Uruguay XXI
INVESTMENT, EXPORT AND COUNTRY BRAND PROMOTION AGENCY

Investment opportunities

RENEWABLE ENERGIES

June 2020

Content

1. Renewable Energies in Uruguay

- Uruguay has travelled a successful path in terms of energy policy. The keys to success lie in the definition of a long-term (25-year) state policy and an appropriate institutional and regulatory framework, which was adapted as the learning curve progressed. The design and implementation of public-private partnership opportunities has led to a significant transformation in the country's energy matrix.

- This process of transformation of the energy matrix positions Uruguay at the forefront of the use of renewable energies in the world. The participation of renewable energies in the primary matrix, 60% in 2018, is well above the world average (less than 20%).

- In **2019, 98% of Uruguay's electricity generation came from renewable sources**. In particular, the contribution of wind energy highlights Uruguay and places it as a world leader together with Denmark, Ireland and Portugal[1].

- The Uruguayan model of stimulating the renewable energy sector has become one of the references at a global level. In particular, the achievement of incorporating a strong private participation in investment through innovative promotion schemes that do not depend on direct subsidies stands out. As an example, the International Renewable Energy Agency (IRENA[2]) includes in its guide for the design of renewable energy auctions, among others, examples of those carried out by UTE.

- **Uruguay is ranked 11th in the WEF'[3]s Fostering Effective Global Energy Transition Index 2019.** This index compares the performance of 115 countries in three dimensions: economic growth and development, energy access and security, and environmental sustainability. In the case of Uruguay, its outstanding position is based on an improvement in all three dimensions and that diversification of generation sources has reduced the vulnerability of its energy system. In turn, it is 5th in the performance ranking of the energy system.

- Both the government and private actors have made significant investments in the sector, totaling over US$ 8 billion since 2010. Investment in energy infrastructure continues to be one of the government's priorities.

- The Uruguayan model of public-private partnership for investment in the sector has proved successful and is now being replicated in several countries. The state-owned public energy company, UTE, has executed various projects under different forms of partnership with private investors: public ventures and financing, traditional bidding processes, leasing contracts, projects financed by multilateral organizations (IDB, CAF, World Bank), bi-national ventures and public ventures with financing from the capital market and pension funds.

1 According to Ren 21

2 IRENA - Renewable Energy Auctions

3 Source: World Economic Forum (WEF).

- The achievements made are reflected in the diversification of the energy matrix, security of self-supply and reduction of dependence on fossil fuels. Within this framework, energy policy is aligned with the commitment to contribute to the mitigation of greenhouse gas emissions and concern about climate change. In this regard, Uruguay participated in the 25th[4]Conference of the Parties at the end of 2019. At that time, governments unanimously agreed on the state of urgency and the need for action, inviting countries to commit to becoming CO2 neutral by 2050.

- In July 2017, the government presented the National Climate Change Policy, which among its objectives proposes to deepen the diversification of the energy matrix into sources with low intensity of greenhouse gas emissions.

- For the next few years, energy policy in Uruguay faces important challenges:

    - Continue with the incorporation of renewable sources in the electrical matrix (wind, biomass, solar and micro-hydro).
    - To extend the electricity transmission network by adapting it to a more distributed generation in the territory and with more variable power flows due to the randomness of the sources involved.
    - Optimize the complementarity between the different sources and incorporate the combined cycle as a cleaner and more economical source of back-up energy than conventional thermal energy.
    - Promote coordination with neighboring countries by strengthening regional energy integration, in order to achieve better management of energy surpluses
    - Consolidate a Smart Grid, which allows for efficient coordination of energy supply and demand, and which enables improvements in the quality of service of the network
    - Incorporate energy storage technologies, as far as technological advances and their economic parameters allow.
    - Seek Energy Efficiency with an active policy that encourages savings and rational use of resources.
    - Continue with the possibilities of reconverting agricultural waste to produce energy, transforming an environmental liability into an energy asset, inserting the use of this type of source in the technical-economic scheme with which the country's electricity sector is managed
    - To continue with analyses to achieve energy recovery from solid urban waste.
    - Incorporate clean energies into the transport sector by applying the latest available technologies, especially in urban public transport and utility fleets powered by electricity. Begin to explore hydrogen for heavy and long-distance transport.

4 COP25, meeting of the signatory parties to the United Nations Framework Convention on Climate Change.

2. Transformation of the Energy Matrix

Historically, the Uruguayan energy system has been highly dependent on climatic conditions. Years of low rainfall meant low hydroelectric power generation, which had to be compensated for by increased use of oil and its derivatives in thermal power stations or by imports of electrical energy. This has changed significantly over the past 15 years. As a country without proven hydrocarbon reserves[5] and having chosen not to develop energy based on nuclear sources, Uruguay has resorted to the development of clean and competitive energy to reduce its vulnerability to external factors.

The incorporation of biomass, followed by the introduction of wind energy generated from large-scale wind farms and photovoltaic generation are the driving forces behind these changes. Thanks to an energy policy agreed upon by all political sectors and in a period of significant economic growth, the country has managed to satisfy the growing demand for energy and replace traditional sources with cleaner ones.

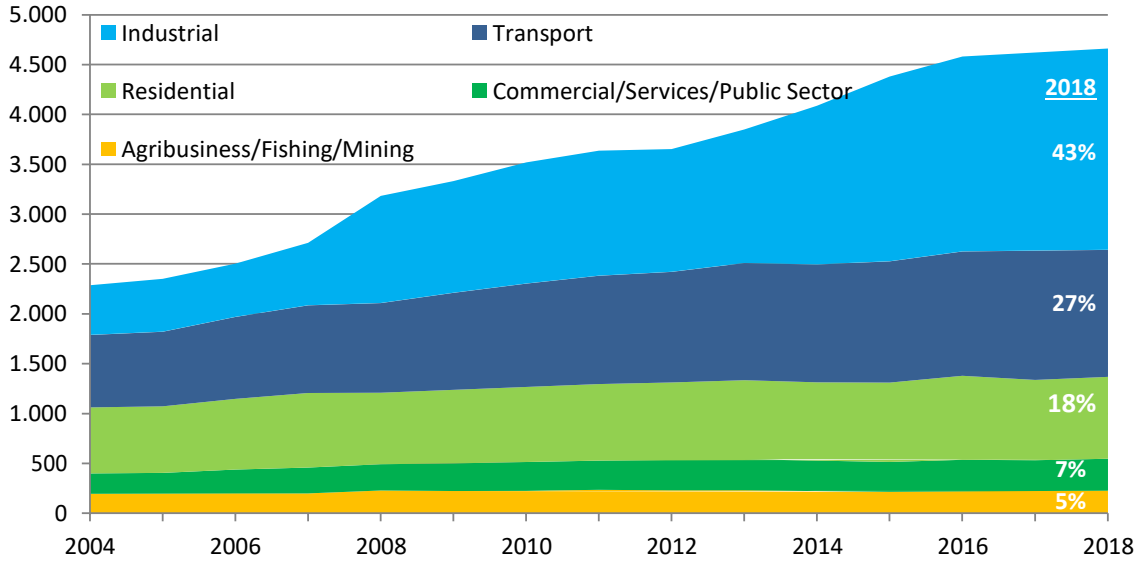
2.1. Evolution of energy demand and consumption

The Uruguayan economy has shown uninterrupted growth between 2003 and 2019 and in that framework energy demand has expanded strongly. This is due to the increase in household income and a more general use of comfort items. In addition, the productive sphere has also contributed to the increase in demand, due to higher production and the existence of new enterprises.

In this context, the total final energy consumption was 4,660 ktoe in 2018, an increase of 46% compared to 10 years ago. It should be noted that at sector level the industry is the one that has shown the strongest dynamism (driven by the pulp sector), obtaining a participation of 43% in 2018. However, it should be noted that from 2016 onwards energy consumption has tended to stabilize, showing year-on-year increases of 1% in both 2017 and 2018.

5 Although in recent years it has been involved in intense onshore and offshore exploration activities.

Graph Nº1 - Final energy consumption by sector (Ktoe)



Source: Energy Balance, DNE- MIEM.

While final energy consumption data for 2019 have not yet been published, according to the Preliminary Energy Balance to 2019 published by the National Directorate of Energy (DNE), final electricity consumption would have been 970 ktoe last year, marking a slight decrease compared to 2018 (1%).

With regard to the evolution of demand in the coming years, the DNE has carried out a prospective study of energy demand for the period 2015-2035[6]. The table below shows the projections of final energy demand by sector for two possible scenarios (both of which involve the construction of a third pulp processing plant). The trend scenario assumes that there will be no significant changes within the structure of the sectors, with the current efficiency measures and presumable technological improvements. The second scenario presented assumes that a series of policies would have been applied to increase the efficiency of each sector, deepening the actions of the trend scenario

Table N°1 - Energy demand by sector: Average annual growth 2015-2035

Scenarios	Residential	Commercial Services	Industrial	Primary Activities	Transport	Total
Trend	2.0%	2.9%	3.2%	2.8%	2.8%	2.8%
Policy and Efficiency	0.5%	1.8%	2.7%	2.5%	2.3%	2.2%

6 Energy Demand Foresight Study - DNE.

Additionally, the latest Seasonal Programming report prepared by the Electricity Market Administration (ADME)[7] includes the forecast that electricity demand will increase at an average annual rate of 0.2 between 2020 and 2024. This projection contemplates the effects of Covid-19 for 2020, assuming a drop of almost 4% this year, and then resuming a growth path (with an average annual rate of 1.3% between 2021 and 2024) between 2019 and 2023.

In this context, it should be clarified that, while energy demand is expected to continue to grow in the coming years, it would do so at lower rates than those observed in the recent increase in supply. In this regard, and looking mainly at electricity production, whether demand for this type of energy continues to grow depends on keeping energy exports to the countries of the region steady and/or developing electricity mobility projects (Uruguay even has the first electricity network for vehicle recharging in[8]Latin America).

2.2. Energy supply matrix

The configuration of the energy matrix has changed considerably in recent times. In particular, energy supply would have reached 5,400 ktoe by 2019 (according to preliminary data from the DNE), reaching a new historical record and increasing by almost 80% compared to 2005 levels.

This increase was accompanied by a change in the composition of the matrix, as energy obtained from conventional generation sources significantly reduced its share of total supply, from 58% in 2005 to 37% in 2018.

On the other hand, biomass, wind and solar energy began to play an extremely important role and in 2018 they reached 41%, 8% and 1% of the total supply, respectively, when in 2005 neither wind nor solar energy contributed to production (see Graph 3).

Hydropower, on its part, has decreased its weight in the supply (representing 13% of the total in 2019), but this is only due to the importance that other strong renewables have gained, as hydropower generation in 2018 has increased by more than 20% compared to 2005. With respect to this type of energy, it should be noted that the country's large water resources are already almost fully used and the future increase in supply will only be possible through small hydroelectric plants.

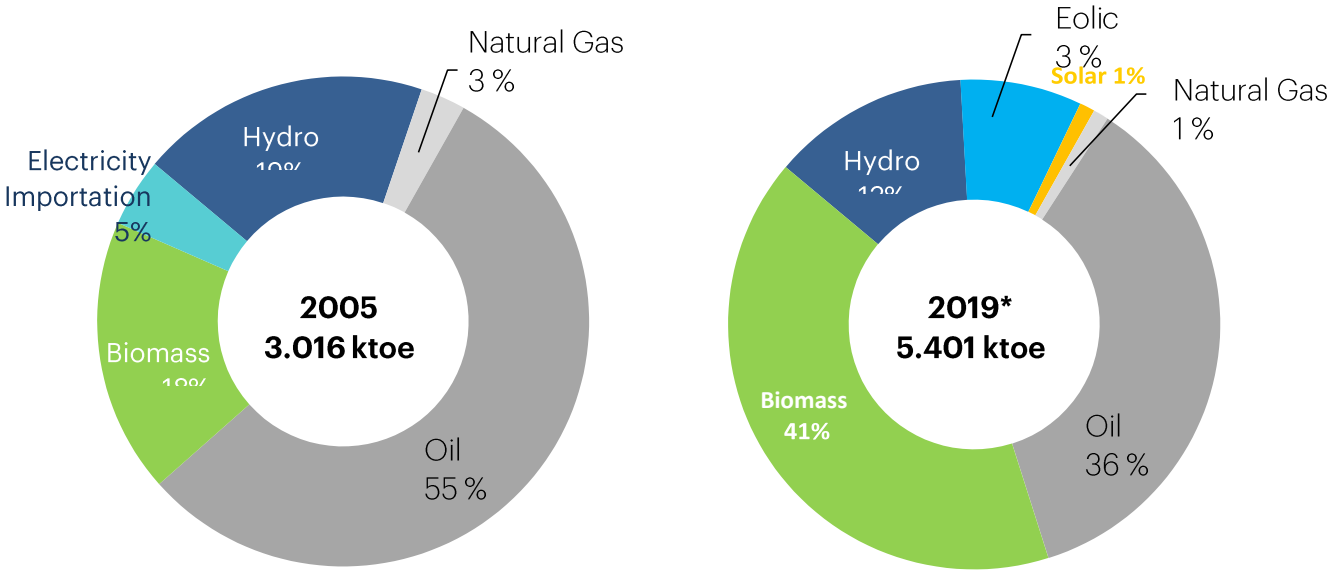
Finally, electricity imports have systematically decreased in recent times and have been virtually irrelevant for several years.

Thus, **renewable energies represented 63% of the total energy matrix in 2019** (compared to only 37% in 2005).

7 Seasonal Programming - ADME

8 For more information see the Report on the Automotive Sector Uruguay X

Graph No. 3 - Energy Supply Matrix-Uruguay



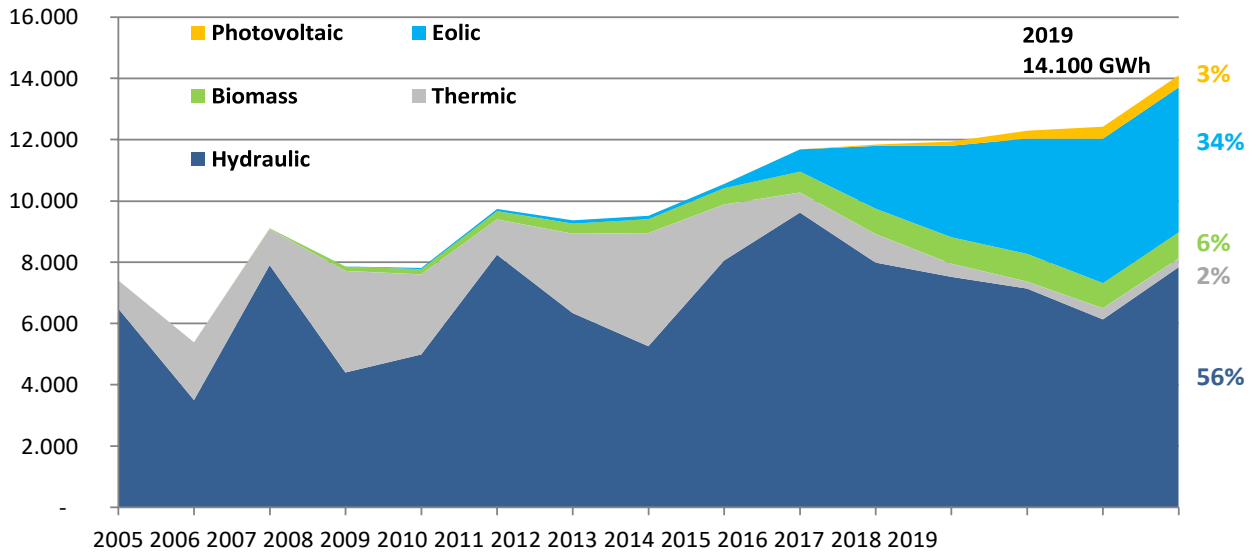
Source: Energy Balance, DNE- MIEM.

2.3. Uruguay's electricity system

With an electricity network of 83,277 km, the country has an electrification rate that covers 99.8% of households. Uruguay's national electricity system consists of two major high-voltage transmission networks. A 1,078 km, 500 kV system links the Salto Grande dam (Río Uruguay) and the Terra, Baygorria and Constitución dams (Río Negro) with the metropolitan area of Montevideo, the largest center of consumption. It has a branch line to the city of San Carlos, located in the southeast of the country, which continues to the border with Brazil. Likewise, a 150 kV network of 3,923 km links the generation plants with almost all the departmental capitals and main consumption centers(72 150 kV stations).

Uruguayan electricity production has maintained a path of steady growth and in 2019 it exceeded 14,100 GWh, the highest level ever recorded in the historical comparison. The penetration of renewable energies in recent years was mostly in electricity production, and in 2019 renewable sources contributed 98% of production. Non-conventional renewable sources (wind, biomass and photovoltaic) together accounted for 42% of total electricity generation. In contrast, thermal energy production from fossil sources plummeted over the last 10 years and in 2019 represented only 2% of total generation.

Graph No. 4- Electricity generation by source (GWh)

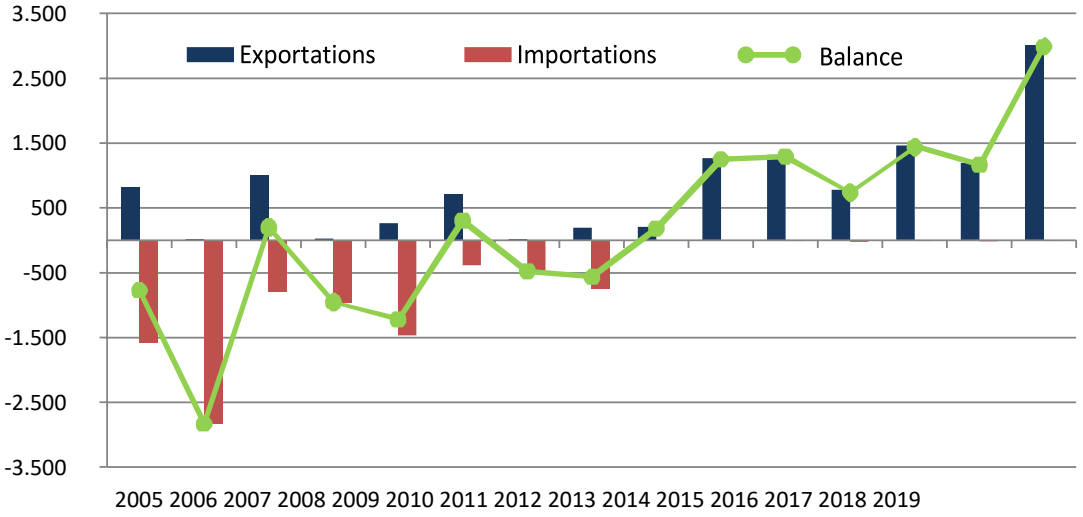


Source: UTE

Three connections with Argentina and two with Brazil allow Uruguay to exchange electrical energy with its neighbors. Uruguay has become a net exporter of electricity to the region (Argentina and Brazil) since 2013. At the same time, it should be noted that since the end of 2017 Uruguay has allowed the company Ventus (dedicated to wind and solar energy) to export electricity to Argentina as a private agent. Although this authorization is still in force, the wind farms covered by this measure opted for long-term contracts with UTE, and are therefore not currently available for such exports (no private exports were recorded in the first five months of 2020).

According to UTE, as well as production, electricity exports set a new record in 2019, exceeding 3,000 GWh, more than double the amount exported in 2018. External sales were mainly to Argentina (80%). Thus, **electricity exports represented 21% of total generation in 2019.**

Chart No. 5 - Electricity Exports and Imports (GWh)



Source: UTE

Finally, the Uruguayan electricity system stands out for its reliability with respect to the rest of the Latin American countries. According to the World Economic Forum's Global Competitiveness Index, Uruguay ranks first in Latin America in relation to the quality of the country's electricity supply. In October 2019, UTE received the "2019 Gold Award" granted by the Regional Energy Integration Commission (CIER), for being the best evaluated in the opinion of its clients among 42 companies in the region (both public and private). According to CIER, 88.6% of UTE's customers consider the service to be good or very good[9].

3. Energy Policy

The Energy Policy 2005-2030, which has been transformed into a State policy, establishes guidelines in the field of energy at the national level with a long-term view. Approved by the Executive Branch in 2008, it was ratified by a Multi-Party Energy Commission in 2010. Under this policy, a strong commitment is made to diversifying the energy matrix and incorporating indigenous sources, particularly renewable energies. This pursues multiple objectives: achieving energy sovereignty, reducing costs, activating the national energy industry, reducing dependence on oil and mitigating the polluting effects by reducing the emission of greenhouse gases.

The Energy Policy 2005-2030 also includes a pillar linked to social development. The objective is to ensure that all sectors of society have access to energy, through efficient use of energy, in conditions of safety and quality, as well as at an accessible cost.

In line with energy policy objectives, a comprehensive regulatory framework has been developed to focus on the development of renewable energies.

9 See LINK

4. Renewable energy sources

Uruguay has several natural resources for the development of renewable energies. A high water flow, constant and predictable winds, uniform solar radiation throughout the territory (although with seasonal variations) and a booming agro-industrial sector provide opportunities for generation from hydraulic, wind, solar and biomass energy.

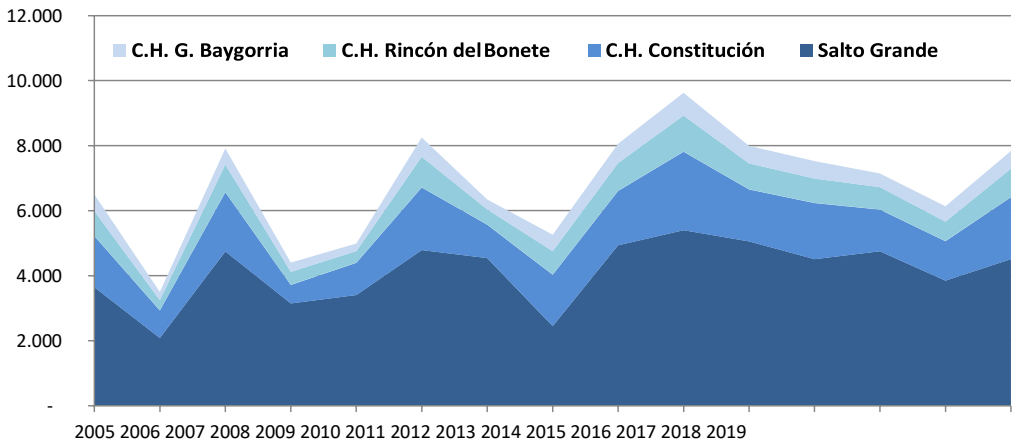
What are renewable energies?

Renewable energy is energy that comes from virtually inexhaustible sources, either because of the immense amount of energy they contain or because they are able to regenerate by natural means. Among the main sources of renewable energy are: solar energy, wind energy, hydraulic energy, tidal energy (which results from harnessing the energy of the tides), geothermal energy (obtained by exploiting the heat generated in the interior of the Earth) and biomass. Renewable energies are defined as opposed to non-renewable energies, which are those found in nature in limited quantities.

4.1. Hydraulics

Hydropower generation in Uruguay is the main source of electricity. The hydraulic generation park is made up of 3 cascade plants on the Río Negro: Gabriel Terra (Rincón del Bonete), with an installed power of 152 MW; Baygorria with 108 MW and Constitución (Palmar) with 333 MW; and a binational plant on the Uruguay River (Salto Grande) with 1890 MW of power, of which 945 MW correspond to Uruguay and the rest to Argentina. Currently, large-scale hydraulic development in Uruguay is close to the maximum limit. However, there is additional capacity for the installation of small hydraulic plants (SHP) that could eventually become an additional source of supply.

Graph 6 - Hydraulic Power Generation by Plant



Source: UTE

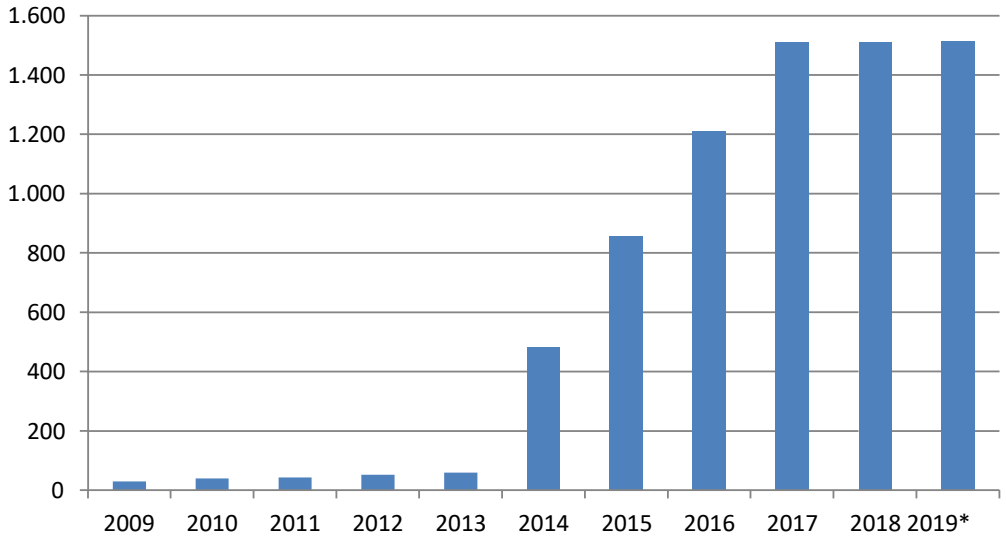
4.2. Wind

Of the various uses that can be made of wind energy through the application of technology, the fastest growing in the world today is large-scale wind generation. This consists of the installation of Wind Farms (connected to the electricity transmission network), which are made up of variable quantities of large wind turbines (currently over 2 megawatts).

In recent years, wind energy has become more reliable and has penetrated the electricity systems of many countries. Uruguay was not alien to the international context and has entered a wind energy development program with strong investments that have allowed it to take advantage of the great availability of the existing resource.

The country's topographical characteristics, with large plains almost without obstacles, guarantee constant and predictable wind availability. A survey carried out by the MIEM and the Faculty of Engineering of the University of the Republic in 2009 has allowed the construction of a national wind map[10]. In said survey, it was found that the CF (Capacity Factor) values are generally higher than 35%, so they are above those considered internationally usable. With the information on the generation of the parks already installed by 2020 this figure is closer to 40%[11].

Chart No. 7- Installed Wind Energy Power (MW)



Source: DNE - BEN Preliminary 2019

So far all the development and expansion of wind power generation capacity has been in the territory. The feasibility of installing offshore wind power plants has not been explored, and they have been significantly developed in some Northern European countries.

10 Wind Energy Program in Uruguay (PEEU)

11 Based on information from UTE: https://portal.ute.com.uy/composicion-energetica-y-potencias

4.3. Solar

Uruguay is located in a geographical latitude range from 30º 04' to 34º 53'. The annual average daily global irradiation on a horizontal plane over the Uruguayan territory is 4.6 kWh/m2. Although the seasonal variation is large, the geographical variation is small, due to the relative geographical uniformity of the Uruguayan territory.

At present, the Solar Energy Laboratory[12] (LES) of the University of the Republic (UDELAR) has very detailed information about the characterization of the solar resource at a geographical and temporal level. Using satellite information and at the plant level, a model was developed to make forecasts about the solar resource available at each point in the territory.

In recent years, the installed capacity of large-scale (large-, small- and medium-scale) photovoltaic energy parks, as well as small and medium-scale installations, has increased sharply (see section 6.2). Solar thermal installations have also developed significantly in Uruguay in recent years, from 2 m2/1000 inhabitants at the end of 2009 to almost 23 m2/1000 inhabitants at the end of 2018, for a total installed area of 87,429 m2 (according to the 2018 National Energy Balance).4.4. Biomass

Biomass is described as "any organic matter capable of being used for energy". This concept covers products and by-products of woody and herbaceous origin, including also certain industrial and municipal waste.

In recent years, Uruguay experienced a major change in its agricultural sector, with a strong expansion in the production of items such as soybeans, rice and wheat. At the same time, forestation in Uruguay has had a significant expansion, reaching today almost 1 million forested hectares that have allowed the development of industries of mechanical transformation of wood. The development of energy production from non-traditional biomass took place in this scenario of growth of the forestry sector, also of the cellulose industry and within the framework of a State Energy Policy that includes the promotion of renewable energies among its goals. The advantages of biomass as a source are fundamentally associated with its potential capacity to be managed and to act as a support for the electricity system in the face of the massive incorporation of non-manageable sources (whose generation is regulated by the availability of the resource).

On the other hand, an important effort has been made from the public sector to analyze the potential of the country for the generation of this type of energy. An example of this is the PROBIO13 and BIOVALOR14projects, which deepen the knowledge of energy generation from agro-industrial waste. During this process an interesting synergy between energy and industry has been verified, due to the important development of local capacities and technology transfer. Today there are local companies that can carry out the projects throughout the chain. 4.5. Forest residues

12 Solar Energy Laboratory
13 PROBIO
14 BIOVALOR

In the last few years, electricity generation projects from forest and agricultural waste have been installed in the country, based on the bidding processes that promoted investment.

Forest industry operations produce large amounts of waste in different processes, it is of interest to encourage the production of different biochemical products. Uruguay currently has the status of a country with policies related to bioeconomy and is committed to transforming production towards a diversified and higher value-added forest bioeconomy.

In Uruguay there is a high percentage of wood[15] to be processed by the industry and therefore there is a great potential for valorization of the by-products generated in the mechanical wood transformation chain. It is estimated that, in the forestry phase, the waste generated is between 10% and 30% of the standing tree. Then, in industrial processes such as sawing, the production of waste is about 50% of the processed wood. According to the National Sawmill Census (2017), some 804,000 cubic metres were processed in 2016 (61% of the maximum installed capacity at the national level), which is equivalent to a maximum installed capacity for processing of around 1.5 million cubic metres per year.

As sawmill waste, it can be considered that at least 350,000 m3 of sawdust are generated per year, which are not currently recovered, making their disposal a problem. Energy is also generated from industrial waste from cellulose production. The UPM and Montes del Plata plants, which have an installed capacity of more than 160 MW each, will be joined by a third plant with a similar capacity in Durazno (which will begin operations in 2022).

4.6. Agricultural and livestock waste

Although there are currently several experiences of generation from other agricultural waste, these resources are under-exploited. One of the first sources of this type used in the country has been rice husks. There are two companies processing this waste (Galofer S.A. and Fenirol S.A.). There are also experiences with the use of sugar cane bagasse (a by-product of sugar cane) for the production of electricity (ALUR).

As for waste generated by livestock activities, there are also experiences of biogas production from anaerobic digestion in the area of dairy (Estancias del Lago) and wool production (Lanas Trinidad). Since the end of 2013, Uruguay has been implementing the BIOVALOR process, which aims to transform waste generated from agricultural and agro-industrial activities and from small population centers into energy and/or by-products, in order to develop a sustainable, low-emission model (contributing to the reduction of GHGs) through the development and transfer of appropriate technologies. Through this program, Uruguay seeks to become an example of a green economy by turning an environmental liability into an energy asset.

Within the framework of the BIOVALOR project, the potential for energy production based on agricultural and livestock waste is being analyzed throughout the country. According to estimates published in September 2016, the main activities generating organic waste are those

15 Sawmill Survey and Sawmill Census 2017

associated with cattle production. Fattening livestock, activities associated with dairy, refrigeration and tanneries generate 71% of total organic waste.

In 2010, with the support of the United Nations Industrial Development Organization (UNIDO), the results of a consultancy were disclosed that analyses the potential for energy generation from biomass from agricultural and industrial waste or by-products. In addition, between 2011 and 2014 the Project for Electricity Production from Biomass in Uruguay (PROBIO) was implemented, a joint initiative of the national Government and the United Nations Development Programme (UNDP) with the aim of promoting the energy use of biomass by-products from forestry and other chains.

4.7. Liquid biofuels

Uruguay - as an important agricultural producer - has the conditions for the production of liquid fuels from biomass. Bioethanol and Biodiesel production has increased in the last decade and in 2018 it obtained a 1.5% share of the gross energy supply, from biofuels generated with national raw materials only, as indicated by the agrofuel law (Law 18,195)

The company ALUR S.A. (90.79% owned by ANCAP) is the main producer of agrofuels in the country. It has a bioethanol production capacity of 100 million liters per year, whose main destination is to supply ANCAP where it is mixed with gasoline at a rate of approximately 8%. In addition, it has an annual production capacity of 75 million liters of biodiesel, which are also supplied to ANCAP, to make an approximate 5% mixture with the gasoil. The company has managed to place its products in international markets: Bioethanol has been exported to Chile and Biodiesel has managed to enter the Dutch market (the exported Biodiesel was generated from frying oil).

For the production of Bioethanol, ALUR S.A. uses BT sorghum and corn (summer crops), wheat and barley (winter crops) and sugar cane (annual crops) as raw materials, and may also use sweet sorghum. In turn, the raw materials used for the production of Biodiesel include soya and canola, beef tallow and used frying oil.

To replace 10% of the gasoline, Uruguay needs approximately 60,000 hectares of BT sorghum, depending on the annual yield of this crop. This area represents a smaller fraction compared to the one million hectares of summer crops that are usually grown, and winter crop area could also be added, so bioethanol production could be perfectly exceeded. In summary, in Uruguay there is great potential to increase biofuel blending percentages.

There is an ANCAP initiative to take advantage of existing biomass resources in accordance with the obligations granted by Article 67 of the Forestry Law (15.939), for which it created a second generation biofuel research center together with the Latitud de Latu Foundation (CIDEB) from lignocellulosic waste. In this center, research projects are carried out to obtain second generation biofuels from lignocellulosic materials coming from forest crops, residues of the same or energy crops.4.8. Urban Waste

The use of municipal solid waste (MSW) for energy production is a mechanism increasingly used worldwide as a means of mitigating the pollution generated by large urban centers.

Currently, Uruguay does not have medium or large plants for the transformation of urban waste into energy, beyond pilot plans carried out by some municipalities. For example, in Maldonado there is a plant for the production of electricity from sanitary landfills, Las Rosas. With an installed capacity of 1.2 MW, it generates electricity from the capture and burning of biogas. In Montevideo, a plant that captures methane gas, under an agreement with the World Bank, generates Certificates of Emission Reductions. In this last project, the gas generated could be used to generate electricity.

The treatment and final disposal of urban waste is the responsibility of each of the country's 19 municipalities. According to the various studies available, it is estimated that the MSW disposed of at the main Final Disposal Sites totals 1,100,000 tons/year, of which 780,000 tons correspond to Montevideo.

In November 2015 the Chamber of Industries of Uruguay (CIU) inaugurated a final industrial solid waste disposal site that receives part of the industrial waste from the capital and its surroundings, from both public and private companies. The site receives waste from primary (agro-industry), secondary (manufacturing), and service industries.

The national and departmental authorities consider the recovery of waste through energy production as a necessary action and are interested in developing ventures of this type, which cover several urban centers and understand that there are opportunities for the entry of private actors. The call for the construction of a treatment plant for the Municipality of Canelones stands out.

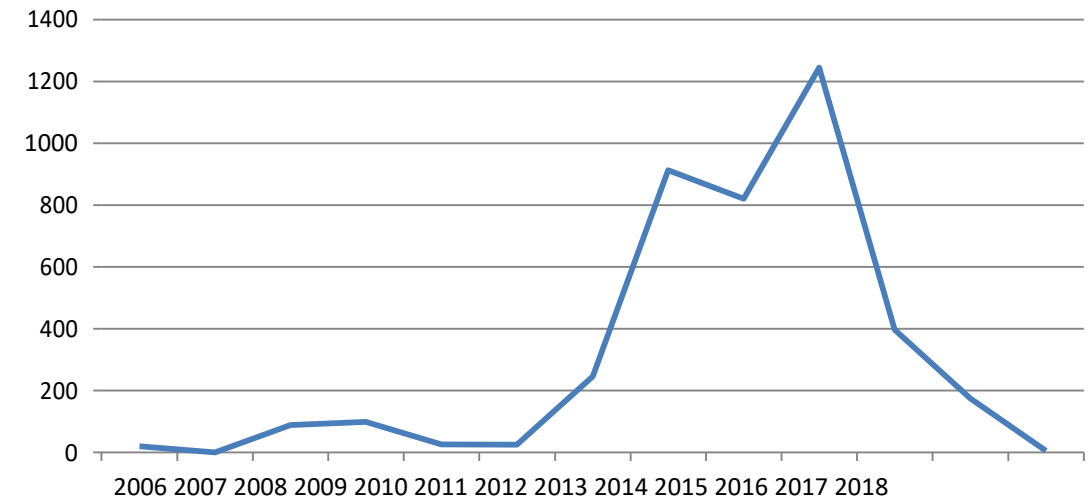
Meanwhile, in September 2019 the Waste Management Act was passed[16]. The law aims to be a regulatory instrument that frames and regulates waste management, with clear guidelines integrated with environmental policy. The law is based on a sustainable development model, promoting the revaluation of waste and betting on new forms of business and employment.

5. Investments in the sector

The energy transformation experienced by Uruguay was made possible by significant public and private investment. According to Climascopio 2019[17], between 2011 and 2018 Uruguay received $ 4.5 billion in investments in clean energy from commercial banks (national and international) and development banks (international). In 2015, the country registered the highest annual investment, $1.2 billion. More than 90% of the total went to wind power plants. In 2018, investments in renewable energy reached low levels compared to previous years, with only $5 million going to clean energy projects. 75% of investments in the clean energy sector were foreign.

16 Waste Management Act
17 Climascope 2019

Chart No. 8- Investment in Clean Energy in Uruguay
(Millions of US$)



Source. Climascope 2019

5.1. Macroeconomic Stability and Legal Security

Uruguay has consolidated in recent years as a reliable destination for foreign investors. A favorable framework for investment and good economic performance, explain the significant flows of FDI received in the last decade. Legal security is another pillar that supports the privileged position as a place to invest, beyond being a small economy. In fact, Uruguay is the only MERCOSUR country with an Investment Grade, ratified by the main rating agencies.

The state-owned energy company UTE is the main player in the sector, which produces and buys electricity from private producers and distributes it to consumers. Contracts concluded with private parties therefore have the implicit guarantee of the State. In practice, UTE has been the executor of the public policies that have led to the remarkable diversification of the Uruguayan energy matrix.

5.2. Availability of Financing

Despite being a small financial center, in Uruguay there are various mechanisms through which part of the financing of energy infrastructure projects can be obtained.

-Bank Financing:

The state-owned “Banco de la República Oriental del Uruguay” (BROU) is the main commercial bank in Uruguay and has participated in the financing of some wind farm projects in Uruguay. The Uruguayan private banking sector is composed of banks of foreign origin that have already participated in the structuring of infrastructure projects.

- Institutional Investors:

Pension Fund Administrators (AFAPs) have grown steadily in terms of affiliates and savings amounts, and tend to diversify their investment portfolio into long-term assets. Since they can only invest in securities with high credit ratings, this type of investment is attractive to these institutions.

-Infrastructure Funds:

In 2017, a US$ 350 million fund began operating through a trust managed by CAF, which provides 10% of the financing for public projects with private sector involvement.

-Multilateral bodies:

They include financing for infrastructure projects within a broader framework of support for the country's structural reforms (IDB, World Bank, CAF). They also channel foreign investment through their private sector investment segments.

-Local Retail Market:

Small savers have been eager to channel their savings into instruments offered by the stock market (Bolsa de Valores de Montevideo, Bolsa Electrónica de Valores SA, private investment funds).

Private sector investments are channelled through corporate bonds or trusts.

Negotiable Obligations (NBs) are debt securities issued by private sector companies. They represent the simile of what is internationally called corporate bonds. They have a pre-established maturity and a fixed or re-adjustable interest rate, but previously agreed upon. It does not imply participation in the ownership of the company. The issuing company undertakes to reimburse the capital and pay the corresponding interest within the established terms.

There are also debt securities issued by trusts, or participation securities. The trust is the legal business through which the trust property of a set of rights is constituted, which are transmitted by the settlor to the trustee, so that he manages them, for the benefit of a person (beneficiary), who is designated in the same, and returns them to the settlor or transmits them to the beneficiary. The trustee issues securities that are purchased by the investors and receives a capital that is managed for the purpose of carrying out a project, together with the assets contributed by the settlor, in accordance with a contract called the "trust agreement". Some trusts issue fixed-income securities. These titles have the same characteristics as NPOs. The difference is that NPOs have the backing of a company while debt securities issued under this figure are backed by the independent assets defined in the contract.

5.3. Targeted public investment

Combined cycle power plant in Punta del Tigre

At the end of 2012, UTE signed a contract with the South Korean company Hyundai Engineering & Construction (HDEC), awarding it the construction and maintenance (for 7 years) of a second combined cycle thermal terminal in Punta del Tigre.

In November 2019, UTE inaugurated the Punta del Tigre B combined cycle plant, the largest investment by a public company in 40 years. The new plant is expected to reduce fuel consumption for electricity generation, using a turbine that uses the steam generated by the other two plants owned by UTE. The investment cost $500 million.[18]

Remodeling of Salto Grande

At the beginning of 2019, a project to remodel Salto Grande began, led by the governments of Uruguay and Argentina, with the aim of extending the life of the hydroelectric plant. This project would require an investment of around US$ 1 billion and is planned to last more than 10 years (since the aim is to preserve the productivity of the complex in the years of remodeling). It is estimated that between 2019 and 2020 some US$ 300 million will be disbursed for the first works. The project will have loans from the Ibero-American Development Bank.

ALUR Biodiesel and Ethanol Plants

The company "Alcoholes del Uruguay" (ALUR) has 4 biofuel production plants. The first biodiesel plant began operating in 2009 in Paso de la Arena, but is not currently in operation. In 2013, construction was completed on a second biodiesel plant in Capurro with a production capacity of 65 million liters per year. In terms of ethanol production, since 2010 it has been producing from sugar cane some 25 million liters of anhydrous fuel ethanol in Bella Unión. In February 2015, an anhydrous ethanol plant started operating in Paysandú with a production capacity of 70 million liters of ethanol per year. Thus, the company has plants in Bella Unión (Anhydrous Ethanol), Paysandú (Anhydrous Ethanol), Paso de la Arena (Biodiesel) and Capurro (Biodiesel). These agro-industrial chains directly employ more than 1000 people and indirectly more than 4000.

It should be noted that the mixing of biofuels in fossil fuels produces several benefits to the environment; in particular, it is responsible for saving 270,000 tons of CO_2 that would be emitted annually into the atmosphere

Energy interconnection with Brazil

In addition to these projects associated with energy development, an energy frequency converter was built in Melo (50/60Hz) together with an important network layout, in order to communicate President Medici's networks in Brazil with San Carlos (Uruguay). The total

[18] For more information access https://www.presidencia.gub.uy/comunicacion/comunicacionnoticias/puntas-tigre-b-ute-planta-ciclo-combinado-500-millones-dolares-mayor-inversion-historia

project involves an investment of US$ 300 million and was carried out with a contribution of US$ 83 million from the MERCOSUR Structural Convergence Fund (FOCEM).

With a capacity of 550 MW and a system-level connection of 500 kV in each country, the Melo converter station began exporting to Brazil in the first half of 2017.

5.4. Companies in the Renewable Energy sector

The remarkable transformation of the sector was made possible on the one hand by the close coordination between the national government authorities and the UTE company (calling for proposals, selecting and signing the long-term power purchase agreements that allowed the financing and effective realization of the projects) and, on the other hand, thanks to the involvement of the private sector. Both domestic and foreign companies contributed to the development and implementation of new technologies. In this way, these companies -many of them SMEs- were able to expand their capacities and are in a position to internationalize by providing services to the countries of the region. This section lists some of these actors.

Companies related to the installation of wind farms

The wind power generation sector is undoubtedly the one that has experienced the most notable development. This strong development has been possible thanks to the interaction of multiple actors from the public and private sectors. Among the companies involved are large and small firms, both national and foreign, which play multiple roles: park owners, financiers, project developers, consultants, manufacturers, importers and various service providers.

Many of these actors are part of the Uruguayan Association of Renewable Energies (AUDER), an organization that brings together companies in the sector and promotes the use of renewable energies and battery and hydrogen electric transport.

The following link presents an extensive list of actors prepared by the

DNE. See the Wind Energy Actors Guide in Uruguay

Companies in biomass energy generation

UPM's and Montes del Plata's cellulose plants are the largest productive enterprises in Uruguay. They have a joint processing capacity of 8 million m3 of eucalyptus wood per year. The plants are energetically self-sufficient, taking advantage of the residues dissolved in the cooking liquor, and in some cases also the wood residues, to generate electric energy. They have a generation capacity of 160 MW and 180 MW each, which exceeds their own consumption, with the surplus being sold to the network. In addition, a new UPM plant is under construction in the department of Durazno. The new plant represents an investment of $ 2,700 million and is expected to start operations in 2022.

Galofer S.A. is a consortium of five rice mills (Saman, Casarone, Coopar, Glencore, and Arrozal 33) that uses rice husks as fuel for the generation of renewable electricity in Treinta y Tres. The investment amounted to about US$ 15 million and has the capacity to generate 14 MW by

processing about 110,000 tons of rice husks (husks represent approximately 20% of the tonnage of rice produced).

Bioener S.A.'s objective is to generate electricity and steam from biomass from the wood of the sawmills in the Rivera area. The installed capacity is 12 MW. The steam is sold to Urufor S.A., a company dedicated to the processing of wood, to be used in its drying processes, while the electric energy is supplied to the national grid through the sale to the state-owned company UTE. The plant is located in the department of Rivera, which allows it to be close to the biomass generation area, as well as to the sawmill where the generated steam is used.

The mechanical wood processing company Weyerhaeuser has built a cogeneration plant that uses the by-products of industrial wood processing. Its generation capacity is 12 MW, and the plant's consumption requirements are between 5 MW and 6 MW. When the generation exceeds the energy consumed, the surplus is sold to the state electricity distribution company. This plant is now owned by Timberland Investment Group (TIG) of BTG Pactual which in June 2017 acquired all the assets of Weyerhaeuser in Uruguay.

Energía Renovable Tacuarembó (Fenirol S.A.) generates electricity from forest residues and rice husks. It is owned by four business groups of different origins: Conatel (electrical appliances), Tsakos (shipyards), Zenda (tannery) and Secco (refrigerator). The company was awarded one of the tenders for up to a total of 10 MW, which will be fed into the electricity grid.

The company Ponlar S.A., located in Rivera, uses the by-products of a neighboring sawmill to feed a steam boiler. Part of the steam is used to supply the thermal demand of the sawmill and part to generate electrical energy in a turbine with a power of 7.5 MW.

Liderdat S.A., a joint venture of Azucarlito and other investment groups, produces electricity for the sugar industry from the generation of steam by burning chips and sawdust. The industrial plant operates 90 days a year, and the rest of the energy generated is sold in the SPOT market.

ALUR, 94% owned by ANCAP and 6% by Venezuela's PDVSA, with three plants in operation throughout the country (Bella Unión, Paysandú, Capurro) produced 47,923 ^{m3} of biodiesel and some 80,375 $^{m3\ of}$ bioethanol. The Agrofuels Law (Law No. 18,195) establishes that they must be mixed in a proportion of at least 5% in the replacement of diesel and gasoline. It also participates in the electricity market by selling energy generated from bagasse, chips and eucalyptus sawdust in a cogeneration plant in Bella Unión with a capacity of 10MWh.

The company Lanas Trinidad S.A., located in Flores, is dedicated to the production of wool. It has a biogas energy generation plant with an installed capacity of 0.6 MW.

Companies in the solar energy generation sector

The photovoltaic power generation sector has undergone significant development. This has been made possible by the interaction of multiple public and private sector actors. The companies involved include large and small firms, both domestic and foreign, which play

multiple roles: farm owners, financiers, project developers, consultants, manufacturers, importers and various service providers.

Many of these actors are part of the Uruguayan Association of Renewable Energies (AUDER), an organization that brings together companies in the sector and promotes the use of renewable energy and electric transport

Construction of transmission lines

In September 2019, a high-voltage (500 kV) power transmission line was inaugurated between Melo and Tacuarembó[19]. This project was carried out through an operating lease with the Italian company Terna SpA. UTE will use and maintain the line through an operating lease contract. Most of the project will be financed by the IDB and the China Co-financing Fund for Latin America and the Caribbean.

In addition, the construction of a 500 kV high-voltage line between Tacuarembó and Salto (Tacuarembó - Chamberlain - Salto) is planned, with a lowering for UPM's new cellulose plant, which will enable the plant to supply itself with energy until it starts producing its own (based on biomass) and then injecting significant generation surpluses into the national grid. With this work, the electric ring would be closed, consisting of the high voltage lines of Salto Grande - Montevideo, San Carlos - Melo (which gives access to the interconnection with Brazil) and Melo - Tacuarembó. The ring will allow for greater flexibility in the Uruguayan electricity system, being able to feed the network from more than one starting point, as well as improve Uruguay's electricity export profile. The financing modality of this work is still under discussion (the options are aimed at public funds, a trust or an operational leasing modality)[20].

6. Opportunities associated with Renewable Energies

The country's natural conditions, the favorable regulatory framework for investment, an energy policy with clear objectives and the commitment of the authorities and the political system to continue making progress in incorporating renewable energies into the energy matrix ensure that significant investment opportunities will continue to arise in the medium and long term.

6.1. Wind Farms

The policy of incorporating wind energy as a renewable and competitive source for the country has been very successful. Prior to 2008, there were no large-scale wind farms in the country. At present there are a total of 44 farms in operation with an installed capacity of 1,508 MW. This large investment was possible thanks to a varied menu of business models.

19 More information
20 More information

The incorporation of private parks was carried out through competitive bids that were presented in successive calls. In these, UTE awarded the winners with power purchase contracts (PPAs) that varied according to each call (Decrees 77/006, 403/009, 159/011 and 424/011).

For the incorporation of its own parks, UTE has resorted to different modalities: association with the Brazilian electric company (Electrobras), trusts with the participation of institutional and private investors, operational leasing.

Both national and foreign companies have participated in these projects. For example, the Italian company ENEL, through Enel Green Power (EGP), has completed the installation and connection to the electricity grid of the "Melowind" wind farm, its first energy plant in Uruguay. Other important foreign companies that have participated in wind farms are the German companies Enercon and Nordex SE; the Spanish companies Abengoa, Grupo Cobra and Gamesa and the American company Akuo Energy. A complete list of the players in the sector can be found in Appendix 1.

In the case of wind farms financed through the domestic capital market, participation in the structured financial trusts for Pampa and Arias wind farms demonstrated the eagerness of retail and institutional investors to include these instruments in their investment portfolio. These different modalities could be used to continue expanding the wind farm as demand demands.

6.2. Solar Parks

The use of solar energy transformation technology has undergone significant development in the country. To date, there are 16 large-scale photovoltaic plants that feed their energy into the electricity grid, with a total power of almost 230 MW. The plants range from a few MW installed to 50 MW (in plants such as "La Jacinta" or "El Naranjal", installed in the area of Salto, in the northwest of the country). In addition, small and medium-scale photovoltaic generation connected to the grid increased from 0.04 MW in 2011 to 21 MW in 2019.

Photovoltaic capacity was also expanded within the framework of generation without injection into the electricity grid. Since 2014, subscribers have been able to generate their own electricity from any energy source without losing their subscriber status. This framework has no limitations on grid connection voltage, and does not enable the injection of electricity into the national grid. As of December 2019, there were 11 operational photovoltaic installations with a total capacity of 2.66 MW[21].

21 For more information see: http://www.energiasolar.gub.uy/index.php/medidas-promocionales/medidas-prom-fotovoltaicas/generacion-sin-inyeccion

6.3. Biomass plants

Today the low price of electricity from other renewable sources is the key challenge for the development of forest bioenergy in the country.

For this reason, new forest biomass bioenergy projects are likely to be viable only if they operate integrated (associated) with other industries in the sector. Today, bioenergy is conceived as a project enabler by valorizing waste. The future forestry industry will operate in integrated complexes, wood-based bio refineries and in consortium with other industries.

In addition to the generation of bioelectricity from forest biomass, there are other bioenergy development alternatives such as: advanced fuels (renewable diesel, green hydrogen, methanol, renewable natural gas, aviation and marine biofuels), solid biofuels (roasted pellets (TwP), pellets, activated carbon, biochar), in the development of biomaterials such as CLT wood for construction and textile fibers. It is expected that their demand will continue to increase towards 2030, in line with the active regulation at a global level to increase the content of renewable origin in these means of transport and understanding that the "new generations" today demand clean and renewable products.

Taking into account the characteristics of the waste available, as well as its competitiveness and comparative advantages with other biomass suppliers at the international level, Uruguay could position itself in the bio refining and use of bio-based waste as a niche for certain demanding markets in the de-carbonization of their economies. The bio economy seeks the sustainable use of biomass by resorting to the application of new technologies, such as biotechnology, nanotechnology, bioinformatics and green chemistry, using renewable raw materials of biological origin as inputs for the joint production of new materials and energy[22].

At the same time, progress was made in incorporating non-conventional biomass into the electricity matrix. In the call for Decrees 77/006 and 397/007, 60 MW were also incorporated from this input. An exclusive call for biomass (Decree 367/010) incorporated 0.6 MW from an anaerobic digestion plant (Lanas Trinidad).

6.4. Small Hydroelectric Plants (SHP)

Between 2012 and 2014, MIEM's DNE, with support from the IDB, carried out a series of studies to evaluate the energy potential of this type of facility in Uruguay, identifying the best sites for their location and also considering those existing dams that could be used for multipurpose purposes.

70 sites were identified as the most feasible for small-scale generation, with which the country would have an additional installed capacity of 231.5 MW. In addition, pre- feasibility studies were carried out for projects to install SHPs in multipurpose dams with

22 For more information on waste recovery as a priority aspect of sector development see Opportunities for the future of the forest bioeconomy in Uruguay (OPP, 2019) and Roadmap for the forest/wood sector (Transforma Uruguay, 2019)

priority use for irrigation and subsidiary hydroelectric generation. Included are 20 sites with existing dams and 17 for new dams. The profitability of the projects is not always assured and depends, among other factors, on the irrigation modality.

6.5. Waste thermo-valuation plant

The recovery of urban waste through its transformation into energy is one of the explicit objectives of energy policy. The treatment and final disposal of urban waste is the responsibility of each of the country's 19 municipalities.

According to a study carried out by the National Directorate for the Environment (DINAMA), with more than 1,000,000 tons of solid waste generated annually, the Metropolitan area of Montevideo would be the most attractive for the installation of a large-scale energy plant based on the thermal treatment of waste.

There is also the possibility of a project covering the whole country's urban waste or regional associations allowing the viability of energy generation from the waste of several departments.

On the other hand, based on the technology available at a global level, it is now possible to profitably handle smaller volumes (e.g. 100-150 tons/day), which makes the possibility of setting up various plants in the interior of the country more feasible.

6.6. National Electrical System

There is another set of opportunities that, although not directly related to the generation of renewable energy, are a consequence of the appearance of these resources in the energy matrix. This sub-section presents some of these opportunities, especially those related to changes in the electricity system.

The expansion of electricity generation capacity associated with renewable energies poses a series of challenges that will have to be faced in the short and medium term.

The generation was notably decentralized. Wind farms must be installed where the winds are, biomass production near industries and photovoltaic panels in the sites of greatest solar irradiation. This requires an extended network with more high-voltage lines and transmission stations.

Furthermore, as electricity exchange increases, it is necessary to ensure interconnection with neighboring countries. In this sense, there is a new connection with Brazil in operation since 2016. In its five-year budget, UTE plans to invest over US$ 1 billion in the transmission and distribution network (between 2019 and 2023)[23]. These investments, like those implemented in wind resources, may take different forms: own investments, traditional tenders and private investments under different participation schemes.

23 More information

6.6. Energy efficiency

To complement the changes in the energy matrix, the authorities are implementing the National Energy Efficiency Plan[24]. This plan envisages promoting measures that include an economically desirable reduction in the amount of energy needed to produce a product or service, while ensuring equal or higher levels of quality. This concept also includes the replacement of traditional energy sources in final use with non-conventional renewable energy sources.

To meet this objective, among other actions, there is provision for financing and/or guaranteeing investment projects and technical assistance in Energy Efficiency (EE) in the public and private sectors. To this end, various economic and financial promotion instruments are available.

6.7. Intelligent Network

As different sources of energy are incorporated, the management of the electricity system becomes increasingly complex, both in the generation and distribution stages. On the one hand, it is necessary to complement the different energy resources in order to make the most of the generation capacity and at the lowest possible cost. On the other hand, since consumption peaks -throughout the year and throughout the day- do not usually coincide with the moments of most abundant and cheapest generation, it is also necessary to optimize consumption.

According to official data, UTE will install smart meters in all homes over the next four years. The first objective, within the framework of the Uruguay Digital Agenda 2020, is to reach half of them by the end of the year.

6.8. Energy storage

In order to continue expanding generation capacity based on wind and solar resources (which are non-disposable energy sources), in the long term it will be necessary to introduce forms of managing the most complex variability. One possible strategy is to achieve greater dynamics of exchanges with neighboring systems (Argentina and Brazil) while another option is to implement energy storage mechanisms. The technologies available today are in increasing development of efficiency and competitiveness (e.g. batteries) or have associated high amounts of investment and construction periods (dams and/or storage and pumping plants). However, it is estimated that in the future they would be a technically and economically viable option for the country.

With regard to the advantages of energy storage, it allows (like demand management) to move supply or demand from one moment to another of the day. This makes it possible to

[24] National Energy Efficiency Plan

delay the incorporation of backup thermal power plants into the electricity system. In addition, it is very useful if storage is installed in a distributed manner to make more efficient use of the networks. On the other hand, storage is not a good mechanism to use the structural electricity surpluses that Uruguay has, because it has an almost 100% renewable matrix with an important hydroelectric participation with high variability and growing participation of wind and solar.

6.9. Electrical Mobility[25]

In Uruguay, the transport sector is the main consumer of oil derivatives and the second largest consumer of energy after industry.

In this sense, the government has promoted both the generation of alternative sources to fossil fuels (Biofuel) and electric mobility with the aim of reducing emissions of polluting gases, reducing noise pollution and achieving energy sovereignty in the transport sector.

The electrification of transport (gradually replacing internal combustion engine vehicles that use gasoline and diesel by zero emission electric vehicles), represents a material opportunity to take advantage of indigenous renewable resources of low marginal cost, have cost stability; as well as mitigate the risks associated with increasingly strict environmental regulations on CO2 emissions and use of fossil fuels in general, which are becoming more relevant due to their impact on climate change.

In this direction of transport electrification, MIEM has been developing the MOVES Project (battery electric vehicles) and the Verne Project (pilot for the production of green hydrogen by electrolysis and its use in heavy fuel cell vehicles).

Both are electric vehicles with zero emissions. In battery powered vehicles, the electrical energy to power the engine is stored in the battery. In fuel cell vehicles, electrical energy to power the engine is generated on board the vehicle in a fuel cell where hydrogen stored in a tank is combined with oxygen from the air to produce electrical energy and water vapor.

Among the incentive measures for electric vehicles that have been promoted since 2010 are the reduction of the Specific Internal Tax (IMESI) applicable to hybrid and electric vehicles, the incorporation of electric utility vehicles to the cleaner production indicator of the Investment Promotion Law and the modification of the Global Tariff Rate for cars with exclusively electric propulsion engines, which was set at 0%.

It is worth mentioning that the country is in a position to meet the energy demand that may arise from the development of electric transport. In particular, wind power produced at night is sufficient to meet the expected increase in energy demand.

As a result of the measures promoted, in 2018 UTE was the public electric company with the largest fleet of battery electric utility vehicles in all of Latin America. In Montevideo there were 1 bus and 54 battery electric taxis, in addition to 1 hybrid bus. In 2019, 20 battery electric

[25] For more information see the Report on the Automotive Sector Uruguay XXI.

buses and more than 200 more environmentally friendly vehicles with Euro 5 technology were incorporated.

The country has been a pioneer in the region in the development of a non-polluting mobility infrastructure: for example, Uruguay has the first electric route in Latin America, with 50 recharging points[26]. It is expected that by the end of 2020 the entire country will be covered by a network of charging stations no more than 60 kilometers away.

The GEF 6- "Towards a System of Urban and Sustainable Mobility in Uruguay" project is now called the MOVÉS Project - Efficient and Sustainable Urban Mobility. Through this project, the aim is to promote the testing of battery electric utility vehicles in companies.

6.10. Pilot project for the incorporation of hydrogen

With a 98% renewable electricity generation, reduced geographical dimension, high institutional quality and commitment to clean energies, Uruguay is an ideal partner for the development of green hydrogen demonstration projects in the region. In March 2019, an inter- institutional project team, MIEM-ANCAP-UTE, was established to carry out the VERNE pilot project, which aims to install a green hydrogen production plant and deploy a fleet of some 10 fuel cell powered heavy vehicles that will use this hydrogen.

The transport sector consumes about 70% of Uruguay's oil, which is imported, and generates 64% of the country's CO_2 emissions. In particular, heavy transport vehicles, although constituting only 19% of the total fleet, are responsible for 56% of the total CO_2 emissions of the transport sector. The heavy vehicle fleet is estimated at 3,600 intercity buses and 20,000 road trucks, to which could be added freight trains, ferries, river barges, etc.

There is a global consensus that hydrogen and fuel cells are the feasible way to electrify heavy and long-distance transport. The VERNE project seeks to introduce hydrogen as an energy vector for this sector, build a pilot ecosystem for hydrogen and its associated technologies, identify technical, legal and regulatory barriers and gaps, generate local knowledge and capacities, and serve as an input for the generation of the Hydrogen Roadmap in Uruguay.

ANCAP is leading the implementation of the project. Its role implies the installation of the hydrogen production plant and being a facilitator in the assembly of the ecosystem necessary for the operation of the pilot involving relevant actors from the public and private sectors and civil society. On the other hand, UTE will supply the electric energy and will have the opportunity to generate knowledge on the use of electrolyzers as an element of demand management. This project is being supported by the IDB, which in late 2019 granted non-reimbursable technical cooperation for technical studies related to it[27].

While the pilot focuses on heavy transport, the Road Map will address not only this sector but also the use for production and export of chemical feedstocks such as ammonia and methanol and eventually the export of green hydrogen as such.

26 Cargo - UTE

27 Project Verne - ANCAP Presentation April 2020

In addition, ANCAP's Exploration and Production Management is currently studying the geological storage of hydrogen in porous media in Uruguay's onshore, taking advantage of a previous study on natural gas storage.

7. Annex 1 - Generation Sources

7.1. Hydroelectric Power Plants

	Central	Total power (MW)	Department
Uruguay River	Salto Grande Binational Dam	945	Salto
Rio Negro	Rincón Baygorria	108	Durazno
	Constitución	333	Soriano
	Dr. Gabriel Terra	152	Tacuarembó
TOTAL		**1.538**	

* Corresponding to Uruguay

7.2. Solar Photovoltaic

Call for applications	Name	Investor	Installed Power (MW)	Department
D 133/013	La Jacinta	FRV B.V.	50	Salto
D 133/013	Alto Cielo	Nicolás Castellano Gard	20	Artigas
	Del Litoral	Jolipark S.A.	16	Salto
D 133/013	Yarnel S.A.	Yarnel S.A.	9,5	Río Negro
D 133/013	Natelu S.A.	Natelu S.A.	9,5	Soriano
D133/013	Raditon S.A.	Tecnova Renovables - Sky Solar Group	8	Soriano
R 13.-1318	Casalko	Casalko S.A.	1,75	Paysandú
UTE	Granja Fotovoltaíca (Asahí)	UTE-Embajada Japón	0,5	Salto
D133/013	El Naranjal	Colidim S.A.	50	Salto
D 133/013	Menafra solar	Giacote S.A.	20	Río Negro
D 133/013	Arapey Solar	Giacote S.A.	10	Artigas
R 13.-1316	Dicano	Dicano S.A.	11,25	Paysandú
R 13.-1319	Petilcoran	Petilcoran S.A.	9,5	Paysandú
R 13.-1320	Fenima	Fenima S.A.	9,5	Paysandú
D 133/013	Vingano	Vingano S.A.	1	Paysandú
D 133/014	Abril	Gilpyn S.A.	1	Paysandú
D 282/015	TS	Cerneral S.A.	1	Paysandú
TOTAL			**228,5**	

7.3. Biomass

Name	Origin of the Investor	Investor	Authorized Power (MW)
Punta Pereira S.A.	Sweden - Finland - Chile	Montes del Plata	180
UPM S.A.	Finland	UPM-Kymmene Oyj	161
Galofer S.A.	Uruguay/Brazil	Consorcio (5 molinos arroceros)	14
Uruply S.A	Brazil/Canada	Uruply S.A	12
Bioener S.A.	Uruguay	Grupo Otegui	12
Fenirol	Uruguay / Greece	Consorcio de grupos inversores	10
ALUR S.A.	Uruguay/Venezuela	ANCAP - PDVSA	10
PONLAR S.A.	Uruguay		7,5
Liderdat S.A.	Uruguay	Grupo Azucarlito	5
Las Rosas	Uruguay	Consorcio Aborgama - Ducelit - I.M.Maldonado - UTE – PNUD	1,2
Lanas Trinidad	Uruguay	Lanas Trinidad	0,6
TOTAL			**427,9**

7.4. Wind

Call for applications	Company	Park	Power (MW)	Department	Operation input
77/006	Agroland	La Bettina	0,45	Rocha	Mar-07
77/007	Loma Alta	Nuevo Manantial I -II	18	Rocha	2008/2014
UTE	UTE	Caracoles I	10	Maldonado	Dec-08
UTE	UTE	PdeV	0,15	Lavalleja	Apr-10
UTE	UTE	Caracoles II	10	Maldonado	Jun-10
77/006	Kentilux	Magdalena	17,2	San José	May-11
Autoprod.	Engraw	Engraw	1,8	Florida	Jan-13
Autoprod.	Blengio	Santa Fe	1,8	San Jose	Jul-13
Wind I	Palmatir	Cuch. de Peralta	50	Tacuarembó	Apr. 14
Eol. II1/2	R del sur	Maldonado	50	Maldonado	Apr-14
Eol. II	Luz de Río	Luz de Río	50	Florida	Jun-14
Eol. II	Gemsa	Minas I	42	Lavalleja	Jun-14
Eol. II1/2	Polesine	Florida I	50	Florida	Jul-14
77/006	Luz de Mar	Pintado I	18	Florida	Jul-14
77/006	Luz de Loma	Pintado II	20	Florida	Jul-14
Spot	Ventus	Libertad	7,7	San José	Jul-14
UTE	UTE	Juan Pablo Terra	67,2	Artigas	Aug-14
Aeol.II1/2	Cadonal	Cadonal-Talas de Maciel II	50	Flores	Dec-14
UTE-Electrobras	Rouar s.a.	Artilleros	65,1	Colonia	Dec. 14
424/011	Astidey	Talas de Maciel I	50	Flores	Jun-15
159/011	Agua leguas	Peralta I	58,8	Tacuarembó	Jun-15
159/011	Agua leguas	Peralta II	58,8	Tacuarembó	Jul-15
403/009	Fingano	Carapé I	50	Maldonado	set-15
424/011	Vengano	Carapé II	40	Maldonado	set-15
424/011	Estrellada	Melowind	50	Cerro Largo	set-15
567/009	Rafisa	Ventus I	9	Colonia	Oct-15
567/009	Ventus	Rosario	9	Colonia	Dec-15
Spot	Ventus	Julieta	3,6	Durazno	Feb-16
R13-1927	R del Este	Maldonado II	50	Maldonado/ Lavalleja	May-16
Spot	Ventus	Ma. Luz	10	Treinta y tres	Jul-16
R13-1928	Glymont	Florida II	50	Rocha	Jul-16
Spot	Ventus	Solis de Mataojo	10	Rocha	oct-16

Trust	UTE	Pampa	141,6	Tacuarembó	oct-16
Aeraflin	UTE	Valentines	70	Treinta y tres-Florida	oct-16
Spot	Ventus	Villa Rodríguez	10	San José	Dec. 16
Spot	Ventus	18 de julio	10	Rocha	Dec. 16
Leasing op.	UTE	Palomas	70	Salto	Feb. 17
424/011	Grupo Cobra Uruguay	Kiyú	49,2	San José	Feb. 17
158/012	Ventus	Marystay	1,8	San José	May. 17
424/011	Grupo Cobra Uruguay	Nuevo Pastorale	50	Flores	June 17
UTE - R 13,384	Colonia Arias	UTE	70	Florida, Flores	on probation
424/011	Cerro Grande	Ladaner	50	Cerro largo	1st Semester 2018
Autoproduct / Sale to UTE.	Corfrisa	Ventus	2	Canelones	1st Semester 2018
		TOTAL	**1.508**		

Source: UTE

8. Annex 2 - Energy Policy, Institutions and Regulatory Framework

The success of the sector is partly possible because of the existence of an energy policy that sets the direction, a solid institutional framework and an attractive regulatory framework for the investor.

Uruguay's **Energy Policy 2005-2030** has been transformed into a **state policy** that establishes the main guidelines in the energy field at the national level with a long-term view. It was approved by the Executive Branch in 2008 and ratified by a Multiparty Energy Commission of Parliament in 2010.

It is based on four elements:

- The Strategic Guidelines, which define the major conceptual axes of energy policy,

- The goals to be achieved in the short (5 years), medium (10 to 15 years) and long term (20 years and more)

- The Lines of Action needed to achieve these Goals,

- The permanent Situation Analysis of the energy issue in the country, in the region and in the world.

The Energy Policy is strongly committed to the diversification of the energy matrix, to the incorporation of indigenous sources in general and, in particular, of renewable energies. This commitment has various objectives, among which are achieving energy sovereignty, reducing costs, activating the national energy industry and reducing dependence on oil.

See more information in the following link: Energy Policy 2005-2030.

8.1. Institutions

Executive unit of the Ministry of Industry, Energy and Minning (MIEM) responsible for proposing and coordinating national energy policy. Its main duties include coordinating and guiding the actions of actors operating in the energy sector, and participating in the preparation of policy and regulatory frameworks for energy activities.

::Website:: www.miem.gub.uy/energia

Administración Nacional de Usinas y Transmisiones Eléctricas (UTE) is a state- owned company dedicated to the generation, transmission, distribution and marketing of electricity. Although there is a spot market, the vast majority of private power generators sell the electricity they produce to it.

::Website:: www.ute.com.uy

State-owned company that carries out various activities in the markets for the production, distribution and marketing of fuel, alcohol and Portland. For the operation in these markets it participates directly and as a shareholder (in many cases the majority) or owner of various companies operating in some of these lines of business. At the energy level, the activities surrounding natural gas and liquid fuels are noteworthy. In the area of renewable energies, the company ALUR - a biofuel producer - has ANCAP as its majority shareholder.

::Website:: www.ancap.com.uy

The regulatory body for the sector is the Energy and Water Services Regulatory Unit (URSEA), created as a decentralized body of the Executive Branch, with control competence over the electricity, gas and hydrocarbons markets, in which the aforementioned public companies operate. Website: www.ursea.gub.uy

::Website:: www.ursea.gub.uy

The Electricity Market Administration is a non-state-owned public person that administers the Wholesale Electricity Market.

::Website:: www.adme.com.uy

The Investment Law Enforcement Commission operates under the Ministry of Economy and Finance and aims at promoting and protecting investments made by national and foreign investors in the national territory.

Website:: http://comap.mef.gub.uy

The Uruguayan Association of Private Electric Power Generators is the non-profit civil association that brings together most of the private electric power generators located in Uruguayan territory, which have current contracts with UTE or agreements for connection to the National Interconnected System (SIN). It is made up of 28 companies with a total generation capacity of more than 1000 MW.

Website:: www.augpee.org.uy

The Uruguayan Wind Energy Association is a civil association that promotes, groups companies or people, supports, issues and projects oriented to the use of Wind Energy as a renewable source of natural resources. It currently has nearly 100 active members including developers, suppliers, advisors and logistics operators.

::Website:: www.audee.org

Association that brings together companies in the solar energy sector operating in the country, importers, manufacturers, and designers of facilities.

Other institutions and programs

Wind energy program in Uruguay	www.energiaeolica.gub.uy
Solar energy program in Uruguay	www.energiasolar.gub.uy
Probio Project	www.dne.probio.gub.uy
Project Biovalor	www.biovalor.gub.uy
Energy Efficiency Plan	www.eficienciaenergetica.gub.uy
Ministry of Housing, Spatial Planning and the Environment	www.mvotma.gub.uy
Private Sector Support Unit (UNASEP)	www.mef.gub.uy/unasep
National Climate Change Response System	www.cambioclimatico.gub.uy
National Agency for Research and Innovation (ANII)	www.anii.gub.uy
Technological Laboratory of Uruguay (LATU)	www.latu.org.uy
Solar Table	www.mesasolar.org
Solar Laboratory (LES) - University of the Republic	www.les.edu.uy
Universidad Tecnológica del Uruguay - Engineering in Renewable Energies	www.urtec.edu.uy
Pando Technology Pole - R+D - Renewable Energies	www.polotecnologico.fq.edu.uy

Uruguay in brief (2020)

Official name	Eastern Republic of Uruguay
Geographical location	South America, bordering Argentina and Brazil
Capital	Montevideo
Surface area	176,215 km2. 95% of the territory is productive land suitable for farming
Population (2018)	3.52 million
Population growth (2017)	0.4% (annual)
GDP per capita (2019)	US$ 15,914
Currency	Uruguayan Peso ($)
Literacy rate	0,987
Life expectancy at birth	77.6 years
Form of government	Democratic Republic with a presidential system
Political division	19 departments
Time Zone	GMT - 03:00
Official language	English

Main economic indicators 2015-2019

Indicators	2015	2016	2017	2018	2019	2020e
GDP (Annual % change)	0,4%	1,7%	2,6%	1,6%	0,2%	-3,5%
GDP (Millions of US$)	53.182	52.734	59.520	59.519	55.995	48.646
Population (Millions)	3,47	3,48	3,49	3,51	3,52	3,53
GDP per Capita (US$)	15.339	15.152	17.039	16.976	15.914	13.777
Unemployment Rate - Annual Average (% EAP)	7,5%	7,8%	7,9%	8,3%	8,9%	9,2%
Exchange Rate (Pesos per US$, Annual Average)	27,4	30,1	28,7	30,8	35,3	43,1
Exchange Rate (Annual Average Variation)	17,6%	10,1%	-4,8%	7,3%	14,7%	22,0%
Consumer Prices (Annual cumulative % change)	9,4%	8,1%	6,6%	8,0%	8,8%	9,9%
Exports of goods and services (Millions of US$)**	15.632	14.532	16.079	16.397	16.008	13.418
Imports of goods and services (Millions of US$)**	13.912	11.799	12.429	13.138	12.707	9.989
Trade Surplus / Deficit (Millions US$)	1.720	2.733	3.651	3.259	3.301	3.429
Trade surplus / deficit (% of GDP)	3,2%	5,2%	6,1%	5,5%	5,9%	7,0%
Overall Fiscal Result (% of GDP)	-3,6%	-3,8%	-3,5%	-4,2%	-4,8%	-
Gross capital formation (% of GDP)	19,7%	17,8%	15,2%	16,5%	16,2%	-
Gross Public Sector Debt (% of GDP)	59,3%	63,5%	65,3%	64,5%	66,4%	-
Foreign Direct Investment (Millions of US$) * **	905	-1.177	-837	-487	189	-
Foreign Direct Investment (% of GDP)	1,7%	-2,2%	-1,5%	-1,0%	-1,0%	-

Sources: Data on GDP, foreign trade, FDI, exchange rate, international reserves and external debt are from the BCU; rates of population growth, literacy, unemployment and inflation are from the National Institute of Statistics. Data estimated for 2020 based on BCU surveys of economic and inflation expectations and Exante projections.

** In 2017 the BCU adopted the methodology of the 6th Balance of Payments Manual. The data base on this this new methodology include purchase and sale of goods and re-exports and are available from 2012.
*** In 2017 the BCU adopted the methodology of the 6th Balance of Payments Manual. The data are net flows and can therefore take negative values.