IAEA

Atoms for Peace and Development

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International Atomic Energy Agency
Agence internationale de l'énergie atomique
Международное агентство по атомной энергии
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The Secretariat of the International Atomic Energy Agency (IAEA) presents its compliments to the IAEA's Member States and has the honour to draw their attention to the **International Workshop on the Role of Low Carbon Hydrogen for a Net Zero Energy System** (hereinafter referred to as "event") to be held at the Hotel Renaissance, in Aix-en-Provence, France, from **22 to 24 June 2022**.

The purpose of the event is to bring together experts and representatives from Member States to exchange views on the importance of hydrogen for the decarbonization of energy sectors, including with regard to heavy transport, as well as industrial applications such as steel and concrete production.

The attached Information Sheet provides further details of the event.

The event will be held in English.

Member States are invited to designate one participant to represent the Government at this event. Member States are strongly encouraged to identify suitable women 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 at the time of designating the participant using the attached Grant Application Form (Form C).

It should be noted that compensation is not payable by the IAEA for any damage to or loss of personal property. The IAEA also does not provide health insurance coverage for participants in IAEA events. Arrangements for private insurance coverage on an individual basis should therefore be made. The IAEA will, however, provide insurance coverage for accidents and illnesses that clearly result from any work performed for the IAEA.

Designations should be submitted to the IAEA through the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) not later than **10 May 2022** using the attached Participation Form (Form A). Completed and authorized Participation Forms should be sent either by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed). Copies should be sent by email to the Scientific Secretary of the event, Mr Henri Paillere, Division of Planning, Information and Knowledge Management, Department of Nuclear Energy (Email: H.Paillere@iaea.org). The Scientific Secretary of the event will liaise with the participants directly concerning further arrangements, including travel details, as appropriate, once official designations have been received.

The Secretariat of the International Atomic Energy Agency avails itself of this opportunity to renew to the IAEA's Member States the assurances of its highest consideration.

2022-04-21

Enclosures: Information Sheet

Participation Form (Form A)

Grant Application Form (Form C)

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International Workshop on the Role of Low Carbon Hydrogen for a Net Zero Energy System

Hosted by the

Government of France

through the

Commissariat à l'énergie atomique et aux énergies alternatives (CEA)

and in cooperation with the IEA Hydrogen Technology Collaboration Programme (H2 TCP)

Hotel Renaissance, Aix en Provence, France

22–24 June 2022

Ref. No.: EVT2102849

Information Sheet

Introduction

The International Atomic Energy Agency (IAEA) is organizing a Workshop on the Role of Low Carbon Hydrogen for a Net Zero Energy System in Aix-en-Provence, France, on 22-24 June 2022, in cooperation with the French Alternative Energies and Atomic Energy Commission (CEA) and the IEA's Hydrogen Technology Collaboration Programme (H2 TCP).

Energy scenarios modelling the transitions towards net zero systems foresee nuclear energy's role being mostly in the power sector. Deep decarbonization will require increased electrification, to which all available low-carbon technologies will need to contribute, including nuclear energy. The IEA's net zero scenario published in 2021 for example foresees a doubling of nuclear generation by 2050. But to achieve net zero emissions for the energy section by the middle of the century, other sectors – those that cannot be easily electrified, for instance heavy duty or maritime transport, or

energy-intensive industrial sectors such as steel making, etc, will need to be decarbonized as well, using low carbon fuels. Hydrogen is increasingly seen as one of those fuels, a key energy vector to help decarbonize hard to abate sectors provided it can be produced without emissions. In future low-carbon energy systems, hydrogen could also play an important role as a source of energy storage, and as a source of flexibility to address peak loads.

Large hydrogen development programmes are underway in many countries, although there are only a few projects that consider nuclear production of hydrogen. Whereas around twenty countries adopted national hydrogen development strategies or announced their intention to do so, only a few countries have projects on nuclear hydrogen production, and even they are in early stages. Low carbon hydrogen can be produced by electrolysis using electricity from low carbon sources such as renewables or nuclear, or from electricity from the grid provided it is low carbon. Compared to some other low carbon electricity sources, using nuclear power for electrolysis allows for optimal utilization of the electrolyser, minimising the related costs. In addition, the heat from the reactor can be used for high-temperature steam electrolysis or for thermo-chemical splitting, which produces hydrogen more efficiently than low-temperature electrolysis.

The development of advanced reactors including Small Modular Reactors can provide opportunities for nuclear-based hydrogen production, and indeed some designs are specifically targeting hydrogen production as a potential future market. For existing plants, especially those exposed to uncertain wholesale electricity market prices, the production of hydrogen can help improve the plants' competitiveness by diversifying revenue streams. By operating steadily at full power, while modulating output between electricity and non-electric products, nuclear power plants can achieve increased load factors responding to market demands for each product (electricity, heat, hydrogen).

The precise role that nuclear energy will play in the transition towards low-carbon energy systems will therefore depend on the way electricity markets will evolve, the technological readiness level and cost-competitiveness of nuclear designs and hydrogen production options, as well as policy drivers.

Objectives

The main objective of this event is to discuss both the technological and economic aspects of hydrogen production with nuclear energy. Technological aspects include both the nuclear reactor technologies (traditional, advanced) and the hydrogen production technologies (low and high temperature steam electrolysis, thermochemical cycles). Economic aspects include costs of the different technologies, the choice of the hydrogen production location (on the site of the nuclear plant or closer to the user industry), the mode of operation and the competitive landscape to produce hydrogen with other renewable sources. The consequences of "green labelling" of nuclear power and low carbon hydrogen will also be discussed. Ongoing and future projects on nuclear hydrogen production will be discussed.

Target Audience

Member States are invited to designate one participant for this workshop who has specialized knowledge of, or experience in, hydrogen end-user industries. This event is suitable for policymakers, technology developers, scientists, managers from the electricity, nuclear and hydrogen industries as well as investors working on or interested in hydrogen research and technology development, low

carbon energy systems and the potential role of nuclear energy to contribute to cost-effective transitions to net zero. Member States are strongly encouraged to identify suitable women participants.

Working Language(s)

English

Topics

The following topics will be included in the Workshop agenda:

- The role of low carbon hydrogen in decarbonization scenarios. The potential markets and economics of low carbon hydrogen production and utilization (all technologies) will be discussed, looking at the pros and cons of onsite production (collocated with power generation unit), on-grid production (for decarbonized electricity grids) and the issue of cost of transport when the site of utilisation is different from the site of production.
- The production of hydrogen with nuclear energy – current and future hydrogen production technologies, including low temperature electrolysis, high temperature steam electrolysis and thermochemical cycles.
- The business case opportunities for producing hydrogen with existing nuclear power plants, and current and planned demonstration and large-scale industrial projects by nuclear utilities.
- The business case opportunities for producing hydrogen with future nuclear power plants, including with the use of advanced reactors (concepts, designs, economic assessments) and dedicated large scale nuclear giga factories.
- Communication and policies – including the labelling of green or low carbon hydrogen, and the policy and financial frameworks that can shape future industries.

A technical visit to CEA Cadarache will also be organized.

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 **10 May 2022**. 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 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.

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 **10 May 2022**.

Visas

Participants who require a visa to enter France should submit the necessary application to the nearest diplomatic or consular representative of France at least four weeks before they travel to France. Since France is a Schengen State, persons requiring a visa will have to apply for a Schengen visa. In States where France has no diplomatic mission, visas can be obtained from the consular authority of a Schengen Partner State representing France in the country in question. A letter of invitation, if needed, should be requested from the local organizers by emailing to paul.lucchese@cea.fr.

Additional Information

The event is organized in collaboration with the IEA Hydrogen Technology Collaboration Programme, represented by its Chair Mr Paul Lucchese (Email: paul.lucchese@cea.fr), from CEA, and with the support of CEA Cadarache Centre and the IRESNE Institute (Institut de recherche sur les systèmes nucléaires pour la production d'énergie bas carbone).

The event will take place at Hotel Renaissance in Aix-en-Provence, France.

IAEA Contacts

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

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Form A
EVT2102849

Participation Form

International Workshop on the Role of Low Carbon Hydrogen for a Net Zero Energy System

Hotel Renaissance, in Aix-en-Provence, France

22–24 June 2022

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 or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary H.Paillere@iaea.org and to the Administrative Secretaries V.Gartner@iaea.org and E.T.B.Hartzell@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: 10 May 2022

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:	

If/as applicable:

Do you intend to submit a paper? Yes ☐ No ☐

Would you prefer to present your paper as a poster? Yes ☐ No ☐

Title:

I plan to attend virtually: Yes ☐ No ☐

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.

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Form C
EVT2102849

Grant Application Form

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Hotel Renaissance, in Aix-en-Provence, France

22–24 June 2022

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 or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary H.Paillere@iaea.org and to the Administrative Secretaries V.Gartner@iaea.org and E.T.B.Hartzell@iaea.org.

Deadline for receipt by IAEA through official channels: 10 May 2022

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 ☐ No ☐	

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 _____**