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AFPM United States Refining Capacity Report

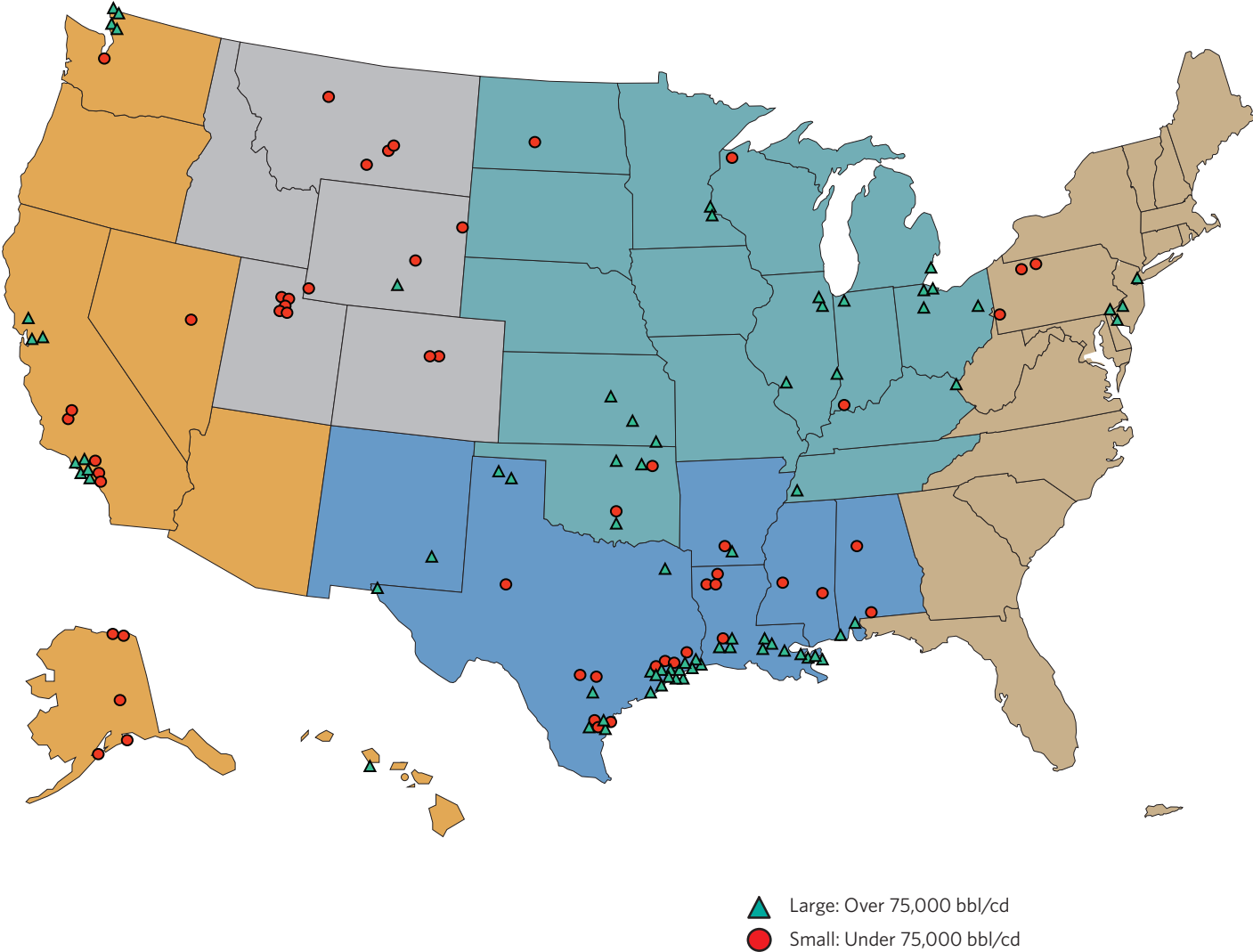
January 1, 2023

Published August 2023



Refining Capacity Report January 1, 2023

Locations of U.S. Refineries 2023



Refining Capacity Report January 1, 2023

AFPM United States Refining Capacity Report

Summary

The enclosed statistics provide U.S. refining capacity data as reported by the Energy Information Administration (EIA) in their 2023 Refinery Capacity Report. This data, along with other EIA statistics, is also available online. (See *the note at the bottom for details*). This report is also available on the AFPM website (www.afpm.org) located within the Data & Reports dropdown menu at the top of the webpage by clicking the Data & Statistics link.

As of Jan 1, 2023, there are 129 operable refineries in the United States with operable crude distillation capacity of 18.1 million barrels per calendar day (bbl/cd). Since Jan 1, 2023, U.S. operable refining capacity has increased by 235,000 bbl/cd to 18.3 million bbl/cd but is expected to decline to 18.2 million bbl/cd by year-end 2023. The growth in capacity was driven by capacity expansions at ExxonMobil's Beaumont and Marathon Petroleum's Garyville refineries. The decline by end 2023 takes into account the planned closure of Phillips 66's Rodeo refinery in San Francisco, California.

Details

According to the 2023 Refinery Capacity Report from the U.S. Energy Information Administration (EIA), as of Jan 1, 2023, there are 129 operable refineries in the United States, including both operating and idle refineries, with a total crude distillation capacity of 18.1 million bbl/cd. Of the 129 operable refineries, As of January 1, 2023, 124 were operating with capacity of 17.7 million bbl/cd.

The number of operable refineries decreased by one as compared with 2022 with the closure of Greka Energy's 9,500 bbl/cd asphalt refinery in Santa Maria, California. However, as of January 1, 2023, total crude distillation capacity increased by more than 116,000 bbl/cd with the restart of 60,000 bbl/cd of idled capacity at PBF Energy's Paulsboro refinery in New Jersey, and small net capacity increases at existing refineries. There were small capacity increases, known as "capacity creep," at refineries in Alabama, Alaska, Indiana, Illinois, Kansas, Louisiana, Minnesota, Ohio, and Texas which when summed far exceeded the combined total of small capacity decreases at refineries in Louisiana, Montana, Ohio, Texas, and Washington.

Since January 1, 2023, U.S. crude distillation capacity has increased to 18.3 million bbl/cd. ExxonMobil added about 240,000 bbl/cd (250,000 barrels per stream day) at its Beaumont refinery, Marathon added 40,000 bbl/cd at its Galveston Bay refinery, and Phillips 66 completed the planned closure of its 45,000 bbl/cd Santa Maria, California refinery, which is part of its San Francisco (Rodeo) refinery complex.

The number of idle refineries, also, dropped from five at the start of the year to zero in the first half of 2023 following the restart of the Cenovus refineries in Toledo, Ohio and Lake Superior, Wisconsin, the HF Sinclair refinery in Tulsa, Oklahoma, and Suncor's Commerce City, Colorado, refineries. As a result, operating capacity increased to 18.3 bbl/cd.

At end of 2023, when Phillips 66 completes the conversion of the San Francisco (Rodeo) refinery complex to a renewable fuels production facility, the number of U.S. operable refineries will decline by one to 128 and total crude distillation capacity will decline by 75,200 bbl/cd, reducing U.S. operable refinery capacity to 18.2 million bbl/cd. The previously announced planned closure of LyondellBasell's 263,776 bbl/cd Houston refinery at the end of 2023 has been delayed to 2025.

There were three refinery sales and one merger of refining companies in 2022. In 2022, Deer Park Refining, which had been a joint venture between Mexican state refiner Petróleos Mexicanos (PEMEX) and Shell USA, is now wholly owned by PEMEX; Shell USA also completed the sale of its Saraland, Alabama, refinery, to Vertex Refining Alabama LLC; and Limetree Bay Refining sold the decommissioned St. Croix refinery to Port Hamilton Refining and Transportation, although the sale has been the subject of legal disputes. HollyFrontier completed its merger with Sinclair Oil in 2022, combining HollyFrontier's portfolio of facilities in Kansas, Oklahoma, New Mexico, Utah, and Washington with Sinclair's Wyoming facilities under a single firm, HF Sinclair.

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In 2023, there has been one refinery sale and one change in refinery ownership. Par Petroleum completed its acquisition of ExxonMobil's Billings, Montana refinery on June 1, 2023. The agreement to purchase the Billings refinery was finalized in October 2022. In February 2023, Cenovus Energy closed its acquisition of the share of the Toledo, Ohio refinery that it did not already own. In June 2022, Cenovus Energy reached an agreement with BP, which had been operating the refinery, to purchase BP's 50% interest in the Toledo refinery. The following table lists the total U.S. operable refining capacity as of January 1st for the past five years:

January 1 - Total Operable Capacity in Thousands of Barrels Per Calendar Day

	2019	2020	2021	2022	2023
U.S. Capacity	18,802	18,976	18,127	17,944	18,060

Percentage Change in U.S. Operable Capacity from Previous Year

	2019	2020	2021	2022	2023
	1.10%	0.93%	-4.47%	-1.01%	0.65%

Changes in 2023 U.S. Refinery Capacity

	2023 EIA Refinery Cap. Rpt.	Change in Oper. Ref. Cap.	Capacity Changes since Jan 1, 2023	Current Capacity	Changes B/W now and End 2023	End 2023
PADD 1	877,800	60,000	0	877,800	0	877,800
PADD 2	3,948,885	-248,080	0	3,948,885	0	3,948,885
PADD 3	9,676,729	70,119	280,000	9,956,729	0	9,956,729
PADD 4	537,564	-125,600	0	537,564	0	537,564
PADD 5	2,634,571	-15,700	-45,000	259,571	-75,200	2,523,371
Total	18,060,369	116,559	235,000	18,295,369	-75,200	18,220,169

■ P66 Rodeo complex closure Phase 1

■ P66 Rodeo complex closure Phase 2

This summary of petroleum refineries in the United States and U.S. territories is taken from EIA's 2023 Refinery Capacity Report, published June 21, 2023. Capacity data are reproduced by AFPM as a courtesy to members. The data enclosed, as well as other EIA refining statistics, are available online from EIA (<https://www.eia.gov>). For more information, call EIA's automated information line at 202.586.8800 or email them at: InfoCtr@eia.gov.

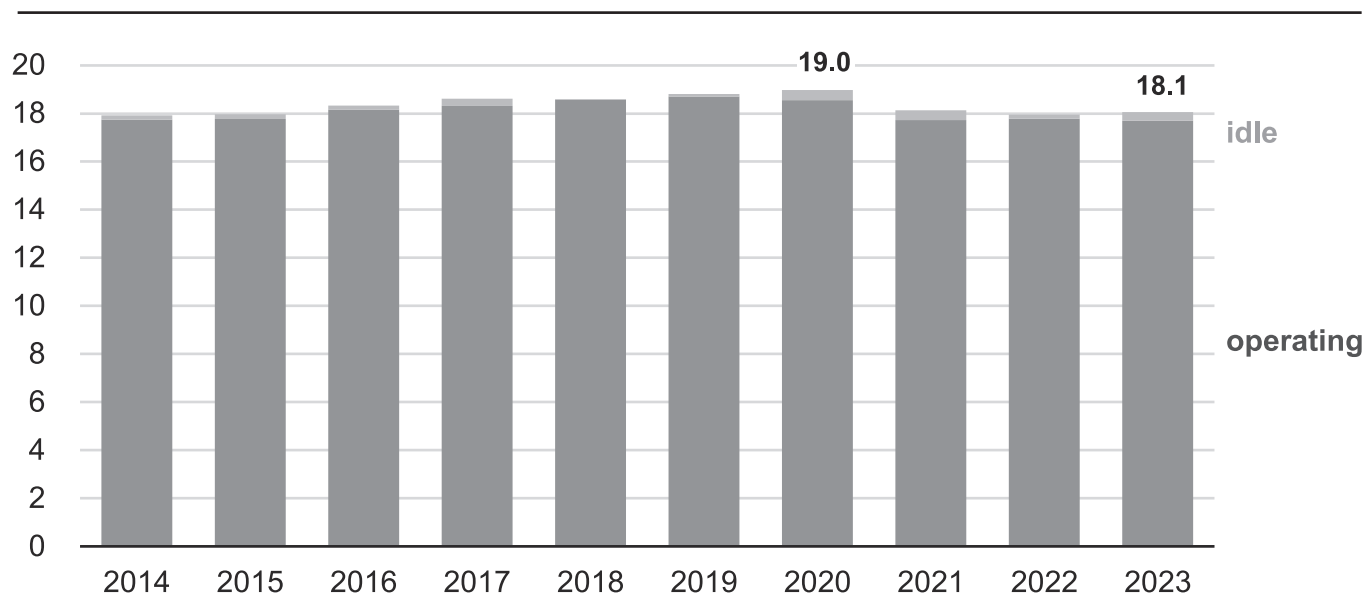
U.S. Energy Information Administration
This Week in Petroleum Summary

Release Date: July 6, 2023 | Next Release Date: July 12, 2023

Refinery capacity increased for the first time since the COVID-19 pandemic

U.S. refining capacity (excluding U.S. territories) increased this year for the first time since the COVID-19 pandemic, according to our annual *Refinery Capacity Report* (Figure 1). U.S. operable atmospheric crude oil distillation capacity, the primary measure of refinery capacity, totaled 18.1 million barrels per calendar day (b/cd) at the start of 2023, up by 117,000 b/cd (0.6%) from 17.9 million b/cd at the start of 2022.

Figure 1. U.S. atmospheric crude oil distillation capacity (2014 - 2023)
(million barrels per calendar day as of January 1)



Data source: U.S. Energy Information Administration, *Refinery Capacity Report*

We produce two measures of refinery capacity: barrels per calendar day and barrels per stream day (b/sd). Calendar-day capacity represents the operator's estimate of the input that a distillation unit can process in a 24-hour period under usual operating conditions, considering the effects of both planned and unplanned maintenance. Stream-day capacity reflects the maximum input that a distillation facility can process within a 24-hour period when running at full capacity with an optimal crude oil and products slate and with no allowance for downtime. Stream-day capacity is typically about 6% higher than calendar-day capacity.

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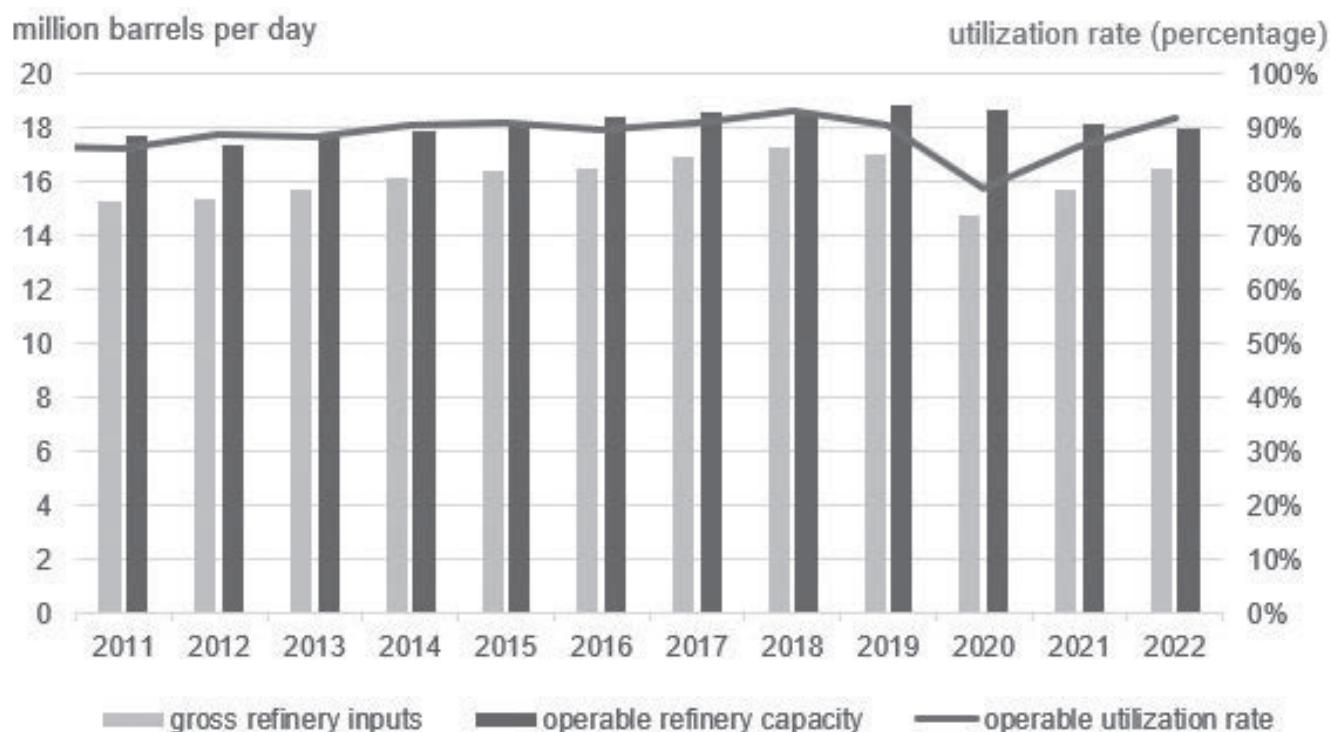
The number of operable refineries in the United States—including both idle and operating refineries—decreased to 129 refineries at the beginning of 2023, down from 130 refineries at the beginning of 2022. The single refinery closure reflects the loss of a small facility in Santa Maria, California, with 9,500 b/cd of crude oil distillation capacity. Despite the loss of the Santa Maria plant, overall capacity increased because PBF Energy reactivated a previously retired crude oil distillation unit at its Paulsboro, New Jersey, refinery. The unit's crude oil capacity increased from 100,000 b/cd in 2022 to 160,000 b/cd in 2023. Minor capacity increases reported by refineries in Alabama, Alaska, Indiana, Illinois, Kansas, Louisiana, Minnesota, Ohio, and Texas also contributed to the annual increase in 2023 compared with 2022. Minor decreases at existing facilities were reported in Montana and Washington.

The 2023 Refinery Capacity Report does not reflect changes in U.S. refining capacity that were not in effect as of January 1, 2023. ExxonMobil announced the completion of a major refinery capacity addition in mid-March, boosting the facility's total crude oil distillation capacity by 250,000 b/d to 630,000 barrels per day (b/d), according to the announcement. This new estimated capacity is reflected in our monthly data as of our May Petroleum Supply Monthly, and an exact measure in b/cd and b/sd will be included in next year's Refinery Capacity Report. Additional more recent expansion projects include a smaller crude oil capacity expansion at Marathon's Galveston Bay refinery and a coker expansion project at Valero's Port Arthur refinery, which are also not reflected in this year's report. Phillips 66 has announced plans to stop refining petroleum at its 120,200 b/cd Rodeo refinery in California while the facility transitions to refining biofuel, but it had still not terminated its refining operations as of January 1, 2023. LyondellBasell had previously announced that its 263,776 b/cd refinery in Houston would close by the end of 2023, but the company recently announced that it will delay the facility's shutdown until 2025, according to reports in late May 2023.

Three refinery sales took place in 2022. Deer Park Refining started out as a joint venture between Mexican state refiner Petróleos Mexicanos (PEMEX) and Shell, but last year, PEMEX gained complete control of the Houston-area facility after Shell sold its stake in the facility. Shell also sold its refinery in Saraland, Alabama, to Vertex Refining Alabama LLC. Lastly, Limetree Bay Refining sold its control of the decommissioned St. Croix refinery to Port Hamilton Refining and Transportation, although the sale has been the subject of legal disputes. HollyFrontier also completed its merger with Sinclair Oil last year, combining HollyFrontier's portfolio of facilities in Kansas, Oklahoma, New Mexico, Utah, and Washington with Sinclair's Wyoming facilities under a single firm, HF Sinclair.

As refinery inputs increased more than refinery capacity increased, annual refinery utilization in 2022 rose to 92%, the highest annual level since 2018. The increase also puts 2022 utilization slightly above pre-pandemic averages, as refiners increased production to offset lost supplies of petroleum products from Russia in both U.S. and European markets (Figure 2). Because we calculate refinery utilization by dividing total gross refinery inputs by total crude oil distillation capacity, decreases in capacity increase refinery utilization given nearly equal refinery input volume.

Figure 2. U.S. refinery inputs, capacity and utilization



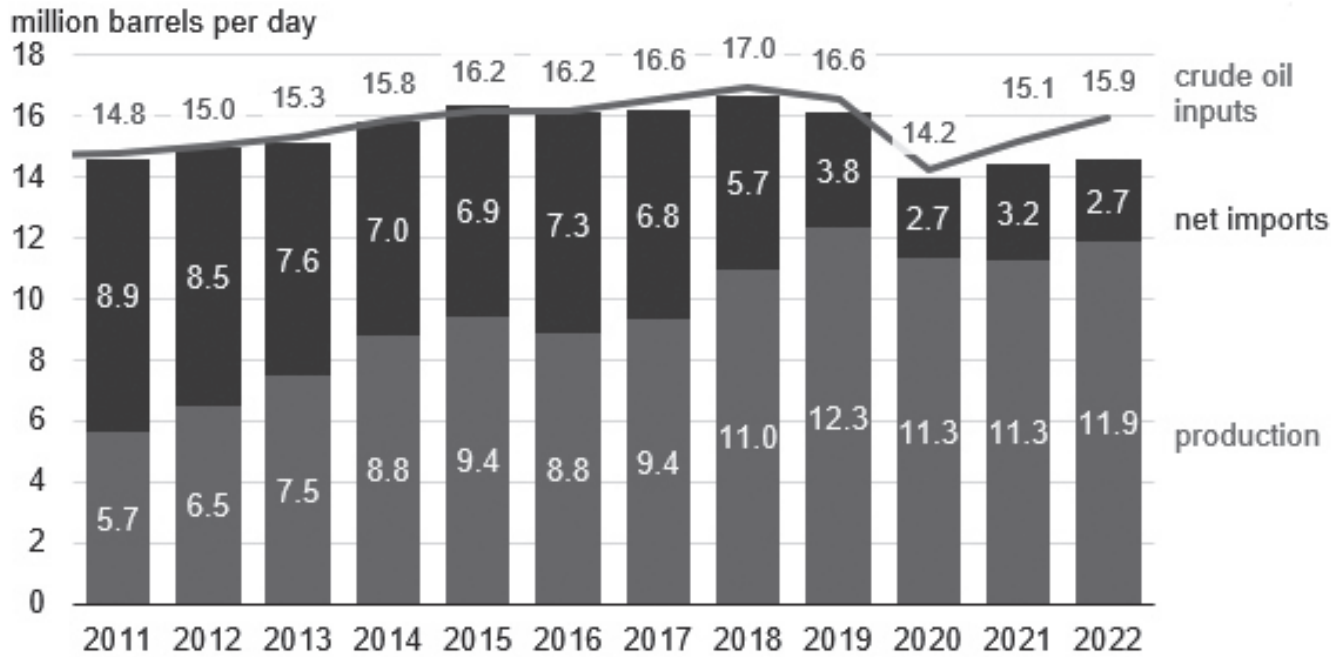
Data source: U.S. Energy Information Administration, *Petroleum Supply Monthly*

The U.S. refining fleet can maintain only a certain level of utilization to account for necessary maintenance, unforeseen disruptions, and general safety, which makes running at 100% utilization of capacity for a sustained period extremely difficult. The average annual refinery utilization over the last 10 years (2013-2022) was about 89%, and the maximum for any individual year during that period was 93% in 2018, just slightly above 2022 levels. Utilization was relatively high last year as refiners faced pressure to produce greater quantities of petroleum products like motor gasoline and diesel at a time of lower global refinery capacity and changing global petroleum trade flows. Capacity expansions coming online this year should ease the pressure on refiners to operate at higher utilization to meet current U.S. and global refined product demand.

Net inputs of crude oil to U.S. refineries averaged 15.9 million b/d in 2022, a 0.8 million b/d (5%) increase from 2021 and 1.7 million b/d (12%) uptick from 2020 – the lowest level of annual refinery inputs in more than a decade (Figure 3). Crude oil runs in 2022 remained below 2019 by 0.6 million b/d (4%). The increase in crude oil runs in 2022 was primarily met by more domestic crude oil production, although imports of crude oil also increased. However, exports increased more than imports, leading to a decrease in crude oil net imports compared with 2021. High volumes of crude oil releases from the Strategic Petroleum Reserve (SPR) in 2022 also served as a source of crude oil supply available to refiners.

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Figure 3. U.S. crude oil production, net imports, and crude oil inputs to refineries (2011-2022)



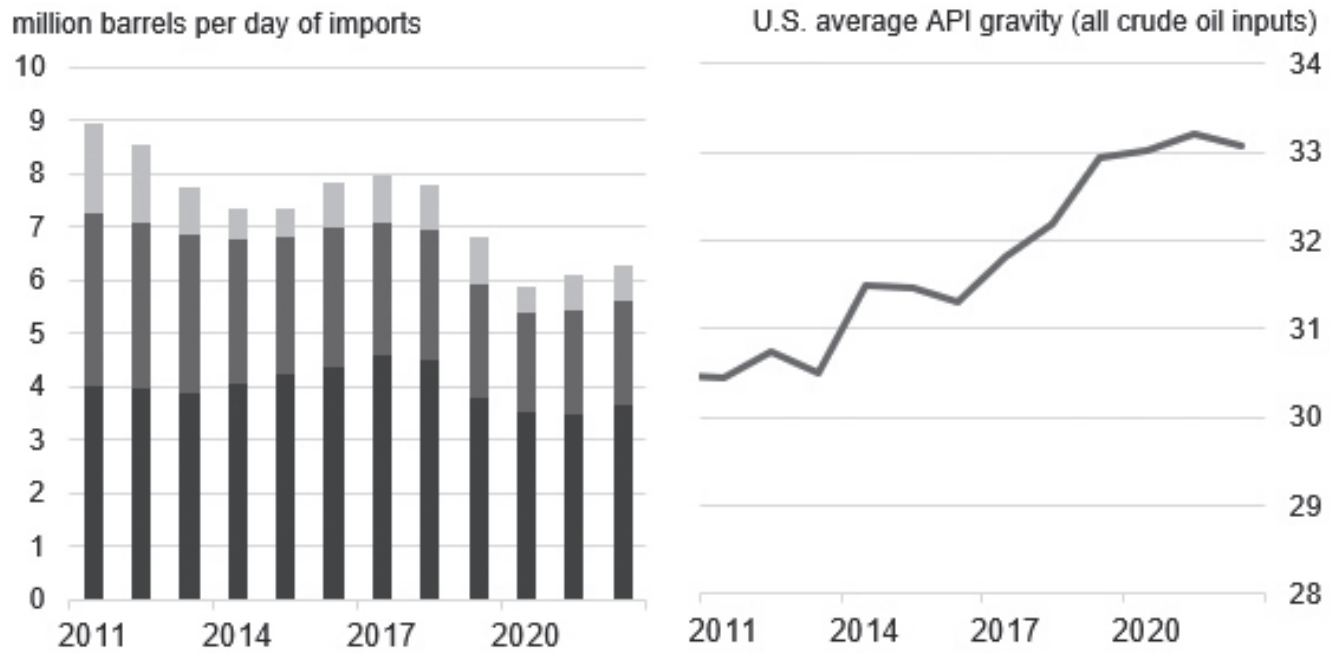
Data source: U.S. Energy Information Administration, *Petroleum Supply Monthly*

Note: Differences between crude oil inputs and the sum of production and net imports reflect inventory changes and unaccounted for crude oil.

As the United States increased domestic crude oil production over the past decade, the average density of U.S. crude oil became lighter, measured by increasing API gravity. U.S. refineries with substantial secondary conversion capacity, particularly those along the U.S. Gulf Coast (PADD 3), can process denser crude oil grades, which have a low API gravity and high sulfur content. However, many U.S. refineries (particularly those on the Gulf Coast) are geographically well-positioned to take advantage of increasing domestic production of lighter crude oil grades. Gradually declining crude oil imports from Venezuela, before sanctions banning that country's primarily heavy-grade crude oils also contributed to the lighter crude oil slate in the United States. Last year, Chevron received permission from the Treasury Department to return to operations in Venezuela, and the U.S. resumed small volumes of Venezuelan crude oil imports in January 2023. This trend increased the average weighted API of U.S. crude oil inputs to 33.2 in 2021 compared with 33.0 in 2020, 32.9 in 2019, and 30.4 in 2011. In 2022, the average API gravity of U.S. crude oil inputs decreased slightly to 33.1.

When refined, lighter crude oil grades produce larger yields of more valuable petroleum products such as gasoline, naphtha, distillates, and jet fuel. As a result, lighter crude oil grades often have a price premium compared with heavier grades, which produce more asphalt and residual fuel oil and tend to sell at a discount. Secondary conversion units, such as catalytic cracking, catalytic hydrocracking, and thermal cracking (or coking) units, enable refiners to transform low value residuals from heavier crude oil grades into more high-value products. West Texas Intermediate (WTI), the U.S. benchmark crude oil grade, is a light crude oil with an API gravity of about 40, but many U.S. refiners still import discounted heavier crude oils for use in secondary conversion units (Figure 4).

Figure 4. U.S. crude oil imports by API gravity



Data source: U.S. Energy Information Administration, *Monthly Imports Report, Crude Oil Input Qualities*

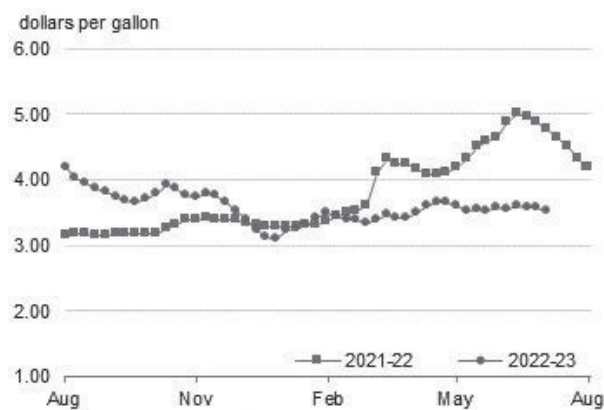
Note: U.S. average API gravity (all crude oil runs) is a weighted average and accounts for domestic and imported crude oil.

As of January 2023, U.S. catalytic cracking capacity decreased by 0.7%, and catalytic hydrocracking capacity decreased by 1.5% from January 2022; however, catalytic reforming capacity increased by 1.0% from the previous January. Desulfurization capacity, which is used to bring gasoline and diesel fuel into compliance with on-road emissions standards, also increased by 0.6%. Aromatics production capacity decreased by 6.6%.

For questions about This Week in Petroleum, contact the Petroleum and Liquid Fuels Markets Team at 202.586.5840.

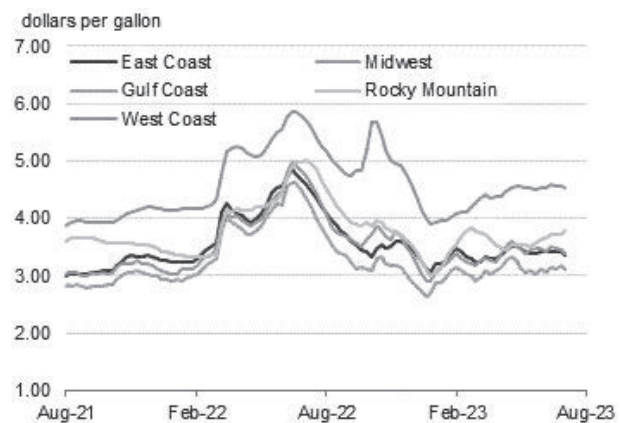
Retail prices (dollars per gallon)

U.S. regular gasoline prices



Data source: U.S. Energy Information Administration

Retail average regular gasoline prices

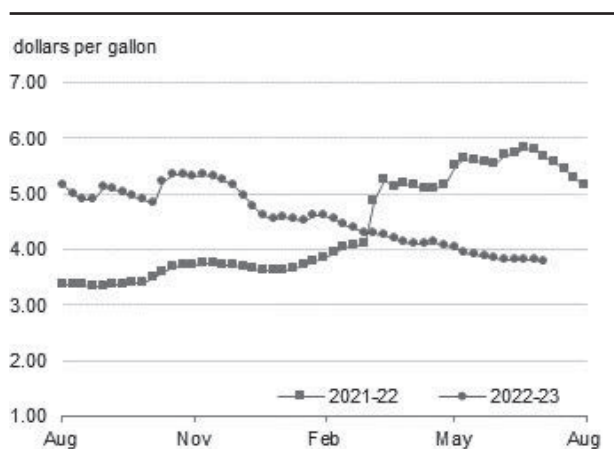


Data source: U.S. Energy Information Administration

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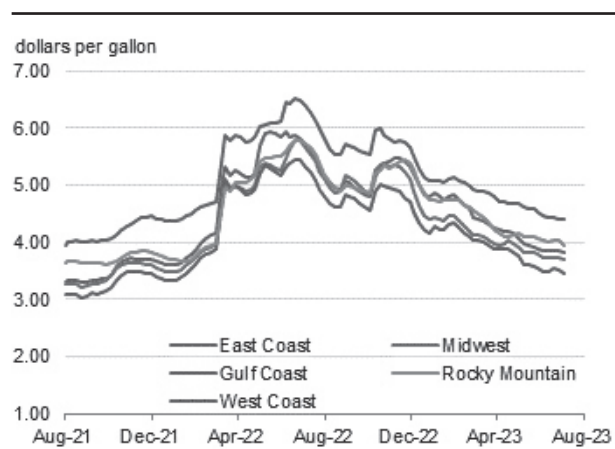
Gasoline	Retail prices 07/03/23	Change from last Week	Change from last Year
U.S.	3.527	-0.044	-1.244
East Coast	3.372	-0.033	-1.219
Midwest	3.389	-0.063	-1.340
Gulf Coast	3.108	-0.082	-1.243
Rocky Mountains	3.790	0.056	-1.211
West Coast	4.533	-0.023	-1.161

U.S. on-highway diesel fuel prices



Data source: U.S. Energy Information Administration

Regional average all-type diesel fuel prices

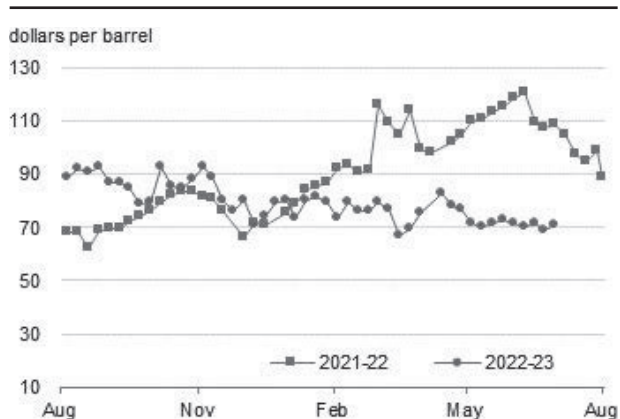


Data source: U.S. Energy Information Administration

Diesel	Retail prices 07/03/23	Change from last Week	Change from last Year
U.S.	3.767	-0.034	-1.908
East Coast	3.811	-0.042	-1.902
Midwest	3.704	-0.030	-1.943
Gulf Coast	3.468	-0.042	-1.862
Rocky Mountains	3.950	-0.072	-1.782
West Coast	4.412	-0.003	-1.977

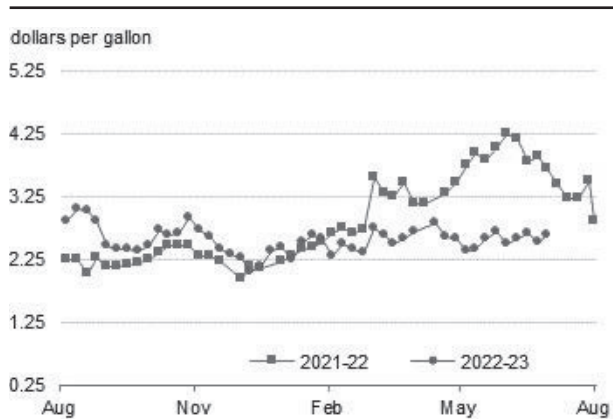
Retail prices (dollars per gallon)

Crude oil futures price contract 1



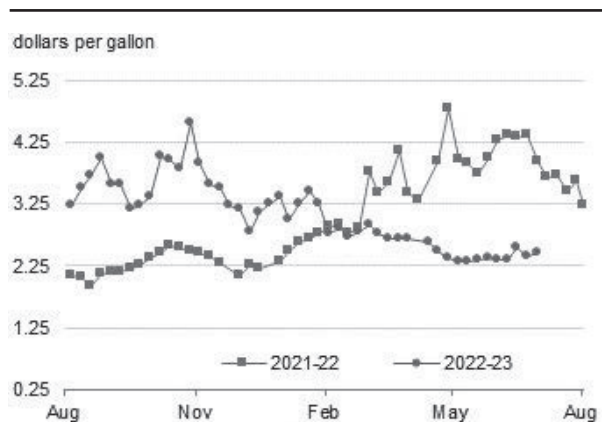
Data source: U.S. Energy Information Administration, New York Mercantile Exchange (NYMEX)

RBOB gasoline futures prices contract 1



Data source: U.S. Energy Information Administration, Refinitiv An LSEG Business

Heating oil futures price contract 1



Data source: U.S. Energy Information Administration, Refinitiv An LSEG Business

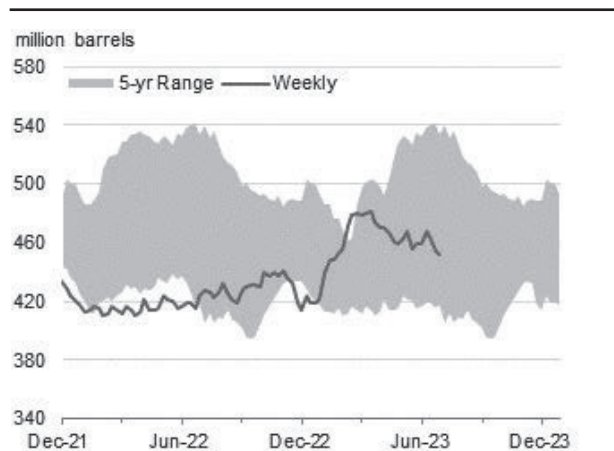
	Future prices 06/30/23	Change from last Week	Change from last Year
U.S.	70.64	1.48	-37.79
East Coast	2.634	0.117	-1.054
Midwest	2.448	0.041	-1.491

*Note: Crude oil price in dollars per barrel.

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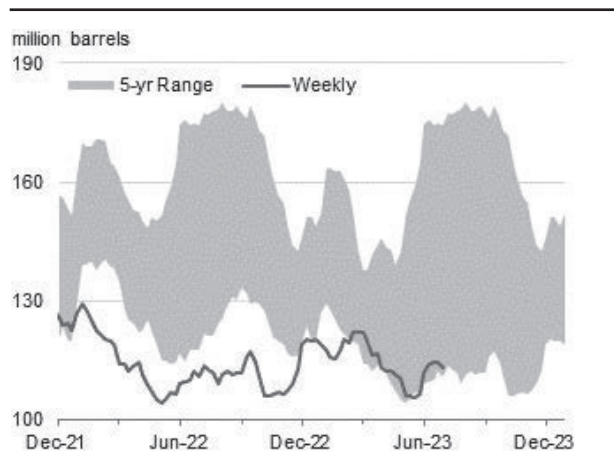
Stocks (million barrels)

U.S. crude oil stocks



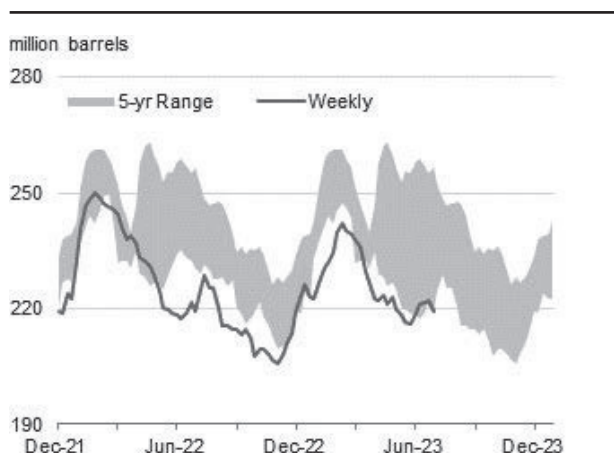
Data source: U.S. Energy Information Administration

U.S. distillate stocks



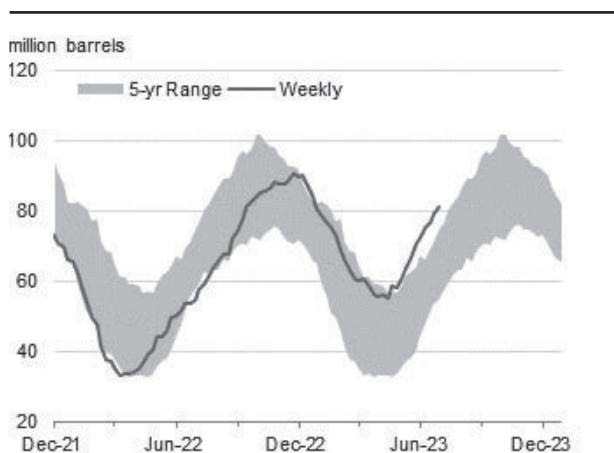
Data source: U.S. Energy Information Administration

U.S. gasoline stocks



Data source: U.S. Energy Information Administration

U.S. propane/propylene stocks



Data source: U.S. Energy Information Administration

	Stocks 06/30/23	Change from last Week	Change from last Year
Crude oil	452.2	-1.5	28.4
Gasoline	219.5	-2.5	0.3
Distillate	113.4	-1.0	2.2
Propane	81.119	1.572	26.208

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Table 1. Number and Capacity of Operable Petroleum Refineries by PAD District and State as of January 1, 2023

PAD District and State	Number of Operable Refineries			Atmospheric Crude Oil Distillation Capacity					
				Barrels per Calendar Day			Barrels per Stream Day		
	Total	Operating	Idle ^a	Total	Operating	Idle ^b	Total	Operating	Idle ^b
PAD District I	7	7	0	877,800	877,800	0	930,900	930,900	0
Delaware.....	1	1	0	171,000	171,000	0	180,000	180,000	0
New Jersey.....	2	2	0	418,500	418,500	0	438,100	438,100	0
Pennsylvania.....	3	3	0	266,000	266,000	0	289,800	289,800	0
West Virginia.....	1	1	0	22,300	22,300	0	23,000	23,000	0
PAD District II	25	22	3	4,206,105	3,948,885	257,220	4,464,787	4,179,287	285,500
Illinois.....	4	4	0	1,043,485	1,043,485	0	1,100,800	1,100,800	0
Indiana.....	2	2	0	469,500	469,500	0	475,700	475,700	0
Kansas.....	3	3	0	404,600	404,600	0	416,767	416,767	0
Kentucky.....	1	1	0	291,000	291,000	0	306,000	306,000	0
Michigan.....	1	1	0	140,000	140,000	0	152,000	152,000	0
Minnesota.....	2	2	0	440,000	440,000	0	485,000	485,000	0
North Dakota.....	1	1	0	71,000	71,000	0	74,000	74,000	0
Ohio.....	4	3	1	604,720	455,800	148,920	630,000	470,000	160,000
Oklahoma.....	5	4	1	523,800	453,500	70,300	569,520	494,020	75,500
Tennessee.....	1	1	0	180,000	180,000	0	205,000	205,000	0
Wisconsin.....	1	0	1	38,000	0	38,000	50,000	0	50,000
PAD District III	56	56	0	9,676,729	9,676,729	0	10,276,994	10,276,994	0
Alabama.....	3	3	0	142,100	142,100	0	148,700	148,700	0
Arkansas.....	2	2	0	90,500	90,500	0	92,700	92,700	0
Louisiana.....	15	15	0	2,964,220	2,964,220	0	3,116,355	3,116,355	0
Mississippi.....	3	3	0	393,940	393,940	0	415,000	415,000	0
New Mexico.....	1	1	0	110,000	110,000	0	124,000	124,000	0
Texas.....	32	32	0	5,975,969	5,975,969	0	6,380,239	6,380,239	0
PAD District IV	15	13	2	650,164	537,564	112,600	696,200	574,500	121,700
Colorado.....	2	0	2	103,000	0	103,000	111,700	0	111,700
Montana.....	4	4	0	214,600	205,000	9,600	223,400	213,400	10,000
Utah.....	5	5	0	206,714	206,714	0	217,200	217,200	0
Wyoming.....	4	4	0	125,850	125,850	0	143,900	143,900	0
PAD District V	26	26	0	2,649,571	2,643,571	6,000	2,787,900	2,779,900	8,000
Alaska.....	5	5	0	165,500	165,500	0	180,000	180,000	0
California.....	14	14	0	1,740,371	1,734,371	6,000	1,835,400	1,827,400	8,000
Hawaii.....	1	1	0	93,500	93,500	0	95,000	95,000	0
Nevada.....	1	1	0	2,000	2,000	0	5,000	5,000	0
Washington.....	5	5	0	648,200	648,200	0	672,500	672,500	0
U.S. Total	129	124	5	18,060,369	17,684,549	375,820	19,156,781	18,741,581	415,200

Table 1. Number and Capacity of Operable Petroleum Refineries by PAD District and State as of January 1, 2023

PAD District and State	Downstream Charge Capacity (Barrels per Stream Day)							
	Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Hydro-Cracking	Catalytic Reforming	Hydrotreating/Desulfurization	Fuels Solvent Deasphalting
			Fresh	Recycled				
PAD District I	391,200	54,500	305,000	5,000	48,000	182,900	754,800	22,000
Delaware	104,600	54,500	82,000	4,000	25,000	43,000	180,300	0
New Jersey	165,000	0	145,000	0	0	69,000	298,100	22,000
Pennsylvania	113,000	0	78,000	1,000	23,000	66,200	252,300	0
West Virginia	8,600	0	0	0	0	4,700	24,100	0
PAD District II	1,855,542	607,805	1,362,435	8,800	361,500	903,658	4,196,664	18,500
Illinois	491,800	213,420	324,300	0	101,200	250,100	976,610	0
Indiana	290,700	102,000	185,800	200	0	73,500	619,100	0
Kansas	162,500	75,000	104,800	500	43,000	84,500	406,400	0
Kentucky	134,000	0	104,000	0	0	58,000	280,000	14,000
Michigan	90,500	38,000	44,000	0	0	21,500	135,000	0
Minnesota	284,000	82,000	127,000	2,500	67,000	72,500	454,500	4,500
North Dakota	0	0	28,000	3,600	0	12,500	60,400	0
Ohio	164,500	59,000	206,300	0	109,800	172,300	523,400	0
Oklahoma	214,042	38,385	156,912	2,000	14,000	113,458	571,754	0
Tennessee	0	0	70,000	0	26,500	36,000	129,000	0
Wisconsin	23,500	0	11,323	0	0	9,300	40,500	0
PAD District III	4,696,325	1,661,207	2,829,567	16,500	1,387,300	1,844,480	9,162,858	258,500
Alabama	55,000	38,000	0	0	23,000	40,000	120,700	0
Arkansas	48,850	0	21,000	0	0	15,300	98,750	0
Louisiana	1,539,100	577,000	946,000	3,500	456,900	569,400	2,681,200	72,000
Mississippi	354,875	104,000	88,000	0	119,000	101,600	307,300	0
New Mexico	34,300	0	30,000	0	18,000	24,000	118,000	18,000
Texas	2,664,200	942,207	1,744,567	13,000	770,400	1,094,180	5,836,908	168,500
PAD District IV	239,000	76,000	209,860	1,990	37,200	120,550	561,750	6,000
Colorado	33,500	0	30,000	500	0	21,900	87,430	0
Montana	119,600	46,000	67,160	990	6,200	35,500	213,820	0
Utah	34,900	10,000	72,700	0	15,000	38,250	146,700	6,000
Wyoming	51,000	20,000	40,000	500	16,000	24,900	113,800	0
PAD District V	1,422,106	562,400	758,900	16,600	557,600	554,000	2,422,900	80,000
Alaska	26,000	0	0	0	13,000	13,500	24,500	0
California	1,033,256	464,600	611,500	13,600	459,600	385,500	1,857,500	56,000
Hawaii	40,000	11,000	0	0	20,000	13,500	13,000	0
Nevada	2,750	0	0	0	0	0	0	0
Washington	320,100	86,800	147,400	3,000	65,000	141,500	527,900	24,000
U.S. Total	8,604,173	2,961,912	5,465,762	48,890	2,391,600	3,605,588	17,098,972	385,000

^a Refineries where distillation units were completely idle but not permanently shutdown on January 1, 2023.

^b Includes capacity from refineries that are either completely or partially idle.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

Table 2. Production Capacity of Operable Petroleum Refineries by PAD District and State as of January 1, 2023 (Barrels per Stream Day, Except Where Noted)

PAD District and State	Production Capacity							
	Alkylates	Aromatics	Asphalt and Road Oil	Isomers	Lubricants	Marketable Petroleum Coke	Hydrogen ^a (MMcfd)	Sulfur (short tons/day)
PAD District I	47,800	5,191	45,260	19,280	20,945	13,620	109	1,074
Delaware	12,500	5,191	0	6,000	0	13,620	65	596
New Jersey	18,800	0	21,000	4,000	12,000	0	31	320
Pennsylvania	16,500	0	23,560	9,280	2,945	0	10	157
West Virginia	0	0	700	0	6,000	0	3	1
PAD District II	305,736	112,600	275,400	168,000	9,900	194,354	623	8,732
Illinois	96,600	17,200	45,100	16,000	0	74,690	202	2,380
Indiana	34,400	16,800	33,200	31,400	0	30,000	0	1,913
Kansas	34,000	0	4,000	31,000	0	23,064	120	831
Kentucky	22,500	2,500	35,400	19,000	0	0	0	448
Michigan	8,000	0	32,000	0	0	12,850	0	460
Minnesota	21,000	0	62,000	33,500	0	28,400	209	1,339
North Dakota	5,000	0	0	0	0	0	0	15
Ohio	29,950	20,000	26,000	23,200	0	16,300	0	922
Oklahoma	35,586	21,000	21,700	13,900	9,900	9,050	62	275
Tennessee	17,000	29,000	0	0	0	0	30	116
Wisconsin	1,700	6,100	16,000	0	0	0	0	33
PAD District III	667,393	171,665	227,625	335,770	192,900	490,393	747	24,125
Alabama	0	0	26,000	5,650	0	7,500	45	228
Arkansas	5,000	0	21,300	8,000	6,000	0	13	90
Louisiana	214,500	34,400	103,000	115,720	66,000	164,436	118	6,053
Mississippi	22,000	15,600	16,125	0	48,000	35,500	242	1,264
New Mexico	9,500	0	7,000	0	0	0	38	224
Texas	416,393	121,665	54,200	206,400	72,900	282,957	291	16,266
PAD District IV	45,050	0	62,000	16,068	0	23,780	208	910
Colorado	0	0	13,200	0	0	0	22	116
Montana	17,150	0	39,000	6,750	0	15,480	134	489
Utah	21,600	0	1,800	9,318	0	2,500	0	92
Wyoming	6,300	0	8,000	0	0	5,800	52	213
PAD District V	235,562	1,500	49,050	228,400	39,800	161,173	1,188	5,596
Alaska	0	0	12,500	5,000	0	0	13	25
California	193,362	1,500	25,950	180,800	39,800	137,523	971	4,728
Hawaii	0	0	0	0	0	0	18	38
Nevada	0	0	1,600	0	0	0	0	0
Washington	42,200	0	9,000	42,600	0	23,650	186	805
U.S. Total	1,301,541	290,956	659,335	767,518	263,545	883,320	2,875	40,437

^a Includes hydrogen production capacity of hydrogen plants on refinery grounds and operated by the refinery operator.

MMcfd = Million cubic feet per day.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

Directory of Operable Petroleum Refineries on Tables 3 and 4

Refiner	State(s)	Refiner	State(s)
Alon Refining Krotz Springs Inc.....	LA	Lazarus Energy LLC.....	TX
Alon USA Energy Inc.....	TX	Lima Refining Company.....	OH
American Refining Group Inc.....	PA	Lion Oil Co.....	AR
BP Products North America Inc.....	IN, WA	Lunday Thagard Co.....	CA
BP-Husky Refining LLC.....	OH	Magellan Processing LP.....	TX
Big West Oil Co.....	UT	Marathon Petroleum Co LP.....	IL, KY, LA, MI, OH, TX
Buckeye Texas Processing LLC.....	TX	Martinez Refining Co LLC.....	CA
CHS McPherson Refinery Inc.....	KS	Monroe Energy LLC.....	PA
Calcasieu Refining Co.....	LA	Motiva Enterprises LLC.....	TX
Calumet Cotton Valley Refining LLC.....	LA	PDV Midwest Refining LLC.....	IL
Calumet Montana Refining LLC.....	MT	Par Hawaii Refining LLC.....	HI
Calumet Princeton Refining LLC.....	LA	Pasadena Refining Systems Inc.....	TX
Calumet Shreveport Refining LLC.....	LA	Paulsboro Refining Co LLC.....	NJ
Cenex Harvest States Coop.....	MT	Petro Star Inc.....	AK
Chalmette Refining LLC.....	LA	Petromax Refining Co LLC.....	TX
Chevron USA Inc.....	CA, MS, UT	Phillips 66 Company.....	CA, LA, MT, NJ, OK, TX, WA
Citgo Petroleum Corp.....	LA	Placid Refining Co.....	LA
Citgo Refining & Chemical Inc.....	TX	Premcor Refining Group Inc.....	TX
Coffeyville Resources Rfg & Mktg.....	KS	San Joaquin Refining Co Inc.....	CA
ConocoPhillips Alaska Inc.....	AK	Shell Oil Products US.....	LA
Countrymark Refining & Logistics LLC.....	IN	Silver Eagle Refining.....	UT, WY
Cross Oil Refining & Marketing Inc.....	AR	South Hampton Resources Inc.....	TX
Deer Park Refining LP.....	TX	St Paul Park Refining Co LLC.....	MN
Delaware City Refining Co LLC.....	DE	Suncor Energy (USA) Inc.....	CO
Delek Refining LTD.....	TX	Superior Refining Company LLC.....	WI
Diamond Shamrock Refining Co LP.....	TX	Talley Asphalt Products Inc.....	CA
Equistar Chemicals LP.....	TX	Tesoro Alaska Company LLC.....	AK
Ergon Refining Inc.....	MS	Tesoro Refining & Marketing Co.....	CA, ND, UT, WA
Ergon West Virginia Inc.....	WV	Texas International Terminals.....	TX
Excel Paralubes.....	LA	The San Antonio Refinery LLC.....	TX
ExxonMobil Refining & Supply Co.....	IL, LA, MT, TX	Toledo Refining Co LLC.....	OH
Flint Hills Resources LP.....	MN, TX	Torrance Refining Co LLC.....	CA
Foreland Refining Corp.....	NV	TotalEnergies Petrochem & Refg USA.....	TX
Goodway Refining LLC.....	AL	US Oil & Refining Co.....	WA
HF Sinclair Casper Refining Company.....	WY	Ultramar Inc.....	CA
HF Sinclair El Dorado Refining LLC.....	KS	United Refining Co.....	PA
HF Sinclair Navajo Refining LLC.....	NM	Valero Ref Company Tennessee LLC.....	TN
HF Sinclair Puget Sound Refg LLC.....	WA	Valero Refining - Meraux LLC.....	LA
HF Sinclair Tulsa Refining LLC.....	OK	Valero Refining Co California.....	CA
HF Sinclair Woods Cross Refining LLC.....	UT	Valero Refining Co Oklahoma.....	OK
HF Sinclair Wyoming Refining Co.....	WY	Valero Refining Co Texas LP.....	TX
Hartree Channelview LLC.....	TX	Valero Refining New Orleans LLC.....	LA
Hilcorp North Slope LLC.....	AK	Vertex Refining Alabama LLC.....	AL
Houston Refining LP.....	TX	WRB Refining LP.....	IL, TX
Hunt Refining Co.....	AL	Western Refining Company LP.....	TX
Hunt Southland Refining Co.....	MS	Wynnewood Refining Co.....	OK
Kern Oil & Refining Co.....	CA	Wyoming Refining Co.....	WY
Kinder Morgan Crude & Condensate.....	TX		

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking			
	Operating	Idle	Operating	Idle		Delayed Coking	Fluid Coking	Visbreaking	Other/Gas Oil
Alabama	142,100	0	148,700	0	55,000	38,000	0	0	0
Goodway Refining LLC Atmore	4,100	0	5,000	0	0	0	0	0	0
Hunt Refining Co Tuscaloosa	50,000	0	52,500	0	26,000	38,000	0	0	0
Vertex Refining Alabama LLC Saraland (Formerly Shell Chemical LP)	88,000	0	91,200	0	29,000	0	0	0	0
Alaska	165,500	0	180,000	0	26,000	0	0	0	0
ConocoPhillips Alaska Inc Prudhoe Bay	15,000	0	16,000	0	0	0	0	0	0
Hilcorp North Slope LLC Prudhoe Bay	6,500	0	8,000	0	0	0	0	0	0
Petro Star Inc North Pole	21,000	0	24,000	0	0	0	0	0	0
Valdez	55,000	0	60,000	0	0	0	0	0	0
Tesoro Alaska Company LLC Kenai	68,000	0	72,000	0	26,000	0	0	0	0
Arkansas	90,500	0	92,700	0	48,850	0	0	0	0
Cross Oil Refining & Marketing Inc Smackover	7,500	0	7,700	0	3,850	0	0	0	0
Lion Oil Co El Dorado	83,000	0	85,000	0	45,000	0	0	0	0
California	1,734,371	6,000	1,827,400	8,000	1,033,256	407,600	52,000	5,000	0
Chevron USA Inc El Segundo	269,000	0	290,500	0	169,100	76,700	0	0	0
Richmond	245,271	0	257,200	0	123,456	0	0	0	0
Kern Oil & Refining Co Bakersfield	26,000	0	27,000	0	0	0	0	0	0
Lunday Thagard Co South Gate	8,500	0	10,000	0	5,000	0	0	0	0
Martinez Refining Co LLC Martinez	156,400	0	157,000	0	101,000	26,800	22,500	0	0
Phillips 66 Company Rodeo	114,200	6,000	120,000	8,000	93,200	51,000	0	0	0
Wilmington	139,000	0	147,000	0	83,400	53,200	0	0	0
San Joaquin Refining Co Inc Bakersfield	15,000	0	25,000	0	14,300	0	0	5,000	0
Talley Asphalt Products Inc Kern	1,700	0	2,000	0	0	0	0	0	0
Tesoro Refining & Marketing Co Carson	363,000	0	382,000	0	205,000	109,100	0	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Catalytic Cracking		Catalytic Hydrocracking			Catalytic Reforming		Fuels Solvent Deasphalting
	Fresh	Recycled	Distillate	Gas Oil	Residual	Low Pressure	High Pressure	
Alabama	0	0	0	23,000	0	18,000	22,000	0
Goodway Refining LLC Atmore	0	0	0	0	0	0	0	0
Hunt Refining Co Tuscaloosa	0	0	0	23,000	0	18,000	0	0
Vertex Refining Alabama LLC Saraland (Formerly Shell Chemical LP)	0	0	0	0	0	0	22,000	0
Alaska	0	0	0	13,000	0	13,500	0	0
ConocoPhillips Alaska Inc Prudhoe Bay	0	0	0	0	0	0	0	0
Hilcorp North Slope LLC Prudhoe Bay	0	0	0	0	0	0	0	0
Petro Star Inc North Pole	0	0	0	0	0	0	0	0
Valdez	0	0	0	0	0	0	0	0
Tesoro Alaska Company LLC Kenai	0	0	0	13,000	0	13,500	0	0
Arkansas	21,000	0	0	0	0	15,300	0	0
Cross Oil Refining & Marketing Inc Smackover	0	0	0	0	0	0	0	0
Lion Oil Co El Dorado	21,000	0	0	0	0	15,300	0	0
California	611,500	13,600	232,200	227,400	0	171,800	213,700	56,000
Chevron USA Inc El Segundo	73,800	0	0	55,000	0	49,000	0	0
Richmond	90,000	0	0	103,400	0	71,300	0	56,000
Kern Oil & Refining Co Bakersfield	0	0	0	0	0	2,500	3,300	0
Lunday Thagard Co South Gate	0	0	0	0	0	0	0	0
Martinez Refining Co LLC Martinez	72,000	0	42,900	0	0	31,000	0	0
Phillips 66 Company Rodeo	0	0	0	69,000	0	0	34,000	0
Wilmington	51,600	0	27,500	0	0	0	36,200	0
San Joaquin Refining Co Inc Bakersfield	0	0	0	0	0	0	0	0
Talley Asphalt Products Inc Kern	0	0	0	0	0	0	0	0
Tesoro Refining & Marketing Co Carson	102,500	0	99,500	0	0	0	83,000	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Desulfurization (incl. Catalytic Hydrotreating)							
	Naphtha/ Reformer Feed	Gasoline	Kerosene/ Jet Fuel	Diesel Fuel	Other Distillate	Residual	Heavy Gas Oil	Other
Alabama	44,200	0	21,500	17,000	27,500	0	10,500	0
Goodway Refining LLC Atmore	0	0	0	0	0	0	0	0
Hunt Refining Co Tuscaloosa	17,500	0	3,500	0	27,500	0	10,500	0
Vertex Refining Alabama LLC Saraland (Formerly Shell Chemical LP)	26,700	0	18,000	17,000	0	0	0	0
Alaska	13,000	0	0	11,500	0	0	0	0
ConocoPhillips Alaska Inc Prudhoe Bay	0	0	0	0	0	0	0	0
Hilcorp North Slope LLC Prudhoe Bay	0	0	0	0	0	0	0	0
Petro Star Inc North Pole Valdez	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Tesoro Alaska Company LLC Kenai	13,000	0	0	11,500	0	0	0	0
Arkansas	20,000	8,750	0	35,000	0	0	21,000	14,000
Cross Oil Refining & Marketing Inc Smackover	0	0	0	0	0	0	0	6,000
Lion Oil Co El Dorado	20,000	8,750	0	35,000	0	0	21,000	8,000
California	397,700	215,000	203,800	252,100	81,100	0	637,600	70,200
Chevron USA Inc El Segundo Richmond	62,500 57,600	0 64,800	41,500 96,000	51,500 64,800	14,000 0	0 0	74,000 65,000	0 34,000
Kern Oil & Refining Co Bakersfield	5,000	0	0	0	9,000	0	0	0
Lunday Thagard Co South Gate	0	0	0	0	0	0	0	0
Martinez Refining Co LLC Martinez	28,000	90,000	0	0	49,500	0	80,500	14,500
Phillips 66 Company Rodeo Wilmington	27,500 50,800	0 0	0 12,900	0 32,000	0 0	0 0	0 55,000	0 0
San Joaquin Refining Co Inc Bakersfield	0	0	0	0	3,600	0	1,800	0
Talley Asphalt Products Inc Kern	0	0	0	0	0	0	0	0
Tesoro Refining & Marketing Co Carson	79,000	17,000	38,000	24,000	0	0	147,000	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking			
	Operating	Idle	Operating	Idle		Delayed Coking	Fluid Coking	Visbreaking	Other/Gas Oil
California	1,734,371	6,000	1,827,400	8,000	1,033,256	407,600	52,000	5,000	0
Torrance Refining Co LLC									
Torrance	160,000	0	166,200	0	102,300	62,000	0	0	0
Ultramar Inc									
Wilmington	85,000	0	87,000	0	46,000	28,800	0	0	0
Valero Refining Co California									
Benicia	145,000	0	150,000	0	85,500	0	29,500	0	0
Wilmington	6,300	0	6,500	0	5,000	0	0	0	0
Colorado	0	103,000	0	111,700	33,500	0	0	0	0
Suncor Energy (USA) Inc									
Commerce City East	0	36,000	0	38,700	8,500	0	0	0	0
Commerce City West	0	67,000	0	73,000	25,000	0	0	0	0
Delaware	171,000	0	180,000	0	104,600	0	54,500	0	0
Delaware City Refining Co LLC									
Delaware City	171,000	0	180,000	0	104,600	0	54,500	0	0
Hawaii	93,500	0	95,000	0	40,000	0	0	11,000	0
Par Hawaii Refining LLC									
Kapolei	93,500	0	95,000	0	40,000	0	0	11,000	0
Illinois	1,043,485	0	1,100,800	0	491,800	213,420	0	0	0
ExxonMobil Refining & Supply Co									
Joliet	251,800	0	275,000	0	142,100	57,500	0	0	0
Marathon Petroleum Co LP									
Robinson	253,000	0	266,000	0	76,000	31,000	0	0	0
PDV Midwest Refining LLC									
Lemont	182,685	0	192,300	0	77,200	41,220	0	0	0
WRB Refining LP									
Wood River	356,000	0	367,500	0	196,500	83,700	0	0	0
Indiana	469,500	0	475,700	0	290,700	102,000	0	0	0
BP Products North America Inc									
Whiting	435,000	0	440,000	0	276,200	102,000	0	0	0
Countrymark Refining & Logistics LLC									
Mount Vernon	34,500	0	35,700	0	14,500	0	0	0	0
Kansas	404,600	0	416,767	0	162,500	75,000	0	0	0
CHS McPherson Refinery Inc									
McPherson	110,600	0	115,767	0	51,500	27,500	0	0	0
Coffeyville Resources Rfg & Mktg									
Coffeyville	132,000	0	136,000	0	46,000	25,000	0	0	0
HF Sinclair El Dorado Refining LLC									
El Dorado (Formerly HollyFrontier El Dorado Refining LLC)	162,000	0	165,000	0	65,000	22,500	0	0	0
Kentucky	291,000	0	306,000	0	134,000	0	0	0	0
Marathon Petroleum Co LP									
Catlettsburg	291,000	0	306,000	0	134,000	0	0	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Catalytic Cracking		Catalytic Hydrocracking			Catalytic Reforming		Fuels Solvent Deasphalting
	Fresh	Recycled	Distillate	Gas Oil	Residual	Low Pressure	High Pressure	
California	611,500	13,600	232,200	227,400	0	171,800	213,700	56,000
Torrance Refining Co LLC Torrance	90,000	13,600	28,300	0	0	0	20,000	0
Ultramar Inc Wilmington	56,300	0	0	0	0	18,000	0	0
Valero Refining Co California Benicia	75,300	0	34,000	0	0	0	37,200	0
Wilmington	0	0	0	0	0	0	0	0
Colorado	30,000	500	0	0	0	21,900	0	0
Suncor Energy (USA) Inc Commerce City East	9,000	500	0	0	0	11,000	0	0
Commerce City West	21,000	0	0	0	0	10,900	0	0
Delaware	82,000	4,000	0	25,000	0	43,000	0	0
Delaware City Refining Co LLC Delaware City	82,000	4,000	0	25,000	0	43,000	0	0
Hawaii	0	0	2,000	18,000	0	13,500	0	0
Par Hawaii Refining LLC Kapolei	0	0	2,000	18,000	0	13,500	0	0
Illinois	324,300	0	0	101,200	0	214,300	35,800	0
ExxonMobil Refining & Supply Co Joliet	99,300	0	0	0	0	52,600	0	0
Marathon Petroleum Co LP Robinson	54,500	0	0	44,000	0	82,000	0	0
PDV Midwest Refining LLC Lemont	69,500	0	0	0	0	0	35,800	0
WRB Refining LP Wood River	101,000	0	0	57,200	0	79,700	0	0
Indiana	185,800	200	0	0	0	6,500	67,000	0
BP Products North America Inc Whiting	177,000	0	0	0	0	0	67,000	0
Countrymark Refining & Logistics LLC Mount Vernon	8,800	200	0	0	0	6,500	0	0
Kansas	104,800	500	0	43,000	0	61,000	23,500	0
CHS McPherson Refinery Inc McPherson	24,800	500	0	43,000	0	27,500	0	0
Coffeyville Resources Rfg & Mktg Coffeyville	36,000	0	0	0	0	26,000	0	0
HF Sinclair EI Dorado Refining LLC EI Dorado (Formerly HollyFrontier EI Dorado Refining LLC)	44,000	0	0	0	0	7,500	23,500	0
Kentucky	104,000	0	0	0	0	24,500	33,500	14,000
Marathon Petroleum Co LP Catlettsburg	104,000	0	0	0	0	24,500	33,500	14,000

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Desulfurization (incl. Catalytic Hydrotreating)							
	Naphtha/ Reformer Feed	Gasoline	Kerosene/ Jet Fuel	Diesel Fuel	Other Distillate	Residual	Heavy Gas Oil	Other
California	397,700	215,000	203,800	252,100	81,100	0	637,600	70,200
Torrance Refining Co LLC Torrance	25,300	0	0	19,800	0	0	108,300	0
Ultramar Inc Wilmington	32,000	0	0	45,000	0	0	67,000	0
Valero Refining Co California Benicia	30,000	43,200	15,400	15,000	5,000	0	39,000	21,700
Wilmington	0	0	0	0	0	0	0	0
Colorado	22,000	0	12,100	23,330	0	0	30,000	0
Suncor Energy (USA) Inc Commerce City East	11,000	0	0	0	0	0	0	0
Commerce City West	11,000	0	12,100	23,330	0	0	30,000	0
Delaware	58,800	33,000	16,500	52,000	0	0	0	20,000
Delaware City Refining Co LLC Delaware City	58,800	33,000	16,500	52,000	0	0	0	20,000
Hawaii	13,000	0	0	0	0	0	0	0
Par Hawaii Refining LLC Kapolei	13,000	0	0	0	0	0	0	0
Illinois	444,400	120,000	66,950	328,960	0	0	0	16,300
ExxonMobil Refining & Supply Co Joliet	177,800	0	0	88,000	0	0	0	0
Marathon Petroleum Co LP Robinson	71,000	46,000	0	83,500	0	0	0	0
PDV Midwest Refining LLC Lemont	111,300	0	13,700	97,160	0	0	0	6,800
WRB Refining LP Wood River	84,300	74,000	53,250	60,300	0	0	0	9,500
Indiana	134,200	103,700	51,400	137,800	0	0	192,000	0
BP Products North America Inc Whiting	122,700	97,000	51,400	121,500	0	0	192,000	0
Countrymark Refining & Logistics LLC Mount Vernon	11,500	6,700	0	16,300	0	0	0	0
Kansas	128,400	49,000	21,000	131,000	27,000	0	50,000	0
CHS McPherson Refinery Inc McPherson	42,400	0	0	47,000	0	0	0	0
Coffeyville Resources Rfg & Mktg Coffeyville	36,000	22,000	9,000	30,000	27,000	0	0	0
HF Sinclair El Dorado Refining LLC El Dorado (Formerly HollyFrontier El Dorado Refining LLC)	50,000	27,000	12,000	54,000	0	0	50,000	0
Kentucky	59,500	0	32,000	81,500	0	0	107,000	0
Marathon Petroleum Co LP Catlettsburg	59,500	0	32,000	81,500	0	0	107,000	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking			Other/Gas Oil
	Operating	Idle	Operating	Idle		Delayed Coking	Fluid Coking	Visbreaking	
Louisiana	2,964,220	0	3,116,355	0	1,539,100	565,200	0	0	11,800
Alon Refining Krotz Springs Inc Krotz Springs	80,000	0	83,000	0	36,200	0	0	0	0
Calcasieu Refining Co Lake Charles	135,500	0	137,000	0	36,000	0	0	0	0
Calumet Cotton Valley Refining LLC Cotton Valley	13,020	0	14,000	0	0	0	0	0	0
Calumet Princeton Refining LLC Princeton	8,300	0	8,655	0	7,000	0	0	0	0
Calumet Shreveport Refining LLC Shreveport	57,000	0	60,000	0	28,000	0	0	0	0
Chalmette Refining LLC Chalmette	190,000	0	197,000	0	169,000	42,000	0	0	0
Citgo Petroleum Corp Lake Charles	455,000	0	479,000	0	230,000	110,000	0	0	0
Excel Paralubes Westlake	0	0	0	0	0	0	0	0	0
ExxonMobil Refining & Supply Co Baton Rouge	522,500	0	544,600	0	254,000	123,500	0	0	0
Marathon Petroleum Co LP Garyville	596,000	0	627,000	0	299,000	110,000	0	0	0
Phillips 66 Company Westlake	264,000	0	273,000	0	125,000	65,200	0	0	11,800
Placid Refining Co Port Allen	75,000	0	82,500	0	27,000	0	0	0	0
Shell Oil Products US Norco	227,900	0	250,000	0	91,300	28,500	0	0	0
Valero Refining - Meraux LLC Meraux	125,000	0	125,600	0	56,600	0	0	0	0
Valero Refining New Orleans LLC Norco	215,000	0	235,000	0	180,000	86,000	0	0	0
Michigan	140,000	0	152,000	0	90,500	38,000	0	0	0
Marathon Petroleum Co LP Detroit	140,000	0	152,000	0	90,500	38,000	0	0	0
Minnesota	440,000	0	485,000	0	284,000	82,000	0	0	0
Flint Hills Resources LP Saint Paul	335,000	0	375,000	0	234,000	82,000	0	0	0
St Paul Park Refining Co LLC Saint Paul	105,000	0	110,000	0	50,000	0	0	0	0
Mississippi	393,940	0	415,000	0	354,875	104,000	0	0	0
Chevron USA Inc Pascagoula	356,440	0	375,200	0	330,000	104,000	0	0	0
Ergon Refining Inc Vicksburg	26,500	0	27,300	0	18,000	0	0	0	0
Hunt Southland Refining Co Sandersville	11,000	0	12,500	0	6,875	0	0	0	0
Montana	205,000	9,600	213,400	10,000	119,600	36,000	10,000	0	0
Calumet Montana Refining LLC Great Falls	15,000	9,600	17,000	10,000	10,000	0	0	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Catalytic Cracking		Catalytic Hydrocracking			Catalytic Reforming		Fuels Solvent Deasphalting
	Fresh	Recycled	Distillate	Gas Oil	Residual	Low Pressure	High Pressure	
Louisiana	946,000	3,500	55,000	401,900	0	473,200	96,200	72,000
Alon Refining Krotz Springs Inc Krotz Springs	34,000	0	0	0	0	0	13,000	0
Calcasieu Refining Co Lake Charles	0	0	0	0	0	0	0	0
Calumet Cotton Valley Refining LLC Cotton Valley	0	0	0	0	0	0	0	0
Calumet Princeton Refining LLC Princeton	0	0	0	0	0	0	0	0
Calumet Shreveport Refining LLC Shreveport	0	0	0	0	0	12,000	0	0
Chalmette Refining LLC Chalmette	75,600	0	0	0	0	22,700	30,000	0
Citgo Petroleum Corp Lake Charles	148,000	3,000	0	51,200	0	65,000	53,200	0
Excel Paralubes Westlake	0	0	0	43,000	0	0	0	0
ExxonMobil Refining & Supply Co Baton Rouge	243,000	0	27,000	0	0	80,000	0	0
Marathon Petroleum Co LP Garyville	150,000	0	0	130,000	0	137,000	0	38,000
Phillips 66 Company Westlake	51,600	0	0	0	0	48,000	0	0
Placid Refining Co Port Allen	25,000	500	0	0	0	11,500	0	12,000
Shell Oil Products US Norco	118,800	0	0	44,000	0	40,000	0	0
Valero Refining - Meraux LLC Meraux	0	0	0	48,700	0	32,000	0	22,000
Valero Refining New Orleans LLC Norco	100,000	0	28,000	85,000	0	25,000	0	0
Michigan	44,000	0	0	0	0	21,500	0	0
Marathon Petroleum Co LP Detroit	44,000	0	0	0	0	21,500	0	0
Minnesota	127,000	2,500	67,000	0	0	36,000	36,500	4,500
Flint Hills Resources LP Saint Paul	96,000	0	67,000	0	0	36,000	13,000	0
St Paul Park Refining Co LLC Saint Paul	31,000	2,500	0	0	0	0	23,500	4,500
Mississippi	88,000	0	0	119,000	0	61,600	40,000	0
Chevron USA Inc Pascagoula	88,000	0	0	119,000	0	61,600	40,000	0
Ergon Refining Inc Vicksburg	0	0	0	0	0	0	0	0
Hunt Southland Refining Co Sandersville	0	0	0	0	0	0	0	0
Montana	67,160	990	6,200	0	0	12,500	23,000	0
Calumet Montana Refining LLC Great Falls	3,000	0	0	0	0	0	1,300	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Desulfurization (incl. Catalytic Hydrotreating)							
	Naphtha/ Reformer Feed	Gasoline	Kerosene/ Jet Fuel	Diesel Fuel	Other Distillate	Residual	Heavy Gas Oil	Other
Louisiana	602,200	756,900	208,100	808,800	0	13,500	266,700	25,000
Alon Refining Krotz Springs Inc Krotz Springs	14,000	18,000	0	0	0	0	0	0
Calcasieu Refining Co Lake Charles	0	0	0	0	0	0	0	0
Calumet Cotton Valley Refining LLC Cotton Valley	6,500	0	0	0	0	0	0	0
Calumet Princeton Refining LLC Princeton	0	0	0	0	0	0	0	0
Calumet Shreveport Refining LLC Shreveport	16,000	0	0	14,000	0	0	21,100	1,200
Chalmette Refining LLC Chalmette	42,000	46,000	0	35,000	0	0	65,600	0
Citgo Petroleum Corp Lake Charles	131,200	85,400	70,100	100,000	0	0	0	23,800
Excel Paralubes Westlake	0	0	0	0	0	0	0	0
ExxonMobil Refining & Supply Co Baton Rouge	79,000	261,000	0	215,800	0	0	0	0
Marathon Petroleum Co LP Garyville	124,500	126,000	85,000	181,000	0	0	106,000	0
Phillips 66 Company Westlake	50,000	63,500	38,000	62,000	0	13,500	50,000	0
Placid Refining Co Port Allen	12,000	20,000	0	25,000	0	0	0	0
Shell Oil Products US Norco	42,000	77,000	0	70,000	0	0	0	0
Valero Refining - Meraux LLC Meraux	40,000	0	15,000	40,000	0	0	0	0
Valero Refining New Orleans LLC Norco	45,000	60,000	0	66,000	0	0	24,000	0
Michigan	35,500	0	7,000	48,000	0	0	44,500	0
Marathon Petroleum Co LP Detroit	35,500	0	7,000	48,000	0	0	44,500	0
Minnesota	89,500	57,000	53,500	95,500	0	0	159,000	0
Flint Hills Resources LP Saint Paul	49,000	57,000	43,500	63,500	0	0	128,000	0
St Paul Park Refining Co LLC Saint Paul	40,500	0	10,000	32,000	0	0	31,000	0
Mississippi	60,800	0	34,000	38,000	0	0	104,000	70,500
Chevron USA Inc Pascagoula	60,800	0	34,000	35,500	0	0	104,000	50,000
Ergon Refining Inc Vicksburg	0	0	0	2,500	0	0	0	20,500
Hunt Southland Refining Co Sandersville	0	0	0	0	0	0	0	0
Montana	45,900	27,800	13,400	47,750	25,000	0	46,070	7,900
Calumet Montana Refining LLC Great Falls	2,750	0	0	7,000	0	0	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking			
	Operating	Idle	Operating	Idle		Delayed Coking	Fluid Coking	Visbreaking	Other/Gas Oil
Montana	205,000	9,600	213,400	10,000	119,600	36,000	10,000	0	0
Cenex Harvest States Coop Laurel	62,500	0	64,000	0	32,200	16,000	0	0	0
ExxonMobil Refining & Supply Co Billings	61,500	0	62,900	0	32,300	0	10,000	0	0
Phillips 66 Company Billings	66,000	0	69,500	0	45,100	20,000	0	0	0
Nevada	2,000	0	5,000	0	2,750	0	0	0	0
Foreland Refining Corp Ely	2,000	0	5,000	0	2,750	0	0	0	0
New Jersey	418,500	0	438,100	0	165,000	0	0	0	0
Paulsboro Refining Co LLC Paulsboro	160,000	0	166,000	0	90,000	0	0	0	0
Phillips 66 Company Linden	258,500	0	272,100	0	75,000	0	0	0	0
New Mexico	110,000	0	124,000	0	34,300	0	0	0	0
HF Sinclair Navajo Refining LLC Artesia (Formerly HollyFrontier Navajo Refining LLC)	110,000	0	124,000	0	34,300	0	0	0	0
North Dakota	71,000	0	74,000	0	0	0	0	0	0
Tesoro Refining & Marketing Co Mandan	71,000	0	74,000	0	0	0	0	0	0
Ohio	455,800	148,920	470,000	160,000	164,500	59,000	0	0	0
BP-Husky Refining LLC Toledo	0	148,920	0	160,000	72,500	36,000	0	0	0
Lima Refining Company Lima	183,000	0	185,000	0	57,000	23,000	0	0	0
Marathon Petroleum Co LP Canton	100,000	0	105,000	0	35,000	0	0	0	0
Toledo Refining Co LLC Toledo	172,800	0	180,000	0	0	0	0	0	0
Oklahoma	453,500	70,300	494,020	75,500	214,042	38,385	0	0	0
HF Sinclair Tulsa Refining LLC Tulsa East (Formerly HollyFrontier Tulsa Refining LLC)	0	70,300	0	75,500	27,000	0	0	0	0
Tulsa West (Formerly HollyFrontier Tulsa Refining LLC)	85,000	0	91,020	0	32,000	11,000	0	0	0
Phillips 66 Company Ponca City	208,000	0	235,000	0	89,042	27,385	0	0	0
Valero Refining Co Oklahoma Ardmore	86,000	0	90,000	0	32,000	0	0	0	0
Wynnewood Refining Co Wynnewood	74,500	0	78,000	0	34,000	0	0	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Catalytic Cracking		Catalytic Hydrocracking			Catalytic Reforming		Fuels Solvent Deasphalting
	Fresh	Recycled	Distillate	Gas Oil	Residual	Low Pressure	High Pressure	
Montana	67,160	990	6,200	0	0	12,500	23,000	0
Cenex Harvest States Coop Laurel	16,500	0	0	0	0	12,500	0	0
ExxonMobil Refining & Supply Co Billings	23,660	0	6,200	0	0	0	12,500	0
Phillips 66 Company Billings	24,000	990	0	0	0	0	9,200	0
Nevada	0	0	0	0	0	0	0	0
Foreland Refining Corp Ely	0	0	0	0	0	0	0	0
New Jersey	145,000	0	0	0	0	69,000	0	22,000
Paulsboro Refining Co LLC Paulsboro	0	0	0	0	0	32,000	0	0
Phillips 66 Company Linden	145,000	0	0	0	0	37,000	0	22,000
New Mexico	30,000	0	0	18,000	0	24,000	0	18,000
HF Sinclair Navajo Refining LLC Artesia (Formerly HollyFrontier Navajo Refining LLC)	30,000	0	0	18,000	0	24,000	0	18,000
North Dakota	28,000	3,600	0	0	0	0	12,500	0
Tesoro Refining & Marketing Co Mandan	28,000	3,600	0	0	0	0	12,500	0
Ohio	206,300	0	52,000	57,800	0	65,500	106,800	0
BP-Husky Refining LLC Toledo	55,000	0	0	31,800	0	42,000	0	0
Lima Refining Company Lima	45,300	0	0	26,000	0	0	55,000	0
Marathon Petroleum Co LP Canton	24,000	0	0	0	0	23,500	0	0
Toledo Refining Co LLC Toledo	82,000	0	52,000	0	0	0	51,800	0
Oklahoma	156,912	2,000	14,000	0	0	64,200	49,258	0
HF Sinclair Tulsa Refining LLC Tulsa East (Formerly HollyFrontier Tulsa Refining LLC)	28,000	2,000	0	0	0	25,000	0	0
Tulsa West (Formerly HollyFrontier Tulsa Refining LLC)	0	0	0	0	0	0	0	0
Phillips 66 Company Ponca City	76,912	0	0	0	0	0	49,258	0
Valero Refining Co Oklahoma Ardmore	30,000	0	14,000	0	0	20,500	0	0
Wynnewood Refining Co Wynnewood	22,000	0	0	0	0	18,700	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Desulfurization (incl. Catalytic Hydrotreating)							
	Naphtha/ Reformer Feed	Gasoline	Kerosene/ Jet Fuel	Diesel Fuel	Other Distillate	Residual	Heavy Gas Oil	Other
Montana	45,900	27,800	13,400	47,750	25,000	0	46,070	7,900
Cenex Harvest States Coop Laurel	17,000	0	0	0	25,000	0	20,000	0
ExxonMobil Refining & Supply Co Billings	13,900	20,500	7,600	11,000	0	0	0	7,900
Phillips 66 Company Billings	12,250	7,300	5,800	29,750	0	0	26,070	0
Nevada	0	0	0	0	0	0	0	0
Foreland Refining Corp Ely	0	0	0	0	0	0	0	0
New Jersey	97,500	0	29,100	154,000	17,500	0	0	0
Paulsboro Refining Co LLC Paulsboro	32,000	0	29,100	46,000	0	0	0	0
Phillips 66 Company Linden	65,500	0	0	108,000	17,500	0	0	0
New Mexico	42,000	0	15,000	43,000	0	0	18,000	0
HF Sinclair Navajo Refining LLC Artesia (Formerly HollyFrontier Navajo Refining LLC)	42,000	0	15,000	43,000	0	0	18,000	0
North Dakota	29,600	0	7,000	23,800	0	0	0	0
Tesoro Refining & Marketing Co Mandan	29,600	0	7,000	23,800	0	0	0	0
Ohio	187,400	107,000	69,500	84,000	0	0	75,500	0
BP-Husky Refining LLC Toledo	42,000	0	0	22,500	0	0	53,000	0
Lima Refining Company Lima	65,000	35,000	24,000	36,000	0	0	0	0
Marathon Petroleum Co LP Canton	34,500	0	13,500	25,500	0	0	22,500	0
Toledo Refining Co LLC Toledo	45,900	72,000	32,000	0	0	0	0	0
Oklahoma	158,411	119,487	18,678	139,600	39,161	0	58,338	38,079
HF Sinclair Tulsa Refining LLC Tulsa East (Formerly HollyFrontier Tulsa Refining LLC)	25,000	29,000	0	45,000	0	0	0	0
Tulsa West (Formerly HollyFrontier Tulsa Refining LLC)	28,000	0	0	0	0	0	0	21,600
Phillips 66 Company Ponca City	51,511	58,987	18,678	34,000	39,161	0	23,888	16,479
Valero Refining Co Oklahoma Ardmore	27,000	16,500	0	35,000	0	0	34,450	0
Wynnewood Refining Co Wynnewood	26,900	15,000	0	25,600	0	0	0	0

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(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking			
	Operating	Idle	Operating	Idle		Delayed Coking	Fluid Coking	Visbreaking	Other/Gas Oil
Pennsylvania	266,000	0	289,800	0	113,000	0	0	0	0
American Refining Group Inc									
Bradford	11,000	0	11,800	0	0	0	0	0	0
Monroe Energy LLC									
Trainer	190,000	0	208,000	0	73,000	0	0	0	0
United Refining Co									
Warren	65,000	0	70,000	0	40,000	0	0	0	0
Tennessee	180,000	0	205,000	0	0	0	0	0	0
Valero Ref Company Tennessee LLC									
Memphis	180,000	0	205,000	0	0	0	0	0	0
Texas	5,975,969	0	6,380,239	0	2,664,200	900,207	42,000	0	0
Alon USA Energy Inc									
Big Spring	73,000	0	74,000	0	28,000	0	0	0	0
Buckeye Texas Processing LLC									
Corpus Christi	60,000	0	65,000	0	0	0	0	0	0
Citgo Refining & Chemical Inc									
Corpus Christi	167,500	0	177,839	0	85,300	45,127	0	0	0
Deer Park Refining LP									
Deer Park	312,500	0	340,000	0	180,000	96,000	0	0	0
Delek Refining LTD									
Tyler	71,000	0	76,000	0	28,000	7,500	0	0	0
Diamond Shamrock Refining Co LP									
Sunray	195,000	0	204,000	0	50,000	0	0	0	0
Three Rivers	89,000	0	100,000	0	33,500	0	0	0	0
Equistar Chemicals LP									
Channelview	0	0	0	0	0	0	0	0	0
ExxonMobil Refining & Supply Co									
Baytown	564,440	0	588,000	0	297,000	54,000	42,000	0	0
Beaumont	369,024	0	384,400	0	180,000	46,500	0	0	0
Flint Hills Resources LP									
Corpus Christi East	74,500	0	75,000	0	0	0	0	0	0
Corpus Christi West	268,500	0	275,000	0	87,500	0	0	0	0
Hartree Channelview LLC									
Channelview	45,000	0	50,000	0	0	0	0	0	0
Houston Refining LP									
Houston	263,776	0	289,000	0	196,500	100,500	0	0	0
Kinder Morgan Crude & Condensate									
Galena Park	105,000	0	121,000	0	0	0	0	0	0
Lazarus Energy LLC									
Nixon	14,000	0	15,000	0	0	0	0	0	0
Magellan Processing LP									
Corpus Christi	42,500	0	50,000	0	0	0	0	0	0
Marathon Petroleum Co LP									
Galveston Bay	593,000	0	625,000	0	259,500	30,000	0	0	0
Motiva Enterprises LLC									
Port Arthur	626,000	0	659,700	0	331,800	178,000	0	0	0
Pasadena Refining Systems Inc									
Pasadena	112,229	0	115,700	0	38,000	0	0	0	0

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(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Catalytic Cracking		Catalytic Hydrocracking			Catalytic Reforming		Fuels Solvent Deasphalting
	Fresh	Recycled	Distillate	Gas Oil	Residual	Low Pressure	High Pressure	
Pennsylvania	78,000	1,000	23,000	0	0	50,000	16,200	0
American Refining Group Inc Bradford	0	0	0	0	0	0	2,200	0
Monroe Energy LLC Trainer	53,000	0	23,000	0	0	50,000	0	0
United Refining Co Warren	25,000	1,000	0	0	0	0	14,000	0
Tennessee	70,000	0	26,500	0	0	36,000	0	0
Valero Ref Company Tennessee LLC Memphis	70,000	0	26,500	0	0	36,000	0	0
Texas	1,744,567	13,000	252,100	433,800	84,500	988,900	105,280	168,500
Alon USA Energy Inc Big Spring	23,500	0	0	0	0	21,500	0	10,000
Buckeye Texas Processing LLC Corpus Christi	0	0	0	0	0	0	0	0
Citgo Refining & Chemical Inc Corpus Christi	71,377	0	0	0	0	51,500	0	0
Deer Park Refining LP Deer Park	75,100	5,000	0	60,000	0	44,000	24,500	0
Delek Refining LTD Tyler	20,250	0	0	0	0	13,000	4,500	0
Diamond Shamrock Refining Co LP Sunray	56,000	0	0	29,000	0	29,000	18,000	14,500
Three Rivers	23,840	0	0	28,000	0	23,500	10,000	10,500
Equistar Chemicals LP Channelview	0	0	0	0	0	0	0	0
ExxonMobil Refining & Supply Co Baytown	220,000	8,000	30,600	0	0	126,500	0	47,000
Beaumont	115,000	0	70,000	0	0	146,000	0	0
Flint Hills Resources LP Corpus Christi East	49,100	0	0	0	0	0	0	0
Corpus Christi West	58,100	0	0	15,500	0	0	0	0
Hartree Channelview LLC Channelview	0	0	0	0	0	0	0	0
Houston Refining LP Houston	110,000	0	0	0	0	0	0	0
Kinder Morgan Crude & Condensate Galena Park	0	0	0	0	0	0	0	0
Lazarus Energy LLC Nixon	0	0	0	0	0	0	0	0
Magellan Processing LP Corpus Christi	0	0	0	0	0	0	0	0
Marathon Petroleum Co LP Galveston Bay	218,000	0	79,500	0	84,500	146,500	0	19,500
Motiva Enterprises LLC Port Arthur	92,600	0	0	115,500	0	129,500	0	0
Pasadena Refining Systems Inc Pasadena	0	0	0	0	0	23,000	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Desulfurization (incl. Catalytic Hydrotreating)							
	Naphtha/ Reformer Feed	Gasoline	Kerosene/ Jet Fuel	Diesel Fuel	Other Distillate	Residual	Heavy Gas Oil	Other
Pennsylvania	109,900	39,000	28,300	75,100	0	0	0	0
American Refining Group Inc Bradford	3,900	0	0	4,800	0	0	0	0
Monroe Energy LLC Trainer	80,000	34,000	23,300	53,300	0	0	0	0
United Refining Co Warren	26,000	5,000	5,000	17,000	0	0	0	0
Tennessee	52,000	39,000	0	38,000	0	0	0	0
Valero Ref Company Tennessee LLC Memphis	52,000	39,000	0	38,000	0	0	0	0
Texas	1,470,900	1,093,648	599,100	1,422,860	16,000	75,000	991,300	168,100
Alon USA Energy Inc Big Spring	25,500	0	5,000	24,000	0	0	6,300	0
Buckeye Texas Processing LLC Corpus Christi	0	0	0	0	0	0	0	0
Citgo Refining & Chemical Inc Corpus Christi	52,800	48,121	0	101,660	0	0	70,900	0
Deer Park Refining LP Deer Park	80,000	46,600	40,000	50,000	0	0	49,000	63,000
Delek Refining LTD Tyler	28,000	13,000	0	36,000	0	0	0	0
Diamond Shamrock Refining Co LP Sunray	44,400	39,600	0	47,500	0	0	0	0
Three Rivers	35,000	0	0	28,000	0	0	20,000	0
Equistar Chemicals LP Channelview	0	0	0	0	0	0	0	0
ExxonMobil Refining & Supply Co Baytown	157,000	203,800	132,700	158,300	0	0	117,000	50,300
Beaumont	166,300	69,700	51,000	42,000	0	0	0	23,300
Flint Hills Resources LP Corpus Christi East	33,000	0	0	0	0	0	0	0
Corpus Christi West	60,000	72,000	32,000	85,000	0	0	0	0
Hartree Channelview LLC Channelview	0	0	0	0	0	0	0	0
Houston Refining LP Houston	61,000	89,000	41,000	92,600	0	0	117,000	0
Kinder Morgan Crude & Condensate Galena Park	0	0	0	0	0	0	0	0
Lazarus Energy LLC Nixon	0	0	0	0	0	0	0	0
Magellan Processing LP Corpus Christi	0	0	0	0	0	0	0	0
Marathon Petroleum Co LP Galveston Bay	128,500	57,000	76,000	60,000	0	0	108,500	0
Motiva Enterprises LLC Port Arthur	184,500	55,000	79,000	174,300	0	0	65,000	21,000
Pasadena Refining Systems Inc Pasadena	23,000	0	0	0	16,000	0	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking			
	Operating	Idle	Operating	Idle		Delayed Coking	Fluid Coking	Visbreaking	Other/Gas Oil
Texas	5,975,969	0	6,380,239	0	2,664,200	900,207	42,000	0	0
Petromax Refining Co LLC Houston	25,000	0	27,500	0	0	0	0	0	0
Phillips 66 Company Sweeny	265,000	0	286,000	0	132,100	78,700	0	0	0
Premcor Refining Group Inc Port Arthur	335,000	0	424,000	0	220,000	103,000	0	0	0
South Hampton Resources Inc Silsbee	0	0	0	0	0	0	0	0	0
Texas International Terminals Galveston	45,000	0	50,000	0	0	0	0	0	0
The San Antonio Refinery LLC San Antonio	20,000	0	21,000	0	0	0	0	0	0
TotalEnergies Petrochem & Refg USA Port Arthur	238,000	0	245,000	0	117,000	60,000	0	0	0
Valero Refining Co Texas LP Corpus Christi	290,000	0	301,000	0	91,000	19,000	0	0	0
Houston	205,000	0	218,700	0	38,000	0	0	0	0
Texas City	225,000	0	227,400	0	133,500	53,500	0	0	0
Western Refining Company LP El Paso	133,000	0	140,000	0	55,500	0	0	0	0
WRB Refining LP Borger	149,000	0	155,000	0	82,000	28,380	0	0	0
Utah	206,714	0	217,200	0	34,900	10,000	0	0	0
Big West Oil Co North Salt Lake	31,664	0	33,000	0	0	0	0	0	0
Chevron USA Inc Salt Lake City	54,720	0	57,600	0	27,900	10,000	0	0	0
HF Sinclair Woods Cross Refining LLC Woods Cross (Formerly HollyFrontier Woods Cross Refg Co)	39,330	0	41,400	0	0	0	0	0	0
Silver Eagle Refining Woods Cross	15,000	0	15,700	0	7,000	0	0	0	0
Tesoro Refining & Marketing Co Salt Lake City	66,000	0	69,500	0	0	0	0	0	0
Washington	648,200	0	672,500	0	320,100	86,800	0	0	0
BP Products North America Inc Ferndale	238,500	0	251,000	0	139,000	61,500	0	0	0
HF Sinclair Puget Sound Refg LLC Anacortes (Formerly HollyFrontier Puget Sound Refg LLC)	145,000	0	149,000	0	65,800	25,300	0	0	0
Phillips 66 Company Ferndale	105,000	0	110,500	0	48,100	0	0	0	0
Tesoro Refining & Marketing Co Anacortes	119,000	0	120,000	0	48,000	0	0	0	0
US Oil & Refining Co Tacoma	40,700	0	42,000	0	19,200	0	0	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Catalytic Cracking		Catalytic Hydrocracking			Catalytic Reforming		Fuels Solvent Deasphalting
	Fresh	Recycled	Distillate	Gas Oil	Residual	Low Pressure	High Pressure	
Texas	1,744,567	13,000	252,100	433,800	84,500	988,900	105,280	168,500
Petromax Refining Co LLC								
Houston	0	0	0	0	0	0	0	0
Phillips 66 Company								
Sweeny	111,000	0	0	0	0	42,100	0	0
Premcor Refining Group Inc								
Port Arthur	75,000	0	0	134,800	0	58,000	0	0
South Hampton Resources Inc								
Silsbee	0	0	0	0	0	5,200	0	0
Texas International Terminals								
Galveston	0	0	0	0	0	0	0	0
The San Antonio Refinery LLC								
San Antonio	0	0	0	0	0	0	6,000	0
TotalEnergies Petrochem & Refg USA								
Port Arthur	80,000	0	0	0	0	43,000	0	15,500
Valero Refining Co Texas LP								
Corpus Christi	95,500	0	0	51,000	0	39,000	11,000	0
Houston	75,200	0	72,000	0	0	0	0	18,000
Texas City	86,000	0	0	0	0	18,100	0	33,500
Western Refining Company LP								
El Paso	35,000	0	0	0	0	29,500	0	0
WRB Refining LP								
Borger	54,000	0	0	0	0	0	31,280	0
Utah	72,700	0	0	15,000	0	0	38,250	6,000
Big West Oil Co								
North Salt Lake	12,500	0	0	0	0	0	8,750	0
Chevron USA Inc								
Salt Lake City	15,500	0	0	0	0	0	9,100	0
HF Sinclair Woods Cross Refining LLC								
Woods Cross (Formerly HollyFrontier Woods Cross Refg Co)	18,200	0	0	15,000	0	0	8,400	6,000
Silver Eagle Refining								
Woods Cross	0	0	0	0	0	0	0	0
Tesoro Refining & Marketing Co								
Salt Lake City	26,500	0	0	0	0	0	12,000	0
Washington	147,400	3,000	0	65,000	0	113,000	28,500	24,000
BP Products North America Inc								
Ferndale	0	0	0	65,000	0	65,000	0	0
HF Sinclair Puget Sound Refg LLC								
Anacortes (Formerly HollyFrontier Puget Sound Refg LLC)	57,900	0	0	0	0	0	21,700	0
Phillips 66 Company								
Ferndale	38,000	0	0	0	0	18,500	0	0
Tesoro Refining & Marketing Co								
Anacortes	51,500	3,000	0	0	0	29,500	0	24,000
US Oil & Refining Co								
Tacoma	0	0	0	0	0	0	6,800	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Desulfurization (incl. Catalytic Hydrotreating)							
	Naphtha/ Reformer Feed	Gasoline	Kerosene/ Jet Fuel	Diesel Fuel	Other Distillate	Residual	Heavy Gas Oil	Other
Texas	1,470,900	1,093,648	599,100	1,422,860	16,000	75,000	991,300	168,100
Petromax Refining Co LLC Houston	0	0	0	0	0	0	0	0
Phillips 66 Company Sweeny	73,400	68,700	0	126,300	0	0	110,200	0
Premcor Refining Group Inc Port Arthur	51,500	90,000	33,000	104,600	0	0	60,000	0
South Hampton Resources Inc Silsbee	11,000	0	0	0	0	0	0	4,000
Texas International Terminals Galveston	0	0	0	0	0	0	0	0
The San Antonio Refinery LLC San Antonio	7,000	0	0	8,000	0	0	0	0
TotalEnergies Petrochem & Refg USA Port Arthur	57,500	51,600	31,000	80,000	0	0	54,400	0
Valero Refining Co Texas LP Corpus Christi	57,000	54,500	10,000	72,000	0	75,000	25,000	0
Houston	9,000	38,027	15,900	0	0	0	0	0
Texas City	25,000	61,500	28,000	55,000	0	0	110,000	6,500
Western Refining Company LP El Paso	33,000	35,500	9,500	49,000	0	0	0	0
WRB Refining LP Borger	67,500	0	15,000	28,600	0	0	78,000	0
Utah	45,900	8,000	2,900	51,200	31,500	0	0	7,200
Big West Oil Co North Salt Lake	11,800	0	0	12,400	0	0	0	0
Chevron USA Inc Salt Lake City	9,100	0	0	13,300	20,700	0	0	7,200
HF Sinclair Woods Cross Refining LLC Woods Cross (Formerly HollyFrontier Woods Cross Refg Co)	12,500	0	2,900	0	10,800	0	0	0
Silver Eagle Refining Woods Cross	1,000	0	0	3,000	0	0	0	0
Tesoro Refining & Marketing Co Salt Lake City	11,500	8,000	0	22,500	0	0	0	0
Washington	204,200	104,500	45,000	174,200	0	0	0	0
BP Products North America Inc Ferndale	101,800	0	20,000	59,400	0	0	0	0
HF Sinclair Puget Sound Refg LLC Anacortes (Formerly HollyFrontier Puget Sound Refg LLC)	21,700	43,900	25,000	39,900	0	0	0	0
Phillips 66 Company Ferndale	19,400	34,100	0	37,800	0	0	0	0
Tesoro Refining & Marketing Co Anacortes	50,500	26,500	0	28,500	0	0	0	0
US Oil & Refining Co Tacoma	10,800	0	0	8,600	0	0	0	0

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking			
	Operating	Idle	Operating	Idle		Delayed Coking	Fluid Coking	Visbreaking	Other/Gas Oil
West Virginia	22,300	0	23,000	0	8,600	0	0	0	0
Ergon West Virginia Inc Newell	22,300	0	23,000	0	8,600	0	0	0	0
Wisconsin	0	38,000	0	50,000	23,500	0	0	0	0
Superior Refining Company LLC Superior	0	38,000	0	50,000	23,500	0	0	0	0
Wyoming	125,850	0	143,900	0	51,000	20,000	0	0	0
HF Sinclair Casper Refining Company Evansville	29,850	0	30,000	0	0	0	0	0	0
(Formerly Sinclair Casper Refining Company)									
HF Sinclair Wyoming Refining Co Sinclair	75,000	0	92,000	0	51,000	20,000	0	0	0
(Formerly Sinclair Wyoming Refining Co)									
Silver Eagle Refining Evanston	3,000	0	3,400	0	0	0	0	0	0
Wyoming Refining Co Newcastle	18,000	0	18,500	0	0	0	0	0	0
U.S. Total	17,684,549	375,820	18,741,581	415,200	8,604,173	2,775,612	158,500	16,000	11,800

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Catalytic Cracking		Catalytic Hydrocracking			Catalytic Reforming		Fuels Solvent Deasphalting
	Fresh	Recycled	Distillate	Gas Oil	Residual	Low Pressure	High Pressure	
West Virginia	0	0	0	0	0	4,700	0	0
Ergon West Virginia Inc Newell	0	0	0	0	0	4,700	0	0
Wisconsin	11,323	0	0	0	0	9,300	0	0
Superior Refining Company LLC Superior	11,323	0	0	0	0	9,300	0	0
Wyoming	40,000	500	16,000	0	0	5,000	19,900	0
HF Sinclair Casper Refining Company Evansville	10,500	500	0	0	0	5,000	0	0
(Formerly Sinclair Casper Refining Company)								
HF Sinclair Wyoming Refining Co Sinclair	22,000	0	16,000	0	0	0	13,000	0
(Formerly Sinclair Wyoming Refining Co)								
Silver Eagle Refining Evanston	0	0	0	0	0	0	2,900	0
Wyoming Refining Co Newcastle	7,500	0	0	0	0	0	4,000	0
U.S. Total	5,465,762	48,890	746,000	1,561,100	84,500	2,637,700	967,888	385,000

Table 3. Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Downstream Charge Capacity							
	Desulfurization (incl. Catalytic Hydrotreating)							
	Naphtha/ Reformer Feed	Gasoline	Kerosene/ Jet Fuel	Diesel Fuel	Other Distillate	Residual	Heavy Gas Oil	Other
West Virginia	7,700	0	0	9,500	0	0	6,900	0
Ergon West Virginia Inc Newell	7,700	0	0	9,500	0	0	6,900	0
Wisconsin	12,500	12,500	8,000	7,500	0	0	0	0
Superior Refining Company LLC Superior	12,500	12,500	8,000	7,500	0	0	0	0
Wyoming	37,600	6,500	14,000	35,700	0	0	20,000	0
HF Sinclair Casper Refining Company Evansville	8,200	6,500	0	11,200	0	0	0	0
(Formerly Sinclair Casper Refining Company)								
HF Sinclair Wyoming Refining Co Sinclair	21,500	0	14,000	18,500	0	0	20,000	0
(Formerly Sinclair Wyoming Refining Co)								
Silver Eagle Refining Evanston	3,900	0	0	0	0	0	0	0
Wyoming Refining Co Newcastle	4,000	0	0	6,000	0	0	0	0
U.S. Total	4,624,711	2,900,785	1,577,828	4,366,700	264,761	88,500	2,838,408	437,279

Note: Refer to Table 5 for corporate ownership information. Some names of previously independent companies have been preserved by acquiring companies.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

Directory of Operable Petroleum Refineries on Tables 3 and 4

Refiner	State(s)	Refiner	State(s)
Alon Refining Krotz Springs Inc.....	LA	Lazarus Energy LLC.....	TX
Alon USA Energy Inc.....	TX	Lima Refining Company.....	OH
American Refining Group Inc.....	PA	Lion Oil Co.....	AR
BP Products North America Inc.....	IN, WA	Lunday Thagard Co.....	CA
BP-Husky Refining LLC.....	OH	Magellan Processing LP.....	TX
Big West Oil Co.....	UT	Marathon Petroleum Co LP.....	IL, KY, LA, MI, OH, TX
Buckeye Texas Processing LLC.....	TX	Martinez Refining Co LLC.....	CA
CHS McPherson Refinery Inc.....	KS	Monroe Energy LLC.....	PA
Calcasieu Refining Co.....	LA	Motiva Enterprises LLC.....	TX
Calumet Cotton Valley Refining LLC.....	LA	PDV Midwest Refining LLC.....	IL
Calumet Montana Refining LLC.....	MT	Par Hawaii Refining LLC.....	HI
Calumet Princeton Refining LLC.....	LA	Pasadena Refining Systems Inc.....	TX
Calumet Shreveport Refining LLC.....	LA	Paulsboro Refining Co LLC.....	NJ
Cenex Harvest States Coop.....	MT	Petro Star Inc.....	AK
Chalmette Refining LLC.....	LA	Petromax Refining Co LLC.....	TX
Chevron USA Inc.....	CA, MS, UT	Phillips 66 Company.....	CA, LA, MT, NJ, OK, TX, WA
Citgo Petroleum Corp.....	LA	Placid Refining Co.....	LA
Citgo Refining & Chemical Inc.....	TX	Premcor Refining Group Inc.....	TX
Coffeyville Resources Rfg & Mktg.....	KS	San Joaquin Refining Co Inc.....	CA
ConocoPhillips Alaska Inc.....	AK	Shell Oil Products US.....	LA
Countrymark Refining & Logistics LLC.....	IN	Silver Eagle Refining.....	UT, WY
Cross Oil Refining & Marketing Inc.....	AR	South Hampton Resources Inc.....	TX
Deer Park Refining LP.....	TX	St Paul Park Refining Co LLC.....	MN
Delaware City Refining Co LLC.....	DE	Suncor Energy (USA) Inc.....	CO
Delek Refining LTD.....	TX	Superior Refining Company LLC.....	WI
Diamond Shamrock Refining Co LP.....	TX	Talley Asphalt Products Inc.....	CA
Equistar Chemicals LP.....	TX	Tesoro Alaska Company LLC.....	AK
Ergon Refining Inc.....	MS	Tesoro Refining & Marketing Co.....	CA, ND, UT, WA
Ergon West Virginia Inc.....	WV	Texas International Terminals.....	TX
Excel Paralubes.....	LA	The San Antonio Refinery LLC.....	TX
ExxonMobil Refining & Supply Co.....	IL, LA, MT, TX	Toledo Refining Co LLC.....	OH
Flint Hills Resources LP.....	MN, TX	Torrance Refining Co LLC.....	CA
Foreland Refining Corp.....	NV	TotalEnergies Petrochem & Refg USA.....	TX
Goodway Refining LLC.....	AL	US Oil & Refining Co.....	WA
HF Sinclair Casper Refining Company.....	WY	Ultramar Inc.....	CA
HF Sinclair El Dorado Refining LLC.....	KS	United Refining Co.....	PA
HF Sinclair Navajo Refining LLC.....	NM	Valero Ref Company Tennessee LLC.....	TN
HF Sinclair Puget Sound Refg LLC.....	WA	Valero Refining - Meraux LLC.....	LA
HF Sinclair Tulsa Refining LLC.....	OK	Valero Refining Co California.....	CA
HF Sinclair Woods Cross Refining LLC.....	UT	Valero Refining Co Oklahoma.....	OK
HF Sinclair Wyoming Refining Co.....	WY	Valero Refining Co Texas LP.....	TX
Hartree Channelview LLC.....	TX	Valero Refining New Orleans LLC.....	LA
Hilcorp North Slope LLC.....	AK	Vertex Refining Alabama LLC.....	AL
Houston Refining LP.....	TX	WRB Refining LP.....	IL, TX
Hunt Refining Co.....	AL	Western Refining Company LP.....	TX
Hunt Southland Refining Co.....	MS	Wynnewood Refining Co.....	OK
Kern Oil & Refining Co.....	CA	Wyoming Refining Co.....	WY
Kinder Morgan Crude & Condensate.....	TX		

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
Alabama	0	0	26,000	1,150	4,500	0	0	7,500	45	228
Hunt Refining Co										
Tuscaloosa	0	0	26,000	0	4,500	0	0	7,500	45	195
Vertex Refining Alabama LLC										
Saraland	0	0	0	1,150	0	0	0	0	0	33
(Formerly Shell Chemical LP)										
Alaska	0	0	12,500	0	5,000	0	0	0	13	25
Petro Star Inc										
North Pole	0	0	3,000	0	0	0	0	0	0	0
Tesco Alaska Company LLC										
Kenai	0	0	9,500	0	5,000	0	0	0	13	25
Arkansas	5,000	0	21,300	0	8,000	0	6,000	0	13	90
Cross Oil Refining & Marketing Inc										
Smackover	0	0	800	0	0	0	6,000	0	3	0
Lion Oil Co										
El Dorado	5,000	0	20,500	0	8,000	0	0	0	10	90
California	193,362	1,500	25,950	49,200	131,600	0	39,800	137,523	971	4,728
Chevron USA Inc										
El Segundo	33,300	0	0	10,500	22,300	0	0	30,000	74	628
Richmond	32,662	0	0	7,200	46,000	0	34,000	0	330	1,008
Kem Oil & Refining Co										
Bakersfield	0	0	0	0	0	0	0	0	0	11
Lunday Thagard Co										
South Gate	0	0	3,750	0	0	0	0	0	0	0
Martinez Refining Co LLC										
Martinez	12,800	0	0	0	15,000	0	0	9,000	179	413

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
Phillips 66 Company										
Rodeo	0	0	0	3,800	10,000	0	0	14,500	22	560
Wilmington	16,000	0	0	7,000	12,800	0	0	16,800	105	370
San Joaquin Refining Co Inc										
Bakersfield	0	1,500	8,000	0	0	0	5,800	0	4	6
Talley Asphalt Products Inc										
Kern	0	0	1,700	0	0	0	0	0	0	0
Tesoro Refining & Marketing Co										
Carson	29,500	0	0	16,500	25,500	0	0	31,243	122	749
Torrance Refining Co LLC										
Torrance	30,000	0	0	0	0	0	0	19,180	0	400
Ultramar Inc										
Wilmington	22,000	0	0	0	0	0	0	10,000	0	280
Valero Refining Co California										
Benicia	17,100	0	9,000	4,200	0	0	0	6,800	135	303
Wilmington	0	0	3,500	0	0	0	0	0	0	0
Colorado	0	0	13,200	0	0	0	0	0	22	116
Suncor Energy (USA) Inc										
Commerce City East	0	0	0	0	0	0	0	0	0	2
Commerce City West	0	0	13,200	0	0	0	0	0	22	114
Delaware	12,500	5,191	0	6,000	0	0	0	13,620	65	596
Delaware City Refining Co LLC										
Delaware City	12,500	5,191	0	6,000	0	0	0	13,620	65	596
Hawaii	0	0	0	0	0	0	0	0	18	38
Par Hawaii Refining LLC										
Kapolei	0	0	0	0	0	0	0	0	18	38

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
Illinois	96,600	17,200	45,100	0	16,000	0	0	74,690	202	2,380
ExxonMobil Refining & Supply Co										
Joliet	31,500	0	17,100	0	0	0	0	26,000	0	683
Marathon Petroleum Co LP										
Robinson	19,000	3,300	0	0	16,000	0	0	7,890	0	202
PDV Midwest Refining LLC										
Lemont	24,300	9,400	0	0	0	0	0	12,900	12	487
WRB Refining LP										
Wood River	21,800	4,500	28,000	0	0	0	0	27,900	190	1,008
Indiana	34,400	16,800	33,200	0	31,400	0	0	30,000	0	1,913
BP Products North America Inc										
Whiting	32,000	16,800	29,500	0	27,900	0	0	30,000	0	1,904
Countrymark Refining & Logistics LLC										
Mount Vernon	2,400	0	3,700	0	3,500	0	0	0	0	9
Kansas	34,000	0	4,000	4,000	27,000	0	0	23,064	120	831
CHS McPherson Refinery Inc										
McPherson	10,000	0	0	2,500	12,000	0	0	7,364	42	287
CoFFEYville Resources Rfg & Mktg										
CoFFEYville	10,000	0	0	0	0	0	0	8,700	22	229
HF Sinclair El Dorado Refining LLC										
El Dorado	14,000	0	4,000	1,500	15,000	0	0	7,000	56	315
(Formerly HollyFrontier El Dorado Refining LLC)										
Kentucky	22,500	2,500	35,400	0	19,000	0	0	0	0	448
Marathon Petroleum Co LP										
Callettsburg	22,500	2,500	35,400	0	19,000	0	0	0	0	448

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
Louisiana	214,500	34,400	103,000	23,000	92,720	0	66,000	164,436	118	6,053
Alon Refining Krotz Springs Inc										
Krotz Springs	6,000	0	0	0	6,220	0	0	0	0	0
Calumet Cotton Valley Refining LLC										
Cotton Valley	0	0	0	0	500	0	0	0	2	0
Calumet Princeton Refining LLC										
Princeton	0	0	2,000	0	0	0	7,000	0	4	3
Calumet Shreveport Refining LLC										
Shreveport	0	0	6,500	0	0	0	12,500	0	12	40
Chalmette Refining LLC										
Chalmette	16,800	10,500	15,000	0	0	0	0	13,000	0	920
Citgo Petroleum Corp										
Lake Charles	28,100	20,900	0	0	28,000	0	0	32,820	0	717
Excel Paralubes										
Westlake	0	0	0	0	0	0	30,000	0	0	185
ExxonMobil Refining & Supply Co										
Baton Rouge	41,000	0	40,000	0	0	0	16,500	31,525	0	944
Marathon Petroleum Co LP										
Garyville	40,000	0	33,000	23,000	33,000	0	0	33,275	0	1,476
Phillips 66 Company										
Westlake	9,000	0	6,500	0	25,000	0	0	22,500	0	440
Placid Refining Co										
Port Allen	7,500	0	0	0	0	0	0	0	0	55
Shell Oil Products US										
Norco	18,100	0	0	0	0	0	0	7,316	0	209
Valero Refining - Meraux LLC										
Meraux	0	0	0	0	0	0	0	0	0	224
Valero Refining New Orleans LLC										
Norco	48,000	3,000	0	0	0	0	0	24,000	100	840

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
Michigan	8,000	0	32,000	0	0	0	0	12,850	0	460
Marathon Petroleum Co LP Detroit	8,000	0	32,000	0	0	0	0	12,850	0	460
Minnesota	21,000	0	62,000	0	33,500	0	0	28,400	209	1,339
Flint Hills Resources LP Saint Paul	14,000	0	45,000	0	18,000	0	0	28,400	199	1,229
St Paul Park Refining Co LLC Saint Paul	7,000	0	17,000	0	15,500	0	0	0	10	110
Mississippi	22,000	15,600	16,125	0	0	0	48,000	35,500	242	1,264
Chevron USA Inc Pascagoula	22,000	15,600	0	0	0	0	25,000	35,500	229	1,264
Ergon Refining Inc Vicksburg	0	0	10,000	0	0	0	23,000	0	13	0
Hunt Southland Refining Co Sandersville	0	0	6,125	0	0	0	0	0	0	0
Montana	17,150	0	39,000	5,250	1,500	0	0	15,480	134	489
Calumet Montana Refining LLC Great Falls	750	0	4,700	0	1,500	0	0	0	5	0
Cenex Harvest States Coop Laurel	4,000	0	19,800	1,250	0	0	0	4,800	70	243
ExxonMobil Refining & Supply Co Billings	5,100	0	14,500	0	0	0	0	4,000	23	0
Phillips 66 Company Billings	7,300	0	0	4,000	0	0	0	6,680	36	246
Nevada	0	0	1,600	0	0	0	0	0	0	0

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
Foreland Refining Corp Ely	0	0	1,600	0	0	0	0	0	0	0
New Jersey	18,800	0	21,000	4,000	0	0	12,000	0	31	320
Paulsboro Refining Co LLC Paulsboro	0	0	21,000	0	0	0	12,000	0	9	320
Phillips 66 Company Linden	18,800	0	0	4,000	0	0	0	0	22	0
New Mexico	9,500	0	7,000	0	0	0	0	0	38	224
HF Sinclair Navajo Refining LLC Artesia	9,500	0	7,000	0	0	0	0	0	38	224
(Formerly HollyFrontier Navajo Refining LLC)										
North Dakota	5,000	0	0	0	0	0	0	0	0	15
Tesoro Refining & Marketing Co Mandan	5,000	0	0	0	0	0	0	0	0	15
Ohio	29,950	20,000	26,000	4,500	18,700	0	0	16,300	0	922
BP-Husky Refining LLC Toledo	11,500	0	9,000	0	0	0	0	10,000	0	462
Lima Refining Company Lima	0	9,200	0	4,500	18,700	0	0	6,300	0	240
Marathon Petroleum Co LP Canton	8,500	0	17,000	0	0	0	0	0	0	104
Toledo Refining Co LLC Toledo	9,950	10,800	0	0	0	0	0	0	0	116
Oklahoma	35,586	21,000	21,700	900	13,000	0	9,900	9,050	62	275

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
HF Sinclair Tulsa Refining LLC										
Tulsa East	5,500	0	15,200	0	13,000	0	0	0	0	75
(Formerly HollyFrontier Tulsa Refining LLC)										
Tulsa West	0	0	6,500	900	0	0	9,900	2,750	0	0
(Formerly HollyFrontier Tulsa Refining LLC)										
Phillips 66 Company										
Ponca City	17,574	0	0	0	0	0	0	6,300	35	0
Valero Refining Co Oklahoma										
Ardmore	7,012	0	0	0	0	0	0	0	27	200
Wynnewood Refining Co										
Wynnewood	5,500	21,000	0	0	0	0	0	0	0	0
Pennsylvania	16,500	0	23,560	0	9,280	0	2,945	0	10	157
American Refining Group Inc										
Bradford	0	0	560	0	780	0	2,945	0	0	0
Monroe Energy LLC										
Trainer	12,000	0	0	0	0	0	0	0	0	90
United Refining Co										
Warren	4,500	0	23,000	0	8,500	0	0	0	10	67
Tennessee	17,000	29,000	0	0	0	0	0	0	30	116
Valero Ref Company Tennessee LLC										
Memphis	17,000	29,000	0	0	0	0	0	0	30	116
Texas	416,393	121,665	54,200	54,300	152,100	0	72,900	282,957	291	16,266
Alon USA Energy Inc										
Big Spring	5,000	1,000	7,600	0	0	0	0	0	0	100
Citgo Refining & Chemical Inc										
Corpus Christi	25,198	16,270	0	0	0	0	0	17,374	0	370

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
Deer Park Refining LP										
Deer Park	21,000	0	0	0	0	0	0	26,100	0	1,220
Delek Refining LTD										
Tyler	4,700	0	0	0	0	0	0	1,500	0	39
Diamond Shamrock Refining Co LP										
Sunray	9,800	0	12,000	3,000	0	0	0	0	30	75
Three Rivers	7,000	10,800	0	3,000	0	0	1,900	0	0	224
Equistar Chemicals LP										
Channelview	22,370	0	0	0	0	0	0	0	0	0
ExxonMobil Refining & Supply Co										
Baytown	44,500	0	0	0	0	0	32,000	22,750	0	1,828
Beaumont	16,300	0	0	13,300	33,800	0	0	15,039	0	661
Flint Hills Resources LP										
Corpus Christi East	0	0	0	0	0	0	0	0	0	102
Corpus Christi West	15,500	0	0	0	0	0	0	0	0	160
Houston Refining LP										
Houston	11,250	0	0	0	0	0	0	30,150	0	1,123
Marathon Petroleum Co LP										
Galveston Bay	65,500	39,400	0	0	0	0	0	11,910	0	1,452
Motiva Enterprises LLC										
Port Arthur	20,500	0	0	0	58,500	0	39,000	50,975	0	3,203
Phillips 66 Company										
Sweeny	26,200	20,500	0	0	10,100	0	0	22,800	0	915
Premcor Refining Group Inc										
Port Arthur	19,500	0	0	0	0	0	0	32,240	0	1,490
South Hampton Resources Inc										
Silsbee	0	3,640	0	0	4,400	0	0	0	0	0
TotalEnergies Petrochem & Refg USA										
Port Arthur	7,500	13,600	0	0	7,800	0	0	19,200	0	806

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
Valero Refining Co Texas LP										
Corpus Christi	24,500	16,455	30,600	16,000	0	0	0	5,919	160	1,142
Houston	28,875	0	0	0	0	0	0	0	0	336
Texas City	14,700	0	0	0	6,500	0	0	19,000	0	680
Western Refining Company LP										
El Paso	12,500	0	4,000	4,000	0	0	0	0	10	0
WRB Refining LP										
Borger	14,000	0	0	15,000	31,000	0	0	8,000	91	340
Utah	21,600	0	1,800	3,318	6,000	0	0	2,500	0	92
Big West Oil Co										
North Salt Lake	3,100	0	0	1,900	3,000	0	0	0	0	3
Chevron USA Inc										
Salt Lake City	5,200	0	0	1,418	0	0	0	2,500	0	63
HF Sinclair Woods Cross Refining LLC										
Woods Cross	5,300	0	1,800	0	3,000	0	0	0	0	10
(Formerly HollyFrontier Woods Cross Refig Co)										
Tesoro Refining & Marketing Co										
Salt Lake City	8,000	0	0	0	0	0	0	0	0	16
Washington	42,200	0	9,000	11,600	31,000	0	0	23,650	186	805
BP Products North America Inc										
Ferndale	0	0	0	0	26,000	0	0	15,250	186	284
HF Sinclair Puget Sound Refig LLC										
Anacortes	12,500	0	0	0	0	0	0	8,400	0	350
(Formerly HollyFrontier Puget Sound Refig LLC)										
Phillips 66 Company										
Ferndale	12,700	0	0	2,900	0	0	0	0	0	112
Tesoro Refining & Marketing Co										
Anacortes	17,000	0	0	8,700	0	0	0	0	0	48

Table 4. Production Capacity of Operable Petroleum Refineries by State as of January 1, 2023
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Alkylates	Aromatics	Asphalt and Road Oil	Isomers			Lubricants	Marketable Petroleum Coke	Hydrogen (MMcfd) ^a	Sulfur (short tons per day)
				Isobutane	Isopentane and Isohexane	Isooctane				
US Oil & Refining Co										
Tacoma	0	0	9,000	0	5,000	0	0	0	0	11
West Virginia	0	0	700	0	0	0	6,000	0	3	1
Ergon West Virginia Inc										
Newell	0	0	700	0	0	0	6,000	0	3	1
Wisconsin	1,700	6,100	16,000	0	0	0	0	0	0	33
Superior Refining Company LLC										
Superior	1,700	6,100	16,000	0	0	0	0	0	0	33
Wyoming	6,300	0	8,000	0	0	0	0	5,800	52	213
HF Sinclair Casper Refining Company										
Evansville	0	0	0	0	0	0	0	0	0	10
(Formerly Sinclair Casper Refining Company)										
HF Sinclair Wyoming Refining Co										
Sinclair	5,000	0	8,000	0	0	0	0	5,800	52	203
(Formerly Sinclair Wyoming Refining Co)										
Wyoming Refining Co										
Newcastle	1,300	0	0	0	0	0	0	0	0	0
U.S. Total	1,301,541	290,956	659,335	167,218	600,300	0	263,545	883,320	2,875	40,437

^a Includes hydrogen production capacity of hydrogen plants on refinery grounds and operated by the refinery operator.

Note: Refer to Table 5 for corporate ownership information. Some names of previously independent companies have been preserved by acquiring companies.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

Table 5. Refiners' Total Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 2023

CORPORATION / Refiner / Location	Barrels per Calendar Day	CORPORATION / Refiner / Location	Barrels per Calendar Day
Companies with Capacity Over 100,000 bbl/cd		Valero Ref Company Tennessee LLC	
MARATHON PETROLEUM CORP	2,898,000	Memphis, Tennessee	180,000
Marathon Petroleum Co LP		Valero Refining Co California	
Garyville, Louisiana	596,000	Benicia, California	145,000
Galveston Bay, Texas	593,000	Wilmington, California	6,300
Catlettsburg, Kentucky	291,000	Valero Refining - Meraux LLC	
Robinson, Illinois	253,000	Meraux, Louisiana	125,000
Detroit, Michigan	140,000	Valero Refining Co Oklahoma	
Canton, Ohio	100,000	Ardmore, Oklahoma	86,000
Tesoro Refining & Marketing Co		Ultramar Inc	
Carson, California	363,000	Wilmington, California	85,000
Anacortes, Washington	119,000	EXXONMOBIL CORP	1,769,264
Mandan, North Dakota	71,000	ExxonMobil Refining & Supply Co	
Salt Lake City, Utah	66,000	Baytown, Texas	564,440
Western Refining Company LP		Baton Rouge, Louisiana	522,500
El Paso, Texas	133,000	Beaumont, Texas	369,024
St Paul Park Refining Co LLC		Joliet, Illinois	251,800
Saint Paul, Minnesota	105,000	Billings, Montana	61,500
Tesoro Alaska Company LLC		PHILLIPS 66 COMPANY	1,425,700
Kenai, Alaska	68,000	Phillips 66 Company	
VALERO ENERGY CORP	2,181,300	Sweeny, Texas	265,000
Valero Refining Co Texas LP		Westlake, Louisiana	264,000
Corpus Christi, Texas	290,000	Linden, New Jersey	258,500
Texas City, Texas	225,000	Ponca City, Oklahoma	208,000
Houston, Texas	205,000	Wilmington, California	139,000
Premcor Refining Group Inc		Rodeo, California	120,200
Port Arthur, Texas	335,000	Ferndale, Washington	105,000
Diamond Shamrock Refining Co LP		Billings, Montana	66,000
Sunray, Texas	195,000		
Three Rivers, Texas	89,000		
Valero Refining New Orleans LLC			
Norco, Louisiana	215,000		

Table 5. Refiners' Total Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 2023

CORPORATION / Refiner / Location	Barrels per Calendar Day	CORPORATION / Refiner / Location	Barrels per Calendar Day
CHEVRON CORP	1,037,660	Tulsa West, Oklahoma	85,000
Chevron USA Inc		Tulsa East, Oklahoma	70,300
Pascagoula, Mississippi	356,440	^a HF Sinclair Puget Sound Refg LLC	
El Segundo, California	269,000	Anacortes, Washington	145,000
Richmond, California	245,271	^a HF Sinclair Navajo Refining LLC	
Salt Lake City, Utah	54,720	Artesia, New Mexico	110,000
Pasadena Refining Systems Inc		^b HF Sinclair Wyoming Refining Co	
Pasadena, Texas	112,229	Sinclair, Wyoming	75,000
PBF ENERGY CO LLC	1,010,200	^a HF Sinclair Woods Cross Refining LLC	
Chalmette Refining LLC		Woods Cross, Utah	39,330
Chalmette, Louisiana	190,000	^b HF Sinclair Casper Refining Company	
Toledo Refining Co LLC		Evansville, Wyoming	29,850
Toledo, Ohio	172,800	KOCH INDUSTRIES INC	678,000
Delaware City Refining Co LLC		Flint Hills Resources LP	
Delaware City, Delaware	171,000	Saint Paul, Minnesota	335,000
Paulsboro Refining Co LLC		Corpus Christi West, Texas	268,500
Paulsboro, New Jersey	160,000	Corpus Christi East, Texas	74,500
Torrance Refining Co LLC		BP PLC	673,500
Torrance, California	160,000	BP Products North America Inc	
Martinez Refining Co LLC		Whiting, Indiana	435,000
Martinez, California	156,400	Ferndale, Washington	238,500
PDV AMERICA INC	805,185	SAUDI ARAMCO	
Citgo Petroleum Corp		Motiva Enterprises LLC	
Lake Charles, Louisiana	455,000	Port Arthur, Texas	626,000
PDV Midwest Refining LLC		WRB REFINING LP	505,000
Lemont, Illinois	182,685	WRB Refining LP	
Citgo Refining & Chemical Inc		Wood River, Illinois (50% Phillips 66, 50% Cenovus)	356,000
Corpus Christi, Texas	167,500	Borger, Texas (50% Phillips 66, 50% Cenovus)	149,000
HF SINCLAIR CORP	716,480	PEMEX	
^a HF Sinclair El Dorado Refining LLC		^c Deer Park Refining LP	
El Dorado, Kansas	162,000	Deer Park, Texas	312,500
^a HF Sinclair Tulsa Refining LLC			

Table 5. Refiners' Total Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 2023

CORPORATION / Refiner / Location	Barrels per Calendar Day	CORPORATION / Refiner / Location	Barrels per Calendar Day
DELEK GROUP LTD	307,000	CHS McPherson Refinery Inc	
Lion Oil Co		McPherson, Kansas	110,600
El Dorado, Arkansas	83,000	Cenex Harvest States Coop	
Alon Refining Krotz Springs Inc		Laurel, Montana	62,500
Krotz Springs, Louisiana	80,000	PAR PACIFIC HOLDINGS	152,200
Alon USA Energy Inc		Par Hawaii Refining LLC	
Big Spring, Texas	73,000	Kapolei, Hawaii	93,500
Delek Refining LTD		US Oil & Refining Co	
Tyler, Texas	71,000	Tacoma, Washington	40,700
ACCESS INDUSTRIES		Wyoming Refining Co	
Houston Refining LP		Newcastle, Wyoming	18,000
Houston, Texas	263,776	BP-HUSKY REFINING LLC (50% BP, 50% Husky)	
TOTALENERGIES SE		BP-Husky Refining LLC	
TotalEnergies Petrochem & Refg USA		Toledo, Ohio	148,920
Port Arthur, Texas	238,000	TRANSWORLD OIL USA INC	
SHELL PLC		Calcasieu Refining Co	
Shell Oil Products US		Lake Charles, Louisiana	135,500
Norco, Louisiana	227,900	KINDER MORGAN ENERGY PTNRS LP	
CENOVUS ENERGY INC	221,000	Kinder Morgan Crude & Condensate	
Lima Refining Company		Galena Park, Texas	105,000
Lima, Ohio	183,000	SUNCOR ENERGY INC	103,000
Superior Refining Company LLC		Suncor Energy (USA) Inc	
Superior, Wisconsin	38,000	Commerce City West, Colorado	67,000
CVR ENERGY	206,500	Commerce City East, Colorado	36,000
Coffeyville Resources Rfg & Mktg			
Coffeyville, Kansas	132,000		
Wynnewood Refining Co			
Wynnewood, Oklahoma	74,500		
DELTA AIR LINES INC			
Monroe Energy LLC			
Trainer, Pennsylvania	190,000		
CHS INC	173,100		

Table 5. Refiners' Total Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 2023

CORPORATION / Refiner / Location	Barrels per Calendar Day	CORPORATION / Refiner / Location	Barrels per Calendar Day
CALUMET SPECIALTY PRODUCTS PARTNERS, L.P.	102,920	Corpus Christi, Texas	60,000
Calumet Shreveport Refining LLC		ERGON INC	48,800
Shreveport, Louisiana	57,000	Ergon Refining Inc	
Calumet Montana Refining LLC		Vicksburg, Mississippi	26,500
Great Falls, Montana	24,600	Ergon West Virginia Inc	
Calumet Cotton Valley Refining LLC		Newell, West Virginia	22,300
Cotton Valley, Louisiana	13,020	HARTREE PARTNERS LP	
Calumet Princeton Refining LLC		Hartree Channelview LLC	
Princeton, Louisiana	8,300	Channelview, Texas	45,000
Total	17,213,605	TEXAS INTL TERMINALS	
		Texas International Terminals	
		Galveston, Texas	45,000
		MAGELLAN MIDSTREAM PARTNERS LP	
		Magellan Processing LP	
		Corpus Christi, Texas	42,500
		COUNTRYMARK COOP INC	
		Countrymark Refining & Logistics LLC	
		Mount Vernon, Indiana	34,500
		FJ MANAGEMENT INC	
		Big West Oil Co	
		North Salt Lake, Utah	31,664
		Total	672,464
		Companies with Capacity	
		30,001 to 100,000 bbl/cd	
VERTEX ENERGY LP			
Vertex Refining Alabama LLC			
Saraland, Alabama	88,000		
ARCTIC SLOPE REGIONAL CORP	76,000		
Petro Star Inc			
Valdez, Alaska	55,000		
North Pole, Alaska	21,000		
PLACID OIL CO			
Placid Refining Co			
Port Allen, Louisiana	75,000		
RED APPLE GROUP INC			
United Refining Co			
Warren, Pennsylvania	65,000		
HUNT CONSLD INC	61,000		
Hunt Refining Co			
Tuscaloosa, Alabama	50,000		
Hunt Southland Refining Co			
Sandersville, Mississippi	11,000		
BUCKEYE PARTNERS LP			
Buckeye Texas Processing LLC			
		Companies with Capacity	
		10,001 to 30,000 bbl/cd	
		KERN OIL & REFINING CO	
		Kern Oil & Refining Co	
		Bakersfield, California	26,000
		PETROMAX REFINING CO LLC	
		Petromax Refining Co LLC	
		Houston, Texas	25,000

Table 5. Refiners' Total Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 2023

CORPORATION / Refiner / Location	Barrels per Calendar Day	CORPORATION / Refiner / Location	Barrels per Calendar Day
STARLIGHT RELATIVITY ACQUISITION CO		Goodway Refining LLC	
The San Antonio Refinery LLC		Atmore, Alabama	4,100
San Antonio, Texas	20,000	FORELAND REFINING CORP	
SILVER EAGLE REFINING INC		Foreland Refining Corp	
Silver Eagle Refining	18,000	Ely, Nevada	2,000
Woods Cross, Utah	15,000	TALLEY ASPHALT PRODUCTS INC	
Evanston, Wyoming	3,000	Talley Asphalt Products Inc	
CONOCOPHILLIPS CO		Kern, California	
ConocoPhillips Alaska Inc		Total.....	30,300
Prudhoe Bay, Alaska	15,000	U.S. Total.....	18,060,369
SAN JOAQUIN REFINING CO INC			
San Joaquin Refining Co Inc			
Bakersfield, California	15,000		
BLUE DOLPHIN ENERGY CO			
Lazarus Energy LLC			
Nixon, Texas	14,000		
AMERICAN REFINING GROUP INC			
American Refining Group Inc			
Bradford, Pennsylvania	11,000		
Total.....	144,000		
Companies with Capacity 10,000 bbl/cd or Less			
WORLD OIL CO			
Lunday Thagard Co			
South Gate, California	8,500		
MARTIN RESOURCE MGMT CORP			
Cross Oil Refining & Marketing Inc			
Smackover, Arkansas	7,500		
HILCORP ENERGY CO			
Hilcorp North Slope LLC			
Prudhoe Bay, Alaska	6,500		
GOODWAY REFINING LLC			

Table 5. Refiners' Total Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 2023

CORPORATION / Refiner / Location	Barrels per Calendar Day	CORPORATION / Refiner / Location	Barrels per Calendar Day

a Formerly owned by HollyFrontier Corporation
 b Formerly owned by Sinclair Oil Corporation
 c Formerly 50% Shell PLC and 50% Pemex
 d Formerly owned by Shell Chemical LP

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

Table 6. Operable Crude Oil and Downstream Charge Capacity of Petroleum Refineries,
(Thousand Barrels per Stream Day, Except Where Noted)

Year/PAD District	Atmospheric Crude Oil	Vacuum	Thermal	Catalytic Cracking		Catalytic Hydro-	Catalytic	Hydrotreating/ Desulfurization	Fuels Solvent
	Distillation	Distillation	Cracking	Fresh	Recycled	Cracking	Reforming	Desulfurization	Deasphalting
JAN 1, 1994	15,904	6,892	2,107	5,586	191	1,376	3,875	10,616	261
JAN 1, 1995	16,326	7,248	2,123	5,583	169	1,386	3,867	10,916	251
JAN 1, 1997	16,287	7,349	2,050	5,595	155	1,388	3,727	11,041	275
JAN 1, 1999	17,155	7,538	2,046	5,920	153	1,552	3,779	11,461	319
JAN 1, 2000	17,393	7,617	2,163	5,949	99	1,576	3,770	11,440	351
JAN 1, 2001	17,511	7,798	2,277	5,983	86	1,615	3,797	11,673	350
JAN 1, 2002	17,676	7,779	2,329	5,989	80	1,633	3,753	11,845	362
JAN 1, 2003	17,675	7,788	2,377	6,052	79	1,644	3,777	11,987	350
JAN 1, 2004	17,815	7,964	2,435	6,098	87	1,602	3,812	13,501	366
JAN 1, 2005	18,031	8,120	2,491	6,151	87	1,624	3,836	14,087	384
JAN 1, 2006	18,308	8,398	2,540	6,188	87	1,637	3,859	14,808	386
JAN 1, 2007	18,425	8,251	2,564	6,219	82	1,791	3,908	15,447	379
JAN 1, 2008	18,558	8,421	2,606	6,266	79	1,770	3,892	15,807	378
JAN 1, 2009	18,681	8,542	2,639	6,292	79	1,743	3,829	16,131	381
JAN 1, 2010	18,581	8,543	2,632	6,140	92	1,820	3,700	16,023	383
JAN 1, 2011	18,953	8,650	2,672	6,220	96	1,856	3,721	16,683	383
JAN 1, 2012	18,560	8,680	2,763	6,033	85	1,880	3,642	16,565	375
JAN 1, 2013	18,972	8,938	2,877	6,089	84	2,081	3,758	16,860	368
JAN 1, 2014	19,064	8,987	2,959	6,032	76	2,208	3,759	17,095	370
JAN 1, 2015	19,134	8,979	2,975	6,012	76	2,305	3,741	17,324	370
JAN 1, 2016	19,508	9,073	2,983	6,052	76	2,318	3,743	17,483	371
JAN 1, 2017	19,800	9,126	2,994	6,007	76	2,421	3,750	17,621	393
JAN 1, 2018	19,794	9,076	3,023	6,031	77	2,462	3,801	17,697	393
JAN 1, 2019	19,961	9,121	3,046	5,986	62	2,490	3,810	17,795	395
JAN 1, 2020	20,092	9,171	3,069	5,988	62	2,505	3,809	17,926	396
JAN 1, 2021	19,160	8,710	2,994	5,600	58	2,417	3,606	17,191	396
JAN 1, 2022	18,949	8,583	2,960	5,502	49	2,427	3,571	16,996	397
JAN 1, 2023	19,157	8,604	2,962	5,466	49	2,392	3,606	17,099	385
PADD I	931	391	55	305	5	48	183	755	22
PADD II	4,465	1,856	608	1,362	9	362	904	4,197	19
PADD III	10,277	4,696	1,661	2,830	17	1,387	1,844	9,163	259
PADD IV	696	239	76	210	2	37	121	562	6
PADD V	2,788	1,422	562	759	17	558	554	2,423	80
JAN 1, 2024^a	19,447	8,604	3,014	5,466	49	2,409	3,608	17,232	385
PADD I	931	391	55	305	5	48	183	755	22
PADD II	4,465	1,856	608	1,362	9	362	904	4,200	19
PADD III	10,567	4,696	1,713	2,830	17	1,404	1,847	9,293	259
PADD IV	696	239	76	210	2	37	121	562	6
PADD V	2,788	1,422	562	759	17	558	554	2,423	80
2023-2024^a	290	0	52	0	0	17	2	133	0
PADD I	0	0	0	0	0	0	0	0	0
PADD II	0	0	0	0	0	0	0	3	0
PADD III	290	0	52	0	0	17	3	130	0
PADD IV	0	0	0	0	0	0	0	0	0
PADD V	0	0	0	0	0	0	0	0	0

^a Projected data from refiners.

Notes:

NA = Not available.

Totals may not equal sum of components due to independent rounding.

The EIA-820 refinery capacity survey was not conducted for January 1, 1996 or January 1, 1998.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

Table 7. Operable Production Capacity of Petroleum Refineries
(Thousand Barrels per Stream Day, Except Where Noted)

Year/PAD District	Production Capacity							
	Alkylates	Aromatics	Asphalt and Road Oil	Isomers	Lubricants	Marketable Petroleum Coke	Hydrogen ^a (MMcfd)	Sulfur (short tons/day)
JAN 1, 1994	1,086	278	793	499	213	410	2,940	24,554
JAN 1, 1995	1,105	285	846	502	217	427	3,139	24,885
JAN 1, 1997	1,120	288	872	577	244	458	3,052	26,466
JAN 1, 1999	1,172	302	846	667	233	441	3,104	26,423
JAN 1, 2000	1,185	315	886	643	218	464	3,143	26,645
JAN 1, 2001	1,191	318	900	654	214	538	3,230	27,446
JAN 1, 2002	1,181	313	917	658	218	548	3,244	29,107
JAN 1, 2003	1,191	316	873	679	216	646	3,265	29,766
JAN 1, 2004	1,205	322	887	688	210	672	3,258	30,606
JAN 1, 2005	1,229	318	881	703	217	696	2,965	31,004
JAN 1, 2006	1,238	319	893	708	220	709	2,823	32,421
JAN 1, 2007	1,227	306	877	739	234	722	3,100	33,021
JAN 1, 2008	1,261	285	858	727	249	735	3,109	33,487
JAN 1, 2009	1,261	299	847	736	230	762	2,914	33,500
JAN 1, 2010	1,249	271	844	715	240	760	2,985	34,058
JAN 1, 2011	1,262	297	828	703	243	778	3,082	35,483
JAN 1, 2012	1,247	297	796	688	242	823	3,215	36,663
JAN 1, 2013	1,269	318	741	737	241	867	3,047	39,478
JAN 1, 2014	1,266	297	744	739	240	883	3,094	41,375
JAN 1, 2015	1,267	316	710	757	265	887	3,102	41,266
JAN 1, 2016	1,286	323	733	755	273	889	2,997	41,343
JAN 1, 2017	1,300	324	726	749	261	898	3,009	41,766
JAN 1, 2018	1,316	324	659	743	262	896	3,037	41,419
JAN 1, 2019	1,337	332	645	740	263	903	3,073	41,639
JAN 1, 2020	1,349	332	651	772	261	909	3,126	41,917
JAN 1, 2021	1,314	327	642	744	264	894	2,893	40,578
JAN 1, 2022	1,294	312	690	758	264	883	2,893	40,453
JAN 1, 2023	1,302	291	659	768	264	883	2,875	40,437
PADD I	48	5	45	19	21	14	109	1,074
PADD II	306	113	275	168	10	194	623	8,732
PADD III	667	172	228	336	193	490	747	24,125
PADD IV	45	0	62	16	0	24	208	910
PADD V	236	2	49	228	40	161	1,188	5,596
JAN 1, 2024^b	1,302	291	659	791	264	897	2,875	40,892
PADD I	48	5	45	19	21	14	109	1,074
PADD II	306	113	275	168	10	194	623	8,732
PADD III	667	172	228	359	193	505	747	24,580
PADD IV	45	0	62	16	0	24	208	910
PADD V	236	2	49	228	40	161	1,188	5,596
2023-2024^b	0	0	0	23	0	14	0	455
PADD I	0	0	0	0	0	0	0	0
PADD II	0	0	0	0	0	0	0	0
PADD III	0	0	0	23	0	15	0	455
PADD IV	0	0	0	0	0	0	0	0
PADD V	0	0	0	0	0	0	0	0

^a Includes hydrogen production capacity of hydrogen plants on refinery grounds and operated by the refinery operator.

^b Projected data from refiners.

Notes:

NA = Not available. MMcfd = Million cubic feet per day.

Totals may not equal sum of components due to independent rounding.

The EIA-820 refinery capacity survey was not conducted for January 1, 1996 or January 1, 1998.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

Table 8. Capacity and Fresh Feed Input to Selected Downstream Units at U.S. Refineries, 2021 - 2023
(Barrels per Calendar Day)

Year/PAD District	Cokers		Catalytic Crackers		Hydrocrackers		Reformers	
	Capacity	Inputs	Capacity	Inputs	Capacity	Inputs	Capacity	Inputs
2021	2,702,906	2,138,433	5,189,568	4,328,104	2,219,689	1,818,767	3,320,353	2,592,342
PADD I	49,100	33,838	277,300	252,899	43,100	40,663	135,550	113,729
PADD II	547,335	464,592	1,252,514	1,083,173	345,320	295,729	834,820	664,995
PADD III	1,534,221	1,198,468	2,756,954	2,251,573	1,280,677	1,017,751	1,734,645	1,343,422
PADD IV	68,550	54,603	194,800	153,142	53,092	27,173	111,500	92,425
PADD V	503,700	386,932	708,000	587,318	497,500	437,452	503,838	377,773
2022	2,673,997	2,262,575	5,089,089	4,365,696	2,237,826	1,846,526	3,285,715	2,724,740
PADD I	49,100	37,430	277,300	249,384	43,100	39,836	135,550	119,671
PADD II	551,924	476,515	1,250,820	1,056,071	342,020	286,545	832,719	675,310
PADD III	1,512,723	1,306,296	2,657,004	2,302,981	1,293,154	1,056,351	1,704,105	1,464,992
PADD IV	68,550	47,038	195,965	158,277	53,092	21,882	111,750	92,885
PADD V	491,700	395,296	708,000	598,984	506,460	441,912	501,591	371,882
2023	2,675,408	NA	5,063,828	NA	2,211,475	NA	3,323,502	NA
PADD I	49,100	NA	277,300	NA	44,100	NA	164,050	NA
PADD II	552,714	NA	1,257,319	NA	332,195	NA	833,344	NA
PADD III	1,503,074	NA	2,623,764	NA	1,295,488	NA	1,706,300	NA
PADD IV	70,270	NA	197,445	NA	35,092	NA	111,700	NA
PADD V	500,250	NA	708,000	NA	504,600	NA	508,108	NA

NA = Not Available.

Note: Capacities are as of January 1 of the indicated year.

Sources: Capacities are from the Energy Information Administration (EIA) Form EIA-820, "Annual Refinery Report." Inputs are from the form EIA-810, "Monthly Refinery Report." Year 2021 data are final, 2022 data are preliminary.

Table 9. Refinery Receipts of Crude Oil by Method of Transportation by PAD District, 2022
(Thousand Barrels)

Method	PAD Districts					United States
	I	II	III	IV	V	
Pipeline	22,982	1,385,701	2,679,632	178,112	250,053	4,516,480
Domestic	2,179	743,576	2,250,954	88,733	142,032	3,227,474
Foreign	20,803	642,125	428,678	89,379	108,021	1,289,006
Tanker	231,077	0	387,887	0	473,778	1,092,742
Domestic	31,816	0	22,668	0	168,535	223,019
Foreign	199,261	0	365,219	0	305,243	869,723
Barge	3,824	10,623	134,588	0	34,373	183,408
Domestic	3,824	10,623	112,778	0	1,109	128,334
Foreign	0	0	21,810	0	33,264	55,074
Tank Cars (Rail)	11,790	0	12,216	0	32,632	56,638
Domestic	2,376	0	1,491	0	24,580	28,447
Foreign	9,414	0	10,725	0	8,052	28,191
Trucks	2,476	2,286	51,582	33,340	7,298	96,982
Domestic	2,354	2,286	51,582	33,340	7,258	96,820
Foreign	122	0	0	0	40	162
Total	272,149	1,398,610	3,265,905	211,452	798,134	5,946,250
Domestic	42,549	756,485	2,439,473	122,073	343,514	3,704,094
Foreign	229,600	642,125	826,432	89,379	454,620	2,242,156

^a

Receipts are reported by the last method of transportation used if the distance traveled is greater than 100 miles. If several methods are used and none are greater than 100 miles, the method which represents the greatest distance traveled is reported. For example, if crude oil traveled by rail for 1,500 miles and then by barge for 120 miles, then the reported mode of transportation would be barge rather than rail.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

Table 10a. Fuel Consumed at Refineries by PAD District, 2022
(Thousand Barrels, Except Where Noted)

Table 10a. Fuel Consumed at Refineries by PAD District, 2022 (Thousand Barrels, Except Where Noted)						
Commodity	PAD Districts					United States
	I	II	III	IV	V	
Crude Oil	0	0	0	0	0	0
Hydrocarbon Gas Liquids	0	494	329	0	918	1,741
Distillate Fuel Oil	0	33	126	4	94	257
Residual Fuel Oil	5	36	1	0	0	42
Still Gas	10,701	52,155	109,969	8,339	43,129	224,293
Marketable Petroleum Coke	0	0	0	205	0	205
Catalyst Petroleum Coke	5,152	17,129	36,910	2,517	10,666	72,374
Natural Gas (million cubic feet)	51,793	176,104	587,274	27,807	200,651	1,043,629
Coal (thousand short tons)	0	0	0	0	0	0
Purchased Electricity (million kWh)	1,828	12,900	22,470	2,337	3,695	43,230
Purchased Steam (million pounds)	6,512	13,260	72,034	1,085	3,766	96,657
Other Products ^a	0	12	539	324	552	1,427

Note: Includes volumes used as fuel at refineries and all nonprocessing losses of crude oil and petroleum products (e.g., spills, fire losses, contamination, etc.)

^a Includes other hydrocarbons, hydrogen, unfinished oils, gasoline, special naphthas, jet fuel, lubricants, asphalt and road oil, and miscellaneous products.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report," and Form EIA-810, "Monthly Refinery Report."

Table 10b. Natural Gas Used as Feedstock for Hydrogen Production at Refineries by PAD District, 2022 (Million Cubic Feet)

Commodity	PAD Districts					United States
	I	II	III	IV	V	
Natural Gas Used As Feedstock For Hydrogen Production	6,202	50,913	53,291	17,032	43,634	171,072

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report".

Table 11. New, Shutdown and Reactivated Refineries During 2022

PAD District / Refinery	Location	Total Atmospheric Crude Oil Distillation Capacity (bbl/cd) ^a	Total Downstream Charge Capacity (bbl/sd) ^b	Date Operable	Date of Last Operation	Date Shutdown
SHUTDOWN						
PAD District V		9,500				
California Asphalt Production Inc	Santa Maria, CA	9,500			04/21	01/22
PAD District VI		176,400	480,000			
Port Hamilton Refg & Transp Llp	Kingshill, VI	176,400	480,000		05/21	08/22

^a bbl/cd=Barrels per calendar day.

^b bbl/sd=Barrels per stream day.

Table 12. Refinery Sales from January 2, 2022 to January 1, 2023

Former Corporation/Refiner	Total Atmospheric Crude Oil Distillation Capacity (bbl/cd)	New Corporation/Refiner	Date of Sale
Limetree Bay Ventures LLC/Limetree Bay Refining Kingshill, VI	176,400	Port Hamilton Refining and Transportation LLLP/Port Hamilton Refining and Transportation LLLP	1/22
Deer Park Refining LP/Deer Park Refining LP Deer Park, TX	312,500	PEMEX/Deer Park Refining LP	2/22
Shell PLC/Shell Chemical LP Saraland, AL	87,500	Vertex Energy/Vertex Refining Alabama LLC	2/22
HollyFrontier Corp/HollyFrontier El Dorado Refining LLC El Dorado, KS	162,000	HF Sinclair Corp/El Dorado Refining LLC	3/22
HollyFrontier Corp/HollyFrontier Navajo Refining LLC Artesia, NM	110,000	HF Sinclair Corp/Navajo Refining LLC	3/22
HollyFrontier Corp/HollyFrontier Puget Sound Refining LLC Anacortes, WA	145,000	HF Sinclair Corp/Puget Sound Refining LLC	3/22
HollyFrontier Corp/HollyFrontier Tulsa Refining LLC Tulsa (East), OK Tulsa (West), OK	85,000 70,300	HF Sinclair Corp/Tulsa Refining LLC	3/22
HollyFrontier Corp/HollyFrontier Woods Cross Refining LLC Woods Cross, UT	39,330	HF Sinclair Corp/Woods Cross Refining LLC	3/22
Sinclair Oil Corp/Sinclair Casper Refining CO Evansville, WY	29,850	HF Sinclair Corp/Sinclair Casper Refining CO	3/22
Sinclair Oil Corp/Sinclair Wyoming Refining CO Sinclair, WY	75,000	HF Sinclair Corp/Sinclair Wyoming Refining CO	3/22

bbl/cd= Barrels per calendar day

Sources: Energy Information Administration (EIA) Form EIA-810, "Monthly Refinery Report" and Form EIA-820, "Annual Refinery Report."

Table 13. Refineries Permanently Shutdown By PAD District Between January 1, 1990 and January 1, 2023

PAD District / Refinery	Location	Total Atmospheric Crude Oil Distillation Capacity (bbl/cd)	Total Downstream Charge Capacity (bbl/sd)	Date of Last Operation	Date Shutdown
PAD District I		979,450	1,662,600		
Primary Energy Corp	Richmond, VA	6,100	0	a	
GNC Energy Corp	Greensboro, NC	3,000	0	a	
Saint Mary's Refining Co	Saint Mary's, WV	4,000	4,480	02/93	03/93
Cibro Refining	Albany, NY	41,850	27,000	07/93	09/93
Calumet Lubricants Co LP	Rouseville, PA	12,800	26,820	03/00	06/00
Young Refining Corp.	Douglasville, GA	5,400	0	07/04	07/04
Sunoco Inc	Westville, NJ	145,000	263,000	11/09	02/10
Western Refining Yorktown Inc	Yorktown, VA	66,300	182,600	09/11	12/11
Sunoco Inc	Marcus Hook, PA	178,000	278,000	12/11	12/11
Chevron USA Inc	Perth Amboy, NJ	80,000	47,000	03/08	07/12
Hess Corporation	Port Reading, NJ	0	115,000	02/13	03/13
Axeon Specialty Products LLC	Savannah, GA	28,000	0	09/12	12/14
Axeon Specialty Products LLC	Paulsboro, NJ	74,000	32,000	04/17	06/17
Philadelphia Energy Solutions	Philadelphia, PA	335,000	686,700	a	
PAD District II		496,815	670,790		
Coastal Refining & Mktg	El Dorado, KS	0	20,000	b	
Intercoastal Energy Svcs Corp	Troy, IN	1,250	2,250	11/90	03/91
Farmland Industries	Philipsburg, KS	26,400	22,800	12/91	07/92
Coastal Refining & Mktg	Wichita, KS	28,800	41,300	05/93	06/93
Coastal Refining & Mktg	Augusta, KS	0	21,000	06/93	06/93
Crystal Refining	Carson City, MI	3,000	0	10/92	09/93
Marathon	Indianapolis, IN	50,000	68,000	09/93	10/93
Indian Refining	Lawrenceville, IL	80,750	103,000	09/95	10/95
Cyril Petrochemical Corp	Cyril, OK	7,500	0	09/95	12/95
Laketon Refining	Laketon, IN	11,100	0	06/95	01/96
Total Petroleum, Inc.	Arkansas City, KS	56,000	74,840	08/96	09/96
TPI Petro Inc.	Alma, MI	51,000	63,300	11/99	12/99
Premcor Refining Group	Blue Island, IL	80,515	124,500	01/01	04/01
Premcor Refining Group	Hartford, IL	64,000	116,700	09/02	10/02
Ventura Refining & Transmission LLC	Thomas, OK	12,000	0	10/10	11/14
Continental Refining Company LLC	Somerset, KY	5,500	3,600	02/18	12/19
Dakota Prairie Refining LLC	Dickinson, ND	19,000	9,500	d	

Table 13. Refineries Permanently Shutdown By PAD District Between January 1, 1990 and January 1, 2023

PAD District / Refinery	Location	Total Atmospheric Crude Oil Distillation Capacity (bbl/cd)	Total Downstream Charge Capacity (bbl/sd)	Date of Last Operation	Date Shutdown
PAD District III		838,226	1,447,640		
Imron Refining, Inc.	San Leon, TX	7,000	0	c	
Eagle Refining	Jackson, TX	1,800	1,800	01/90	10/90
Vulcan Refining	Cordova, AL	9,500	5,000	09/90	12/90
Sabine Resources	Stonewall, LA	12,000	0	c	
Rattlesnake Refining	Wickett, TX	8,000	10,400	02/92	03/92
Longview Refining Assoc	Longview, TX	13,300	13,800	08/92	09/92
Thriftway Co	Bloomfield, NM	4,000	3,250	01/92	10/92
El Paso Refining	El Paso, TX	50,000	76,000	10/92	12/92
Dubach Gas	Dubach, LA	8,500	3,000	12/93	12/93
Amerada Hess	Purvis, MS	30,000	50,500	01/94	02/94
Barrett Refg Corp	Vicksburg, MS	8,000	0	06/95	01/96
Arcadia Refining & Mktg	Lisbon, LA	7,350	6,700	01/96	02/96
Canal Refg Co.	Chuch Point, LA	9,500	2,100	07/95	09/97
Gold Line Refining LTD	Jennings, LA	12,000	0	07/97	01/98
Petrolite Corp	Kilgore, TX	600	750	12/97	02/98
Pride Refining Inc.	Abilene, TX	42,750	40,500	05/98	04/98
Shell Oil Co	Odessa, TX	28,300	33,500	10/98	11/98
Berry Petroleum Co.	Stephens, AR	6,700	3,700	07/99	02/00
Dow Haltermann Products	Channelview, TX	880	0	09/04	12/05
Hunt Southland Refining Co	Lumberton, MS	5,800	0	03/05	12/06
Gulf Atlantic Operations LLC	Mobile, AL	16,700	15,400	03/06	09/07
Western Refining Southwest Inc	Bloomfield, NM	16,800	19,500	12/09	11/12
Trigeant LTD	Corpus Christi, TX	0	29,000	12/13	12/14
Pelican Refining Company LLC	Lake Charles, LA	0	12,000	12/14	01/15
Shell Oil Products US	Saint Rose, LA	45,000	25,000	01/18	01/18
Western Refining Southwest Inc	Gallup, NM	27,000	37,500	04/20	09/20
Shell Oil Products US	Convent, LA	211,146	574,900	12/20	01/21
Phillips 66 Company	Belle Chasse, LA	255,600	483,340	a	

Table 13. Refineries Permanently Shutdown By PAD District Between January 1, 1990 and January 1, 2023

PAD District / Refinery	Location	Total Atmospheric Crude Oil Distillation Capacity (bbl/cd)	Total Downstream Charge Capacity (bbl/sd)	Date of Last Operation	Date Shutdown
PAD District IV		109,800	188,100		
Amoco Oil Co.	Casper, WY	40,000	44,900	12/91	12/91
Landmark Refining	Fruita, CO	10,000	25,900	01/92	11/93
Pennzoil Producing Co.	Roosevelt, UT	8,000	12,900	09/94	10/94
Antelope Refining LLC	Douglas, WY	3,800	0	02/15	12/16
HollyFrontier Cheyenne Refining LLC	Cheyenne, WY	48,000	104,400	d	
PAD District V		665,360	1,037,750		
Gibson Oil & Refining	Bakersfield, CA	9,600	0	07/87	12/90
Chevron USA Inc	Kenai, AK	22,000	0	06/91	07/91
Anchor Refining Co.	McKittrick, CA	10,000	6,000	06/91	08/91
Golden West	Santa Fe Springs, CA	47,000	94,300	02/92	03/92
Eco Asphalt Inc.	Long Beach, CA	10,550	7,000	c	
Fletcher Oil & Refining	Carson, CA	29,675	48,100	09/92	10/92
Sunbelt Refining	Coolidge, AZ	10,000	7,000	08/93	09/93
Chemoil Refining Corp	Long Beach, CA	18,000	0	02/94	04/94
Powerine Oil Co.	Santa Fe Springs, CA	46,500	100,300	06/95	09/95
Sunland Refining Corp.	Bakersfield, CA	12,000	2,650	03/95	12/95
Intermountain Refining Co.	Fredonia, AZ	3,800	2,000	01/94	05/96
Pacific Refining Co.	Hercules, CA	50,000	62,400	07/95	09/97
Sound Refining Inc	Tacoma, WA	11,900	6,000	10/98	12/98
Chevron USA Inc.	Richmond Beach, WA	0	6,200	05/00	06/00
Foreland Refining Corp.	Tonopah, NV	0	3,000	02/01	01/02
Tricor Refining LLC	Bakersfield, CA	0	14,400	07/01	01/02
Paramount Petroleum Corporation	Portland, OR	0	10,000	11/06	12/08
Tenby Inc	Oxnard, CA	2,800	0	12/11	12/11
Flint Hills Resources LP	North Pole, AK	126,535	5,500	a	
Alon Bakersfield Operating Inc	Bakersfield, CA	0	52,000	12/08	09/17
Paramount Petroleum Corporation	Paramount, CA	84,500	78,500	d	
Tesoro Refining & Marketing Co	Martinez, CA	161,000	532,400	d	
California Asphalt Production Inc	Santa Maria, CA	9,500		04/21	01/22
U.S. Total		3,089,651	5,006,880		

Table 13. Refineries Permanently Shutdown By PAD District Between January 1, 1990 and January 1, 2023

PAD District / Refinery	Location	Total Atmospheric Crude Oil Distillation Capacity (bbl/cd)	Total Downstream Charge Capacity (bbl/sd)	Date of Last Operation	Date Shutdown
PAD District VI		380,700	807,200		
Arochem International	Ponce, PR	75,600	37,000	12/91	12/92
Peerless Oil & Chemical	Ponce, PR	8,800	45,200	09/94	12/94
Chevron Phillips Chem	Guayama, PR	0	93,200	03/01	01/02
Caribbean Petroleum Corp	San Juan, PR	42,000	60,500	12/00	01/05
Shell Chem Yabucoa Inc	Yabucoa, PR	77,900	91,300	10/08	12/09
Port Hamilton Refg & Transp Lllp	Kingshill, VI	176,400	480,000	05/21	08/22

a. Facility in operation as other than a refinery since it no longer processes crude oil or unfinished oils.

b. Facility maintained asphalt production capacity until September, 2004.

c. Never Operated

d. Converted to a renewable diesel plant

bbl/cd=Barrels per calendar day

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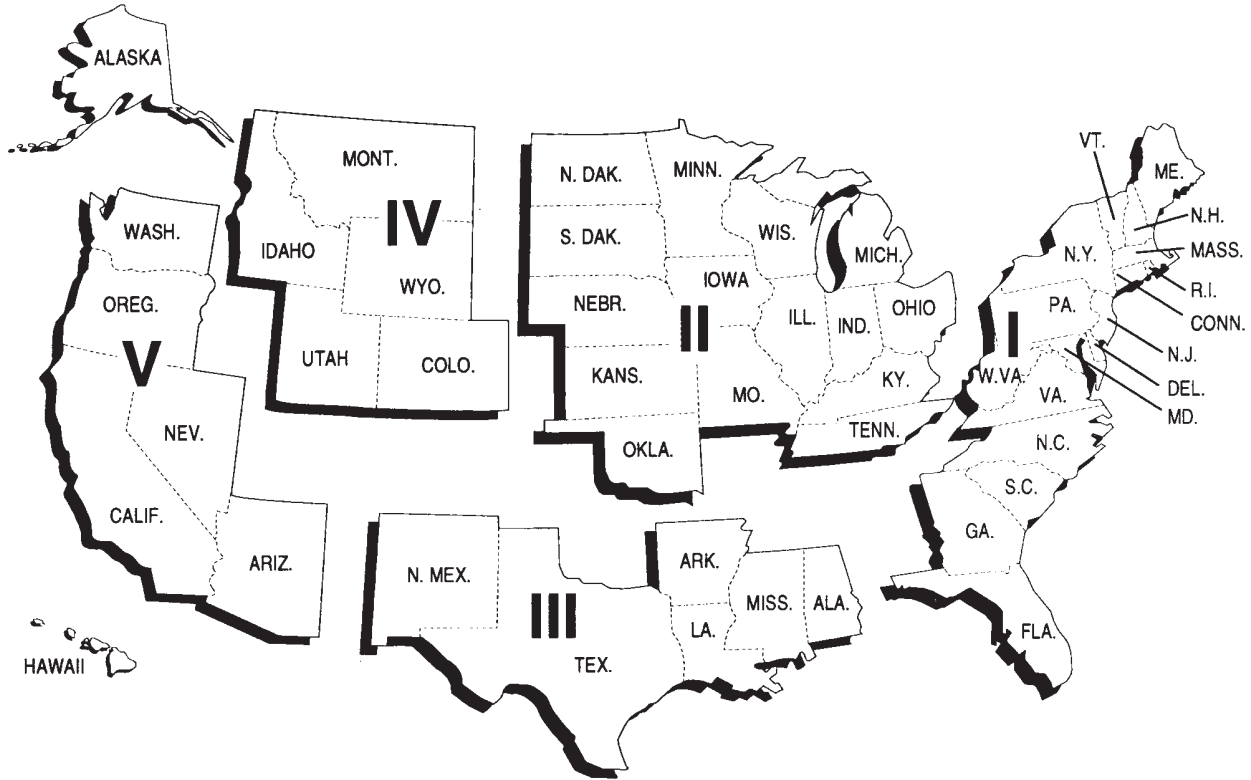


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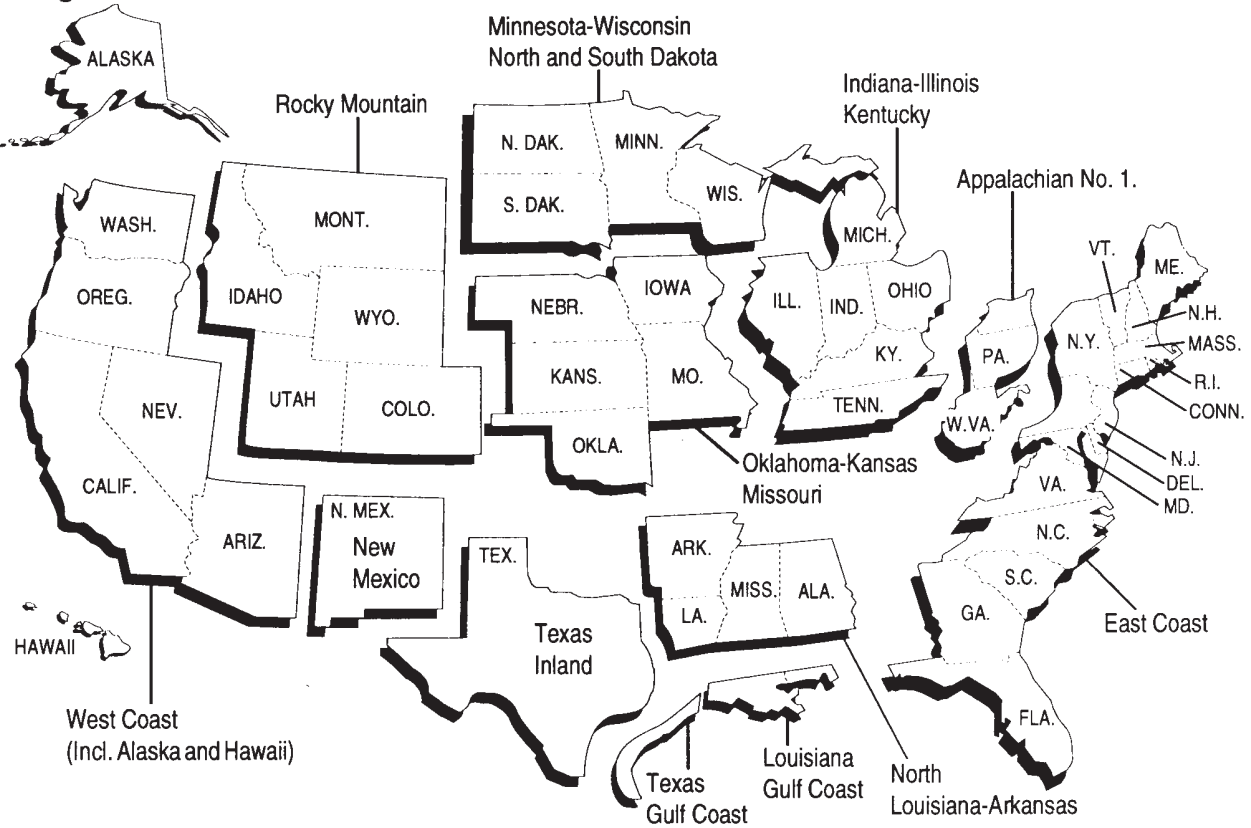
Appendix A: District Descriptions and Maps



Petroleum Administration for Defense (PAD) Districts



Refining Districts



Appendix A

District Descriptions and Maps

The following are the Refining Districts which make up the Petroleum Administration for Defense (PAD) Districts.

PAD District I

East Coast: District of Columbia and the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, and the following counties of the State of New York: Cayuga, Tompkins, Chemung, and all counties east and north thereof. Also the following counties in the State of Pennsylvania: Bradford, Sullivan, Columbia, Montour, Northumberland, Dauphin, York, and all counties east thereof.

Appalachian No. 1: The State of West Virginia and those parts of the States of Pennsylvania and New York not included in the East Coast District.

Sub-PAD District I

New England: The States of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.

Central Atlantic: The District of Columbia and the States of Delaware, Maryland, New Jersey, New York, and Pennsylvania.

Lower Atlantic: The States of Florida, Georgia, North Carolina, South Carolina, Virginia and West Virginia.

PAD District II

Indiana-Illinois-Kentucky: The States of Indiana, Illinois, Kentucky, Tennessee, Michigan, and Ohio.

Minnesota-Wisconsin-North and South Dakota: The States of Minnesota, Wisconsin, North Dakota, and South Dakota.

Oklahoma-Kansas-Missouri: The States of Oklahoma, Kansas, Missouri, Nebraska, and Iowa.

PAD District III

Texas Inland: The State of Texas except the Texas Gulf Coast District.

Texas Gulf Coast: The following counties of the State of Texas: Newton, Orange, Jefferson, Jasper, Tyler, Hardin, Liberty, Chambers, Polk, San Jacinto, Montgomery, Harris, Galveston, Waller, Fort Bend, Brazoria, Wharton, Matagorda, Jackson, Victoria, Calhoun, Refugio, Aransas, San Patricio, Nueces, Kleberg, Kenedy, Willacy, and Cameron.

Louisiana Gulf Coast: The following Parishes of the State of Louisiana: Vernon, Rapides, Avoyelles, Pointe Coupee, West Feliciana, East Feliciana, Saint Helena, Tangipahoa, Washington, and all Parishes south thereof. Also the following counties of the State of Mississippi: Pearl River, Stone, George, Hancock, Harrison, and Jackson. Also the following counties of the State of Alabama: Mobile and Baldwin.

North Louisiana-Arkansas: The State of Arkansas and those parts of the States of Louisiana, Mississippi, and Alabama not included in the Louisiana Gulf Coast District.

New Mexico: The State of New Mexico.

PAD District IV

Rocky Mountain: The States of Montana, Idaho, Wyoming, Utah, and Colorado.

PAD District V

West Coast: The States of Washington, Oregon, California, Nevada, Arizona, Alaska, and Hawaii.

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Appendix B: Explanatory Notes



Appendix B

Explanatory Notes

Survey Methodology

Description of Survey Form

The Form EIA-820, “Annual Refinery Report,” is the primary source of data in the “Refinery Capacity Report” tables. The form collects data on the consumption of purchased steam, electricity, coal, and natural gas; refinery receipts of crude oil by method of transportation; operable capacity for atmospheric crude oil distillation units and downstream units; and production capacity for selected petroleum products.

Frame

The respondent frame consists of all operating and idle petroleum refineries, located in the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam and other U.S. possessions. As of January 1, 2023 there were 131 refineries.

The respondent frame is maintained by monitoring the monthly Form EIA-810, “Monthly Refinery Report,” and industry publications for changes and developments in the petroleum industry such as refinery sales, mergers and new operations.

Collection

The Form EIA-820 is sent to respondents in January. Survey forms can be submitted by secure file transfer. Completed forms are required to be submitted by the 15th day of February of the current report year. Receipt of the reports is monitored using an automated respondent mailing list. Telephone follow-up calls are made to secure responses from those companies failing to report by February 15th.

Processing and Micro Editing

Upon receipt, all reported data are transformed into a standard format and sent through a log-in and prescreening process to validate respondent control information and resolve any discrepancies. The data are then processed using generalized edit and imputation procedures. Automated editing procedures check current data for consistency with past data and for internal consistency (e.g., totals equal to the sums of the parts).

After the edit failures are resolved and imputation performed for nonrespondents, preliminary tables are produced and used to identify anomalies. Anomalies result in further review of respondent data which in turn may result in additional flagged data and imputation.

Imputation and Estimation

Imputation is performed for companies that fail to file prior to the publication deadline. When nonresponse occurs, values for these companies are imputed from data reported on the most recent year’s Form EIA-820 and/or from data reported on Form EIA-810, “Monthly Refinery Report,” for that company. For most surveyed items, the value imputed for nonrespondents is the value that the company reported on the Form EIA-820 for the most recent year. For two categories of information however, the imputed value is also based on their data from the Form EIA-810 as follows:

Part 4: Refinery Receipts of Crude Oil by Method of Transportation

The imputation methodology for this section is based on data reported on both the monthly Form EIA-810 and the annual Form EIA-820. Annual refinery receipts of domestic and foreign crude oil for a nonrespondent are imputed by aggregating the values for the refinery on the monthly survey. These values are allocated to the method of transportation by using the percentages reported for the refinery in the previous year.

Part 5: Atmospheric Crude Oil Distillation Capacity

Operable atmospheric crude oil distillation capacity in barrels per calendar day is collected on the monthly Form EIA-810 as of the first day of each month and on the annual Form EIA-820 as of January 1. As part of the editing process for the Form EIA-820, these two values are compared. Companies are contacted and any discrepancies are resolved by the time of publication. Imputed values for operable atmospheric crude oil distillation capacity in barrels per calendar day are taken directly from the January Form EIA-810. A barrel per stream day capacity is then derived by dividing the reported barrels per calendar day capacity by .95.

Parts 6 and 7: Downstream Charge Capacity and Production Capacity

Current year and projected year data for downstream charge capacity and production capacity are taken directly from the previous year’s annual report.

Macro Editing

A comparison of the data collected on the EIA-820 with other similar data series and industry trade journals is performed each year.

Dissemination

Prior to 2006, the data collected on Form EIA-820, "Annual Refinery Report," was published in the Petroleum Supply Annual, Volume 1. Beginning with data for 2006, the Form EIA-820 data are published as a standalone product in the EIA publication "Refinery Capacity Report." This report contains statistics on consumption of purchased steam, electricity, coal, and natural gas; refinery receipts of crude oil by method of transportation; current and projected capacities for atmospheric crude oil distillation, downstream charge and production capacities. The data are also published in the Annual Energy Review. The "Refinery Capacity Report" can be found at: <http://www.eia.gov/petroleum/refinerycapacity/>

Additional Sources of Data

The Form EIA-820, "Annual Refinery Report," is the primary source of data in the "Refinery Capacity Report" tables. In addition, some data collected on the Form EIA- 810, "Monthly Refinery Report," are included.

Quality

Response Rates

The response rate for the Form EIA-820 is normally 100 percent.

Non-sampling Errors

There are two types of errors usually associated with data produced from a survey -sampling errors and nonsampling errors. Because estimates from the Form EIA-820 survey are based on a complete census of the frame of petroleum refineries, there is no sampling error in the data presented in this report. The data, however, are subject to nonsampling errors. Nonsampling errors are those which can arise from: (1) the inability to obtain data from all companies in the frame or sample (nonresponse) and the method used to account for nonresponses; (2) definitional difficulties and/or improperly worded questions which lead to different interpretations; (3) mistakes in recording or coding the data obtained from respondents; and (4) other errors of collection, response, coverage, and estimation. Quality control procedures are employed in the collection and editing operations to minimize misrepresentation and misreporting. Nonresponse follow-up procedures are employed to reduce the number of nonrespondents, and procedures employed to impute missing data, introduce a minimal amount of error, given the relatively small volume of imputed data.

Resubmissions

EIA-820 resubmissions are required whenever an error greater than 5 percent of the true value is discovered. In the event of a reporting error, company reports are updated after contact with the company and are followed up by corrected report resubmissions.

Revision Policy

The "Refinery Capacity Report" reflects EIA's final data on refinery capacity and will be revised only if, in EIA's judgment, a revision is expected to substantively affect understanding of the U.S. refinery capacity.

Confidentiality

Information on operable atmospheric crude oil distillation capacity, downstream charge capacity, and production capacity reported on Parts 5, 6, and 7 of Form EIA-820 are not considered confidential and are published in the "Refinery Capacity Report." All other information reported on Form EIA-820 (i.e. Parts 3 and 4 and respondent information) will be protected and not disclosed to the public to the extent that it satisfies the criteria for exemption under the Freedom of Information Act (FOIA), 5 U.S.C. §552, the DOE regulations, 10 C.F.R. §1004.11, implementing the FOIA, and the Trade Secrets Act, 18 U.S.C. §1905.

The Federal Energy Administration Act requires the EIA to provide company-specific data to other Federal agencies when requested for official use. The information reported on this form may also be made available, upon request, to another component of the Department of Energy (DOE); to any Committee of Congress, the General Accountability Office, or other Federal agencies authorized by law to receive such information. A court of competent jurisdiction may obtain this information in response to an order. The information may be used for any nonstatistical purposes such as administrative, regulatory, law enforcement, or adjudicatory purposes.

Company specific data are also provided to other DOE offices for the purpose of examining specific petroleum operations in the context of emergency response planning and actual emergencies.

Disclosure limitation procedures are not applied to the statistical data published from this survey's information. Thus, there may be some statistics that are based on data from fewer than three respondents, or that are dominated by data from one or two large respondents. In these cases, it may be possible for a knowledgeable person to estimate the information reported by a specific respondent.

Refinery Capacity History

Refinery capacity data collection was begun in 1918 by the Bureau of Mines, then in the Department of Commerce, and was operated on a voluntary basis until 1980. In 1980, the mandatory Energy Information Administration (EIA) Form EIA-177, "Capacity of Petroleum Refineries," was implemented. Information on refining capacity was expanded to include not only current year operations, but two-year projections, and refinery input/production data. Working storage capacity data was also added to the form and product categories were added for total coverage. Information on refinery downstream facilities was expanded to include a breakdown of thermal operations and to add vacuum distillation, catalytic hydrotreating and hydrorefining. Production capacity was also added to include information on isomerization, alkylation, aromatics, asphalt/road oil, coking, lubricants and hydrogen.

In 1983, the form was revised to improve the consistency and quality of the data collected by the EIA and redesignated as Form EIA-820, "Annual Refinery Report." Two sections for data previously reported monthly were added: (1) refinery receipts of crude oil by method of transportation, and (2) fuels consumed for all purposes at refineries. Also, the second year projections on refining capacity were eliminated. As a result of a study conducted by the EIA evaluating motor gasoline data collected by the Federal Highway Administration (FHWA) and by the EIA, motor gasoline blending plants were included for the first time in the respondent frame in order to produce more accurate statistics on the production of motor gasoline.

In 1987, the form was revised to reduce respondent burden and to better reflect current refinery operations through updated terminology. Information on projected input/production of refinery processing facilities was deleted. Several categories under catalytic hydrotreating were combined: naphtha and reformer feeds were combined into a single category as well as residual fuel oil and "other." Thermal cracking types, gas oil and "other" were also combined into a single category. Catalytic reforming types, conventional and bi-metallic were replaced with low and high pressure processing units. Two new categories were added: fuels solvent deasphalting was added to downstream charge capacity and sulfur recovery was added to production capacity.

In 1994, the form was revised to enable EIA to calculate utilization rates for certain downstream processing units and to reflect storage capacity of fuels mandated by the Clean Air Act Amendments of 1990. Additions to the form included calendar day downstream charge capacity for fluid and delayed coking, catalytic cracking, and catalytic hydrocracking. Also storage capacity categories for reformulated, oxygenated,

and other finished motor gasoline were added, as well as oxygenate storage capacity and separate categories for high and low sulfur distillate fuel oil.

In 1995, motor gasoline blending plants were dropped from the survey frame, since by this time, the only section of the form that applied to them was working and shell storage capacity. Also in 1995, a decision was made to no longer collect storage capacity from shutdown refineries; therefore, these refineries were also eliminated from the survey frame.

In 1996, the survey was moved to a biennial schedule (every other year) and was renamed "Biennial Refinery Report." The survey was not conducted for January 1, 1996 or January 1, 1998. Respondents were not required to submit data for crude oil and petroleum products consumed at refineries during 1995 and 1997. These data are available from the Form EIA-810, "Monthly Refinery Report." The requirement to submit data for refinery consumption of natural gas, coal, and purchased steam and electricity on the Form EIA-820 remained.

In 2000, the survey was moved to an annual schedule.

In 2004, the survey form was amended to reflect the increasing emphasis on the removal of sulfur from transportation fuels.

In 2009, natural gas used as feedstock for hydrogen plant production was added to the form. Also, isooctane production capacity was added.

In 2010, the survey form was amended to reflect the increasing use of bio-fuels. Storage capacities of biomass-based diesel fuel, other renewable diesel fuel and other renewable fuels were added to the form. Also, barrels per calendar day capacity of the catalytic reformer was added; previously this was only collected on a stream day basis.

In 2011, storage capacity data was removed from the form. Storage capacity is now being collected as of March 31 on the Form EIA-810, "Monthly Refinery Report."

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Glossary



Glossary

Definitions of Petroleum Products and Other Terms (Revised June 2019)

Alcohol. The family name of a group of organic chemical compounds composed of carbon, hydrogen, and oxygen. The series of molecules vary in chain length and are composed of a hydrocarbon plus a hydroxyl group; $\text{CH}_3(\text{CH}_2)_n\text{-OH}$ (e.g., methanol, ethanol, and tertiary butyl alcohol).

Alkylate. The product of an alkylation reaction. It usually refers to the high-octane product from alkylation units. This alkylate is used in blending high octane gasoline.

Alkylation. A refining process for chemically combining isobutane with olefin hydrocarbons (e.g., propylene, butylenes) through the control of temperature and pressure in the presence of an acid catalyst, usually sulfuric acid or hydrofluoric acid. The product, alkylate, an isoparaffin, has high octane value and is blended with motor and aviation gasoline to improve the antiknock value of the fuel.

API Gravity. A scale expressing the gravity or density of liquid petroleum products. The measuring scale is calibrated in terms of degrees API; it may be calculated in terms of the following formula:

$$\text{Degrees API} = 141.5/\text{sp.gr.}_{60^\circ \text{ F}/60^\circ \text{ F}} - 131.5$$

The higher the API gravity, the lighter the compound. Light crudes generally exceed 38 degrees API and heavy crudes are commonly labeled as all crudes with an API gravity of 22 degrees or below. Intermediate crudes fall in the range of 22 degrees to 38 degrees API gravity.

Aromatics. Hydrocarbons characterized by unsaturated ring structures of carbon atoms. Commercial petroleum aromatics are benzene, toluene, and xylenes (BTX).

Asphalt. A dark-brown-to-black cement-like material containing bitumens as the predominant constituent obtained by petroleum processing; used primarily for road construction. It includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts. Note: The conversion factor for asphalt is 5.5 barrels per short ton.

ASTM. The acronym for the American Society for Testing and Materials.

Atmospheric Crude Oil Distillation. The refining process of separating crude oil components at atmospheric pressure by heating to temperatures of about 600 degrees Fahrenheit to 750 degrees Fahrenheit (depending on the nature of the crude oil and desired products) and subsequent condensing of the fractions by cooling.

Aviation Gasoline (Finished). A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in aviation reciprocating engines. Fuel specifications are provided in ASTM Specification D 910 and Military Specification MIL-G-5572. Note: Data on blending components are not counted in data on finished aviation gasoline.

Aviation Gasoline Blending Components. Naphtha's which will be used for blending or compounding into finished aviation gasoline (e.g., straight-run gasoline, alkylate, reformate, benzene, toluene, and xylenes). Excludes oxygenates (alcohols, ethers), butanes, and pentanes. Oxygenates are reported as other hydrocarbons, hydrogen, and oxygenates.

Barrel. A unit of volume equal to 42 U.S. gallons.

Barrels per Calendar Day. The amount of input that a distillation facility can process under usual operating conditions. The amount is expressed in terms of capacity during a 24-hour period and reduces the maximum processing capability of all units at the facility under continuous operation (see Barrels per Stream Day) to account for the following limitations that may delay, interrupt, or slow down production: the capability of downstream facilities to absorb the output of crude oil processing facilities of a given refinery. No reduction is made when a planned distribution of intermediate streams through other than downstream facilities is part of a refinery's normal operation; the types and grades of inputs to be processed; the types and grades of products expected to be manufactured; the environmental constraints associated with refinery operations; the reduction of capacity for scheduled downtime due to such conditions as routine inspection, maintenance, repairs, and turnaround; and the reduction of capacity for unscheduled downtime due to such conditions as mechanical problems, repairs, and slowdowns.

Barrels Per Stream Day. The maximum number of barrels of input that a distillation facility can process within a 24-hour period when running at full capacity under optimal crude and product slate conditions with no allowance for downtime.

Benzene (C₆H₆). An aromatic hydrocarbon present in small proportion in some crude oils and made commercially from petroleum by the catalytic reforming of naphthenes in petroleum naphtha. It is also made from coal in the manufacture of coke. Used as a solvent, in manufacturing detergents, synthetic fibers, and petrochemicals and as a component of high-octane gasoline.

Blending Components. See Motor or Aviation Gasoline Blending Components.

Blending Plant. A facility which has no refining capability but is either capable of producing finished motor gasoline through mechanical blending or blends oxygenates with motor gasoline.

Bonded Petroleum Imports. Petroleum imported and entered into Customs bonded storage. These imports are not included in the import statistics until they are: (1) withdrawn from storage free of duty for use as fuel for vessels and aircraft engaged in international trade; or (2) withdrawn from storage with duty paid for domestic use.

BTX. The acronym for the commercial petroleum aromatics benzene, toluene, and xylenes. See individual categories for definitions.

Bulk Station. A facility used primarily for the storage and/or marketing of petroleum products which has a total bulk storage capacity of less than 50,000 barrels and receives its petroleum products by tank car or truck.

Bulk Terminal. A facility used primarily for the storage and/or marketing of petroleum products which has a total bulk storage capacity of 50,000 barrels or more and/or receives petroleum products by tanker, barge, or pipeline.

Butane (C4H10). A normally gaseous four-carbon straight-chain or branched-chain hydrocarbon extracted from natural gas or refinery gas streams. It includes normal butane and refinery-grade butane and is designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial butane.

***Refinery-Grade Butane (C4H10).** A refinery-produced stream that is composed predominantly of normal butane and/or isobutane and may also contain propane and/or natural gasoline. These streams may also contain significant levels of olefins and/or fluorides contamination.*

Butylenes (C4H8). A four-carbon olefinic hydrocarbon recovered from refinery processes.

Captive Refinery Oxygenate Plants. Oxygenate production facilities located within or adjacent to a refinery complex.

Catalytic Cracking. The refining process of breaking down the larger, heavier, and more complex hydrocarbon molecules into simpler and lighter molecules. Catalytic cracking is accomplished by the use of a catalyst and is an effective process for increasing the yield of gasoline from crude oil. Catalytic cracking processes fresh feeds and recycled feeds.

***Fresh Feeds.** Crude oil or petroleum distillates which are being fed to processing units for the first time.*

***Recycled Feeds.** Streams that have been processed and are fed back to the reactor for additional processing.*

Catalytic Hydrocracking. A refining process that uses hydrogen and catalysts with relatively low temperatures and high pressures for converting middle boiling or residual material to high-octane gasoline, reformer charge stock, jet fuel, and/or high-grade fuel oil. The process uses one or more catalysts, depending upon product output, and can handle high sulfur feedstocks without prior desulfurization.

Catalytic Hydrotreating. A refining process for treating petroleum fractions from atmospheric or vacuum distillation units (e.g., naphthas, middle distillates, reformer feeds, residual fuel oil, and heavy gas oil) and other petroleum (e.g., cat cracked naphtha, coker naphtha, gas oil, etc.) in the presence of catalysts and substantial quantities of hydrogen. Hydrotreating includes desulfurization, removal of substances (e.g., nitrogen compounds) that deactivate catalysts, conversion of olefins to paraffins to reduce gum formation in gasoline, and other processes to upgrade the quality of the fractions.

Catalytic Reforming. A refining process using controlled heat and pressure with catalysts to rearrange certain hydrocarbon molecules, thereby converting paraffinic and naphthenic hydrocarbons (e.g., low-octane gasoline boiling range fractions) into petrochemical feedstocks and higher-octane stocks suitable for blending into finished gasoline. Catalytic reforming is reported in two categories. They are:

***Low Pressure.** A processing unit operating at less than 225 pounds per square inch gauge (PSIG) measured at the outlet separator.*

***High Pressure.** A processing unit operating at either equal to or greater than 225 pounds per square inch gauge (PSIG) measured at the outlet separator.*

Charge Capacity. The input (feed) capacity of the refinery processing facilities.

Coal. A readily combustible black or brownish-black rock whose composition, including inherent moisture, consists of more than 50 percent by weight and more than 70 percent by volume of carbonaceous material. It is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time.

Commercial Kerosene-Type Jet Fuel. See **Kerosene-type Jet Fuel.**

Conventional Gasoline. See **Motor Gasoline (Finished).**

Crude Oil. A mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Depending upon the characteristics of the crude stream, it may also include:

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Small amounts of hydrocarbons that exist in gaseous phase in natural underground reservoirs but are liquid at atmospheric pressure after being recovered from oil well (casinghead) gas in lease separators and are subsequently commingled with the crude stream without being separately measured. Lease condensate recovered as a liquid from natural gas wells in lease or field separation facilities and later mixed into the crude stream is also included; Small amounts of nonhydrocarbons produced from oil, such as sulfur and various metals; Drip gases, and liquid hydrocarbons produced from oil sands, gilsonite, and oil shale. Liquids produced at natural gas processing plants are excluded. Crude oil is refined to produce a wide array of petroleum products, including heating oils; gasoline, diesel and jet fuels; lubricants; asphalt; ethane, propane, and butane; and many other products used for their energy or chemical content.

Crude oil is considered as either domestic or foreign, according to the following:

Domestic. *Crude oil produced in the United States or from its "outer continental shelf" as defined in 43 USC 1331.*

Foreign. *Crude oil produced outside the United States. Imported Athabasca hydrocarbons (derived from Canadian oil sands) are included.*

Crude Oil, Refinery Receipts. Receipts of domestic and foreign crude oil at a refinery. Includes all crude oil in transit except crude oil in transit by pipeline. Foreign crude oil is reported as a receipt only after entry through customs. Crude oil of foreign origin held in bonded storage is excluded.

Crude Oil Losses. Represents the volume of crude oil reported by petroleum refineries as being lost in their operations. These losses are due to spills, contamination, fires, etc. as opposed to refinery processing losses.

Crude Oil Production. The volume of crude oil produced from oil reservoirs during given periods of time. The amount of such production for a given period is measured as volumes delivered from lease storage tanks (i.e., the point of custody transfer) to pipelines, trucks, or other media for transport to refineries or terminals with adjustments for (1) net differences between opening and closing lease inventories, and (2) basic sediment and water (BS&W).

Crude Oil Qualities. Refers to two properties of crude oil, the sulfur content and API gravity, which affect processing complexity and product characteristics.

Delayed Coking. A process by which heavier crude oil fractions can be thermally decomposed under conditions of elevated temperatures and low pressure to produce a mixture of lighter oils and petroleum coke. The light oils can be processed further in other refinery units to meet product specifications. The coke can be used either as a fuel or in other applications such as the manufacturing of steel or aluminum.

Desulfurization. The removal of sulfur, from molten metals, petroleum oil, or flue gases. Petroleum desulfurization is a process that removes sulfur and its compounds from various streams during the refining process. Desulfurization processes include catalytic hydrotreating and other chemical/physical processes such as adsorption. Desulfurization processes vary based on the type of stream treated (e.g. naphtha, distillate, heavy gas oil, etc.) and the amount of sulfur removed (e.g. sulfur reduction to 10 ppm). See Catalytic Hydrotreating.

Disposition. The components of petroleum disposition are stock change, crude oil losses, refinery inputs, exports, and products supplied for domestic consumption.

Distillate Fuel Oil. A general classification for one of the petroleum fractions produced in conventional distillation operations. It includes diesel fuels and fuel oils. Products known as No. 1, No. 2, and No. 4 diesel fuel are used in on-highway diesel engines, such as those in trucks and automobiles, as well as off-highway engines, such as those in railroad locomotives and agricultural machinery. Products known as No. 1, No. 2, and No. 4 fuel oils are used primarily for space heating and electric power generation.

No. 1 Distillate. *A light petroleum distillate that can be used as either a diesel fuel or a fuel oil.*

No. 1 Diesel Fuel. *A light distillate fuel oil that has distillation temperatures of 550 degrees Fahrenheit at the 90-percent point and meets the specifications defined in ASTM Specification D 975. It is used in high-speed diesel engines generally operated under frequent speed and load changes, such as those in city buses and similar vehicles.*

No. 1 Fuel Oil. *A light distillate fuel oil that has distillation temperatures of 400 degrees Fahrenheit at the 10-percent recovery point and 550 degrees Fahrenheit at the 90-percent point and meets the specifications defined in ASTM Specification D 396. It is used primarily as fuel for portable outdoor stoves and portable outdoor heaters.*

No. 2 Distillate. *A petroleum distillate that can be used as either a diesel fuel or a fuel oil.*

No. 2 Diesel Fuel. *A fuel that has distillation temperatures of 500 degrees Fahrenheit at the 10-percent recovery point and 640 degrees Fahrenheit at the 90 percent recovery point and meets the specifications defined in ASTM Specification D 975. It is used in high speed diesel engines that are generally operated under uniform speed and load conditions, such as those in railroad locomotives, trucks, and automobiles.*

Low Sulfur No. 2 Diesel Fuel. *No. 2 diesel fuel that has a sulfur level no higher than 0.05 percent by weight. It is used primarily in motor vehicle diesel engines for on-highway use.*

High Sulfur No. 2 Diesel Fuel. No. 2 diesel fuel that has a sulfur level above 0.05 percent by weight.

No. 2 Fuel Oil (Heating Oil). A distillate fuel oil that has distillation temperatures of 400 degrees Fahrenheit at the 10-percent recovery point and 640 degrees Fahrenheit at the 90-percent recovery point and meets the specifications defined in ASTM Specification D 396. It is used in atomizing type burners for domestic heating or for moderate capacity commercial/ industrial burner units.

No. 4 Fuel. A distillate fuel oil made by blending distillate fuel oil and residual fuel oil stocks. It conforms with ASTM Specification D 396 or Federal Specification VV-F-815C and is used extensively in industrial plants and in commercial burner installations that are not equipped with preheating facilities. It also includes No. 4 diesel fuel used for low-and medium-speed diesel engines and conforms to ASTM Specification D 975.

No. 4 Diesel Fuel. See **No. 4 Fuel.**

No. 4 Fuel Oil. See **No. 4 Fuel.**

Electricity (Purchased). Electricity purchased for refinery operations that is not produced within the refinery complex.

Ending Stocks. Primary stocks of crude oil and petroleum products held in storage as of 12 midnight on the last day of the month. Primary stocks include crude oil or petroleum products held in storage at (or in) leases, refineries, natural gas processing plants, pipelines, tank farms, and bulk terminals that can store at least 50,000 barrels of petroleum products or that can receive petroleum products by tanker, barge, or pipeline. Crude oil that is in-transit by water from Alaska, or that is stored on Federal leases or in the Strategic Petroleum Reserve is included. Primary Stocks exclude stocks of foreign origin that are held in bonded warehouse storage.

ETBE (Ethyl tertiary butyl ether) (CH₃)₃COC₂H₅. An oxygenate blend stock formed by the catalytic etherification of isobutylene with ethanol.

Ethane (C₂H₆). A normally gaseous straight-chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of -127.48 degrees Fahrenheit. It is extracted from natural gas and refinery gas streams.

Ether. A generic term applied to a group of organic chemical compounds composed of carbon, hydrogen, and oxygen, characterized by an oxygen atom attached to two carbon atoms (e.g., methyl tertiary butyl ether).

Ethylene (C₂H₄). An olefinic hydrocarbon recovered from refinery processes or petrochemical processes. Ethylene is used as a petrochemical feedstock for numerous chemical applications and the production of consumer goods.

Exports. Shipments of crude oil and petroleum products from the 50 States and the District of Columbia to foreign countries, Puerto Rico, the Virgin Islands, and other U.S. possessions and territories.

Field Production. Represents crude oil production on leases, natural gas liquids production at natural gas processing plants, new supply of other hydrocarbons/ oxygenates and motor gasoline blending components, and fuel ethanol blended into finished motor gasoline.

Flexicoking. A thermal cracking process which converts heavy hydrocarbons such as crude oil, oil sands bitumen, and distillation residues into light hydrocarbons. Feedstocks can be any pumpable hydrocarbons including those containing high concentrations of sulfur and metals.

Fluid Coking. A thermal cracking process utilizing the fluidized-solids technique to remove carbon (coke) for continuous conversion of heavy, low-grade oils into lighter products.

Fresh Feed Input. Represents input of material (crude oil, unfinished oils, natural gas liquids, other hydrocarbons and oxygenates or finished products) to processing units at a refinery that is being processed (input) into a particular unit for the first time.

Examples:

(1) Unfinished oils coming out of a crude oil distillation unit which are input into a catalytic cracking unit are considered fresh feed to the catalytic cracking unit.

(2) Unfinished oils coming out of a catalytic cracking unit being looped back into the same catalytic cracking unit to be reprocessed are not considered fresh feed.

Fuel Ethanol (C₂H₅OH). An anhydrous denatured aliphatic alcohol intended for gasoline blending as described in Oxygenates definition.

Fuels Solvent Deasphalting. A refining process for removing asphalt compounds from petroleum fractions, such as reduced crude oil. The recovered stream from this process is used to produce fuel products.

Gas Oil. A liquid petroleum distillate having a viscosity intermediate between that of kerosene and lubricating oil. It derives its name from having originally been used in the manufacture of illuminating gas. It is now used to produce distillate fuel oils and gasoline.

Gasohol. A blend of finished motor gasoline containing alcohol (generally ethanol but sometimes methanol) at a concentration of 10 percent or less by volume. Data on gasohol that has at least 2.7 percent oxygen, by weight, and is intended for sale inside carbon monoxide nonattainment areas are included in data on oxygenated gasoline. See Oxygenates.

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Gasoline Blending Components. Naphthas which will be used for blending or compounding into finished aviation or motor gasoline (e.g., straight-run gasoline, alkylate, reformat, benzene, toluene, and xylenes). Excludes oxygenates (alcohols, ethers), butane, and natural gasoline.

Gross Input to Atmospheric Crude Oil Distillation Units. Total input to atmospheric crude oil distillation units. Includes all crude oil, lease condensate, natural gas plant liquids, unfinished oils, liquefied refinery gases, slop oils, and other liquid hydrocarbons produced from oil sands, gilsonite, and oil shale.

Heavy Gas Oil. Petroleum distillates with an approximate boiling range from 651 degrees Fahrenheit to 1000 degrees Fahrenheit.

Hydrogen. The lightest of all gases, occurring chiefly in combination with oxygen in water; exists also in acids, bases, alcohols, petroleum, and other hydrocarbons.

Idle Capacity. The component of operable capacity that is not in operation and not under active repair, but capable of being placed in operation within 30 days; and capacity not in operation but under active repair that can be completed within 90 days.

Imported Crude Oil Burned As Fuel. The amount of foreign crude oil burned as a fuel oil, usually as residual fuel oil, without being processed as such. Imported crude oil burned as fuel includes lease condensate and liquid hydrocarbons produced from oil sands, gilsonite, and oil shale.

Imports. Receipts of crude oil and petroleum products into the 50 States and the District of Columbia from foreign countries, Puerto Rico, the Virgin Islands, and other U.S. possessions and territories.

Isobutane (C₄H₁₀). A normally gaseous four-carbon, branched-chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of 10.9 degrees Fahrenheit. It is extracted from natural gas or refinery gas streams.

Isobutylene (C₄H₈). An olefinic four-carbon hydrocarbon recovered from refinery processes or petrochemical processes.

Isohexane (C₆H₁₄). A saturated six-carbon branched-chain hydrocarbon. It is a colorless liquid that boils at a temperature of 156.2 degrees Fahrenheit.

Isomerization. A refining process which alters the fundamental arrangement of atoms in the molecule without adding or removing anything from the original material. Used to convert normal butane into isobutane (C₄), an alkylation process feedstock, and normal pentane and hexane into isopentane (C₅) and isohexane (C₆), high-octane gasoline components.

Isopentane. See **Natural Gasoline**

Kerosene. A light petroleum distillate that is used in space heaters, cook stoves, and water heaters and is suitable for use as a light source when burned in wick-fed lamps. Kerosene has a maximum distillation temperature of 400 degrees Fahrenheit at the 10-percent recovery point, a final boiling point of 572 degrees Fahrenheit, and a minimum flash point of 100 degrees Fahrenheit. Included are No. 1-K and No. 2-K, the two grades recognized by ASTM Specification D 3699 as well as all other grades of kerosene called range or stove oil, which have properties similar to those of No. 1 fuel oil. See **Kerosene-Type Jet Fuel**.

Kerosene-Type Jet Fuel. A kerosene-based product having a maximum distillation temperature of 400 degrees Fahrenheit at the 10-percent recovery point and a final maximum boiling point of 572 degrees Fahrenheit and meeting ASTM Specification D 1655 and Military Specifications MIL-T5624P and MIL-T-83133D (Grades JP-5 and JP-8). It is used for commercial and military turbojet and turboprop aircraft engines.

Commercial. *Kerosene-type jet fuel intended for use in commercial aircraft.*

Military. *Kerosene-type jet fuel intended for use in military aircraft.*

Lease Condensate. A mixture consisting primarily of pentanes and heavier hydrocarbons which is recovered as a liquid from natural gas in lease separation facilities. This category excludes natural gas liquids, such as butane and propane, which are recovered at downstream natural gas processing plants or facilities. See **Natural Gas Liquids**.

Light Gas Oils. Liquid petroleum distillates heavier than naphtha, with an approximate boiling range from 401 degrees Fahrenheit to 650 degrees Fahrenheit.

Liquefied Petroleum Gases (LPG). A group of hydrocarbon-based gases derived from crude oil refining or natural gas fractionation. They include: ethane, ethylene, propane, propylene, normal butane, butylenes, isobutane, and isobutylene. For convenience of transportation, these gases are liquefied through pressurization.

Liquefied Refinery Gases (LRG). Liquefied petroleum gases fractionated from refinery or still gases. Through compression and/or refrigeration, they are retained in the liquid state. The reported categories are ethane/ethylene, propane/propylene, normal butane/butylenes, and isobutane/isobutylene. Excludes still gas.

Lubricants. Substances used to reduce friction between bearing surfaces or as process materials either incorporated into other materials used as processing aids in the manufacture of other products, or used as carriers of other materials. Petroleum lubricants may be produced either from distillates or residues. Lubricants include all grades of lubricating oils from spindle oil to cylinder oil and those used in greases.

Merchant Oxygenate Plants. Oxygenate production facilities that are not associated with a petroleum refinery. Production from these facilities is sold under contract or on the spot market to refiners or other gasoline blenders.

Methanol (CH₃OH). A light, volatile alcohol intended for gasoline blending as described in Oxygenate definition.

Middle Distillates. A general classification of refined petroleum products that includes distillate fuel oil and kerosene.

Military Kerosene-Type Jet Fuel. See **Kerosene-Type Jet Fuel.**

Miscellaneous Products. Includes all finished products not classified elsewhere (e.g., petrolatum, lube refining byproducts (aromatic extracts and tars), absorption oils, ram-jet fuel, petroleum rocket fuels, synthetic natural gas feedstocks, and specialty oils). Note: Beginning with January 2004 data, naphtha-type jet fuel is included in Miscellaneous Products.

Motor Gasoline (Finished). A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline, as defined in ASTM Specification D 4814 or Federal Specification VV-G-1690C, is characterized as having a boiling range of 122 to 158 degrees Fahrenheit at the 10 percent recovery point to 365 to 374 degrees Fahrenheit at the 90 percent recovery point. "Motor Gasoline" includes conventional gasoline; all types of oxygenated gasoline, including gasohol; and reformulated gasoline, but excludes aviation gasoline. Note: Volumetric data on blending components, such as oxygenates, are not counted in data on finished motor gasoline until the blending components are blended into the gasoline.

Conventional Gasoline. *Finished motor gasoline not included in the oxygenated or reformulated gasoline categories. Note: This category excludes reformulated gasoline blendstock for oxygenate blending (RBOB) as well as other blendstock.*

OPRG. "Oxygenated Fuels Program Reformulated Gasoline" is reformulated gasoline which is intended for use in an oxygenated fuels program control area.

Oxygenated Gasoline (Including Gasohol). Oxygenated gasoline includes all finished motor gasoline, other than reformulated gasoline, having oxygen content of 2.0 percent or higher by weight. Gasohol containing a minimum 5.7

percent ethanol by volume is included in oxygenated gasoline. Oxygenated gasoline was reported as a separate product from January 1993 until December 2003 inclusive. Beginning with monthly data for January 2004, oxygenated gasoline is included in conventional gasoline. Historical data for oxygenated gasoline excluded Federal Oxygenated Program Reformulated Gasoline (OPRG). Historical oxygenated gasoline data also excluded other reformulated gasoline with a seasonal oxygen requirement regardless of season.

Reformulated Gasoline. Finished gasoline formulated for use in motor vehicles, the composition and properties of which meet the requirements of the reformulated gasoline regulations promulgated by the U.S. Environmental Protection Agency under Section 211(k) of the Clean Air Act. It includes gasoline produced to meet or exceed emissions performance and benzene content standards of federal-program reformulated gasoline even though the gasoline may not meet all of the composition requirements (e.g. oxygen content) of federal-program reformulated gasoline. Reformulated gasoline excludes Reformulated Blendstock for Oxygenate Blending (RBOB) and Gasoline Treated as Blendstock (GTAB). Historical reformulated gasoline statistics included Oxygenated Fuels Program Reformulated Gasoline (OPRG).

Reformulated (Blended with Ether). Reformulated gasoline blended with an ether component (e.g. methyl tertiary butyl ether) at a terminal or refinery to raise the oxygen content.

Reformulated (Blended with Alcohol). Reformulated gasoline blended with an alcohol component (e.g. fuel ethanol) at a terminal or refinery to raise the oxygen content.

Reformulated (Non-Oxygenated). Reformulated gasoline without added ether or alcohol components.

Motor Gasoline Blending. *Mechanical mixing of motor gasoline blending components, and oxygenates when required, to produce finished motor gasoline. Finished motor gasoline may be further mixed with other motor gasoline blending components or oxygenates, resulting in increased volumes of finished motor gasoline and/or changes in the formulation of finished motor gasoline (e.g., conventional motor gasoline mixed with MTBE to produce oxygenated motor gasoline).*

Motor Gasoline Blending Components. *Naphthas (e.g., straight-run gasoline, alkylate, reformate, benzene, toluene, xylenes) used for blending or compounding into finished motor gasoline. These components include reformulated gasoline blendstock for oxygenate blending (RBOB) but exclude oxygenates (alcohols, ethers), butane, and pentanes. Note: Oxygenates are reported as individual components and are included in the total for other hydrocarbons and oxygenates.*

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Conventional Blendstock for Oxygenate Blending (CBOB).

Conventional gasoline blendstock intended for blending with oxygenates downstream of the refinery where it was produced. CBOB must become conventional gasoline after blending with oxygenates. Motor gasoline blending components that require blending other than with oxygenates to become finished conventional gasoline are reported as All Other Motor Gasoline Blending Components. Excludes reformulated blendstock for oxygenate blending (RBOB).

Gasoline Treated as Blendstock (GTAB). Non-certified Foreign Refinery gasoline classified by an importer as blendstock to be either blended or reclassified with respect to reformulated or conventional gasoline. GTAB is classified as either reformulated or conventional based on emissions performance and the intended end use.

Reformulated Blendstock for Oxygenate Blending (RBOB). Specially produced reformulated gasoline blendstock intended for blending with oxygenates downstream of the refinery where it was produced. Includes RBOB used to meet requirements of the Federal reformulated gasoline program and other blendstock intended for blending with oxygenates to produce finished gasoline that meets or exceeds emissions performance requirements of Federal reformulated gasoline (e.g. California RBOB and Arizona RBOB). Excludes conventional gasoline blendstocks for oxygenate blending (CBOB).

RBOB for Blending with Ether. Motor gasoline blending components intended to be blended with an ether component (e.g. methyl tertiary butyl ether) at a terminal or refinery to raise the oxygen content.

RBOB for Blending with Alcohol. Motor gasoline blending components intended to be blended with an alcohol component (e.g. fuel ethanol) at a terminal or refinery to raise the oxygen content.

All Other Motor Gasoline Blending Components.

Naphthas (e.g. straight-run gasoline, alkylate, reformate, benzene, toluene, xylenes) used for blending or compounding into finished motor gasoline. Includes receipts and inputs of Gasoline Treated as Blendstock (GTAB). Excludes conventional blendstock for oxygenate blending (CBOB), reformulated blendstock for oxygenate blending, oxygenates (e.g. fuel ethanol and methyl tertiary butyl ether), butane, and natural gasoline.

MTBE (Methyl tertiary butyl ether) (CH₃)₃COCH₃.

An ether intended for gasoline blending as described in Oxygenate definition.

Naphtha. A generic term applied to a petroleum fraction with an approximate boiling range between 122 degrees Fahrenheit and 400 degrees Fahrenheit.

Naphtha Less Than 401o F. See **Petrochemical Feedstocks.**

Naphtha-Type Jet Fuel. A fuel in the heavy naphtha boiling range having an average gravity of 52.8 degrees API, 20 to 90 percent distillation temperatures of 290 degrees to 470 degrees Fahrenheit, and meeting Military Specification MIL-T-5624L (Grade JP-4). It is used primarily for military turbojet and turboprop aircraft engines because it has a lower freeze point than other aviation fuels and meets engine requirements at high altitudes and speeds. Note: Beginning with January 2004 data, naphtha-type jet fuel is included in **Miscellaneous Products.**

Natural Gas. A gaseous mixture of hydrocarbon compounds, the primary one being methane.

Natural Gas Field Facility. A field facility designed to process natural gas produced from more than one lease for the purpose of recovering condensate from a stream of natural gas; however, some field facilities are designed to recover propane, normal butane, natural gasoline, etc., and to control the quality of natural gas to be marketed.

Natural Gas Liquids. Those hydrocarbons in natural gas that are separated from the gas as liquids through the process of absorption, condensation, adsorption, or other methods in gas processing or cycling plants. Generally, such liquids consist of propane and heavier hydrocarbons and are commonly referred to as lease condensate, natural gasoline, and liquefied petroleum gases. Natural gas liquids include natural gas plant liquids (primarily ethane, propane, butane, and isobutane; see **Natural Gas Plant Liquids**) and lease condensate (primarily pentanes produced from natural gas at lease separators and field facilities; see **Lease Condensate**).

Natural Gas Plant Liquids. Those hydrocarbons in natural gas that are separated as liquids at natural gas processing plants, fractionating and cycling plants, and, in some instances, field facilities. Lease condensate is excluded. Products obtained include ethane; liquefied petroleum gases (propane, butanes, propane-butane mixtures, ethane-propane mixtures); isopentane; and other small quantities of finished products, such as motor gasoline, special naphthas, jet fuel, kerosene, and distillate fuel oil.

Natural Gas Processing Plant. Facilities designed to recover natural gas liquids from a stream of natural gas that may or may not have passed through lease separators and/or field separation facilities. These facilities control the quality of the natural gas to be marketed. Cycling plants are classified as gas processing plants.

Natural Gasoline and Isopentane. A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas, that meets vapor pressure, end-point, and other specifications for natural gasoline set by the Gas Processors Association. Includes isopentane which is a saturated five-carbon branched-chain hydrocarbon, (C₅H₁₂), obtained by fractionation of natural gasoline or isomerization of normal pentane.

Net Receipts. The difference between total movements into and total movements out of each PAD District by pipeline, tanker, and barge.

Normal Butane. See **Butane**.

OPEC. The acronym for the Organization of Petroleum Exporting Countries, that have organized for the purpose of negotiating with oil companies on matters of oil production, prices and future concession rights. Current members are Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela. The Neutral Zone between Kuwait and Saudi Arabia is considered part of OPEC. Prior to January 1, 1993, Ecuador was a member of OPEC. Prior to January 1995, Gabon was a member of OPEC.

Operable Capacity. The amount of capacity that, at the beginning of the period, is in operation; not in operation and not under active repair, but capable of being placed in operation within 30 days; or not in operation but under active repair that can be completed within 90 days. Operable capacity is the sum of the operating and idle capacity and is measured in barrels per calendar day or barrels per stream day.

Operating Capacity. The component of operable capacity that is in operation at the beginning of the period.

Operable Utilization Rate. Represents the utilization of the atmospheric crude oil distillation units. The rate is calculated by dividing the gross input to these units by the operable refining capacity of the units.

Operating Utilization Rate. Represents the utilization of the atmospheric crude oil distillation units. The rate is calculated by dividing the gross input to these units by the operating refining capacity of the units.

Other Hydrocarbons. Materials received by a refinery and consumed as a raw material. Includes hydrogen, coal tar derivatives, gilsonite, and natural gas received by the refinery for reforming into hydrogen. Natural gas to be used as fuel is excluded.

Other Oils Equal To or Greater Than 401o F. See **Petrochemical Feedstocks**.

Other Oxygenates. Other aliphatic alcohols and aliphatic ethers intended for motor gasoline blending (e.g., isopropyl ether (IPE) or n-propanol).

Oxygenated Gasoline. See *Motor Gasoline (Finished)*.

Oxygenates. Substances which, when added to gasoline, increase the amount of oxygen in that gasoline blend. Fuel Ethanol, Methyl Tertiary Butyl Ether (MTBE), Ethyl Tertiary Butyl Ether (ETBE), and methanol are common oxygenates.

Fuel Ethanol. Blends of up to 10 percent by volume anhydrous ethanol (200 proof) (commonly referred to as the "gasohol waiver").

Methanol. Blends of methanol and gasoline-grade tertiary butyl alcohol (GTBA) such that the total oxygen content does not exceed 3.5 percent by weight and the ratio of methanol to GTBA is less than or equal to 1. It is also specified that this blended fuel must meet ASTM volatility specifications (commonly referred to as the "ARCO" waiver). Blends of up to 5.0 percent by volume methanol with a minimum of 2.5 percent by volume co-solvent alcohols having a carbon number of 4 or less (i.e., ethanol, propanol, butanol, and/or GTBA). The total oxygen must not exceed 3.7 percent by weight, and the blend must meet ASTM volatility specifications as well as phase separation and alcohol purity specifications (commonly referred to as the "DuPont" waiver).

MTBE (Methyl tertiary butyl ether). Blends up to 15.0 percent by volume MTBE which must meet the ASTM D4814 specifications. Blenders must take precautions that the blends are not used as base gasolines for other oxygenated blends (commonly referred to as the "Sun" waiver).

Pentanes Plus. A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes isopentane, natural gasoline, and plant condensate.

Persian Gulf. The countries that comprise the Persian Gulf are: Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates.

Petrochemical Feedstocks. Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics. The categories reported are "Naphtha Less Than 401° F" and "Other Oils Equal To or Greater Than 401° F."

Naphtha less Than 401o F. A naphtha with a boiling range of less than 401 degrees Fahrenheit that is intended for use as a petrochemical feedstock.

Other Oils Equal To or Greater Than 401o F. Oils with a boiling range equal to or greater than 401 degrees Fahrenheit that are intended for use as a petrochemical feedstock.

Petroleum Administration for Defense (PAD) Districts. Geographic aggregations of the 50 States and the District of Columbia into five districts by the Petroleum Administration for Defense in 1950. These districts were originally defined during World War II for purposes of administering oil allocation.

Petroleum Coke. A residue high in carbon content and low in hydrogen that is the final product of thermal decomposition in the condensation process in cracking. This product is reported as marketable coke. The conversion is 5 barrels (of 42 U.S. gallons each) per short ton. Coke from petroleum has a heating value of 6.024 million Btu per barrel.

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Marketable Coke. Those grades of coke produced in delayed or fluid cokers which may be recovered as relatively pure carbon. This "green" coke may be sold as is or further purified by calcining.

Catalyst Coke. The only catalytic coke used as a fuel is the coke on catalyst in the FCC process. In other catalytic processes there is coke deposited on catalyst, but it is not regenerated in a way such that the heat of combustion is recovered.

Petroleum Products. Petroleum products are obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

Pipeline (Petroleum). Crude oil and product pipelines used to transport crude oil and petroleum products respectively, (including interstate, intrastate, and intra-company pipelines) within the 50 States and the District of Columbia.

Plant Condensate. One of the natural gas liquids, mostly pentanes and heavier hydrocarbons, recovered and separated as liquids at gas inlet separators or scrubbers in processing plants.

Processing Gain. The volumetric amount by which total output is greater than input for a given period of time. This difference is due to the processing of crude oil into products which, in total, have a lower specific gravity than the crude oil processed.

Processing Loss. The volumetric amount by which total refinery output is less than input for a given period of time. This difference is due to the processing of crude oil into products which, in total, have a higher specific gravity than the crude oil processed.

Product Supplied, Crude Oil. Crude oil burned on leases and by pipelines as fuel.

Production Capacity. The maximum amount of product that can be produced from processing facilities.

Products Supplied. Approximately represents consumption of petroleum products because it measures the disappearance of these products from primary sources, i.e., refineries, natural gas processing plants, blending plants, pipelines, and bulk terminals. In general, product supplied of each product in any given period is computed as follows: field production, plus refinery production, plus imports, plus unaccounted for crude oil, (plus net receipts when calculated on a PAD District basis), minus stock change, minus crude oil losses, minus refinery inputs, minus exports. Propane (C3H8). A normally gaseous three-carbon straight-

chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of -43.67 degrees Fahrenheit. It is extracted from natural gas or refinery gas streams. It includes all products designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial propane and HD-5 propane.

Propylene (C3H6). An olefinic three-carbon hydrocarbon recovered from refinery processes or petrochemical processes.

Propylene (C3H6) (nonfuel use). Propylene that is intended for use in nonfuel applications such as petrochemical manufacturing. Nonfuel use propylene includes chemical-grade propylene, polymer-grade propylene, and trace amounts of propane. Nonfuel use propylene also includes the propylene component of propane/propylene mixes where the propylene will be separated from the mix in a propane/propylene splitting process. Excluded is the propylene component of propane/propylene mixes where the propylene component of the mix is intended for sale into the fuel market.

Refinery. An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and oxygenates.

Refinery-Grade Butane. See **Butane**.

Refinery Input, Crude Oil. Total crude oil (domestic plus foreign) input to crude oil distillation units and other refinery processing units (cokers, etc.).

Refinery Input, Total. The raw materials and intermediate materials processed at refineries to produce finished petroleum products. They include crude oil, products of natural gas processing plants, unfinished oils, other hydrocarbons and oxygenates, motor gasoline and aviation gasoline blending components and finished petroleum products.

Refinery Production. Petroleum products produced at a refinery or blending plant. Published production of these products equals refinery production minus refinery input. Negative production will occur when the amount of a product produced during the month is less than the amount of that same product that is reprocessed (input) or reclassified to become another product during the same month. Refinery production of unfinished oils, and motor and aviation gasoline blending components appear on a net basis under refinery input.

Refinery Yield. Refinery yield (expressed as a percentage) represents the percent of finished product produced from input of crude oil and net input of unfinished oils. It is calculated by dividing the sum of crude oil and net unfinished input into the individual net production of finished products. Before calculating the yield for finished motor gasoline, the input of natural gas liquids, other hydrocarbons and oxygenates, and net input of motor gasoline blending components must be

subtracted from the net production of finished motor gasoline. Before calculating the yield for finished aviation gasoline, input of aviation gasoline blending components must be subtracted from the net production of finished aviation gasoline.

Reformulated Gasoline. See Motor **Gasoline (Finished)**.

Residual Fuel Oil. A general classification for the heavier oils, known as No. 5 and No. 6 fuel oils, that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations. It conforms to ASTM Specifications D 396 and D 975 and Federal Specification VV-F-815C. No. 5, a residual fuel oil of medium viscosity, is also known as Navy Special and is defined in Military Specification MIL-F-859E, including Amendment 2 (NATO Symbol F-770). It is used in steam-powered vessels in government service and inshore power plants. No. 6 fuel oil includes Bunker C fuel oil and is used for the production of electric power, space heating, vessel bunkering, and various industrial purposes.

Residuum. Residue from crude oil after distilling off all but the heaviest components, with a boiling range greater than 1000 degrees Fahrenheit.

Road Oil. Any heavy petroleum oil, including residual asphaltic oil used as a dust palliative and surface treatment on roads and highways. It is generally produced in six grades from 0, the most liquid, to 5, the most viscous.

Shell Storage Capacity. The design capacity of a petroleum storage tank which is always greater than or equal to working storage capacity.

Special Naphthas. All finished products within the naphtha boiling range that are used as paint thinners, cleaners, or solvents. These products are refined to a specified flash point. Special naphthas include all commercial hexane and cleaning solvents conforming to ASTM Specification D1836 and D484, respectively. Naphthas to be blended or marketed as motor gasoline or aviation gasoline, or that are to be used as petrochemical and synthetic natural gas (SNG) feedstocks are excluded.

Steam (Purchased). Steam, purchased for use by a refinery that was not generated from within the refinery complex.

Still Gas (Refinery Gas). Any form or mixture of gases produced in refineries by distillation, cracking, reforming, and other processes. The principal constituents are methane, ethane, ethylene, normal butane, butylenes, propane, propylene, etc. Still gas is used as a refinery fuel and a petrochemical feedstock. The conversion factor is 6 million BTU's per fuel oil equivalent barrel.

Stock Change. The difference between stocks at the beginning of the reporting period and stocks at the end of the reporting period. Note: A negative number indicates a decrease (i.e., a drawdown) in stocks and a positive number indicates an increase (i.e., a buildup) in stocks during the reporting period.

Strategic Petroleum Reserve (SPR). Petroleum stocks maintained by the Federal Government for use during periods of major supply interruption.

Sulfur. A yellowish nonmetallic element, sometimes known as "brimstone." It is present at various levels of concentration in many fossil fuels whose combustion releases sulfur compounds that are considered harmful to the environment. Some of the most commonly used fossil fuels are categorized according to their sulfur content, with lower sulfur fuels usually selling at a higher price. Note: No. 2 Distillate fuel is currently reported as having either a 0.05 percent or lower sulfur level for on-highway vehicle use or a greater than 0.05 percent sulfur level for off-highway use, home heating oil, and commercial and industrial uses. This also includes Ultra Low Sulfur Diesel (<15 ppm sulfur). Residual fuel, regardless of use, is classified as having either no more than 1 percent sulfur or greater than 1 percent sulfur. Coal is also classified as being low-sulfur at concentrations of 1 percent or less or high-sulfur at concentrations greater than 1 percent.

Supply. The components of petroleum supply are field production, refinery production, imports, and net receipts when calculated on a PAD District basis.

TAME (Tertiary amyl methyl ether) (CH₃)₂(C₂H₅)COCH₃. An oxygenate blend stock formed by the catalytic etherification of isoamylene with methanol.

Tank Farm. An installation used by gathering and trunk pipeline companies, crude oil producers, and terminal operators (except refineries) to store crude oil.

Tanker and Barge. Vessels that transport crude oil or petroleum products. Data are reported for movements between PAD Districts; from a PAD District to the Panama Canal; or from the Panama Canal to a PAD District.

TBA (Tertiary butyl alcohol) (CH₃)₃COH. An alcohol primarily used as a chemical feedstock, a solvent or feedstock for isobutylene production for MTBE; produced as a co-product of propylene oxide production or by direct hydration of isobutylene.

Thermal Cracking. A refining process in which heat and pressure are used to break down, rearrange, or combine hydrocarbon molecules. Thermal cracking includes gas oil, visbreaking, fluid coking, delayed coking, and other thermal cracking processes (e.g., Flexicoking). See individual categories for definition.

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Toluene (C₆H₅CH₃). Colorless liquid of the aromatic group of petroleum hydrocarbons, made by the catalytic reforming of petroleum naphthas containing methyl cyclohexane. A high-octane gasoline-blending agent, solvent, and chemical intermediate, base for TNT.

Unaccounted for Crude Oil. Represents the arithmetic difference between the calculated supply and the calculated disposition of crude oil. The calculated supply is the sum of crude oil production plus imports minus changes in crude oil stocks. The calculated disposition of crude oil is the sum of crude oil input to refineries, crude oil exports, crude oil burned as fuel, and crude oil losses.

Unfinished Oils. All oils requiring further processing, except those requiring only mechanical blending. Unfinished oils are produced by partial refining of crude oil and include naphthas and lighter oils, kerosene and light gas oils, heavy gas oils, and residuum.

Unfractionated Streams. Mixtures of unsegregated natural gas liquid components excluding, those in plant condensate. This product is extracted from natural gas.

United States. The United States is defined as the 50 States and the District of Columbia.

Vacuum Distillation. Distillation under reduced pressure (less than atmospheric) which lowers the boiling temperature of the liquid being distilled. This technique prevents cracking or decomposition of the charge stock which occurs above 1000°F.

Visbreaking. A thermal cracking process in which heavy atmospheric or vacuum-still bottoms are cracked at moderate temperatures to increase production of distillate products and reduce viscosity of the distillation residues.

Wax. A solid or semi-solid material consisting of a mixture of hydrocarbons obtained or derived from petroleum fractions, or through a Fischer-Tropsch type process, in which the straight-chained paraffin series predominates. This includes all marketable wax, whether crude or refined, with a congealing point (ASTM D 938) between 100 and 200 degrees Fahrenheit and a maximum oil content (ASTM D 3235) of 50 weight percent.

Working Storage Capacity. The difference in volume between the maximum safe fill capacity and the quantity below which pump suction is ineffective (bottoms).

Xylenes (C₆H₄(CH₃)₂). Colorless liquid of the aromatic group of hydrocarbons made the catalytic reforming of certain naphthenic petroleum fractions. Used as high-octane motor and aviation gasoline blending agents, solvents, chemical intermediates. Isomers are metaxylene, orthoxylene, paraxylene.

Notes

Notes





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