

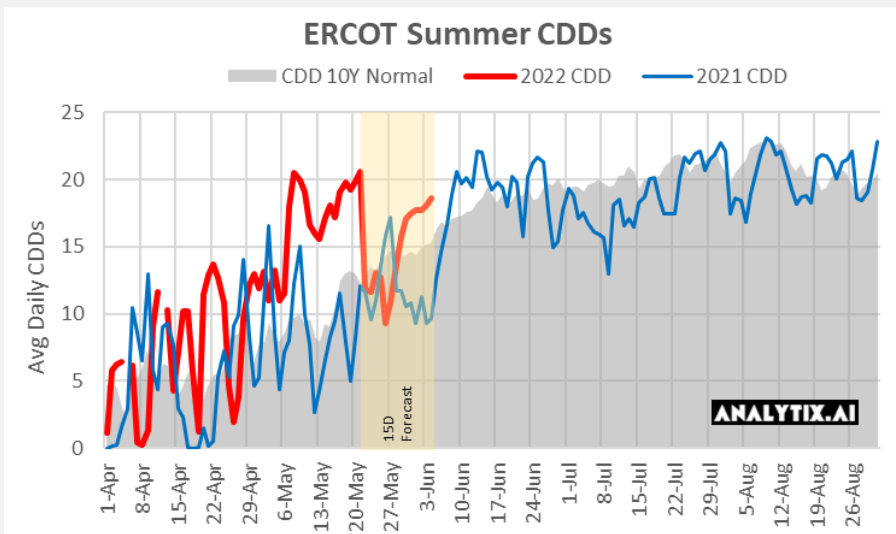
This week we drill in to see how the ERCOT region while under the stress of peak temps early in the summer season. This week gave us a small preview to see whether ERCOT is ready for the coming summer heat, and how the grid will respond.

On May 17, ERCOT and the Public Utility Commission of Texas spoke to the public about whether the Texas power grid is ready for the summer heat. They said they are ready but will operate with an abundance of caution to keep the grid reliable.

Texas is the only state with its own, isolated power grid (The Lonestar state). That means when extreme weather or other circumstances take out in-state generation, Texas cannot easily borrow from other power jurisdictions. Adding to that we have to note that the Texas power market is also “energy-only,” meaning generation companies are not rewarded to produce backup power.

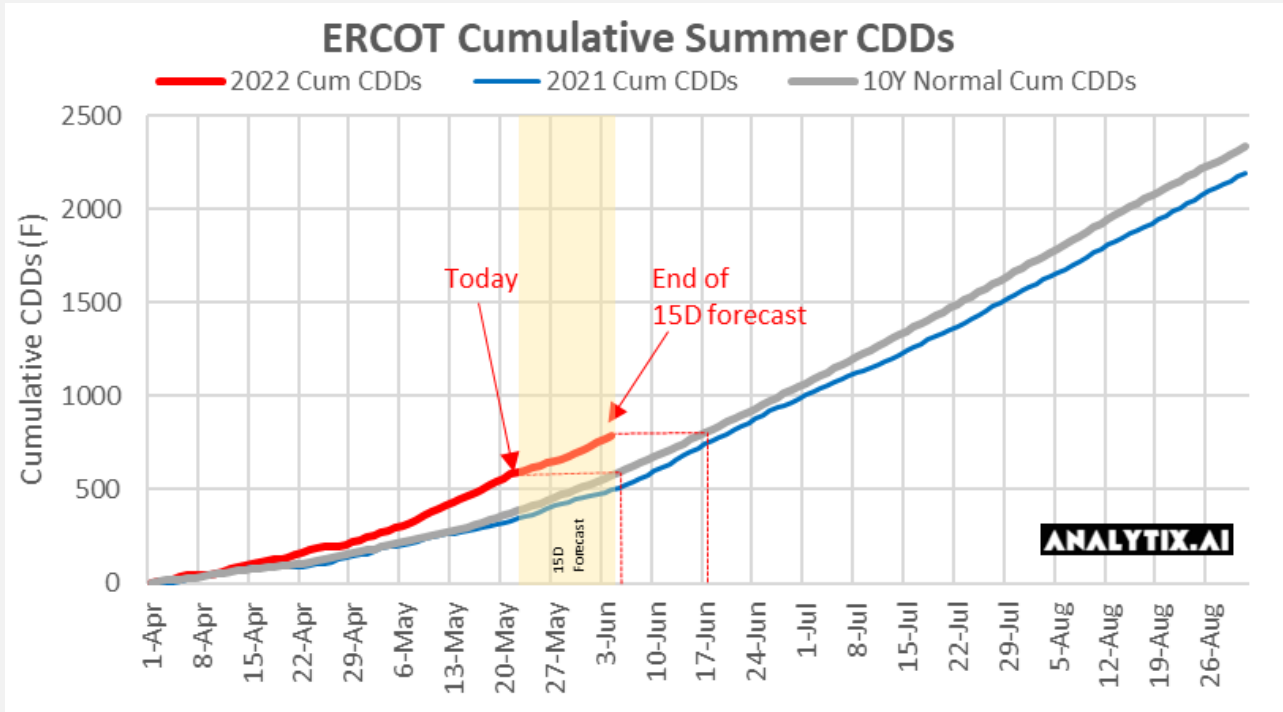
To ensure they do not run into any issues, ERCOT asked power plants to delay maintenance and sent notices to the public urging them to conserve energy. This was especially important after six power plants tripped on May 13th. The power plant failures led to a loss of about 2,900 MW, but all did return last weekend. ERCOT did not disclose which power plants had shut down, nor did they give the reason for the failures. It is highly likely to be heat-related. At least one of the six generators that unexpectedly went offline Friday, a plant owned by Calpine, had been told by ERCOT to delay scheduled repairs and keep operating because of high power demand.

So let's look at how ERCOT weathered the heat this past week from the EIA930 data and regional daily weather. Here are a series of charts that help explain what's going on. First, we start with current daily summer CDDs vs last year and the 10Y normal. As clearly seen, temps in May have been quite extreme. The level of temps we experienced the last two weeks are similar to the levels typically seen in late June to mid-July.

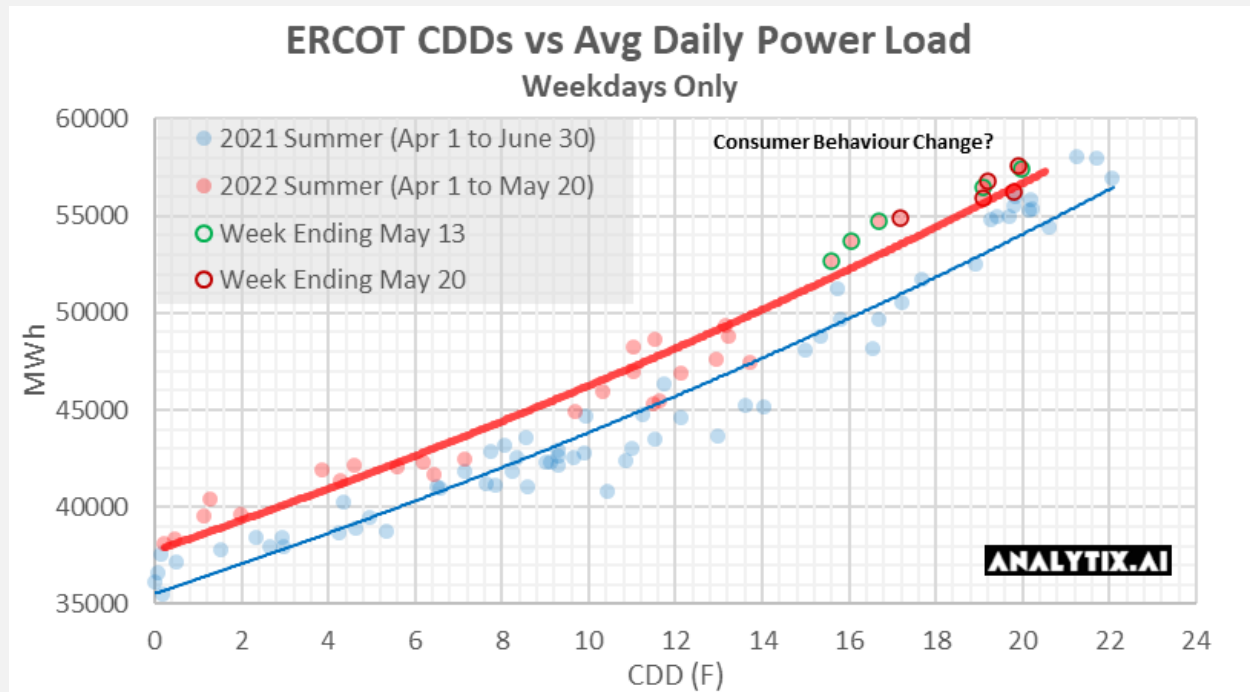


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With the recent extreme heat, the total season CDD count by the end of this month will be 2 weeks ahead of schedule for the summer.



Now finally, let's look at the relationship between CDDs and power load. As expected, the higher temps result in higher power usage.



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Here are some key observations from the chart below:

1) Temps in the past two weeks are close to levels seen in during peak summer. The chart shows daily average CDDs vs ERCOT power loads for weekdays only. The red dots cover the range of Apr 1 2022 to June 1 2022, and the blue dots cover the range of Apr 1 2021 to July 1 2021.

2) ERCOT power loads are ~4% higher YoY, but despite that overall burns should be lower due to the big increase in renewable generation YoY. Here is a quick calc.

ERCOT (May 2021 to May 2022)			
	YoY Capacity Chg (GW)	Normal Seasonal Utilization Factor	Extra Generation from Renewables (GW)
Wind	6.2	39%	2.4
Solar	4.5	27%	1.2
			3.6

	YoY Wx Adj Power Demand Chg (GW)
ERCOT	2.1

<--- the 4% wx adj increase we observe

Worst Case Scenarion of Impact to Gas Generation	
-1.5 GW	(3.6-2.1)
-0.3 Bcf/d	8 HR Plant

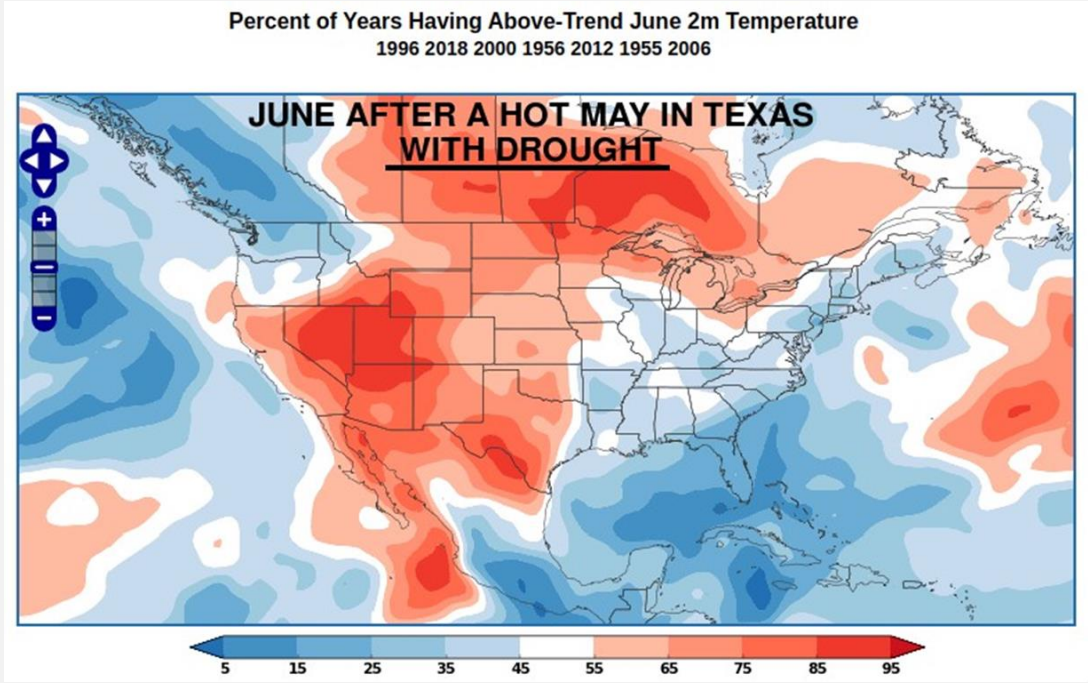
*there are no known coal retirements over the period

3) Retail consumers did not modify their power usage behavior for the 2nd week of extreme heat across Texas. We were expecting demand to be lower last week, as it was only at the start of the 2nd week that the ERCOT asked electricity consumers to keep their thermostats at 78F and avoid using large appliances between 3 and 8pm. With no changes in consumer behavior, power prices hit \$4000/MWh, which should hit power bills next month.

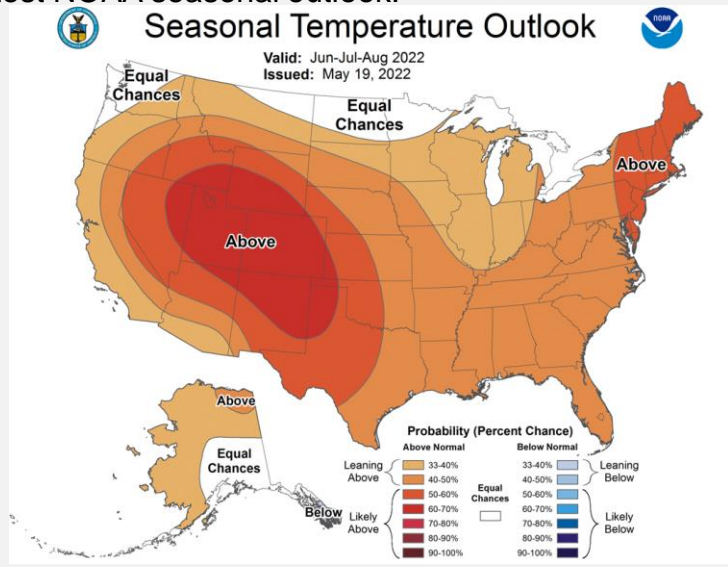
Will this preview of peak summer hit those power bills and be enough to give Texans the further nudge needed to lower their energy consumption for the peak summer months? Bearish?

Finally, what should we expect for summer temps?

If May temps are a preview for the rest of summer, then we likely are going to have extreme power burns. Not to cause any alarm, but here is how June typically looks after a HOT MAY in Texas with drought conditions according to the Prescient Weather (their service is known as [World Climate Service](#)). This comes from a post put on enelyst last Friday.

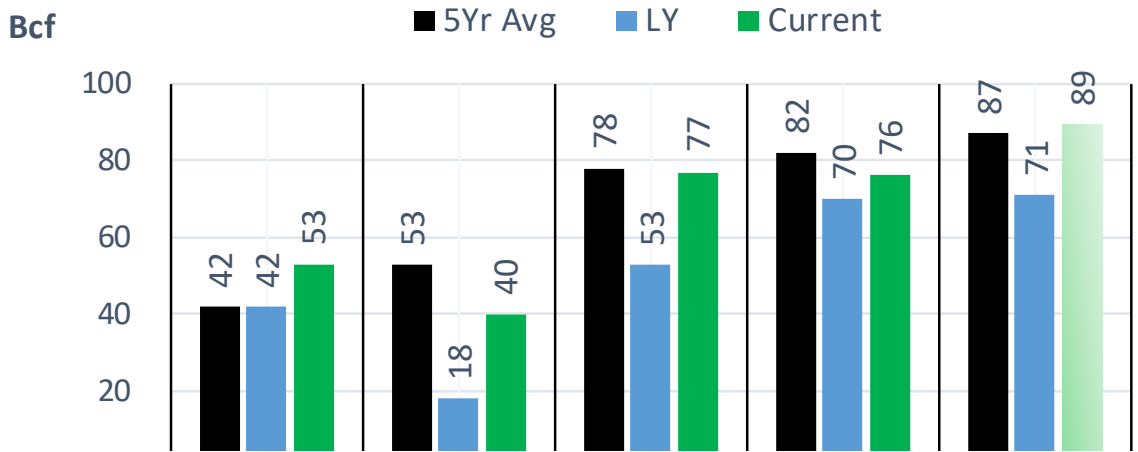


And here is the latest NOAA seasonal outlook:

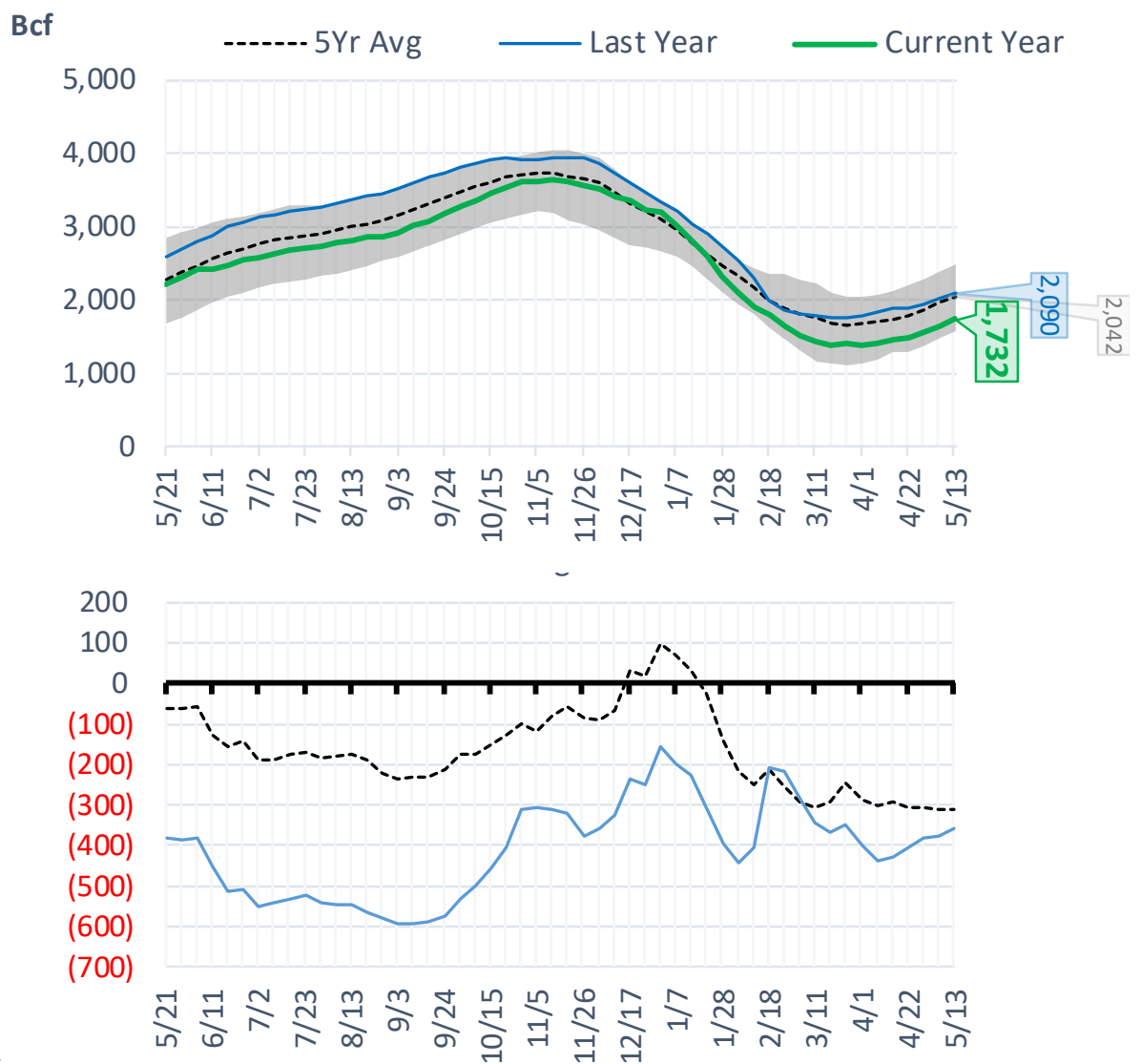


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Total Lower 48 YoY Weekly Change



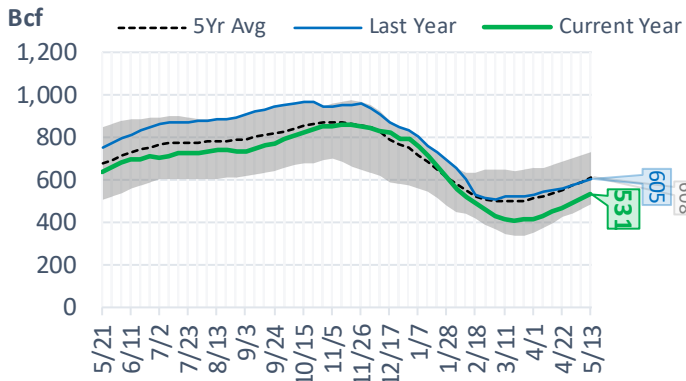
Total Lower 48 Storage Levels



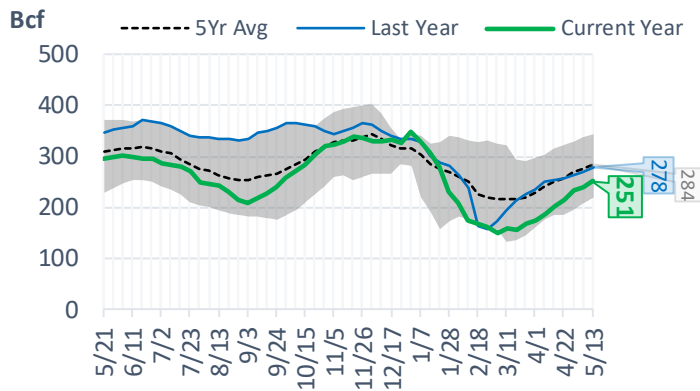
Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 13-May	Week - 1 6-May	Week - 2 29-Apr	Week - 3 22-Apr	Week - 4 15-Apr	Week - 5 8-Apr
Total Lower 48 Storage Level	1732	1643	1567	1490	1450	1397
Weekly Change	+89	+76	+77	+40	+53	+15
vs LY	-358	-376	-382	-406	-428	-439
vs 5Yr Avg	-310	-312	-306	-305	-292	-303
S. Central Salt Storage Level	251	241	233	215	201	186
Weekly Change	+10	+8	+18	+14	+15	+13
vs LY	-27	-27	-30	-43	-54	-63
vs 5Yr Avg	-33	-35	-35	-42	-48	-54
S. Central NonSalt Storage Level	531	507	489	467	449	431
Weekly Change	+24	+18	+22	+18	+18	+15
vs LY	-74	-79	-81	-90	-104	-114
vs 5Yr Avg	-77	-82	-81	-83	-87	-92
Midwest Storage Level	364	342	324	309	304	293
Weekly Change	+22	+18	+15	+5	+11	-3
vs LY	-106	-114	-116	-117	-116	-119
vs 5Yr Avg	-77	-77	-77	-76	-72	-79
East Storage Level	296	274	253	238	238	229
Weekly Change	+22	+21	+15	0	+9	-12
vs LY	-60	-71	-77	-82	-85	-81
vs 5Yr Avg	-67	-67	-66	-63	-52	-52
Mountain Storage Level	103	96	92	90	89	90
Weekly Change	+7	+4	+2	+1	-1	-1
vs LY	-31	-34	-31	-29	-29	-28
vs 5Yr Avg	-18	-19	-18	-15	-13	-10
Pacific Storage Level	187	183	176	171	169	169
Weekly Change	+4	+7	+5	+2	0	+4
vs LY	-58	-50	-47	-45	-40	-35
vs 5Yr Avg	-38	-32	-29	-26	-21	-16

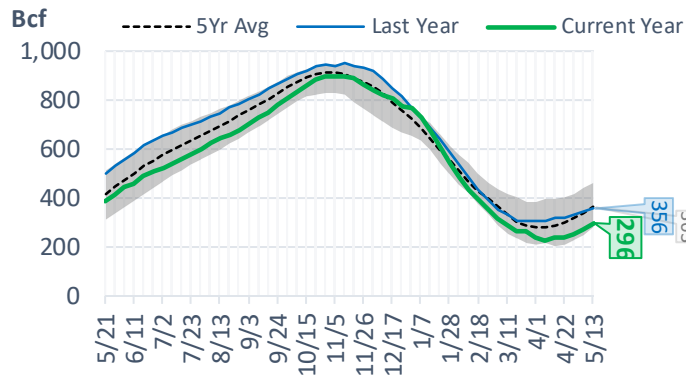
NonSalt Storage Levels



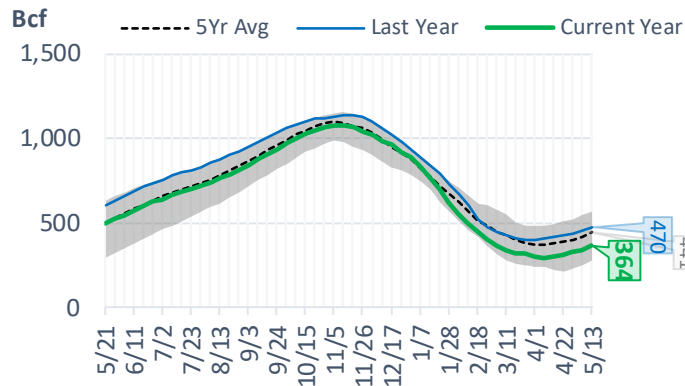
Salt Storage Levels



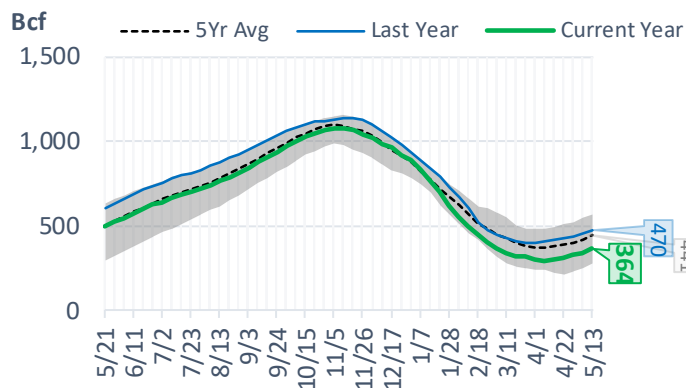
East Storage Levels



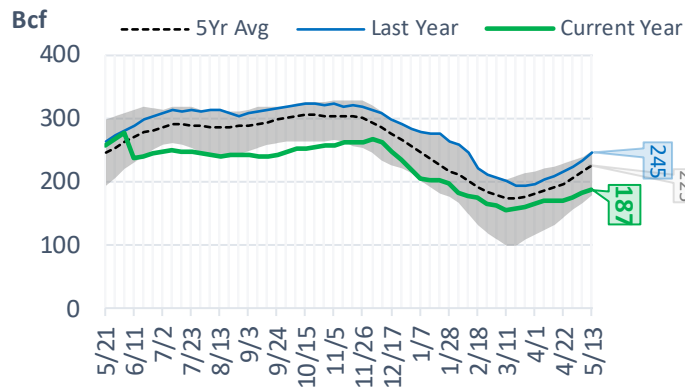
Midwest Storage Levels



Midwest Storage Levels



Pacific Storage Levels



EIA Storage Week Balances

	15-Apr	22-Apr	29-Apr	6-May	13-May	20-May	WoW	vs. 4W
Lower 48 Dry Production	96.4	96.7	95.8	95.8	96.0	95.0	▼ -1.0	▼ -1.1
Canadian Imports	5.6	5.8	6.1	5.9	5.2	4.9	▼ -0.3	▼ -0.9
L48 Power	24.6	25.1	24.9	26.2	26.7	30.2	▲ 3.5	▲ 4.5
L48 Residential & Commercial	22.4	24.1	18.5	16.5	14.2	9.9	▼ -4.3	▼ -8.5
L48 Industrial	21.7	21.8	22.0	21.7	21.4	21.1	▼ -0.4	▼ -0.7
L48 Lease and Plant Fuel	5.3	5.3	5.2	5.2	5.2	5.1	▼ -0.1	▼ -0.1
L48 Pipeline Distribution	2.6	2.7	2.4	2.4	2.3	2.3	▼ 0.0	▼ -0.2
L48 Regional Gas Consumption	76.5	79.0	73.0	72.1	69.9	68.5	▼ -1.3	▼ -5.0
Net LNG Exports	12.5	12.1	12.2	12.2	12.2	12.2	▲ 0.0	▲ 0.0
Total Mexican Exports	6.6	6.7	6.9	6.9	7.0	7.0	▼ -0.1	▲ 0.1
Implied Daily Storage Activity	6.5	4.7	9.8	10.6	12.1	12.3	0.2	
EIA Reported Daily Storage Activity	7.6	5.7	11.0	10.9	12.7			
Daily Model Error	-1.1	-1.0	-1.2	-0.3	-0.6			

Monthly Balances

	2Yr Ago May-20	LY May-21	Jan-22	Feb-22	Mar-22	Apr-22	MTD May-22	MoM	vs. LY
Lower 48 Dry Production	87.0	93.0	93.4	92.6	94.9	96.2	95.6	▼ -0.6	▲ 2.6
Canadian Imports	3.9	4.5	6.7	6.6	5.2	5.8	5.3	▼ -0.5	▲ 0.8
L48 Power	26.9	26.5	31.5	28.9	25.6	24.8	28.2	▲ 3.4	▲ 1.7
L48 Residential & Commercial	12.8	12.8	49.1	44.4	30.7	22.2	13.1	▼ -9.1	▲ 0.4
L48 Industrial	19.4	20.9	24.7	22.5	21.8	22.0	21.4	▼ -0.6	▲ 0.5
L48 Lease and Plant Fuel	4.7	5.0	5.1	5.1	5.2	5.2	5.2	▼ -0.1	▲ 0.1
L48 Pipeline Distribution	2.2	2.2	3.8	3.6	2.9	2.6	2.3	▼ -0.2	▲ 0.1
L48 Regional Gas Consumption	65.9	67.5	114.3	104.4	86.2	76.8	70.2	▼ -6.6	▲ 2.8
Net LNG Exports	6.7	10.8	12.4	12.4	12.9	12.3	12.2	▼ -0.1	▲ 1.4
Total Mexican Exports	4.8	6.8	6.3	6.2	6.5	6.7	7.0	▲ 0.3	▲ 0.2
Implied Daily Storage Activity	13.6	12.4	-32.9	-23.7	-5.5	6.2	11.4		
EIA Reported Daily Storage Activity									
Daily Model Error									

Source: Bloomberg, analytix.ai

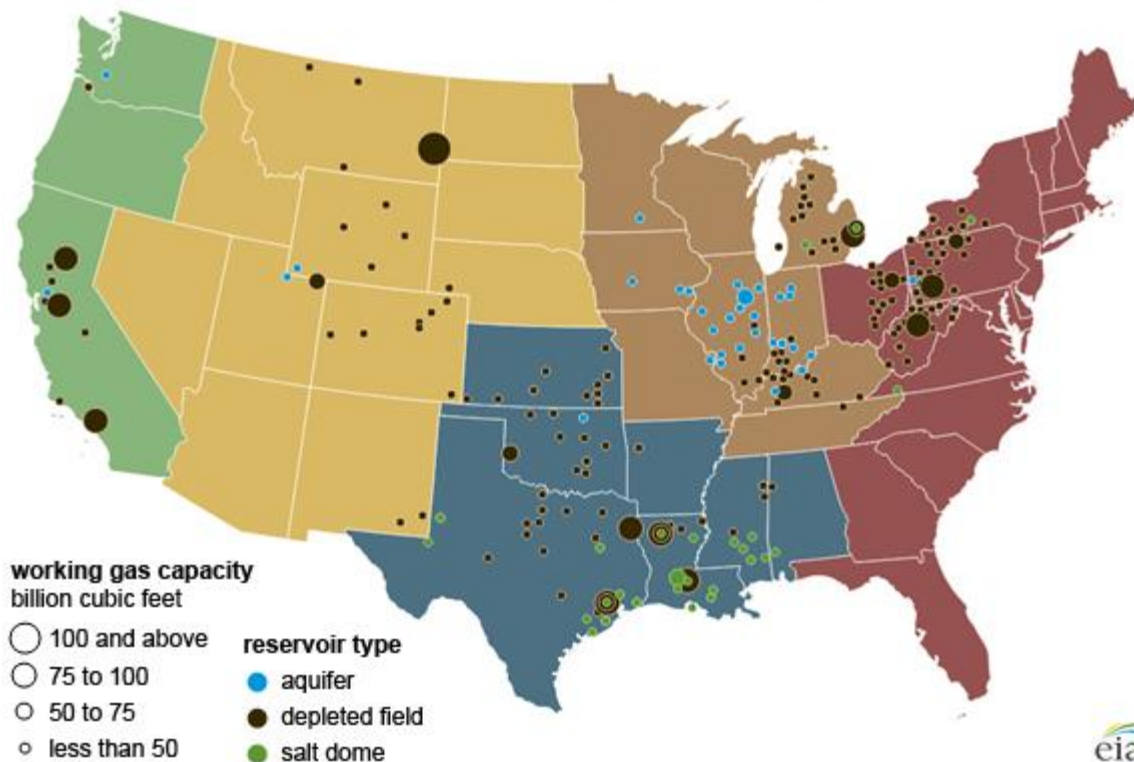
Regional S/D Models Storage Projection

Week Ending 20-May

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	13.0	0.0	13.0	91
East	2.0	2.6	4.5	32
Midwest	5.0	-0.9	4.0	28
Mountain	4.8	-3.6	1.2	8
South Central	-0.1	2.6	2.5	18
Pacific	1.3	-0.6	0.7	5

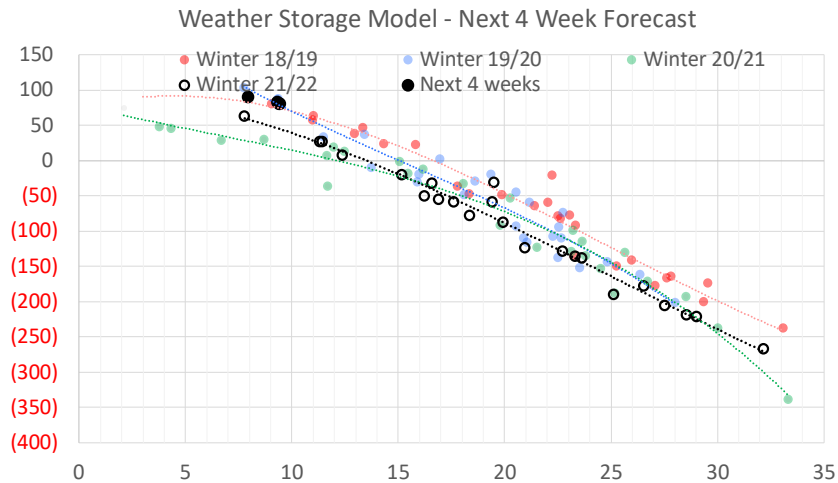
*Adjustment Factor is calculated based on historical regional deltas

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



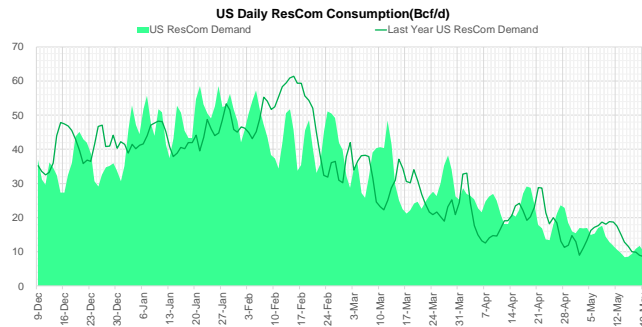
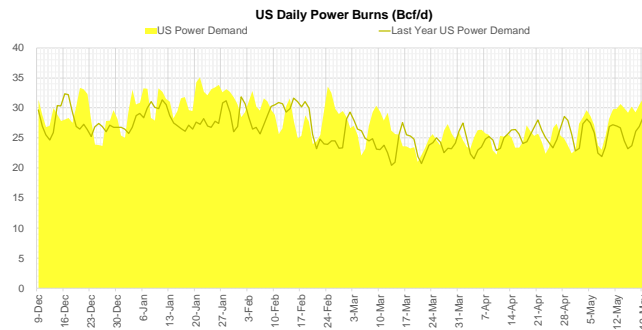
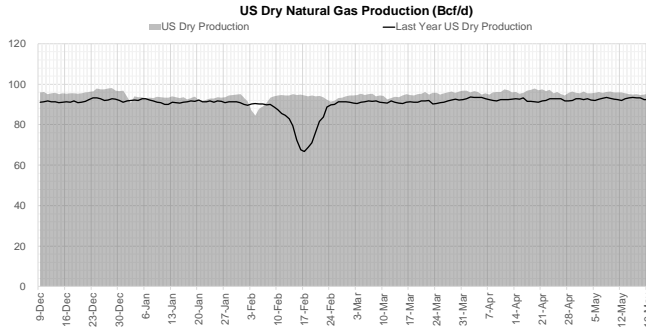
Weather Model Storage Projection

Next report and beyond		
Week Ending	TDDs	Week Storage Projection
20-May	7.9	91
27-May	9.4	81
03-Jun	9.4	81
10-Jun	9.3	83



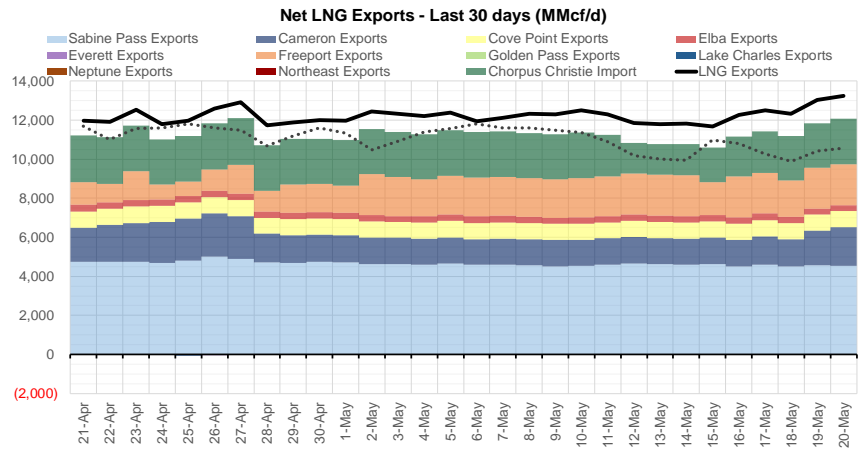
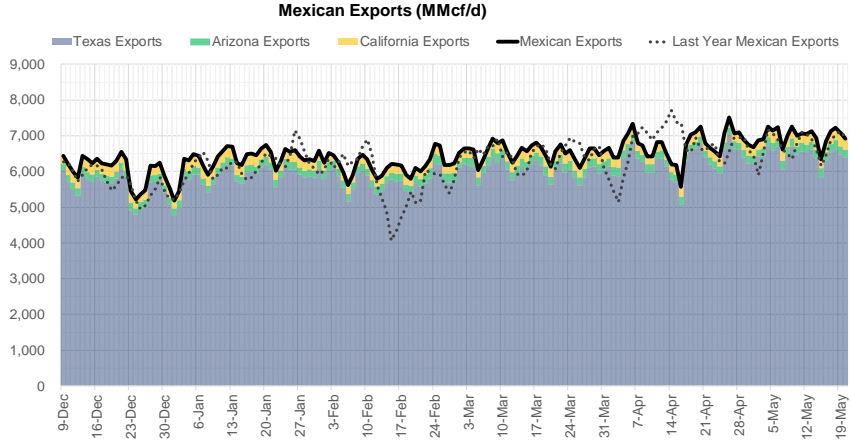
Note: this is not our official end of season forecast. This chart signifies where storage levels end with 10-year normal weather and current market tightness relative to last year

Supply – Demand Trends



Source: Bloomberg

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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
6	2022	C	10.00	16552	8	2022	C	10.00	51949
6	2022	C	10.10	13900	8	2022	C	10.50	41549
6	2022	P	7.50	9745	10	2022	C	6.00	35395
6	2022	P	7.40	8025	6	2022	C	6.00	25035
6	2022	C	9.00	7225	10	2022	C	5.00	24089
6	2022	C	8.50	4764	9	2022	C	6.00	23663
6	2022	P	8.00	3293	6	2022	C	10.00	21127
8	2022	C	10.00	2998	6	2022	P	6.00	21077
7	2022	C	8.00	2532	10	2022	P	3.50	20919
7	2022	C	9.00	2246	10	2022	P	3.00	20642
8	2022	C	10.50	2185	10	2022	P	2.50	19868
6	2022	P	6.00	2142	6	2022	P	4.00	19629
3	2023	C	8.00	2000	6	2022	C	7.00	19575
6	2022	C	11.50	1700	8	2022	C	6.00	19483
8	2022	C	7.50	1501	7	2022	C	8.00	19436
6	2022	P	6.50	1316	7	2022	C	6.00	18936
6	2022	P	7.00	1307	10	2022	P	6.00	18928
6	2022	C	9.25	1121	6	2022	P	7.00	18908
7	2022	C	9.10	1001	12	2022	C	5.00	18221
3	2023	C	5.00	1000	8	2022	C	7.00	18115
3	2023	C	7.50	1000	9	2022	C	7.00	18096
3	2023	C	8.50	1000	6	2022	P	5.50	17937
7	2022	P	5.50	973	9	2022	C	10.00	17841
6	2022	C	9.50	900	7	2022	C	10.00	17706
3	2023	C	6.00	900	7	2022	C	7.00	17664
10	2022	P	5.00	890	6	2022	C	5.00	17647
6	2022	C	11.00	870	10	2022	P	2.00	17558
6	2022	C	8.00	863	10	2022	P	4.00	17463
7	2022	C	7.50	750	7	2022	P	3.25	17344
9	2022	C	7.50	750	6	2022	P	3.00	17223
8	2022	C	9.00	701	6	2022	P	4.75	17111
10	2022	P	4.00	700	7	2022	P	6.00	17001
10	2022	P	7.00	700	6	2022	C	9.00	16930
6	2022	C	9.75	621	7	2022	P	7.00	16573
7	2022	C	10.00	619	1	2023	C	10.00	16034
6	2022	C	8.75	574	6	2022	P	3.50	15958
6	2022	C	8.25	554	5	2023	P	2.00	15761
9	2022	P	3.00	525	11	2022	P	4.00	15744
7	2022	P	6.00	523	6	2022	P	5.00	15596
6	2022	P	7.60	516	2	2023	C	10.00	15524
10	2022	C	15.00	505	7	2022	C	9.00	15405
7	2022	C	13.25	501	9	2022	P	2.50	15291
12	2022	P	6.25	500	7	2022	P	5.00	15030
12	2022	P	6.50	500	7	2022	P	3.50	14978
6	2023	C	7.00	493	9	2022	P	2.75	14883
6	2022	C	12.00	492	8	2022	C	8.00	14788
8	2022	C	8.00	463	9	2022	P	3.00	14776
7	2022	P	7.50	455	10	2022	P	3.25	14717
6	2022	C	10.25	428	8	2022	P	3.00	14553
					7	2022	P	3	14491

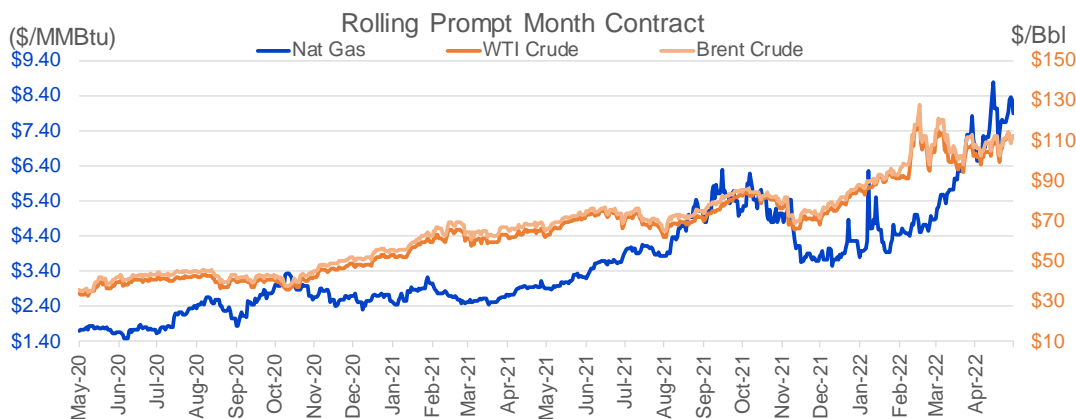
Source: CME, ICE

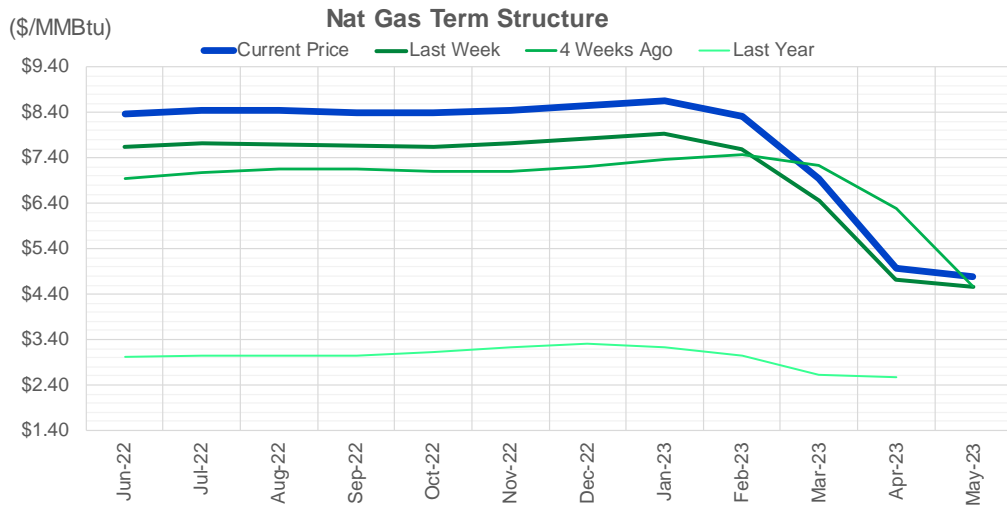
Nat Gas Futures Open Interest

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
JUN 22	42533	48624	-6091	JUN 22	82985	84008	-1023
JUL 22	201498	200257	1241	JUL 22	81740	80267	1473
AUG 22	62330	61711	619	AUG 22	59574	59486	89
SEP 22	89510	88626	884	SEP 22	63130	63615	-485
OCT 22	97709	97956	-247	OCT 22	76404	76302	102
NOV 22	51119	51937	-818	NOV 22	59524	58305	1219
DEC 22	50935	50965	-30	DEC 22	62389	62599	-210
JAN 23	63014	63180	-166	JAN 23	65639	65166	473
FEB 23	27925	27846	79	FEB 23	56786	56210	576
MAR 23	39033	39110	-77	MAR 23	55023	54712	311
APR 23	58871	59309	-438	APR 23	52721	52898	-177
MAY 23	61674	62217	-543	MAY 23	51731	52065	-335
JUN 23	25505	25503	2	JUN 23	44684	44810	-127
JUL 23	21717	21593	124	JUL 23	43660	43756	-96
AUG 23	13601	13918	-317	AUG 23	43301	43459	-158
SEP 23	17454	17794	-340	SEP 23	42509	42665	-156
OCT 23	34551	33443	1108	OCT 23	49512	49600	-89
NOV 23	12795	12827	-32	NOV 23	43390	43528	-138
DEC 23	14958	14442	516	DEC 23	39454	39521	-66
JAN 24	20182	20458	-276	JAN 24	38873	39062	-189
FEB 24	6000	5913	87	FEB 24	26289	26289	0
MAR 24	14314	14263	51	MAR 24	30638	30672	-33
APR 24	12091	12094	-3	APR 24	26946	27038	-92
MAY 24	6449	6441	8	MAY 24	25695	25739	-43
JUN 24	1804	1803	1	JUN 24	21988	22032	-44
JUL 24	1987	1986	1	JUL 24	22152	22173	-22
AUG 24	2966	2965	1	AUG 24	22238	22281	-43
SEP 24	1367	1367	0	SEP 24	21615	21659	-44
OCT 24	6743	6729	14	OCT 24	24368	24349	19
NOV 24	4683	4683	0	NOV 24	22436	22474	-38

Source: CME, ICE






	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
Current Price	\$8.368	\$8.455	\$8.444	\$8.402	\$8.383	\$8.441	\$8.559	\$8.655	\$8.306	\$6.955	\$4.977	\$4.788
Last Week	\$7.640	\$7.727	\$7.708	\$7.661	\$7.650	\$7.712	\$7.828	\$7.921	\$7.594	\$6.463	\$4.716	\$4.548
vs. Last Week	\$0.728	\$0.728	\$0.736	\$0.741	\$0.733	\$0.729	\$0.731	\$0.734	\$0.712	\$0.492	\$0.261	\$0.240
4 Weeks Ago	\$6.937	\$7.065	\$7.158	\$7.151	\$7.102	\$7.112	\$7.198	\$7.365	\$7.469	\$7.225	\$6.278	\$4.585
vs. 4 Weeks Ago	\$1.431	\$1.390	\$1.286	\$1.251	\$1.281	\$1.329	\$1.361	\$1.290	\$0.837	-\$0.270	-\$1.301	\$0.203
Last Year	\$2.964	\$3.028	\$3.041	\$3.034	\$3.051	\$3.115	\$3.238	\$3.317	\$3.242	\$3.045	\$2.637	\$2.582
vs. Last Year	\$5.404	\$5.427	\$5.403	\$5.368	\$5.332	\$5.326	\$5.321	\$5.338	\$5.064	\$3.910	\$2.340	\$2.206

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	2.224	▲ 0.000	▲ 0.000	▲ 2.196
NatGas Oct21/Nov21	\$/MMBtu	0.361	▲ 0.000	▲ 0.000	▲ 0.293
NatGas Oct21/Jan22	\$/MMBtu	-1.817	▲ 0.000	▲ 0.000	▼ -2.095
NatGas Apr22/Oct22	\$/MMBtu	2.993	▲ 0.561	▲ 1.174	▲ 2.957
WTI Crude	\$/Bbl	112.21	▲ 6.080	▲ 8.420	▲ 50.160
Brent Crude	\$/Bbl	112.04	▲ 4.590	▲ 3.710	▲ 46.930
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	379.20	▼ -12.410	▼ -10.880	▲ 182.760
Propane, Mt. Bel	cents/Gallon	1.24	▼ -0.006	▼ -0.086	▲ 0.422
Ethane, Mt. Bel	cents/Gallon	0.59	▲ 0.017	▲ 0.091	▲ 0.335
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						Baker Hughes 
5/20/2022						
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago	
Oil	576	13	563	220	356	
Gas	150	1	149	51	99	
Miscellaneous	2	0	2	2	0	
Directional	39	1	38	11	28	
Horizontal	664	13	651	252	412	
Vertical	25	0	25	10	15	
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago	
Oil	40	3	37	15	25	
Gas	48	-3	51	15	33	
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago	
Ardmore Woodford	2	1	1	1	1	
Arkoma Woodford	3	0	3	2	1	
Barnett	4	0	4	3	1	
Cana Woodford	27	0	27	12	15	
DJ-Niobrara	15	0	15	8	7	
Eagle Ford	65	3	62	33	32	
Granite Wash	3	-1	4	0	3	
Haynesville	70	2	68	23	47	
Marcellus	39	0	39	9	30	
Mississippian	1	0	1	1	0	
Permian	343	8	335	112	231	
Utica	12	0	12	2	10	
Williston	38	0	38	22	16	