

CHEMSYSTEMS

**Petroleum and
Petrochemical Economics**

Get the Competitive Edge

CHEMSYSTEMS Return on Analysis

2009 Prospectus

www.chemsystems.com

CHEMSYSTEMS®

PROSPECTUS January 2009

Petroleum and Petrochemical Economics

Griffin House, 161 Hammersmith Road, London W6 8BS, UK
tel: +44 20 7950 1600, **fax:** +44 20 7950 1550

Nexant®, ChemSystems® and ChemSystems Online® are registered trade marks of Nexant, Inc.

*CHEMSYSTEMS – a brand owned by Nexant, Inc. that provides support
to decision makers in the petroleum, chemical and petrochemical industries*

CONTENTS

SECTION	PAGE
1 Introduction to the Program	1
2 Value of the Program	2
3 Scope of the Program	4
4 Detailed Description of the Program	5
5 Costs and Subscription	9

APPENDIX	PAGE
A Subscription Terms and Conditions	10
B Contact Details	12
C Illustrative Table of Contents (Quarterly Business Analysis - Western Europe)	13
D Illustrative Tables and Figures	14

SECTION 1.



Introduction to the Program

For over 30 years, our Petroleum and Petrochemical Economics (PPE) program has provided accurate data, insightful analysis and dependable forecasts of the profitability, competitive position and supply/demand trends of the global petroleum and petrochemical industry. Subscribers have found the program an invaluable support for strategic and business planning, project appraisal and financing, and operational benchmarking. Users include oil and chemical producers, polymer purchasers, equity analysts, project financiers and venture capitalists, logistics providers and technology companies. Over the past six years the program has been completely overhauled and upgraded. The models and databases that run the analysis have been replaced with a state-of-the-art industry simulation program that has taken the 30 years of industry knowledge and experience of our consultants and enhanced it to provide a new level of forecasting expertise.

The simulation model is used to generate the paper PPE reports and also an internet service, ChemSystems Online[®] that provides global data, analysis and forecasts of:

- Market dynamics
 - plant capacity and process type
 - production
 - consumption
 - supply/demand and trade
- Profitability analysis
 - quarterly historic analysis
 - long term forecasts
- Techno-economic analysis
 - process models and cost/yield factors

Subscription to the Petroleum and Petrochemical Economics program includes both written reports on the petroleum and petrochemical industry and internet access to all data analysis and forecasts through the ChemSystems Online[®] program. Subscription includes access to spreadsheet files containing data from each written report via a subscriber account on our www.chemsystems.com website.

A further level of planning excellence is available through subscription to our ChemSystems Simulator – a planning system that includes an internet application which allows companies to input their own scenarios and run confidential private simulations of the industry on the ChemSystems Simulator.

SECTION 2.



Value of the Program

The Petroleum & Petrochemical Economics (PPE) program is used by Business Managers, Corporate and Business Planners, Industry Analysts, Investors etc. to understand the dynamics of this global business so that they may improve business performance and shareholder returns.

Your subscription may be tailored to meet your specific company requirements and the fees reflect the value brought to your business. Our insightful analysis and reliable forecasting methodology provide the means to significantly improve your business performance through better investment decisions and improved competitive position.

The Petroleum & Petrochemical Economics program with ChemSystems Online[®] is designed for companies active in the oil refining, petrochemical, and polymer industries, or for those that need to be well informed about developments in these industries.

- Oil companies need:
 - an objective review of refinery developments
 - data and forecasts for changes in refined product demand and implications of product quality changes
 - estimates of petrochemical feedstock requirements
 - to know how petrochemical feedstock selection is affected by relative prices
 - to know the effect of gasoline price on the economics of the aromatics business
 - to understand the refinery/chemical interface
 - an impartial analysis of the relationship between costs and prices in the industry.
- Petrochemical producers need:
 - to know the future supply and relative price of hydrocarbon feedstocks
 - a comprehensive data bank of petrochemical product demand forecasts
 - an assessment of changes in technology and economics that affect their competitiveness
 - an assessment of the effect on their business of developments taking place in other regions and markets and in world trade
 - an analysis of the supply potential and the steps needed to bring supply and demand into balance
 - an appreciation of what sets prices, what price environment they can expect, and price and margin forecasts
 - an objective view of current margins and trends in those margins.

- Consumers of base petrochemicals need:
 - to know the effect of changes in crude oil and other costs on raw material costs
 - to know the price trends for base petrochemicals (olefins and aromatics), and changes in relative prices of their raw materials
 - to understand the current and future availability of the petrochemicals they purchase
 - to understand the market in which they make their purchases of petrochemical raw materials and the issues and profitability of their suppliers.
- Strategic planners, policy advisers in these companies and in many organisations whose activities are affected by hydrocarbon and petrochemical businesses need:
 - a reliable and objective source of industry data
 - a concise analysis of the business and of important developments
 - medium- and long-term forecasts of prices, margins, supply and demand from a well respected industry consulting organization with over 44 years of experience in the field.

The service will continue to analyse and comment on these developments and is an essential source of analysis for those companies active in the industry. Our program is backed up by access to experienced Nexant consultants who are able to discuss and comment on the latest developments and their implications.

SECTION 3.



Scope of the Program

Your subscription to the program includes access to the data and analysis through the ChemSystems Online® service via our website at www.chemsystems.com and via printed and electronic reports.

Industry Sectors

All commodity sectors of the petroleum, petrochemical, polymer and intermediates industry are included in our program. The main value chains available for subscribers are:

- Petrochemical feedstocks - Crude oil, refined products, natural gas and petrochemical feedstocks
- Olefins - Ethylene, propylene, butadiene plus mixed C₄s
- Aromatics - Benzene, toluene and mixed xylenes
- Polyolefins - LDPE, LLDPE, HDPE, PP
- Styrenics - Styrene, polystyrene (GPPS & HIPS), EPS, SBR, ABS
- Vinyls - Chloralkali, EDC, VCM, PVC
- Polyester & intermediates - *para*-Xylene, MEG, PTA & DMT, PET fibre and bottle resin
- Propylene & derivatives - Propylene, PP, ACN, PO, cumene/phenol, acrylic acid, IPA
- Butadiene & derivatives - C₄s & butadiene, BR, SBR and SB latex, ABS

Global Reach

We provide market analysis for all global regions. Capacity, supply and demand data are provided for each country or trading block. Profitability analysis and forecasting are provided for the three major petroleum and petrochemical markets of the U.S., Western Europe and Asia. Our program examines global competitive advantage by comparing cost of production, delivery etc., of products to the major markets of the world.

Fields of Expertise

Our program is produced by a global organisation of Nexant researchers, analysts and recognised industry experts. Your subscription to our program will provide the analysis and forecasts that you need to make critical decisions with the confidence of knowing the decision is based on the best available research, analysis and forecasting techniques. Our program provides analysis and forecasts in three major inter-related areas:

- Industry Profitability
 - Quarterly Business Analysis (QBA) reports of current and historical profitability with monthly updates
 - Long-term profitability and price forecasts.
- Techno-Economic Evaluation
 - Detailed description of the processes and the cost of production of petrochemicals.
- Market Dynamics
 - Plant capacity data, company ownership structure and market share analysis
 - Consumption growth analysis and forecasts
 - Production sources, feedstock analysis and forecasts
 - Supply/demand and global trade forecasts.

SECTION 4.



Detailed Description of the Program

Subscription to our PPE program and ChemSystems Online[®] service entitles the subscriber to reports and access to a web site providing data, analysis and forecasts for the period of the subscription.

The results are delivered in four formats:

- bound printed paper reports
- electronic (PDF) version of the paper reports
- downloadable spreadsheets containing the main data deliverables from each report
- a fully integrated database accessed via the internet at www.chemsystems.com.

Industry Profitability

Quarterly Business Analysis: Western Europe, U.S., Asia (Japan, South Korea)

A report is produced each quarter for each of the three regions containing current and historical analysis of the profitability of the oil refining and petrochemical industry. The reports include cost of production, and margin and profitability analysis of a wide range of refined oil products, petrochemicals, polymers, chemicals, and fuels. The reports examine the current issues in the industry and put them into context by providing detailed cost and margin analysis for the individual products and for the industry as a whole. Four editions of these reports are published during the annual subscription period. Publication is at the end of the last month of each quarter, covering costs and prices for the first two months of the quarter. The analysis is then updated for the full quarter's costs and prices in the first month of the following quarter and the results are displayed in the ChemSystems Online[®] web site.

In addition, the QBA reports contain global competitive analysis by examining the cost of production for a selection of petrochemicals in the major production regions and compare the delivered cost into the major consuming markets. The relevant cost of production and delivered cost estimates are prepared for each regional report from the following products, regions and markets:

Products	Producing Regions	Target Markets
Ethylene	U.S.	Western Europe
HDPE	Canada	South-East Asia
LLDPE	Western Europe	
Ethylene Glycol	Middle East	
	Japan	
	South Korea	

Petrochemical Profitability Forecasts: Western Europe, U.S. and Asia

These reports for the major price setting regions of the U.S. Gulf Coast, Western Europe and South-East Asia, provide long-term forecasts for prices, costs, margins and returns on investment of petrochemicals and polymers. Forecasts are provided for three crude oil and economic scenarios of annual profitability to 2025. The price setting mechanism in each region for each product is discussed. In addition to analysis of the cost of production for producers within the region, global trade and the regional competitive position are considered. The reports are published annually in paper and downloadable electronic format, and updated quarterly via the ChemSystems Online® web site.

Petroleum Profitability Forecasts: Western Europe, U.S. and Asia

These reports for the major oil refining regions of the U.S. Gulf Coast, Western Europe and Asia (Singapore), provide an analysis of profitability for the refining sector and long-term (to 2025) forecasts for prices of refined products. The reports are published annually in paper and downloadable electronic formats only. Prices are also available through the ChemSystems Online® web site.

Global Economic Assumptions and Crude Oil Price Scenarios

This report analyses historical crude oil prices, currency exchange rates and economic growth, and projects the crude oil scenarios and macroeconomic assumptions used by Nexant in its profitability and market forecasts. The report is published annually in paper and downloadable electronic formats only.

Our ChemSystems Simulator service allows companies to use their own corporate views of future macroeconomic parameters to produce custom market dynamics and profitability reports.

Techno-economic Evaluation**Quarterly Business Analysis Supplement: Western Europe, U.S. and Asia**

The techno-economic basis for the Leader and Laggard models used in the QBA analysis is produced as a separate report for each region. For each process the reports define:

- Plant capacity and the process technology
- Capital cost
- Operating rate
- Raw material consumption factors
- By-product production yield factors
- Utility consumption factors
- Variable production costs
- Labour costs
- Maintenance and insurance costs
- Direct overheads
- Site allocated overheads
- Cash costs.

The reports are updated quarterly when the QBA reports are published via the ChemSystems Online® web site. A paper and downloadable electronic report is published annually.

Market Dynamics

Petrochemical Feedstocks Market Dynamics

This report examines the global oil refining business from the perspective of petrochemical feedstocks. It provides historical analysis and forecasts of the supply/demand balances for refined products and petrochemical feedstocks, including LPG. Product quality and refinery investment requirements are discussed. The report is updated annually in paper and downloadable electronic format only. The data are also available from the ChemSystems Online® web site.

Petrochemical Market Dynamics

These reports examine the supply, demand and trade dynamics for each petrochemical value chain. The reports list all producers, their production capacity, location, etc., and discuss the status of new projects. The consumption of petrochemicals and polymers is analysed and forecasts are based on projections of end-use consumption and economic activity in each region. Consumption growth may be a combination of growth in the end-use sector, additional penetration into the sector (including inter-material competition), and cyclical inventory build up or decline throughout the product chain from basic petrochemical through intermediates, manufactured products to the consumer. The reports provide historical analysis and forecasts (to 2025) of consumption (by derivative or end use), production, imports/exports, inventory build up/decline, capacity and capacity utilisation for each region. The reports are available in paper and downloadable electronic format for the complete global analysis or by specific region:

- North America
- South America
- Western Europe
- Central and Eastern Europe
- Middle East and Africa
- Asia Pacific.

Reports are produced on an annual cycle and cover:

- Olefins
- Polyolefins
- Vinyls
- Styrenics
- Aromatics
- Polyester and Intermediates
- Propylene and Derivatives
- Butadiene and Derivatives.

Consulting Support

Our consultants are available to subscribers to provide further discussion and clarification of any areas of the industry covered by the subscription. Any travel or out-of-pocket expenses associated with such consulting support is not covered by the subscription and will be invoiced separately at cost.

ChemSystems Simulator

Our ChemSystems Simulator is the proprietary simulation model developed by Nexant and used to generate all the analysis and forecasts of the ChemSystems Online[®] and Petroleum and Petrochemical Economic programs (and our PolyOlefins Planning Service, POPS). Our ChemSystems Simulator is available to subscribing companies, for an additional subscription fee, to develop private forecasts of market dynamics, industry profitability, etc. Clients are currently using our simulator for corporate and business unit planning, investment decision making and competitive analysis.

Subscription to our ChemSystems Simulator is fully supported by our global team to provide on-site training workshops, custom installation of the ChemSystems Simulator software (and hardware if required), modelling and scenario development support, etc. The simulator software may be hosted by Nexant at its secure facilities or may be implanted into your IT infrastructure. In either case, Nexant guarantees absolute security and confidentiality.

Our simulation model is a proprietary, experience-based database running commodity petrochemical business logic algorithms to produce multi-scenario simulations of the global industry. It is integrated from end-use markets back to polymer consumption to intermediates, through monomers to petrochemical feedstocks. It considers inter-material competition, inter-regional price relationships, chain margins, product substitution, logistic costs and trade drivers. Costs and prices are integrated from crude oil and petrochemical feedstocks through olefins and aromatics to intermediates and polymers. The model may be used as delivered with our business logic algorithms and relationships ready programmed, or it may be customised to your company views – ensuring that the experience and expertise of your company is programmed into your version of the simulator.

Our ChemSystems Simulator is more than just an integrated petrochemical industry simulation; it is a complete planning process that has been proven to bring real competitive advantage to subscribers. In addition to being the only fully-integrated market model of consumption, production and trade (the tons) as well as costs, prices and profitability (the money) for the global petrochemical industry, the process adopted by subscribing companies has significantly aided the efficiency and productivity of the planning functions, and helped to enhance the relationship between business units and corporate planning. The adoption of a single corporate-wide market planning simulator has aided capital allocation issues as all projects use a common, company developed, basis. The implementation of our ChemSystems Simulator typically takes three months and results in a net decrease in time spent by planners on maintaining multiple models and inputs.

As each subscriber has a dedicated version of the software, updated by Nexant during the subscription period, subscribers are able to respond to unexpected world events more rapidly and gain the first mover advantage. Subscribers run “what if? analysis” to test the robustness of plans and projects in a time-effective and consistent manner.

Our ChemSystems Simulator delivers step change improvements in market forecasting and business/corporate planning, while reducing the resources required at subscribing companies.

SECTION 5.

Costs and Subscription



Subscription prices are for an annual company subscription to our PPE and ChemSystems Online® service of current reports and analysis available for each region, product and type of analysis. The standard subscription includes three paper copies of PPE reports, unlimited downloads of electronic reports and up to 25 registered users of the ChemSystems web site. Subscription prices are in U.S. dollars and are invoiced at the start of the subscription period.

SUBSCRIPTION PRICES

(Annual Subscription Price for Subscriptions Starting in 2009)

ChemSystems Online® (dollars per year)

	Americas	Asia Pacific	Europe, Middle East & Africa	Global	Any Two Regions
Total Program - includes (1), (2) and (3)					
Petrochemicals & Feedstocks	\$36 500	\$36 500	\$36 500	\$98 500	\$69 500
Petrochemicals Only	\$31 000	\$31 000	\$31 000	\$83 500	\$59 000
Partial Program - Petrochemicals					
(1) Quarterly Business Analysis	\$13 000	\$13 000	\$13 000	\$35 000	\$24 500
(2) Price / Margin Forecasts	\$13 000	\$13 000	\$13 000	\$35 000	\$24 500
(3) Petrochemical Market Dynamics	\$13 000	\$13 000	\$13 000	\$35 000	\$24 500
Partial Program - Limited Product Coverage					
Single Product Chain	\$14 500	\$14 500	\$14 500	\$39 000	\$27 500
Two Product Chains	\$23 500	\$23 500	\$23 500	\$63 500	\$44 500
Three Product Chains	\$29 000	\$29 000	\$29 000	\$78 500	\$55 000

ChemSystems Online® Simulator Subscription price (as above) plus: \$125 000

Valid for subscription agreements from 1st January 2009 through 31st December 2009

Custom subscriptions may be built from any combination of product coverage, regions and type of analysis. Please contact your Nexant representative for a detailed price proposal.

Subscription Terms and Conditions

1. Nexant will provide employees of Subscriber direct online access to electronic copies of the Subscribed Reports of the Petroleum and Petrochemical Economics program and to data and analysis of the ChemSystems Online[®] program via a Subscriber account through the www.chemsystems.com web site for the duration of this Agreement. Nexant will provide users of the service with a user name and password. Subscriber will inform Nexant if any of its employees who are registered users leave Subscriber's employment.
2. Nexant will provide to Subscriber bound paper copies of each Subscribed Report of the Petroleum and Petrochemical Economics program, on publication.
3. While the Subscribed Reports will represent an original effort by Nexant based on its own research, it is understood that portions of the Subscribed Reports will involve the collection of information from third parties, both published and unpublished. Nexant does not believe that the Subscribed Reports will contain any confidential technical information of third parties. Nexant does not warrant the accuracy or completeness of information.
4. The information disclosed in the Subscribed Reports and the terms of this Agreement will be retained by Subscriber for the sole and confidential use of Subscriber and its 51 percent or greater owned affiliates except those parents or affiliates which are engaged in the business of marketing research, management consulting, or publishing or are subsidiaries of such firms (Permitted Subscribers). However, the Permitted Subscribers may use said information in their own research and commercial activities, including loaning the data on a confidential basis to third parties for temporary and specific use for the sole benefit of Subscriber. It is the responsibility of Subscriber to notify Nexant of 51 percent or greater owned affiliates requiring access to the Subscribed Reports. Breach of this covenant of use shall entitle Nexant to terminate this Agreement immediately with no obligation to return any portion of the Subscription Fee.
5. Subscriber further agrees that it will use reasonable efforts to keep the Subscribed Reports for its sole use; however, this restriction shall not apply to information which is or becomes generally available to the public in a printed publication, which is already in the possession of Subscriber, or which is received by Subscriber in good faith from a third party without an obligation of confidentiality.
6. The obligations of paragraphs 4 and 5 shall terminate five (5) years from the date of this Agreement.
7. Subscriber shall not republish all or any portion of the Subscribed Reports. Subscriber further agrees to refrain from any dissemination of the Subscribed Reports, either directly or through its subsidiaries and affiliates, so as to constitute passage of title into the public domain or otherwise jeopardise common law or statutory copyright in said Subscribed Reports.
8. The Subscribed Reports are delivered, inter alia, via the Internet. The Agreement does not include provision of hardware or software to allow Subscriber employees to view the Internet sites, download data, etc. The software requirements include an Internet browser (Netscape 4.7 or higher or Microsoft Internet Explorer IE version 5.0 or higher). Some changes to the configuration of the user's browser, and windows control panel, may be required for optimal use of the products. The web site that houses the products uses software including Flash Plug-in version 4.0 or higher and may pass applets to the user. Subscriber firewall restrictions may inhibit access to Subscribed Reports or the performance of the products. Nexant is not responsible for restrictions to use of the Subscribed Reports imposed by Subscriber firewall(s).
9. There are no warranties of any kind for the Subscribed Reports provided under this Agreement and there shall be no liability for consequential or indirect damages. Nexant's entire liability under this Agreement is limited to the total amount paid to Nexant for the services.
10. Nexant does not accept responsibility for the accuracy of the information in the Subscribed Reports. Subscriber is responsible for use of the information contained in the Subscribed Reports and Nexant will not be responsible for any reliance Subscriber places on the contents thereof.
11. A person who is not a party to this Agreement shall have no right to enforce any of its terms.
12. By signing the Authorization Nexant and Subscriber agree that the Authorization and Subscription Terms and Conditions represents the complete agreement between them regarding the Subscribed Reports. No change, modification, extension, termination or waiver of this Agreement, or any of the provision herein, shall be valid unless made in writing and signed by duly authorised representatives of the parties.
13. This Agreement and the relationship between the parties shall be governed by and interpreted in accordance with the laws of the state of New York, United States of America.

APPENDIX A.

Subscription Terms and Conditions

Industry Sectors

Feedstocks

Petrochemicals

Others

Please check all that apply

Global Reach

Americas

Asia Pacific

Europe, Middle East, Africa

Fields of Expertise

Quarterly Business Analysis

Profitability Forecast

Market Dynamics

If the foregoing terms are acceptable, please sign below to confirm subscriber's agreement and return to Nexant.

AUTHORISATION

AGREED TO AND ACCEPTED:

AGREED TO AND ACCEPTED:

SUBSCRIBER:.....

NEXANT, INC

Name:

Name:

Title:

Title:

Address:

Address:

Phone:

Phone:

Fax:

Fax:

Email:

Email:

Signature:

Signature:

Total Cost:

Date:

Date:

If your company purchase order is required, please provide the purchase order number below:

Purchase Order Number: _____

NEXANT, INC., CHEMSYSTEMS PPE PROGRAM &
CHEMSYSTEMS ONLINE®
44 SOUTH BROADWAY
WHITE PLAINS, NY 10601-4425, U.S.A.
FAX: 1-914-609-0399

Contact Details

EUROPE

Nexant Ltd.

Griffin House
161 Hammersmith Road
London, W6 8BS
United Kingdom
Attn: Alastair Hensman
Manager
Tel: + 44 (20) 7950 1577
Fax: + 44 (20) 7950 1550
Email: ahensman@nexant.com

AMERICAS

Nexant, Inc.

44 South Broadway
White Plains, NY 10601-4425
U.S.A.
Attn: Heidi Junker Coleman
Multiclient Programs Administrator
Division Marketing/Communication Manager
Tel: + 1 (914) 609 0381
Fax: + 1 (914) 609 0399
e-mail: hcoleman@nexant.com

ASIA

Nexant Asia Ltd

22nd Floor, Rasa Tower 1
555 Phahonyothin Road
Kwaeng Chatuchak, Khet Chatuchak
Bangkok 10900
Thailand
Attn: Maoliosa Denye
ChemSystems Marketing Manager
Tel: +66-2-793 4626
Fax: +66-2-937 5145
Email: mdenye@nexant.com

Illustrative Table of Contents (Quarterly Business Analysis – Western Europe)

APPENDIX C.

Section	Page
1 Executive Summary	1
2 Crude Oil, Refining and Petrochemical Feedstocks	7
2.1 Crude Oil and Refining	7
3 Olefins	13
3.1 Ethylene	13
3.2 Propylene	22
3.3 Butadiene	27
4 Polyolefins	30
4.1 Low Density Polyethylene (LDPE)	30
4.2 Linear Low Density Polyethylene (LLDPE)	34
4.3 High Density Polyethylene (HDPE)	38
4.4 Polypropylene (PP)	45
5 Vinyls	48
5.1 Chloralkali, Ethylene Dichloride and Vinyl Chloride Monomer	48
5.2 Polyvinyl Chloride (PVC)	55
6 Aromatics	59
6.1 Reformate, Benzene, Toluene and Xylenes	59
6.2 Cyclohexane	68
7 Styrenics	71
7.1 Styrene	71
7.2 Polystyrene	75
8 Polyester and Intermediates	79
8.1 Ethylene Oxide (EO) and Mono Ethylene Glycol (MEG)	79
8.2 <i>para</i> -Xylene (PX) and <i>ortho</i> -Xylene (OX)	86
8.3 Purified Terephthalic Acid (PTA)	90
8.4 Polyethylene Terephthate (PET)	93
9 Propylene Derivatives	96
9.1 Acrylonitrile	96
9.2 Cumene and Phenol	99
10 Competitive Regional Economics	102
Appendix	Page
A Prices	109

Illustrative Tables and Figures

Table D.1 Ethylene Costs, Revenues and Margins (Standard)
Including Butadiene and Benzene Extraction
(euros per ton ethylene)

		Leader		Difference	Laggard	
		2008.3	2008.4		2008.3	2008.4
OPERATING DATA						
Battery Limits (ISBL)	€ million	667	668		340	340
Offsites (OSBL)	€ million	334	334		167	167
Capital Costs	€ million	1 001	1 001		507	507
Capacity	(thousand tons/yr)	800	800		325	325
Operating Rate	(percent)	86	76		86	76
Production	(thousand tons/yr)	688	608		280	247
PRODUCTION ECONOMICS						
Raw Materials						
Naphtha		2 069	1 043	(1 027)	2 210	1 114
Catalyst and Chemicals		3	4	-	3	4
Total Raw Materials		2 073	1 046	(1 026)	2 214	1 117
Utilities		312	204	(108)	341	222
By Products						
Benzene		(204)	(130)	74	-	-
Butadiene		(189)	(194)	(5)	-	-
Propylene		(509)	(478)	32	(519)	(487)
Pygas		-	-	-	(550)	(331)
Mixed C4		-	-	-	(232)	(113)
Fuel (FOE)		(359)	(228)	131	(386)	(245)
Raffinate-1		(114)	(56)	58	-	-
Light Ends		(109)	(66)	43	-	-
C7 - C9 cut		(176)	(107)	69	-	-
Benzene Raffinate		(37)	(19)	18	-	-
Total By Product Credits		(1 697)	(1 277)	421	(1 687)	(1 175)
Variable Cost						
		687	(26)	(714)	868	165
Direct Fixed Costs		36	40	-	56	63
Allocated Fixed Costs		29	33	-	41	47
Technical Support/Royalty		-	-	-	-	-
Cash Costs		752	47	(705)	965	275
Depreciation		121	137	16	151	171
MARGIN ANALYSIS						
Price		1 228	1 120	(108)	1 228	1 120
Freight		20	20	-	20	20
Price, Netback		1 208	1 100	(108)	1 208	1 100
Variable Cost Margin		521	1 127	606	341	936
Cash Cost Margin		456	1 053	597	244	826
Return on Replacement Capital		23.0	55.6	32.6		

Figure D.1 Standard Steam Cracker Margins
(cash cost (naphtha feed, including benzene and butadiene))

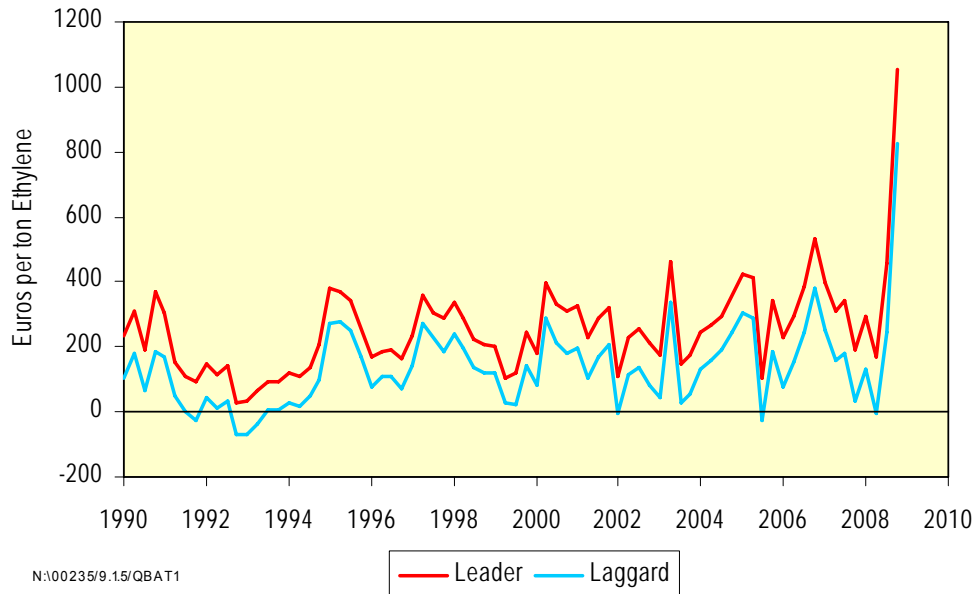


Table D.2 Capacities for SBR in Asia Pacific
(thousand tons per year)

Company	Location	2006	2007	2008	2009	2010	2011	2012	Process
China									
Bridgestone (Huizhou) Synthetic Rubber	Huizhou, Guangdong	-	-	25	50	50	50	50	Emulsion
Dushanzi Petrochemical	Dushanzi, Xinjiang	-	-	-	-	100	100	100	Solution
Fujian Refinery & Petrochemical	Quanzhou, Fujian	-	-	-	-	-	100	100	Solution
Fushun Petrochemical	Fushun, Liaoning	-	-	-	-	101	200	200	Emulsion
Huajin Chemical	Panjin, Liaoning	-	-	-	-	-	50	100	Solution
Jilin Chemical	Jilin, Jilin	140	140	140	140	140	140	140	Emulsion
Lanzhou Petrochemical	Lanzhou, Gansu	55	55	132	155	155	155	155	Emulsion
Maoming Petrochemical	Maoming, Guangdong	30	30	30	30	30	30	30	Solution
Nantong Shenhua	Nantong, Jiangsu	120	120	120	120	120	120	120	Emulsion
Nantong Shenhua	Nantong, Jiangsu	50	50	50	50	50	50	50	Emulsion
Qilu Petrochemical	Zibo, Shandong	146	200	200	300	300	300	300	Emulsion
Shanghai Gaoqiao	Caojing, Shanghai	15	42	42	42	42	42	42	Solution
Yangzi Petrochemical	Nanjing, Jiangsu	-	67	100	100	100	100	200	Emulsion
Total		556	704	839	987	1 188	1 437	1 587	

Table D.2 Capacities for SBR in Asia Pacific (Cont.)
(thousand tons per year)

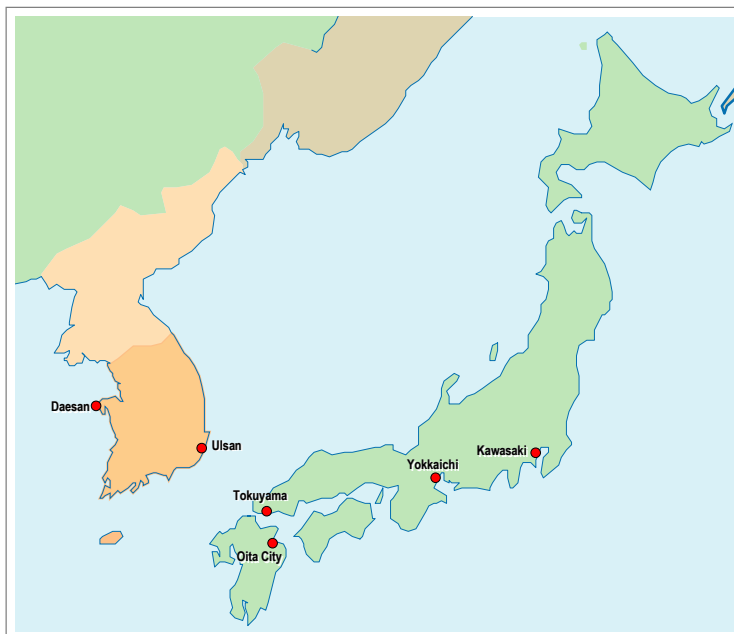
Company	Location	2006	2007	2008	2009	2010	2011	2012	Process
Japan									
Asahi Kasei	Kawasaki	109	113	113	154	168	168	168	Solution
Japan Elastomer	Oita City, Oita	35	35	55	62	62	62	62	Solution
JSR	Yokkaichi, Mie	255	255	255	255	255	255	255	Emulsion
JSR	Yokkaichi, Mie	45	45	45	45	45	45	45	Solution
Mitsubishi Chemical	Yokkaichi, Mie	65	65	65	65	65	65	65	Emulsion
Zeon	Tokuyama, Yamaguchi	110	110	110	110	110	110	110	Emulsion
Zeon	Tokuyama, Yamaguchi	55	55	55	55	55	55	55	Solution
	Total	674	678	698	746	760	760	760	
South Korea									
Kumho Petrochemical	Ulsan	240	261	350	350	350	350	350	Emulsion
LG Daesan	Daesan	95	125	127	135	135	135	135	Emulsion
	Total	335	386	477	485	485	485	485	
Taiwan									
Chi Mei	Tainan	20	20	20	20	20	20	20	Solution
Taiwan Synthetic Rubber	Kaohsiung City	100	100	100	100	100	100	100	Emulsion
	Total	120	120	120	120	120	120	120	
India									
Apar	Mumbai	8	10	10	10	10	10	10	Emulsion
Apcotex Lattices Ltd.	Taloja	10	10	10	10	10	10	10	Emulsion
Indian Oil Corp.	Panipat	-	-	-	-	-	-	120	Solution
	Total	18	20	20	20	20	20	140	
Indonesia									
Sentra Sintetikajaya	Merak, West Java	60	60	60	60	60	60	60	Emulsion
	Total	60	60	60	60	60	60	60	
Thailand									
BST Elastomers	Map Ta Phut	72	72	72	72	72	72	72	Emulsion
	Total	72	72	72	72	72	72	72	
	Total Firm Capacity	1 835	2 040	2 286	2 490	2 705	2 954	3 224	
	Speculative Changes	-	-	-	-	-	12	12	
	Total	1 835	2 040	2 286	2 490	2 705	2 966	3 236	

Figure D.2 Location of SBR Plants in China



PP: 00235/09.01.03.06/08/SBR

Figure D.3 Location of SBR Plants in Japan and South Korea



PP: 00235/09.01.03.06/08/SBR

CHEMSYSTEMS

ChemSystems Programs

ChemSystems Online

Providing online databases and tools for analysis and forecasts of the markets and economics of the petroleum and petrochemical industry.

Petroleum & Petrochemical Economics (PPE)

Providing regular analysis and forecast reports on the profitability, competitive position, and supply/demand trends of the global industry.

ChemSystems Simulator

Providing a state-of-the-art simulation model for the entire global petroleum and petrochemical market – including technology, costs, supply/demand, and profitability.

Process Evaluation/ Research Planning (PERP)

Providing analysis and economic models of the existing and developing process technology used by the industry.

ChemSystems Training

Providing in-house and public training courses on the industry, its chemistry and on the planning and analysis methodologies.

PolyOlefins Planning Service (POPS)

Providing detailed market and technology evaluation of the global polyolefin industry.

ChemSystems Conferences

Providing access to 'must-attend' events.

Special Reports

Providing reports on topical issues and aspects of the industry.

www.chemsystems.com