



RENEWABLES READINESS ASSESSMENT:

PARAGUAY

EXECUTIVE SUMMARY

The report highlights **key action areas** to accelerate the country's energy transition through the uptake of renewables:

1. **Strengthen institutional structure and governance in energy**
2. **Enhance planning, policy and the regulatory framework for renewable energy**
3. **Develop policy instruments and implementing initiatives to foster energy efficiency**
4. **Promote the use of renewable energy beyond the power sector**
5. **Foster investment in renewable energy technologies**
6. **Reinforce the continuous creation of institutional and human capacities**



EXECUTIVE SUMMARY

The energy mix of the Republic of Paraguay is dominated by clean energy sources, with one of the highest shares of renewable energy in South America. Hydropower accounts for the largest share of the country's power generation, representing around 99.5% of the installed power capacity. Consequently, Paraguay is highly dependent on the hydrological conditions of the rivers that feed the main hydropower plants of the country, where most of the electricity produced is exported to neighbouring countries.

Paraguay's economy is based mainly on agriculture, livestock and the services sector, which has been growing in recent years. However, the global crisis caused by the COVID-19 pandemic has affected the country's economy, reducing its Gross Domestic Product (GDP) by around 1% during 2020. Regardless of persistent challenges, Paraguay has experienced social and economic progress over the last two decades, with national policies and strategies increasingly contributing to the achievement of the Sustainable Development Goals (SDGs) and reiterating Paraguay's commitment to reducing its greenhouse gas emissions by 2030. Advances include the ratification of the Paris Agreement in 2016, the National Climate Change Law of 2017, and the updated Nationally Determined Contribution (NDC) under the Paris Agreement submitted in July 2021.

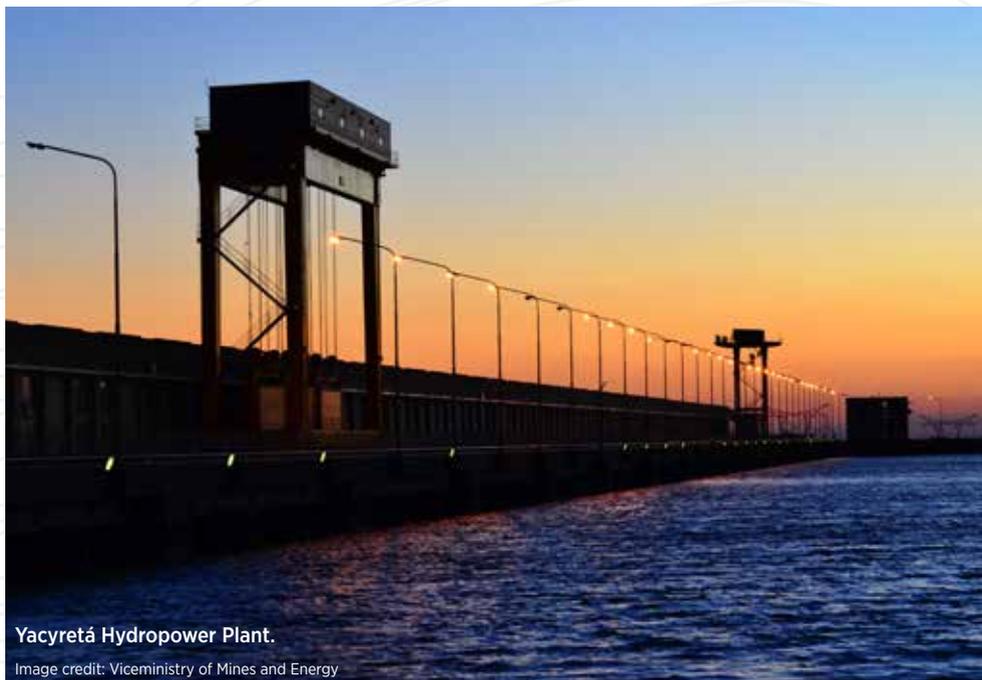
Paraguay's renewable energy resources are vast and diverse and have an important role in enhancing energy security, mitigating climate change and promoting economic growth aligned to the United Nations 2030 Agenda for Sustainable Development and to the net zero objectives of the Paris Agreement. By 2020, renewables had reached a total installed capacity of around 8832 megawatts (MW) with hydropower capacity alone accounting for 8810 MW. Despite renewables being the largest source of Paraguay's total energy supply, emissions have been increasing gradually due to the growing use of fossil fuels, mainly in the transport sector. During the period of 2010-2019, the import of oil derivatives (mostly petrol and diesel) increased rapidly, an average annual growth of 5.1%, making it the second-largest source of energy in the country.

Paraguay sees the need to encourage the diversification of its energy mix through the adoption of renewable energy and net zero technologies. This would contribute to the decarbonisation of end-use sectors, the mitigation of greenhouse gas emissions, the promotion of energy efficiency, and the achievement of net zero emissions, while attracting investment and bringing diverse socio-economic benefits to the country's population.

These aspects are clearly highlighted in the National Energy Policy 2016-2040, which promotes the use of Paraguay's endowed renewable energy sources to improve energy access, enhance energy security, implement energy efficiency and, thanks to its geographical position and to existing bi-national hydropower projects, consolidate the country's key role in regional energy integration. The national energy policy also provides clear implementation guidelines that are leveraged in the recently developed

Sustainable Energy Agenda 2019-2023. The agenda focuses its efforts on promoting sustainable mobility, with the aim of greatly reducing imports of oil derivatives to the country. Likewise, the National Development Plan 2030 highlights the crucial role that renewable energy will play in increasing national income and contributing to the sustainable development of the country.

The Renewables Readiness Assessment (RRA) process for Paraguay has identified key actions for accelerating the deployment of renewable energy in the country. The consultative process led by the Ministry of Public Works and Communications, represented by the Vice-Ministry of Mines and Energy (VMME), and facilitated by the International Renewable Energy Agency (IRENA), aims to help unlock Paraguay's renewable energy potential. The identified actions are grouped in six areas, where the main challenges have been identified.



Yacretá Hydropower Plant.

Image credit: Viceministry of Mines and Energy

Challenges and key recommendations

1. Strengthen institutional structure and governance in energy

Paraguay's current institutions face capacity constraints to guarantee the rapid implementation of policies, programmes and strategies in the energy sector. The key energy institutions require additional human resources, capabilities and budgetary resources in order to lead multi-sectoral responsibilities, implement national energy programmes and provide technical assistance in the design of business models, installation, maintenance and certification of renewable energy technologies.

Therefore, it is essential to prioritise enhancing the governance of energy institutions in the country by strengthening capacities and increasing the budgets of existing entities or creating specialised agencies to implement strategic pillars of the energy policy, such as energy efficiency and renewable energy. For instance, a short- to medium-term approach could reside in the creation of an Energy Committee as a transitory measure towards the eventual creation of a leading institution for the energy sector, such as a Ministry of Energy. This Committee would enhance co-ordination among the different institutions of the energy sector, following up on implementation of the National Energy Policy and assessing the potential benefits of energy reforms in the country.

Furthermore, Paraguay needs to establish an independent regulatory environment, either by increasing this capacity in an existing institution or by considering granting these responsibilities to a new one. The regulatory body should guarantee adequate and independent supervision of different aspects of the energy sector and work closely with the key energy institutions in the country. Additionally, there is a need to streamline administrative procedures when granting permits and concessions to accelerate the deployment of renewable energy projects. The creation of a "single-window agency", as an independent legal body or under the mandate of an existing institution, can facilitate more efficient and rapid awarding of licences for faster advancement of renewable energy projects.

2. Enhance planning, policy and the regulatory framework for renewable energy

Paraguay has a rich diversity of renewable energy resources that have not yet been clearly assessed and elaborating resource maps could help in the identification of zones with potential for the development of renewable energy projects that serve power generation or other applications.

Additionally, the advancement of the energy sector in Paraguay requires better guidance given by a robust national energy plan that includes clear guidelines for all end-use sectors, including power, transport, industry and buildings. The current planning responsibilities in the country are scattered among different institutions, hindering utilisation of the full renewable energy potential in the country. Likewise, the Paraguayan energy sector would benefit from delimiting clear renewable energy targets beyond the power sector – which could integrate the economic, social, environmental and governance dimensions of sustainable development – as well as from a clear linkage and contribution to climate action in the framework of the NDCs.

The Paraguayan renewable energy sector has a strong nexus with different aspects of the SDGs and having a clear link to these goals would benefit the achievement of a sustainable energy future and potential net zero emissions by 2050. The development of a cross-cutting strategy highlighting the nexus areas of the energy sector with the SDGs would position the sector as a national priority and emphasise its contributions towards improved land use, modernisation of the agricultural sector and women's empowerment, among others.

Furthermore, there is a need to prioritise actions to establish clear enabling frameworks for the development of renewable energy projects in the country. Creating transparent and effective rules and legislation – including incentives, regulations and guarantees – could help attract new investments into the country.

3. Develop policy instruments and implementing initiatives to foster energy efficiency

Energy efficiency is one of the pillars of the country's National Energy Policy, and some actions have been implemented to foster more efficient use of energy in Paraguay. For instance, the country has developed an inter-ministerial co-ordination mechanism and has established guidelines across the economic sector through the National Energy Efficiency Committee (CNEE) as well as the development of a National Energy Efficiency Plan.

However, these efforts have not yet led to concrete outcomes, and energy efficiency still requires wider promotion and targeted implementation in the country. The development of legislation on energy efficiency can provide conditions for the implementation of targets and clear initiatives throughout different sectors, including buildings, transport, industry, etc., while promoting the adoption of renewable energy and energy efficiency technologies for different applications. Moreover, there is a need for programmes that raise general public awareness about the responsible use of energy, helping to shift the prevailing view that the country has infinite hydropower resources. Structuring integral policies that offer a more relevant role for the population in its approach to energy consumption could favour raising awareness about responsible energy use in Paraguay.

4. Promote the use of renewable energy beyond the power sector

The deployment of renewable energy can benefit many different sectors in the country, by assessing the potential and impact of clean energy technologies in end-use sectors such as transport, industry, buildings, etc. Nevertheless, institutional co-ordination to execute cross-cutting strategies demands organization among ministries and vertical coherence across other government institutions.

It would be beneficial for Paraguay to develop roadmaps that assess the potential penetration of clean energy technologies, highlighting the diverse benefits brought about by these types of projects, such as enhanced food security, the mitigation of emissions from the transport sector, the modernisation of the industrial sector, among others.

The development of roadmaps across different sectors will require strengthening institutional and stakeholder engagement beyond the power sector, with the aim of having all relevant actors involved and committed to moving forward the actions identified in the roadmap. The institutional co-ordination could also fill the need to assess the capacity to invest in low-carbon technologies and to design business models to install and deploy renewable energy technologies. Likewise, Paraguay can leverage its work on existing regional initiatives to foster international cooperation for the promotion of renewables and contribute to the regional energy integration in Latin America.

5. Foster investment in renewable energy technologies

Paraguay's strengthened macroeconomic framework is based on fiscal rules, inflation reduction targets, low public debt and adequate foreign exchange reserves. At the beginning of 2020, its favourable investment conditions positioned it among the five countries in Latin America with the lowest risk premium. However, the country faces challenges to attract investments in certain areas of the energy sector.

To accelerate investments in renewable and energy efficiency projects in Paraguay, direct incentives can be created in the form of tax exemptions and discounts for high-efficiency and renewable energy equipment, among others. Additionally, the country can consider providing technical assistance to study the economies of scale for developing the use of renewable energy in strategic sectors, to support the organisation and professional development of small- and medium-sized enterprises, and to create capacities in commercial banks and borrowers to increase access to financing.

More financing opportunities should be created in the country to boost the rapid development of renewable energy projects. For instance, guarantees, credit lines and other dedicated financing mechanisms can help attract the interest of project developers and investors. Additionally, climate finance support from international institutions should be considered for the development of renewable energy and energy efficiency projects.



View of a sugar cane factory in Troche, Paraguay.

Image credit: Shutterstock

6. Reinforce the continuous creation of institutional and human capacities

Currently, Paraguay is experiencing an imbalance between supply and demand for trained personnel with skills in energy-related activities, including energy policy, regulation, installation and maintenance of renewable energy systems, certification of technologies and project development, among others.

It is necessary to map the labour skills that are in demand and to develop adequate education, capacity-building programmes and training to satisfy the growing demand of professionals and technicians in the energy sector. This can be done in collaboration with academia, by identifying current and future skills needed in the energy sector and reinforcing existing educational programmes.

Collaboration among the different stakeholders from the public and private sectors involved in the development process of the RRA will be key in bringing these actions to reality. The implementation of these steps is expected to pave the way for the energy transition and associated climate action in Paraguay.

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