



Interregional Workshop on Advances in Design of Generation-IV Small and Medium Sized or Modular Reactors (SMRs)

Hosted by
The Government of the People's Republic of China

through

China Institute of Atomic Energy (CIAE)

Beijing, China

3 to 7 June 2024

Ref. No.: ME-INT2023-2301208

Information Sheet

Purpose

The purpose of the event is to discuss the innovative designs of Small and Medium Sized or Modular Reactors (SMRs) within the framework of the six concepts outlined by the Generation-IV International Forum (GIF). Additionally, the event will serve as a platform for stimulating discussions and facilitating the exchange of fresh ideas among both the participants and the lecturers.

Working Language

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

Deadline for Nominations

Nominations received after March 2, 2024, will not be considered.

Project Background

To meet the growing demand for energy and to mitigate global climate challenge, the interest in Small and Medium sized or Modular Reactors (SMRs) and Micro-Reactors (MRs) is growing, especially with 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 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.

Through established Agency's forums and mechanisms, including the Technical Working Group (TWG) for SMRs, Member States (MS) have requested IAEA to provide the technical training on the recent advances in developing of the innovative SMRs, including conceptual designs introduced and investigated by Generation-IV International Forum (GIF). There are several different SMR designs currently under development, which are using the basic principles formulated by GIF for next-generation innovative reactors. For example, a fast neutron reactor, in addition to its efficient use of fuel, can operate either as breeder to create more fissile fuel, or as a burner of plutonium and/or long-lived minor actinides. Combining this capability with the benefits of SMR power generation flexibility could produce additional advantages. However, it also introduces new challenges, technological and others, such as non-proliferation issues. To identify such benefits and challenges of Gen-IV SMRs, the IAEA conducted a technical meeting on the topic in 2019 followed by the publication of the IAEA TECDOC "Benefits and Challenges of Small Modular Fast Reactors" in 2021.

In this Interregional Workshop on "Advances in Design of Generation-IV SMRs" hosted by the Government of People's Republic of China, participants will learn the state-of-the-art of technology in the following areas: (i) sodium cooled fast neutron SMRs, (ii) heavy liquid metal cooled fast neutron SMRs, (iii) molten salt SMRs, (iv) gas cooled SMRs, (v) safety aspects of fast SMRs and (vi) technology and research in support of SMR development. Three group discussions — on (i) in-factory construction, (ii) technological challenges to be resolved and (iii) benefits of Gen-IV SMRs including market needs will provide a comprehensive understanding of the most relevant topics in this area.

Scope and Nature

During the five-day workshop, selected participants will receive lectures from international experts from the IAEA, China, and other IAEA Member States, and they will also actively engage in interactive discussions. The workshop will provide participants with a theoretical foundation in the most crucial research and technology development areas of innovative reactors and energy systems, as well as familiarity with modern physical models and simulation codes for the design and safety analysis of advanced nuclear reactors of SMR types.

Active discussions, group activities, poster sessions, and various blended learning approaches will enhance the sharing of new ideas and emphasize the need for continued R&D and innovation in all areas of innovative SMRs. By the end of the workshop, participants are expected to have a better understanding of the six Gen-IV conceptual reactor designs, their scalability to SMRs, and the benefits and challenges

of using different coolants and technologies.

The hosting organization will provide technical tours for participants to the Fast-neutron Spectrum SMR. In addition, the workshop will provide opportunities for participants to network and continue sharing information and good practices as well as other potential follow-up tasks and coordinated activities, as appropriate.

Expected outputs

The expected outputs of the workshop are:

- Enhanced understanding of the theoretical foundations and key research areas in innovative nuclear energy systems.
- Familiarity with modern physical models and simulation codes for the design and safety analysis of advanced nuclear reactors of SMR types.
- Increased engagement and stimulation of young scientists, researchers, and engineers in the field of nuclear reactors research.
- Improved comprehension of the six Gen-IV conceptual reactor designs, their scalability to SMRs, and the benefits and challenges associated with different coolants and technologies.

Participation

The event is open to up to 35 participants from the following Member States participating in the TC Project INT2023:

Algeria, Argentina, Armenia, Belarus, Bolivia, Brazil, Bulgaria, China, Croatia, Czech Republic, Egypt, El Salvador, Estonia, Ethiopia, Georgia, Ghana, Greece, Guatemala, Hungary, Indonesia, Islamic Republic of Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Latvia, Libya, Lithuania, Madagascar, Malaysia, Mexico, Morocco, Myanmar, Namibia, Nigeria, Pakistan, Peru, Philippines, Poland, Qatar, Romania, Rwanda, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Sri Lanka, Sudan, Thailand, Tunisia, Türkiye, United Republic of Tanzania, Uzbekistan, Zambia.

At no cost to the IAEA, participants from following countries can also be considered:

Australia, Canada, France, Italy, Japan, Belgium, Denmark, Spain, Finland, India, Republic of Korea, Russian Federation, United Kingdom, United States of America.

Participants' Qualification and Experience

The target participants for this workshop includes individuals, especially young scientists, researchers, and engineers currently involved in nuclear reactor research, prospective owner/operator organizations/ developers/ regulatory bodies/ potential users, who are interested in understanding the key benefits and challenges associated with innovative Gen-IV SMRs and related technologies. Candidates are required to submit a motivation letter detailing how the workshop could benefit their current or future job positions. Additionally, all applicants are encouraged to provide a title and a brief abstract of the poster presentation related to one of the Gen-IV reactor designs or relevant topics.

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

Accepted participants will need to prepare a poster for presentation during the workshop poster session and read the following reference to get the most out of the event:

- INTERNATIONAL ATOMIC ENERGY AGENCY, Small Modular Reactors: A New Nuclear Energy Paradigm
- Generation IV Systems
- INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA-TECDOC-1936, Applicability of Design Safety Requirements to Small Modular Reactor Technologies Intended for Near Term Deployment, Vienna (2020)
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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;
 - c. Search for the relevant technical cooperation event (EVT2301208) under the 'My Eligible Events' tab, answer the mandatory questions and lastly submit the application to the required..

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](#).

NOTE: A medical certificate signed by a registered medical practitioner dated not more than four months prior to starting date of the event must be submitted by candidates when applying for a) events with a duration exceeding one month, and/or b) all candidates over the age of 65 regardless of the event duration.

Administrative and Financial Arrangements

Nominating authorities will be informed in due workshop 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 workshop, 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 workshop 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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