

NEW YORK MERCANTILE EXCHANGE, INC.

ANALYSIS OF DELIVERABLE SUPPLY

RBOB GASOLINE FUTURES

September 2018

In estimating deliverable supply for the RBOB Gasoline Futures, the New York Mercantile Exchange, Inc. (“NYMEX” or “Exchange”) relied on long-standing precedent, which provides that the key component in estimating deliverable supply is the portion of typical production and supply stocks that could reasonably be considered to be readily available for delivery. In its guidance on estimating deliverable supply, the Commodity Futures Trading Commission (“CFTC” or “Commission”) states:

In general, the term “deliverable supply” means the quantity of the commodity meeting a derivative contract’s delivery specifications that can reasonably be expected to be readily available to short traders and saleable by long traders at its market value in normal cash marketing channels at the derivative contract’s delivery points during the specified delivery period, barring abnormal movement in interstate commerce. Typically, deliverable supply reflects the quantity of the commodity that potentially could be made available for sale on a spot basis at current prices at the contract’s delivery points. For a non-financial physical-delivery commodity contract, this estimate might represent product which is in storage at the delivery point(s) specified in the futures contract or can be moved economically into or through such points consistent with the delivery procedures set forth in the contract and which is available for sale on a spot basis within the marketing channels that normally are tributary to the delivery point(s).¹

I. Methodology and Data Sources

The Exchange considered three components in evaluating deliverable supply estimates of RBOB Gasoline for the New York Harbor delivery location of the RBOB Gasoline Futures contract:

- (1) Refinery and Blender Production;
- (2) Pipeline flows and net receipts to the delivery area;
- (3) Storage levels in the delivery area.

The Exchange determined to use data collected by the U.S. Department of Energy’s Energy Information Administration (“EIA”) for its analysis and evaluation of deliverable supply estimates for RBOB Gasoline in New York Harbor. The EIA provides detailed data on each of the three components of deliverable supply.

II. Introduction

The New York Harbor RBOB Gasoline Futures contract is the main benchmark used for pricing of gasoline in the U.S. petroleum products market. The U.S. gasoline market represents a large physical market, with total U.S. refinery capacity of 9.5 million to 10.0 million barrels per day (b/d) of gasoline.

In the U.S. gasoline market, there are two main formulations for gasoline: Reformulated Gasoline and Conventional Gasoline, as required by a complex network of federal and state regulations. The U.S. Environmental Protection Agency (“EPA”) administers the Clean Air Act (“CAA”) requirements, and various state agencies regulate their own specific air rules. Under the CAA, the urban areas with the highest levels of smog pollution are required to use clean-burning Reformulated Gasoline blended with 10% ethanol. These urban areas include the entire Northeastern United States, California, Chicago, Atlanta, and Houston. These areas account for approximately 40% of U.S. gasoline demand. The 10% ethanol blending requirement in Reformulated Gasoline requires that the ethanol be segregated from the gasoline at the

¹ http://www.ecfr.gov/cgi-bin/text-idx?SID=74959c3dbae469e2efe0a42b45b8dfae&mc=true&node=ap17.1.38_11201.c&rgn=div9

wholesale level in the pipeline distribution system. In the wholesale market, the gasoline is shipped unfinished (without the ethanol) and it is called Reformulated Blendstock for Oxygen Blending (RBOB). The ethanol blending occurs at the last stage of the delivery process when the gasoline is loaded into the tanker truck for retail delivery.

A. New York Harbor Delivery Region

New England and the Central Atlantic Coast of the United States, collectively defined by the EIA as the “Northeast”, is a well-connected and integrated geographical region in terms of oil and products infrastructure. The region is part of the larger PADD 1², and is more specifically defined by PADD 1A (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont) and PADD 1B (New York, New Jersey, Delaware, Pennsylvania, Maryland, and Washington, DC).³

Located in both New York and New Jersey, the New York Harbor area is the largest oil importing and third largest container port in the nation and is the main refined products pricing and trading hub. Petroleum products in New York Harbor are supplied by refineries located in New Jersey, Delaware and Pennsylvania, all located within 100 miles of the New York Harbor area. East Coast refineries, a majority of which are located in New Jersey, Pennsylvania and Delaware, send products by local pipelines into New York Harbor.

Many of the petroleum products delivered to New York Harbor are redistributed to smaller ports where they supply local demand. In particular, the Hudson River is a major inland water route for petroleum product barges supplying eastern New York and parts of western New England. Significant volumes are shipped to New England via barge from New York Harbor. On the other side of the state, western New York product markets are primarily supplied from Canada at the Port of Buffalo, and via the Buckeye and Sunoco pipeline systems from Pennsylvania and the Midwest⁴.

B. Refineries and Refinery Capacity Overview

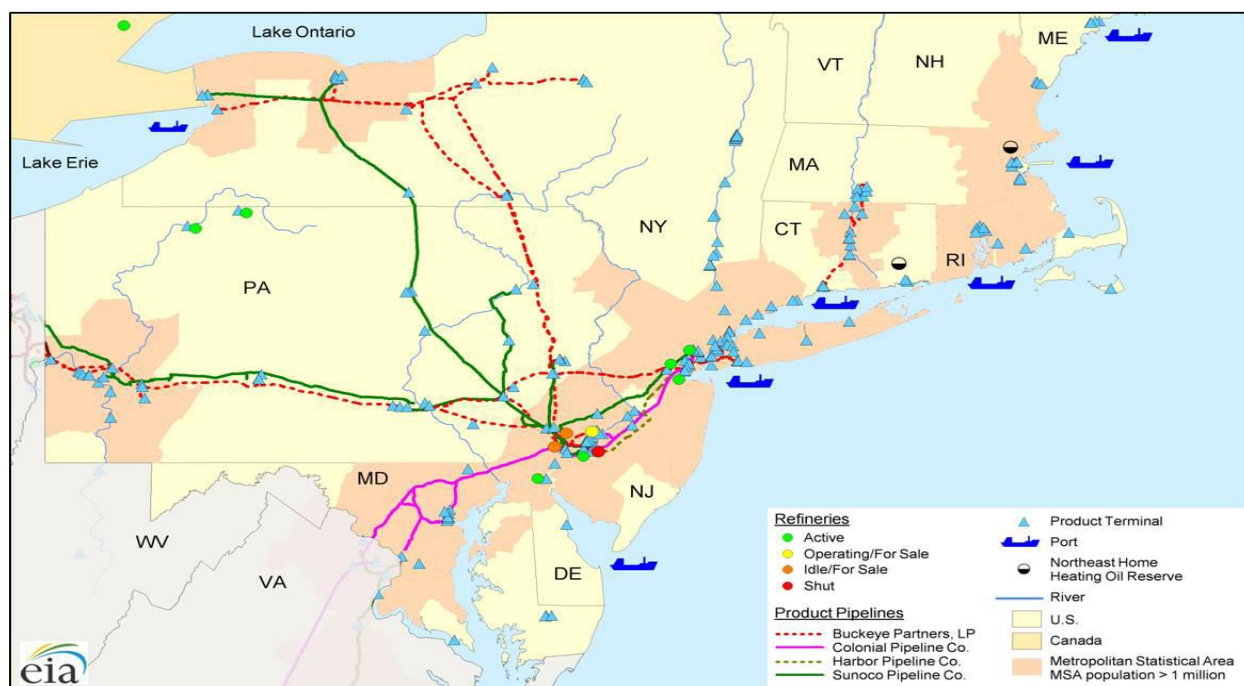
The Colonial Pipeline is the largest refined products pipeline in the U.S. and a key products supply link for the Northeast. The pipeline connects the Northeast to refinery output from the US Gulf Coast. Colonial's network of pipelines crosses 11 states, serving more than 260 marketing terminals in the Southern and Eastern United States. It generally takes from 14 to 24 days for a product batch on the Colonial Pipeline to get from Houston, Texas to the New York Harbor area, with 18.5 days being the average time.

² <http://www.eia.gov/tools/glossary/index.cfm>

³ <http://www.eia.gov/analysis/petroleum/nerefining/prelim/>

⁴ <http://205.254.135.7/state/state-energy-profiles-analysis.cfm?sid=NY>

Figure 1 - Northeast Refined Products Market Logistics⁵



In 2011, Colonial Pipeline expanded the northern end of its Houston-to-New York system by adding 100,000 b/d of capacity. In addition, the company completed a series of system upgrades leading to more than 100,000 b/d of capacity for distillates⁶ specifically serving the New Jersey, Pennsylvania, and New York markets. Also, Colonial Pipeline added an additional 100,000 b/d of gasoline and distillates capacity in early 2013⁷ to meet demand on the northern portion of the line (Greensboro, NC to Linden, NJ).

In the U.S., there were 135 operating refineries in the US with total atmospheric crude oil distillation capacity (ACDU) of 18.6 million b/d as of January 1, 2018⁸. The East Coast (PADD 1) has eight refineries, which are currently operating, with 1.2 million b/d of atmospheric crude distillation capacity. The region has 502,500 b/d of fluid catalytic cracking (FCC) capacity. PADD 1 includes all states in New England, the Mid-Atlantic, and the South Atlantic and is subdivided into three sub-PADDs.

- PADD 1A – Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut
- PADD 1B – New York, Pennsylvania, New Jersey, Delaware, Maryland, District of Columbia
- PADD 1C – West Virginia, Virginia, North Carolina, South Carolina, Georgia, Florida

Supply dynamics for each of the three sub-PADDs vary. PADD 1A, which encompasses New England, has no refineries and relies on imports and transfers from other PADDs, primarily PADD 1B. PADD 1C, the South Atlantic, has one operating refinery and relies primarily on pipeline transfers and marine shipments from PADD 3 and imports. PADD 1B is supplied by a combination of refineries, transfers from other PADDs -- primarily from PADD 3 -- and imports⁹. As stated above, the majority of PADD 1B refineries are located in New Jersey, Delaware and Pennsylvania, and are within 100 miles of the New York Harbor

⁵ <http://www.eia.gov/analysis/petroleum/nerefining/update/pdf/neprodmkts.pdf>

⁶ http://www.eia.gov/pressroom/presentations/sieminski_10102012.pdf

⁷ <http://www.colpipe.com/home/news-media/press-releases/pressdetail?ID=7cb2e327-d0b3-6eb4-9c07-ff00009907dd>

⁸ <https://www.eia.gov/petroleum/refinerycapacity/>

⁹ http://www.eia.gov/pressroom/testimonies/howard_03192012.pdf

area. These refineries are directly connected to the New York Harbor market by local pipelines and/or waterborne barges. A list of Northeast refineries is provided in Table 1.

Table 1 – Mid-Atlantic (PADD 1B) Refineries (Source: EIA)

Name	State	Owner	Capacity	Status
Delaware City Refinery Co LLC	Delaware City, DE	PBF Energy Co LLC	182,200 b/d	Operational
Paulsboro Refining Co LLC	Paulsboro, NJ	PBF Energy Co LLC	160,000 b/d	Operational
Phillips 66 Company	Linden, NJ	Phillips 66 Company	258,000	Operational
American Refining Group Inc	Bradford, PA	American Refining Group Inc	11,000 b/d	Operational
Philadelphia Energy Solutions	Philadelphia, PA	Carlyle Group	335,000 b/d	Operational
United Refining Co	Warren, PA	Red Apple Group Inc	65,000 b/d	Operational
Monroe Energy LLC	Trainer, PA	Delta Airlines Inc	190,000 b/d	Operational

III. Deliverable Supply Estimates

A. Refinery and Blender Production

In recent years, Northeast refineries supplied about 40% of gasoline (and 60% of the ULSD) consumed in the Northeast. Shipments from the U.S. Gulf Coast and imports supply the remainder of the market.¹⁰ The EIA provides gasoline production data for RBOB Gasoline that is produced by both refiners and blenders, under the category of “refiner and blender net production” as shown in Table 2 below. The majority of PADD 1 refineries are located in Delaware, New Jersey, and Pennsylvania, with direct connection to the New York Harbor market by pipelines and/or waterborne barges. In addition, the EIA’s “refiner and blender net production” category includes RBOB produced by refiners, and also includes blender production which relies on imported gasoline blending components.

Blenders are significant producers of RBOB gasoline, and the majority of RBOB blending components are sourced through imported gasoline blendstocks that enter via the New York Harbor. Typically, gasoline blenders are large trading companies that operate in the global market, such as Vitol, Glencore, and Trafigura. Since the blenders’ production of RBOB is sourced from imported gasoline blending components, these imported blending components are captured in the EIA’s category of “refinery and blender net production.” Consequently, the Exchange will include only the EIA’s “refinery and blender net production” category as the key component of New York Harbor supply and *not* include import data. Thus, to prevent potential double-counting of imported gasoline blending components, the Exchange will not use imports in its deliverable supply analysis, but rather will utilize the EIA’s data for “refinery and blender net production”.

According to EIA data from 2015 through 2017, the three-year average of RBOB production by refiners and blenders in PADD 1 was 1.27 million b/d, or 38.1 million barrels per month, as presented in Table 2 below. The RBOB gasoline that is produced in PADD 1 is in the vicinity of New York Harbor area, with direct connectivity to New York Harbor terminals, and the majority of this RBOB is transshipped and/or stored in New York Harbor terminals.

¹⁰ http://www.eia.gov/pressroom/testimonies/howard_03192012.pdf

Table 2 – PADD 1 Production¹¹ (Source: EIA)

RBOB Gasoline, in thousands b/d	August 2015 – July 2016	August 2016 – July 2017	August 2017 – July 2018	Average
Refinery and Blender Net Production	1,274	1,271	1,267	1,271

In conversations with market participants, it was determined that a portion of the Philadelphia refinery production is used to supply the Pennsylvania market via the Buckeye Laurel Pipeline. Based on EIA's prime supplier sales data¹², the Exchange estimates that the gasoline supplied to Pennsylvania was approximately 200,000 barrels per day for the three-year period of 2015 through 2017. Therefore, the Exchange reduced the total refinery and blender net production by 200,000 barrels per day to account for gasoline supplied to Pennsylvania directly from Philadelphia-area refineries. Consequently, the total refinery and blender net production available for the New York Harbor market is approximately 1.0 million b/d (rounding down), which is equivalent to 30.0 million barrels per month.

Further, according to input from market participants, approximately 30% to 40% of RBOB production is committed to retail distribution networks, and the remaining portion is available for re-selling in the spot market. Therefore, at least 60% of PADD 1 production of RBOB would be available for re-selling in the New York Harbor spot market. Consequently, we estimate that approximately 18.0 million barrels per month of RBOB (60% of 30.0 million barrels per month) would be deliverable in New York Harbor.

B. Pipeline Flows and Net Receipts

The U.S. Gulf Coast, or PADD 3, refining capacity accounts for 50% of total US production of refined products, and provides approximately 269,000 b/d of RBOB gasoline to PADD 1 via pipeline and tanker/barge shipments, as presented in Table 3 below. However, the majority of PADD 1 pipeline and tanker/barge receipts of RBOB from PADD 3 do not end up in the New York Harbor area as they are delivered at points further south of New York Harbor. According to market participants, only about 25% to 30% of PADD 1 gasoline receipts are delivered to the New York Harbor area. Therefore, using the more conservative 25% estimate for RBOB pipeline and tanker/barge shipments from PADD 3, the total receipts from PADD 3 to the New York Harbor area accounts for approximately 67,250 b/d (25% of 269,000 b/d) or 2.0 million barrels per month.

Table 3 – RBOB Movements from PADD 3 into PADD 1¹³ (Source: EIA)

	July 2015 – June 2016	July 2016 – June 2017	July 2017 – June 2018	Average
RBOB Movements, in Barrels per Day	282	263	261	269

¹¹ EIA, <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=WGRRPP12&f=W>

¹² EIA Prime Supplier Sales Volumes by State, https://www.eia.gov/dnav/pet/pet_cons_prim_dcu_SPA_m.htm

¹³ EIA, Monthly Data in barrels per day, https://www.eia.gov/dnav/pet/pet_move_ptb_dc_R10-R30_mbbbl_m.htm

C. Inventories of Gasoline in the New York Harbor Market

The New York Harbor area has petroleum bulk storage capacity of over 75 million barrels, making it the largest petroleum product hub in the country. The three-year average of gasoline stocks held in the Central Atlantic region, or PADD 1B, including New York, New Jersey, and Pennsylvania is approximately 32.8 million barrels as seen in Table 4 below. According to market participants, the New York Harbor RBOB market accounts for 25% to 30% of the inventories reported in EIA's PADD 1B inventory statistics. Using the more conservative estimate of 25% of PADD 1B inventories, the average stock level of gasoline is estimated to be about 8.2 million barrels in the New York Harbor area. Based on estimates from industry experts, we determined that the operational minimum levels for storage tanks in the New York Harbor area are approximately 5% to 10%. Using the more conservative estimate of 10%, we therefore estimate that approximately 820,000 barrels of the approximately 8.2 million barrels of stored gasoline in the New York Harbor area is used for operational purposes, leaving 7.4 million barrels available for spot month delivery from inventory.

Table 4 – Gasoline Stocks in PADD 1B¹⁴ (Source: EIA)

Inventory, in thousand barrels	PADD 1B (Central Atlantic)
August 2015 – July 2016	33,398
August 2016 – July 2017	34,235
August 2017 – July 2018	30,837
Average	32,823

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Based on the above analysis, the Exchange determined at this time to base its estimates of deliverable supply on the sum of:

- A. *Refinery and Blender Production = 18.0 million barrels*
- B. *Pipeline flows to the delivery area = 2.0 million barrels*
- C. *Storage levels in the delivery area = 7.4 million barrels*

The Exchange estimates the monthly deliverable supply of RBOB gasoline to the New York Harbor to be approximately 27.4 million barrels, which is equivalent to **27,400** contracts per month (contract size 42,000 gallons or 1,000 barrels). The current spot month position limit for the New York Harbor RBOB Gasoline Futures Contract is 1,000 contracts or **3.6%** of the estimated monthly deliverable supply.

¹⁴ http://www.eia.gov/dnav/pet/pet_stoc_wstk_dcu_r1y_w.htm

APPENDIX A.

PADD 1, Refiner and Blender Net Production¹⁵
(Source: EIA, Monthly Averages based on Weekly Data)

(Thousand Barrels per Day)

Year	Month	Total
2015	Aug	1,307
	Sep	1,274
	Oct	1,273
	Nov	1,256
	Dec	1,268
2016	Jan	1,178
	Feb	1,216
	Mar	1,249
	Apr	1,316
	May	1,297
	Jun	1,322
	Jul	1,333
	Aug	1,328
	Sep	1,307
	Oct	1,289
	Nov	1,285
	Dec	1,281
2017	Jan	1,164
	Feb	1,203
	Mar	1,244
	Apr	1,257
	May	1,297
	Jun	1,306
	Jul	1,297
	Aug	1,301
	Sep	1,276
	Oct	1,296
	Nov	1,290
	Dec	1,288
2018	Jan	1,144
	Feb	1,207
	Mar	1,235
	Apr	1,267
	May	1,291
	Jun	1,302
	Jul	1,309

¹⁵ <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=WGRRPP12&f=W>

A. PADD 1B (Central Atlantic) Total Gasoline Stocks ¹⁶

(Source: EIA, Monthly Averages based on Weekly Data)

(Thousand Barrels)

Year	Month	PADD 1B (Central Atlantic) Total Gasoline Stocks
2015	Aug	28,521
	Sep	29,039
	Oct	31,631
	Nov	27,827
	Dec	28,304
2016	Jan	32,682
	Feb	37,227
	Mar	37,433
	Apr	37,100
	May	37,276
	Jun	36,614
	Jul	37,122
	Aug	36,180
	Sep	31,043
	Oct	28,946
	Nov	29,129
	Dec	31,845
2017	Jan	36,925
	Feb	41,031
	Mar	37,005
	Apr	35,456
	May	37,014
	Jun	34,376
	Jul	31,870
	Aug	31,601
	Sep	27,981
	Oct	25,764
	Nov	24,673
	Dec	29,707
2018	Jan	30,745
	Feb	34,686
	Mar	32,363
	Apr	33,428
	May	32,655
	Jun	33,175
	Jul	33,263
Average		32,823

¹⁶ http://www.eia.gov/dnav/pet/pet_stoc_wstk_dcu_r1y_w.htm