

Loss of Load Cost: An Estimate for the Uruguayan Residential Sector

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Summary— The estimation of the loss of load cost in electricity markets is quite relevant for everyday and long term political and strategic decisions both. Determining outage cost creates a measurement of the value of the energy that was not supplied to the clients, which can be contrasted with possible levels of investment needed to improve system reliability, contributing to a more rational approach to necessary supply cuts when it comes to their size, duration and areas of application. Likewise, the estimated loss of load cost is a useful input for planning grid maintenance and management of primary energy resources (i.e. fuel inventories and reservoir levels at hydroelectric plants). Load loss's variety of possible manifestations and the diversity of end users contribute to the complexity of how the loss of load cost is approximated. This article estimates the loss of load costs for residential electricity supply in Uruguay by considering their different levels of capacity for adjustment in cases of energy rationing by using two alternative, complementary methods.

Key words - *loss of load cost, electrical system, demand for electricity, residential end users.*

1. OVERVIEW

The loss of load (i.e. interruption of electricity supply, outage) cost is defined as “the economic cost for society of a lack of supply of electricity or lack of expected reliability” (Munasinghe, 1979). This imbalance between supply and demand imposes costs on the consumer, which vary

substantially by end user according to the consumer's level of dependency on electricity and his or her capacity to postpone activities until service has been restored.

The approximation of the loss of load cost in electricity markets is relevant both for quotidian decisions and strategic planning and policy analysis. Understanding this cost provides a measurement method for energy that does not reach end users and can be contrasted with different levels of investment in system reliability. Furthermore, it contributes to the decisions that inform magnitude, location and duration of supply cuts, when necessary. An approximation of the loss of load cost is a useful input for planning grid maintenance and primary energy resource management (i.e. fuel inventories and reservoir levels at hydroelectric plants). In addition, it plays a crucial role in measuring the cost-benefit of energy efficiency programs and when conducting market risk and segmentation analyses.

Load loss's many permutations and the diversity of end users in the system makes estimating loss of load cost tricky. The objective of this study is to estimate the value assigned by the residential end users to the restrictions in supply that happen as a result of an energy deficit. The value varies according to end users' capacity to adjust to energy rationing. If their capacity to adjust is high (efficient rationing) and consequentially the cost of load loss per MWh¹ goes up with the energy volumes rationed, the value is estimated by

¹ Mega Watt hour