

## **Mangalore Refinery & Petrochemicals Limited (MRPL)**

### **Environmental and Green/Sustainability Initiatives taken:**

MRPL has always been Environmental friendly in many respects. Right from inception stage, all Environmental friendly technologies are incorporated in the configuration of the Refinery. During operation various Environmental friendly modifications for Fuel reduction / Air emission reduction / Water Conservation / Wastewater reduction were done.

#### **I. Activities undertaken and progress achieved so far**

##### **A) Energy Management**

At MRPL, energy conservation is targeted through Process Optimization, Continuous monitoring and Implementation of several Energy Conservation modifications. The major energy conservation measures undertaken during the year 2014-15 are

1. Recycle Splitter heater Air Preheater replacement in Hydrocracker-1, achieving an energy saving of 0.74 MMKcal/Hr
2. Commissioning of Cooling Tower-1 Steam Driven Pump, achieving an energy saving of 1.9 MMKcal/Hr
3. Crude and Vacuum Heater Online Chemical Cleaning in Crude Distillation Units-1&2, achieving an energy saving of 2.5 MMKcal/Hr
4. Recycle Splitter optimization in Hydrocracker-1, achieving an energy saving of 1.96 MMKcal/Hr
5. Heavy Naphtha pump impeller trimming in Crude Distillation Unit-1, achieving an energy saving of 0.07 MMKcal/Hr
6. Impeller trimming for HGO pump and (-) 370 cut pump in Crude Distillation Unit-1, achieving an energy saving of 0.30 MMKcal/hr
7. Gas Oil Hydro Desulfurization product Pump impeller trimming, achieving an energy saving of 0.12 MMKcal/Hr
8. Shifting of underutilized VSD from CCR-2 to CCR-1 for NHT charge pump, achieving an energy saving of 0.42 MMKcal/Hr
9. Air Preheater replacement in Visbreaker-2, achieving an energy saving of 0.20 MMKcal/Hr

The above measures have resulted in Energy saving of around 8.22 MMkcal/Hr, which is equivalent to 5070 SRFT/Year, with an investment of ~ Rs 4.8 Crore.

Some additional investments and proposals which are under implementation for reduction of consumption of energy / resources are

- i) Air Preheater replacement in Hydrocracker-2
- ii) Compressed Air and Nitrogen network leak survey and arresting.
- iii) Introduction of Diesel Pump around in Hydrocracker - 1&2 Recycle Splitter Column
- iv) Heat recovery from Hydrocracker-1/2 Unconverted Oil by Cold DM Water
- v) Crude Distillation Unit-1/2 Heater Online Cleaning
- vi) Crude Distillation Unit-3 Crude Charge pump VSD installation
- vii) Proposal for routing of Amine Regeneration Unit-3 Flash drum off gas to incinerator for recovering heat of combustion.

## B) Environment Management

- An advanced Waste Water Treatment Plant having Sequential Batch Reactor (SBR), Membrane Bio Reactor (MBR), Ultra Filtration (UF) and Reverse Osmosis (RO) commissioned. This plant will improve the quality of treated effluent and help to recycle maximum Treated effluent quantity.
- Sulphur Pastillation Unit (SPU) is commissioned in the Refinery as a part of Phase – III to reduce dust emissions in the Sulphur Recovery Unit.



- **Utilization of STP water in MRPL as to conserve fresh water consumption**  
The main source of water requirement for the refinery operation is from River. To reduce the water intake from river, MRPL has made an agreement with Mangalore Special Economic Zone (MSEZ) for utilizing Sewage Treatment Plant (STP) treated water as a make-up to cooling towers in MRPL. The total water requirement for phase – III refinery operation is 13 MGD out of which 6.5 MGD will be sourced from the river through

MSEZ pipeline and rest 6.5 MGD will be sourced from MSEZ STP. Treated tertiary STP water is received in MRPL in a closed sump and after proper disinfection treatment it is being taken to cooling towers as make-up water. At present MRPL receives approximately 3.0 MGD STP water and it will be increased to the maximum over a period.

- The fired heaters in process units of the entire Refinery Complex and also the captive power plant installed under the recently commissioned Phase-3 project are designed to take Liquefied Natural Gas (LNG) as fuel.
- Two Gas turbines (1\* 22 MW, 1\* 36 MW) have been installed to generate power and steam, to either consume Refinery fuel gas or Liquefied Natural Gas as fuel
- Solar Lights are provided in many places of Refinery and Colony
- An advanced Reverse Osmosis Plant (1000 Cum/Hr) is commissioned for maximizing the quantity of treated effluent back to the Refinery.



- Wet Air Oxidation Unit (WAO) is set-up in the refinery to treat Spent Caustic and to improve the WWTP performance.





- A Condensate Recovery Unit commissioned in process unit resulting reduction in fresh water consumption.



- A Closed Bioremediation Unit is commissioned in the refinery to treat oily sludge generated in the Refinery.
- As a proactive measure, Oily sludge is being fed to Delayed Coker Unit (DCU) for re-processing purpose.
- An anaerobic garbage treating Bio-gas plant to treat organic food wastes of MRPL Township & Refinery is commissioned. (MRPL Township comprises of 680 Quarters). By this set-up, the entire Food wastes of Township & Refinery is bio-treated in an



Environmental friendly plant producing bio-gas as well as an excellent organic compost for plants / greenery.



- In addition to the existing greenbelt developed in the Refinery, 4800 Nos. saplings have been planted in Phase – III area in association with Karnataka Forest Department.



*MRPL has been truly Environment Friendly and plan to further take forward this noble cause in the coming years by implementing various Environmental Protection & Conservation measures.*

## **II. The Goals & Objectives sought to be achieved:**

CO<sub>2</sub> emission reduction objectives:

1. 5.331 MMT in 2015 to 4.918 MMT by 2020 (Total reduction is 0.413 MMTPA)
2. 4.918 MMT in 2020 to 4.802 MMT by 2030 (Total reduction is 0.116 MMTPA)

## **III. The Progress made so far:**

Roof top solar panels are being provided on 10,000 m<sup>2</sup> area during FY 2015-16. Order is being placed for the first year i.e. 2015-16

Government of India is encouraging all PSUs to utilize renewable source of energy, thereby minimizing dependence on existing grid power. Grid Interactive photovoltaic power plant works on solar energy. Solar energy captured by the photovoltaic cells will be converted into electrical energy. These cells will be positioned in a location where solar energy is available. During day time, energy generated by these cells will be connected to the grid through synchronizing circuit. This power will meet the partial load of the building during day time.

As per recommendation of Government of India-Ministry of New and Renewable energy roof top solar panels are being installed towards energy conservation and usage of renewable source of energy. In MRPL, roof top area of 50000 Sq M on substations and central control rooms in phase 1 and phase 2 of the refinery is planned to be utilized. The estimated expenditure is about Rs. 6.4 Crores per 10000 Sq Meter area. It is planned to complete solar rooftop panels implementation in stages during next five years. Pay back is calculated to be approximately 3 years.

## **IV. Activities proposed for the future which will help reduce GHG emissions or help adapt to climate change:**

- Process optimization including flare gas recovery system
- Fired heater efficiency improvement
- Steam optimization
- Power importing