



Quick Take

Gulf Coast Exports Signal Growing Divide in U.S. Ethane Markets

By Michael Sloan and Eric Kuhle

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- The first ethane cargo from Morgan's Point Terminal marks a critical milestone in Gulf Coast ethane markets.
- Ethane markets will increasingly divide, with the Gulf Coast tightening and the Northeast remaining oversupplied.
- The U.S. will become the global leader in ethane exports, with capacity increasing to more than 400,000 b/d by 2018.

Following nearly a month's delay, Enterprise Products Partners began loading the first ethane cargo from the Gulf Coast Morgan's Point Terminal the last week of August. The expansion in export capacity is occurring at the same time that the U.S. petrochemical complex in the Gulf Coast is undergoing a once-in-a-generation expansion driven by low-cost ethane from the shale gas and tight oil revolution.

ICF expects that the dramatic start-up of Gulf Coast ethane exports and sharply growing domestic petrochemical demand will result in rising Gulf Coast ethane prices and a bifurcation in ethane markets between the Gulf Coast and Marcellus/Utica region.



The Reshaping of U.S. Ethane Exports

Over the past three years, U.S. ethane exports went from zero to nearly 100,000 b/d. The first ethane exports occurred by pipeline from the Marcellus/Utica region to Sarnia, Ontario, via Sunoco's Mariner West Ethane Pipeline in late 2013. These exports were followed shortly thereafter by exports from the Bakken shale region to Empress, Alberta, via Pembina's Vantage Ethane Pipeline. Canadian demand for U.S.-produced ethane has been driven by reduced ethane production from Western Canada and conversion of Ontario petrochemical facilities to use ethane as a feedstock due to ongoing cost advantages.

The first waterborne shipment of ethane took place in March 2016 from the Marcus Hook export terminal near Philadelphia. Served by Sunoco's Mariner East pipeline, the Marcus Hook Marine terminal has become the export center for national gas liquids (NGLs) produced in the Marcellus/Utica region.

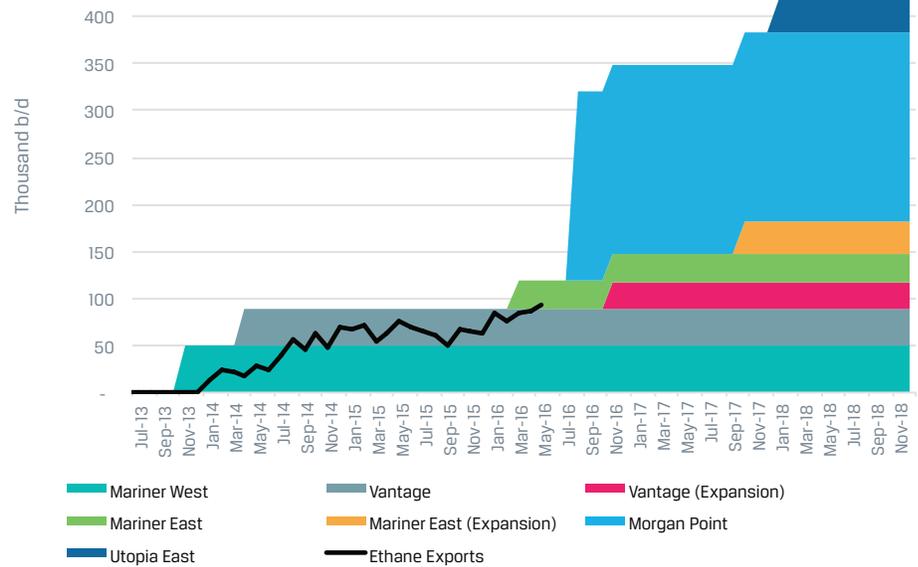
Although these exports have supported ethane markets in the Bakken and Marcellus/Utica regions, the capacity has been insufficient to balance regional ethane markets. Excess ethane production has been rejected into the natural gas stream, keeping ethane prices low.

In contrast, the completion of the Morgan's Point ethane export terminal will dramatically change the scale of U.S. ethane exports and will account for nearly half of total capacity once all planned facilities are completed. Enterprise's Morgan's Point is nearly fully committed and expected to ramp up exports to 180,000 b/d by the end of 2016.

Export capacity from the Gulf Coast will be heavily dependent on the relative pricing differences between U.S. ethane and other global petrochemical feedstocks such as propane and naphtha. Persistently low oil prices would erode the pricing advantages compared with other feedstocks and remain a risk to the demand for U.S. ethane exports.

The exhibit on the next page shows the dramatic expansion in U.S. ethane export capacity—from zero capacity in 2013 to more than 420,000 b/d following expansions on existing systems and the start-up of Kinder Morgan's Utopia East project in 2018. U.S. exports are expected to increase rapidly during the next two years as Morgan's Point reaches full capacity in early 2017 and Canada export capacity increases.

EXHIBIT I. U.S. ETHANE EXPORT CAPACITY



Source: ICF, Company Reports

Gulf Coast Ethane Markets to Tighten

Ethane rejection is expected to remain a persistent issue in the U.S. Northeast and Midwest. ICF estimates that up to 600,000 b/d of ethane is being rejected from these regions. Differing supply and demand dynamics between the Gulf Coast and Marcellus/Utica, driven in part by the addition of Morgan's Point export terminal in the Gulf Coast, will result in two distinct ethane markets in the coming years.

Since 2011, Gulf Coast ethane prices have traded near Btu-parity with natural gas, because the ethane rejection has acted as the market balancing mechanism. However, in recent months, ethane has at times traded above gas value in anticipation of the new export capacity coming online and to build inventory levels.

The initiation of marine exports from the Gulf Coast region and nearly 400,000 b/d of new petrochemical demand growth are expected to occur from 2016-2018. These occurrences, combined with reduced growth from associated gas, will result in tighter regional balances and a substantial reduction in ethane rejection levels. Higher prices will be needed to incentivize both the increased recovery of ethane from the gas stream and the importation of ethane from the Marcellus/Utica region to meet the expected growth in regional ethane demand.

In contrast, the ethane market in the Marcellus/Utica region is expected to experience persistently low ethane prices and remain oversupplied until, and unless, additional export capacity and new petrochemical facilities come online post-2020. ICF estimates that up to 250,000 b/d of ethane will be rejected in Marcellus/Utica during 2016 and 2017.



About ICF

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About the Authors

Michael Sloan has more than 30 years of experience in the energy field. He provides a wide variety of market trend analysis and demand forecasting services to the propane industry, including U.S. propane supply outlook; propane demand assessments at the national, state, and county levels; and market trend analyses on issues related to use per customer, new construction market share, and propane

competition with alternative fuels in different end-uses and regions. As part of his propane supply analysis, Mr. Sloan tracks and projects a variety of supply trends impacting propane supply, including natural gas liquids (NGL) production, refinery activity, propane imports and exports, and propylene demand and production trends. He also provides regulatory and market analysis services to the natural gas industry, including market assessments, gas supply planning services, and natural gas storage valuation.



Eric Kuhle is a manager with ICF's Energy Advisory Group who works on projects related to NGL and Natural Gas Markets. He has over 8 years of experience in energy related research and consulting and most recently worked at Halliburton's Production Enhancement group in strategy and planning before joining ICF in 2016. Mr. Kuhle has expertise covering the forecasting of natural gas and

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