25th National Award for Excellence in Energy Management - 2024

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Presented By:

Indian Farmers Fertiliser Cooperative Ltd.

Phulpur- I Unit

10th – 12th September, 2024

IFFCO: At a Glance

IFFCO was established as the farmers' own initiative in Cooperative Sector on 3rd Nov. 1967

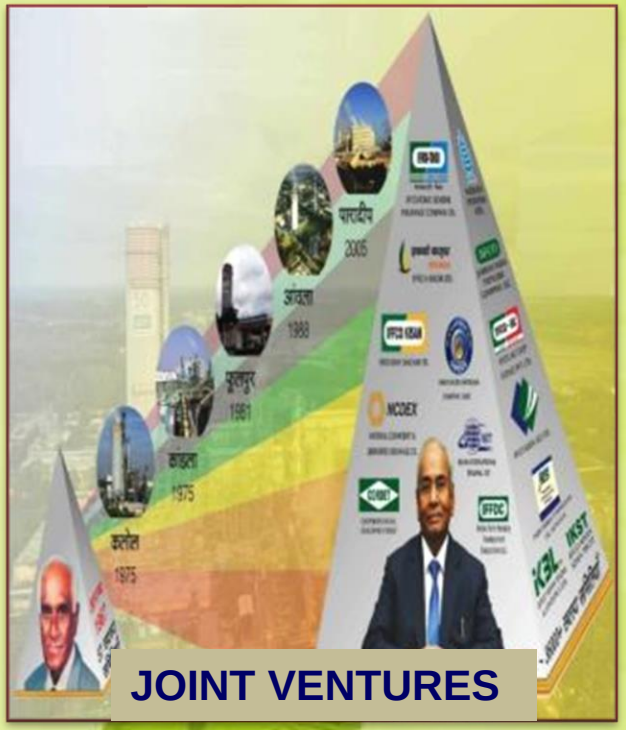
- Largest producer of fertilisers in the country.
- Nos. of Plant : Five (Kandla, Kalol, Phulpur, Aonla, Paradeep)

Installed/Revamped Annual Capacity (Lakh MT)

Urea	: 42.4
NP/NPK/DAP	: 43.3
Total 'N'	: 26.3
Total 'P_2O_5'	: 17.2
WSFs	: 0.15
Zinc Sulphate Monohydrate	: 0.30

IFFCO Nano Urea Daily Capacity
Kalol: 1.5 Lakhs bottles
Aonla: 2.0 Lakhs bottles
Phulpur: 2.0 Lakhs bottles

IFFCO Nano DAP Daily Capacity
Kalol: 2.0 Lakhs bottles



IFFCO Phulpur Unit-I : Profile

Plant	Ammonia	Urea
Process Licenser	MW Kellogg, U.S.A	Snamprogetti, Italy
Commissioned	March, 1981	
Daily Capacity (MTPD)	1215	2115
Annual Capacity (Lakhs MT)	4.0	7.0
Till Date Production (Lakhs MT)	147	254

IFFCO Phulpur Unit-I : Production Outline

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RLNG

COAL

RLNG

Utility Boiler

Ammonia Plant

GTG-HRSG

HP Steam

HP Steam

HP Steam

CO2

Ammonia

Power

RAIL

ROAD

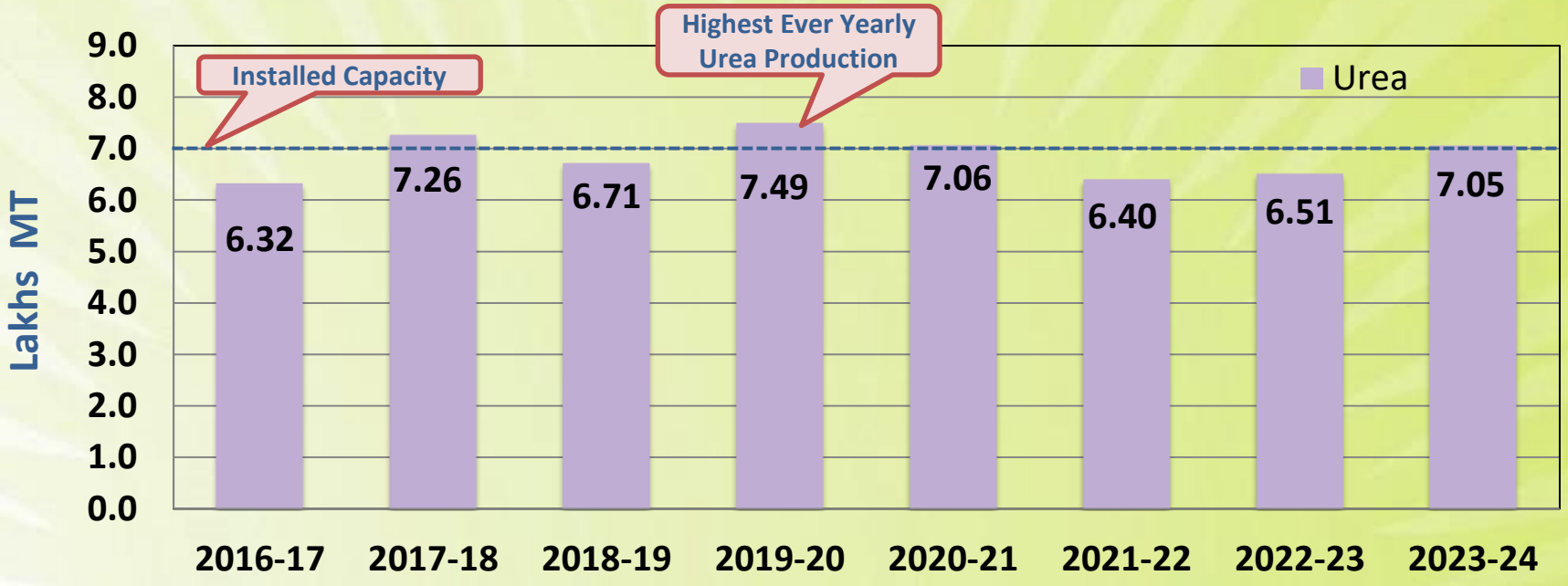
Dispatch

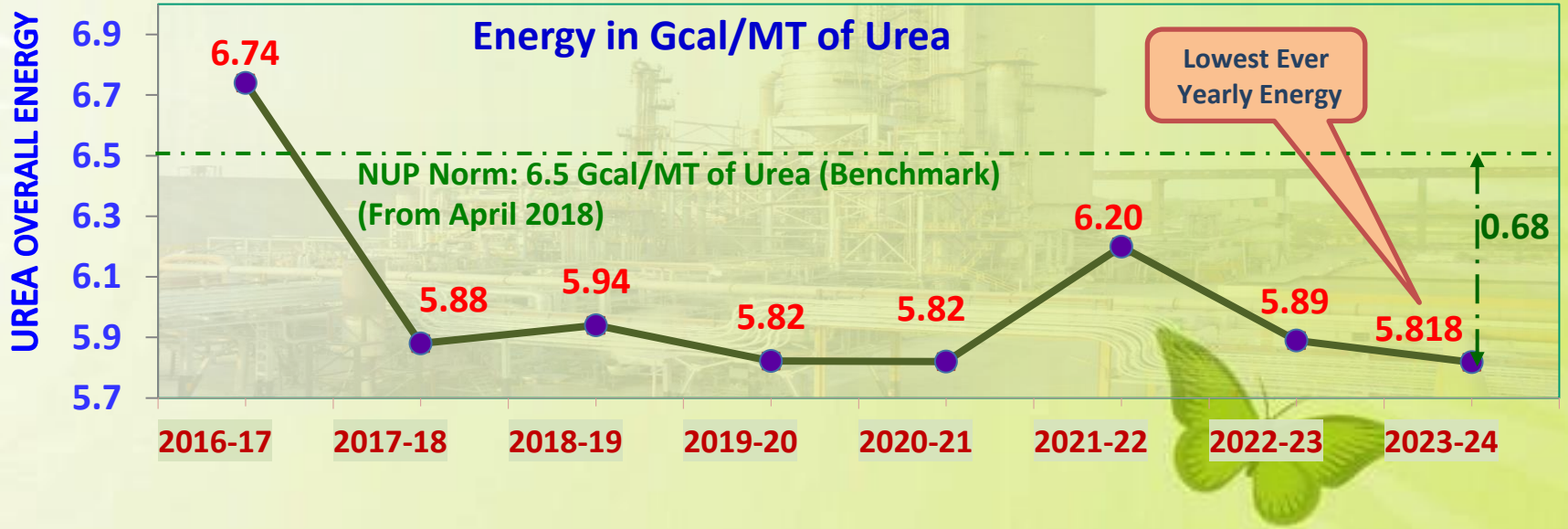
Bagging Plant

Neem Urea

Urea Plant

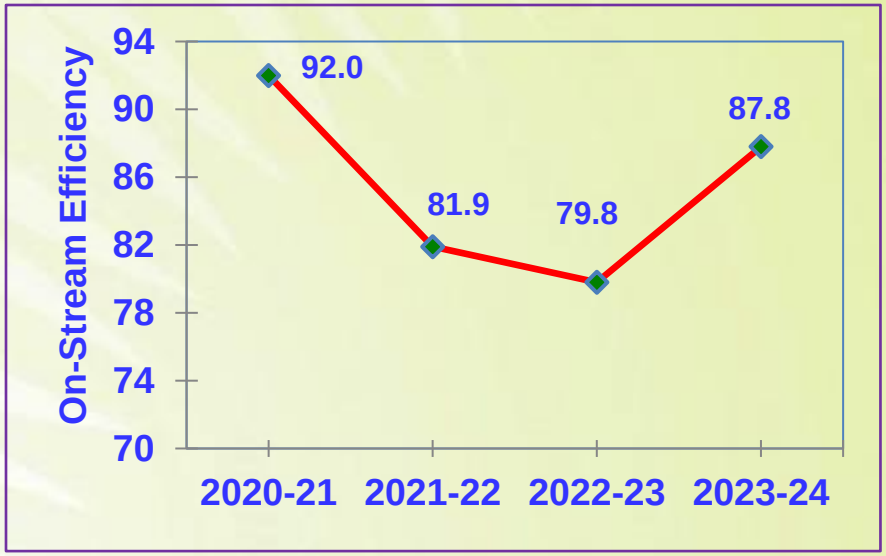
Phulpur-I: Production and Energy Performance



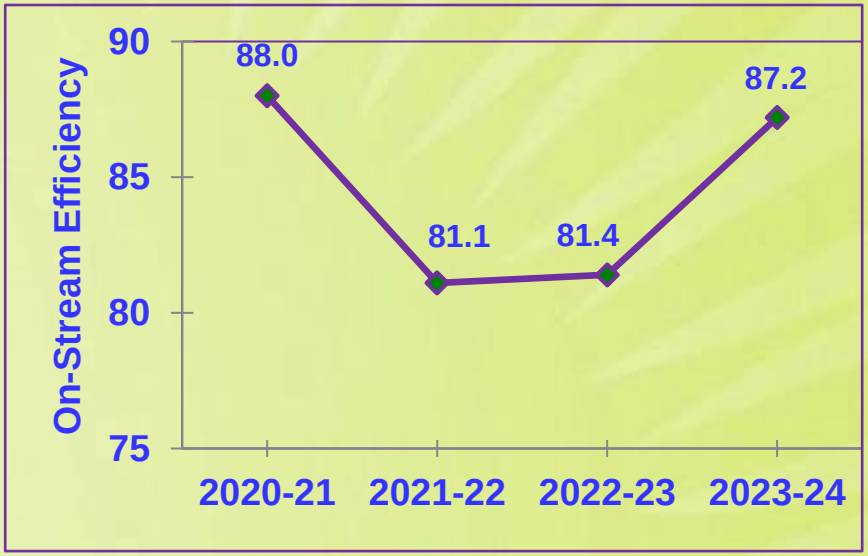


On-Stream Efficiency

Ammonia Plant On-Stream Efficiency



Urea Plant On-Stream Efficiency

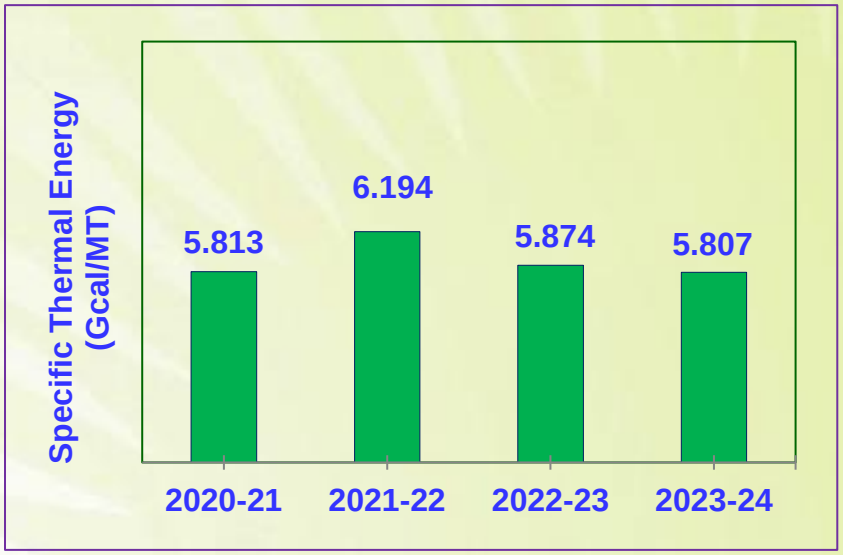


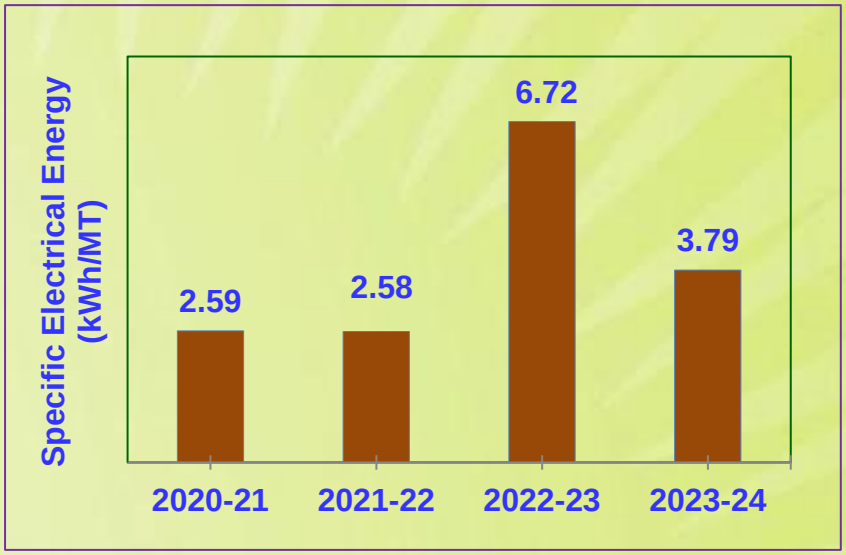
One of the important factor which effects the Productivity / Energy of the fertiliser plant is the Downtime of the plant. During the year 2023-24, Plant was running efficiently resulting lowest energy record of Urea Plant. The onstream efficiency during the year 2023-24, for Ammonia and Urea plant was 87.8 % and 87.2 %, respectively.

➢ **Poor Reliability of Plant & Equipments leads to:**

- ↑ *Duration of Downtime days*
- ↓ *Productivity*
- ↑ *No. of Downtimes*
- ↓ *Productivity / Energy Efficiency*

Phulpur-I : Sp. Thermal Energy and Electrical Consumption





List of Encon Projects Planned (2024-25)

SL. No.	Energy Saving Schemes Planned in 2024-25	Annual Thermal Saving (Million Kcal)	Annual Electrical Saving (Million KWh)	Investment (Rs. Million)	Estimated Payback (Months)
1	Replacement of old Boiler Feed water Pump with Higher efficiency Pump in Power Plant	-	1.806	15.2	8.5
2	Complete revamping of Ammonia-I cooling Tower	14013	-	140.0	27.1
3	Revamping of Power Plant Cooling Tower from wooden to Pultruded FRP Structure in PPCT-1	6672.9	-	30.0	21.1

Major Energy Conservation Measures in Phulpur-I Unit : 23- 24

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Name of Energy saving Projects	Investment (Rs. Million)	Electrical Savings (kWh)	Thermal Savings (Million Kcal)	Saving (Rs. Millions)	Pay Back (Month)
Changing LTS Converter Catalyst in Ammonia-I Plant	116.7	0.0	12856.9	72.68	19.3
Replacement of both HP & LP case Rotor and overhauling of Syn Gas Compressor of Ammonia-I	120.9	0.0	22749.4	58.14	25.0
Higher Load Operation, Maximization of on-stream days & optimization of Process Parameters in Phulpur-I Unit	0.0	0.0	13477.4	46.18	0.0
Modification at suction line of Syn Gas Compressor Lube Oil Pump to avoid tripping of Synthesis Gas Compressor Turbine in Ammonia-I Plant	0.05	0.0	4564.6	25.66	0.02
Replacement of 72 Nos 400 W High Bay type HPMV with 105 W highly efficient LED lamp fixture at Electrical, Mechanical and Heat exchanger workshop of Phulpur-I unit	0.46	93031	0.0	1.1	5.0
Replacement of 10 Nos 400 W High Bay type HPMV with 105 W highly efficient LED lamp fixture at Gas Turbine Generator Area of Phulpur-I Unit	0.06	12921.0	0.0	0.15	5.0
Replacement of 12 Nos 400 W High Bay type HPMV with 105 W highly efficient LED lamp fixture at Turbo Generator (TG-I) Area of Phulpur-I Unit	0.08	31010.0	0.0	0.37	2.5
Replacement of 16 Nos 400 W High Bay type HPMV with 105 W highly efficient LED lamp fixture at Pump House of Phulpur-I Unit	0.10	41347.0	0.0	0.49	2.52

Major Energy Conservation Measures in Phulpur-I Unit : 22- 23

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Name of Energy saving Projects	Investment (Rs. Million)	Electrical Savings (kWh)	Thermal Savings (Million Kcal)	Saving (Rs. Millions)	Pay Back (Month)
Installation of Methanator Feed Heater in Ammonia-I Plant	12.30	0.0	28310.0	208.73	0.7
Higher Load Operation & optimization of Process Parameters in Phulpur-I Unit	0.00	0.0	1045.2	4.81	0.0
Replacement of 150 Nos 80 W Well Glass Luminaire with High Pressure Mercury Vapour Lamp with 45 W Well Glass Luminaire LED Lamp at Coal Conveyers 2, 4 and Crusher House	0.26	15966.0	0.0	0.21	14.9
Replacement of 100 Nos 80 W Double Open Channel Type Luminaire (Tube Rod) of Fluorescent Lamp with 45 W Well Glass Luminaire LED Lamp at Coal Conveyers 5 and 6	0.17	10644.0	0.0	0.14	15.1
Replacement of 130 Nos 250 W HPMV Flood light fixture with 105 W LED Flood light fixture at Electrical and Mechanical Workshop	0.25	57327.0	0.0	0.75	4.0
Replacement of 100 Nos 400 W HPMV Flood light fixture with 135 W LED Flood light fixture at TG Floor, AMF-2, Compressor House-2 and Pump House 1 & 2	0.28	80592.0	0.0	1.05	3.3
Replacement of 250 Nos 72 W Fluorescent fixture with 38 W LED 2x19 W Tube light fixture at Bagging-1 & 2 Slat area and Platform area	0.18	25850.0	0.0	0.34	6.6
Replacement of 178 Nos 70 W Well Glass fixture of Sodium Lamp with 45 W Well Glass fixture at Bagging-2 Silo and Conveyor gallery	0.24	13533.0	0.0	0.18	16.7
Replacement of 100 Nos 70 W Post top lantern HPSV type with 45 W Post top lantern fixture at Maitri Park, Guest House walkway, Bharadwaj Park in Township	0.19	3802.0	0.0	0.05	46.9

Major Energy Conservation Measures in Phulpur-I Unit: 21 - 22

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Name of Energy saving Projects	Investment (Rs. Million)	Electrical Savings (kWh)	Thermal Savings (Million Kcal)	Saving (Rs. Millions)	Pay Back (Month)
Replacement of Methanator Effluent Cooler (115-C) with higher capacity cooler in Ammonia-I Plant	12.00	0.0	20794.4	55.92	2.6
Scheme for installation of additional Cold Ammonia Pump (118-JB) in Ammonia-I Plant	3.50	236867.0	0	2.10	20.0
Connecting Blow down Steam in GT-HRSG with LS Header	0.65	0.0	1425.3	6.23	1.3
Replacement of LT Steam Super-heater Coil in Ammonia-I Plant	120.00	0.0	20900.5	91.31	15.8
Change the orientation of Ammoniacal water pre-heater (1501-C) in Ammonia-I Plant	0.08	0.0	4709.8	12.67	0.1
Replacement of 1st Stage Inter-cooler of Process Air Compressor in Ammonia-I Plant	13.61	0.0	1986.1	5.34	30.6
Installation of M.P Steam Ejector Vacuum System for Common Steam Condenser in Ammonia-I Plant	3.50	0.0	4034	10.85	3.8
Replacement of 400 Nos of 2X36 W, 4 feet Tube light Fittings & 17 W per Choke with 2X2 feet, 20 W Surface Mounted LED Fixtures at Central School in Township	0.32	50068.0	0	1.00	3.8
Replacement of 400 Nos of 2X36 W, 4 feet Tube light Fittings & 17 W per Choke with 2X19 W LED Fixtures at Ammonia & Urea MCC Buildings	0.27	103170	0	2.06	1.6
Replacement of 200 Nos 250 W SON-T Fittings with 120 W Street Light at Bagging area & Plant Roads in Offsites	0.37	49309.0	0	0.99	4.5
Replacement of 2400 Nos 36 W, 4 Feet Tube Lights with 19 W, 4 feet Tube Lights at Bagging floor & Offsite area	0.42	77378.0	0	1.55	3.3
Replacement of 15 Nos 1000 W Tower Light Fixtures from Towers of Boundary wall with 300 W Flood Light	0.16	19913.0	0	0.40	4.8

Changing Low Temperature Shift (LTS) Converter Catalyst in Ammonia-I Plant:

- The LTS converter is a catalytic Reactor loaded with a copper-based catalyst. The purpose of LTS Converter is to convert Carbon monoxide (CO) in the reformed gas to carbon dioxide in presence of steam and to gain one mole of hydrogen for every mole of CO converted.
- The operating inlet temperature and pressure are maintained at 208 Deg C and 29 Kg/cm2g, respectively. The differential pressure has increased to 0.8 Kg/cm2 against normal value of 0.4 Kg/cm2 and CO slip increased to 0.32 % (mole) from normal value of 0.15 (mole) resulting plant load limitation. The last catalyst loading was done in the year 2017.

View of LTS Converter

Changing Low Temperature Shift (LTS) Converter Catalyst in Ammonia-I Plant:

- The catalyst replaced during Annual shutdown. The loaded catalyst volume is 61.05 M3.
- After replacing the catalyst, the differential pressure came down to 0.39 Kg/cm2 and the CO slip reduced to 0.15% (mole). As a result of lower CO slip, the Methanator ΔT has reduced from 32° C to 16.9 ° C resulting in lower inert (CH4) content in the makeup gas (H2 loss reduced).
- Thereby gaining of hydrogen production resulting increase of ammonia production.
- The annual thermal saving of the scheme is 12856.9 Gcal and in terms of Rs. 726.8 Lakhs.

Replacement of both HP & LP case Rotor and overhauling of Syn Gas Compressor of Ammonia-I:

- Synthesis Gas Compressor is the highest energy consuming machine of the Ammonia–Urea Complex.
- Ammonia-I Synthesis Gas Compressor (103-J) was revamped in the year 2006 during Energy Savings Project (ESP-II). During the Annual Turnaround, complete inspection and overhauling was carried out in the presence of M/s Dresser-Rand expert.
- After overhauling the efficiency of each stage is increased and the seal clearance is reduced to the desired level.
- Also, due to change in LTS converter catalyst, the differential pressure of the converter is reduced resulting in an increase in suction pressure of Syn Gas compressor which leads to reduction in HP Steam consumption in Turbine.
- The annual thermal saving of the scheme is 22749.4 Gcal and in terms of Rs. 581.4 Lakhs.

View of Syn Gas Compressor

Higher Load Operation, Maximization of on-stream days & optimization of Process Parameters in Phulpur-I Unit

- Specific Feed, Fuel, Steam and Power Consumption of Plants is monitored on daily basis.
- Based on design data, corrective measures are taken on daily basis to run the plant at optimum efficiency.
- Other important parameters like, Turbine, Compressor and Reactor's Efficiency, each Reactor's differential pressure, proper utilization of Turbine condensate, waste management, preventive maintenance of critical machinery, stack temperature of various furnaces and Turbine exhaust pressure are monitored to achieve the lowest overall plant energy.
- Due to these measures, overall energy per MT of Urea has been realized.
- Annual saving comes of 13477.4 Gcal and in terms of Rs. 461.8 Lakhs.

Innovative way to modify the suction line of Syn Gas Compressor Lube Oil Pump to avoid tripping of Synthesis Gas Compressor Turbine in Ammonia-I Plant

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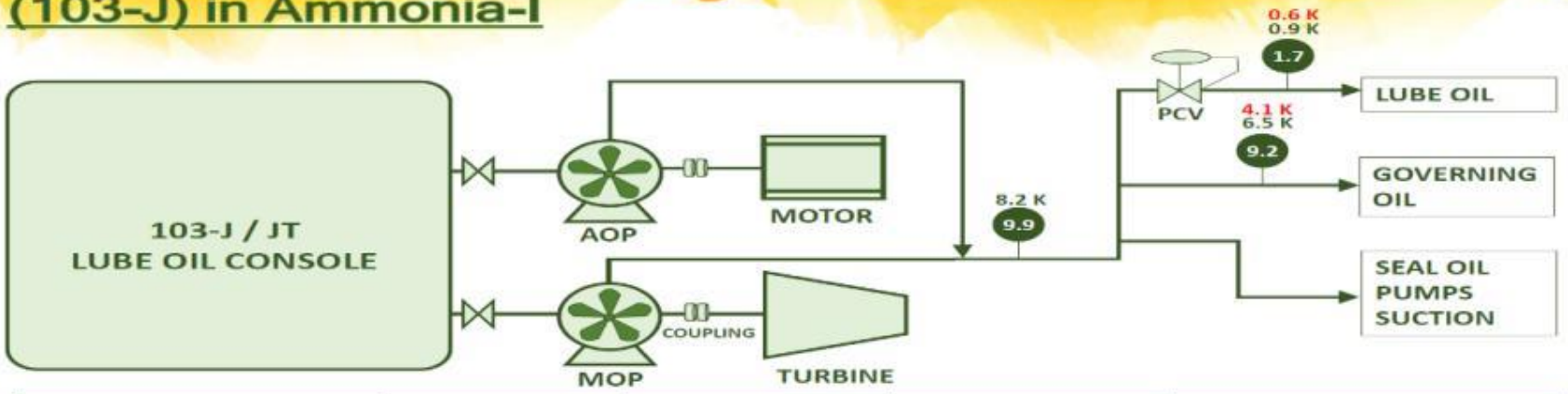
Problem Description:

- Due to space limitation, the layout of LO Console Skid for Synthesis Gas Compressor Turbine train (103-J/JT) is very compact.
- Lube oil skid has two no's lube oil supply pumps which are Turbine driven Main oil pump (MOP) and Motor driven Auxiliary oil pump (AOP).
- Pump coupling of MOP was frequently failed on high vibration. In some instances, the motor driven AOP could not generate the required pressure within the stipulated time and the compressor would trip.
- Between April 2022 to September 2022, this problem resulted in the coupling failure nine times and Ammonia plant back-end trip three times.

1. Suggestion to avoid tripping of Synthesis Gas Compressor (103-J) in Ammonia-I



Particular	Unit	Normal	AOP Auto Start	Compressor Trip Value
Header Pressure	Kg/cm2g	9.9	8.2	-
Governing Oil Pressure	Kg/cm2g	9.2	6.5	4.1
Lube Oil Pressure	Kg/cm2g	1.7	0.9	0.6

Innovative way to modify the suction line of Syn Gas Compressor Lube Oil Pump to avoid tripping of Synthesis Gas Compressor Turbine in Ammonia-I Plant

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Suggestion:

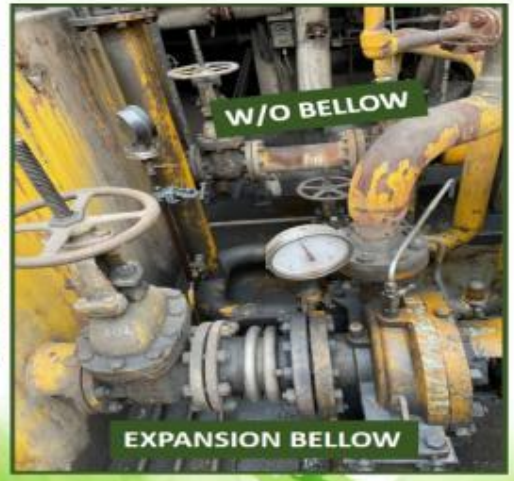
The problem was studied, and it was observed that:

- **due to space limitation, suction line of MOP was rigid and was not having flexibility. there was no space for making the line flexible.**
- **most probably due to rigidity in suction line of MOP, pump coupling frequently failed.**
- **providing an expansion bellow in the small space, should resolve the vibration problem.**

Actual Benefits:

- **Expansion Bellow was installed in the suction line of lube oil steam turbine driven pump (MOP) and since then there has been no case of coupling failure.**
- **Complete system vibration reading improved and pump life also increased.**
- **The annual thermal saving of the scheme is 4564.6 Gcal and in terms of Rs. 256.6 Lakhs with payback is almost nil.**

103-J/JT LO CONSOLE




NEW EXPANSION BELLOW

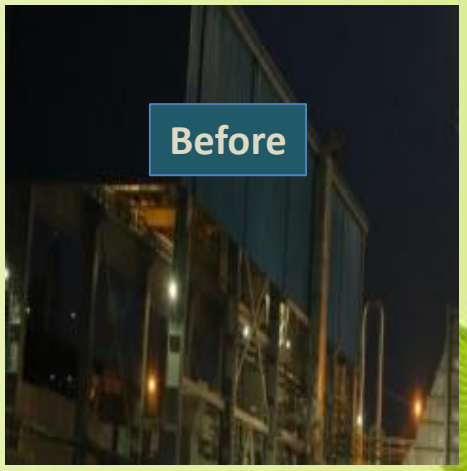
Electrical Energy saving during 2023-24

1. Replacement of 72 Nos 400 W High Bay type HPMV with 105 W highly efficient LED lamp fixture at Electrical, Mechanical and Heat exchanger workshop of Phulpur-I unit:

To reduce the energy consumption, 72 Nos 400 W High Bay type HPMV replaced with 105 W highly efficient LED lamp fixture at Electrical, Mechanical and Heat exchanger workshop of Phulpur-I. Annual savings come to 93031 kWh.

2. Replacement of 10 Nos 400 W High Bay type HPMV with 105 W highly efficient LED lamp fixture at Gas Turbine Generator Area of Phulpur-I Unit

To reduce the energy consumption, 10 Nos 400 W High Bay type HPMV replaced with 105 W highly efficient LED lamp fixture at Gas Turbine Generator Area of Phulpur-I. Annual savings come to 12921 kWh.



3. Replacement of 12 Nos 400 W High Bay type HPMV with 105 W highly efficient LED lamp fixture at Turbo Generator (TG-I) Area of Phulpur-I Unit:

To reduce the energy consumption, 12 Nos 400 W High Bay type HPMV replaced with 105 W highly efficient LED lamp fixture at Turbo Generator (TG-I) Area of Phulpur-I Unit. Annual savings come to 31010 kWh.

4. Replacement of 16 Nos 400 W High Bay type HPMV with 105 W highly efficient LED lamp fixture at Pump House of Phulpur-I Unit:

To reduce the energy consumption, 16 Nos 400 W High Bay type HPMV replaced with 105 W highly efficient LED lamp fixture at Turbo Generator (TG-I) Area of Phulpur-I Unit. Annual savings come to 41347 kWh.

UTILISATIONS OF RENEWABLE ENERGY RESOURCES

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Bagging Top Floor


Roof of Central Canteen


Raw water Pump House


Roof of Control Room


Solar Unit at Plant

Solar Power Pack:

- Total 585 KWp Solar power pack installed in Phulpur –I Unit and is connected to the LT Grid.
- The Solar Power Units are in continuous operation generating Electric Power there by reduction of CO2 emission.
- Solar light installed at different locations inside the plant and as well as township also.

Year	Technology (Electrical)	Type of Energy	Onsite / Offsite	Installed Capacity (MW)	Capacity addition (MW) after 2021	Generation (Million kWh)	% of purchased Electrical Energy	% of total Electrical power requirement
2021-22	Solar PV System	Solar Energy	Onsite	0.585	-	0.710	43.1	0.73
2022-23	Solar PV System	Solar Energy	Onsite	0.585	-	0.639	14.6	0.65
2023-24	Solar PV System	Solar Energy	Onsite	0.585	-	0.659	24.7	0.61

Solar Water Heaters

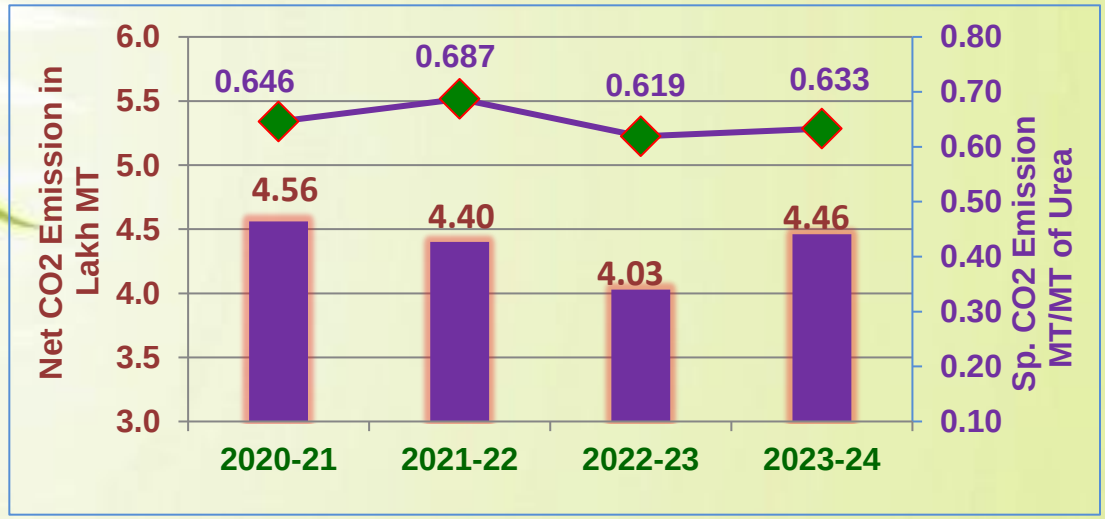
6 Nos. of Solar Water Heater installed in Guest House.

Bio-Methanation Plant

GHG EMISSION REDUCTION

Our endeavours for every year is to reduce specific energy consumption, which will also result in lesser CO2 emissions. We have also installed solar power plants which also reduce CO2 emission.

Parameters	Unit	2020-21	2021-22	2022-23	2023-24
Scope 1 Emission	Kg CO2/Equivalent Product	643.7	685.1	614.2	630.6
Scope 2 Emission	Kg CO2/Equivalent Product	1.7	1.7	4.5	2.5
Scope 3 Emission	Kg CO2/Equivalent Product	0.308	0.348	0.267	0.259
Total Emission	**Kg CO2/Equivalent Product**	**645.7**	**687.2**	**619.0**	**633.4**



CARBON DI OXIDE RECOVERY (CDR) PLANT:

- **In Phulpur Unit, Carbon Di Oxide Recovery (CDR) Plant of 450 MTPD capacity installed in the year 2006-07, to recover CO2 from flue gases of Ammonia-II Plant primary reformer furnace. This CO2 is consumed in both Urea-I and Urea-II Plants.**
- **Solar power plants installed at different locations inside the Plants such as at the roof of Bagging Plant, Raw water storage tank, roof of central canteen and roof of plant control rooms to reduce CO2 emission.**

WASTE UTILISATION:

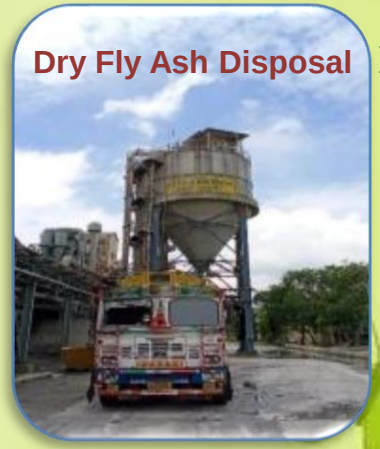
PURGE GAS RECOVERY (PGR) UNIT:

Purge gas from Ammonia-I plant is sent to PGR Unit to recover hydrogen. Then, the recover hydrogen send back to 1st suction of Syn Gas Compressor. The tail gas generated at PGR Unit is used as fuel in primary reformer burners which in turn saves NG fuel and, also utilisation of waste.

YEAR	NAME OF THE FUEL	QUANTITY OF WASTE AS FUEL (MT)	HEAT VALUE (MILLION Kcal/year)
2020-21	Tail Gas	33300.817	127468.88
2021-22	Tail Gas	29651.492	113499.99
2022-23	Tail Gas	28886.431	110571.49
2023-24	Tail Gas	31869.013	121988.22

WASTE DISPOSAL IN POWER PLANT

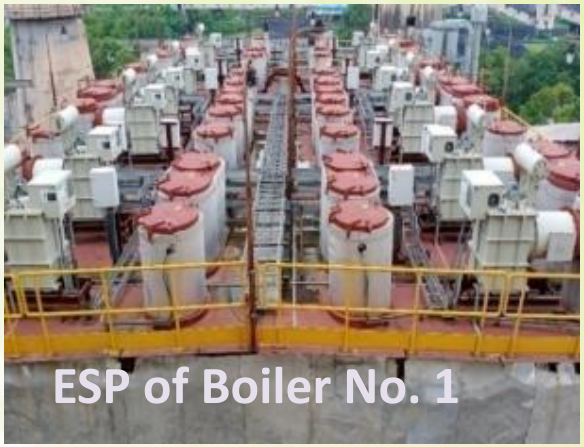
- **Fly Ash also used for Brick making at in-house Fly Ash Brick Plant. Brick is used for Paving & Boundary walls and for Usar land reclamation. This bricks are also provided for renovation of schools in nearby villages with free of cost.**

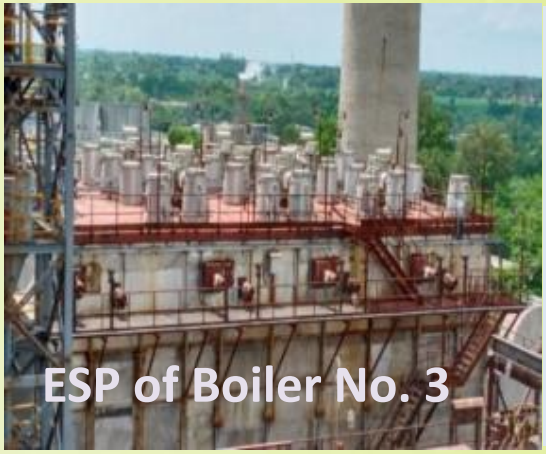


- **Fly Ash Generated in Power Plant being gainfully utilized by Cement industries.**

Environment monitoring system and reduction of Stack emission:

New Electrostatic Precipitator (ESP) in Coal Fired Boilers


ESP of Boiler No. 1


ESP of Boiler No. 3

ESP of Coal fired boilers were very old and their performance was deteriorated in due course of time and needed improvement. So, new ESP installed in both Boiler 1 & 3. In the year 2024-25, installation of ESP of Boiler no. 2 is under progress.

Installation of Ammonia Sensor and water curtain in Plants:

- To monitor ammonia leakage, ammonia sensor is installed at strategic locations of Ammonia-I, Urea-I and Ammonia Storage Tank area of IFFCO Phulpur-I Unit.
- In case of any leakages in the plants, the Panel operator shall identify the location of Ammonia Leakage and take action accordingly to arrest the leakage.
- Water curtain has been provided at the periphery of the control room as well as ammonia feed pumps for safety of the Plant personnel.

Environment & Sustainability : *Liquid Effluent Treatment*

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Rejection water of Reverse Osmosis Plant used in Coal yard in Phulpur Unit:

We are using cooling tower blowdown for RO Feed. The recovered RO product is being used in softening plant as make-up water and the reject water is being used in coal yard to supress the coal dust. The Plant Capacity is 3000 M3 /day (Recovery 85 %).

Sewage Treatment cum Recycle Plant:

The sewage generated in Plant Township is treated in Sewage Treatment Plant and is being used for irrigation purpose at Farmland at CORDET. The Plant Capacity is 125 M3 / hr.

Waste Disposal from Horticulture and Kitchen:

Bio-degradable wastes from kitchen and horticulture are converted into very good manure by vermi composting System. The manure is used in horticulture, green belt area & 150 Acres farm land at CORDET area.

Rainwater Harvesting System:

Total 5 Nos. Rainwater Harvesting systems are installed in township. IFFCO is also planning to install more Rainwater harvesting systems at different locations. New construction of lake for water conservation is under progress.

Installation of Online Environment Monitoring System

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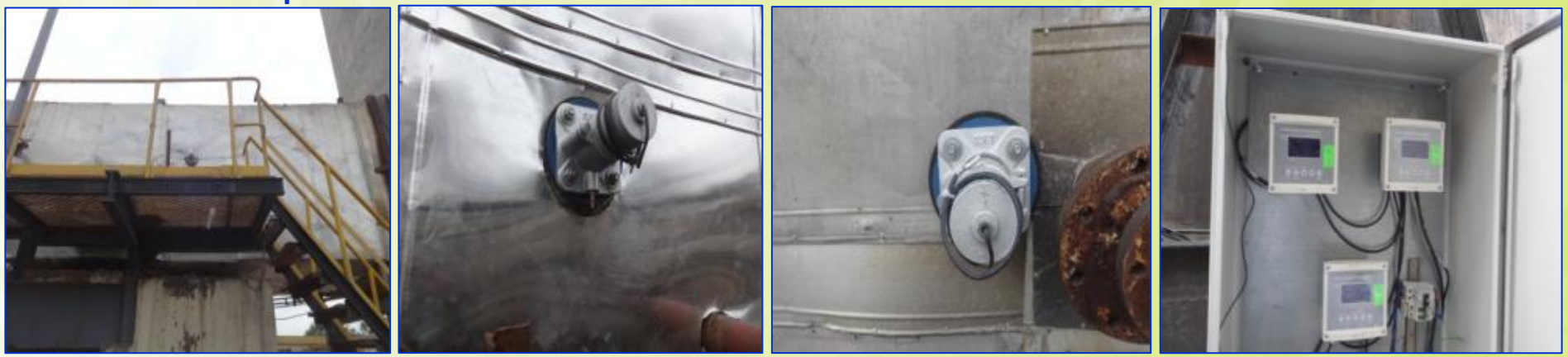
PM (Particulate Matter) Monitoring System in Boiler ducts:

IFFCO Phulpur Unit is measured and monitored the Particulate Matters (PM) in Boiler ducts and maintained within permissible limit.



Installed Transmitter & Receiver on Boiler Duct and Local Display

Installation of Vent Silencer in Ammonia-I Plant to Reduce Noise Pollution:

- **Phulpur-I Plant commissioned in the year 1981. For safety of the Plant there are several vent valves and PSVs are provided. The vent valves are connected to a vent header.**
- **During start up, shutdown and any other abnormal condition of the plant, the gas to be vent through the vent header and created noise, as there was no vent silencer.**
- **To reduce the noise pollution, the vent silencer provided in Ammonia-I Plant.**
- **It has planned to install more silencer for noise creating vent such as start-up heater vent in Ammonia plant.**

Procurement Process

IFFCO Phulpur has taken care of Energy optimization right from Procurement process among Vendors / Suppliers / Contractors

- **The Evaluation of a Bid is done based on Operating Cost**
- **Loading is being done to take care of the Performance and Productivity of equipment offered.**
- **In case the consumption of utilities is different for different Bidders. Extra operating cost over the minimum one shall be calculated as below for loading.**

Operating cost = Difference in utilities consumption x Unit cost of Utility x 8760 x 0.9 x 5.5860 x N

Where:
8760 is number of available hours in a year
0.9 is availability factor
5.5860 is discount factor at an interest rate of 10% per annum for one year erection/commissioning and ten years operational period.
N is the number of operating equipment items.

Green Supply Chain Management:

- Fly Ash Generated in Power Plant being gainfully utilized by Cement industries.
- The waste generated in Plants is disposed of to third party Vendors.
- The Main Raw material i.e. Natural Gas is being supplied by M/s GAS AUTHORITY OF INDIA LIMITED (M/s GAIL) through pipeline since 2006 and it is part of Green supply chain.

NET ZERO commitment

The energy sector is the source of around three-quarters of greenhouse gas emissions today and holds the key to averting the worst effects of climate change, perhaps the greatest challenge humankind has faced.

Key milestones:

Launching of IFFCO Nano Urea Liquid :

- IFFCO Nano Urea is a nanotechnology based revolutionary Agri input which provides nitrogen to plants.
- Nano Urea is a sustainable option for farmers towards smart agriculture and combat climate change.
- It promotes clean and green technology as its industrial production is neither energy intensive nor resource intensive.
- In addition to this, Nano urea Production is an eco-friendly energy saving process whereby the carbon footprint is significantly lower than in typical urea manufacturing.
- This product, unlike the traditional urea, is more efficient in terms of energy consumption and hence reduces emission, nitrogen use efficiency and is thus significantly reduces water pollution.
- Presently, IFFCO has three nano urea plants - Kalol in Gujarat, Aonla and Phulpur in Uttar Pradesh. Installation of two other nano Urea Plants at Deoghar in Jharkhand and Bangalore in Karnataka is under progress.

EMS System and other requirements:

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➢ Daily Monitoring System:

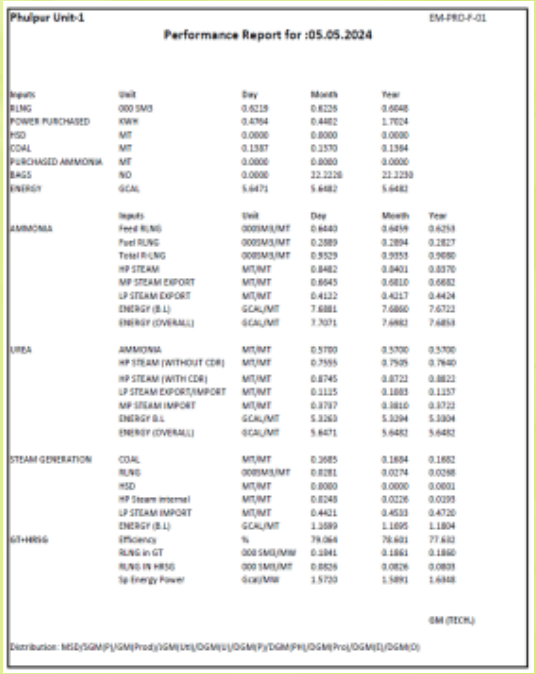
Energy conservation is the topmost priority of our company since its profitability is directly linked with it. Energy is being monitored daily morning meeting in the presence of Unit Head, and other Plant Personnel to facilitate these various reports are prepared and corrective actions are taken immediately to rectify the problem. Various types of Reports are generated on daily/weekly/monthly/quarterly and yearly basis for Reporting & Monitoring of Energy Consumption.

➢ Energy Conservation Cell:

A core Energy conservation Cell and plant wise Energy Conservation Sub-cells are already existing with representatives from different departments/sections related to the plant. The role of the energy conservation cells include monitoring of energy consumption, identification of areas and coordination of various activities for energy conservation.

➢ Budget Allocation:

Since energy saving is directly linked with the profitability of the Unit, top Management is very supportive for energy conservation schemes. Based on cost benefit analysis of the schemes, budget is allocated.


Phulpur Unit-1 EM-PRD-F-01

Performance Report for :05.05.2024

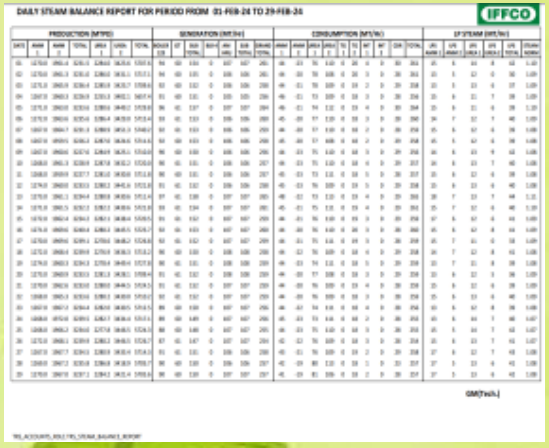
Inputs	Unit	Day	Month	Year
RLNG	000 SM3	0.6219	0.8226	0.6048
POWER PURCHASED	KWH	0.4764	0.4482	1.7024
HSD	MT	0.0000	0.0000	0.0000
COAL	MT	0.1387	0.1370	0.1364
PURCHASED AMMONIA	MT	0.0000	0.0000	0.0000
BAGS	NO	0.0000	22.2220	22.2220
ENERGY	GCAL	5.6471	5.6482	5.6482

	Inputs	Unit	Day	Month	Year
AMMONIA	Feed RLNG	000SM3/MT	0.6440	0.6459	0.6259
	Fuel RLNG	000SM3/MT	0.2889	0.2894	0.2827
	Total R-LNG	000SM3/MT	0.9329	0.9353	0.9086
	HP STEAM	MT/MT	0.8482	0.8401	0.8370
	MP STEAM EXPORT	MT/MT	0.6645	0.6810	0.6682
	LP STEAM EXPORT	MT/MT	0.4122	0.4217	0.4424
	ENERGY (B.L)	GCAL/MT	7.6881	7.6860	7.6722
	ENERGY (OVERALL)	GCAL/MT	7.7071	7.6982	7.6853
UREA	AMMONIA	MT/MT	0.5700	0.5700	0.5700
	HP STEAM (WITHOUT CDR)	MT/MT	0.7555	0.7595	0.7640
	HP STEAM (WITH CDR)	MT/MT	0.8745	0.8722	0.8822
	LP STEAM EXPORT/IMPORT	MT/MT	0.1115	0.1083	0.1157
	MP STEAM IMPORT	MT/MT	0.3797	0.3810	0.3722
	ENERGY (B.L)	GCAL/MT	5.3263	5.3294	5.3304
	ENERGY (OVERALL)	GCAL/MT	5.6471	5.6482	5.6482
STEAM GENERATION	COAL	MT/MT	0.3685	0.3684	0.3682
	RLNG	000SM3/MT	0.0281	0.0274	0.0268
	HSD	MT/MT	0.0000	0.0000	0.0001
	HP Steam internal	MT/MT	0.0248	0.0226	0.0295
	LP STEAM IMPORT	MT/MT	0.4421	0.4533	0.4720
	ENERGY (B.L)	GCAL/MT	1.1699	1.1695	1.1804
GT+HRSG	Efficiency	%	79.064	78.601	77.632
	RLNG in GT	000 SM3/MW	0.1841	0.1861	0.1860
	RLNG IN HRSG	000 SM3/MT	0.0826	0.0826	0.0803
	Sp Energy Power	Gcal/MW	1.5720	1.5891	1.6948

GM (TECH.)

Distribution: MS(S/SGM(P)/GM(Prod)/GM(Ut)/DGM(U)/DGM(Py/DGM(PH)/DGM(Proj/DGM(E)/DGM(O)

Sample of Daily Performance Reports


DAILY STEAM BALANCE REPORT FOR PERIOD FROM 01-FEB-24 TO 29-FEB-24

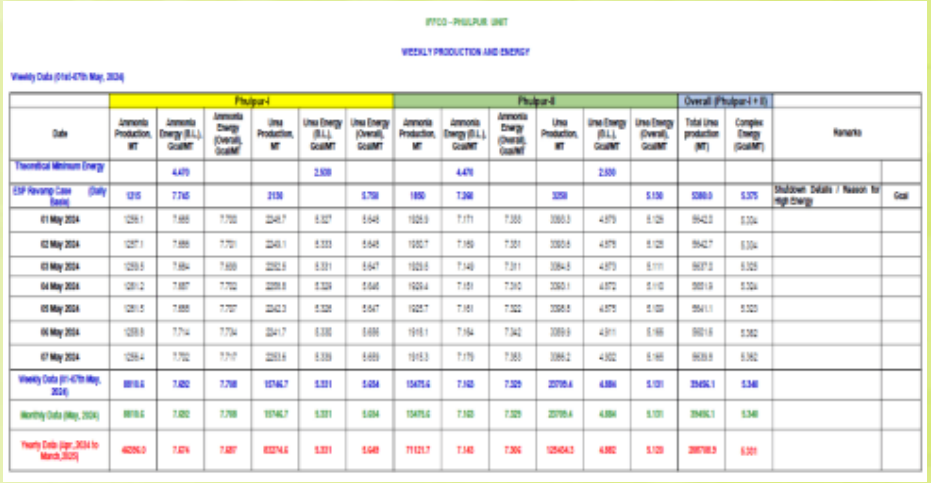
IFFCO

Sample of Daily Steam Balance Reports

EMS System and other requirements:

Employee Engagement:

- IFFCO Phulpur Unit encourages its employees through Suggestion Scheme to give ideas of energy conservation.
- In our Unit, We have online suggestion scheme portal for all Employees. All Employees (Workman & Supervisor Level) participated the Suggestion Scheme Awards. The selected candidate awarded in in-house /National / International level.
- Energy Efficiency & Awareness Training programme is being conducted time to time for betterment & smooth running of the Plant with minimum specific energy consumption.
- Apart from this, our senior official frequently interact with plant operating personnel to discuss all sorts of problems and rectify the problem for reducing the specific energy consumption of the Plant.



IFFCO - PHULPUR UNIT

WEEKLY PRODUCTION AND ENERGY

Weekly Data (01st-07th May, 2024)

Date	Phulpur-I						Phulpur-II						Overall (Phulpur-I + II)		Remarks	
	Ammonia Production, MT	Ammonia Energy (B.L.), Gcal/MT	Ammonia Energy (Overall), Gcal/MT	Urea Production, MT	Urea Energy (B.L.), Gcal/MT	Urea Energy (Overall), Gcal/MT	Ammonia Production, MT	Ammonia Energy (B.L.), Gcal/MT	Ammonia Energy (Overall), Gcal/MT	Urea Production, MT	Urea Energy (B.L.), Gcal/MT	Urea Energy (Overall), Gcal/MT	Total Urea production (MT)	Complex Energy (Gcal/MT)		
Theoretical Minimum Energy		4.470			2.500			4.470			2.500					
ESP Revamp Case (Daily Basis)	1215	7.745		2130		5.758	1850	7.368		3250		5.130	5380.0	5.375	Shutdown Details / Reason for high Energy	Goal
01 May 2024	1259.1	7.666	7.703	2248.7	5.327	5.648	1928.9	7.171	7.300	3390.3	4.979	5.129	5642.0	5.334		
02 May 2024	1257.1	7.666	7.701	2248.1	5.333	5.648	1930.7	7.169	7.301	3390.6	4.979	5.129	5642.7	5.334		
03 May 2024	1259.5	7.664	7.699	2252.6	5.331	5.647	1929.6	7.148	7.281	3384.5	4.973	5.111	5637.0	5.325		
04 May 2024	1261.2	7.667	7.702	2255.8	5.329	5.646	1929.4	7.151	7.283	3390.1	4.972	5.110	5551.9	5.324		
05 May 2024	1261.5	7.666	7.707	2242.3	5.328	5.647	1928.7	7.151	7.322	3386.8	4.973	5.109	5541.1	5.323		
06 May 2024	1259.8	7.714	7.754	2241.7	5.330	5.696	1918.1	7.164	7.342	3389.8	4.911	5.166	5601.6	5.362		
07 May 2024	1256.4	7.702	7.717	2253.6	5.339	5.669	1915.3	7.179	7.353	3386.2	4.922	5.166	5639.8	5.362		
Weekly Data (01-07th May, 2024)	8818.6	7.692	7.709	15746.7	5.331	5.654	13475.6	7.163	7.329	23709.4	4.954	5.131	39456.1	5.348		
Monthly Data (May, 2024)	8818.6	7.692	7.709	15746.7	5.331	5.654	13475.6	7.163	7.329	23709.4	4.954	5.131	39456.1	5.348		
Yearly Data (Apr.,2024 to March,2025)	46256.0	7.674	7.687	83274.6	5.331	5.649	71121.7	7.143	7.304	125454.3	4.992	5.129	208708.9	5.331		

Sample Weekly Production and Energy Reports

EMS System and other requirements:

Challenges and Upgradation:

- In the current market scenario, our endeavour for the future is to improve the all-around efficiency of Plants with increased production to bring down substantial savings in the energy consumption and cost of production by ensuring reliable and sustained run of all the plants.
- The most common issue for Ammonia pumps is seal failure. To avoid breakdown of machinery, IoT system is installed at Ammonia Pumps area. To detect and mitigate this early requires understanding the root cause.
- To identify the root cause for failure, IoT system is used to identify if any changes in pumps rpm and failure. It will give alarm well in advance before failure of pump's plungers.
- The challenge to ensuring a successful predictive maintenance monitoring solution the IoT System work successfully.

Learning from CII Energy Award 2023 or any other award program:

- The objective of the awards is to recognise and Award “Excellence” in Energy Management in Industries and to facilitate sharing of information by excellent energy efficient companies.
- It is a sense of competition to motivate other plants to achieve excellence and establish futurity by pinpointing Carbon Emission Reduction initiatives focused on energy conservation.
- The Awards evaluate all kinds of new processes, products, services, technologies, and other types of innovations in a common platform. They also assess new ideas and approaches along with tangible results.

INTERNATIONAL CERTIFICATIONS

IFFCO
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Certificate of Registration

ENERGY MANAGEMENT SYSTEM - ISO 50001:2018

This is to certify that: Indian Farmers Fertilizers Co-Operative Ltd. Phulpur Unit: Ghiya Nagar Allahabad (UP) 212 404 Uttar Pradesh India

Holds Certificate No: ENMS 567240

and operates an Energy Management System which complies with the requirements of ISO 50001:2018 for the following scope:

The Manufacture of Urea and Ammonia, Generation of Compressed Air, Generation of Steam through Coal Fired, Natural Gas Boilers and HRSG, Generation of Power through Steam Turbine and Gas Turbine.

For and on behalf of BSI: Theuns Kotze, Managing Director Assurance - IMETA

Original Registration Date: 2010-10-25 Effective Date: 2023-05-16
Latest Revision Date: 2023-04-28 Expiry Date: 2026-05-15

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Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that: Indian Farmers Fertilizers Co-Operative Ltd. Phulpur Unit: Ghiya Nagar Allahabad (UP) 212 404 Uttar Pradesh India

Holds Certificate No: EMS 534419

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The Manufacture of Fertiliser Grade Urea (including activities at Holi Lal Nehru Farmers Training Institute, Ghiyanagar Residential Township and Township Hospital.

For and on behalf of BSI: Theuns Kotze, Managing Director Assurance - IMETA

Original Registration Date: 2008-07-15 Effective Date: 2023-05-16
Latest Revision Date: 2023-05-09 Expiry Date: 2026-05-15

Page: 1 of 1

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SGS

Certificate IN22/00000428

Indian Farmers Fertiliser Cooperative Limited

IFFCO Sadan, C-1, Distt. Centre, Saket Place, New Delhi – 110017, India

IFA Protect & Sustain Product Stewardship Programme

To achieve the level of IFA Product Steward Excellence

Production of Neem Coated Urea Fertilizers/ Production of DAP, NP, NPK, Water Soluble Fertilizers

This certificate is valid from 01 July 2022 until 01 July 2025
Issue 1. Certified since 01 July 2022

This is a multi-site certification.
Additional site details are listed on the subsequent page.

protect&sustain

bsi.

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that: Indian Farmers Fertilizers Co-Operative Ltd. Phulpur Unit: Ghiya Nagar Allahabad (UP) 212 404 Uttar Pradesh India

Holds Certificate No: FM 534418

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

The Manufacture and Supply of Fertiliser Grade Urea.

For and on behalf of BSI: Theuns Kotze, Managing Director Assurance - IMETA

Original Registration Date: 2008-07-15 Effective Date: 2023-05-16
Latest Revision Date: 2023-05-09 Expiry Date: 2026-05-15

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Certificate of Registration

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM - ISO 45001:2018

This is to certify that: Indian Farmers Fertilizers Co-Operative Ltd. Phulpur Unit: Ghiya Nagar Allahabad (UP) 212 404 Uttar Pradesh India

Holds Certificate No: OHS 582315

and operates an Occupational Health and Safety Management System which complies with the requirements of ISO 45001:2018 for the following scope:

The Manufacture of Urea.

For and on behalf of BSI: Theuns Kotze, Managing Director Assurance - IMETA

Original Registration Date: 2017-12-22 Effective Date: 2023-05-16
Latest Revision Date: 2023-05-09 Expiry Date: 2026-05-15

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Certificate IN22/00000428, continued

Indian Farmers Fertiliser Cooperative Limited

IFA Protect & Sustain Product Stewardship Programme

To achieve the level of IFA Product Steward Excellence

Issue 1

Site 1:
Indian Farmers Fertiliser Cooperative Limited, Phulpur, P.O. Ghiyanagar, Prayagraj, Pin -212404 (Uttar Pradesh), India
Production of Neem Coated Urea Fertilizers

Site 2:
Indian Farmers Fertiliser Cooperative Limited, Aonla, Paul Pothen Nagar, P.O. IFFCO Township, Bareilly, Pin -243403, (Uttar Pradesh), India
Production of Neem Coated Urea Fertilizers

Site 3:
Indian Farmers Fertiliser Cooperative Limited, Kalol, Kasturi Nagar, Gandhi Nagar, Pin -382423 (Gujarat), India
Production of Neem Coated Urea Fertilizers

Site 4:
Indian Farmers Fertiliser Cooperative Limited, Kandla, P.O. Kandla (Kutchh), Gujarat, 370210, India
Production of DAP, NPK, Water Soluble Fertilizers

Site 5:
Indian Farmers Fertiliser Cooperative Limited, Paradeep – Village Muladia, P.O Paradeep, Dist. Jagatsinghpur, Pin -754142 (Odisha), India
Production of DAP, NP, NPK Fertilizers

protect&sustain

Awards & Recognition

24th CII Excellence Energy Efficiency Award for Phulpur Unit-II in 2023

24th CII Energy Efficient Award for Phulpur Unit-I in 2023

23rd CII National Award for Phulpur Unit-I in 2022

23rd CII National Award for Phulpur Unit-II in 2022

Certificate of Appreciation Under PAT Cycle –II

Greentech Energy Conservation Award - 2021

Platinum Award- Grow Care Energy Conservation 2021

Indian National Suggestion Schemes' Association (INSSAN) Award

Team Member:
P.K.Verma (9426330277)
T.K.Singha (9112580296)
Navneet Kushwaha (9041661375)