POSSIBILITIES AND OPPORTUNITIES OF SMR DEPLOYMENT IN UKRAINE

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Nuclear Power Plants in Ukraine

Reactor types:
- VVER-1000
- VVER-440
- Under construction
Ukraine’s national nuclear strategy

Completion of power unit №3-4 Khmelnitskyi NPP by 2030

The Soviet VVER project using the latest technologies and safety systems of the Westinghouse company

Construction of two AP 1000 power units at several NPP by 2030

Tested generation III+ reactor plant with the latest safety systems and the load following capabilities

Construction of small modular reactors to replace coal generation by 2030

Construction of 20 SMRs using various vendors, with full localization of production of reactors and components in Ukraine

Introduction of microreactor technology by 2040

Implementation of the technology microreactors for decentralized generation of electric and thermal energy, as well as hydrogen production

1000 MW

X*1000 MW

up to 6 000 MW

1-10 MW each unit
ENERGOATOM’S Experience

- 15 NPP power units modernized according to Western standards
- >1,000 measures have been implemented for improving NPP safety
- 490 reactor years of experience in the safe operation of VVER power units
- Continuation of operation of 13 NPP power units
- Experience of completion of 3 NPP power units during the time of Independence
- Unparalleled resilience: operating NPPs amidst military operations and occupation, demonstrating robust safety measures.
- A program of measures to protect the NPP has been developed
Prerequisites for SMRs Deployment

Challenges

➢ Damage to thermal power plants and other energy facilities
➢ Occupation of the ZNPP
➢ Shortage of generating capacities

Possibilities that ENERGOATOM is currently considering

➢ Construction of large power nuclear power units and small modular reactors
➢ Creation of own nuclear cycle from fuel fabrication to handling of spent fuel and radioactive waste
➢ The opportunity to accumulate leading innovative energy technologies in Ukraine and subsequently export them to the EU
Destroyed thermal power plants of Ukraine
Memorandum of cooperation companies
The policy of SMR’s deployment in Ukraine

I. Construction of stations on new areas

II. SMR deployment on the of existing thermal power plants sites

III. SMR deployment in the Chernobyl Exclusion Zone

IV. Construction of a plant for the production of components for SMR

V. Ukraine’s accession to the EU Industrial Alliance for Small Modular Reactors
SMRs potential sites

I Construction of stations on new areas

II SMR deployment on the of existing thermal power plants sites

III SMR deployment in the Chernobyl Exclusion Zone

- Chernobyl NPP
- Tripilska TPP
- Ladyzhynska TPP
- Kryvyi Rih TPP
- Kharkiv CHP-2 "Eshar"
- Zmiivska TPP
- Slavyanska TPP
- Prydniprovska TPP

ENERGOATOM
Ⅳ Construction of a plant for the production of components for SMR

V Ukraine's accession to the EU Industrial Alliance for Small Modular Reactors
Construction of a series of SMRs using the SMR technology to replace coal generation

**Advantages:**
- The power of the reactor is up to 300 MW
- Licensing period - 2 years
- Construction period - up to 3 years
- Serial construction - reduction of terms to 1.5 years
- 100% localization and production of all SMR components in Ukraine
- The possibility of underground placement of the reactor body and the spent fuel pool with nuclear fuel is envisaged, which will significantly increase safety
Transition from coal-fired power plants to nuclear energy / reuse of infrastructure can reduce SMR construction costs by 35%.

SMRs can use existing electricity, transport and water infrastructure left over from coal-fired power plants.

Limited retraining of TPP workers will allow the use of the existing workforce.

The negative impact of the decommissioning of the TPP on the local community is leveled off.
Accelerators for the deployment of SMRs

**Governmental Support:**
- Streamlined regulatory framework
- Financial incentives
- Research and development funding

**International Collaboration:**
- Technology transfer: Partner with established SMR developers to gain access to proven technologies and expertise, accelerating the learning curve.
- Financial partnerships: Develop joint ventures or public-private partnerships with international investors to share financial risks and resources.
- Knowledge sharing: Participate in international SMR research initiatives and forums to gain insights and best practices from other countries.

**Focus on one design:**
Focus on one design will help to overcome following challenges:
- Incomplete design
- Immature supply chain
- Untrained workforce
Thank you for your attention