MORNINGSTAR®

# Deal or No Deal? LyondellBassell Hold on to Refinery
## No buyer found for Ship Channel fixer upper

**Morningstar Commodities Research**
18 January 2017

Sandy Fielden
Director, Oil and Products Research
+1 512 431-8044
sandy.fielden@morningstar.com

**Data Sources for this Publication**

- CME Group
- Texas Railroad Commission
- U.S. Energy Information Administration

To discover more about the data sources used, Click Here

### Short Term 2016 Listing

In August 2016, petchems giant LyondellBassell Industries, or LBI, retained Bank of America Merrill Lynch to help sell its Houston refinery. Independent oil refiners Valero, Canadian oil producers Cenovus Energy and Suncor as well as Saudi national oil company Aramco (through U.S. subsidiary Motiva) were said to have expressed interest (although Motiva denied this). In early January 2017 LBI confirmed the plant was no longer for sale—at least in the short term. In light of that decision, we look at why LBI might want to sell or keep this refinery based on recent performance and future prospects.

LyondellBasell is a commodity chemical company headquartered in the Netherlands and managed from the U.S. LBI owns manufacturing facilities worldwide and is a global leader in propylene oxide, polymers, and oxyfuels. Formed from the 2007 merger of Dutch-based Bassell with Houston's Lyondell Chemical Co, the company went bankrupt in 2008 during the Great Recession, emerging restructured in 2010. Since then, its fortunes have improved during the shale era, benefiting from access to cheap U.S. natural gas liquid feedstock (ethane) for its Gulf Coast petrochemical plants. In addition to petrochemicals, the company owns Houston Refining, a 268 thousand barrel/day oil refinery located on the Houston Ship Channel at the heart of the Gulf Coast refining region. The company acquired the refinery in a joint venture with Citgo (a subsidiary of Venezuelan national oil company PDVSA) in 1993, taking complete ownership in 2006.

### Petrochemical and Refining Relationship Split by Shale

A good part of the rationale behind LBI wanting to sell the Houston refinery reflects a fundamental shift in the relationship between petrochemicals and oil refining since the shale revolution—at least in the U.S. The shale boom began with a rapid increase in dry natural gas production, but when gas prices cratered in 2012 due to oversupply, producers shifted to wet gas basins where natural gas liquids (or NGLs) are produced alongside the gas. The subsequent boom in gas liquids provided abundant cheap feedstock for petrochemical plants in the shape of ethane and propane. Up until this time, most petrochemical steam crackers, which produce basic petrochemical building blocks such as ethylene and propylene, used naphtha (a product of refining crude oil) as a feedstock. As we described in a June 2016 note (see Narrow Crude to Gas Ratio Threatens Infrastructure Investment) a widening in the ratio of crude oil prices to natural gas provided better petrochemical cracker margins for those plants that could increase their use of ethane in particular, but also propane, as an alternative to the more expensive naphtha. Although as we pointed out in the June note, the oil to gas ratio dynamics are changing again after the crude price crash during 2015, companies like LBI have invested heavily to upgrade existing U.S. petchems facilities to process more ethane. Petrochemical companies have also begun building at

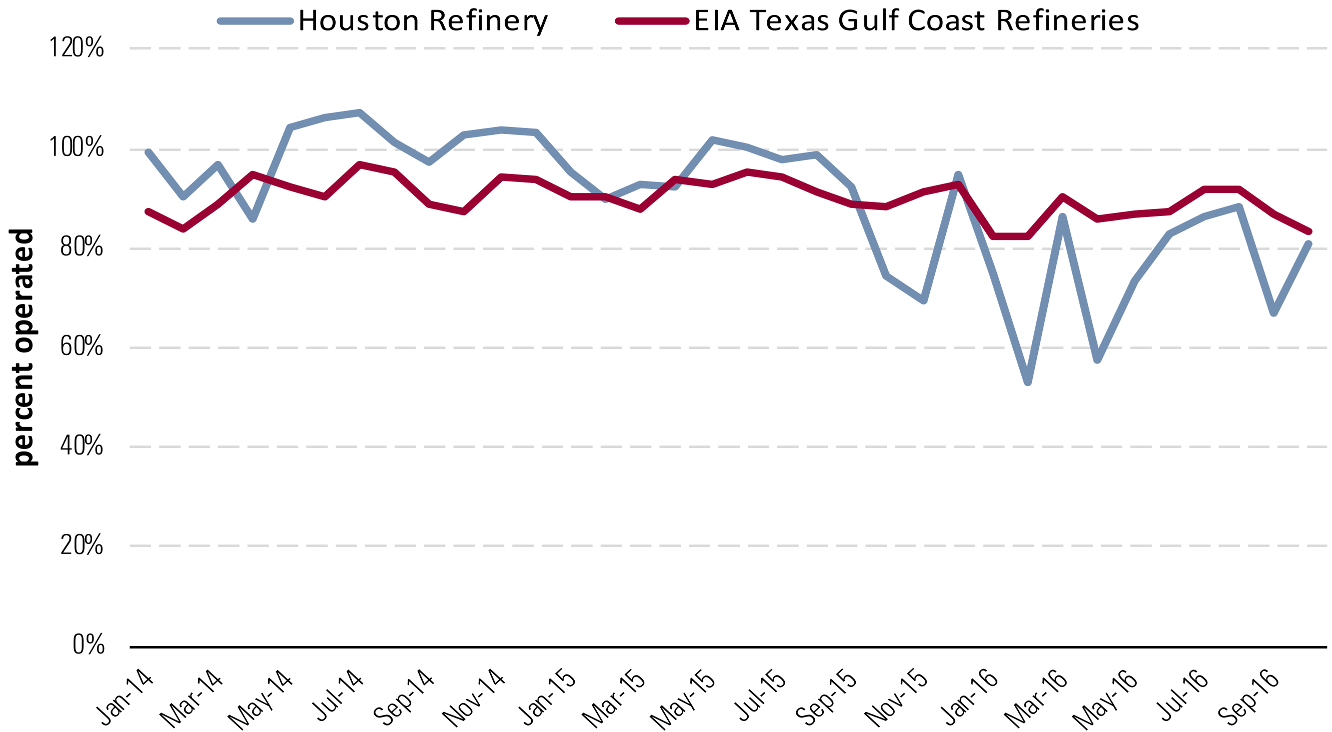
least eight new steam crackers in the Gulf Coast region that are expected online during the next three years—all designed to process ethane.

This change in petrochemical feedstock choices served to delink the petrochemical and refining relationship. Prior to shale, owning a refinery made sense for a petchems producer because refineries produce naphtha—the principal feedstock. Post shale, as more chemical plants use ethane or propane produced by gas processing plants, the synergy of owning a refinery diminished considerably. Perhaps reflecting this new reality, during the shale boom, LBI rightly chose to invest in the petchems side of the business, debottlenecking its existing Gulf Coast plants to use more ethane and planning a new propylene oxide plant rather than investing in its refinery. As a result, the refinery arguably did not receive adequate investment to maintain performance with predictable effect in 2016.

### Owner Neglect?

The Houston Refinery has a high Nelson complexity rating of 12.5—a measure reflective of a complex deep conversion refinery with a coking unit. This refinery is typical of Gulf Coast plants, designed to process heavy sour crude. We described how coking refineries enjoy higher margins in an August 2016 note (see Gulf Coast Refiners Enjoy Higher Margins From Processing Heavy Crude). Because heavy crude is less attractive to most refineries that are less sophisticated, it is generally cheaper than lighter grades, increasing refining margins. However, refineries require a lot of upkeep and encounter unplanned operational outages if they are not well maintained. Evidence from monthly reports submitted by Houston Refining to the Texas Railroad Commission (TRRC, the State overseer) suggests that, for whatever reason, the LBI plant suffered increased operational issues over the past two years. Exhibit 1 shows monthly operational capacity for the Houston refinery as a percentage of its nameplate 268 mb/d since the start of 2014 (blue line). The chart also shows average percent-operated capacity for all refineries on the Texas Gulf Coast as tallied by the Energy Information Administration (red line).

**Exhibit 1** Refinery Percent Operated




Source: EIA, TRRC, Morningstar

In 2014, the Houston refinery performed extremely well, with throughput averaging over 99% of capacity versus a regional average of 91%. But in 2015, the plant suffered unplanned outages in the latter half of the year that brought down operational throughput to an average 92% versus the regional average of 96%. Then in 2016 (through October, the latest data available), the Houston refinery seriously underperformed the market with throughput averaging 75% compared with a regional average 87%. The increase in outages added to the delinking of refining and petchems to help explain LBI's decision to consider selling the refinery in August 2016.

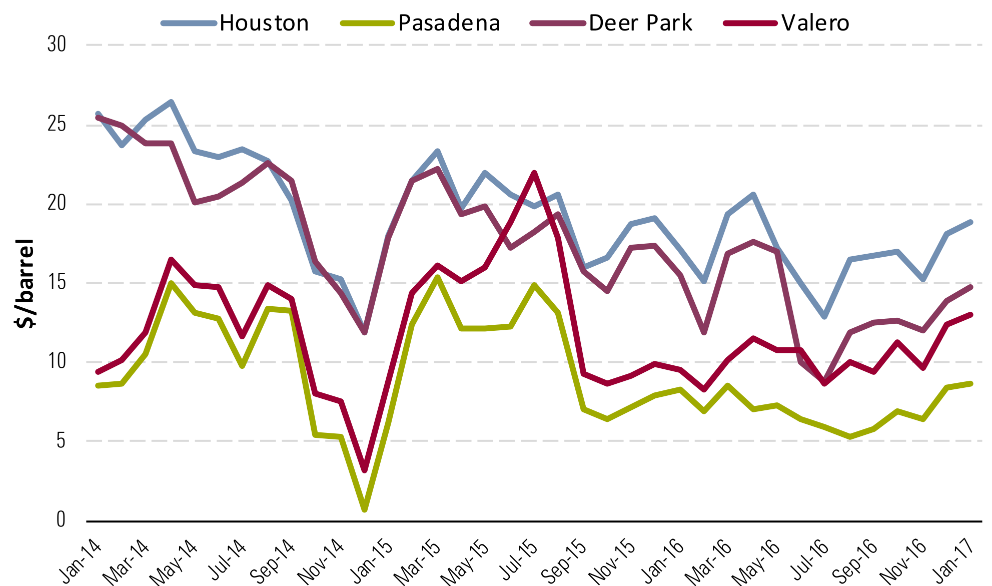
**Performance Improving**

We don't know for sure why LBI decided not to sell. It may have been because buyers were unwilling to pay the asking price. But the company did invest in significant refinery maintenance during 2016. In a November conference presentation, LBI said it expected refinery throughput to increase by 40 mb/d in 2017—which would increase operational capacity from the 75% average (through October) in 2016, closer to 90% going forward. Perhaps more importantly, refining margins for the plant improved during 2016 such that if it had operated at closer to capacity during the year, LBI would have seen stronger returns.

Exhibit 2 shows our estimate of refining margins for Houston Refinery (blue line) and three peer plants located on the Houston Ship Channel. The peer plants are the 286 mb/d Shell/Pemex Deer Park refinery

(purple line), the Valero Houston refinery (red line), and the Petrobras Pasadena refinery (green line). We calculated refining margins using monthly TRRC reported data to estimate refined product yields and monthly average market prices for refined products and crude feedstock. The LBI Houston refinery crude price is based on heavy sour Mexican Maya crude as is Deer Park—also a complex plant. The Valero and Pasadena refineries are configured to process light sweet crude, and we used an LLS crude price to estimate their margins.

**Exhibit 2** Peer Group Refining Margin Comparison




Source: CME Group, PEMEX, TRCC, Morningstar

Based on these estimates, the Houston refinery margins outperformed the peer group during the latter half of 2015 and all of 2016. The Houston refinery enjoyed an average margin of $19.67/barrel in 2015 and $16.76/barrel in 2016 and has seen margins increase to over $18/barrel since December 2016. Note that the chart shows how coking margins for LBI and Shell/Pemex continue to be better than those for refiners that process lighter crudes (as explained in our July 2016 note, Gulf Coast Refiners Penalized For Running Lights). In effect, if this refinery is operating at or near full capacity, it should produce good margins for the owners.

### Prospects

Looking to the future, the Houston refinery is well positioned to take advantage of increased volumes of heavy Canadian crude reaching the Houston area and competing against heavy crude from Mexico, Venezuela, and Columbia. LBI has processed about 20% Canadian crude since the end of 2014—the remainder is largely imported from Latin America. If additional pipeline capacity is opened to permit increased flows of Canadian crude—such as the Keystone XL pipeline denied a permit by the Obama Administration—this will increase downward pressure on heavy crude prices. Changes implemented in

October 2016 by the International Maritime Organization to reduce the sulfur content of marine fuel in 2020 (see our November 2016 note Marine Bunker Deadline) will benefit refiners like LBI with coking capacity that turns fuel oil into more valuable products like diesel.

For now, the prospects of wide margins and a profitable future no doubt helped LBI decide to retain its refinery. And as petchem feedstock economics change again in the post-shale world, LBI's chemicals business could benefit from renewed refining synergies if naphtha regains its role as a primary feedstock for olefin steam crackers. M

**About Morningstar® Commodities Research™**

Morningstar Commodities Research provides independent, fundamental research differentiated by a consistent focus on the competitive dynamics in worldwide commodities markets. This joint effort between Morningstar's Research and Commodities & Energy groups leverages the expertise of Morningstar's 23 energy, utilities, basic materials, and commodities analysts as well as Morningstar's extensive data platform. Morningstar Commodities Research initially will focus on North American power and natural gas markets with plans to expand coverage of other markets worldwide.

Morningstar, Inc. is a leading provider of independent investment research in North America, Europe, Australia, and Asia. The company offers an extensive line of products and services for individuals, financial advisors, and institutions. Morningstar's Commodities & Energy group provides superior quality market data and analytical products for energy data management systems, financial and agricultural data management, historical analysis, trading, risk management, and forecasting.

**For More Information**

+1 800 546-9646 North America
+44 20 3194 1455 Europe
commoditydata-sales@morningstar.com

22 West Washington Street
Chicago, IL 60602 USA

©2017 Morningstar. All Rights Reserved. Unless otherwise provided in a separate agreement, you may use this report only in the country in which its original distributor is based. The information, data, analyses, and opinions presented herein do not constitute investment advice; are provided solely for informational purposes and therefore are not an offer to buy or sell a security; and are not warranted to be correct, complete, or accurate. The opinions expressed are as of the date written and are subject to change without notice. Except as otherwise required by law, Morningstar shall not be responsible for any trading decisions, damages, or other losses resulting from, or related to, the information, data, analyses, or opinions or their use. References to "Morningstar Credit Ratings" refer to ratings issued by Morningstar Credit Ratings, LLC, a credit rating agency registered with the Securities and Exchange Commission as a nationally recognized statistical rating organization ("NRSRO"). Under its NRSRO registration, Morningstar Credit Ratings issues credit ratings on financial institutions (e.g., banks), corporate issuers, and asset-backed securities. While Morningstar Credit Ratings issues credit ratings on insurance companies, those ratings are not issued under its NRSRO registration. All Morningstar credit ratings and related analysis are solely statements of opinion and not statements of fact or recommendations to purchase, hold, or sell any securities or make any other investment decisions. Morningstar credit ratings and related analysis should not be considered without an understanding and review of our methodologies, disclaimers, disclosures, and other important information found at https://ratingagency.morningstar.com. The information contained herein is the proprietary property of Morningstar and may not be reproduced, in whole or in part, or used in any manner, without the prior written consent of Morningstar. To license the research, call +1 312 696-6869.