

**Facultad Politécnica Universidad Nacional de Asunción
Consejo Nacional de Ciencia y Tecnología**

**Proyecto 14-INV-271
“Valuación de Inversiones en Infraestructura Eléctrica y
Comportamiento Estratégico”**

**ANEXO 22
PGT 6.1 – Integración y Comparación de modelos de
Opciones Reales (OR) y Teoría de Juegos (TJ), ABM y
Dinámica de Sistemas (DS) – Informe**

Investment Valuation in Liberalized Power Markets: Integrating Real Options with System Dynamics

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Investments in generation capacity have many characteristics in the context of liberalized electricity markets. One of these particular features is the investment postponement option, which basically refers to an owner's right to defer an investment for a period of time while waiting for new information to arrive at the market. This is crucial when investors cope with major uncertainties about the evolution of market conditions. In that context, the generation activity becomes riskier and might limit the timely addition of new capacity, because of the investors' "wait-and-see" behavior.

The literature indicates the existence of business cycles in the long run deregulated electricity industry; however, the flexibility value given by the postponement option was not systematically incorporated as an input for investment signals in the revised models. Therefore, this paper proposes a new methodology to assess the long-term development of power markets based on an innovative approach for valuing the addition of new power plants. The proposal is elaborated under a long run market framework, based on System Dynamics simulative approach, and considers for the investment rates to be a function of the value of flexibility of the deferral option, obtained by means of Real Options analysis.

Results show that, with an uncertain demand growth, the market exhibits an even more volatile behavior than in the previous models, meaning that the capacity in this case at a certain point falls under the growing demand. This might be help explaining the origins of crisis in supply's security, reported in some countries just after their market liberalization.

Keywords: Flexibility, Power Generation Planning, Power System Simulation, Real Options, System Dynamics.



Certificate of Attendance & Presentation

Daniel Alberto Rios Festner

attended and gave an oral presentation at the Energy7
Conference in Manchester, England, UK on 13-17 August 2017

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