

VIKRAM ISPAT
(A Unit of Grasim Industries Ltd.)

Unit Profile

Vikram Ispat is a Unit of GRASIM under Aditya Birla Group of Industries.

The plant is located 140 km south of Mumbai and was set up in 1989 with design capacity of 0.75 million tons of Sponge Iron in the form of HBI (Hot Briquetting Iron). The factory is spread over 43 hectares (106 acres). Site work started in 1991 and production commenced in 1993. The plant was upgraded in 1998 to a capacity of 0.9 million tons. The plant produces both HBI and DRI (Direct Reduced Iron) from the same Reactor – A first and the only plant in the.

The Unit is the first among Sponge Iron manufacturer in introducing recently an Oxygen Injection Scheme for improving energy efficiency and productivity. But due to shortage of N.G, the scheme is not operational.

Energy Consumption

Natural Gas is the main source of energy for process and fuel Steam generated from waste heat is the source for power generation. There is zero power requirement from grid. Due to shortage of Natural Gas, Provision has been made to fire Naphtha as fuel in radiant and convection section of reformer. Recently, arrangement has been made to use Propane for mixing in Natural Gas.

Annual consumption of Natural Gas, Naphtha and Propane is given in the table below.

	Natural Gas	Naphtha	Propane	Gcals / Te Product
	lakhs SCM	MT	MT	All inclusive *
2002-03	2026.650	12230.785	-	2.975
2003-04	1942.957	3301.421	1829.307	2.936
2004-05	1614.590	49623.719	33893.75	2.884

* - Total Energy from all sources.

Energy Conservation Commitment, Policy and Set up

Commitment is reflected in Quality, Safety, Health and Environment Policy itself - “ Vikram Ispat is committed to deliver values to stake holders by ----- conservation of resources and prevention of pollution-----.” A copy of Quality, Safety, Health and Environment Policy is enclosed here with.

All aspects of Energy Conservation are being looked after by Technical Department headed by D.G.M.(Process Engineering) reporting to Sr. Vice President (Technical).

Energy Consumption Achievements :

Design Stage

Many features were incorporated in design itself. Vikram Ispat is first Sponge Iron unit in the world to incorporate Reducing Gas Heat Exchanger (RGHE) to recover 13 Gcal / hr of energy from Reactor exhaust gas, which otherwise was being lost to cooling water. There is application of total energy concept in raising steam from waste heat, generation of power and utilization of extraction steam for process.

Improvements

Many steps were taken to conserve energy. One multipurpose schemes, DM water - DCG preheating and NG Preheating costing Rs.56 lakhs brought savings of 2.0 Gcals/hr. More

important this scheme rescued critical plant equipment reducing Gas Heat Exchanger (RGHE) from stress corrosion cracking.

A Natural Gas Preheater was installed at a cost of Rs. 13lacs to heat N.G. used in reformer section resulting in a saving of 1 Gcal/hr. Further the scheme was modified to heat N.G. used for Process Gas Heater(PGH) also.

Apart from these, various schemes were implemented and process parameters were optimized to conserve energy.

To overcome short fall in energy supply through Natural Gas, various alternative fuels were considered and Naphtha was chosen as an alternate source of energy and burners in Radiant and Convection section of Reformer was changed with dual firing burners. Further decline in N.G. supply forced us to consider Propane and a scheme was developed for storage, vapourisation and injection of Propane in Natural gas at a pressure of 16 Kg/cm²g. Vapourisation and use of Propane after mixing with N.G. at a pressure of 16 Kg/cm² is unique and perhaps there is no another example in India.

During Operation

The specific energy consumption is monitored on daily and monthly basis. Material and energy balances are regularly made. Cause of deviation is identified and operating parameters corrected.

Schemes implemented in 2004-05

We are having (3+1) cells of Cooling Tower with design capacity of 2100 M³/hr and 13 °C temperature range for Equipment Cooling Water and 2 cells of Cooling Tower with design capacity of 1500 m³/hr and 23 °C temperature range. All cells were having GRP fans.

FRP fan is considered to be more efficient than GRP fan due to aerodynamic profile of blade and low weight of hub and fan. The fan in one cell of Equipment Cooling water Tower was replaced by FRP fan supplied by M/s Encon and trial was conducted on 12.05.04. A saving of 38% energy was achieved without sacrificing in air flow and efficiency of tower. Encouraged by the result, all fans were replaced by FRP fans in phased manner.

Total saving is as follow

All six Cooling tower fans were replaced by FRP fan. The net saving in Power =103.35 Kw. Thus for the year the saving comes 818532 kw.

At average power cost of Rs. 2.73 /Kw, the saving comes to Rs.22.3 Lacs.

ENERGY CONSERVATION PLANS AND TARGETS

Improvement in Process Cooling Water Pump Efficiency by replacing with a high efficiency pump.

Reduction of Reformer stack losses by installing Plate type Air Preheater for increased load.
Approximate installation cost – Rs.225 lacs
Energy Saving – 1.6 Gcal/hr, Rs. 91 lacs/year

Reduction of stack losses from Process Gas Heater (PGH) by installing two additional rows of tubes in convection section
Approximate installation cost – Rs.75 lacs
Energy Saving – 0.5 Gcal/hr, Rs. 28 lacs/year

Installation of Variable Frequency Drive in selected pumps to save energy
Approximate installation cost – Rs.8.5 lacs
Energy Saving – 35 KW, Rs. 8.3 lacs/year

Installation of I.G. blow Down pump of smaller capacity
Approximate installation cost – Rs.2.0 lacs

Energy Saving – 14 KW, Rs. 3.3 lacs/year