ISO 50001 Energy Management System – Case Study

2024 United Arab Emirates

EPPCO INTERNATIONAL LIMITED

Contractor Site Power for Projects

Case Study Snapshot	
Industry	Oil Storage Terminal
Product/Service	Petroleum product
Location	Jebal Ali, Port & Fujairah Port.
Energy performance improvement percentage (over the improvement period)	5.19 % improvement over 3 years on 2019 baseline consumption.
Total energy cost savings (over the improvement period)	USD 73,946.00
Cost to implement Energy Management System (EnMS)	USD 20,500.00
Total energy savings (over the improvement period)	35.647 MWh - (356,479) Liter diesel
Total CO_2-e emission reduction (over the improvement period)	303.8 Metric Tons

Organization Profile / Business Case

EPPCO International Limited (EIL) a Joint venture between Horizon Terminals Ltd (ENOC) and Chevron, EIL Terminals are strategically located inside the Jebal Ali port Petro-chemical area and Inside port of Fujairah. It is integral part of ENOC during its the formation dating more than 35 years ago.

EIL is the only terminal which cater the needs of all fuel requirement to the Dubai Airports, ENOC and EPPCO retail stations Dubai & Northern Emirates & Abu Dhabi region and one of the oldest terminals in UAE.

The EIL terminal consists of 3 terminals in Jebal Ali and 1 terminal in Fujairah.

"At ENOC, our commitment to sustainability is central to the long-term development of our business. As part of our longstanding practices and commitment to our sustainability, we have been focusing on improving efficiencies of our operations, minimizing the environmental impact and using tools available to us to bring about positive economic change."

H.E Saif Humaid Al Falasi, Group Chief Executive Officer.

Being the oldest terminal, the journey to energy conservation started a decade ago in 2013 with the replacement of obsolete equipment and outdated technology. This was introduced as part of Preventive & Corrective maintenance action plan and yearly budget resource was allocated for both OPEX & CAPEX.

Further, the awareness was enhanced with interaction with Original Equipment Manufacturers (OEM) & Supplier and greatly by ENOC Group sustainability technical team.

Prior to implementation of ISO 50001, energy conservation was integral part of EIL management priority in identifying and replacement of conventional and outdated equipment and system such as Lights, Air conditioning, Motors, and electrical systems to reduce the power consumption, maintenance cost and increase reliability for operational of terminal facilities.

To support EIL road map towards energy conservation program, implementation of ISO 50001 has become crucial for all stakeholders of EIL Internal & External and received the inaugural certification of ISO 50001 in 2019.

Many initiatives have been identified & implemented before and post ISO 50001 Implementation. Below are some of the projects.

- Replacement of conventional Lights to energy saving LED
- Old Air conditioning units with New Energy efficient inverter type.
- Monitoring of Energy consumption by installing meters on all Incomers, motors, and utilities
- Replacement of old motors
- Installation of Soft-starters and Variable frequency drives (VFD)
- Replacement of old heater burners with energy efficient
- Solar PV for renewable energy source.
- Process changes in SOP by eliminating pumps and using gravity flow.

Contractor Site Power for Projects

As part of the brain storming session, we have analyzed by providing DEWA power to contractor site facilities as one of the very sustainable projects with least cost.

Below is the overview of the case study implemented.

The EIL project for Tank Refurbishment involves contractor mobilization to site with full team to carry out the Tank repair.
During their schedule period of 8 to 10 months at site, contractor arranges DG for their site office. EIL has eliminated DG by providing DEWA power from EIL distribution board.

This eliminates high cost for unit power generation, reduction in diesel consumption, reduction in CO2 emission, No noise pollution & Environmental ground pollution.

Also note the Fuel cost are increasing / fluctuating on monthly basis against DEWA cost of 0.45 AED / Kwh.

"Encourage and promote energy conservation measures by providing necessary resources and framework to set Objectives and Targets related to Energy and reviewing the same periodically."

Khalid M Al Ahthel, General Manager – EPPCO International Limited.

Business Benefits

This eliminates high cost for unit power generation, reduction in diesel consumption, reduction in CO2 emission, No noise pollution & Environmental ground pollution.

Also note the Fuel cost are increasing / fluctuating on monthly basis against DEWA cost of 0.45 AED / Kwh.

With the implementation of ISO 50001, energy conservation program we identified and replaced the conventional and outdated age asset/ equipment and system such as Lights, Air conditioning, Motors, and electrical systems to reduce the power consumption, maintenance cost and increase reliability for operational of terminal facilities.

ISO 50001 recertification ensures our commitment towards Energy & Environmental conservation.

Through Energy Management system, a culture of sustainability can be cultivated by instilling it as a core individual value and consistently integrating it into the business.

In addition, this will Inspire employee thinking and behaviour to consider sustainability in all their activities right from the design phase itself.

Plan

The management is responsible for implementing the EnMS by designing the policy, assisting in the selection of the ECT team and ensuring that the team holds quarterly meetings to discuss EnMS performance and monitoring.

As part of EIL annual budget session, we have allocated a session for energy improvement project as identified in the objectives and targets of the EnMS ISO 50001.

The project with its saving and ROI is submitted for management approval, these projects normally have advantages on multiple aspects such improvement on maintainability, operational reliability, energy conversation with potential commercial return on investment.

ISO 50001 projects are being implemented and monitored by inhouse resources of EIL Energy Core Team.

By implementing energy meters and monitoring system across 4 terminals, data has supported in identifying the Significant energy use (SEU) in our terminal operations and energy consumption. The data's being are analyzed by core energy technical team that involves Ops, Maint. and management team members to understand the deviation and root cause.

The project is being monitored on quarterly basis on the schedule & review meetings. Feasibility studies were done, and Projects were planned.

ISO 50001 supports in understanding the external and internal guidelines, roles & responsibilities and data monitoring and analysis of different energy consumption and its efficiency.

Multiple sites are integrated using smart energy meters which can communicate to central server for data storage and analysis. In addition, for verification purpose data are being taken monthly, manually.

The energy meters are being periodically calibrated as per procedure.

An energy review is conducted yearly to understand the energy performance, review if the baseline is valid, identify if any new activity in the terminals, review the Energy performance indicators and predict future energy consumption.

The energy consumption is based on the operations and quantity of material handled and compared the same with the expected energy consumption derived based on the future energy consumption values of last year's energy review. It continues with the analysis of the energy consumption and EnPI trend, compared with the baseline to evaluate continual improvement in energy performance.

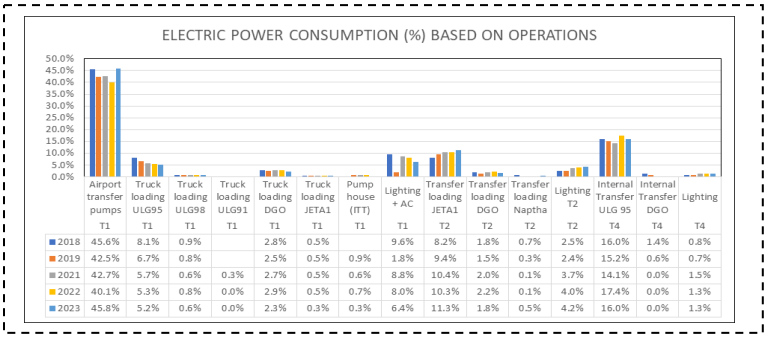
The operational control procedures are in place, awareness is given to employees for energy usage and operations, monthly energy performance is monitored and reviewed, projects are identified and implemented, energy committee is meeting is conducted to identify the gaps which all will help to achieve the targets.

GHG conservation

- Replacement of old air conditions with Energy efficient and environment friend refrigerant.
- The asphalt Heaters performance & stack are being monitored and required upgrades implemented.

"Support the Energy conservation measures through the purchase of Energy efficient products and services and their by using energy and resources in the most efficient, cost effective and Environmentally friendly manner"

Abdul Rahuman, Maintenance Superintendent – EPPCO International Limited.



	Airport transfer pumps T1	Truck loading ULG95 T1	Truck loading ULG98 T1	Truck loading ULG91 T1	Truck loading DGO T1	Truck loading JETA1 T1	Pump house (ITT) T1	Lighting + AC T1	Transfer loading JETA1 T2	Transfer loading DGO T2	Transfer loading Naptha T2	Lighting T2 T2	Internal Transfer ULG 95 T4	Internal Transfer DGO T4	Lighting T4
2018	45.6%	8.1%	0.9%		2.8%	0.5%		9.6%	8.2%	1.8%	0.7%	2.5%	16.0%	1.4%	0.8%
2019	42.5%	6.7%	0.8%		2.5%	0.5%	0.9%	1.8%	9.4%	1.5%	0.3%	2.4%	15.2%	0.6%	0.7%
2021	42.7%	5.7%	0.6%	0.3%	2.7%	0.5%	0.6%	8.8%	10.4%	2.0%	0.1%	3.7%	14.1%	0.0%	1.5%
2022	40.1%	5.3%	0.8%	0.0%	2.9%	0.5%	0.7%	8.0%	10.3%	2.2%	0.1%	4.0%	17.4%	0.0%	1.3%
2023	45.8%	5.2%	0.6%	0.0%	2.3%	0.3%	0.3%	6.4%	11.3%	1.8%	0.5%	4.2%	16.0%	0.0%	1.3%

Recertification enables improvement opportunities to further enhance system, competencies, skills aside from ensuring compliance on current Management system requirements.

Do, Check, and Act

The energy review in EIL are carried out as follows-

- Measurement and monitoring data
- Quantity of material handled
- Equipment list
- Power data by Janitza power system
- Standard Operating procedures
- Logbooks
- Energy consumption data of equipment

- Material handling records from the Inventory department
- Transport fuel consumption and travel data
- Asphalt handling data

The data are being collected through operations, inventory and maintenance team, and ECT team periodically monitor and review the energy performance.

Top management formulated the energy policy with the support of ECT to implement the energy management system, encourage employees to give energy related suggestions, conduct energy campaign, energy initiatives.

The energy consuming processes as follows.

- Unloading at berth and Pumping to storage tanks (Found negligible in the initial review)
- Loading to the ship
- Internal transfer pumping (ITT)
- Truck loading facility (TTLR)
- Direct pumping to customer desired destination (PLT)
- Heating the Asphalt tanks/pipelines to keep it in suitable viscosity to pump and load in the truck.
- Lighting of premises and offices and Air conditioning of offices

The initial energy review was conducted in Jan 2019 with 2018 data as base year. Later, the other terminals also joined in the automation and installation of energy-measuring devices. It was decided to align the energy review period with the financial year and also capture the annual seasonal effect. Hence the (third) next energy review was conducted in Jan 2022, with the monitored data from January 2021- December 2021. The current baseline is from Jan-Dec 2021.

EIL has baseline 2019 and energy performance of the different activity during this period.

To demonstrate continual improvement, EPPCO ECT shall compare the actual energy performance of 2023 with:
Baseline value (established using actual performance of Jan 21 – Dec 21)
Expected value (it is the estimated energy performance under the given condition/situation of 2023, this is established using the regression analysis of the actual performance of Base year and fine-tuned in 2022)

The comparison is presented in following manner:
If performance of 2023 is better than both baseline and expected value then it is presented in green
If performance of 2023 is not better than both baseline and expected value then it is presented in red
If performance of 2023 is better than either baseline or expected value then it is presented in blue

Two important EnPI s were set to monitor the energy performance as follows.

- EnPI 1: Specific Power consumption: Specific power consumption (SPC) for JA: total power/ total material handled (kwh/m3)
- EnPI 2: Overall utility consumption/month (kwh/month)

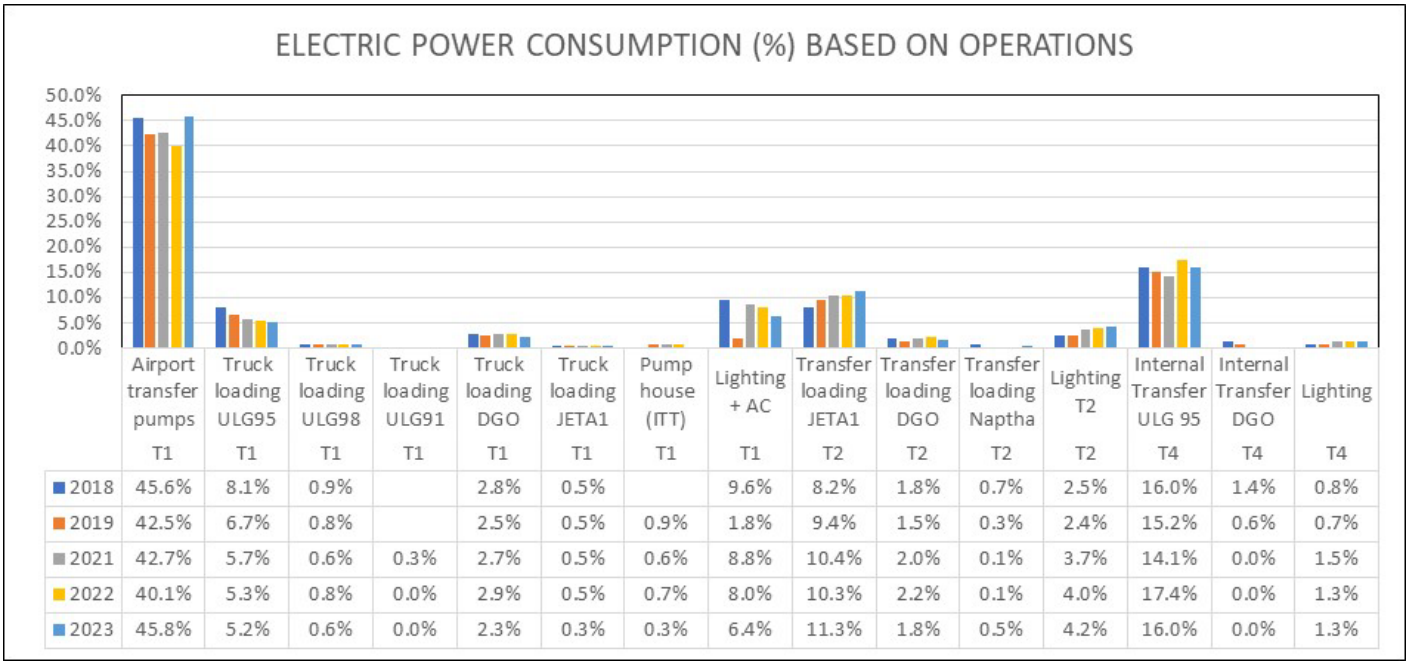
The energy variables of the significant energy use (SEUs) were determined that are affecting the energy performance namely.

- Material handled.
- Outside temperature (determines cooling load of ACs)
- Operation hours (determines lighting load, though the impact is less)
- Internal to external transfer ratio (impact is less)

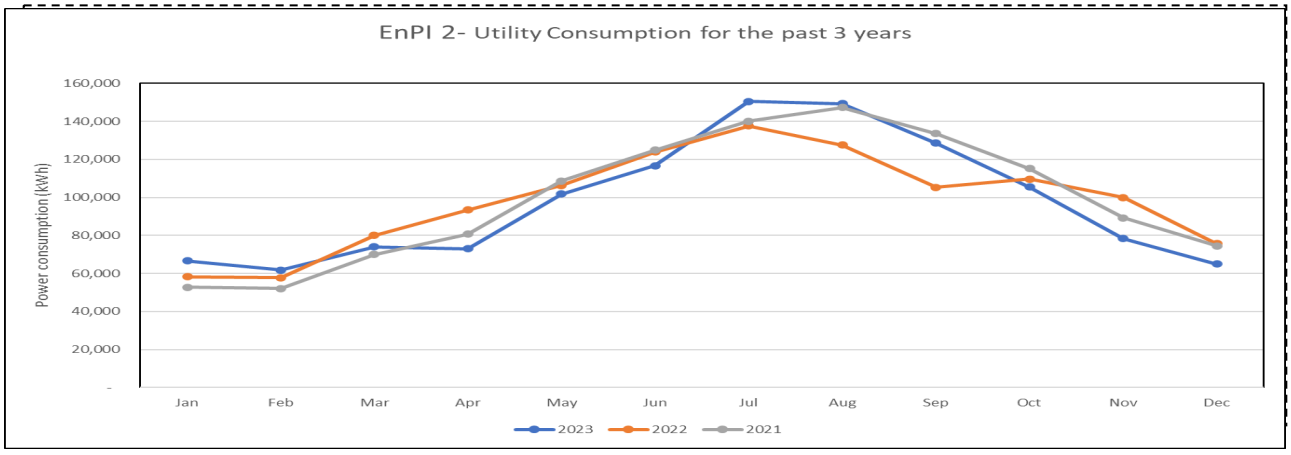
- Especially for Asphalt the following energy variables.
- Quantity of the asphalt handled/heated.
- Receipt, Stored and Outlet Temperature (during transfer) of Asphalt
- Duration of heating
- Circulation hours

The data are tabulated as below.

- Graphs
- Charts
- Tables
- Monitoring system
- Specific energy consumption analysis



	Airport transfer pumps T1	Truck loading ULG95 T1	Truck loading ULG98 T1	Truck loading ULG91 T1	Truck loading DGO T1	Truck loading JETA1 T1	Pump house (ITT) T1	Lighting + AC T1	Transfer loading JETA1 T2	Transfer loading DGO T2	Transfer loading Naptha T2	Lighting T2	Internal Transfer ULG 95 T4	Internal Transfer DGO T4	Lighting T4
2018	45.6%	8.1%	0.9%		2.8%	0.5%		9.6%	8.2%	1.8%	0.7%	2.5%	16.0%	1.4%	0.8%
2019	42.5%	6.7%	0.8%		2.5%	0.5%	0.9%	1.8%	9.4%	1.5%	0.3%	2.4%	15.2%	0.6%	0.7%
2021	42.7%	5.7%	0.6%	0.3%	2.7%	0.5%	0.6%	8.8%	10.4%	2.0%	0.1%	3.7%	14.1%	0.0%	1.5%
2022	40.1%	5.3%	0.8%	0.0%	2.9%	0.5%	0.7%	8.0%	10.3%	2.2%	0.1%	4.0%	17.4%	0.0%	1.3%
2023	45.8%	5.2%	0.6%	0.0%	2.3%	0.3%	0.3%	6.4%	11.3%	1.8%	0.5%	4.2%	16.0%	0.0%	1.3%



Transparency

Quarterly meeting is being done and operational & maintenance data are being addressed and project delay etc. as part of ISO 50001 procedure by Energy Core Team Members.

Any performance deviations are investigated and communicated to the respective EIL department.

EIL ISO 15001 successful certification is being communicated to ENOC Group Quality and Business Excellence Department.

What We Can Do Differently

Not necessarily, as the EIL is the oldest terminal, however key lesson learnt, awareness trainings shall be encouraged to support improving and identifying the significant energy usage.

EIL shall continue to embark on ISO 50001 audit / recertification journey and seek continuous improvement on;

- Management system conformity to all requirements of audit standards.
- Identifying areas for potential improvement of the management system.