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Export Ready: Polymer producers take hand in preparing for polymer surge

Gregory DL Morris, Chemical Week December 2016

Amid monumental capacity additions coming into service in the next year or two along the US Gulf Coast is some concern by polymer producers and transportation companies that bottle-necks my develop in the export supply infrastructure. There is plenty of transport and storage capacity to get bulk liquids onto ships and out to world markets. The same cannot be said of the infrastructure for exporting plastic pellets. As many resin lines near their start dates, polymer producers are already working with their logistics providers to both improve efficiency and add capacity to the supply chain.

The market for North American olefins and key derivatives such as polyethylene (PE) continues to be transformed by shale and access to advantaged feedstocks. North America's net export position will grow from an expected 3.2 million metric tons/year (MMt/y) in 2016 to about 9.6 MMt/y by 2026, according to Chemical estimates at IHS Markit.

Nearly 9.4 MMt/y of new PE production capacity in North America has been announced and targeted to start up between 2016 and 2021. And the market in entering a key phase in the expansion. Braskem Idesa has started production at PE units with nameplate capacity of 900,000 metric tons / year in 2016. Nova Chemical and an Ineos-Sasol joint venture (JV) are scheduled to start PE units in Joffre, Alberta, Canada; and Deer Park, Texas, respectively, in the fourth quarter. And four greenfield ethylene units are scheduled to start in 2017. An additional 3.2 MMt/y of PE is scheduled to start up in 2017, as part of the start-up of greenfield crackers on the US Gulf Coast by Chevron Philips Chemical in 2017.

"The goal is to have a proven supply network that we can rely on plus contingencies if something unplanned happens," says Karen Bryant, North American logistics director for Dow Chemical. "We have been collaborating with our transportation companies and even with some other producers to ensure that the heavyweight corridors around Houston [Texas,] will be able to handle the volume. We are making common cause on things like customs hours and clearing operations." Stew Serpas, supply-chain director for packaging and specialty plastics at Dow, adds, "Our exports will be going out of Houston and New Orleans [Louisiana,] primarily but also through Dallas and Mexico City [Mexico,] for handling and then to ports. That is plan A and plan B." Dow has 750,000 metric tons/year of new PE production due next year at its Freeport, Texas, complex.

Emerging markets are a key market opportunity, says April Feick, vice president/supply chain for ExxonMobil Chemical. "The opportunity for us is outside North America, and our new plant at Mont Belvieu [Texas,] is specially designed as an export machine. That makes the question how can we be most efficient and effective. We have chosen to package the resin on-site as opposed to ship in bulk to packaging facilities and then move containers to port. We already load containers at our Singapore polyethylene plant because of its proximity to the port." ExxonMobil has 1.3 MMt/y of PE due late next year at Mont Belvieu.

Although the opportunity lies in export, there is a complication to serving the global market. Shippers have to package based on how customers can take delivery, not based on what is most efficient for shipping. That is why the vast majority of polymer exported in the world is packaged in 25-kilogram (kg) or 55-kg bags, which are stacked on pallets, shrink wrapped, and loaded into shipping containers.

According to LyondellBasell Industries, the operation of boxing or bagging is typically done at third-party locations. One railcar of resin to a packaging facility can become four bulk truckloads to a customer or as much as 4,000 25-kg bags.

LyondellBasell has evaluated on-site and third-party packaging. And based on forecast North American PE supply, the company tells Chemical Week it will be using third-party packaging for exports from all plants, not just the new La Porte, Texas, plant. In La Porte, 500,000 metric tons/year of new HDPE is due in 2019.

There are some dense customer clusters, such as Antwerp, Belgium, to which ExxonMobil can ship PE bulk loaded into a lined shipping container. "We will be serving Latin America, Asia, Europe, and Africa," Feick explains. "The packaging form all depends on what the customer wants. At Mont Belvieu, the resin will come off the production line and directly into bags for loading or into bulk containers."

Feick says she and her supply-chain team are already in discussions with transportation companies. "We will have our main supply routes, such as out of Houston, and we will have alternatives. We will definitely test the competitiveness of the system," she adds.

Those alternate routes include other Gulf Coast ports, as well as those on the East and West Coasts. "We already use all those routes, so they are not new for us. The big change is rather the volume. It will be an order of magnitude increase. There is a lot of polymer going to be moving. The infrastructure needs to be ready."

Even firms with mostly regional distribution are gearing up for more offshore business. Nova Chemicals ships about 90 percent of its polymer by rail, "Which is low cost and effective," says Debra van Holst, Nova director of logistics. "As all this new polymer comes on, we will see more exports. From Alberta, we can go out through the West Coast or through Montreal." Nova is adding 454,000 metric tons/year of PE at its large Joffre cracker complex due in service later this year.

"We see the same things as everyone else," says van Holst. "Everyone talks about possible congestion and lack of empty containers. We are already in talks with ports and packagers. If we need to, we can chose where we go out of, Louisiana or Charleston, South Carolina. We feel very comfortable about that if we need to expand exports." Joffre has its own packaging facilities, and the company that was an early adopter of big storage-in-transit yards for strings of jumbo hopper cars is expanding capacity and adding 1,200 rail cars.

Serpas, at Dow, says in general the steamship lines are responsible for getting empty containers to shippers, be they the producer or packaging firm. "The ship lines have told us that if we can commit to the volume, they will be able to get us the containers. It is a market for boxes, so they will flow to areas of demand through some combination of work by shippers and carriers."

Dow has polymer plants at Freeport and Plaquemine, Louisiana. Some resin is packaged on-site, and some is sent to outside firms for packaging. "Ideally it is better to package closer to the plant, but that is from a pure logistics standpoint," Serpas concedes. "In real life, there are questions around real estate and capital. There are always other considerations."

Beyond the Gulf Coast, several producers and packaging companies are looking at Dallas as an inland hub. Polymer would be sent there by long cuts of hopper cars from coastal plants then packaged and the containers sent to either coast to go transatlantic or transpacific. Not all polymer producers confirm they are preparing for getting more molecules to market. Chevron Phillips, which has 1 MMt/y of new PE capacity due at Sweeny, Texas next year, only says it uses third-party packagers. The company has declined to discuss how it hopes to get those pellets to market.

As noted, some producers ship bulk in lined containers, but that takes specialized handling equipment at the point of delivery or use. Serpas says there have even been experiments in dry bulk ships, the way coal and ore are carried. "One problem with that is there are hundreds of grades of polymer. The other is that most converters don't use that much at once. The amount in a 20-foot or 40-foot container is usually a good amount."

The same logic applies for shipments coming into the United States. Braskem is first out of the blocks among North American polymer expansions, with its 1-MMt/y high-density PE JV with Idesa at Veracruz, Mexico, just entering commercial service. Braskem claims primacy as "the largest thermoplastic producer in the Americas, with 16 MMt/y of all types."

"In Mexico, we have a large number of small and medium-size customers that need to receive by truck," says Jose Federico Maciel, logistics manager for Braskem Idesa. "A little more than half of our customers receive by truck on pallets with 25-kg bags, the other 45 percent by bulk trucks. For some few large customers, we ship by rail, in hopper cars or bulk trucks. Only a small number of customers, 5 percent or less, receive by bulk in rail hopper cars. For exports into the US, the usual way is by rail hopper cars, as any producer in US does."

Cleantho de Paiva Leite Filho, Braskem Idesa director/business development, adds, "Not only in the US but in all countries, it is very important to maintain the investment in the infrastructure of ports. We have heard, for example, that the Port of Houston is doing its job and investing in expansions. Here in Mexico, we have ongoing expansions in the ports of Veracruz, Manzanillo, and Lazaro Cardenas. We do not foresee any real difficulty to move our production from the Mexican ports. We will export to the US by rail or rail barge. To the others continents, we will export by ship in containers."

Logistics sources at LyondellBasell add, "Every shipper is looking at import and export container balances at each North American port. Additionally, the shipper community has heard steamship lines agree to reposition empty containers if trade flows are imbalanced. The unanswered question [s are] what will be the cost to reposition empty containers and will that cost be high enough to justify shipping out of a different port that has an abundance of empty containers."