Global Energy Management System Implementation: Case Study

Indonesia

PT Schneider Indonesia

"Energy Efficiency is in our DNA to achieve best performance through ISO 50001."
—Mujino – Management Representative

Case Study Snapshot	
Industry	Electronic & Electrical Equipment
Product/Service	MV & LV switchgear
Location	EJIP Cikarang Selatan Bekasi Indonesia
Energy Management System	ISO 50001
Energy Performance Improvement Period	2014 - 2016
Energy Performance Improvement (%) over improvement period	10.5 %
Total energy cost savings over improvement period	$ 32,480 USD
Cost to implement EnMS	$ 8,076
Payback period on EnMS implementation (years)	5 years
Total Energy Savings over improvement period	$ 32,357 USD
Total CO_2-e emission reduction over improvement period	206.51 tones CO_2

Business Case for Energy Management

The global specialist in energy management and automation

Schneider Electric develops connected technologies and solutions to manage energy and process in ways that are safe, reliable, efficient and sustainable. The Group invests in R&D in order to sustain innovation and differentiation, with a strong commitment to sustainable development.

As the global specialist in energy management and automation, we create connected technologies that reshape industries, transform cities, and enrich lives to ensure that Life Is On everywhere, for everyone and at every moment.

Homes

From grid to living space, we ensure peace of mind, comfort, and sustainability. We keep people safe, secure, and in control of their environment and energy through intuitive, adaptive technologies for energy-efficient homes.

Cities

From downtown to suburb, we deliver urban efficiency today. To us, a smart city is an urban center where infrastructure management and energy efficiency go hand in hand.

Industry

From process automation to machines, we make industry smart, safe, efficient, and productive. No matter the approach to production or industrial segment, we see the promise of a bright industrial future.

Electrical utilities & renewable

From source to load, we make the grid easy, efficient, and reliable. Together with our partners, we enable smarter utilities, the integration of distributed renewable energies, and increased energy efficiency through smart metering and devices.

Data central

From rack to cyberspace, we optimize performance, speed, and cost. We build highly available and energy-efficient data centers that service the growing IT needs of all types of companies

Remote communities

From off-grid to fuel-poor communities, we create innovative solutions to address the energy paradox. We balance our planet's carbon footprint while upholding the indisputable human right of everyone to energy access.

Our Company Strategy

A healthier Planet

Our planet is facing an unprecedented energy challenge. Assuming that all recently introduced energy efficiency policies are implemented with full success, global primary energy demand is still expected to increase 32 percent by 2040. This demand would have a dramatic impact on energy costs and energy security, competition for resources, access to energy for the poorest populations, economic growth — and of course climate change.

Energy demand in perspective

To meet expected demand, the increase in energy-related greenhouse gas emissions would be 16 percent — whereas it actually would have to decrease by 41 percent for the world to achieve the environmental targets outlined at COP21.[2] Without question, the energy mix needs to change, with the share of renewable energies increasing.

Our strategic pillars

Schneider Electric is responding to today's megatrends in six strategic ways:

Energy efficiency everywhere
We strive to answer the world's new energy challenges by boosting energy efficiency everywhere: in our homes, buildings and cities, industry, the grid, and throughout remote communities.

Improved productivity and precision
We serve the increasing need for automation as a proven way to help customers thrive. Customers have asked for improved productivity, precision, and efficiency. We're answering those needs.

Digital transformation of customers
We pledge to support the digital transformation of customers and partners through continuous innovations in converged technologies to increase productivity, facilitate new business models, and make life easier all around.

Expanded presence in new economies
We are expanding our presence in new economies to leverage opportunities to respond to ever-growing energy, infrastructure, and industrialization needs through dedicated offers.

Creating new opportunites
We continue to advance both product and solution business models to create new opportunities for customers, distributors, and direct partners as we work together to improve efficiency everywhere.

Responsible, sustainable growth
We care about profit but only within the hand-in-hand context of responsible, sustainable growth that nurtures concrete efficiency improvements based on our trusted research and development.

Energy Reduction Approach

Align with corporate strategies and also based on ISO 50001:2011 requirement we also do this strategy:

- **Plan** : conduct the energy review and establish the baseline, energy performance indicators (EnPIs), objectives, targets and action plans necessary to deliver results in accordance with opportunities to improve energy performance and the organization's energy policy.
- **Do** : implement the energy management action plans.
- **Check** : monitor and measure processes and the key characteristics of its operations that determine energy performance against the energy policy and objectives and report the results.
- **Act**: take actions to continually improve energy performance and the EnMS.

Business Benefit :

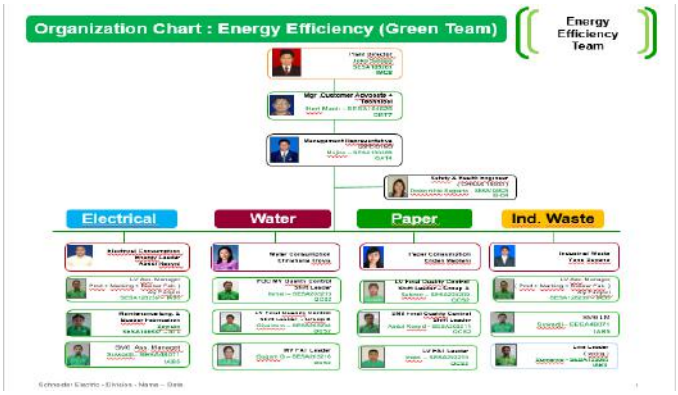
We have managed to decouple production to energy consumption. From our energy consumption reduction program from 2009 to 2016 (fig. 1) shows increase in production output by 139% with 46% reduction of electricity consumption.

Since 2015 we started to deploy Energy Performance Indicator (EnPI) tool with the baseline 2014 and this tool enables us to monitor the saving from the energy efficiency measures we apply from time to time (Fig. 2). Most of the time, the actual consumption is managed to stay below what it should to produce the amount of products calculated with the model. In cases when the consumption went higher than what the model suggests, there was the capacity expansion we had that mandates stops to the equipment, or hiccups in raw material supply that disrupts machine operation.

EnMS Development and Implementation

Schneider Cikarang (SCI) has obtained and renewed ISO 14000 for a few times and awarded 50001 in 2014. With the management system in place, we establish governance and discipline to our environment and energy program.

Schneider Organizational for Energy Efficiency Team :



Job Description per each Energy Team :

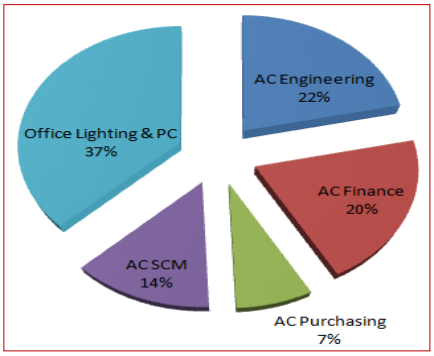
1. Review energy consumption per month.
2. Review action plan progress
3. Find improvement items to reduce the consumption of energy.
4. Report to Safety , Energy. Environment monthly meeting to top management.

Cost Benefit Analysis :

1. **Repalcement AC SPLIT Duct to AC Cassette.**

   Considering that currently we are using AC from 25 year ago , we already change the old AC for split duct (central AC) with the new one for AC Cassette.

   Based on below electricity distribution , showing that the AC is the biggest consume energy in the office , so Energy Efficiency Team recommended to change the AC in office with saving energy unit.



Based on the calculation and actual energy saving consumption , currently we can get saving from this action for total IDR 68, 493,312 per year

Please see below for the details of calculation :

Engineering & Finance AC Replacement			
BASELINE		New Cassete	
Working Hours /Day	12	12	Hours
Working Days /Year	264	264	Days
Working Hours /Year	3168	3168	Hours
ENERGY COST	Existing	New	
Power Required	72,272.73	58,760	W
Energy consumption /Year	228,960.00	186,151.68	kWh/Year
Electricity costs /kWh	1,600	1,600	IDR/kWh
Total Electricity costs /Year	366,336,000.00	297,842,688.00	IDR/Year
AC COST	Existing	New	
Price	0.00	578,906,700.00	IDR
SAVINGS			
Saving Cost /Year		68,493,312.00	IDR/Year
Payback Period		8.45	Years
ROI		12%	

2. Replacement Old Compressor machine with new Energy Saving unit.

Based on the electricity distribution model , as shown below , that our compressor machine is consume 3rd higher electric in our factory.

After we conduct energy audit calculation , we have conclusion to replace the old Compressor that consume more energy with the new one that more save the energy.

Below the details calculation related with the replacement of our compressor machine.

ROI Calculation for New Variable Speeed Drive Compressor

Description	Hyper Link	Value	Unit	Kurs to IDR	Value	Unit
Compressor Investment	BSD72 SFC Quotation.pdf	27,500	Euro	12,887.71	354,412,025	IDR
Efficiency Saving New VSD vs Current Compressor	Global Saving Report.pdf	4,900	USD/Year	10,166.21	49,814,429	IDR
Information about Kaeser BSD 72	Kaeser BSD 72 SFC.pdf					
Trade Off Old Compressor		60,000,000	IDR	12,887.71	4655.60	Euro
Saving from Time Schedulling		30,246,506	IDR/Year			

Description	Value IDR	Value Euro	Unit
Total Investment	294,412,025	22,844.40	
Total Calculated Saving	80,060,935	6,212.19	/Year
ROI New VSD Compressor	3.7	3.7	Year

3. Production Lighting Replacement from High beam mercury to LED lighting :

Considering that the highest consume energy in the production sector is lighting control system , as shown in below distribution chart , Energy Efficiency Team agreed to replace the old lighting system from High beam mercury to LED that consume more saving that the old one.

Below the details calculation of Lighting control system in our factory :

Saving replacement Led Production

Mercury 400 Watts
Led 150 Watts
Δ Power 250 Watts

Delta Power	Qty	Total Power Consumption	Daily usage hours	Days / month	Saving Kwh/month	Energy price / Kwh	Total saving / month (IDR)	Total saving / year (IDR)
250	50	12500	12	25	3750	1300	IDR 4,875,000	IDR 58,500,000

	Quantity	Price	Total Price
Investment Led	50	IDR 2,700,000	IDR 135,000,000
ROI	2.3	Years	

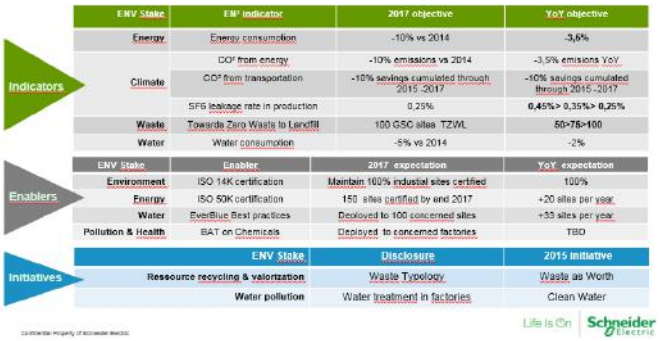
Energy Review and Planning :

In Schneider, the energy program is governed through:

1. Energy Policy that is disseminated globally reflecting on energy and CO2 keeping in mind the financial implication as well as the energy requirements on people, building and processes. Schneider Electric is committed to sustainably reduce its energy and CO_2 footprints through behavioral, process and technological transformations.

   Our objective is three-fold:

   1. Reduction of our Energy intensity year after year, ie decoupling Energy from our activity growth as well as profit generation
   2. Adoption of Schneider Electric products & solutions whenever relevant to allow our Sites to be showcases for Customers
   3. Purchase or Production -and self consumption- of low CO2 renewable energy whenever viable.
2. Environmental Strategy 2020



	ENV Stake	EMP indicator	2017 objective	YoY objective
Indicators	Energy	Energy consumption	-10% vs 2014	-3,6%
	Climate	CO² from energy	-10% emissions vs 2014	-3,5% emisions YoY
		CO² from transportation	-10% savings cumulated through 2015 -2017	-10% savings cumulated through 2015 -2017
		SF6 leakage rate in production	0,25%	0,45%> 0,35%> 0,25%
	Waste	Towards Zero Waste to Landfill	100 GSC sites TZWL	50>75>100
	Water	Water consumption	-5% vs 2014	-2%
	ENV Stake	Enabler	2017 expectation	YoY expectation
Enablers	Environment	ISO 14K certification	Maintain 100% industial sites certified	100%
	Energy	ISO 50K certification	150 sites certified by end 2017	+20 sites per year
	Water	EverBlue Best practices	Deployed to 100 concerned sites	+33 sites per year
	Pollution & Health	BAT on Chemicals	Deployed to concerned factories	TBD
		ENV Stake	Disclosure	2015 initiative
Initiatives		Ressource recycling & valorization	Waste Typology	Waste as Worth
		Water pollution	Water treatment in factories	Clean Water

Life Is On Schneider Electric

We need to save 10% energy saving in 3-year program since 2015 to 2017.

Next step is to control and monitor the progress of each action plan such as lighting control replacement with energy saving (LED) in production sector and office. Purposes for this monitoring and controlling are to ensure that all the equipment installed impact to the energy efficiency program.

StructureWare of SCADA (Supervisory Control and Data Acquisition) this tools part of Schneider Electric software ,to measure and monitor the consumption of electrical usage every day in Schneider Electric Cikarang Factory.

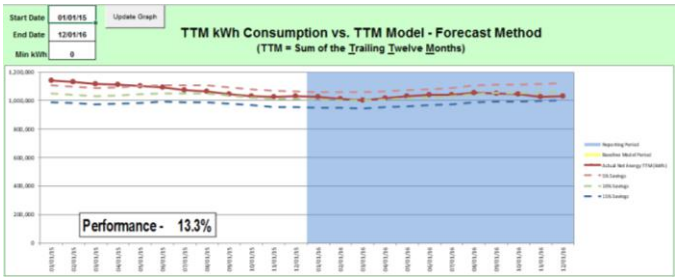
This measurement can be done after installed the power metering. This tools is part of Schneider Electric to achieve energy efficiency program and continual improvement activities.

Energy Performance Improvement Program :

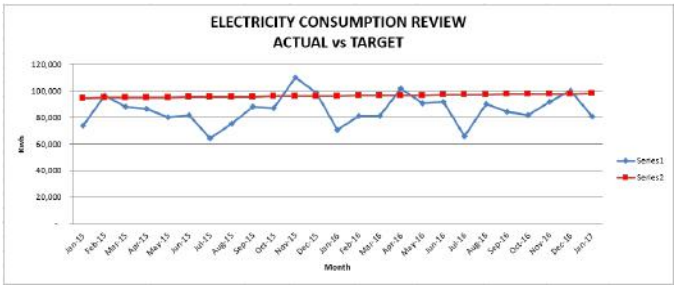
- Air compressor. Change with low energy.
- Air conditioning. AC central to cassette.
- Lighting Office. Change TL lamp to LED.
- Lighting Production. Change Mercury lamp to LED
- Power Control Fan : switch OFF during break.
- Solar Panel installation for sustainable
- Transparent roof implementation
- Reduction lamp office in alley way

Maintain Operational Control

* Monthly performance dashboard KPI in plant



* Electricity consumption Graph.



Develop to Energy Professional Expertise & Employee Enggagement

* ESS – employee suggestion system – Idea System (Kaizen System)

Tools & Resources :

- Energy Performance Indicator tool

- Power Monitoring System

Lesson Learn :

- Regular monitoring allows early mitigation to energy loss and inefficiency
- Active and continuous improvement

Key Success :

- Strong commitment from top management is mandatory
- Boosting Awareness from all peoples related with the energy efficiency programs
- Fully implemented for ISO 50001:2011 for Energy Management System.

Visualization Energy Improvement :

Installation of solar panel to support the energy in the lobby show room

Install of Production Lighting control system.

Install sensor movement in all meeting & toilet room.

Installed fan controlling system in the production sector.

Replace old Split duct air con with AC cassette type