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Mariner East Pipeline has sparked a boom in fracked gas exports from Philly region

The Mariner East Pipeline system, now completed, paid \$24 million in fines, and was three years late to the finish line. Now it's driving up exports of fracked gas liquids (propane, butane, and ethane).



A vessel is loaded with propane and butane at the Marcus Hook Industrial Complex in Marcus Hook, PA on April 29, 2019. DAVID MAIALETTI / Staff Photographer

by Andrew Maykuth

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Nearly once a day last year, a large tanker sailed up the Delaware River and docked at Marcus Hook Terminal to take on a cargo of liquid fuel, produced mostly from the Marcellus and Utica Shale formations in Western Pennsylvania and neighboring states.

The fuels — propane, butane, and ethane — were destined for markets in Europe, the Caribbean, Asia, Africa, and South America, where they're used for heating, motor fuel, and as raw material for petrochemical manufacturing. Almost all the products were piped into Marcus Hook via the controversial Mariner East Pipeline system, the fuel transportation network whose protracted construction was hugely disruptive along its 350-mile route but finally seems to be delivering on its promise as an economic engine.

For all of 2011, when shale gas extraction was picking up momentum in Pennsylvania, only one vessel departed Delaware Bay loaded with gas liquids, according to data supplied by the Maritime Exchange for the Delaware River and Bay, a trade group for the shipping industry. Gas liquids are a byproduct of natural gas production, as well as oil refining.

By last year, 328 tankers left Delaware River terminals carrying shipments of gas liquids, or nearly one out of four of the 1,346 cargo vessels that set sail from the region (container vessels accounted for the majority). While other industrial sectors stalled during the pandemic, the number of vessels loaded with propane, butane, and ethane at Philadelphia-area wharves jumped 61% in the last two years.

Each vessel requires the services of a river pilot, tugboats, stevedores, and suppliers, said Paul R. Myhre, director of operations for the Maritime Exchange.



INEOS, a European chemical producer, is one of the major exporters of gas liquids from the Marcus Hook Terminal. The company commissioned a fleet of tankers to carry

ethane and propane to its plants, each labeled with a pro-shale message. This one: "Shale Oil for Manufacturing." PER OSKAR KJENDALEN

It's a similar story nationwide, where exports of gas liquids steadily climbed in the last decade, linked to the expansion of shale exploration and hydraulic fracturing, or fracking. Exports of natural gas liquids increased exponentially from 164,000 barrels per day in 2010 to 2.3 million barrels per day last year, according to the U.S. Energy Information Administration. Most of the export traffic originates from Texas and Louisiana ports on the Gulf of Mexico. |

Environmentalists have opposed the expansion of shale oil and gas production because of harmful climate impacts and believe exporting the products only prolongs the use of fossil fuels over alternatives.

But supporters of fuel exports say they are vital to generating foreign exchange and jobs, and in some cases, displace dirtier fuel like coal. Propane, the bottled fuel associated in America with backyard barbecues, is widely used overseas for heating, cooking, and in some petrochemical production.

It's also an alternative fuel in Europe for piped Russian gas. Butane is blended into gasoline. And ethane is the raw material in the production of ethylene, a building block for plastics, and is considered a cleaner and more efficient alternative to petroleum products.

About 90% of the 328 ships last year loaded with gas liquids on the Delaware River came from one location: the Marcus Hook Terminal, a former Sunoco refinery that shut down in 2011 and has been rebuilt by its new owner, Energy Transfer LP of Dallas, as a facility for processing, storing, and transloading gas liquids onto ships.

Though Marcus Hook can receive some products by truck and rail, most of the gas liquids that disembarked from Marcus Hook arrived via the Mariner East system, which costs less and is safer than using trucks or rail.

Few projects have caused as much uproar as Mariner East. Sunoco Pipeline, the Energy Transfer subsidiary that built the project, drew \$24 million in fines from Pennsylvania regulators during construction, according to a tally by the PA Environment Digest blog. And last year Pennsylvania Attorney General Josh Shapiro announced a criminal indictment of Energy Transfer related to spills and leaks of drilling mud at nearly two dozen locations across Pennsylvania, including Marsh Creek State Park in Chester County.

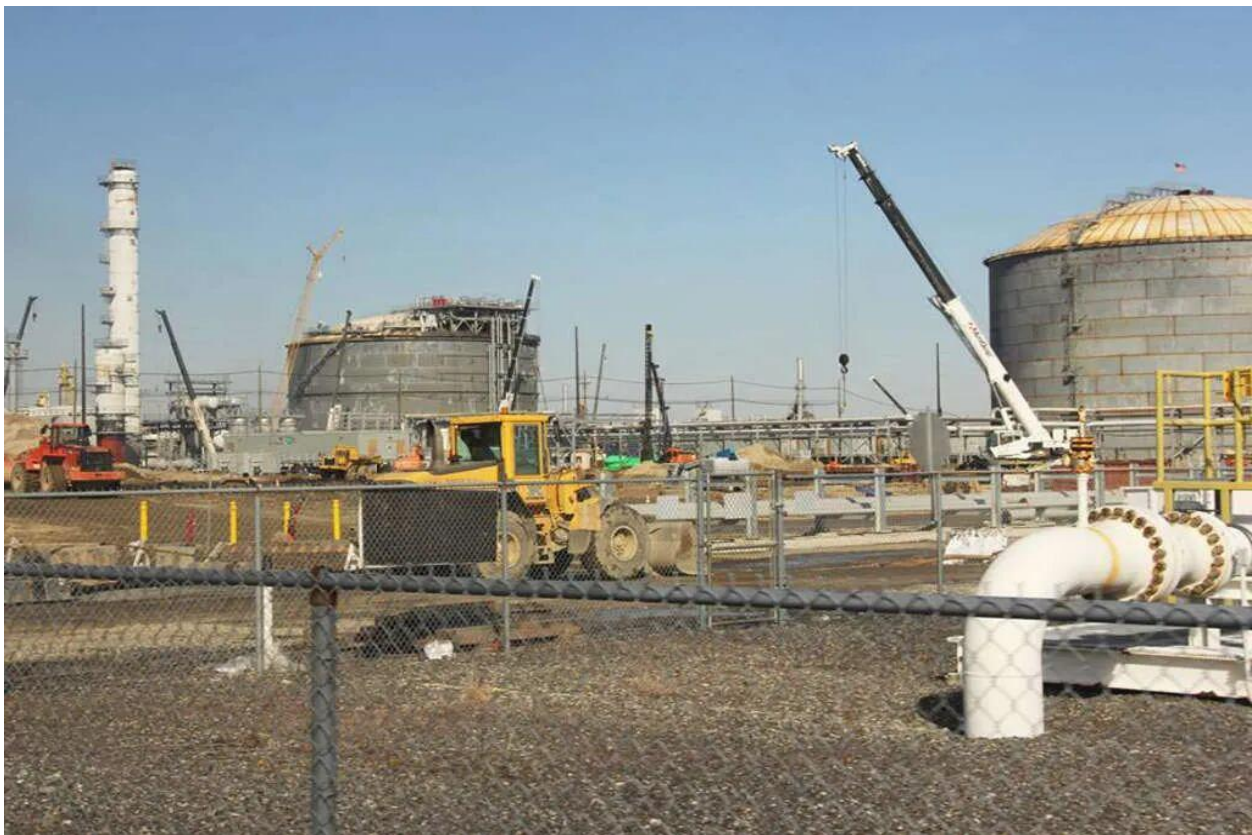
To little fanfare, the pipeline project was completed in February, about three years behind schedule due to construction problems, permit suspensions by regulators, and forced redesigns to reduce the project's harm to private wells and waterways.

The Mariner project drew especially strong resistance in Delaware and Chester Counties, where two new Mariner pipelines weave through suburban neighborhoods, largely following the path of a smaller 1930s gasoline pipeline that was converted in 2014 to handle the new fracked gas liquids. Sunoco Pipeline was able to expand the pipeline corridor by eminent domain,

piggybacking on its long-standing status as a public utility, which generated additional antipathy to a fossil fuel project that was primarily tied to exports.

As recently as January, three Democratic legislators whose districts include parts of Chester County that were disrupted by the Mariner East construction called for the state to declare the pipeline a nuisance and to halt construction. State Sen. Katie Muth, State Rep. Dianne Herrin, and State Rep. Danielle Friel-Otten said in a letter to the attorney general that none of the state's previous punishments against Energy Transfer "held this corporate polluter truly accountable for the damage that it has caused."

So it was a decidedly low-key occasion in February when Energy Transfer mentioned in a call with investment analysts that its multibillion-dollar Mariner East project was finally completed, except for remediation and restoration, including the cleanup of Marsh Creek Lake.



Ethane storage tanks under construction at the Marcus Hook Terminal, which has become a major export hub for gas liquids like ethane, propane and butane produced from the Marcellus and Utica Shale regions of Western Pennsylvania, Ohio and West Virginia.

There was no formal announcement or public event marking the completion of work, which Econsult Solutions estimated in 2018 would produce up to \$9.1 billion in economic benefits, in addition to producing \$140 million to \$210 million of ongoing annual economic impact in Pennsylvania. The only announcement came from the Pennsylvania Energy Infrastructure

Alliance, a coalition of supportive business and labor groups that lauded the economic benefits it will bring.

“I had a ceremony, privately in my office,” said Jim Snell, business manager of Steamfitters Local 420, whose 4,600 members in Southeastern Pennsylvania included many employed on the pipeline and the redevelopment of Marcus Hook Terminal. Snell praised Gov. Tom Wolf for supporting the project, though he said Wolf, a Democrat, took “an awful lot of abuse” from the progressive wing of his party.

“Gosh, we are so happy to be at the end of the road on Mariner after all these years,” Marshall S. McCrea, the co-chief executive of Energy Transfer, said Wednesday during the company’s quarterly earnings call with investment analysts. Without offering specific costs, McCrea acknowledged the project cost a lot of money, time, effort, and stress.

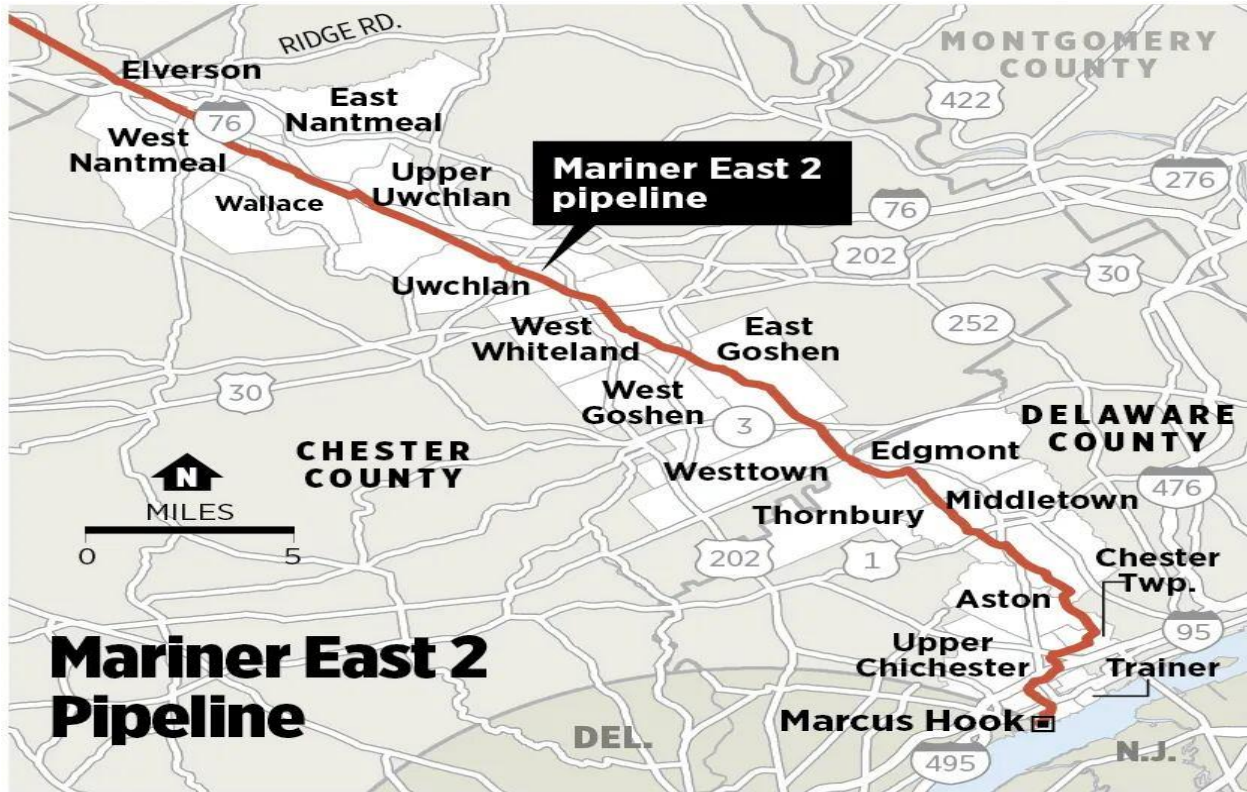
“We’re past all that,” he said.

With the completion of construction, Energy Transfer has also apparently consolidated the transport of all of the “highly volatile liquids” — another name for gas liquids — into the two new Mariner East pipelines, one 20 inches in diameter and the other 16 inches in diameter.

An older, smaller pipeline, known as Mariner East 1, which began carrying gas liquids in 2014, is being converted back to carrying refined fuels from Midwestern refineries to the Philadelphia market, a reversal in direction from its original purpose in the 1930s to move fuel from Philadelphia refineries to markets in Western Pennsylvania. The use of an older pipeline to transport highly volatile liquid fuels like ethane was a major concern for safety advocates.

The company in 2018 also temporarily pressed into service a second, older 12-inch fuel pipeline in Chester and Delaware Counties to substitute for the delayed Mariner East completion, allowing Energy Transfer to meet contractual obligations to transport ethane, propane, and butane to Marcus Hook by the end of 2018.

That bypass route, which opponents dubbed the “workaround” or the “Frankenpipe,” was taken out of service Feb. 17 and mothballed, according to a document that Energy Transfer filed in March with the Pennsylvania Public Utility Commission.



Staff Graphic

Map of the Mariner East 2 pipeline through Chester and Delaware Counties. Mariner East 2 is the largest of three pipelines that make up the pipeline network owned by Energy Transfer LP.

All told, Energy Transfer said Wednesday that the Mariner East system is capable of moving about 360,000 barrels of gas liquids per day to Marcus Hook. The stated capacity is significantly less than the amount of gas liquids that Energy Transfer told investors at a 2017 conference that the two new Mariner East pipes could carry: up to 700,000 barrels per day.

In calls with investment analysts in the last five years, Energy Transfer has been circumspect about the capacity and cost of the Mariner East project, and did not respond last week to emailed questions about the project. Any discrepancy about the capacity may be significant to an investor who based a financial analysis of the project on wrong assumptions.

McCrea, the Energy Transfer co-CEO, told analysts on Wednesday the company is looking for additional overseas buyers of natural gas liquids (NGLs), which could be shipped out of Marcus Hook or the company's terminal in Nederland, Texas. More capacity could be achieved on the Mariner East system with the addition of more pumps, he said. The larger cost would be associated with adding processing and storage capacity at Marcus Hook.

"We've got an enormous number of customers around the globe," he said. "We're talking to as many as 600,000 barrels a day of NGL markets out there."

While most of the region's exports of gas liquids flowed through Energy Transfer's Marcus Hook facility, a second terminal in Gibbstown, Gloucester County, began exporting propane and butane last year.

The Repauno Port and Rail Terminal, which is located on a former DuPont dynamite factory across the Delaware River from Philadelphia International Airport, loaded 30 vessels for export last year, according to the Maritime Exchange and Fortress Transportation & Infrastructure Investors LLC, which operates the terminal. The company is an affiliate of New Fortress Energy Inc.



The Repauno site in Gloucester County before construction of a rail terminal and a loading terminal for natural gas liquids.

The Repauno site has been a major concern for environmental advocates, mostly because New Fortress wants to produce liquefied natural gas (LNG) at a proposed \$800 million plant in northeastern Pennsylvania and transport the fuel by rail to Gibbstown. That project is stalled, and New Fortress has appealed to the Biden administration to permit it to move LNG by rail.

LNG is a liquefied form of methane, or natural gas, and is different from the gas liquids like propane in part because it falls under a regulatory structure that governs natural gas. Propane and gas liquids are “petroleum products” that can move by rail or be exported without special permit.

But LNG transport and export is more closely regulated (no LNG is being exported or moves by rail in the Philadelphia region). Because New Fortress requires special permits to move LNG by

rail, its proposal has attracted attention from the Delaware Riverkeeper Network and other environmental advocates, who raise the specter of LNG “bomb trains” moving through the region.

Fred Millar, a hazardous-materials consultant and safety advocate, says there’s not much difference between the risks of LNG and propane should a rupture occur in a tanker containing the fuels. “The inherent risks are very similar,” he said. “Both turn into vapor as soon as they’re released, and the vapor cloud can be enormous and lead to fireballs and explosions.”

Maya van Rossum, the leader of the Delaware Riverkeeper Network, said the group is primarily focused on blocking the LNG proposal because it still needs approval. “We still have a chance to stop that from happening, to stop it before it starts,” she said. “And so that is where we are focusing our energy.”

Meanwhile, fossil fuel producers are freely moving gas liquids like butane and propane by rail and truck into the Repauno site. The owners are also talking about expanding the capacity of an underground gas liquids storage cavern at Repauno, which could justify building a second wharf and exporting more.

It is difficult to break down how much propane, butane, and ethane moved through the Delaware River terminals, since some shipments were only identified on Maritime Exchange records as “gas” or liquefied petroleum gas (LPG), which is what propane and butane are called in some markets.

Forty-two ships were destined for the United Kingdom, most to Grangemouth, Scotland, where the European chemical producer INEOS operates an ethylene plant. Other major destinations included 36 ships to Norway, also the site of an ethylene plant, 29 to the Netherlands, and 27 to Panama, a way point for onward shipments to Asia. Belgium, the Dominican Republic, France, Japan, Morocco, Spain, Sweden, and Turkey were listed as destinations for more than 10 shipments each.



Sound walls that reach as high as a two-story house and were constructed in April of 2019 stand in the residential neighborhood of Uwchlan as part of the Mariner East Pipeline project. Energy Transfer LP announced in February that construction of the project is finished, three years behind schedule. MICHAEL BRYANT / Staff Photographer