

METADATA (*)

TOPIC A – Training Unit 3: Energy Management System (EMS)

Source

Partner:

CORE IC - Lessons 1 - Understanding energy management systems and 2 - Applications in industrial set-ups (**).

R2M – Lesson 3 - The standard ISO 50.001

Project: TRINEFLEX - Transformation of energy intensive process industries through integration of energy, process, and feedstock flexibility, Grant agreement ID: 101058174

Ownership

The ownership of the lessons 1 and 2 is of CORE IC in the name of the author Ioannis Maimaris.

The ownership of lesson 3 is R2M Solution in the name of the author Marco Rocchetti and Ramiz Qumsieh

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Abstract

This training unit focuses on Energy Management Systems (EMS) within the context of industrial energy sustainability. It addresses key aspects of energy management and emphasizes essential skills and knowledge required to implement EMS effectively, drawing insights from data sourced from industrial environments. Through this training, participants will learn the importance of energy management systems to drive energy efficiency and sustainability in industrial settings by leveraging technological innovations.

Structure

- Lesson 1: Understanding energy management systems
This lesson explores the principles and concepts underpinning energy management systems. Participants will learn about the advantages that effective energy management can bring to an organization, including cost savings and environmental benefits. Additionally, examines EMS by addressing best practices and regulatory aspects essential for successful implementation in industrial settings.
- Lesson 2: Applications in industrial set-ups
This training module provides an in-depth exploration of the fundamental elements and structures that constitute Energy Management Systems (EMS), along with effective implementation strategies and the pivotal role played by Energy Performance Indicators (EnPIs).
- Lesson 3: The standard ISO 50.001
Main characteristics of the standard ISO 50.001, the application in industrial energy management and the output generated.

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<p>Learning Outcomes</p> <p>Participants will gain an understanding of various facets of energy management and the significant elements post-implementation of an EMS. They will also educate themselves on the fundamental technical components of EMS and acquire information to facilitate a successful implementation.</p>
<p>Intended Audience</p> <p>Students and general audience, Production Managers, Energy of Sustainability Managers, Operations managers, Industrial Engineers, Energy Analysts</p>
<p>Pre-requisites</p> <p>For lesson 1, 2: main understanding of industrial energy management and general knowledge about Industry 4.0 technologies and energy related concepts.</p> <p>For lesson 3: main concepts related to energy consumptions, energy profiles and characteristics of them. General knowledge about energy systems as storages and PV plants. General overview on demand response schemes</p>
<p>Language: English</p>
<p>Format: Video mp4, PDF</p>
<p>Expected workload</p> <p>20 minutes each lesson</p>
<p>References / Complementary additional training material:</p> <p>Lessons 1, 2</p> <ul style="list-style-type: none"> • Best Practices and Case Studies for Industrial Energy Efficiency Improvement https://c2e2.unepccc.org/wp-content/uploads/sites/3/2016/02/best-practises-for-industrial-ee-web.pdf • Implementation of energy management system (ABB) https://library.e.abb.com/public/5559efd9ebf84ad68bc294983e5781e4/CaseStudy_Papera%20Brandia_EnergyManagement_210420_Final_LowRes%20(002).pdf?x-sign=VS/ESc9EKqI8xiDUjJ5joi6HkWs3IKgy2+rBRXxtD9CEwNu5q7ReynZxkKOfnXSL • Practical guide for implementing an EMS (UNIDO) https://www.industrialenergyaccelerator.org/wp-content/uploads/IEE_EnMS-Practical-Guide.pdf <p>Lesson 3</p> <ul style="list-style-type: none"> • ISO 50001 – Energy Management systems available on iso.org

(*) The structure of the Metadata for the Training Units derives from the training Metadata model developed within the Leonardo da Vinci project LINKVIT (2013-15, GA N. 2013-IT1-LEO05-04046)

(**) the contents of the lessons were developed using the following sources:

- [https://www.acruent.com/resources/blog-posts/energy-management-system#:~:text=Examples%20of%20Energy%20Management%20Systems&text=Building%20Automation%20Systems%20\(BAS\)%3A,systems%20to%20optimize%20energy%20usage](https://www.acruent.com/resources/blog-posts/energy-management-system#:~:text=Examples%20of%20Energy%20Management%20Systems&text=Building%20Automation%20Systems%20(BAS)%3A,systems%20to%20optimize%20energy%20usage)
- https://en.wikipedia.org/wiki/Energy_management_software
- <https://www.gridx.ai/knowledge/what-is-an-energy-management-system>
- <https://www.iso.org/climate-change/environmental-management-system-ems#toc1>

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- https://www.industrialenergyaccelerator.org/wp-content/uploads/EnMS_brochure-1.pdf
- <https://www.epa.gov/ems/what-ems>
- <https://www.metron.energy/blog/ems-energy-management-system-definition>
- <https://blog.mitsde.com/importance-of-energy-management/>
- <https://www.accruent.com/resources/blog-posts/energy-management>
- <https://www.ibm.com/topics/energy-management#:~:text=Energy%20monitoring%20and%20management%20not,lower%20costs%20through%20competitive%20procurement.>
- <https://www.nistglobal.com/blog/2023/05/benefits-of-implementing-an-environmental-management-system/>
- https://www.energy.gov.za/EEE/Projects/Industrial%20Energy%20Management/IEM%20Training/Modules/IEMTCModule1_final.pdf
- <https://www.linkedin.com/pulse/5-benefits-energy-management-maximizing-efficiency-sustainability/>
- https://www.industrialenergyaccelerator.org/wp-content/uploads/EnMS_brochure-1.pdf
- <https://www.epa.gov/ems/costs-and-benefits-ems>
- <https://www.linkedin.com/pulse/best-practices-improving-energy-efficiency-manufacturing/>
- <https://energy5.com/industrial-energy-efficiency-regulatory-frameworks-and-policies>
- <https://www.graygroupintl.com/blog/energy-management#:~:text=This%20can%20involve%20streamlining%20production,energy%20conservation%20in%20industrial%20settings>
- <https://www.intechopen.com/chapters/5586>
- <https://codibly.com/news-insights/what-is-an-energy-management-system/>
- <https://www.gridx.ai/knowledge/what-is-an-energy-management-system>
- https://www1.eere.energy.gov/manufacturing/eguide/iso_step_2_7.html
- <https://harksys.com/blog/what-are-energy-performance-indicators-enpi-and-why-are-they-important/>
- <https://blackmoresuk.com/energy-performance-indicators-and-energy-baselines/>
- <https://vertenergygroup.com/5-crucial-energy-kpis-to-monitor-for-effective-business-energy-management/>
- https://www1.eere.energy.gov/manufacturing/eguide/iso_step_2_7.htm
- https://www.industrialenergyaccelerator.org/wp-content/uploads/IEE_EnMS-Practical-Guide.pdf
- <https://www.graygroupintl.com/blog/energy-management>
- <https://c2e2.unepccc.org/wp-content/uploads/sites/3/2016/02/best-practises-for-industrial-ee-web.pdf>
- <https://ieeegypt.org/enms-case-studies/>
- [https://library.e.abb.com/public/5559efd9ebf84ad68bc294983e5781e4/CaseStudy_Papelera%20Brandia_EnergyManagement_210420_Final_LowRes%20\(002\).pdf?x-sign=VS/ESc9EKql8xiDUj5joi6HkWs3IKgy2+rBRXtd9CEwNu5q7ReynZxkKOfnXSL](https://library.e.abb.com/public/5559efd9ebf84ad68bc294983e5781e4/CaseStudy_Papelera%20Brandia_EnergyManagement_210420_Final_LowRes%20(002).pdf?x-sign=VS/ESc9EKql8xiDUj5joi6HkWs3IKgy2+rBRXtd9CEwNu5q7ReynZxkKOfnXSL)
- <https://konsys-international.com/energy-management-software-case-studies-utility>