

## **Stochastic Risk Cost Benefit Analysis Aligned to Asset Management Strategy: How to Maximize Profitability in the Life Cycle in Power Generation Systems in the Oil and Gas Industry**

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**Abstract:** Within the oil and gas industry one of the most important systems is power supply which provides energy to the oil production facilities. It is considered that this system is divided into important subsystems such as Generation, Transmission and Distribution, the first being the most critical being the heart of the energy operation. The main criticality of this system is based on failure consequences, and the high costs of operation and recurrence of faults. Considering the costs of generation, it becomes indispensable to be able to quantify the risk associated to a failure of the system, in addition to the profit generated its availability. This methodology is directly aligned to Asset Management based on ISO55000 whose objective is to have maximum profitability in the life cycle. Decision-making in industry is not always based on measurable parameters, although they are usually logical and based on experience, they are not necessarily the right ones because they are not quantified and do not use risk assessment methodologies for analysis. In this case, it is intended to demonstrate how a decision based on reliability engineering helps to make the right choice and allows to increase the profit by reducing the uncertainty. A Reliability Block Diagram Analysis is used, including probability and related costs of a workover for a major failure on the downhole equipment, motor or cables of electrosumergible pumps. After quantifying the risk, cost and profit, the decision becomes easy to know in which operational mode the generation system must work, how many generators must be operating and how many in standby, considering if they operate in kW control, isochronous or droop mode. This analysis has increased millions of dollars in profit per year in oil and gas industry.

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