Presentation

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

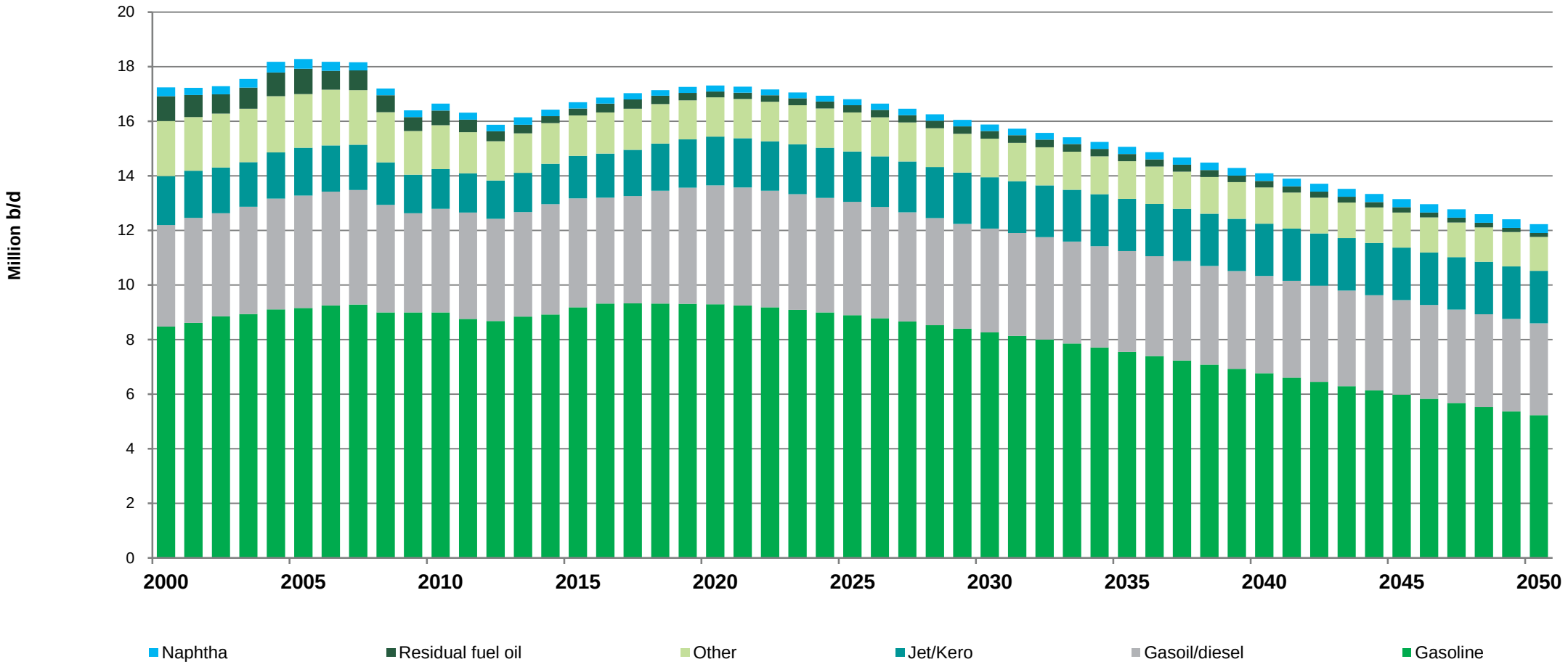
Philadelphia Energy Solutions refinery profile

(Maximum)	PES Volume	% of PADD 1	% of US
Crude Runs	335,000 b/d	30%	1.9%
Gasoline Production	150,000 b/d	4.5% (includes blenders)	1.5%
Diesel Production	140,000 b/d	45%	2.8%
Jet Production	0-80,000 b/d	0-90%	0-4.5%
Residual Fuel Oil Production	20,000 b/d	50%	5%
Propane (% of refining only)	5,000 b/d	25%	1.6%
Normal/Isobutane	-3,600 b/d, -3,500 b/d		

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



Source: IHS Markit

Note: Includes blended biofuel components.

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**