BRAHMAPUTRA CRACKER AND POLYMER LIMITED

(A Government of India Enterprise)

21ST REFINERY TECHNICAL MEET - 2017

Experiences in setting up & operating a petrochemical plant in north east INDIA

BCPL Team:

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Introduction

BCPL is the prestigious Assam Gas Cracker Project, the first ever Petrochemical Project in entire North East India and came as a part of the historic Assam Accord signed on 15th August, 1985.

It was incorporated on 08th January, 2007 as Central Public Sector Enterprise under the under the Department of Chemicals & Petrochemicals, Govt. of India.

Introduction

- An initiative for socio economic development of Assam.
- CCEA approval in Sept'1994 with capital subsidy of Rs. 377 Crore.
- Reliance agreed to implement the Project with enhancement of capacity from 200 KTPA to 300 KTPA later.
- The Project remained a nonstarter due to non-availability of sufficient feedstock.
- The Project finally handed over to GAIL in 2003.

Chronology of events

- Detailed Feasibility Report by M/s EIL - Dec'04
- CCEA approval - Apr'06
- Joint Venture formation (BCPL)- 08.01.2007
- Foundation Stone laying by then Hon'ble Prime Minister – 09.04.2007
- Commencement of field construction jobs - Nov'09
- CCEA Approval for Project Cost of Rs.8,920 Cr - Nov'11
- Commissioning of the Project- 02.01.2016
- Dedication to the Nation by Hon'ble Prime Minister – 05.02.2016

Plant Commissioning

Hon'ble Prime Minister Shri Narendra Modi dedicated BCPL Petrochemical Complex, a flagship Project of Assam to the Nation on 5th Feb, 2016.

Stake Holders

GAIL (India) Limited is the main promoter having 70% equity participation and the rest 30% is equally shared by Oil India Limited (OIL), Numaligarh Refinery Limited (NRL) and Government of Assam.

गेल
GAIL

NRL

ऑयल इंडिया लिमिटेड
Oil India Limited

অসম চৰকাৰ
सत्यमेव जयते
GOVERNMENT OF ASSAM

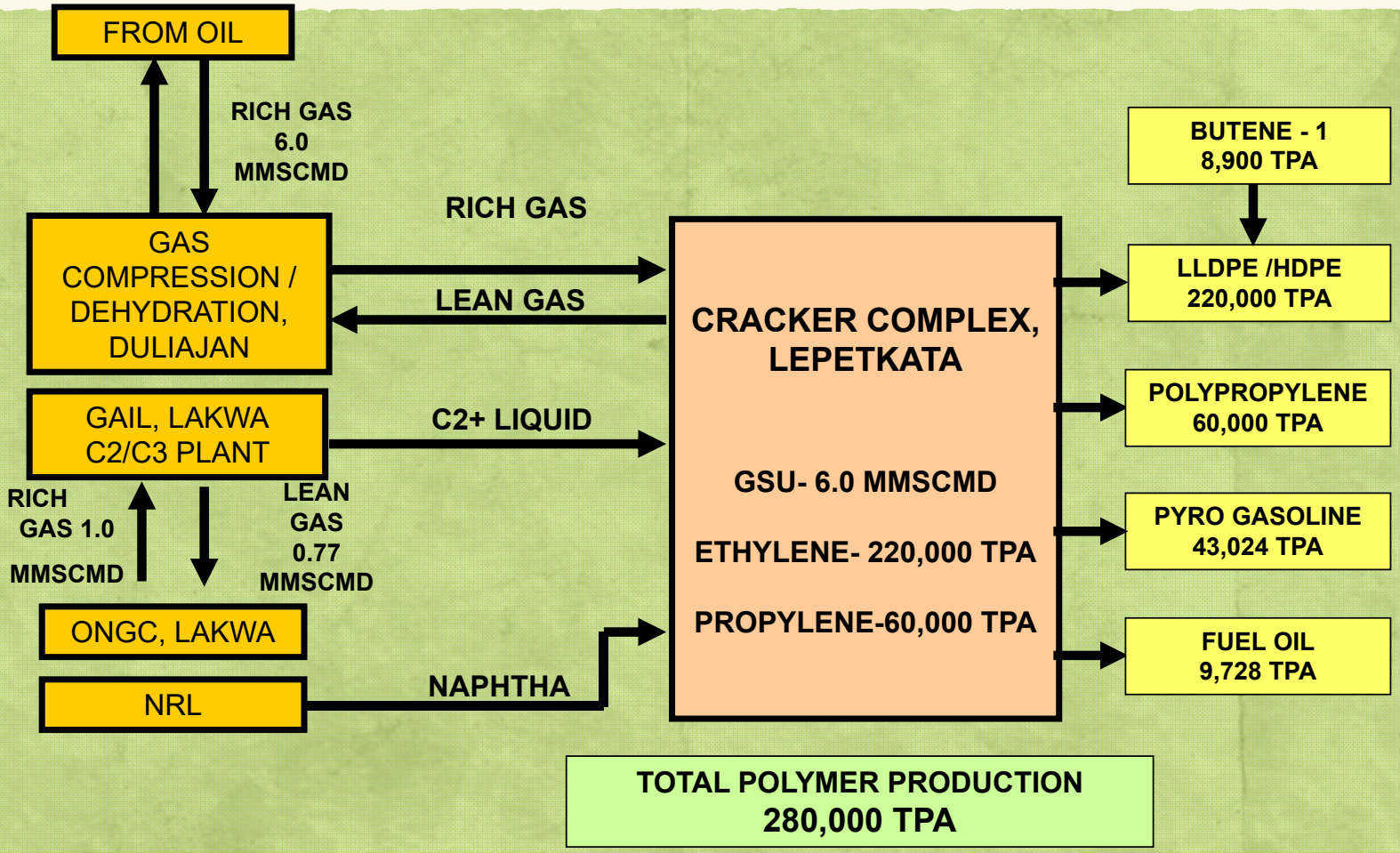
Vision

TO EMERGE AS A DOMINANT PETROCHEMICAL PLAYER IN THE NORTHEAST REGION, PROVIDING VALUE TO STAKEHOLDERS, OFFERING BEST-IN CLASS PRODUCTS & SERVICES, CONTRIBUTING TO ECONOMIC GROWTH WHILE REMAINING ENVIRONMENTALLY CONSCIOUS.

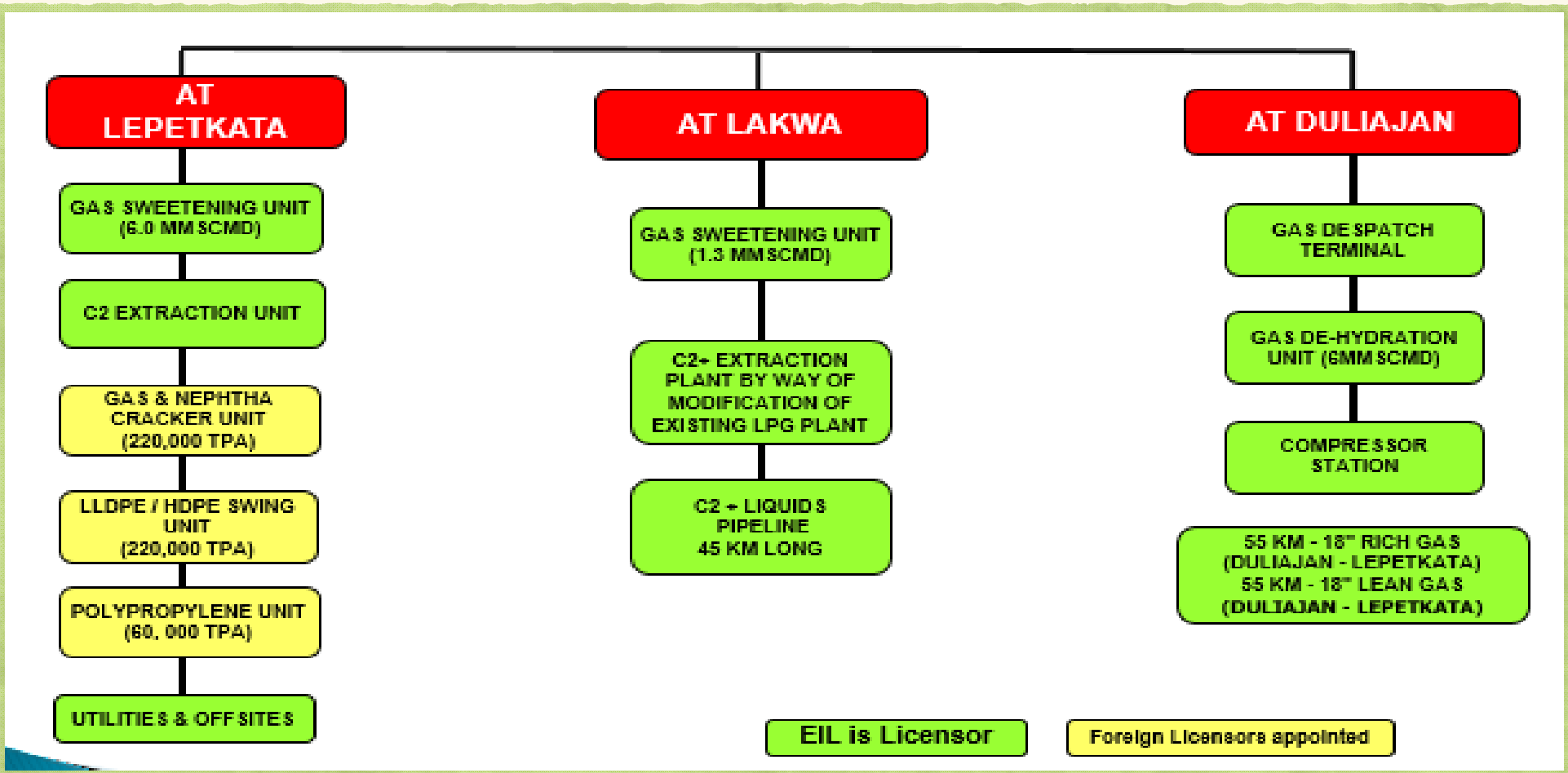
Mission

TO ESTABLISH SIGNIFICANT PRESENCE IN THE NORTH-EAST REGION IN PETROCHEMICAL SECTOR BY WAY OF PRODUCTION / SOURCING AND MARKETING OF QUALITY PRODUCTS, DEPLOYING EFFICIENT DISTRIBUTION AND MARKETING CHANNELS TO CATER TO THE NEEDS OF TARGET CUSTOMERS.

Plant configuration



Plant spread



Principal End Products

Principal end products:

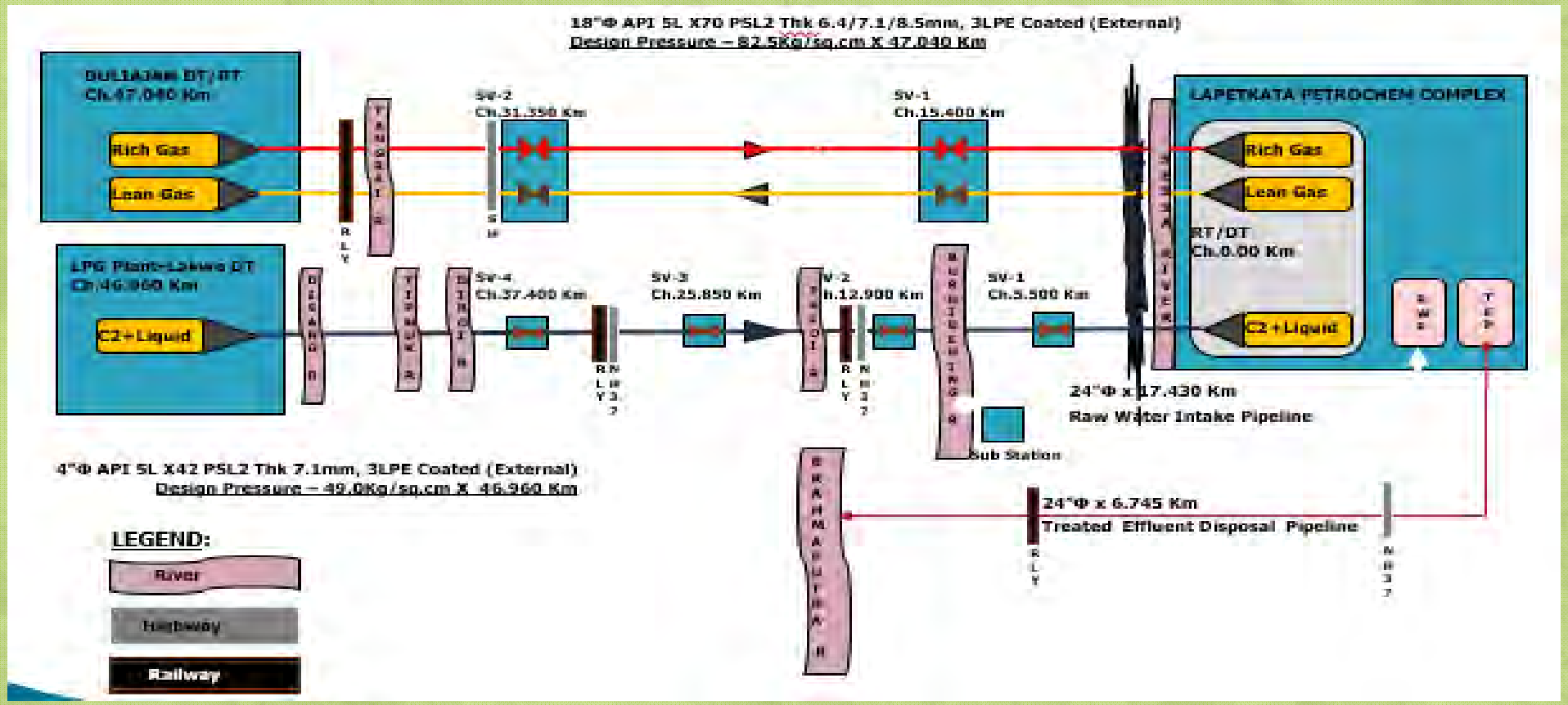
1. HDPE/ LLDPE- 2,20,000 TPA

2. PP - 60,000 TPA

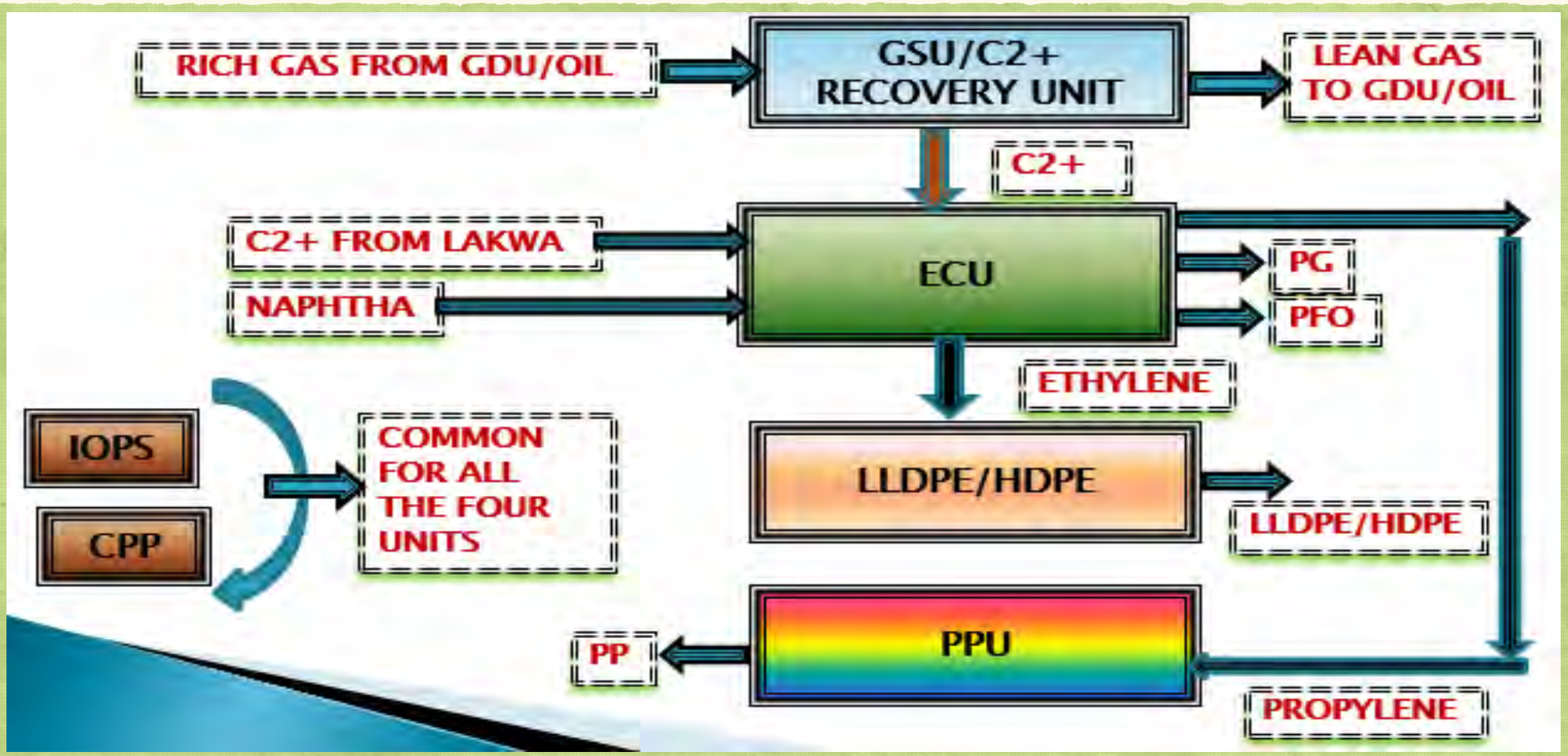
3. Pyrolysis Gasoline & Fuel oil

BCPL: Plant Operations brief

SCHEMATIC DRAWING OF LAPETKATA-DULIAJAN & LAPETKATA-LAKWA PIPELINE (including RWI & TED Pipeline)



Operation details



Polymer Industry: An over-view

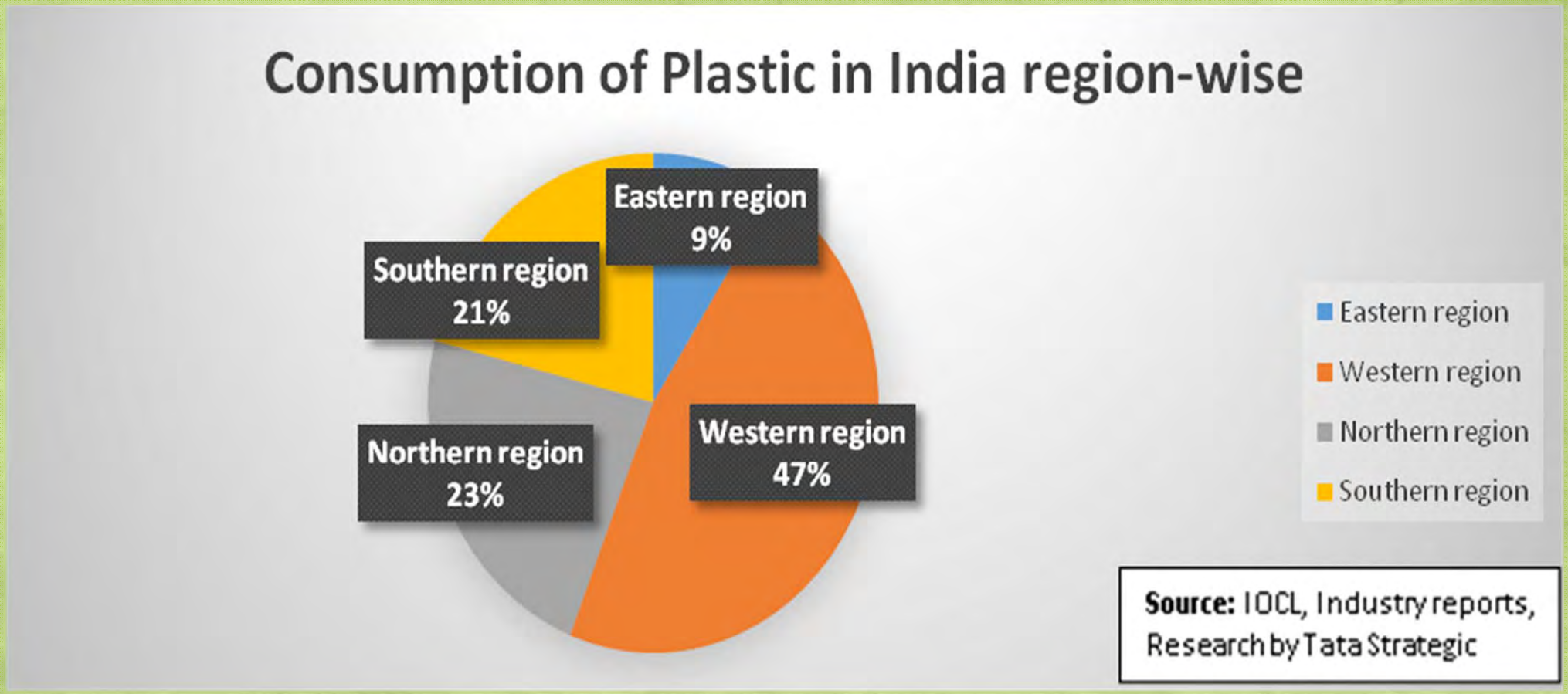
Major Players

Existing/Future - Manufacturing Capacity
Major players (Thermoplastics)

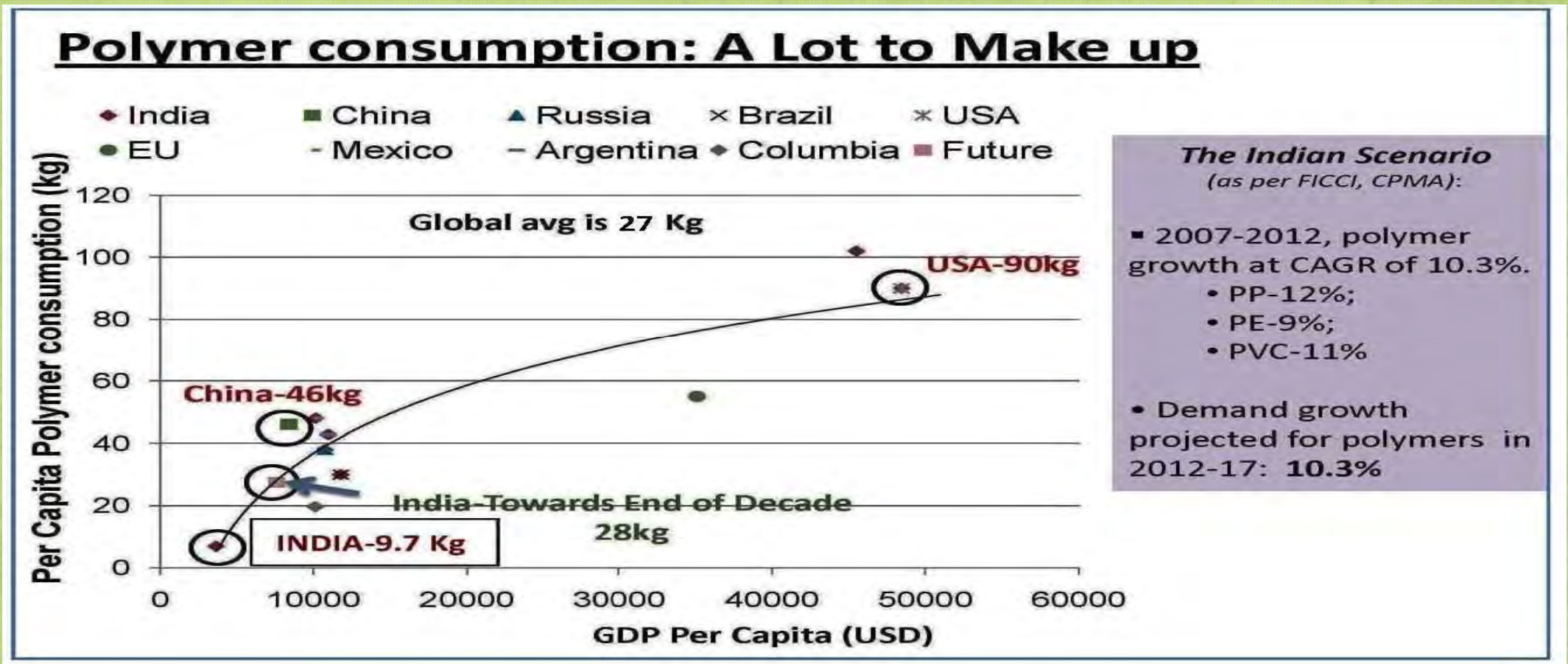
Plastic Industries in India

Company	13-14	% Share	15 - 16	% Share
RIL	4865	47%	6565	43.2%
IOC	1250	12%	1250	8.2%
Haldia	1110	11%	1110	7.3%
GAIL	505	5%	975	6.4%
HMEL	440	4%	440	2.9%
Dhunseri Petrochem	400	4%	400	2.6%
Supreme Petrochem	342	3%	342	2.3%
Finolex	270	3%	270	1.8%
Chemplast Sanmar	250	2.4%	250	1.6%
JBF Industries	150	1.4%	180	1.2%
LG Polymers India	130	1.2%	130	0.9%
Styrolution	105	1.0%	105	0.7%
DCW	90	0.9%	90	0.6%
DSCL	61	0.6%	61	0.4%
OPaL	----	----	1400	9.2%
MRPL	----	----	440	2.9%
BCPL	----	----	280	1.8%
Micropolypet	----	----	220	1.4%
Others	435	4.2%	675	4.4%
Total	10403	100%	15183	100%

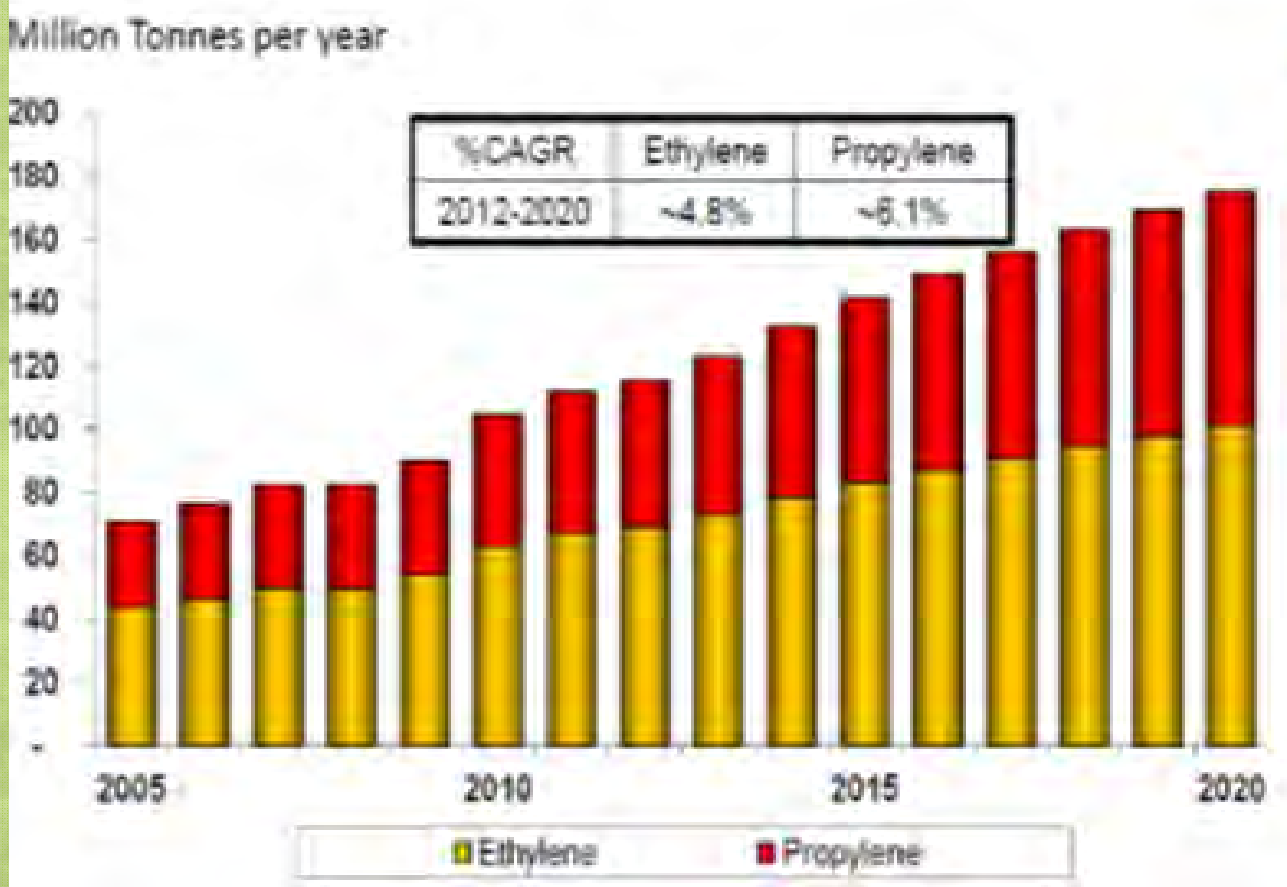
Consumption trends



Polymer consumption



Demand growth in Asia and Middle East



%CAGR	Ethylene	Propylene
2012-2020	~4.8%	~6.1%

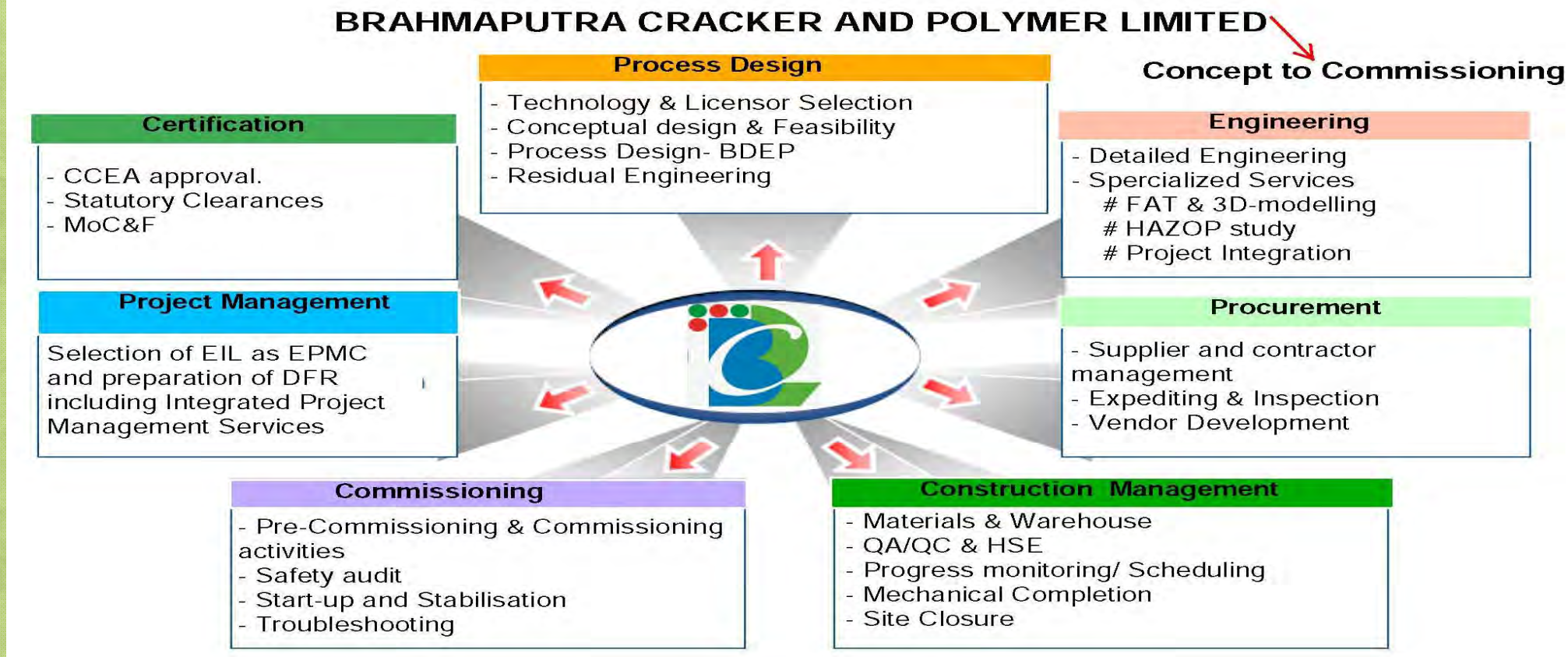
The Indian Scenario

(FICCI, industry source)

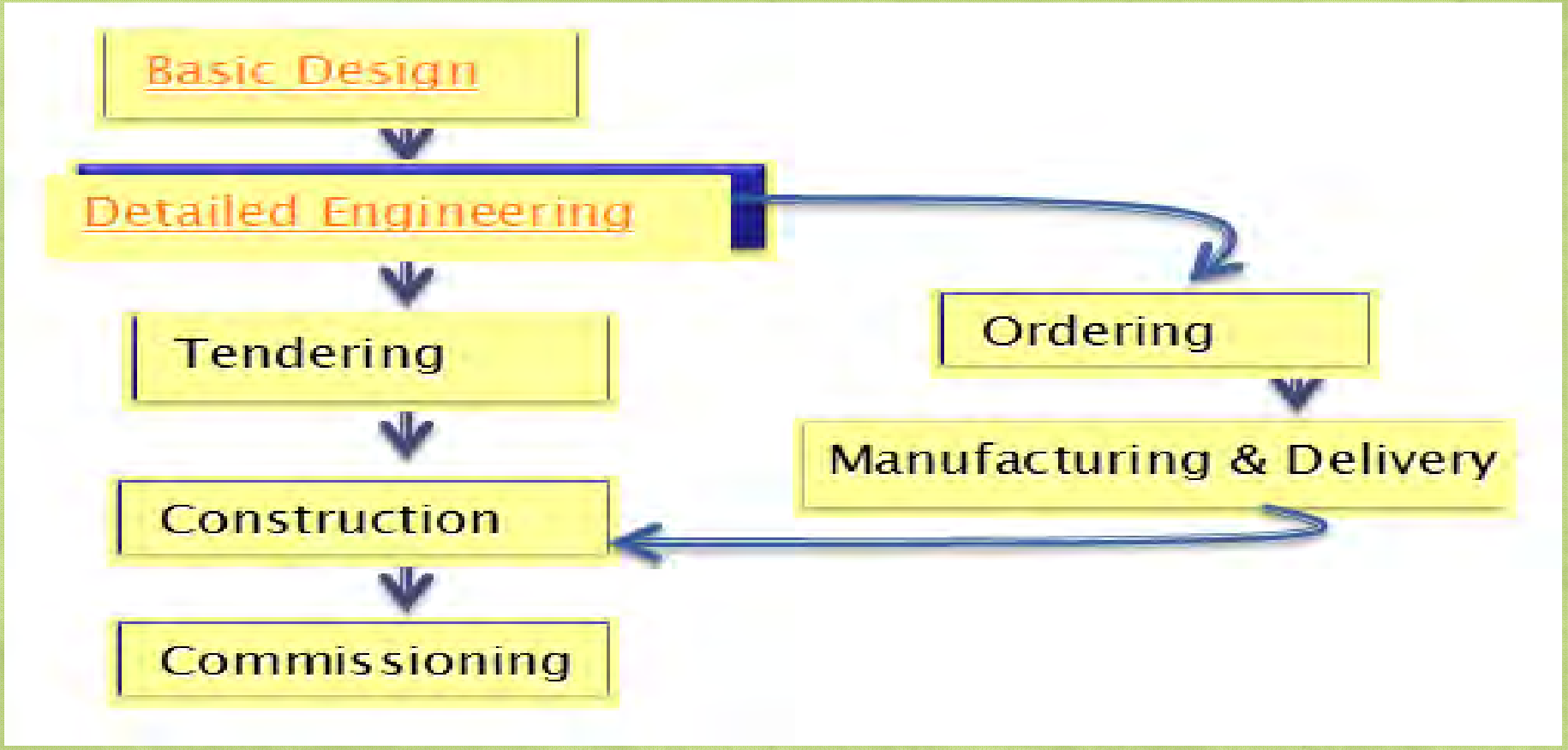
- Demand for basic petrochemicals expected to grow a CAGR of 9.3% in 2012-17

Project Management

Concept to Commissioning



Design to Commissioning



Planning to Commissioning

Challenges

Challenges faced during execution of Project

- Logistics – transportation of over design consignments (ODC) to site.
- Remote geographical location of the plant.
- Resources – Lack of availability of Materials and skilled Manpower in the region.
- Lack of proper infrastructure e.g. Rail/ Road connectivity to distant places, Poor Road network etc.
- *Bandh* Culture in the region.
- Marketing of the products in North East.
- Lack of awareness among people in the region about the benefits of Petrochemical products.

Challenges faced during execution of Project

- Delay in finalization of licensor for ECU.
- Delay in permission from statutory authority regarding minor minerals used in the project.
- Frequent Theft / Sabotage, misplacement of project materials.
- Loss of working days due to bandh/ strikes, rain, festival etc.
- Scarcity of local skilled manpower.

Feasibility

Time consumed due to revision in detail feasibility Report as supply of Licensor BDEP was late.

Delay in selection of licensor due to capacity limitization.

Licenser selection

Licensor Selection and Technology Design

Relocation of RWTP due to storage limitation

Dosing of dolomite done and regeneration cycle of DM Water was increased

Design issues due to deviation in raw water quality

Procurement and Delivery

Procurement & Delivery:

Delay due to non availability of sea port at near by area.

Continuous follow up with the transporter/excise department

Constructional & Execution

Constructional & Execution

Frequent Rain leading to flooding effected land filling & piling works.

The piling works and land filing was planned accordingly

Inherent high level of underground water effected the pile up works.

Frequent bandhs/ Labour Strikes

Continuous follow up with Local administration and proper manpower planning inside the plant

Contractual Issues

- *Non performance of LSTK contractors*
- *Offloading of LSTK Contractors and job completed at the risk and cost of the main contractor*
- *Non availability of requisite skilled and unskilled manpower*
- *Later Skilled and experienced contract man power was outsourced*
- *Delay in project execution time lead to Escalation in project cost*

Other issues

Delayed in erection of heavier equipment due to non availability of high capacity crane.

Alternet arrangement done from other companies on hire basis

Lack of industrial Culture

Frequent training and interaction with the workers to make them conscious about their work and different safety procedures

Other issues

Major modification jobs done at site at later stage as 3D Modeling & Hazop study which was done at later stage after construction

Delay in erection of major equipments due to transportation

Delay in erection of equipments due to supply of large equipment in part wise

Pre-commissioning & Commissioning

Delay in commissioning due to location remoteness of both GDU & GSU Lakwa unit from main complex

Delay in readiness of utilities due to non performance of some LSTK Contractors

Offloading of LSTK Contractors and job completed at the risk and cost of the main contractor

Pre-commissioning & Commissioning

Problem in gas supply line in GDU for commissioning of Captive Power Plant at Lepetkata

Modification in gas supply line made

One compressor (Residue gas Compressor) electric motor was under design and used to take high ampere

Pre-commissioning & Commissioning

A diminished compressor discharge header pressure maintained

Problem in start up of PPU due to problem in inlet dryer

Modification in the PPU Dryer outlet to recirculate max amount of propylene to send back to sphere during initial start up of PPU reactor.

Pre-commissioning & Commissioning

- Financial Crunch faced by the project executing agencies
- Breakdown of Utility Boiler-2 in CPP during commissioning.
- Damage of 68 Pole structures of the HT Overhead transmission line during cyclone.
- Leakage in cold box of ECU

Feed availability issues

Shortage of Butene-1: Co-ordination with different industries to procure the same as per specification. Presently it is received from domestic sources Pan India.

Limited availability of Pentane as per required specification

Shortage of Propylene feed for PPU

Measures to arrest Delays

Measures to arrest delay

- Instead of waiting for the Final Process Packages, Procurement / Engineering activities has been commenced based on preliminary datasheets

- After issuing enquiry, if price implications are required before price bid opening then Amendment for the same shall be issued with extension bid due date.

Measures to arrest delay

- Recovery of time lost in selection of licensors / signing of license agreement.
- Licensors being expedited to issue final datasheets at the earliest.

Measures to arrest delay

- Process Licensors were made to agree to supply critical Equipment and long lead items Datasheets, P&ID's, Equipment Layouts etc. within 12-16 weeks as against Contractual date for supply of BDEP from 26 to 36 weeks.

Measures to arrest delay

- Cracker Unit Licensor was made to agree to provide the Heater's Detailed Engineering Package within 36 weeks (i.e. Nov'09) against contractual 54 weeks (i.e. Mar'10).

Measures to arrest delay

- Completion of Site Office, Construction Substations & Receiving Substation buildings achieved by adopting unconventional construction techniques.

Measures to arrest delay

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Measures to arrest delay

- To avoid any stoppage of work and to facilitate smooth movement of Equipment and Manpower during monsoon respective Site Grading Contractors were advised to complete the construction activities for Approach roads along with Culverts and Drains for each of the Buildings.

Measures to arrest delay

- Award and construction of Plant Buildings, Piling for Unit areas have been taken up on priority by usage of EIL's In-house Data.

Measures to arrest delay

- Basic and Detail Engineering also being executed from ROK for Facilities at Lakwa and Duliajan and for GSU and C2+ Recovery, Lepetkata and PPU from ROC. However major procurement were executed by EIL HO.

Measures to arrest delay

- Exemption: Excise Duty for 10 years and Income Tax for 10 years and Entry Tax on Capital Goods , Works Contract Tax and Sales Tax/VAT on Feed & Product for 15 years.

Present Scenario

- The plant is in the phase of stabilization with currently running on 90% load.
- Efforts are being made for early stabilization / sustained operations.
- As on 31.03.2017, 102200 MT of polymers and 1054 MT of liquid hydrocarbons have been produced .

SWOT Analysis

Strength	Weakness
GAIL as major promoter with vast experience in petrochemicals. Major feedstock suppliers are JV partners Single largest project in NE region Availability of NATURAL gas & Naphtha at concessional prices Low transportation cost of feedstock	Project implementation dependency on capital subsidy Plant viability dependent on continued feedstock subsidy No nearby industrialized place Non-availability of adequate manpower
Opportunities	**Threat**
Development of Socio-economic status of the people of region Potential of Export to South East Asian countries Lowest Per Capita Consumption of Plastics in the region @1 Kg against the national average of 9 kg. Hence, huge potential Likely additional gas findings in the area and improving plant viability with the time	Economies of scale Possible project time & cost over-run due to prolonged monsoon period Location disadvantage Recruiting & Retaining quality

Products for Down-stream industries

Finished Products

The resin grades manufactured in the Plant will primarily cater to the:

- Film manufacturing
- Injection Moulding.
- Rotational Moulding.
- Raffia Monofilament.
- Blow Moulding Sectors.

Finished Products

Monolayer Film Applications

Industrial liners
Heavy duty films
Packaging films

Grocery bags
Shipping sacks
meat wrap
Confectionary

Stretch films
Agriculture films

Finished Down-stream Products

Conclusion

Tackling Challenges

- Synergetic approach & Highly motivated Team spirit to commission the plant in schedule time.

- Spreading awareness among the people about the benefits of usage of Plastics.

- Showcasing the models of the would-be products at Plastic Seminars/ Exhibitions etc.

- Strong Marketing network in the North East to market the products.

Socio Economic benefits

- Direct Employment : 700 approx.
- Employment on outsource basis : 1200 - 1500
- Indirect Employment through downstream plastic processing industries: 1 lakh (approx.) over 10-15 years
- Potential for setting up of New Downstream Industries: 1250 (approx.)
- Industrial Investment in Engineering, Construction, Service Sector etc.
- Socio economic development by Huge investment and building of surrounding infrastructure

Initiatives undertaken

- Plastic Park being developed in Tinsukia (60 km away) by Govt. of Assam,
- Entrepreneurs being encouraged by BCPL to set up plastic processing units,
- Awareness programs, being conducted by BCPL across NER, for prospective entrepreneurs.

Thank You!