# The changing face of **the global methanol industry**

By Marc Alvarado

**The global methanol industry has undergone** dramatic changes in the past 15 years. These changes have included a shift in regional demand dominance, the development of new end uses, and the emergence of new production centers. These factors have resulted in new tradeflows, pricing and economic dynamics which have previously not existed in the industry with closer links to other chemical product areas, adding further complexity in determining market direction.

## The shift in the demand center

China has emerged as the dominant country with respect to both methanol capacity and demand owing to its rapid economic growth. China represented just 12% of global methanol demand in 2000 while North America and West Europe represented 33% and 22%, respectively. By 2015, Chinese methanol consumption had grown to 54% of global demand while North American had fallen to 11% and West Europe to 10% *(see chart 1)*. Chinese demand has grown significantly in traditional methanol derivatives, such as formaldehyde and acetic acid, but there has also been large, step like growth into new end uses, such as light olefins production, as well as expanded demand into energy applications, such as DME and direct gasoline blending.

## New end uses.

Fuel applications for methanol have been relatively minor historically with very limited direct use as a motor fuel. Chinese direct blending use of methanol into the country's gasoline pool has seen an average annual growth rate of 25% from 2000 to 2015, resulting in gasoline blending becoming the third largest demand segment for methanol by 2015.

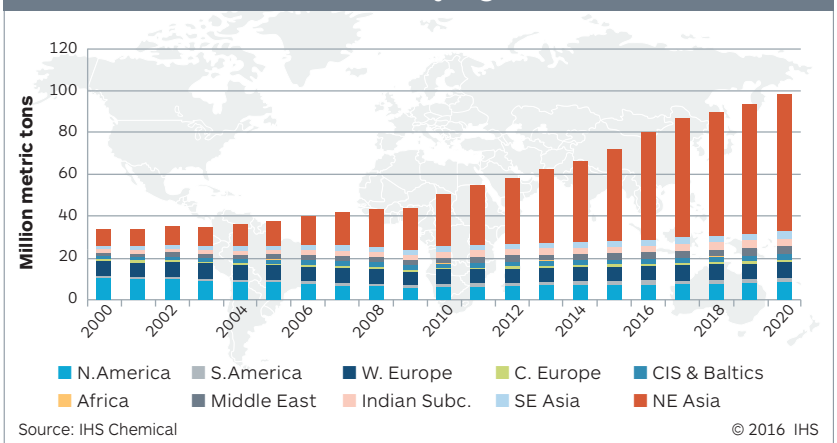
Produced from methanol, DME is primarily used as an aerosol propellant in the West, making for a rather small overall market. However DME can also be used as a fuel, either when used instead of diesel in road vehicles or blended into liquefied petroleum gas (LPG). The latter has been widely seen at the consumer level for home cooking and heating in China. This market segment is large enough that methanol consumption into DME has grown from virtually nothing in 2000 to represent the fourth largest methanol derivative.

A newer and very rapidly growing demand segment for methanol is in the production of light olefins (methanol-to-olefins, MTO). In an MTO unit, merchant methanol is used as a feedstock; it is not a unit which is back integrated to the feedstock for methanol. Such integrated coal-to-olefins (CTO) or gas-to-olefins (GTO) units do not have an impact on the methanol markets as they neither buy nor sell methanol as it is simply an intermediate phase in the overall process. For these reasons, the subsequent comments related to MTO refer to only those units that consume methanol produced by non-associated methanol units. As of 2016, MTO units exist exclusively in China with production beginning in late 2011 at very modest levels of methanol consumption. However there has been staggering growth in methanol consumption into this end use with as many as seven MTO units running by the end of 2015, while a stoichiometric relationship that requires three tons of methanol to be consumed for every one ton of olefins produced has resulted in MTO becoming the sixth largest methanol derivative in just four years of commercial existence *(see chart 2)*.

## New production centers

Feedstock costs for methanol make up as much as 90% of the total cash cost and as such access to low cost feedstocks is key to overall methanol economics. The primary feedstock for methanol has been natural gas, representing as much as 85% of installed global capacity and historically methanol production primarily existed in Europe and North America.

**Chart 1: World methanol demand by region**




Source: IHS Chemical

Other regions with access to low cost natural gas have also seen a surge in methanol capacity additions, such as the Middle East, Africa and South America. With the growth in Chinese demand for methanol and the country's rich coal reserves, the industry has seen a sharp rise in coal based methanol production beginning in the early 2000s. Currently coal based methanol capacity represents around 35% of installed global capacity.

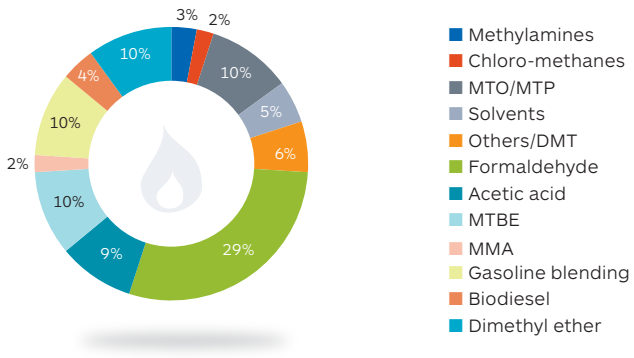
The capacity additions in regions based on more competitive/stranded gas economics lead to capacity rationalizations in the more mature western markets of North America and Europe in the early 2000s with North American capacity all but extinguished by 2008. However the fairly recent exploitation of unconventional natural gas supply through hydraulic fracturing in North America has seen this region regain its position as a methanol production powerhouse, with methanol capacity additions at cash costs close to those of South America. Understanding methanol production economics requires insight into natural gas prices around the world and coal prices in China.

### Price setting mechanisms

West coast, coal-based Chinese methanol capacity has been the marginal ton needed to meet global demand and as such that last increment of production sets the price in China and in the world. As mentioned, there are other low cost regions such as the Middle East with more competitive production; the Middle East acts as a swing supplier to Europe and North America based on the price that China sets. Thus global pricing originates in China and the regions are priced according to freight and duty differentials. The US having closed nearly all of its production capacity in the early 2000s became the highest priced region, having to pay a premium to pull tons from international markets. However with the re-emergence of a North American production base to a level that will far exceed domestic demand, the region has undergone a dramatic shift from being the highest priced market to the lowest price market with economics and prices now based on export alternatives. Europe has benefited as the North American capacity additions have added supply in the Atlantic basin.

Supply and demand pressures drive methanol pricing, dictating where on the cost curve that last critical increment of production resides. Now that methanol has significant volumes of derivatives that compete as alternatives to crude oil derived products, however the picture becomes significantly more complicated with some methanol derivative affordabilities dependent on crude oil price fluctuations. The analysis of these requires an understanding of global fuel markets as well as light olefins markets. Understanding the interactions between these markets and production cost comparisons for olefins from the various manufacturing routes will be key to determining methanol market direction.

**Chart 2: World 2015 methanol demand by end use**




Source: IHS Chemical



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### What can the industry expect in the next few years?

The industry will face more moderate growth rates with respect to demand as direct gasoline blending has matured and the feverish pace of MTO projects begins to moderate. Overall demand during the next five years will grow at an average annual growth rate of almost 7% with MTO due to become the second largest methanol derivative. The new capacity in North America is forecast to turn the region from a net importer to a net exporter by early 2019. ■

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