

## **ABSTRACT**

Asset owners are faced with the challenge of making operational decisions that are consistent with strategic objectives of the company. Staying in the forefront of Asset Management to optimize long term profitability and sustainability often have conflicting objectives and more so for an ageing asset. In 2008, South Africans saw the highest load shedding events ever experienced in the country as the power utility, Eskom cut electricity supply to houses. The government, in its bid to ensure a year-on-year economic activity, decided to operate assets in the power Industry to their maximum capacity while waiting for new capacity that will be provided by the new built Power Plants to be commissioned. Balancing conflicting objectives of Total Asset Care is a challenge in itself for asset managers, adding an Asset Management environment where profitability and reducing the risk of load shedding in the short term takes precedence over Total Asset Care, adds a totally new dimension.

The objective of the research was to investigate, using a single case study, the impact of a focus of ensuring security of electricity supply to the National Grid or profitability as opposed to Total Asset Management in a Power Plant. A single case study with embedded units was used for the research. The study was considered within the context of the Asset Management strategy used in the Power Plant under study and the environment in which it operates. Literature review revealed that the Power Utility adopted PAS 55, currently considered as the best practice in Asset Management in industry, in 2010. Following this, the subject of the research is to investigate the actual Asset Management practices, dictated by operational indicators as compared to the Power Utility Asset Management Requirements and thus PAS 55.

Power Plant Key Performance Indicators (KPI's) were used as the central focus of the analysis section. This is because KPI's not only gives information about the performance of the Power Plant; it also indicates the means of achieving such a performance. 17 year operational data from the Power Plant was used in the analysis. The data was collected from archiving systems in the Power Plant. The data collected included information about operations, availability, reliability, risk management, asset renewal, asset configurations and modification. Analysis of data employed both qualitative and quantitative techniques. The objective of the analysis was to use KPI's to determine how asset managers in such power utilities manage conflicting objectives of short-term performance and long term sustainability, asset utilization and asset care, capital investment and operating cost in the light of current electricity capacity challenges in South Africa.

The analysis showed that the performance of the Power Plant regarding availability is amongst the best in the world. The availability average is above 90% as compared to an average industry figure



of 83%. The load factor is also very high, with an average of 77% as compared to the industry average of 64%. This particular Power Station under study is used for grid frequency regulation. In summary, the analysis highlighted that the asset is operated at higher utilization factors, higher load factors close to operating limits and with limited maintenance opportunities. The key finding in the investigation is that prior 2001, the Power plant built a considerable maintenance backlog and it has not been able to recover from that. The plant started showing signs of distress from having limited maintenance opportunities after that. The distress was further exacerbated by a decrease in reserve margins. In addition, the asset is not renewed timeously (to make it more available, instead of taking it down for replacements) and all systems supporting Asset Management are showing signs of deterioration. The current high asset availability levels, as indicated by the analysis might be giving a false sense of security to customers, regulators and investors in South Africa, however the current means of achieving good production performances are not sustainable.

The impact of the current asset care regime will eventually lead to premature plant deterioration and the signs are already visible as shown by the incident management system. The current environment is a breeding ground for creation of future problems about premature asset deterioration in an effort to obtain short term gains. This means that by the time new built capacity is commissioned, the current assets might not be able to sustain current production levels because of deterioration. This will lead to a situation where this new capacity will not serve the intended purpose of relieving current shortages but compensate for losses resulting from deteriorating assets. This will eventually lead to a condition where the country will remain in a state of lack until something drastic is done e.g. building a number of high capacity nuclear plants.

A focus on Total Asset Management on the other hand inherently takes care of long term sustainability of production levels. The analysis of the data shows that even though the power utility has adopted the best practices in Asset Management currently available in the market i.e. PAS 55, asset operational data paints a different picture. This is attributed to the fact that the day-to-day running of the plant contradicts the strategic objectives of the utility i.e. the line of sight between strategy and operation is blurred. An Asset Management system that does not support the strategic objectives of the organization is fruitless. The recommendation was that the utility reviews the appropriateness of its Asset Management strategy taking into account, the current status of the asset, operational environment and all supporting systems with the objective of aligning to world best practice. Currently the world best practice in Asset Management is PAS 55. Adoption of the standard without operational proof of adherence and certification is not sufficient. Adherence to the standard and certification on the other hand gives assurance to all stakeholders that the asset will deliver personnel safety, environmental safety, profit, security of supply as well as positive public opinion.