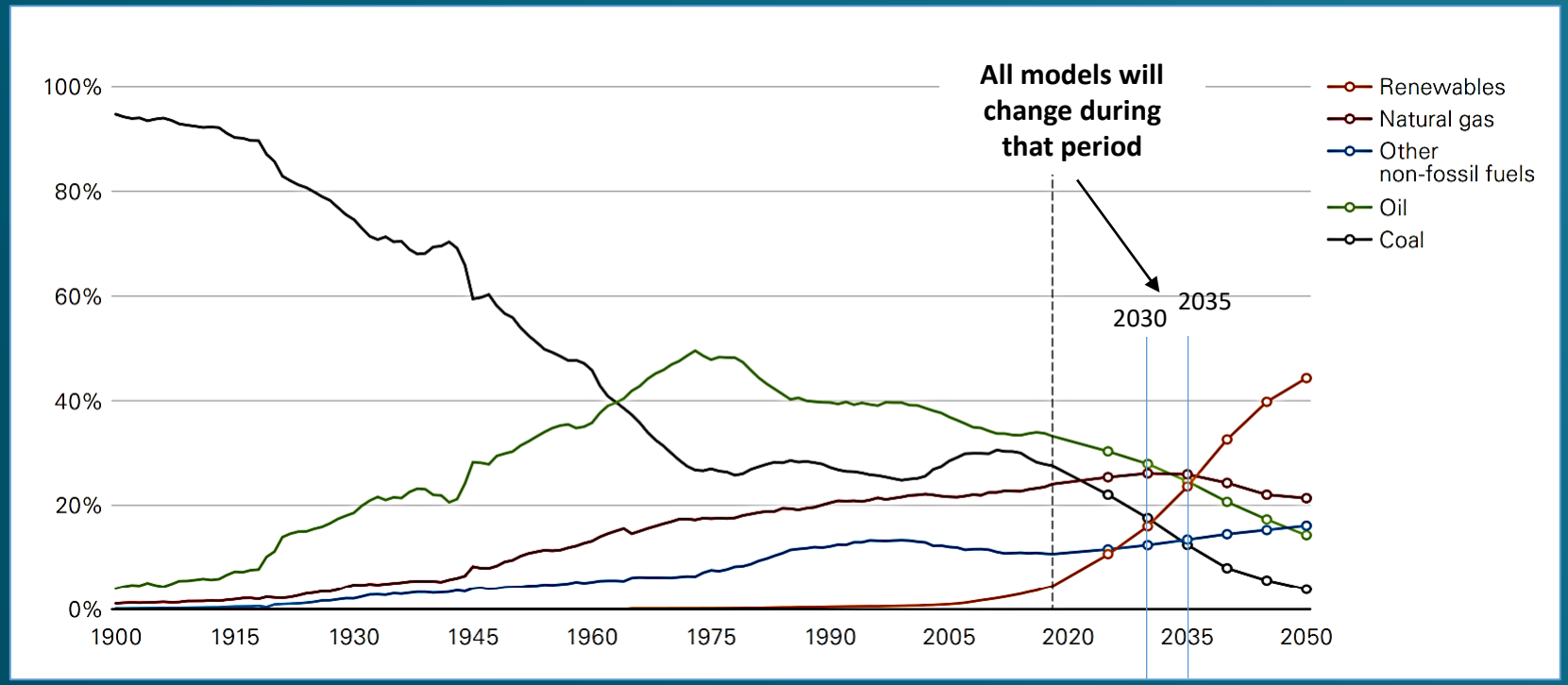
Innovative RES technologies are still absent

Transition towards today's RES is unregulated.

In summary, without the support of natural gas, RES will never cover the electricity needs.

The European Union is trying since 2021 to structure mechanisms to purchase natural gas and increase gas storage facilities.

The energy crisis is global and systemic
It relates to raw materials and technology and will probably stay for years
War in Ukraine added an additional parameter



Geopolitics around the Eastern Mediterranean determine the course of exploration, exploitation and transport of gas in the Mediterranean.

A FEW TRUTHS

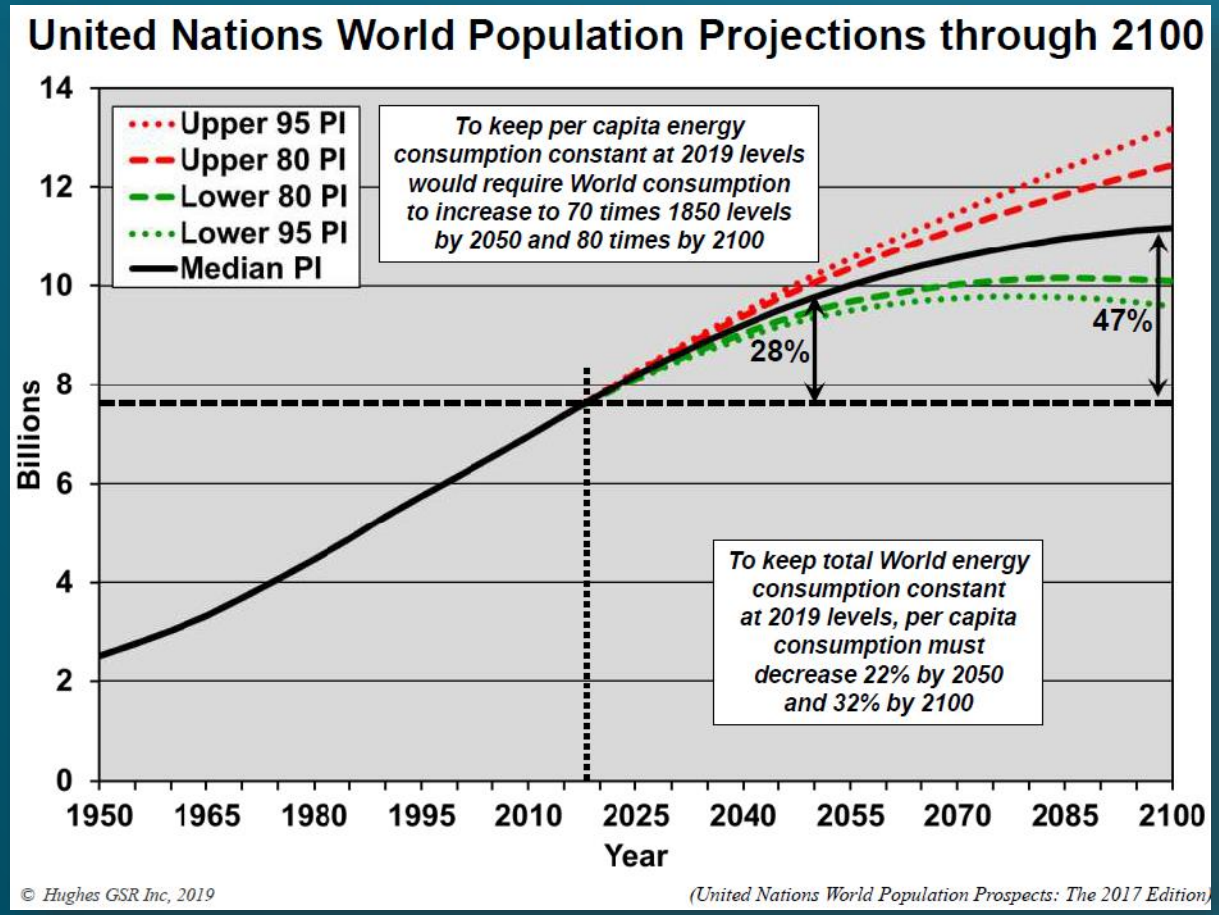
Need for energy - means - demand for energy

Renewables are not the next step because we have been using renewables since the beginning of humanity while exploiting coal and hydrocarbons accounts only for the last 200 years.

Hydrocarbons allowed the use of machines. Without machines the GDP would be hundreds of times lower.

Since 1950, oil, and now natural gas, have kept pace with growth, though increasing the anthropogenic carbon dioxide

Population and standard of living are developing in the world, but the surface of the earth remains the same



Significant innovative technological steps, that the current RES do not offer, are necessary in order to avoid shrinkage and under-development

CONSTRUCTION FEVER

While Europe continues to move away from Russian gas, Russia turns to alternative buyers for its gas and oil, particularly China, India and Asia in general.

These exports will require the construction of additional interconnectors, pipelines and terminals.

Consequently, gas imports into Europe will require additional gasification terminals in Europe and additional liquefaction terminals in US, Qatar etc.

These circumstances presage a large global construction activity of installations, driven by natural gas and oil demand, and serving to maintain high prices for the consumer.

THE CO2 SAGA

Energy prices remained high as did global carbon emissions due to the minimal substitution of coal and oil by natural gas.

The reasons that led since 2015 to a slight decrease in global CO2 emissions are not related to political decisions but, to:

1) *the lack of funding for new hydrocarbon exploration (2014-1015)*

2) *the control of supply imposed by OPEC (2016-2017)*

3) *the rise in prices to 50 - 60 dollars per barrel (2018-2019) accompanied by investment controls on the environment*

4) *the global Covid-19 pandemic (end of 2019-2021) due to a curfew and a decrease in global fuel demand*

GAS RESERVES

World gas proven reserves 7,000 Tcf → (52 years)

Russia	*24 %*
Iran	*17 %*
Qatar	*12 %*
US	*5 %*
SE Med	*1 %*

Shale gas potential reserves in the world

China	*1,115 Tcf*
India	*964 Tcf*
Indonesia	*464 Tcf*
US	*322 Tcf*
Europe	*167 Tcf*

A FEW WORDS ABOUT GREECE

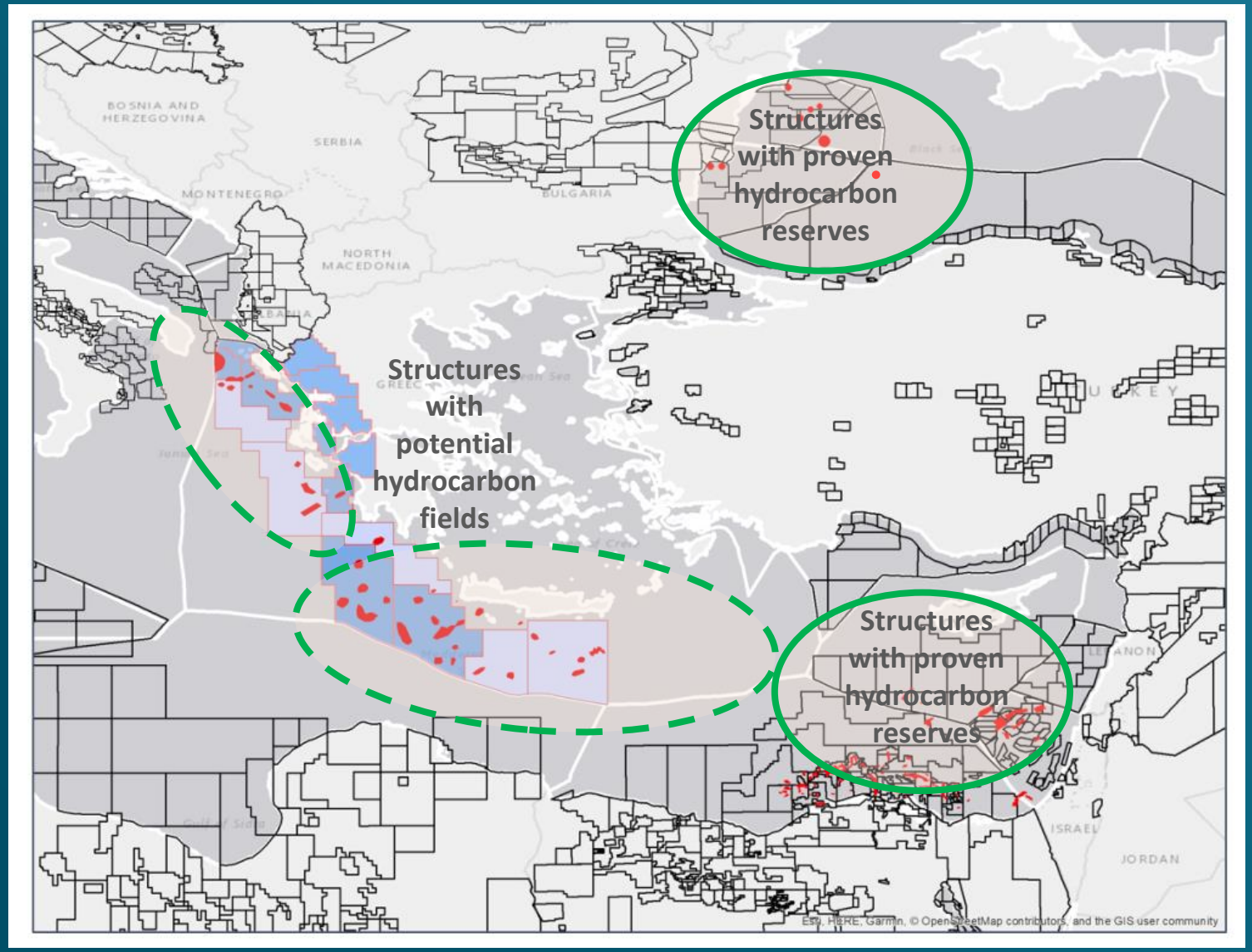
Greece will have in 5 years 21 Bcm of natural gas transit capacity.

However, the geological geometrical structures of the Greek subsurface contain gas and oil.

There are at least 600 Bcm of gas (25% of the potential 2450 Bcm in the Greece).

Greece has annual consumption of only 6 Bcm compared to 550 Bcm of Europe.

Question: How much the Greek State will make out of the transit service of 15 Bcm ?



HORIZON 2030-2040

1 Strong competition between shale gas and synthetic fuels

The cost of synthetic fuels will be sustainable with the current levels of gas prices, which are at 7 to 8 dollars per 1000 cubic feet and of crude oil at more than 100 dollars per barrel.

China, is leading the way, with annual production capacity of more than 200 Bcm of synthetic natural gas and up to 1 MMbd of synthetic fuels making it capable of reducing its annual crude oil imports by 10%.

2 Competing techniques between liquefaction of natural gas and liquefaction of coal.

3 Competing techniques for hydrogen production from methane (industry supported) and electrolysis (government supported)

FEW WORDS ON HYDROGEN

Hydrogen has inherent limitations which no technology innovation can change, at least today

When you convert renewable energy into hydrogen through electrolysis, and then convert it back to electricity by fuel cells, you lose over 70% of the energy

10 turbines are necessary to produce by electrolysis the electricity of one turbine directly from the wind flow

This low efficiency of electrolysis may be acceptable for certain industrial applications

Technically it is possible to mix up to 20% hydrogen (by volume) without massive changes in infrastructure.

A fraction of 20% it would represent only 7% in energy terms (due to the difference in molecular weight), which means that mixing could, at best, only bring about a 7% reduction in CO2 emissions

Listening to the International Energy Agency, gas will continue to bridge today's alternative energy sources for decades, unless major technological advances allow for energy production through non-energy-intensive processes unrelated to today's alternative sources.

But this is another story…..

… and by the way, if you own gas, produce hydrogen,
but never buy gas to produce hydrogen