ISO 50001 Energy Management System – Case Study

2024 United Arab Emirates

ENOC RETAIL LLC

Energy Conservation initiatives and retrofit projects in compliance to the ISO 50001 standards at ENOC Retail Fuel Filling Stations collaboration with Etihad ESCO

Case Study Snapshot	
Industry	Oil and Gas
Product/Service	Fuel Filling Station
Location	Dubai, United Arab Emirates
Energy performance improvement percentage (over the improvement period)	49 % improvement over 3 years
Total energy cost savings (over the improvement period)	USD 1,247,406
Cost to implement Energy Management System (EnMS)	USD 593,933
Total energy savings (over the improvement period)	12,816 GJ
Total CO_2-e emission reduction (over the improvement period)	1,487 Metric Tons

Organization Profile / Business Case

The Emirate National Oil Company (ENOC) serves as a global leader in the energy sector, offering comprehensive energy solutions across the UAE and beyond. As a responsible operator in the Oil & Gas industry, our commitment lies in safeguarding the environment and enhancing energy efficiency within our operations. Our focus extends beyond mere compliance with regulations; we strive to surpass them by embracing innovative technologies, best practices, and procurement strategies.

In an era marked by heightened environmental awareness and the imperative of economic sustainability, the collaboration between Etihad ESCO and ENOC Retail emerges as an epitome of innovation. By leading energy efficiency initiatives in retrofit projects at fuel filling stations, this partnership not only diminishes carbon footprints but also establishes new benchmarks for responsible business conduct within the energy sector.

Etihad ESCO, renowned for its proficiency in energy conservation, has joined hands with ENOC Retail, a prominent provider of petroleum products and services, to rejuvenate the energy infrastructure of fuel filling stations throughout the region. The primary objective is to curtail energy consumption and operational expenses while concurrently advancing environmental sustainability.

Etihad ESCO projects encompass a thorough examination of energy usage, succeeded by the conceptualization and execution of bespoke solutions aimed at optimizing efficiency. This encompasses the upgrade of lighting systems to energy-efficient LED fixtures, the enhancement of HVAC systems to ensure superior climate control, and the integration of smart monitoring devices for real-time tracking and management of energy consumption.

ENOC Retail remains steadfast in its commitment to innovation in the design and construction of its fuel stations to cater to the evolving needs of its clientele. Managing and operating 199 service stations across the UAE, ENOC oversees 31 certified sites adhering to ISO 50001 standards. These retail station facilities include vehicle fueling forecourts, convenience stores, and automotive services such as oil changes, maintenance, and car wash facilities.

The development of smart stations stands as a strategic initiative of ENOC Retail, with the implementation of an Energy Management System serving as a pivotal pillar in realizing the vision and mission of the ENOC Group. Through such concerted efforts, ENOC Retail continues to lead the charge towards a sustainable and energy-efficient future.

Vision: *To be an innovative energy partner, delivery sustainable value and industry-leading performance.*

Mission: *Deliver world class sustainable and integrated energy solutions, striving for excellence in operations, innovation and happiness of employees, customers, and partners.*

> ***"At ENOC Group, sustainability is an integral part of our DNA. Having set a remarkable benchmark regionally, we are looking forward to leaving our imprint globally as a sustainability champion in the energy sector."***
>
> *— H.E .Saif Humaid Al Falasi, Group Chief Executive Officer ENOC*

The primary goal is to enhance environmental sustainability within the operations of ENOC Retail fuel filling stations. This involves reducing carbon footprints and minimizing energy consumption through the implementation of energy-efficient solutions and retrofit projects. he implementation of energy-efficient technologies and practices aims to optimize efficiency and enhance the financial performance of the company. The collaboration with Etihad ESCO and the successful outcomes of retrofit projects position ENOC Retail as an industry leader in environmental sustainability and energy efficiency.

ENOC Retail's energy management actions are rewarded through various platforms which include SEP Awards, best E&RM awards green procurement Champion etc aimed at promoting environmental sustainability and energy efficiency.

The outcomes of the Etihad ESCO projects in ENOC Retail fuel filling stations speak volumes about their success. Significant reductions in energy consumption have been achieved, resulting in substantial cost savings for the company. Moreover, the implementation of sustainable practices has garnered acclaim from stakeholders and positioned ENOC Retail as a pioneer in corporate responsibility.

Business Benefits

Implementing ISO 50001 has yielded significant benefits for our organization, both in terms of energy performance improvements and broader business impacts. Here's an overview of our experience:

Through the implementation of ISO 50001 Energy Management System (EnMS), we have achieved notable reductions in energy consumption and associated costs. By systematically identifying energy-saving opportunities, optimizing

processes, and implementing energy-efficient technologies, we have realized substantial energy savings across our operations. These savings translate directly into cost reductions, enhancing our bottom line. Additionally, our efforts have resulted in a reduction in emissions, contributing to our environmental sustainability goals.

There were initial investments in implementing the EnMS, including costs associated with staff training, system development, and implementation, these expenditures have proven to be highly worthwhile. The estimated staff time dedicated to the implementation process has been significant, reflecting our commitment to thoroughness and excellence in execution. However, the returns on these investments, in terms of energy cost savings and other benefits, have far outweighed the initial costs.

Implementing ISO 50001 across multiple sites has allowed us to achieve synergies and economies of scale in energy management. By standardizing processes, sharing best practices, and leveraging centralized resources, we have optimized our energy management efforts across our entire organization. This approach has facilitated consistent performance improvements and cost savings across all our sites, enhancing overall competitiveness and sustainability.

In summary, our experience with ISO 50001 implementation has been highly positive, resulting in tangible benefits for our organization in terms of energy efficiency, cost savings, and overall business performance. Maintaining certification to ISO 50001 underscores our ongoing commitment to continuous improvement and sustainable operations.

The project is designed to maximize energy efficiency and enhance occupant comfort through a comprehensive set of Energy Conservation Measures (ECMs) and energy monitoring initiatives. Here's an overview of the key elements:

ECM 1.1 - By upgrading existing HVAC systems to VRF technology, the project aims to optimize heating and cooling efficiency while providing individualized climate control. This not only reduces energy consumption but also improves comfort levels for building occupants.

ECM 1.2 -The implementation of smart programmable thermostats enables precise temperature control and scheduling, allowing for energy savings while maintaining occupant comfort. These thermostats adjust heating and cooling settings based on occupancy patterns and environmental conditions, optimizing energy usage throughout the day.

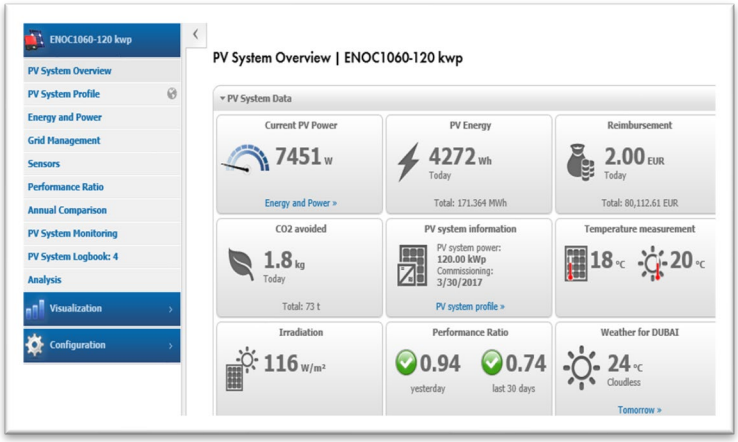
ECM 2 -The project includes the deployment of energy-efficient lighting solutions throughout the facility. By replacing traditional lighting fixtures with high-efficiency LED lights, energy consumption is significantly reduced while maintaining optimal lighting levels for tasks and activities. This improves both energy efficiency and visual comfort for occupants.

ECM 3 - To further enhance energy efficiency, the project focuses on upgrading signage lights to more efficient and environmentally friendly alternatives. By utilizing energy-efficient lighting technologies and smart controls, energy consumption associated with signage lighting is minimized without compromising visibility or aesthetics.

ECM 4 - The installation of grid-tied rooftop solar photovoltaic (PV) systems enables the generation of clean, renewable energy on-site. By harnessing solar power, the facility can offset a portion of its electricity consumption from the grid, thereby reducing carbon emissions and operating costs while promoting sustainability.

Energy Monitoring - Energy Analytics & Reporting Platform: To ensure ongoing performance optimization and informed decision-making, the project incorporates an energy monitoring system with advanced analytics and reporting capabilities. This platform provides real-time insights into energy usage patterns, identifies opportunities for further efficiency improvements, and facilitates proactive maintenance and troubleshooting.

By integrating these key elements into the ETIHAD ESCO project, energy efficiency is maximized, operating costs are minimized, and occupant comfort is prioritized, leading to a sustainable and environmentally responsible facility.



Live monitoring dashboard – PV system Overview

ENOC Retail 31 EnMS sites which is the scope of this case study has achieved 49% energy performance improvement over 3 years improvement period. And resulted to energy cost savings of USD 1,247,406.

Beyond energy and cost savings, implementing ISO 50001 has generated various non-energy benefits for our organization. These include improved operational efficiency, enhanced reliability of energy supply, and increased awareness and engagement of employees in energy management practices. By fostering a culture of energy efficiency, we have seen improvements in overall organizational performance and resilience.

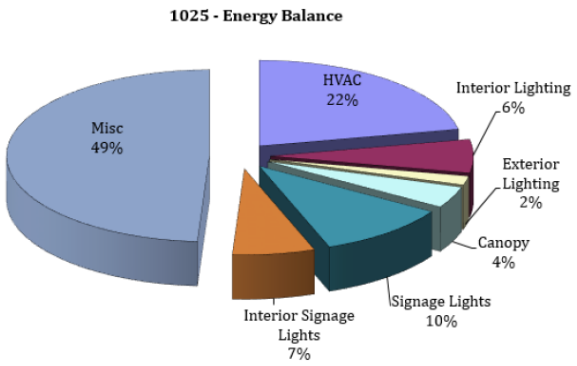
What we have achieved

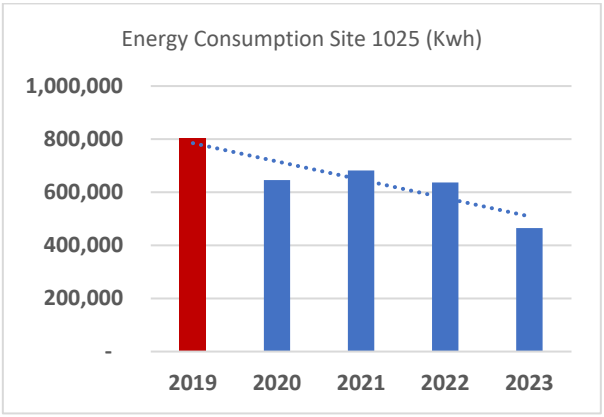
- AED1.527 million/ year
- 49% Savings
- 1,778 Trees Co2E Emissions
- 3.56 GWh/ Year

In addition to the tangible benefits mentioned, implementing energy efficiency measures and sustainability initiatives can also yield various intangible benefits for businesses.

- By implementing energy efficiency measures and upgrading infrastructure, the project aims to reduce and optimize the growing demand for energy within the facility.
- The project sets refined energy objectives and targets, aligning them with organizational goals and sustainability initiatives to drive continuous improvement in energy performance.

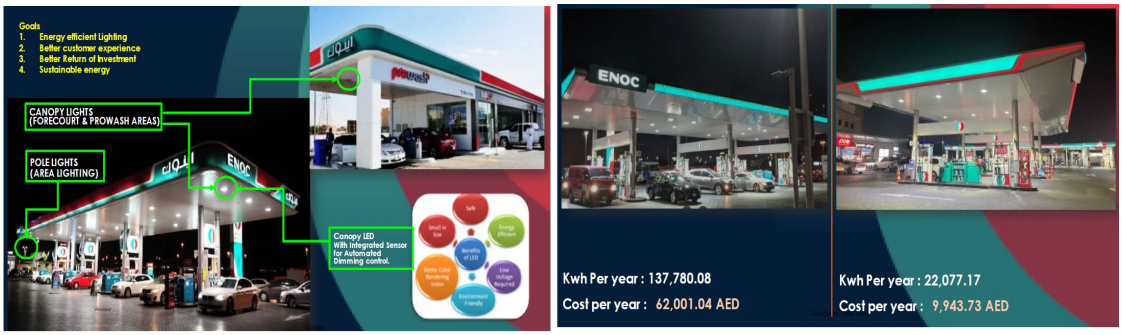
- Through the implementation of energy conservation measures and the adoption of efficient technologies, the project strives to improve the overall energy performance of the facility, resulting in reduced energy consumption and lower operating costs.
- Establishing an energy baseline and benchmarking data provides a reference point for measuring progress and identifying areas for further improvement in energy efficiency and resource management.





Baseline 2018-19 Monthly consumption trend (Kwh)

- The incorporation of smart metering and sub-metering technologies enables real-time monitoring and analysis of energy consumption, allowing for better management and optimization of energy usage across different areas of the facility.
- By identifying and analyzing significant energy users, the project aims to gain insights into energy consumption patterns and implement targeted measures to optimize energy usage in these areas.
- Educating and engaging employees in energy and resource management practices increases awareness and fosters a culture of sustainability within the organization, encouraging participation and collaboration in energy-saving initiatives.
- The project aligns with Dubai's carbon reduction initiatives by reducing carbon emissions and promoting sustainable practices, thereby contributing to the city's efforts to mitigate climate change and achieve environmental targets.
- By proactively addressing energy efficiency and sustainability measures, the project positions itself for potential participation in carbon credits schemes and programs, further incentivizing and rewarding efforts to reduce carbon emissions and promote environmental stewardship.



Regulatory compliance and adherence to policies

- Dubai Green building regulations
- ASHRAE Guidelines
- National Air Quality Agenda 2031

- Sustainable Development Goals by UAE
- Alignment to UAE national green agenda

Plan

ENOC ensures management commitment and support for energy management implementation through the ENOC Energy & Resource Steering Committee. This committee comprises directors from various business units and convenes periodically to oversee energy management initiatives.

Energy management objectives, including energy efficiency targets, KPI's are integrated into the Business Scorecard. Annual targets are agreed upon and set in preparation for implementation in the following year, ensuring alignment with organizational goals.

Implementing Energy Management Systems (EnMS) at multiple sites initial challenges, but with the support of energy sub-metering, significant savings opportunities are identified. Establishing an effective energy aspect register allows ENOC to identify the significant areas for improvement and optimize energy usage across its facilities. We conduct a comprehensive inventory of GHG emissions associated with its energy consumption and operations. Implemented measures to reduce energy related GHG emissions, such as improving energy efficiency, transitioning to renewable energy sources, and implementing carbon reduction initiatives. This may involve investing in energy-efficient technologies, optimizing processes, and promoting behavior change among employees.

To ensure that identified savings opportunities are realized, resources are allocated as part of the annual budget planning process. Investment in energy-efficient technologies and initiatives is prioritized to drive continuous improvement in energy performance.

During the ISO 50001 recertification in 2023, the focus was on enhancing the effectiveness of EnMS approaches and improving energy-saving targets. This represents a shift from merely meeting minimum requirements to actively striving for continuous improvement and maximizing energy efficiency across ENOC's operations.

"For a very long time now, energy and efficiency have been our focus areas but now they have become embedded in our core. We consider efficiency measures in everything we do."
—Taleb Al Saleh, Director Retail Marketing

Do, Check, and Act

ENOC likely employed a centralized approach to coordinate the implementation of energy management initiatives across its multiple sites. This may have involved establishing a dedicated committee responsible for overseeing the planning, execution, and monitoring of energy-saving measures at each site. Regular communication channels, site visits, and progress reporting mechanisms likely facilitated coordination and alignment of efforts across the network.

To determine whether performance had improved, ENOC likely employed various methods like Comparison of energy consumption data before and after the implementation of energy-saving measures, calculation of energy intensity metrics to assess energy efficiency improvements, Benchmarking energy performance against industry standards or similar facilities and conducting periodic energy audits to validate and verify results.

To fulfill the requirements of our Energy & Resource Management (E&RM) policy, we measure, monitor, and analyze energy and resource utilization to reduce consumption. Detailed understanding of energy consumption breakdown by operational areas is crucial for identifying relevant saving opportunities.

Smart monitoring systems have been introduced at our retail sites, along with energy monitoring systems at Autopro and Sharjah Auto Village sites, to pinpoint areas of high energy consumption and achieve our annual energy-saving target of 3.5%. These systems also support sites in meeting ISO 50001:2011 certification requirements.

The energy review process requires substantial planning inputs, detailed in subsequent sections, to conduct effective and valuable energy reviews. Expected outputs include practicable and reasonable measures to improve energy performance, leading to continual improvement.

The energy savings outlined in the case study are based on a baseline period of one year (2019) and a reporting period spanning the following three years (2021-2023). The reporting period commenced in 2021, coinciding with the commencement of the Etihad ESCO project on retrofit fuel filling stations. EnMS implementation prompted the organization to establish green procurement objectives, supported by a Green Procurement Procedure and a dedicated Green Procurement Analyst. The green procurement target is set at 100% from 2019 onward.

ENOC Retail Energy Management Committee headed by Managing Director and members from cross-functional teams.

Transparency

ENOC takes pride in its achievements in energy management, including ISO 50001 certification. The company actively communicates its efforts and accomplishments to both employees and the public through various channels.

ENOC publishes annual Energy Efficiency and Sustainability Reports that showcase collective energy-saving initiatives across the group and its business units. These reports are available to everyone on the company website https://www.enoc.com/en/ and distributed at energy-related conferences ENOC sponsors or attends.

ENOC Retail displays its ISO 50001 certification at each service station, demonstrating its commitment to energy efficiency to customers.

ENOC's dedication is further emphasized by its participation in, and receipt of awards related to Energy Management Systems (EnMS). ENOC's membership in external committees, such as the Dubai Supreme Council of Energy, the Green Procurement Committee, and the Dubai Carbon Abatement Strategy, allows them to share their ISO 50001 achievements and contribute to wider industry best practices.

ENOC actively engages in sharing its success story across various platforms, thereby fostering employee engagement, inspiring public trust, and promoting collaboration within the industry towards a sustainable future.

Within ENOC, achievements, and accomplishments in Energy Management System, including ISO 50001 certification, are communicated to employees and society through diverse venues and communication platforms. ENOC issues an Energy Efficiency Annual Report and Sustainability Report, highlighting collective efforts across the group and individual business unit energy initiatives. These reports are published on ENOC's company website, accessible to the public, and distributed at energy-related conferences sponsored and participated in by ENOC. This transparent dissemination of information showcases ENOC's commitment to energy efficiency and sustainability, while also encouraging transparency and accountability within the organization and the r community

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ENOC Retail ISO 50001 certification announcement also by posting certificate at each retail site. ENOC is member of several external committees where ISO 50001 certification achievement is also highlighted. Some of the key groups include Dubai Supreme council of Energy, Green procurement Committee and Dubai Carbon Abatement Strategy.

ENOC Retail has achieved many awards and acknowledgments for its project, including:

- The **Ideas UK Award** for the On-Grid Solar Project in ENOC Retail Outlets.
- Selection as a finalist for the **Dubai Supreme Energy Council Best Project Award**.
- The **Ideas Arabia** Award for the On-Grid Solar Project in ENOC Retail Outlets.
- Appreciation from **DEWA Etihad ESCO.**

What We Can Do Differently

Throughout the EnMS implementation period, several valuable lessons have been learned across various aspects of energy management. Here are some key areas identified:

The importance of having a robust online data management system cannot be overstated. Such a system is essential for timely monitoring and effective analysis of significant energy users (SEU), enabling proactive management of energy consumption. There is a need to improve the verification methodology of SEU performance results. By refining the verification process, organizations can ensure the accuracy and reliability of energy performance data, facilitating informed decision-making.

Converting manual energy aspect registers to software or online platforms enhances accessibility and efficiency in managing energy-related data. This transition streamlines processes and improves data accuracy and integrity.

Enhancing internal benchmarking approaches and selecting appropriate external benchmarks are crucial for evaluating energy performance and identifying improvement opportunities. Benchmarking allows organizations to gauge their performance relative to industry standards and best practices.

When refurbishing old sites, organizations should consider integrating renewable energy projects, particularly in new smart site constructions. Incorporating renewable energy solutions into refurbishment projects promotes sustainability and reduces reliance on conventional energy sources.

There should be a concerted effort to enhance the effectiveness of the Energy Management System (EnMS) for additional retail sites within the region. Understanding the benefits of EnMS implementation and tailoring strategies to maximize its impact are essential for achieving energy management objectives across all sites.

By learning from these key areas and implementing corresponding improvements, organizations can optimize their energy management practices, drive efficiency gains, and contribute to sustainability objectives effectively. By focusing on these next steps and plans, ENOC will further strengthen its ISO 50001 EnMS, drive continuous improvement in energy performance, and reinforce its commitment to sustainability and environmental responsibility.