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Potential Impacts of Reductions in Refinery Activity on Northeast Petroleum Product Markets

February 2012

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1. Introduction

This report is an update to a previous U.S. Energy Information Administration (EIA) report, *Reductions in Northeast Refining Activity: Potential Implications for Petroleum Product Markets*.² Since September 2011, two domestic refineries in the Philadelphia area and one major Caribbean export refinery supplying the East Coast have closed, and another domestic refinery will potentially be idled this summer (Table 1). ConocoPhillips idled its Trainer refinery (185,000 barrels per day [bbl/d]) in September 2011, Sunoco's Marcus Hook refinery (178,000 bbl/d) was idled in December 2011, and HOVENSA's U.S. Virgin Islands refinery (350,000 bbl/d) closed in February 2012. Sunoco has announced plans to close the Sunoco Philadelphia refinery (335,000 bbl/d) in July 2012 if no buyer is found. (Note: In this report, the terms "refineries in the Philadelphia area" and "Philadelphia-area refineries," refer to the ConocoPhillips Trainer, Sunoco Marcus Hook, and Sunoco Philadelphia refineries as a group. The terms "Sunoco Philadelphia refinery" and "Philadelphia refinery" refer to the one specific refinery with that name.)

Table 1. U.S. East Coast Refineries Operating Capacity

Owner	City	State	Operating Crude Unit Capacity (bbl/calendar day)	Percent of Region	Status
Operating and Idled Refineries					
ConocoPhillips	Linden	NJ	238,000	17%	Operating
PBF Energy Co. LLC	Delaware City	DE	182,200	13%	Operating
PBF Energy Co. LLC	Paulsboro	NJ	160,000	12%	Operating
United Refining Co.	Warren	PA	65,000	5%	Operating
American Refining	Bradford	PA	10,000	1%	Operating
Ergon-West Virginia	Newell/Congo	WV	20,000	1%	Operating
Hess Corp.	Port Reading	NJ	0*	0%	Operating
Sunoco Inc.	Philadelphia	PA	335,000	24%	Operating, For Sale
Sunoco Inc.	Marcus Hook	PA	178,000	13%	Idled 12/2011, For Sale
ConocoPhillips	Trainer	PA	185,000	13%	Idled 9/2011, For Sale
Total Operating and Idled			1,373,200	100%	
Recently Shut Refineries					
Western Refining	Yorktown	VA	66,300		Shut 9/2010
Sunoco Inc.	Eagle Pt/Westville	NJ	145,000		Shut 2/2010

*Hess Port Reading has a production capacity of 70,000 bbl/calendar day but no crude unit capacity.

Notes: Yellow shading indicates operating refineries for sale and at risk of shutdown. Orange shading indicates idled refineries for sale and at risk of shutdown. Red shading indicates shut refineries. Total refinery capacity excludes two refineries that primarily produce asphalt, as well as the Yorktown VA and Eagle Point refineries that were shut down in 2010.

Source: U.S. Energy Information Administration.

To date, the market transition has been relatively smooth, in part because the closures so far were partially offset by the October 2011 startup of PBF Energy's Delaware City refinery, which had been shut down in late 2009 by Valero before its sale to PBF Energy. There have been no volume disruptions, although product prices have increased somewhat relative to crude oil prices, and the impacts of the U.S. Virgin Islands' HOVENSA refinery closure are just beginning to be seen. (See box.) But the situation

²<http://www.eia.gov/analysis/petroleum/nerefiningactivity/>.

Liquid fuels are supplied in the Northeast by local refinery production, imports, and pipeline and tanker/barge receipts of product from the Gulf Coast. This report is focused on gasoline and distillate fuel oil, which includes ULSD and heating oil. In recent years, the Northeast refineries have supplied about 40% of the gasoline, 60% of the ULSD, and 45% of the heating oil consumed in the Northeast, with imports and receipts from the Gulf Coast making up most of the remainder.

If the Sunoco Philadelphia refinery shuts down in July 2012, suppliers may need to find 240,000 bbl/d of gasoline and 180,000 bbl/d of ULSD by 2013 in addition to the amounts that have been supplied historically. The ULSD gap is not simply from lost production. Under current rules, New York State is requiring that heating oil meet the same low sulfur levels as ULSD starting in July 2012. This requirement will effectively increase ULSD consumption by 70,000 bbl/d, with annual consumption of ULSD in the Northeast increasing by 20% on average, however, heating oil consumption is highly seasonal, and the ULSD increase will be concentrated during the winter.

Replacing lost volumes presents a challenge in terms of both logistics and alternate supply sources, but the challenge posed by logistics is significantly greater. Two major logistical hurdles must be overcome. The first is moving product from the Gulf Coast to the Northeast, which will require overcoming both pipeline and tanker constraints. The pipeline that delivers products from the Gulf Coast to the Northeast is at or near capacity. As a result, additional volumes will need to move from the Gulf Coast to the Northeast by water. Shipments between two U.S. ports require tankers that meet Jones Act requirements. (See box.) Generally, Jones Act ships are chartered months in advance, limiting their short-term availability. The second logistical constraint is receiving products at ports and connecting into the product pipelines that originate in the Philadelphia-area refining complex to serve inland Pennsylvania and western New York markets. Unloading systems and related equipment that had been used for the receipt of crude oil at idled refineries require considerable modification before they can be used to receive products. Moreover, there is little or no connectivity from existing crude oil terminals to product pipelines at ports that have been receiving crude oil for use as a refinery input.

In terms of lost volumes, replacing ULSD is likely to stress markets more than replacing gasoline. Global distillate markets are structurally tight. This is particularly true for

Jones Act

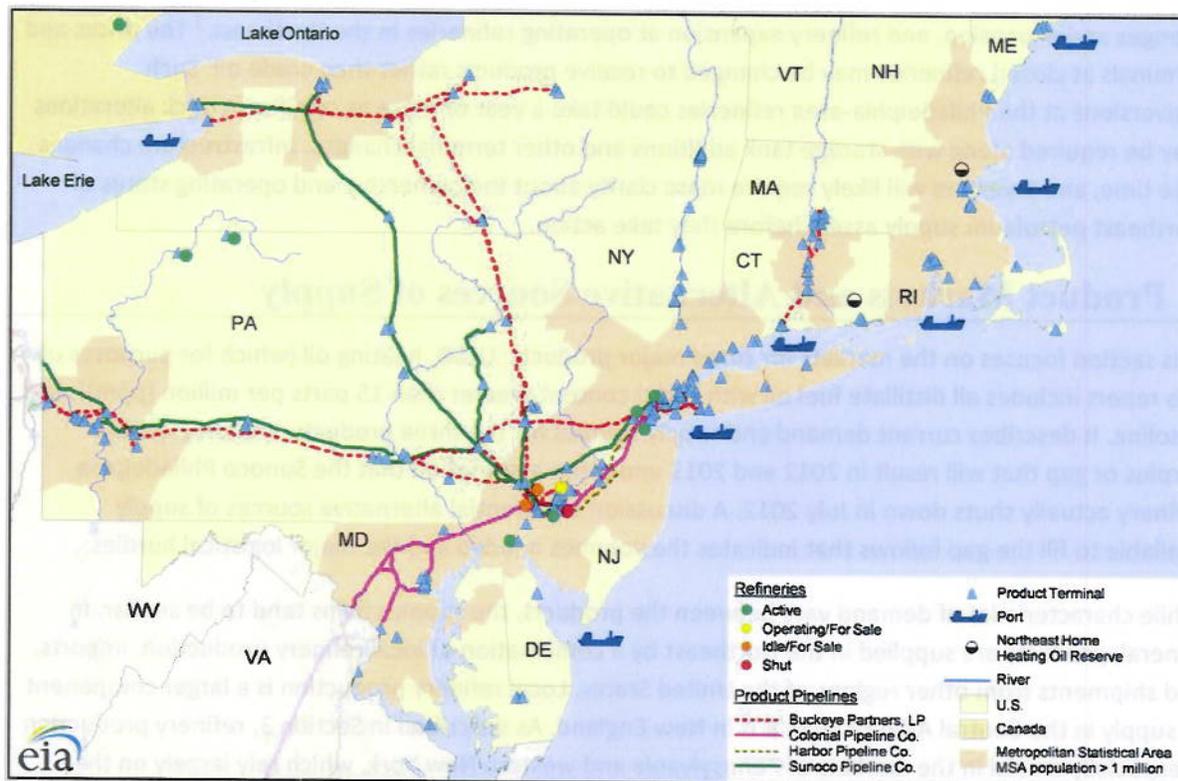
The Merchant Marine Act of 1920 (P.L. 66-261) is a U.S. Federal statute that regulates maritime commerce in U.S. waters and between U.S. ports. Section 27 of the statute, also known as the Jones Act, requires that all commercial shipping between U.S. ports and trade or navigation in coastal waters must be performed by U.S.-flag ships constructed in the United States, wholly owned by U.S. citizens, and crewed by U.S. citizens and U.S. permanent residents. Steep penalties result from noncompliance. At the end of 2010, 56 tankers met the Jones Act requirements, accounting for less than 1% of both the total number and the total deadweight tonnage of tankers in the world (see table below). At any given time, 35 Jones Act tankers are engaged in trade in U.S. waters.

Jones Act and International Tankers, Year-End 2010

Vessels Larger Than 10,000 Deadweight Tons	Number of Vessels	Total Capacity (Million Deadweight Tons)
Total World: All Vessels	20,050	1,214
Total World: Tankers	5,794	478
Jones Act Tankers	56	4

Source: MARAD, http://www.marad.dot.gov/library/landing_page/data_and_statistics/Data_and_Statistics.htm.

Figure 1. Petroleum Product Assets in the Northeast



Source: U.S. Energy Information Administration.

limited.) There will be some additional ability to inject volumes into the affected Buckeye and Sunoco pipelines soon. Sunoco's Eagle Point, NJ refinery, which was closed in February 2010, is being converted to a terminal that can accept waterborne products. This facility will be able to feed into the pipelines affected by the three closed or possibly idled refineries, but it is still not finished. Even when it is completed, its additional capacity, along with other incremental pipeline flow increases that may be available by July, will be inadequate to replace the lost volumes from the three Philadelphia-area refineries.

If the product volumes that can be shipped through the Sunoco and Buckeye pipelines are insufficient, prices will need to increase to balance consumption with available supply and attract additional product delivery by truck and rail; although, the current capacity of rail terminals to handle petroleum flows is limited. Trucks can come from terminals fed by Midwest refineries and from New York Harbor. A higher-price environment could persist for months, if not longer, until infrastructure changes can be made.

Eventually a number of longer-term solutions will evolve. Which changes occur will depend on the economics at the time, and because many of the infrastructure changes may not be needed if the Sunoco Philadelphia plant stays in operation, the uncertainty surrounding its future will likely cause investors to wait until a shutdown is definite.

Companies are looking at various potential solutions in the interim, along with longer-term options which are described in more detail in Section 6. Longer-term options include pipeline connectivity

advanced emission control devices required on diesel engines, ULSD is restricted to a maximum of 15 ppm of sulfur content. The regulation requires ULSD for on-highway use, non-road applications (e.g., construction), locomotive use, and marine applications. ULSD fuel requirements began taking effect in 2006, but the EPA allowed for a gradual implementation of requirements over time. During 2010, all on-highway and non-road fuel use had to be ULSD. In 2012, locomotive and marine applications will all use ULSD.

In 2008, ULSD consumption in the Northeast was about 360,000 bbl/d. After a brief dip in 2009 during the recession,⁴ consumption returned to earlier levels in 2010 and remained there through the first 11 months of 2011. Diesel fuel is used mainly in trucking. While diesel fuel use in trucking has generally declined following the economic slowdown, ULSD consumption has been relatively flat, mainly as a result of the ongoing phase-in of ULSD.

Looking ahead, ULSD demand in the Northeast is expected to increase considerably. The improving economy is expected to increase transportation-related demand and a new requirement by New York State will reduce the maximum allowable sulfur level in heating oil to 15 ppm effective in July 2012. (See box.) Heating oil currently has no Federal sulfur requirement. The new limit on sulfur content in heating oil sold in New York has several implications for the ULSD market. First, the volumes are sizable. Heating oil consumption in New York has averaged around 70,000 bbl/d on an annual basis,⁵ while ULSD consumption in the entire Northeast was about 360,000 bbl/d in 2011. The switch will increase ULSD consumption in the Northeast by about 20% and, in addition, will add a stronger seasonal component to the ULSD market. Currently, ULSD demand has a small seasonal variation, with a minor increase during the summer months related to increased transportation use. However, heating oil use is highly seasonal, peaking in the winter months (see Section 4.2). New York heating oil consumption has peaked in recent years between 130,000 and 170,000 bbl/d, meaning that ULSD consumption could increase from 35% to 50% over the base ULSD demand of 360,000 bbl/d during that peak winter period, with less than a 10% increase over base ULSD demand during the low-demand summer months.

Northeast States Reducing Heating Oil Sulfur Content

Effective July 2012, New York State will be the first of several Northeastern States to require ULSD be used for space heating, replacing higher-sulfur distillate fuels in order to improve air quality.

Following New York's lead, other Northeast States have announced dates to phase-in ULSD for heating oil:

- Maine—2016-2018
- Massachusetts—2014-2018
- New Jersey—2014-2016
- Vermont—2014-2018

⁴ Recent recession ran from December 2007 through June 2009, <http://www.nber.org/cycles/cyclesmain.html>.

⁵ U.S. Energy Information Administration Prime Supplier sales data for Distillate No. 2 Fuel Oil is used as the estimate for New York heating oil demand.

region. Through November 2011, imports from the U.S. Virgin Islands were down, but Eastern Europe (including Russia) supplied ULSD volumes to the Northeast in two of the months, which is unusual by historical standards.

Exports of ULSD from the Northeast averaged about 5,000 bbl/d in 2010, but picked up in 2011 to more than 30,000 bbl/d, as regional consumption was flat, and there was surplus capacity to take advantage of ULSD markets outside the United States. Export volumes can be expected to be absorbed into the local supply pool because price differentials are not expected to support exports from the Northeast if the Sunoco Philadelphia refinery closes.

4.1.3 Supply-Demand Balance and Alternative Sources of Supply

It is unclear how the available supply sources will meet demand if the Sunoco Philadelphia refinery closes. Table 2 shows the volumes of ULSD that might need to be replaced in the event that the refinery, which has been a major producer of ULSD in recent years, is actually idled. Annual historical data are shown through 2011.⁶ The projections for 2012 and 2013 (at the bottom of the table) show a gap that represents the volume of additional supply needed over and above historical levels to meet projected demand given reduced production levels within the region.

Table 2. Northeast ULSD Supply-Demand Balance and Projections: Annual Average 2007-2013

(Thousand bbl/d)

(Rounded to closest 10,000 bbl/d)

	2007	2008	2009	2010	2011*	2012 Outlook	2013 Outlook
Consumption	340	360	340	360	360	380	430
Supply	340	360	340	360	360	290	250
In-Region Production (+)	250	250	200	210	220	150	110
Net Receipts from Other Regions (+)	–	30	90	70	100	90	90
Imports (+)	90	80	60	70	70	50	50
Exports (-)	–	–	–	–	30	–	–
Stock Decrease (+) / Increase (-)	–	–	-10	10	–	–	–
Surplus (+) / Gap (-)	–	–	–	–	–	-90	-180

*Data through November 2011.

Notes: Projected consumption is based on data from EIA's *Short-Term Energy Outlook*. It includes a switch in consumption from heating oil to ULSD of an additional 70,000 bbl/d beginning in July 2012, based on New York's requirement that heating oil move to ULSD specifications. Projected production is based on assumed yields and the capacity of remaining refineries. Sunoco Philadelphia is assumed to close in July 2012. Projected imports are 3-year historical averages adjusted down by U.S. Virgin Islands contributions. Historical net receipts are estimated. Projected net receipts are 3-year historical averages. The Surplus/Gap indicates the under- or over-supply needed to meet consumption.

Source: U.S. Energy Information Administration.

It is estimated that if the Sunoco Philadelphia refinery closes, it will result in the need for 90,000 bbl/d of ULSD in 2012 and 180,000 bbl/d in 2013 in addition to historical levels of supply. Rising consumption – both from continued economic recovery and the addition of New York heating oil volumes switching to ULSD— and declining production widen the gap, but removing ULSD export volumes adds back supply to close the gap somewhat. Because the estimates are based on EIA consumption forecasts, any deviation

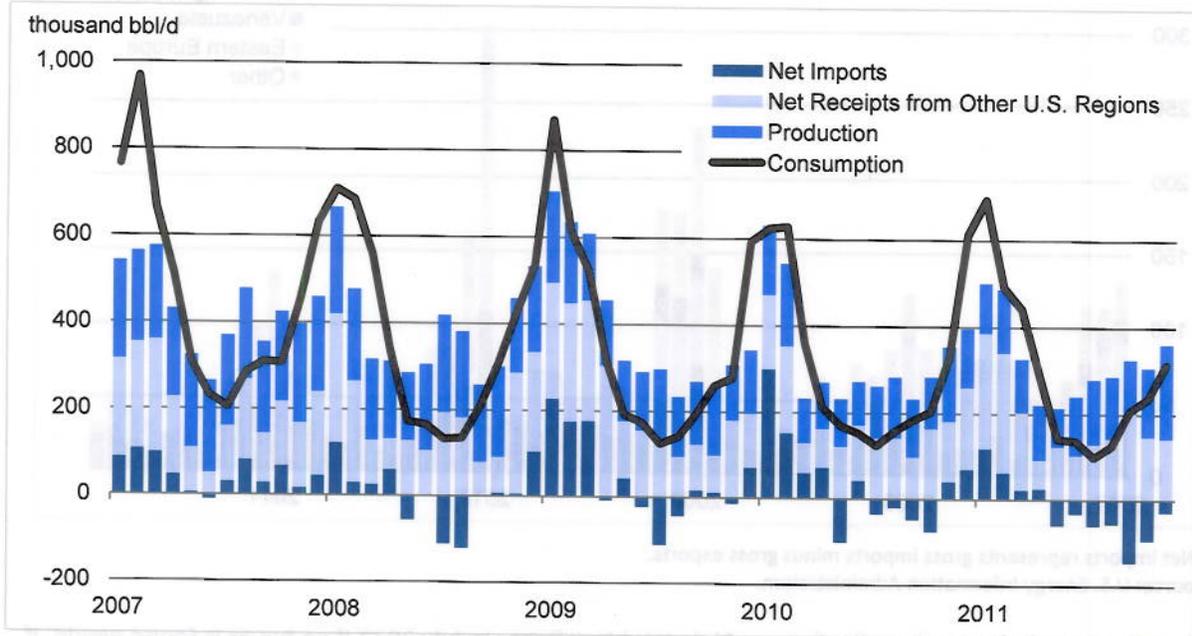
⁶ Year 2011 data is through November.

months.

4.2.2 Supply

Figure 4 provides a monthly view of seasonal heating oil consumption and supply sources used to meet that consumption. Refinery production is relatively flat throughout the year, supplying less than half the annual demand, but supplying proportionally less in the winter than in the summer. During the peak-demand winter months, imports surge to help meet peak needs, and exports typically drop to zero. Inventories also play an important role with heating oil supply. They are built up during the low-demand summer months, as represented by the consumption line dropping below total supply, and then drawn down to help meet peak-winter needs, which is shown in Figure 4 by the consumption line being well above the supply sources listed.

Figure 4. Northeast Heating Oil Supply-Demand Balance, Monthly 2007-2011



*Net imports represents gross imports minus gross exports.

Source: U.S. Energy Information Administration.

During the peak winter months of December, January, and February, Northeast refineries typically supply about 30% of heating oil consumption, imports provide about 20%, net receipts from other U.S. regions about 35%, and stock draws about 15%.

Northeast refinery production of heating oil had been declining before the recent refinery shutdowns, dropping by about 70,000 bbl/d from the 2007 total to an average of 140,000 bbl/d in 2010 and 2011. With the closure of three Philadelphia-area refineries, production may drop by another 40,000 bbl/d from 2011 to an average of 100,000 bbl/d in 2013, which is proportionally less than the decline in ULSD production between 2011 and 2013.

of heating oil should be adequate even after the recent refinery shutdowns and the potential implementation of announced plans to close the Sunoco Philadelphia refinery in July 2012 if no buyer is

Table 3. Northeast Heating Oil Supply-Demand Balance and Projections: Annual Average 2007-2013

(Thousand bbl/d)

(Rounded to closest 10,000 bbl/d)

	2007	2008	2009	2010	2011*	2012 Outlook	2013 Outlook
Consumption	470	370	360	310	290	310	280
Supply	470	370	360	310	290	340	310
In-Region Production (+)	210	190	160	140	140	120	100
Net Receipts from Other Regions (+)	180	170	170	140	160	160	160
Imports (+)	80	70	100	80	60	60	50
Exports (-)	40	60	50	50	80	-	-
Stock Decrease (+) / Increase (-)	40	-	-20	-	10	-	-
Surplus (+) / Gap (-)	-	-	-	-	-	30	30

*Data through November 2011.

Notes: Projected consumption is based on data from EIA's *Short-Term Energy Outlook*. It includes a switch in consumption from heating oil to ULSD of an additional 70,000 bbl/d beginning in July 2012, based on New York's requirement that heating oil move to ULSD specifications. Projected production is based on assumed yields and the capacity of remaining refineries. Sunoco Philadelphia is assumed to close in July 2012. Projected imports are 3-year historical averages adjusted down by U.S. Virgin Islands contributions. Historical net receipts are estimated. Projected net receipts are 3-year historical averages. The Surplus/Gap indicates the under- or over-supply needed to meet consumption.

Source: U.S. Energy Information Administration.

found.

4.3 Gasoline

4.3.1 Demand

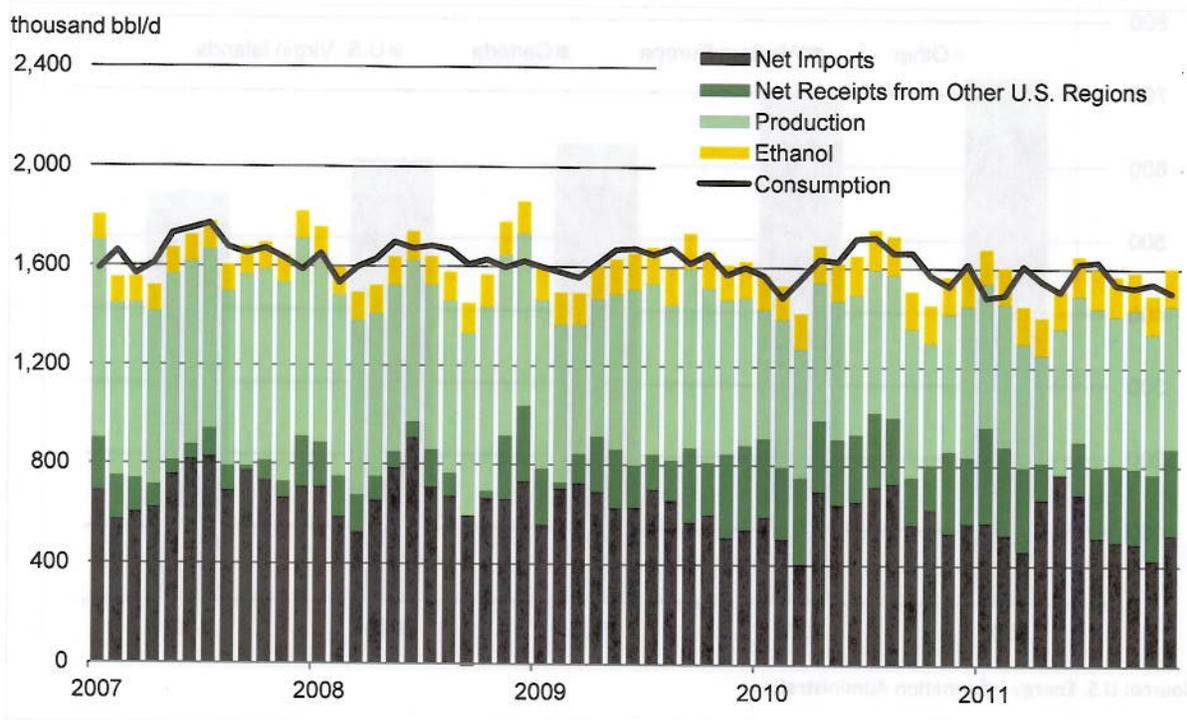
Gasoline consumption in the Northeast peaked at more than 1,660,000 bbl/d in 2005 and stayed roughly consistent through 2007. Since 2007, consumption of finished gasoline has fallen by about 120,000 bbl/d to an average of 1,540,000 bbl/d through the first 11 months of 2011. The decline began with the recent recession, and supply has been further diminished by increased vehicle fuel efficiency, demographic trends, and generally higher prices compared with the peak-consumption years. However, the decline in finished gasoline consumption hides an even larger decline in consumption of petroleum-based gasoline due to increased ethanol blending over this period. With the blending of ethanol increasing from about 2% in 2005 to almost 10% (about 150,000 bbl/d) of the Northeast's supply of finished gasoline in 2011, consumption of petroleum-based gasoline is almost 250,000 bbl/d lower than in 2005.

Ethanol blending has changed the way the gasoline market is supplied. Because of the chemical characteristics of ethanol, finished gasoline (which contains ethanol) cannot be shipped via pipeline. Thus, ethanol generally is shipped by rail from the Midwest to blending terminals on the East Coast. Because finished gasoline containing ethanol cannot be shipped via pipeline, refiners and blenders now produce an unfinished petroleum-based gasoline component that can be shipped on a pipeline. This unfinished gasoline is called "blendstock for oxygenate blending" (BOB). Once the BOB is blended with

finished gasoline consumed was supplied by the blending of ethanol.⁷ Figure 6 shows supply sources for gasoline in the Northeast since 2007.

In 2011, gasoline production from Northeast refineries was about 580,000 bbl/d. If the Sunoco Philadelphia refinery closes in July 2012 and the Sunoco Marcus Hook and ConocoPhillips Trainer refineries remain closed, production is estimated to drop to an average of 420,000 bbl/d in 2012 and 350,000 bbl/d in 2013. Thus, if all three refineries are closed, it would leave the Northeast gasoline market with approximately 240,000 bbl/d of incremental supply needs.

Figure 6. Northeast Gasoline Supply-Demand Balance, Monthly 2007-2011



*Net imports represents gross imports minus gross exports.

Source: U.S. Energy Information Administration.

Gasoline imports to the Northeast averaged about 560,000 bbl/d in 2011. Imports played an important role in supplying New York and New England, which is particularly reliant on imports. Most of the Northeast's gasoline imports come through New York Harbor. However, the Central Atlantic is much less reliant on imports. Imports to the Northeast come mainly from Western Europe, Canada, and the U.S. Virgin Islands. Figure 7 shows imports to the Northeast by origin. The Canadian and U.S. Virgin Islands volumes tend to move more to New England while volumes from Western Europe tend to move more to New York Harbor.

The Northeast exports only small amounts of gasoline, less than 5,000 bbl/d in 2011. While not significant, those export volumes can be expected to be absorbed into the local supply pool, because

⁷ Sum of supply components does not add to 100% due to stock changes and rounding.

240,000 bbl/d level shown for 2013. Most of this supply requirement will be needed throughout Pennsylvania and western New York, the areas which are directly supplied by the Philadelphia-area refineries. However, with some volumes from the Philadelphia-area refineries going to New York Harbor, and the loss of imports from the U.S. Virgin Islands, there will be some additional supply needs throughout the Northeast.

Table 4. Northeast Gasoline Supply-Demand Balance and Projections: Annual Average 2007-2013

(Thousand bbl/d)

(Rounded to closest 10,000 bbl/d)

	2007	2008	2009	2010	2011*	2012 Outlook	2013 Outlook
Consumption	1,660	1,630	1,620	1,610	1,540	1,540	1,540
Supply	1,660	1,630	1,620	1,610	1,540	1,380	1,300
In-Region Production (+)	750	710	640	560	580	420	350
Ethanol Inputs (+)	100	120	140	150	150	150	150
Net Receipts from Other Regions (+)	120	120	200	270	270	250	250
Imports (+)	720	700	630	610	560	560	550
Exports (-)	20	20	-	-	-	-	-
Stock Decrease (+) / Increase (-)	-	-10	-	10	-	-	-
Surplus (+) / Gap (-)	-	-	-	-	-	-160	-240

*Data through November 2011.

Notes: Projected consumption is based on data from EIA's *Short-Term Energy Outlook*. Projected production is based on assumed yields and the capacity of remaining refineries. Sunoco Philadelphia is assumed to close in July 2012. Projected imports are 3-year historical averages adjusted down by U.S. Virgin Islands contributions. Historical net receipts are estimated. Projected net receipts are 3-year historical averages. The Surplus/Gap indicates the under- or over-supply needed to meet consumption.

Source: U.S. Energy Information Administration.

In the short term, increasing imports is the most readily available option for replacing lost gasoline production. Finding additional volumes of gasoline generally should not pose a problem because global markets have sufficient supplies. Europe, despite recent refinery closures, should be able to ship additional volumes to the United States. Refineries in Canada also are likely to have additional supplies to send. However, less traditional sources are also likely to play an increasing role in supplying the Northeast. One of the most probable incremental suppliers is India. With significant refinery capacity additions over the past few years, India has become an increasingly large supplier in global product markets and is already exporting about 40,000 bbl/d of gasoline to the U.S. East Coast. Additional volumes could come from increased refining capacity elsewhere in Asia and the Middle East.

Some of the supply gap may also be filled by increased shipments from the Gulf Coast. However, this is less certain. Based on historical levels, EIA estimates that 250,000 bbl/d will come from the Gulf Coast in 2012 and 2013, but in 2011 that number was larger at 270,000 bbl/d. Thus, 20,000 bbl/d of the gap could be filled by pipeline shipments that already are occurring. Beyond that, additional volumes from the Gulf Coast via the Colonial pipeline will be limited by pipeline capacity issues described above. Moreover, if demand rebounds on the southern end of the line, some of the recent increases in supply

challenges will be overcome and to what extent, if any, very long-haul trips would be needed. Generally, very long-haul trips would be a last resort and would be undertaken only as needed to help the affected markets rebalance.

As the market rebalances from any price spikes, but before infrastructure changes can be made, a less efficient supply chain would be in place than was operating prior to the assumed idling of the Sunoco Philadelphia refinery considered in this analysis. In the analysis scenario, this situation could persist for a year or more, depending on the infrastructure projects that are ultimately needed. Prices in the Northeast would likely be higher relative to other regions than before, depending on the interim marginal sources of supply.

Prices being set from marginal sources of supply are influenced by additional costs to produce and deliver a product as well as by what is necessary to bid that product away from its current market. Predicting where the marginal price-setting supply will come from and what price will be required to obtain that supply is highly uncertain. More product volumes will be moving by higher-cost modes than prior to the closure. The marginal supply sources and price impacts of serving the inland Pennsylvania and western New York areas, which are affected by constrained pipeline access, would be expected to be different than the price impacts of those other Northeast areas that can receive additional waterborne deliveries. However, there will be interactions among all of these areas through the links that are still functioning in our analytical scenario.

First consider the price impacts of serving the inland Pennsylvania and western New York areas for all products after the initial transition impacts of the Sunoco Philadelphia refinery closure assumed in the analysis scenario subside. Much of the replacement product volume will likely have to come from the Midwest. As Midwest supplies move east, Gulf Coast supplies can flow via pipeline and traditional routes into the Midwest. Midwest and Gulf Coast refineries have adequate supplies to replace the lost volumes in this inland area, but movement into Pennsylvania and New York will still require longer haul trucking. Even if increased Midwest supplies are able to move by pipeline into western Pennsylvania, those west-to-east pipelines stop in the Pittsburgh area, and the terminal network is not set up to deliver those supplies further east, so longer haul trucking will persist, although there should be minimal need for very long routes, such as the 300-mile example above. Some trucking from New York Harbor into inland areas that are closer to New York Harbor than Pittsburgh may also add to supply. While the marginal trucking costs in this case are likely to be less than the 20-30 cents mentioned above, trucks and drivers may be in short supply, which could keep prices above marginal transportation costs. This type of strained supply chain is also more exposed to temporary disruptions and price volatility.

For inland areas that see a significant reduction in the amount of petroleum products received through product pipelines originating in the Philadelphia refinery complex that have traditionally served as an important supply channel, price impacts will likely vary by product as well. For example, some products move into Pennsylvania through a pipeline that links to the Colonial pipeline. With most marginal supply of ULSD being on the Gulf Coast, suppliers may reduce some gasoline supply through this pipeline route in favor of ULSD. While this might help ULSD prices, it would require more gasoline from the Midwest and New York Harbor truck routes, adding more pressure to gasoline prices.

6. Long-Term Implications

6.1 Integration of East Coast Product Markets

Although Philadelphia-area refineries primarily supply the Central Atlantic region, other East Coast markets (i.e., New England and the Lower Atlantic regions) may also feel the long-term effects of refining downsizing. The three East Coast subregions may become more integrated in the future from the standpoint of logistics and more uniform from the standpoint of product specification. Supply systems will become more integrated as a result of refinery downsizing in the Northeast. Up until now, the Central Atlantic region, as the historic heartland of East Coast refining, has depended on a distinctive supply mix – including a combination of local refinery output, Gulf Coast products delivered by pipeline, and waterborne imports – which set it apart from the rest of the East Coast. Both Florida (in the Lower Atlantic) and New England depend heavily on waterborne product supply, whereas other parts of the Lower Atlantic (excluding Florida) rely primarily on pipeline deliveries from the Gulf Coast. A permanent and significant reduction in East Coast refining capacity would thus bring the Central Atlantic market in closer competition with New England and Florida for waterborne imports and with the rest of the Lower Atlantic for pipeline deliveries. Should Gulf Coast or international refined product markets grow tight, upward price pressure in the Central Atlantic could quickly spread to the rest of the East Coast.

In addition, expansions of pipeline, terminal, and storage capacity may be accompanied by increased logistical connectivity among facilities throughout the East Coast. This may translate into greater market integration and new opportunities for arbitrage between subregions along the East Coast.

At the same time as supply systems become more integrated, expected increases in the use of ULSD as heating fuel is expected to create a more uniform distillate market. The transition of heating oil from high-sulfur distillate to ULSD is scheduled to start with New York in 2012 and continue with Maine, Massachusetts, New Jersey, and Vermont through 2018. Other Northeast States are likely to follow suit. In the past, the Northeast's reliance on heating oil for space heating set it apart from the rest of the East Coast, where distillate was used primarily for transportation, and ULSD accounted for most of its demand. The widespread adoption of ULSD requirements for heating oil is likely to encourage the development of a seamless ULSD distillate market throughout the entire East Coast, causing commercial and residential consumers of heating-oil in the New England and Central Atlantic areas to compete with truckers for the same barrels.

6.2 Impact of Reduced Refining Activity on East Coast Product Distribution

Refinery closures in the U.S. Virgin Islands and the Philadelphia area are likely to affect product distribution arrangements along the entire East Coast. With the HOVENSA shutdown, both the Lower Atlantic and New York Harbor lose a major source of supply, while Philadelphia-area refinery closures most directly affect the Central Atlantic markets in Delaware, the District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.

The short-term impacts of the idling of refineries serving the Northeast market are discussed in Sections 4 and 5 above. As mentioned, the most pressing near-term challenges are in the Central Atlantic, where logistics must be upgraded and expanded to efficiently and economically accommodate alternate supply sources. This will take time, capital investments, and clarity on asset ownership and corporate plans. In

of such large and newly independent midstream companies. Often initially launched as spinoffs by refining companies, those new MLPs have joined the ranks of more established logistics firms such as Buckeye Partners, LP. Several companies, including NuStar, Sunoco Logistics, Buckeye, and Plains All American Pipeline, have been rapidly expanding their East Coast and Caribbean footprints and have announced plans to further expand their local tank farms.

Shrinking refining capacity in the Atlantic Basin goes hand in hand with fast-rising terminal capacity, not least because some of the idled refineries are being converted into storage.

- Plains All American bought the Yorktown, VA refinery in 2011, and converted it into a 6.6 million barrel terminal for crude oil, refined products, and liquefied petroleum gas (LPG).
- Sunoco Logistics is converting Sunoco's idled Eagle Point refinery in Westville, NJ, into a marine terminal.
- HOVENSA, in announcing the closure of its St. Croix refinery, also said it would convert it into a product tank farm.
- NuStar has announced a planned expansion of its Linden NuTop tank farm in New York Harbor, including the conversion of the facility from a rack marketing terminal to a bulk storage terminal accompanied by an 850,000-barrel capacity increase.
- Buckeye in 2008 bought Northeast gasoline and distillate distributor Farm & Home Oil Company and merged it with Buckeye Energy Services, its wholesale Midwest and Northeast product distribution arm. In early February 2012, Buckeye announced its acquisition of a 4-million-barrel marine terminal from Chevron at Perth Amboy in New York Harbor, which it may integrate with its nearby Linden, NJ, tank farm at some point via a new pipeline.

Even as they have been separated from once vertically-integrated oil companies, midstream companies have been consolidating horizontally, expanding their reach beyond the United States and enhancing their assets' internal connectivity. Both NuStar and Buckeye have acquired major Caribbean tank farms:

- NuStar bought a 13.8-million-barrel terminal in St. Eustatius, in the former Netherlands Antilles, in 2005, and plans to expand it by 11.8 million barrels. NuStar's international portfolio also includes assets in Canada, Mexico, the United Kingdom, and Turkey.
- Buckeye bought Bahamas Oil Refining Company International (BORCO), a 21.6-million-barrel terminal for crude oil, fuel oil, and light products in 2011, and plans to boost its capacity by more than a third. Ultimately, Buckeye said it may double BORCO's capacity. In combination with the Perth Amboy terminal and its Linden facility, BORCO would enable seamless movement of waterborne light products, such as gasoline and diesel, onto existing pipeline networks running from Linden through inland Pennsylvania and into western New York.

Non-U.S. firms also are active in the Caribbean, China's national oil company PetroChina, India's privately-owned refiner Reliance, and Brazil's national oil company Petrobras all have been identified in trade publications as major capacity holders in the Caribbean. These large market participants reportedly use Caribbean storage to break bulk (i.e., break down large imported tanker loads into smaller parcels for distribution across multiple markets in the Americas) or build bulk (i.e., aggregate small tanker loads from various regional suppliers into large tankers for export). In the future, growth in