

## Brief Summary of the Project

### 1. Background:

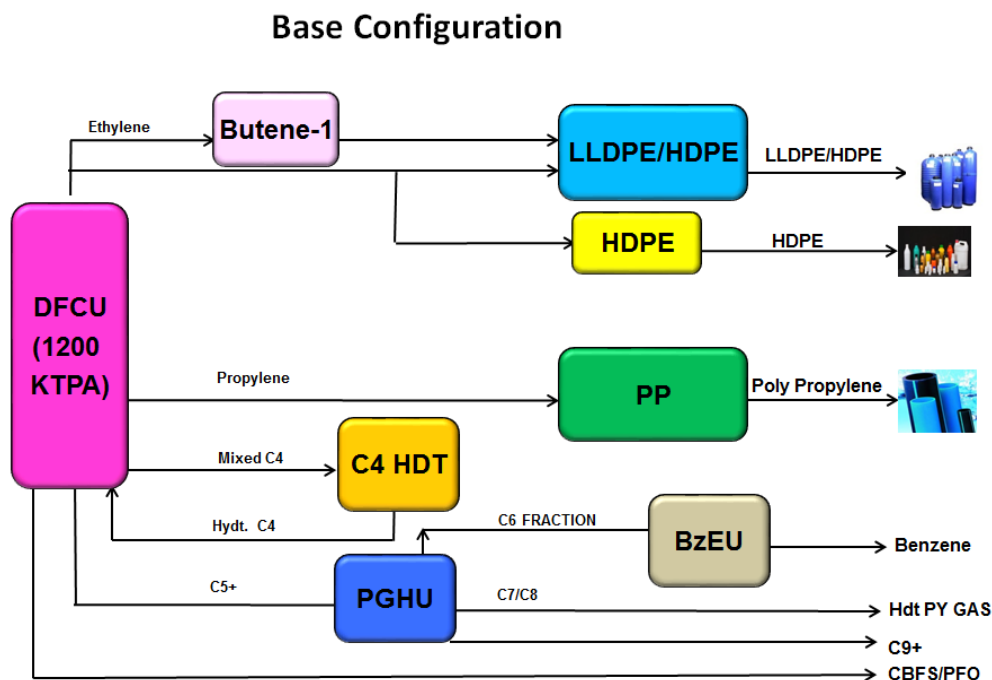
HPCL Mittal Energy Limited (HMEL) currently operates a 9.0 MMTPA Guru Gobind Singh Refinery in Bathinda-Punjab, supplying EURO-III and EURO-IV compliant fuels in the Northern region. The refinery is equipped with a Petro FCC and Delayed Coker Unit with an upstream VGO+HCGO Hydrotreater. HMEL has undertaken project for a Low Cost Expansion of the existing refinery wherein it is debottlenecking and increasing the throughput without adding major equipment, the existing units to achieve a capacity of 11.25 MMTPA. Additionally, a CFBC based steam generation system is also being implemented, wherein, with coal/ Petcoke as fuel, steam and power shall be generated. This will displace expensive fuels being used for power generation currently thereby enhancing returns from the refinery. The project for producing EURO-VI grade fuels has been Kick-Started & shall be commissioned by September 2019.

### 2. Project Description:

2.1. HMEL intends to set up an integrated petrochemical Complex (***Guru Gobind Singh Polymer Additions Complex***) within the existing refinery complex to maximise returns as well as expand their product portfolio.

#### 2.2. Block Flow Diagram

The petrochemical Complex will have a steam cracker unit and downstream polymer units as per the schematic shown below.



### 2.3. Feed Streams to the Complex

The following Streams shall be feed for the complex:

- a) Refinery Fuel Gas,
- b) LPG
- c) Heavy Naphtha
- d) Light Kero.
- e) Hexane
- f) Hexene-1
- g) Pentane

Refinery fuel gas, LPG, Naphtha and Kero feed shall be supplied from within the refinery, and same shall be utilized within Dual feed Cracker Unit in the complex. However, Hexane, hexene-1 and Pentane shall be outsourced to the complex, and shall be utilized with in Polymer units.

### 2.4. Unit Capacity

The proposed complex shall consist of various process units as well as Storage and utility system. All the Utility and storage facilities shall be utilized for captive consumption within the Complex.

The following table shows the Name and Capacity of Process units;

Sr. No.	Unit Name	Capacity
1.	Dual Feed Cracker Unit consisting <ol style="list-style-type: none"><li>i. Steam Cracking Unit</li><li>ii. Refinery Off gas treatment unit</li><li>iii. C4 Hydrogenation unit</li><li>iv. Pyrolysis Gasoline Hydrogenation Unit</li><li>v. Benzene Extraction Unit.</li></ol>	1200 KTPA of Ethylene (Expandable to 1500 KTPA)
2.	Butene-1 Unit	55 KTPA
3.	Linear Low Density Polyethylene/High Density Polyethylene Swing Unit	2x400 KTPA
4.	High Density Polyethylene Unit	450 KTPA
5.	Polypropylene Unit	500 KTPA

Main Feed for the Polymer Units shall be internally generated within the Complex. Polymer units shall also substituted by other feed and same are described above.

## 2.5 Intermediate and Finished Products Generated from the Complex

The process units shall generate intermediate as well as finished products. The description of intermediate/finished products is as follows;

Sr. No.	Name	Intermediate Product	Final Product
1.	Ethylene	√ Utilized in LLDPE/HDPE swing/ HDPE & Butene-1 units)	-
2.	Propylene	√ (Utilized in Polypropylene unit)	-
3.	Raw C4	√ (Utilized with in Steam Cracker Unit)	-
4.	Raw Pyrolysis Gasoline	√ ( Utilized in Pyrolysis gasoline hydrogenation unit)	-
5.	Hydrogenated Pyrolysis Gasoline		√ (Produced from PGHU)
6.	C9+		√ (Produced from PGHU)
7.	CBFS		√ (Produced from PGHU/SCU)
8.	LLDPE		√ (Produced from LLDPE/HDPE swing unit)
9.	HDPE		√(Produced from LLDPE/HDPE and HDPE swing unit)
10.	PP		√(
11.	Butene-1	√ (Utilized in LLDPE/HDPE swing unit)	
12.	Hydrogen		√( Part Utilized with in Steam Cracker Unit/ PGHU and balance shall be exported to Refinery)
13.	Fuel gas		√( Part Utilized with in Steam Cracker Unit balance shall be exported to Refinery)

## 2.6 Utility generation Facilities

The complex shall have captive Utility generation facilities to cater the captive requirement of the complex.

The following Utilities generartion systems are envisaged as a part of the complex;

- i. Recirculating Cooling Water System
- ii. Compressed air system
- iii. Inert Gas system
- iv. Fuel gas system
- v. Flare system

- vi. Condensate polishing unit
- vii. DM Water System

## 2.7 Offsite Storage Facilities

The following storage facilities are envisaged for the new complex

Sr. no.	Name
1	Liquid Ethylene
2	Liquid Off spec Ethylene
3	Liquid Propylene
4	Liquid Off-spec Propylene
5	C4-Mix /Hydrogenated
6	Offspec-C4
7	Raw Pyrolysis Gasoline
8	C6-Cut
9	Butene-1
10	Benzene
11	Pyrolysis fuel oil/CBFS
12	Hydrogenated Pyrolysis Gasoline
13	C9+ Cut
14	C6+ Oligomer
15	Slop
16	Hexane
17	Pentane
18	Hexene-1
19.	Bagging

## 3.0 Main Processing Sections in Various Process Units

The main processing sections in each unit are indicated below

### 3.1 Steam Cracker Unit:

- Feed preheating and Steam Cracking
- Cracked gas quenching, water scrubbing and Compression
- Cracked gas cooling, front end separation and Acetylene removal
- Demethanisation, Hydrogen Separation and purification
- Ethylene recovery and refrigeration
- Propylene recovery and refrigeration
- C4 recovery and hydrogenation
- C5+ Fraction and Hydrogenation
- Hydrogenated Pygas recovery, C9+ Recovery and CBFS recovery

- Benzene extraction
- Refinery Off gas treatment
- Caustic scrubbing and spent caustic treatment
- Amine absorption and regeneration
- Steam and BFW system.

### **3.2 Butene-1 Unit**

- Feed Purification Section
- Reaction Section
- Catalyst & Co-catalyst Injection Section
- Catalyst Removal System.
- Distillation Section
- Disposal System

### **3.3 PP Unit**

- Catalyst Feeding
- First Polymerisation
- Reactor Powder Transfer
- Second Polymerisation
- Powder Deactivation and Devolatilization
- Product Finishing
- Pellet Blending and Dedusting Other Facilities:
- Propylene Recovery Unit
- Propylene Purification Unit
- Instrument Air Compression
- Flare & Blowdown Drums
- Condensates Recovery System
- Waste Water Pits

### **3.4 HDPE Unit**

- Catalyst Preparation
- Feed purification and comonomer injection
- Polymer separation
- Hydrocarbon recovery and recycle
- Preparation of finished product, Extrusion.

### **3.5 LLDPE/HDPE Swing Unit**

- Catalyst Activation section, CAU
- Catalyst Injection section, CIU
- Polymerisation section, PU
- Vent Recovery section, VRU
- Liquid Recovery Unit, LRU

- Additive and Pelletising section, APU
- Pellet Blending section, PBU
- Core Process Vent Collection section, PV
- Reagent Storage & Unloading, RSU