Market Insights - PES Refinery Complex

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Site Assets

• Large site – 1,400 acres with consolidated ownership
• Petroleum processing equipment, storage facilities and infrastructure
• Industrial utilities, wastewater treatment, docks, new rail unloading facility
• Transportation access – I-76, I-95, PHL, Delaware River, Class 1 railroads
• Proximity to key economic drivers (Center City, University City, PHL)
• Heavy industrial zoning
• Large supply of skilled labor
Site Uncertainties and Liabilities

• Extent of fire damage – condition of processing equipment
• Supplying NGLs, availability of Hydrogen
• Environmental conditions
• Pervasive infrastructure across site may impede or delay other uses
• Urban location close to residential communities
  ➢ 219,700 persons lived within 3 miles in 2017, 618,600 within 5 miles
• Changing land use factors related to climate change
# Philadelphia Energy Solutions refinery profile

<table>
<thead>
<tr>
<th>(Maximum)</th>
<th>PES Volume</th>
<th>% of PADD 1</th>
<th>% of US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Runs</td>
<td>335,000 b/d</td>
<td>30%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Gasoline Production</td>
<td>150,000 b/d</td>
<td>4.5% (includes blenders)</td>
<td>1.5%</td>
</tr>
<tr>
<td>Diesel Production</td>
<td>140,000 b/d</td>
<td>45%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Jet Production</td>
<td>0-80,000 b/d</td>
<td>0-90%</td>
<td>0-4.5%</td>
</tr>
<tr>
<td>Residual Fuel Oil Production</td>
<td>20,000 b/d</td>
<td>50%</td>
<td>5%</td>
</tr>
<tr>
<td>Propane (% of refining only)</td>
<td>5,000 b/d</td>
<td>25%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Normal/Isobutane</td>
<td>-3,600 b/d, -3,500 b/d</td>
<td></td>
<td></td>
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</tbody>
</table>
Market Conditions in the Refining Sector

• Demand for refined petroleum peaks in 2020, earlier on East Coast
  • Causes: increased fuel efficiency and wider use of electric/hybrid vehicles
• Declining demand is expected to pressure US refiners into cutting production.
• East Coast is expected to see steepest declines, due to waning demand, higher operating costs, and competition from alternative supply sources
  ➢ East Coast refinery capacity utilization to go from near 90% in 2018 to 30% by 2050
• Global tanker fleet shifts towards lower sulfur bunker fuels, benefitting the most complex refineries with coking and hydrocracking capacities
US Refined product demand by product

Note: Includes blended biofuel components.

Source: IHS Markit © 2019 IHS Markit
Potential Industrial Reuse Options

• **Continued Petroleum Processing** – Part or all of the site could be maintained for this use, subject to challenging market conditions
  - Energy and product storage terminals

• **Alternative Energy** – Repurpose site assets for production of biofuels and/or renewable energy

• **Natural Gas Liquids** – Utilize existing infrastructure for petrochemical facility using ethane and propane

• **Petrochemical** – Utilize existing infrastructure for production of ethylene, plastics, polypropylene, chemicals, plastics recycling

• **Manufacturing** – Leverage site assets for compatible heavy manufacturing

• **Logistics, warehousing, distribution**
Redevelopment Examples - Former Refineries & Industrial Sites

• Philadelphia region
  ➢ Marcus Hook Industrial Complex & Keystone Industrial Port Complex

• Biofuels & Renewable Energy
  ➢ Paramount (CA) and Le Mede refineries (France) – converted to renewable diesel/jet fuel plants

• Product Storage & Terminals
  ➢ Imperial Oil refinery (Nova Scotia) closed in 2013 - converted to a terminal operation
  ➢ Shell Haven refinery (England) closed in 1999 - redeveloped as container port, business center and storage and distribution facilities

• Logistics
  • Sparrows Point (Baltimore): 3,100 acre steel plant being redeveloped for logistics and manufacturing
Key Factors in Determining Viability of Reuse Options

• Site owner’s support for the proposed use(s)
• Market justification for the project(s)
• Interested buyer with the resources needed to invest
• Compatibility of the use(s) with known environmental contamination
• Costs & timing
  ➢ Upgrading part or all of facility to maintain current uses
  ➢ Changing infrastructure to allow different uses
  ➢ Removing infrastructure

• As in any development project, location and market conditions, local or global depending on the use, really matter