

## Case Study: Monetizing Methane From an Ethanol Production Facility

A major ethanol producer taps into a new revenue stream by selling Renewable Natural Gas (NRG)

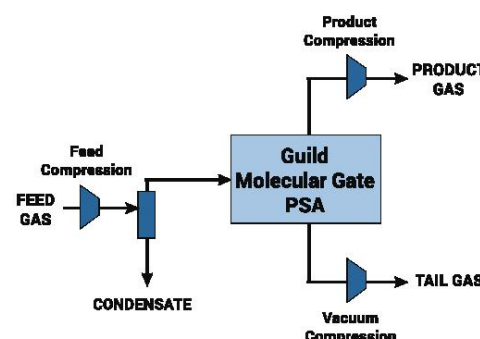


The process of making ethanol produces mid-BTU value methane. It is common industry practice to utilize this fuel source as a heating fuel in the ethanol production process. However, if the mid-BTU gas is upgraded to Renewable Natural Gas (RNG), it has a sale price much higher than the pipeline natural gas used in place of it in the plant. The end result is a new and highly profitable revenue stream for ethanol production facilities.

Guild Associates will complete commissioning a plant at a major ethanol producer in June 2017. The plant's mid-value BTU methane gas is upgraded to RNG by a Guild Associates' Molecular Gate™ Pressure Swing Adsorption (PSA) system. The simple system diagram is shown at the right.

The feed gas is compressed and cooled to remove the bulk of water as condensate. This low-moisture gas is re-heated with the waste heat of the compressor to 150°F and fed into the PSA, where carbon dioxide, water, hydrogen sulfide (H<sub>2</sub>S), VOCs, siloxanes and other trace impurities are removed. The resulting RNG is compressed for injection into the pipeline system.

RNG when used as a vehicle fuel under the EPA Renewable Fuel Standard 2 has a value of up to \$28/MMBTU, compared to a wholesale price of natural gas of \$3/MMBTU. There are additional revenue streams from the California Low Carbon Fuel Standard (LCFS) and from Voluntary Carbon Offset Credit markets. Contact Guild Associates to learn about these systems and new revenue streams.



### About Guild Associates

Guild Associates is the sole licensee of BASF's Molecular Gate™ Adsorbent. PSA systems using Molecular Gate™ adsorbent were first commercialized in 2004.

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3-17

Mass Balance Table			
	FEED	PRODUCT	TAIL
Feed Flow (SCFM)	2083	1536	524
Pressure (psig)	3	90	2
Temperature (°F)	100	105	180
Methane (mole %)	77.08	96.18	24.52
Nitrogen (N <sub>2</sub> )	1.00	1.33	<0.01
Carbon Dioxide (CO <sub>2</sub> )	20.00	2.00	72.10
Oxygen	0.39	0.50	<0.01
Water	5.24	<150 PPM	3.38