



Technical Meeting on Nuclear Fuel Cycle Options for Current and Advanced Reactors

**IAEA Headquarters
Vienna, Austria**

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Information Sheet

Introduction

The growing international commitment to achieving climate and energy security objectives has renewed interest in nuclear energy as a reliable source of low-carbon energy. Beyond electricity generation, nuclear technology is increasingly being considered for other applications, such as industrial process heat, district heating, and hydrogen production. However, concerns related to safety/security/safeguards, spent fuel and radioactive waste management, and economics continue challenging its public acceptance as a sustainable energy source.

The nuclear fuel cycle is central to the deployment of nuclear power, not only because it encompasses the processes needed to produce nuclear fuel but because there are a range of nuclear fuel cycle options available depending on the nuclear fuel used in the reactors and the management of the spent fuel when discharged from the reactors.

As nuclear power expands, continued attention to the management of spent nuclear fuel (SNF) and radioactive waste (RW) is required from policy, industrial and technological perspectives. This requires assessing the economic, environmental, societal, safety, security and safeguards implications of different nuclear fuel cycle options. Existing reactor technologies and nuclear fuel cycles have demonstrated high levels of safety, reliability and operational maturity, while significant innovation is underway in both reactor and nuclear fuel cycle technologies.

A variety of nuclear fuel cycle options are currently available or under development, depending on national priorities, resource utilization, technological capabilities and long-term energy

strategies. These options range from once-through systems, in which spent fuel is destined for disposal, to recycling options based on recovering and reusing valuable materials to improve resource utilization, strengthen energy security and contribute to the responsible management of SNF and RW.

Understanding the implications of the different nuclear fuel cycle options currently available or under development/demonstration is key in the decision making process. The IAEA is, therefore, conducting a Technical Meeting on Nuclear Fuel Cycle Options for Current and Advanced Reactors, to discuss the status of nuclear fuel cycle options for the existing Water Cooled Reactors fleet, and future Gen-IV large reactors and Small Modular Reactors/Advanced Micro Reactors. The objective is to prepare a high level publication on the topic, targeting decision makers, to provide concise information to support Member States' decision-making processes on the potential options for managing SNF from existing and future power reactors.

Objectives

The purpose of the event is to discuss the state of the art and advancements in nuclear fuel cycle options for current and advanced reactors (e.g. Generation IV, SMRs/AMRs) and to identify the differences in terms of nuclear facilities, nuclear materials, wastes generated, required infrastructures and other aspects necessary for their future deployment.

The TM also aims at gathering relevant information on existing industrial operational experiences as well as on R&D and Demonstration activities worldwide carried out on innovative nuclear fuel cycle options for advanced reactor systems (e.g., Gen-IV, SMRs/AMRs, etc.). This is to support the drafting of an IAEA publication to provide guidance to Member States on the implications of different nuclear fuel cycle options, and how SNF recycling options can reduce the need for natural resources and the burden of the RW through recycling and valorising elements present in the SNF, minimizing the environmental impact of the entire nuclear fuel cycle.

Target Audience

Participation is solicited from representatives of governmental, national and international organizations, research centres, universities, regulators, operators, developers, and industry. To ensure maximum effectiveness in the exchange of information, the participants should be persons actively involved in the subject of the meeting.

Expected Outputs

The foreseen outputs of the Technical Meeting are:

- To improve Member States’ understanding of the state of the art of advanced nuclear fuel cycles development for current and next generation of nuclear power reactors, including SMRs/AMRs, gathering relevant information on existing operational experiences as well as on R&D and Demonstration activities worldwide.
- To discuss potential synergies among different fuel cycle options, challenges for the different stages of the backend of the nuclear fuel cycle, enablers and barriers for their implementation, required infrastructures and nuclear facilities, involved nuclear materials and generated wastes as well as other aspects of interest (e.g., collaborative approaches, regulatory frameworks, economics, etc.).
- To consolidate and review the content of an IAEA publication on “Nuclear Fuel Cycle Options for Recycling and Reusing Valuable Materials, Natural Resources Preservation, and Waste Burden Minimization”. The objective of the publication is to provide guidance to Member States on how SNF recycling options can minimize the environmental impact of the entire fuel cycle through recycling and valorising elements present in SNF.

Topics

Extended abstracts and presentations on the following topics are welcomed:

- 1. Sustainable Strategies:** Role of, and key results from, international sustainability assessments, life cycle assessments (LCA), scenario analysis, modelling of nuclear energy systems and the nuclear fuel cycle optioneering studies, including the tools that can be used to analyse fuel cycles and results from studies.
- 2. Nuclear Fuel Cycle Technologies:** Technological aspects of the different nuclear fuel cycle options with specific focus on nuclear fuel recycling (reprocessing and impacts on the use of recycled products; partitioning technologies including the management of associated wastes; nuclear fuel cycle options for molten salt reactors, high temperature gas cooled reactors, Generation IV, and SMRs/AMRs).
- 3. Impacts of nuclear fuel cycle options:** With a focus on the factors that can influence decision making as drivers for advanced nuclear fuel cycles, impacts of deploying different nuclear fuel cycle options, including challenges and barriers for deployment and enablers needed.

These include, but are not limited to:

- a. Stabilisation of SNF inventory
- b. Energy security
- c. Environmental footprint: in terms of resource preservation through recovery and recycling valuable materials, and impacts on radioactive waste management for waste burden minimisation (e.g., High Level Waste volume, heat loading & inventory, waste reclassification)
- d. Public support of nuclear energy, waste management, and societal impacts/perception
- e. Safeguards, security and non-proliferation aspects
- f. Economics

- g. Technology maturity
 - h. Location of facilities (inc. co-location and other alternatives), transportation, logistics, and others.
- 4. International cooperation:** Aspects relating to advanced nuclear fuel cycle development, demonstration & deployment, including international collaboration and partnerships in reprocessing and recycling and other crucial steps of the backend of the fuel cycle. Opportunities for international cooperation in research and technology development to accelerate deployment of innovative systems.
- 5. Updates of Nuclear Fuel Cycle National Programmes.**

Structure

The meeting will consist of plenary and thematic sessions, group discussions, and a concluding session to identify key challenges and elements for potential new IAEA activities on spent fuel recycling and advanced fuel cycles including international collaborations in the backend of the nuclear fuel cycle. Presentations by participants will be based on submitted abstracts and contributions to the IAEA publication on “Nuclear Fuel Cycle Options for Recycling and Reusing Valuable Materials, Natural Resources Preservation, and Waste Burden Minimization” will be requested on a case by case basis.

The IAEA encourages participants to deliver presentations on the work of their respective institutions related to nuclear fuel cycle options to strength nuclear energy sustainability in the long-term, addressing topics listed above.

Working Language(s)

The working language of the meeting will be English, with no interpretation provided. All communications, abstracts and papers must be in this language.

Participation and Registration

All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State or invited organization, participants are requested to submit their application via the InTouch+ platform (<https://intouchplus.iaea.org>) to the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA by **2 October**, following the registration procedure in InTouch+:

1. Access the InTouch+ platform (<https://intouchplus.iaea.org>):
 - Persons with an existing NUCLEUS account can sign in to the platform with their username and password;
 - Persons without an existing NUCLEUS account can register [here](#).
2. Once signed in, prospective participants can use the InTouch+ platform to:
 - Complete or update their personal details under ‘Complete Profile’ and upload the relevant supporting documents;
 - Search for the relevant event under the ‘My Eligible Events’ tab;
 - Select the Member State or invited organization they want to represent from the drop-down menu entitled ‘Designating Authority’ (if an invited organization is not listed, please contact InTouchPlus.Contact-Point@iaea.org);
 - If applicable, indicate whether financial support is requested and complete the relevant information (this is not applicable to participants from invited organizations);
 - Based on the data input, the InTouch+ platform will automatically generate the Participation Form (Form A) and/or the Grant Application Form (Form C);
 - Submit their application.

Once submitted through the InTouch+ platform, the application, together with the auto-generated form(s), will be transmitted automatically to the required authority for approval. If approved, the application, together with the applicable form(s), will automatically be sent to the IAEA through the online platform.

NOTE: The application for financial support should be made, together with the submission of the application, by **2 October**.

For additional information on how to apply for an event, please refer to the [InTouch+ Help](#) page. Any other issues or queries related to InTouch+ can be sent to InTouchPlus.Contact-Point@iaea.org.

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

Participants are hereby informed that the personal data they submit will be processed in line with the [Agency’s Personal Data and Privacy Policy](#) and is collected solely for the purpose(s) of reviewing and assessing the application and to complete logistical arrangements where required. The IAEA may also use the contact details of Applicants to inform them of the IAEA’s scientific and technical publications, or the latest employment opportunities and current open vacancies at the IAEA. These secondary purposes are consistent with the IAEA’s mandate. Further information can be found in the [Data Processing Notice](#) concerning IAEA InTouch+ platform.

Papers and Presentations

The IAEA encourages participants to give presentations on the work of their respective institutions that falls under the topics listed above.

Participants who wish to give presentations are requested to submit an abstract of their work through INDICO page <https://conferences.iaea.org/event/491/> by **2 October**. The abstract will be reviewed as part of the selection process for presentations. Authors will be notified of the acceptance of their proposed presentations by **23 October**.

Accepted contributions will be requested to submit an extended abstract that should be in A4 page format and should extend to no more than **5** pages (including figures and tables) no later than **1 December**.

In addition to the registration already submitted through the InTouch+ platform, participants have to submit the abstract, together with the Form for Submission of a Paper (Form B), to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA not later than **2 October**.

Expenditures and Grants

No registration fee is charged to participants.

The IAEA is generally not in a position to bear the travel and other costs of participants in the event. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Upon specific request, such assistance may be offered to normally one participant per country, provided that, in the IAEA's view, the participant will make an important contribution to the event.

The application for financial support should be made, together with the submission of the application, by **2 October**.

Venue

The event will be held at the Vienna International Centre (VIC) where the IAEA's Headquarters are located. Participants must make their own travel and accommodation arrangements.

General information on the VIC and other practical details, such as a list of hotels offering a reduced rate for IAEA participants, are listed on the following IAEA web page: <https://www.iaea.org/events>.

Participants are advised to arrive at Checkpoint 1/Gate 1 of the VIC one hour before the start of the event on the first day in order to allow for timely registration. Participants will need to present an official photo identification document in order to be admitted to the VIC premises.

Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria at least four weeks before they travel to Austria. Since Austria is a Schengen State, persons requiring a visa will have to apply for a Schengen visa. In States where Austria has no diplomatic mission, visas can be obtained from the consular authority of a Schengen Partner State representing Austria in the country in question.

Organization

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretary/Secretaries and correspondence on other matters related to the event to the Administrative Secretary.

Event Web Page

Please visit the following IAEA web page regularly for new information regarding this event:

[www.iaea.org/events/ EVT2604486](http://www.iaea.org/events/EVT2604486)

INDICO Webpage for Paper submission: <https://conferences.iaea.org/event/491/>