

RENEWABLES
READINESS
ASSESSMENT

THE KYRGYZ REPUBLIC

Executive Summary



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ISBN: 978-92-9260-465-3

This executive summary is taken from: IRENA (2022), Renewables Readiness Assessment: The Kyrgyz Republic, International Renewable Energy Agency, Abu Dhabi.

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Acknowledgements

IRENA wishes to thank the Ministry of Energy and Industry of the Kyrgyz Republic and UNDP country office for close co-operation in developing the report.

The report also benefitted from the inputs of various experts including Ute Collier, Diala Hawila, Michael Taylor, Zafar Samadov, Imen Gherboudj, Aleksandra Prodan, and Francis Field, Stephanie Clarke also provided valuable input.

This report was prepared by under the guidance of Gürbüz Gönül, Binu Parthan and Prasoon Agarwal (IRENA) and authored by Arslan Khalid (consultant) and Tatiana Vedeneva (consultant).

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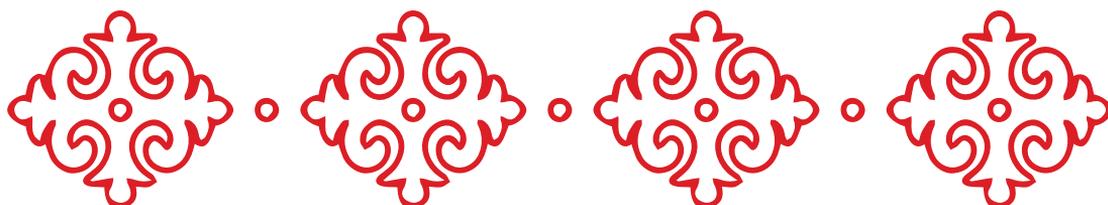
EXECUTIVE SUMMARY

The energy sector of the Kyrgyz Republic is central to the country's development and growth. As the population continues to increase, living standards improve and the economy grows, energy demand has been rising. Domestic consumption far exceeds local production, which leads to costly fuel imports, and makes the transition to clean energy a key imperative for decision making in the sector. Balancing the objectives of sustainable growth while addressing the challenges posed by climate change and energy sector dynamics is difficult. Cognisant of this, Kyrgyz decision makers are taking legislative strides towards a more sustainable energy sector, which can help address the rising demand through clean energy sources.

A relative economic boom from 2010 onwards boosted energy demand, with final energy consumption rising by about 54% in the 2010-2019 period. The main energy consumers include the residential, industry and transport sectors. Driven by improving living standards and rising demand for heating, energy consumption in the residential sector quadrupled between 2010 and 2019.

Demand for energy is addressed by oil products, electricity, coal, natural gas and heat. Oil products account for around 37% of the primary energy supply, followed by electricity (primarily hydropower) at 30% and coal at 26%. Since 2000, the energy mix has gradually shifted towards oil and coal as the production of hydropower has stagnated. Indeed, a very limited amount of hydroelectric capacity has been put into operation in recent decades. In addition to being used for heating, oil products are primarily used to address rising demand for transport fuel. Domestic coal is being utilised for exports and local consumption in heating and other sectors. The Kyrgyz Republic is among the most energy-intensive countries in the world, which gives rise to recurring energy shortages and reduces economic productivity and competitiveness (World Bank, 2017a).

The power sector now has the challenging task of meeting the new level of electricity demand, which has increased by about 75% since 2010. The bulk of power generation (92%) is supplied by hydropower plants followed by small contributions from coal- and gas-fired power plants. The power sector also contributes to the socio-economic growth of the region through electricity trade. The dominant role of hydropower leads to strong interlinkages between irrigation and power, creating challenges for decision makers in the power and agricultural sectors. Ageing infrastructure, power sector entities' lack of financial viability, energy losses and limited new generation systems are other key challenges, which tend to reduce the quality and reliability of electricity.



A strong rationale for diversification

A more diverse Kyrgyz energy sector that relies on various renewable energy technologies, increased energy efficiency and accelerated electrification can help address rising energy demand while creating economic opportunities.

While large hydropower is set to retain its role as the backbone of the sector, the introduction of renewables such as solar photovoltaic (PV), wind, bioenergy and small hydropower can help meet demand and diversify the energy mix. The rationale for diversification towards renewables includes various social, economic and environmental factors.

Rising energy demand and energy imports: As energy consumption continues to rise, reliance on imported fossil fuels will increase. Excessive fossil fuel imports pose a significant burden on government budgets and could create energy security issues. Dependence on imported fossil fuels could also make the Kyrgyz Republic more vulnerable to volatility in international and regional fuel markets. Renewable energy technologies can help cater to domestic energy demand, thus helping to cut down the import bill.

Deteriorating infrastructure: The deterioration of energy sector infrastructure coupled with the financial crisis in the energy system will eventually lead either to a significant decrease in the quality of produced energy or to an increase in energy prices. Both of these impacts could increase demand for independent energy production and pave the way for the deployment of reliable renewable energy technologies.

Local air pollution: The Kyrgyz Republic is among those Central Asian nations most affected by diseases linked to indoor air pollution. In the winter months, the city of Bishkek regularly features among the top polluted cities in the world due to its air quality. Renewables could help replace fossil fuels (especially coal) in heating and power generation, thus reducing air pollution. Vehicular emissions can be reduced through greater adoption of public transport and the uptake of electric vehicles.

Mitigating climate change: The Kyrgyz Republic is vulnerable to the impacts of climate change, and national decision makers understand the importance of addressing this impending challenge. They are initiating mitigation and adaptation plans and programmes to ward off the impacts and to contribute to the international climate effort.

Declining renewable energy costs: Renewable energy technology prices, which are becoming increasingly competitive with fossil fuel alternatives, further strengthen the case for the uptake of non-hydro renewables. The levelised costs of solar PV and wind, for example, declined by 85% and 56%, respectively, between 2010 and 2020.

Short construction periods of renewables: The Kyrgyz Republic's rising energy demand needs to be met with rapid investments in sustainable and clean technologies. Renewables such as solar PV, wind and small hydropower tend to be modular and can be constructed in a very short time. In contrast, large hydropower projects tend to require longer construction times and can be susceptible to delays.

Seasonal variation in hydroelectricity generation: Hydropower in the Kyrgyz Republic is influenced by several factors such as seasonal variability of river flows, electricity demand and water demand for irrigation. An energy system that includes a diverse mix of complementary renewable energy technologies can be more resilient to seasonal variations.

Environmental impacts of hydropower: Large hydropower projects, just like many other large infrastructure projects, can have negative environmental and social impacts such as displacement, habitat destruction, loss of forest and disturbance to wildlife. A shift towards small hydropower projects can help avoid some of the impacts linked with large projects. Also, run-of-river hydropower installations can sidestep several of the impacts associated with reservoirs.

Abundant renewable energy resources: The country has significant renewable energy potential for solar, wind, bioenergy and hydropower. These resources can be utilised to create a diversified energy system that is sustainable from financial, social, climatic and environmental perspectives.

While the rationale for greater inclusion of renewables in the energy sector is clear, wide-scale deployment has been held back by several issues:

- Average power and heat tariffs are well below cost recovery, which holds back renewables at the retail level.
- Renewable energy targets have not been effective as they are not enforced by law, or backed by concrete policies.
- Renewable energy policies remain limited to the power sector, with little focus on heating and transport. Distributed generation policies such as net metering and wheeling are also not in place.
- Feed-in tariffs have not been successful in attracting investments, as the levels are low and the frameworks are not clear.
- Auctions/tenders have not been successful in the past.
- Permitting procedures require further clarification.
- Renewable energy capacity building is needed for public and private stakeholders.

Recommendations for the deployment of renewable energy

The Renewables Readiness Assessment presents a set of short- to medium-term recommended actions to address key challenges and support the country in moving towards a diversified and climate-friendly energy system.

Create a level playing field with energy tariff reforms

Well-designed tariff reforms in the energy sector can help generate revenue while lowering the barrier to market entry for distributed renewable energy technologies. To be sustainable, tariff reforms should be designed in a way to minimise the economic impact on low-income and marginalised parts of society.

Streamline the procedure for bringing renewable energy projects online

Permitting requirements and procedures should be streamlined under an overarching renewable energy law, implemented through concrete secondary regulations, which clearly articulate the process and identify responsible government entities. The design of the procedures should focus on simplicity, flexibility and transparency.

Improve the feed-in tariffs

The feed-in tariffs scheme should be revised and improved based on factors such as changing market conditions, competitive technology costs and clear resource assessments. The selection of an appropriate tariff is an extensive process that should be led by the government with active and diverse representation from all stakeholders. Feed-in tariffs need to be supported by a conducive policy and clear institutional responsibilities.

Implement auctions for large capacities

Auctions can be used to attract investment for relatively large-scale projects in hydropower, solar and wind. They need to be designed in a way that attracts developers, enhances competition and enables price discovery while ensuring project delivery.

Enact policies to decarbonise end-use sectors

The decarbonisation of the heating sector needs a multifaceted approach that includes renewables-based electrification, use of renewable heating (where available, solar thermal, biomass, geothermal) and investments in efficient district heating. In the transport sector, more efficient public transport, electric vehicles and support for alternative modes of transportation (e.g. bicycle and walking infrastructure) can help. The introduction of net metering, wheeling and other distributed generation policies can help unlock the small-scale market segment.

Improve renewable energy resource mapping

Zoning for solar PV and wind should be prioritised. An analysis of potential suitability, as conducted by the IRENA, identifies suitable zones for solar PV and wind, and can serve as an important initial step towards a complete zoning assessment. Follow-up studies could build on this exercise by performing detailed technical and economic analyses and ground-based measurements within the identified solar and wind zones.

Develop long-term energy scenarios

A detailed long-term planning exercise should be undertaken for energy demand in all sectors to identify the optimal energy mix. Scenario analyses that explore a host of different energy sector futures can be used to inform policy making. Energy sector planning needs to be complemented by reforms in the collection and reporting of energy statistics.

Establish comprehensive and ambitious renewable energy targets

Renewable energy targets should reflect the country's strong renewable energy potential, declining technology costs and rising energy demand. They are best backed by strong political commitment and legislation, to be defined at the level of the sector and further disaggregated by subsector.

Adopt a standard power purchase agreement

Design elements of renewable energy power purchase agreements (PPAs) should be devised in accordance with international best practices to de-risk investments and facilitate financing. This effort may be complemented by a thorough review of contractual project document templates for renewables along with the development of standardised PPAs.

Introduce public-private partnerships

To be successful, the introduction of public-private partnerships (PPPs) in the Kyrgyz energy sector must be backed by strong political will, capable institutions and conducive legislation. Fair risk-sharing criteria must be established. On the public side, there should be an absolute commitment to the long-term payment for energy production. On the private side, penalties should be levied if services are not delivered.

Enhance institutional capacities

The technical and co-ordination capabilities of public and private sector entities require improvement to facilitate renewable energy deployment. Topics to address include technology costs, grid integration issues, economic management and the introduction of flexibility mechanisms, regulatory aspects, policy design, etc.

Educate and train a skilled workforce

Investment in the education and training of workers such as engineers, technicians and other skilled personnel is very important. Universities, vocational training institutes and schools all have a role to play. Industry upgrade programmes, joint ventures and tax breaks can be used to strengthen local industrial capabilities.



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