

ISO 50001 Energy Management System Case Study

2021

Indonesia

PT. KMK Global Sports

KMK is the first company in the footwear industry to be ISO 50001 certified. We managed to achieve a 20% savings upon implementation of the Energy Management System.



Organization Profile & Business Case

PT. KMK Global Sports is manufacturing of footwear with production capacity of 15 billion per year. All of the finished products are exported to overseas.

The vision and mission of KMK are formulated with philosophical thoughts. **Human Touch Management (HTM)** is the backbone of KMK Group's principles. Our employees are proud to be associated with HTM principles; identity we respect. The Human Touch Management ensures workers are aware of their basic rights, they are protected and can voice out their concerns without fear of retaliation. In the current world of manufacturing, being competitive is extremely crucial but ensuring a safe working environment to the employees is of utmost importance to our leadership. KMK's Human Touch Management and Environment Sustainability Policies encourages our employees to push the boundaries, expand their creativity and be competitive in current business atmosphere. Our aim is to continue to produce best quality products in a sustainable environment that safeguards the planet for future generation.

Case Study Snapshot	
Industry	Manufacturing
Product/Service	Footwear
Location	Tangerang - Indonesia
Energy management system	ISO 50001
Energy performance improvement period, in years	2 years (2019-2020) Baseline 2018
Energy Performance Improvement (%) over improvement period	3.36%
Total energy cost savings over improvement period	78,093.54 \$USD
Cost to implement EnMS	224,631.37 \$USD
Total Energy Savings over improvement period	3,589.15 GJ
Total CO ₂ -e emission reduction over improvement period	769.67 Metric tons

KMK's Organizational Mission is to Develop and Produce World Class Quality Footwear through Manufacturing Excellence & Innovation. We strive to achieve this by being the Employer of Choice with agile workforce in a Sustainable Working Environment. We are committed towards being the influencer on social and economic development in Indonesia by implementing Energy Management System as a driver for sustainability efforts and strategic goals.

KMK implemented several certification standards such as ISO 50001, ISO 14001 and ISO 45001. The aim of these implementations is to pay attention to safety, health, and environmental impacts from the business processes. KMK is committed in building its reputation in Indonesia, through CSR (Corporate Social Responsibility) program that benefits Socio economy and Sustainability.

Business Benefits

At the initial implementation of the energy program in 2007, KMK produced 7.5 million pairs of shoes/year and used 24 GWhe in energy. In 2020 the production increased by 100% producing 15 million pairs, however the energy consumption increased by only 25% to 30 GWhe. The company is committed towards continuous improvement plans to achieve a lower energy index.

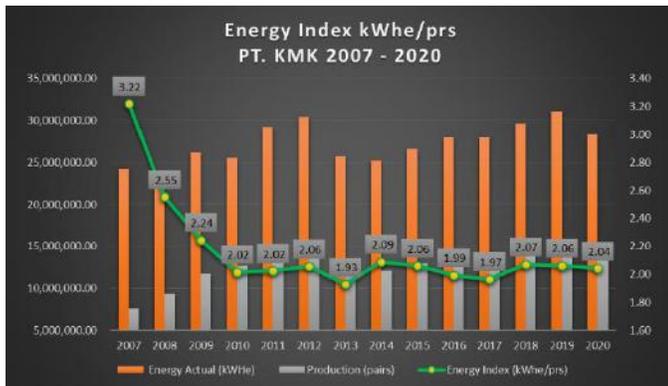


Figure 1. Diagram of Energy Index 2007-2020

The energy index is determined in kWh/pair as the production of shoes is quantified in per pair. In 2007, the index was 3.2 kWh/pair. In 2018 we achieved to reduce the energy consumption to 2.09 kWh/pair. As part of Strategic Business planning, KMK applies the new baseline to measure energy performance in 2019-2020.

Energy Saving

Below is the energy performance monitoring graph for the period of 2019-2020 which is based on 2018's baseline and some other parameters by **implementing the Energy Management System**:

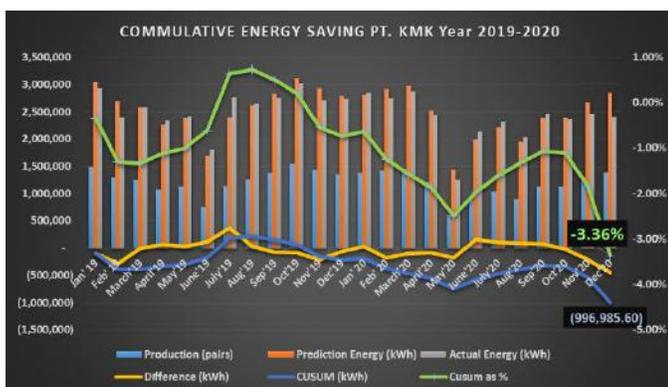


Figure 2. Diagram CUSUM Energy Saving KMK 2019-2020

Since 2018, KMK has increased its energy saving by 3.36% which is equivalent to 3,589.15 GJ. This is the cumulative calculation from the past 2 years. The results have been validated through annual management review.

Carbon Emission Reduction

As the company increased its energy saving, it also reduced the carbon footprint significantly. We reduced carbon emission by 769.67 Metric Ton for 2019-2020.

Cost Saving

The growth, expansion of KMK has been gradual and strategic. Energy usage too has increased with the growth of Company. We have implemented many energy conservation improvement plans to ensure lower but better energy utilization. We have been successful in our implementation of energy utilization plans which has reaped a cumulative savings of USD \$ 78,093.54 for the period of 2019-2020. We believe as a Company, KMK is moving towards the right direction in Energy conservation programs, and we will continue to strive to achieve better results with lower implications to the environment.

Beyond Monetary Benefits

- Implementation of Energy Management System creates awareness and commitment at all levels of employees about energy (consumption, use, efficiency and renewable energy sources).
- Improves the company's ability to manage and choose the best energy efficient equipment to enhance the effectiveness and efficiency of the production processes.
- Become a company benchmarked by the Ministry of Energy and Mineral Resources of the Republic of Indonesia and become a role model for footwear companies throughout Indonesia as the first company to implement an Energy Management System.
- KMK was awarded the 3rd position at the National Energy Efficiency Awards from the Ministry of Energy and Mineral Resources of Indonesia in 2016.

“Implementing of Energy Management System Improved our company energy savings by 5%-6% each year, the percentage is not too big, but it is very impactful”.

— Arwan Nur, Senior Manager of Engineering.

Plan

Management’s Commitment

Energy plays a major role in a Company’s operations. Energy is needed for each aspect of shoe manufacturing. The Management recognizes the importance of energy conservation program hence the requirements are incorporated into the company’s energy policy. KMK’s commitment is embedded into the Energy Policy as following:

- Commitment to comply with national regulation of energy and properly handle reduction of emission
- Commitment to optimize and reduce energy consumption for continuous improvement
- Commitment to select, purchase, and utilize energy efficient machineries and devices
- Commitment to provide training and education on occupational health, safety, environment and energy to all employees
- Ensure vendors and contractors comply with energy management system.

Commitment from the KMK leadership is in the forefront when we are working towards a better working environment and business management. The steering committee of Energy Program in KMK consists of HQ representatives, Senior Management, Mid Management, Energy Manager, Document Control Team, Heads of Departments and their selected employee level coordinators in the implementation of the Energy Management System.

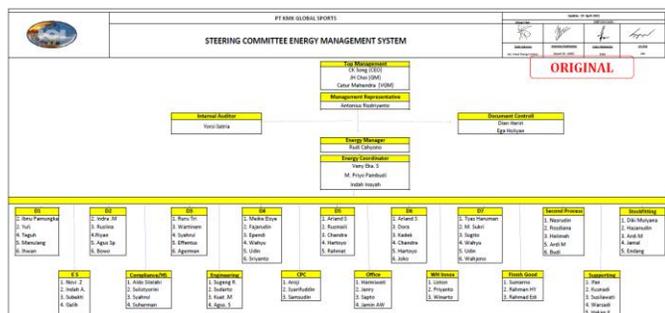


Figure 3. Steering Committee Energy KMK

Upon identification and setting up the team, we conducted in-depth training based on each level’s responsibility and accountability. The Management Representative (MR) and Energy Manager are officially

certified as Energy Auditor and Energy Manager by Indonesian Professional Certification Board. Management also supported the Energy Team Coordinators to develop their competence via training and benchmarking to enhance their knowledge on energy management system. We have also fulfilled certification requirements using third party auditors. Moreover, management’s commitment towards establishing a good and robust energy management system is evident in its willingness to invest in new technology as well as improving the knowledge of our workforce.

Our company policies and standards comply with government and buyer's requirements. Based on Government of Republic Indonesia requirements, a company that consumes energy more or equivalent to 6,000-ton oil equivalent (TOE), then, the company needs to implement Energy Management System. This regulation came into rule in 2009. At KMK our consumption of energy is less than 3,000 TOE/year but we still established the Energy Management System as it’s our belief that every penny saved will be useful for a better future and at the same time, we would also protect the environment for the future generation. KMK would be well prepared to tackle such situations and not scramble at the last minute. We aim to implement sustainable projects that goes beyond basic compliance needs. Implementation of ISO 50001 has made it possible for our internal team to gain knowledge of the energy management technical skills which in turn has improved our energy management methodology.

Energy Roadmap Initiatives – Long Term Plan

PT. KMK had long term energy Plan. The journey began in 2007 and we are going full-fledged until present.

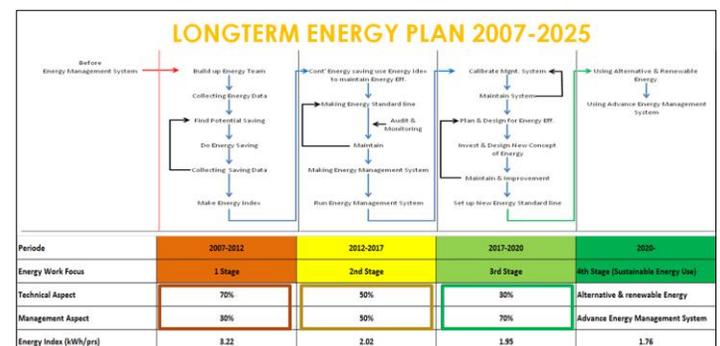


Figure 4. Long Term Plan KMK 2007-2025

The goals are divided into 4 stages:

1. Stage 1: Year 2007 ~ 2012
 In the early stages, KMK established an energy team, obtained Top Management’s commitment, mapped out basic data, identified low hanging fruits in potential savings, implemented short to mid-term improvement plans and commenced development program in Energy Management System.
2. Stage 2: Year 2012~ 2015
 Established Energy policy, determined Energy Baseline, regulated energy performance, conducted Internal Audits (Measurements & Evaluation), initiated New Equipment Deployment program, created Continuous Energy Saving Program, and EnMS ISO 50001:2011 Implementation (*certification on March, 2014*).
3. Stage 3: Year 2015 ~ 2020
 Re-certification ISO 50001:2018, establishment of Operational Control System, TPM Advance System, Energy Pull System Kanban, Energy Saving Culture, People Development & Empowerment.
4. Stage 4: Year 2020 ~ 2025 Beyond
Renewable Energy – Zero Emission.

EnMS – Powering Our Growth

First step in the Energy Program was to map out the energy consumption within the manufacturing site and to identify the priority areas. Energy mapping determined the areas and machines which had the Significant Energy Usage. Using statistical data made the energy mapping easier to understand. One of the methods used is Pareto. Below are some examples on how our company determined the focus area for potential energy saving implementation.

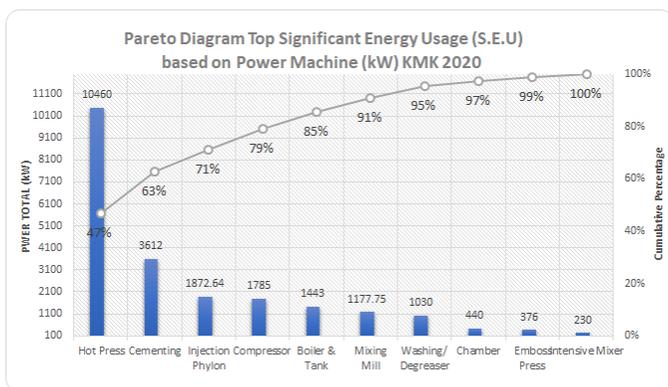


Figure 5. Diagram Pareto Top Significant Energy Usage (S.E.U)

Energy Review, Energy Baseline & Energy Performance

We also focused on the energy review to evaluate utilization of energy and to determine the energy performance indicators. Every year, the energy performance data was recorded, tracked and reviewed during management review sessions. Using the baseline data, we carried out comparison study for the years 2018-2020. The data was used to compare with the achievement of cumulative saving (CUSUM), we were able to find indicators related to the energy performance improvement.

Determining the baseline is crucial as it is a part of statistical methodology used to compare and track energy progress and savings.

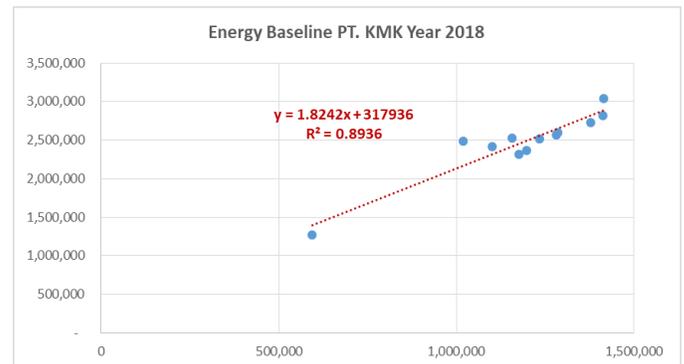


Figure 6. Energy Baseline KMK year 2018

EnPI values as Energy Performance Indicators are used to determine Action Plan. EnB and EnPI are adjustable if these values no longer reflect the targeted energy performance, such as addition of SEU equipment, changes in operating hours and process would also be a factor.

“Energy Management System is helpful for KMK’s future growth and sustainability. A systemic approach on energy management system would be hugely beneficial to the company and its employees.”

— Erry Sunarli, Senior Management KMK Group.

Do, Check, Act

Top Management Support for Implementation

Representatives, all cross functional departments, support coordinators, TPM, engineering, technical, utilities and the finance teams to review, evaluate the

Energy Management System in a planned manner, to ensure its suitability, adequacy, and effectiveness. Sustainable alignment with the company's strategic direction is also part of the review. Several areas are scrutinized during the Management Review such as Information on the performance of the Energy Management System including non-conformities and corrective actions; results of monitoring and measurement; audit results; evaluation results of compliance with legal requirements and brand standards. The results of the Management Review provide the team with the opportunity to establish continuous improvement. Appended below the implementation plan in 2020:

- Continuous replacement of Clutch Motor to Servo (150 pcs installed and saving 106,264.56 kWh)
- Optimized Compress Air System by repairing all leakages in the Compress Air system and distribution optimization
- Continuous replacement of Tubular to LED Lamp
- Replacement of Conventional Air Conditioner to VRF System

Based on the projects that were implemented in 2020, KMK achieved a savings of 1.83% from 1.31% in 2019. The data was reviewed by internal audit team and validated by the Company Corporate Finance team before it was disclosed during the annual management review.

During the 2020 pandemic, several work programs were put on hold due to budget diversions. The Company capital were used to fund CoVid19 prevention programs and to assist local community who were in dire medical health needs. However, the Steering Committee continues to strive to conserve energy by implementing energy savings using costless or low-cost methods. At present, field inspections with more emphasis on Operational Control related to the process of each machine, yields the energy savings results. In the “Optimization of Operational Control – No Cost Project” program in 2020 KMK was able to save energy by 288,653.76 kWh, Cost Savings of US \$ 28,119.50.

IMPLEMENTATION PLAN 2020										
KMK (KORPRI) (KORPORASI) (KORPORASI) (KORPORASI) (KORPORASI) (KORPORASI) (KORPORASI) (KORPORASI) (KORPORASI) (KORPORASI)										
Date: 2020										
No	Improvement Action	Description	Findings/Problems Before Taking Action	Description of Proposed Actions	Implementation Responsible	Target Reduction %	Potential Savings Opportunity (kWh)	Implementation Date	Current Status	Comments and remarks
1	Change Clutch Motor to Servo	Using Servo motor to reduce energy consumption	Clutch Motor continuously runs to provide the hydraulic system working pressure	Set a Long Term Plan of Quantity Clutch Motor to Change Servo Motor	Rudi Cahyono	79.88%	106,263.97	1/1/2020	Implemented	152 PCS actual
2	Motor Management System @ LD HP	Change IE0 technology with IE3 Motor (up to 20 hp)	IE0 Motors are low operation performance & high energy consumption	Set a Long Term Plan of Quantity IE0 to Change IE3 Motor	Rudi Cahyono	26.50%	102,715.96	1/1/2020	On progress	8.3% Project Postpone (Pandemic)
3	Optimized Compress Air System	Repair All Leakage Compress Air	Compress Air Leakage at Production Area	Monthly Audit TPM & Team Member Awareness	Rudi Cahyono	30.00%	4,800.00	1/1/2020	Implemented	
4	Continuous Replace LED Lamp	Change TL Lamp to LED	Mix of Lamp Using Tubular Lamp	Set a Long Term Plan of Quantity TL Lamp to Change LED	Rudi Cahyono	85.05%	20,818.56	1/1/2020	Implemented	1514 pcs actual
5	Quality Improvement at Strobot Machine	Using Small Wheel Modification	Quality Issue at Strobot Area	Change Big Wheel to Small Wheel and Modification Machine	Rudi Cahyono	6.67%	5,948.37	1/9/2020	Implemented	
6	Tooling Improvement at Rotary Screen Machine	Screen Printing Pallet improvement	Quality Screen Issue at Rotary Screen Machine	Make a gender pallet strong with mica material and using spiky moxa for reduce change time pallet	Rudi Cahyono	6.45%	1,346.40	10/5/2020	Implemented	
7	Tooling Improvement at Rotary Post Belt 1 Machine	Sewing Pallet improvement	Quality Issue at Rotary Post Belt 1 Machine	Batching strap using computer machine (BKS 24) and pallet to get better quality and proper	Rudi Cahyono	5.83%	1,330.56	16/5/2020	Implemented	
8	Energy Reduction at Screen Printing Area	Reduce Quantity of Lamps (24 pcs)	Previously one screen printing table used 7 pieces lamps with distance of 200 cm from the table	Set a Long Term Plan of Quantity TL Lamp to Change LED	Rudi Cahyono	2.74%	16,096.32	2/6/2020	Implemented	
9	Line Balancing Capacity at Washing IP Machine	Optimization of Capacity Washing Machine adjust load productivity	washing machines at bottom area (07) that operate with little load	Make a procedure for line balancing load at washing machine when the production was ramp down.	Rudi Cahyono	13.81%	12,464.00	1/6/2020	Implemented	
10	Operational Control Optimization at Hoist Machine	Operational Control improvement to turn OFF machine	Hoist machine still on standby mode during the break time and no production	Make a SOP Control to turn OFF machine during the break time and NO production.	Rudi Cahyono	9.61%	15,619.12	7/6/2020	Implemented	
TOTAL							523,252.26			

Figure 7. Table Implementation Plan KMK 2020

The Implementation Plan which includes a description of project initiatives, pre-empting issues before it becomes a problem, taking action, description of proposed actions, goals, potential saving opportunities, budgeting (include LCCA requirements), target achievement, implemented responsibility and timeline.

Key Activities Impact:

Based on the implementation plans that has been established, we would be able to identify activities or programs that are either long term plans or annual project initiatives that greatly affect efforts to achieve targets. Below are some of the key activities which have the most impact on the Energy Management Program at KMK:

- Motor Management System Change IE0 to IE3 Motors (in 2020 implemented, saving 102,715.96 kWh and 8,045.71 USD)

Energy Teamwork and Work Teams

To ensure a successful implementing of the Energy Management System, it is a necessity to have full participation from all relevant parties in the Company. It commences with the Top Management support and commitment. It is necessary to develop an integrated team with interdepartmental coalition. Then, we move on with team development and empowerment. Management’s support and commitment would be evident when they provide adequate budget for energy team. This has allowed the energy team to build a training system, to publicly support energy-saving awareness campaigns, team members attend skills certification and decision made by the Energy Team is fully endorsed by the leadership.

Measurement and Monitoring

Real Time Energy Monitoring System is tool used to ensure energy consumptions. The principle of this monitoring is the normalization of real-time energy consumptions data with production output. The energy index (**kWh/pair of shoes**) determines the accuracy of the data in a certain period. Energy monitoring meters are installed on every panel in the production line.



Figure 8. Display of Real Time Monitoring System

The benefits are:

- Determine energy consumption at each production line.
- Determine rank of efficiency on the production line
- Determine specific index for each shoe model
- Opportunity to improve energy savings at the production line

Energy KPI- for All Department

Key Performance Indicators (KPIs) are used to motivate all department heads to unite and be responsible for energy use. The head of the department must prioritize energy-saving activities into the annual work plan on production and quality targets. Energy KPI is the EnPI value of each department. The index value is obtained from the normalization of monthly energy consumption data divided by the total production output each month as the main variable. Baseline EnPI uses linear regression analysis.

Another support is that each building has a project implementation initiative. This project will be reviewed

monthly in conjunction with the Energy Team. The head of the department also encourages team members to provide energy-saving ideas through the Suggestion System (SUSY) program. This comprehensive activity received a positive response from employees and showed a significant impact on the company's targets.

“The challenge that we faced during implementation of Energy Management System is obtaining support from our workforce. To ensure the success of Energy Team’s plan we worked tirelessly to obtain collaboration from all levels within KMK”.

— Rudi Cahyono, Energy Manager.

Transparency

KMK has implemented Management System ISO 50001:2018, ISO 14001:2018 and ISO 45001:2018. KMK’s dedication in implementing energy management systems is published in the:

- KMK Annual Sustainability Report.
- PROPER assessment to the Ministry of Environment and Forestry (KLHK).
- Feasibility Environment Manufacturing (FEM) assessment report (Higg Index).
- Announcement letter to all energy suppliers.

What We Would Have Done Differently

- Learns from experts and benchmark other industries.
- Obtain feedback from shop floor employees on the implementation.
- Shorter periodic review on implementation versus policy.
- Utilize robust technology of energy savings.
- Encompass energy culture in employee orientation program.
- Active participation and involvement of each department’s leader.

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.

