

Saving a dollar today is likely not worth it if we then spend five more next year

From procurement to end-of-life: A sustainable asset lifecycle

ABSTRACT

In this column, Dr Tony McGrail examines the concept of sustainability. He first looks at the meaning of “asset management”, which is all about the balance of cost, risk, and performance. Furthermore, questions on sustainable procurement practices are asked. The next topics explored in the column are transformer specifications and transformer construction

in light of sustainability. The final part of the column deals with appropriate condition monitoring.

KEYWORDS:

asset management, balance, transformer life cycle, specifications, condition monitoring, procurement



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So... What, exactly, is “sustainability”? I’d suggest that when we act in a “sustainable” manner, we are aiming to not mess things up for future denizens of planet earth. And there are many ways to mess things up. The International Standards Organization standard for asset management, ISO 55000 (2014), states that asset management is about the balance of cost, risk, and performance, noting that the balance needs to be achieved in a sustainable manner over time. This means looking at the whole of the asset life cycle, from the decision process identifying the need for a new unit, through to the end-of-life management, whatever that end may be.

Alabama Power Company has put data analytics to work to manage not just the procurement of new transformers, but to look at “whole of life” costs including, for example, maintenance, inspections, and losses [1]. Saving a dollar today is not worth it if we spend five more next year. In making purchasing decisions they look to the longer term. This also goes for procurement practices: are the raw materials sourced sustainably? Are we making use of recycled materials where possible? Otherwise, it is not sustainable.

And how do we know that the unit will actually meet its “design life”? A good transformer specification takes time, effort and expertise to produce, but without a good specification we may end up wasting resources. A few years ago, a colleague at a large US utility made a comment about the growth in transformers imported into the US: “Be careful what you ask for, because you’re going to get it.” This is not only a positive comment about non-US manufacturers who built to meet the specification, but a negative/neutral comment on the strong possibility that US based manufacturers had, over the years, gained an understanding of what was really wanted by the buyer without necessarily writing it all down in a specification. And as more “overseas”

manufacturers bid, the specification supplied would be “exactly” what they built, which means the specification had better be right [2]. And getting it right takes time. Otherwise, it is not sustainable.

But the specification is just a starting point: there is the whole process of transformer construction, electrical and heat run tests, shipping, installation and commissioning. All of which need to be witnessed and monitored – and viewed as part of the asset life. And mistakes can be made: a large generator station in the UK had, unbeknownst to them, three auxiliary/unit transformers supplied with undersized HV bushing connections. This would have gone unnoticed but for anomalous levels of furfuraldehydes, indicating accelerated ageing, which were unexplained in relatively lightly loaded units. However, a step change in online composite DGA levels over a few hours led to an investigation and saved the units from failure [3]. Appropriate witnessing of the factory build would likely have identified the issue. We often see organizations choosing to see this witnessing as something to be contracted out, which is fine as long as the people doing the work know what they’re doing and have appropriate experience [2]. Otherwise, it is not sustainable.

Such appropriate condition monitoring [3] is a feature of good asset manage-

ment [4], but just throwing condition monitoring at an asset without integrating it into the asset management process is a waste of resources, and unsustainable. Condition monitoring is often hugely valuable, avoiding possibly catastrophic failures, extending asset life, and allowing for better utilization of assets. But it requires effort to look at not just the “upfront” costs, but also the whole of life costs including inspection, maintenance, and repairs, and not only having alerts set based on data, but also having a response plan. Otherwise, it is not sustainable.

Overall, sustainability requires thought, resources, and effort to think long term and holistically. It is a part of the asset management process and has to be included in decisions regarding risk, performance and investment. Otherwise, our efforts are not sustainable.

Bibliography

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