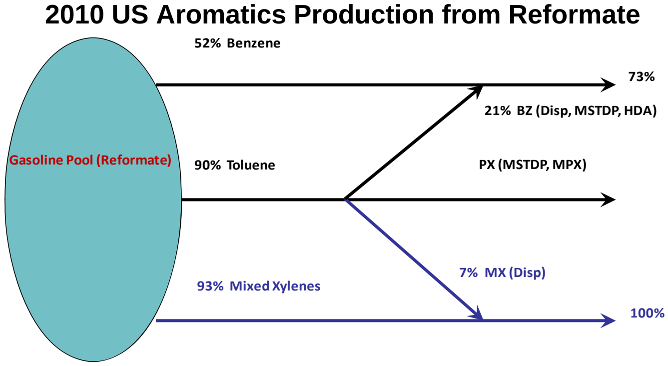
DeWitt & Hart Energy Announces the Release of:

Refining Outlook for Atlantic Basin, 2008-2020: Reformer Operations and Impact on Aromatics Supply

In the next decade, demand for gasoline derived from hydrocarbons is expected to decline in North America and Europe, as more renewable fuels are blended and consumers favor more fuel efficient vehicles.

While faced with prospects of declining gasoline demand, refiners in Europe and the Americas must take steps to comply with new regulatory mandates, while competing with new world-scale refining capacity in the Middle East, India and the rest of Asia. Under that scenario, the role of reformers within the refineries of the Atlantic Basin continues to evolve. Most reformers were designed to produce a high-octane, aromatic-rich reformate stream and by-product hydrogen from low octane naphtha. Reformer hydrogen production is extremely important to the refiner since it is generally the refiner's primary source of hydrogen for use in the various hydrotreating operations across the refinery. Very low natural gas prices in North America make on purpose hydrogen production, via steam methane reformers, a viable alternative to reformer hydrogen, and theoretically constrain contribution margins of hydrogen to reformer economics. Poor contribution margins from octane and hydrogen should have far-reaching effects on supplies of benzene, toluene and xylenes. Last year, reformate extraction directly accounted for 50% of U.S. benzene production, and 90% of toluene and 93% of mixed xylenes. If toluene is used as a feedstock for additional benzene and xylenes, then reformate directly and indirectly accounted for 73% of benzene production and 100% of xylenes.

2010 US Aromatics Production from Reformate



Will Reformate be available for Aromatics with Fuel Changes?

If reforming capacity is rationalized or operated at lower rates or severity, as expected, global supplies of benzene, toluene and xylenes will be greatly impacted. Reformers directly or indirectly account for more than 50% of the Atlantic Basin's benzene production and virtually all of the region's toluene and mixed xylenes. In a recently published study entitled "Refining Outlook for Atlantic Basin, 2008-2020: Reformer Operations and Impact on Aromatics Supply", Hart Energy and DeWitt have generated three forecasts for reformer operations in the Atlantic Basin: The Low Case assumes that reformers run at lower rates, as octane demand is reduced due to increased blending of renewable fuels and lower overall gasoline demand; the Base Case, which we consider to be the most likely scenario; and the High Case, which assumes that reformers are run at higher rates due to slower penetration of renewable components into the motor fuel pool. Major changes in CAFÉ standards and vehicle pool make-up would likely reduce gasoline pool octane, further reducing octane requirements for refinery produced gasoline (at the same ethanol blending levels). Gasoline Reid Vapor Pressure (RVP) continues to be targeted for further restrictions to reduce emissions. Reductions in gasoline pool octane and/or RVP will put increased pressure on refiners to decrease octane production and blending of high RVP stocks.

As ethanol in gasoline increases over time, refinery produced gasoline decreases in quantity, octane and RVP. To quantify these impacts and to establish regional gasoline production, supply and demand, refinery models were used to simulate refining and gasoline blending operations in each region (East North America, Mid Continent North America, Gulf Coast North America and Europe).

The regional refinery models are provided with an initial slate of crude and other input streams (ethanol, ethers and miscellaneous unfinished oils), target refined product volumes, gasoline and other product specifications and a crude and product price set. The model output provides an optimal combination of crude, processing, refined product production and product values. Gasoline and diesel product values from initial model runs are compared and model production targets adjusted until reasonable product price equilibrium between regions is achieved. The final solutions establish the forecast supply and demand balance for refined products.

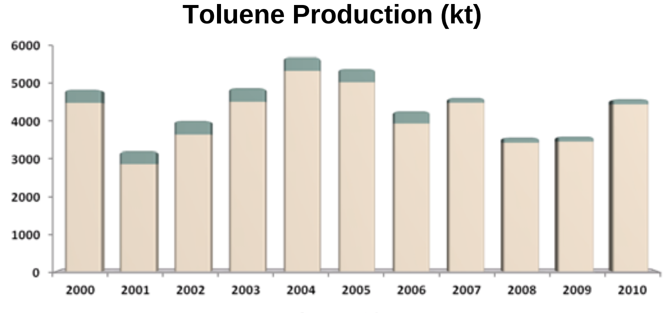
The model solutions provide detailed gasoline processing and blending summaries including octane processing activities. The gasoline reformer is the primary variable used by the model to adjust gasoline octane requirements, taking into consideration octane provided by ethanol, ethers and other refinery gasoline streams. The model processing and gasoline blending activities have the option of varying naphtha feed to the reformer, blending naphtha directly to gasoline without reforming, and adjusting the reformer operating severity (reformer product octane). The model solutions provide reformer throughput, yield and operating severity.

Historically, benzene produced from naphtha either ends up in the gasoline pool (via reformate blending) or as reformer yield (BTX streams). It is anticipated that naphtha processing will be reduced as ethanol in gasoline increases, and that benzene in gasoline will be reduced to meet regulatory requirements. The new benzene gasoline standard (MSAT II) consists of two parts. The first includes a reduction in benzene in gasoline to 0.62% by volume for annual refinery average, starting on January 1, 2011. Major refiners, being defined as having an aggregate crude distillation capacity in 2005 of more than 155,000 bpd and more than 1500 employees, were obligated to comply with the new 0.62% vol. standard beginning in January 2011. The second part mandates an upper limit, which is a maximum average benzene standard for each refinery of 1.3% by volume to come into effect on July 1, 2012 without the use of benzene credits. Credits may still be used to reduce levels at or below 1.3 % to the required 0.62%. Small refiners will have until July 1, 2015 to meet the regulations.

Historically, 75-80% of the benzene in gasoline is attributed to reformer produced benzene. With less reformate blended into gasoline, MSAT II compliance can be achieved without expensive investments in new extraction capacity. Refiners are managing reformer benzene in other ways, as described in the MSAT section of this study. These new standards led many industry analysts to the false conclusion that U.S. benzene supplies would be increased and the U.S. would import far less benzene in the future than in recent years. To the contrary, the study's Base Case projects that:

- U.S. benzene imports will increase to 1.4 million tons by 2015, which is an increase of 200,000 metric tons (mt) over 2010; and European import requirements are forecast to more than double, from 577 KT in 2010 to 1.2 million tons in 2015. Under that scenario, the U.S. and Europe will regularly vie for benzene coming out of the Middle East and Asia.
- U.S. toluene availability is expected to decline by 6%, but this could be offset if more refiners dedicate reformers to supply the chemical market, instead of octane for the gasoline pool. The toluene price spread over gasoline is forecasted to remain relatively flat in the U.S. as reduced octane demand limits toluene values. Europe is expected to remain an importer of toluene throughout the forecast period and its pricing over naphtha will increase over current levels.

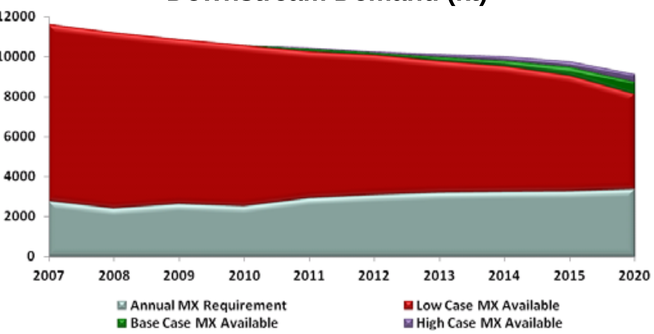
2000-2010 North America Toluene Production (kt)



Current production curve threatened by Reformate availability.

- Mixed xylenes production will be severely limited by reduced reformer operations. With polyester demand expected to grow, U.S. mixed xylenes pricing relative to toluene is forecasted to increase from 1.7 cents per gallon in 2010 to 50 cents per gallon by 2020. The European toluene/mixed xylenes spread is forecast to remain near parity through 2020.

European Xylenes in Reformate & Required for Downstream Demand (kt)



US Markets following in the footsteps of European supply.

As reformate octane demand decreases, large refiners could consider shut-down of reformer capacity. With options to blend naphtha directly to gasoline and pre-fractionate naphtha for benzene management, the refiner could manage naphtha production effectively. If purchased hydrogen is readily available from pipeline or a nearby production facility, this could be the alternate hydrogen source.

For refineries with aging reformers, the conversion of fixed bed technologies to CCR can provide a right-sizing of naphtha management, as demand for high octane reformate decreases. As demand for reformate octane decreases, refiners could consider switching reformers to aromatics production targeted for chemicals.

However this will remove significant gasoline volume away from the refiner, and could require additional logistics expense for aromatics transport. This option may only be feasible for companies with integrated refining and chemical operations, in order to maximize the entire value chain and minimize logistics costs.

For further details on the study, Refining Outlook for Atlantic Basin, 2008-2020: Reformer Operations and Impact on Aromatics Supply, please contact Chuck Venezia at cvenezia@dewittworld.com or Terry Higgins at thiggins@hartenergy.com.