

Contribution from the International Renewable Energy Agency (IRENA) to inform ECFA's Report on EU's new Strategy for Central Asia

Global Energy Transformation:

In an era of accelerating change, the imperative to limit climate change and achieve sustainable growth is strengthening the momentum of the global energy transformation. The rapid decline in renewable energy costs, improving energy efficiency, widespread electrification, continual technological breakthroughs and well-informed policy making all drive this shift, bringing a sustainable energy future within reach. Energy efficiency and renewable energy are the main pillars of the energy transition.

While different paths can mitigate climate change, renewable energy and energy efficiency provide the optimal pathway to deliver the majority of the emission cuts needed at the necessary speed. Together they can provide over 90% of the energy-related CO₂ emission reductions that are required to maintain a 2°C limit, using technologies that are safe, reliable, affordable and widely available¹.

Renewable energy contributes to environmental sustainability by mitigating the local and global environmental impacts associated with energy consumption. It creates conditions to further human development by facilitating access to basic services, improving human health and enhancing incomes and productivity. Renewables also create new job opportunities and spawn new local industries.

Renewable Energy in Central Asia:

Countries of Central Asia region possess large potential of renewable energy, as reflected in Table 1. This vast resource potential provides opportunities for increasing renewable energy uptake and countries in the region have been taking positive steps in this direction. Yet they are at different levels of readiness for the adoption of renewable energy solutions to address their energy challenges.

Table 1: Technical Potential for Renewable Electricity Generation in Central Asia (MW)²

	Azerbaijan	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Solar	115,200	3,760,000	267,000	195,000	655,000	593,000
Wind	4,500	354,000	1,500	2,000	10,000	1,600
Small Hydro	400	4,800	1,800	23,000	1,300	1,800
Biomass	1,500	300	200	300	-	800

The share of renewables in the Total Final Energy Consumption (TFEC) across the region is generally low, except Kyrgyzstan and Tajikistan, where in 2015 electricity generation from hydro power plants

¹ IRENA (2018), Global Energy Transformation: A roadmap to 2050, International Renewable Energy Agency, Abu Dhabi

² UNDP Renewable energy snapshots

constituted about 23% and 45% respectively³. Hydropower represents the majority of installed renewable power capacities in all the countries (Annex 1) while the highest installed non-hydro renewable energy power capacities are in Azerbaijan (135 MW) and Kazakhstan (171 MW) in 2017. In this context, wind and solar PV have the most significant contribution.

These countries have achieved important milestones in 2018, with Kazakhstan conducting first ever renewable energy auctions in Central Asia, and Uzbekistan signing agreements with SkyPower and the International Finance Corporation (IFC) to develop solar PV capacity in the country.

Drivers for Renewables Development:

By signing the Paris Agreement, Central Asian countries joined the international community in expressing their determination to address climate change and reduce carbon emissions. Nationally determined contributions (NDCs) can enable renewables to play an important role. IRENA analysed NDCs in relation to national energy plans and actual deployment trends. In many cases, NDCs have not kept up with recent, rapid growth in renewables, and significant untapped potential exist⁴. NDCs from countries in the region do not include any quantified targets for renewables, they acknowledge renewable energy as possible solution for meeting the set emission reduction targets. Table 2 provides an overview of references to renewable energy in the NDCs of Central Asian countries.

Table 2: NDC Reference to Renewable Energy

Azerbaijan	The NDC refers to the “use of alternative and renewable energy sources”, including small hydro power, biomass, solar, wind and geothermal.
Kazakhstan	The NDC mentions the adoption of the law “On Supporting the Use of Renewable Energy Sources”.
Kyrgyzstan	The NDC mentions that 90% of electricity in the country is currently generated from hydropower.
Tajikistan	The NDC states that a 65-75% reduction of GHG emissions by 2030 will be possible through the “promotion and diversification of renewable energy sources”, among other things.
Turkmenistan	The NDC mentions that the country has identified the “use of alternative energy sources” as a priority in its National Strategy on Climate Change.
Uzbekistan	The NDC refers to the development of large solar PV, biogas and wind power plants.

Source: IRENA analysis

Other key drivers for the wider deployment of renewables in Central Asia include:

- Meeting growing energy demand and improving power supply reliability through diversification of energy sources and competitive costs;

³ IEA (2017), World Energy Balances

⁴ IRENA (2017), Untapped potential for climate action: Renewable energy in Nationally Determined Contributions, International Renewable Energy Agency, Abu Dhabi.

- Unlocking socio-economic benefits, such as economic diversification, local job creation, domestic industrial development, and improved health and environmental conditions in urban and remote rural areas;
- Optimising the operation of national power systems;
- Attracting foreign investments;

IRENA's Regional Initiative in Central Asia:

As part of IRENA's efforts to support Central Asia in its energy transition, the Agency initiated a regional consultative process in 2016 to discuss the challenges and opportunities in developing the region's renewable energy resources and to identify the areas of priority action.

The first round of consultations took place in Baku, Azerbaijan, in October 2016, where participating experts from governments and key regional stakeholders highlighted the main barriers for deployment of renewables. The Agency organized a second round of consultations in Abu Dhabi, at the IRENA Headquarters, in April 2017, to identify priority areas of actions, as well as exchange views on IRENA's potential role in supporting the uptake of renewables in the region.

Following these extensive consultations, in June 2017, the [*Astana Communiqué on Accelerating the Uptake of Renewables in Central Asia*](#) was adopted at the Ministerial Session on Renewable Energy in Central Asia on the sidelines of the *Energy Ministerial Conference: Meeting the Challenge of Sustainable Energy*, in Astana, Kazakhstan.

The *Communique* outlined the key action areas for collaboration with IRENA. A regional action plan was also developed in consultation with governments of the region, which includes a set of priorities for implementation through partnerships with a wide range of national, regional and international partners.

Challenges and Opportunities for Renewable Energy Development:

Some countries of the region have underlined the importance of developing renewables in their long-term strategies while some others have already adopted legislative frameworks on renewable energy along with the introduction of various support schemes (Annex 2). Nevertheless, further action is necessary to address the challenges hindering more accelerated renewables deployment in the region. During IRENA's consultative process, the following challenges were identified:

- **Policy and Regulatory Frameworks.** Almost all countries in the region have set renewable energy targets. However, the implementation of renewable energy policies and regulations is rather weak across the region. Fossil fuel subsidies persist across all countries in the region, resulting in misalignment of incentives for renewable energy development. The cost of renewable energy is high in the region because of the overall legal and regulatory framework falling short of expectations by developers. Guarantee frameworks and contractual arrangements, such as Power Purchase Agreements (PPAs), are not set out according to the international standards.

- **Institutional Capacity.** The countries of the region are at varying levels of institutional readiness for renewable energy deployment. The energy, or equivalent ministries, along with the state-owned utilities play a central role in policy making as well as the operation of the sector. In the absence of a dedicated agency to support development of renewables and regulate the sector, countries are lacking human and technical capacity to manage preparations and implementation of policies and regulations.
- **Investment Flows into Renewable Energy Projects.** The available information on renewable energy investment in the region is limited. Project financing is mainly from multilateral development banks rather than the local banks and private sector. The banking sector overall has limitations, such as integrity issues which prevents transactions with international partners. The low-level of investments results not only from inadequate financing opportunities, but also due to the lack of quality projects as the developers are not fully informed on the requirements to raise commercial or development funding for their projects.
- **Electricity Grid Management and Infrastructure Upgrades.** Lack of clear and enforceable rules for grid integration and modernization is a critical barrier for renewable energy deployment. Some of the countries have oversupply of power during certain parts of the year, while others are suffering from seasonal power shortages. This is further exacerbated by the lack of working regional grid interconnections which prevents optimal use of the available resources at regional level.
- **Awareness of Renewable Energy Technology and its Socio-economic Benefits.** The awareness of renewable energy technologies across the region is low except for hydropower, which has been part of the countries' power systems for decades. There is also low awareness of potential benefits of renewable energy, including in terms of job creation and benefits for local businesses. This includes general public as well as the decision makers.

Based on IRENA's detailed assessment and extensive stakeholder consultations, the following priority areas have been identified for regional action to support the rapid uptake of renewable energy technologies in the region.

- **Strengthening of renewable energy policies and regulations.** Central Asian countries need comprehensive policies, regulatory, technical and economic frameworks and financial mechanisms for renewable energy, specifically to encourage private investments in the sector.
- **Building institutional capacity in the renewable energy sector.** Empowered institutions are required for the implementation and monitoring of policies and regulation on renewable energy. They need to be equipped with adequate resources, including finances and human capacity.

- **Addressing data and information gaps.** Detailed and integrated mapping of all renewable energy resources across the region should be undertaken, with an assessment of technically and economically feasible potential. Capacity building on renewable energy statistics, including data collection, management, analysis and reporting would be key to support effective policy analysis and tracking progress.
- **Increasing investment flows to renewable energy projects.** Administrative processes for PPAs, regulatory frameworks, and an uncertain investment climate for renewables are among some of the areas where efforts could be undertaken to address the perceived risks by investors.
- **Leveraging penetration of renewables through upgrading of electricity grids.** Clear and enforceable rules for system modernisation or grid integration could enable optimal use of the available renewable resources. Smart grid technologies could help to optimize the production, transmission and distribution of electricity and prepare grounds for increasing renewable energy shares in the countries' power systems.
- **Supporting uptake of renewable energy in end-use sectors.** In addition to efforts aimed at increasing the share of renewables in power generation, there is also a need to promote renewable energy in end-use sector applications, such as solar water heating, or bioenergy in heating and transport. Besides these, there is a strong potential for uptake of renewables in the industrial sector, where initiatives such as corporate sourcing of renewables could be advanced.
- **Raising awareness on renewable energy benefits.** It is important to raise public awareness of tangible socio-economic benefits of renewable energy, such as the positive impact on employment, job creation and the development of local markets. Development partners can play an important role in this direction by providing a platform for dialogue amongst the decision-makers of the region.

Despite diverse resource endowments and different stages in renewable energy development, Central Asian countries face certain common challenges that can best be addressed through regional co-operation and action. In these priority areas, the countries of the region could strongly benefit from development cooperation and technical assistance. Sharing international best practices and information exchange could enable a wider diffusion of renewable energy technologies.

IRENA is already undertaking efforts in this direction, specifically working with Central Asia to enhance capacities on policy support mechanisms, statistics and grid integration, as well as conducting resource assessments to identify optimal areas for deployment of solar and wind projects.

Further efforts by international development partners, such as the European Union, in the areas listed above could be instrumental in helping the countries of Central Asia in unlocking their renewable energy potential and supporting their efforts towards a sustainable energy future.

Annex 1: Renewable Power Installed Capacities (MW)

Country	Installed Capacity / Capacity additions	Hydro	Wind	Solar PV	Solid Biofuels	Biogas	Total
Azerbaijan	Installed Capacity-2017	1,132	62	35	37	1	1,267
	Capacity additions 2016-2017	27	46	10	0	0	83
Kazakhstan	Installed Capacity-2017	2,727	112	59	-	-	2,898
	Capacity additions 2016-2017	31	14	2	-	-	47
Kyrgyzstan	Installed Capacity-2017	3,677	-	-	-	-	3,677
	Capacity additions 2016-2017	0	-	-	-	-	0
Tajikistan	Installed Capacity-2017	5,325	-	-	-	-	5,325
	Capacity additions 2016-2017	0	-	-	-	-	0
Turkmenistan ⁵	Installed Capacity-2016	200	-	-	-	-	200
	Capacity additions 2015-2016	195	-	-	-	-	195
Uzbekistan	Installed Capacity-2017	1,839	1	4	-	-	1,844
	Capacity additions 2016-2017	45	1	0	-	-	46

Source: IRENA (2018), *Renewable Energy Statistics 2018*, The International Renewable Energy Agency, Abu Dhabi.

⁵REN21 UNECE renewable energy status report, 2017

Annex 2: Renewable Energy Targets

Country	Sector/Technology	Renewable Energy Target
Azerbaijan	Energy	20% of electricity consumption from renewable energy sources by 2020. 9.7% of total energy consumption from renewable energy sources by 2020.
	Wind	350 MW of new generation capacity.
	Solar	50 MW of new generation capacity.
	Bioenergy	20 MW of new generation capacity.
Kazakhstan	Energy	3% share of renewables in energy production by 2020 and 10% by 2030.
	Wind	1787 MW in 34 wind power stations by 2020.
	Solar	713.5 MW in 28 solar electric plants by 2020.
	Bioenergy	15.05 MW in 3 bioelectric stations by 2020.
	Hydropower	539 MW in 41 hydroelectric power stations by 2020.
Kyrgyzstan	Energy	1.5% share of electric energy from renewables until 2017. 100 MW renewable energy installed capacity by 2025.
Tajikistan	Energy	10% of renewables in the electricity balance.
Turkmenistan	None	None.
Uzbekistan	Energy	RE target of 16% of total power generation by 2030 and 19% by 2050.

Source: REN21 UNECE renewable energy status report, 2017