



# **Technical Meeting on Advances in High Temperature Processes for Hydrogen Production with Nuclear Energy**

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

**5–8 September 2023**

**Ref. No.: EVT2103544**

## **Information Sheet**

### **Introduction**

Hydrogen is gaining increased attention as a versatile energy carrier with no associated carbon emissions, which can concretely help Member States reach net-zero emission goals. However, about 95% of the hydrogen used today is produced from fossil resources (gas, oil and coal), with the associated carbon emissions and implications for energy security related to imported fossil fuels in many countries. Nuclear energy has the potential to replace fossil fuels for supplying the forecasted increasing demand of hydrogen. One of the IAEA's statutory objectives is to "seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world". Hydrogen production from nuclear energy can help advance this objective.

Nuclear reactors are in turn well suited to provide the energy needs for hydrogen production with no associated carbon emissions, by virtue of their reliable, stable, and dispatchable operations for electricity generation. In addition, nuclear plants can effectively utilize the large amount of no-carbon heat to produce hydrogen, a unique feature of nuclear plants among the various scalable zero-carbon energy sources.

Hydrogen production with heat from nuclear plants can effectively increase the overall efficiency of nuclear generation, increase the revenue to nuclear plants owners, and increase the amount of hydrogen produced with the same facilities. Therefore, it is important for decision makers in Member States to have a full and clear understanding of the actual current status and true potential of hydrogen production

with the various methods that can take advantage of the heat produced by nuclear plants. Developing this information is the goal of this meeting.

The following hydrogen production methods follow within the scope of this initiative: high temperature steam electrolysis (HTSE), various thermochemical cycles (e.g. Sulfur-Iodine, Copper-Chlorine etc.), steam methane reforming, gasification of coal, and methane pyrolysis.

This technical meeting aims to collect the most recent developments in high temperature hydrogen production projects worldwide, including associated technological information, and understand the true potential for coupling those technologies with various types of nuclear plants.

## **Objectives**

The objectives of the meeting are the following:

- Provide a forum to discuss relevant aspects (such as needed R&D, current status of commercial development, associated technical challenges) for the hydrogen production technologies that can capitalize on heat from nuclear reactors, represented by the current fleet as well as the emerging reactor technologies, including SMRs.
- Understand the potential for the various technologies that can make good use of nuclear heat, including expected efficiency gains compared to low-temperature electrolysis, as well as other factors affecting their expected performance.
- Start a discussion of further potential areas of work, where nuclear energy can have a great impact. One of these options is for example the co-electrolysis of CO<sub>2</sub> with HTSE for the production of carbon neutral hydrocarbon commodities.
- Discuss potential synergisms between High temperature H<sub>2</sub> production technologies.
- Understand the key factors that can facilitate the deployment of nuclear hydrogen projects, including required temperatures and relative size of the heat/electricity demand.
- Provide advice and guidance on IAEA activities relating to nuclear hydrogen production using heat from nuclear reactors for the benefits of Member States.

## **Target Audience**

The event is intended for project managers, decision makers, engineers and other stakeholders with relevant expertise in high temperature hydrogen projects and coupling of hydrogen generation plants to nuclear power plants and associated issues, in countries with operating nuclear power plants, countries pursuing deployment of advanced reactor technologies in the view of producing hydrogen, as well as newcomer countries interested in nuclear hydrogen production and the steps needed for implementation of such projects.

## **Working Language(s)**

English.

## Expected Outputs

The main expected outputs of this meeting are a full understanding of the current status and development potential, and associated issues, of the various technologies that can make good use of nuclear heat. This includes expected efficiency gains compared to low-temperature electrolysis, other factors affecting their expected performance; the technologies readiness level of different high temperature hydrogen production systems; a collection of relevant input related the status and prospects of nuclear hydrogen projects; identification of the main challenges to be addressed in deployment of high temperature hydrogen production and ways to address these challenges, as well as collecting material to develop a report summarizing the discussions held.

## 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, participants are requested to send the **Participation Form (Form A)** to their competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) for onward transmission to the IAEA by **5 July 2023**. Participants who are members of an organization invited to attend are requested to send the **Participation Form (Form A)** through their organization to the IAEA by the above deadline.

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.

## 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 using the **Grant Application Form (Form C)**, which has to be stamped, signed and submitted by the competent national authority to the IAEA together with the **Participation Form (Form A)** by **5 July 2023**.

## 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:

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

## **IAEA Contacts**

### **Scientific Secretaries:**

#### **Mr Francesco Ganda**

Division of Nuclear Power  
Department of Nuclear Energy  
International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 VIENNA  
AUSTRIA

Tel.: +43 1 2600 22859

Fax: +43 1 26007

Email: [F.Ganda@iaea.org](mailto:F.Ganda@iaea.org)

#### **Ms Alina Constantin**

Division of Nuclear Power  
Department of Nuclear Energy  
International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 VIENNA  
AUSTRIA

Tel.: +43 1 2600 22822

Fax: +43 1 26007

Email: [A.Constantin@iaea.org](mailto:A.Constantin@iaea.org)

**Administrative Secretary:**

**Ms M. Nicole Córdova Jurak**

Nuclear Power Technology Development Section

Division of Nuclear Power

Department of Nuclear Energy

International Atomic Energy Agency

Vienna International Centre

PO Box 100

1400 VIENNA

AUSTRIA

Tel.: +43 1 2600 22815

Fax: +43 1 26007

Email: [M.Cordova-Jurak@iaea.org](mailto:M.Cordova-Jurak@iaea.org)

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.

# Participation Form

## Technical Meeting on Advances in High Temperature Processes for Hydrogen Production with Nuclear Energy

IAEA Headquarters Vienna, Austria and virtual participation via Cisco Webex

5–8 September 2023

To be completed by the participant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary [F.Ganda@iaea.org](mailto:F.Ganda@iaea.org) and to the Administrative Secretary [M.Cordova-Jurak@iaea.org](mailto:M.Cordova-Jurak@iaea.org).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

**Deadline for receipt by IAEA through official channels: 5 July 2023**

|                                                                                                                                   |                                                                                      |       |
|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------|
| Family name(s): (same as in passport)                                                                                             | First name(s): (same as in passport)                                                 | Mr/Ms |
| Institution:                                                                                                                      |                                                                                      |       |
| Full address:                                                                                                                     |                                                                                      |       |
| Tel. (Fax):                                                                                                                       |                                                                                      |       |
| Email:                                                                                                                            |                                                                                      |       |
| Nationality:                                                                                                                      | Representing following Member State/non-Member State/entity or invited organization: |       |
| Do you intend to make a presentation?                      Yes <input type="checkbox"/> No <input type="checkbox"/>               |                                                                                      |       |
| Title:                                                                                                                            |                                                                                      |       |
| I plan to attend virtually:                                              Yes <input type="checkbox"/> No <input type="checkbox"/> |                                                                                      |       |

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.

# Grant Application Form

## Technical Meeting on Advances in High Temperature Processes for Hydrogen Production with Nuclear Energy

IAEA Headquarters, Vienna, Austria and virtual participation via Cisco Webex  
 5–8 September 2023

To be completed by the applicant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary [F.Ganda@iaea.org](mailto:F.Ganda@iaea.org) and to the Administrative Secretary [M.Cordova-Jurak@iaea.org](mailto:M.Cordova-Jurak@iaea.org).

**Deadline for receipt by IAEA through official channels: 5 July 2023**

|                                       |                                                          |        |
|---------------------------------------|----------------------------------------------------------|--------|
| Family name(s): (same as in passport) | First name(s): (same as in passport)                     | Mr/Ms: |
| Mailing address:                      | Tel.:                                                    |        |
|                                       | Fax:                                                     |        |
|                                       | Email:                                                   |        |
| Date of birth (yy/mm/dd):             | Nationality:                                             |        |
| I plan to attend virtually:           | Yes <input type="checkbox"/> No <input type="checkbox"/> |        |

### 1. Education (post-secondary):

| Name and place of institution | Field of study | Diploma or Degree | Years attended from | to |
|-------------------------------|----------------|-------------------|---------------------|----|
|                               |                |                   |                     |    |
|                               |                |                   |                     |    |
|                               |                |                   |                     |    |
|                               |                |                   |                     |    |

### 2. Recent employment record (starting with your present post):

| Name and place of employer/ organization | Title of your position | Type of work | Years worked from | to |
|------------------------------------------|------------------------|--------------|-------------------|----|
|                                          |                        |              |                   |    |
|                                          |                        |              |                   |    |
|                                          |                        |              |                   |    |

### 3. Description of work performed over the last three years:

### 4. Institute's/Member State's programme in field of event:

**Date:** \_\_\_\_\_ **Signature of applicant:** \_\_\_\_\_  
**Date:** \_\_\_\_\_ **Name, signature and stamp of Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority** \_\_\_\_\_