

# Global Energy Management System Implementation: Case Study

India

## Grasim Industries Limited, Unit- Indian Rayon, Veraval



*Indian Rayon implemented ISO 50001 towards achieving its sustainable vision*



Grasim Industries Limited, Unit – Indian Rayon

### Business Profile:

Grasim Industries Limited, Unit - Indian Rayon, Veraval is a leading manufacturer of Viscose Filament Yarn (VFY) in India with a rich heritage of over 60 years. From a product standpoint, this yarn is an input to the Textile Industry for manufacturing of fabrics mainly for apparel and home furnishing purposes. With a turnover of Rs.743 Crores/annum (FY'17), the company shares the largest producer position in the country. Indian Rayon is a perpetual No. 1 VFY exporter with exports to 45 countries, in addition to having a lion's share of market in India. IR has played a major role in catapulting India to the 2<sup>nd</sup> position in the global VFY manufacturing map only after China.

The SBU owns complete integrated operations of 21300 Tons/annum, equipped with three technologies – PSY (Pot Spun Yarn), CSY (Continuous Spun Yarn) and unique SSY (Spool Spun Yarn) from globally renowned ENKA – Germany). It has a backward integration of 34.5 MW

*“Energy performance is the key factor in Sustainable development, ISO 50001 will definitely add value towards our journey to excellence.”*

-- Mr. H. S. Dagur, Unit Head, Grasim Industries Limited, Unit-Indian Rayon, Veraval

### Case Study Snapshot

<b>Industry</b>	Grasim Industries Limited, Unit-Indian Rayon
<b>Product/Service</b>	Viscose Filament Yarn (VFY) and Chlorine Alkali (CA)
<b>Location</b>	Veraval, Gujarat, India
<b>Energy Management System</b>	ISO 50001
<b>Energy Performance Improvement Period</b>	Total number of years: 2
<b>Energy Performance Improvement (%) over improvement period</b>	VFY – 11.05% CA – 2.31%
<b>Total energy cost savings over improvement period</b>	1273684 USD
<b>Cost to implement EnMS</b>	1325308 USD
<b>Payback period (years) on EnMS implementation</b>	1.04
<b>Total Energy Savings over improvement period (GJ)</b>	59608
<b>Total CO<sub>2</sub>-e emission reduction over improvement period</b>	2318

captive Power Plant and 250 TPD Caustic Chlorine plant (which falls under the Chlor-Alkali SBU). The integrated complex of the Unit is located in Veraval. IR has manufacturing and other functions in Veraval, Gujarat

and Sales & Marketing at Mumbai. The customer base is all across in India with sales 60% in Western, 12% Southern, 11% in Northern region and 17% is being exported in Asian, American, European, African and Australian countries

**Indian Rayon is unique in many ways:**

- It is the only company to use all 3 kinds of technology, customers can choose the VFY required at one location
- It is the first VFY business in India accredited with ISO 9001, ISO 14001(EMS), ISO 50001 (EnMS) OHSAS 18001 (OHS), SA 8000, REACH Compliance and OekoTex certification
- It is the first company taking a VFY brand to the end consumer that will also benefit the industry as a whole, in India

**Journey towards Excellence :**

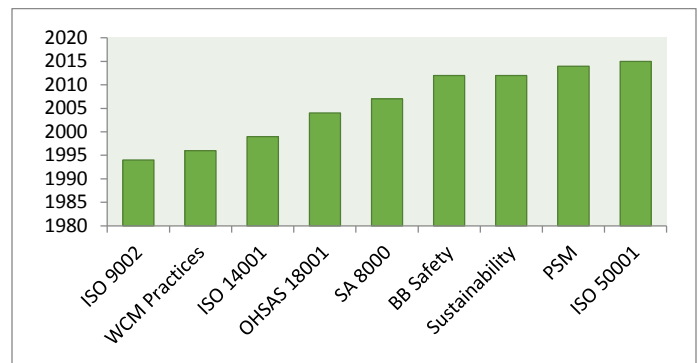
Main Products & Manufacturing Capacities		Integrated Operation
Product	Capacity	
VFY	57.0 TPD	
Sodium Sulphate	32 TPD	
Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )	100 TPD	
Carbon di Sulfide (CS <sub>2</sub> )	27 TPD	
Power	34.5 MW	
Caustic	250 TPD	

Indian Rayon (IR) is a system oriented plant: the journey towards implementing management Systems was started way back in 1994 by ISO 9002, and from 1996 onwards, Aditya Birla World Class manufacturing practices (WCM) were initiated. Indian Rayon is accredited with ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007, ISO 50001:2011 and SA 8000:2014. IR is also working for implementing Behavior Based Safety and Process Safety Management. The ABG WCM framework was upgraded to a Business Excellence framework and implemented from 2014. Indian Rayon’s commitment of transforming into sustainable Business is fortified by the Groups three core strategic dimension as Sustainability Model (Responsible stewardship, Stakeholder engagement and Future Proffing) and working towrds to realesing sustainbiltiy reprot as per GRI-G4 indicators. Improving its energy performance IR has opted to certified with ISO 50001:2011 compliant in

year 2015. World Class Manufacturing practices involving Kaizen, various campaigns, competitions and award schemes.

In line with our Group’s vision of CSR, Indian Rayon has established the Jan Seva Trust (JST) in the unit, for the cause of Education, Health care, Sustainable Livelihood, Infrastructure Development and Women.

**Indian Rayon’s journey towards implementation of Management Systems**



**Business Benefits:**

The implementation of the EnMS at Indian Rayon, not only help to optimize its energy consumption but also helped to improved environmental performance to achieve sustainable growth. Involvement of various section peoples enables them to understand the process at micro level and identify the potential energy savings sources. Savings coming out from energy may invest in other area like improvement of quality, safety and environment.

- Total energy saving was 16.56 Million kwh over the base line which 11.02% in VFY and 2.3% in Chlore Alkali
- Corresponding GHG reduction was 2318 T eq to CO2
- Other intangible benefits of learning of the team members
- Till 2014 energy savings initiative were being identified through Kaizens under WCM practices, in the year 2015 implementing ISO 50001 provided a systematic approach for the energy saving, which is more sustainable

## EnMS Developments & Implementation:

In July 2014, Management decided to implement the ISO 50001:2011 Energy Management System not only to improve its energy performance but also sustainable development. A certifying body, DNV-GL was identified, who could work with the company to implement the system. Since company had a strong team with two decades of experience in Management Systems, no consultant was engaged for documentation; however, training and certification were within the scope of DNV-GL. With the guidance of the Unit Head, a core team was formed under the leadership of FH (QA&TS) who was also appointed as Management Representative for ISO 50001:2011. The core team consisted of:

- Function Head (Caustic plant)
- Department Head (Finance and Accounts)
- Department Head (Power Plant) – also Energy Manager
- Department Head (Caustic Plant)
- Department Head (Technical)
- Section Head (Daily Report)
- Section Head (VFY Electrical)

Apart from the core team, an execution team was also formed with members from different sections of the plant. The responsibility of the core team was to review the progress, whereas the execution team was responsible for data collection and documentation

### Implementation plan:

A detailed implementation plan was established by the Management from August 2014 to April 2015 to execute all the activities. The implementation started from August 2014 by finalizing the certifying body and the first training program was conducted for team members on 11<sup>th</sup> October 2014. Thereafter, a two- day internal auditor's training program was also organized

for a team of 20 people during 13<sup>th</sup> -14<sup>th</sup> November 2014.

Internal Awareness Program –  
Feb'-Mar'15



Awareness Program –  
11<sup>th</sup> Oct'14



The first stage document audit was carried out by DNV-GL during 13<sup>th</sup> to 14<sup>th</sup> March 2015. Corrective actions on the first stage audit findings were completed with 15 days. An internal audit was carried out from 6<sup>th</sup> – 9<sup>th</sup> April 2015 and thereafter, a management review was carried out on 11<sup>th</sup> April 2015.

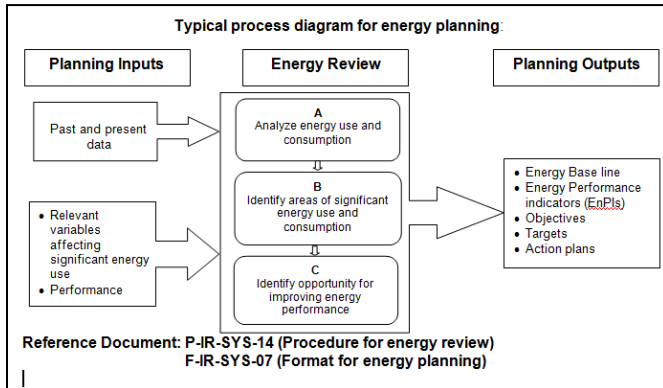
Review of documentation and preparedness for final audit was carried out by DNV-GL from 13<sup>th</sup> to 14<sup>th</sup> April 2015 and recommended for final audit which was conducted from 28<sup>th</sup> to 30<sup>th</sup> April 2015. Audit was successfully carried out and recommended certification. Dedication and the involvement of the team made implementation in a short period possible without a consultant.

*“ISO 50001:2011 is an effective tool to address climate change issue by saving energy”*

-- Mr. M. D. Sharma, Head Power Plant

### Energy Review and Planning (Breakthrough in achieving substantial Savings):

- The review process identified different energy use and obtained energy consumption details for a specific period, normally a full year on monthly basis with significant affecting variables

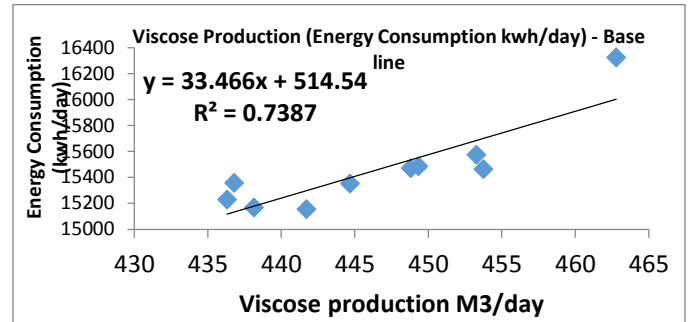


- Collected historic energy data for last 12 months and reviewed for establishing base line
- Defined criteria to identify significant energy consuming process / equipments as :

Criteria :		1	2	3
A	Percentage of impact on energy consumption	Low, <10% of total consumption	2= Medium, 10 to 30% of total consumption	3= High, 30 % to 100% of Total consumption
B	saving potential of energy consumption based on the consideration comparing with OEM/Best achieve data/Benchmark or best available other	<5%	5~10%	>10%
C	Potential for usage of renewable energy sources	No	Not Mandatory but better to implement	Mandatory
D	Cost involved (Investment cost to improve energy performance)	High (ROI>5 Yrs)	Medium (ROI 3-5 Yrs)	low ( ROI < 3 Yrs)
E	Legal requirements	No	Not Mandatory but better to implement	Mandatory
<b>Conclusion</b>				
Final Score : F = Ax+BxCxDxE				
Whenever the total score is >3, it will be treated as significant. Moreover, if the impact requires legal obligation fulfillment, it will automatically become significant				

- Energy review carried out for all the processes
- Significant energy consuming process identified and action plan initiated
- The Concept of Energy Review as it applies to Operations and Maintenance is further divided into various sequence
- Frequency of review process is defined as whenever any changes in the process or once per
- Baselines established for all processes considering all the variables like product mix, production level, period, new energy source and a regression analysis is performed to established the base line for significant process

- Energy performance indicators , objective and targets established for all the processes

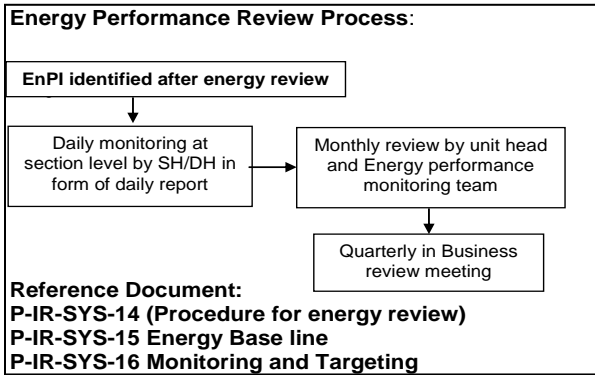


**Some of the specific action initiated for energy saving:**

S. No.	Measures for energy saving
1	Installation of LED Tube lights
2	Installation of 50 KW solar power plant
3	Harnessing natural light using light pipes
4	Mist type combo vacuum system for Flash Deaerator
5	China Filters (4 Nos) in place of Sand filters
6	Energy efficient distribution in Cooling Tower No. 7 & Energy efficient Pump for Air washer
7	Spin bath return through gravity in CSY 1
8	Condensate tank common for CSY 1 & 2

**Approach for Performance Monitoring:**

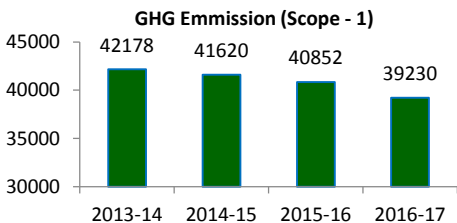
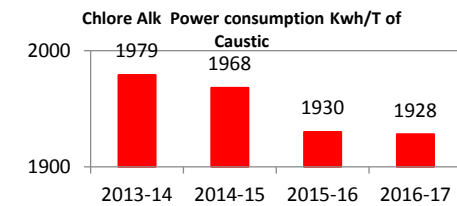
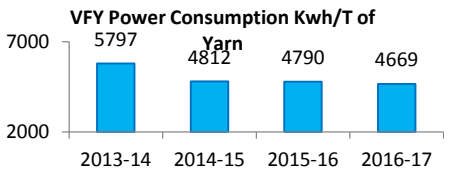
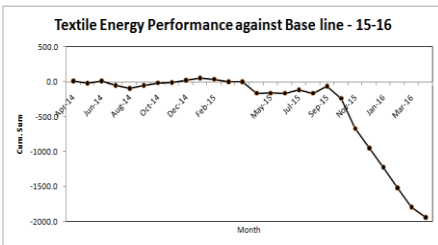
- EnPIs established for all the processes like kwh/t of production, kwh/TR, etc.
- Methods are defined by which energy performance is to be compared
- On line energy monitoring system (EMS-Software) is there and designated person circulate the energy consumption reports on daily basis and corrective actions are initiated as and there. This became the part of daily management
- Variables like weather, product mix were considering for establishing base line
- Internal Audit and management review frequency is defined as twice per year. There are 20 trained internal auditors and 10 lead auditors. energy review is done by energy review team
- Internal audit is done through On-line Integrated management system



- Energy performance is monitoring by plotting cumulative saving against base line

**Example:**

Total Reduction in energy consumption during 15~16  
 Total Saving / Loss: -149.6  
 Total consumption: 4053  
 % saving / Loss: -3.69 (Negative value indicate savings)



## Steps for Sustenance and operational control, Developments and Training

- Energy manual established as per ISO 50001:2011 requirement
- Energy and Carbon policy documented and communicated to team.
- Procedures such as energy review, energy base line, monitoring and measurement method defined
- Various Formats like energy monitoring, change in facility, opportunity register, etc., established
- Energy profile, current energy consumptions trend and comparison with past data documented
- Training and awareness down the line on regular basis established.
- Resources are ensure for implementation of energy scheme through planning and budgeting
- Priority is being given for the procurement of energy efficient equipments. Energy clause is added.
- Since company is already ISO 9001 certified, operation control in form of SOP / work instruction are established in each processes
- various visuals like company policy, energy policy, energy saving quotes are displayed on various location of the plants
- Yearly training need identified and training calendar established



## Tools and Resources

- An Energy and Carbon management team is formed to identify the energy improvement projects, ensure resources and executing of the projects timely. They review the same on monthly basis.
- Calibration process and frequency for all the meters defined and



being done through certified external agency. 160 Additional energy meters were provided for energy monitoring

- Thumb rules displayed for energy savings at various location of the plant
- Maintenance practices like I Operate I maintained
- Continual improvement through Kaizen , Idea and Innovation
- Projects are identified and allocated to team for solving them through, Problem solving technique like six sigma, 7 QC tools
- Reward and recognition scheme also there for best projects, highest savings scheme, best kaizen, maximum kaizen contributors etc.

## Challenges Faced during implementation

In the absence of a consultant, documentation and establishing of various processes was challenging, but the strong internal team with experience in documentation helped. An Energy Management System cannot be effectively implemented without the involvement of bottom line people and the plant is manpower intensive; three plants at one place made the process little difficult. Awareness programs and campaigns helped to educate people and encouraged them to participate actively.

*“Energy is one of the key factors to control cost and environmental impact. ISO 50001 is providing systematic approach for the organization growth*

-- Mr. Pankaj Srivastava: Functional Head: QA, R&D, TS

## Benefit s of ISO 50001: 2011

- Improved understanding within the team
- Focus on micro level projects which could enhance productivity
- Improvements in monitoring and measurement
- Involvement of the team
- Reduced power consumption
- Achievement of PAT targets

Other long term benefits:

- Company images as improvement in energy performance is resulted in environment improvement also
- Focus of the process owner on energy performance
- Continuous learning and capability building of the team members as many are the part of internal audits for energy management

## Lesson & Key To success:

- Commitment and involvement of leadership
- Committed team and involvement of bottom line
- Adoption of new technologies
- Training, awareness , knowledge sharing with peers
- KIP visits with other ABG units, seminar etc.
- Regular review and providing timely resources
- Energy audits by CTS and external agency

Through the Energy Management Working Group (EMWG), government official’s 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](http://www.cleanenergyministerial.org/energymanagement).

