

Tenth session of the Assembly
Abu Dhabi, 11-12 January 2020

Background Note Ministerial Roundtable Decarbonisation - Green Hydrogen

1. An increasing number of countries have identified hydrogen as an important energy carrier to further integrate renewables and more broadly for the energy transition. Japan hosted the first Hydrogen Energy Ministerial Meeting in 2018 when the *Tokyo Statement* was released, consisting of four pillars - research, development, demonstration and deployment. The second Hydrogen Energy Ministerial, held in 2019 in Japan, set a Global Action Agenda for the implementation of the *Tokyo Statement*. Several other initiatives have been taken jointly by countries and international organisations to further develop hydrogen from renewables, and are listed in the *Annex of the Chair's Summary of the second Hydrogen Energy Ministerial Meeting*.
2. IRENA's work on hydrogen from renewable power focuses on assessing the role of green hydrogen in the energy transition, as an enabler to integrate higher shares of renewable energy in the power sector and in turn decarbonise end-use sectors such as transportation, industry and buildings.
3. To this end, in 2018, IRENA released the [Hydrogen from renewable power: Technology outlook for the energy transition](#) report which gives an overview of key sectors for renewable-based hydrogen uptake and the production of hydrogen through electrolysis using renewable power. In addition, the latest [Hydrogen: A renewable energy perspective](#) report, released in September 2019 at the second Hydrogen Energy Ministerial, expands on the previous report bringing insights about strategies to accelerate the development of competitive hydrogen from renewables and highlights the rapidly increasing activity on green hydrogen in many countries. IRENA also joined the *Getting to Zero Coalition*, aiming at decarbonising the shipping sector. In the [Navigating the way to a renewable future: Solutions to decarbonise shipping](#) report, the analysis indicates that e-fuels from hydrogen can play a role in decarbonising shipping.
4. On 6 November 2019, during the eighteenth meeting of the IRENA Council, the Agency hosted a thematic meeting on *Decarbonising complex sectors: Paving the way towards a carbon-free economy*. The meeting had, among its main topics, the potential for hydrogen to decarbonise energy-intensive industries, trucks, aviation, shipping and heating applications. The meeting also provided an overview of the most carbon intensive branches of the industrial sector, evaluate their energy needs and present various alternatives to enhance the use of renewables energies. On 21 November 2019, IRENA, together with the government of the Republic of Korea, organised the *Global Renewable Energy Forum 2019*, in Bonn, with a special focus on green hydrogen.

5. A deep transformation in the energy sector is essential to achieve the decarbonised energy world envisaged by the Paris Agreement. In this context, power from renewables may become the main vehicle for the energy transition. However, the decarbonisation of sectors such as heavy industry, transport and other uses that require high-grade heat may be difficult purely by means of electrification. This challenge could be addressed by green hydrogen produced from renewables, which allows large amounts of renewable electricity to be channelled into these sectors. Hydrogen from renewable power together with bioenergy are the only net-zero solutions for the decarbonisation of these sectors.
6. Green hydrogen is gaining unprecedented political and business momentum, with a number of policies and projects expanding rapidly around the world. For example, Australia exported for the first time in 2019 a small amount of green hydrogen produced from renewable energy to a large energy company in Japan. Many projects are under development to scale up production of hydrogen from electrolysis for domestic consumption in industry, transport or for injection in the gas system. Further acceleration of efforts is critical to ensure a significant share of hydrogen in the energy system in the coming decades.
7. Electrolysers, the devices necessary to produce hydrogen using electricity and water as inputs, are scaling up quickly as technology continues to evolve and costs are projected to halve in the coming decades. In addition to being the cheapest source of electricity in most countries around the world today, renewables – when used for electrolysis of water – may become the cheapest pathway to produce hydrogen. Once scaled-up and made competitive, hydrogen from renewable power can also contribute in decarbonising a wider range of energy sectors, complementing direct electrification.
8. Nevertheless, a lot of uncertainty and competing visions have been seen amongst policy makers about the potential of hydrogen, its most suitable applications and the different pathways to scale-up its production. Therefore, a high-level discussion would be beneficial to build an understanding among countries on the role of green hydrogen from renewables for decarbonisation of the energy sector.

Objectives of the session

9. The goal of this session is to present the progress of hydrogen from renewable power and discuss findings and implications, and IRENA's role in supporting the development of hydrogen from renewable power in Member countries. The objectives of this session include:
 - Assessing the potential of green hydrogen and its relevance to national energy transitions.
 - Building an understanding among Members, with support from private sector, on the importance and the role of green hydrogen from renewables.
 - Exchanging views on the different technologies and potential for new projects.

Guiding questions

- What role can green hydrogen play in the future of the energy transformation, including in energy and development plans in the achievement of relevant international commitments?
- What actions are needed from the public and private sectors to scale-up the production and use of green hydrogen, in particular for hard-to-decarbonise sectors?
- What are some specific steps needed to bring green hydrogen to scale and at a *competitive* cost?

Associated Publications

- [Hydrogen from renewable power: Technology outlook for the energy transition](#)
- [Hydrogen: A renewable energy perspective](#)
- [Navigating the way to a renewable future: Solutions to decarbonise shipping](#)