A system Dynamics Approach to Feasibility Studiies: An Assessment of the Learning Curve effects and associated Risk in a Biomass Gasification Project.

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Feasibility studies is a strategic planning exercise undertaken to justify an investment in a project. Its objective is to examine the business case for, and technical feasibility of, the project. A typical process will involve an examination of estimated cost and benefits together with social considerations relevant to the project so that an informed decision can be made about whether to further commit resources or not. The desired outcome of a feasibility study is an accurate definition of the total problems to be addressed and an identification of series of options to tackle these problems.

This paper reports an ongoing experience from the use of System Dynamics modeling and simulation to assess the learning curve effects and the associated risks in the strategic development of a biomass-integrated gasification combined cycle (BIG-CC) technology. The BIG-GT project is funded by Global Environment Facility/World Bank to demonstrate the commercial viability of using wood as a feedstock for power generation under an Independent Power Producer (IPP). The study is a joint effort between the Power and Energy division of the World Bank and Powersim Corporation(tm).

The objectives of the study include an assessment of how to mitigate uncertainty and risks and an estimate of the nth plant cost versus the 1st plant cost compared with other conventional ways of power generation. It also includes an effort to assess the cost/benefit of the GEF/World Bank's financing in the pilot project and to establish a methodology to assess a clean, but new technology.

The simulation model developed gave us better insight into the nature and cost of the uncertainties associated with the construction and operation of the 1st and nth plants. As well as insight into the potential for reduced unit cost of power generation through value engineering and the replication of standard design of component parts. It also afforded us the possibility of validating our dynamic hypothesis through experimentation, an impossible task in traditional approaches to feasibility studies.