



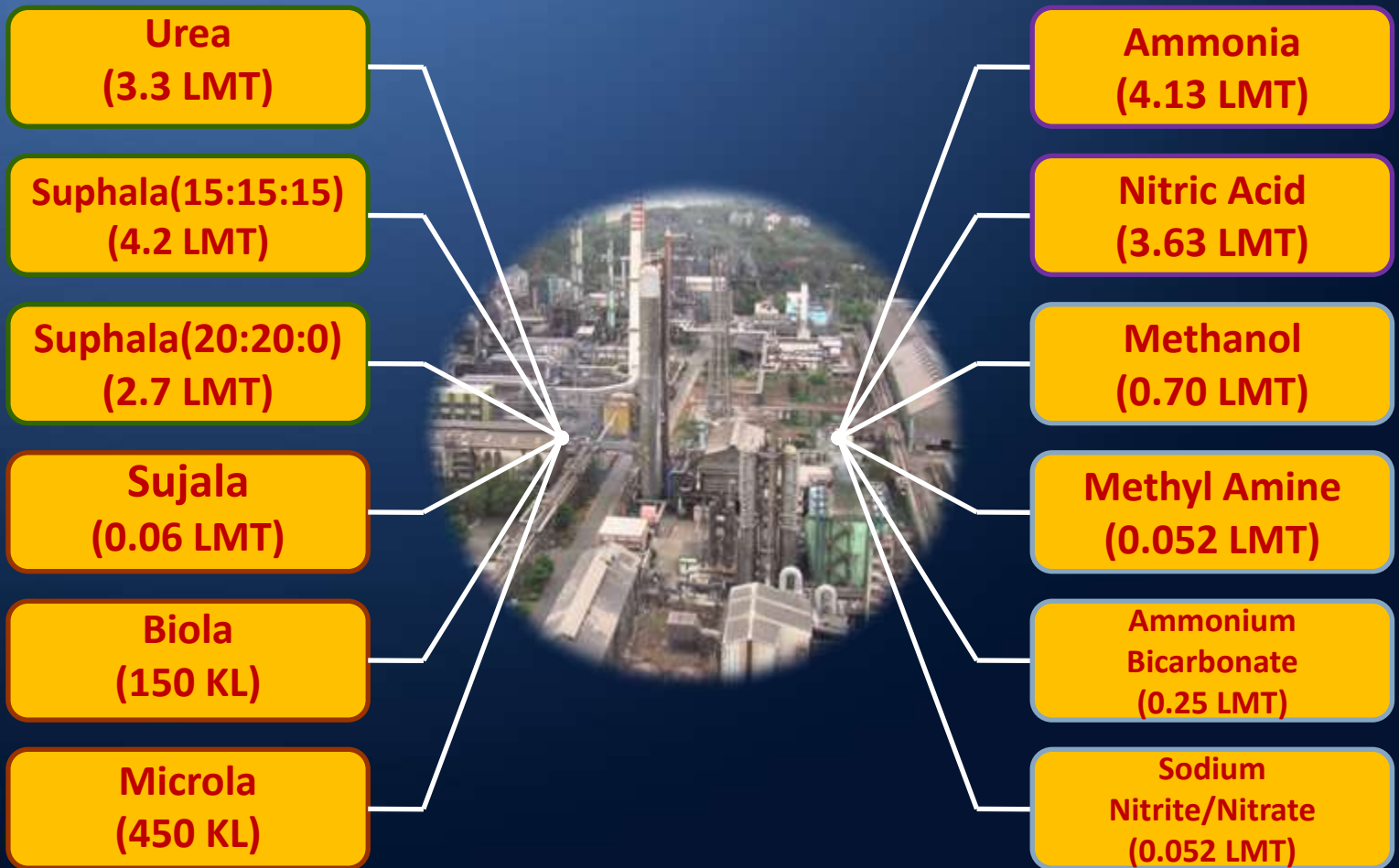
Knowledge Exchange Platform

Transmitting Knowledge through Best Practices

Best Practices in Energy Efficiency in RCF, Trombay Unit



Overview of Trombay Unit



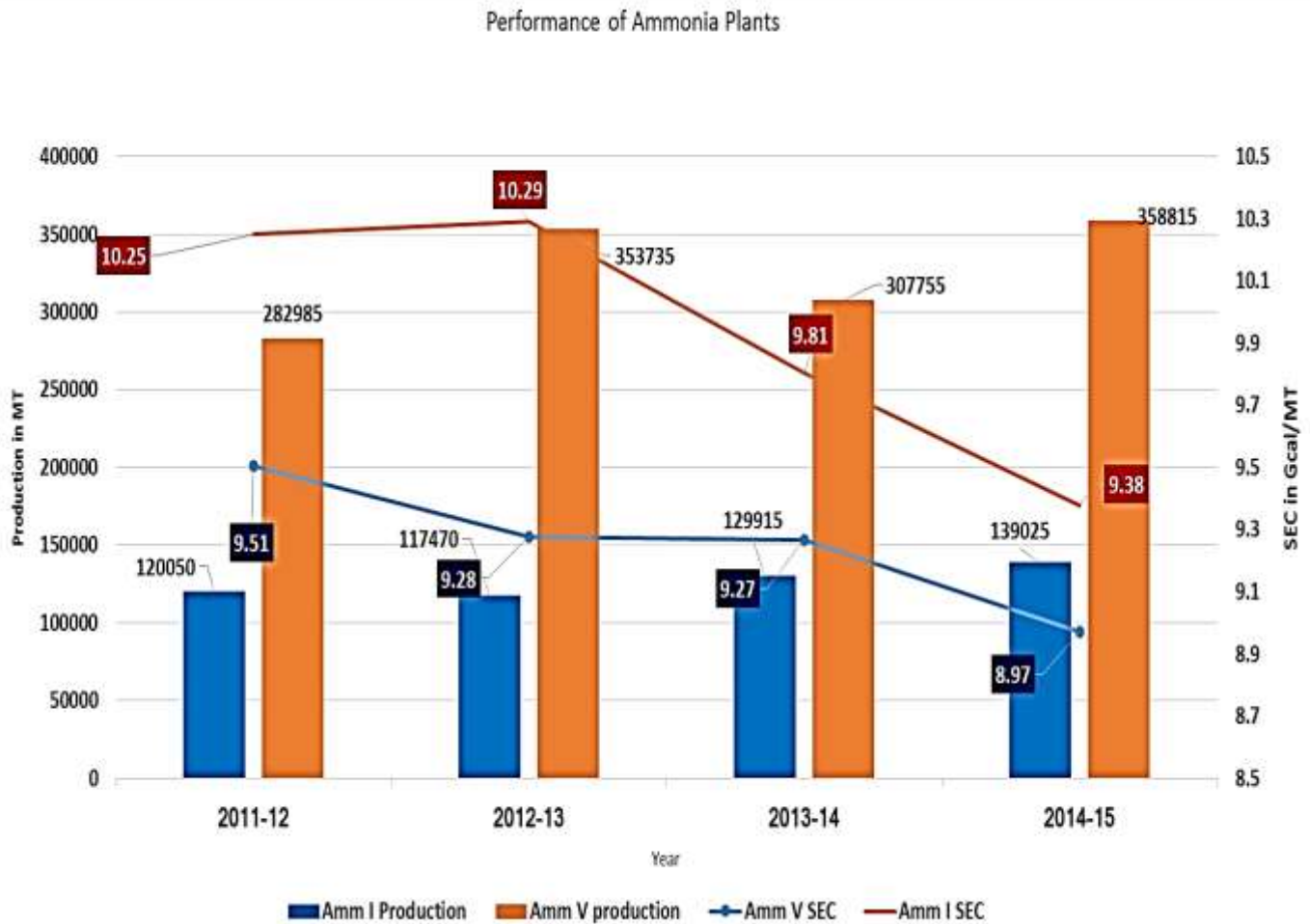
Capacity Utilization

		2013-14		2014-15	
	Annual Installed capacity	Production	% Cap utilization	Production	% Cap utilization
	MT	MT		MT	
Urea	330000	352910	107	423480	128
Suphala	420000	333295	79	396810	94
ANP	270000	184125	68	260520	96
Amm I	115500	129915	112	139025	120
Amm V	297000	307755	104	358815	121

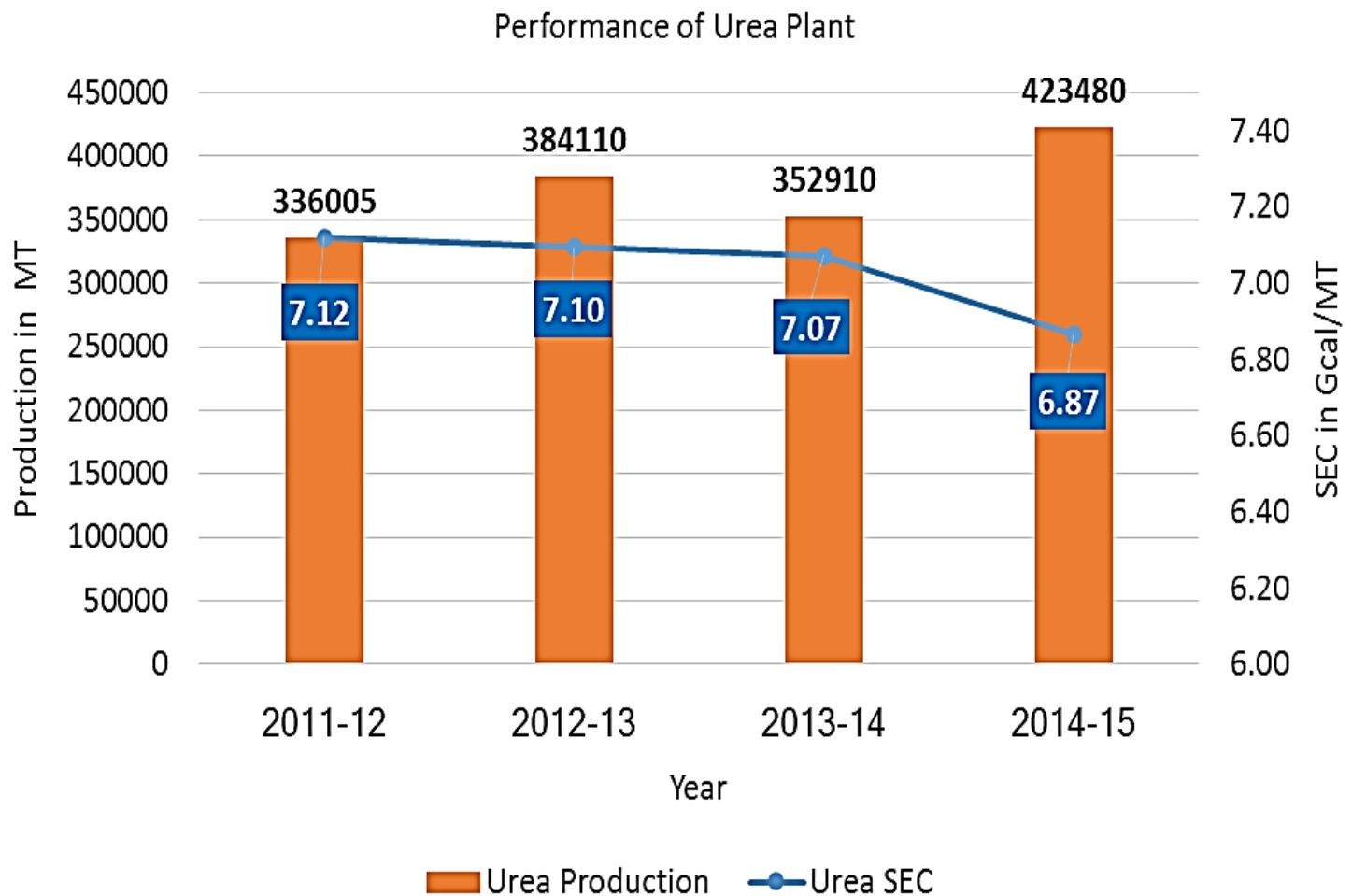
Achievements during the year 2014-15:-

- Highest ever total fertilizer production 10.88 Lakh MT including specialty Fertilizer production. Previous Best was 10.25 Lakh MT in 1999 – 2000
- Lowest Specific Energy has been achieved in Ammonia – I (9.380 MKcal/ MT), Ammonia – V (8.971 MKcal / MT) and Urea (6.865 MKCal /MT)
- We have achieved highest ever Ammonia Production of 4.98 lakh MT, from both Ammonia I & Ammonia V Plant.
- Highest ever stream days have been achieved for Ammonia I, Urea & ANP plants

Performance of Ammonia Plants



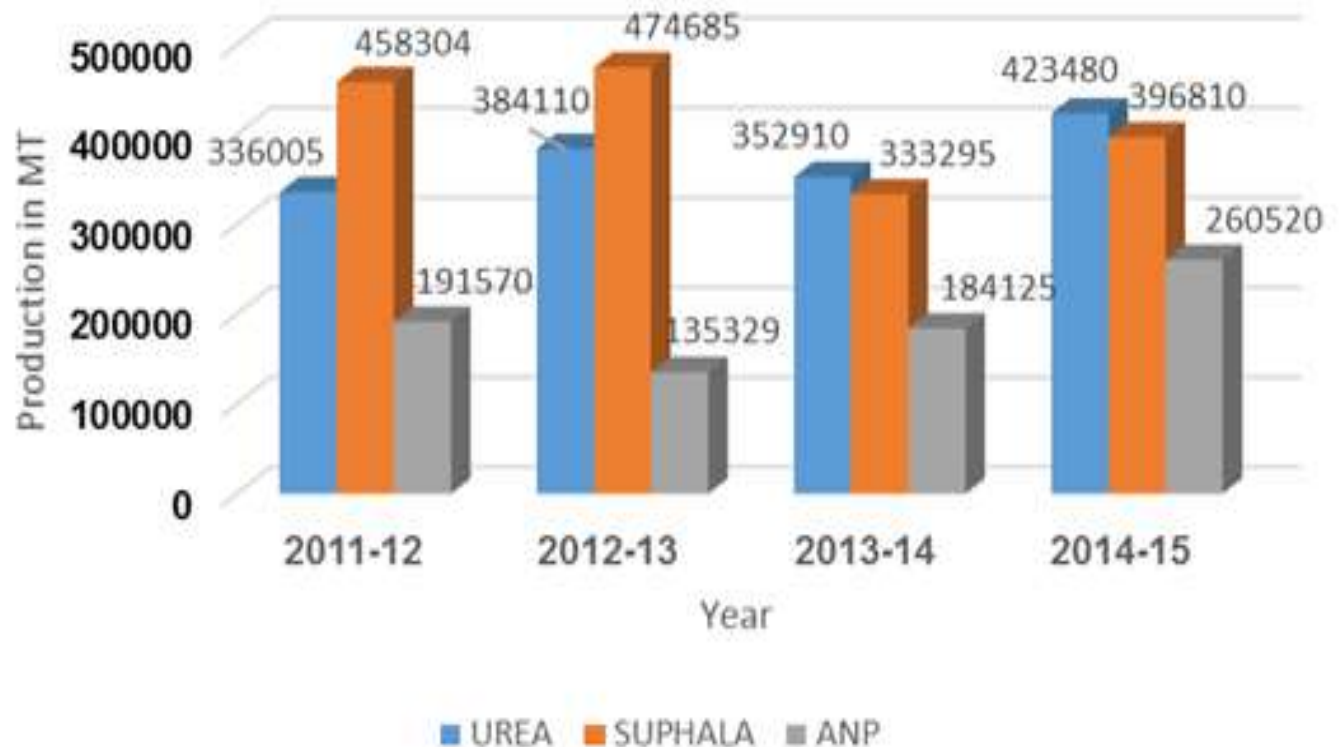
Performance of Urea Plant



Fertilizer Production



Fertilizer Performance



Energy Policy of RCF Trombay

RASHTRIYA CHEMICALS AND FERTILIZERS LIMITED
TROMBAY

ENERGY POLICY

Rashtriya Chemicals and Fertilizers Limited (RCF Ltd), is committed to achieve continual excellence in energy performance and comply with all the applicable legal and other requirements related to energy usage and energy efficiency.
RCF Ltd. shall strive to achieve the goal through :

- ❖ Adoption of technologies to enhance energy efficiency.
- ❖ Monitoring, controlling and reviewing the consumption of various forms of energy through effective Energy Management System.
- ❖ Putting efforts for adoption of operational control strategies for improving specific energy consumption in the production processes.
- ❖ Enhancing awareness of employees through training for conservation of natural resources and energy.
- ❖ Initiating steps for achieving improvement in Energy Performance through active participation of employees.

आर.सी.एफ. लि.

Date: 14 February, 2013 Chairman & Managing Director

राष्ट्रीय केमिकल्स एण्ड फर्टिलाइजर्स लिमिटेड
ट्राम्बे

ऊर्जा नीति

राष्ट्रीय केमिकल्स एण्ड फर्टिलाइजर्स लिमिटेड, (आ.सी.एफ.लि.) ऊर्जा निष्पादन की निरंतर उत्कृष्टता प्राप्त करने और ऊर्जा के उपयोग एवं ऊर्जा दक्षता से संबंधित कानूनी एवं अन्य आवश्यकताओं का अनुपालन करने के लिए प्रतिबद्ध है।

हम निम्नानुसार प्रयास करके लक्ष्य को सध्य करेंगे।

- ❖ ऊर्जा दक्षता बढ़ाने के प्रौद्योगिकी को अपनायेंगे।
- ❖ प्रभावी ऊर्जा प्रबंधन प्रणाली के माध्यम से विभिन्न प्रकार के ऊर्जाओं की खपत की मॉनीटरिंग निबंधन एवं समीक्षा करेंगे।
- ❖ उत्पादन प्रक्रियाओं में विशिष्ट ऊर्जा की खपत में सुधार लाने के लिए प्रचालनीय निबंधन कार्यनीति अपनाने हेतु निरंतर प्रयास करेंगे।
- ❖ प्राकृतिक संसाधनों एवं ऊर्जा संवर्धन को बढ़ाने के प्रति प्रशिक्षण के माध्यम से कर्मचारियों में जागरूकता लायेंगे।
- ❖ कर्मचारियों की सक्रिय सहभागिता के माध्यम से ऊर्जा निष्पादन में सुधारों को प्राप्त करेंगे।

आर.सी.एफ. लि.

दिनांक : १४ फरवरी, २०१३

अध्यक्ष एवं प्रबंध निदेशक

राष्ट्रीय केमिकल्स एण्ड फर्टिलाइजर्स लिमिटेड
ट्राम्बे

ऊर्जा धोरण

राष्ट्रीय केमिकल्स एण्ड फर्टिलाइजर्स लिमिटेड, (आ.सी.एफ.लि.) ऊर्जा निष्पादनाधी निरंतर उत्कृष्टता प्राप्त करण्यासाठी आणि ऊर्जा उपयोग व कार्यक्षमतेशी संबंधित कायदेशीर व इतर आवश्यकतांचे पालन करण्यासाठी बांधील आहे.

आ.सी.एफ.लि. पुढील प्रकारे प्रयत्न करून हे उद्दिष्ट साध्य करेल :

- ❖ ऊर्जा कार्यक्षमता वाढविण्याच्या प्रौद्योगिकीकरणामा अंगीकार करणे.
- ❖ प्रभावी ऊर्जा व्यवस्थापन पद्धतीच्या माध्यमातून विविध प्रकारच्या ऊर्जांच्या वापराचे मॉनीटरिंग, नियंत्रण व समीक्षा करणे.
- ❖ उत्पादन प्रक्रियेतील विविध ऊर्जांच्या वापरामध्ये सुधारणा करण्यासाठी प्रचालनीय निबंधन कार्यनीतिमा अंगीकार करण्याच्या दृष्टीने निरंतर प्रयत्न करणे.
- ❖ नैसर्गिक साधने व ऊर्जा संरक्षण करण्याबाबत कर्मचाऱ्यांमध्ये जागरूकता वाढविण्यासाठी प्रशिक्षण देणे.
- ❖ कर्मचाऱ्यांच्या क्रियाशील सहभागामा माध्यमातून ऊर्जा निष्पादनामध्ये सुधारणा करण्यासाठी प्रारंभ करणे.

आर.सी.एफ. लि.

दिनांक : १४ फेब्रुवारी, २०१३ अध्यक्ष व व्यवस्थापकीय संचालक

ISO 50001:2011 certification



CERTIFICATE OF APPROVAL

Issued by Indian Register Quality Systems
(A Division of IRCLASS Systems and Solutions Private Limited)

This is to certify that the Energy Management System of

Organisation: Rashtriya Chemicals and Fertilizers Ltd.
Address: Chembur,
Mumbai - 400 074

has been assessed and found conforming to the following requirement

Standard Certified: ISO 50001:2011


Scope: Manufacture of Fertilizers
and Industrial Chemicals

Certificate No.: IRQS/15100320 granted on: 2nd April 2015

Originally Certified:02/04/2015 **Current Issue Date:**02/04/2015 **Valid Till Date:**01/04/2018



Indian Register Quality Systems


Shashi Nath Mishra
Head IRQS

This approval is subject to continued satisfactory maintenance of the Energy Management System of the organization to the above standard, which will be monitored by IRQS. The use of the Accreditation Mark indicates accreditation with respect to activities covered by the certificate with accreditation no. 99027435.
Condition Overleaf

Head Office: 52A, Adi Shankaracharya Marg Opp. Powai Lake, Powai, Mumbai - 400 072, India.

Budget Allocation

- 5-10% of total annual capital budget expenditure of all plants and departments are dedicated to Energy Conservation measures.
- All Energy Management Action Plans/Energy conservation schemes under ISO 50001 and Capital Expenditure budget are approved by the Management irrespective of the investment involved as a part of Budget allocation policy.
- All monitoring and measurement instruments required for energy auditing and reviewing are bought by Energy Management Cell under capital budget allocated.

Use of renewable Energy sources

- A 2 MWp Grid connected Photovoltaic Solar power plant has been setup within factory premises of Trombay unit with capital Cost of Rs.14.60 Crore.
- Based on the average intensity of solar radiation, it is expected to generate around 2 million units of power on annual basis. The power generated shall be used for captive consumption of the Trombay unit and reduce our power import to that extent.
- This venture is in line with the solar mission of Government of India and leads RCF's foray into generation of renewable energy resulting in to reduction in the overall carbon footprint of the company.

Use of renewable Energy sources

- Two nos. rooftop Solar Energy generation facilities with 10 KW peak capacity of each unit have been installed in Technical Building and Administration Building.
- About 40-50 kWh electricity generation is achieved through each solar energy generating facilities per day.
- Two nos. of rooftop solar energy generation facilities with 50 KW peak capacity of each unit shall be installed by March-2016 atop our plant buildings.

Training and Awareness

- Members of Energy Cell have attended different Training Programs in-house as well as at external.
- For the Core group members of Energy Cell training was imparted for ISO 50001:2011 Standard - Energy Management System
- The core group members imparted trainings to almost 90% of the Employees and Contractors in the unit under ISO 50001:2011 Energy Management System.
- The topics included in the training include
 - General Awareness for Energy Conservation, Energy Scenario.
 - Energy Policy of RCF Trombay Unit
 - Energy Review and Baseline Calculation for all critical equipment
 - Significant Energy Usage equipments and Opportunities for Energy Conservation.
 - Energy Conservation Tips in industry and household.

Training and Awareness

- Energy Conservation Week was celebrated from 22nd December to 27th December 2014.
- *A lecture on 'ENERGY CONSERVATION IN INDIA AND ISSUES IN ENERGY AUDIT' by Shri. T.S.Narayanan, Director and Head, National Productivity Council (Mumbai) was organised.*
- A **booklet** comprising tips on energy conservation at home and work place was prepared and distributed in the factory.
- *Energy Management Action Plans presentation was organized wherein all the plants presented their progress in Energy Management Plans and future plans.*

CELEBRATION OF ENERGY CONSERVATION WEEK



Let us grow together

**RCF TROMBAY UNIT
HANDBOOK FOR**

**TIPS ON
ENERGY CONSERVATION**

AT HOME AND WORK



Need For Energy Conservation

- India is a developing country and mainly depends upon sources of Energy such as Oil, Coal and Natural Gas which have to be imported.
- Natural Resources such as Coal, Oil and Natural Gas are depleting very fast.
- Shortage of Electricity in the country.
- Reduce Environmental Pollution. Reduce Green House Gas emission and curbs Global Warming.
- Saving energy today for a brighter tomorrow.
- Energy conservation gives a sense of responsibility.



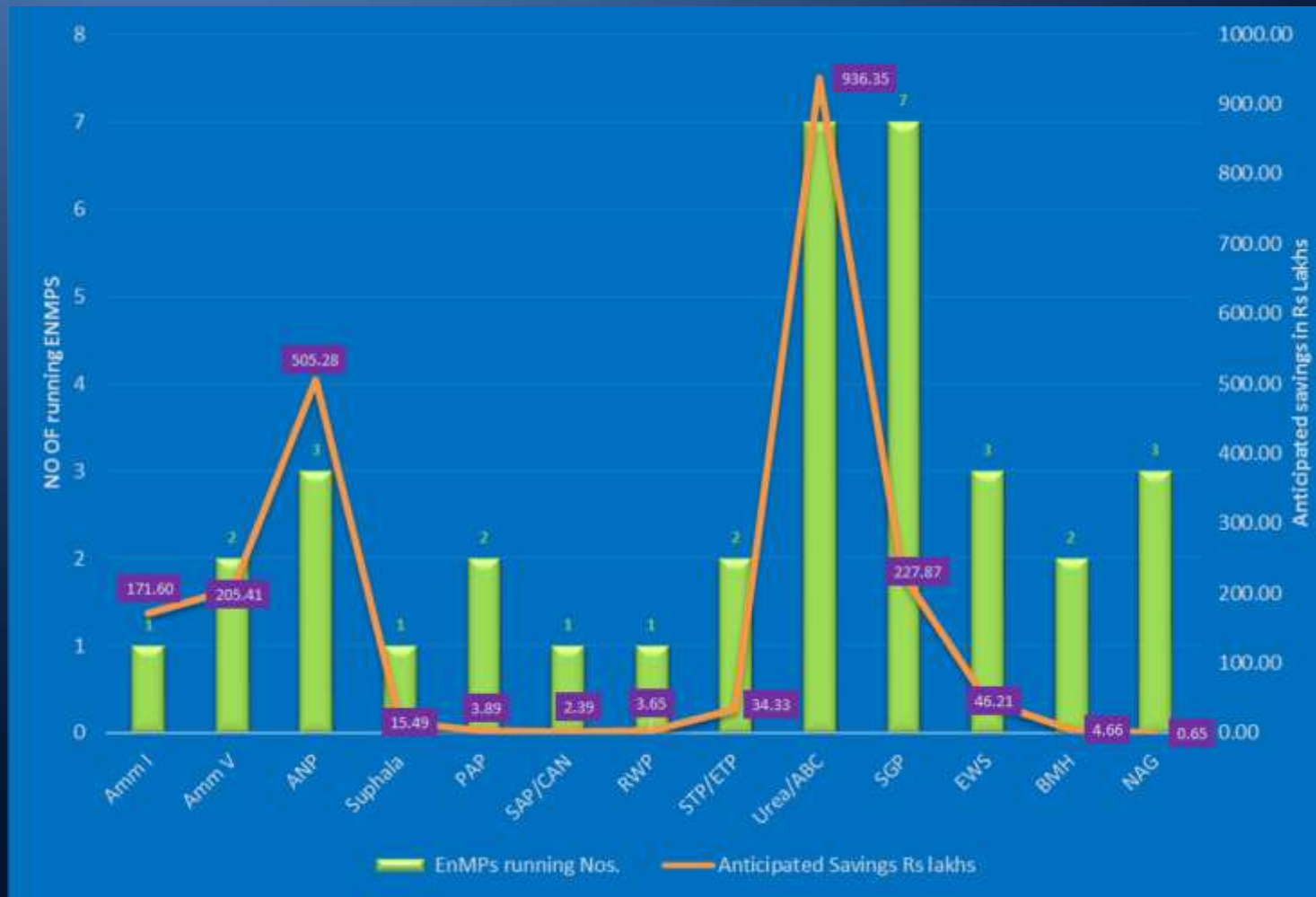
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Energy Management Action Plans

- Energy Review of all Significant Energy Usage (SEU) is carried out on yearly basis.
- Baseline data of all the energy consuming equipment is established.
- Opportunities for reducing Energy consumption of the SEUs are chalked down by different methodologies
- Brain Storming, New Technology availability, suggestion schemes, Schemes implemented in other plants in RCF or other industry are also considered.
- Cost benefit analysis study is carried out and best opportunities are selected as Energy Management Action Plans (EnMP).
- The EnMPs are planned for a specific period with Approval for implementation and performance monitoring and analyzing steps are included.
- EnMPs are reviewed in monthly meetings and Management Review Meetings by Top Management.

Energy Management Action Plans

Expected Savings through implementation of ISO 50001



Target Setting and Monitoring

	2013-14		2014-15	
	Target	Actual	Target	Actual
	Mkcal/MT		Mkcal/MT	
Urea	7.09	7.07	7.05	6.87
Ammonia I	10.14	9.81	9.78	9.03
Ammonia V	9.19	9.39	9.10	8.97

Target Setting and Monitoring

- Improvement Schemes for reliability, environment, safety and energy conservation is presented by Operations Manager of Plants – Reviewed by Top Management every month.
- **Monitoring of Schemes from Inception stage is done by Executive Director (Trombay) in Monthly Production Review Meetings.**
- These Energy conservation related improvement plans are taken up as Energy Management Action Plans by the respective plants.
- **The targets for Specific Energy Consumption of plants for following year are finalized.**

Future Plans and Energy Conservation

- Replacement of steam super-heater coil assembly (E203A) in the convection zone of primary reformer in Ammonia- V plant. (Reduction in steam import by about 0.8 to 1.0 MT/hr).
- Installation of VFD for Reverse Osmosis (RO) feed water pumps of RO Reject Recycle plant, to reduce electrical power consumption of RO Reject Recycle plant.
- Replacement of Combustion Air duct bellows at exit of Combustion Air Preheater Coil with glass Fabric expansion bellows which are suitable for 450°C temperature. This shall result in reduction in ID Fan Suction temperature due to increased Combustion Air temperature in Ammonia-V plant.

Future Plans and Energy Conservation

- Dry ice cleaning of Coils in Convection Zone of Primary Reformer of Ammonia-V Plant. This shall help to reduce Specific Energy consumption by 0.01 Mkal/MT of Ammonia. Target Date- April 2016
- Installation of Vortex Mixer and Conversion Booster in reactor of Urea Plant for reduction of energy by 0.07 Mkal/MT of Urea. Technology supplier M/s NIK, Russia. Target Date- April 2016
- Installation of Gas Turbine (GT). M/s Projects and Development India Ltd. (PDIL) is finalizing NIT for the same.
- Removal of one stage of BFW pumps in 2 Nos. of Boilers. Savings of 6.1 Lakh KWH per annum for each boiler. Target Date- March 2016. Already completed in Boiler No. 2. Savings accrued Rs. 67.5 Lakhs.

Future Plans and Energy Conservation

- Installation of 2 MWp Solar Grid connected plant in RCF Trombay unit with investment of Rs. 14 Crore. Expected generation of 2 million Units per year.
- Installation of Vapor Absorption Machine for cooling air going to inlet of Process Air Compressors in Nitric Acid Plants. Target Date- July 2016. Expected increase in production of Nitric Acid : 50 MTPD
- Installation & Commissioning of 2 Nos. 50 kW Rooftop Solar power Generation system.

Major Energy Efficiency Improvement Projects

New Technologies Adopted

- 1 Installation of Electronic governing system, Over-speed protection and Anti-surge control system for PAC compressors in Ammonia-V plant**

Implemented in October 2013. Cost of implementation – Rs. 350 Lakhs

Saving of about 20.2 Lakh M3 of Natural Gas (Rs. 200 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

New Technologies Adopted

2 Replacement of Old Stripper in Urea-V plant with New Stripper with improved design.

Implemented in November 2013. Cost of implementation – Rs. 1750 Lakhs

Saving of about 11.5 Lakh M3 of Natural Gas and 8.6 Lakh kWh Electricity (Rs. 169 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

New Technologies Adopted

³ Replacement of Combustion air preheater to reduce ID fan suction temperature from 270 Deg C to 220 Deg C in Ammonia-V plant

Implemented in November 2013. Cost of implementation – Rs. 710 Lakhs

Saving of about 15.8 Lakh M3 of Natural Gas (Rs. 144 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

New Technologies Adopted

- 4 Installation of New Ammonia Feed pump in Urea Plant –leading to saving in Electrical energy and improving reliability.**

Implemented in April 2014. Cost of implementation – Rs. 1230 Lakhs

Saving of about 17.4 Lakh kWh of Electricity (Rs. 141 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes

5 Commissioning of new MP stripper completed in place of LP Stripper in Ammonia-I plant

Implemented in December 2013. Cost of implementation – Rs. 712 Lakhs

Saving of about 36.80 Lakh M3 of Natural Gas (Rs. 334 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes

⁶ Replacement of Primary reformer, High Temperature, LT Guard & LT main catalyst in Ammonia-V Plant

Implemented in October 2013. Cost of implementation – Rs. 935 Lakhs

Saving of about 27.4 Lakh M3 of Natural Gas (Rs. 249 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes

7 Overhead condenser reversal in WW section leading to saving of Ammonia loss to atmosphere in Urea-V plant

Implemented in November 2013. Cost of implementation – Rs. 15 Lakhs

Saving of about 2.98 Lakh M3 of Natural Gas and 0.3 Lakh kWh Electricity (Rs. 30.7 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes

8 Improved design pumps with energy efficient motors provided for plant cooling tower in Ammonia-I plant

Implemented in April 2013. Cost of implementation – Rs. 71 Lakhs

Saving of about 10.6 Lakh kWh Electricity (Rs. 79.3 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes 2013-14 and 2014-15

⁹ Replacement of conventional light fittings with energy efficient LED type fittings for factory.

Implemented in 2013-14. Cost of implementation – Rs. 46 Lakhs

Saving of about 1.03 Lakh kWh Electricity (Rs. 7.75 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes 2013-14 and 2014-15

10 Optimization of flow of Rich MDEA through hydraulic turbine to reduce load on Semilean Solution pump motor in Ammonia-I Plant

Implemented in December 2014.

Saving of about 7.13 Lakh kWh Electricity
(Rs. 57.5 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes 2013-14 and 2014-15

11 **Associated gas getting vented at the outlet of the specific gravity analyzer connected to the fuel gas header in the plant and used as fuel in the primary reformer of Ammonia-I plant.**

Implemented in April 2014. Cost of implementation – Rs. 0.2 Lakhs

Saving of about 1.60 Lakh M3 Natural Gas (Rs. 22.4 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes 2013-14 and 2014-15

12 Modification of Secondary air duct of Furnace and replacement of hot air duct of spherodizer in Suphala plant resulting in saving in Natural Gas.

Implemented in August-2014. Cost of implementation – Rs. 3.0 Lakhs

Saving of about 4.8 Lakh M3 Natural Gas (Rs. 47.7 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes 2013-14 and 2014-15

13 Installation steam turbine driven for BFW (Boiler Feed Water)pump in HP Nitric Acid Plant by using steam being letdown from 40 ata to 12 ata.

Implemented in August 2014. Cost of implementation – Rs. 130 Lakhs

Saving of about 5.94 Lakh kWh Electricity (Rs. 47.9 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes 2013-14 and 2014-15

14 Energy efficient motors (39 Nos.) installed in Methanol and Methyl Amine Plant and Storage area, and Steam Generation Plant

Implemented in 2014-15. Cost of implementation – Rs. 14.89 Lakhs

Saving of about 0.74 Lakh kWh Electricity (Rs. 5.99 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes 2013-14 and 2014-15

15 Replacement of 605 Nos. conventional light fittings with energy efficient LED type fittings for factory.

Implemented in 2014-15. Cost of implementation – Rs. 63.0 Lakhs

Saving of about 3.15 Lakh kWh Electricity (Rs. 25.4 Lakhs per Annum)

Major Energy Efficiency Improvement Projects

Other Schemes 2013-14 and 2014-15

16 Installation of VFD(Variable Frequency Drive) for FST (Final Storage Tank)Supply Pump in Sewage Treatment Plant

Implemented in January 2015. Cost of implementation – Rs. 2.50 Lakhs

Saving of about 1.0 Lakh kWh Electricity (Rs. 8.0 Lakhs per Annum)

Awards Won Recently

- **ENVIRONMENT EXCELLENCE AWARD 2015** in Platinum Category instituted by **GREENTECH FOUNDATION** for outstanding performance in environment management.
- **MERIT CERTIFICATE for NATIONAL ENERGY CONSERVATION AWARD 2015.**
- **2nd prize in Energy Conservation Award in Fertilizer Sector organized by Maharashtra Energy Development Agency**
- **Fertilizer Association of India (FAI) Award – for BEST PRODUCTION PERFORMANCE of an Operating Fertilizer Unit for Complex Fertilizer for 2014-15.**

A tall, cylindrical industrial distillation column with multiple levels of platforms and ladders, illuminated by lights at dusk or dawn. The background is a clear blue sky. A large, solid yellow banner is positioned at the top of the slide, and a yellow diagonal bar runs from the top left towards the bottom left.

Thank You