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## Country Report: URUGUAY

### 1. Overview of URUGUAY



<b>Country name:</b>	República Oriental del Uruguay
<b>Capital city:</b>	Montevideo
<b>Political division:</b>	19 Provinces
<b>Land area:</b>	176,215 sq.km
<b>Population:</b>	3.3 million inhabitants
<b>Annual growth rate:</b>	0.305 %
<b>Density:</b>	18.8 inhabitants/km <sup>2</sup>
<b>Life expectancy:</b>	75.85 years
<b>Infant mortality rate:</b>	10.5/1000

<b>Literacy rate:</b>	97 %
<b>Language:</b>	Spanish
<b>Gross Domestic Product:</b>	8,000 US\$ per capita
<b>Population with access to drinkable water:</b>	98 %
<b>Electrification rate:</b>	98 %
<b>Cars per 100 inhabitants:</b>	19
<b>Government type:</b>	Republic under an elected presidential system
<b>Suffrage:</b>	Compulsory and universal over 18 years of age
<b>Main activities:</b>	Agriculture and feedstock (natural grass, extensive use)
<b>Main exports:</b>	Meat, rice, dairy products, raw hides skins and leather, forestry products, wool, agriculture byproducts

## 2. Current energy policy and measures

### 2.1 General overview

The Energy System has to ensure domestic supply at the lowest possible cost and in conformity with quality standards. This should be performed under the leading role of the State and involving public and private actors, through the best use of available local, regional and international resources, and will contribute to the sustainable development of the country (economic, social and environmental).

Thus, energy efficiency and the search for diversification of the energy grid have become issues of special interest. They may be achieved through the incorporation of mainly renewable domestic resources to the present energy grid, with a more extensive use of labour forces. This may impact productive activity, looking forward to preserving environment and fostering regional integration.

At the same time and in order to develop the Energy System, the legal instruments need to be adapted subject to specific national requirements.

At present energy situation in Uruguay can be summarized as follows:

- Strong dependence on oil (consumption of petroleum: double of global average)
- Scarce domestic sources in the energy grid (25% to 40%)
- Several energy supply crisis in recent years (high dependence on regional suppliers)
- Investments are delayed (electric power plants, refinery, infrastructure)
- Lack of energy efficiency culture

Concerning availability of energy sources it can be mentioned that:

- Hydroelectric potential has been almost exploited completely. The remaining potential is suitable for small-size projects.
- There is lack of local fossil fuel resources
- There is no availability of natural gas in the region
- There is potential for wind projects to be implemented
- There is a vast potential among biomass byproducts related to agricultural and forest industry

### 2.2 Energy strategic priorities

- Directive role of the state involving controlled participation of private actors.
- Diversification of the energy grid including sources and suppliers, guaranteeing provision at reasonable costs, reducing dependence on oil imports, increasing the participation level of local sources of energy, fostering non-traditional renewable energies, improving local development and encouraging the preservation of environment.
- Energy Efficiency in every economic field (transport, education, building industry, lighting, etc.).
- Energy access to all social strata.

### 3. Energy Supply and Demand

#### 3.1 Energy Supply

Figure 1 - Energy Supply by Source (2007).

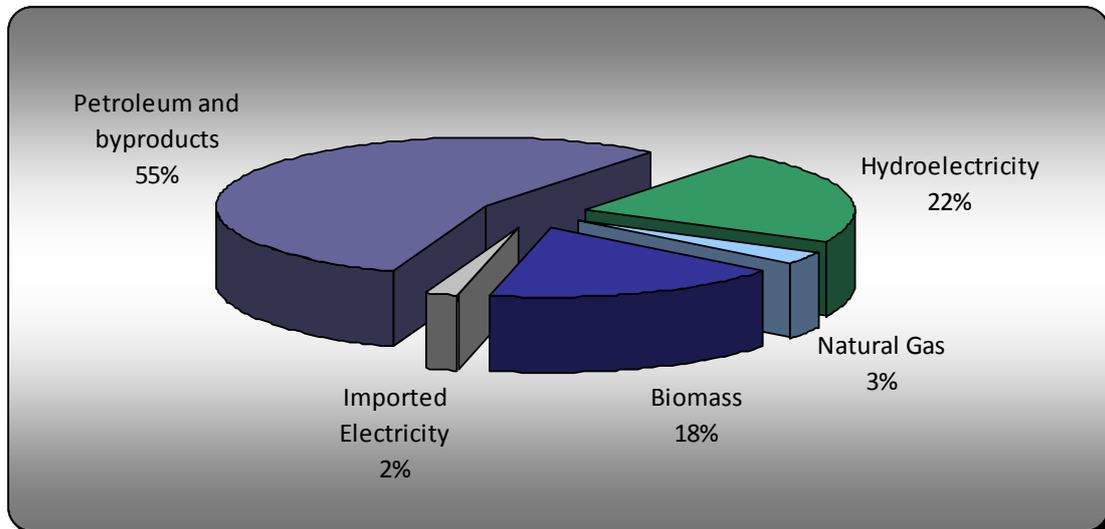


Figure 1 shows the participation level of the different sources of energy supply the country has. As it can be observed, the energy supply relies on imported energy sources; 57% of the total supply corresponds to imports. Local sources of energy used are mainly hydroelectricity (22%) and biomass (14% wood and 4% wastes). In spite of important investments made in the area of Natural Gas, to transport its share to the energy grid is still not relevant. It is worth mentioning that the participation level of hydroelectricity in the energy supply of Uruguay depends on the year, based on rain levels. Figure 2 shows the evolution of the energy supply by source, for the years between 1997 and 2007.

Figure 2 - Energy Supply by Source (1997 - 2007).

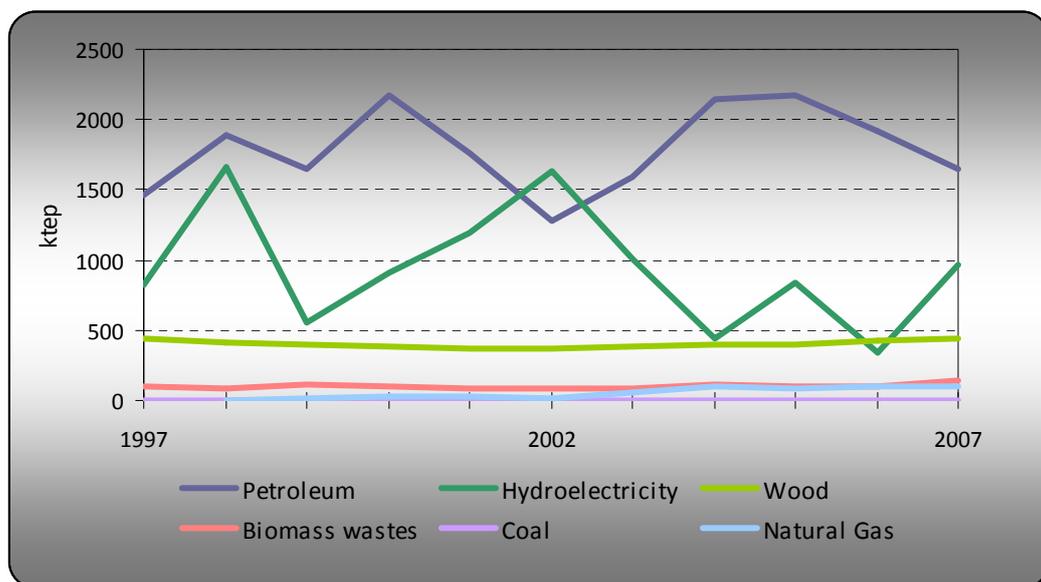
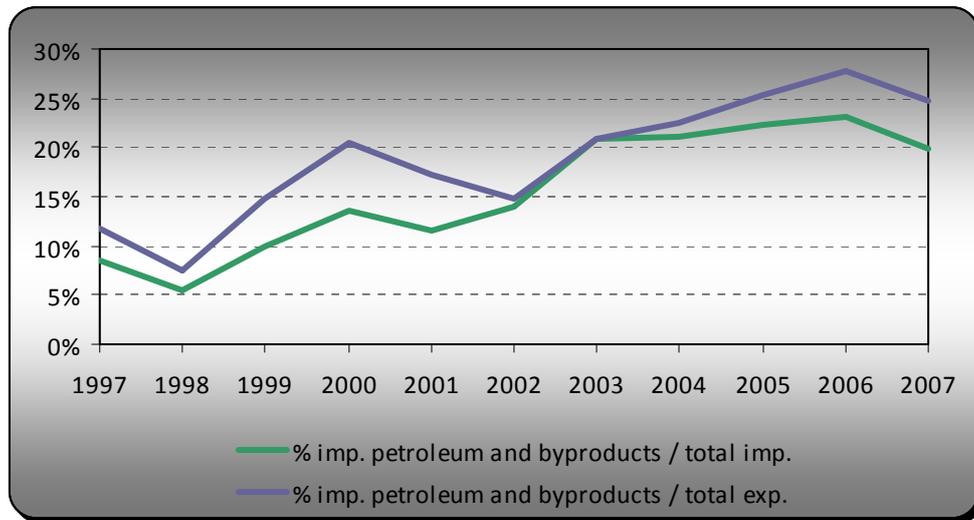


Figure 3 - Petroleum and byproducts imports vs. Uruguay total imports & exports (1997 - 2007).



In the year 2007 petroleum and byproducts imports represented 20% of total imports in Uruguay and meant 25% of total exports of Uruguay. Figure 3 shows the evolution of these ratios for the years between 1997 and 2007. Uruguay's high dependence on petroleum supply (double of global average) and its impact on the trade balance speak about the need for policies tending to diminish the effect of petroleum consumption on the domestic economy.

### 3.2 Energy Demand

In the 90's the use of energy grew almost 40%, from 1,940 ktep in the year 1990 to 2,677 ktep in 1999. In the year 2002 the country suffered a severe economic crisis that brought on a decrease in energy demand, reaching 2,226 ktep in 2003. Since 2004 there has been a sustained growth of energy demand mainly due to the economic recovery of the country.

Figure 4 - GDP vs. Total Use of Energy Evolution (Base year 1965 = 100).

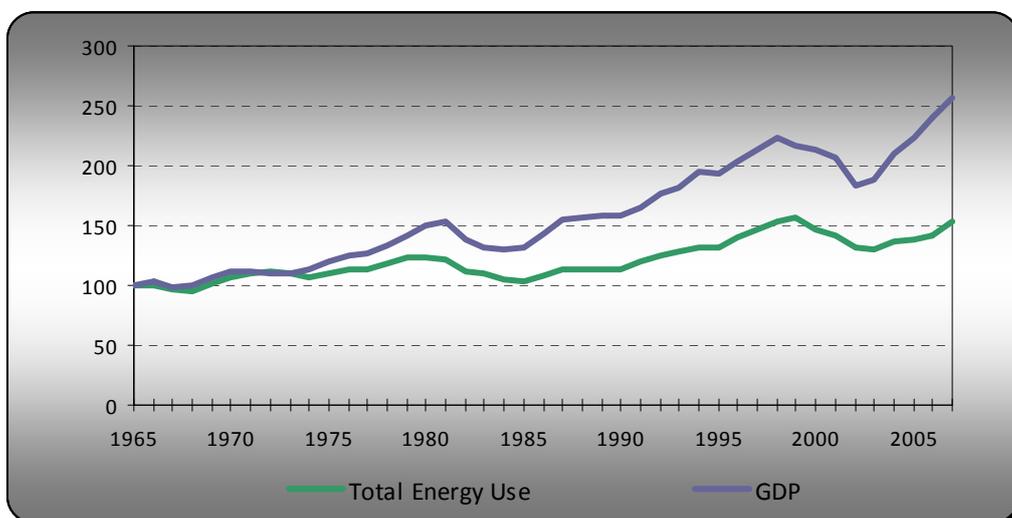
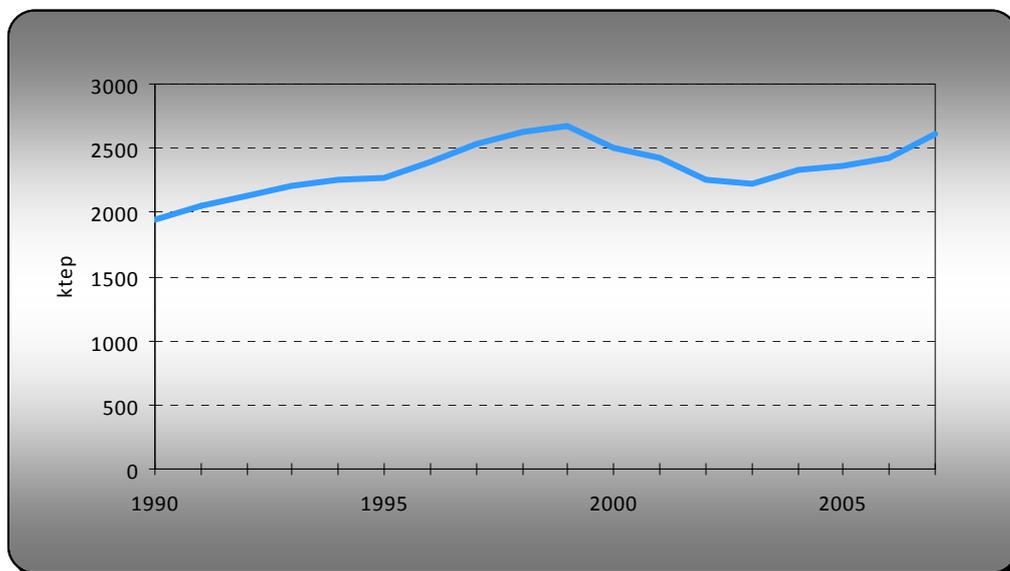


Figure 4 shows the behavior of GDP vs. Total Energy Use during the period 1965 - 2007. Even though both curves show similar behaviors the total use of energy had a slower rate evolution compared to GDP, becoming this difference more evident since 2002. During the period 1990 - 2007 the annual accumulated growth rate for use of total energy was 1.8% while GDP grew annually 2.9%.

Figure 5 shows Total Energy End-use for the period 1990 to 2007. Total Energy End-use considers energy-consumption sectors (residential, industrial, transport, agribusiness, etc.). However, it does not include the use of energy for generation or conversion at refineries or power plants; commonly known as the self consumption of such sector. At the same time, Energy End-use may be due to energetic applications (heating, lighting, etc.) or to non-energetic ones (cleaning, lubrication, etc.). Since energy demand for non-energetic applications is negligible, compared to energy demand for energetic applications, only energy demand by source and by sector will be next analyzed.

Figure 5 - Total Energy End-use.



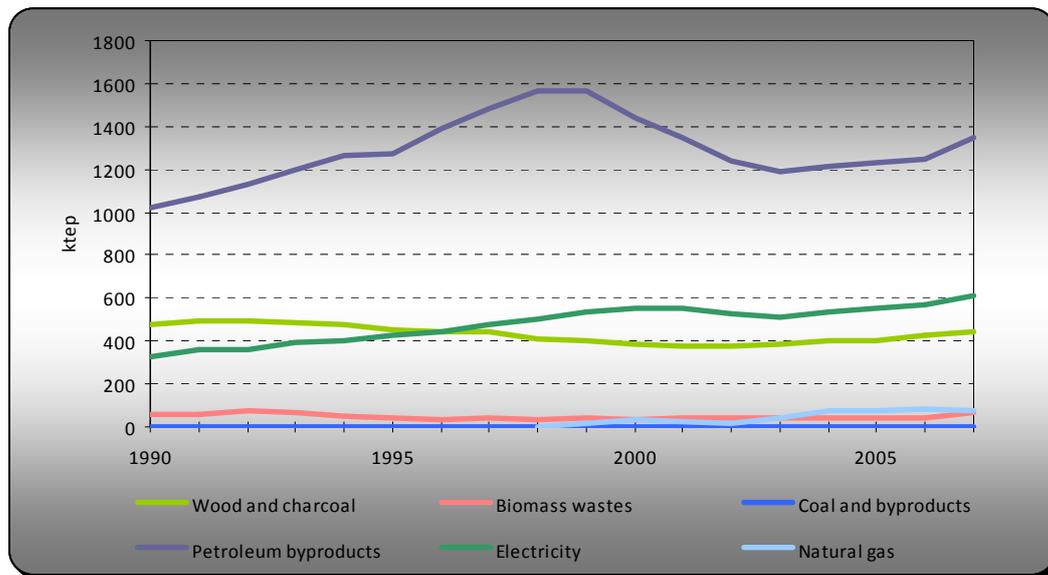
### 3.2.1 Energy demand by source

It is observed that for the year 2007 petroleum byproducts had a participation level of 53%, followed by electricity with 24% and biomass (mainly wood) with 20% if energy end-use by source is analyzed.

It is worth mentioning that wind and solar energy are not taken into account in this report since there is not enough information to make an estimate of their use.

Figure 6 shows the behavior of Energy End-use by source since 1990. The demand for petroleum byproducts reached its highest value during the year 1999, and then started to decrease due to the economic crisis the country encountered. Nevertheless, in the last years it started increasing once again in a slowly way.

Figure 6 - Energy End-use by Source.



Biomass consumption (approximately 87% corresponding to wood and the rest to biomass wastes), which has been decreasing since 1992, is being recovered in the last few years associated to a major use of wood in industry.

As well as petroleum, electricity has increased its share in the energy grid in the past years.

Last but not least, in spite of the addition of natural gas to the energy grid in the year 1988, its share in the energy demand has not been relevant until now.

### 3.2.2 Energy demand by sector

Figure 7 shows the evolution of energy demand for different economic sectors for the period 1990 - 2007. Since 1994 transport sector has shown to be the more demanding one among the other sectors. Residential sector stays just behind transport. Energy demand for transport sector reached its highest value in the year 1999, consuming 920 ktep. By the end of 2007 the consumption was 836 ktep.

Residential sector had its maximum energy demand in the year 2000 reaching 725 ktep, then has decreased until 2004 when the demand was 663 ktep. In 2007 residential energy use reached 708 ktep. It is worth mentioning that these values may be overestimated due to wood consumption.

During 1990 and 2007 the energy demand of industrial sectors has experienced fluctuations. The highest demand was of 574 ktep in 1992 while the lowest was of 414 ktep in 2002. During the last few years the use of energy associated to the industrial sector has been increasing until reaching 566.5 ktep in 2007.

Figure 7 - Energy End-use by Sector.

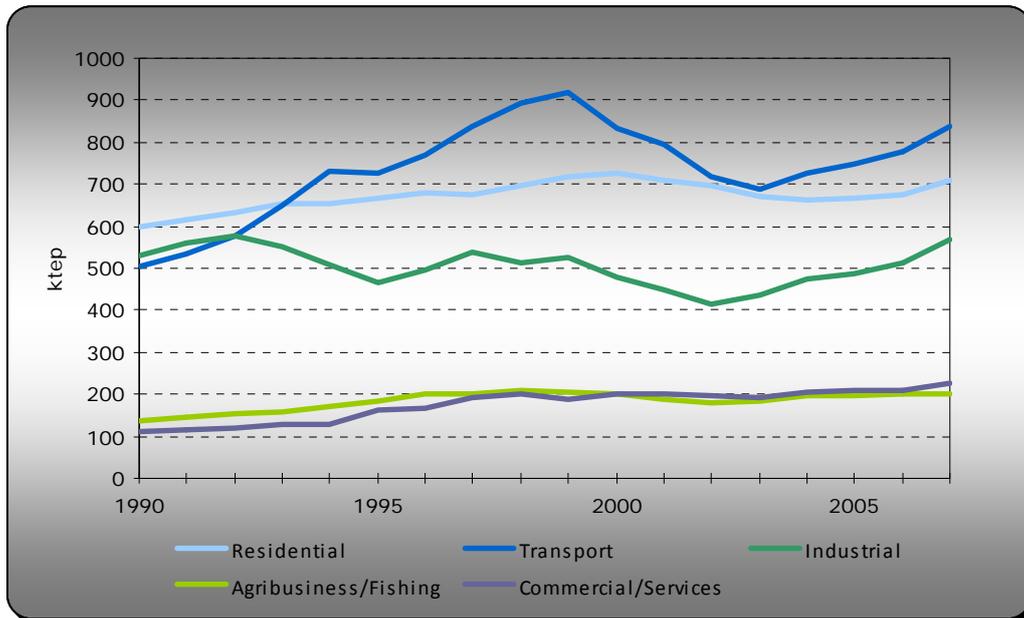
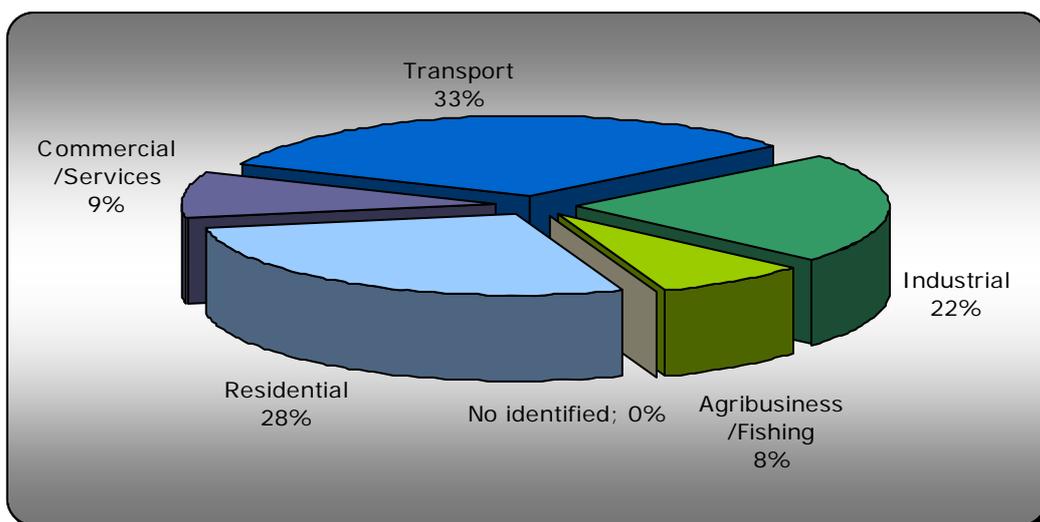


Figure 8 shows the participation level of each sector in the total energy demand of the year 2007. Transport and residential sectors showed to be the most energy demanding ones, consuming 33% and 28% respectively, followed by the industrial sector with 22%.

Figure 8 - Energy demand structure by sector (2007).



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#### **4. Major difficulties and bottlenecks currently faced in formulating energy policies**

- Lack of people working on the design of energy plans.
- Lack of specialized professionals in energy topics.
- Lack of budget to finance researches and projects in energy outlook.
- Lack of information due to absence of human resources and for budget constraints.
- To face integration of energy policies with other countries of the region.
- Economies of scale: being a small country with a small market makes investments more expensive relatively.
- Energy state-owned companies and Government (Ministry of Energy) are not enough coordinated. Historically, many strategic decisions were made by these companies and not by the Ministry of Energy. The reason for this was that most specialized professionals in energy topics worked at companies while the Ministry did not count with well-prepared personnel devoted to those issues.

At present, some of these items are being developed. More staff has been lately incorporated to the Ministry and a detailed energy demand survey is being carried out. There is indeed an effort to improve coordination among institutions in what concerns energy topics.

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