IS NUCLEAR READY TO USE THE CURRENT OPPORTUNITIES?

Editorial

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About 10 years ago, during an international conference dedicated to energy, I was amazed by the strong convictions of some participants that the future energy systems will be based on a strong penetration of intermittent renewable sources (wind and solar). *How strong will be? More than 50% in 2030, and later after 2050 going to 100%, many national systems will use only such resources.*

Really? I asked and the answer was yes, without any other alternatives - no fossil fuels due to their pollution, no nuclear energy due to the risk of severe accidents and difficulty to manage the radioactive wastes. *And what about hydro? Won't even hydro contribute to the future energy?* In general no, only on a case-by-case basis, if a state has enough hydro resources and they are used without affecting the existing ecosystems.

A more than a green perspective, I told myself, a utopian perspective without considering the immediate effects the strong increase in the share of intermittent energies in the total electricity produced will have. At that time, many were convinced of a possible revolution in battery technology that could give a solution to the variability of the renewables' production. But this revolution didn't come. Today we have the same batteries, just as consuming a lot of natural resources, toxic for the environment and occupying considerably large volumes.

The experience of recent years has shown we cannot support the functionality of the economy without power plants that produce energy exactly as required by the system. Flexibility is needed, and variable renewables do not have it, moreover they produce a strong disturbance of the system by increasing production when the wind is blowing or the sun is shining, and decreasing the production otherwise.

The decrease in the investment cost both for photovoltaic and wind remains a strong argument for the expansion of these technologies. On the other hand, many of the greens support the total closure of coal production, and, as far as possible, closure of the nuclear energy. *What do we see today in the middle of the energy crisis? The decisions to close the coal units and progressively the nuclear power plants were very uninspired.*

Such diminishing of the very robust production is one of the main reasons for the painful increase in the price of electricity for the final consumers. *Nothing can be cheap if there is no abundance!* It is an elementary rule of any economy. The simple intention to decrease the production potential has a strong impact on the market, creating distrust in the availability of the necessary amount of energy for the near future. It is the consequence of the replacing a predictable production with an unpredictable one, the increase in the intermittent production shares has led to a serious increase in uncertainty in the total electricity production. Long-term contracts decreased in the last months, being replaced, mainly, by spot transactions. Let's not forget that solar energy can be very cheap on a sunny day and infinitely expensive at night, because the output becomes zero. *The consumers are those paying for this adventure of the policy-makers!*

In these conditions, nuclear has a great opportunity, since the nuclear power is able to provide energy with zero emissions, with a very stable production and at an affordable price for the economy and population. It is a technology with a high degree of maturity and, despite the opponents, with a high degree of safety in the operation.

The coexistence between nuclear and renewable sources is seen by the greens as difficult because nuclear is not flexible enough to cover the disturbances continuously generated in production by the renewables. But contrary to these opinions, the new designed nuclear plants are moving firmly in the direction of a good flexibility.

The last years have shown us a robust development of SMR projects at the level of some design and development companies. In some countries, like those from Central and Eastern Europe region, there is sufficient political determination to implement SMR systems, on short-term.

Orientation towards iPWR is a natural one due to the existing technological maturity and availability of the components. It is a step that will be able to demonstrate the promised capabilities and it will be ready in one decade only.

On the other hand, nuclear has developed methods to adapt to a greater variability of the demand, for example the solution of the thermal storage. A simple use of the common materials, such the rocks or the sand, is able to store the energy up to 24 hours that is a limited storage, but a solution much more reasonable than the using of the batteries. A simple solution, even if not very advantageous from an economic point of view, is the production of hydrogen when nuclear offers too much electricity in relation to the demand.

In this context, our journal is oriented to publish meaningful results oriented to reflect the efforts of the research and development, education and training, academia and industry, and also the efforts to build sustainable decisions by involving the diversity of the stakeholders.

These examples do not require huge investments in research; they exist and can be applied immediately. The market will probably push them very soon to the common use since, now, the appropriate conditions exist.

The geopolitical crisis in Eastern Europe has fully demonstrated to the most of us that *a high degree of energy dependence is a major weakness of the economy* for any country. How can we reduce it? Most of the politicians are supporting the diversification of the supply of needed resources. I say that there is a need to better use the local resources. They can be renewable, nuclear, but also fossil fuels, for which we are obliged to improve solutions for drastically diminished emissions. We cannot build a sustainable world based on utopias and being inflexible due to some adversities or fears.

Dear readers and dear potential contributors, you are welcomed in our journal to participate to a balanced debate on the nuclear issues and moreover to contribute with innovative and valuable solutions to the nuclear development in the context of the modern society sustainable development.