
# Emerging ethane market can't be ignored

## First-of-its-kind business activity by Texas-based Gas Innovations highlights the current surge in domestic ethane supply

By Ron Welter, editor

As anyone following the oil and gas market in the United States knows, ethane is now plentiful and available at economical prices. The sudden growth in U.S. shale gas development has brought an equally dramatic surge in supply of natural gas liquids, and ethane is far and away the least expensive and most abundant natural gas liquid found in the relatively "wet" shale-sourced gas.

Not too many years ago companies were shuttering their gigantic cracker plants in the United States because of the high cost of naphtha. That was before technological advances in shale development made it possible to produce oil and natural gas liquids, most notably ethane, at a very competitive cost Today, additional drilling areas are being discovered both in "old" plays such at the Permian and in relatively new ones such as the Marcellus, Eagle Ford, and Bakken plays, not to mention new formations being found under long-known formations.

The United States is truly blessed in hydrocarbons, and it now has the technological capability to produce them economically, without having to depend on oil from elsewhere in the world. Our abundance position looks even better when you consider that our neighbors to the North are also rich in hydrocarbons and our neighbors to the South have opened their hydrocarbon opportunities to private investment.

### What will soak up excess supply?

Today we find a huge imbalance between available ethane and the usage market, with more ethane available than can be used. Billions of capital-expenditure dollars are being spent to build ethane crackers (to make ethylene); seven are under construction in the Gulf Coast area and more have been announced. Ethane's principal value still lies in its global use as a petrochemical feedstock, and that will no doubt soak up some of the excess ethane, especially as exporting and importing infrastructure develops, petrochemical plants switch to ethane from competing feedstocks, and the price of ethane (including shipping costs) remains low. Large new ethane ships—VLEC (Very Large Ethane Carriers)—have been built, some are now being built, and some have already been deployed to move ethane from the United States to Europe and other parts of the world to produce plastics.

Yet petrochemical feedstock is not the only application that can help take up the excess. Other users and applications are there to be developed or better served.

### An underserved segment—the ethane specialty market

"There is an additional market," explains Gas Innovations Vice President of Marketing Don Bobyk, "that involves ethane requirements that have not yet matured enough—and indeed have not been allowed to develop based on supply—to call for pipeline or shipload quantity. This market is underserved today due to a lack of suitable supply, and that is where our company has stepped in and applied our rigorous pursuit of dependable, appropriate supply."

From its inception in 2002, Gas Innovations, headquartered in La Porte, Texas, has met its goal of serving industrial gas producers and distributors as a dependable, independent wholesale supply partner. Since its founding, the company has grown to become a worldwide supplier of high-purity hydrocarbons, refrigerant gases, and specialty gases, as well as related equipment and technical expertise. At its main facility near the Houston Ship Channel, the company maintains its liquefied petroleum gas plant, inventories of approximately 100,000 gallons, and an analytical laboratory that certifies all specialty gas products.

"For simplicity sake," says Gas Innovations Executive Vice President Ashley Madray, "we refer to this additional market as the ethane specialty market,

and we group the market's applications in three categories: Refrigerants, Specialty Gases, and BTU Supply. This market requires specialty expertise, equipment, and packaging, and this is where we believe our company excels."

### Refrigerants

The refrigerants market is just now in its infancy in some aspects, with substantial growth expected in future years.

LNG plants are starting to be built again, and the liquefaction technology is such that ethane is a preferred refrigerant in some cases because of its being part of NGLs in the event of leaks. Typically, large amounts are needed for start-ups and black starts, or in the event of leaks when the plant does not have the capability to produce its own ethane.

Ethane is also used as a replacement for such refrigerants as R23 and R508B. It is viewed as a naturally occurring refrigerant that reduces ozone depletion and global warming compared with typical refrigerants made of chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), or hydrochlorofluorocarbons (HCFCs).

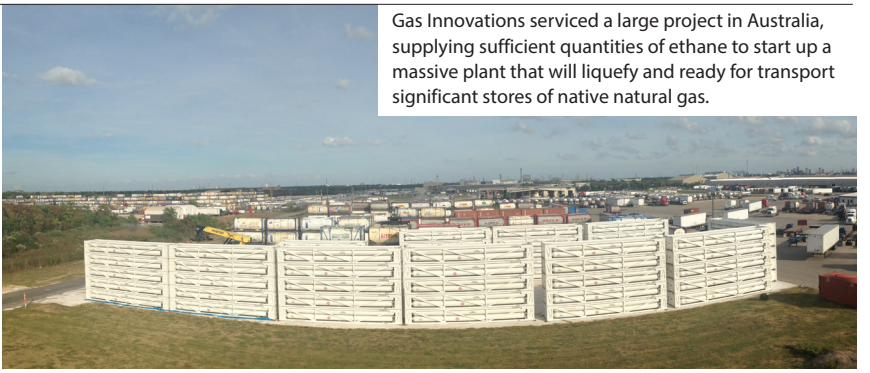
In summary, worldwide refrigerant applications include the following:

- LNG facilities—use of ethane as a refrigerant to make LNG (Gas Innovations, for example, supplied Chevron's Gorgon project)
- A "naturally occurring" refrigerant to replace CFCs, HFCs, and HCFCs in commercial, industrial, and consumer applications

### Specialty gases

The specialty gases segment had grown over previous years, but over the past year it has been stifled by the disappearance of a prime source of ethane supply, which has forced customers and potential customers to seek alternative products or to shelve their projects until suitable supply is available. (Gas Innovations now helps fill the void.)

Considering the worldwide market, applications in the specialty gases segment include the following examples:



Gas Innovations serviced a large project in Australia, supplying sufficient quantities of ethane to start up a massive plant that will liquefy and ready for transport significant stores of native natural gas.

- Engine testing (converting turbines, diesel engines to ethane)
- Experimental, R&D testing
- Petrochem pipeline support (during interruptions)
- Small specialty and fine chemical supply
- Large chemical supply where pipelines are not available – tanker, shipload, or railcar quantities are used
- Oil and gas well fracking
- Enhanced oil recovery (EOR)

### BTU supply (fuel)

Within the overall ethane specialty market, the BTU supply (fuel) segment offers by far the largest growth potential and the best opportunity for suppliers. The biggest opportunity for growth is in power generation, where the pricing and BTU content of ethane compete favorably with LNG. (Ethane has a higher heat value than propane and produces far less emissions than crude oil or coal.) Some of the new ethane ships (the VLEC) can also burn their cargo as fuel.

Worldwide applications in the BTU (fuel) segment include the following examples:

- Gas turbines (power generation)
- Diesel engine conversion to ethane ( in power generation, for instance)
- Ship and bunkering fuel
- Drilling and fracking site generator set fuel
- Asphalt plants
- Asphalt remix equipment

### Specialty packages and expertise

As noted earlier, the specialty market requires specialty packages, as well as specialty loading equipment and extensive knowledge and expertise in handling cryogenics, liquefied gases, and high-pressure gases. Gas Innovations provides the following lists of personnel, plant equipment, and packaging requirements. "Although we catalog these recommendations in some detail," says Don Bobyk, "safety is always our priority and number one goal in packaging and distributing the products we handle. We want our employees to go home to their loved ones from every workday having no safety incidents."

Personnel requirements:

- Overall safety training – personal protective equipment, hazards identification, specific product training, specific equipment training, site security
- Extensive knowledge in cryogenics and high-pressure gases; documented training, testing, and observation
- Complete understanding of each package being filled (DOT requirements and container requirements)

Plant equipment requirements – cryogenics, liquefied compressed gas, high-pressure gas:

- Cryogenic tanks
- High-pressure liquid pumps, high-pressure gas compressors
- High-pressure storage tubes
- Vacuum pumps, fill racks, associated equipment
- Full-size truck scales
- Full-service laboratory
- Tractors

Specialty package requirements (packages owned by or readily available to Gas Innovations):

- Low-pressure cylinders (ranging from 5 pounds to 435 pounds)
- High-pressure cylinders (ranging from 1,800 psi to 6,000 psi maximum work pressure)
- Cryogenic tankers (10,000 gallon)
- High-pressure tube trailers (to 3,600 psi)
- Bulk trailers (hydrocarbons; to 11,000 gallon)
- ISO cryogenic (6,000 gallon)
- ISO high-pressure tubes (15,000 pounds for high-pressure gas or liquefied compressed gas)
- ISO bulk, low-pressure (6,000 gallon, typically 22 bar or below required, single-hulled)
- Railcars – cryogenic, bulk, high-pressure tubes (not owned but used by Gas Innovations)
- Ships – LPG, Ethane, LNG (not owned but used by Gas Innovations)


On September 21, the first truck entered the loading pad of a new ethane distribution rack at Sunoco LP in Marcus Hook, PA. Gas Innovations has a truck loading agreement with Sunoco Logistics.

## Gas Innovations answers the need

Ethane customers that start out small, prove technology, and then move into larger volumes requiring larger packages, pipelines, or plants have up until now been stymied. This developmental-stage market had been stagnating because of a lack of supply, both in the form of continuity and in the composition of supply (cryogenic, liquefied compressed). Many applications or potential applications require a test or demonstration period prior to the major investment in pipes, ships, or massive storage capacity. Again, if pipeline or ship quantities are needed, there is no problem tapping the surplus of ethane or its economical pricing.

"As more ethane is liquefied for shipping, truckload supply of ethane will be available for the many applications..."

"Until a year or so ago," explains Don Bobyk, "the only supply to the specialty market was in the form of liquefied compressed gas, but the primary provider decided this market was not core to its business and left the specialty market high and dry, abruptly and without warning. Gas Innovations stepped in and brought in ethane from Australia and Europe to keep the market supplied. We are committed to the ethane market—as evidenced by expert personnel, plant equipment, and packages—to further develop and grow the specialty segment. Users who require temporary, portable, or short-term supply now have a solution with our truckload option. As more ethane is liquefied for shipping, truckload supply of ethane will be available for the many applications that call for trucks, ISO containers, or cylinders."

In July, Gas Innovations announced its new venture into the cryogenic ethane business and executed a truck loading agreement with Sunoco Logistics. In September, the company began providing truckload quantities of high-purity cryogenic ethane from Sunoco LP in Marcus Hook, PA, the first such facility to load liquid ethane onto tanker trucks for local delivery. (Sunoco is part of the Energy Transfer LP family of companies.) Gas Innovations supplies North American customers by cryogenic tankers and uses cryogenic ISO containers to serve the rest of the world. It fills high-pressure tube trailers, ISO modules, and cylinders from both the new source and its La Porte, TX, facility.

"We are proud to be the first to haul cryogenic ethane," says Ashley Madray, "and we look forward to an exciting future with ethane."

### GAS INNOVATIONS CELEBRATES FIRST DELIVERY OF CRYOGENIC ETHANE

On October 12, Gas Innovations of La Porte, TX, made its first delivery of cryogenic ethane (-128 F) to its first bulk customer. The new liquid ethane delivery venture coincides with the execution of a truck loading agreement with Sunoco Logistics.

Shown here, one of three 11,000-gallon tankers makes the first bulk container delivery, which took only 35 minutes to complete. The Gas Innovations cryogenic tankers are equipped with pumps to rapidly deliver product directly into customer storage tanks. The tankers can deliver approximately three times more product than traditional tube trailers.

### GET IN TOUCH

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