

Global Energy Management System Implementation: PHE ONWJ Case Study

Indonesia

PT. PHE ONWJ

By Implementing EnMS, 5% Energy Saving has been achieved per year



Mike Mike Flow station; one of PHE ONWJ's offshore facilities

Business Benefits Achieved

PHE ONWJ is the only subsidiary of PT. Pertamina (Persero) that implements Energy Management System (EnMS) ISO 50001. Being the 1st ISO 50001 certified company, PHE ONWJ becomes a benchmark company on EnMS implementation in Oil and Gas Industry; for example for PHE NSO & PHE NSB.

Since its implementation in 2014, EnMS has been used as tool by PHE ONWJ to achieve its Key Performance Indicator of Energy Efficiency and Emission Reduction.

By implementing low and no cost Energy Conservation Opportunities (ECO's), PHE ONWJ has reduced its energy consumption by 5% (2014) and 3% (2015). It also means contributed in reducing CO₂-e emission as much as 6.7% in 2014 and 1% in 2015.

Financially, the improvement gained from EnMS has reduced energy cost of the company as much as USD 840 thousand per annum.

Implementation of EnMS has also risen employee awareness on energy and encouraged employee to innovate not only in the scope of Significant Energy Uses (SEU) but also in the larger production system. For example, innovation on main oil line using "Ejector" has been successfully reduced gas flaring and increase production simultaneously. This innovation along with others are registered already for patent process.

"Profitable, safe and reliable operation has become our way of life in oil and gas industry. However, business environment has changed, decline oil price really pressed our business and we had to promptly respond it. Having Energy Management System implemented, we expect more efficient operation in energy and lower CO₂ emission. It will in turn help us to achieve our business sustainability. We know there is a long road ahead, but we are confident to face it."

—Irwansyah, President of PHE ONWJ

PHE ONWJ: Safe, Reliable, Green

Case Study Snapshot

Industry	Oil and Gas
Location	West Java, Indonesia
Energy Management System	ISO 50001
Product/Service	Oil and Gas
Energy Performance Improvement (%)	5%
Annual energy cost savings	USD 840,000
Cost to implement	USD 1,587,009
Payback period	1.9 Year

Company (or Facility) Profile

PHE ONWJ is subsidiary of PT. Pertamina (Persero) which operates North West Java (ONWJ) block situated at West Java Sea-Indonesia. The block covers an area of 8,300 sqm.

PHE ONWJ Production Sharing Contract (PSC) is one of the first PSCs in Indonesia with initial operation in 1971 under Atlantic Richfield Indonesia and later become BP West Java and in July 2009 transferred the operatorship to PHE ONWJ.

PHE ONWJ production installed capacity is 300 MBOPD (oil) and 300 BBTUD (gas). Due to natural decline, the production to date is 38 MBOPD (oil) and 207 BBTUD (gas). By nature, oil and gas industry production tends to decline time by time and needs to discover new resources. Ratio of water to oil tends to increase along the time that means lower production. These are some of the challenges upstream oil and gas industry has to face.

To sustain the business, PHE ONWJ encourages initiatives; one of them is energy efficiency through Energy Management System.

Business Case for Energy Management

As stipulated in Indonesia's Government Regulation no 70 Year 2009, every corporation whose annual energy consumption equals or more than 6 thousand TOE, is obliged to conserve energy through energy management. PHE ONWJ annual energy consumption is 230 thousand TOE, thus it is obliged to implement energy management system.

Environmentally, it is also required for every corporation in Indonesia to manage energy as part of natural resource that is annually monitored through PROPER (Program for Assessment of Company's Performance Rating in Environmental Management). PROPER is a prestigious annual award that is conducted by Ministry of Environment and Forestry. Considering its high importance, PHE ONWJ established PROPER as Key

Performance Indicator (KPI) of Management and declared energy efficiency on its Policy.

Internally in PHE ONWJ, energy efficiency is concerned in order to maximize production by reducing own use (fuel gas consumption). Energy consumed in PHE ONWJ is significantly dominated by fuel gas (*Figure 1*) thus reducing fuel gas consumption will have big impact to overall energy performance of the company. While it is not necessarily reduce energy cost since it is owned, fuel gas saved is an addition to gas sales on top of normal production.

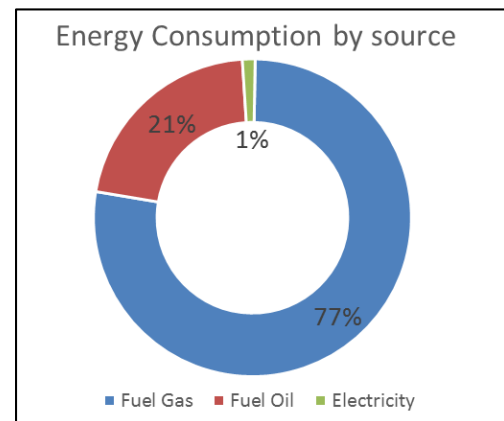


Figure 1 Energy Consumption by Source

Keys to Success

- Leadership and commitment
- Changing of mindset on energy efficiency
- Leveraging energy efficiency as business practices
- Established system approach (ISO 14001, OHSAS 18001)
- Intensive communication across department and function

EnMS Development and Implementation

Policy

The first significant energy efficiency initiatives in PHE ONWJ is launched in 2011 when company initiated the energy audit for 5 sites. In this stage, the initiative is handled solely by Environmental Department and is managed under Environmental Management System ISO 14001. Sensing the potential energy saving and available resources around, PHE ONWJ then start to manage energy through EnMS ISO 50001 in 2013 Management signed Energy Policy as part of Sustainability Policy and HSSE Policy.

Following the policy, Energy Management Team¹ (Figure 2) was then formulated; serial trainings and awareness are launched both in executive and working level.

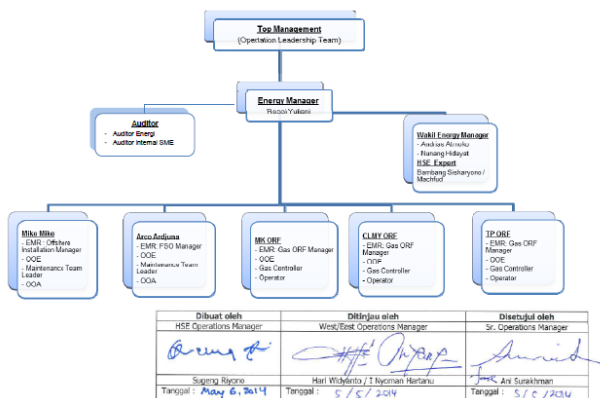


Figure 2 Energy Management Team

Top Management appointed an Energy Manager to manage energy and implementation of EnMS in PHE ONWJ. Energy Manager is supported by Deputy Energy Manager and HSSE Expert. Each site manager was appointed as Management Representative(s). The Energy Management Team involves personnel cross-departmentally to ensure the expertise required is covered and well represented.

Plan

Prior to set energy objective, target and program, energy review was conducted to identify energy consumption & use, significant energy use, energy saving potential etc.

The energy review was also taking into account the energy audit done by Certified Energy Service Company. The review covered also energy related regulation and standard applied to PHE ONWJ.

PHE ONWJ like any other oil and gas companies, is an energy intensive company with annual energy consumption of 230 thousands TOE per year. This energy is used for drilling process, operation, marine, logistic and offices (Figure 3). From energy review, it is understand that Turbine Compressor in Operations Divisions is SEU with 73% fuel gas consumption.

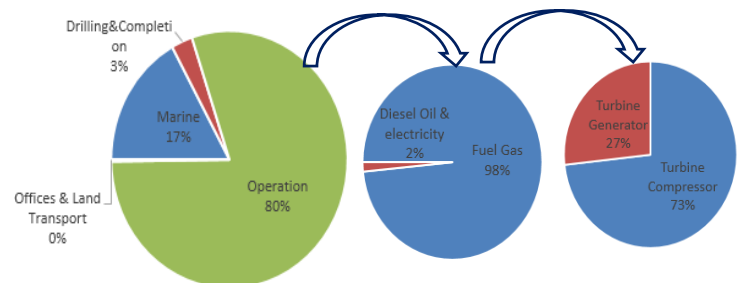


Figure 3 Significant Energy Uses (SEU)

Energy action program is then created to mainly improve energy performance of turbine compressor. Since, turbine compressor is a complex equipment and the change cannot be done quickly, some other simple energy conservation opportunities are also targeted such as installation of LED lighting, soft starters for air compressors and inverter AC (Figure 4).

¹ Energy Management Team is revised in 2014 due to personnel rotation

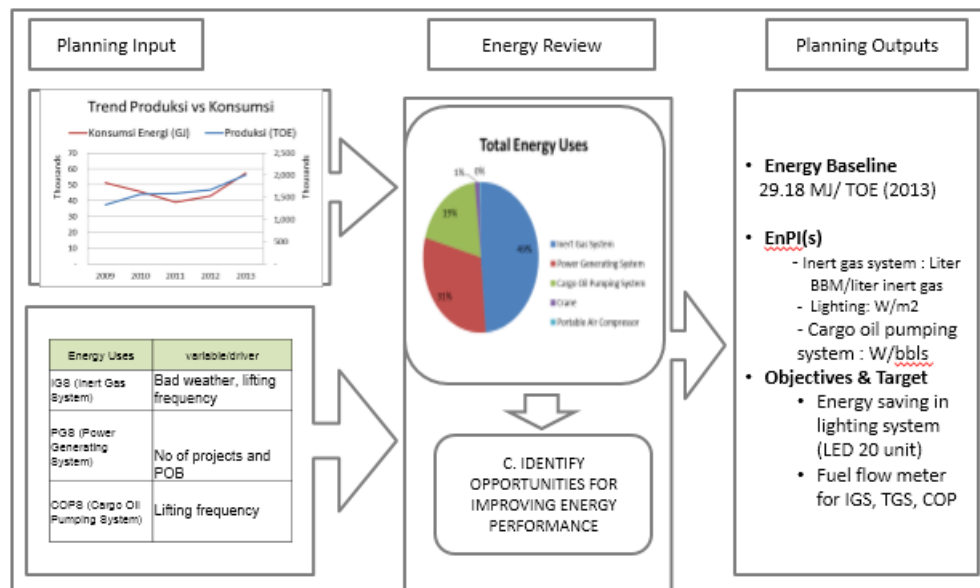


Figure 4 Sample of Energy Planning Process

Do

To fulfill competence of personnel, PHE ONWJ identifies training matrix which covers management and personnel driver to SEU. Both energy manager and energy auditor are Certified Energy Manager and Certified Energy

Auditor issued by the National Profession Certificate Body.



Figure 5 Awareness and Implementation training

Awareness of employee on energy is risen through serial broadcasts and training in parallel with Green Life Style Program.

In achieving the target, energy action programs are launched.

List of Energy Action Plan

Reduction of power installed capacity
Replacement of lighting with LED
Replacement of air compressor
Installation of VSD
Power Management System
Replacement of navigation aid lighting with solar cell
Flaring reduction

EnMS ISO 50001 has encouraged our company towards more detail in Energy Efficiency Design (EED). This step become a significant guidance for developing of new facilities. In addition, it will affect procurement process to be a more energy-aware supply chain.

Check

Monitoring process was done daily as part of production activities. In every morning meeting, energy

performance is part of daily production update. Each potential reduction of energy performance is identified in the meeting and further addressed through engine or equipment setting.



Figure 6 Onsite monitoring

To ensure the system is working well, auditor (system auditor and energy auditor) was appointed.



Figure 7 Internal Audit training

Act

Continual improvement of the system is maintained through integrated management review which held in head office.

Implementation of EnMS has improved energy performance of PHE ONWJ since Year 2013 when it is first implemented. Although year to year comparison of 2014 and 2015 shows increase in GJ/TOE energy consumed, it is due to low production level.

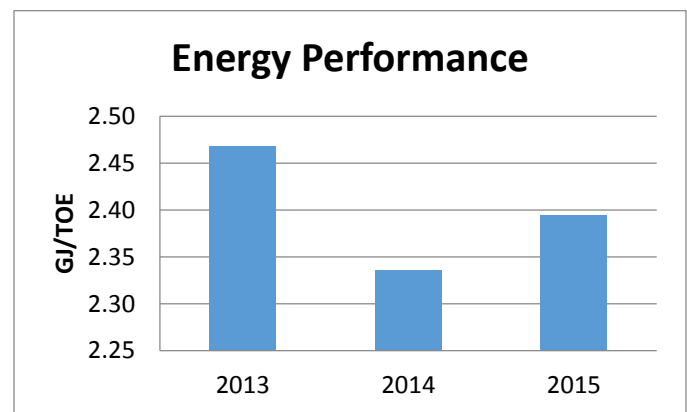


Figure 8 PHE ONWJ's Energy Performance

PHE ONWJ used energy intensity as its energy performance indicator which is also used by Oil and Gas Producers (OGP) as a benchmark in its annual OGP Environmental Performance Indicator. It is understood that intensity as indicator needs to be improved since in its calculation, the base-load energy consumption is divided evenly. PHE ONWJ is seeking the best indicator as improvement to the existing one.

“Generally, implementation of management system such as EnMS is perceived as a cost center. But, in our company, EnMS has proven in contributing to business benefits.”

—Rossi Yuliani, Energy Manager

Lessons Learned

1. Involvement of procurement team is essential to ensure supplies of energy efficient equipment and services. It serves as preventive action to avoid energy inefficiency due to improper equipment.
2. Procurement evaluation that is regulated be based on lowest bidder is barrier for introduction of energy efficiency equipment & services. Life cycle cost analysis should be considered immediately.
3. Availability of energy efficiency best practices for upstream oil and gas industry is a challenge
4. Energy Efficiency Design has a significant contribution in ensuring sustainable energy performance improvement

Through the Energy Management Working Group (EMWG), government officials worldwide share best practices and leverage their collective knowledge and experience to create high-impact national programs that accelerate the use of energy management systems in industry and commercial buildings. The EMWG was launched in 2010 by the Clean Energy Ministerial (CEM) and International Partnership for Energy Efficiency Cooperation (IPEEC).

For more information, please visit www.cleanenergyministerial.org/energymanagement.

