

ISO 50001 Energy Management System Case Study

2020

INDIA

JK Tyre and Industries Ltd., Vikrant Tyre Plant, Mysuru

JK Tyre, the leading tyre manufacturers in India and the world at large. We are the 1st Tyre Company in Asia certified for ISO 50001:2018 and second in the World.



JK TYRE & INDUSTRIES LTD., VIKRANT TYRE PLANT

Organization Profile & Business Case

Vikrant Tyre Plant (VTP) Mysuru, located in Karnataka state of India, is the 3rd manufacturing plant of JK Tyre with State of Art Machineries and Technologies, which manufactures 1.7 million Truck / Bus Bias Tyre, 1.2 Million Truck / Bus Radial (TBR) tyres and 0.5 million Off The Road tyres per year. Mysuru Plant is one of the unique plant in JK Tyre, where 3 different product range is manufactured. The Mysuru plant is the oldest but most energy efficient Tyre plants in the country. The Mysuru plant is awarded First Prize from Bureau of Energy Efficiency (Government of India), Leaders award in Sustainability 4.0 from Frost & Sullivan and National Energy Leader from Confederation of Indian Industry. The Mysuru plant won British Safety council – Sword Of Honor award in Nov'2019 from BSC- UK.

“ISO 50001 strives us towards the path of continual improvement in our energy performance & guiding us to become one of the Energy efficient leaders in Tyre industries”

—Vuppu Eswara Rao, Unit Head

Case Study Snapshot

Industry	Rubber
Product/Service	Tyre
Location	Mysuru, India
Energy management system	ISO 50001:2018
Energy performance improvement period	7 Years
Energy Performance Improvement (%) over improvement period	16.4 %
Total energy cost savings over improvement period	1,888,262 US \$
Cost to implement EnMS	114,041 US \$
Total Energy Savings over improvement period	224,950 (GJ)
Total CO ₂ -e emission reduction over improvement period	71,147 CO ₂ -e Tons (cumulative reduction from the base year 2013-14)

Salient Features of Vikrant Tyre Plant

- Location Selection – Only Tyre plant in the State
- Most Product diversity
- Stabilized process & High product quality
- Zero Liquid Discharge (ZLD) Plant
- Environment friendly technology - Usage of maximum day light & Green Cover
- Highly optimized WIP (Work In Progress) material flow
- Skilled Workforce with an commitment to save energy and environment (as the Mysuru is one of the cleanest city in the country)

Drivers for energy and climate sustainability efforts, and goals

At JK Tyre Mysuru, we are seized by the need to moderate our carbon footprint even as we increase production. Over the years, we have moderated the consumption of water and energy even as we have increased production. Helping moderate our carbon footprint, reinforcing our commitment to sustainability in mobility and emerging as a responsible corporate citizen in line with our Vision and Mission. Our commitment towards environment responsibility comprises energy and water conservation coupled with reduction in overall carbon footprint. This focus resulted strengthened the company's competitiveness in local, national and international geographies

“Putting sustainability at the heart of JK Tyre’s culture has undoubtedly given us a competitive edge and has made us one of the most sustainable companies in the industry”

- Satheesha Kumar Shetty, Engineering Head (EnMs MR)

We adopted the ISO 50001 – Energy Management System model of Continual Improvement since year 2013 and committed ourselves for sustainable growth. Energy Management System (EnMS) provides a framework for establishing energy management best practice and helps us to improve the energy efficiency. This System enables us to establish, implement, maintain and review the Energy Policy, Objectives, Targets, Energy Performance Indicators (EnPIs) and Management Action Plans relating to Energy Performance.

The Company achieved a significant reduction in energy consumption, achieving a new milestone in energy consumption of the lowest 8.86 GJ/Tonne of finished goods.

As part of Energy Management Program, each year we identify the opportunities for improvement (Energy Projects – both Electrical & Thermal) and implement it to reduce energy consumption, improve efficiency and substitute the dependency on fossil fuel. In the year 2013, we set the goal to offset the use of fossil fuel by 70% by year 2023. To make this happen, we identified

and implemented various Renewable Energy projects which comprises solar & Wind power and implemented in phased manner. Today at Mysuru plant, more than 90% of overall Plant Electrical Power Consumption is met through Renewable Sources (i.e. 15MW wind power and 0.75 MW Roof top solar Power Plant) this initiative has drastically reduced our carbon footprint year-on-year basis. All the above initiatives are reinforcement of support of our Top Management to strengthen & improve Energy Management system.

Business Benefits

ISO 50001 allows JK Tyre to continually monitor the energy use & consumption and has helped businesses to make substantial reduction in energy cost. In addition, there is market value for conforming to an internationally recognized standard, which enhance the brand and directly supports our Marketing strategy.

ENERGY PERFORMANCE ACHIEVEMENT

In FY-2019 we achieved a total energy benchmark level of **8.86 GJ/ Tonne of production** which is almost **30%** less than as compared to **Base Year (2013-14)** and stands in the line with the top three best companies in the sector, which directly resulted in phenomenal **40%** reduction in Carbon Foot Print. Highlights of energy performance achievement during the period are as under:

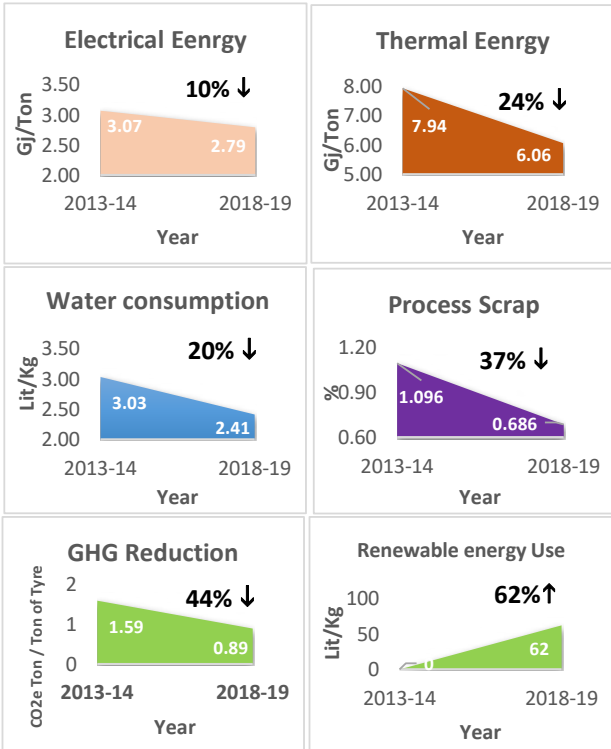
- Energy cost reduced by **20 %**
- Reduction in thermal energy by **24 %** and electrical energy by **10%**
- More than 60% of total energy use is from renewable sources (Electrical is > **90%**)
- Helped us in strengthening monitoring systems
- Increased energy efficiency awareness among employees at all levels
- Improves the ability of organizations to manage energy risks concerning possible impacts in an efficient and effective way.

Other benefits

- Plant process scrap / wastage reduced by **37%**
- 100% Regulatory compliance at all time
- Improved corporate image and credibility among customers, clients and stakeholders
- Enhance employees awareness & knowledge on energy conservation & importance.

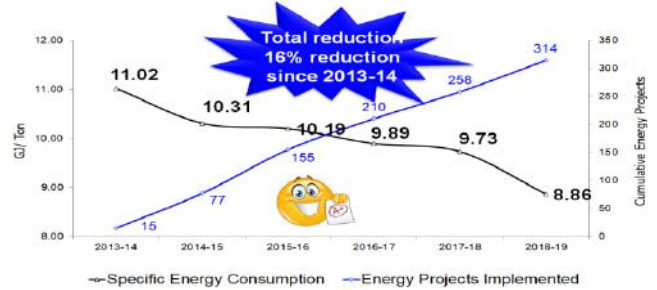
- **“Resource optimization with lower wastage is key to energy efficiency activities.”**

- Subramanya H K, Head Production



Energy projects implemented details

OVERALL IMPACT OF ENERGY SAVING PROJECTS



YEAR	Projects in (Nos)	savings in (GJ)	Savings in (US \$)	Investment in (US \$)
2013-14	7	35576	237260	77123
2014-15	9	30396	244548	93969
2015-16	16	25002	196726	74055
2016-17	19	69364	669562	251301
2017-18	17	12264	104768	63274
2018-19	20	4302	83384	50767
2019-20	14	48046	352014	177260
Total	102	224950	1888262	787749

Note : Savings are annualized due to overlap of projects in financial years

Operational savings (Without investment) – 1.58 million US \$ (mainly by reducing losses, wastages & breakdowns)

Savings from projects (with capital investment) – 2.24 million US\$

Overall savings by implementing ISO50001 : 3.82 million US\$

EnMS implementation cost and cost savings

Year	Activity	Cost (US \$)
2013	Gap Assessment, audit consultancy, training and awareness program	3425
2013	Certification Audit (2011 version)	4110
2013	Energy audit cost & trainings	23973
2014	Periodic audit & Training	4795
2015	Energy audit cost & trainings	20890
2016	Periodic audit & Training	3425
2016	Recertification audit (2011 version)	4110
2017	Energy audit & training	30822
2018	Capacity building training and audit	3425
2019	Energy audit & training	11644
2019	Migration to ISO50001:2018 version	3425
	TOTAL	114041

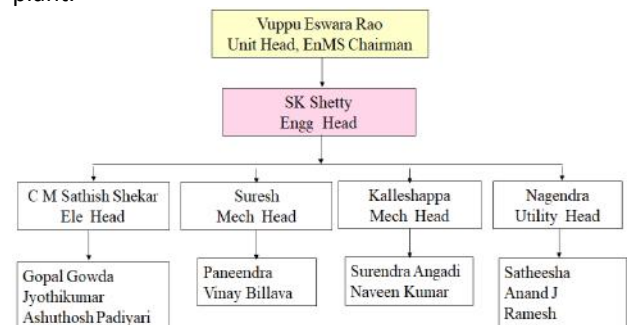
- **“Energy is time, and time is everything – Save Energy today to so that you can make life better tomorrow”**

Vinay, Head Mfg Excellence & System

Plan

Management Commitment

To demonstrate the top management commitment, an energy policy is formulated in accordance with the ISO50001 requirement, and communicated throughout the organization. EnMS Team formed comprises of Energy Management Representative, a Certified Energy Manager and EnMS Coordinators from various departments that represent each department in the plant.

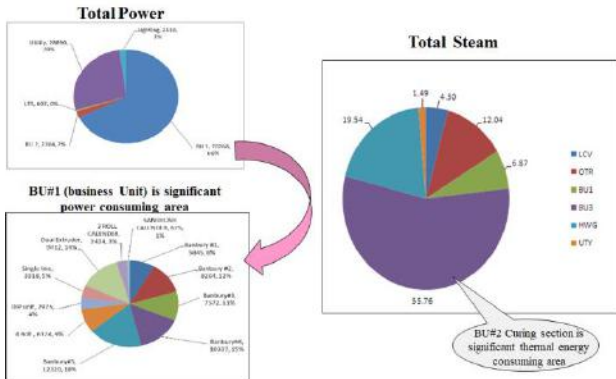


Energy Planning

Our Energy review is performed as per ISO50001. We use mainly Thermal Energy accounting 65% of total energy followed by Electrical energy which is 35%. Tyre curing is significant thermal energy use where the steam is used for vulcanization. In Electrical power Rubber Mixers are the significant energy consuming areas. We have identified energy variables & controls are established along with EnPIs to maintain & improve energy performance. The energy consumption is analyzed based on **variable** (Proportional to Production), **Semi fixed** (Energy X Prod + Constant), and **Fixed** (Constant - irrespective of production) load so that appropriate action can be taken to improve overall energy performance.

The energy performance is plotted for area wise, equipment wise and plant wise. This allowed management to have a closer look at detailed energy consumption of plant on daily basis.

Sample energy profile shown in fig.



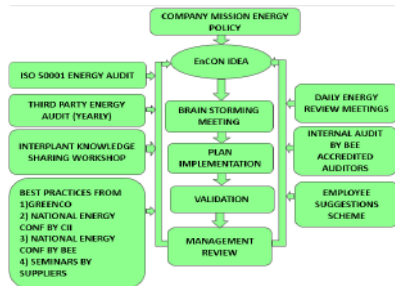
Developing Energy Baseline

Base line energy is arrived by taking the average of last one-year energy consumption considering factors influence like capacity utilisation, climate change, new product development etc.

Energy Strategy

Our energy strategy is based on ISO 50001 systematic approach (plan-do-check and act).

Please refer Figure



Planning - Target setting

Energy audit is being conducted every 3 year and energy performance improvement opportunities are prioritized, budget allotted & implemented in phased manner in next 36 months period. Target is fixed is based on the base line energy value and planned energy improvement activities for the current financial year.

All legal requirements and other requirements are also taken in to account. Overall Energy Targets fixed and breakdown in to Area wise, Equipment wise and Component wise. As an example, target setting of plant’s electrical energy use is shown in above fig.

ISO 50001 gave us the clear understanding on Sustainable Energy Practices, which helped our Organization become more sustainable.

A.K. Makkar, Manufacturing Director

Do, Check, Act

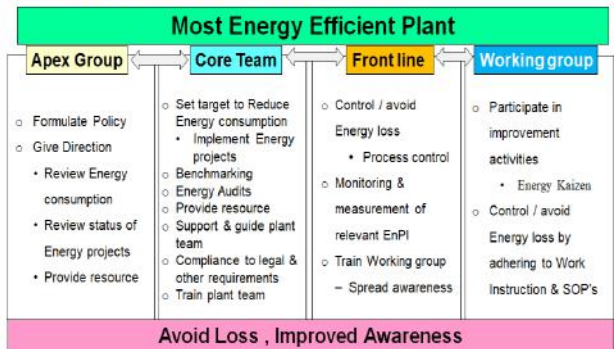
Implementation process

Top management has assigned the responsibility and authority to the energy management team to ensure that the EnMS is established, implemented, maintained and continually improved.

Training and awareness creation

Energy Management Team creates awareness for all employees and Stakeholders who are involved with the EnMS according to their role for successful implementation and maintenance of the system in following ways like Class room training, Visual aids / displaying posters, Small group discussion, Motivation by Awards & Recognition

STRATEGIES FOR EMPLOYEE AWARENESS & INVOLVEMENT



Communication

We have an excellent system in place for both internal and external communication of information related to EnMS for our Employees, Stakeholders and interested parties, like Kiosk, Energy Scorecards, advance EnMS Software with Mobile Application, Energy Metrics display, suggestion box and Monthly Communication Meeting.

Operation control, documentation and procurement

Operational criteria has been set for the effective operation and maintenance of significant energy uses to prevent deviation. Appropriate variables for each operation identified and established operational controls to control variation. The operational controls are communicated to our employees and relevant stakeholders through classroom and on the job trainings. The Operational controls has been well documented in our Energy manuals, procedures & SOPs.

Green Procurement guideline have been formulated based on the inputs from Energy Management System and it has been mandated for all products and services, which have an impact to the significant energy use. As part of our sustainable practices, we insist our vendors to adopt the green practices there by we mutually get benefited.

Energy monitoring system(EMS)

Apart from regular monitoring & reviewing of energy consumption (both specific & absolute), We have identified Energy variables & Energy performance indicators (EnPIs) at each equipment which can impact the consumption & performance. These variables are checked & monitored to achieve consistent energy performance.

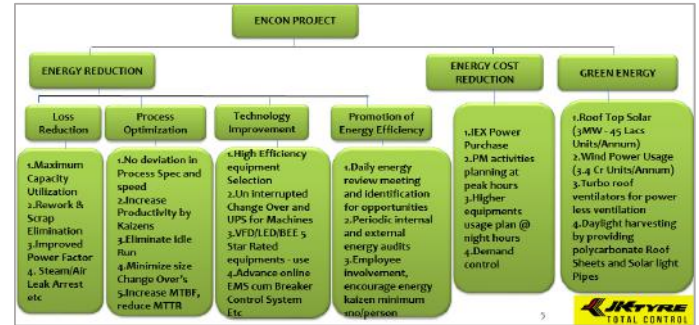
The deviations are identified, reported, root cause analyzed and suitable action are taken to avoid repetition. Preventive & predictive maintenance (vibration & thermal imaging) helped us to improve our overall energy performance.

Top management support for implementation

- Implementing, Maintaining and Reviewing the Energy Policy, Objectives, Targets, Energy Performance Indicators and Management Action Plans relating to Energy Performance. .
- Identification and allocation of resources for the system.

- Overall Review of the Energy Performance and Energy Management System.
- Ensure compliance with relevant Energy regulations.

En Con -Project Selection Methodology



Key Energy performance activities implemented during the period

- Air ventilation fans performance improvement by replacing belt driven low efficiency centrifugal fans with high efficiency direct coupled axial fans
- Customized dome insulation to reduce heat loss. In curing press.
- Installed back pressure turbine in place of conventional PRS (pressure reduction station) to reduce steam pressure and generate the electrical power (1st in tyre industry)
- UPS installed at critical machines to eliminate tyre scraps
- Nitrogen tyre curing introduced in place of Hot water tyre curing, hence hot water generation system completely eliminated- Savings of 7000 Tons of coal per year
- 100% plant lightings converted to LED lights
- 100% VFD applications used for equipment
- Various projects implemented for steam and condensate recovery, boiler efficiency improvement, trap management and coal savings.



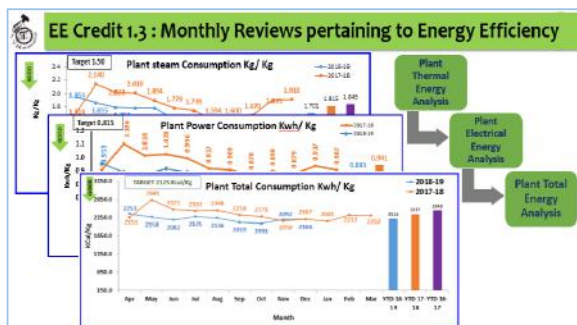
Energy performance validation

Internal audit is being carried at interval of 6 months by qualified internal auditors to check the maturity of EnMS as per ISO 50001. The internal audit identifies the gaps in the system, this helps us to take actions to bridge the gap. Based on audit results corrective and preventive actions are implemented, so that Mysuru plant is always conforms & complies with ISO 50001.

Performance and target review

- Daily Review Meeting chaired by Plant Head
- Monthly Energy Review meeting chaired by Director Manufacturing
- Monthly Business Review Meeting chaired by Deputy Managing Director
- EnMS Management Review Meeting chaired by Plant Head (UMR) – Half Yearly. UMR Review Energy Management Action Plans are implemented thus achieving the Energy Objectives and Targets relating to the various sections.

Plant Energy Management Team



Transparency

Transparency allows us not only display our successes, but also honestly reflect upon our weaknesses, driving innovation and improvement.

We are voluntarily publish our EnMS Performance in Sustainability Report as per GRI, GHG Report (verified by 3rd party) is publicly available in our Website. Moreover, we also participating in Global survey of Carbon Disclosure Project - Climate Change.

Awards and Accolades for Energy Management



Lessons Learned

- ISO50001 is a robust system, helping us to sustain & continually improve our energy efficiency at all times
- Developed dedicated, trained and committed team to drive the energy project.
- Energy Management System makes us aware of the potential risks of energy security and helps to address it through renewable energy sources.
- Need of advanced energy monitoring to identify and eliminate the energy wastage.
- Integration with other management systems **ISO 14001, IATF16949, ISO 45001 & ISO 14064-1**
- Energy Management System implementation provides good respect and potential business from clients who prefer to associate with socially responsible and sustainable companies.

Through the Energy Management Working Group (EMWG), government officials worldwide share best practices and leverage their collective knowledge and experience to create high-impact national programs that accelerate the use of energy management systems in industry and commercial buildings. The EMWG was launched in 2010 by the Clean Energy Ministerial (CEM) and International Partnership for Energy Efficiency Cooperation (IPEEC).

For more information, please visit www.cleanenergyministerial.org/energymanagement.