



## IEA Implementing Agreement on Electricity Networks Analysis, Research and Development (ENARD)

# Annex I Briefing Sheet “Asset Management”

## Annex I: Information Collation and Dissemination

### Introduction

Asset Management is the term used to describe how an organization manages its assets to achieve the maximum benefit in line with the organization's strategy. Typically, the term tends to be used in relation to physical assets, although can encompass processes, software and people.

Publicly Available Specification 55 (PAS 55), developed by the British Standards Institute, has defined asset management as “*systematic and coordinated activities and practices through which an organization optimally manages its assets, and their associated performance, risks and expenditures over their lifecycle for the purpose of achieving its organizational strategic plan.*” Whilst these guidelines have originated in the UK, they are increasingly being used globally as a reference point for good practice.

In many countries, electricity infrastructure is approaching the end of its life cycle and operators are facing the need to make critical decisions about how to prioritize investment. This is particularly important in those countries where the electricity sector has been privatized as investment needs to be justified to shareholders, whose predominant focus is on returns for their investment.

Traditionally, there has been a separation of function between the operational aspect of the organisation who know the assets and the financial budget holders. Asset Management attempts to combine these two areas to create a cost-effective maintenance and end of life replacement programmes. There are a number of techniques used to achieve this; these tend to focus on either maintenance or investment approaches and are complementary to each other rather than exclusive. Examples of some of these techniques are discussed below.

### Corrective Maintenance

The most extreme technique used in asset management is Corrective Maintenance. As the name suggests, this technique is only used when something has gone wrong and there is a fault to correct.

Whilst there are instances when the use of Corrective Maintenance cannot be avoided, it is far from ideal. This is particularly true for network operators as there is the potential for a fault to lead to an outage on the system somewhere, in the more extreme instances. The other techniques generally aim to ensure equipment is maintained before Corrective Maintenance would become necessary.

### Reliability Centred Maintenance

Another approach to asset management is Reliability Centred Maintenance (RCM). RCM focuses on identifying risks and associated consequences and then using maintenance to prolong an asset's life.

The analysis is based on a detailed Failure Mode and Effects Analysis (FMEA) which identifies different possible failures and the potential consequences. Maintenance schedules can then be focused around preventing the more severe consequences. Endesa, in Spain, have recently announced their intention to use RCM to analyse their Distribution Substations System.

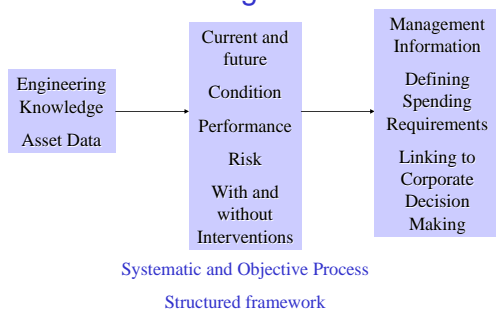
### Condition Based Risk Management

Condition Based Risk Management (CBRM) has been developed in the UK as a technique to assist in the

development of investment strategies. CBRM focuses on the links between information held by network operators about their assets and how this information is fed into the investment and implementation planning.

CBRM considers the condition of assets against a 'health index' which is then assessed against the Probability of Failure. This Probability of Failure can then be compared to the potential consequences of failure and how critical the asset is to the system to generate a quantifiable view of the risk associated with failure of that particular asset. The associated risk factor can then be used for planning future investment and defining priority expenditure.

### Condition Based Risk Management



The information created by CBRM allows forecasts to be made for future years (normally 10-20 years, depending on the age of the assets), covering scenarios with no intervention and with different levels of intervention. This allows operator to quantify future risk relative to Key Performance Indicators.

### Benefits of Asset Management

The benefits of asset management to transmission and distribution companies are multiple. Good asset management should enable an operator to optimise its expenditure when planning its future investment and maintenance needs, in order to achieve the most effective impact for a given expenditure. In a privatised industry, with shareholders to report to, the need to minimise unnecessary expenditure is often also an important factor in the uptake of asset management techniques.

Asset management offers companies other benefits. It can, for example, minimise the amount of outages required by facilitating better scheduling of maintenance work. It should also reduce unplanned outages by identifying the assets that are likely to

require more frequent maintenance schedules or sooner investment, as well as those assets that require less maintenance or investment.

### Workforce as an Asset

One asset of the electricity industry that is not included in most asset management techniques is the workforce; although a large proportion of the workforce is due to retire in the relatively near future. The North American Electric Corporation (NERC), for example, has identified an ageing workforce as a significant concern. NERC has reported, for example, that up to 40% of senior electrical engineers and shift supervisors in the US could be due to retire as early as 2009. This was reflected in the US 2007 Strategic Directions in the Electric Utility Industry Survey where respondents ranked the Ageing Workforce as the second most pressing concern, after Service Reliability.

This concern is not isolated to the US. In June 2008, the UK Government, for example, added 27 engineering occupations, specific to the electricity generation industry, to the National Shortage Occupational List for Work Permits. Whilst investment in the physical assets is essential, for many countries, investment into personnel assets could become the next critical challenge.

### References

1. British Standards Institute; PAS 55-1 Asset Management; 2004
2. D. Hughes & T. Pears; Condition Based Risk Management (CBRM); Assets (Journal of the Institute of Asset Management); Issue 11; Spring 2008
3. E. Gurumeta (Endesa); Reliability Centred Maintenance; Presentation to 9<sup>th</sup> Electrical Power Quality & Utilisation Conference; Barcelona; 2007 (available at <http://www.leonardo-energy.org/drupal/files/EPQU/2007conference/p298.pdf?download>)
4. NERC; Key Issues: Aging Workforce; (<http://www.nerc.com/page.php?cid=4%7C53%7C55>)

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