

# Technical Meeting on Compatibility Between Coolants and Materials for Fusion Facilities and Advanced Fission Reactors

IAEA, Vienna

*30 October -03 November 2023*

## Concluding Remarks

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# DG IAEA Statement to the 67-th Regular Session of the IAEA General Conference

## 25.09.2023



Nuclear power capacity will need to grow significantly if the world is to meet its climate goals.

Nuclear power capacity will need to grow significantly if the world is to meet its climate goals. Part of that growth could come from Small Modular Reactors (SMRs). The **IAEA Platform on SMRs and their Applications** provides Member States with enhanced Agency support on this important emerging technology whose modular design allows for a more gradual scaling up of power capacity making SMRs especially relevant for developing countries. To further support the global deployment of safe and secure advanced reactors such as SMRs, I launched the Nuclear Harmonization and Standardization Initiative (NHSI). It works towards enhancing the harmonization of regulatory approaches and also the wider standardization of industrial approaches.

Further down the line, nuclear fusion promises the possibility of abundant energy. Four years ago, IAEA activities on fusion were exclusively focused on science. Today, we have expanded our efforts, aiming also to accelerate development and deployment of fusion energy systems. We have come a long way, and I invite you to take stock of this progress next month in London at our biannual *Fusion Energy Conference*, where we will be launching a new publication, the *IAEA World Fusion Outlook*. It will provide a forum for discussing key physics and technology issues as well as innovative concepts of direct relevance to the use of nuclear fusion as an abundant source of low-carbon energy.

# Recent Trends in Fusion: From Plasma Science to Power Applications



The IAEA's DG Rafael Mariano Grossi opened the IAEA's 29th International Fusion Energy Conference (FEC) in with the announcement an inaugural meeting of the World Fusion Energy Group will be convened next year.

This group aims to bring together not just scientists and engineers from laboratories and experimental centres, but also policy makers, financiers, regulators and private companies. This collaboration will enable these stakeholders to keep pace as the fusion energy journey continues from the experimental stage towards demonstration, with the eventual goal of commercial fusion energy production.

The announcement comes as interest in fusion energy research gains momentum around the world. Fusion has the potential to provide a source of limitless, inherently safe, clean and affordable energy.

# Key Attributes and Roadmap of SMRs

Advanced Reactors that produce typically up to 300 MWe, built in factories and transported as Modules to sites for Installation as demand arises.

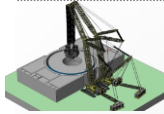
**Fusion:  
Energy  
Justice**

Enhanced Safety



**Economic**

- Lower Upfront capital cost
- Economy of serial production



**Modularization**

- Multi-module
- Modular Construction



**Flexible Application**

- Remote regions
- Small grids

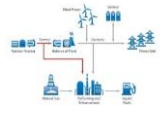


**Smaller footprint**

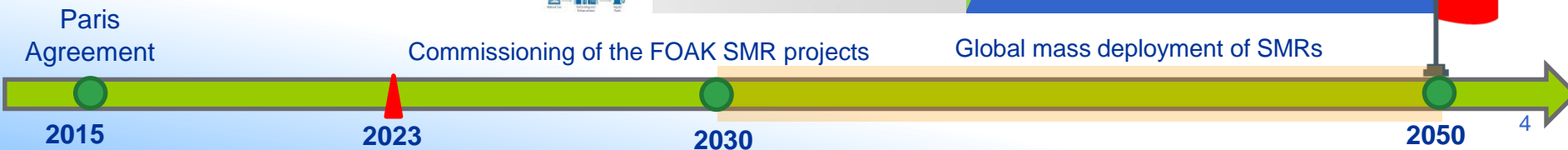
- Reduced Emergency planning zone



**Replacement for aging fossil-fired plants**



**Potential Hybrid Energy System**



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1961: IAEA Conference on Plasma Physics and Controlled Nuclear Fusion research

1996: IAEA Fusion Energy Conference (FEC)

FEC-23: 20% of contributions – on technology

FEC-25:

IAEA Fusion Energy Conference: [Towards Power Applications](#)



30 October  
03 November  
2023

**Technical Meeting on Compatibility Between  
Coolants and Materials for Fusion Facilities and  
Advanced Fission Reactors**

IAEA Headquarters, Vienna, Austria  
and virtual participation via Cisco Webex

30 October–3 November 2023

Ref. No.: EVT2205016

The purpose of the event is to present, review and discuss the state of the art of research on compatibility between coolants and structural materials used or proposed for use in fusion experimental facilities and future thermonuclear reactors for energy production; and to determine the applicability of the technology and materials used in advanced fission reactors to future fusion systems.

# Positioning of the TM

**TM on Compatibility**  
30 Oct -03 Nov, 2023

**TECDOC Publication**

**CM-1**  
07-09.02.2023

**CM-2**  
19-20.09.2023

**CM-3**

**International Symposium  
on Fusion Nuclear  
Technology, Spain**  
10-15.09

**Fusion Energy  
Conference,  
UK**  
16-21.10

Example of  
publication

IAEA TECDOC SERIES

Structural Materials  
for Heavy Liquid Metal  
Cooled Fast Reactors

*Proceedings of a Technical Meeting*

IAEA-TECDOC-1978

# Technical Meeting on Compatibility Between Coolants and Materials for Fusion Facilities and Advanced Fission Reactors



Session 1 Advances in the Areas of Fusion & Fission Technologies

Session 2 IAEA activities in support of advanced technologies

Session 3 Experimenting: Corrosion and mass transfer 14 (11 + 3 virtual)

Session 4 Modelling: Corrosion and mass transfer 5 (4+1)

Session 5 Specifics of coolant-material compatibility  
in fusion environment 4 (3+1)

Session 6 Compatibility of materials and coolants  
in nuclear reactors' environments 9 (5+4)

Session 7 Conclusions

Total: 32 (23+9) Contributions  
65 nominations

# Objectives of the TM:



**The purpose** of the event is to present, review and discuss the state of the art of research on compatibility between coolants and structural materials used or proposed for use in fusion experimental facilities and future thermonuclear reactors for energy production; and to determine the applicability of the technology and materials used in advanced fission reactors to future fusion systems.

**Specific objectives** of the event are:

- Promote and facilitate the exchange of information on compatibility between coolants and materials for both fusion and fission;
- Summarize the current status of research into the topic of coolants and materials;
- Identify needs and challenges on the topic;
- Document the discussions and major findings among subject matter experts to support Member States in better understanding and benefiting from research into coolant-material compatibility.





**IAEA**

International Atomic Energy Agency  
*Atoms for Peace and Development*

**Thank  
you**

