

## Rural microgrids uruguay

In this context, this study mainly aims to explore the viability of the use of renewable energy as a tool for rural development in typical family production systems in the departments of Canelones and Montevideo. The specific objectives are: 1) to review the current regulatory framework and the energy situation in Uruguay; 2) to investigate the interest of the agricultural producers included in the subject study; 3) to explore the importance of energy, both at productive and household levels, and 4) to know the main sources of energy used by producers and their cost.

Regarding the concept of renewable energy (hereinafter re), the definition of the National Institute of Agricultural Technology (inta-Argentina) is considered for this study, which specifies that "re is the energy that is obtained from virtually inexhaustible natural sources, some due to the immense amount of energy they contain, and others because they are capable of regenerating through natural means"<sup>1</sup>. Some examples of renewable energy resources are: hydropower, wind, geothermal, solar, and bioenergy (included biomass and waste of various kinds).

By 2016, the country's energy matrix consisted of the following: 41% biomass, 40% oil and derivatives, 13% electricity of hybrid origin, 5% wind energy, and 1% natural gas (Graph 1).

In 2018, the total energy supply increased by 5% compared to 2017. Biomass proportion (firewood, charcoal, biomass residues and biomass for biofuel production) exceeded the use of oil and derivatives for the third consecutive year, which has been, historically, the main supply source of the country.<sup>4</sup> The contribution of solar energy and electricity from wind energy has also increased since 2016, while the contribution of electricity of hydroelectric origin decreased (Figure 2).

Table 1: Main companies that are currently contributing to the electricity grid by renewable sources and authorized power

Since no previous work was available at the time of the study on the use of re by the population of family producers, this study was exploratory. Thus, to gather the information, a sample of producers was used, built on the basis of three criteria: 1) farmers that developed their productive activity in the south of the country, more accurately in the departments of Canelones (west area) and Montevideo; (2) that were family producers, and (3) that the sample reflected the diversity of production systems in those departments.

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