IRENA
International Renewable Energy Agency

26 May 2019

Seventeenth meeting of the Council
Abu Dhabi, 25-26 June 2019

Background Note
Innovations for a Renewable-Powered Future

1. Innovation is the engine powering the energy transition and the pace of innovation around the world is accelerating. A multitude of innovation solutions are being trialed and adopted in a wide range of countries for a wide range of applications across energy systems. The power sector has been leading the way with rapid cost reductions in key renewable energy technologies of solar and wind. The cost of electricity from solar PV fell by almost 75% in the years between 2009 and 2018, and the costs of onshore wind electricity dropped by almost 25% in the same period. Renewable power generation accounted for an estimated quarter of total global power generation in 2017, with an impressive growth in recent years in variable renewable energy (VRE), wind and PV technologies.

2. According to IRENA's analysis, decarbonisation of the power sector, in line with the climate objectives outlined in the Paris Agreement, would require a share of renewable energy in total electricity generation of 85% by 2050. The share of electricity consumed in the total energy demand of end-use sectors – industry, transport and buildings – needs to more than double from around 20% in 2015 to 50% in 2050. Therefore, it is of paramount importance to focus innovation efforts on the integration of high shares of VRE in power systems.

3. IRENA has conducted a comprehensive analysis of the innovation landscape for the integration of VRE, mapping and categorizing the many examples of innovations and innovative solutions being created by pioneering companies and being backed by far-sighted governments around the world. The report *Innovation landscape for a renewable-powered future* was jointly launched by the European Commissioner for Energy and Climate Action and the IRENA Director-General, at the European Commission in Brussels on 19 February 2019. The report explains how innovations in technology, market design, business models and system operation are being combined to create solutions suitable for a wide range of power-systems and provides a clear framework for assisting decision makers to make informed judgments on the most relevant solutions for their needs and what to explore further.

4. The analysis contained in the report and the accompanying innovation landscape briefs provide decision-makers with a comprehensive toolbox to create solutions tailored to their context. The solutions built using this innovation toolbox aim at facilitating the integration of high shares of renewable energy in power systems at the lowest cost. Such a toolbox can also support countries in defining strategies to achieve their Nationally Determined Contributions (NDCs) and Long-Term Strategies (LTS) under the UNFCCC process as well as Sustainable Development Goals (SDGs).

5. After the release of the report *Innovation landscape for a renewable-powered future*, some Members have requested that IRENA organises region-focused events on the implementation of this innovation toolbox tailored to their context. In response, the Agency will organize a series of Regional Innovation Days, events organised jointly by IRENA and a host country in the selected region, which aim to connect experts and policy makers, showcase emerging technology-driven innovations and inspire and inform the broader and faster uptake of innovation solutions that can help deliver a renewable-powered future. These events follow a similar format and build on the two IRENA Innovation Week organized in 2016 and 2018 in Bonn, but with a focus on sharing insights and experiences to the particular needs of countries in the region.

Objective of the session

6. This session at the Council will comprise an interactive exchange of experiences between member countries on national successes in deploying innovative solutions and the challenges experienced. IRENA will provide context for the discussion by briefing Members on the insights presented in the report *Innovation landscape for a renewable-powered future*, on how the resulting toolbox can be used by countries, and the plans for the forthcoming Regional Innovation Days. Countries will then have the opportunity to highlight their national strategies for integrating VRE, their national experience with innovation and share best practices to date. Members will be encouraged to propose and exchange views on suggestions to fully exploit the innovative solutions identified by IRENA's analysis and provide guidance on future work by IRENA, including Innovation Days and other activities, that can assist them.

Guiding Questions

- How to accelerate the adoption of relevant innovations to get countries to a fully decarbonised power system?
- How should countries deal with and benefit from a rapid electrification, decentralisation and digitisation of the energy sector?
- What are the best practices in innovative enabling infrastructure and business models to transform the power sector?
- How to best use the results of IRENA's analysis (such as the report *Innovation landscape for a renewable-powered future*) and its region-focused events (such as Regional Innovation Days) to support countries' actions as well as foster cross-border collaboration on innovation?

Associated Publications

- IRENA Innovation Week 2018 Summary report
- Innovation landscape for a renewable-powered future
- Innovation outlook: smart charging for electric vehicles