NUCLEAR POWER IN THE TIME OF CORONAVIRUS

Editorial

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A very promising 2020 was suddenly transformed in a difficult battle, the world facing the pandemic situation generated by the spreading of the coronavirus COVID-19. The situation gradually evolved toward a disaster exacerbated by systemic dysfunctions of the society in a non-experienced and even predicted context.

Such a crisis requires a cooperative, internationalist approach to keep alive the national economies and the hopes of the people for the restoring of the human behavioral patterns, after a short period of time.

Throughout the spring, the media was full of discussions, advices, news, analyses on the daily fight and daily adaptation to the unprecedented challenges. Nothing in the recent history dominated our lives in the same way this coronavirus has. Some columnists described the pandemic as a nuclear war in slow motion, revealing the deep fears of the humans for unknown and uncontrolled situations.

The difficulty of the present is, in terms of the health system response, especially the insufficiency of the resources, equipment, materials, and peoples. Paradoxically, no large difficulties with the funding since the most of the governments are aware on the gravity of the spreading and the insufficient capacity of the health system. Similar with the large nuclear accidents, we are seeing an enormous complexity induced by the globalization, amazing network of inter-relations, and the weakness of the borders for the coronavirus spreading. The world is closely connected, so the virus spreading is very fast and very effective.

In such a complex crisis what is the role of the nuclear power?

Is the nuclear management enough skilled to plan and maintain the nuclear performances in terms of economics, safety and security?

Is the society more aware on the importance of the stability and security of supply constantly offered by the nuclear energy?

Are people more aware on the importance of the nuclear power in the modern society?

Perhaps during this year, an important part of the general public and many supporters of renewables will understand better the electricity as a vital need. The isolation of people in their houses, experienced by the most of the affected countries, has generated profound anxiety for many people feeling so many things outside of their control (how long the pandemic lasts, how other people behave, what's going to happen in the local community or larger, in the society). Beyond of this bad experience let's imagine another difficulty induced by the lack of electricity or the randomly supply of electricity. The crisis is reminding us that electricity is more indispensable than ever.

Economically speaking, we cannot survive without a stable supply of electricity, no stable production for the basic needs, no teleworking to save some jobs, no functional e-commerce sites, no e-learning, and no streaming video platforms. Electricity is critical for operating the medical equipment used in the treatment of the sick people, being in same time the base for our modern communication.

In the last years the decision-makers oriented the efforts of the society to reduce the climate change effects. Therefore, broad digitalization and green energy becomes priorities of the strategic development. A dominance of wind and solar electricity is targeted, together with a quasi-total electrification of the activities. In such a context, the security of the electricity supply is crucial for the functionality of the society.

During the last months, the pandemic situation produced a temporary closure of many industrial consumers, creating new circumstances to understand the needs of flexibility. *What are our reserves for flexibility in extreme conditions such as in case of dominance of the household consumers and indispensable services?* No dispatchable users available, therefore the population will experience daily short or longer blackouts.

Today no relevant storage exists, except the hydro-pumping plants, in the countries with appropriate landscape and climate. The natural gas power plants provide the flexibility, being able to quickly ramp generation up or down at short notice. Sometime the coal plants are used. Both of them are relevant or large CO_2 emitters.

The functioning of the society in normal state or in the crisis depends on the firm capacity, plants able to work safely, for long time, dispatchable, and with enough energy resources. A mix of the energy alternative with a dominance of free carbon electricity is desired to cope with the environmental objectives.

Today nuclear is offering most of these advantages: stability, security of supply, dispatchability, large amount of energy at affordable prices, zero carbon emissions. More flexibility is expected to be developed by the innovative systems such as the Generation IV systems and SMRs (Small Modular Reactors). Many researchers are working to develop system structures to allow a synergy between nuclear power and renewable alternatives. A need for demonstration system is a pressure for research and development.

Without doubts we need green energy to protect our environment and to keep sustainable habitats of the humans. We need smart systems able to use a combination of the existing energy alternatives with best characteristics.

Beyond the technical part, the awareness of the stakeholders is highly important. The nuclear experts and communicators have to build a new understanding of the role of nuclear: from the concerns dominated by emotional fears to the rationality of the scientific truths and technological advantages.

During the coronavirus crisis, the nuclear industry demonstrated a robust functionality and rapid adaptation to the context such as enacting pandemic protocols to protect their workforce.

What is to be learned? First, the world may suffer dramatic changes due to some adverse conditions. Secondly, we cannot rely on renewables, even in case of a shortage of the consumption. In the third line, it is much wiser to build an electricity system characterized by diversity, high security of supply, good stability, friendly with the environment, and assuring acceptable prices for the economy and people. Not least, the world has to learn from the nuclear the approaches on the risks and emergency situations, how to develop performant methods and tools to simulate as much as exactly possible new situations, and to train the people to adapt to adverse circumstances in order not only to survive, but to keep the functionality of the systems. Unfortunately, the last events show the fragility both of the globalization and the modern society. *We have to build a better one!*

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.

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.