



PLANTS AND PROJECTS

BASF Expands Automotive Catalysts Capacity for Brazilian Market

BASF Catalysts (www.catalysts.basf.com), a leading supplier of environmental and process catalysts, is expanding its automotive catalyst manufacturing facility in Indaiatuba, Brazil, to meet increased demand generated by market growth and tightening emissions standards. The expansion will significantly increase the plant's capacity by the end of the first quarter of 2008. Growth in the Brazilian economy continues to drive increased consumer demand for vehicles, with auto sales in the country expected to grow by more than 20% in 2008. Meanwhile, the Brazilian government is moving to pro-

tect air quality in anticipation of the increased vehicular traffic by adopting regulations equivalent to rigorous European and U.S. emission standards. The tightening emission standards will require more vehicles to use advanced catalyst technology.

BASF Catalysts is also expanding its automotive catalyst plants in Shanghai, China, and Chennai, India, to meet growing customer demand over the next few years.

Eurochem Licenses UOP Technology for Methanol-to-Olefin Conversion

Viva Methanol Ltd., a subsidiary of Eurochem (www.eurochem-corp.com), has selected the UOP/Hydro MTO process technology and the Total Petro-

chemicals/UOP Olefin Cracking process technology to produce light olefins from natural-gas-derived methanol at a new Viva Polymers, Ltd., facility in Nigeria. The project will be the first commercial-scale plant to use these technologies to produce olefins in this manner. Methanol derived from natural gas is a plentiful and cost-efficient feedstock in the Lagos Free Trade Zone, the location of the new facility, which will produce 1.3 m.t. of ethylene and propylene annually. These will be used in the production of plastics for packaging, pipes, carpeting, film and other products. UOP will provide the technology license, basic engineering, catalysts, adsorbents, specialty equipment, and technical support. The new plant is expected to come online in 2012.

CHEM ECONOMICS

2007 Ends Mixed; Indicators Point to Recession

The fourth quarter of 2007 ended on a soft note for the chemical industry. Production volumes for basic chemicals and specialty chemicals slipped during the quarter. Nonetheless, volumes were up 3.7% and 1.2%, respectively, compared to the same quarter in 2006.

Overall, 2007 was marked by very strong export demand, which offset stable domestic demand, especially by those segments of the industry (coatings, adhesives, etc.) tied to housing and light vehicles. Demand for basic and specialty chemistry ultimately rests in the manufacture of durable and non-durable goods in the U.S., and these industries, in turn, are tied to the overall business cycle.

Since the new year, there has been a wave of news about a recession having started or about to start. Rising energy prices, the housing downturn, and the credit crunch are all cited as causes of a recession.

The peaks and troughs of the business cycle are tracked by the National Bureau of Economic Research (NBER). The NBER defines a recession as "a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real gross domestic product (GDP), real income, employment, industrial production, and wholesale-retail sales."

The NBER emphasizes two monthly measures of activity: (1) personal income minus transfer payments in real terms, and (2) employment; as well as two other indicators: (3) industrial production, and (4) sales of the

manufacturing, wholesale and retail sectors adjusted for price changes.

Where do we stand? Activity for the four measures peaked in the fourth quarter of 2007: industrial production in September; income minus payments, and sales, in October; and employment in December.

Thus, a strong case can be made that a recession has arrived. It's possible that revisions to the data will change the apparent trend, and more time may be needed to make the call. We'll have a much better reading by April.

Ultimately, a decline in broad economic activity would adversely affect the demand for molecules, pulling the chemical industry along with it. The fourth quarter softness may reflect this. Keep in mind, though, that the preemptive cuts in the federal funds rate and the economic stimulus package will both provide a positive spin to the economy, especially in the second half of the year when both kick in. The latter would aid the economy and it is hoped make for a short and shallow recession.

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Dr. T. Kevin Swift is chief economist at the American Chemistry Council (ACC). Beginning with this issue of CEP, Swift will write a monthly column, keeping the chemical engineering community up-to-date on global economic trends affecting the industry, what ACC refers to as "the business of chemistry."

ExxonMobil Chemical Opens New Polymer Facility

ExxonMobil Chemical (www.exxonmobilchemical.com) has completed a new \$20-million compounding facility to supply high-performance polymers to the automotive and other industries. The facility, located at ExxonMobil's integrated Baton Rouge, LA, complex, has an initial capacity of 40,000 ton/yr of specialty compounded products. These will include Exxtral thermoplastic olefins and Santoprene thermoplastic compounds for interior, exterior and under-the-hood automotive applications, as well as other specialty materials for appliance, packaging, personal care, construction, and electrical end uses. The facility includes an extensive product support and testing center to manufacture new products more quickly and cost-effectively.

Invetech Supports North American Clients with New U.S. Office

Melbourne, Australia-based Invetech (www.invetech.us), a manufacturer of biomedical products, instruments and custom automation, has opened a new facility in San Diego, CA, to support the expansion of its client base in North America. The California location is in close proximity to an extensive high-technology, scientific and biomedical community that will both aid and benefit from Invetech's product development, custom automation and manufacturing solutions. The company serves a wide range of sectors, including clinical *in vitro* diagnostics, medical devices, life sciences, bioprocessing and drug discovery. The new facility adds design, engineering and contract manufacturing services to Invetech's capabilities.

Pfizer to Build R&D Center in France

Pfizer Inc. plans to invest \$193 million to set up an industrial research center in France to formulate and manufacture inhaled medicines. Inhalation is widely used for asthma and other respiratory drugs and is also being explored by pharmaceutical companies in a bid

to improve delivery of other medicines. Construction of the new research center, to be located at an existing plant in Amboise, is expected to begin in the spring of 2008.

Hunt Refinery to Boost Gasoline and Diesel Output

Hunt Refining Co. (www.huntrefining.com) — a provider of gasoline, diesel fuel and home heating oil — plans to double its gasoline and diesel output for the Southeastern U.S. UOP will supply the technology for the refinery upgrades. It will install two new units at its Tuscaloosa, AL, facility, helping to increase crude throughput by more than 30% to 69,000 bbl/d, and double production of gasoline and diesel. Hunt also plans to convert an existing unit to allow production of a gasoline product that will meet future benzene regulations — the U.S. Environmental Protection Agency (EPA) has mandated that refineries adhere to annual averages of 0.62% benzene content in gasoline by 2011. Construction will begin in 2008, with the new units scheduled to come online in late 2009. The revamp is scheduled for completion in 2010.

Reichhold to Build Manufacturing Facility in India

Reichhold (www.reichhold.com), a major supplier of unsaturated polyester resins, has begun construction of a new manufacturing plant in Ranjangoan, India, to serve India's growing composites market. The facility is scheduled for completion in September 2008. Reichhold's composites offerings include resins, gel coats, structural adhesives, and flame-retardant resins for a variety of markets, including industrial, building and construction, marine, wind energy, electrical, and transportation. The company also offers comprehensive research and development, technical, and market development services. Headquartered in Research Triangle Park, NC, Reichhold has manufacturing operations throughout North America, Latin America, the Middle East and Europe.

MERGERS & ACQUISITIONS

Tata Chemicals Acquires General Chemical Industrial Products

Tata Chemicals Ltd. (TCL; www.tatachemicals.com), India's leading manufacturer of inorganic chemicals, fertilizers and food additives, and part of the \$28-billion Tata Group, has entered into a \$1-billion agreement to acquire the soda ash business of U.S.-based General Chemical Industrial Products, Inc. (GCIP). The transaction is subject to shareholder and regulatory approvals.

GCIP operates 2.5-million ton/yr of soda ash capacity in Wyoming, a region that holds the world's largest reserve of raw ore. The acquisition of GCIP will lead to a sizeable increase in TCL's global soda ash capacity, making it one of the largest soda ash producers worldwide. The merger will give TCL access to markets in North America, Latin America and the Far East, which complement its existing markets.

Wacker Group Acquires Polymer Joint Ventures

Wacker Chemie AG (www.wacker.com) has acquired full ownership of Air Products Polymers (APP) and Wacker Polymer Systems (WPS), its two joint ventures with Air Products and Chemicals, Inc. The transaction has been approved by European and U.S. anti-trust authorities. Wacker's stake in APP had been 35%, with Air Products holding the remaining 65%; Wacker held 80% of WPS, and Air Products 20%. APP and WPS are expected to be fully integrated into the Wacker Group structures by year-end.

A leading supplier of dispersible polymer powders for construction applications, Wacker will take over vinyl acetate/ethylene operations from APP and WPS, including full ownership of the two companies' activities in Allentown, PA, Calvert City, KY, South Brunswick, NJ, Cologne and Burghausen, Germany, and Ulsan,

South Korea. In return, Air Products is to receive production facilities at Elkton, MD, and Piedmont, SC, as well as related businesses and a payment of \$265 million. The acquisition is expected to boost the Wacker Group's 2008 polymer business to about \$1.45 billion.

JOINT VENTURES AND ALLIANCES

Materials Research Institute Will Study Power Plant Integrity

The Electric Power Research Institute (EPRI; www.epri.com) — a nonprofit center for public interest energy and environmental research — has teamed with Électricité de France (EDF) and Tokyo Electric Power Co. (TEPCO) to create the international Materials Aging Institute. This collaborative research laboratory — to be based at EDF's facility in Les Renardières, France — will examine the link between materials science and power plant component performance and integrity. The Institute has an initial budget of \$13.1 million. Research and development projects for 2008 include analysis of equipment corrosion, component and material degradation due to irradiation, non-metallic material performance (*e.g.*, polymers), and concrete aging. The Institute's research will provide the technical foundation for the safe, efficient and cost-effective operation of power plants, as well as the construction of new plants built to the highest industry and technical standards. Research will encompass materials issues at nuclear, fossil and hydroelectric generating facilities.

Sulzer and Kühni to Collaborate on Liquid-Liquid Extraction

Sulzer Chemtech, Ltd. (www.sulzerchemtech.com) and Kühni AG (www.kuhni.ch) — two Swiss firms active in liquid-liquid extraction — will team up to offer comprehensive solutions in the area of packed liquid-liquid extraction columns. The companies will complement each others' efforts, lever-

aging Kühni's experience in the field of stirred extraction columns and Sulzer's know-how in the area of structured packings. The collaboration will lead to technically and economically optimized plant designs for a range of liquid-liquid-extraction tasks, from pilot tests to industrial realization.

Savi Technology and AVANNA Deliver Supply-Chain RFID to India

Savi Technology (www.savi.com), a Lockheed Martin company, and India-based AVAANA (www.avaana.com) have entered into a strategic partnership for active radio frequency identification (RFID)-based supply-chain solutions, products and services focused on markets in India. The partners will combine technical expertise and geographic know-how to deliver state-of-the-art, real-time solutions that improve the management, security and efficiency of supply chains, especially in the government, defense, homeland security and transportation sectors. Headquartered in New Delhi, AVANNA has been instrumental in pioneering RFID technology in the region. Savi is a leader in RFID hardware and software for the management and security of supply-chain assets, shipments and consignments.

Pratt & Whitney Partners with GTI on Gasification Study

Pratt & Whitney Rocketdyne (PWR; www.pw.utc.com) and Gas Technology Institute (GTI; www.gastechnology.org) will collaborate on an advanced gasification system pilot-plant and process development program. The \$12.9-million, 30-month project aims to develop and validate PWR's compact gasifier technology in a representative pilot-scale test facility. Successful pilot testing will support the design of a commercial-scale demonstration plant. Much of the infrastructure required for the testing — as well as a proven design, build and test team — is already in place at GTI's headquarters in Des Plaines, IL, including flex-fuel test facilities.

GreenShift Enters Biodiesel Plant Agreement with NextDiesel

GreenShift Corp. (www.greenshift.com), a developer of clean technologies that facilitate the efficient use of natural resources, has entered into a collaboration with Biofuel Industries Group, LLC, owner and operator of the NextDiesel (www.nextdiesel.net) facility in Adrian, MI. GreenShift will design and build more than \$10 million worth of equipment for biodiesel production and feedstock pre-treatment, based on its proprietary biofuel technologies. NextDiesel is currently using an early version of GreenShift's 10-million-gal/yr biodiesel production system — with transesterification, direct esterification and other capabilities — to produce biodiesel out of pork fat, crude corn and vegetable oils, and feedstocks high in free fatty acids. Under the new agreement, GreenShift will design, build and commission an additional 20-million-gal/yr of biodiesel production capacity, with full alternative-feedstock processing capabilities.

The current feedstock-challenged marketplace requires biodiesel producers to integrate feedstock pre-treatment and other processes into their facilities in order to produce fuel profitably. GreenShift will design NextDiesel's new process to accept and convert GreenShift's low-cost crude corn-oil supplies into biodiesel at high yields. Traditional corn ethanol processes convert each bushel of corn, which weighs about 54 lb, into about 18 lb of ethanol, 18 lb of carbon dioxide, and 18 lb of distillers dried grains, which contain about 2 lb of fat. GreenShift's high-yield corn-oil extraction technology intercepts the flow of the distillers grain co-product from inside the ethanol facility, extracting more than 75% of the fat. The two-step process can extract more than 6.5 million gal/yr of crude corn oil from a 100-million-gal/yr ethanol production facility.

[For more on biofuels, see this issue's special supplement on energy challenges and opportunities.]