

Emirates Gas LLC

The structured approach to Energy and Resource conservation in EMGAS through the implementation of ISO 50001 has resulted in 32% reduction in the energy intensity in the EMGAS operations. With the continual improvement ingrained in associated business process this is only going to reduce further.



Case Study Snapshot

Industry	Downstream LP Gas Storage and Distribution
Product/Service	LP Gas, Propane & Aerosol grade LP Gas
Location	Jebel Ali, Dubai, U.A.E
Energy performance improvement percentage (over the improvement period)	32% over 10 years
Total energy cost savings (over the improvement period)	USD 100,023.05
Cost to implement Energy Management System (EnMS)	USD 48,963/-
Total energy savings (over the improvement period)	2301 MWh
Total CO₂-e emission reduction (over the improvement period)	920 Metric Tons

Organization Profile / Business Case

Emirates Gas LLC (hence forth referred to as EMGAS) is fully owned by Emirates Notional Oil Company (ENOC), Government of Dubai with a license issued by Department of Economic Development, Dubai. The vision of the company is to be the most dynamic and reliable petroleum gas partner of choice. EMGAS is the leading supplier of LPG and associated gases in the UAE. It was established in 1974 to make LPG available to the residence of U.A.E. In 1998 EMGAS became a part of ENOC.

EMGAS management policies are aligned to supporting the UAE Governments Initiatives and Goals on ESG such as Dubai Integrated Energy Strategy 2030 (DIES 2030) , which had a significantly impact on implementation of Energy & Resource Management.

EMGAS started working on Energy & Resource Management since 2009 and on maturity of the system it was formerly certified to ISO 50001:2011 for the first time in 2017 by SGS. It was subsequently re-certified (ISO50001:2018) in 2020 by Bureau Veritas in 2020 which is valid until 13th April 2025. The Energy policy was framed to address the Measurement, Monitoring and analysis of energy and resources, use of renewable energy besides other aspects such as Energy efficiency in evaluation of equipment during procurement.

Initially EMGAS Energy & Resource Management (E&RM) activities were initiated to comply with demand side management directives from Dubai Supreme Council of Energy which was formed in 2009. Subsequently the management formed a E &RM technical committee with members representing those processes that have the

maximum impact on energy utilization like Plant Operations, Delivery Logistics and Maintenance. The Maintenance & Technical Services Manager was nominated the head and focal point of E&RM systems and was a member of the E&RM technical committee formed at ENOC group level under the Sustainability department. Policies and requirements were made at ENOC level and cascaded to EMGAS besides its own initiatives. A superior Energy Performance scheme was instituted by ENOC group sustainability and EMGAS is among the few business units that is certified at Silver Category based on its annual energy performance.

“Our forwarding thinking approach to improve energy efficiency ,reduce cost and leverage market opportunities through ISO 50001 continue to contribute to our bottom line besides aligning with the national strategy on ESG .”

— Nader Al Fardan, Senior Director Gas Marketing

Business Benefits

In the early days the energy resource management was ad hoc and did not have a system to measure, monitor, analyze and control energy utilization. The efforts were based solely on random ideas. EnMS (ISO50001) standards were released in 2011 and EMGAS progressed to implementing the EnMS in structured manner. Training and awareness sessions were carried out to enhance the competency of the field work force. Identified staff were nominated to Energy management courses at Engineer and Technician levels. An E&RM Technical Committee was formed under the direction of the Management with members representing those processes that have the maximum impact on energy utilization like Plant Operations, Delivery Logistics and Maintenance. The Maintenance & technical Services Manager was made the chair of this committee and steers the Energy and resource management initiatives of EMGAS. The M&TS Manager was provided the opportunity to complete Energy Managers course from British Institute as a part of capacity building. An E&RM KPI was developed that required E&RM projects to be implemented each year so as aim at reduction of energy consumption by at least 3% compared to the base year of 2018.

Criteria to identify Equipment consuming significant Energy (SEU) was established. The significant Energy consumption equipment have been identified. They have been provided with energy meters and are connected to a high-level SCADA monitoring system for acquiring and monitoring energy consumption. The analysis shows that 78 % of the consumption of electrical energy is in Plant operations (cylinder filling and Bulk loading) and only 22% is attributable to building loads like AC and lighting. As energy utilization in plant operations was dependent on the sales demand ta KPI to monitor the energy performance was developed as KWh/MT of production.

A number of projects were initiated and implemented. The below non exhaustive list gives and idea of the projects:

1. Optimization of Building HVAC- Automated cut off during non- operational hours.
2. Building HVAC control temperature fixed at 24 C in line with directions of DSCE
3. Rationalization of cylinder conveyors and lay out to reduce conveyor energy consumption- reduction of 4 conveyor motors.
4. Variable speed drive in Pumps for cylinder filling – 30 % reduction in energy consumption.
5. Replacement of al Fluorescent lamps LED lamps
6. Installation of smart energy meters with Energy monitoring Scada system
7. Operational procedure for energy optimization- stoppage of night shift
8. Work Cultural etc.
9. Renewable Energy Resources – 40 KW Solar PV direct to Grid- Al Qusais Gas distribution depot roof top

10. Integrating of Remote Tank Gauging with customer load planning procedure to reduce dead freighting and saving in diesel.
11. Provision of Wet Wall System for high-capacity HVAC – 7% saving in energy consumption
12. Direct to Grid Solar PV system at JA Gas terminal commissioned totaling a generation of 327MW annually i.e almost 25 % of the overall EMGAS electrical energy consumption.

With the implementation of various E&RM projects, trainings, management commitment, communication and awareness across the work force and other systems in place as per ISO 50001 EMGAS was able to reduce its energy intensity from 7.97KWh/MT to 5.417 KWh/MT of production. A reduction of 32% since base line year of 2013.

The estimated GHG gas emission reduction due to reduced energy consumption over the implementing years up to 2023 is 920 MT of CO2 Equivalent

The total cost to implement the ISO50001 including staff time , monitoring instrument & SCADA cost and third art Audits was USD 48963/-

Plan

When it first started the Energy Management System was top driven as any energy cost saved in operations was a direct addition to the bottom line. Further when the DUBAI government formed the Dubai Supreme Council of Energy that formulated the Dubai integrated Energy strategy and set goals for reduction in energy consumption with increasing thrust on renewables that had a lower carbon footprint, EMGAS Management committed to the EnMS to align with the DSCE directions on Demand Side Management committed and contribute to the Nation objectives of the UAE towards Sustainability. The management released the EMGAS energy policy that forms the integral part of all Emgas business strategy. This was the first step in developing EnMS as the policy detailed the objectives of energy management. The Maintenance & Technical Services Manager was given the responsibility to develop and implement the EnMS in EMGAS duly supported by a technical committee and Quality & Business Excellence Manager so as to integrate the same with the existing Integrated Management System. Financial commitments for the implementation of EnMS towards training and audits was budgeted and approved by the management. Projects that were identified for implementation of energy reduction initiative and required costs were budgeted in annual CAPEX budget and approved by the management. E&RM project status, audit out comes, and plans are reviewed my Management in Quarterly Management Reviews.

The entire business process of EMGAS across the value chain was mapped and the type and amount of energy utilized in each segment was determined. This data was analyzed to understand and identify Significant Energy consuming Equipment (SEU). A Plan to monitor SEU was put in place and implemented to monitor performance and analyze deviation to enable corrective actions.

An energy audit was conducted by external team and based on its outcome high energy utilization areas was identified where improvements would enable significant savings/reduction in energy consumption. Based on this audit projects with focus on areas that would yield significant energy reductions were proposed for management approval and financial commitment. Once the approval was received the projects were implemented in a time bound manner.

In certain cases, even though there was not significant reduction in energy consumption but the was reduction in GHG emissions the management approved proposal. A case in point is the conversion of the entire delivery vehicles into bio-diesel from conventional diesel. Though the reduction in energy consumption was not of any significance the GHG emissions reduced by 424 MT CO2 equivalent; a reduction of 33% over regular diesel.

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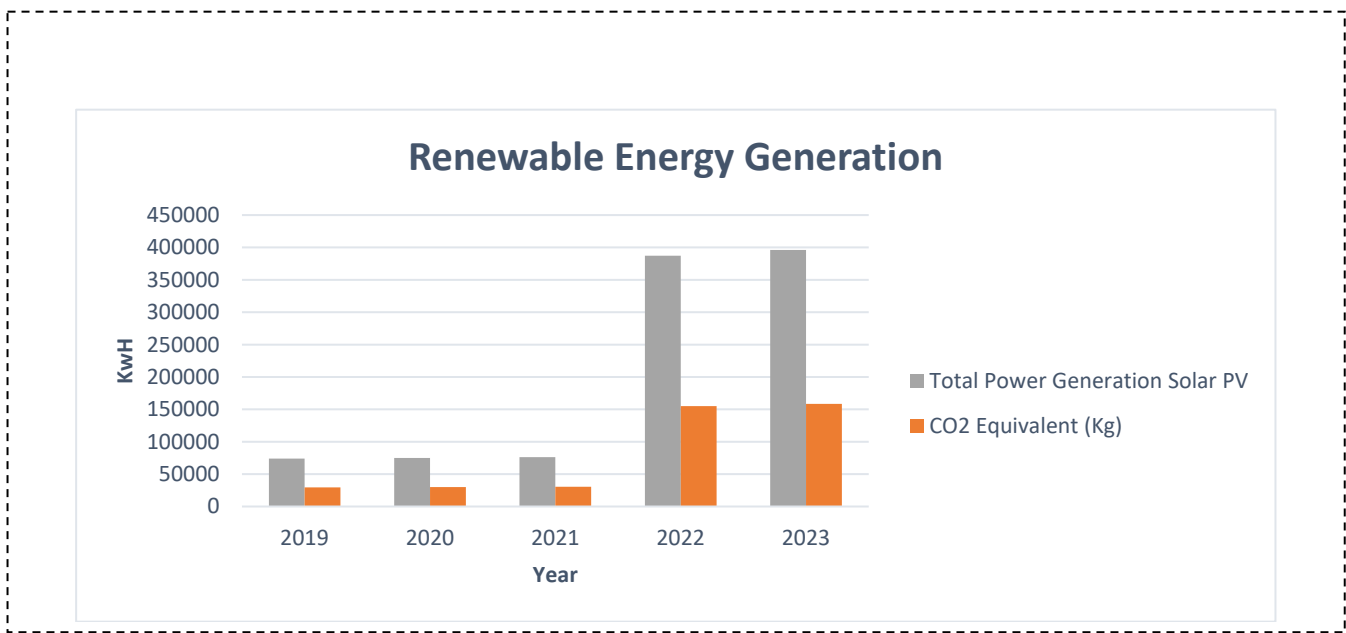
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In the following sections we will discuss one of the projects planned titled “Provision of Direct to Grid Solar PV system over Car Park” as case study.

“Our journey to achieve compliance to ISO 50001 enabled us to discover many areas of technological intervention that resulted in significant energy reduction. The structured approach under ISO 50001 to measure, monitor and analyze was instrumental in the implementation of technological solutions like Variable Frequency Drives in our LPG Cylinder bottling operations that resulted in over 28% reduction in energy in this operation .”

— G.Vinod Maintenance & Technical Services Manager



Do, Check, and Act

An E&RM technical committee was formed by the management to steer the E7RM activities of EMGAS. An E&RM energy policy was released by the management and communicated across EMGAS through notice boards, toolbox meeting and staff meetings. Subsequently ISO50001 awareness training were carried out extensively across EMGAS.

Internal procedures were developed by the committee after consulting with other stake holders. Identified staff were given specific technical training on energy conservation. A gap analysis of the implemented energy management system against the ISO 50001 was carried out by external auditors and recommendations implemented in a time bound manner. Significant energy use equipment was identified and smart metering was fixed on them to monitor and evaluate their performances. Subsequently a certification audit was carried out by external auditors and the EMGAs EnMS was certified to ISO 50001:2011 in 2017.

Energy audit was carried out by Energy specialist from ENOC group Sustainability department.

Once our staff were upskilled, E&RM projects were identified based on improvement opportunities that are recommended after the initial Energy audit. These are then protarized with immediate implementation of tasks that

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don't need significant CAPEX and not very complex. These include operation process and procedures that enable better utilization of energy.

Depending on the nature of initiative the respective area functionaries are involved. For example, if the initiative required a change in the process, then the operations team lead by the plant manager is involved in the implementation and periodic feedback monthly on the implementation status and energy saved. A case in point is the initiative to use the storage pressure of Propane to unload LPG from road tankers which eliminates the use of LPG compressor for this operation This initiative did not require any CAPEX and was carried out by the operation team. If an initiative requires CAPEX, then the same is budgeted and on approval implemented by the technical team following the project implementation cycle. A case in point is the initiative to provide direct to grid Solar panels to increase the use of renewable over the Car Park in Jebel Ali Gas Terminal. The progress of such projects are reviewed by management at quarterly Management review meetings. Once executed the energy footprint of the project is monitored against base line to confirm that proposed energy savings as envisaged is achieved. The system is monitored, and any deviation is analyzed to understand the root cause and necessary corrective action taken. An example is the generation of electricity from the roof top solar panel. Initially the panel were cleaned at a fixed periodicity. But subsequently the cleaning was undertaken based on the outcome of the daily energy generation report and it was possible to maintain a higher average daily production.

A guideline was issued by the ENOC group sustainability “Purchase and design Efficiency standards” which was adopted by EMAS for procurement of equipment’s such as Acc, Motors, Lights, vehicles, etc). Any new equipment procured in EMGAS is technically evaluated for energy efficiency besides its core functions.

Non exhaustive List of projects planned and executed is given below to give an insight into the nature of such projects :

Sl.Nos	Energy reduction Initiatives	Implemented by	CAPEX project
1	Optimization of Building HVAC- Automated cut off during non-operational hours.	Technical Services	NA
2	Building HVAC control temperature fixed at 24 C in line with directions of DSCE	Administartion/Technical services	NA
3	Rationalization of cylinder conveyors and lay out to reduce conveyor energy consumption- reduction of 4 conveyor motors.	Technical Services	Yes
4	Variable speed drive in Pumps for cylinder filling – 30 % reduction in	Technical Services	Yes
5	Replacement of al Fluorescent lamps LED lamps	Technical Services	Yes
6	Installation of smart energy meters with Energy monitoring Scada system	Technical Services	Yes
7	Operational procedure for energy optimization- stoppage of night shift	Operations & Logistics	NA
9	Renewable Energy Resources – 40 KW Solar PV direct to Grid- Al Qusais Gas distribution depot roof top	Technical Services	Yes
10	Integrating of Remote Tank Gauging with customer load planning procedure to reduce dead freighting and saving in diesel	Operations & Logistics	No
11	Provision of Wet Wall System for high-capacity HVAC – 7% saving in energy consumption	Technical Services	Yes
12	Direct to Grid Solar PV system at JA Gas terminal commissioned totaling a generation of 327MW annually i.e almost 25 % of the overall EMGAS	Technical Services	Yes

The product handled by EMGAS is essentially LPG. LPG is a Hydrocarbon which is liquefied under pressure at atmospheric temperature. The Vapour pressure of LPG is dependent on the ambient temperature. As the ambient temperature changes based on the season the vapour pressure of LPG also varies accordingly. The highest Vapor pressure is experienced in summer months and the lowest in cooler seasons. This has an impact on the pumping

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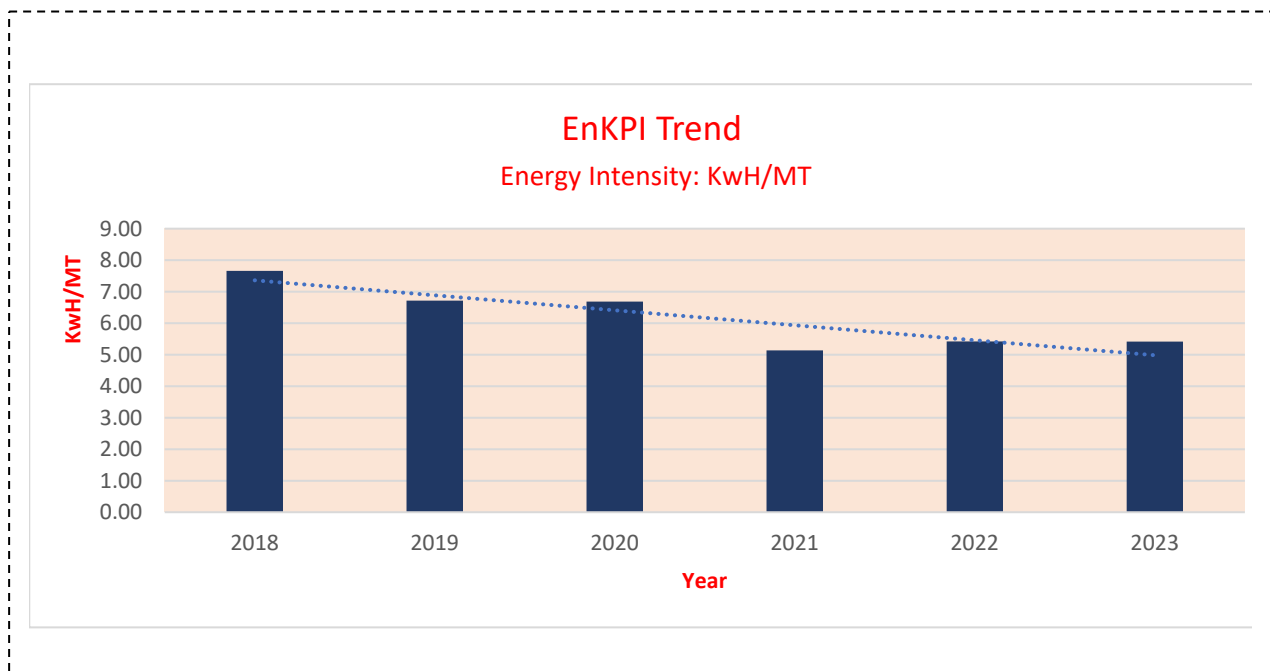
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energy consumed in the LPG loading and cylinder filling activities. Seasonal temperature variation also has an effect on the energy consumption in Climate control in office buildings. Day light hours variation due to seasonal affects also have an impact on the usage of energy for lighting. The energy consumption in operations was significantly dependent on the production required for meeting the sales demand. Basis this the appropriate KPI to measure and monitor the efficiency of the energy utilization was Kwh/MT of sales (Energy intensity with respect to sales).

The base line for energy conservation activities was initially 2013 and with various initiatives resulting in substantial reduction in energy intensity the base line was then in 2019. The revised base line EnMS KPI is 7.66 Kwh/MT

With the implementation of various E&RM projects, trainings, management commitment, communication and awareness across the work force and other systems in place as per ISO 50001 EMGAS was able to reduce its energy intensity from 7.97KWh/MT to 5.417 KWh/MT of production. A reduction of 32% since base line year of 2013.

The awareness and culture change towards resource optimization that came with the implementation of ISO50001 resulted in focus on other areas of resource conservation that indirectly helped in reducing the carbon foot print of our operations such as optimizing utilization of water . Projects for implementation of water less Urinals, Sensor activated water taps , Filter and recycling of water used in Cylinder water resulted in substantial savings of water. The conversion of vehicle fleet to Bio-diesel resulting in significant reduction in GHG emissions is also a result of the cultural change in approach due to the implementation of ISO50001 in EMGAS.



“The reduction in the energy intensity in our plant operations over the last 5 years is a testimony to the fact that effective implementation of ISO50001 has a positive impact on EMGAS bottom line while aligning the business with ESG goals .”

— Faisal Shafie , Operations & Logistics Manager

Transparency

EMGAS being a business unit under ENOC reports the performance of EnMS to Enoc group sustainability on a quarterly basis who in turn reports the total performance of all ENOC companies at a group level to relevant authorities. Management reviews are carried out on a quarterly basis on EnMS. Surveillance audit of the EnMS by third part certifying bodies are carried out bi- annually where in the system as well as data are checked on a sampling basis. Besides this , annual audits of the EnMS is carried out by external auditors from other Group companies under ENOC who verify the compliance along with field inspections to ascertain the state of implementation of the EnMS. The communication on EMGAS being ISO50001 certified is a part of our official letter template and business correspondence to all our customers and stake holders.

What We Can Do Differently

ISO 50001 was implemented by EMGAS using existing staff and with no additional resources. For developing and implementing the utilization of a specialized consultant would have provided for a faster speed of implementation .Add text here.



The Energy Management Leadership Awards is an international competition that recognizes leading organizations for sharing high-quality, replicable descriptions of their ISO 50001 implementation and certification experiences. The Clean Energy Ministerial (CEM) began offering these Awards in 2016. For more information, please visit www.cleanenergyministerial.org/EMAwards.