NexantThinking™

Special Reports Package

Polyisobutylene (PIB): A Market in Motion

Brochure
October 2016

Nexant

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Contents

Section 1 Introduction and Report Objectives

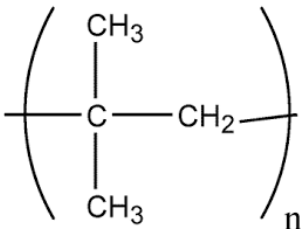
1.1 OVERVIEW

The polyisobutylene (PIB) market has been in flux recently, because of feedstock, process, and applications dynamics. These are all addressed in this study suite in an integrated / modular approach. This study will be useful to players all along the value chain, and especially to PIB producers, feedstock suppliers, PIB consumers, and potential new players considering entering the PIB market.

1.1.1 Background

PIB was discovered by BASF in 1931. It has diverse applications in areas such as adhesives and sealants, construction, healthcare, lubricants/automotive, metal working, and chewing gum. Drivers expected to impact PIB markets in the near term include automobile industry recovery and increased emphasis on engine performance and fuel economy, new applications in sealing (e.g., Solar PV and consumer electronics), and in medical/pharma (drug delivery).

Figure 1.1 Structure of PIB



The PIB market and its applications are driven by demand in a number of market sectors as well as macroeconomic drivers such as the global economy, and geo-politics, as illustrated in Figure 1.2.

Figure 1.2 PIB Market Impactors

1.1.2 Upstream Market Implications

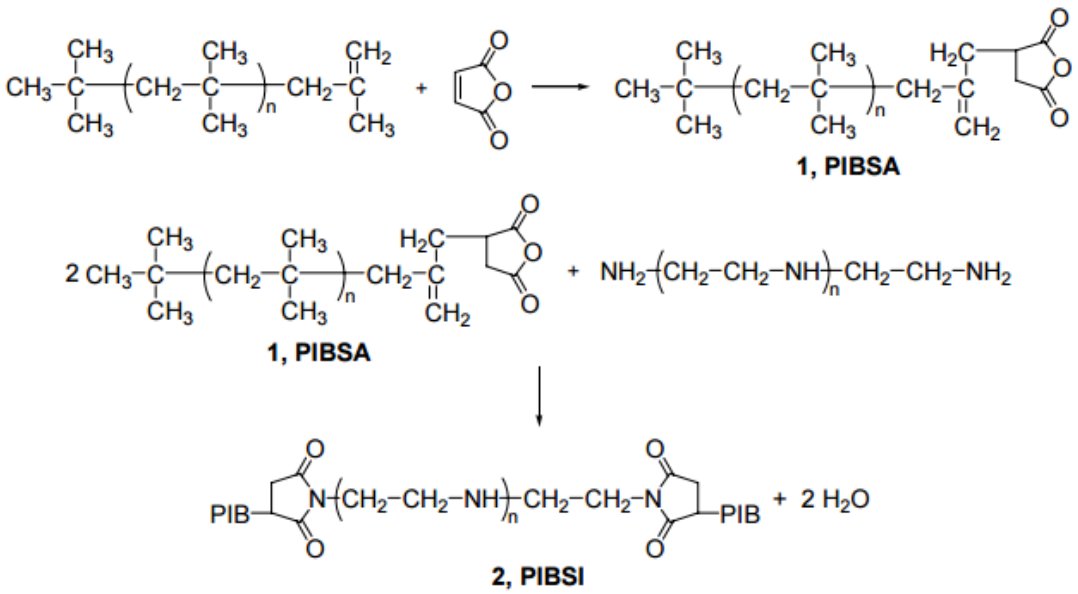
A major focus of this suite of studies is to better understand the changing dynamics of isobutylene feedstocks. Since mixed C_4s, the key feedstock for butadiene and isobutylene production, are produced as a byproduct of ethylene production, supply rarely matches demand, which leads to considerable volatility in pricing over large relatively short periods of time. In 2011, global markets for mixed C_4 experienced a severe shortage due to a spike in demand for butadiene and synthetic rubbers as a result of extremely high natural rubber prices. Although the price spike and shortage of mixed C_4s was relatively short-lived, natural rubber prices have continued dropping, and the availability of mixed C_4s has improved, this has drawn considerable attention to the future availability of C_4 feedstocks for the wider C_4 downstream value chain and its prospects for future development. This has received added focus due to ongoing structural changes in global olefin feedstock selection that has reduced the availability of surplus mixed C_4 supply. These supply factors continue to be a concern when evaluating future availability of mixed C_4 streams for butadiene and isobutylene production:

- A trend towards investments in lighter feedstock cracking, promoted primarily by continued advantaged feedstock pricing and availability in the Middle East
- Impact of shale gas development in North America, with production of condensates, leading to a shift towards lighter feedstock slates for olefin production and promoting new investments in crackers utilizing these lighter feedstocks
- Lower utilization rates for naphtha steam crackers due to higher cost position and poor regional demand for ethylene derivatives
- Conversely, in some regions, more utilization of naphtha crackers exploiting continued low cost petroleum fractions
- Other capacity/production trends for ethylene and propylene from non-conventional technologies such as coal-to-olefins, metathesis, propane dehydrogenation, and biomass-to-olefins, which do not yield mixed C_4 streams

1.1.3 Applications

PIB has many end uses, from chewing gum to lipstick, explosives, building blocks for lube additives and metal working fluids (e.g., polyisobutylene succinimide [PIBSI] and polyisobutenyl succinic anhydride [PIBSA]), viscosity index improvers in automotive and industrial gear oils, thickeners in greases, smoke-suppressants in two-stroke oils, and building blocks for dispersants), even lubes themselves. In metal working fluids, it can serve to reduce particle size and prevent misting and as an antioxidant emulsifier in soluble metalworking fluids. The fact that it depolymerizes at high temperatures (>200°C) is particularly functionally useful. In personal care, the emulsifier property combined with the very low toxicity is particularly useful as a replacement for sulfonate emulsifiers. For fuel additives and lubricants, dispersants derived from PIB and PIBSA have two main functions: disperse carbon soot and prevent sludging in motor oils remove engine deposits when added to diesel fuels. Significant quantities are converted to PIBSA and PIBSI for downstream formulations as shown in Figure 1.3. First the PIB is reacted with succinic anhydride to produce PIBSA. Next, the PIBSA is reacted with a diamine (or polydiamine) to produce PIBSI. The MW of both the PIB and the diamine will determine the properties of the PIBSI.

Figure 1.3 PIB Conversion to PIBSA and PIBSI



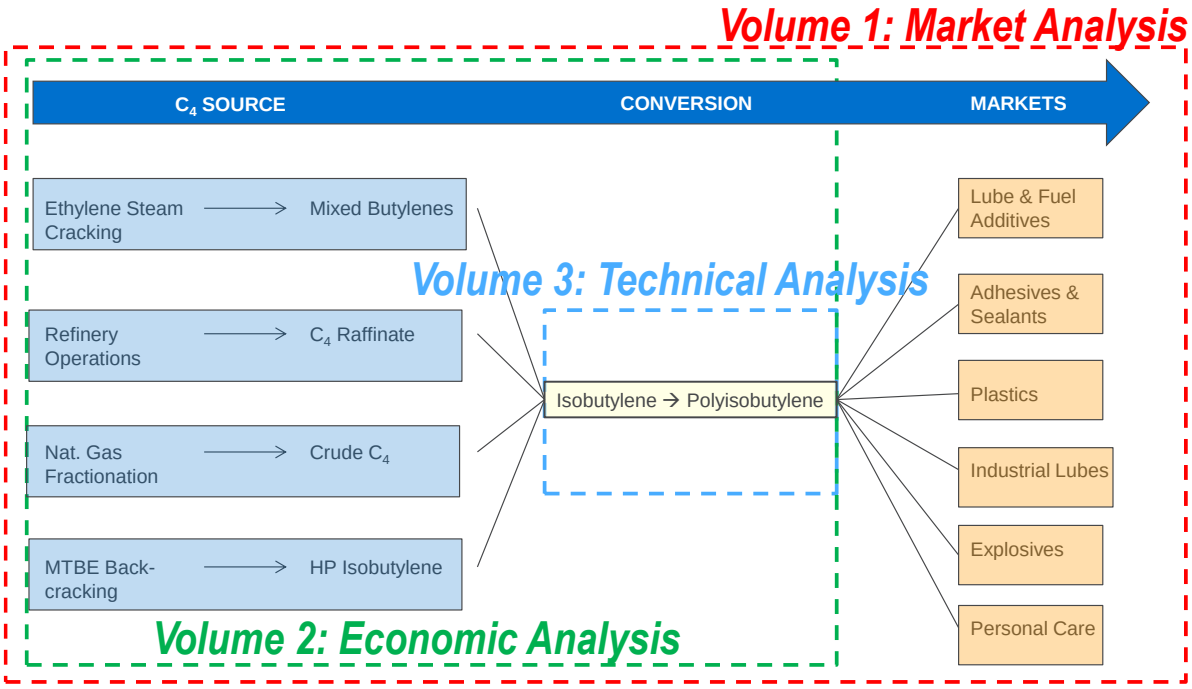
Growth in the automotive industry will be a major driver for growth, particularly in emerging economies such as in Asia and Latin America. Growth in Personal Care and CASE (Coatings, Adhesives, Sealants, an Elastomers) is also expected to drive the market demand due to the superior properties of PIB (impermeability to moisture and gasses, tackiness, UV resistance, oxidation resistance, heat resistance, weight, flexibility, and dielectric properties etc.) as well as the highly non-toxic nature of PIB as compared to many competing chemicals receiving additional scrutiny and backlash over health concerns.

High molecular weight polyisobutylene was the prominent product segment and accounted for a major significant share of market volume. Wide application scope of high molecular weight polyisobutylene in industries including automotive, petrochemicals, and pharmaceuticals is expected to augment demand. However, rising concern regarding disposal of polyisobutylene is expected to pose a challenge to the market over the forecast period.

1.2 KEY QUESTIONS TO BE ANSWERED

Nexant will provide an end-to-end analysis of the PIB value chain in three separate volumes (shown in Figure 1.4):

Figure 1.4 Special Report Focus



The analysis will include detailed discussions of the drivers impacting industry dynamics. Nexant will investigate the impacts of low oil prices on upstream and downstream considerations and the effects on comparative economics. Capacity developments (additions and expansions) will be investigated and derivative products market developments will be profiled. Nexant will evaluate the PIB value chain, and segmentation based upon molecular weight (MW) (Low = 330 to 6,000; Medium = 20,000 to 45,000; High = 75,000 MW to 600,000; and Ultra high = >760,000, as well as Reactivity, which is critical if the PIB is further chemically converted (Conventional (C) PIB has about 10 percent terminal reactive sites, while Highly Reactive (HR) PIB has over 80 percent terminal reactive sites).

The Special Reports will address key questions:

1. How are the markets and economics changing?
2. What is the market potential and what are the key business considerations market players should be focusing on?
3. What are the market dynamics and growth opportunities for current producers?
4. What are the key business considerations for new entrants to the industry?
5. What is the penetration / substitution threat for current applications?
6. What opportunities exist for new or growing applications?
7. What factors are impacting supply and upstream market drivers, and how will they impact PIB markets and economics?
8. What factors are impacting demand and downstream market drivers, and how will they impact PIB markets and economics?
9. What is the impact of the captive market contrasted with the merchant market?
10. Who are the major players? What are their business models? Who is forward- and backward-integrated?
11. What is the regional competitiveness?
12. What is driving current supply and demand dynamics?
13. How will the market be affected by changes in crude oil prices?

The Special Report will have 3 volumes, as presented in Figure 1.4. The first report of the series of ***Polyisobutylene (PIB): A Market in Motion*** reports, ***Volume 1: Market Analysis***, has a targeted completion by the end of 2016. ***Volume 2: Economic Analysis***, and ***Volume 3: Technical Analysis*** will be published in order, both with targeted completion dates in the first quarter of 2017.

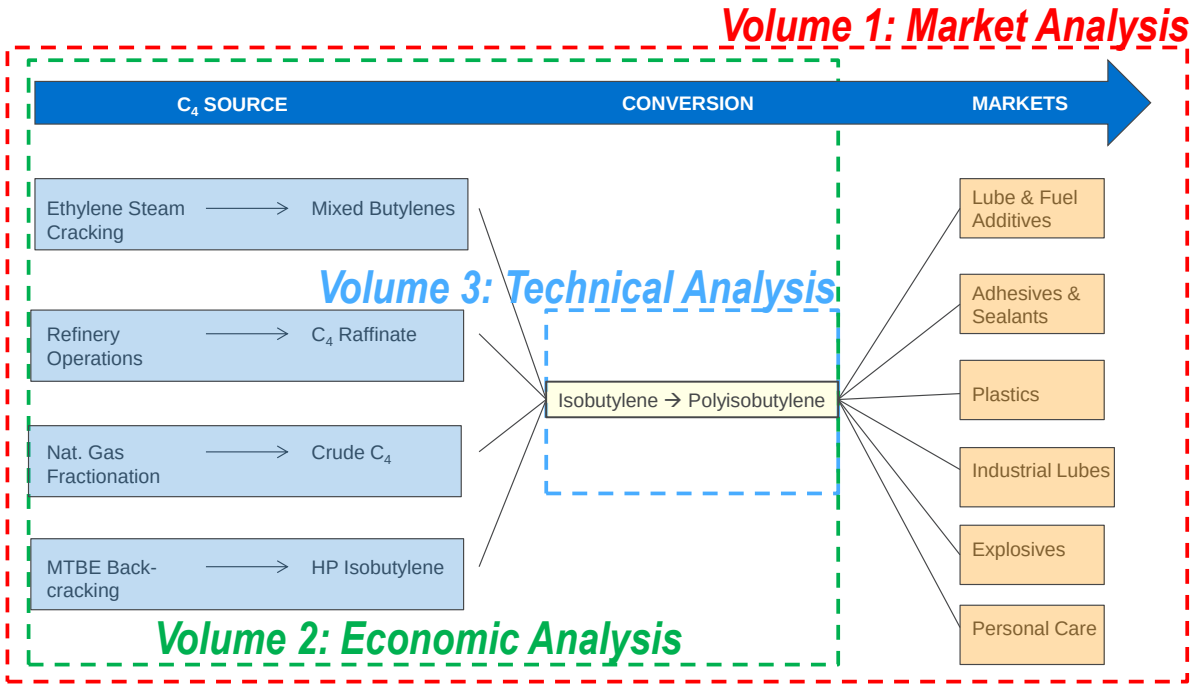
2.1 REPORTS COVERAGE

Three reports will be published in the ***Polyisobutylene (PIB): A Market in Motion*** series of Special Reports:

- Volume 1: Market Analysis
- Volume 2: Economic Analysis
- Volume 3: Technical Analysis

The general scope of these reports is shown in Figure 2.1.

Figure 2.1 Scope of Reports



The analysis will include detailed discussions of the drivers impacting industry dynamics. Nexant will investigate the impacts of low oil prices on upstream and downstream considerations and the effects on comparative economics. Capacity developments (additions and expansions) will be investigated and derivative products market developments will be profiled. Nexant will evaluate the PIB value chain, and segmentation based upon molecular weight (MW) (Low = 330 to 6,000; Medium = 20,000 to 45,000; High = 75,000 MW to 600,000; and Ultra high = >760,000, as well as reactivity, which is critical if the PIB is further chemically converted (Conventional (C) PIB has about ten percent terminal reactive sites, while Highly Reactive (HR) PIB has over 80 percent terminal reactive sites). Nexant will also discuss the market dynamics and growth opportunities for current producers and business considerations for new entrants to the industry.

2.1.1 Polyisobutylene (PIB): A Market in Motion, Volume 1: Market Analysis

This report will mainly focus on PIB markets. Nexant's end-to-end market analysis of the PIB value chain will include a forecast to 2025, based upon three oil price scenarios (Low: $40 per barrel WTI; Medium: $70 per barrel WTI; High: $100 per barrel WTI). This will include analysis of:

- Capacity
  - By producer
  - By Region
  - Firm Capacity versus Speculative
  - Merchant Capacity versus Captive
- Operating Rates
- Production
  - HR-PIB versus C-PIB
  - High MW versus Medium and Low MW
- Demand
  - Demand by Application
  - Demand by MW and Reactivity
- Trade
  - Key exporters
  - Key importers

For the Regions:

- North America
- Western Europe
- South America
- Asia (Excluding China)
- China
- Rest of the World

The presented data in this report covers historical analysis (2005-2016) and forecasts (2016-2025) under three oil price scenarios:

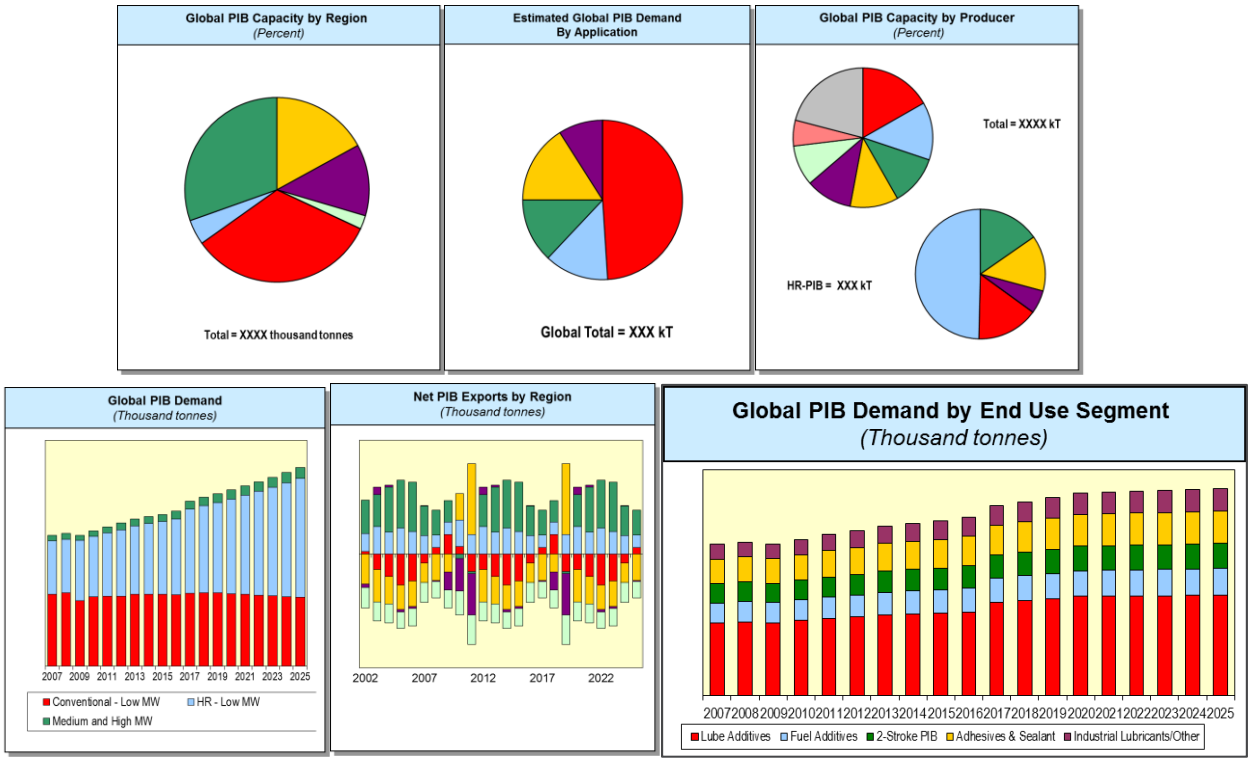
- Low, US$40 per Barrel WTI
- Medium, US$70 per Barrel WTI
- High, US$100 per barrel WTI

Demand will be forecast in a ground up approach, based upon different growth rates in end use sectors in the three scenarios. Capacity will be divided into firm (announced, planned capacity) and speculative capacity (capacity required to meet market demand, which must come online to prevent a supply bottleneck). In the analysis, speculative capacity additions will be made as required by market dynamics. Production will be forecast based upon feedstock availability, market requirements, and potentials for feedstock-based arbitrage and trade within each region and globally. Capacity, production, operating rates and trade will be forecast based upon regional competitiveness in a complex model. Nexant's market forecasts are supported by a proprietary simulation model of the global petrochemical industry. This

advanced simulator is a fully integrated model of global business dynamics, including material flows and cash flows, using sophisticated software. Nexant's expertise and experience in the global industry have been used to develop algorithms to simulate petrochemical business dynamics. The resulting simulator has been a major advance in market forecasting technology. A full methodology will be provided and is discussed in Section 4 of this prospectus.

Figure 2.2 Example Market Data Output

(Illustrative Purposes Only)



2.1.2 Polyisobutylene (PIB): A Market in Motion, Volume 2: Economic Analysis

This report will mainly focus on PIB cost of production and economics. Nexant will provide a current economic analysis, and forecasts for 2020 and 2025 based upon three oil price scenarios (Low: $40 per barrel WTI; Medium: $70 per barrel WTI; High: $100 per barrel WTI). This will include models for C-PIB and HR-PIB, including:

- Cost of Production Models
- Analysis of Margins and Returns
  - Regional Competition
  - Feedstock Competition
- Price Forecasts to 2025 under the oil price scenarios for each region
  - Price trends
  - Analysis of price differential between C-PIB and HR-PIB

With specific analysis of the following regions:

- United States
- Western Europe
- Brazil
- China
- Southeast Asia

The presented data in this report covers historical analysis (2005-2016) and forecasts (2016-2025) under three oil price scenarios:

- Low, US$40 per Barrel WTI
- Medium, US$70 per Barrel WTI
- High, US$100 per barrel WTI

Figure 2.3 Example Redacted Cost of Production Model
(Illustrative Purposes Only)

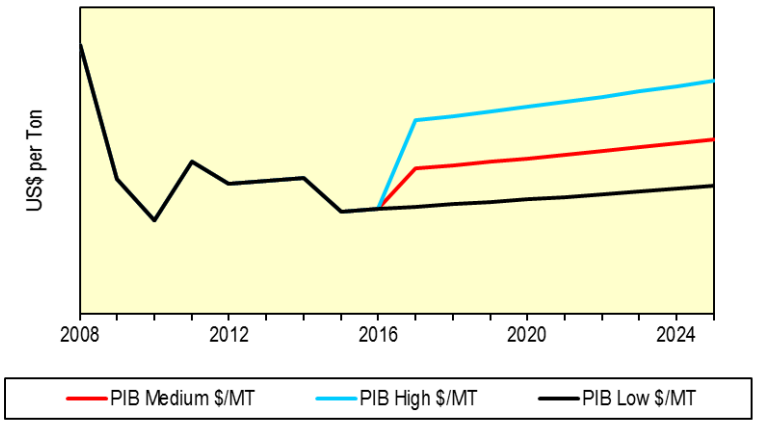
COST OF PRODUCTION ESTIMATE FOR: Polyisobutylene

								CAPITAL COST		**MILLION U.S. $**			
Plant start-up	2016							ISBL		###			
Analysis date	Q4 2016							OSBL		###			
Location	USGC							**Total Plant Capital**		**###**			
Capacity	###	Thousand Tons/yr						Other Project Costs		###			
	###	Millions lb/yr						**Total Project Investment**		**###**			
Operating rate	100	percent						Working capital		###			
Throughput	###	Thousand Tons/yr						**Total Capital Employed**		**###**			
Throughput	###	Millions lb/yr									**ANNUAL**		
							UNITS	**PRICE**			**COST**		
							Per Lb	**U.S. $**		**U.S. $**	**Million**	**U.S. $**	
PRODUCTION COST SUMMARY							**Product**	**/Unit**		**Per Lb**	**U.S. $**	**Per Ton**	
RAW MATERIALS	Isobutylene 87.7%			lb			####	####		###	###		
	Caustic Soda			lb			####	####		###	###		
	Boron Trifluoride			lb			####	####		###	###		
	Isopropyl alcohol (IPA)			lb			####	####		###	###		
	Catalyst & Chemicals						####	####		###	###		
			TOTAL RAW MATERIALS							**###**	**###**	**###**	
BY-PRODUCT CREDITS	Dimer and Trimer			lb			####	####		###	###		
	Low MW PIB			lb			####	####		###	###		
	Unreacted C4 Olefin and Paraffin			lb			####	####		###	###		
			TOTAL BY-PRODUCT CREDITS							**###**	**###**	**###**	
	NET RAW MATERIALS									**###**	**###**	**###**	
UTILITIES	Power			kWh			####	####		###	###		
	Fuel gas			lb			####	####		###	###		
	Cooling Water			k metric ton			####	####		###	###		
	process water			lb			####	####		###	###		
	Steam, 50 psig			lb			####	####		###	###		
			TOTAL UTILITIES							**###**	**###**	**###**	
	NET RAW MATERIALS & UTILITIES									**###**	**###**	**###**	
	VARIABLE COST									**###**	**###**	**###**	
DIRECT FIXED COSTS	Labor	##	men	##	Thousand	U.S. $				###	###		
	Foremen	#	men	###	Thousand	U.S. $				###	###		
	Supervisor	#	men	###	Thousand	U.S. $				###	###		
	Maint., Material & Labor			#.#	% of ISBL					###	###		
	Direct Overhead			##	% Labor & Supervision					###	###		
			TOTAL DIRECT FIXED COSTS							**###**	**###**	**###**	
ALLOCATED FIXED COS	General Plant Overhead			##	% Labor & Maintenance					###	###		
	Insurance, Property Tax			#.#	% Total Plant Capital					###	###		
	Environmental			#.#	% Total Plant Capital					###	###		
			TOTAL ALLOCATED FIXED COSTS							**###**	**###**	**###**	
	TOTAL FIXED COSTS									**###**	**###**	**###**	
	TOTAL CASH COST									**###**	**###**	**###**	
	Depreciation @		10 % for ISBL & OPC			5 % for OSBL				###	###	**#VALUE!**	
	COST OF PRODUCTION									**###**	**###**	**###**	
	Return on Capital Employed (Incl. WC) @					10%				###	###	**#VALUE!**	
	COST OF PRODUCTION + ROCE									**###**	**###**	**###**	

Cost of production will be forecast using Nexant's PPE (Petroleum & Petrochemical Economics) pricing data, as well as Nexant's industry known cost of production models. As part of developing estimates for capital and production costs of petrochemicals, Nexant monitors industry technology developments on a

regular basis, with inputs derived from a number of sources, including technology licensor data, discussions with producers and technology owners, project reviews, patent research, and plant performance monitoring activities, where non-confidential data are available. Investment costs are estimated using a top-down approach based on in-house data and previous project experience, rather than a bottom-up calculation based on equipment specifications and contractor unit rates. Production costs are developed at different levels, including raw material costs, byproduct credits, utility costs, direct fixed costs, and allocated fixed costs.

Figure 2.4 Example Price Forecast
(Illustrative Purposes Only)



2.1.3 Polyisobutylene (PIB): A Market in Motion, Volume 3: Technical Analysis

This report will mainly focus on PIB technology and players. Nexant will provide analysis of the technologies currently producing both HR-PIB and C-PIB. This will include:

- Process Descriptions
- Process Chemistry
- Indications of Which Technologies are Available for Licensing
- Profiles of Major Players
- Overview of business models
- Overview of industry structure
- Investment Considerations

Figure 2.5 Some Major Players Profiled

3.1 POLYISOBUTYLENE (PIB): A MARKET IN MOTION, VOLUME 1: MARKET ANALSYIS

3.2 POLYISOBUTYLENE (PIB): A MARKET IN MOTION, VOLUME 2: ECONOMIC ANALYSIS

3.3 POLYISOBUTYLENE (PIB): A MARKET IN MOTION, VOLUME 3: TECHNICAL ANALYSIS

4.1 OVERVIEW

Nexant has considerable experience in undertaking this type of study. The general approach includes:

- Utilizing in-house databases, updated analyses, and the latest forecasts from Nexant's multi-client research programs that include:
  - The Petroleum and Petrochemical Economics (PPE) program covering supply, demand, and trade, as well as pricing and profitability, of numerous products in the global petroleum and petrochemical industries
  - Nexant's proprietary simulation model, which is an experience-based database running commodity petrochemical business logic algorithms to produce multi-scenario simulations of the global petrochemical industry
  - The Process Evaluation/Research Planning (PERP) program offering process evaluations of existing, emerging, and embryonic technologies of interest to the energy and chemicals industries
- Conducting direct market research and fieldwork with a range of relevant participants within the energy and chemicals industries, including:
  - Consumers, producers, and other relevant bodies (e.g., traders and distributors), where possible
  - Technology licensors and engineering, procurement, and construction (EPC) contractors, as appropriate
- Utilizing extensive experience and non-confidential information derived from a number of previous assignments
- Reviewing selected public domain sources to compare the latest statistics and views on market developments

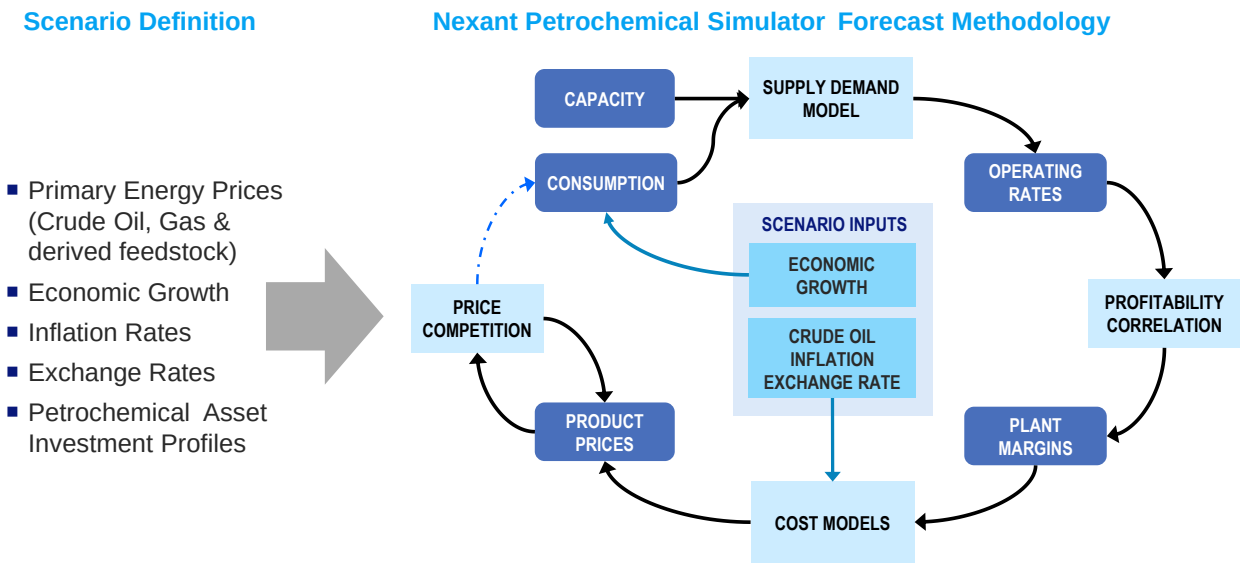
Nexant has a strong track record in evaluating petrochemical markets. This study draws upon Nexant's extensive industry experience, business and technical expertise, and deep understanding of markets, technologies, and economics within the chemicals sector.

4.2 MARKET ANALYSIS

Nexant's market forecasts are supported by a proprietary simulation model of the global petrochemical industry. This advanced simulator is a fully integrated model of global business dynamics, including material flows and cash flows, using sophisticated software. Nexant's expertise and experience in the global industry have been used to develop algorithms to simulate petrochemical business dynamics. The resulting simulator has been a major advance in market forecasting technology.

Figure 4.1 illustrates the simulator forecast methodology, which relates market demand drivers to petrochemical consumption. From a database of petrochemical processes and plant capacity the regional consumption is compared to the ability to produce. Global trade algorithms complete a full supply, demand and trade model of the industry. Basic commodity theory dictates that market tightness, measured by average operating rates, is the primary driver of profitability. Production costs are built up from a detailed database of archetype plant techno-economic models, heavily influenced by the assumptions of crude oil prices. Petrochemical product prices are determined by adding projected production costs to the margin outlook. Inter-regional competition and inter-material competition add further constraints and complexity to shape the pricing dynamics.

Figure 4.1 Nexant Petrochemical Simulator Forecast Methodology



4.3 PRODUCTION ECONOMICS EVALUATION

Nexant has well-established methodologies for production economics evaluations, which include the development of:

- Capital and production costs
- Price forecasts

As part of developing estimates for capital and production costs of petrochemicals, Nexant monitors industry technology developments on a regular basis, with inputs derived from a number of sources, including technology licensor data, discussions with producers and technology owners, project reviews, patent research, and plant performance monitoring activities, where non-confidential data are available. Investment costs are estimated using a top-down approach based on in-house data and previous project experience, rather than a bottom-up calculation based on equipment specifications and contractor unit rates. Production costs are developed at different levels, including raw material costs, by-product credits, utility costs, direct fixed costs, and allocated fixed costs.

As indicated in Figure 4.2, the variable cost of production includes the costs of raw materials – feedstocks plus catalysts and chemicals – and utilities at cash cost or purchased cost, with a credit for co-products. The direct fixed costs include:

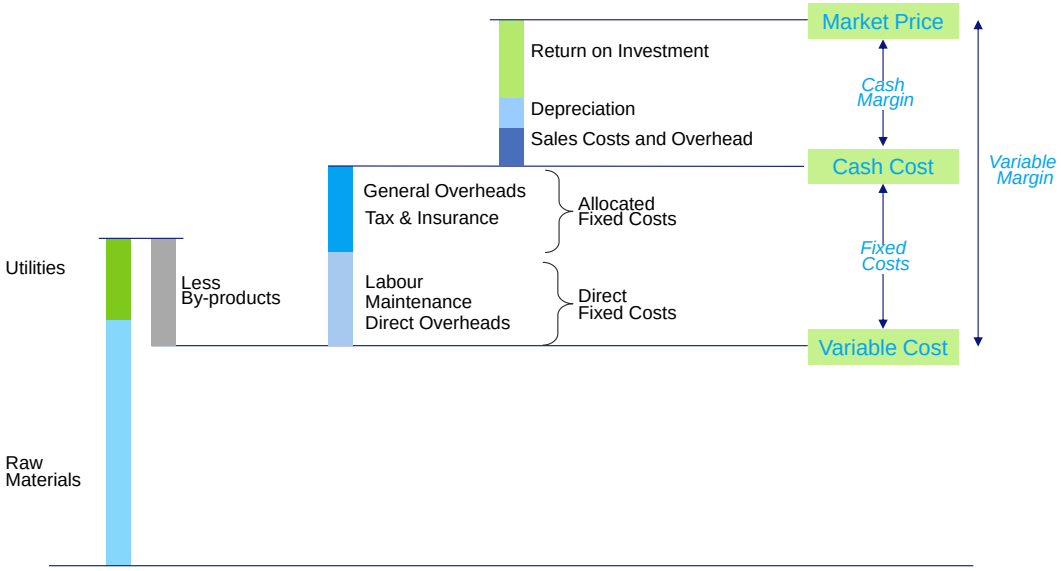
- Salaries of operating staff plus associated costs, such as holiday cover, social insurance, fringe benefits, etc.
- Maintenance costs including materials and labor, with periodic maintenance costs such as 2- or 3-year shutdowns averaged over the period; maintenance costs are usually calculated as a percentage of process plant capital cost.

The allocated fixed costs are site charges, which are necessary for production but which are not directly associated with the operation of the specified process plant. They include packing and warehousing, storage and workshops, site laboratories, safety and environment, security, site management, and on-site amenities for the workers. Insurance of the fixed assets is also included under allocated fixed costs.

To calculate the total delivered cash cost involved in delivering a product to a particular target market, Nexant takes into account the freight and handling costs as well as any tariffs, in addition to the derived total cash cost of production.

As defined by Nexant for its analyses of production costs and its price forecasting, the cash cost does **not** include corporate overheads such as general marketing, company administration, and R&D. Nor does it include working capital.

Figure 4.2 Components of Cost of Delivery to Market



In addition to the derived total cash cost of production, the Return on Capital analyses for the production of major petrochemicals in key locations for the different crude oil price scenarios will be based on the following:

- Nexant's price projections for each product in the selected market
- Estimated investment costs for new, world scale facilities in each location

The methodology used to develop the investment cost estimates is briefly summarized below.

A process plant can be viewed as consisting of two types of facilities. The first is the manufacturing area containing all process equipment needed to convert the raw materials into the product. The capital costs of these facilities are commonly referred to as the inside battery limits (ISBL). The second group of facilities contains the outside battery limits (OSBL) or offsites. These include general utilities (e.g., instrument and utility air, nitrogen, fire water, etc.), administrative buildings, steam generation facilities, cooling water system, electrical distribution systems, waste disposal facilities, etc.

For all the cases considered, investment costs assume "instantaneous" construction or implementation in the designated year. This is a simplification because initiation, design, and construction can take several years to complete. In order to undertake the instantaneous analysis, phased investment costs and associated financial charges are consolidated into a single overall project cost.

In addition to the plant capital, the owner usually has other costs associated with the project such as project management, startup, etc. Working capital is calculated to reflect raw material, byproduct, and supplies inventories; accounts receivable; cash requirements etc., with credit for accounts payable.

For petrochemical price forecasting, Nexant's methodology is largely based on an assumption for the underlying price of crude oil, which drives production costs, and on an understanding of the long-term relationship between supply and demand conditions and profit margins. This methodology primarily considers long-term fundamental industry developments in global supply, demand, and regional cost competitiveness, and also assumes that market conditions have come to equilibrium with no short-term disturbances.

5.1 OVERVIEW

Nexant uses multidisciplinary project teams drawn from the ranks of our international staff of engineers, chemists, economists and financial professionals, and from other Nexant groups to respond to the requirements of each assignment. Most of the consulting staff possesses credentials in both scientific and commercial disciplines plus substantial industrial experience. The collective talents of our staff are strategically located and closely linked throughout the world, resulting in valuable insights gained through a variety of perspectives.

Nexant is an international consultancy and is dedicated to assisting businesses within the global energy, chemical, plastics, and process industries by providing incisive, objective, results-oriented management consulting. Over five decades of significant activity translates into an effective base of knowledge and resources for addressing the complex dynamics of specialized marketplaces. By assisting companies in developing and reviewing their business strategies, in planning and implementing new projects and products, diversification and divestiture endeavors and other management initiatives, Nexant helps clients increase the value of their businesses. Additionally, we advise financial firms, vendors, utilities, government agencies and others interested in issues and trends affecting industry segments and individual companies.

Nexant was formed as an independent global consulting company in 2000, and combines a number of companies that had a long history of providing consultancy services to the chemical and refining-related industries. Nexant's experience covers all aspects of project development relating to major refinery, petrochemical, and polymer investments, ranging from grassroots plants to revamps of existing process units. Nexant's key offices serving the petrochemical and downstream oil sectors are located in New York, London, Bangkok, and Bahrain, and locations for other offices are shown in Figure 5.1.

Figure 5.1 Nexant Office Locations

From major multinationals to locally based firms and governmental entities, our clients look to us for expert judgment in solving compelling business and technical problems and in making critical decisions.

Nexant's clients include most of the world's leading oil and chemical companies, financial institutions, and many national and regional governments. Nexant is active in most of the industrialized countries of the world, as well as in developing areas including the Middle East, Africa, and East and Southeast Asia.

Major annual subscription programs are:

- Process Evaluation/Research Planning (PERP)
- Petroleum & Petrochemical Economics (PPE) – United States, Western Europe, Middle East and Asia
- PolyOlefins Planning Service (POPS)

5.2 PROCESS EVALUATION/RESEARCH PLANNING (PERP)

The PERP program provides valuable insights and information to research planning and marketing personnel. It examines existing, developing and embryonic technologies, aiming to provide early identification of commercially significant technical developments. Ten or more reports per year are on petrochemicals; additional reports cover polymers, fine and performance chemicals, and other topics.

The PERP program covers technology, commercial trends, and economics applicable to the chemical industry. The program has more than 40 subscribers, including most of the major international chemical companies. Many of the processes to be analyzed in this multi-client study have been assessed in the PERP program.

5.3 PETROLEUM & PETROCHEMICAL ECONOMICS (PPE)

The PPE program provides historic and forecast analysis of the profitability, competitive position, and supply/demand trends of the global petroleum and petrochemical industry. The program includes capacity listings and analysis, global supply, demand and trade balances, profitability, competitiveness, and price analysis and projections for all the major petrochemical value chains. The PPE program is supported by an internet-based planning and forecasting tool that provides online access to the database behind the reports of the PPE program.

5.4 POLYOLEFINS PLANNING SERVICE (POPS)

The POPS program provides reports on the global polyethylene and polypropylene industry. It is recognized globally as the benchmark source for detailed information and analysis on current commercial, technical, and economic developments in the polyolefins industry. Coverage includes: capacity listing and analysis, detailed consumption, supply/demand, trade, operating rates, price forecasts, technological developments, new products, inter-material substitution, and regional competitiveness.

6.1 CONTACT INFORMATION

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