

Regional Workshop on Renewable Energy in Central Asia

26-27 April 2017 – Abu Dhabi

Summary Report

Overview of the meeting

Opening remarks by Mr. Adnan Z. Amin, Director-General of IRENA and H.E. Dr. Thani Al Zeyoudi, Minister of Climate Change and Environment, United Arab Emirates.

Mr. Adnan Z. Amin welcomed the participants at the first Regional Workshop on Renewable Energy in Central Asia taking place in the IRENA Headquarters. He noted that developments in renewable energy sector have exceeded the expectations of even most optimistic supporters as plummeting costs and rapid innovation have spurred investments, transforming renewable energy from niche to an economically and technically preferred solution.

Mr. Amin stated that Central Asia is a region whose importance for the global energy system is entering a new stage. He highlighted key renewable energy developments in each country of the region, such as ambitious renewable energy targets in Azerbaijan and Kazakhstan, high hydropower potential in Kyrgyzstan and Tajikistan, major steps towards development of solar energy in Turkmenistan and Uzbekistan. Mr. Amin recalled the fruitful regional consultation meeting, which took place in Baku, Azerbaijan, and enabled the identification of the major challenges and opportunities of the region.

The Director-General reiterated IRENA's support to the government of Kazakhstan in the organization of the upcoming International Exhibition EXPO-2017 in Astana, Kazakhstan, themed "Future Energy" and confirmed the Agency's presence in Astana for the entire duration of the Exhibition in the International Organizations Joint Pavilion and across various events taking place throughout June to September of this year. He affirmed his participation at the opening of the EXPO.

H.E. Dr. Thani Al Zeyoudi noted how renewable energy has risen significantly in the past decade to become a prominent, feasible energy source in many countries. The UAE has been at the forefront of the global renewable energy upsurge, achieving record prices for solar energy three times in the past two years in Dubai and Abu Dhabi. The country provides significant finance and foreign aid for renewable energy and climate change projects in developing countries, primarily through the \$350 million dollars Abu Dhabi Fund for Development (ADFD) project facility in collaboration with IRENA.

Dr. Al Zeyoudi welcomed the theme of EXPO-2017 in light of the global commitments to address climate change and the Sustainable Development Goals. The UAE is one of Kazakhstan's key partners for EXPO-2017, and in 3 years, Expo 2020 will take place in Dubai. Expo 2017 Astana and Expo 2020

Dubai have signed a memorandum of understanding and co-operation in January 2017 on the sidelines of the World Future Energy Summit, to exchange knowledge and experiences as the countries work to ensure that both events are successful and as collaborative as possible. The UAE's Exhibition is structured around three unique themes, representing the universal drivers of progress: "Opportunity", "Sustainability" and "Mobility" and seeks to act as a global platform of collaboration with two universal aims "connecting minds" and "Creating the future".

In conclusion, Dr. Al Zeyoudi noted that the workshop underlines the commitment of countries to increasing the deployment of renewable energy and encouraged non-members of IRENA present at the workshop to join the Agency. He recognized IRENA's efforts in engaging countries and playing an instrumental role in advancing the deployment of renewables around the globe.

Session I: Status and Priorities for Renewable Energy Development

The workshop resumed with Session I, which consisted of regional and country specific perspectives on the status and priorities for renewable energy development in Central Asia, and provided the foundation for the rest of the day's discussions. The session was moderated by **Sakari Oksanen, Deputy Director-General of IRENA.**

Mr. Gurbuz Gonul, IRENA's senior programme officer for regional engagement, provided the scene-setting presentation on the key outcomes of the gap analysis, and explained the purpose and methodology of the study. He presented the drivers and challenges for the development of renewable energy in the region identified by the study.

Among the drivers for growth of renewables, Mr. Gonul noted the need to upgrade the region's aging power infrastructure and leverage it for introduction of renewable power; increasing government commitments to phase out subsidies for fossil fuels; and the socio-economic benefits brought by renewables, including improved health and environmental conditions.

For energy importing countries of the region, as Kyrgyzstan and Tajikistan, renewables could improve the quality of energy access, especially in heating and electricity, as well as optimize the operation of the largely hydro-based power systems through complementarities with non-hydro renewables. Azerbaijan, Kazakhstan, Uzbekistan, and Turkmenistan, as energy producing countries, could benefit from the economic diversification through local job creation and replace fossil fuel consumption in power generation with clean and renewable energy.

Mr. Gonul highlighted the following five challenges for development of renewable energy in the region:

- Inadequate policy and regulatory frameworks.
- Lack of clear and enforceable rules for grid integration and modernization as well as limited regional power trade within the Central Asia United Power System.
- Varying level of institutional readiness to adopt renewables across the region.

- Lacking exposure to global technology developments as the technical & scientific know-how lags behind global trends.
- Limited investment flows to renewable energy projects.

The scene-setting presentation was followed by country presentations from representatives of Azerbaijan, Kazakhstan, Kyrgyzstan, and Tajikistan. Each presentation provided information on the status of renewable energy development, including existing legislation, targets, and tariffs, resource potentials, statistics on renewable energy generation, and on challenges and opportunities for development of renewables within their respective countries.

Mr. Nazir Ramazanov, advisor to the chairman of the State Agency on Alternative and Renewable Energy Sources of the Republic of Azerbaijan, provided an overview of renewable energy developments at the national level. He presented the solar and wind potential maps available on the State Agency's website. Mr. Ramazanov informed the participants about the "Azguntech" plant built by the State Agency, producing solar modules ranging from 42 to 250 watts. The opening of the plant in 2012 was attended by the President Ilham Aliyev.

Ms. Raigul Bulekbayeva, chief expert with the Renewable Energy Department at the Ministry of Energy of the Republic of Kazakhstan, presented on the advancements on renewables in Kazakhstan. She explained how the available support mechanisms operate, and demonstrated the co-operation mechanism of the Settlement and Financial Center, which acts as the single off-taker and buys electricity generated from renewable energy sources in full at a fixed rate. Kazakhstan is targeting to add 53 renewable energy projects with a total capacity of 1966 MW by the end of 2020.

Mr. Kybanych Bekov, head of Strategic Planning with the National Energy Holding Company of the Kyrgyz Republic, shared information on the development of renewables in the country. He noted high potential for hydropower, solar, wind and biomass development. With 47 MW of renewable energy capacity currently installed, the government plans to install additional 100 MW by 2025.

Mr. Abdunabi Sharipov, leading specialist at the Economics & Forecast Department, in the Ministry of Energy and Water Resources of the Republic of Tajikistan, delivered a presentation on renewables in Tajikistan. He informed of the development of large hydropower plants Sangtuda HPP-1 and Sangtuda HPP-2.

Presentation: Review Progress of Renewable Energy Targets: Achieving SDG7

Following the country presentations, **Mr. Sergey Tulinov, from the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)**, presented on Sustainable Development Goal 7, which aims to ensure access to affordable, reliable, sustainable and modern energy for all. In his presentation, Mr. Tulinov demonstrated the Asia Pacific Energy Portal, which offers member States powerful tools, including highly interactive data visualizations that enable rapid trends identification as well as policy tracking and search. The portal is intended to help improve analysis of the energy situation, policies and their development impact.

In addition, he described the Global Tracking Framework, which was established in 2012 in order to set baseline energy data and provide regular biannual updates on trends in energy access, renewable energy and energy efficiency. Two editions of the Global Tracking Framework report have been published so far. The third edition of the report has been under preparation with active involvement of the regional commissions, and will be issued in mid-2017.

Session II: Renewable Energy Target Setting and Support Schemes

The session provided an overview of the policy-making process and critical ingredients of successful policies. **Ms. Diala Hawila (IRENA)** gave a scene-setting presentation on targets in the global renewable energy landscape and trends in renewable energy support policies. **Mr. Hannes Reinisch** from **PriceWaterhouseCoopers (PwC)** presented the renewable energy target setting process in the United Arab Emirates. He described how the targets evolved from 1% by 2020 to 44% by 2050 in just five years. **Mr. Allen Eisendrath** from the **United States Agency for International Development (USAID)** outlined the largest developments of worldwide auctions for solar PV and wind as well as record prices for PV and wind. By 2019, at least half of all clean energy capacity additions in the world are expected to be procured by auctions.

Participants inquired about the success rate of projects being implemented, which were procured through auctions. Some projects, as in the case of China for example, have not been implemented due to overaggressive bidding by project developers. In response, Ms. Hawila recalled that there are several auction design elements nowadays, including penalties for not delivering projects, sufficient electricity levels, and others. For instance, some of the projects in Brazil do not see light. However, Brazil is not in dire need for extra power capacity.

Interest was expressed by participants regarding reasons for divergence of the auction prices across the globe. Ms. Hawila informed that prices greatly depend on the energy markets in the countries, and if the markets are not mature enough, significant support from IFIs is necessary, as was in the case of Zambia, where the World Bank mitigated many risks. USAID representative added that solvency of the off-taker is crucial; if one has a financially sound off-taker, then the prices will be lower. According to their experience, expensive projects bear higher risks of bankruptcy than projects with lower prices, since low bids are often well calculated and are prepared by international companies.

The effect of the 75% target in the UAE on the night consumption was an interesting experience for countries of the region, in particular due to high shares of solar energy in the plan. Mr. Reinisch informed that 75% is inclusive of the nuclear component; pumped hydro; biofuels, solar PV and CSP (with storage that allows to have 24 hours of solar electricity). There are large differences between winter and summer in terms of electricity consumption, however, during summer no large differences between day and night consumption exist.

Participants asked if a methodology for forecasting an auction price exists. NREL and USAID representatives shared the opinion that prior to participating in an auction, an investor would calculate cost of equipment, import taxes, land, and other expenses, and then the price is discovered

through a competitive bidding. There is no tool to say what would be a price in the region, however, NREL has a model to estimate some costs.

Participants expressed interest in a workshop on auctions and inquired about how IRENA could support data collection. The request was noted by the Secretariat.

Session III: Costs and Benefits of Renewable Energy

The session focused on how renewable energy can stimulate economic growth, create new employment opportunities, offer local manufacturing and service opportunities, enhance human welfare, and contribute to a climate-safe future. **Mr. Michael Taylor and Ms. Rabia Ferroukhi** from **IRENA** provided the scene-setting presentations.

Mr. Taylor presented the renewable cost analysis conducted by the Agency, including the IRENA renewable cost database, consisting of 15000 utility-scale projects for levelized cost of electricity (LCOE), 3/4 million small-scale solar PV, and datasets on biofuels/EVs. Mr. Taylor highlighted that relentless improvement in competitiveness continues and that renewables are competing head-to-head with fossil fuels, despite the integration of variable renewables. He added that future cost reductions will be primarily driven by policy measures. In conclusion, Mr. Taylor brought to the attention of the participants the IRENA Renewable Costing Alliance and the Agency's various costing analysis products.

Ms. Ferroukhi provided a presentation on renewable energy benefits and informed the participants of the existing IRENA knowledge base, which includes various publications, report and events, such as the *Renewable Energy Benefits: Measuring the Economics, Annual Review for Renewable Energy and Jobs*, and others. Amongst the benefits of renewables, she highlighted environment, human development, energy security, and economic growth. According to IRENA analysis, with accelerated deployment of renewable energy the global GDP in 2050 is boosted by around 0.8% compared to the Reference Case, which is the most likely case based on current and planned policies and expected market developments for each country's energy sector¹. Furthermore, the positive impact on welfare would be even greater, resulting in 4% welfare growth. Ms. Ferroukhi noted that in 2015, there were 8.1 million jobs in the renewable energy sector.

Following the conclusion of the scene-setting presentations, **Sake van der Wal** from the **Department of Trade and Industry of the Republic of South Africa**, presented the case of renewable energy's economic impact in his country. Mr. van der Wal hailed the success of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) in SA, which has led to investment of more than 13 billion USD in the first four rounds of the programme.

¹ IRENA (2017), Perspectives for the energy transition: investment needs for a low-carbon energy system.

After the presentations, Ms. Ferroukhi opened the panel discussion to share experiences and discuss how policies can maximize benefits of renewable energy deployment in light of the recent dramatic declines in the technology costs. The panel consisted of representatives from USAID, PwC, and NREL.

Panellists expressed their views on the impact of renewables on economic growth. In the Middle East, for example, green investments were noted to be economically viable, as has been seen in the United Arab Emirates, where investments in the green sector could add 4.9% to GDP by 2030 and 160,000 extra jobs by 2030.

Participants raised a question regarding monopolized electricity markets in Central Asia and its effect on their readiness to adopt auctions. In response, the panel described how the United Arab Emirates, with similar monopolies, has managed to achieved record low prices. A competitive wholesale market does not necessarily depend on a competitive generation procurement, it was noted.

Session IV: Mapping Support for Renewables in the Region

During the session, key regional stakeholders present their ongoing work and planned programmes to support the uptake of renewables in the region.

The scene setting presentation was delivered by **Ms. Katarina Uherova Hasbani, IRENA consultant**, who outlined the main findings on the stakeholder mapping for renewable energy in Central Asia from the Gap Analysis study. Ms. Hasbani highlighted that 1.02 Billion USD has been identified so far in terms of donors and development banks financing provided between 2005 and 2016 to renewable energy in Central Asia.

Ms. Aida Sitdikova from the **European Bank for Reconstruction and Development (EBRD)** presented the Bank's work in the region. EBRD has been present in Central Asia since 2013 and the main principles of its energy work are affordability, security and sustainability. EBRD has financed hydropower projects in Kyrgyzstan and Tajikistan, power distribution projects in Kyrgyzstan and solar projects in Kazakhstan. The Bank is aiming to develop solar and wind projects in Azerbaijan and Uzbekistan. The 50 MW Burnoye Solar in Kazakhstan is its flagship project in the region, EBRD has a pipeline of renewable energy projects under preparation in Kazakhstan: 50 MW solar, 51 MW of wind and 100 MW of hydropower. EBRD is a contributor to the Central Asia-South Asia power project (CASA-1000) trust fund and also aims to finance small hydropower projects in Tajikistan.

EBRD offers support in terms of policy and regulatory frameworks and access to non-concessional financing, and in terms of covering due diligence costs. The Bank's expectations for renewable energy projects include a credible off-taker, bankable PPAs and completion risk is covered, although it is willing to accept political and regulatory risks. Some of the challenges in the region include on-going economic crisis, fluid climate change agenda, as well as lack of infrastructure upgrade and cost-reflective energy prices.

She expressed the invaluable role of IRENA in the region and stated that there is a need for decentralized energy systems in some countries. She added that markets are small and tariffs are not

reflected, and she sees the support of investors in the region across a range of technologies, in addition to the necessity to swift to decarbonisation agenda for a sustainable future.

Mr. Gianluca Sambucini from the **United Nations Economic Commission for Europe (UNECE)** presented the Commission's efforts in promoting renewable energy. UNECE has been working on energy efficiency and renewables since 1991. In 2014, a dedicated Group of Experts on Renewable Energy (GERE) was created to support UNECE member States in increasing substantially the uptake of renewable energy. Flagship GERE work is on data collection (UNECE Renewable Energy Status Report 2015 & 2017); exchange of information on best practices; dialogue among stakeholders in the countries (Hard Talks) and promotion of investment conditions (Matchmaking activities).

UNECE will continue tracking progress in 17 countries through the UNECE-REN21 Renewable Energy Status Report, using GERE as a platform for dialogue and exploring further facilitation of policy talks and matchmaking services between project owners and financiers of renewable energy projects. Mr. Sambucini praised IRENA's efforts in the area of regional co-operation on renewable energy in Central Asia and South East Europe. He added that the Agency has the opportunity to significantly contribute to the ongoing efforts in both regions.

Mr. Michael Curtis from **USAID** welcomed the opportunity for USAID to exchange on renewable energy developments in the region. He shared information on the Agency's both regional activities and bilateral work with countries in Central Asia. USAID follows 3 priorities: Supporting utility-scale renewable energy, enhancing regional co-operation across borders, and supporting energy trade and optimising operations of energy companies to reduce energy losses. The Power of the Future is a 4 years, comprehensive support programme aimed for transition to low-carbon economy in Central Asia, with the exception of Azerbaijan. The project will cover power sector planning conducive to renewable energy integration, renewable energy forecasting, and knowledge management and increasing private sector engagement.

USAID is also involved in supporting C5+1 political dialogue, which includes renewable energy as an area of common interest between the US and Central Asia countries. The Energy Links project promotes regional energy integration by providing secretariat for the CASA-1000 trust fund. It also provided support to facilitate the finalisation of key CASA-1000 agreements. Mr. Curtis noted that countries need to be more proactive and donor co-ordination needs to improve to allocate funds more effectively. Regulations need to be conducive to facilitating projects and transactions in the renewable energy market. USAID said it would take part in a co-ordination meeting in mid-May in Dushanbe for Central Asia Regional Economic Cooperation (CAREC), where renewable energy would be addressed as a possible area for co-operation, with potential for involvement by IRENA. He concluded by noting the need for greater co-ordination within the donor community, with IRENA providing a suitable platform for this.

Mr. Mits Motohashi from the **World Bank** provided an overview of the Bank's work in the region and on renewable energy. The Bank committed to financing 10 GW of renewable power by 2017, with more than 40% as hydropower. Countries in Central Asia have advanced a lot on policies and

regulatory frameworks, however still require work on operational aspects to allow renewable energy projects to materialise. World Bank is working on wind power in Uzbekistan, and the International Finance Corporation, part of World Bank group is discussing support to the solar sector in Uzbekistan. Mr. Motohashi presented RISE (Regulatory Indicators for Sustainable Energy), developed by the World Bank, in which Central Asian countries are ranked in the middle tier of 111 evaluated countries. Kazakhstan was identified as the top RISE performer for renewable energy. RISE shows that progress was made on creating the necessary regulatory framework, including adopting targets, policies and regulations.

Mr. Sergey Tulinov from **ESCAP** presented the activities in relation to renewable energy. UNESCO promotes the integral role of energy in sustainable development and designs programmes and projects aimed at advancing energy access, renewable energy, and energy efficiency. UNESCO hosts a regional energy information portal. Mr. Tulinov mentioned that donors' activities have been so far fragmented and IRENA's efforts are welcome to provide a platform for developing renewable energy know-how in the region. Enabling environment needs to be targeted by donors and development banks as a priority, including liberalisation of electricity markets and ensuring energy prices are cost-reflective. UNESCO could offer the SPECA (Special Programme for the Economies of Central Asia) platform to bring countries to work together with a group focusing on energy.

The session ended with a round of questions highlighting where development partners and international financial institutions should focus their efforts in renewable energy development in the region. The following are the areas, identified:

1. Renewable energy requires that overall energy policy and infrastructure is addressed, including:
 - Sector fundamentals (generation, transmission, etc.);
 - Energy pricing;
 - Sector governance;
 - Development of capital markets;
2. Specific support for renewable energy is needed, in particular for:
 - Policy improvements;
 - Better conditions for private sector investment;
 - Grid codes and grid access – working with grid operators;
 - Zoning;
 - Integration of renewable power into conventional power systems;
 - Addressing nexus of energy, water and food ecosystems;
3. Improved co-ordination, including:
 - Annual meetings of stakeholders;
 - Building on existing regional initiatives, such as CAREC, or SPECA.

Session V: Identifying Priority Actions

The objective of this session was to present the different tools IRENA provides to support project implementation in the countries. During the session, participants brainstormed ways in which they can continue to work together within their individual countries to increase the region's share of renewable energy and discussed key areas of focus for the regional approach. Gurbuz Gonul moderated the session and encouraged participants to actively provide feedback on the following presentations.

Mr. Nicolas Fichaux (IRENA) highlighted IRENA's range of resource assessment and project support tools. He provided information on the RResource knowledge portal², the Global Atlas for Renewable Energy³, the Project Navigator tool⁴, the Sustainable Energy Marketplace platform⁵, and the IRENA/ADFD Project Facility (a joint programme with the Abu Dhabi Fund for Development to help finance innovative renewable energy projects in developing countries)⁶. All of these tools aims to furnish project developers, investors and policy makers with useful information for renewable energy projects. The Global Atlas is a free online resource-assessment tool intended to help policy makers and investors appreciate the extent of the renewable energy resources at their disposal in each country or region. Mr. Fichaux explained the principles of the platform and described plans to develop it further. The tool was developed in co-ordination with numerous countries and partners, and at present, includes over 2000 datasets.

Mr. Adrian Whiteman (IRENA) presented the Agency's work on renewable energy statistics. IRENA produces several statistical products, which include technical manuals (books and online), RResource charts and tables (available for download), and renewable energy statistics publications. IRENA is currently collecting data from Azerbaijan, Kazakhstan, Kyrgyzstan, and Uzbekistan. The statistics team is seeking to establish contacts with Tajikistan and Turkmenistan.

Mr. Gurbuz Gonul explained IRENA's initiatives in the area of enabling frameworks, and presented the Renewables Readiness Assessment (RRA), which is a comprehensive tool for assessing the conditions existing in a country for the development and deployment of renewable energy, along with the actions required to improve those conditions.

Mr. Daniel Russo (IRENA) presented work to support countries with long-term capacity expansion planning for variable renewable power. This consists of work to consolidate data, methodologies, and good practices (guides and manuals); support in the application of methodologies (country case studies); and capacity building in the use of methodologies.

The concluding presentation of the session was provided by **Mr. Francisco Gafaro (IRENA)** on the integration of variable renewable sources into the power grid. Mr. Gafaro provided the example of

² <http://resourceirena.irena.org/gateway/>

³ <https://irena.masdar.ac.ae/gallery/>

⁴ <https://navigator.irena.org/index.html>

⁵ <http://marketplace.irena.org/>

⁶ <http://adfd.irena.org/>

grid integration in Germany, adding that transformation is happening everywhere regardless of size of the country. His presentation included a segment on the challenges in grid integration.

During the Q&A section, countries praised IRENA's efforts and acknowledged the usefulness of the presented tools. Global Atlas was highlighted as an effective tool for policy makers in comparing resource availability with other countries. Interest was shown in the site assessment, specifically in the calculation of CAPEX. Further, countries expressed interest in collaborating with Global Atlas on promoting of existing national resource maps and maps under development.

In terms of planning and grid integration, countries noted the deficit of skilled experts and lack of systematised publicly available information. There is a need in the region for additional support in understanding the problems and impact of large shares of renewable energy generation in the modelling of the energy system. Further workshops in a similar format were suggested in order to continue exchange of knowledge, bearing in mind the language barrier.

NREL addressed the above concerns and informed of an upcoming workshop on grid integration, targeted for system operators, for which countries could provide their specific technical questions.

Way Forward

At the conclusion of the workshop, **Ms. Vanessa Interiano (IRENA)** and **Mr. Gianluca Sambucini (UNECE)** reviewed preparations for the Ministerial Conference and the 8th International Forum "Meeting the Challenge of Sustainable Energy", to be held in Astana, Kazakhstan, on 11-14 June 2017.

Mr. Sambucini described the adoption of a joint Ministerial Statement as an outcome document of the conference and presented for main tracks for discussions at the 8th Forum: Renewable Energy Matchmaking; Energy Efficiency; Fossil Fuels; and Regional Co-operation.

Ms. Interiano explained IRENA's steps ahead towards the Energy Ministerial Conference. The feedback received from the national and regional stakeholders during the consultative process, as well as the findings of the regional gap analysis study will constitute the basis for formulating customised regional Action Plan for guiding IRENA's future support to the region in the development of renewable energy.

The draft Action Plan is intended to be validated by the region prior to its presentation at the Energy Ministerial Conference "Meeting the Challenge of Sustainable Energy" within the Ministerial Dialogue on Renewable Energy in Central Asia during EXPO Astana 2017. A Ministerial Communique on the Action Plan is envisaged to be released.

The Action Plan will serve as an input into IRENA's Work Programme for 2018 – 2019, which will be presented to the Agency's member states at the upcoming IRENA Assembly on 13 and 14 January 2018 in Abu Dhabi, United Arab Emirates.

She provided participants with information on the 4 sessions led by the Agency during the 8th Forum. IRENA will take the lead on the following sessions

- Day 1 (12 June) – Socio-Economic Benefits of Renewable Energy;
- Day 2 (13 June) – Regional Co-operation on Renewable Energy in Central Asia,
- Day 3 (14 June) – Renewable Energy Finance (in co-operation with EBRD); and Realising Renewable Energy Targets and Commitments through Policies.

Tour of Masdar Institute

Following the conclusion of the workshop, participants were given a tour of Masdar Institute. **Mr. Ali Buhaji, Masdar's Senior Manager, Business Development**, welcomed the participants and presented them with the company's objectives, vision and plans for the development of Masdar City up to 2020 and 2030.