DuPont Gains Hard-Fought Majority Stake In Pannar Seed

DuPont has completed its three-year effort to buy a majority stake in South Africa's largest seed company, overcoming that country's stiff opposition to the foreign ownership with pledges to keep a rein on pricing and to aid small South African farmers. The deal with privately held Pannar Seed should provide immediate financial gain to DuPont, with new products expected to be on the market in August and September, according to Paul Schickler, president of DuPont Pioneer, DuPont's agricultural seed unit.

German Chemicals Economy Flat in H1 but European Sales Improve

In the first six months of 2013, a clear business trend for Germany's chemical producers did not materialize, the industry association Verband der chemischen Industrie (VCI) said in July. But while the sector lacked dynamic, compared with counterparts in other European countries German companies performed relatively well, the association said.

Production and sales of German chemical companies in H1 2013 were flat at the 2012 level and thus below producers' expectations. Business with foreign customers was slightly better than at home. Along with pharmaceuticals, polymers, consumer chemicals were the only segments to see any growth.

For the full year 2013, VCI is sticking to its earlier forecast of a 1.5% rise in chemical output and a sales increase of the same dimension to €190 billion. The association predicts slight gains in Germany and the rest of Europe in the second half, with export growth slightly less dynamic than expected earlier. (dw)

Lanxess Reports Successful PBT Trials with Bio-based BDO Feedstock

Trial production of polybutylene terephthalate (PBT) at the Hamm-Uentrop, Germany, plant of specialty chemicals producer Lanxess, using bio-based 1.4 butanediol (BDO) made according to the process developed by U.S.-based Genomatica, have proven that the renewable route to the polymer is commercially feasible, the two companies said.

In the test, Lanxess fed 20 t of the 100% bio-based BDO into the continuous production process at the 80,000 t/y polymerization facility it operates in a joint venture with DuPont. The company said it found that the properties and the quality of the resulting product were "fully equivalent" to conventional petroleum-based PBT.

Also using the Genomatica process, Japanese chemicals and plastics producer Toray in May said it had developed a partially bio-based PBT at bench scale with physical properties and formability equivalent to polymer made from conventional BDO. Toray also has made prototypes of molded components, and before scaling up to commercial production it plans to share samples of its bio-based PBT with customers to help develop market demand. (dw)

EU Chemicals Output Shrinking in 2013

European chemicals output will contract by 1% this year before returning to modest growth of 1.5% in 2014, Cefic, the European Chemical Industry Council, said. The 2013 figure is lower than the 0.5% slight expansion announced in December 2012, as the economic development to date has been weaker than expected.

The gradual recovery will be founded upon stabilization of industrial production in Europe after two years of weakness and a modest rise in exports. But the European chemicals sector, which generates 1% of the continent's gross domestic product and employs 1.2 million, will face tough competition from U.S. producers benefiting from cheap energy and feedstock.

"The EU chemical industry is still facing headwinds from the weak European economy," Cefic President Kurt Bock said. "The chemical industry continues to be exposed to strong international competition, mainly due to low-cost energy and feedstock in the US. European policymakers need to address the energy and feedstock issue if we are to preserve Europe's industrial core."

The 1% fall in European chemical output during 2013, compared with 2012, will be the second consecutive year of modest output decline. Important industrial markets for Although demand is stronger in some individual countries, both automotive and construction remain generally weak. The European construction output also remains at historically low levels. Cefic forecasts a return to moderate positive growth for chemicals output in 2014 of 1.5%. Petrochemicals and fine and specialty chemicals sub sectors both are predicted to grow by 2%. Consumer chemicals, a subsector that will remain in positive growth territory in 2013, will further expand by 1.5% next year followed by a 1% uptick for inorganic basic chemicals. Employment in the sector is forecast to remain stagnant.

Bayer Confirms 2015 Start for Commercial-Scale CO_2 to Polyols Unit

Bayer MaterialScience has confirmed 2015 as the start-up date for commercial scale production facility of polyether of polycarbonate polyols made from CO_2 feedstock. The new plant at Dormagen, Germany, will have capacity for "several thousand tons" of polyols.

Output will not be sufficient to accommodate market demand, but CEO Patrick Thomas said the Bayer group may opt to license its patented technology rather than to become an exclusive producer. Along with bedding, the CO_2-derived polyols could be used to produce thermoplastic polyurethanes and later coatings or fibers, he added.

In early 2011, BMS began producing test quantities of the PU foam precursors at Leverkusen, Germany, with an eye to developing foam with properties equivalent to those of conventional grades. The test project known as Dream Reaction and later Dream Production was supported financially by the German federal ministry for research and development, BMBF, and included input from research partners such as RWTH Aachen University, which developed the catalyst. CO_2 was sourced from a nearby power plant owned by German energy utility RWE.

The use of carbon dioxide as a feedstock not only benefits the environment, said the BMS chief. CO_2 also will replace some of the fossil raw material traditionally used exclusively. The company also expects the new process to have economic advantages, as the waste streams can be obtained for free. (dw)

Bio Jet Fuel

– Alternative Bio-Based Fuel from Non-Food Resources and Residues Meets Kerosene Standards –

Green Air Travel – Continuous growth of air traffic and its corresponding increase in CO_2 emissions can be offset by high-quality bio jet fuels that meet all kerosene-related parameters. Some technologies are already certified and on the market. An innovative new technology uses bio-based nonfood resources and residues and, therefore, broadens the raw material basis for bio jet fuels and has the potential to supplement existing technologies.

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Aviation Industry Growth and Related CO_2 footprint

Aviation is, among all transport sectors, growing strongly: Annual growth rates are projected at approximately 4.5% per year throughout the next decades. The majority of this growth is expected to be linked to Southeast Asia. Technological progress in the aviation industry – mainly more energy-efficient planes – might reduce the fuel consumption a bit. Yet without further changes in the fuel sector, aviation-related CO_2 emissions would increase by 3% per year. The aviation industry expects to be reliant on liquid fuels for the next 30 to 50 years, since no alternatives for biofuels – like batteries for cars – exist for airplanes.

This would put even more pressure on the CO_2 footprint of aviation: Already today, 12% of transport CO_2 emissions and 3% of all synthetic CO_2 emissions are due to aviation. European airlines consumed 53 million tons of kerosene in 2010; the whole world used 200 million tons.

Challenges For Aviation Companies

Governmental bodies are discussing joint targets and implementing several regulative actions in this context. The European Union decided in its Renewables Energy Directive (RED) to use 10% renewable energy in the transport sector by 2020 and is shooting for 2 million tons of "sustainable" kerosene by 2020. Details can be found in the technical paper "A Performing Biofuels Supply Chain for EU Aviation" of DG ENER 2011.

Aviation companies agreed on a voluntary commitment to grow only in a climate-neutral way from 2020 onward. They are, however, confronted by several challenges. Their cost pressure is tremendous, and fuel costs are continuously increasing: More than 30% of operating costs in aviation are due to fuel. Established biofuels for land transport like bioethanol and biodiesel cannot be used in airplanes because of their fuel properties – air transport requires biofuels that are chemically identical to fossil kerosene.

State-of-the-Art Processes for Bio Jet Fuel

State-of-the-art for producing alternative fuels not based on fossil oils is summarized in an International Air Transport Association (IATA) report. Basically, ASTM accepts two routes: First, there is the so-called Fischer-Tropsch (FT) process. In particular CTL, GTL and BTL (coal-, gas- and biomass-to-liquid) products are addressed. It implies gasification of feedstock to syngas with ash as a byproduct. Syngas is converted further to a mixture of fuels containing naphtha, olefins, kerosene, diesel and waxes, which are treated in several steps by so-called hydroprocessing and isomerization to yield fuels including jet fuel. Since those processing steps require very large units, typically more than 50% of fuel costs are due to investment costs.

Second, there are so-called hydrogenated vegetable oils, sometimes also called hydroprocessed renewable jet (HRJ). Processing steps comprise, besides distillation, the steps hydrotreating, hydrocracking and isomerization. Raw materials include nonfood and recycled fats and oils. Here, more than 50% of fuel costs are due to raw materials. The hydrotreating step requires much hydrogen, which currently can be obtained only from fossil sources. The technology is much more developed than the FT technology for renewable raw materials. To preserve the activity of the hydrotreating catalyst, only feedstock displaying food-quality parameters can be used. Palm oil and tallow fat are the preferred raw materials because of their high degree of saturation requiring the lowest amount of hydrogen.

Technologies Not Yet Considered by ASTM but Lining up for Testing:

- Hydroprocessed synthetic paraffinic kerosene (SPK) derived from fermented alcohols. Initially focused on iso-butanol, but other variations will be considered, too (alcohol-to-jet, e.g., Lanzatech/Swedish Biofuels).
- Synthetic biology, i.e., genetically engineered microorganisms converting sugar to pure hydrocarbons, resulting in farnesene and other similar terpenes (sugar-to-jet, e.g., Amyris Biotechnologies, Gevo and Cobalt).
- Synthesized kerosene aromatics (SKA), implying alkylated benzenes, a fuel component important for elastomeric seals and fuel lubricity (e.g., UOP and KIOR).
- Pyrolysis of cellulosic biomass to synthetic crude products (plus hydroprocessing).
- Comingling petroleum and biomass in refinery hydroprocessing. This is supported by refineries to optimize efficiencies but is currently not allowed.

Greasoline Technology as a New Approach

In contrast to these approaches, Greasoline technology is starting from bio-based fats and oils like HRJ. Greasoline, however, is based on a gaseous phase reaction technology and therefore can transform raw materials of significantly lower quality, because residual water and inorganic residues are separated in the evaporation step. The catalyst for the gaseous phase reaction also is highly tolerant to impurities. As a result, bio-based residues and side-products can be utilized instead of feedstock in the food-quality range.

Primary products are hydrocarbon chains identical with fossil diesel and kerosene fuels. Most of the diesel components can be transformed into the kerosene boiling range via isomerization. The technology also produces bio-based alkylated benzenes, which are crucial for jet fuel properties, especially as expanding agents in seals as well as for lubrication. These products cannot be obtained by hydro-treating processes and therefore HRJ fuel has to be blended with fossil jet fuel.

The basic technology does not need external hydrogen, because the formation of coke as a byproduct on the catalyst automatically closes the carbon-hydrogen balance within the system. A subsequent hydrogenation step with little hydrogen consumption is optional to guarantee all product quality parameters. The catalyst itself is regenerated after the biofuel reaction in an industrially established process. The process is currently performed in a pilot plant at Oberhausen; partners, mainly in the oil industry, are elaborating on plans for a demonstration plant.

Dr. Peter Haug, CEO, Greasoline; Dr. Axel Kraft, head of biofuels unit, Fraunhofer Umsicht

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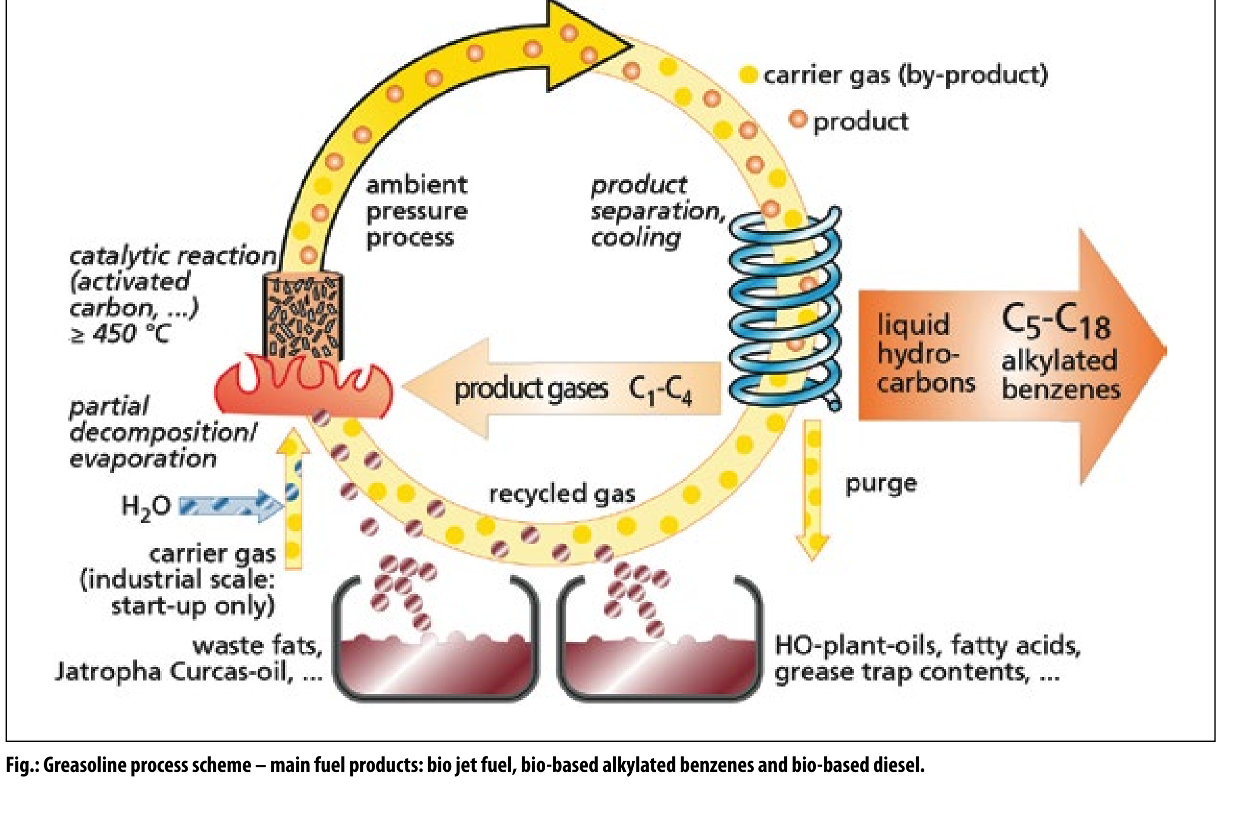

Fig.: Greasoline process scheme – main fuel products: bio jet fuel, bio-based alkylated benzenes and bio-based diesel.