

Global Energy Management System Implementation: Case Study

Indonesia

PT. Amerta Indah Otsuka



Sukabumi Plant

Kejayan Plant

Business Benefits Achieved

Energy conservation program started since 2012. The programs focus on Significant Energy Used (SEU), such as fuel, steam, water and electricity (production machine and utilities). For industrial category, the program is intended for energy efficiency in the utility and process.

PT. Amerta Indah Otsuka then started assessment program to implement ISO 50001 from 2012, at 2013 PT. Amerta Indah Otsuka was start to conduct energy audit in whole plant, for the audit result, there are some recommendation of energy efficiency program submitted.

In 2015, The Certification Body of TÜV SÜD has issued the certificate of ISO 50001 : 2011, and that certificate is valid from July 3rd, 2015.

From 2012 until 2015, energy conservation program was successfully implemented at PT. AIO and the program can reduce energy consumption about 13,33,315 kWh/year equivalent to the emission reduction of 163,431 tCO₂/year. There are two program that high contribute and impact of energy reduction, which is:

1. Optimizing absorption chiller to replace electric chiller, it can save energy about 3,648,000kWh/year.

“Implementation of EnMS ISO 50001 should be give positive impact to the Company and endorse the Company program such us energy conservation and Cost Reduction Program (CRP)”

-Wheny Utoyo, Management Representativ-

Case Study Snapshot

Industry	Food and Beverage
Location	Kejayan Plant: Jl. Raya Malang – Pasuruan Km 11, Desa Pacarkeling, Kecamatan Kejayan, Pasuruan (67172) Sukabumi Plant : Jl. Siliwangi Km 28 Desa Kutajaya, Kec. Cicurug Kab Sukabumi 43359
Energy Management System	ISO 50001
Product/Service	Pocari Sweat
Energy Performance Improvement (%)	6.6% (energy consumption based on process)
Annual energy cost savings	IDR 3,166,250,075
Cost to implement	IDR 2,681,723,016
Payback period	1.18

2. Installation air intake cooler can reduce and save energy about 6,600,000kWh/year.

Company Profile

PT. Amerta Indah Otsuka is affiliate of the Otsuka Group Holding Company based in Japan. Otsuka Group is engaged in the field of health with their philosophy is Otsuka-people creating new products for better health worldwide. The Company has combined the two pillars of health as a business strategy named: pharmaceutical products that contribute to the diagnosis and treatment of diseases and nutraceutical product support and maintain the daily activities in order to better, productive and healthy life.

Otsuka Group has a total of about 1,000 employees and then headquarter is in Wisma Pondok Indah 7th Floor, Sultan Iskandar Muda Road Kav. V - TA, Jakarta 12310. There are two factories located in Siliwangi Road KM 28 Sindangresmi RT. 07/04, Kutajaya Village, District Cicurug 43 359 and in Pasuruan Malang Road KM 11, Pacarkeling Village, District Kejayan, Pasuruan Regency 67 172.

PT. Amerta Indah Otsuka not only carry on the distribution directly through the branch offices, but also supported by the distributors to spread throughout Indonesia. Products of PT. Amerta Indah Otsuka is POCARI SWEAT, an isotonic drink which is leading in Indonesia and has received various certification of ISO such as ISO 9001 : 2008 (Quality Management System), ISO 22000 : 2005 (Food Safety System) and ISO 14001 : 2004 (Environmental Management System). Also aSOYJOY fruit soy bar, healthy snack of soybeans and fruits which is still imported from Japan.

Energy at PT. Amerta Indah Otsuka is supplied by 3 energy sources: Natural Gas (Gas Turbine Generator), Government Electricity Company (PLN) and liquid fuel.

At PT. AIO Sukabumi, capacity Natural Gas is 650,000 nM3/month. Natural Gas used as fuel to generating power at Gas Turbine Kejayan Factory is 1,147,000 nM3/month.

For PLN Sukabumi Factory is supplied by 2 tower power supply which has capacity 5.4 MW, Kejayan factory supplied by single tower power supply which has capacity 5.5 MW.

Liquid Fuel is used for forklift, back-up Boiler, Emergency Generator and Gas Turbine (back up). Liquid fuel consumption approximately only 2%.

Business Case for Energy Management

PT. Amerta Indah Otsuka is committed to being brilliant company with a significant contribution and reliable for costumers and society. The Company is also committed to maintain the quality and development in order to be better by implementing energy management systems ISO 50001:2011, this system is also required to fulfill the legal requirement that established by the government, such us : PEEN 2015 (*Penghargaan Efisiensi Energi Nasional*), PROPER, Green Industry Certification. PT. Amerta Indah Otsuka will also participate in **CEM Energy Management Leadership Awards this year 2016.**

The main objective of the implementation of ISO 50001 is to satisfy the legal compliance of Government Regulation No. 70 of 2009, the Management conduct optimal and efficient energy conservation so that it can be guaranteed the sustainability of energy in the future and sustainability of the business simultaneously (Business Continuity Management). Risk management clauses No. 13 and 14: Risk related to the shutdown of manufacturing base & Risk related to environmental pollution.

It is also related with the company commitment in implementing energy management which is stated in the Company Policy, "*PT. Amerta Indah Otsuka is the company of meals, drinks and trade import which produce quality products, halal and safe as well as our consider to customer satisfaction, employee protection in the safety and healthy, the impact on the environment and energy efficiency*"

Based on the company policies, Management then defines the OGSM (Objective, Goal, Strategy, and Measurement), in 2016 Company have target for energy reduction by 2.5% from the previous year, in the other side, there are another objectives to be achieved:

- Reduce energy costs
- Reduce overall production costs
- Reduce green house gases

- increase performance against environmental sustainability
- Improve product quality
- Increase the value of the company
- improving the capacity of employees
- improving compliance with Regulations and Laws
- Improve compliance with company policies against environmental targets.

Picture 2. Environment activity



Keys to Success

- Commitment : every stake holder at company should support the system
- Team Work : energy team not only from one department but representative from all department
- Capability : the implementation will give high impact if the driver (company) of the system have proper capability
- Consistency : continuous improvement will give more impact

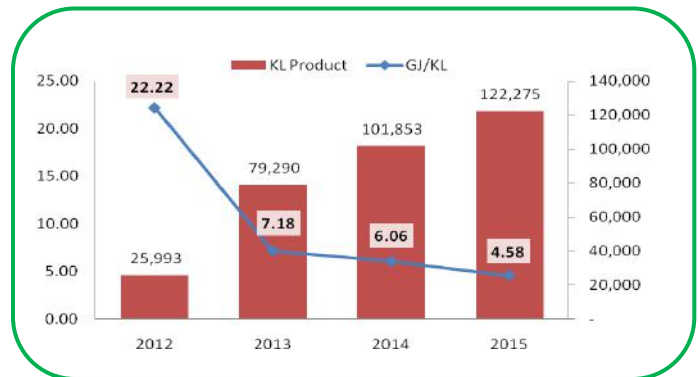
“AIO must be excellent company who have good EnMS programme by monitoring and continuous improvement of SEU. Saving Energy, Save the company and Save the world”
 -Lina Erdawati, Head of Plant-

EnMS Development and Implementation

Achieved Energy Performance

Picture 3 is the graph of energy intensity in Giga Joule per Kilo Litre (GJ/KL) show us the significant reduction of energy consumption, if we compare the achievement between 2012 and 2015, energy intensity can be reduced until 70%.

Picture 3. Energy intensity PT. Amerta Indah Otsuka



From the graph above, we can see that the energy intensity decrease year by year, it is mean that PT. Amerta Indah Otsuka commit to reduce the energy consumption and also to reduce the carbon footprint (tCO2).

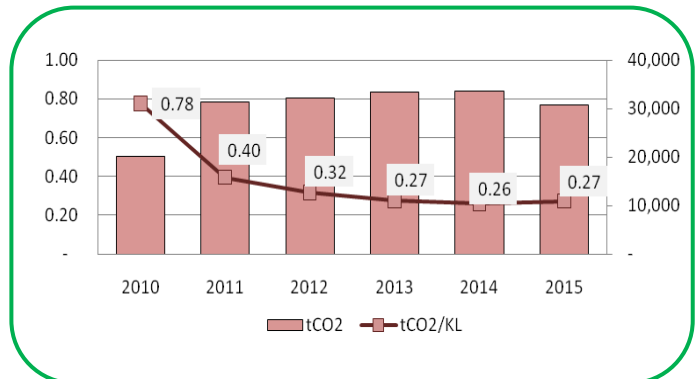
Cost savings

Table 1. Cost saving by efficiency program

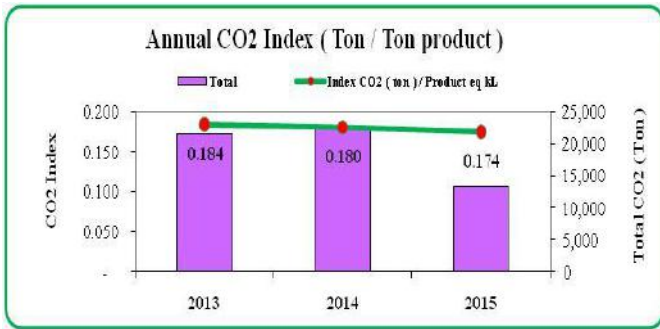
Plant	Energy saving (IDR)	Cost (IDR)	Payback Period
Kejayan	2.53 Billion	2.08 Billion	1.22
Sukabumi	0.64 Billion	0.60 Billion	1.06
TOTAL	3.17 Billion	2.68 Billion	1.18

CO2 reduction intency

Picture 4. tCO2 and emission Intensity Kejayan Plant



Picture 5. tCO2 and emission Intensity Sukabumi Plant

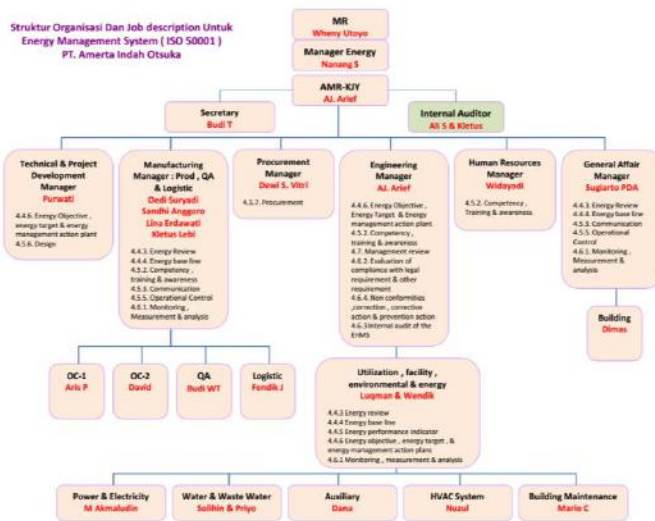


Picture 6. Declaration of ISO 50001



Organizational

Picture 6. Organization Chart ISO 50001



“Every improvement, even just turn off the lamp when not in use, will give significant effect to energy performance”
 -A. J Arief, Head of Manufacturing-

Energy review and planning

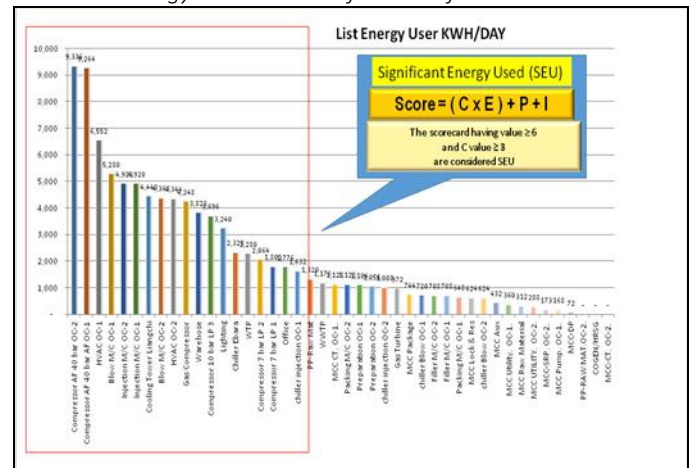
The process of energy planning is adopted to a model of energy planning ISO 50001: 2011. PT. Amerta Indah Otsuka conduct energy planning by define planning input after energy review. Energy action plan will be created base on Significant Energy Use, The significant of the energy aspect is depend upon the factor of energy consumption (C) and energy saving potential (E). The possibility of renewable energy usage (P) and increase energy exchange with society (I) have one the bonus point each.

$$\text{Score} = (C \cdot E) + P + I$$

Implementation of energy management system in Amerta Indah Otsuka refers to the Energy Management System ISO 50001: 2011, which uses the PDCA cycle (Plan, DO, Check, Action). On the top level of management, Plant Director has a role in drafting policies related to energy management, a Management Representative (MR) is appointed to control its implementation, in terms of technical planning of energy directly led by the Energy Manager. Core team was formed with members who are representatives from each relevant departments. In addition, the internal auditor team who have been certified also established to conduct internal audit. Management Review is also conducted annually to review the implementation of energy management systems.

If the score card have value ≥ 6 and/or C value is ≥ 3 , it's considered as SEU.

Picture 8. Energy review: Identification of SEU



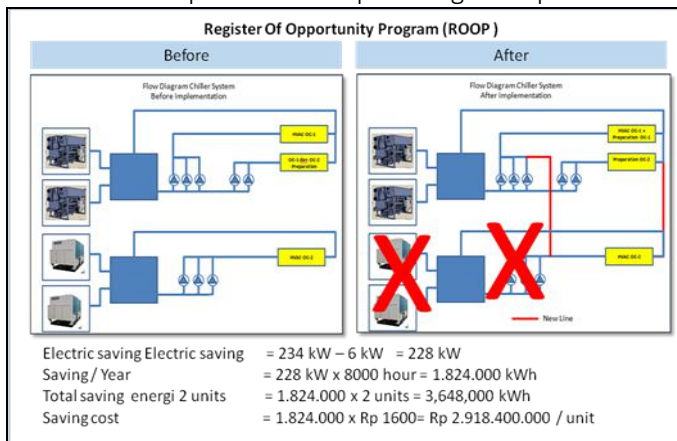
In the process planning of energy conservation is also obtained in the form of energy efficiency potential of energy conservation programs that are listed in the Register of Opportunity Program (ROOP).

Table 2. Register of Opportunity Program (ROOP)

ROOP 2016						
No	Action Plan	Energy reduce (kwh/y)	tCO2 Reduce	Benefit (IDR/y)	Invest (IDR)	ROI (Y)
1	optimizing piping line or install buffer tank	11,040	13.20	20,269,440	15,000,000	0.74
2	install APF (automatic power factor) or APC ABB	295,919	353.91	543,308,002	350,000,000	0.64
3	Optimasi HVAC OC2 dengan mematika AHU.II.2	60,053	71.82	110,257,901	50,000,000	
4	installation active filter (PF and Harmonic)	106,569	127.45	109,454,976	144,763,308	1.32
5	automatic operation blower and pump (need PQA)	64,800	77.50	118,972,800	1,000,000	0.0084
6	installation APF complete with harmonic filter	294,275	351.94	540,289,162	296,442,184	0.55
7	installation flow meter,			Management data record for EnPI mesin		
8	review and reduce air consumption	78,408	93.77	131,960,664		

ROOP contain energy efficiency activities such as, Action Plan, Saving target, Emission Reduction, Benefit, Investment, Return on Investment (ROI) and responsible activity, and also timeline. The energy baseline, Energy Performance Indicator are also defined in this step.

Picture 9. Example of ROOP Optimizing absorption chiller



The Management will be review for the action plan to define the priority of ROOP base on payback period and also consider the financial availability. If the payback period is less than 1 year, the action plan will be recommended to be approved immediately for realization. If the payback period more than 3 year, the action plan will be set for long term project.

PT. Amerta Indah Otsuka has defined the target for reduce energy 2016 about 2.5% from the previous year 2015.

Development and use of professional expertise, training, and communications:

Picture 10. Training and capability activities



Some activities are conducted to motivate, and develop the capability of employee regarding to the implementation of ISO 50001:

- Certification of Energy Manager by Badan Sertifikasi Nasional (BSN) (1 manager energy)
- Energy Management ISO 50001 by ESDM and UNIDO (2 person)
- Training Internal Auditor by Multi Prima Consulting (12 person)
- In House training by SAI Global (75 employee were already trained)
- New employee training to introduce the implementation of ISO 50001 at Company

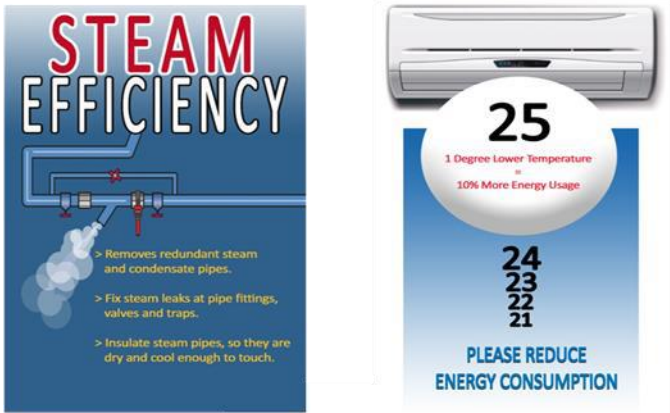
Picture 11. Certificate for PIC in charge



Internal Communication

Internal communication throughout the organization is carried out in many activities such as meeting coordination, sharing session, company email, web portal, bulletin, and also socialization using banner, poster, sticker, etc.

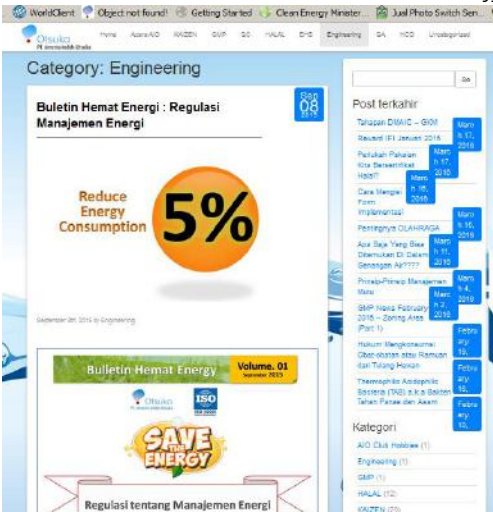
Picture 12. Energy awareness



Picture 13. Socialization ISO 50001 and Awareness efficiency energy



Picture 14. Socialization and Awareness efficiency energy



In addition, the Company is also implementing IFI programs (Idea for Improvement) and GKM (Gugus Kendali Mutu) with a culture based on KAIZEN / Continuous Improvement. The program encourages all employees personally or in group to develop continuous improvement include improvement in energy conservation.

Picture 15: Logo of IFI and GKM program



Picture 16. Personal idea of energy conservation; setting inverter.

Before	After

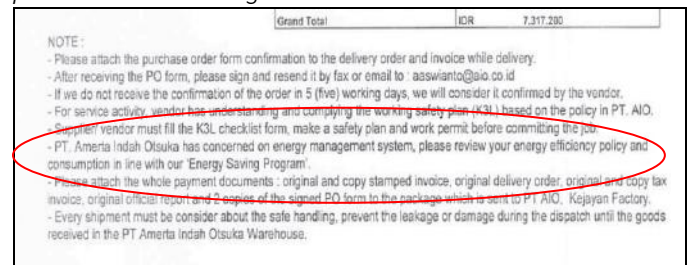
Saving:

- Energy saving inverter no.1 = (30 kW-18.05kW) = 11 kW
- Energy saving inverter no.3 = (29.98 kW-23.11kW) = 6 kW
- Total saving= (11+6)x24x30x12 =146.880 kWh
- Cost saving per year = 146.880 kWh x 1890 Rp/kWh= IDR 277,603,200

External Communication

Communication in external side, all the external stakeholders who cooperate with the Company should be consider to the aspect of energy saving, it was agreed at the beginning of cooperation with company, for examples it is listed in the Purchasing Order with external parties.

Picture 17. Communication about ISO 50001 to external parties at Purchasing Order letter.

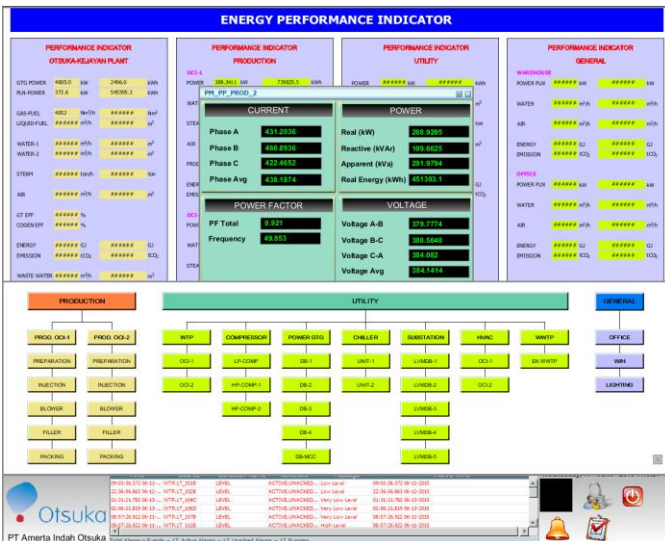


Tools & Resources

Measurement and monitoring tool is built to support implementation of ISO 50001:

1. Installation instrument tool : *Water Flow Meter, Air Compress Flow Meter, Power Meter, Gas Flow Meter, Fuel Flow Meter, Steam Flow Meter*
2. *System Scada Monitoring*
To monitoring energy performance in real time, it can record the data along the time.

Picture 18. Scada Energy Monitoring System



Lessons Learned

Implementation of energy management systems in the industrial level at industrial companies do not readily applied and implemented, because it takes more time for preparation and implementation.

At the beginning of the implementation of ISO 50001, the system has not been fully implemented because it requires continuous improvements to enhance the existing weaknesses, for example in the first implementation, our team face the problem in measuring of energy consumption in each significant energy use (SEU), because we did not install the power meter yet, thus for the improvement we take an action to install power meter at the specific machine which defined as SEU.

3. Investment of measurement tool for energy audit, such us : Power quality analyzer, Thermal imager, Ultrasonic leak detector, Combustion Analyzer, Infra red Leak Gas Detector, MultiMeter, Earth tester, Instrumentation Calibrator, Mega ohm meter, Lux meter, Vibration meter analysis, Db meter, Tachometer, Particle counter measurement, WWTP & WTP Laboratories, Water Level Sounding Meter.

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.