

MARKET FORECAST

Coal to chemicals plants use the most metering pumps

Robert McIlvaine, the President & Founder of the McIlvaine Company investigates pumps in the chemical industry, indicating that coal to chemical plants are set to use the most metering pumps.

By Robert McIlvaine, President & Founder, McIlvaine Company

Plants which convert coal into chemicals utilize more metering pumps than conventional petrochemical plants, and more than used in any chemical, mining, pulp & paper, or other process. One reason is a much longer production chain involving coal conversion, refining, and then petrochemical manufacture all in one location. The magnitude of such plants and the number of processes involved is demonstrated by the Sasol facility in South Africa (See Figure 1).

Metering pumps are used in many of the production processes, but also in the initial water treatment and in

the wastewater treatment and recovery stages. Recently, the Sasol Secunda wastewater treatment facilities were upgraded.

Milton Roy pumps worth about R2-million were sold through Uhde for this upgrade. The order included 12 stainless steel metering pump models including MaxRoy, mRoy and PrimeRoy. The largest of the pumps delivered dosing capacities of up to 2,500 l/h.

The bulk of the metering pumps are for product processing, but many are required for the water used in the processes

and the wastewater generated by the plants.

Metering pump sales for coal to chemical plants are projected to exceed \$70 million per year, as those countries with large coal resources, but little oil and gas, take advantage of the home grown option. China is at the forefront of this movement.

Between 2013 and 2020, 13 million m.t./year of ethylene and propylene capacity will go online in the United States. During the same period, almost 20 million m.t./year of coal-based light olefin capacity will go online in China. This is

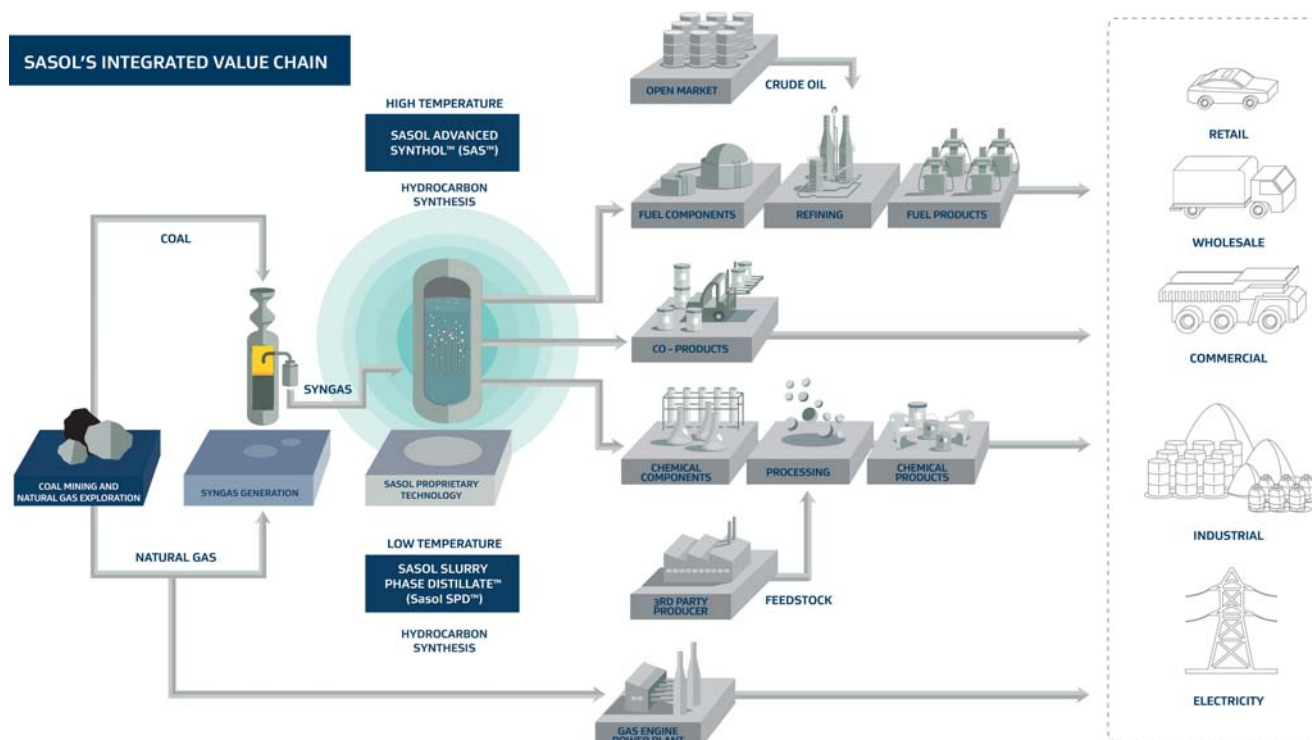


Figure 1: Sasol's integrated value chain.

Process	Metered chemicals
Distillation	Scale inhibitors, defoamers, corrosion inhibitors
Reformer	Scale inhibitors, defoamers, corrosion inhibitors, sulfiding agents, lubricity improvements, tetrachlorethylene
Coker	Defoamers
Cracking	Scale inhibitors, tetrachlorethylene
Water Treatment	Metered chemicals
Desalination	Scale inhibitors to keep membranes clean
Cooling Water	Corrosion inhibitors, coagulants, flocculants
Boiler Feedwater	Scale inhibitors, corrosion inhibitors
Wastewater Treatment	Metered chemicals
Metal Removal	Sulfides
Solids	Coagulants, flocculants

Table 1: List of processes and the relative metered chemicals.

based on the current five year plans. These coal-to-chemical projects are generally located far inland, but not because of the coastal regions' high labor costs. Investors are instead pursuing low-cost feedstocks provided by stranded coal mines with poor access to traditional markets.

Shenhua Baotou began operating the world's first coal-to-olefin (CTO) plant in August 2010 and Shenhua Ningmei started up the world's first coal-to-propylene plant in May 2011. Sinopec brought a methanol-to-olefin plant online in October 2011, while Datang International started up a coal-to-propylene plant in January 2012. In total, China has 400,000 m.t./year of coal-based ethylene and 1.4 million m.t./year of coal-based propylene in operation. The world's first coal-to-MEG (CTMEG) plant was brought online by GEM Chemical in

December 2009. Four other CTMEG plants were started up in central China raising China's total coal-based MEG capacity to 800,000 m.t./year.

Of the more than 120 coal-to-chemical plants announced in China, 54 are olefin projects and 27 are MEG projects. A recent large olefin plant shows positive results. Over 360 million pounds of light olefins have been produced at a plant in Nanjing, China, using breakthrough technology from the multinational petroleum refining, gas processing, and petrochemical production company, UOP LLC.

Ethanol-to-olefins (MTO) process technology converts methanol derived from coal into ethylene and propylene. The lower price of oil and resistance by environmentalists are casting some doubt on this program. Four out of five coal conversion plants are or will be located in

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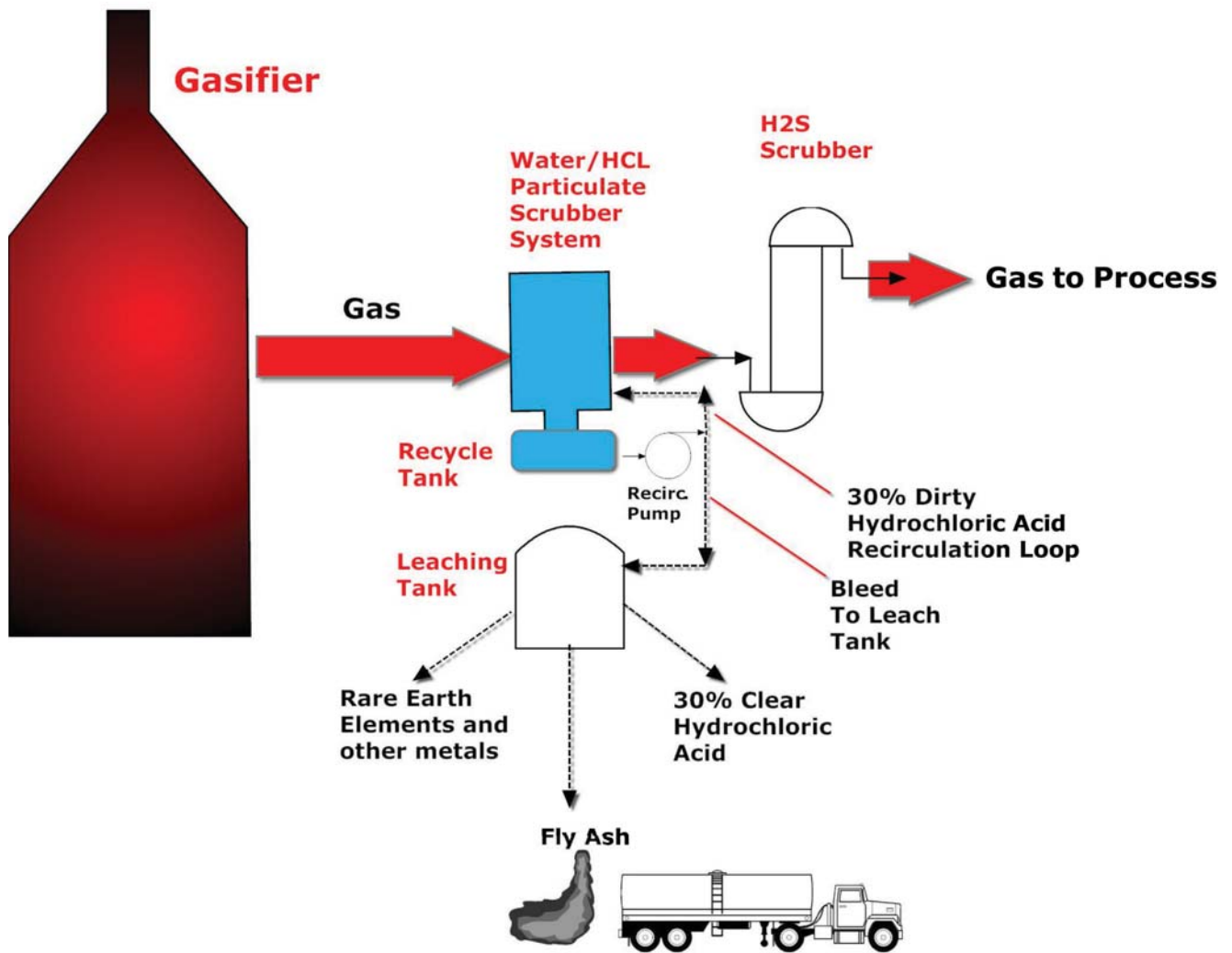
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HCL process with gasification.

Xinjiang, Inner Mongolia, and other northwestern regions, which are among the country's driest lands. There has been much publicity regarding water and air pollution. New technology may solve both the economic and environmental problems. Zero liquid discharge systems have been successfully applied to coal fired generating plants and to plants processing tar sands. So, the water problem is readily solved.

The ability to recover rare earths could radically change the economics. The Chinese program envisions conversion of 1.5 billion tons of coal per year. This is more than 10% of all the coal mined in the world. The rare earths contained in this

coal are sufficient to make it the leading source of these valuable minerals. China has embarked on a research program which shows that extracting rare earths from coal is cost effective. The McIlvaine company just released an analysis showing that the native chlorine in the coal can be used in the leaching process. This avoids purchase of

acid and can substantially reduce costs.

The coal to chemicals market is one of the biggest new opportunities for metering pumps. China, the Ukraine, India, South Korea and many other countries are initiating conversion programs. Environmental and economic challenges can be met.

ABOUT THE AUTHOR: Robert McIlvaine

Robert McIlvaine is the President and Founder of the McIlvaine Company, which publishes reports across worldwide pump and valve markets. He was a pollution control company executive prior to 1974, when he founded the McIlvaine Company. He oversees a staff of 30 people in the United States and China.



Robert McIlvaine, President & Founder, McIlvaine Company

All forecasts are extracted from *Pumps: World Markets* published by the McIlvaine Company www.mcilvaine.com