

Keynote of Nicolae Hurduc, Minister of Research and Innovation, Romania

Dear participants,

Romania has an installed capacity of around 17 GWe characterized by a balanced mix, high share of low carbon electricity, availability of own natural resources, and independency

The national energy policies were oriented to capitalize: (1) the advantages of important internal energy resources (oil, natural gas, and coal), (2) the considerable potential for hydro-energy, solar, wind and bio-mass, (3) the existing uranium reserves. A well balanced energy mix was developed based on diversity and stability offering independence, security of supply, and capability to operate properly.

In the last decades the national electricity consumption was affected by three factors:

- (1) restructuration of the economy (closing large consumers, growing up of the low intensive energy industry),
- (2) demographic decline from 22 million (1990) to 19 mil. (2016) inhabitants,
- (3) energy efficiency measures.

After a decline of consumption (from 60 TWh in 1990 to 40 TWh in 1999) it stabilized around 49 TWh (2016) with a trend of 1-2% annual growth.

Nuclear power contributes with 18-20% to the total electricity production. It is a stable, reliable and price affordable electricity. The peculiarity of nuclear sector in Romania is the natural uranium based on CANDU technology. The security of supply is strengthened by the fact our industry produces the nuclear fuel, the heavy water, nuclear equipment and a lot of services.

Very important is to note the contribution of the national research to this achievement. The nuclear fuel is a result of the national efforts, also the heavy water, and now the Tritium issue was deeply approached to find valuable solutions. Romanian research organizations have developed technics, methods, instruments and tools to support the national nuclear power. An important research infrastructure was developed together with research groups, teams and organizations, and important efforts were devoted to build the education and training system.

Nowadays the Romanian nuclear Agenda includes:

- (1) operational safety of the the Nuclear Power Plant and other nuclear installations,
- (2) the continuation of works at Cernavoda Unit 3 and Unit 4,
- (3) Plant life extension for Cernavoda NPP Unit 1,
- (4) Radioactive waste management (LILW repository construction, geological disposal strategy),
- (5) ALFRED GenIV demonstrator implementation,
- (6) Mining and environmental issues (site remediations).

On the short term the plant life extension of the nuclear units from Cernavoda NPP is a major decision to preserve the current share of free carbon electricity in the national system. The refurbishment of Unit 1 was approved and entered in the preparation phase. The project consists of the re-tubing of the CANDU core and it will be implemented from December 2026.

The continuation of the works at the Unit 3 and Unit 4 is considered as a feasible and optimal approach to significantly increase the free-carbon electricity production and a set of dedicated measures are included in the national energy strategy.

From the long term perspective the National Strategy for Research, Development and Innovation (NSRDI) is oriented to stimulate the development of advanced technologies including nuclear technologies able to face the societal and climate challenges. The development of the lead-cooled fast reactors technology (LFR) is seen as an optimal option for the implementation of nuclear systems with great performances in safety, security, economics, and waste management. At the same time the synchronism of the national research with the major European themes, the enhancing of collaboration, the growth of the spin-off capacity, and the job creation are targeted.

Based on NSRDI, a separate subprogram (5.5 Program for research, development and innovation of 4th generation reactors-ALFRED) was started, in 2019, to support preparatory activities for the implementation of the LFR demonstrator. ALFRED project is also mentioned in the national energy strategy as an important development for the consolidation of the nuclear sector in Romania and for the development of advanced system able to cope with the societal, market, and climate challenges.

ALFRED is a European project, emerged from the Euratom supported projects. Our vision is to combine the European structural funds with national funds and industry contribution in order to transform the vision into a real infrastructure. After a large national consultation of the stakeholders, today ALFRED is present in the main national strategic documents. Based on thrm, the Ministry of research supports the efforts to include ALFRED in the planning of the future EU budget and to fulfill the full procedure to declare it as a major project.

FISA and EURADWASTE conferences will approach the success of the collaborative research in the frame of Euratom programme, how the critical mass

on different very focused topics was created and worked, what kind of outcomes were produced, what are the directions for the future.

I hope the collaboration on the main topics of nuclear safety and radioactive waste management will be more and more fruitful producing valuable solution and helping the nuclear power to be more and more accepted by the society as a powerful contributor to de-carbonization of the energy sector.

I wish a great success for your debate!