

**NexantThinking™**

Special Reports

**Changing Feedstock Trends and their  
Effects on the Surfactants Value  
Chain**

Prospectus  
July 2016

# NexantThinking™

## Special Reports

### Changing Feedstock Trends and their Effects on the Surfactants Value Chain

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# Contents

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Section	Page
1 Introduction.....	1
1.1 OVERVIEW .....	1
2 Report Scope .....	4
2.1 OBJECTIVE .....	4
2.2 SCOPE .....	4
3 Proposed Table of Contents .....	6
4 Methodology.....	8
4.1 MARKET DYNAMICS .....	8
5 Nexant Experience .....	14
5.1 NEXANT ENERGY AND CHEMICALS ADVISORY .....	14
5.2 NEXANT'S TEAM.....	15
5.3 SELECTED RECENT PROJECT EXPERIENCE .....	15
5.4 RELEVANT MULTI-CLIENT REPORTS.....	17
6 Contact Details, Terms and Conditions, Authorization Form .....	18
6.1 CONTACT DETAILS.....	18

1.1 OVERVIEW

In terms of commercial value, surfactants contribute to the largest portion of the cost of producing detergents. There are two fundamental production routes, namely the synthetic route and the natural route. "Natural" and "synthetic" are merely industry terms, which have been historically used to differentiate these two routes. Natural routes refer to processes that are based on oleo feedstocks, such as coconut oil, while synthetic routes refer to processes which are based on petrochemical feedstocks such as ethylene or *n*-paraffin.

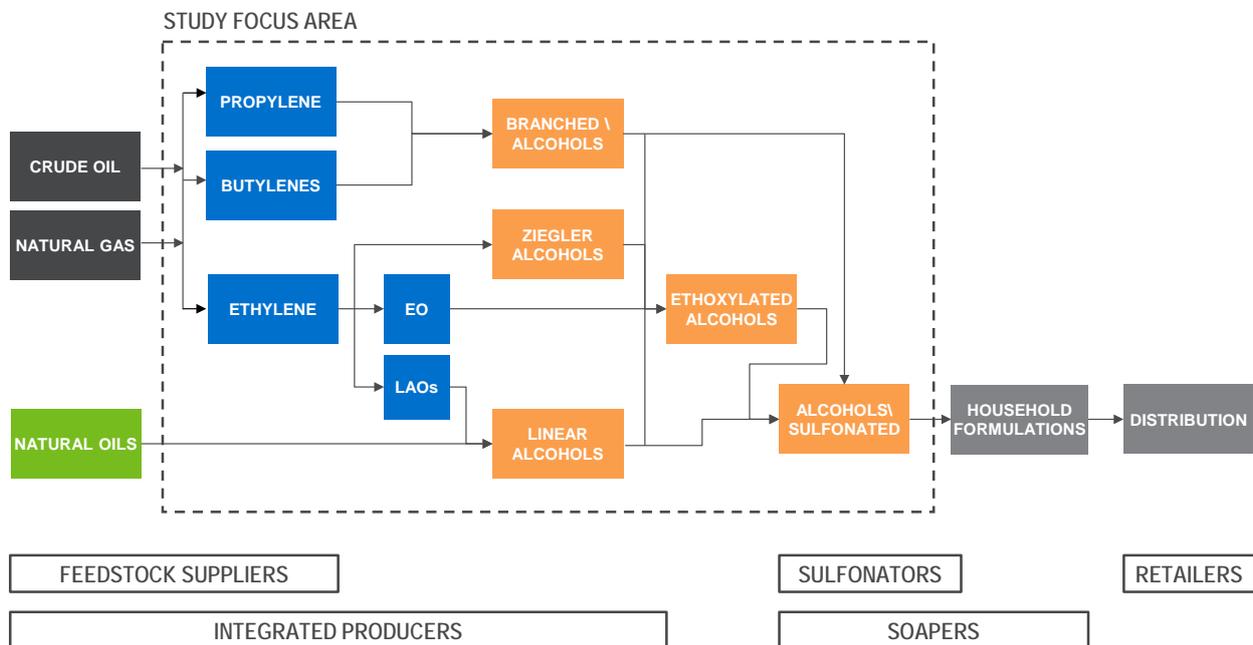
This prospectus describes Nexant’s upcoming multi-client study, **Changing Feedstock Trends and their Effect on the Surfactant Value Chain**, including the objective, the scope of works, the methodology to be used and Nexant’s qualifications to perform such a study.

The study will focus on the value chain below and provide detailed research and analysis assessing the impacts of feedstock changes to each player in this supply chain.

Nexant has significant experience in the study focus area from single client engagements for major producers. In addition, the NexantThinking™ simulator and database will be used to provide data and insights from its subscription reports on the petrochemicals shown in the value chain.

The project will be led by Eric Hudson who has extensive experience in detergent alcohols, intermediates and surfactants and has managed projects for multiple major producers in these sectors globally.

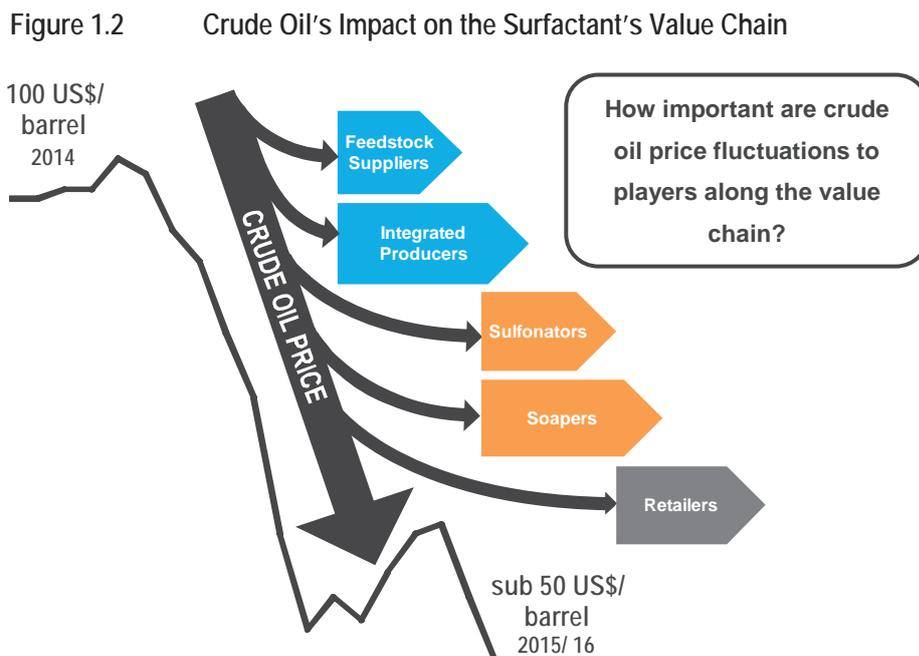
Figure 1.1 Typical Surfactants Value Chain



As shown by the figure below the oil price has dropped significantly from approximately 100 US\$ per barrel in 2014 to below 50 US\$/ barrel for the majority of 2015 and year to date 2016. This change has differing impacts for players along the value chain and this study will provide a comprehensive strategic analysis of the new low crude oil price scenario and the longer term effects across the competitive landscape. The study will highlight strategic options for players in the surfactants value chain including producers based on both natural and synthetic feedstocks, such as sulphonators, soapers, and retailers in the Fast Moving Consumer Goods (FMCG) sector.

The scope of the study will to answer the following key questions regarding the low oil price environment:

- What impact does a prolonged period of low crude oil prices have on the surfactants value chain and what does this mean for the various players?
- How do the revised economics affect formulators going forward and what does this mean for all participants in the value chain?
- How important is crude oil pricing to formulators and their downstream clients?
- Does the current low crude oil price scenario impact unfavourably on green chemicals?
- How does low price crude oil affect shale oil developments?
- How does the financial community view the new situation and how could this alter the possible supply chain tightness of synthetic product for formulators?



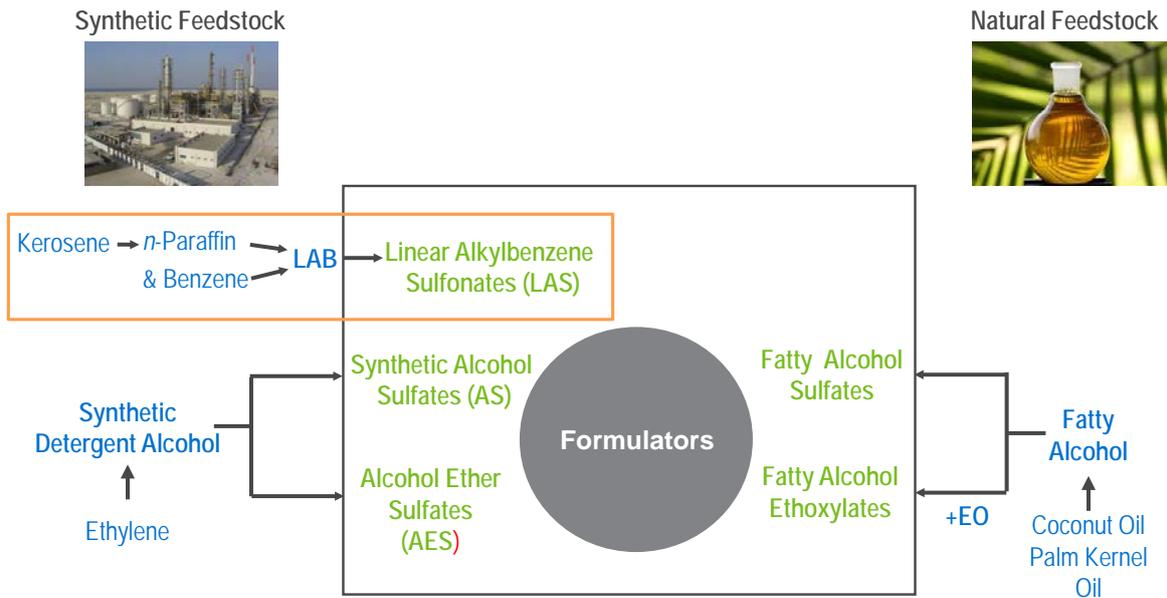
As exhibited in the figure below there are multiple feedstocks which formulators purchases, each with varying feedstock dynamics and varying levels of competition with alternative feedstocks. The scope of the study will to answer the following key questions regarding the dynamics of synthetic and natural feedstocks and their impact on the surfactants value chain:

- How vulnerable will the natural oil chain be to changes synthetic feedstock cost structures and where does that leave the supply/demand picture downstream?
- How valid is the threat to European producers from South-East Asian upstream suppliers of palm oil?

- What impact would future legislation and regional government policies have on global competitiveness and possible supply chain shifts?
- Where does this leave new alternative technology sourcing?

The impact of biosurfactants will also be addressed as will opportunities for “green” products as possible opportunities to add value for formulators. Amongst these could be green ethylene oxide which benefits various participants in the value chain.

Figure 1.3 Feedstock Dynamics within the Surfactants Value Chain



## 2.1 OBJECTIVE

**The objective of this study is to provide a strategic assessment of the key impacts on the surfactants value chain as a result of the changing feedstock pricing trends in both fossil and naturally derived feedstocks.**

## 2.2 SCOPE

### 2.2.1 The Surfactants Value Chain

This report will introduce the surfactants value chain, discuss levels of integration along it, key suppliers and characteristics of the industry at each step. Analysis will include:

- Feedstocks including crude oil, natural gas, natural oils
- Intermediates including propylene, butylenes, ethylene (EO, LAOs)
- Alcohols including branched, ziegler, linear, ethoxylated
- Surfactants
- End users (e.g. in detergent and personal care applications)

#### 2.2.1.1 *Market Dynamics*

This report will provide the supply (capacities & production), demand and trade history and forecast for the following products in the value chain. Analysis would be on a global and regional basis (North America, Western Europe, Asia, and Rest of the World) and would focus on the impact of any overcapacity/ new entrants, and growth outlook in key end use markets. It would also cover in more detailed sections on emerging markets growth (e.g. Iran, South America) opportunities. The products covered will include:

- Ethylene
- Ethylene Oxide
- Linear Alpha Olefins
- Propylene
- Butylenes
- Alcohols
- Surfactants
- Natural Oil Products

It will also discuss how regulations could impact the market dynamics and will include regulatory issues such as palm oil forests, ecological issue. Analysis of what trade barriers exist and the impacts on the value chain will be detailed.

#### 2.2.1.2 *Competiveness and Profitability*

The report will provide pricing at in a low oil environment (2015 actual prices) for feedstocks (crude oil, natural gas) and two scenarios for natural feedstocks (natural oils, fatty acids). It would also discuss raw material price volatility and its impact along the value chain. It will qualitatively describe the situation at higher oil prices of 80\$/bbl and above.

Cost of production models for each of the below products will be developed for 2015 and in the United States and Western Europe as well as Asia models for natural oil based. It will also present a scenario where crude oil could be 80 US\$ per barrel.

- Ethylene
- Ethylene Oxide
- Linear Alpha Olefins
- Alcohols, synthetic and natural based
- Surfactants, synthetic and natural based

A comparison of the synthetic cost structure against the natural cost structure will be made and sensitivities based on Nexant's crude oil and natural oil price forecasts will be performed.

The cost of production for on purpose feedstock production of several surfactant feedstocks produced using alternative technology will be developed and compared with the cost structure of traditional production routes.

### 2.2.1.3 *Strategic Business Options*

Nexant will research and answer key strategic questions inclusive of:

- Where is value created (via integration or innovation?)
- Where are new geographic growth areas for surfactants likely to be?
- Future bio and other feedstocks, product substitution issues
- How do the various stakeholders optimise their business position?
- New game changers in technology including synthetic and bio-based developments
- Iran as a new market?
- What is the optimum supply pattern for soapers?

- 1 Executive Summary**
- 2 Introduction**
  - 2.1 SCOPE
  - 2.2 WHO WINS IN A LOW CRUDE OIL ENVIRONMENT?
- 3 The Surfactants Value Chain**
  - 3.1 FEEDSTOCKS
  - 3.2 INTERMEDIATES
  - 3.3 ALCOHOLS
  - 3.4 SURFACTANTS
  - 3.5 END USERS
- 4 Market Dynamics**
  - 4.1 REGULATORY AND TRADE ISSUES
  - 4.2 ETHYLENE
  - 4.3 ETHYLENE OXIDE
  - 4.4 LINEAR ALPHA OLEFINS
  - 4.5 PROPYLENE
  - 4.6 BUTYLENES
  - 4.7 ALCOHOLS
  - 4.8 SURFACTANTS
  - 4.9 NATURAL OIL PRODUCTS
- 5 Competiveness and Profitability**
  - 5.1 FEEDSTOCK PRICING
  - 5.2 COST OF PRODUCTION MODELS & COMPETIVENESS ANALYSIS
    - 5.2.1 Ethylene
    - 5.2.2 Ethylene Oxide
    - 5.2.3 Linear Alpha Olefins
    - 5.2.4 Alcohols
      - 5.2.4.1 Synthetic based
      - 5.2.4.2 Natural based
    - 5.2.5 Surfactants
      - 5.2.5.1 Synthetic based
      - 5.2.5.2 Natural based (PKO – Palm Kernel Oil)
      - 5.2.5.3 Synthetic vs natural comparison
    - 5.2.6 Sensitivities based on Nexant's crude oil and natural oil price forecasts
    - 5.2.7 On purpose feedstock production
- 6 Strategic Business Options**
  - 6.1 WHERE IS VALUE CREATED (VIA INTEGRATION OR INNOVATION?)
  - 6.2 WHERE ARE NEW GEOGRAPHIC GROWTH AREAS FOR SURFACTANTS LIKELY TO BE?
  - 6.3 FUTURE BIO AND OTHER FEEDSTOCKS, PRODUCT SUBSTITUTION ISSUES
  - 6.4 HOW DO THE VARIOUS STAKEHOLDERS OPTIMISE THEIR BUSINESS POSITION?

- 6.5 NEW GAME CHANGERS IN TECHNOLOGY INCLUDING SYNTHETIC AND BIOBASED DEVELOPMENTS
- 6.6 IRAN AS A NEW MARKET?
- 6.7 WHAT IS THE OPTIMUM SUPPLY PATTERN FOR SOAPERS?

Commercial information and forecasts will be developed using Nexant's in-house databases including its award winning NexantThinking™ Global Industry Simulator tools, supplemented by extensive regional fieldwork. Discussions will be held with key industry and value chain participants to provide a thorough understanding of the dynamics of the current and future surfactant value chain.

Nexant's London, New York, and Malaysia offices are expected to be heavily involved in this exercise. The insights will be supplemented by experience gained from previous single and multi-subscriber studies carried out by Nexant's Energy and Chemicals Advisory division. The approach will cover:

- A series of interviews with:
  - Soapers/ formulators
  - Local chemical companies (including personnel in marketing, technology, planning and manufacturing)
  - Feedstock producers and suppliers to the surfactants value chain
  - Importers, distributors, traders and end-users
  - Technology licensors for new developments
  - Industry and regional trade associations.
- Review of extensive in-house and published information on the global detergent industries. Nexant will leverage on its widely popular and recognized globally Process Evaluation and Research Planning (PERP) program and economic studies on the crude oil and natural oil feedstock businesses.
- Preliminary views on industry dynamics, macro-economic and country-related issues for developing markets such as South America, China, Iran, the GCC and North African region.
- Fieldwork in the business will be completed as necessary to supplement the analysis and clarify specific issues. Given the global nature of these businesses, all analysis will be supported by professionals from Nexant's network of global offices particularly in the natural oil and biosurfactant segments.

#### 4.1 MARKET DYNAMICS

Nexant's supply, demand and trade analysis is segmented into three principle areas:

##### *Demand*

- Assesses historic and forecast consumption; forecasts are based on projections of economic activity and diverse end use applications across key consuming industry sectors.

##### *Supply*

- Identifies all producers, the capacity, location, and process of all current production assets, along with discussion regarding the status of new projects and capacity under construction.

##### *Supply, Demand and Trade*

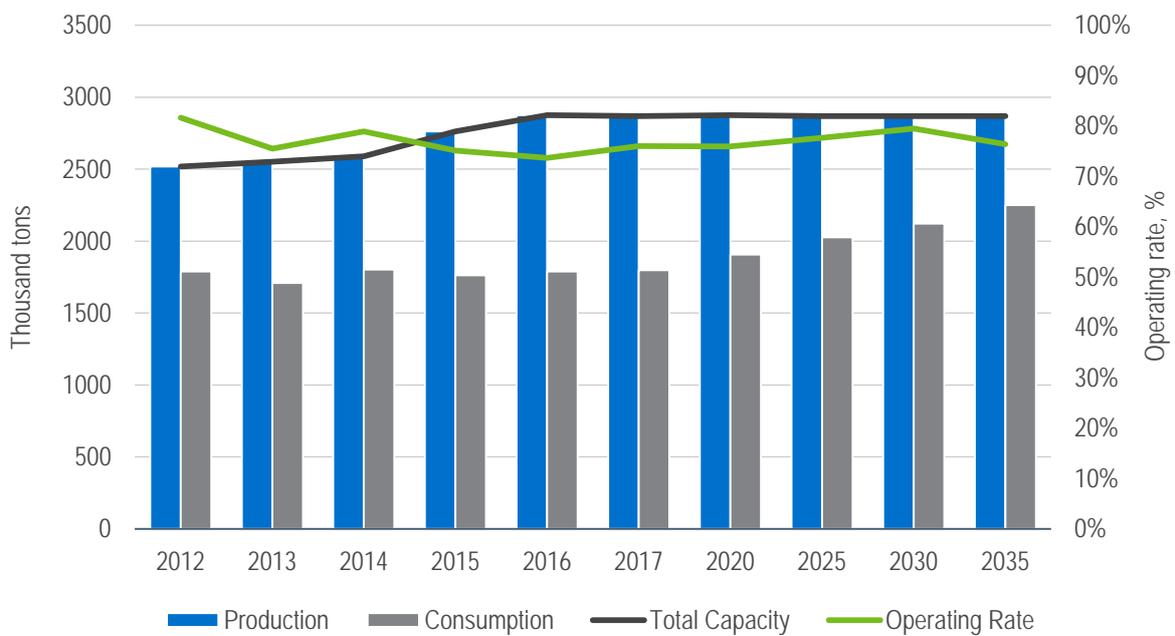
- Provides historical analysis and forecasts of consumption, production, imports/exports, inventory build-up/decline, capacity and capacity utilisation. The analysis provides a key insight into the relative strength of regional markets.

The study will provide market dynamics data and insights for the products shown in the Proposed Table of Contents in Section 3. Below are some examples of the types of deliverables which will be provided.

**Table 4.1** Surfactants Supply, Demand and Trade  
(Illustrative)

	Actual			Estimate			Forecast				Average Annual Growth Rate, %	
	2012	2013	2014	2015	2016	2017	2020	2025	2030	2035	2000-2014	2014-2020
Firm Capacity	2 517	2 551	2 589	2 762	2 876	2 868	2 876	2 868	2 868	2 868		
Speculative	-	-	-	-	-	-	-	-	-	-		
Total Capacity	2 517	2 551	2 589	2 762	2 876	2 868	2 876	2 868	2 868	2 868	0.3	1.8
Operating Rate	82%	75%	79%	75%	74%	76%	76%	78%	79%	76%		
Production	2 054	1 925	2 042	2 074	2 119	2 180	2 184	2 226	2 279	2 190	(0.3)	1.1
Net Export	265	216	240	312	331	382	279	199	159	60		
Consumption	1 789	1 709	1 802	1 762	1 788	1 798	1 905	2 026	2 120	2 250	0.4	0.9

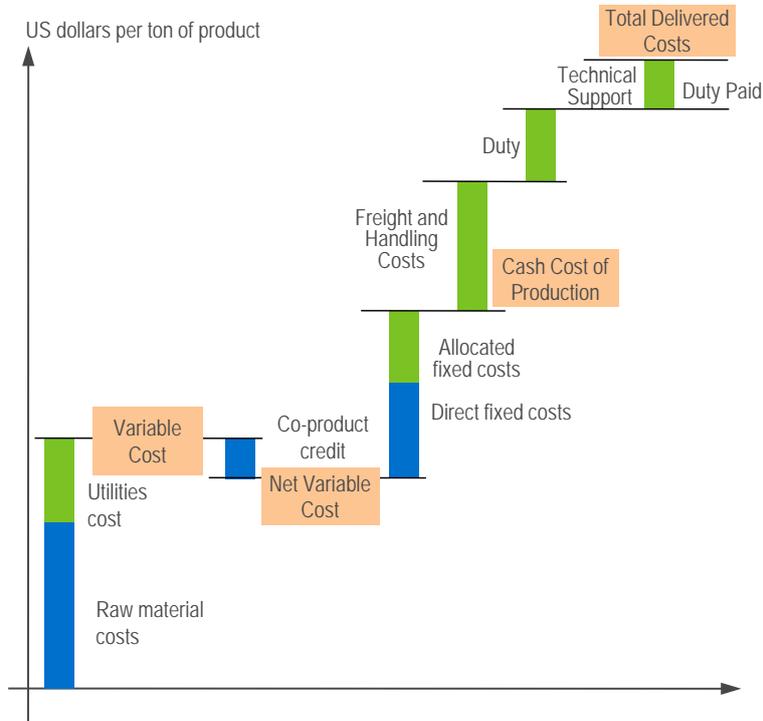
**Figure 4.1** Surfactants Supply, Demand and Trade  
(Illustrative)



### 4.1.1 Competiveness and Profitability

Nexant uses a standard pro-forma to calculate delivered costs. As the Figure below indicates, the variable cost of production includes the costs of raw materials – feedstocks plus catalysts and chemicals – and utilities at cash cost or purchase cost, with a credit for co-products.

**Figure 4.2 Delivered Cost of Production Breakdown**

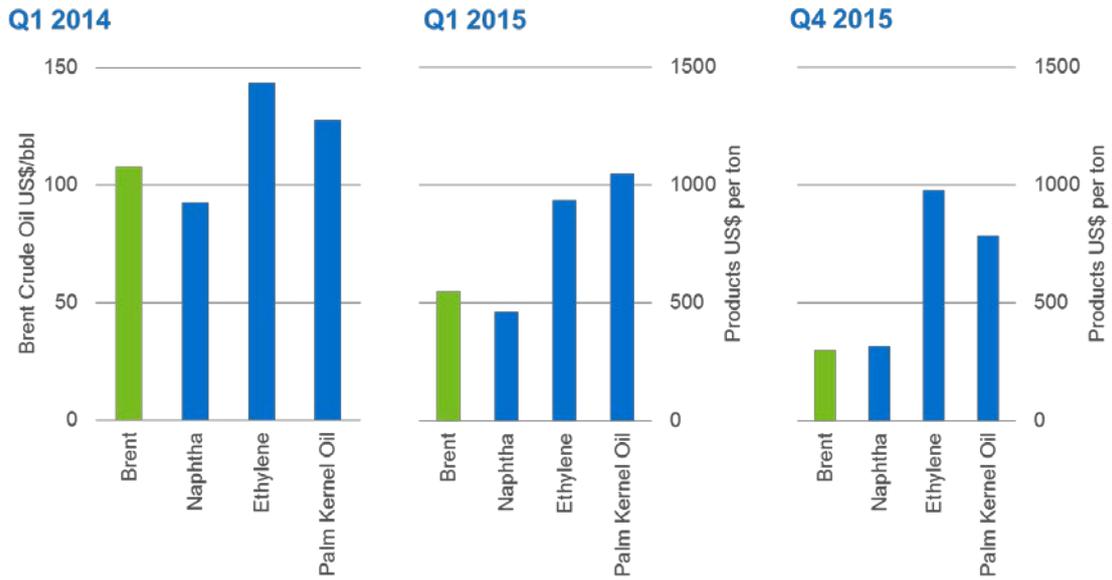


The study will provide cost of production estimates and analysis for the products shown in Section 2. This will analyse the impact falling crude oil prices have had on industry players along the value chain. Some examples of deliverables are shown below.

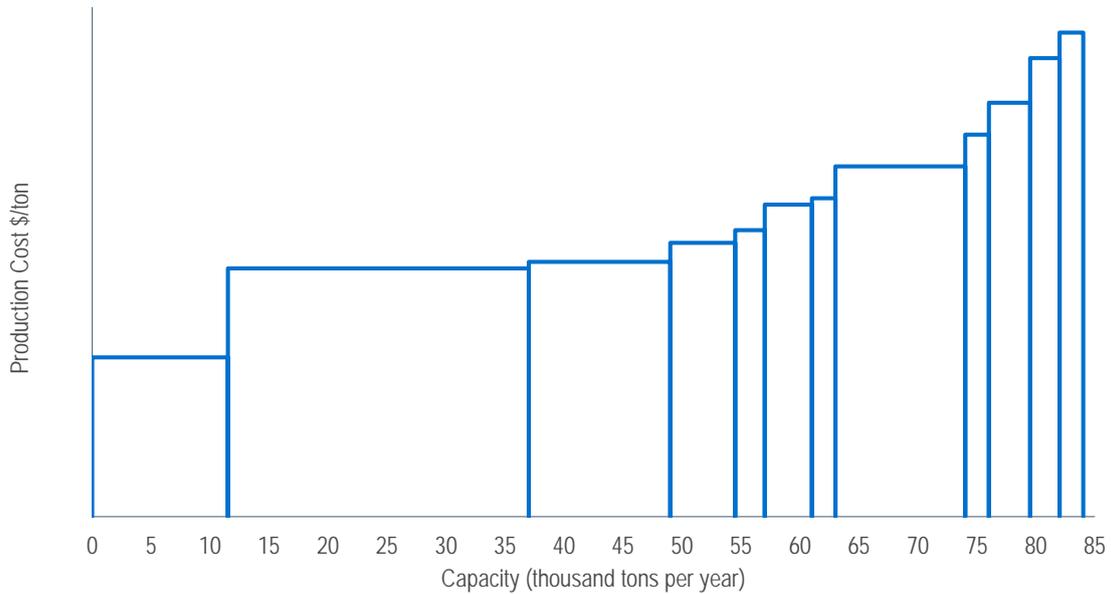
**Table 4.2 Cost of Production Table**  
(Illustrative)

		CAPITAL COST		MILLION U.S. \$		
Plant start-up	2015	Inside Battery Limits (ISBL)		149.21		
		Outside Battery Limits (OSBL)		52.22		
Location	USGC	<b>Total Plant Capital</b>		<b>201.43</b>		
Capacity	100 thousand tons per year	Other Project Costs (OPC)		50.36		
	220 millions lbs per year	<b>Total Project Investment</b>		<b>251.79</b>		
Operating rate	100 percent	Working capital		28.74		
Throughput	100 thousand tons per year	<b>Total Capital Employed</b>		<b>280.53</b>		
		UNITS	PRICE	ANNUAL		
		Per Ton	U.S. \$/	U.S. \$	COST U.S.\$	
		Product	Unit	Per Ton	millions	
					U.S. \$	
					Per Lb	
PRODUCTION COST SUMMARY						
<b>RAW MATERIALS</b>	Normal Paraffin	ton	0.792	1,153	912.54	91.25
	Benzene	ton	0.351	887	311.23	31.12
	Catalysts & Other Chemicals (LAB-	U.S. \$	1.000	20	20.00	2.00
			<b>TOTAL RAW MATERIALS</b>		<b>1,243.77</b>	<b>124.38</b>
						<b>0.56</b>
<b>BYPRODUCT CREDITS</b>	Heavy Alkylate	ton	(0.073)	444	(32.20)	(3.22)
	Pacol™ Net Light Ends	ton	(0.040)	187	(7.52)	(0.75)
	PEP™ Aromatics	m <sup>3</sup>	(0.026)	95	(2.46)	(0.25)
	Benzene drag	m <sup>3</sup>	(0.010)	709	(6.88)	(0.69)
			<b>TOTAL BYPRODUCT CREDITS</b>		<b>(49.07)</b>	<b>(4.91)</b>
						<b>(0.02)</b>
	<b>NET RAW MATERIALS</b>				<b>1,194.70</b>	<b>119.47</b>
						<b>0.54</b>
<b>UTILITIES</b>	Cooling Water	kiloton	0.087	28.10	2.44	0.24
	Electricity	MWh	0.270	50.86	13.72	1.37
	Fuel Gas (GJ)	Gigajoule	18.921	3.34	63.27	6.33
	MP Steam (200 psig)	ton	0.552	14.38	7.94	0.79
			<b>TOTAL UTILITIES</b>		<b>87.37</b>	<b>8.74</b>
						<b>0.04</b>
	<b>VARIABLE COST</b>				<b>1,785.52</b>	<b>178.55</b>
						<b>0.81</b>
<b>DIRECT FIXED COSTS</b>	Labor	18 employees	52,982	U.S. \$	9.54	0.95
	Foreman	3 employees	60,139	U.S. \$	1.80	0.18
	Supervisor	1 employees	72,568	U.S. \$	0.73	0.07
	Maintenance, Material & Labor		3.5 %	of ISBL	52.22	5.22
	Direct Overheads		45 %	Labor & Supervision	5.43	0.54
			<b>TOTAL DIRECT FIXED COSTS</b>		<b>69.72</b>	<b>6.97</b>
						<b>0.03</b>
<b>ALLOCATED FIXED COSTS</b>	General Plant Overhead		60 %	Direct Fixed Costs	41.83	4.18
	Insurance, Property Tax		1.0 %	Total Plant Capital	20.14	2.01
	Environmental		0.5 %	Total Plant Capital	10.07	1.01
			<b>TOTAL ALLOCATED FIXED COSTS</b>		<b>72.05</b>	<b>7.20</b>
						<b>0.03</b>
	<b>TOTAL FIXED COSTS</b>				<b>141.77</b>	<b>14.18</b>
						<b>0.06</b>
	<b>TOTAL CASH COST</b>				<b>1,927.28</b>	<b>192.73</b>
						<b>0.87</b>

**Figure 4.3** Raw Materials Costs along the Value Chain  
*(Illustrative)*



**Figure 4.4** Typical Cost Curve for Fatty Alcohols  
*(Illustrative)*



4.1.1.1 Delivered Cost Competitiveness

Nexant will provide an analysis comparing the delivered cash cost from the proposed plants at reference destinations. A typical deliverable is shown in the following chart.

Figure 4.5 Delivered Cost Competitiveness to Destination Market for Surfactants (Illustrative)

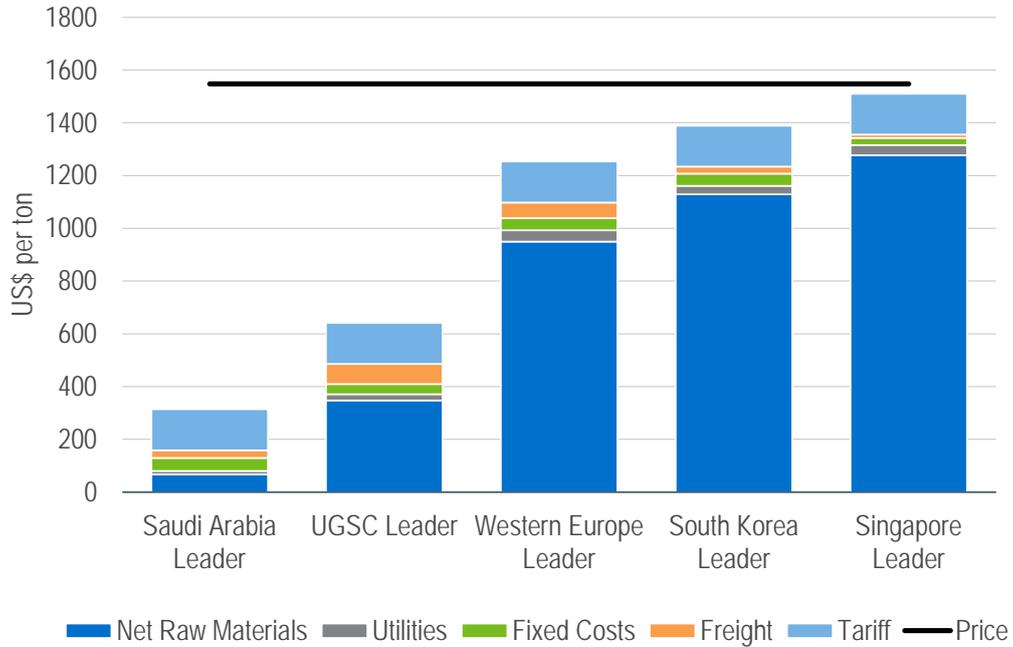
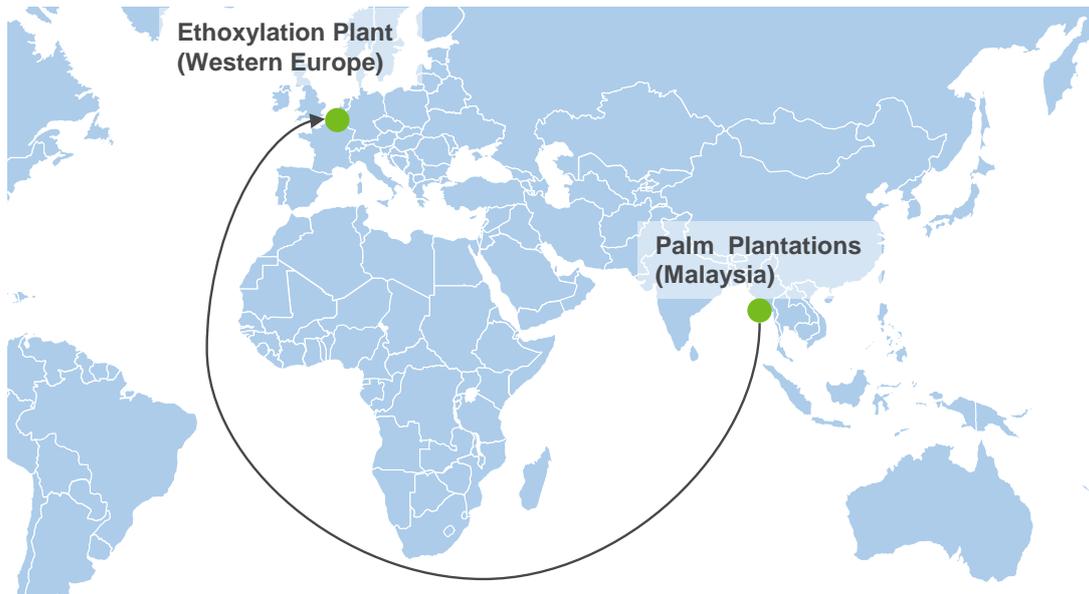


Figure 4.6 Palm Kernel Oil Back Integration (Illustrative)



### 5.1 NEXANT ENERGY AND CHEMICALS ADVISORY

For over 50 years, Nexant's consulting professionals have helped clients by providing strategic advisory, technical and operations consulting services, and most importantly, privileged insights. The company has completed thousands of client assignments in more than 100 countries. Our clientele ranges from major oil and chemical companies, governments, and financial institutions to regulator and development agencies and law firms.

We are unique in our comprehensive focus on the entire energy, oil, gas and chemical sector. Staffed by over 150 seasoned industry experts, we understand the challenges facing senior management in the industries we serve. Our global consulting team brings together our collective technical, commercial and financial skills, who work closely and confidentially with our clients to address real world issues and identify opportunities that add value to their businesses. Our staff includes engineers, chemists, bio chemists, MBA's and seasoned business leaders from the sectors we serve.

Nexant provides a range of targeted consulting services from the initial assessment of corporate and business unit strategies to the development of actionable strategies, to advisory support in project finance and due diligence for mergers and acquisitions – all backed by deep knowledge of downstream oil & gas, petrochemicals, plastics, specialty chemicals and Clean Tech markets and products.

Significantly, Nexant has proprietary technology and commercial analysis, NexantThinking™ market data, which includes market dynamics and pricing forecasts, capacity developments and production cost economics.

Our purpose is to deliver subject matter expertise that gives a clearer perspective and to provide visionary thinking which allows our customers to be insightful and ahead of the competition

This can only be achieved through an unrivalled combination of:

- **Industry Knowledge** - our consultants all have extensive industry experience, and are engaged fulltime on identifying and addressing the challenges facing the Alternative Fuels, Petroleum/Gas and Chemical industry.
- **In-house Data** - we have an unrivalled database on the industry its technology and market dynamics, and employ teams of researchers to continually update this resource. Our NexantThinking™ products which can be accessed by subscribers, contains the core of this knowledge base covering the commodity chemicals and polymers plus a range of intermediates and specialties.
- **Proven and Tested Methodologies** - we have developed a range of methodologies to cover different types of assignments, such as feasibility studies, project finance support, privatizations, due diligence studies for acquisitions and financings, market and technology reviews. All of these have been tailored and continuously improved to suit the needs of the industry.
- **Technical Competence** - we continuously track the technical improvements in the industry and frequently review new process improvements for clients. Our NexantThinking™ Process Evaluation/Research Planning (PERP) product encapsulates some of this work and is available to subscribers. A core strength is our capability to provide independent support to the key issue of process technology selection.
- **Global Presence** - our permanent offices in London, Bahrain, New York, Houston, Singapore, Bangkok, Kuala Lumpur and Shanghai will provide comprehensive coverage. In addition, we have long-term relationships with representatives or registered branch offices in most major

locations, including Beijing, Seoul and Tokyo. Nexant professionals have extensive experience in emerging markets such as the former Soviet Union and China, and our team of industry experts can work fluently in over ten languages.

- **Strategic Consulting** - we have been on the leading edge of many of the strategic initiatives in the industry, including major investments, acquisitions, consolidations, restructuring, and privatizations.
- **Thought Leadership** – We pride ourselves on identifying key issues at their formative stages and exploring options for the industry to capture any associated potential benefits.
- **Coverage** - across all relevant sectors. Our team can provide clients with a complete and holistic view of the sector and its place in the overall economy covering the entire hydrocarbon value chain.

**We are recognized for our quality and industry thought leadership:**

- Nexant is often quoted in the alternative fuels, petroleum/gas and chemical press on its views on markets and developments and team members are regularly called on to give expert papers at major conferences.
- Our team of experienced vice presidents is responsible for the quality of our work in their individual areas of expertise. They are expected to provide inputs to and supervise every assignment we undertake.

## 5.2 NEXANT'S TEAM

The study will be managed and conducted by Nexant's Energy and Chemicals Advisory staff with extensive industry experience in synthetic petrochemicals, such as detergent alcohols and LAB, as well as biosurfactants and natural oil derivatives.

The project will be led by **Eric Hudson** who is a Managing Consultant Nexant's Energy & Chemicals Business in the Europe, Africa and Middle East region. He has extensive experience in detergents alcohols, intermediates and surfactants and has managed projects for multiple major producers in these sectors globally. He has been a guest speaker and chairman at several international conferences in these sectors.

## 5.3 SELECTED RECENT PROJECT EXPERIENCE

- **Various confidential studies** for a major European detergent alcohols producer on cost benchmarking, availability of LAO's, threats for Far East palm oil into Europe and a review of the US suppliers
- **Due diligence: initial markets** – For potential investors, Nexant provided an independent assessment of markets that might be addressed by client's bio-based farnesene. Nexant calculated opportunities and strategies to supply, among others, higher alcohols, polyalpha olefins, oleochemicals and ethoxylates to makers of cosmetics, lubricants and detergents
- **Creating leadership in surfactants** – For a major Brazilian surfactants producer, Nexant mapped opportunities and implementation strategies for multiple pathways to growth. The analysis entailed a deep analysis of US and Latin American markets for surfactants. For the acquisition pathway, Nexant provided a detailed comparison and ranking of fifteen potential targets
- **Opportunities for growth in the shale revolution** – For a specialty chemical producer, Nexant tabulated and ranked opportunities in chemical end-user segments likely to be impacted by low cost shale oil and gas. These included surfactants used in hydraulic fracturing

- **Detergents and intermediates in Gulf states** -- This market study involved a program of contacts with bulk detergent importers and formulators in multiple Middle Eastern countries plus contact with licensors in Western Europe and the USA
- **Detergent Alcohols** – For a European manufacturer, Nexant reviewed the manufacturing processes employed by the major producers of synthetic detergent-range alcohols and determined the ability of these producers to shift a significant proportion of their output to C16-C18 alcohols. The market analysis included producer profiles and plant location, capacity and process, applications, demand by alcohol ethoxylates, alcohol ether sulfates and alcohol sulfates, and product distribution and chain length
- **Supply/Demand forecasting for North American LAB Market and Global Delivered Cost Competitiveness Modelling** - Nexant provided supply and demand balances and forecasting as well as global delivered cost competitiveness of global competitors to prospective lenders as part of a major grass roots cracker complex project in the United States. The project sponsor is a major LAB producer. In depth analysis of the impact of the large scale extraction of shale gas in North America was undertaken in this study.
- **GTL Products Feasibility in the Middle East** - A detailed feasibility study of GTL products for LAB plants in the Middle East including supply/demand, price/margin forecasts, ITB for FEED documents, background to negotiate a fair n-paraffin price from GTL facilities.
- **Guerbet Alcohols Study** - A confidential study for financial institutions for a world scale complex to build guerbet alcohols using LAB as a financial support mechanism.
- **Market and Technical Intelligence of a US Based Chemical Company** - Report assesses technical and market risks of business plan of the company and evaluates the size, drivers and growth prospects for a various products including LAB. It also reviews the technical plans that were used to construct an existing plant in Asia, including process flow diagrams, flowsheets, capital cost estimates.
- **Palm oil industry overview** - overview of palm oil industry focusing on supply demand, industry structure, profiling of major palm plantation companies in Indonesia and Malaysia, technology developments in cultivation and processing and other new industrial developments.
- **Oelochemicals Due diligence report** - Market, technoeconomic and strategic insights in to oelochemical and derivatives industry. Explains historical fatty acid price and capacity trends; key consumers, applications, demand drivers and substitution threats. Analyses markets for glycerine (crude, refined and from biodiesel), palm kernel oil and tallow.
- **Natural detergent grade fatty alcohols feasibility study** - study for a natural detergent grade fatty alcohols plant based on palm kernel oil, with availability of C12-14 chain alcohols, to be located at Al Jubail in the Kingdom of Saudi Arabia.
- **Cost Curves for LAB and Ethoxylates** - Nexant developed cost curves for LAB and Ethoxylates
- **LAB/ LABS Prefeasibility Study** - Nexant were engaged to carry out a pre-feasibility study for a green field linear alkyl benzene / sulphonate (LAB/ LABS) plant to be located in the Arab Gulf. This includes a supply/ demand balances, technology review, HSE requirements and economic model. Modelling of both traditional kerosene routes and GTL feedstock was developed for the cost analysis.
- **Prefeasibility Study for Major Petrochemical Complex in the Middle East** - Review of markets and technology for a range of products including LAB and the development of a financial model to consider complex configurations.

#### 5.4 RELEVANT MULTI-CLIENT REPORTS

- **Process Evaluation/Research Planning (PERP) Report on LAB (2013, 2009, 2003)** - This PERP reviews commercial LAB production technologies. It also calculates regional costs of production and supply / demand.
- **Process Evaluation/ Research Planning (PERP) Report on Detergent Alcohols (2014 and 2012)** – This report provides a comprehensive analysis of technology, economics and markets for the production of detergent range alcohols. Commercial process technologies via both synthetic (based on petrochemical feedstock) and natural (based on oleo feedstock) routes are discussed, and cost of production estimates are included to illustrate cost competitiveness in selected regions. A market review includes capacity listings and supply/demand figures.
- **Process Evaluation/ Research Planning (PERP) Report on Ethoxylates (2015)** – This report provides analysis of the chemistry, technology, business strategies, process economics and markets for ethoxylates from both synthetic and natural feedstocks.
- **Process Evaluation/ Research Planning (PERP) Report on Ethylene (2013)**: An in-depth technology, economic, and market analysis of ethylene. Regional cost competitiveness, commercial end-use markets, chemistry review, process descriptions, and simplified PFDs are covered in the comprehensive evaluation. Technologies modelled for economic evaluation include: steam cracking (ethane, propane, butane, naphtha, and gas oil hydrocarbon feeds), methanol to olefins, and dehydration of bio-ethanol to bio-based ethylene.
- **Process Evaluation/ Research Planning (PERP) Report on Oleochemicals (2012)**: The report provides analysis on the chemistry, feedstocks, process technology, economics and markets of fatty acids, glycerines, methyl esters and fatty alcohols.
- **Biorenewable Insights Program Report on Natural Oil Feedstocks (2015)** - This report analyses the technical, commercial and economic aspects of producing natural oil feedstocks and investigates future capacities. The report lines up feedstock cost inputs - land, fertilizer, agricultural chemicals, harvesting, transport - in North America, South America, western Europe and Asia, adding in-depth coverage for major biomass producing countries. Finally the report analyses patents by crop.
- **Next generation biofeedstocks: resources for renewables. Special report (2013)** - Analysis of biofeedstocks as a source of renewables. Biofeedstocks can be converted into a number of chemical and polymer products through technologies such as fermentation, gasification, pyrolysis, catalysis, among others. This report assesses the technical, commercial, and economic aspects of producing biofeedstocks as well as providing supply estimates.
- **North American Shale gas: opportunity or threat or global ethylene producers? (July 2012)** This report addresses new opportunities and uncertainties facing global ethylene producers. It profiles and assesses current and future North American shale gas production, and analyses its future impact on global ethylene producers. The report also analyses future trends in the mix of North American steam cracker feedstocks, scenarios for the North American ethylene industry and the implications for the global industry.

## Section 6 Contact Details, Terms and Conditions, Authorization Form

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### 6.1 CONTACT DETAILS

#### **AMERICAS**

Nexant, Inc.  
44 South Broadway, 4th Floor  
White Plains, NY 10601-4425  
U.S.A.

Attn: Heidi Junker Coleman  
Global Programs Support Manager  
Tel: + 1 914 609 0381  
Fax: + 1 914 609 0399  
e-mail: [hcoleman@nexant.com](mailto:hcoleman@nexant.com)

#### **ASIA**

Nexant (Asia) Ltd  
22nd Floor, Rasa Tower 1  
555 Phahonyothin Road  
Kwaeng Chatuchak, Khet Chatuchak  
Bangkok 10900  
Thailand

Attn: Tiankanok Sirichayaporn  
Managing Consultant, E&CA, Nexant Thinking  
Tel: +66 2 937 5150  
Email: [Tiankanoks@nexant.com](mailto:Tiankanoks@nexant.com)

#### **EUROPE**

Nexant Limited  
1 King's Arms Yard, 1<sup>st</sup> Floor  
London EC2R 7AF  
United Kingdom

Attn: Anna Ibbotson  
Global Director, Petrochemical Markets & Profitability,  
Nexant Thinking  
Tel: +44 207 950 1528  
Email: [aibbotson@nexant.com](mailto:aibbotson@nexant.com)

Or

Attn: Eric Hudson  
Managing Consultant  
Tel: +44 207 950 1564  
Email: [ehudson@nexant.com](mailto:ehudson@nexant.com)

**Nexant, Inc.**

San Francisco  
New York  
Houston  
Washington D.C.  
London  
Frankfurt  
Bahrain  
Singapore  
Bangkok  
Shanghai  
Kuala Lumpur

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