

ISO 50001 Energy Management System Case Study

2021

Malaysia

Kuala Lumpur Golf & Country Club (KLGCC)

*Top 100 Platinum Golf and Country Club
2020-2021 by the Platinum Clubs of the
World, the Best Golf Courses in Malaysia by
Golf Digest International*



Kuala Lumpur Golf & Country Club, Malaysia

Organization Profile & Business Case

Established in 1991, Kuala Lumpur Golf & Country Club is a 36-hole tournament standard course strategically located in the lush landscapes of Mont Kiara, Kuala Lumpur. Its proprietor, Sime Darby Property Berhad designed the club as an elegant and relaxing golf haven surrounded by perfectly manicured greenery. The certifications are testaments to the Club's efforts in developing and implementing sustainable business practices and our continuous endeavour to improve operations at the workplace for the benefit of our people and the planet. The achievement also speaks for our compliance with the industry's best practices.

***“KLGCC is committed to upholding the
industry's standards and best practices.”***

Dato' Azmir Merican, Sime Darby Property Group Managing
Director and KLGCC Berhad director

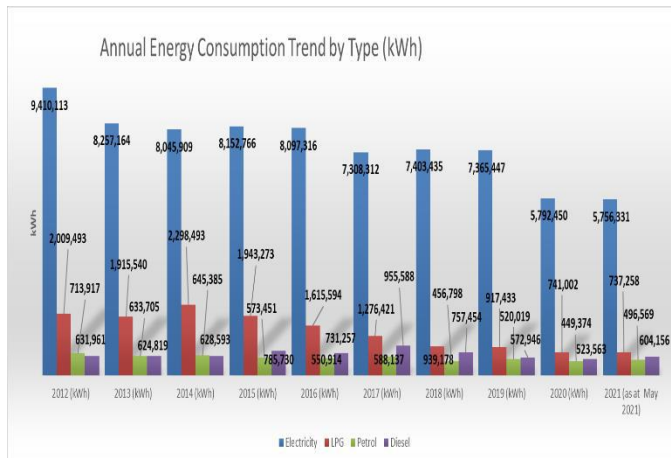
Case Study Snapshot

Industry	Hospitality Sector
Product/Service	Golf & Country Club
Location	Kuala Lumpur, Malaysia
Energy management system	ISO 50001
Energy performance improvement period, in years	7 years (the baseline year 2012)
Energy Performance Improvement (%) over improvement period	22 % (Electricity) 54 % (LPG)
Total energy cost savings over improvement period	Electricity: USD 1,224,430 LPG: USD 204,134 Total: USD 1,428,565
Cost to implement EnMS	\$USD 18,000
Total Energy Savings over improvement period	Electricity: 40,466 GJ LPG: 11,378 GJ Total: 51,843 (GJ)
Total CO ₂ -e emission reduction over improvement period	Electricity: 7,800 tCO ₂ e LPG: 742 tCO ₂ e Total: 8,544 tCO ₂ e

Business Benefits

An energy consumption is one of the most significant elements of the Club operating cost. The Club's main energy consumption is from electricity (76 per cent and Liquid Petroleum Gas (LPG – 10 per cent). Other energy sources is also being consumed such as petrol and diesel (14 per cent). More than 90% of the energy cost are from electricity and LPG. Currently, the Club focuses on these two types of energy as a priority for improvement.

The Club has established its ISO 50001 implementation in 2013. Since then, the Club has been able to reduce 22% (in 2019) of electricity consumption and 54% for LPG consumption through several energy-saving approaches.



The approaches are through the implementation of No-Cost, Low cost and lastly High-Cost energy-saving measures in phases.

From the energy-saving measures implemented, the club has achieved a total cost saving of USD 1.43 Million over the period. Operational control has played a major role in the saving which account for about 86% of the total saving, especially from the electricity consumption reduction. The remnants are from the capital expenditure energy-saving measures such as installation of heat-pump technology replacing the gas-based hot water system.

The CO₂ reduction is monitored yearly in terms of its CO₂ equivalent. It is the way the Club monitored its carbon emissions to support the global sustainable development goal agenda. The accumulative CO₂ reduction throughout the period is 8,543 tCO₂e. The electricity reduction has contributed 91% of the total carbon emission reduction.

Costs of the implementation of the EnMS derived for the following elements:

Cost to implement EnMS	Cost to implement (\$USD)
Internal Staff time to develop and implement the EnMS	4500
Internal staff time to prepare for external audit	2000
Additional monitoring and metering equipment installed to meet EnMS requirements	3500
Third party audit costs	4500
Technical assistance (e.g. hired consultants to assist with EnMS implementation)	3000
Other (e.g. internal communications)	500
Total	18000

The total cost of implementation is USD 18,000 throughout the period.

The estimated staff time to develop, implement, and maintain EnMS is less than a half-year of equivalent staff time

Non-energy or other benefits

The Club is obliged to report and demonstrate energy management practices under the Efficient Management of Electrical Energy Regulation 2008 Under the Energy Supply Act of Malaysia. With the EnMS implementation, the Club has managed to comply with the law and also support the national program in energy conservation.

Plan

The Club planned the implementation of the EnMS is based on the Energy Policy, Objective and Target developed by the Management. The company ensures that the documented Energy Policy, Objective and Target are communicated and understood by all levels of employees in the organization so that employees are aware of their obligations and duties towards meeting the intent of the policy. The Club used dedicated EnMS tools to update its energy review including its energy performance and prioritizing energy improvement initiatives. The implementation of the EnMS was

delegated to the Energy Management Team. The energy performance, policy and issues are subjected for management to review at Management Review Meeting to ensure that it continues to be suitable, relevant and appropriate to the aims and purposes of the company.

Top management commitment and support

The Energy Policy also provides a framework for the decision-maker to demonstrate their commitment and support on effective implementation of EnMS.

To gain their commitment, the following approaches are being strategized;

- Address the importance to comply with the relevant legal and other requirements related to energy
- Integrate the energy objective and target to the Club's business operation
- Present the key elements such as financial performance in terms of its ROI for energy improvement initiatives that require capex, and includes its life-cycle analysis to gain the supports of the purchase of energy-efficient products, services, or design for energy performance improvement
- Discuss and update the energy performance and achievement regularly with the top management on top of the management review meeting. The platform is also used to discuss the issues and concerns to improve further the EnMS.

Energy Review

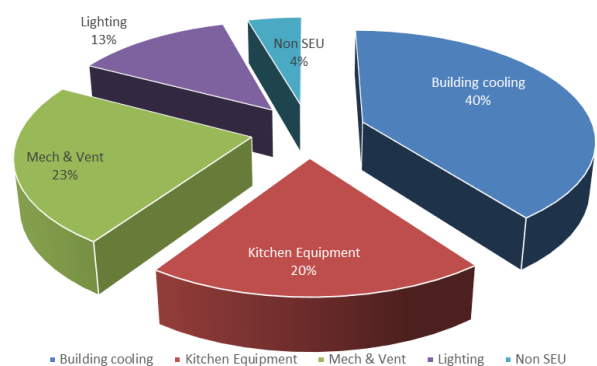
Energy review is the key activity to ensure appropriate data were collected, analysed and significant improvement opportunities were identified.

The review is done using the EnMS Tools developed for the Club to gather all the data and analysis. All the data were manually input to the tools which include the data of energy types and consumption and energy variables. Among the data collected are as follows:

- Monthly energy types, cost and consumption for Electricity, LPG, Petrol and Diesel
- Energy variables data – Cooling Degree Days (CDD), Number of Golf Tournament Days per month, Monthly number of Patronage, Events
- Energy users data which includes power rated data, measured data and operating hours
- Recordings made from energy meter (where applicable).
- Size of the Club area and building drawings.

Based on the data collected, analysis to determine the significant energy users, consumption trending and energy performance are carried out in the tools. The identification process will include 80% of the identified SEUs and they will be ranked from the highest to the lowest consumption. Any energy user that consumes more than 20% of the identified energy will be considered as an SEU.

In determining the SEUs, relevant variable(s) that drive/s the energy use and consumption shall be identified, determine current energy performance and also identify the person(s) doing work under its control that influence or affect the SEUs. The significant energy user (SEU) for the Club is as follows:



Building cooling accounts 40% of the total electrical energy consumption, followed by Mechanical & Ventilation System (23%), Kitchen Equipment (20%) and Lighting, 13%.

In terms of a data collection system, all the data for SEUs are either taken from the sub-metered or manually spot measurement or based on rated power

calculation. While for LPG consumption, only one user involve which is kitchen equipment.

The review has enabled the Club to focus and prioritize its resources and energy improvement initiatives based on the significant energy users.

Action plan - supports the strategy and targets of the Club

A list of energy improvement initiatives identified in the review will be screened out and prioritized. Prioritizing an action is based on the significant energy users. The selected initiatives will then be registered in the action plan of the Club. The action plan is important documented information in ensuring the energy objective and target are realistically set and practically achieved. The Club has strategized the implementation of the action plan via three stages namely no-cost implementation where only operational control and changes and low-cost measures. The third stages are the implementation of capital required energy-saving measures.

“ISO 50001 and EnMS has provided the Club an informed decision and integrate the energy cost saving investment and its business operation.”

—Ghazali, Energy Manager

Do, Check, Act

The implementation phase of the EnMS has been assigned by the top management to the Energy Team. The team is responsible to oversee all the to establish appropriate objectives, achievements towards the targets, and ensure the action plan is implemented to support the improvement of energy performance at the relevant functions and levels.

The energy performance is monitored, measure and analysed by the team through the Energy Intensity Index (EII). The performance achievement is analysed against the baseline to ensure the measures implemented are effective and achieve the intended

outcome. The performance and achievement are being monitored on monthly basis.

Do – Implementation of the EnMS

The energy team which was assigned for the implementation of the EnMS consists of the following member;

Chairman – Club’s General Manager, Management representative – ESSH Department, Energy Manager, Members across the Club’s departments such as Golf Operation, Golf Course, Food & Beverage, Facility, Security Dept., HR and Admin, and Finance Dept.

The team will establish and review objectives and targets considering the SEUs, opportunities that can improve energy performance, financial availability, Operational impacts and business requirement and available technology options

The team will propose on annual basis to the management during the budget cycle for acceptable capital investment value required for high-cost measure initiatives.

When planning how to achieve the objective and energy target, all identified opportunities to improve energy performance were included and updated in the Objective, Target & Program or Action Plan (OPT) document. The document includes what will be done, resources required, the person responsible for projects execution, plan and actual implementation date and methodology statement to evaluate the result to verify energy performance improvement.

Over the period, the Club has implemented several energy-saving measures. In the first 5 -years of implementation, the Club focuses on the no-cost measures. The No-cost measures are also being implemented which is very much related to maintenance. The high-cost measure only started in the 6th year of the EnMS implementation. Among the energy improvement initiatives implemented throughout the period is as follows:

- Operational control for Water Cooled Chiller operation and building cooling system. Ensuring the cooling system operated according to the needs such as events, tournaments etc.
- Kitchen equipment operation control and awareness to kitchen staff
- Installation of timer for swimming pool pumping system
- Continuous replacing high efficient lighting (LED) for faulty inefficient lighting
- Installation of hot water heat-pump system replacing the gas burner hot water system
- Installation of an automatic door within the area zone to control the in-leakage
- Introduce room temperature control at a range of 24 to 26 degrees Celsius

Check - Monitoring and Evaluation of Performance

Monitoring the performance of the Club is carried out for both the energy performance itself and the EnMS (system). The energy performance is monitored via the EnPIs namely the Energy Intensity Index and also absolute energy consumption. While the EnMS is monitored via its non-conformities result during the internal and external (third-Party) audits.

Energy Performance Indicator (EnPI) and Baseline

The EnPI – Energy Intensity Index is defined as the follows;

$$EII = \frac{\text{Actual energy consumption (kWh)}}{\text{Expected energy consumption (kWh)}}$$

- Actual energy consumption is collected based on utility bill or measurement monthly
- Expected energy consumption is calculated based on the regression formula. Actual variables (energy variables) value is incorporated in the formula from the data collected monthly

The EII indicates how far the Club energy performance deviates from the baseline and target (target can be set from the baseline or expected consumption). Generally,

the EII value of more >1 indicates that the actual energy consumption is more than expected or needed. Action and investigation will be carried out to identify the inefficiency root cause. The EII has been established for both significant energy types i.e. Electricity and LPG. The EnPI monitoring for electricity is illustrated below.



Energy Baseline and Regression Analysis

Throughout the period, the Club has revised its baseline a few times due to the target has been achieved. The first baseline year is in 2012/13, this is during the initial year of EnMS implementation, the second baseline year was in 2015 and the current baseline year is 2018.

The baseline(s) determination also takes into consideration the energy variables that affect the energy consumption, including static factors. The methodology of determining the effects of the variables was made through a regression model analysis.

The factor and simulation model is presented below;

Electricity: $Y = X1(877.8) + X2(8881.3) + X3(4646.7) + 203614.0$. Where,

$X1 = \text{CDD}$, $X2 = \text{Weekend Days}$, $X3 = \text{Golf Tournament Days}$

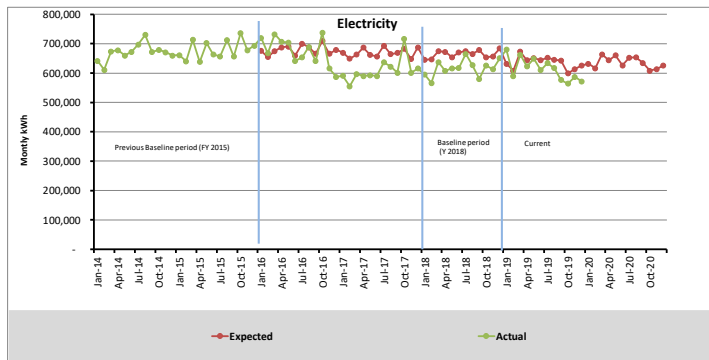
LPG: $Y = X1(3.08) + X2(0.78) + 57796.65$, Where,

$X1 = \text{Golf \& Sport patronage}$, $X2 = \text{Food \& Beverage patronage}$

The simulation model for both energy types have been constructed based on the analysis for at least one year

data (baseline year), including the energy variables data. The data analysis for the regression is carried out using excel spreadsheet in the EnMS Tools.

The Club energy consumption against the expected consumption is depicted in the below chart.



Third-party audit preparation

The EnMS recertification audit is carried out once every 3 years with surveillance audit done annually in between. The preparation for the 3rd Party audit starts with the internal audit by the 2nd party audit carried out by the Group HQ member to maintain impartiality. The team manage non-conformities, corrective and preventive actions related to the EnMS before the audit. To ensure the credibility and quality of the audit, the Club has chosen an accredited third party Certification Body to conduct the certification audit. All the findings from the audit are discussed in the Management review findings for further action.

Top Management Review

All the results of the EnMS and energy improvement are reported by the team to the top management through the annual management review meeting. The meeting discusses the achievement, proposed new target, issues and concerns regarding the implementation of the

EnMS, system audit results including reviewing the energy policy. The staff competency and necessary training for EnMS are also being reported.

Transparency

The public announcement is considered as external communication in the Club. The decision to communicate energy management related matters will be made by the top management according to the procedure.

Thus far the Club has announced the certification publicly through its website. Apart from that, the certification also is made available to participate in some best practices programs such as Top 100 Platinum Golf and Country Club 2020-2021 by the Platinum Clubs of the World as well as the Best Golf Courses in Malaysia by Golf Digest International.

The EnMs also provide an avenue for the Club to quantify its carbon emission and be reported to the Group for sustainable report preparation.

What We Would Have Done Differently

- To begin the awareness program especially for the golf member during the initial stage of EnMS to instil and to get their buy-in. The influence from golf members could accelerate the implementation of energy improvement initiatives. The energy monitoring could be enhanced further taking into consideration an advanced monitoring and control system.

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.