



RBN U.S. Propane Billboard

U.S. Propane Market Update & Outlook

For questions, please email trout@rbnenergy.com; Follow on Twitter @RBNEnergy

November 13, 2023

TABLE OF CONTENTS

Summary	p. 1
Inventories	p. 3
Markets	p. 4
Demand	p. 6
Exports	p. 7
Production	p. 9
Infrastructure Map	p. 10
PADD Analysis	p. 11
Prices	p. 16
International	p. 18
Appendix	p. 19

U.S. PROPANE SUPPLY & DEMAND

Table A:	MM gal / month							M bbl / day						
	EIA MONTHLY		ESTIMATED		FORECAST			EIA MONTHLY		ESTIMATED		FORECAST		
	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Production	3,005	3,036	2,939	3,029	2,949	3,061	3,056	2,308	2,332	2,332	2,327	2,341	2,351	2,347
Gas Plants	2,629	2,661	2,586	2,677	2,598	2,693	2,702	2,019	2,044	2,052	2,056	2,062	2,068	2,075
Refinery	376	375	353	352	351	368	354	289	288	280	270	279	283	272
Imports	91	107	89	112	125	155	145	70	82	70	86	100	119	111
TOTAL SUPPLY	3,096	3,143	3,027	3,141	3,075	3,216	3,200	2,378	2,414	2,403	2,412	2,440	2,470	2,458
Demand (Prod. Supplied)	741	853	807	952	1,240	1,556	1,673	569	655	640	731	984	1,195	1,285
Exports	2,013	1,914	2,086	2,194	2,007	2,063	2,044	1,546	1,470	1,656	1,685	1,593	1,584	1,570
Stock Change	342	378	134	(2)	(172)	(403)	(516)	263	290	107	(2)	(137)	(309)	(396)
TOTAL DISPOSITION	3,096	3,144	3,027	3,144	3,075	3,216	3,200	2,378	2,415	2,402	2,414	2,440	2,470	2,458
TOTAL INVENTORY*	3.7	4.0	4.2	4.2	4.0	3.6	3.1	87.3	96.3	99.5	99.4	95.3	85.7	73.4

* Inventories are shown in billion gallons and million barrels respectively.

MONTHLY HIGHLIGHTS

- The big story this month is the severe drought at the Panama Canal that is restricting ship traffic through the waterway. Is a perfect storm brewing for U.S. propane exports to Asia? We discuss what all the market buzz is about in this month's Market Spotlight section.
- October U.S. propane inventories were relatively flat, dropping by 55 Mbbl, which was well below the 4.7-MMbbl build last year and the 1.3 MMbbl 5-year average increase for the month. Total U.S. propane stocks remain healthy at 99.4 MMbbl, but the inventory cushion compared to last year and the 5-year average has gotten smaller over the last few months.
- Propane exports remained strong in October at 1,685 Mb/d, coming in just 11 Mb/d below the March 2023 all-time high. The U.S.-Asia export arb for propane was wide open in early November, despite higher VLGC freight rates, as the spread between Asia FEI and Mont Belvieu prices soared. Gulf Coast LPG export terminals are reportedly operating full-out with no new capacity slated to come online until mid-2025.
- Several major midstream companies highlighted robust NGL production growth, new infrastructure projects and an increasing overseas appetite for U.S. ethane and LPG exports on their recent third-quarter earnings calls. Enterprise and Energy Transfer already have export expansion projects underway while is evaluating ONEOK a new ethane/LPG export terminal at Sabine Pass in Jefferson County, TX.

MARKET OVERVIEW

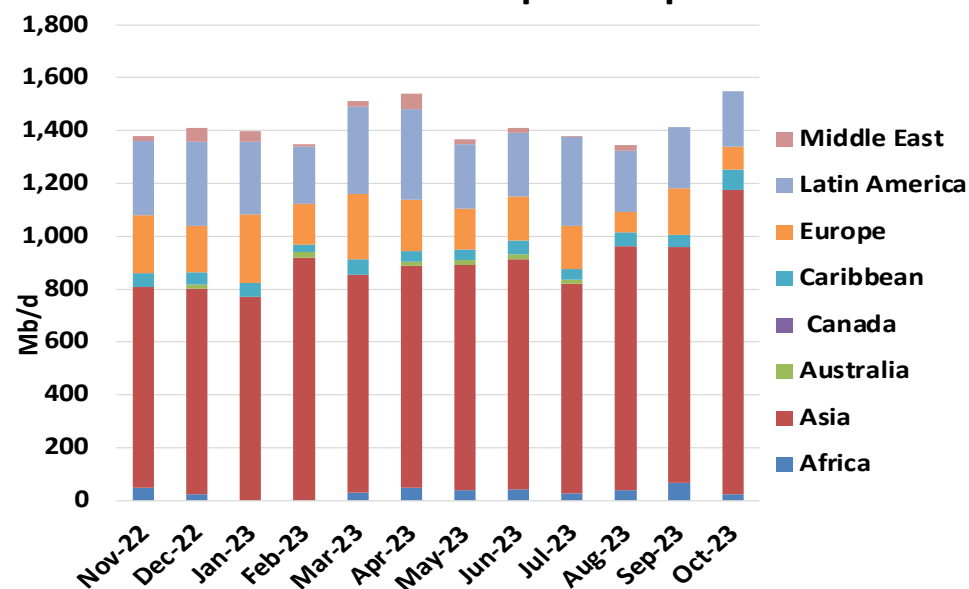
Strong exports, flat inventories, and new Panama Canal vessel transit restrictions are the main highlights of this month's report. The U.S. propane market remains well supplied, with stock levels well above last year and the 5-year average, but the inventory cushion has been shrinking. We estimate October ending stocks just below 100 MMbbl, which should be more than ample for the heating season barring any polar vortex type weather event. We got positive EIA data on propane gas plant production, which rebounded from last month's unexpected drop and should continue to march higher as new gas plants come online in the Permian. U.S. propane exports remain robust, but uncertainty abounds as the market grapples with the implications of new Panama Canal restrictions on U.S. waterborne shipments to Asia. Lastly, most weather forecasts are now showing a strong El Nino for this winter, which would result in below-average propane demand for the heating season.

MONTHLY PROPANE MARKET SPOTLIGHT

PERFECT STORM: WILL NEW PANAMA CANAL TRANSIT RESTRICTIONS IMPACT U.S. PROPANE EXPORTS TO ASIA

A perfect storm appears to be brewing as unprecedented drought conditions (attributed to El Nino) at the Panama Canal are restricting vessel traffic through the critical waterway, threatening trade flows of U.S. propane to Asia. The Panama Canal Authority (PCA) issued new stringent transit restrictions October 30 in a bid to save water. Normally the Panama Canal can handle up to 40 vessel transits a day, but the PCA cut it to 24 this week, and will reduce that to 22 in December, then to 20 in January and 18 in February. This means the waterway will be operating at less than 50% of capacity by early next year. In addition, LPG VLGCs (Very Large Gas Carriers), almost all of which go through the larger Neo-Panamax locks, are pretty much at the bottom of the pecking order relative to higher-paying container ships, product tankers and LNG carriers. It is likely that most of the remaining Neo-Panamax transit slots will be taken by container ships and VLGCs will be totally shut out. With the normal route for ~90% of VLGCs out of the U.S. Gulf Coast to Asia going via the Panama Canal you can see the problem. VLGCs from the USGC to Asia will have to re-route through the Suez Canal or sail around the Cape of Good Hope; that turns the normal voyage of 30 days via the Panama Canal into 40 days via the Suez Canal and 45 days via the Cape of Good Hope. In turn, longer travel times mean higher transportation costs, a tighter VLGC market and a narrower arb. Simply put, the freight market is already strong with rates up to \$240/MT and is likely to get stronger, which will put more pressure on the arb. Export economics aside, there is also uncertainty about whether we have enough VLGCs to support the longer trade routes. Clearly, there is not a fleet of VLGCs just sitting on the sidelines waiting to be put in service. As the chart below shows, exports to Asia are a critical balancing mechanism for the U.S. propane market, making up ~75% of USGC exports and around 50% of U.S. production. So, any impact to those exports is a really big deal!

U.S. Gulf Coast Propane Exports

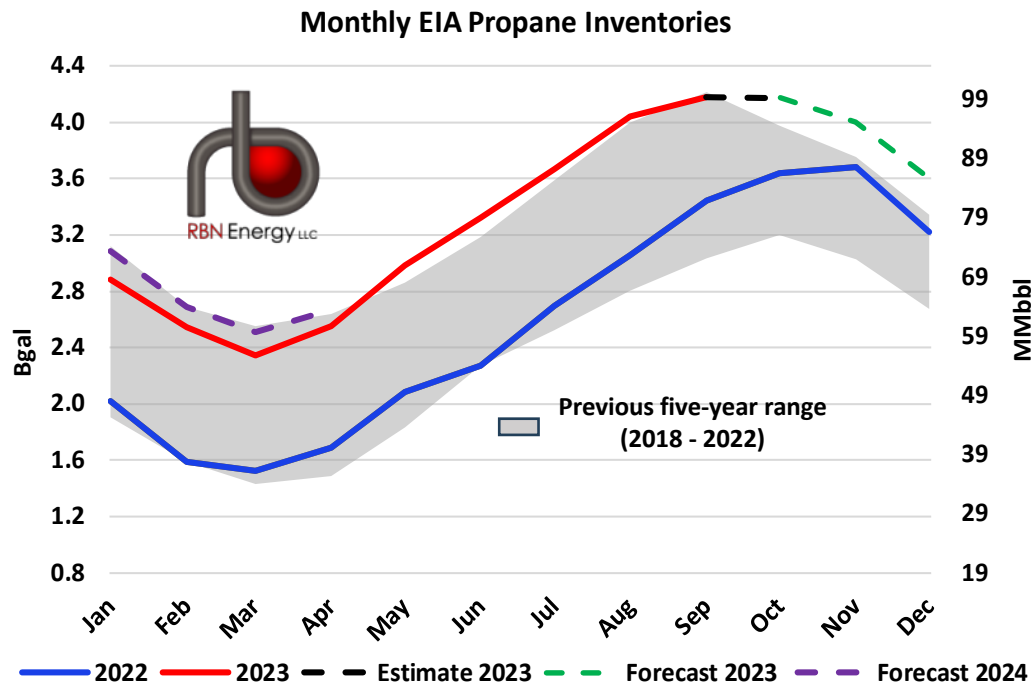


U.S. PROPANE INVENTORIES

Table B: MM gal						
	MONTHLY EIA			ESTIMATED		FORECAST
	Jul-23	Aug-23	M/M	Sep-23	Oct-23	Nov-23
PADD 1 (East Coast)	326	357	31	376	404	385
PADD 2 (Midwest)	967	1,093	126	1,107	1,125	1,111
PADD 3 (Gulf Coast)	2,166	2,363	197	2,460	2,402	2,279
PADD 4 (Rocky Mountains)	121	128	7	133	137	128
PADD 5 (West Coast)	87	102	16	102	107	99
TOTAL PROPANE	3,667	4,043	376	4,177	4,175	4,003
Propylene	52	50	(1)	68	72	85
TOTAL INVENTORIES	3,718	4,093	375	4,245	4,247	4,087

M bbl					
	MONTHLY EIA			ESTIMATED	
	Jul-23	Aug-23	M/M	Sep-23	Oct-23
PADD 1 (East Coast)	7,759	8,490	731	8,945	9,619
PADD 2 (Midwest)	23,019	26,016	2,997	26,359	26,795
PADD 3 (Gulf Coast)	51,581	56,264	4,683	58,567	57,193
PADD 4 (Rocky Mountains)	2,880	3,053	173	3,155	3,253
PADD 5 (West Coast)	2,062	2,436	374	2,432	2,542
TOTAL PROPANE	87,301	96,259	8,958	99,457	99,402
Propylene	1,233	1,199	(34)	1,619	1,712
TOTAL INVENTORIES	88,534	97,458	8,924	101,076	101,114

Figure 1.1



Source: EIA, RBN Forecast

ANALYSIS & INSIGHTS

U.S. propane inventories were essentially unchanged in October, the first month of the official propane winter heating season, which was less than the 4.7-MMbbl build in October 2022 and the 5-year average increase for the month of 1.3 MMbbl, leaving ending stocks at 99.4 MMbbl (4.2 Bgal). That is 12.7 MMbbl, or 14.6%, above last year and 15.3% higher than the 5-year average. PADD 3 had the only draw at 1.4 MMbbl for the month, which was below the 1.3 MMbbl average build for the period. Gulf Coast inventories remain elevated at 9.7 MMbbl, or 20%, above the 5-year average. PADD 2 inventories rose by 0.4 MMbbl, which was above the 0.3 MMbbl average draw for the month. Midwest stocks are 1.7 MMbbl, or 6.6%, above last year and 1.2 MMbbl higher than the 5-year average. PADD 1 inventories increased by 674 Mbbl, which was above the 5-year average draw of 68 Mbbl. PADD 4 stocks rose by 98 Mbbl to 3.3 MMbbl, which is 310 Mbbl above last year and 771 Mbbl higher than the 5-year average. PADD 5 inventories increased by 111 Mbbl to 2.5 MMbbl, which is 31 Mbbl, or 1.3%, above the 5-year average.

INVENTORY OUTLOOK

U.S. propane inventories in November are projected to draw by 4.1 MMbbl, compared to a 0.9-MMbbl increase last year and the 5-year average decline of 4 MMbbl. This will leave total stocks at 95.3 MMbbl (4 Bgal), which is 7.7 MMbbl more than last year and 13.1 MMbbl above the 5-year average.

PROPANE MARKET UPDATE

MONT BELVIEU PROPANE PRICES WEAKER

West Texas Intermediate (WTI) prices were weaker in October, falling back well below \$90/bbl as global economic headwinds weighed on market sentiment. WTI closed at \$81.02/bbl on October 31, down \$9.77/bbl, or 10.8%, from October 2.

U.S. propane prices were also lower during the month. The Mont Belvieu OPIS non-LST price (Enterprise, aka non-TET) settled at 65.3 c/gal on October 31, down 7.2 c/gal, or 9.9%, from October 2. Non-LST propane averaged 68.1 c/gal for the month, 5.6 c/gal below the September average. OPIS LST (Energy Transfer, aka TET) propane prices averaged 68.6 c/gal for the month, closing at 65.8 c/gal on October 31, a decrease of 6.3 c/gal from the beginning of the month. The non-TET vs. TET price spread was slightly wider during the month, with non-TET trading at a 0.5 c/gal discount on October 31. Conway OPIS propane averaged 66.3 c/gal in October, which represented a 1.8 c/gal discount to the average non-LST price.

The benchmark propane-to-WTI Cushing ratio (Figure 1.2) settled at 35% as of November 8, up 1 percentage point from October 2. The current forward curves (Figure 1.3) project the propane-to-WTI ratio to average around 35% through March 2024, which is on par with the forward curves at the beginning of the month. As shown in Figure 1.3, the forward curve for November (red line) was down about 10 c/gal across the curve (December 2023-April 2024) compared to the forward curve in October (yellow line).

Figure 1.2

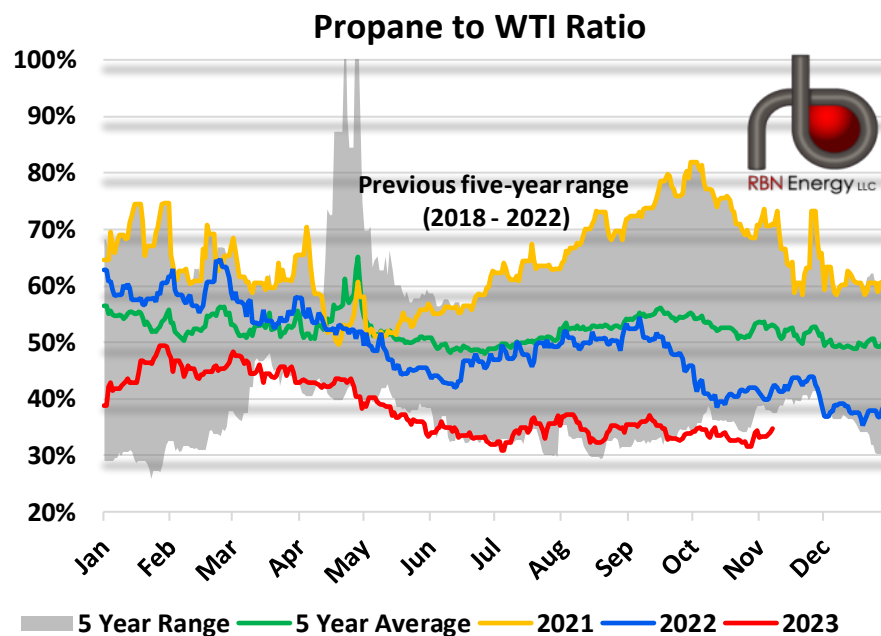
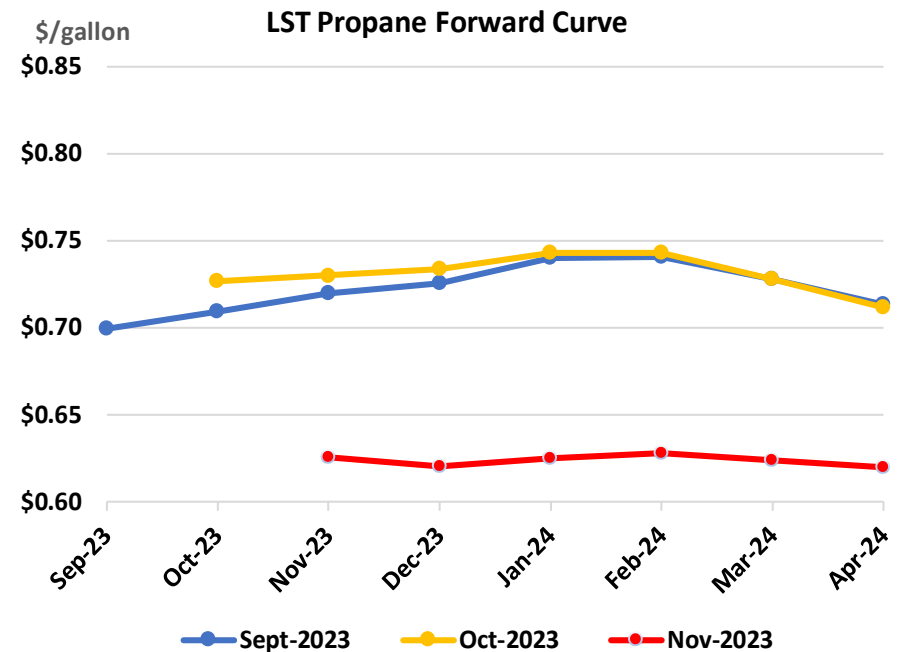


Figure 1.3



CONWAY VS. MONT BELVIEU PROPANE PRICES

Figure 2.5

CONWAY DISCOUNT TO BELVIEU SLIGHTLY WIDER

The Conway spot propane (OPIS) average discount to Mont Belvieu Non-TET (Figure 2.5) increased to 1.8 c/gal during October, compared to a 1.3 c/gal discount in September and a 0.2 c/gal discount in August. In October 2022, Conway was at an average premium of 1 c/gal while in 2018 it was at a discount of 15.8 c/gal. The 5-year average Conway discount for October is 3.5 c/gal.

As of November 8, the Conway spot propane (OPIS) discount to Mont Belvieu Non-TET was slightly lower at 1.9 c/gal, down from 2 c/gal on October 31.

CONWAY PROPANE SPREAD — FORWARD CURVE ANALYSIS

Figure 2.6 shows the propane forward price curves for Conway (blue line) and Mont Belvieu (red line) on the left-hand axis. The gray area is the differential on the right axis. The Mont Belvieu-Conway price spread is a good indicator whether the market is incenting barrels to flow from PADD 2 to PADD 3 or keep barrels in the Midwest. The current forward curves now expect Belvieu to trade at a small premium throughout the winter season into mid-2024. The forward curves project that Gulf Coast propane prices will trade above Conway for the rest of the year, with Mont Belvieu averaging 1.8 c/gal over Conway compared to a 0.8 c/gal premium last year.

The forward curves project that Gulf Coast propane prices will trade above Conway for the rest of the year, with Mont Belvieu averaging 1.8 c/gal over Conway compared to a 0.8 c/gal premium last year.

MB Non-TET vs. Conway Propane Spread

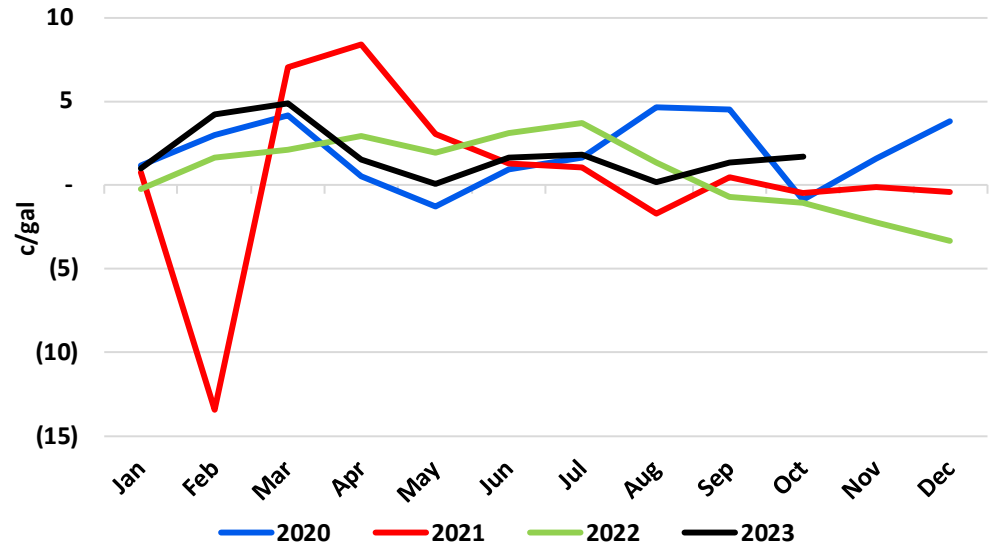
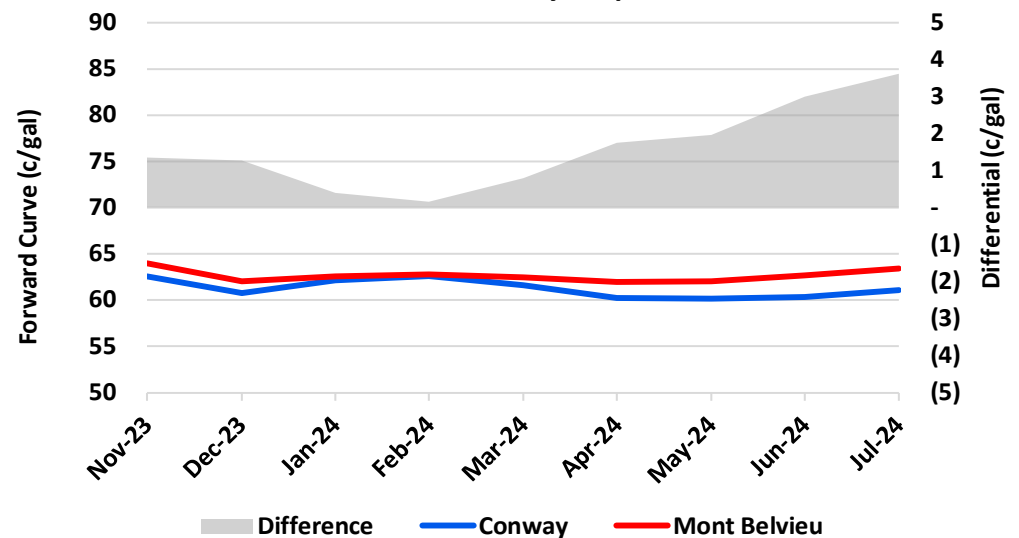


Figure 2.6

MB Non-TET vs. Conway Propane Forward Curve



U.S. PROPANE DEMAND

Table C:	MM gal / month						M bbl / day					
	MONTHLY			ESTIMATED		FORECAST	MONTHLY			ESTIMATED		FORECAST
	Jul-23	Aug-23	M/M	Sep-23	Oct-23		Jul-23	Aug-23	M/M	Sep-23	Oct-23	
ResCom	327	328	0	340	473	586	251	252	0	270	364	465
Crop Drying	39	80	42	128	215	177	30	62	32	102	165	140
Industrial	85	85	0	93	100	99	65	66	0	74	76	78
Petrochemicals	233	237	4	220	231	238	179	182	3	174	178	189
PDH	98	91	(7)	88	98	101	75	70	(5)	70	75	80
Balancing	(41)	31	72	(63)	(165)	(212)	(31)	24	55	(50)	(127)	(168)
TOTAL PROPANE	741	853	112	807	952	988	569	655	86	640	731	784
Propylene	349	355	7	303	316	325	268	273	5	240	243	258
TOTAL DEMAND **	1,090	1,208	118	1,109	1,268	1,313	837	928	91	880	974	1,042
Weekly***	1,061	1,191	130	1,009	1,251		815	915	100	801	961	
Variance	(28)	(17)	11	(100)	(17)		(22)	(13)	9	(80)	(13)	

* EIA reports purity propane product supplied in monthly data, while weekly data includes propylene.

** Total Demand" is the equivalent of product supplied as reported by the EIA.

*** EIA monthly product supplied through August 2023, weekly through the week of October 27, 2023.

RESIDENTIAL & COMMERCIAL

Figure 3.1 shows our forecast for Residential & Commercial ("ResCom") propane demand. ResCom demand was seasonally normal in October at 364 Mb/d (473 MMgal/m), up 94 Mb/d from September. ResCom demand for November is expected to pick up to 465 Mb/d, up 101 Mb/d from October.

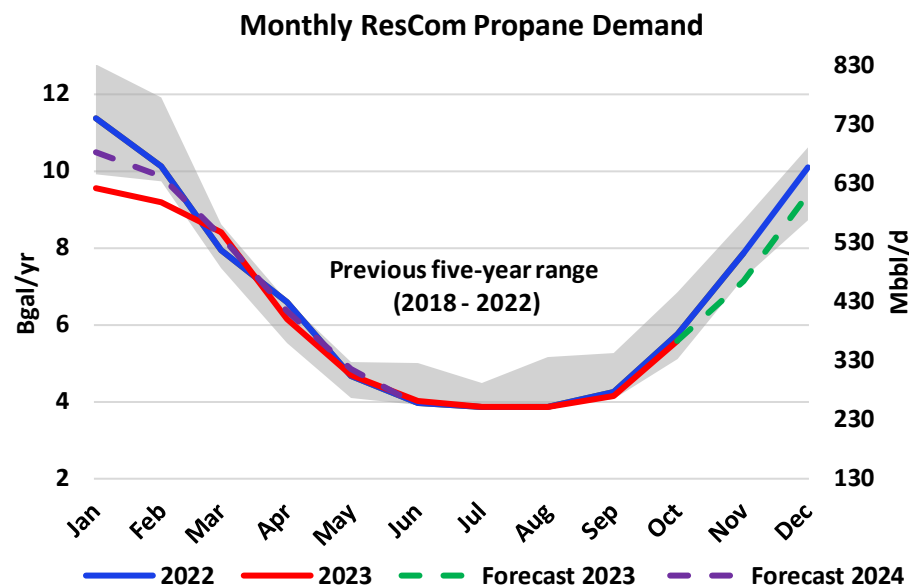
AGRICULTURAL (CROP DRYING) DEMAND ABOUT AVERAGE

Crop-drying demand picked up in October to 165 Mb/d (80 MMgal/m). We should see crop-drying demand start to decline in November. The latest USDA crop progress report shows better-than-average maturity with harvested corn at 4% above the 5-year average. Thus, crop-drying demand for this year continues to look to be about normal.

PETROCHEMICAL DEMAND REMAINS WEAK

Petchem demand for propane was weak during the month at 178 Mb/d due to ongoing unplanned cracker outages at Shell Deer Park and BASF/Total Port Arthur. We expect cracker demand to be slightly higher in November as propane is currently the most economical feedstock. PDH demand in October was at a low rate of 75 Mb/d as Enterprise's PDH 1 unit was down for unplanned maintenance and is not expected to restart until late November.

Figure 3.1



Source: RBN Estimate

U.S. PROPANE EXPORTS

Table D: U.S. Propane Exports Monthly and Weekly*						
(Mbbbl/d)	MONTHLY EIA			ESTIMATED		FORECAST
	Jul-23	Aug-23	M/M	Sep-23	Oct-23	Nov-23
Gulf Coast	1,363	1,241	(122)	1,410	1,502	1,410
East Coast	152	190	38	216	154	150
West Coast	27	35	8	25	25	30
Other	4	4	-	5	4	3
TOTAL EXPORTS	1,546	1,470	(76)	1,656	1,685	1,593
Weekly	1,523	1,551	28	1,722	1,753	
Variance	(23)	81	104	66	68	

*Monthly data from EIA through August 2023, weekly through the week of October 27, 2023.
See [RBN's NGL Voyager Report](#) for additional details on propane exports.

EAST COAST EXPORTS WEAKEN

East Coast propane exports from Energy Transfer's Marcus Hook terminal in Pennsylvania were seasonally weaker at 154 Mb/d in October, down 62 Mb/d from September. PADD 1 exports are expected to be relatively flat in November at 150 Mb/d, which is 48 Mb/d higher than November 2022. East Coast exports

(green bars in Figure 4.1) are projected to grow at a robust rate in 2023, averaging 155 Mb/d, up 21 Mb/d, or 15%, from last year. No propane cargoes were imported into the region during October. We expect that 3-4 cargoes will be imported into the Northeast during the upcoming winter heating season, similar to last year.

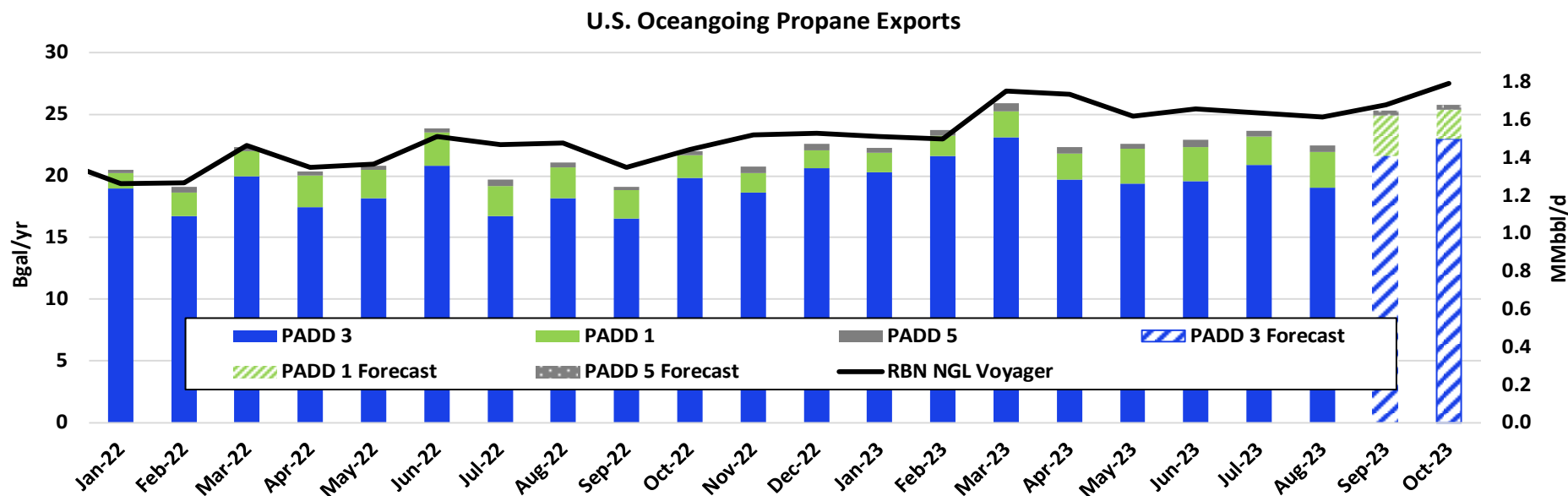
GULF COAST EXPORTS CLOSE TO ALL-TIME HIGH

Gulf Coast propane exports were very strong in October at 1,502 Mb/d, up 92 Mb/d from September and just 8 Mb/d below the March 2023 record high. For November, we expect PADD 3 exports to moderate to 1,410 Mb/d. Gulf Coast exports (blue bars in Figure 4.1) are forecast to grow at a healthy clip in 2023, averaging 1,367 Mb/d, up 156 Mb/d, or 13%, from 2022.

WEST COAST EXPORTS

October West Coast propane exports were unchanged at 25 Mb/d. November shipments are projected at 30 Mb/d and average 31 Mb/d for 2023, up 4 Mb/d from last year. All West Coast exports are destined for Asia (via the AltaGas Ferndale, WA, terminal) or Mexico (railcars/trucks).

Figure 4.1



INTERNATIONAL PROPANE

Figure 4.2

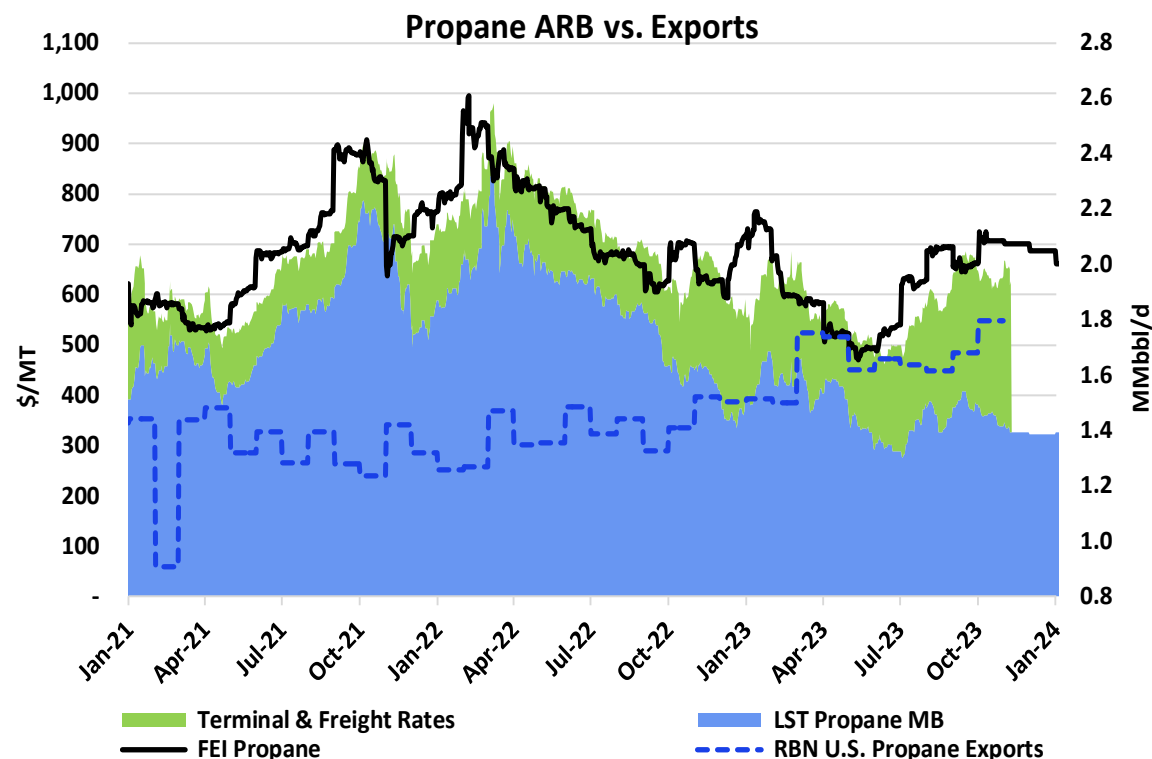
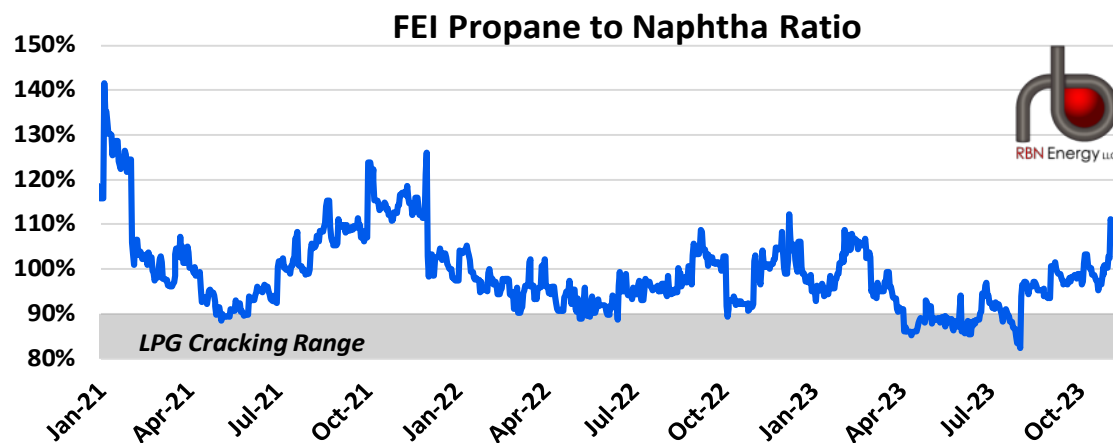


Figure 4.3



U.S.-ASIA EXPORT ARB WIDE OPEN

Saudi Aramco increased its November LPG contract prices (CP) for propane to \$610/MT (117.1 c/gal) and butane to \$615/MT (136.9 c/gal), up \$10/MT (1.9 c/gal) and \$5/MT (1.1 c/gal), respectively, from the October CP. The increase was supported by strong global LPG demand.

VLGC freight rates remained strong over the last month. Spot VLGC freight rates from the U.S. Gulf Coast to Chiba, Japan, (via Panama Canal) increased by \$18/MT (3.5 c/gal) to \$238.5/MT as of November 8, which is 7.5% above the rate on October 2. Congestion at the Panama Canal continues to be highly variable, with wait times of 12 days northbound and 14 days southbound as of November 7. Spot terminal fees (resale differentials) were also erratic, increasing by 1.5 c/gal, averaging 10.5 c/gal for December loadings as of November 8.

Figure 4.2 compares the Asian arb to U.S. propane exports. The arb is open (economic) when the forward month of FEI propane (black line) is higher than the sum of the terminal and freight rates (green area) and the price of Lone Star (LST) propane at Mont Belvieu (blue area). Over the last month, the LST propane price at Mont Belvieu fell by \$47/MT to settle at \$326/MT, or 62.6 c/gal, on November 8, while the December FEI propane forward curve increased by \$52/MT, which resulted in a wider spread between U.S. and Asian prices. Thus, the arb for November-December increased sharply to \$375/MT, or 71.9 c/gal, as of November 8. **Taking into consideration terminal fees and freight costs, the arb for November-December was wide open at minus \$81/MT (minus 15.6 c/gal).**

Figure 4.3 shows the ratio of the Asian FEI propane price to naphtha in the same region. As of November 8, the ratio had spiked up to 114%, which implies that Asian crackers will favor naphtha feedstock over propane.

U.S. PROPANE PRODUCTION

Figure 5.1

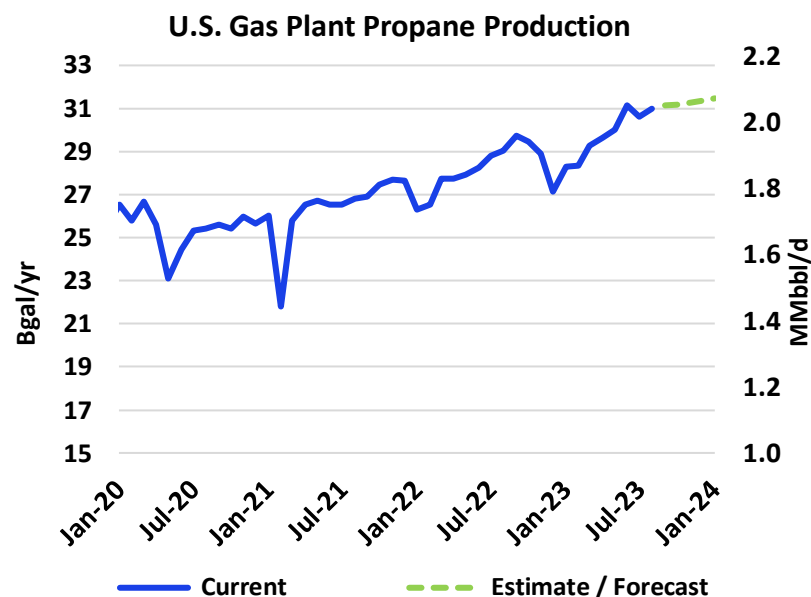


Figure 5.2

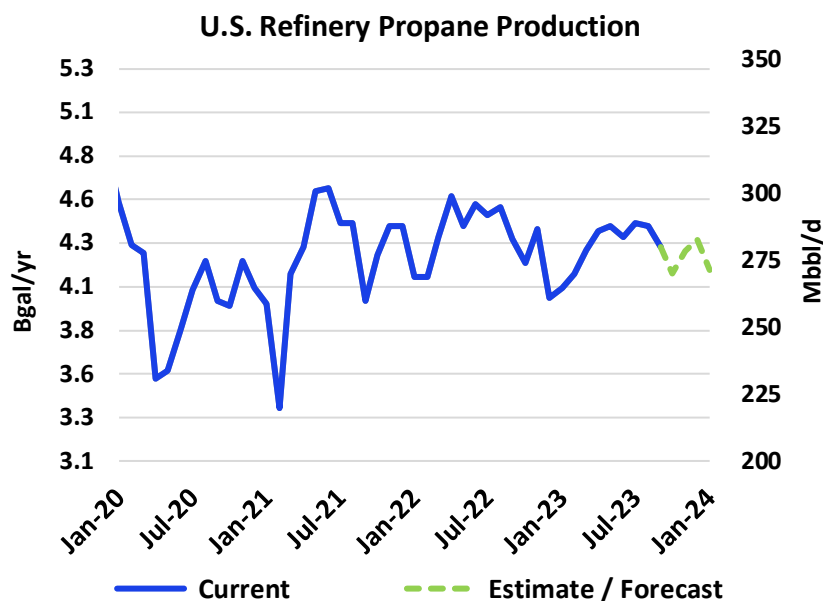


Table E: U.S. Propane Production Monthly and Weekly*						
(Mmbbl/d)	MONTHLY EIA			ESTIMATED		FORECAST
	Jul-23	Aug-23	M/M	Sep-23	Oct-23	Nov-23
Gas Plant	2,019	2,044	25	2,052	2,056	2,062
Refinery	289	288	(1)	280	270	279
TOTAL PROPANE	2,308	2,332	24	2,332	2,327	2,341
Propylene	256	255	(1)	241	234	253
TOTAL PRODUCTION	2,564	2,587	23	2,573	2,560	2,593
Weekly**	2,524	2,622	98	2,606	2,603	
Variance	(40)	35	75	33	43	

* EIA reports purity propane production separately in monthly data, while weekly data includes propylene.

** Monthly production from EIA through August 2023, weekly through the week of October 27, 2023.

GAS PLANT PRODUCTION REBOUNDS FROM JULY DECLINE

Propane gas plant production for August, as reported in the EIA Petroleum Supply Monthly issued October 31, rebounded to 2,044, which is just 10 Mb/d below June's record rate. Gas plant production for August was up 129 Mb/d, or 6.7%, from August 2022. PADD 3 production for the month was also stronger at 1,186 Mb/d, up 13 Mb/d from July. We estimate October gas plant production at 2,056 Mb/d, an increase of 4 Mb/d from September. For 2023, we have increased our production outlook by 4 Mb/d to 1,997 Mb/d, still up 141 Mb/d, or 7.6%, from 2022. Almost all production growth for the year is in PADD 3, primarily in the Permian Basin, with several new gas processing plants scheduled to come online during the fourth quarter.

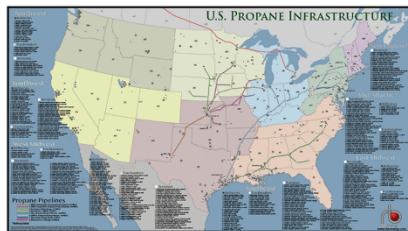
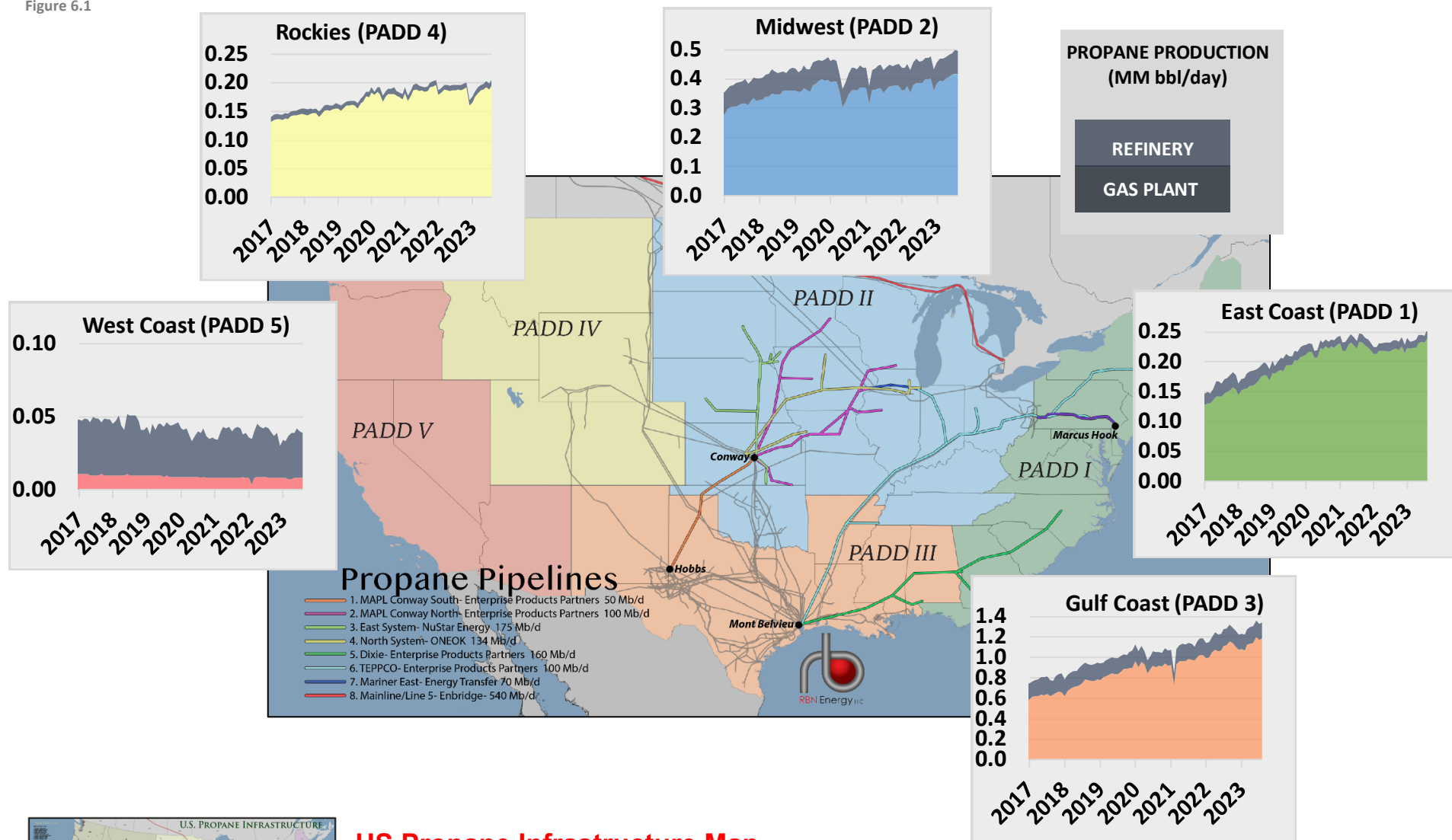
REFINERY PRODUCTION WEAKER

October refinery propane production declined by 10 Mb/d to 270 Mb/d as capacity utilization fell by 5 percentage points to 86%. We forecast that production in November will rebound to 279 Mb/d as refinery operating rates improve to 90%. For 2023, we expect refinery propane production will remain relatively steady and average 280 Mb/d for the year, down 3 Mb/d from 2022, due to slightly lower utilization.

Source: EIA, RBN Forecast

U.S. PROPANE INFRASTRUCTURE MAP

Figure 6.1

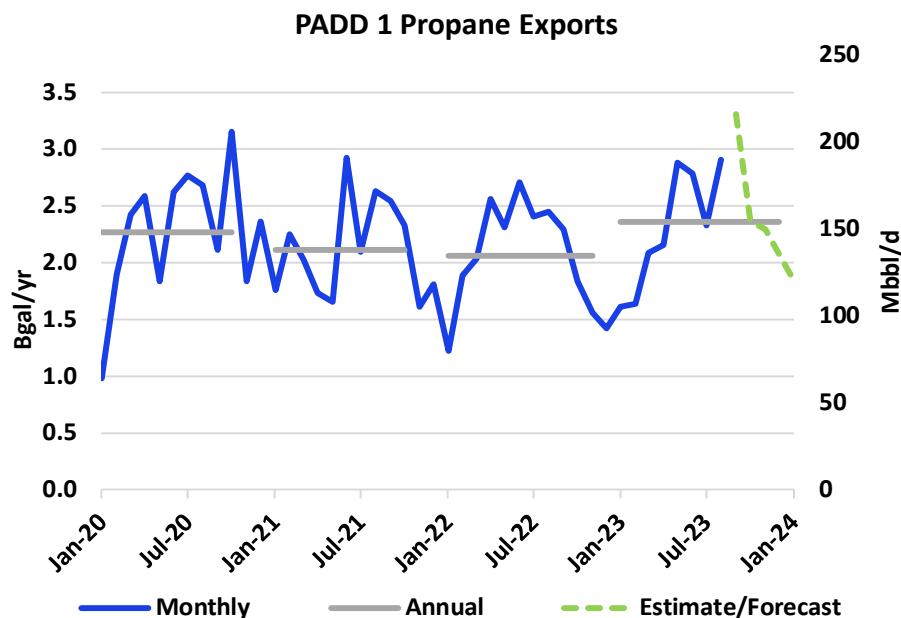
**US Propane Infrastructure Map**

Click on the link above for RBN's U.S. Propane Infrastructure Map, which fits together all the pieces of an opaque and regionally fragmented propane market to reveal the extensive domestic propane network in a clear, concise map.

PADD 1: PROPANE SUPPLY & DEMAND

Table F:	MM gal / month							M bbl / day						
	EIA MONTHLY		ESTIMATED		FORECAST			EIA MONTHLY		ESTIMATED		FORECAST		
	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Production	318	331	316	323	316	328	329	244	254	251	248	251	252	252
Gas Plants	303	311	301	308	298	309	310	233	239	239	237	237	237	238
Refinery	14	20	15	14	18	19	18	11	15	12	11	14	14	14
Imports	12	10	22	27	45	54	53	9	8	18	21	36	42	41
Net Inter-PADD Transfers	221	271	268	223	253	283	310	170	208	213	171	201	218	238
TOTAL SUPPLY	551	612	607	572	613	665	692	423	470	481	439	487	511	532
Demand (Prod. Supplied)	219	335	315	343	444	517	591	168	257	250	264	352	397	454
Exports	198	247	272	201	189	176	156	152	190	216	154	150	135	120
Stock Change	134	31	19	28	(19)	(27)	(55)	103	24	15	22	(15)	(21)	(42)
TOTAL DISPOSITION	551	613	607	572	613	665	692	423	471	481	439	487	511	532
TOTAL INVENTORY	326	357	376	404	385	358	303	7,759	8,490	8,945	9,619	9,164	8,512	7,204

Figure 7.1



Source: EIA, RBN Forecast

INSIGHTS & ANALYSIS

PADD 1 (East Coast) had a gain in stocks of 674 Mbbl for October, which was below the 826-Mbbl increase last year but above the 5-year average draw of 68 Mbbl. Lower exports were the primary reason for the stronger-than-expected build. This puts PADD 1 inventory at 9.6 MMbbl (404 MMgal), which is 1.1 MMbbl above October 2022 and 1.5 MMbbl higher than the 5-year average. Exports were weaker at 154 Mb/d, down 62 Mb/d from August and 3 Mb/d lower than the 2023 year-to-date average. Gas plant production in the Northeast was slightly lower, falling by 2 Mb/d to 237 Mb/d.

PADD 1 OUTLOOK

Our propane model estimates East Coast inventories will increase by 455 Mbbl in November to 9.2 MMbbl (385 MMgal), leaving stocks 566 Mbbl above last year and 945 Mbbl higher than the 5-year average. As shown in Figure 7.1, East Coast exports are expected to be relatively flat in November at 150 Mb/d, which is 7 Mb/d below the year-to-date average rate but 48 Mb/d higher than November 2022. Exports are projected to average 155 Mb/d for 2023, an increase of 21 Mb/d from last year.

PADD 2: PROPANE SUPPLY & DEMAND

Table G:	MM gal / month							M bbl / day						
	EIA MONTHLY		ESTIMATED		FORECAST			EIA MONTHLY		ESTIMATED		FORECAST		
	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Production	650	643	619	636	616	638	639	499	494	492	489	489	490	490
Gas Plants	542	542	527	544	525	545	546	416	416	418	418	417	418	420
Refinery	108	102	92	92	91	94	92	83	78	73	71	72	72	71
Imports	38	56	21	33	27	34	33	29	43	17	26	22	26	26
Net Inter-PADD Transfers	(486)	(523)	(513)	(406)	(328)	(354)	(383)	(373)	(402)	(407)	(312)	(260)	(272)	(294)
TOTAL SUPPLY	202	176	127	264	315	318	288	155	135	101	203	250	244	221
Demand (Prod. Supplied)	81	44	107	240	326	454	471	62	34	85	185	259	349	362
Exports	5	5	6	5	4	4	5	4	4	5	4	3	3	4
Stock Change	117	126	14	18	(15)	(140)	(188)	90	97	11	14	(12)	(108)	(144)
TOTAL DISPOSITION	203	176	127	264	315	318	288	156	135	101	203	250	244	221
TOTAL INVENTORY	967	1,093	1,107	1,125	1,111	970	783	23,019	26,016	26,359	26,795	26,449	23,106	18,636

INSIGHTS & ANALYSIS

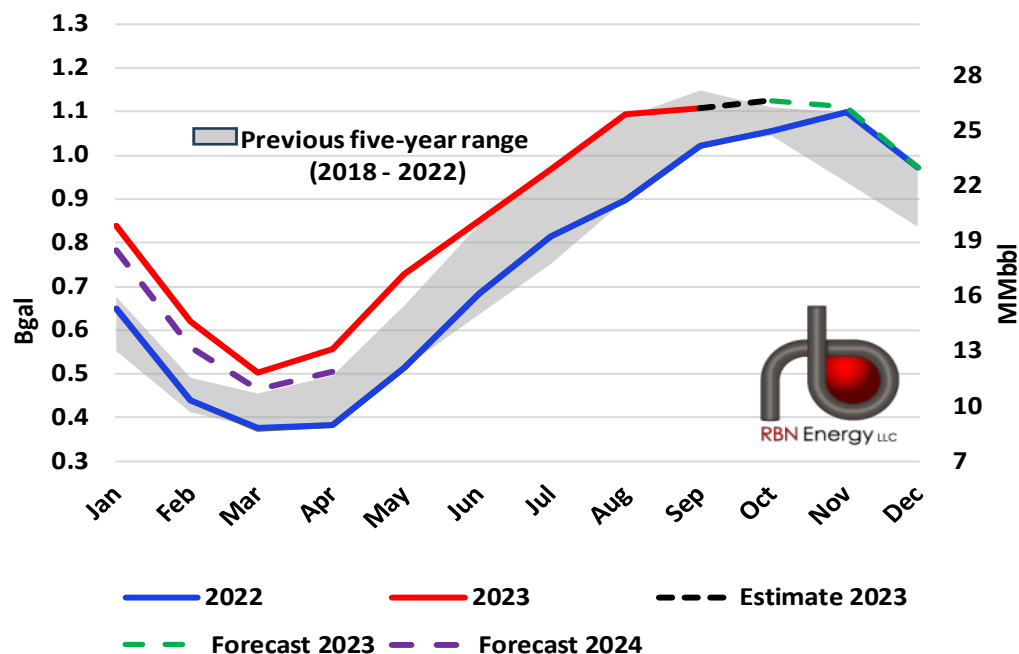
PADD 2 (Midwest) inventories built by 0.4 MMbbl during October, which was below the 0.8-MMbbl increase last year but above the 5-year average draw of 0.3 MMbbl, with stocks ending at 26.8 MMbbl (1,125 MMgal). The Midwest market is in a more comfortable supply position compared to last year with 1.7 MMbbl more in storage. Total production was slightly weaker in October at 489 Mb/d. Imports increased to 26 Mb/d, which is 41 Mb/d less than last October and the 2022 average rate.

PADD 2 OUTLOOK

Midwest inventories are forecast to draw by 0.3 Mbbl in November compared to a 5-year average decline of 1.3 MMbbl, bringing ending inventories to 26.5 MMbbl (1,111 MMgal), 0.3 MMbbl higher than last year and 2.1 MMbbl above the 5-year average. Canadian imports into the Midwest are projected to average 30 Mb/d in 2023, down 15 Mb/d from last year, primarily due to the ramp-up of Inter Pipeline's propane dehydrogenation (PDH) plant in Western Canada (22 Mb/d propane demand).

Figure 7.2

PADD 2 Monthly EIA Propane Inventories

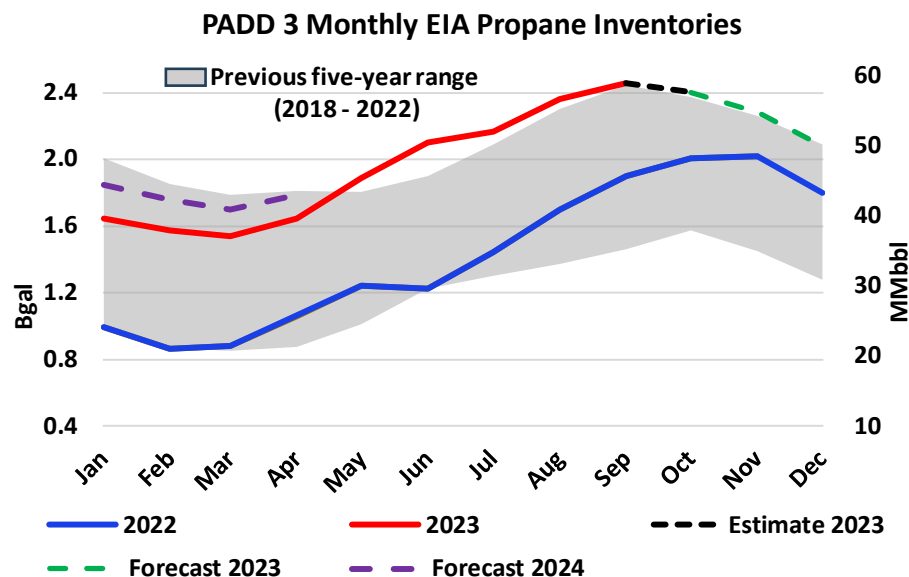


Source: EIA, RBN Forecast

PADD 3: PROPANE SUPPLY & DEMAND

Table H:	MM gal / month							M bbl / day						
	EIA MONTHLY		ESTIMATED		FORECAST			EIA MONTHLY		ESTIMATED		FORECAST		
	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Production	1,729	1,746	1,699	1,760	1,716	1,783	1,779	1,328	1,341	1,348	1,352	1,362	1,369	1,366
Gas Plants	1,527	1,544	1,504	1,563	1,521	1,577	1,583	1,173	1,186	1,194	1,200	1,207	1,211	1,216
Refinery	202	202	194	197	195	206	195	155	155	154	151	155	158	150
Imports	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Inter-PADD Transfers	466	452	445	397	267	265	243	358	347	353	305	212	204	187
TOTAL SUPPLY	2,195	2,198	2,144	2,156	1,983	2,048	2,022	1,686	1,688	1,702	1,656	1,573	1,573	1,553
Demand (Prod. Supplied)	354	387	271	259	329	403	410	272	297	215	199	261	309	315
Exports	1,775	1,616	1,777	1,956	1,777	1,842	1,849	1,363	1,241	1,410	1,502	1,410	1,415	1,420
Stock Change	66	197	97	(58)	(123)	(197)	(237)	51	151	77	(44)	(98)	(151)	(182)
TOTAL DISPOSITION	2,195	2,199	2,144	2,156	1,983	2,048	2,022	1,686	1,689	1,702	1,656	1,573	1,573	1,553
TOTAL INVENTORY	2,166	2,363	2,460	2,402	2,279	2,082	1,845	51,581	56,264	58,567	57,193	54,268	49,574	43,932

Figure 7.3



Source: EIA, RBN Forecast

INSIGHTS & ANALYSIS

PADD 3 had a stock draw of 1.4 MMbbl for the month, which was below the 2.6-MMbbl build in October 2022 and the 1.3 MMbbl average gain for the month. This dropped Gulf Coast inventories to 57.2 MMbbl (2.4 Bgal) at month's end, 9.5 MMbbl higher than last year and 9.7 MMbbl, or 20%, above the 5-year average. Propane exports from the Gulf Coast were strong at 1,502 Mb/d, up 92 Mb/d from September and 209 Mb/d higher than in October 2022. PADD 3 gas plant production increased to 1,200 Mb/d in October, up 6 Mb/d from September and just 5 Mb/d below the record high in June 2023.

PADD 3 OUTLOOK

November inventories are forecast to have a larger draw as exports remain strong and domestic demand improves, declining by 2.9 MMbbl, compared to the 5-year average build of 2.5 MMbbl. That would leave November ending stocks at 54.3 MMbbl (2.3 Bgal), which is 6.2 MMbbl more than last year and 9.3 MMbbl above the 5-year average. Gulf Coast propane production is expected to increase modestly in November to 1,194 Mb/d, which is 118 Mb/d, or 10.9%, above November 2022.

PADD 4: PROPANE SUPPLY & DEMAND

Table I:	MM gal / month							M bbl / day						
	EIA MONTHLY		ESTIMATED		FORECAST			EIA MONTHLY		ESTIMATED		FORECAST		
	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Production	256	266	254	262	254	262	262	197	204	202	201	201	202	202
Gas Plants	246	254	244	251	244	252	252	189	195	194	193	194	194	194
Refinery	10	12	10	10	10	10	10	8	9	8	8	8	8	8
Imports	12	8	14	17	17	26	15	9	6	11	13	14	20	12
Net Inter-PADD Transfers	(217)	(221)	(213)	(227)	(209)	(213)	(189)	(167)	(170)	(169)	(175)	(166)	(164)	(145)
TOTAL SUPPLY	51	52	55	51	62	75	88	39	40	44	39	49	58	68
Demand (Prod. Supplied)	43	44	51	47	71	94	98	33	34	40	36	56	72	75
Exports	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stock Change	9	8	4	4	(8)	(19)	(10)	7	6	3	3	(7)	(14)	(7)
TOTAL DISPOSITION	52	52	55	51	62	75	88	40	40	44	39	49	58	68
TOTAL INVENTORY	121	128	133	137	128	109	100	2,880	3,053	3,155	3,253	3,051	2,604	2,377

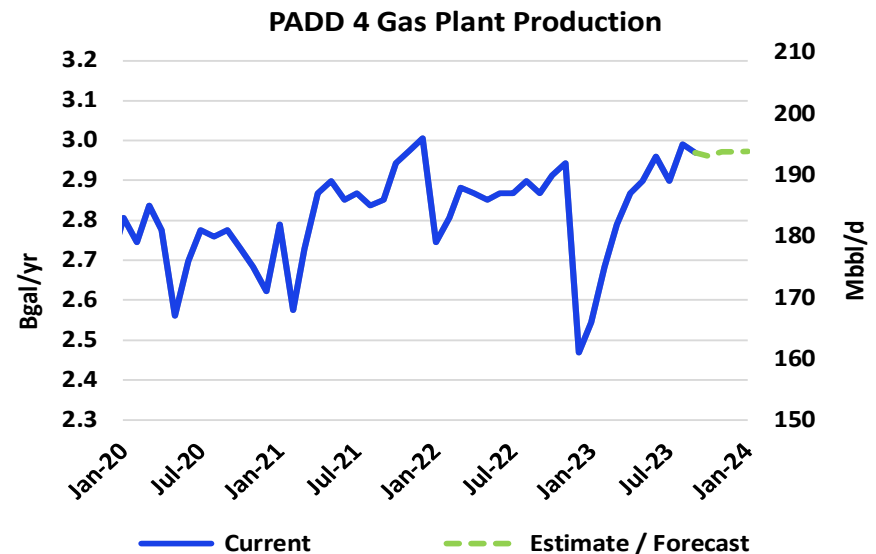
INSIGHTS & ANALYSIS

PADD 4 (Rocky Mountain) inventories built by 98 Mbbl in October to 3.3 MMbbl (137 MMgal), which is 0.3 MMbbl higher than last year and 0.8 MMbbl above the 5-year average. Gas plant production was relatively flat in October at 193 Mb/d (see Figure 7.4). Refinery production and imports were also little changed at 8 Mb/d and 13 Mb/d, respectively.

PADD 4 OUTLOOK

PADD 4 inventories are projected to draw by 202 Mbbl for the second month of the winter heating season (October-March), leaving November stocks at 3.1 MMbbl (128 MMgal), which is 0.3 Mbbl higher than last year and 0.6 MMbbl above the 5-year average. Rockies gas plant production is expected to remain flat in November at 194 Mb/d and average 188 Mb/d for the year, up 3 Mb/d from 2022.

Figure 7.4

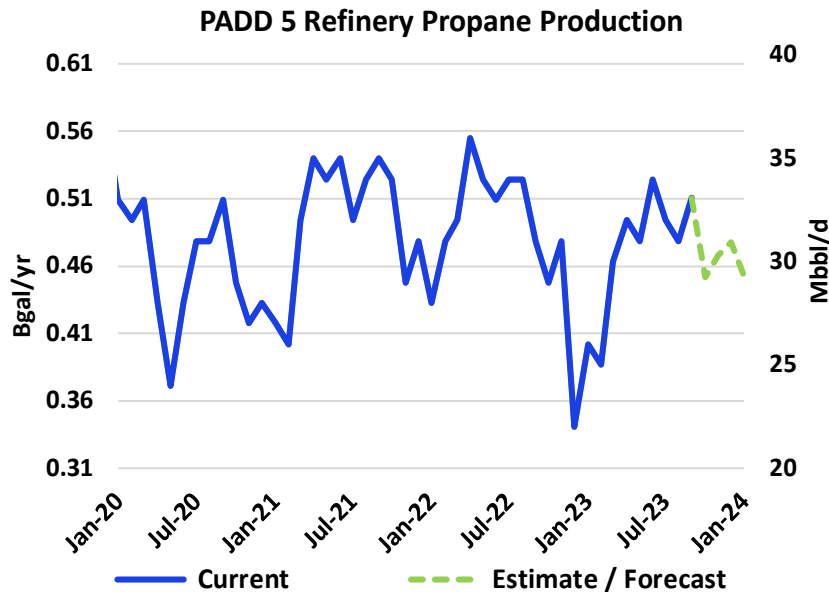


Source: EIA, RBN Forecast

PADD 5: PROPANE SUPPLY & DEMAND

Table J:	MM gal / month							M bbl / day						
	EIA MONTHLY		ESTIMATED		FORECAST			EIA MONTHLY		ESTIMATED		FORECAST		
	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Production	52	51	51	48	47	50	48	40	39	40	37	38	38	37
Gas Plants	10	10	9	10	9	10	9	8	8	7	8	7	7	7
Refinery	42	40	42	38	38	40	38	32	31	33	29	30	31	29
Imports	30	33	31	35	37	41	43	23	25	25	27	29	32	33
Net Inter-PADD Transfers	17	22	12	17	17	20	19	13	17	10	13	14	15	15
TOTAL SUPPLY	99	105	94	100	101	110	110	76	81	75	77	80	85	84
Demand (Prod. Supplied)	44	43	63	63	71	89	103	34	33	50	48	57	69	79
Exports	35	46	32	33	37	40	34	27	35	25	25	30	31	26
Stock Change	16	16	(0)	5	(7)	(19)	(27)	12	12	(0)	4	(6)	(15)	(21)
TOTAL DISPOSITION	95	104	94	100	101	110	110	73	80	75	77	80	85	84
TOTAL INVENTORY	87	102	102	107	99	80	54	2,062	2,436	2,432	2,542	2,368	1,911	1,274

Figure 7.5



Source: EIA, RBN Forecast

INSIGHTS & ANALYSIS

PADD 5 (West Coast) inventories increased by 110 Mbbl in October to 2.5 MMbbl (107 MMgal), leaving stocks 90 Mbbl higher than last year and only 31 Mbbl above the 5-year average. Refinery production was down 2 Mb/d to 29 Mb/d as capacity utilization declined by 7 percentage points to 84%. West Coast exports remained at 25 Mb/d and slightly below imports, which increased to 27 Mb/d.

PADD 5 OUTLOOK

Our propane model projects West Coast inventories to decline by 174 Mbbl in November to 2.4 MMbbl (100 MMgal), leaving stocks 106 Mbbl above the 5-year average. As shown in Figure 7.5, refinery production in PADD 5 is expected to recover to 30 Mb/d in November as capacity utilization increases to 88%. Imports are projected to be modestly stronger at 29 Mb/d and average 30 Mb/d for the year, up 3 Mb/d from 2022. West Coast exports for November are expected to rebound to 30 Mb/d, up 5 Mb/d from the prior month. PADD 5 exports are forecast to average 31 Mb/d for the year, up 4 Mb/d from 2022.

KEY ENERGY PRICES

Table K:		Prices									
Product	Units	Current	Prior Week			Prior Month			Prior Year		
		9-Nov-23	2-Nov-23	W/W	W/W %	9-Oct-23	M/M	M/M %	9-Nov-22	Y/Y	Y/Y %
Brent Crude	\$/bbl	80.0	86.9	(6.8)	-7.9%	88.2	(8.1)	-9.2%	92.7	(12.6)	-13.6%
WTI Cushing Crude	\$/bbl	75.7	82.5	(6.7)	-8.1%	86.4	(10.6)	-12.3%	85.8	(10.1)	-11.8%
Henry Hub Natural Gas	\$/MMbtu	3.04	3.47	(0.43)	-12.4%	3.38	(0.34)	-9.9%	5.87	(2.82)	-48.2%
Propane											
Mont Belvieu Non-TET	c/gal	62.7	65.1	(2.4)	-3.7%	68.9	(6.2)	-8.9%	86.9	(24.2)	-27.9%
Mont Belvieu TET	c/gal	62.9	65.2	(2.3)	-3.6%	69.1	(6.3)	-9.1%	87.1	(24.3)	-27.8%
Conway	c/gal	61.1	63.7	(2.6)	-4.2%	66.6	(5.5)	-8.2%	89.6	(28.5)	-31.8%
Edmonton*	c/gal	47.9	50.6	(2.7)	-5.3%	49.5	(1.6)	-3.3%	75.9	(28.0)	-36.9%
European (ARA)	\$/MT	487.0	501.4	(14.5)	-2.9%	542.2	(55.3)	-10.2%	580.4	(93.5)	-16.1%
Asian (FEI)	\$/MT	724.8	725.6	(0.8)	-0.1%	672.7	52.0	7.7%	680.1	44.7	6.6%

Figure 8.1

Mont Belvieu Non-TET Monthly Propane Price

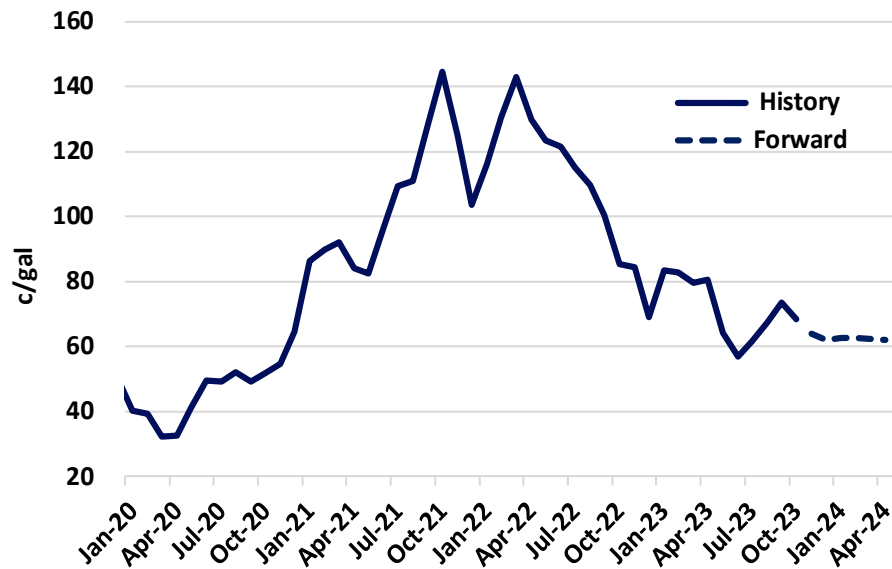


Figure 8.2

Mont Belvieu Non-TET Daily Propane Price



MONTHLY PROPANE PRICE TRENDS

Figure 8.3

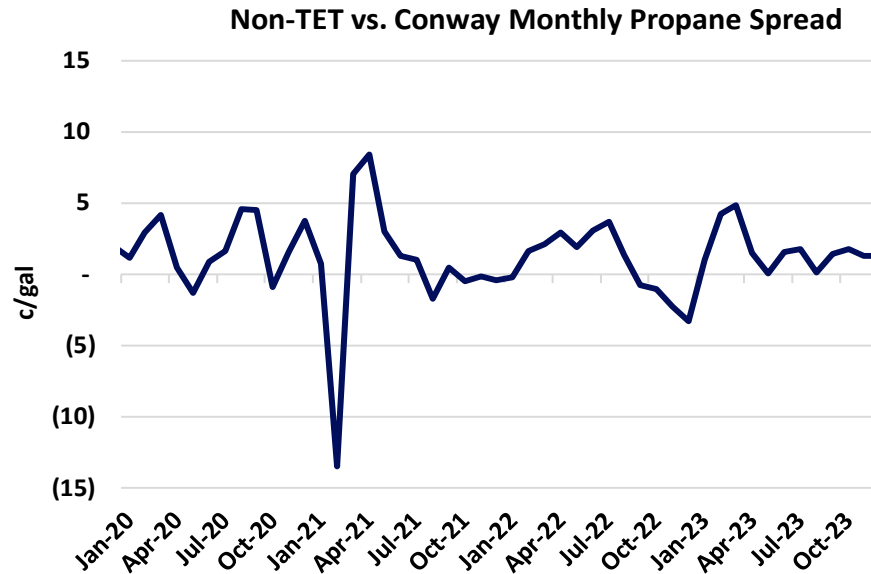


Figure 8.4

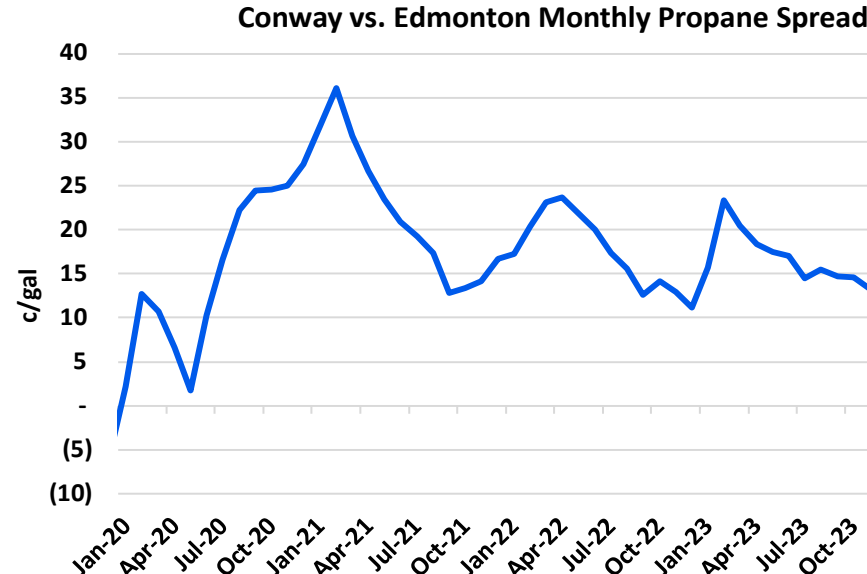


Figure 8.5

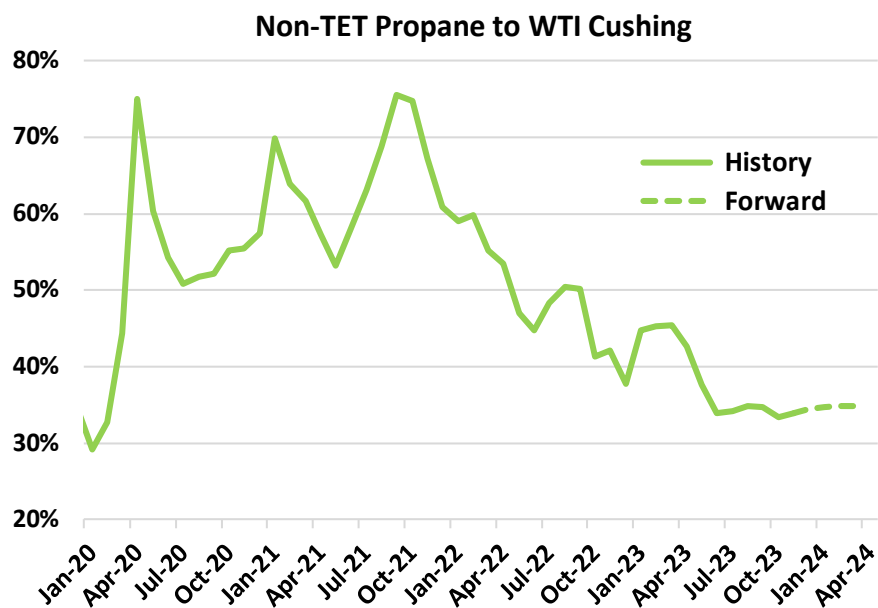


Table L: MB TET Propane / WTI Cushing					
%	2020	2021	2022	2023	Y/Y %
Aug	50.2%	69.1%	50.2%	35.2%	-29.7%
Sep	51.8%	75.3%	50.1%	35.0%	-30.1%
Oct	55.0%	74.9%	41.5%	33.6%	-19.1%
Q1	36.6%	65.8%	58.3%	45.0%	-22.9%
Q2	60.5%	55.5%	48.8%	38.4%	-21.3%
Q3	50.6%	69.2%	49.5%	35.1%	-29.2%
Q4	56.0%	67.7%	40.8%	33.7%	-17.3%
Year	51.0%	64.6%	49.3%	38.7%	-21.5%

INTERNATIONAL PROPANE PRICE SPREADS

Figure 9.1

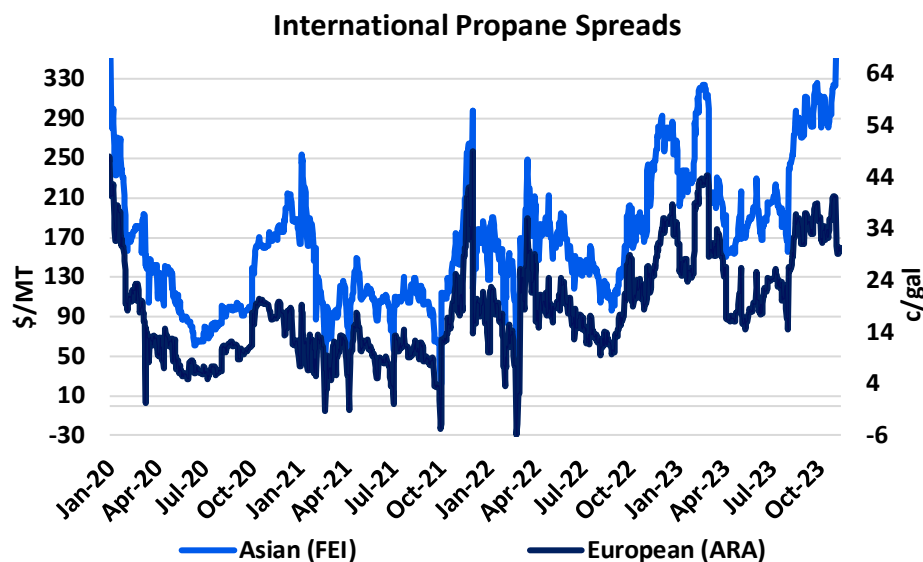


Figure 9.2

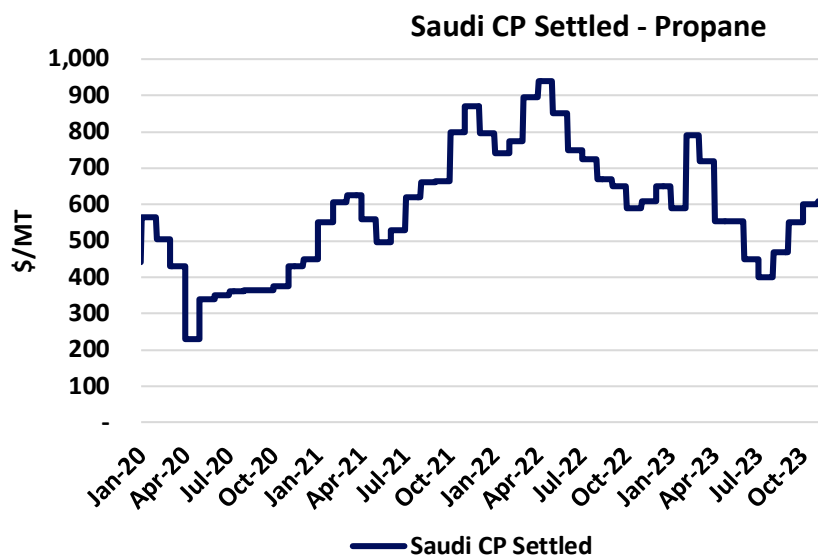


Table M: Asian FEI / MB TET Spread					
\$/MT	2020	2021	2022	2023	Y/Y %
Aug	96.8	115.6	111.2	269.9	142.7%
Sep	97.5	77.1	151.1	304.3	101.4%
Oct	157.2	130.1	177.8	301.6	69.6%
Q1	192.9	129.5	151.5	247.9	63.6%
Q2	97.6	106.1	163.8	181.5	10.8%
Q3	91.0	101.1	134.0	255.7	90.8%
Q4	175.0	163.6	232.5	319.2	37.3%
Year	139.1	125.1	170.6	240.0	40.7%

Table N: European ARA / MB TET Spread					
\$/MT	2020	2021	2022	2023	Y/Y %
Aug	59.2	54.5	61.8	165.2	167.2%
Sep	55.5	28.8	103.5	189.7	83.3%
Oct	100.2	89.0	114.4	186.0	62.6%
Q1	121.6	53.5	90.5	171.3	89.2%
Q2	44.8	50.7	98.3	101.5	3.2%
Q3	49.8	48.3	79.3	156.8	97.8%
Q4	89.5	111.3	147.9	179.8	21.6%
Year	76.4	66.0	104.1	147.8	42.0%

Table O: Saudi CP / MB TET Spread					
\$/MT	2020	2021	2022	2023	Y/Y %
Aug	106.3	85.6	83.2	175.2	110.7%
Sep	110.4	67.5	100.4	260.1	159.2%
Oct	146.4	94.6	136.7	295.2	116.0%
Q1	189.7	118.4	136.5	216.9	58.9%
Q2	103.4	74.8	135.3	142.9	5.6%
Q3	107.5	77.5	91.6	182.4	99.1%
Q4	150.0	144.3	178.4	300.4	68.4%
Year	137.6	103.7	135.4	195.9	44.6%

U.S. PROPANE SUPPLY & DEMAND BALANCE DETAIL

Table P:	MM gal / month							M bbl / day						
	EIA MONTHLY		ESTIMATED		FORECAST			EIA MONTHLY		ESTIMATED		FORECAST		
	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Gas Processing	2,629	2,661	2,586	2,677	2,598	2,693	2,702	2,019	2,044	2,052	2,056	2,062	2,068	2,075
Refinery Propane	376	375	353	352	351	368	354	289	288	280	270	279	283	272
Imports	91	107	89	112	125	155	145	70	82	70	86	100	119	111
TOTAL SUPPLY	3,096	3,143	3,027	3,141	3,075	3,216	3,200	2,378	2,414	2,403	2,412	2,440	2,470	2,458
Product Supplied	741	853	807	952	1,240	1,556	1,673	569	655	640	731	984	1,195	1,285
ResCom	327	328	340	473	586	797	891	251	252	270	364	465	612	685
Crop Drying	39	80	128	215	177	127	74	30	62	102	165	140	98	57
Industrial	85	85	93	100	99	118	125	65	66	74	76	78	91	96
Petrochemicals	233	237	220	231	238	233	230	179	182	174	178	189	179	177
PDH	98	91	88	98	101	117	130	75	70	70	75	80	90	100
Balancing	(41)	31	(63)	(165)	40	164	221	(31)	24	(50)	(127)	32	126	170
Exports	2,013	1,914	2,086	2,194	2,007	2,063	2,044	1,546	1,470	1,656	1,685	1,593	1,584	1,570
Stock Change	342	378	134	(2)	(172)	(403)	(516)	263	290	107	(2)	(137)	(309)	(396)
TOTAL DISPOSITION	3,096	3,144	3,027	3,144	3,075	3,216	3,200	2,378	2,415	2,402	2,414	2,440	2,470	2,458
TOTAL INVENTORY	3,667	4,043	4,177	4,175	4,003	3,600	3,084	87,301	96,259	99,457	99,402	95,300	85,707	73,423
Last Year Inventory	2,695	3,059	3,443	3,642	3,682	3,219	2,882	64,161	72,838	81,980	86,724	87,672	76,642	68,612
Stock M/M Δ	342	378	134	(2)	(172)	(403)	(516)	8,153	8,990	3,198	(55)	(4,102)	(9,594)	(12,284)
Last Year Stock M/M Δ	419	361	386	201	40	(465)	(335)	9,982	8,587	9,180	4,774	960	(11,067)	(7,967)

* Inventories are shown in billion gallons and million barrels respectively.

PADD AVERAGE HEATING DEGREE DAYS (HDDs)

Figure 10.1

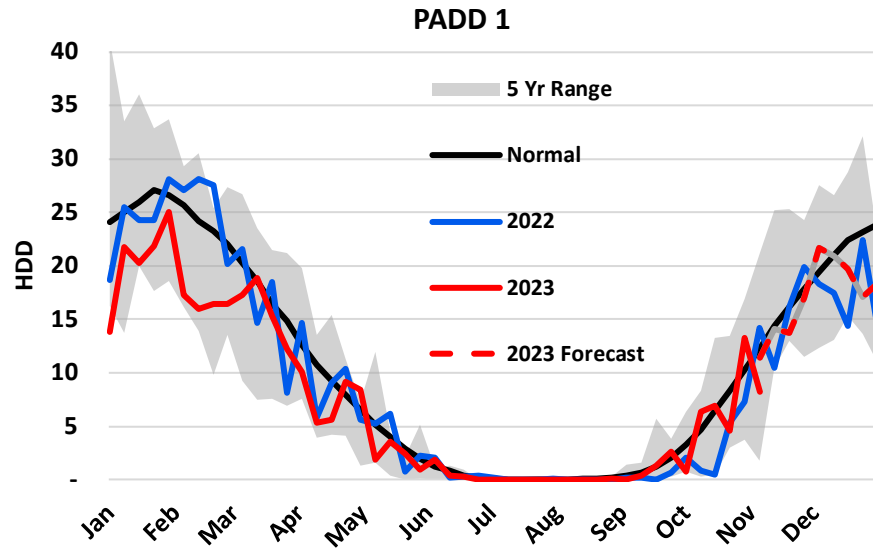


Figure 10.2

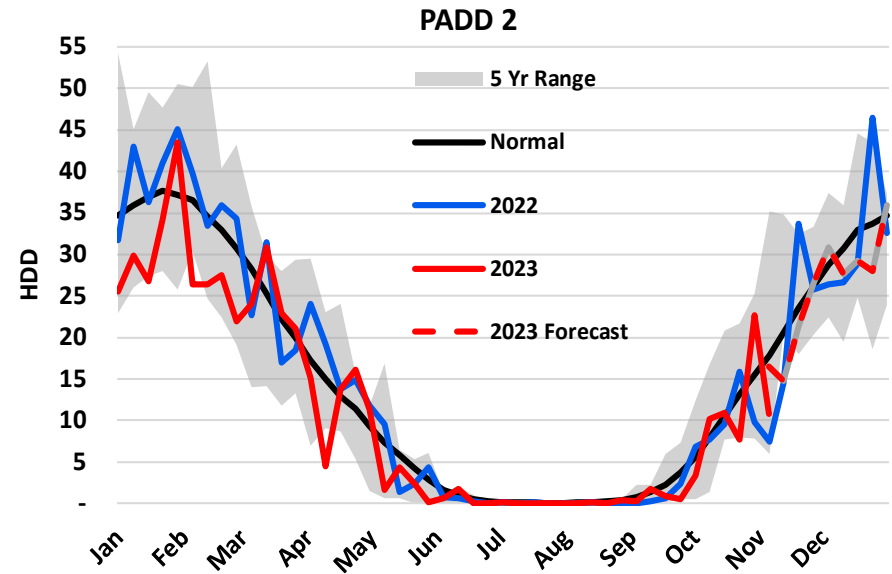


Figure 10.3

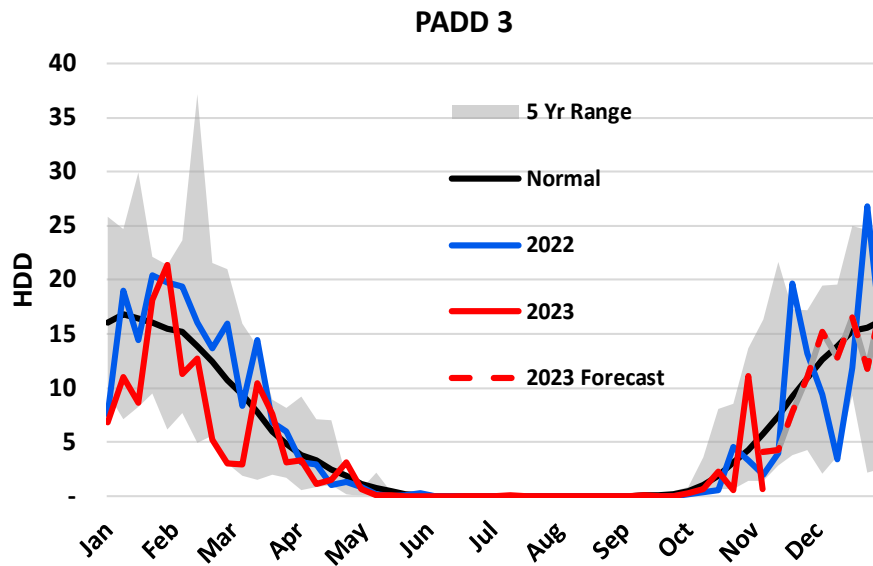


Figure 10.4

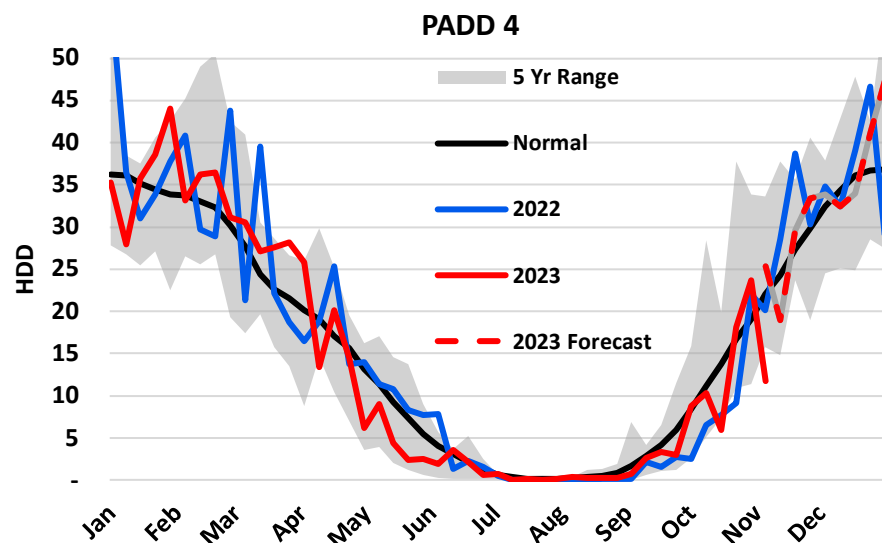
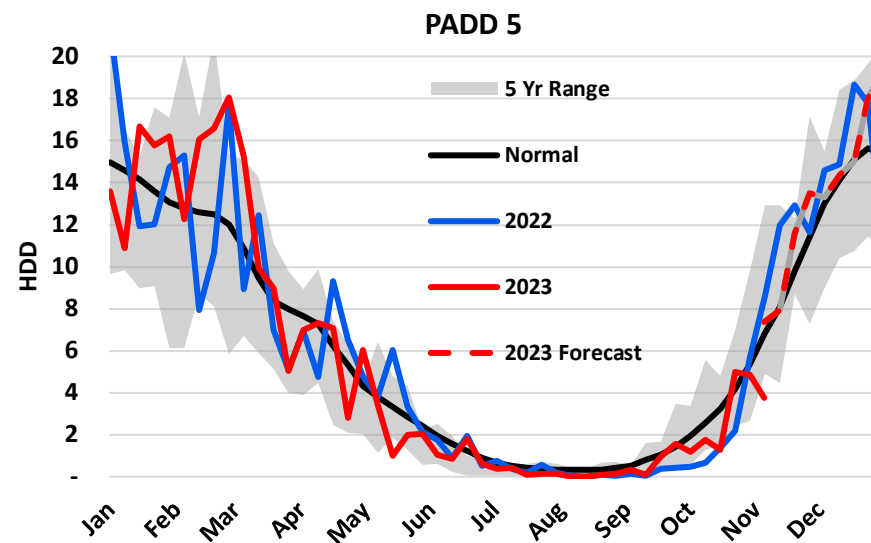


Figure 10.5



DISCLOSURE: This report is provided for the exclusive use of the Subscribing Customer. It is not permissible to make copies of this report for distribution to anyone who is not a Subscribing Customer. RBN Energy (the "Company") is not an investment advisor. The Company does not provide investment, financial, tax, or other advice, nor does the company operate as a broker-dealer. The Company does not recommend the purchase or sale of any particular securities. The data and information in this report may be wrong. This report has been prepared using information derived from publicly available data sourced primarily from internet websites including www.eia.gov, press releases, and media reports. The topics covered are subject to continuous revision. Some of these revisions may not be reported publicly. Some of the reported information used in this report may be erroneous. Accordingly, this report is subject to errors and inaccuracies. You should not rely on any information provided in this report as the basis for any decision or conclusion regarding the topics covered by this report. The information and data in this report are provided on an "as is" basis. The Company makes no warranties as to the accuracy or completeness of any information or data in this report. The Company shall not be liable for any loss or damage arising from any party's reliance on the contents of this report and the Company disclaims any and all liability related to the use of this report to the full extent permissible by law, whether based on warranty, contract, tort or any other legal theory. By using this report, you acknowledge and agree that you, and not the Company are solely responsible for your own investment research and decisions. You further agree that the Company assumes no responsibility or liability for your trading and investment results, and you agree to hold the Company harmless for any such results or losses.