Energy Management System (EnMS)

Oscarlito C. Malvar

Energy Investment Forum and Stakeholders Conference
07 September 2017
Marco Polo Hotel, Cebu City
Outline

1. What is energy management system (EnMS)
   1.1 Six (6) Key concepts of EnMS
   1.2 Energy Management Standard (ISO 50001:2011)
   1.3 What are the benefits of EnMS → Energy Efficiency

2. Who is UNIDO?
   2.1 UNIDO’s EnMS/ISO 50001 Programme
   2.2 What is PIEEP?
Energy management system is....

- A systematic approach to the management of energy use
- Not a piece of software nor a technical or equipment solution
- An application of good management practice which combines:
  - Behaviour change among all employees
  - Behaviour change among management
  - Objective use of data to show performance
  - Technical improvement
  - Low cost operation and maintenance of existing equipment
Six Key Concepts of EnMS

1. Commitment
   - Roles and Responsibilities
2. Significant Energy Users (SEUs)
3. Energy Performance Indicators (EnPIs)
4. Opportunities List
5. Operational Control
6. Review

- Specifies requirements for establishing, implementing, maintaining and improving an energy management system, whose purpose is to enable an organization to follow a systematic approach in achieving continual improvement of energy performance, including energy efficiency, energy use and consumption.

- International standard adopted by the Philippine National Standard (PNS)

- Provides a framework of requirements for organizations to:
  
  - Develop a policy for more efficient use of energy
  - Fix targets and objectives to meet the policy
  - Use data to better understand and make decisions about energy use
  - Measure the results
  - Review how well the policy works, and
  - Continually improve energy management
What are the benefits of EnMS → Energy Efficiency

- **Management focus** → can offer attractive financial and economic returns
- **Systematic activity** → increases security of supply
- **Identify and focus on biggest users** → reduces production and product costs
- **Identify and focus on key people at all levels** → Training
- **Focus on data and numerical methods** → Reduces risk/exposure to rising energy prices
- **Integrated approach** → positive effect on productivity and competitiveness
  - ✔ People
  - ✔ Departments
  - ✔ Budgets
- **Continuity through changes of personnel** → increase reliability of operations
- **Continual improvement** → *saves industrial firms money*
UNIDO is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability.

3 Thematic areas

Advancing economic competitiveness

Creating shared prosperity

Safeguarding the environment
UNIDO’s EnMS/ISO 50001 Programme

30 Countries
Arménia
Belarus
Burkina Faso
Chad
Chile
China
Colombia
Ecuador
Egypt
Georgia
Kazakhstan
India
Indonesia
Iran
Macedonia
Malaysia
Maldives
Mexico
Moldova
Myanmar
Pakistan
Philippines
Russia
South Africa
Thailand
Tunisia
Turkey
UAE
Ukraine
Viet Nam

Ongoing projects
Planned activities
Philippine Industrial Energy Efficiency Project

Project Objective

“Introduce ISO 50001 Energy Management Standard along with Systems Optimization Approach for improvement of industrial energy efficiency in the Philippines”
Project Components

Energy Management System

ISO 50001

Systems Optimization

Steam + compressed air + pumps

Enhancement of Financing Capacity

Expected Benefits:

- Electricity Savings 2,057,755 MWh
- Fuel Savings 6,071,000 GJ

Estimated Direct Environmental Benefits

261,754 tCO₂

equivalent emissions reduction from fuel and electricity savings.
Focus Sectors

- Food & Beverage
- Basic Metals & Steel
- Cement
- Water Utility
- Chemicals
- Pulp & Paper Products
- Semiconductor & Microelectronics
## Project Deliverables

- Train local pool of experts on Energy Management System (EnMS)
- Train local pool of experts on Systems Optimization
- Awareness Training on EnMS delivered to 500 factories
- 40 factories implemented EnMS ISO 50001
- 400 trained factory personnel on Systems Optimization
- 40 equipment vendors trained on Systems Optimization
- 40 Systems Optimization Projects implemented
- 100 Factory Managers trained on financing Energy Efficiency
EnMS TRAINING PROGRAMS

Half-Day Awareness Workshop
for Top Management

Two-Day User Training
for Managers/factory personnel on EnMS Tools

Training
for National Experts
SO TRAINING PROGRAMS

Two-Day User Training
for Managers/factory personnel on UNIDO Tools

Training
for National Experts
Systems Optimization

**Component Approach**
- Involves segregating components and analyzing their performance in isolation
- Focuses on the efficiency of one component rather than of an entire system
- Provides no assurance that energy savings will be attained if the system of which the component is part of is not properly designed and operated

**Systems Approach**
- Involves looking at how the whole group of components function together
- Requires attention to the whole production scheme and considers how one component can impact the whole system
- Offers significantly higher energy and cost savings than a component level analysis

![Graph showing efficiency gains](image)
Systems Optimization

Compressed Air
An average of up to 30% can be saved from improving compressed air system

Steam
Efficiency improvements for steam systems optimization could reach as high as 30%

Pumps
Up to 30% - 50% of the energy consumed by pump systems can be saved through equipment or control system changes
FINANCING CAPACITY TRAINING PROGRAMS

- **Training** for banks/financial institutions personnel
- **Training** for factory managers/engineers
- **Training** for National Experts
### Project Achievements

- 44 trained local experts on Energy Management System (EnMS)
- 42 trained local experts on Systems Optimization
- Awareness Training on EnMS delivered to 667 factories
- 22 factories implemented EnMS based on ISO 50001
- 1,040 trained factory personnel on Systems Optimization
- 28 equipment vendors trained on Systems Optimization
- 14 Systems Optimization Projects implemented
- 164 Factory Managers trained on financing Energy Efficiency
A summary of the 2015 results is shown below:

<table>
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<th>Standard</th>
<th>Number of certificates in 2015</th>
<th>Number of certificates in 2014</th>
<th>Change</th>
<th>Change in %</th>
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<td>-2385</td>
<td>-0.2%</td>
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<td><strong>43448</strong></td>
<td><strong>3%</strong></td>
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* Accredited certification bodies are those that have been independently evaluated by accreditation body members of the IAF, the world association of conformity assessment accreditation bodies


## ISO 50001 - East Asia and Pacific

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Source: ISO 50001 - East Asia and Pacific

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**Note:** The table above represents the number of countries implementing ISO 50001 in the East Asia and Pacific region from 2011 to 2015.
In the Philippines (ISO 50001-certified) as of June 2017

Assisted by the GEF-UNIDO IEE Project

APO and SOLID Plants
Dear RAMONITO S. FERNANDEZ,

Thank you for submitting your high-quality case study to the 2013 Energy Management Leadership Awards program of the global Clean Energy Ministerial (CEM), a high-level global forum of 24 countries and the European Commission that promotes policies and programs to advance clean energy.

We are pleased to inform you that Maynilad Water Services, Inc., is a recipient of an Energy Management Insight Award in recognition for contributing valuable insights on the diverse benefits of certifying energy management systems to the global ISO 50001 standard. An independent panel of international experts determined that your case study shows how an energy management system can be successfully integrated into existing business systems to better manage resources, sustain achieved savings, and continuously improve energy performance.

The awards program is organized by the CEM Energy Management Working Group (EMWG), in which government officials worldwide collaborate to create high-impact national programs that accelerate the use of energy management systems. The EMWG includes representatives from Australia, Canada, Chile, China, Denmark, the European Commission, Finland, Germany, India, Indonesia, Japan, Mexico, the Republic of Korea, Saudi Arabia, South Africa, Sweden, United Arab Emirates, and the United States.

As an Energy Management Insight Award recipient, we will notify your country’s energy ministry of your award and broadly distribute a press release, report, and slide deck that highlight your organization and the other award recipients. Furthermore, your case study will be posted on the CEM website as an inspiration and resource for businesses, governments, and other organizations seeking a cost-effective way to align corporate targets with national climate and energy goals.

Your energy management leadership is important at this critical time. At the Paris climate conference (COP21) in December 2015, 135 countries adopted the first-ever universal, legally-binding global climate deal. With two-thirds of the world’s GHG emissions resulting from energy production and use, energy management has an important role in decarbonizing economies. And support of the new agreement analysis shows that implementation of ISO 50001 across the commercial and industrial sectors globally could drive cumulative energy savings of approximately 10,000 ktoe per year, saving nearly $800 billion in energy costs and avoiding 6,500 million metric tons of CO2 emissions.

The CEM invites you to expand your leadership role by joining its Energy Management Campaign. For this campaign, governments and businesses are making commitments towards the goal of 50,000 global ISO 50001 certification by 2020. We welcome your participation in this community as well.

Congratulations and we wish you continued success!

Sincerely,

Grazia Silvestri
Coordinator, Energy Management Working Group
Clean Energy Ministerial

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INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT
2017 Insight Award
For Leadership in Energy Management
Is presented to
Maynilad Water Services, Inc.
for sharing useful insights on the benefits of certifying energy management systems to the global ISO 50001 standard. Sites:

- La Mesa Treatment Plant 1
- La Mesa Treatment Plant 2
- La Mesa Pump Station and North C Annex
- Villamor Pump Station
- PAGCOR Pump Station
- Pasay Pump Station
- Tondo Sewage Pumping Plant

Graziella Siciliano
Energy Management Working Group Secretariat
Clean Energy Ministerial

May 19, 2017
Date
In photo are (from left) Sanjay Man Shrestha, UNIDO Industrial Energy Efficiency Program manager; Fakhruddin Aziz, UNIDO representative – Ph; Philippines energy director; Ernesto Felix, Cemex Philippines vice president for operations and technology; Energy Secretary Alfredo Cusi, and Energy Undersecretary Jesus Cristino Posadas.

DOE recognizes Cemex for its ISO 50001 certification

The Department of Energy (DOE) through its Philippine Industrial Energy Efficiency Project (PIEEP) recognized Cemex Philippines for its implementation of ISO 50001 Energy Management System (EnMS) in its cement plants. Cemex Philippines’ subsidiaries, Solid Cement Corp. and Apo Cement Corp., are the first cement plants in the country to be certified by SGS Philippines for EnMS.

"We at Cemex make every effort to proactively contribute to the growing demand for positive change in our resource-constrained world. Having our cement plants certified for EnMS ensures that we are operating sustainably by optimizing our energy use in a systematic and environmentally sound way. This recognition is a testament to Cemex’s commitment in building a better future now," Comex Energy Director Eduardo Pons said.

The recognition was given during the Don Emilio Abello Energy Efficiency Awards ceremony at the Maxim Hotel, Resorts World Manila.

PIEEP is jointly implemented by DOE, Department of Trade and Industry, and United Nations Industrial Development Organization, with funding from the Global Environment Facility.
Awarding of certificate

Continental Temic Plant Calamba, LISP I, Calamba City, Laguna
March 7, 2016
Philippine companies that have implemented Energy Management System in partnership with GEF-UNIDO IEE Project

- Pag-asa Steel
- Unilever
- San Miguel Yamamura Packaging Corporation
- Nestlé
- Steel Asia
- Rowell Lithography & Metal Closure Inc.
- Ramcar Batteries Inc.
- Lopez Sugar Corporation
- Newtech Pulp Inc.
- LMC
- Central Azucarera Don Pedro Inc.
- Funai
- Metrodragon Steel Corp.
We also publish case studies of the companies that have implemented EnMS....

And disseminate them to our stakeholders so that the industry will know about the huge savings!

About improved energy efficiency performance that these companies achieved on a continuous basis!
Philippine companies that have implemented Systems Optimization projects in partnership with GEF-UNIDO IEE Project
Philippine companies currently in partnership with GEF-UNIDO IEE Project on Energy Management System implementation
THE PARIS CLIMATE AGREEMENT

Country emissions pledges

196 parties

52.4 billion tonnes of emissions*

99.0% of territorial emissions covered under current pledges

70% (0.32%) by 2030

28% (12.10%) by 2025

*of greenhouse gases in 2012 excluding international aviation and shipping

Has submitted climate pledge

Yet to submit pledge

Submitted but exiting the deal

UNIDO
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE

INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT

www.unido.org
Signed last 22 April 2016, ratified in 23 March 2017 and took effect last 22 April 2017

Philippines

Declaration:

“THAT it is the understanding of the Government of the Republic of the Philippines that its accession to and the implementation of the Paris Agreement shall in no way constitute a renunciation of rights under any local and international laws or treaties, including those concerning State responsibility for loss and damage associated with the adverse effects of climate change;

THAT, the accession to and implementation of the Paris Agreement by the Republic of the Philippines is for the purpose of supporting the country's national development objectives and priorities such as sustainable industrial development, the eradication of poverty and provision of basic needs, and securing social and climate justice and energy security for all its citizens.”
Gatchalian bats for creation of energy policy
By Danessa Rivera (The Philippine Star) | Updated August 7, 2017 - 12:00am

MANILA, Philippines - Senator Sherwin Gatchalian is batting for the creation of a national energy efficiency and conservation policy framework as an innovative alternative approach to securing viable and affordable power nationwide.

The lawmaker sponsored Senate Bill 1531 or the proposed “Energy Efficiency and Conservation Act of 2017,” stressing that “energy efficiency and conservation strategies cover all three fronts of the 3S vision which has guided the legislative agenda of the Committee of Energy.”

MANILA, Philippines - The Philippines should have stricter energy efficiency and conservation standards to ensure the stability of the country’s power supply amid expected surges in energy demand during the summer, Sen. Sherwin Gatchalian said.

This should be the focus of the current administration instead of just putting up more capacity to meet growing power requirements, the lawmaker said.

“Past administrations have mostly focused on adding additional generating capacity to address perennial energy shortages. That needs to change. The government must give greater weight to energy efficiency and conservation strategies in its long-term plan to ensure the stability of the power supply,” said Gatchalian who chairs the Senate Committee on Energy.

In line with this, Gatchalian has been conducting committee hearings on Senate Bill 30, a proposal to institutionalize energy efficiency and conservation policies.

A Minimum Energy Performance Standards (MEPS) should be enforced on machinery equipment, appliances, vehicles and other fuel-using combustion equipment, and electronic devices to ensure homes and businesses consume the least amount of power.

Under this system, manufacturers, importers, and dealers will be required to comply with the MEPS and display an energy label showing the energy requirement and consumption efficiency of the products.

“The imposition of stricter energy efficiency standards will cut down monthly electricity costs and reduce consumption. That will be a win-win situation for both the consumers and the power sector,” Gatchalian said.

The MEPS system will be carried out by multiple agencies, led by the Department of Energy (DOE), which shall develop and implement a Mandatory Energy Efficiency Rating and Labeling System (MEERLS) for designated products.

The DOE will have vital support from various government agencies: the Department of Trade and Industry will require manufacturers, importers, and dealers to comply with MEPS and display the energy label; the Department of Science and Technology will conduct research and development programs in facilitating energy efficient technologies; the Department of Transportation will push for the compliance of vehicle owners, manufacturers, and importers with MEPS for road transport vehicles; the Department of Interior and Local Government will pursue local government unit (LGU) compliance with the mandatory implementation of energy efficiency and conservation measures; and Department of Public Works and Highways will be responsible for the implementation of Guidelines on Energy Efficiency and Conserving Design in Buildings.

LGUs will monitor energy consumption by business establishment and enterprises, which will become part of the requirements for business permit renewal.
Groups/Entities Implementing the PIEEP
PIEEP

Join Us and Reap the Benefits!

Project Management Unit
UNIDO-PIEEP
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+632-833-5171