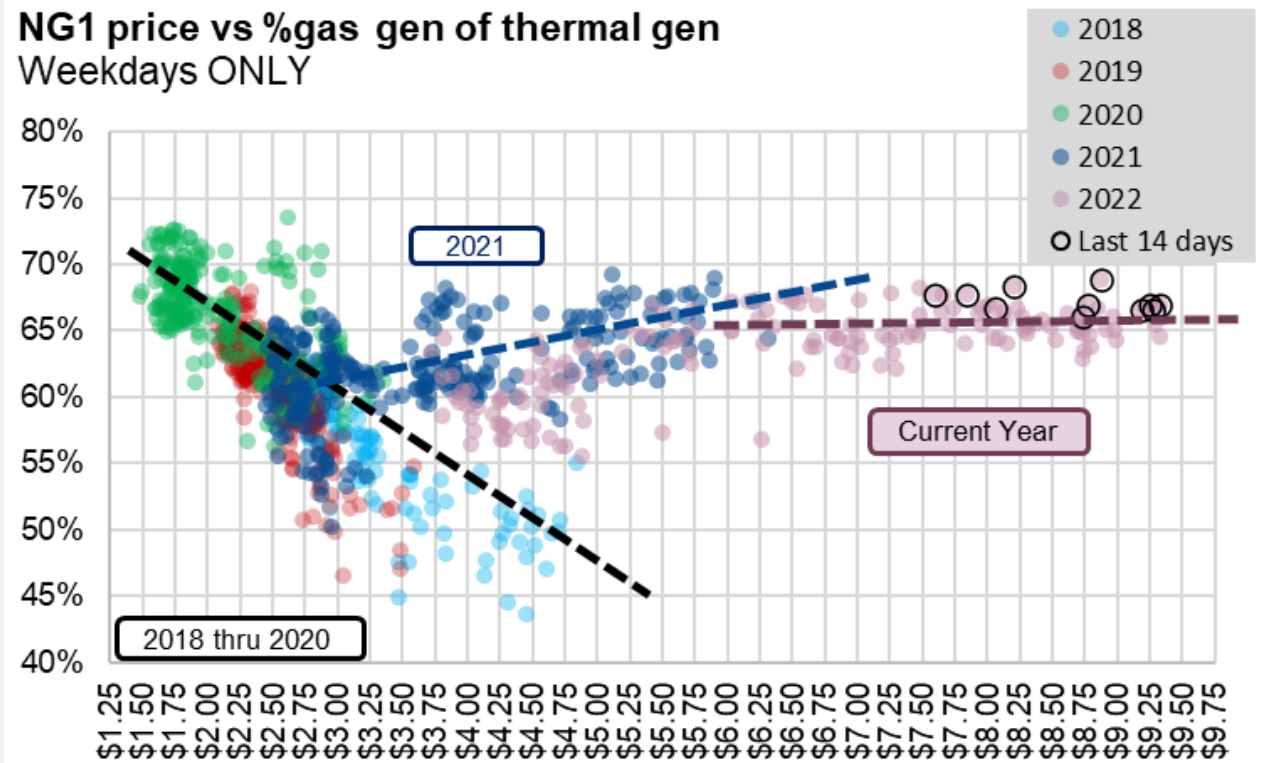


This week we start by looking at the EIA-930 data. With natural gas prices continuing to bounce around, natural gas generation continues to operate at a very stable level. The coal-to-gas switching element no longer exists like we once knew it. As can be seen, natural gas generation's share of thermal generation continues to hold flat at the 64-67% level past \$6/MMBtu.



The primary reason for the loss of coal-to-gas switching flexibility is the massive coal supply shortage. The current coal shortage is the result of a combination of factors that started with COVID lockdowns.

2019: Normal

2020: the lower electricity demand and low natural gas prices drove coal to burn to all-time lows. As a result, coal mines were altogether shut down or reduced output.

2021: US and global markets reopened leading to higher electricity demand. As a result, global natural gas prices spiked leading to soaring demand for coal. For the US this meant a massive reduction of stockpiles for local use and exports.

2022: global natural gas prices continued to soar with the Russian/Ukraine conflict, but production is unable to respond at the same rate due to mine closures and lack of labor.

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How do things look relative to pre-COVID era

How do things look since the death of COVID

Coal Fundamentals: Jan through July for each year (million short tons)

	2018	2019	2020	2021	2022
Total Production	61.6	59.8	44.1	47.4	48.3
YoY		-1.8	-15.7	3.3	1.0
Relative to 2019		0.0	-15.7	-12.4	-11.5
Relative to 2020				3.3	4.2
Total Coal Burn	51.9	45.6	33.6	42.6	41.0
YoY		-6.4	-12.0	9.0	-1.6
Relative to 2019		0.0	-12.0	-3.0	-4.5
Relative to 2020			0.0	9.0	7.5
Total Exports	9.7	8.2	5.7	7.1	7.2
YoY		-1.5	-2.5	1.3	0.1
Relative to 2019		0.0	-2.5	-1.2	-1.1
Relative to 2020			0.0	1.3	1.4
Power Plant Inventory (end of July)	110.3	110.7	138.0	97.3	74.7
YoY		0.3	27.3	-40.6	-22.6
Relative to 2019		0.0	27.3	-13.3	-36.0
Relative to 2020			0.0	-40.6	-63.3

The table above tells a very compelling story of what's leading to the current coal market imbalance:

1) coal production cannot respond quickly to increased demand. As can be seen above, coal supply has only been able to recover by 4.2 million short tons (MMSt) from 2020 to 2022, while coal burns and coal exports have increased by 7.5 MMSt and 1.4 MMSt.

2) after coal inventories ballooned to 138 MMSt in July 2020, the massive coal supply-demand gap has pushed coal power plant inventories to an all-time low.

Coal Exports:

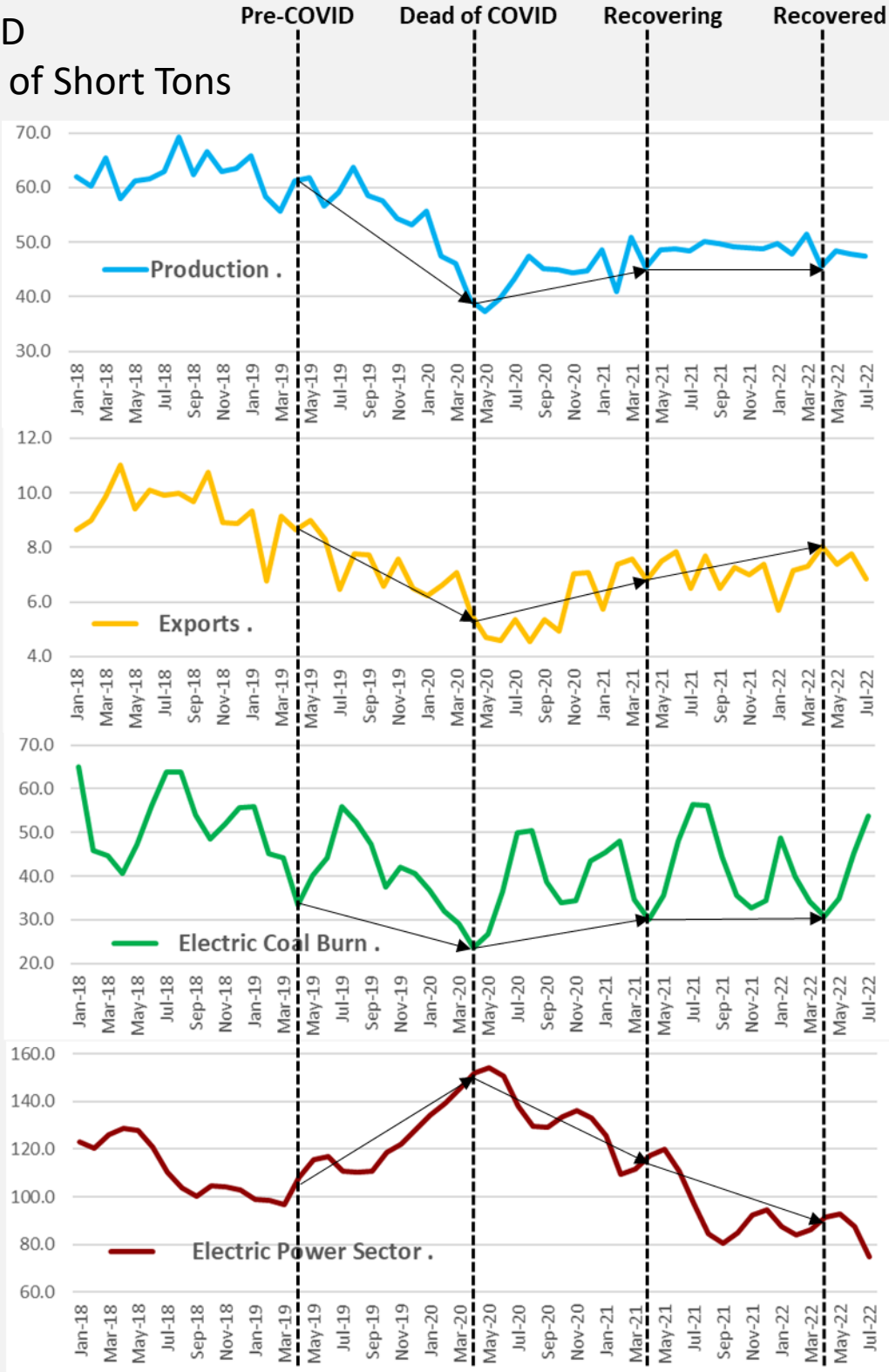
After the war in Ukraine, the price of thermal coal has increased dramatically as European consumers look to import coal from the Eastern US to replace Russian coal. All uncommitted Eastern coals (NAPP, CAPP, and ILB) have been sold to export markets, which reduces the availability of coal to service US spot markets or rebuild inventory levels.

Coal Contracting:

Unlike natural gas pipe delivery, coal is difficult and expensive to transport. Coal generators typically contract 80+% of their coal 6-12 months in advance. This means that the coal gens need to have a pretty strong gustomate of how much coal they will burn over that time frame. The spot market for coal is non-existent because matching excess coal supply (if any) with rail transport is virtually impossible.

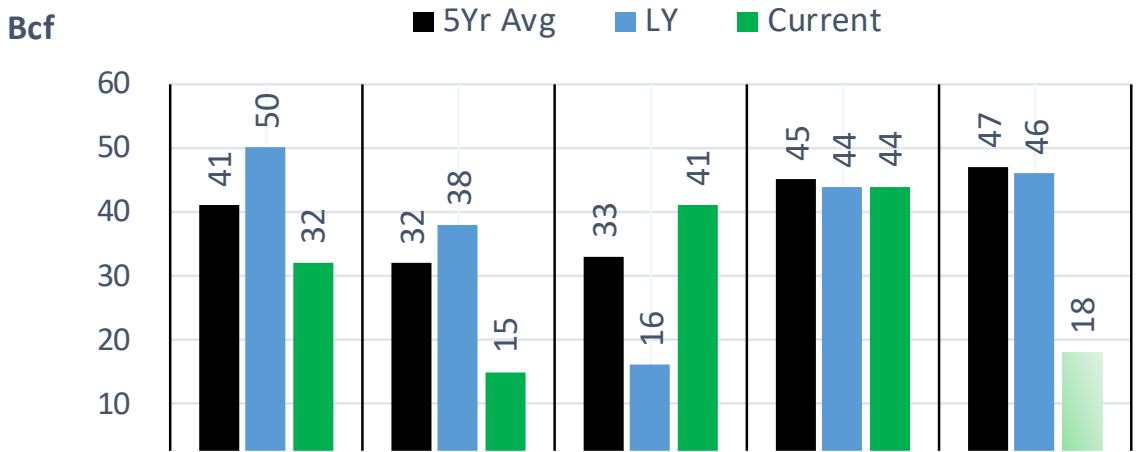
Coal S/D

Million of Short Tons

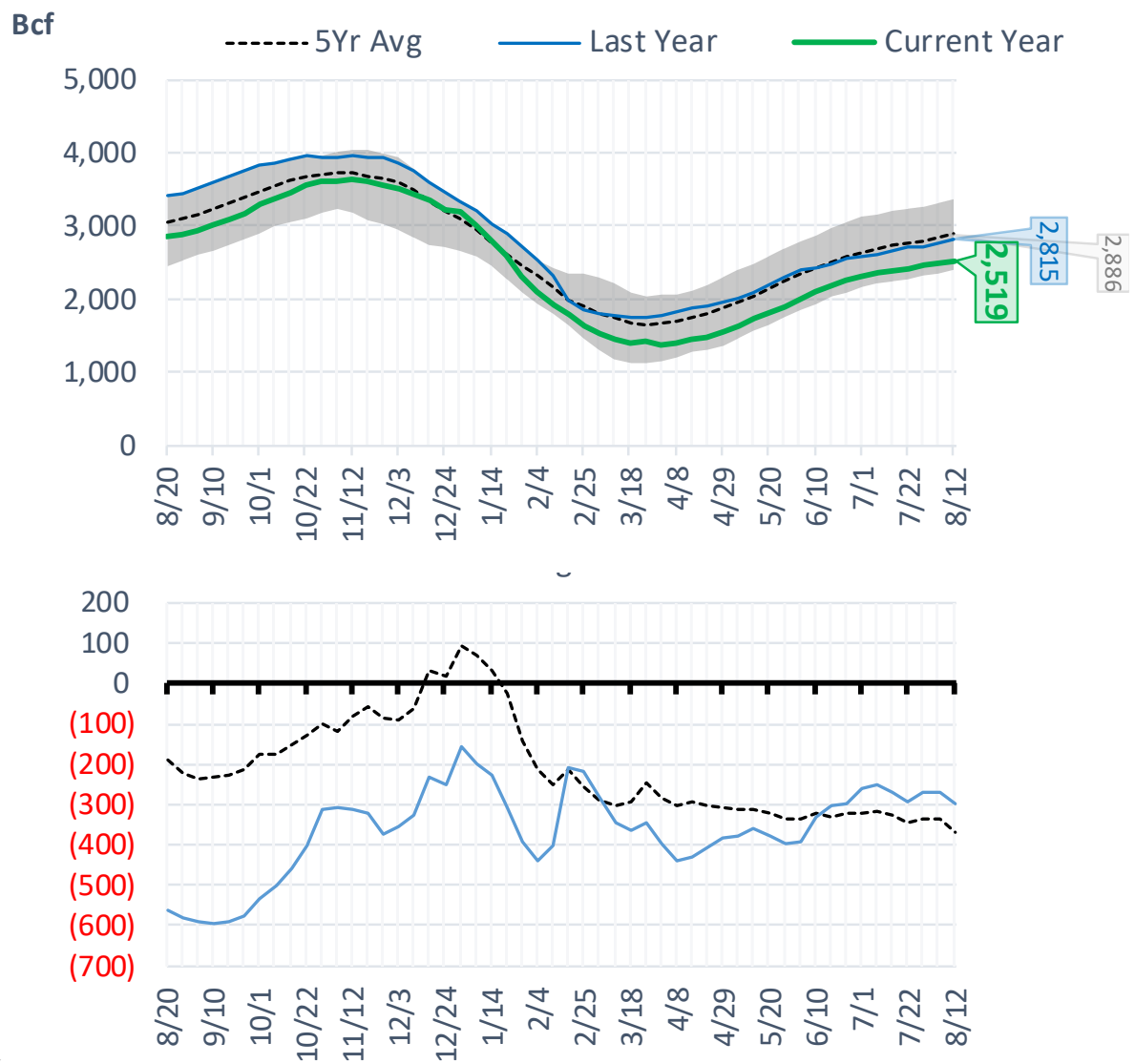


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Total Lower 48 YoY Weekly Change



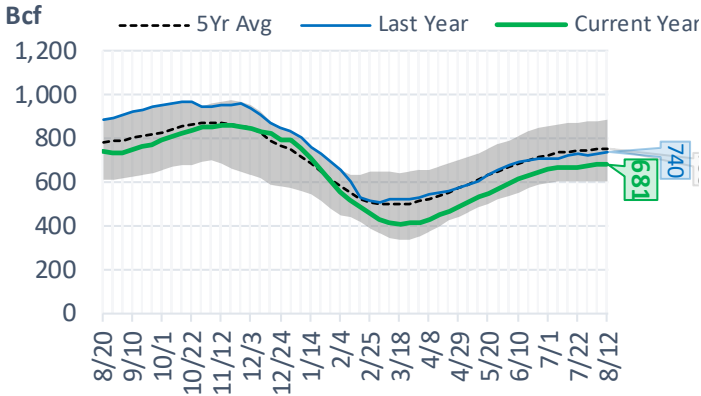
Total Lower 48 Storage Levels



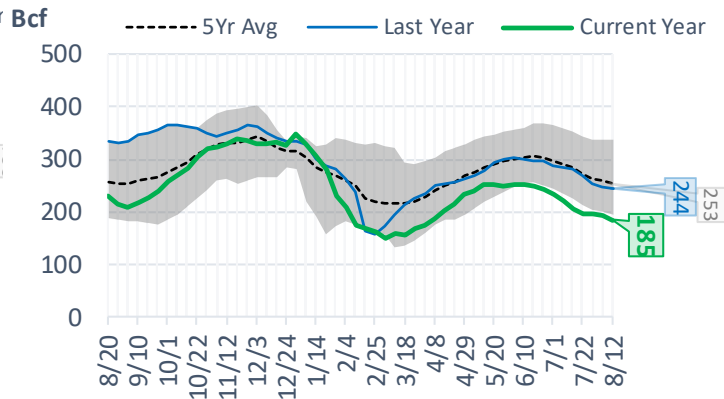
Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 12-Aug	Week - 1 5-Aug	Week - 2 29-Jul	Week - 3 22-Jul	Week - 4 15-Jul	Week - 5 8-Jul
Total Lower 48 Storage Level	2519	2501	2457	2416	2401	2369
Weekly Change	+18	+44	+41	+15	+32	+58
vs LY	-296	-268	-268	-293	-270	-252
vs 5Yr Avg	-367	-338	-337	-345	-328	-319
S. Central Salt Storage Level	185	193	195	195	206	221
Weekly Change	-8	-2	0	-11	-15	-12
vs LY	-59	-54	-58	-75	-74	-62
vs 5Yr Avg	-68	-66	-68	-77	-77	-71
S. Central NonSalt Storage Level	681	681	671	667	669	669
Weekly Change	0	+10	+4	-2	0	+12
vs LY	-59	-50	-55	-61	-52	-42
vs 5Yr Avg	-72	-68	-73	-76	-71	-66
Midwest Storage Level	684	663	643	625	608	586
Weekly Change	+21	+20	+18	+17	+22	+24
vs LY	-78	-75	-74	-74	-72	-73
vs 5Yr Avg	-74	-69	-66	-65	-63	-64
East Storage Level	571	564	549	532	521	501
Weekly Change	+7	+15	+17	+11	+20	+19
vs LY	-72	-61	-52	-48	-38	-39
vs 5Yr Avg	-96	-83	-77	-74	-66	-67
Mountain Storage Level	151	148	147	144	144	143
Weekly Change	+3	+1	+3	0	+1	+5
vs LY	-37	-37	-37	-40	-39	-37
vs 5Yr Avg	-32	-33	-31	-31	-28	-26
Pacific Storage Level	248	252	253	253	253	249
Weekly Change	-4	-1	0	0	+4	+9
vs LY	+8	+11	+9	+7	+6	0
vs 5Yr Avg	-24	-20	-20	-22	-23	-27

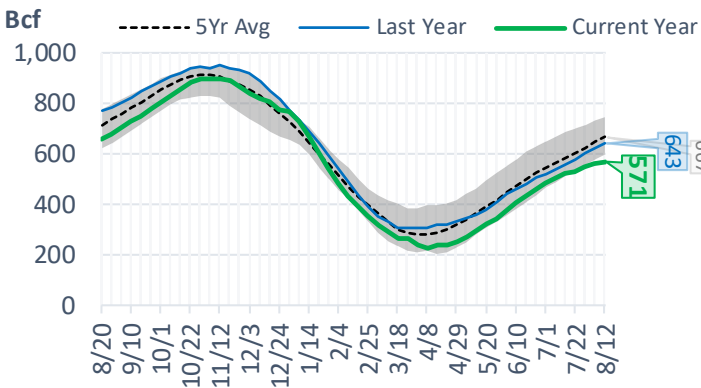
NonSalt Storage Levels



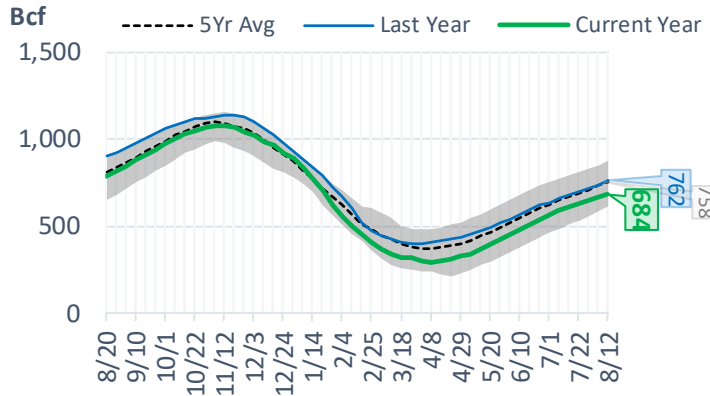
Salt Storage Levels



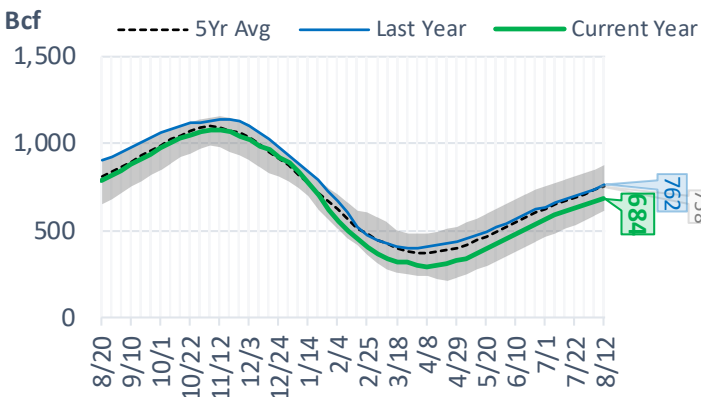
East Storage Levels



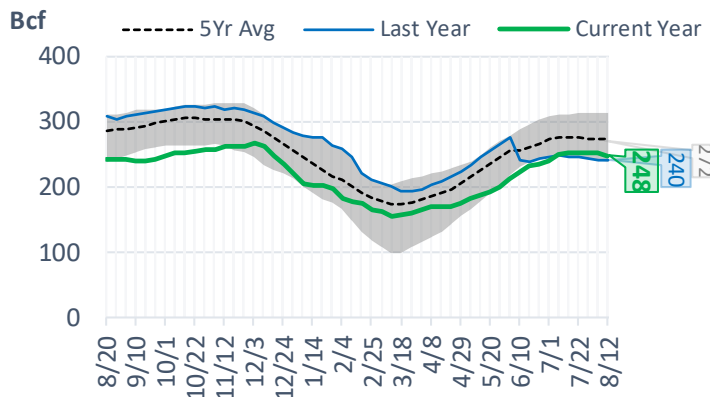
Midwest Storage Levels



Midwest Storage Levels



Pacific Storage Levels



EIA Storage Week Balances

	15-Jul	22-Jul	29-Jul	5-Aug	12-Aug	19-Aug	WoW	vs. 4W
Lower 48 Dry Production	96.5	97.4	97.7	99.1	98.9	98.3	▼-0.6	▲0.0
Canadian Imports	6.0	6.2	5.9	5.7	5.4	4.8	▼-0.6	▼-1.0
L48 Power	42.9	45.5	44.8	44.4	45.7	39.6	▼-6.1	▼-5.5
L48 Residential & Commercial	8.4	8.7	8.6	8.3	8.4	7.9	▼-0.5	▼-0.6
L48 Industrial	20.5	21.0	19.4	20.6	21.8	21.6	▼-0.1	▲0.9
L48 Lease and Plant Fuel	5.2	5.3	5.3	5.4	5.4	5.3	▼0.0	▲0.0
L48 Pipeline Distribution	2.7	2.9	2.8	2.8	2.9	2.5	▼-0.3	▼-0.3
L48 Regional Gas Consumption	79.7	83.3	80.9	81.5	84.1	77.1	▼-7.1	▼-5.4
Net LNG Exports	11.1	10.8	10.7	10.9	10.9	10.9	▲0.1	▲0.1
Total Mexican Exports	7.0	7.1	6.9	6.9	7.0	6.9	▼-0.1	▼0.0
Implied Daily Storage Activity	4.7	2.3	5.1	5.4	2.2	8.1	5.9	
EIA Reported Daily Storage Activity	4.6	2.1	5.9	6.3	2.6			
Daily Model Error	0.2	0.2	-0.8	-0.9	-0.3			

Monthly Balances

	2Yr Ago Aug-20	LY Aug-21	Apr-22	May-22	Jun-22	Jul-22	MTD Aug-22	MoM	vs. LY
Lower 48 Dry Production	88.9	93.9	95.1	96.0	97.1	97.4	98.6	▲1.2	▲4.7
Canadian Imports	4.9	5.1	5.8	5.1	5.7	5.9	5.2	▼-0.7	▲0.1
L48 Power	41.0	40.4	25.1	29.7	36.8	43.4	43.4	▼-0.1	▲3.0
L48 Residential & Commercial	7.7	7.9	22.3	12.4	9.0	8.5	8.2	▼-0.2	▲0.3
L48 Industrial	20.8	21.0	20.1	19.8	20.6	20.3	21.5	▲1.3	▲0.5
L48 Lease and Plant Fuel	4.8	5.1	5.2	5.3	5.2	5.3	5.4	▲0.1	▲0.3
L48 Pipeline Distribution	2.5	2.6	2.6	2.4	2.5	2.8	2.7	▼0.0	▲0.2
L48 Regional Gas Consumption	76.9	77.0	75.3	69.6	74.2	80.2	81.2	▲1.0	▲4.2
Net LNG Exports	4.0	10.5	12.3	12.5	11.2	10.9	10.9	▼0.0	▲0.4
Total Mexican Exports	6.0	6.9	6.7	7.0	7.1	7.0	7.0	▼0.0	▲0.1
Implied Daily Storage Activity	6.8	4.7	6.6	12.0	10.3	5.2	4.8		
EIA Reported Daily Storage Activity									
Daily Model Error									

Source: Bloomberg, analytix.ai

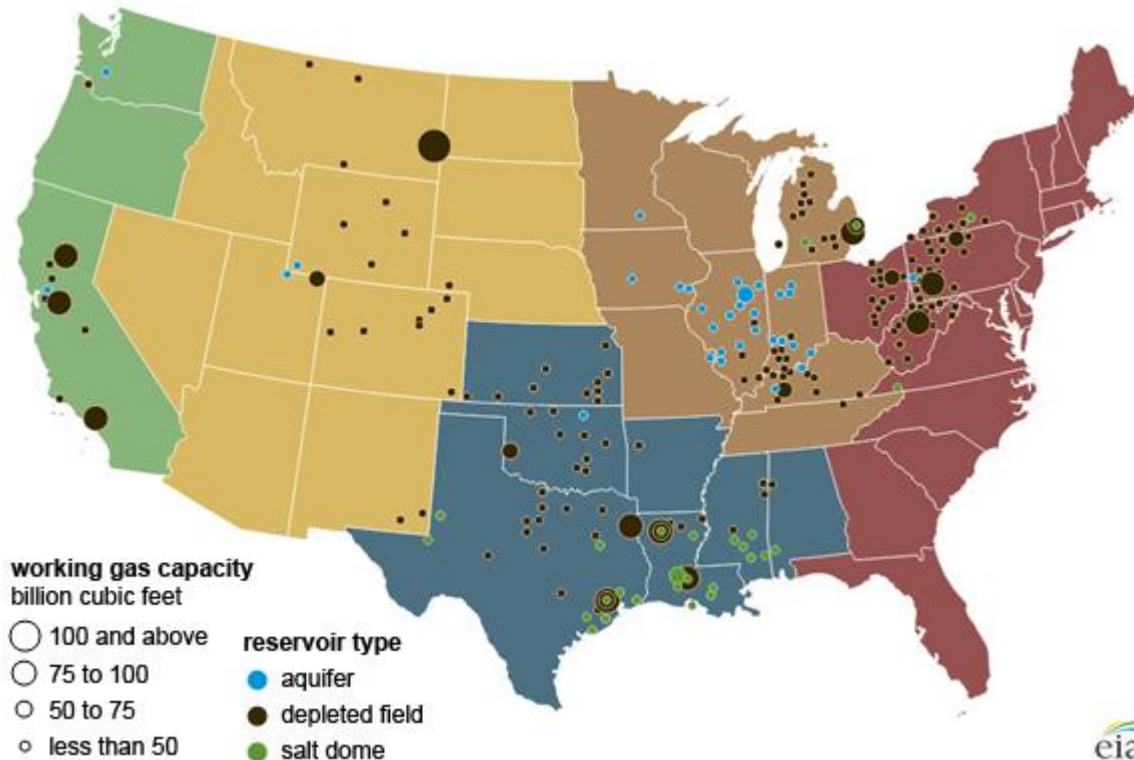
Regional S/D Models Storage Projection

Week Ending 19-Aug

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	8.4	-0.1	8.3	58
East	1.3	2.1	3.3	23
Midwest	5.0	-0.8	4.2	29
Mountain	4.6	-4.1	0.5	3
South Central	-2.3	3.2	0.9	6
Pacific	-0.1	-0.5	-0.6	-4

*Adjustment Factor is calculated based on historical regional deltas

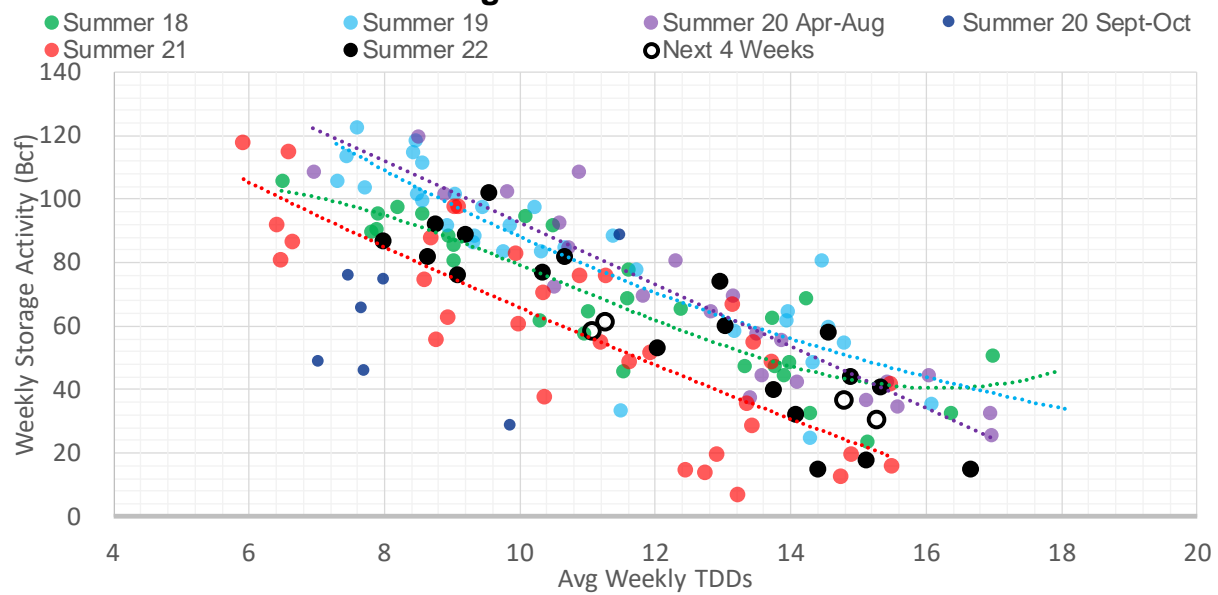
U.S. underground natural gas storage facilities by type (July 2015)



Weather Model Storage Projection

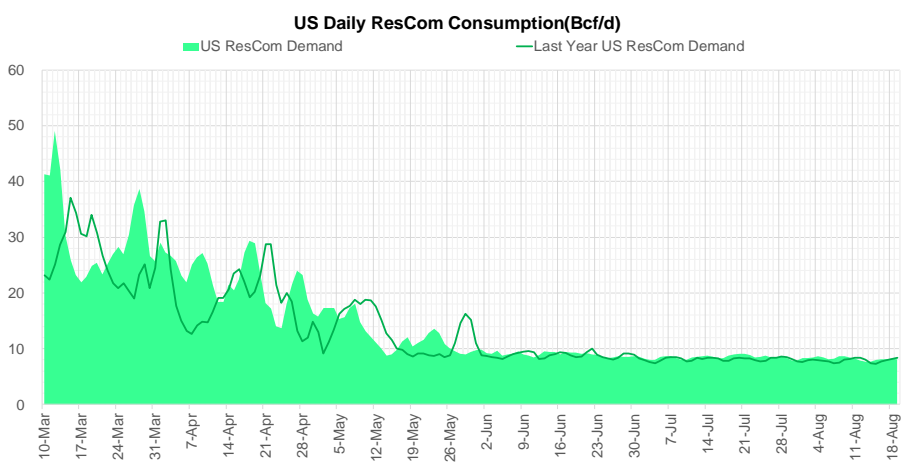
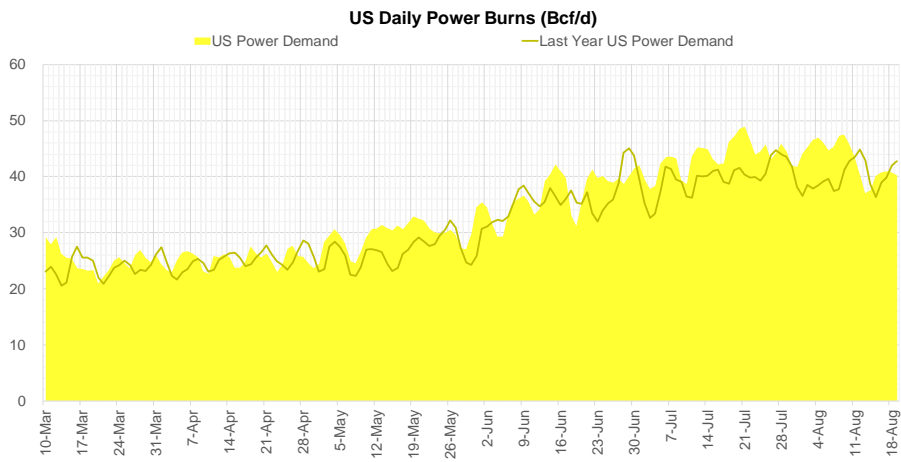
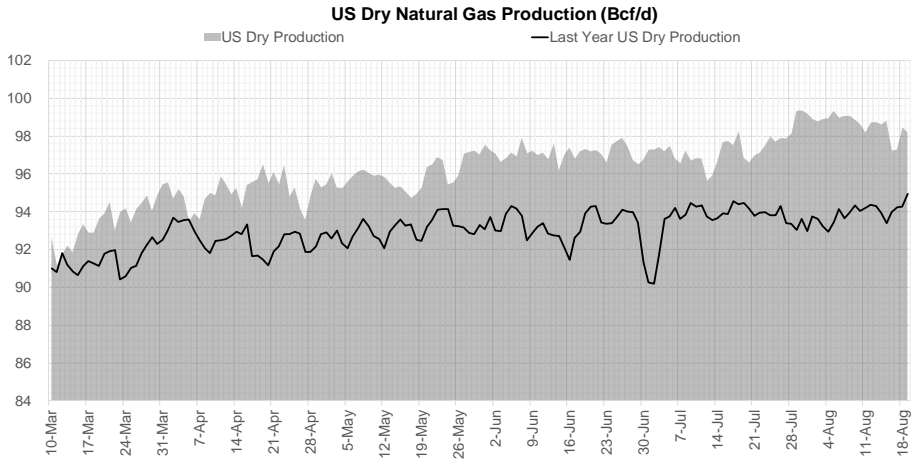
Next report and beyond		
Week Ending	GWDDs	Week Storage Projection
19-Aug	11.1	58
26-Aug	14.8	37
02-Sep	15.3	30
09-Sep	11.3	61

Weather Storage Model - Next 4 Week Forecast



Note: this is not our official end of season forecast. This chart signifies where storage levels end with 10-year normal weather and current market tightness relative to last year

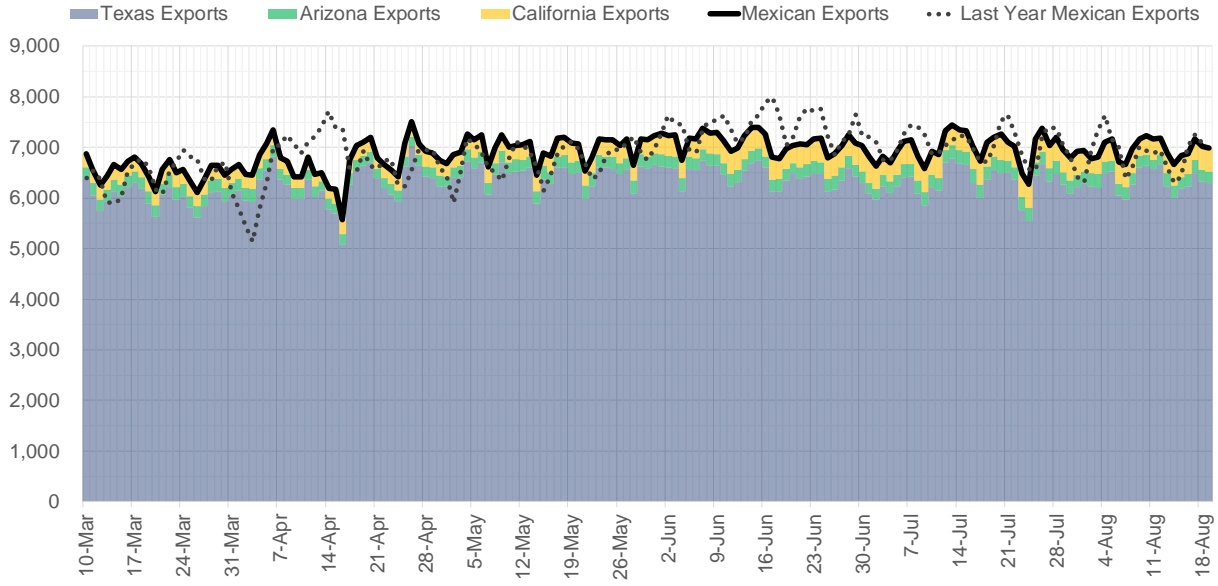
Supply – Demand Trends



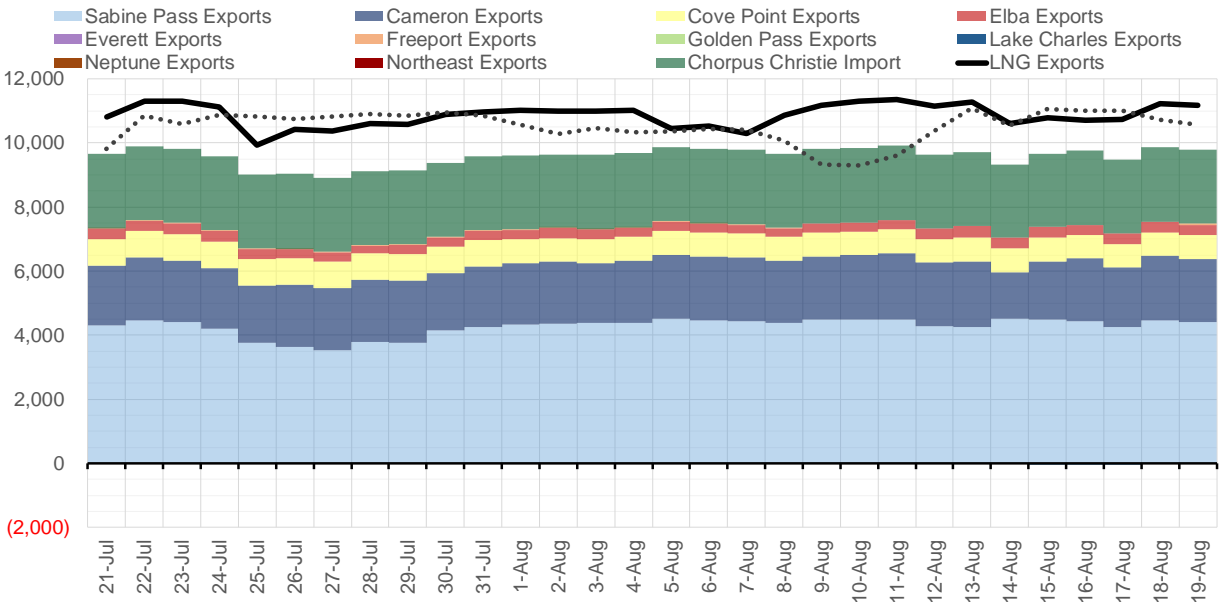
Source: Bloomberg

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Mexican Exports (MMcf/d)



Net LNG Exports - Last 30 days (MMcf/d)



Source: Bloomberg

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Nat Gas Options Volume and Open Interest CME and ICE data combined

CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE VOL	CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE OI
9	2022	C	10.00	7145	10	2022	P	3.00	36640
9	2022	C	9.50	5487	10	2022	C	6.00	36016
9	2022	C	9.00	4877	10	2022	P	6.00	31589
9	2022	P	8.00	4662	10	2022	P	5.00	28933
9	2022	P	9.00	3706	10	2022	P	2.50	28113
9	2022	C	11.00	3604	9	2022	C	6.00	24369
9	2022	C	9.25	3371	10	2022	C	5.00	23268
9	2022	P	8.50	3186	3	2023	C	10.00	22460
10	2022	P	8.00	3146	10	2022	P	3.50	22246
9	2022	C	12.00	2536	10	2022	C	12.00	22239
10	2022	C	10.50	2347	10	2022	C	10.00	22052
10	2022	C	14.00	2342	10	2022	P	4.00	21127
4	2023	P	3.00	2010	5	2023	P	2.00	20997
5	2023	P	3.00	2010	9	2022	P	4.00	20463
6	2023	P	3.00	2010	9	2022	P	6.00	20394
7	2023	P	3.00	1975	11	2022	P	4.00	19971
8	2023	P	3.00	1975	9	2022	C	7.00	19552
9	2023	P	3.00	1975	9	2022	C	10.00	19212
10	2023	P	3.00	1975	12	2022	P	5.00	19173
10	2022	C	9.00	1856	10	2023	P	2.50	18525
10	2022	P	5.00	1807	12	2022	C	5.00	18218
9	2022	P	8.25	1680	3	2023	P	3.00	18051
10	2022	C	12.00	1588	2	2023	C	10.00	17369
9	2022	P	7.50	1571	10	2022	C	8.00	17195
9	2022	C	11.50	1523	1	2023	C	10.00	16813
10	2022	C	10.00	1515	10	2022	P	2.00	16759
10	2022	P	4.00	1502	9	2022	P	3.00	16612
10	2022	P	6.00	1371	9	2022	C	9.00	16265
1	2023	C	10.00	1323	4	2023	P	3.00	16109
10	2022	C	11.00	1292	3	2023	C	20.00	16059
10	2022	P	6.25	1282	9	2022	C	4.00	15969
6	2023	P	4.50	1250	9	2022	C	12.00	15896
12	2022	P	6.50	1138	10	2022	P	5.50	15826
10	2022	P	5.50	1070	9	2022	P	2.50	15478
11	2022	C	15.00	1016	10	2022	P	3.25	15350
12	2022	P	5.50	1002	10	2023	P	2.00	15280
9	2022	C	11.10	1000	9	2022	P	7.00	15252
10	2022	C	10.60	1000	10	2022	C	7.00	15069
10	2022	P	5.40	1000	2	2023	C	9.00	14988
6	2023	C	7.00	1000	9	2022	P	2.75	14887
9	2022	C	10.50	986	10	2023	P	3.00	14808
11	2022	C	11.00	972	9	2022	P	5.00	14472
10	2022	P	7.00	966	9	2022	P	6.50	14417
12	2022	P	7.00	900	4	2023	P	2.75	14370
2	2023	C	10.00	884	11	2022	C	8.00	14290
9	2022	C	12.50	827	9	2022	P	3.50	14015
10	2022	P	7.25	801	12	2022	C	6.00	13987
9	2022	P	9.25	781	11	2022	C	10.00	13795
12	2022	C	11.00	740	10	2022	C	9.00	13671
					12	2022	C	10	13310

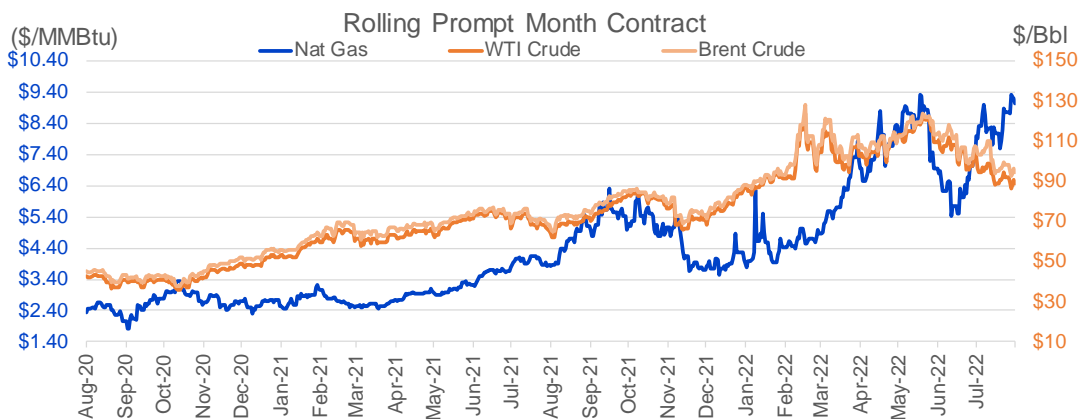
Source: CME, ICE

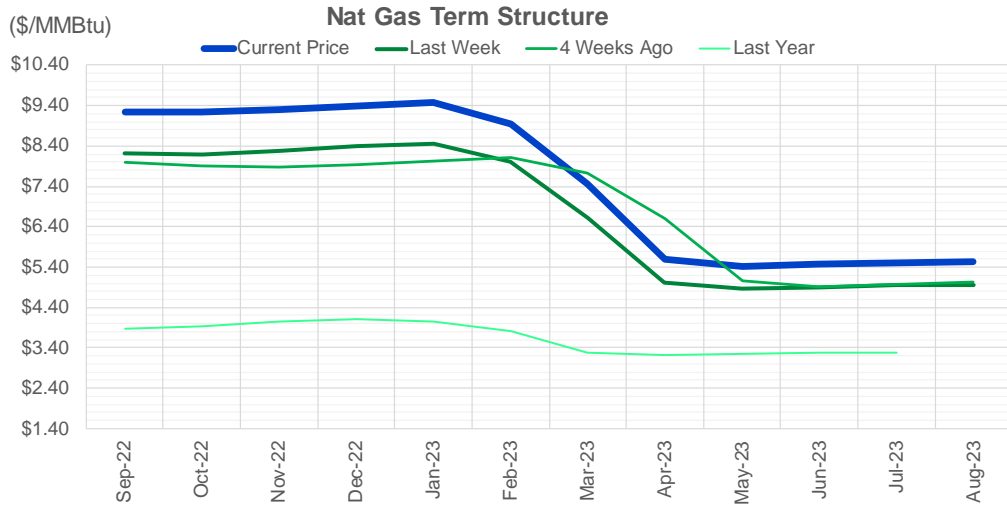
Nat Gas Futures Open Interest

CME and ICE data combined

CME Henry Hub Futures (10,000 MMBtu)				ICE Henry Hub Futures Contract Equivalent (10,000 MM			
	Current	Prior	Daily Change		Current	Prior	Daily Change
SEP 22	44943	52858	-7915	SEP 22	78040	77560	480
OCT 22	117601	116192	1409	OCT 22	77379	77955	-576
NOV 22	121414	120038	1376	NOV 22	65518	64957	561
DEC 22	65900	64833	1067	DEC 22	67707	67629	78
JAN 23	84498	84793	-295	JAN 23	66398	66318	80
FEB 23	37293	37286	7	FEB 23	62336	61942	394
MAR 23	56394	56300	94	MAR 23	54255	54011	244
APR 23	71185	70318	867	APR 23	56414	56430	-16
MAY 23	73395	73442	-47	MAY 23	54862	54822	41
JUN 23	23309	23045	264	JUN 23	46912	47041	-129
JUL 23	23458	23746	-288	JUL 23	46399	46474	-75
AUG 23	19123	19043	80	AUG 23	45130	45120	10
SEP 23	20106	19969	137	SEP 23	43891	43962	-72
OCT 23	48741	49019	-278	OCT 23	51551	51220	331
NOV 23	13120	13057	63	NOV 23	45168	45090	78
DEC 23	12559	12493	66	DEC 23	41250	41194	56
JAN 24	18672	18876	-204	JAN 24	40461	40118	343
FEB 24	7908	7880	28	FEB 24	30528	30526	2
MAR 24	17768	17648	120	MAR 24	35030	34999	31
APR 24	14414	14294	120	APR 24	28505	28561	-56
MAY 24	6897	6845	52	MAY 24	27399	27349	50
JUN 24	2628	2588	40	JUN 24	24360	24311	49
JUL 24	2426	2418	8	JUL 24	24308	24258	50
AUG 24	3316	3310	6	AUG 24	23897	23847	50
SEP 24	1976	1948	28	SEP 24	23832	23784	48
OCT 24	8935	8935	0	OCT 24	27148	27213	-66
NOV 24	4822	4814	8	NOV 24	24901	24885	16
DEC 24	7892	7890	2	DEC 24	28200	28185	16
JAN 25	16559	16554	5	JAN 25	21804	21749	55
FEB 25	953	974	-21	FEB 25	14318	14318	0

Source: CME, ICE






	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
Current Price	\$9.244	\$9.228	\$9.297	\$9.401	\$9.465	\$8.951	\$7.448	\$5.593	\$5.416	\$5.463	\$5.512	\$5.524
Last Week	\$8.202	\$8.193	\$8.272	\$8.389	\$8.449	\$7.997	\$6.605	\$5.015	\$4.854	\$4.901	\$4.947	\$4.960
vs. Last Week	\$1.042	\$1.035	\$1.025	\$1.012	\$1.016	\$0.954	\$0.843	\$0.578	\$0.562	\$0.562	\$0.565	\$0.564
4 Weeks Ago	\$8.007	\$7.899	\$7.870	\$7.944	\$8.030	\$8.109	\$7.726	\$6.588	\$5.074	\$4.923	\$4.975	\$5.028
vs. 4 Weeks Ago	\$1.237	\$1.329	\$1.427	\$1.457	\$1.435	\$0.842	-\$0.278	-\$0.995	\$0.342	\$0.540	\$0.537	\$0.496
Last Year	\$3.852	\$3.866	\$3.939	\$4.057	\$4.120	\$4.045	\$3.800	\$3.287	\$3.220	\$3.250	\$3.284	\$3.292
vs. Last Year	\$5.392	\$5.362	\$5.358	\$5.344	\$5.345	\$4.906	\$3.648	\$2.306	\$2.196	\$2.213	\$2.228	\$2.232

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	2.224	▲ 0.000	▲ 0.000	▲ 1.997
NatGas Oct21/Nov21	\$/MMBtu	0.361	▲ 0.000	▲ 0.000	▲ 0.296
NatGas Oct21/Jan22	\$/MMBtu	-1.817	▲ 0.000	▲ 0.000	▼ -2.054
NatGas Apr22/Oct22	\$/MMBtu	3.834	▲ 0.307	▲ 1.386	▲ 3.817
WTI Crude	\$/Bbl	90.50	▼ -3.840	▼ -5.850	▲ 26.810
Brent Crude	\$/Bbl	96.59	▼ -3.010	▼ -7.270	▲ 30.140
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	364.97	▲ 16.570	▲ 5.940	▲ 168.070
Propane, Mt. Bel	cents/Gallon	1.09	▼ -0.005	▼ -0.054	▼ -0.025
Ethane, Mt. Bel	cents/Gallon	0.61	▲ 0.013	▲ 0.035	▲ 0.270
Coal, PRB	\$/MTon	12.30	▲ 0.000	▲ 0.000	▲ 0.000
Coal, PRB	\$/MMBtu	0.70			

Source: CME, Bloomberg

Baker Hughes Rig Counts

Rotary Rig Count					
8/19/2022					
Baker Hughes 					
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	601	0	601	196	405
Gas	159	-1	160	62	97
Miscellaneous	2	0	2	1	1
Directional	39	0	39	9	30
Horizontal	694	1	693	240	454
Vertical	29	-2	31	10	19
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago
Oil	137	0	137	42	95
Gas	64	0	64	4	60
Miscellaneous	0	0	0	-1	1
Major State Variances	This Week	+/-	Last Week	+/-	Year Ago
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago
Ardmore Woodford	1	0	1	-2	3
Arkoma Woodford	6	0	6	5	1
Barnett	3	0	3	3	0
Cana Woodford	24	-1	25	7	17
DJ-Niobrara	17	0	17	5	12
Eagle Ford	72	0	72	37	35
Granite Wash	7	0	7	3	4
Haynesville	69	0	69	24	45
Marcellus	35	0	35	7	28
Mississippian	1	0	1	1	0
Permian	345	-1	346	98	247
Utica	12	0	12	0	12
Williston	39	0	39	16	23