



The **Technoeconomics – Energy & Chemicals (TECH)** program is globally recognized as the industry standard source of process evaluations of existing, new and emerging technologies of interest to the chemical and energy industries.

Data Analytics and Insights for  
a Sustainable Future

[ContactUs@NexantECA.com](mailto:ContactUs@NexantECA.com)



## Technoeconomics – Energy & Chemicals (TECH)

TECH's comprehensive studies include detailed technology analyses, process economics, as well as commercial overviews and industry trends.

### TECH Program Scope

TECH issues twenty reports per program year, including eight petrochemical updates (building blocks, intermediates and polymers) and twelve special topics covering areas such as specialty/performance materials, refinery products, energy technologies, and engineering know-how.

TECH reports involve detailed reviews of the available literature (patents, scientific and trade journals, etc.), as well as extensive liaison with industry (technology licensors, producers, EPC contractors), and NexantECA know-how. Reports cover:

- Trends in chemical technology
- Strategy/business overview
- Process Technology
  - Chemistry
  - Process flow diagrams and descriptions of established conventional and new/emerging processes
- Process economics – comparative cost of production estimates for different technologies/process routes across different geographic regions
- Overview of product applications and markets for new as well as established products
- Regional supply and demand balances, including capacity tables of plants in each region (listing plant owner, nameplate capacity, location and production process employed, when available)
- Regulatory and environmental issues where relevant

### Petrochemical Updates

Petrochemical updates are designed to give up-to-date (“state of the art”) information on major petrochemical building blocks, intermediates, and polymers. Update topics are reviewed on a three to five year cycle.

### Special Topics

Special topics cover a wide variety of areas, ranging from niche markets to subjects currently considered “hot” or making groundbreaking news. Subjects are chosen based on clients’ requests and NexantECA’s review/perception of the current state of affairs in the industry.

Topics typically covered include:

- Specialty chemicals and polymers – for example, cyclic olefin copolymers, specialty polyamides
- Advanced materials – for example, carbon fiber and solar grade polysilicon
- Oil refinery products – for example, lube oil and catalytic processing of crude residue
- “Hot” topics – for example, plastics recycling technologies, meeting new bunker fuels specifications, international shale gas, sustainability in the chemical industry
- Engineering – for example, project scale-up (lab to industrial plant implementation) and chemical energy storage



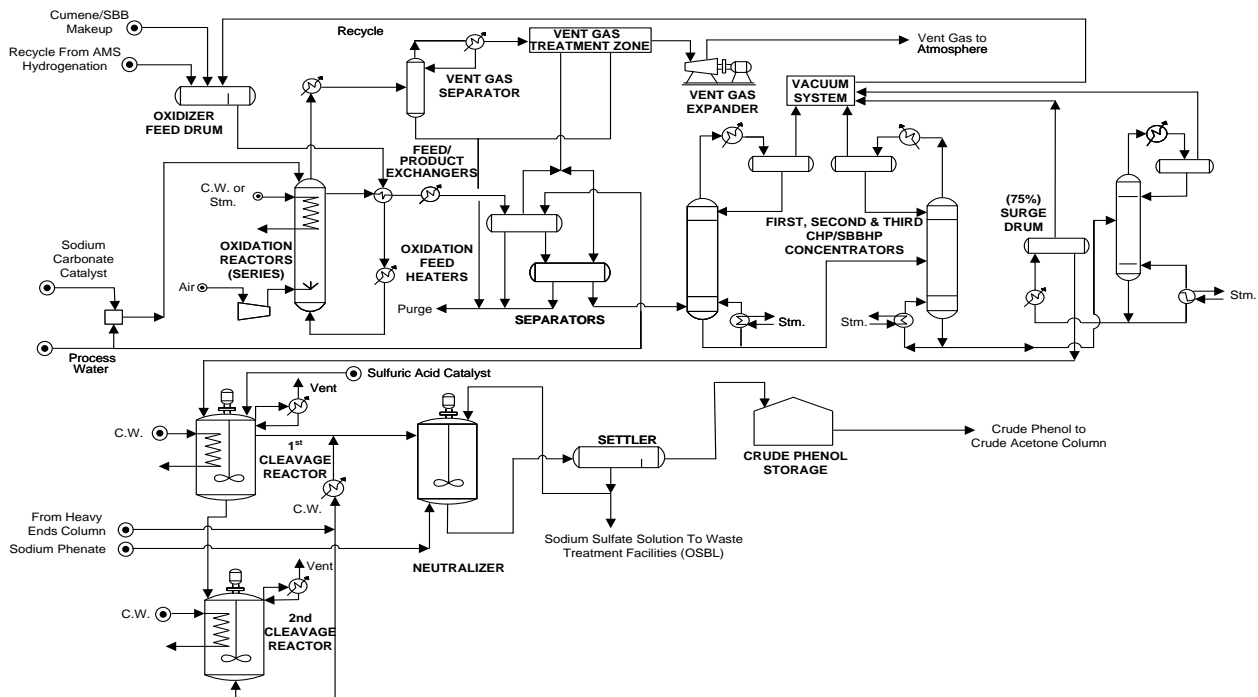
## Technoeconomics – Energy & Chemicals (TECH)

The TECH program is committed to delivering reliable and commercially grounded analysis.

A typical TECH report includes an introduction, where an overview of the business is given, a summary of the technology licensing status and major producers, key physical properties are outlined. Most TECH reports also give an overview of strategic considerations from the perspective of a new entrant to the business.

The core of a TECH report is focused on discussion of the chemistry, process design and economics of developing/emerging technologies compared with the commercially dominant technologies against which they will compete; coupled with an overview of commercial market applications and analysis of the key regional supply/demand markets.

### Sample Process Flow Diagram



### Process Economics

In close liaison with the industry (producers, licensors, EPC contractors), NexantECA know-how/industry experience, review and analysis of the available literature (e.g., patents, scientific journals), as well as product specifications, NexantECA develops reliable and dependable assessments of the process economics for commercially established and pertinent emerging/developing technologies.

TECH Reports provide multi-regional cost of production estimates in metric units. Typical location bases for the economics would include 2 to 4 of the following:

- Brazil
- China
- Eastern Europe
- Japan
- Middle East
- Western Europe
- South East Asia
- United States Gulf Coast (USGC)



## Technoeconomics – Energy & Chemicals (TECH)

### Sample Cost of Production Table

			CAPITAL COST		MILLION U.S. \$		
Plant Start-up	1Q2010		ISBL				61.4
Analysis Date	2010		OSBL				12.2
Location	USGC		<b>Total Plant Capital</b>				<b>73.7</b>
Capacity	274.6	Thousand Tons/yr	Other Project Costs				18.4
			<b>Total Project Investment</b>				<b>92.1</b>
Operating Rate	100	percent	Working Capital				9.2
Throughput	274.6	Thousand Tons/yr	<b>Total Capital Employed</b>				<b>101.3</b>
PRODUCTION COST SUMMARY			UNITS	PRICE		ANNUAL	
			Per Ton	U.S. \$	U.S. \$	COST U.S.\$	U.S. \$
			Product	/Unit	Per Ton	millions	Per Lb
<b>RAW MATERIALS</b>	Natural Gas	Gcal	6.320	21.93	138.58	38.06	
	Oxygen	ton	0.642	64.90	41.67	11.44	
	Catalysts & Chemicals		1.000	0.70	0.70	0.19	
	<b>TOTAL RAW MATERIALS</b>				<b>180.96</b>	<b>49.69</b>	<b>0.08</b>
	<b>NET RAW MATERIALS</b>				<b>180.96</b>	<b>49.69</b>	<b>0.08</b>
<b>UTILITIES</b>	Power	MWh	0.004	57.36	0.25	0.07	
	Cooling Water	kton	0.057	29.04	1.67	0.46	
	Boiler Feed Water	ton	1.385	0.55	0.76	0.21	
	Steam (MP)	ton	(0.498)	20.21	(10.07)	(2.76)	
	Inert Gas	ton	0.067	52.60	3.50	0.96	
	Fuel	Gcal	0.382	21.93	8.38	2.30	
	<b>TOTAL UTILITIES</b>				<b>4.49</b>	<b>1.23</b>	<b>0.00</b>
	<b>NET RAW MATERIALS &amp; UTILITIES</b>				<b>185.44</b>	<b>50.92</b>	<b>0.08</b>
	<b>VARIABLE COST</b>				<b>185.44</b>	<b>50.92</b>	<b>0.08</b>
<b>DIRECT FIXED COSTS</b>	Laborer	12 employees	48.23	Thousand U.S. \$	2.11	0.58	
	Foremen	4 employees	54.74	Thousand U.S. \$	0.80	0.22	
	Supervisor	1 employees	66.05	Thousand U.S. \$	0.24	0.07	
	Maintenance, Material & Labor		3	% of ISBL	6.71	1.84	
	Direct Overhead		45	% Labor & Supervision	1.42	0.39	
	<b>TOTAL DIRECT FIXED COSTS</b>				<b>11.27</b>	<b>3.10</b>	<b>0.01</b>
<b>ALLOCATED FIXED COSTS</b>	General Plant Overhead		60	% Direct Fixed Costs	6.76	1.86	
	Insurance, Property Tax		1.5	% Total Plant Capital	4.02	1.10	
	<b>TOTAL ALLOCATED FIXED COSTS</b>				<b>10.79</b>	<b>2.96</b>	<b>0.00</b>
	<b>TOTAL FIXED COSTS</b>				<b>22.06</b>	<b>6.06</b>	<b>0.01</b>
	<b>TOTAL CASH COST</b>				<b>207.50</b>	<b>56.98</b>	<b>0.09</b>
	Depreciation @	10 % for ISBL & OPC		5 % for OSBL	31.30	8.60	0.01
	<b>COST OF PRODUCTION</b>				<b>238.80</b>	<b>65.58</b>	<b>0.11</b>
	Return on Capital Employed (Incl. WC) @			10 Percent	36.89	10.13	0.02
	<b>COST OF PRODUCTION + ROCE</b>				<b>275.70</b>	<b>75.71</b>	<b>0.13</b>

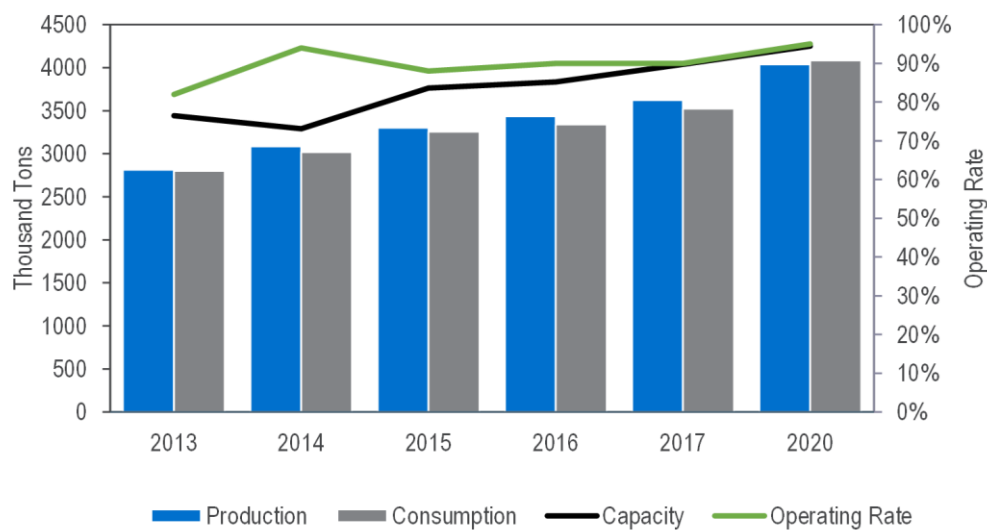


## Technoeconomics – Energy & Chemicals (TECH)

### Commercial Markets

Each TECH report also contains an overview of commercial applications and discussions of global and regional supply/demand/trade data (including historical, current estimate and forecast). Detailed plant capacity tables are provided detailing owning company, location and nameplate capacities for all plants in the regions analyzed.

### Sample Regional Supply and Demand Balance



### Why Subscribe?

Our TECH reports can be used by subscribers to:

- Understand business feasibility in project planning activities
- Obtain a third-party independent comparison of process economics of different technologies offered for license
- Recognize and assess investment opportunities for new products and innovative processes
- Identify commercially significant developments in their early stages, and place them in an economic context

### A Subscription to TECH includes:

- PDF reports including detailed technology analyses, process economics, as well as commercial overviews and industry trends.
- Cost of production tables in spreadsheet format
- Support from our industry experts

A subscription to TECH includes twenty reports published in a given program year. Reports can also be purchased on an individual basis, including reports from previous program years.



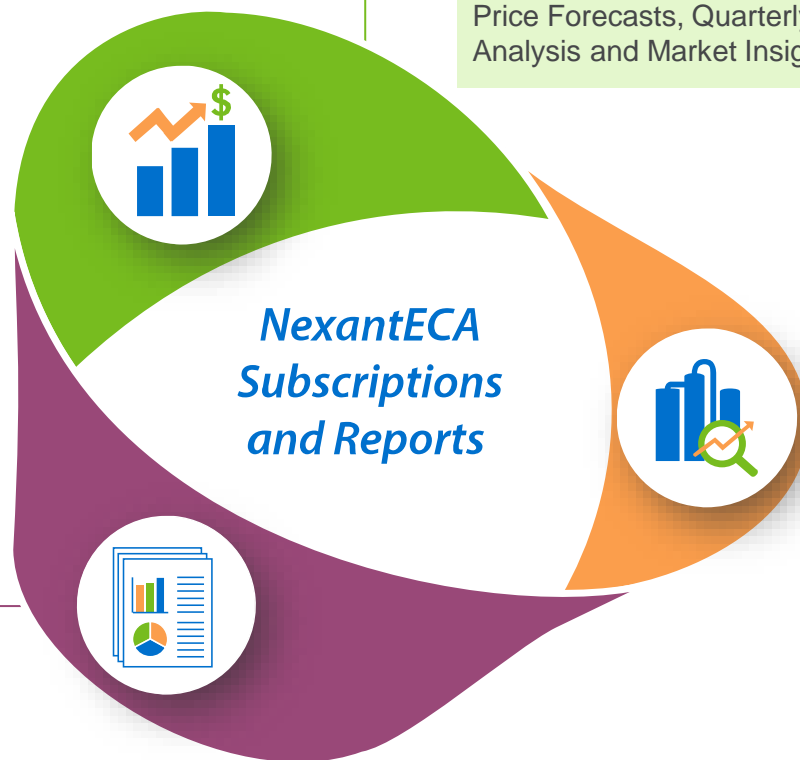
**NexantECA Subscriptions and Reports** provide clients with comprehensive analytics, forecasts and insights for the chemicals, polymers, energy and cleantech industries. Using a combination of business and technical expertise, with deep and broad understanding of markets, technologies and economics, NexantECA provides solutions that our clients have relied upon for over 50 years.

### Special Reports

The **Special Reports** analyse issues of topical importance to the energy and chemicals industry. Each special report explores the subject matter in detail to provide an up-to-date and thorough understanding of the related issue allowing investment decisions and new business strategy to be formulated.

### Markets and Profitability

The **Markets and Profitability** program provides accurate data, insightful analysis and dependable forecasts of the profitability, competitive position and supply/demand trends for over 60 petroleum, gas, petrochemical, polymers, chemical intermediates and fertilizer products. The Markets and Profitability program include Market Analytics, Profitability and Price Forecasts, Quarterly Business Analysis and Market Insights.



### Technology and Costs

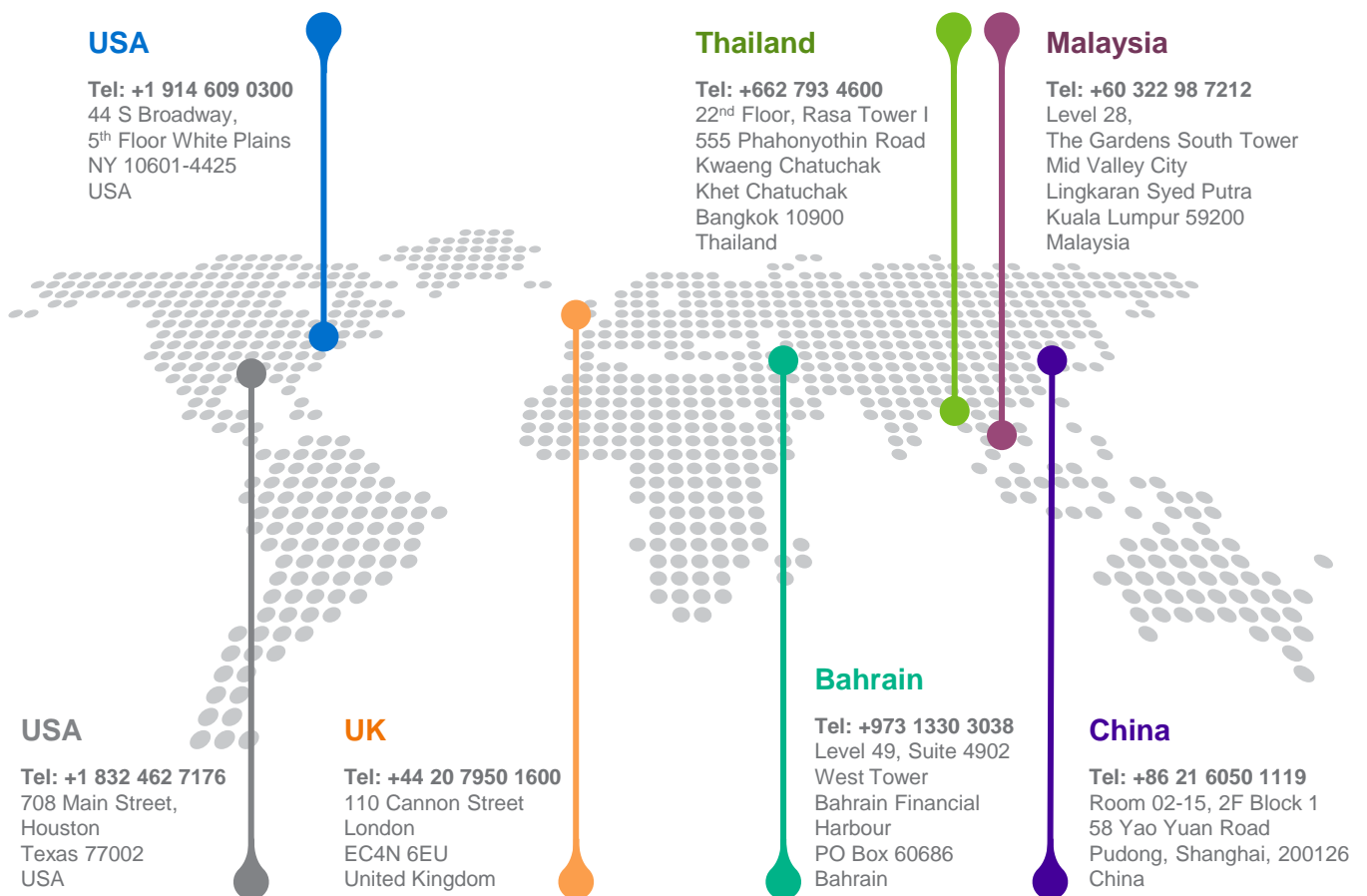
The **Technology and Costs** programs examine the impact of new, emerging and improved industrial technologies on the comparative economics of different process routes in various geographic regions, as well as the cost competitiveness of individual production plants.

The Technology and Costs programs include:

- Technoeconomics – Energy and Chemicals (TECH)
- Biorenewable Insights (BI)
- Cost Curves.



NexantECA partners with clients to help them navigate the big global energy, chemicals and materials issues of tomorrow. We provide independent advice through our consulting, subscriptions and reports, and training businesses using expertise developed in markets, economics and technology through our fifty years of operation. We are entirely dedicated to supporting sustainable development of the industry and provide expert advice with efficiency, speed, and agility.



**Disclaimer**

This Report was prepared by NexantECA, the Energy and Chemicals Advisory company. Except where specifically stated otherwise in this Report, the information contained here is prepared on the basis of information that is publicly available, and contains no confidential third party technical information to the best knowledge of NexantECA. Aforesaid information has not been independently verified or otherwise examined to determine its accuracy, completeness or financial feasibility. Neither NexantECA, Client nor any person acting on behalf of either assumes any liabilities with respect to the use of or for damages resulting from the use of any information contained in this Report. NexantECA does not represent or warrant that any assumed conditions will come to pass.