

Global Energy Management System Implementation: Case Study

United Arab Emirates

ENOC Retail Operations & Marketing (ROM)

Energy efficiency and savings have been one of the core values that have been integrated into all our business process and operations



Business Case for Energy Management

ENOC Retail currently operates 115 Petrol stations of which 9 are certified to ISO 50001. ENOC retail stations are all full service and the activities consist of fueling vehicles, car wash and convenience stores.

Energy source input to all the certified sites is electricity from the Dubai grid. The main energy consumers at each site is refrigeration, HVAC and indoor and outdoor lighting. Most of the sites operate 24 hours a day.

As a member of the Dubai Supreme Council of Energy (DSCE) and in line with ENOC's commitment to support Dubai Integrated Energy Strategy ENOC considers energy efficiency and savings as one of the core values and have integrated it into the business process and operations of ENOC since 2008. Because of this ENOC group developed an Energy and Resource Management System (E&RMS) manual with mandatory requirements. This was prior to the issue of ISO 50001. Group Sustainability office periodically audited the business

Case Study Snapshot

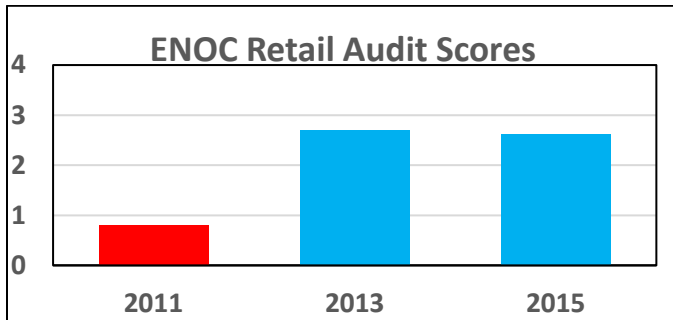
Industry	Oil & Gas
Product/Service	Full service fuel stations
Location	Dubai
Energy Management System	ISO 50001
Energy Performance Improvement Period	2
Energy Performance Improvement (%) over improvement period	5%
Total energy cost savings over improvement period	40,061 for 2016
Cost to implement EnMS	52695
Payback period on EnMS implementation (years)	1.32
Total Energy Savings over improvement period	1176 (GJ in 2016)
Total CO ₂ -e emission reduction over improvement period	167 (Metric tons in 2016)

units including ENOC Retail. The score over the years are shown in the graph below (max possible is 4).

“ENOC is at the forefront of integrating international E&RM best practices throughout all aspects of our operations.”

—Saif Al Falasi, CEO, ENOC (ENOC Energy Report 2015)

Following their score of 2.7 in 2013, ENOC retail was encouraged to apply for ISO 50001 certification for selected sites and any new sites



Other than pure energy savings reasons such as reduction in CO₂, a part of Dubai Carbon Abatement Strategy was also a driver. Additionally, when LED lights were installed as a pilot project, it was seen that the quality of lighting improved thereby providing more customer satisfaction.

Prior to implementing an EnMS, the approach towards energy savings was purely based on the available budget and what was easy to implement. Following the development of the EnMS, an Energy review and the resulting energy aspect register clearly indicated the areas where maximum energy savings would come and the budgets were planned accordingly.

Business Benefits Achieved

Besides the obvious benefits of reduced energy use and cost savings there were several additional business benefits especially from the convenience stores and coffee shops. These are summarized below:

- Switching to LED lights from standard tube resulted in almost no change of lights over years, resulting in lower maintenance activities and reduced customer discomfort
- Considering the large lighting load inside the store and the resulting heat load on the A/Cs the change to LED lights resulted in increased customer and employee comfort, especially during summer.
- The quality of illumination from LED lights were far superior to conventional lights enhancing the attractiveness of the sites
- Switching to higher efficiency VRF A/Cs resulted in better distribution of cooling and more comfort



The financial and environment benefits from implementing ISO 50001 are as follows for the 9 sites in 2016 over baseline year of 2014:

- CO₂-e reduction of 167 t
- Energy use reduction of 1176 GJ over business as usual 2014 for a 5% savings over 2014
- Energy cost reduction of USD 40,061 over 2014

EnMS Development and Implementation

ENOC Retail was one of the first companies in ENOC group to be audited against ENOC E&RMS system of 2010. Following subsequent audit of 2013, they were deemed to be ready to go for ISO 50001 certification for selected sites which they started in 2015 and is continuing by adding more sites every year.

Organizational

In line with Dubai Vision for a greener economy and the Dubai Integrated Energy Strategy (DIES) for 2030, ENOC top management starting from the CEO put considerable focus on energy by mandating a 5% weightage in all business units' balance score cards on energy management and conservation. The Group energy policy was issued in 2010 along with mandatory requirements for implementation.

Following the issue of the above, ENOC Energy Steering committee and Technical committee were set up. The steering committee was chaired by the Executive Director (EHS and Corporate Affairs), a member of ENOC Executive Committee. This committee consisted of all business unit heads and was responsible for setting policies and providing guidance.

The Technical Committee on the other hand was chaired by the Group EHS Director and consisted of engineers from operations, maintenance or EHS departments of each business unit. This committee was primarily involved in identifying opportunities for improvement on the ground, sharing knowledge among the business units and bringing new technologies through supplier presentations.

While the group level committees provided overall direction to the whole group, ENOC Retail set up their own Energy Committee as a part of their efforts towards Business and Operational Excellence. The committee is chaired by the Director Retail Operations and included heads of all departments and the Quality and Business Excellence Manager (QBEM). This committee is responsible for guiding in implementation of ISO 50001, discussing & approving final improvement plans and allocating resources for the same.

The EHS manager and his reportees were assigned the required roles and responsibilities for monitoring and reporting on the performance of the EnMS. Technical assistance to him was provided by an engineer designated by the Retail Engineering Manager. The QBEM was responsible for managing the certification

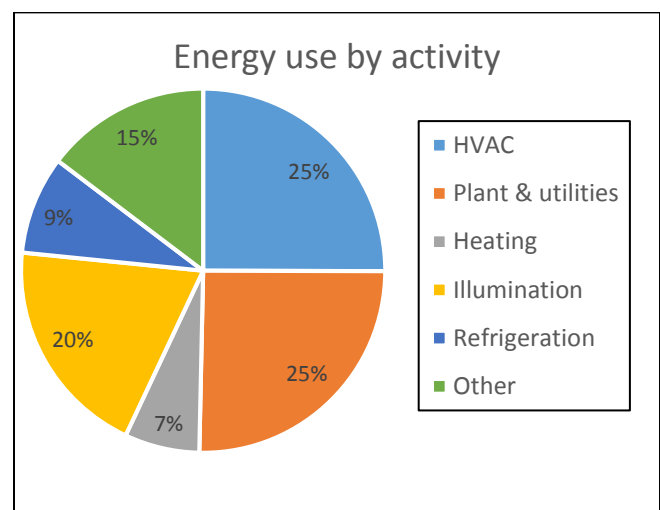
process through documentation, internal audits corrective action monitoring etc.

Energy review and planning

Prior to starting the ISO 50001, the baseline consumption was taken as the actual electricity used in 2014. A detailed energy review was carried out for the main areas of usage. These areas are:

- HVAC – air condition for the store,
- Plant and utilities – mainly car wash equipment,
- Heating – for coffee machines & ovens,
- Illumination – indoor & outdoor lights and signage
- Refrigeration – chillers, coolers & fridges

The results of the review are provided below



Based on the above, Illumination and A/Cs were found to be significant due to both high use and potential for reduction. Additionally, both impacted positively on customer satisfaction. Plant equipment energy use was addressed only through behavioral changes through training and awareness as the equipment themselves were not amenable to intervention. Also, small low cost easy projects were also identified through employee suggestions.

The financing for all the projects thus identified was made through budgetary provisions for the next five years. Additionally, the maintenance budget also carried an item for energy efficiency.

As ENOC retail already had a Quality and Business Excellence (QBE) department managing their certification process for ISO 9001, 14001 and OHSAS 18001, very little additional time of 6 months (other than for review) was required.

“Having seen the immense benefits from implementing the ISO 50001 system in 5 sites to begin with, the retail team is enthusiastic to roll it out to as many sites as possible.”

— Taleb Al Saleh, Director, ENOC Retail & Marketing

Cost-benefit analysis

The cost of implementing the EnMS was USD 52,695/- so far for the 9 sites. The costs include the cost of internal staff time for developing the EnMS (USD 20,000/-), Internal staff time for external audit (USD 13,624/-), third party audit costs (USD 2404/-) and additional metering costs (USD 16,667/-). The cost for the staff time were calculated based on the man-days spent and the third-party cost was additional man-day cost for ISO 50001 (other standards also were audited by the same third-party). No external technical assistance was required.

Based on the expected recurring benefit of at least USD 40,000/- per year, the simple pay-back period for ISO 50001 certification is 1.32 years.

The total investments on the projects from 2013 onwards was USD 190,000/-. Based on the savings, the payback period for the projects is approximately 5 years. However, it should be noted that the projects also had operational benefits, such as increased customer and employee satisfaction.

Approach used to determine whether energy performance improved

During the energy review, measurements were carried out for all activities at different sites. This data was used as basis for establishing savings from lighting efficiency improvements. Measurement of consumption for lighting after improvement provided the actual savings. The operating hours for every site remains the same at

all times. Seasonal variations effecting outdoor lighting average out over a year.

A/C consumption was measured in two identical sites and the correlation between the two were established. The sites where the A/C efficiency improvements were carried out was further measure for a performance period along with the reference site. The difference in usage between the two was then adjusted for CDD to arrive at savings.

Savings from other small initiatives were primarily from eliminating unnecessary equipment that operated 24 hours a day such as multiple LED monitors. Savings from these were established by using the wattage data.

Grid emission factors were obtained from data provided by Dubai Carbon Centre of Excellence (DCCE), a body formed by major energy users and suppliers of Dubai. data.

Approach used to validate results

The actual savings from each project was measured and totaled up to obtain the total energy savings. This savings was then tallied against the overall energy savings from meters installed for the store and outdoor lighting. Savings from such tallying were in good agreement.

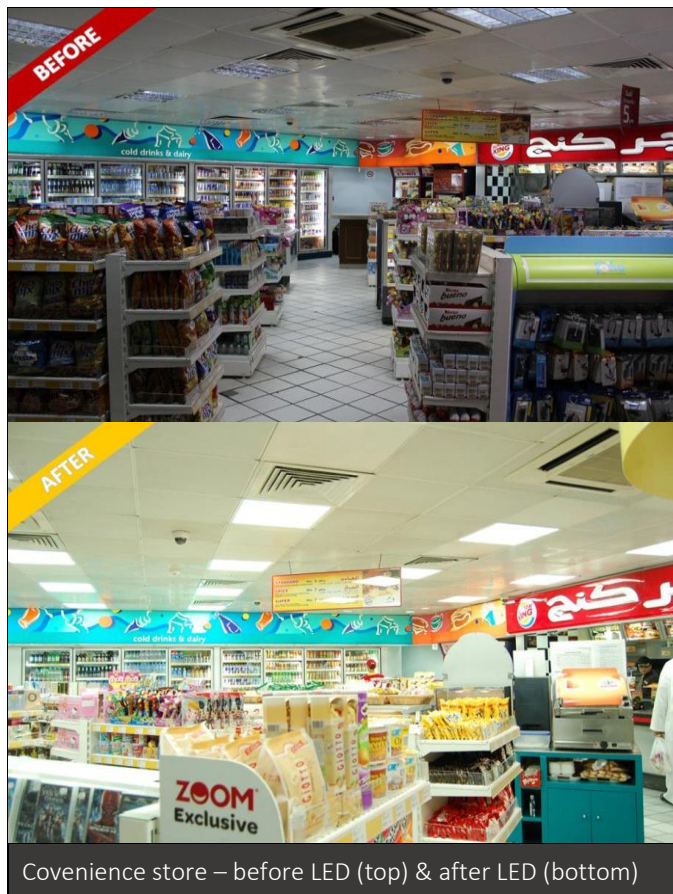
The car wash and other plant energy use would require variables such as number of cars, amount of fuel dispensed etc.

To track the progress of activities related to the management system, management review meetings are held once in six months. Additionally, progress on improvement projects is monitored on a quarterly basis by ENOC Group Sustainability office.

Steps taken to maintain operational control and sustain energy performance improvement

The steps taken to sustain energy performance and instill creativity and motivation of employees are taken primarily at the ENOC group level and cascaded down to the business unit level. Some of these steps are summarized below:

- Business unit KPIs for energy use savings reported and monitored by ENOC Group on a quarterly basis
- ENOC annual energy awards in different categories for categories such as manager, technician, business unit best energy project etc.
- Periodic energy awareness and technical trainings
- Regularly scheduled ENOC energy steering and technical committee meetings
- Publication and mention in ENOC bi-annual energy report
- Special cash awards for best implemented energy saving suggestion in ENOC suggestion scheme



Convenience store – before LED (top) & after LED (bottom)

Development and use of professional expertise, training, and communications

ENOC Group has tie ups with several professional organisation to provide training and also develop methodologies for energy savings and carbon abatement. These include Energy Institute (EI), UK, DCCE,

ENOC group Engineering Department and Sustainability office and Ernest and Young (EY) Sustainability division.

EY and EI are regularly engaged by ENOC to conduct trainings in Energy management as well as on energy intensive equipment such as HVAC, pumps, compressors fans, fired equipment etc. DCCE is engaged in identifying new suppliers and technology and developing tools for determining carbon abatement.

Employee engagement at ENOC Retail is encouraged at as described in the previous sub-section.

Tools & resources

Prior to implementing ISO 50001, ENOC Retail already had several years' experience in systems such as ISO 14001, 9001 and OHSAS 18001. Hence many of the procedures and practices of these systems were utilized in their ISO 50001 system.

Supplier presentations are frequently provided at the Energy Technical Committee meetings to familiarize members on new and more efficient equipment such as VRF A/Cs and LED lights.

Other tools and resources used in the implementation are described in the previous two sub-section of this report

Lessons Learned

One of the primary barriers to implementing an EnMS is management reluctance due to lack of application of mind towards business benefits that would accrue indefinitely over time without any further effort. Management is focused on increasing production, revenue and profitability, all of which they relate to immediately reducing costs and increased sales. Hence, energy efficiency projects were always considered a cost increase with no impact on revenue and sales. We at ENOC have overcome this inertia by including energy efficiency and forming it as a business plan in all our business units' Balance Score Cards for a high weightage of 5%. Additionally, the efforts have been facilitated by

providing facilities for training, supplier interaction, Group finance support etc.

Prior to the pilot implementation of LED lighting there was much reluctance in adopting such a high cost equipment for lighting. Having seen the additional benefits from this, this barrier was removed.

Keys to Success

- Achieve management and employee buy-in.
- Cast energy efficiency as a business objective
- Link energy conservation to profitability and customer and employee comfort
- Provide adequate incentive (5%) for energy initiatives in the balance score cards (BSC) of employees, management and business unit.

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.

