

***The Role of the National TSO
of a Technology User Country
in Achieving Success in Collaboration***

Presented

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Introduction



- This presentation discusses the status of NE and the role of national TSOs in achieving success in collaboration in the field of improvement of nuclear systems for NPP in operation as well as collaboration in feasibility study for development and construction of new generation nuclear reactors.
- The study is based on experience gained during participation of INRNE in EU projects such as NEWLANCER, ARCADIA, CORONA, SARNET, etc.

Status of Nuclear Energy and TSOs in Bulgaria



Based on National Energy Strategy, Bulgaria strongly consider to use NE based on extending of life of units 5&6 and building of new units.

Bulgaria operate nuclear reactors successfully more than 150 reactor/years.

The main activities in nuclear energy field are:

- safety operation of existing two units.
- extending of life for units 5 & 6.
- building dry spend fuel storage for temporary keeping spend fuel.
- building of national radioactive waste depositor

The other important activities are: investigation the feasibility of building of unit 7 on the Kozloduy NPP site.

There are more than 15 TSOs working in the field of NE including 2 biggest University in Bulgaria, 2 Institutes of BAS and 3 international companies.

The Main Objectives and Challenges to a Nuclear Technology User Country – Safety and Sustainable Nuclear Energy System



The role of national TSOs in achieving success in collaboration is directly connected with resolving some tasks and challenges in supporting of sustainable NES.

Despite the long experience and knowledge gathered by tens of years of studies, experiments and direct operation, new R&D challenges are posed for NPP in operation as well as for development and construction of new generation nuclear reactors by the aim at pursuing continuously improving safety and sustainability.

As a matter of facts, the life extension of already operating NPPs, and/or the construction of new units, pose further challenges related to the continuous updating and extension of the nuclear knowledge.

The Main Objectives and Challenges to a Nuclear Technology User Country – Safety and Sustainable Nuclear Energy System



Reasons for creating and supporting national TSOs

The entire process of implementation of a nuclear energy program – from the conceptualization of the design up to the realization, the operation and the dismantling of the nuclear installation – relies on the availability of qualified expertise and of national infrastructures providing the general framework for the project.

Development and construction of a new generation nuclear reactors, is based on the identification of the principal needs for what concerns R&D, Regulatory issues, Environmental & Social impact and E&T and connection to the past and current reactors operational experience.

Participation in EU Projects - NEWLANCER



The **NEWLANCER** (New MS Linking for an Advanced Cohesion in Euratom Research) is a project of EURATOM in the 7th Framework Programme of EC started at November 2011 with responsibility to find and implement rational and efficient actual solutions for New EU Member States participation in the next EURATOM Programmes by strengthening the using of the R&D potential of the organizations and cohesion with national institutions, and in closer collaboration with Old Member States' relevant research partners.

One of the main outcomes of the project are consist in a catalogue mapping the research potential (presenting national TSO with their competences and infrastructure) in the participating new members states, a set of recommendations and good practices aiming to provide useful guidance for a larger participation in the European research area, both for national authorities and nuclear research and education organizations.

Participation in EU Projects - NEWLANCER



Some outcomes of the implementation of project:

- ✓ NEWLANCER analyze the NMS participation in Euratom FPs, and compared and contrasted this with the actual research potential of nuclear research organizations, taking into consideration the European strategic research agendas and energy policies.
- ✓ Best practices and recommendations extracted from the Euratom success stories have been reflected the findings of all project partners, and have been addressed to a large spectrum of end-users interested in better integration of the research potential across EU.
- ✓ The network explored current research capabilities in the NMS, identified opportunities for future project proposals, and produced working plans for a long-time cooperation and an advanced cohesion at regional level.

Participation in EU Project - CORONA

Purpose of the CORONA Project :

- Establishment of a Regional Centre of Competence (RCC) for VVER Technology and Nuclear Applications
- The centre was developed and was implemented pilot training schemes for VVER specifics in cooperation with local, national and international training and educational organizations
- The tasks and responsibilities of the RCC included also support and services for preservation and transfer of VVER related nuclear knowledge.
- The project provided a special purpose structure for training and qualification of personnel for serving VVER technology as one of nuclear power options used in the EU. Such an approach allowed unifying existing VVER related training schemes according to IAEA standards and commonly accepted criteria recognized in the EU.



Participation in EU Project – CORONA



The impact of the project is on the following topics:

- ✓ Enhancement of performance and operational safety of VVER nuclear installations;
- ✓ Safety culture enhancement;
- ✓ Preservation of VVER specific nuclear knowledge, skills and competencies;
- ✓ Retention of sufficient and competent working force for nuclear industry;
- ✓ Enhancement of the level of the nuclear education and research;
- ✓ Improvisation of the process of harmonization of nuclear safety concepts EU-wide;
- ✓ Support training for next generation fission reactor operation;
- ✓ Development of the European nuclear training infrastructure;
- ✓ Enhancement of mobility of VVER professionals and nuclear researches based on comparability of acquired knowledge and skills following the ECVET (European Credit System for Vocational Education and Training) approach;

Participation in EU Project – ARCADIA



- The ARCADIA project has been conceived so as to provide a two fold support to the further development of nuclear research programs in the NMS, targeting two major areas included in the Strategic Research and Innovation Agenda of SNETP: ESNII, through the support of the ALFRED project towards its realization in Romania, and NUGENIA, approaching remaining safety aspects of Gen III/III+.
- On one hand, it focuses on the identification of the primary needs for the ALFRED project and Gen III/III+ reactors, mainly to what concerns E&T, supporting Infrastructures and Regulatory aspects (and integrating – for the R&D needs – the outcomes of other research projects in a common frame of National and Regional needs); on the other hand, it investigates the existing National and Regional supporting structures – with a particular attention to the ones in Romania and in all the participating New Member States – for defining a map of competences potentially eligible to satisfy the previously identified needs.

Example for Bilateral Regional Cooperation



INPRO
International Project on
Innovative Nuclear Reactors
and Fuel Cycles

Supported by the Bulgarian Government, Bulgarian Academy of Sciences has started a program for cooperation with the Macedonian Academy of Sciences and Arts in which INRNE takes part with two Projects.

One of them is the Project “Analysis of the needs, the benefits and requirements for building of a new nuclear reactors in the Republic of Bulgaria and in the Republic of Macedonia”(2014-2016).

In this collaboration between two Academies are involved also experts from other organizations from both countries, such as – NPP Kozloduy (Bulgaria); Ministry of Economy and Energy (Bulgaria); Electricity System Operator (Bulgaria); New Power Plant Enterprise, ELEM (Macedonia); Faculty of Electrical Engineering and Information Technologies - St. St. Cyril and Methodius University (Macedonia); EES Operator, MEPSO (Macedonia).

Conclusions (1/2)

TSOs in technology users countries such as Bulgaria are important as a bridge between science and research from one side and the industry from the other side in implementation of innovations in NPP.

Participation of National TSOs, in EC funded projects and others projects plays a significant role for further developing of nuclear science and technology in Bulgaria – such collaboration enables to have access to many European competences, respectively ability to approach the scientific and technical R&D challenges as well as other competences that are required also in all the aspects connected to the development of a new generation nuclear reactors.

Conclusions (2/2)

The scientists from Academies and Universities must closely communicate with Authorities and all other TSOs involved in NE field in order to efficiently promote national energy strategies.

As a small country with significant experience in operation of Nuclear Power Plant (NPP) for Bulgaria is very important to share the knowledge in nuclear field by national TSOs with other countries for improving and further development of nuclear technology.

INPRO Dialogue Forum on International Collaboration on Innovations to Support Globally Sustainable Nuclear Energy Systems



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Innovative Nuclear Reactors
and Fuel Cycles

*Thank you
for
Your attention !*