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Braskem Targets Top Ten Petchem Position by 2012

Braskem will use a combination of acquisitions and investment in new capacity to build a top ten global petrochemical position, as measured by market capitalization, by 2012, says José Carlos Grubisich, CEO of Braskem. Grubisich addressed attendees at yesterday's keynote breakfast at NPRA's International Petrochemical Conference in San Antonio. Braskem is currently the number one in Latin America, with 2006 revenues of about $7 billion.

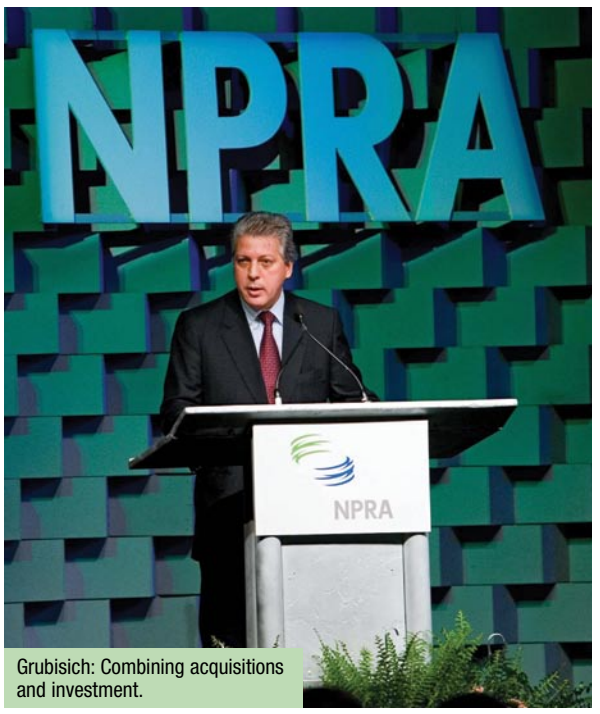
The recent acquisition of the petrochemical assets of Copesul and Ipiranga catapulted Braskem's share of the Latin American thermoplastics market from 42%, to 52%, and doubled its ethylene capacity to 2.5 million m.t./year. Its share of the Latin American polyethylene (PE) market rose from 37% to 53%, and of the Latin American PP market from 41% to 52%. The company has a 55% share of the Latin American polyvinyl chloride (PVC) market. Its PVC share remains at 55%. The deals lifted gross revenue from $7 billion, to $10.3 billion, and Ebitda grew from $760 million to $1.4 billion.

Braskem expects to acquire petrochemical producer Triunfo either later this year, or in 2008, Grubisich says. Triunfo is owned by Petrobras. It is a logical progression for Braskem to acquire Triunfo and merge it into its operations, Grubisich says. There is no ongoing discussion as yet but "Petroquimica Triunfo will be part of Braskem in future," he says.

Braskem is studying the production of an integrated petrochemical plant based on renewable feedstocks, Grubisich says. Braskem is currently evaluating production of ethylene and propylene from ethanol based on sugarcane feedstock at a pilot plant at its technology center at Triunfo, Brazil. The company will decide by the end of year if it will go ahead with the full-scale production of an ethanol-based olefins cracker, with related downstream PE and PP production, Grubisich says.

Brazil is expected to double overall ethanol production over the next five years from 17 billion liters/year. The government mandate to blend at least 2% of biodiesel in diesel oil by 2008, and 5% by 2010 will create a potential market of 2.4 billion liters/year for biodiesel by then. Glycerine by-product will increase as well, potentially creating a good source of feedstock for petchems, Grubisich says.

Braskem also has an aggressive expansion plan for conventional petchem capacity, Grubisich says. The company will double resin capacity from 2.3 million m.t./year, to 4 million m.t./year in the next five years, and its total production capacity from 6 million m.t./year to 10 million m.t./year. It has a 50-50 jv with Venezuelan state-owned Pequiven to build a 1.3-million m.t./year PE plant that is expected to start up 2011. Braskem is also "paying lots of attention" to Bolivia, which might become a potential source of low cost feedstock for petchems in future, he says.



Grubisich: Combining acquisitions and investment.

The company is adding 350,000 m.t./year of PP at Paulinia, Brazil next year; 400,000 m.t./year of PP at El Tablazo, Venezuela in 2009 in a jv with Pequiven; 150,000 m.t./year of ethylene and 350,000 m.t./year of PP at Camaçari, Brazil in 2010.

Braskem will increase its focus on North America and Europe due to the size of the markets. "We cannot be competitive in the Pacific Rim against India and Mideast because of logistics and supply chain issues, but we can be a significant player in the U.S. and Europe," Grubisich says.

Latin America is a solid growth platform, with its large market, consistent growth and competitive feedstocks, Grubisich says. Demand for thermoplastics and petchems have grown consistently close to 7%/year, about three times of GDP growth. Growth last year was close to 8% in PE and PVC, and 12% in PP, he says. "We expect this growth rate to continue."

Energy, Global Climate Key IPC Issues

Energy and natural gas; global climate change policies; and renewable fuels topped the list of concerns at this year's National Petrochemical and Refiners Association (NPRA) 32nd International Petrochemical Conference (IPC).

IPC attracted about 3,300 attendees this year from 600 companies and 48 countries. About 40% of the attendees were from outside of the U.S., consistent with prior years. The attendance was up slightly from last year's 3,200, NPRA says.

The new Congress is expected to scrutinize energy policy and the U.S. oil and gas industry, says NPRA vice chairman Norman Phillips. NPRA will continue its public policy advocacy on key issues facing the industry in this uncertain environment, Phillips says. "Much-needed access to natural gas reserves in the U.S., amongst other issues, will be critical in helping maintain the competitiveness of the industry," he says.

Natural gas and energy accounts for 76% of feedstock costs, and "the lifeblood of the industry is feedstock supply and reasonable prices," Drevna says. "We have a ways to go to get there," he says.

Focus has increased on environmental concerns such as global climate change , and the oversight of the Environmental Protection Agency actions affecting environmental controls on facilities and products, Phillips says. "Chemical facility security may be revisited," he adds.

The Honorable Alexander Graf Lambsdorf, member of the European Parliament, will speak at this morning's petrochemical forum about Reach. Reach regulations include more stringent requirements to get products registered, adding to costs and slowing down the process of getting the product to market, says David Aldous, IPC program chair. This morning's session will also feature Dr. Gary Ross, CEO of the Pira Energy Group, who will give an outlook on crude oil and natural gas, including liquefied natural gas. John Bolton, former U.S. Ambassador to the United Nations, will address today's International Petrochemical Luncheon, and speak on "America, International Security and the Future."

Duncan Wins Petrochemical Heritage Award

Dan L. Duncan receives the 11th annual Petrochemical Heritage Award on Sunday. The award was presented at the annual Symposium on Innovation and Entrepreneurship, held as part of NPRA's International Petrochemical Conference.

(page 5)

Petroleum Additives
Acquired Hatco polyol esters & Anderol specialty lubricants.

Wood/Plastic Composites
New Polybond Coupling Agent for longer-lasting beauty and durability.

Pool & Spa Chemicals
New sales by satellite: GIS System finds underserved areas for distributors.

Pharmaceuticals
Axion® Organometallic Specialties, compounds and catalysts approved for pharmaceuticals.

Coatings
Environmentally friendly Witcobond® A100 aqueous polyurethane alloy, NMP-free.

Epoxy Plasticizers for PVC
15% capacity increase in epoxidized soybean oil production for 2007

Antioxidants
New "greener," cleaner Anox® No Dust Blend Antioxidants.

Agricultural Products
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Competitiveness Highlighted at Heritage Award Ceremony

Petrochemical makers must adapt to increasingly competitive and more global markets, according to speakers at the Symposium on Entrepreneurship and Innovation held Sunday at NPRA's International Petrochemical Conference.

"Ten years ago national chemical companies and national oil companies made up only 11% of the global total" of chemical supply, says Rob Routs, executive director/downstream for Royal Dutch Shell. "Today, their share has increased by half to about 17% and is expected to increase by another 50% to make up about a quarter of total capacity by 2015." Petrochemical makers who want to retain an edge "will need to maintain a relentless focus on cost improvement," Routs says.

Energy and chemical makers also face political, economic and environmental challenges, Routs says. "But there are solutions being developed. I continue to believe in the ingenuity of our people." Global energy needs are forecast to increase 50% by 2030, Routs says. Alternative energy sources are emerging, but fossil fuels will remain a central part of the energy and petchem mix. "That does, however, mean that carbon dioxide emissions will grow, but there may be ways of managing that growth," Routs says. Carbon dioxide abatement, sequestration, and the development of alternative fuels are all likely to be part of that mix, he adds.

Volatile energy costs and more global markets have increased competitive pressures since 2000, particularly in North America, says Huntsman Corp. CEO Peter Huntsman. Since 2000 "U.S. producers have lost raw material competitiveness, and lost the ability to export on a regular basis." Globalization will continue and the U.S. will likely become a net importer of petrochemicals by 2010, Huntsman says. Countries such as China, India and Russia will emerge as the demand growth engines, bringing challenges of increased business and political risk, he says. And the Middle East will assert its role as the leading producer globally, he adds. Producers must pursue disciplined business models to compete in a more global environment, Huntsman says. Those business models will be based on low-cost raw materials, a feature of producers such as Sabic; operators of well integrated, large-scale assets, such as ExxonMobil, Shell, and Dow Chemical; or producers with a differentiated approach such as BASF and Rohm and Haas. Huntsman is shedding commodity assets in favor of a differentiated approach, he adds.

From right: Dan Duncan, Enterprise Products Partners; Doug Culpon, Huntsman; Peter Huntsman, Huntsman; Rob Routs, Shell

NPRA and the Chemical Heritage Foundation also presented the annual Petrochemical Heritage Award to Dan L. Duncan at the symposium on Sunday. Duncan is the controlling shareholder of privately held EPCO, a company he founded in 1968, and is chairman and the largest shareholder of Enterprise Products Partners.

ExxonMobil Wins Safety Award

NPRA presented its highest award, the Distinguished Safety Award (DSA), to ExxonMobil Chemical's Baton Rouge Polyolefins Plant for the fifth consecutive year. Since the NPRA safety awards program began in 1982, no other company has won the coveted DSA for five years in a row. Sherman Glass, senior v.p./basic chemicals, intermediates & synthetics, accepted the award for ExxonMobil Chemical Company at NPRA's International Petrochemical Conference at the Henry B. Gonzalez Convention Center. Also receiving the DSA Honorable Mention this year are the Citgo Corpus Christi, TX, Refinery and the ExxonMobil Baton Rouge, LA, Refinery. All of the winners will also be recognized at the NPRA Annual Safety Awards Banquet to be held May 3, 2007, in The Woodlands, TX as part of the NPRA National Safety Conference.

Emerging Regions Drive Petchem Industry Growth

Rapid petrochemical demand growth in emerging economies including Asia and China and new applications are driving healthy growth rates in the global petrochemical industry, Sherman Glass, senior v.p. at ExxonMobil Chemical, told attendees at CMAI's (Houston) World Petrochemical Conference held last week in Houston. Global petrochemical demand continues to grow two to three percentage points above the rate of world GDP, and demand in Asia and China account for about 60% of that growth, Glass says. Asia is likely to make up 50% of world demand by 2015, and China alone 25%, he says. North America will shift from a net exporter to a net importer by the end of the decade, he adds.

"We are in a growth business" in chemicals, Glass says. "The average chemicals growth rate of about 5%-6%/year is about triple the expected growth rate for energy. This high growth reflects the continued penetration of chemicals and plastics into both existing and new uses around the world."

ExxonMobil is improving competitiveness by expanding feedstock flexibility by using new technologies to crack lower-cost feeds, Glass says. ExxonMobil qualified more than 100 new steam-cracking feedstocks of varying qualities from around the world last year to run in its plants. This allows it to "quickly respond" to changing feedstock availability and costs by switching between liquid and gas feedstocks from different sources, he says.

Meanwhile, "demand is continuing to grow for our products, and it's unlikely to stop," Dan Smith, president and CEO at Lyondell Chemical, told attendees at DeWitt & Co.'s (Houston) World Petrochemical Conference, also held in Houston last week. "When I look at China's economy and India's, I see very large populations with a rapidly developing standard of living. And I see additional countries that are making their way up this demand curve," Smith says. In the U.S., solid economic growth will drive domestic demand and absorb production, Smith says. "There's still life in the domestic economy and in the domestic petrochemical industry. Despite the angst and hoopla, ethylene continues to chug along," he says.

Natural gas is expected to become a more global product over time, as supply restrictions and wide price differentials boost international trade, producers say. "When you look at the increasing level of liquefied natural gas (LNG) imports, and the number of U.S. permits for LNG terminals that have been filed, you can see this is already starting," Smith says. If enough natural gas is brought into the U.S. from overseas, those prices will likely moderate, he says.

Analysts, meanwhile, says that the next two years look strong, but new capacity is likely to cause margins to weaken before the end of the decade. Margins for the global petrochemical industry will be healthy for the next two years, and start to tumble in 2009, as new capacity comes onstream, Gary Adams, president of CMAI (Houston) told delegates at the CMAI conference.

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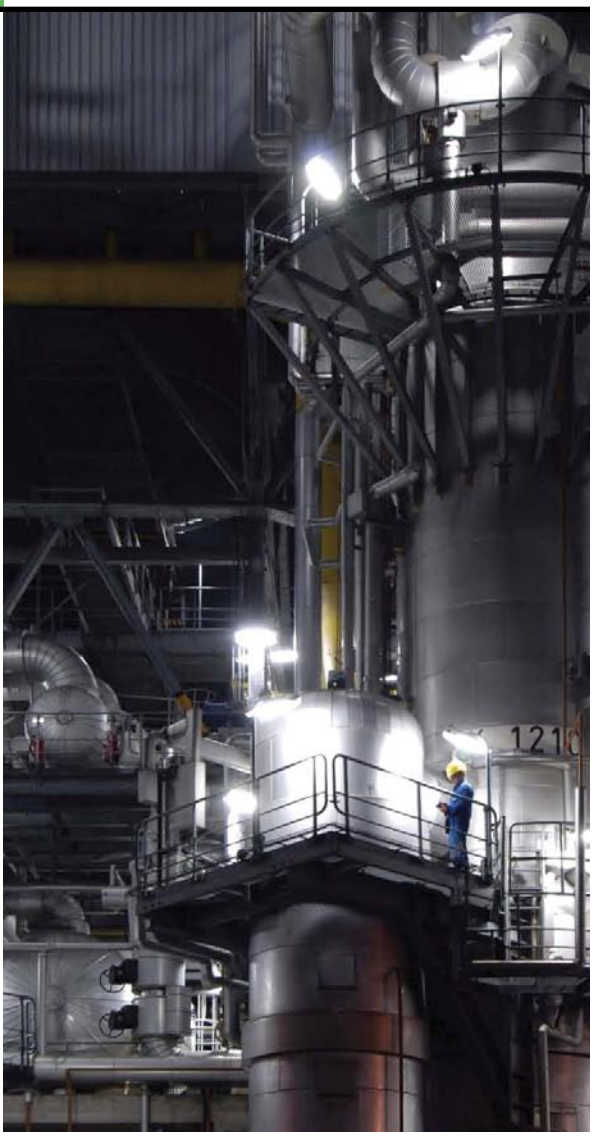


Continued project delays in the Mideast, particularly in Iran, and robust economic growth have lifted industry sentiment this year. Petrochemical markets have rebounded from weak demand in the fourth quarter after a sharp inventory draw down as energy prices fell. Producers expect another year of strong earnings, as demand and supply conditions stay balanced to tight. Operating profit for several products has likely peaked, but balanced supply, and feedstock costs are expected to be comparable to 2006 levels, which should allow sellers to hold margins this year, market analysts say. However, 2008 may be a transition year, with weaker margins due to capacity in the Mideast coming online in 2009-10.

CMAI (Houston) says the global petrochemical industry is likely to see peak-like earnings this year, and earnings above reinvestment levels through 2008 *(chart)*. "In general terms, global markets will not become overwhelmed with new supply until the beginning of 2009, and less surplus capacity will appear than most are expecting," says Gary Adams, president of CMAI.

Methvin: Looking at Mideast.

Smith: Supply not keeping up.

"In our view the outlook in ethylene/polyethylene (PE) is very strong in 2007, 2008, and 2009" in any reasonable GDP-growth scenario, says Chris Pappas, COO of Nova Chemicals. Capacity in the Mideast will not come on as fast as expected, a favorable development for North American producers, Pappas says. Projects, particularly in Iran, face delays due to an inability to get financing, lack of engineering capability and equipment, and a lack of feedstock. "Iran represents 27% of projected capacity growth for 2007, and 51% of capacity growth in 2008," he says. Startup for Mideast projects through 2010 is too optimistic, he says *(table)*. Nova says the cycle appears strong through at least 2009, due mainly to project delays.

Rising costs, a lengthening of lead times for critical equipment, and a shortage of skilled labor will dictate actual completion dates as long as the current pace of investment continues, Adams says. "Delays are likely to continue," he says.

In North America, ethylene and PE markets remain strong, and the market balanced, producers say. Unplanned cracker outages, and strong PE exports resulting from high prices in China have supported the market, they say. Ethylene and PE operating rates in North America have improved as demand improves and inventories are worked off, producers say. Cracker operating rates are about 95% in the first quarter, slightly above fourth-quarter rates of about 94%, they say. Meanwhile, PE operating rates are up to about 92% this quarter, compared to around 85% in the previous quarter.

Global GDP is also expected to be strong this year, which should spur demand, producers say. "The industry is so large that 3% GDP growth is a pretty big volume growth number," says Stacy Methvin, president and CEO of Shell Chemicals' U.S. chemical operations. "Demand has been relatively strong. We're seeing continued strength in petchem markets, partly because of a lack of building of assets earlier in the decade," Methvin says.

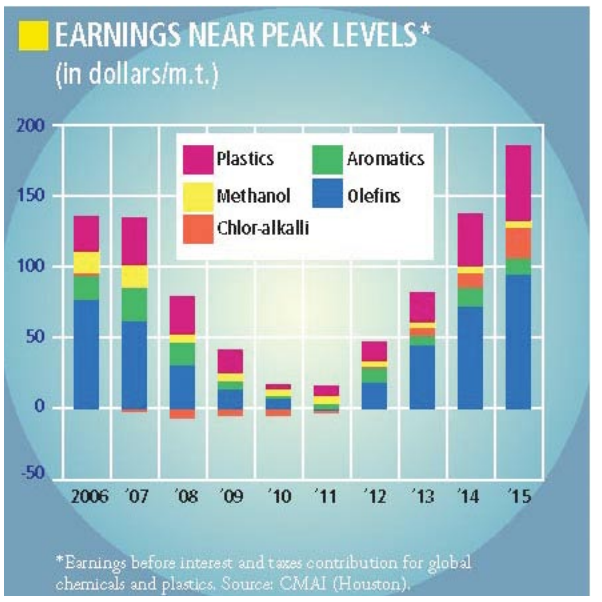
The expectation of impending new capacity also deterred further significant investments. "There was a fear factor that too much capacity was coming on too soon, which resulted in producers being disciplined," says Dan Smith, president and CEO of Lyondell. This deterrent will likely bring about a tighter basic chemicals and plastics market for longer than is currently forecast, Adams says.

Also, the new capacity is not expected to flood the market as yet, producers say. "There are multiple new plants onstream in China and the Mideast, but they aren't keeping up with growth rates in demand," Smith says.

GOING EAST. Nonetheless, the industry's focus is shifting toward Asia and the Mideast, and producers are ramping up capacity in those region. "Over the next 10 years, 60% of petrochemical demand growth will occur in Asia, with China alone accounting for one-third," says Stephen Simon, ExxonMobil senior v.p./downstream. "By 2015, Asia will account for 50% of demand for key petrochemical products, 25% alone in China." ExxonMobil says it expects to make a final decision soon on whether to proceed with a second Singapore cracker. Negotiations over project financing and discussions with the Singapore government are at advanced stages, ExxonMobil chairman and CEO Rex Tillerson said earlier this month. The company is also planning major chemical projects in China and Qatar, as well as a major expansion at its Kemya (Al Jubail, Saudi Arabia) and Yanpet (Yanbu) ethylene and derivatives joint ventures with Sabic in Saudi Arabia. Its capacity for basic petrochemicals in Asia and the Mideast will expand by 60%, to 8 million m.t./year over the next few years,

Lyondell has a 50,000-m.t./year propylene glycol ether project in Tainan, Taiwan due onstream in the second quarter. Shiny Chemical Industrial (Kaohsiung, Taiwan) will build and operate the plant using Lyondell technology, and Lyondell will market and sell the output. Lyondell's propylene oxide-styrene monomer jv with Sinopec at Ningbo, China is scheduled to come online in 2009.

Although China's ethylene capacity will double in the next five years, rapid demand growth in the country is expected to drive up import requirements, to 18 million m.t., CMAI says. The country is expected to absorb another 5 million-6 million m.t. of Mideast ethylene derivative production by 2015, it says. Despite increasing supply from the startup of new plants, demand growth is strong enough to absorb new capacity right now, Methvin says. CNOOC Shell Petrochemicals (CSPC), a 50-50 joint venture of Shell and China National Offshore Oil Corp. (CNOOC) started up its petchem complex at Daya Bay, China last year. Shell is working on engineering for an 800,000-m.t./year ethylene unit at Bukom Island, Singapore that is expected to come online by early 2010, she says.



"We're looking at opportunities in the Middle East," Methvin says. "It is a low-cost region and provides further diversification of our feedstocks." Shell uses ethane/propane in North America, naphtha in Europe, and liquids in Singapore, she says. Shell's equally owned jv with Sabic Saudi Petrochemical Co. (Sadaf; Al Jubail) has a steam cracker with capacity for 1.2 million m.t./year of ethylene at Al Jubail. Shell is exploring opportunities at the jv and in the Mideast, she adds.

The global petchem market is expected to hit a downturn by 2009, however, as new capacity comes onstream, Adams says. "While demand

in Asia is still growing, thanks to consumers all around the globe, the step change in Mideast capacity is too much, and its marketers must find outlets for some volume of product in regions other than Asia," he says. This will set off a competitive battle for the remaining international business and start the fight to protect domestic markets at home, Adams says.

The Mideast is not likely to dictate prices, however, producers say. Commodity prices will be set by the highest-cost producer for each incremental tonnage, and not by low-cost Mideast capacity, says Cheri Zhou, manager/strategy, planning and performance at BP.

STILL VIABLE. America can remain a viable market when new capacity starts up, but more consolidation may be needed, producers say. "North America can be competitive," Methvin says. "What we have to do is to concentrate on large, integrated sites, focus on energy efficiency, and ensure reliability," she says. "Even at 3%/year GDP growth, you are talking about sizable volume growth in what is a very large market."

Expansion opportunities also exist in North America, specifically Canada, producers say. Alberta plans to create incentives that encourage expansion of ethane extraction, with regulations expected to be finalized this year. The incentives and increased gas supplies offer the opportunity to potentially double the size of Alberta's petchem industry over the next 20 years, Pappas says. Nova's current ethylene capacity in Alberta is 4.8 billion lbs/year, a hefty share of the province's total 8.6 billion lbs/year. Nova would seek to maintain at least its current share as production expanded, he says.

Westlake is also growing in North America via acquisitions. The company recently completed the acquisition of Eastman's PE business, and is planning to either buy, expand, or acquire ethylene assets, says Albert Chao, Westlake president and CEO. Westlake will become net short on ethylene following the acquisition, analysts say. The company is planning to debottleneck its Lake Charles, LA cracker by 200 million lbs/year this year, and is planning an ethane cracker in Trinidad that will have capacity for 570,000 m.t./year of ethylene capacity. The project, originally to start construction late this year, is still undergoing feasibility studies, Chao says.

Despite high natural gas prices, the U.S. is competitive versus the rest of the world, because crude oil prices are higher than natural gas prices, Chao says. Crude oil currently is trading around $60/bbl and natural gas at around $7/million Btu, reflecting a ratio of 8.5. This is above the thermal parity ratio of 6, giving natural gas-based feeds the advantage, says Kevin McCarthy, analyst at Banc of America Securities (New York).

"The U.S. is still relatively competitive to the rest of the world except the Mideast," Chao says. The region remains a "good market" to be in for polyolefins and vinyls because GDP and population are still growing, and significant new olefins capacity has been lacking, he says. The size of the U.S. market and its distance from the Mideast make the market viable, he adds.

Industry consolidation will continue in the matured regions, as cracker operators struggle to keep up with low-cost production in the Mideast, producers say. "When the capacity in the Mideast starts up, every U.S. company will have to review their strengths and weaknesses, and to decide whether to expand or shut down," Chao says.

"I think there will continue to be consolidation rather than fragmentation of the industry," says Peter Huntsman, CEO of Huntsman, which has announced plans to sell its petchem business. "I think things will become more evident as we head out of the next downturn," Huntsman says. The last major build of U.S. capacity occurred in the mid- and late-1980s, which will soon push the average age of a U.S. cracker to 25. "You're going to have 50 billion-60 billion lbs/year of ethylene capacity in North America that will be pretty old," he says. "And I still don't know why the industry seems willing to tolerate $8-$9/million btu natural gas." The players that will succeed in North America and Europe will have a well-integrated position across the industry's entire value chain, he adds. "I would not want to be in a position where I'm just buying ethane or propane at market price and selling a basic commodity into the market," Huntsman says. "I'm not sure that's a business model that is sustainable."

MORE ETHYLENE ON THE WAY*

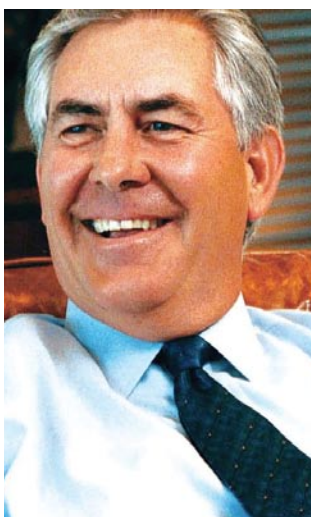
(IN THOUSANDS OF M.T./YEAR)

PROJECT	CAPACITY	COUNTRY	PLANNED STARTUP
PETRO-RABIGH	1,300	SAUDI ARABIA	2009 Q1
SAUDI ETHYLENE AND PE	1,000	SAUDI ARABIA	2009 Q1
KHARG PETROCHEMICAL	500	IRAN	2009 Q1
RAS LAFFAN ETHYLENE CO.	1,300	QATAR	2009 Q2
DUSHANZI PETROCHEMICAL	1,000	CHINA	2009 Q3
FUJIAN PETROCHEMICAL (1)	800	CHINA	2009 Q3
PTT CHEMICAL	1,000	THAILAND	2009 Q4
INDIAN OIL	900	INDIA	2009 Q4
TIANJIN PETROCHEMICAL	1,000	CHINA	2009 Q4
ZHENHAI REFINING	1,000	CHINA	2009 Q4
SHELL CHEMICALS	1,000	SINGAPORE	2010 Q2
BOROUGE	1,400	UAE	2010 Q2
PEMEX	200	MEXICO	2010 Q3
GUANGZHOU ETHYLENE	520	CHINA	2010 Q3
FUSHUN PETROCHEMICAL	800	CHINA	2010 Q3
DOW-SIAM CEMENT	1,200	THAILAND	2010 Q3
SIPCHEM	1,300	SAUDI ARABIA	2010 Q4
ARVAND PETROCHEMICAL (#8)	1,100	IRAN	2011
PEMEX	200	MEXICO	2011
ILAM PETROCHEMICAL (#13)	320	IRAN	2011
CHENGDU PETROCHEMICAL	800	CHINA	2011
PETROX SA	450	CHILE	2011
OMAN PETROCHEMICAL INDUSTRIES [2]	1,000	OMAN	2011
Q-CHEM	1,180	QATAR	2011

1) JOINT VENTURE OF EXXONMOBIL, FUJIAN PETROCHEMICAL, AND SAUDI ARAMCO. 2) JV OF DOW CHEMICAL AND OMAN OIL (MUSCAT). JV OF SOURCE: NOVA CHEMICALS.

ExxonMobil Near Decision on Singapore Cracker

ExxonMobil says it expects to make a final decision soon on whether to proceed with a second Singapore cracker. Negotiations over project financing and discussions with the Singapore government are at advanced stages, says ExxonMobil chairman and CEO Rex Tillerson. "We expect a final decision in the near future," Tillerson said at a press conference in New York last week. Some equipment and materials for the project have been ordered, he says. The company announced in late 2004 that it was studying plans to build another cracker at its Singapore site. The Singapore project would take roughly three years to complete following final approval, he adds.



Tillerson: Record chemicals profit.

ExxonMobil is also planning major chemical projects in China and Qatar, as well as a major expansion at its Kemya (Al Jubail) and Yanpet (Yanbu) ethylene and derivatives joint ventures with Sabic in Saudi Arabia. ExxonMobil's capacity for basic petrochemicals in Asia and the Mideast will expand by 60% to 8 million m.t./year over the next few years, says Stephen Simon, ExxonMobil senior v.p. "Over the next 10 years, 60% of petrochemical demand growth will occur in Asia, with China alone accounting for one-third," Simon says. "By 2015, Asia will account for 50% of demand for key petrochemical products, 25% alone in China."

ExxonMobil posted record chemical earnings of $4.4 billion in 2006, an 11% gain over 2005. Return on capital employed (ROCE) in chemicals was 33%, the highest level for the company since 1995 and nearly triple the ROCE in chemicals posted by Shell and ChevronTexaco, and overall results for Dow Chemical, ExxonMobil says. Productivity initiatives over the past five years delivered nearly $500 million in an after-tax earnings benefit for ExxonMobil Chemical in 2006, Simon says. Energy costs per unit of production have been reduced by 9% since 2002, he says. The chemicals workforce has been reduced by 12% since 2002, generating a productivity gain of 18% when higher volumes over the same period are factored in, he adds.

Manufacturing productivity gains in chemicals—running plants more effectively with less unplanned downtime—has "provided production gains measured in millions of tons/year, or the equivalent of about one-and-a-half worldscale crackers," Simon says. ExxonMobil says that efforts to improve its feedstock flexibility at its steam crackers continue, and today provides it with a roughly 20% advantage in net raw material costs compared with crackers that run on ethane in North America and naphtha in Europe.

ExxonMobil has a strong specialty chemicals unit, which accounted for 21% of 2006 earnings, leading global positions in commodity chemicals, as well as strong productivity and efficiency gains, says John Herrlin, oil analyst with Merrill Lynch (New York). "More importantly, ExxonMobil is focused on growing capacity where its peers have retreated significantly, and is getting involved in feedstock advantaged projects in China, Saudi Arabia, Qatar and Singapore," Herrlin says.

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Producers Seek to Diversify; Value Addition is Key to Success

The Mideast—principally the Gulf Cooperation Council (GCC) member states, as well as Iran—has over the past three decades built a formidable chemical industry, and is today the biggest producer and exporter of basic petrochemicals. Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates (UAE) continue to attract regional and overseas investors looking to establish manufacturing facilities based on cheap feedstocks and in close proximity to the emerging markets of Asia, particularly China and India. More than 30 million m.t./year of ethylene capacity will be added in the Mideast by 2012-13 *(table)*. However, the new capacity is likely to put pressure on global petrochemical markets, analysts say. Steam crackers coming onstream from 2008 in Kuwait, Qatar, and Saudi Arabia will cause an imbalance in worldwide supply and demand, lowering petchem plant operating rates and leading to a softening in prices, analysts add.

Mideast projects also face spiraling construction costs. "Today, the cost of new plant construction is more than 50% higher than it was several years ago," says Mohamed H. Al-Mady, CEO of Sabic and chairman of the Gulf Petrochemical and Chemical Association (GPCA; Dubai). Plants built at high capital cost could lose competitiveness and fail to achieve threshold financial returns, Al-Mady said to attendees at GPCA's first annual conference, held recently in Dubai.

Some projects may be delayed or canceled, analysts say. "The viability of more marginal projects will be put into question," says Andrew Spiers, senior v.p. at Nexant (London).

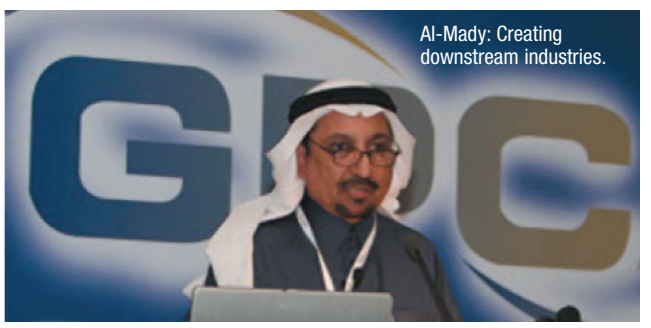
Engineering, procurement, and construction costs in the Mideast have inflated faster than elsewhere, says Philip Leighton, director/petrochemicals at Jacobs Consultancy (London). "This means that new plants in the region are coming into the market with an installed cost penalty compared to plants in Asia," Leighton says.

The cost of a previously announced refinery expansion and petchem project by Saudi Aramco and Sumitomo Chemical at Rabigh, Saudi Arabia has more than doubled, to $9.8 billion, from original estimates of $4.3 billion. Meanwhile, Sabic and Shell Chemicals recently put a styrene expansion on hold by the companies' Saudi Petrochemical Co. (Sadaf) joint venture at Al Jubail, Saudi Arabia, citing rising project costs. Investment costs of a project by Saudi Kayan, a Sabic affiliate, have almost tripled to $10 billion, from estimates of $3.5 billion only a few years ago. Sabic has a controlling 35% interest in Kayan, which is building a complex featuring plants making products that have not been made in Saudi Arabia before.

Changes in feedstock availability and consumption are also expected to alter the Mideast's chemical landscape. Ethane will become less available and petchem development will likely require greater dependence on heavier feedstocks such as propane, naphtha, or gasoil, Al-Mady says. Regional producers will also seek to diversify beyond their traditional ethane-based product slate of polyethylene (PE) and ethylene glycol (EG). Diversification will significantly increase the capital costs of projects, and require effective recovery and utilization of by-products to achieve competitive economics, he says.

Aramco, the sole supplier of petchem feedstocks in Saudi Arabia, will reduce the proportion of ethane in petrochemical feedstock to 60% by the end of this decade, from 100% in the late 1980s, says Aramco senior v.p. Khalid A. Al-Falih.

The Mideast's petrochemical plants have traditionally been built with a view to exporting their output to Asia, but Mideast exporters will increasingly have to find new markets, analysts say. Asia will "easily" absorb Mideast exports until 2009, but the Asian market will then become oversupplied, says Gary K. Adams, president of CMAI (Houston).



Al-Mady: Creating downstream industries.

CRACKERS GALORE*

(IN THOUSANDS OF M.T./YEAR)

COUNTRY	COMPANY	LOCATION	CAPACITY	ONSTREAM
ABU DHABI	BOROUGE II	RUWAIS	1,400	2010
IRAN	NPC NO.5	KHARG ISLAND	500	2010
	AMIR KABIR NO.6	BANDAR IMAM	520	ONSTREAM
	MARUN NO.7	BANDAR IMAM	1,100	2008
	ARVAND NO.8	BANDAR IMAM	1,100	2010-11
	ARYA SASOL NO.9	ASSALUYEH	1,000	2007 (Q4)
	JAM NO.10	ASSALUYEH	1,300	2007 (Q4)
	KAVYAN PETROCHEMICAL NO.11	ASSALUYEH	2,400	2012
	PERSIAN GULF PETROCHEMICAL NO.12	ASSALUYEH	1,900	2012
	ILAM PETROCHEMICALS NO.13	ILAM	500	2010
	NO.14	ASSALUYEH	1,200	2013
	BOUSHEHR PETROCHEMICAL NO.15	ASSALYUEH	670	2014
KUWAIT	OLEFINS II	SHUAIBA	850	2008
OMAN	OPIC	SOHAR	800-1,000	2011
QATAR	QAPCO	MESAIEED	200+	2007 (Q3)
	RAS LAFFAN OLEFINS CO.	RAS LAFFAN	1,300	2009
	QP-HONAM	MESAIEED	900	2011
	QP-EXXONMOBIL	RAS LAFFAN	1,300	2012
	QP-SHELL	RAS LAFFAN	1,200	2012
SAUDI ARABIA	INEOS-DELTA	AL JUBAIL	1,200	2011
	NATIONAL CHEVRON PHILLIPS	AL JUBAIL	1,200	2010
	PETROKEMYA	AL JUBAIL	1,300	2011
	PETRORABIGH	RABIGH	1,300	2008
	SAUDI ARAMCO/ DOW CHEMICAL SAUDI CHEVRON PHILLIPS	RAS TANURA	1,500	2013
	SAUDI KAYAN	AL JUBAIL	300	2008 (Q1)
	SHARQ	AL JUBAIL	1,350	2009-10
	SIPCHEM	AL JUBAIL	1,300	2008 (Q3)
	TASNEE/SAHARA	AL JUBAIL	1,200	2011
	YANSAB	YANBU	1,000	2008-09
			1,300	2008 (Q2)

*ANNOUNCED ETHYLENE PROJECTS IN THE MIDEAST. SOURCE: SRI CONSULTING (ZURICH); *CW* RESEARCH.

Mideast producers' diversification programs are designed partly to tackle anticipated oversupply. Saudi Arabia's ministry of petroleum now allocates feedstock preferentially to projects with a broader product slate. Saudi Arabia accounts for 80% of GCC petrochemical capacity. "There will be no more pure ethane crackers in Saudi Arabia because there is not enough ethane to go around," says Marwan N. Nusair, president and COO of Alujain Corp. (Jeddah, Saudi Arabia), a private group owned by Xenel Industries. The ministry will allocate ethane with other fractions such as butane or propane in the future, Nusair says. Potential investors will need to include plans for some diversification, including downstream products not yet manufactured in Saudi Arabia, to secure feedstock allocation. That could mean "going all the way down to the consumer," Nusair says. Alujain is studying plans for a project at Al Jubail that will have a "different product slate from what is available now," he says.

Sabic, the Mideast's largest producer of petchems and a leading global player, is implementing a long-term growth plan, dubbed "Sabic 2020." The plan is designed to reinforce Sabic's international position and diversify the company's operations to include less cyclical businesses such as specialty chemicals. Specialities, which for Sabic includes polycarbonates (PC), will make up 25%-30% of Sabic's sales by 2020, Al-Mady says. Kayan is Sabic's first major diversification. Kayan's products—in addition to olefins, polyolefins, and EG—will include phenol and acetone, bisphenol A, dimethyl formamide, ethanolamines, methylamines, choline chloride, ethoxylates, and PC.

The Saudi government is embarking on a program to create downstream industries that will consume basic petchems, intermediates, as well as hitherto not manufactured specialty chemicals. New sectors will manufacture automobiles and tires, requiring, among others, polyurethanes and rubbers, respectively. Sabic and ExxonMobil Chemical, joint venture partners in Saudi Yanbu Petrochemical (Yanpet; Yanbu) and Jubail Petrochemical Co. (Kemya; Al Jubail), are planning to supply products to these industries. The companies are carrying out feasibility studies focusing on domestic production of carbon black as well as rubber and thermoplastic specialty polymers, including ethylene propylene diene monomer, thermoplastic olefins, butyl rubber, styrene butadiene rubber, and polybutadiene rubber. Production will serve emerging local and international markets from 2011. "When Sabic was first established, there were no downstream plastics processing plants, and now there are more than 600 plants using our products," Al-Mady says. Other downstream industries will also emerge in Saudi Arabia, he says.

Sabic also has big overseas ambitions. The company recently acquired Huntsman's petchem business in the U.K. and earlier bought DSM's petchem assets. "According to our strategic plan, Sabic will grow tremendously over the next 14 years including local growth, and investments

and acquisitions overseas," Al-Mady says. The company is planning investments in China, India, and other countries, he says.

Meanwhile, overseas companies are establishing production in Saudia Arabia. Huntsman, in partnership with Al-Zamil Group, a private-sector company, is building a $150-million, 30,000 m.t./year amines manufacturing complex at Al Jubail for completion in the first quarter of 2009. Huntsman will be the exclusive marketer of the products, primarily in Asia. The complex forms an important part of Huntsman's previously announced "differentiated products" growth strategy, and the company is considering other investments in Saudi Arabia.

The massive wave of petchem investments in Saudi Arabia has necessitated expansion of the surface area of the Al Jubail and Yanbu industrial complexes. The area of land available to investors will be doubled at Jubail and increased by more than 50% at Yanbu, says Mubarak Abdullah Al-Mubarak, director general/planning and investment at the Royal Commission for Jubail and Yanbu (RC; Riyadh), which provides a one-stop-shop service to investors at the two locations. "There is a significant increase in demand for industrial land, almost similar to the early 1990s boom period," Al-Mubarak says. A host of companies have submitted site allocation requests for the Al Jubail extension, which will be known as Jubail 2.

RC is spending $4.3 billion to create Jubail 2, entailing the addition of 62 sq km of land with all the required infrastructure by 2013, raising the total there to 127 sq km. The new industrial complex is expected to attract local and foreign investments in petchems and metals totalling about $64 billion, Al-Mubarak says. Even that amount of space will not be sufficient, however. "RC has already received applications for 163% of the new land and is working to expand the site further," he says. RC plans to add a further 30 sq km of land at Jubail 2 by 2016 and is currently working out projected land development costs. Petchem products to be manufactured at Jubail 2 will include 2-ethyl hexanol, acetic acid, acetone, acrylonitrile, aromatics, butanediol, cumene, ethylene, ethylene dichloride, EG, maleic anhydride, phenol, PE, polyethylene terephthalate, propylene, polypropylene (PP), purified terephthalic acid, polystyrene, polyvinyl chloride, and styrene.

Aramco and Total are planning a $6-billion refining and aromatics complex at Jubail 2 by 2011. Kayan, which is constructing its complex at the existing Al Jubail site, will have future investment opportunities at Jubail 2, Al-Mubarak says.

Jubail 2 will offer "a lot of synergies and integration opportunities with other projects," Al-Mubarak says. Aramco and Dow are planning what will become the world's biggest integrated refining, petchem, and downstream complex at Ras Tanura, about 50 km from Jubail. It will include ethane and naphtha crackers, aromatics and chlor-alkali complexes, as well as about 30 downstream process units making more than 300 products. "These can be utilized or integrated at the Jubail plants," HEsays. The Ras Tanura project will cost an estimated $15 billion-$16 billion.

Other integration opportunities in Saudi Arabia are being explored by The Saudi Mining Co. (Ma'aden; Riyadh) and RC. Ma'aden is an investor in a planned mining and industrial zone at Ras az Zawr, 70 km from Al Jubail. A phosphate mining and granulation, and diammonium phosphate production complex, as well as an aluminum smelter and refinery, are planned at Ras az Zawr. "These plants could result in a number of downstream industries that could be located at Al Jubail," Al-Mubarak says.

Jubail 2 will complement and extend Al Jubail's existing facilities, and will have direct access to feedstock from the Master Gas system, a network of gas-gathering facilities and pipelines that collects associated gas as a by-product of oil and nonassociated gas production. The system will be enhanced to accommodate increased feedstock requirements from Jubail 2.

RC, meanwhile, is spending about $3.2 billion on the Yanbu expansion, dubbed Yanbu 2. The expansion is expected to attract industrial investments totalling $31 billion. The project will be in two phases, each targeting an extra 33 sq km, expanding Yanbu's total surface area to 115 sq km by 2019. The first phase will be completed this year, RC says. The biggest investment announced so far is that of YanSab, a Sabic affiliate that is constructing a petchem complex based on an olefins plant with capacity to produce 1.3 million m.t./year of ethylene and 400,000 m.t./year of propylene. Downstream units will produce 900,000 m.t./year of PE; 400,000 m.t./year of PP; 770,000 m.t./year of EG; 250,000 m.t./year of benzene, xylene and toluene mixtures; and 100,000 m.t./year of butene-1.

Other GCC states are moving ahead with their own expansion plans. Qatar intends to utilize further the country's abundant gas reserves. Four major jv projects involving state-owned Qatar Petroleum (QP; Doha) are expected to add 4.7 million m.t./year of ethylene capacity over the next six years. Ras Laffan Olefins Co., a jv among QP, Qapco, Chevron Phillips Chemical, and Total Petrochemicals, is building a 1.3-million m.t./year ethane cracker at

Continued on page 11

Braskem, Petrobras, and Ultra Buy Ipiranga Group

Gabrielli: Boosting Fuel Network.

Three of Brazil's largest chemical makers will acquire the Ipiranga Group (São Paulo), a petrochemical, refinery, and fuel distribution firm with 2006 sales of R30 billion ($14.3 billion). Braskem (São Paulo), Petrobras (Rio de Janeiro), and Oxiteno parent company Ultra Group (São Paulo) will spend a total of about $4 billion for Ipiranga's assets. The companies did not disclose how much debt Ipiranga holds.

Braskem (São Paulo) will acquire 60% of Ipiranga's petrochemical assets, with Petrobras picking up the remaining 40%, the companies say. Ultrapar will absorb Ipiranga's fuel distribution network in South and Southeast Brazil, and Petrobras will take over Ipiranga's fuel distribution assets in North, Northeast, and Midwest Brazil, says Petrobras CEO José Sérgio Gabrielli. The total cost to Ultra will be about $1.6 billion, Petrobras will spend $1.3 billion, and Braskem will pay $1.1 billion, the firms say. The companies will each assume a third of Ipiranga's refinery in Rio Grande do Sul, and say they have made "a commitment to continuing operations" at the refinery.

The deal strengthens Braskem's position in the south of Brazil, giving it control of the ethylene and polyethylene (PE) complex Copesul (Triunfo), says Rina Quijada, executive director for market research firm Intellichem (Coral Gables, FL). "Braskem was already strong in the Northeast, and now it has a strong position in the south of Brazil, making it one of the biggest firms in the region," Quijada says.

Before the deal, Braskem and Ipiranga each held a 29.46% stake in the 1.1 million m.t./year ethylene cracker at Copesul (Triunfo). Petrobras had a 15.63% stake, with the remainder held by a diverse group of investors.

Braskem and Petrobras plan to invest R780 million in unspecified upgrades at Copesul over the next three years, says Petrobras director/downstream products Paulo Roberto Costa.

"This new petrochemical consolidation brings an important growth potential to Braskem, with a new competitiveness and profitability benchmark for our business," says Braskem president José Carlos Grubisich.

Analysts say the Ipiranga acquisition fits well with Braskem's petrochemical assets at Copesul. "With this deal, Braskem gains access to three Hostalen high-density PE (HDPE) production lines with a total installed capacity of 400,000 m.t./year, one 150,000 m.t./year gas phase Spherilene linear low-density PE (LLDPE/HDPE), and one 150,000 m.t./year Spheripol polypropylene (PP) line," says Jorge Bühler-Vidal, director of Polyolefins Consulting (North Brunswick, NJ). "Since Braskem already operates Spherilene and Spheripol process lines as Triunfo, just across the fence from Ipiranga, the manufacturing synergies will be substantial and easy to implement," Bühler-Vidal says. Braskem and Suzano are now the only PP producers in Brazil, he says.

Ipiranga is the second-largest fuel distributor in Brazil, after Petrobras. The gasoline stations to be acquired by Ultra will retain the Ipiranga trademark. Those acquired by Petrobras will use the Ipiranga brand name for five years, and will then assume the Petrobras name. "With this incorporation, we take on important assets, committed professionals and, moreover, the Ipiranga flag, which is among Brazil's 10 most valuable brands and one of the country's most respected companies," says Ultra Group president Pedro Wongtschowski.

Brazilian regulators launched an investigation into allegations of insider trading, after several traders were found to have profited from unusually high volumes of trades just prior to the deal's announcement, according to local press reports. Sources say that the investigation, as well as a review of the deal by Brazil's antitrust regulatory agency Cade (Rio de Janiero), are not expected to hinder the deal's finalization.

Chemtura Finalizes Kaufman Deal

Chemtura says it has completed its purchase of Kaufman Holdings (Fords, NJ), which operates Hatco and Anderol, for an undisclosed amount. Hatco is a producer of polyol esters used for synthetic lubricant applications, including aviation turbine oils and lubricants for HFC refrigeration compressors; Anderol makes high-purity, synthetic lubricants used in aviation and industrial markets. Kaufman has sales of about $200 million/year, and operates manufacturing plants at Fords and East Hanover, NJ; and Oakville, ON.

Wood: Strengthening Chemtura's portfolio.

Mann: Combining technology and manufacturing experience.

The acquisition is in line with Chemtura's strategy to add high-performing businesses to its portfolio, the company says. "Our existing petroleum additives/lubricants business is core to our growth, and Hatco and Anderol fit in well with this business," says Robert L. Wood, chairman and CEO of Chemtura. "There are related product offerings in key customer areas, as well as the opportunity to strengthen alliances with major suppliers." Chemtura says it will provide industry expertise, Six Sigma-based products and processes, and information technology systems to Kaufman.

"The acquisition brings together complementary technology and manufacturing experience and will result in our ability to offer customers a broader portfolio of products, technology, and service," says Janet Mann, general manager and v.p./performance specialties at Chemtura. Hatco and Anderol will become part of the performance specialties group of businesses, which includes the petroleum additives/lubricants unit.

"We see many opportunities for global expansion in two high-growth markets: HFC refrigeration lubricants and high-performance synthetic lubricants," Mann says. "Growth in HFC refrigeration lubricants is driven by the Montreal Protocol, which provides for the accelerating adoption of environmentally friendly refrigerants. Growth also will be driven by the demand for improved fuel and energy efficiency, as well as increased equipment durability, all of which are enhanced by the use of synthetic lubricants."

Continued from page 10

Ras Laffan for completion in 2009. ExxonMobil and QP are planning a $3-billion petchem jv at Ras Laffan that will be based on a 1.3-million m.t./year ethylene plant by 2012. Shell and Honam Petrochemical are planning separate petchem jv's with QP.

Dow and Petrochemical Industries Co. (PIC; Kuwait City), partners in the Equate jv, are doubling capacity of their petchem complex at Shuaiba, Kuwait. The project includes construction of an 850,000-m.t./year ethylene plant as well as units producing 600,000 m.t./year of EG; 300,000 m.t./year of PE; and 450,000 m.t./year of styrene by the third quarter of 2008.

MEGlobal (Dubai), an EG partnership between Dow and PIC, is studying plans to build a third EG plant at Shuaiba by 2010. The plant would have capacity to produce 600,000 m.t./year of EG using Dow's Meteor technology, and would raise total EG capacity at Shuaiba to 1.725 million m.t./year. Meanwhile, Dow and PIC have entered the conceptual planning phase for a third olefins complex at Shuaiba.

Borouge, the UAE's leading petchem producer, is planning to build a second cracker complex at Ruwais, Abu Dhabi by 2010. The complex will have capacity to produce 1.4 million m.t./year of ethylene and include a metathesis facility producing 800,000 m.t./year of propylene. Downstream plants will include a 540,000-m.t./year PE unit using Borealis's Borstar process, and two Borstar-process PP facilities with a combined capacity of 800,000 m.t./year. Borouge's existing complex consists of a 600,000-m.t./year ethane cracker and a 580,000-m.t./year Borstar PE unit. Borouge is a jv between Borealis and Abu Dhabi National Oil Co. (Adnoc). Borouge is also studying plans to extend the scope of its portfolio to include other basic petchems.

NPRA SAYS REFINERY REPORT FLAWED

An Environmental Integrity Project (EIP; Washington) report listing the 10 worst polluters in terms of carcinogenic air pollution says nine refineries account for more than a third of the sector's carcinogenic emissions. Those same refineries account for only 15% of the nation's refining output, however, the report says. The report cites BP Texas City, TX facility, ExxonMobil's at Baytown, TX, Lyondell-Citgo's in Houston, and Valero's in Corpus Christi as among the worst emitters of carcinogens. The report drew criticism from the NPRA, which says it does not account for the significant shortcoming of the TRI database "including failure to weigh emissions according to actual risk," NPRA says. Benzene emissions, for example, have decreased "47% in recent years," NPRA says. The report is based on emissions data from 1999 to 2004 as reported in material safety data sheets (MSDS) and to the Toxics Release Inventory (TRI). Texas, Louisiana, and Pennsylvania are "home to the worst refineries, including BP Texas City" EIP says. The known or suspected carcinogens listed in the report include benzene, ethylbenzene, butadiene, polycyclic aromatic hydrocarbons, naphthalene, formaldehyde, and metals including nickel and lead.

PETCHEM PRODUCTION UP, BUT INVENTORIES DOWN

U.S. petrochemical production during the fourth quarter rose 14% year-on-year, to 48.2 billion lbs, but total inventories fell 3% from the year-ago period, to 5.7 billion lbs, NPRA says. Production was up for most petchems, except for butadiene and styrene, NPRA says. Butadiene and styrene production was down 22% and 4%, to 860 million lbs and 2.5 billion lbs, respectively. Inventories of benzene, propylene, and butadiene all fell year-on-year during the fourth quarter, by more than 10%, but inventories of ethylene and styrene both swelled by 14% in the same period, to 1.4 billion lbs and 710 million lbs, respectively, it says. Ethylene production in 2006 rose more than 4% from 2005, to 55.2 billion lbs; propylene and benzene output inched up 1%, to 34.5 billion lbs and 2 billion lbs, respectively; and production of ethylene oxide was up by 9%, to 7.6 billion lbs, it adds. Butadiene production fell 10%, to 4 billion lbs, and styrene was down 4%, to 10.6 billion lbs, NPRA says.

NPRA SAYS EPA MOBILE SOURCE AIR TOXICS LAW TO CONCERN REFINERS

NPRA says it is reviewing EPA's final rule on mobile source air toxics to reduce hazardous air pollutants, including benzene and other hydrocarbons, in motor fuels and vehicles. EPA's rule "further tightens gasoline specifications, especially for conventional gasoline, which represents two-thirds of the nation's total gasoline supply," says Charles T. Drevna, executive v.p. of NPRA. NPRA says it is paying strict attention to the rule's "potential impact on gasoline impact." While EPA has included averaging, banking, and trading into the rule, part of the rule "does not permit the use of credits," which causes concern for many refiners, NPRA says. It will also have different impacts on individual refiners, it says.

HOUSE LAWMAKER SEEKS INPUT ON CLIMATE BILL

House Energy and Commerce chairman John Dingell (D., MI) has written to industry and environmental groups asking for suggestions on how to structure legislation that lawmakers are writing to curb greenhouse gas (GHG) emissions. ACC, the National Petrochemical and Refiners Association (NPRA; Washington), AFL-CIO, and Environmental Defense (New York) were among the groups asked to provide their views on climate change policy.

Several bills to curb climate change have been introduced in the House and Senate, but the levels of restrictions vary. Democrats say they want to have climate legislation ready for proposal by July 4.

"Please outline which issues should be addressed in the committee's legislation, how you think they should be resolved, and your recommended timetable for congressional consideration and enactment," Dingell says.

The recipients have been asked to outline policy implications for the rate of U.S. GHG emissions, the U.S. economy, and for employment. Dingell also poses questions to industry about a potential cap-and-trade program for GHGs including: which sectors should such a program cover; how should allowances be allocated; and should early reductions be credited.

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