

## CHANGE OF ENERGY PARADIGM

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**Rezumat.** *Ne găsim la începutul unei schimbări de paradigmă în sistemele de energie ale întregii lumi. Atât resursele noi ce sunt găsite și exploatare cât și tehnologiile de conversie, transport și distribuție de energie și sistemele de inteligență artificială asociate acestora sunt pe cale să creeze noi tipuri de viitoruri, cu alte valori de viață, pentru cea mai mare mașină creată de om: sistemul energetic. Câteva elemente importante sunt prezentate în lucrare alături de poziția și perspectivele României.*

**Abstract.** *We are at the beginning of a change of paradigm in the energy systems of the whole World. Both new resources being found and exploited and the new technologies for energy conversion, transport and distribution, along with the associated artificial intelligence systems, are starting to create new futures, with different living values, for the greatest machine created by men: the energy system. Some relevant elements are presented in the paper along with the position and the perspectives of Romania.*

**Keywords:** energy, nuclear accident, stress tests

### 1. Introduction

If Edison would have invented the infrared goggles instead of the incandescence lamp, the World would be different today with owners of infrared goggles being energy rich and those who cannot see in the dark being energy poor. Moreover, if Tesla would have not shown how to transport energy in high voltage lines in alternative current, probably there would be local generators of electrical energy at a street or a residence level, making again a difference between owners of energy and those who do not have it.

As seen from above the World has more than one energy future but several, depending; on the type of technologies available and the choice we make among them at any given moment, on the energy resources and on how much we can access, on the way energy fluxes interact with money fluxes and with information ones.

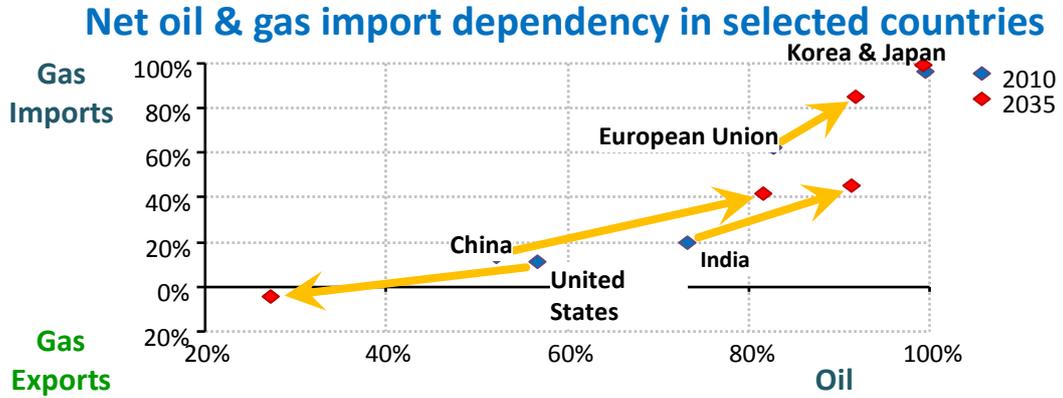
### 2. New resources and technologies

We are living a period of change of the energy paradigm. The distribution of resources in the World is changing: the USA that till not long ago were an importer of energy fuels, are becoming an exporter of coal and, soon, an exporter of natural gas (liquefied). In the last 15 years China has increased the imports of oil and gas more than ten times, arriving at looking for resources in wide areas in

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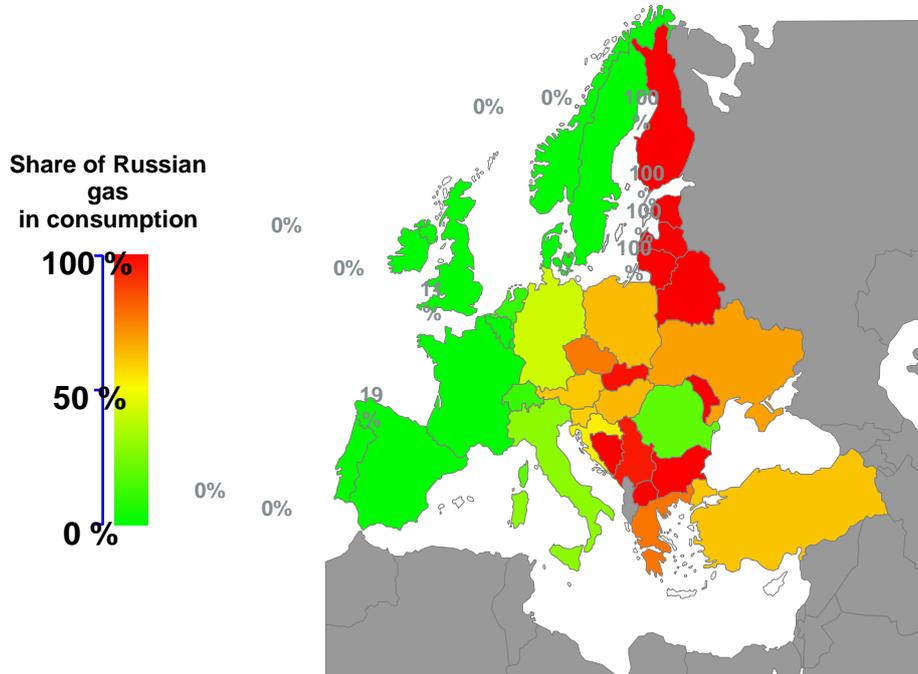
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Africa and South America, which changes the old policy of the land empire to stay within its land borders.



*the United States swims against the tide*

## Dependency on Russian gas imports



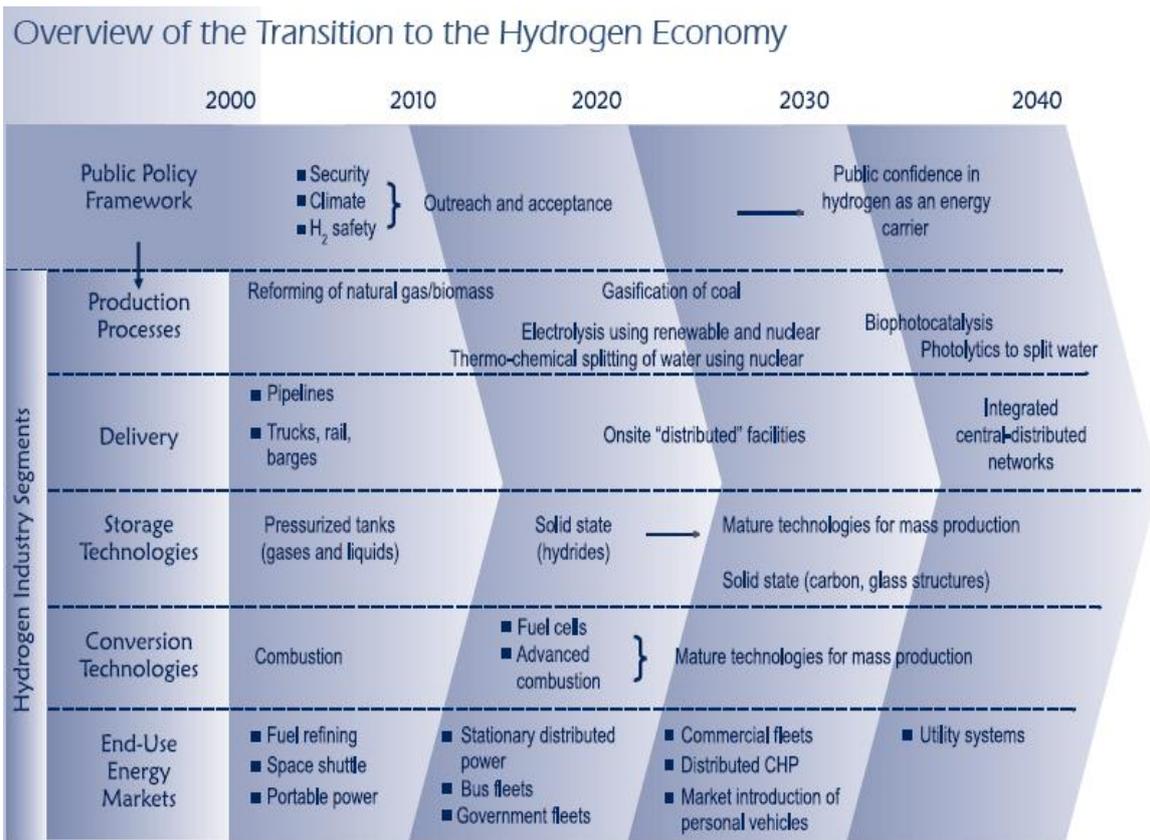
The EU, who was a leader of resource finding in the XIX<sup>th</sup> century, and a leader of technologies production in the XX<sup>th</sup> century, concentrates itself on emission reduction associated with renewable energy conversion technologies and energy efficiency increase to compensate the lack of resources and, implicitly the dependence of the suppliers of such resources.

### 3. Socio-economic impacts and possible futures

The change of resource distribution and outcome of new energy generation and consumption technologies (e.g. electrical transport, efficient lighting, etc.) lead to the change of energy price generating a migration of energy intensive industries toward the economies where energy is available at low price, obviously taking with them the jobs along with the increase in the buying power.

The intense economic activity attracts investment producing a reorientation of the financial fluxes and with them of the power areas that need military protection and generate a more intense political activity.

An example on the path to a Hydrogen based economy is given below.



Source: Purica – WEC NMC

The World Energy Council is finalizing, for its Congress of this year, a report on the energy scenarios where two trends are considered: first the one where the market leads development and governments are helping this development and the second, where the governments give the main development direction and the market follows them.

In the first scenario one may recognize the economies of USA or EU while in the second, the Chinese economy as examples.

#### 4. Position of Romania and potential futures

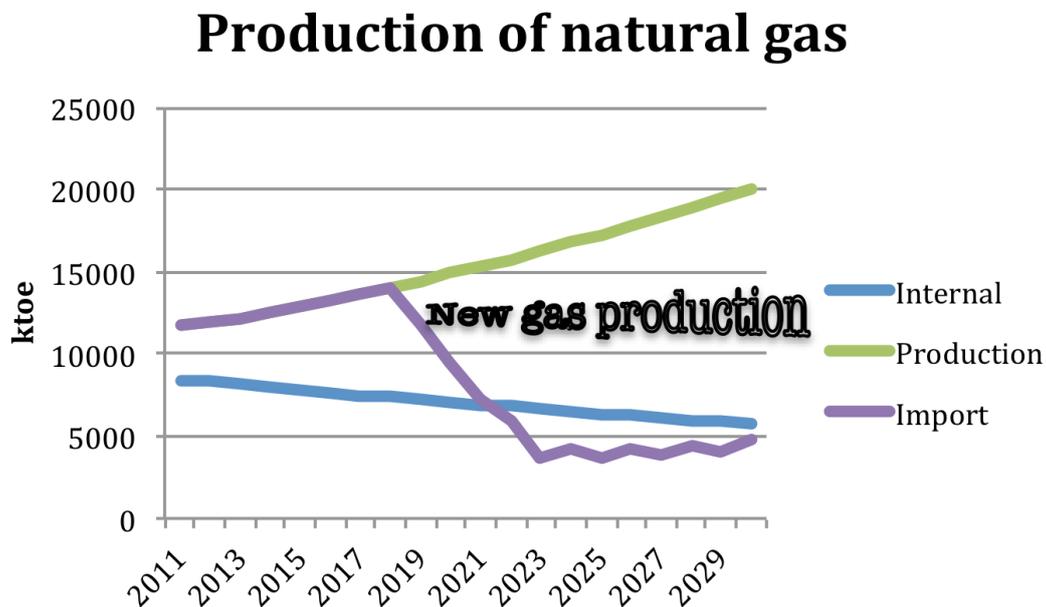
Where is the Romanian economy in this entire dynamic?

Although Romania was the first country in the World to have started the exploitation of oil and among the first to have exploited natural gas, or may be exactly because of that, the present shows a rapid depletion of the conventional resources of oil and gas.

At the same time unconventional resources are discovered in the Black Sea off shore and in shale gas formations as well as hydrates in the Black Sea.

All these may lead not only to energy independence but, to the possibility to become (again) exporters of energy resources.

An example of such a future is given in the figure below related to nonconventional gas resources.



Source WEC – NMC Romania CENTGAS Report

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This is only strengthening the military strategic position we have and to create a power area in South-East Europe.

How will we manage this potential depends on our vision and the capacity to stay united in decision making and applying them with the aim to integrate at the level of our real potential in a European Union and in a World facing substantial and profound changes.

The capacity to choose our future, among the several possible ones, depends on understanding that much more is gained from our control of our own resources (energy, technologies, innovation, etc.) than from giving this responsibility (true, not an easy one) to others in the crowd of specialized international candidates.

Finally we underline the fact that there are options, both regarding the resources and the technologies, options that allow us to determine an optimal path for our development, such as to place Romania once more on the energy map of Europe and even of the World.

## **5. Conclusions**

We are facing a critical moment in the evolution of energy systems where the new resources and the new technologies are leading to potential futures that may change our ways of living and polarize various economies as per their ways of choosing the evolution of respective energy systems.

Romania is in a favourable position regarding its possible best energy future due to the unconventional resources found recently and to the penetration of new technologies that are liable to bring the country once again in a pole position at least in the region, regarding energy independence and exports.

The decisions taken in this period will definitely impact the next 40 years as the ones taken in the 1960s are impacting the energy systems of today.

## **R E F E R E N C E S**

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