An energy management maturity model for multi-site industrial organisations with a global presence

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Abstract

Literature reviewed suggests energy maturity models are in their infancy in the energy management sector, with little practical guidance for their implementation in multi-site organisations. In addressing this gap, this paper presents the development and implementation of an Energy Management Maturity Model for multi-site industrial organisations with a global presence, considered as a fundamental step towards continuous improvement and optimal energy efficiency. The developed maturity model provides a global view of the overall network readiness for engaging in energy efficiency by adapting and enhancing existing ‘site focused’ maturity models to cater for multi-site industrial an organisation. The model enables two-way communication between global and local energy management teams; not only are the individual sites benchmark but the global energy management team gets feedback and a gap analysis on their performance from the network of sites perspective. The evaluation framework created around the maturity model supports automated prioritization of elements with larger deviations. In parallel it provides the global energy management team with direction on where the organisation needs to focus central efforts to support the sites. The maturity model enables the evaluation of key not technical aspects of energy management required for continuous improvement on a multi-site and global scale.

Keywords: Energy Management Maturity Model; Performance Indicators, ISO 50001, Plan-Do-Check-Act, SWOT Analysis.

1 Introduction

Climate change and energy resource sustainability is a major challenge facing humanity today with implications for individuals, businesses and multi-national organisations [1]. Global energy consumption has continuously risen over the past century due to population growth, further industrialisation and increasing energy use per capita [2]. This growth has been largely associated with finite fossil fuels (oil, coal, gas) in industrialized nations, which, at its current rate, is unsustainable. The trend is set to continue with world energy consumption predicted to rise by 56% from 553EJ in 2010 to an estimated 863EJ by 2040 [3].

Industrial production and processing consumes a significant portion of global energy resources. In the EU-27 alone, it is estimated at 25% of the total energy requirements are associated with industry [4]. Investment in energy efficiency by the industrial sector is thus critical to a sustainable future and low carbon economy. Progress has been made, particularly in the past decade [5]. In addressing these issues, the European Environment Agency noted that between 1990 and 2009, energy efficiency in industry has on average improved by 1.8% per year, with further improvement possible using existing cost-effective energy solutions.

Energy management systems are expected to reach a market value of $35.92 Billion by 2024, representing a 13.4% compound annual growth from its value in 2009 [6]. Policy recognises that the consumption of energy and natural resources represents a major overhead for enterprises, and
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