IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Interregional Workshop on the Development of Taxonomy for Small Modular Reactors (SMRs) and Micro-Reactors (MRs)

Hosted by:

Nuclear Industry College (CNIC)

Beijing and Chengdu, China

13-17 May 2024

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Information Sheet

Purpose

The purpose of the event is to discuss the development of taxonomy for Small Modular Reactors (SMRs) and Micro-reactors (MRs) that will facilitate the capture and transfer of knowledge and interoperability of knowledge organization systems for SMRs and MR technologies.

Working Language

The working language(s) of the event will be **English**.

Deadline for Nominations

Nominations received after **March 08, 2024** will not be considered.

Project Background

To meet the growing demand for energy and to mitigate global climate challenge, the interest in Small Modular Reactors and Micro-Reactors is growing, especially from the regions inaccessible to large electricity grids and regions with smaller electricity grids that need technology options deployed incrementally to closely match increasing energy demand. SMRs and MRs are also viable options for users that need beyond electricity supply, e.g., district heating, desalination, industrial process heat, as well as hydrogen.

The purpose of the "INT2023 Supporting Member States' Capacity Building on Small Modular Reactors and Micro-reactors and their Technology and Applications as a Contribution of Nuclear Power to the Mitigation of Climate Change" project is to provide broad support to Member States in the development and deployment of SMRs and MRs. The project provides a broad range of forum to enable effective capacity building through training and technology transfer activities on all aspects of SMR development. The project also covers the emerging MRs, the deployment of SMRs for electric and non-electric applications, and the coupling of such nuclear systems with renewables in integrated energy systems. The aim of the project is to enable national stakeholders to gain enhanced understanding on key characteristics of SMR and MR technologies and their applications, and to formulate, in line with international safety standards, countries' specific legal and regulatory frameworks, and generic user requirements and criteria for SMR technologies.

Event Background

The workshop is being organized under the interregional INT2023 TC project "Supporting Member States' Capacity Building on Small Modular Reactors and Micro-reactors and their Technology and Applications as a Contribution of Nuclear Power to the Mitigation of Climate Change".

The development and adoption of a knowledge-based taxonomy for SMRs and microreactors will enable effective capacity building through capture and transfer of knowledge, enable national stakeholders to gain enhanced understanding on key characteristics of SMR and MR technologies and their applications, alignment with international safety standards, national legal and regulatory frameworks and generic user requirements and criteria for SMR technologies.

Adoption of a common taxonomy for SMRs should also facilitate the interlinking of relevant knowledge management systems developed by different organizations. Users of such an interlinked framework are much more likely to find relevant, valuable information for evaluating and comparing different technologies. IAEA Safety Standard GSR Part 2 (see references) requires that the knowledge and the information of an organization be managed as a resource.

Significant advances have occurred during the last decade in the ability of computer systems to collect and organize knowledge. Semantic technologies make possible the association of information gleaned from many different sources. This development results from the increasing ability of software systems to deduce the meaning of concepts involved by evaluating the attributes characterizing those concepts and the relationships between them. These developments make possible a significant evolution of knowledge systems for the new reactor technologies, including providing the possibility of interconnectivity between different systems, thereby creating a knowledge system of extensive scope.

In the framework of this initiative, the IAEA intends to create a SKOS[1]-based taxonomy that will facilitate the preservation of the knowledge base for SMRs and MRs.

Development of the SKOS-based taxonomy is being implemented through a series of workshops and consultancies by a core team consisting of members of the IAEA secretariat supported by an advisory group of external industry experts' representative of various types of SMR and MRs technologies.

The outcome of the initiative will be made available on specialized taxonomy software (PoolParty Semantic Suite[2]). The collaborative taxonomy development is scheduled to be implemented until the end of 2025, with a technical report to be published by the IAEA in 2026.

Expected Outputs

The key outcome of the workshop would be an enhanced knowledge and understanding of SMRs and MRs technologies for near and mid-term deployment by proposing a taxonomy intended to provide a common foundation to identify, capture, structure and transfer the knowledge. To achieve the outcome, the workshop aims to produce specific outputs, in particular:

- Agreed basic aims, requirements and framework to develop the proposed taxonomy.
- Outline of a core taxonomy, comprising of a set of defined core concepts, sub-concepts and terms presented in a hierarchical structure, that can be embedded in SKOS-based systems.
- An overview of considerations pertinent to, and additional benefits to be gained from, the further development of ontologies.

Finally, the event is also expected to allow the IAEA to consolidate the core advisory team of external experts and compile information that can be later used to finalize the taxonomy and develop the relevant IAEA publication.

Participation

The event is open to up to 40 participants from the following Member States participating in the TC INT2023 Project: Argentina, Brazil, China, Czech Republic, Egypt, Hungary, Indonesia, Jordan, Kenya, Mexico, Nigeria, Pakistan, Poland, Romania, Saudi Arabia, Slovakia, South Africa, Türkiye.

At no cost to the IAEA, participants from following countries are also considered: Belgium, Canada, Denmark, Finland, France, Japan, Republic of Korea, Russian Federation, United Kingdom, United States of America.

Participants' Qualification and Experience

The target audience of this event are those professionals from Technology Developers' organizations or prospective Owner/Operator organizations/Technical Support Organizations/Regulatory Bodies/potential users, having a close familiarity and understanding of key characteristics of an SMR or MR technology (such as design characteristics, operational and safety features, fuel cycle characteristics, technology readiness, economic considerations, environmental impact, deployment indicators, etc.).

[1] SKOS is the semantic web standard recommended by the World Wide Web Consortium for representing any type of structured controlled vocabulary.
[2] PoolParty is one of several semantic software platforms available for building knowledge management systems and applications.

Primary focus is on SMRs and MRs presently in operation or at basic or detailed stages of design and targeted for licensing and deployment in the next decade.

Identified Member States are invited to nominate up to two candidates, ideally from the OEM / technology developer(s) and/or from the operating, regulatory or technical support organizations from countries that meet one of the following conditions:

- Countries that are either designing, constructing and operating nuclear power plants (NPPs) and are actively considering SMRs or MRs to expand their nuclear power programme.
- Newcomer countries considering SMR or MRs as part of their national energy strategy, that have selected or are ready to make a final decision on the power technology selection; have active TC infrastructure-related projects and Infrastructure Working Plan (IWP) for the new power programme.

The activities will be conducted in English and candidates should have sufficient English proficiency to participate in the event without difficulty.

Accepted participants are encouraged to familiarize themselves with the following references to get the most out of the event:

- INTERNATIONAL ATOMIC ENERGY AGENCY, Terms for Describing Advanced Nuclear Power Plants, IAEA Nuclear Energy Series No. NR-T-1.19, IAEA, Vienna (2023).
- INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA Nuclear Safety and Security Glossary: Terminology Used in Nuclear Safety, Nuclear Security, Radiation Protection and Emergency Preparedness and Response, 2022 (Interim) Edition, IAEA, Vienna (2022).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Advanced Reactors Information Systems (ARIS) Database, Glossary of Terms in ARIS Reports, IAEA, Vienna.
- INTERNATIONAL ATOMIC ENERGY AGENCY, Advances in Small Modular Reactor Technology Developments — A Supplement to: IAEA Advanced Reactors Information System (ARIS), 2022 Edition, IAEA, Vienna (2022).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Status of Molten Salt Reactor Technology, Technical Reports Series no. 489, IAEA, Vienna (2023).
- INTERNATIONAL ATOMIC ENERGY AGENCY, A Taxonomy for the Decommissioning of Nuclear Facilities, IAEA-TECDOC-2029, IAEA, Vienna (2023).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Accident Knowledge Taxonomy, Nuclear Energy Series no. NG-T-6.8, IAEA, Vienna (2016).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Fast Reactor Knowledge Preservation System: Taxonomy and Basic Requirements, Nuclear Energy Series no. NG-T-6.3, IAEA, Vienna (2008).
- INTERNATIONAL ATOMIC ENERGY AGENCY, General Safety Requirements No. GSR Part 2, Leadership and Management for Safety, IAEA, Vienna (2016).

In addition, the EU taxonomy for sustainable activities is a beneficial read ahead. The EU taxonomy is a common classification system that defines criteria for economic activities that are aligned with a net zero trajectory by 2050 and the broader environmental goals other than climate.

- EUROPEAN COMMISSION, EU-wide classification system for sustainable activities, (2022).

Application Procedure

Candidates wishing to apply for this event should follow the steps below:

1. Access the InTouch+ home page (https://intouchplus.iaea.org) using the candidate's existing Nucleus username and password. If the candidate is not a registered Nucleus user, she/he must create a Nucleus account (https://websso.iaea.org/IM/UserRegistrationPage.aspx) before proceeding with the event application process below.
2. On the InTouch + platform, the candidate must:
    a. Finalize or update her/his personal details, provide sufficient information to establish the required qualifications regarding education, language skills and work experience ('Profile' tab) and upload relevant supporting documents;
    b. Download and complete the Designation of Beneficiary and Emergency Contact Form, and upload to InTouch+ ('Profile' tab under the personal section) specifying the document name. If already provided, kindly discard this step.

Search for the relevant technical cooperation event (EVT2305623) under the 'My Eligible Events' tab, answer the mandatory questions and lastly submit the application to the required authority.

NOTE: Completed applications need to be approved by the relevant national authority, i.e., the National Liaison Office, and submitted to the IAEA through the established official channels by the provided designation deadline. **All nominations must include a scan of the candidate's first page of passport with photo.**

For additional support on how to apply for an event, please refer to the InTouch+ Help page. Any issues or queries related to InTouch+ can be addressed to InTouchPlus.Contact-Point@iaea.org.

Should online application submission not be possible, candidates may download the nomination form for the meeting from the IAEA website.

Administrative and Financial Arrangements

Nominating authorities will be informed in due course of the names of the candidates who have been selected and will at that time be informed of the procedure to be followed with regard to administrative and financial matters.

Selected participants will receive an allowance from the IAEA sufficient to cover their costs of lodging, daily subsistence, and miscellaneous expenses. They will also receive either a round-trip air ticket based on the most direct and economical route between the airport nearest their residence and the airport nearest the duty station through the IAEA's travel agency American Express, or a travel grant, or they will be reimbursed travel by car/bus/train in accordance with IAEA rules for non-staff travel.

Disclaimer of Liability

The organizers of the event do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability, or death of a participant while he/she is travelling to and from or attending the course, and it is clearly understood that each Government, in approving his/her participation, undertakes responsibility for such coverage. Governments would be well advised to take out insurance against these risks.

Note for female participants

Any woman engaged by the IAEA for work or training should notify the IAEA on becoming aware that she is pregnant.

The Board of Governors of the IAEA approved new International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources. The Standards deal specifically with the occupational exposure conditions of female workers by requiring, inter alia, that a female worker should, on becoming aware that she is pregnant, notify her employer in order that her working conditions may be modified, if necessary. This notification shall not be considered a reason to exclude her from work; however, her working conditions, with respect to occupational exposure shall be adapted with a view to ensuring that her embryo or foetus be afforded the same broad level of protection as required for members of the public.

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