PETRO-CHEMICAL INDUSTRY IN ASSAM: AN OVERVIEW

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***Abstract*:** Petrochemical industry plays a vital role in the growth of an economy. It is one of the fastest growing industries in present era. Assam holds a unique position in respect of petrochemical production in the country. Assam is well known as an oil area. The oil as well as natural gas found in this area has led to the installation of petrochemical industries in Assam. So, this paper makes an attempt to give an overview of petrochemical industries in Assam. Moreover, the paper also makes an attempt to make a SWOT analysis to find out the potentialities, weakness, opportunities and threats of petrochemical industries in the region. The paper is completely based on secondary data.

Keywords: Petrochemical Industry, Assam.

I. Introduction:

Petrochemicals are the backbone of chemical industry. The petrochemical industry which produces chemical using oil and natural gas as major raw materials occupies an important position in India's manufacturing and consuming sector. It plays a vital role in the growth of an economy. Petrochemicals are backbone of some crucial industries including agriculture, infrastructure, healthcare and consumer durables. It also provides foundation for manufacturing industries like construction, packaging, pharmaceuticals, agriculture, textile etc.

The petrochemical industry in India started in 1970. The petrochemical industry saws a rapid growth between 1980's to 1990's. The biggest reason for this growth was the high demand for petrochemicals in India which grew at an annual rate of 13 to 14 per cent since the late 90's. At present the industry contributes about 30 per cent to India's chemical industry which is likely to become $ 250 billion by 2020. The petrochemical industry in India primarily consist of synthetic rubber i.e. elastomer, yarn of synthetic fiber, synthetic detergent, intermediates, performance plastics, plastic processing industry and polymers. Presently India has three gas based and three naphtha based cracker complexes with a combined annual capacity of 2.9 MMT of ethylene. Besides this there are also four aromatic complexes with capacity of 2.9 MMT of xylenes.

Assam holds a unique position in respect of petrochemical production in the country. Assam is well known as an oil area. The oil as well as natural gas found in this area has led to the installation of oil refineries in Assam and petrochemical industries. The Assam Gas Company which is a State Government undertaking has been formed to set up a Gas Fractioning plant to provide a base for possible petrochemical industries.

II. Objectives:

1. To give an overview of petrochemical industries.

2. To present a detailed study about some of the petrochemical companies of Assam.

III. Methodology:

This paper is completely based on secondary data and the data has been collected from various published sources, government reports etc.

IV. History of Petrochemical Industries in India:

The term 'Petrochemical' refers to the chemicals that are formed directly or indirectly from petroleum based hydrocarbons and natural gas. The origin of petrochemical industry was about 70 years ago. It was started in mid 1800. During the time of India's independence, these industries were at the hands of foreign companies. It was only after the Industrial Policy Resolution of 1954, the Indian government placed the petroleum industry at the forefront as a core sector industry and it has led to the formation of Indian petrochemical Industry.

The petrochemical industry is the fastest growing industry in the country. According to a study conducted by Associated Chamber of commerce and Industry of India (ASSOCHAM), the petrochemical industry itself is expected to reach $100 billion by 2020 growing at a compound annual growth rate of about 14 per cent. The Indian petrochemical industry has regenerated the use of benzene as a petrochemical raw material. The three major methods involved in the processing of petrochemicals are BTX (Benzene, Toluene and Xylene), Synthesis Gas (Syn Gas) and Olefins. Around 80 per cent of total inventory for petrochemicals is developed from petroleum refinery liquids and gases. The main end use products of the petrochemical industry in India are:

- Plastics and Resins
- Pharmaceuticals
- Synthetic Elastomers
- Agricultural Chemicals such as fertilizers, pesticides and herbicides
- Detergents, Solvents, plasticizers and Paint varnishes etc.

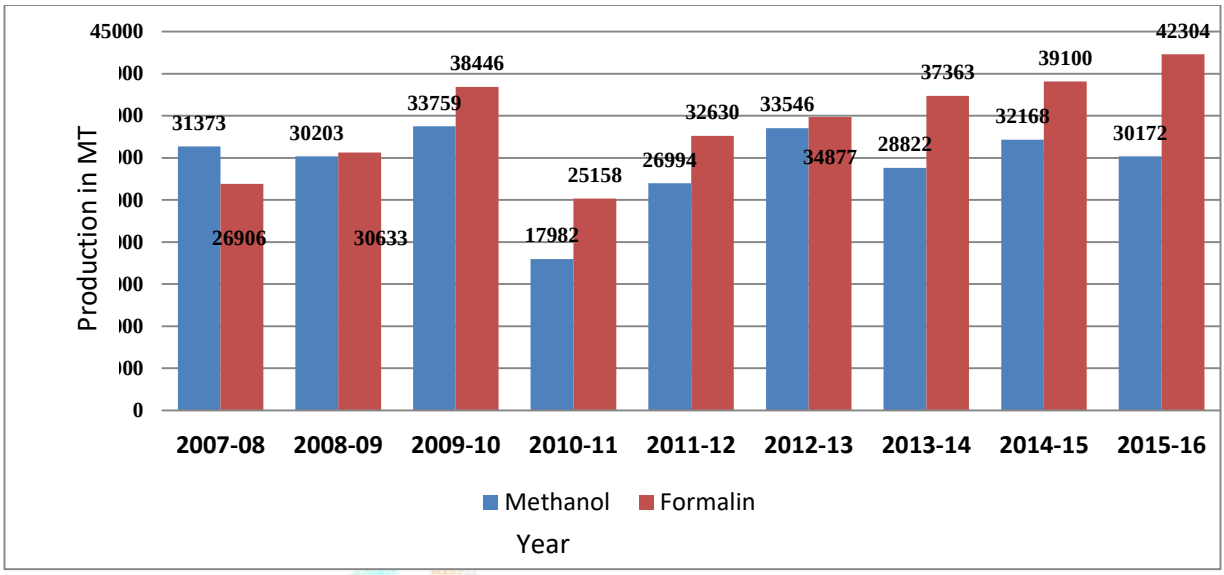
Assam is one of the major producers of oil and natural gas in India. The Petrochemical industries in the state were started with the development of oil fields. In order to utilize natural gas of Assam's oil fields in manufacture of methanol, formalin, U.F adhesive and other petrochemical products the Assam Industrial Development corporation drew up a scheme for petrochemical industry in Assam and obtained an industrial license from the government of India in February, 1971. Since then the petrochemical industry stands as a most prominent industry in the region.

V. About Firms under Petrochemical Industries in Assam:

5.1. Assam Petrochemical Ltd.:

Assam Petrochemical Ltd. (APL) was incorporated in 1971 at Namrup. The company was a pioneer in the field as it was the first to manufacture petrochemicals in India using natural gas as feedstock. It was established for productive utilization of natural gas which was being flared up in the upper Assam oil fields. APL is the first company in NE region to have a public issue. It is also listed in The Bombay Stock Exchange Ltd. and The Guwahati Stock Exchange. The company first started with a small Methanol plant with Formaldehyde and a few Urea Formaldehyde resins as downstream projects with technology supplied by Mitusubishe Gas Chemical Co Inc, Japan. The company's first commercial production began in 1976. At present the company has a bigger Mithanol plant with 100TPD capacity and also has a 100 TPD Formaldehyde plant. APL had overcome several blows throughout its journey. Despite a beginning of moderate prosperity marked by a struggle for survival the company today is a profit making dividend playing industry of the government of Assam with 88 per cent equity participation from AIDC. The major products of APL are Methanol, Formalin, UF Adhesive and UF Molding Powder etc. The Methanol or Methyl alcohol is a building block for various chemical industries. Methanol can be converted into different industrial chemicals like Formaldehyde, Fertilizers, Drugs, Paints, Methylamine, DMT (Dimethyltryptamine), Pesticides, MTBE (Methyl Tertiary-Butyl Ether), Aviation and Bio diesel. On the other hand Formalin is used by Plywood industries for making adhesive resins. It is also used by laminate manufactures, MDE (Medium Density Fibreboard) making, Dyestuff, Pentaerythritol, Hexamine etc. APL markets its products in North Indian States, Odisha, Bihar, West Bengal and North Eastern States as well as exports its product to Nepal, Bhutan and Bangladesh. The production performance of Methanol and Formalin in APL is represented in following chart 1:

Chart 1: Production Performance



Source: www.assampetrochemicals.co.in

The existing Methanol plant of APL has completed has completed twenty eight years against its normal life span of fifteen years. Moreover, frequent maintenance of its equipment, erratic Natural gas supply due to drop of pressure and power supply interruption by Assam Power Distribution Corporation Ltd. (APDCL) affected optimum utilization of Methanol Plant during financial Year 2016-17.

Table 1: Capacity Utilization of Plants

Plant	Installed Annual Capacity	FY 2015-16	FY 2016-17
Methanol	100%	91.43%	97%
Formalin	100%	102.55%	106%

Source: www.assampetrochemicals.co.in

5.2 Bongaigaon Refinery and Petrochemical Ltd.:

The Bongaigaon refinery and Petrochemical Ltd. (BRPL) now IOCL being a refinery-cum -petrochemical complex has a unique distinction from others three refineries of Assam. It Is the first indigenous grass root refinery in the country integrated with a petrochemical complex at one location. The increase in demand for petroleum products in North Eastern region has initiated the Petroleum Ministry, Govt. of India to take a decision to set up third refinery cum petrochemical complex at Bongaigaon in Assam in the public sector. It was incorporated on February 20, 1974 by the government of India. In March 25, 2009 the BRPL merged with Indian Oil Corporation Ltd. (IOCL) to become its eight largest refinery and after that it came to be known as Bongaigaon Refinery.

The BRPL focuses mainly on petroleum refining and production of value added petrochemicals and Polyster Stable Fiber (PSF) products. The petrochemical units of BRPL are mainly based on refinery generated feedstock as downstream industries. The petrochemical units of the company mainly composed of Xylene Plant, Dimethyl Terephthalate (DMT) plant and Polyster Stable Fibre (PSF) pl;ant. The commercial production of the refinery started in 1978. The other plants were commissioned in stages and the last PSF plant was started in 1988. The petrochemical products produced by BRPL are Para- Xylene, Ortho- Xylene, Cee-Nine Solvent, DMT, Polyster Stable Fibre (OSF) and PSF waste. Among these the most prestigious product is the PSF and trade name 'Bonpoly' used as industrial raw material in a number of petro based industries.

The Xylene plant has the capacity to produce 29000 MTPA of Paraxylene, 6000 MTPA Ortho xylene and 10000 MTPA Ceenine. It can also produce 40000 MTPA of mixed xylene in non Paraxylene mode of operation. The Dimethyl Terephthalate plant has the capacity to produce 45000 MTPA of DMT and Polyster Stable Fibre (PSF) plant is designed to produce 34000 MTPA of PSF.

The petrochemical products of BRPL and their major uses are shown in the following Table 1:

Table 1: Petrochemical Products of BRPL and their Major Uses

Sl. No.	Products	Major End Uses
1	Ortho Xylene	Manufacturing of Phthalic Anhydride, Paints, Ink etc.
2	Mixed Xylene	Manufacturing of Paints and Pesticides etc.

3	Ceenine	Manufacturing of Paints and Pesticides etc
4	DMT	Manufacturing of Polyster Fibre/Polyster Filament Yarn/Polyster Film/ Polyster Chips, Resin
5	Petrosol	Manufacturing of Thinner, Varnish, paints, Pesticides etc.
6	Bonmex	Manufacturing of Pesticides etc.

Source: www.brplindia.com

PSF products of BRPL are used mainly for the production of dress materials. The PSF products of BRPL and their end uses are shown in following Table 2:

Table 2: PSF Products of BRPL and their Uses

Sl. No.	Products	Major Uses
1	Annealed and Non Annealed Fibre	Plyster. Blended Yarn, Sewing Thread, Sarees. Shirting, Suiting and Dress Materials, Hosiery Yarn and knitted Fabric
2	Trilobal Fibre	Fancy Dress Materials
3	Tow and Tops	Worsted Fabric, Suiting and Winter Dress Materials
4	Fibre Fill	Filling Materials and Upholstery

Source: www.brplindia.com`

The Para-Xylene plant of BRPL was commissioned in 1985.. Currently the plant has been revamped to process 160000 MTPA of Reformer Feed Napatha. This Unit is also called as CRU-MSQ. It has a Motor Spirit Quality up gradation (MSQ) unit commissioned in Sept.2012 which is designed to produce Euro-III and IV MS. The DMT plant is now dismantled and PSF plant commissioned in 1988 is de-commissioned.

5.3 Brahmaputra Cracker Polymer Ltd. (BCPL):

BCPL is the first ever petrochemical project in entire North East India. M/s Engineers India Ltd (EIL) was the engineer and project management consultant of this prestigious project. The project was incorporated on 8th January 2007 as a part of historic Assam Accord signed on 15th August, 1985. BCPL is a central public sector enterprise under the Department of Chemical and Petrochemicals, Govt. of India. It is a joint venture company of GAIL, OIL, NRL and Govt. of Assam, where GAIL has a major stake of 70 per cent and the rest 30 per cent is equally shared by OIL, NRL and Govt. of Assam. The former Prime Minister of India Dr. Monmohan Singh had laid the foundation stone of this project on 9th April, 2007. However, the plant was successfully commissioned on 2nd January, 2016 and Hon'ble Prime Minister Narendra Modi dedicated BCPL Petrochemical complex to the nation on 5th February, 2016.

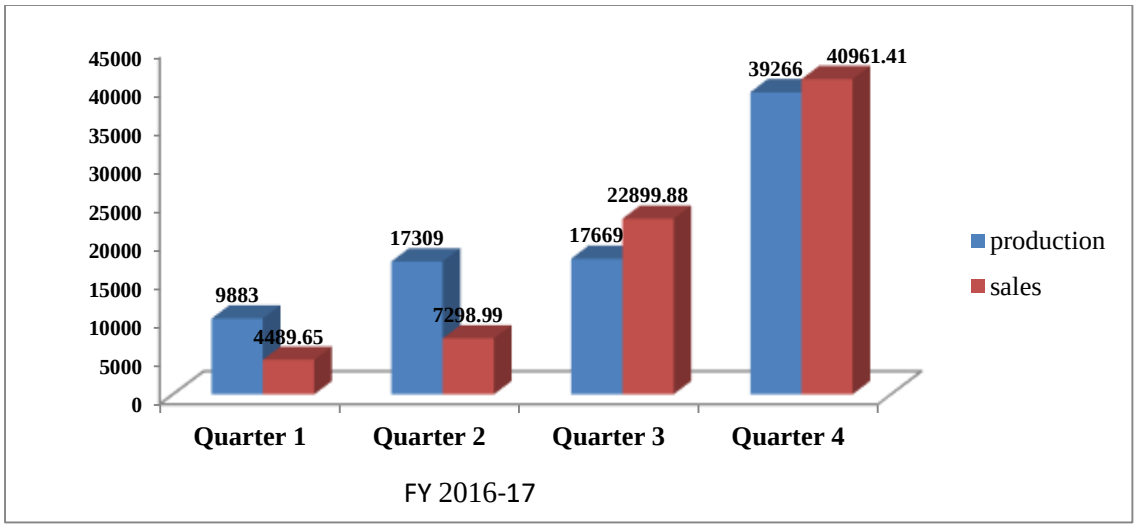
BCPL comprises of four work station-

- GDU Duliajan where Feed Natural Gas is received from M/s. Oil India Ltd.
- Railway siding where Naphtha received from M/s. NRL is unloaded.
- Lakwa GSU cum C2+ Hydro Carbon Recovery unit where Feed Natural Gas supplied by M/s ONGC is processed and
- Lepetkata, Dibrugarh, where Polymer are being produced after processing the feedstock.

The main petrochemical complex of BCPL is at Lepetkata. The principal products of the complex are High Density Polyethylene (HDPE) and Linear Low Density Polyethylene (LLDPE) totaling 220000 Tonnes per Annum (TPA) and 60000 TPA of Poly-Propylene (PP). The other products include Hydro generated Pyrolysis Gasoline and Pyrolysis Fuel oil.

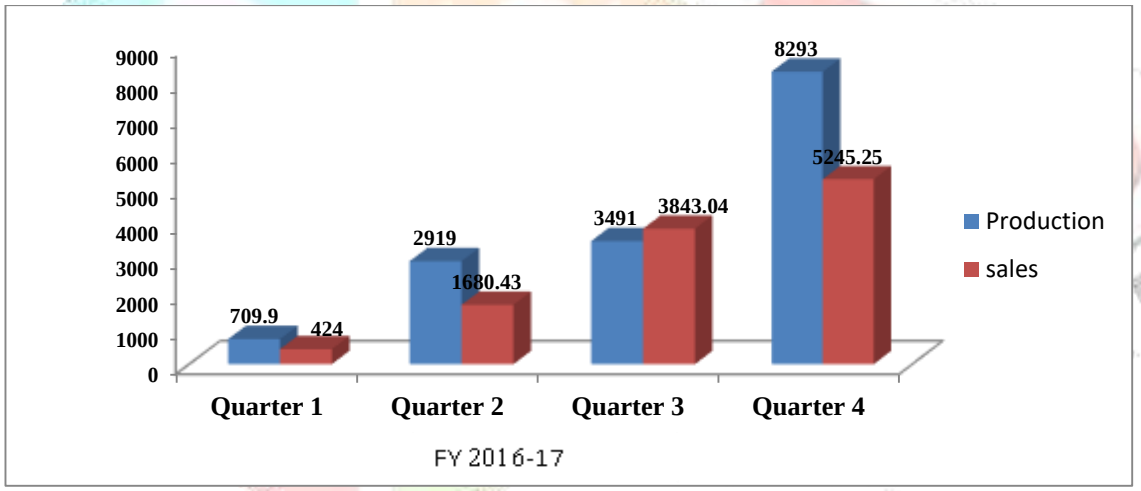
During the year 2016-17, BCPL has produced 99540 MT of Polymers and 14129 MT of liquid hydrocarbons with a sales turnover of Rs. 778.49 crores. Out of the total Polymer produced during the year, the production of LLDPE/HDPE was 84127 MT and Polypropylene was 15413 MT. Similarly, the sales of LLDPE/HDPE and Polypropylene were 75649 MT and 11192 MT respectively.

Chart 2: Production and Sales of LLDPE/HDPE (MT)



Source: Annual Report of BCPL 2016-17

Chart 2: Production and Sales of Polypropylene (MT)



Source: Annual Report of BCPL 2016-17

VI. Analysis and Interpretation:

SWOT Analysis of Petrochemical Industry:

6.1 Strength:

- Assam is rich in crude oil. The natural gas evicted in these oil fields allows the nearest petrochemical complex to utilize this natural gas for its petrochemical capacity.
- The petrochemical projects in Assam have all along garnered strong support from the state and central government which has been instrumental in pushing it onwards to its present status.
- Superior technology allows petrochemical industry to better meet the needs of their customers in a ways that the competitors can't easily imitate.
- The heart of any business success lies in its marketing. The petrochemical projects in Assam are presently producing and marketing its products in globally competitive price and profitably export their products to South East Asian countries. BCPL has decided to market its products through tie up with GAIL. GAIL, which has been a holding company in the field of marketing for a decade would be responsible for 100 per cent evacuation of its products and by-products.

6.2 Weakness:

- The petrochemical industries are highly capital intensive and involves high capital cost. So, improper maintenance planning and resource mobilization may affect its performance. The vulnerability in the performance has the possibility of withdrawal of government support in future.
- Lack of adequate physical infrastructure and remote location also affects the projects in terms of transporting equipment to the project site and an apprehension over the dispatch of product from the plant in future.
- Most of the time the methods of standardization in petrochemical companies are not always based on time which affect the overall companies' performance. Moreover, un uniform work distribution of workers also hampers the work culture in the projects.
- Limited availability of technically skilled and experienced manpower particularly in the region is one of the important weaknesses of the petrochemical companies.

6.3 Opportunities:

- The petrochemical industries has high potential for market growth in Assam as well as in India given favorable demographics, improved money power due to rising disposable income, development of rural marketing, growth of organized retailing, development in agriculture, automobile, telecommunication and health care.
- The region enjoys the advantages of large availability of cheap labors as compared to other parts of the country and also provides good opportunity for expanding capacities.
- The Act of East policy of Govt. of India and opening up trade and business with South East Asian countries is expected to help the companies to market their products in these countries.

6.4 Threats:

- The petrochemical industry is cyclical in nature and passes through 6 to 8 years phases of peaks and lows. Prices are therefore volatile despite of growing demand. Moreover, the volatile currencies of the country also make the petrochemical industry's investment difficult because cost and revenues changes so rapidly.
- For limited market in the present economic environment in NE region is a major concern of the petrochemical companies because of which the companies has to transport their products at high freight cost to the distant market situated at Eastern, Northern and Southern part of the country.
- Depleting natural gas availability and no new discovery of natural gas in the adjoining areas is one of the major threats of petrochemical companies.
- Stiff competition on the quality of petrochemical products and constant rise of the petrochemical projects in the country is another major threat to petrochemical companies.

VIII. Conclusion:

From the above study we can conclude that petrochemical industries play an important role in the economy. It is essential to modern life because they are used to manufacture those which are not made of wood. It is one of the fastest growing industries in present era. Assam being the home land of crude oil has the efficient potential for growth of petrochemical industries. But this region fails to attract foreign investment for around a decade. For which industrialization is not fully developed in the region. So it is necessary to take suitable steps by the government for development of petrochemical industries in the region. Moreover it is also necessary to take suitable technique to treats and handle hazardous waste from petrochemical plants to protect public health and environment.

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