

This week, we review some key takeaways from the Q1 2022 Dallas Fed Energy Survey. The Dallas Fed conducts quarterly surveys with executives in manufacturing, services, energy, and lending across Texas and the broader Eleventh Federal Reserve District. The latest report was released on March 23rd.

Here is a link to the report: <https://www.dallasfed.org/research/surveys/des/2022/2201.aspx>

According to energy executives, oil and gas sector activity jumped considerably in Q1 along with costs. Oil production increased at a faster pace, according to executives at exploration and production (E&P) firms. The oil production index rose sharply from 19.1 in the fourth quarter to 45.0 in the first quarter. Similarly, the natural gas production index advanced 14.0 points to 40.0.

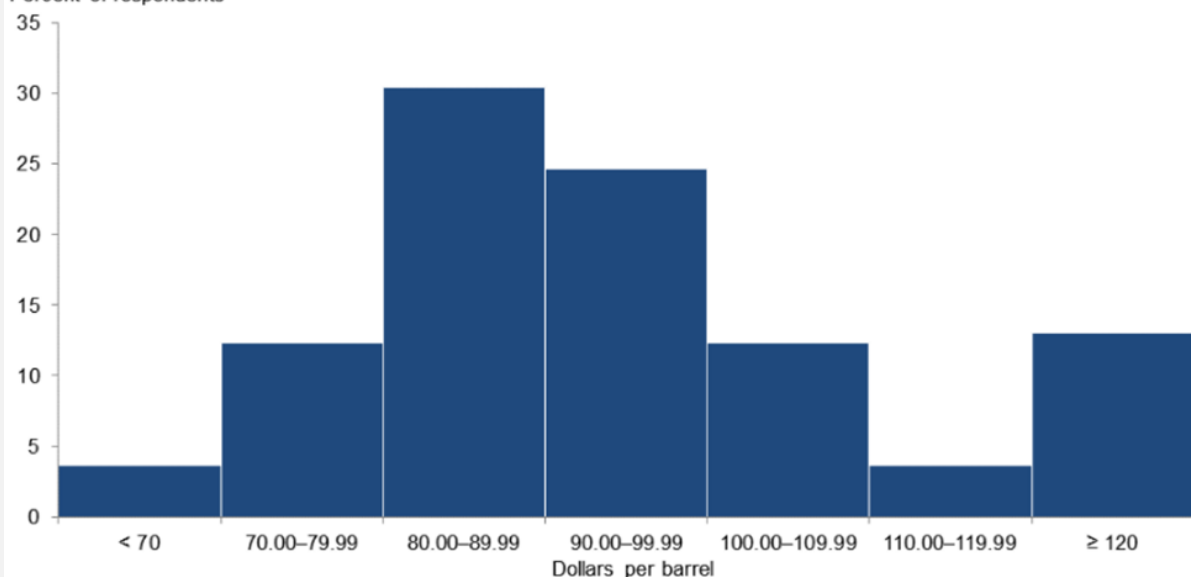
Costs across the board increased. The survey included finding and development costs, lease operating expenses, and labor were all higher. One comment summarized this well:

“A significant part of E&P capital spending growth this year (2022 versus 2021) will be consumed by cost inflation as the cost for all inputs continues to increase against a backdrop of supply-chain challenges and limited incremental equipment being reactivated (due to fiscal constraints and manpower challenges within oilfield services and related suppliers).”

Executives from 130+ oil and gas firms gave their expectations on price levels at the end of 2022. On average, they expect WTI oil prices to be \$93/bbl by year-end 2022 and Henry Hub to be \$4.57/MMBtu by year-end 2022. For reference, last quarter the expectation was for \$74.69 and \$4.06.

What do you expect the WTI crude oil price to be at the end of 2022?

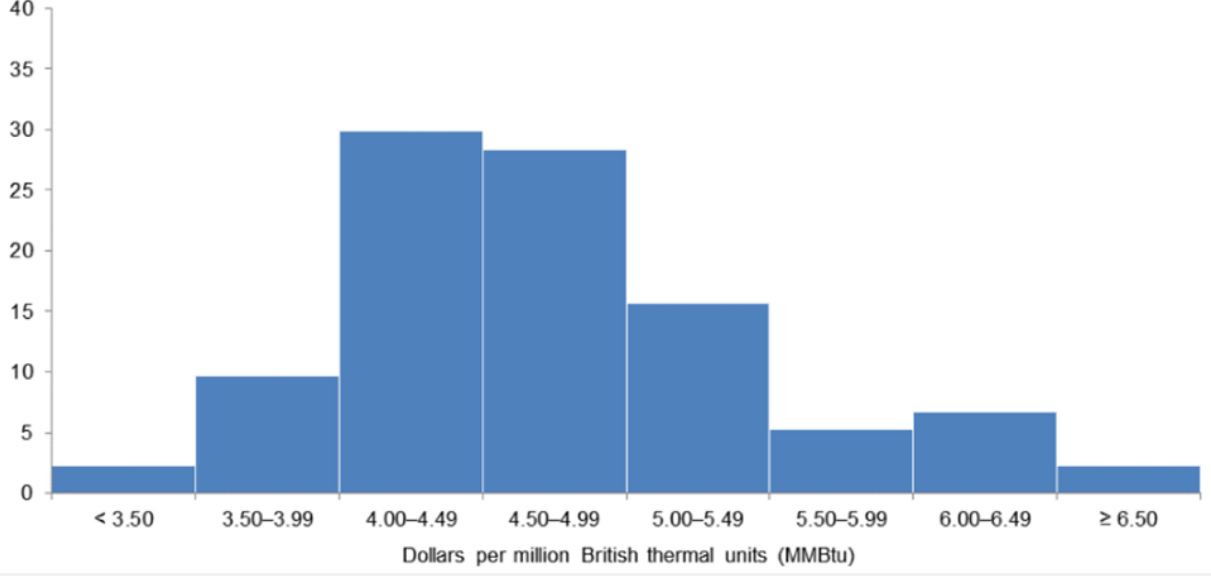
Percent of respondents



Henry Hub Natural Gas

What do you expect the Henry Hub natural gas price to be at the end of 2022?

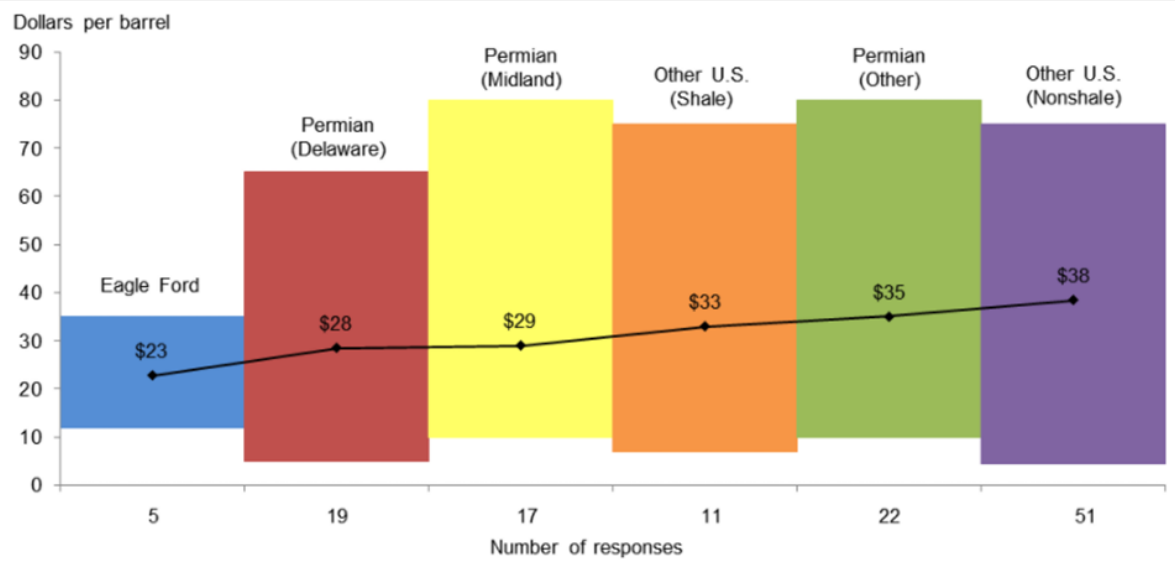
Percent of respondents



Another few interesting questions asked to executives around current and new wells were the following:

In the top two areas in which your firm is active: What West Texas Intermediate (WTI) oil price does your firm need to cover operating expenses for existing wells?

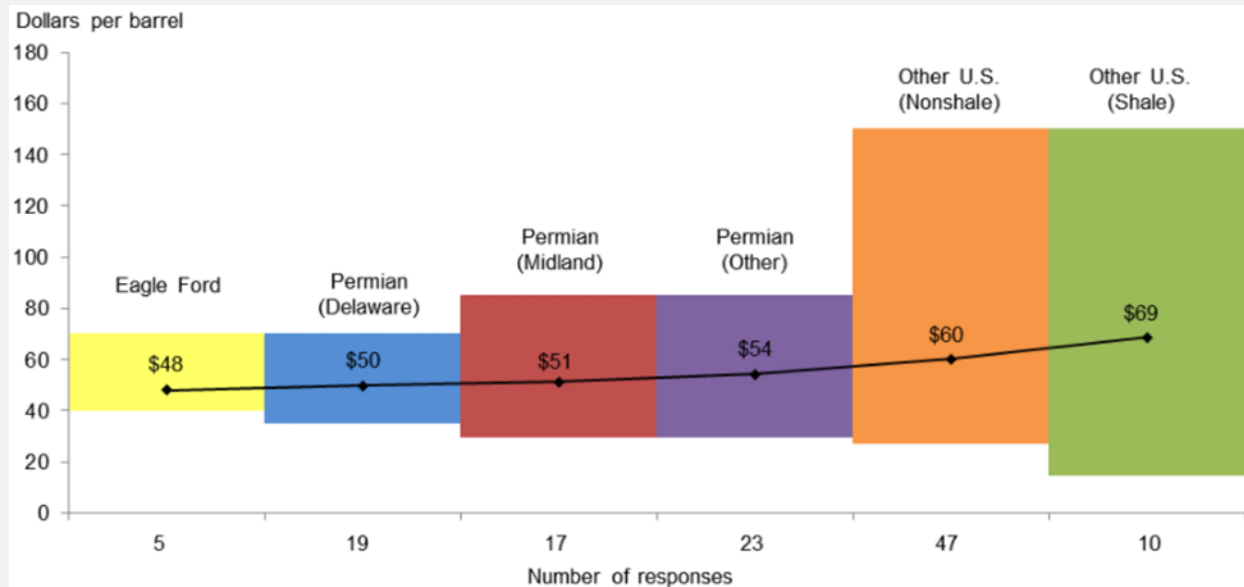
Simply put: What's your oil break-even price for existing wells.



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In the top two areas in which your firm is active: What WTI oil price does your firm need to profitably drill a new well?

Simply put: What's your oil break-even price for new wells.

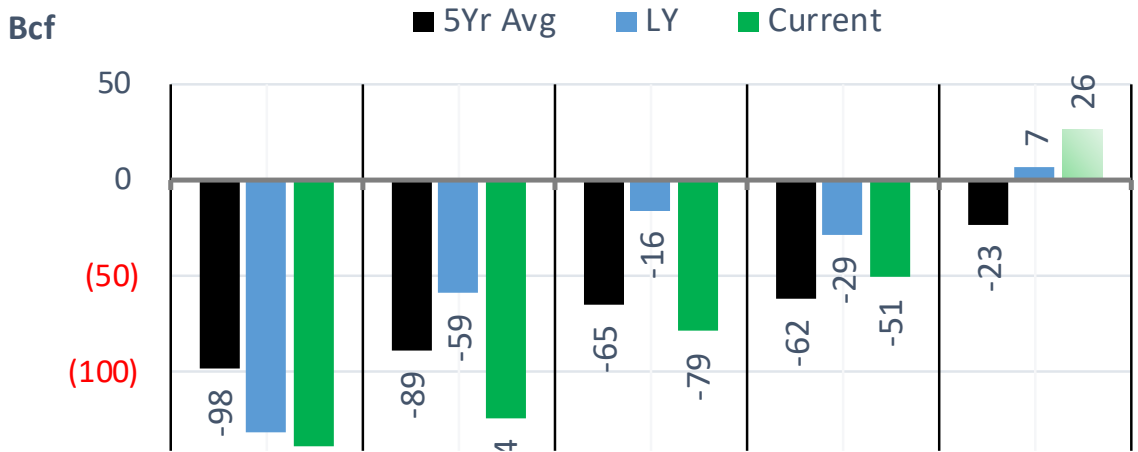


Based on these break-evens and where the current price strip is, we would expect boundless drilling activity. This would lead to a considerable pick up this year, but there are major constraints in the industry stalling this rise.

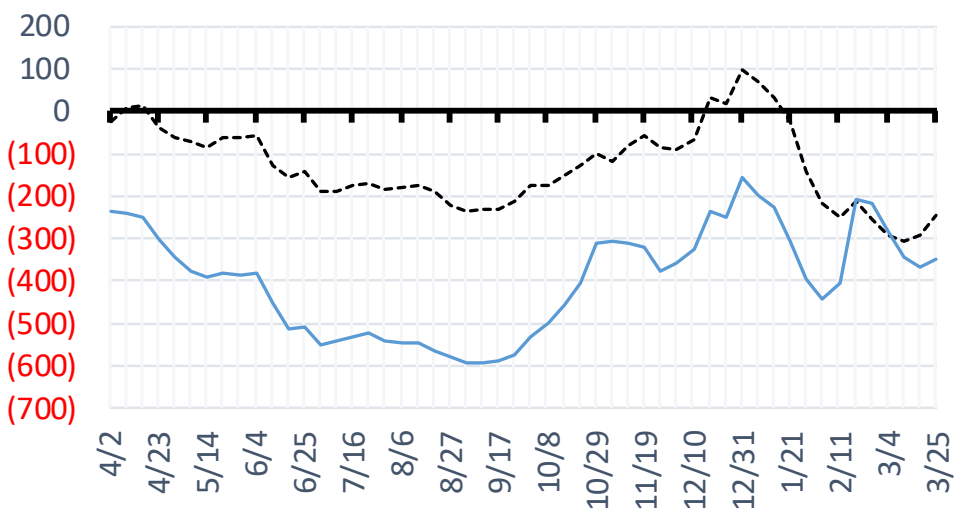
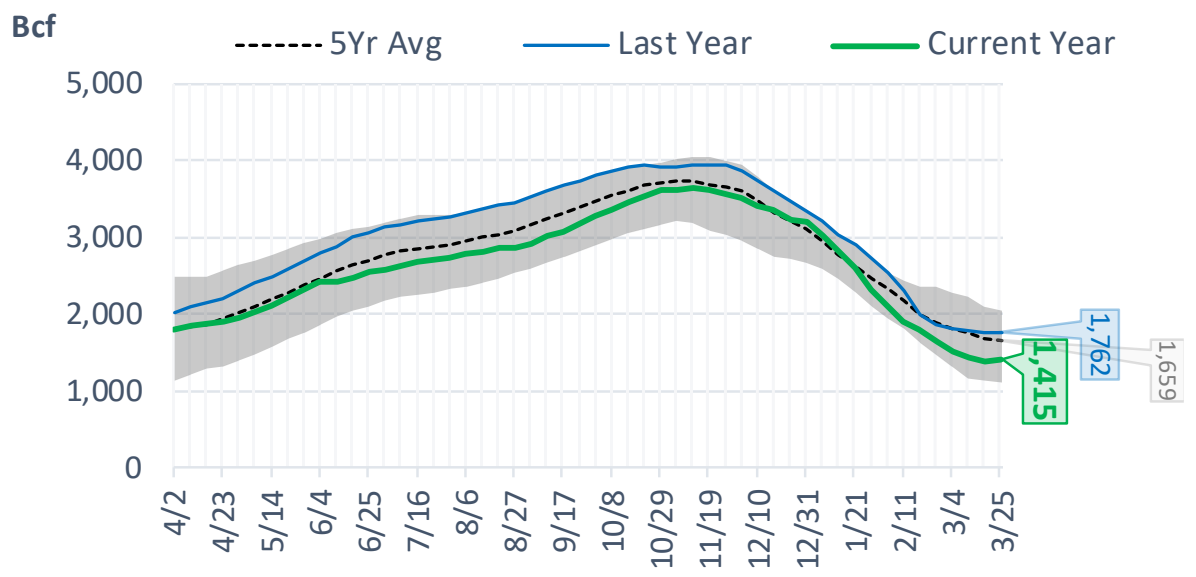
The major things highlighted are:

- 1) *“supply issues for the materials needed to grow production” – “the delivery and cost of pipe, frac sand, cement, etc., are all concerns for our business.”*
- 2) *“workforce issues because a meaningful portion of the labor force left the industry during the downturn”*
- 3) *“Traditional lending and capital markets access for exploration and production companies are down across”*
- 4) *“Private-equity capital for oil and gas is down 70 to 80 percent over the last several years”*
- 5) *“The U.S. needs to fast track infrastructure, such as the Keystone pipeline, Mountain Valley pipeline, Constitution pipeline and liquefied natural gas export facilities and eliminate the Jones Act”*
- 6) *“investor pressure, ESG issues, government regulation and lack of growth capital”*
- 7) *Capital “Discipline continues to dominate the industry. Shareholders and lenders continue to demand a return on capital”*

Total Lower 48 YoY Weekly Change



Total Lower 48 Storage Levels

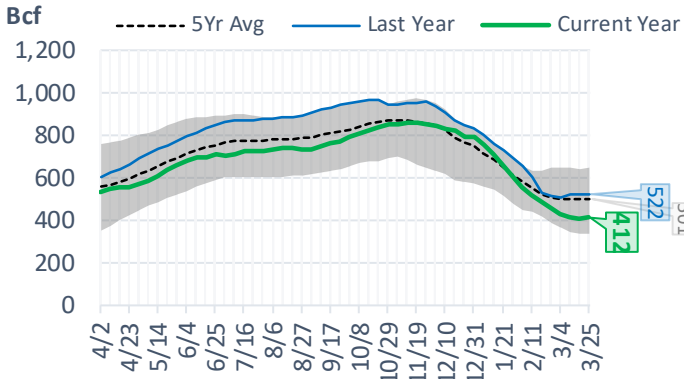


The risk person

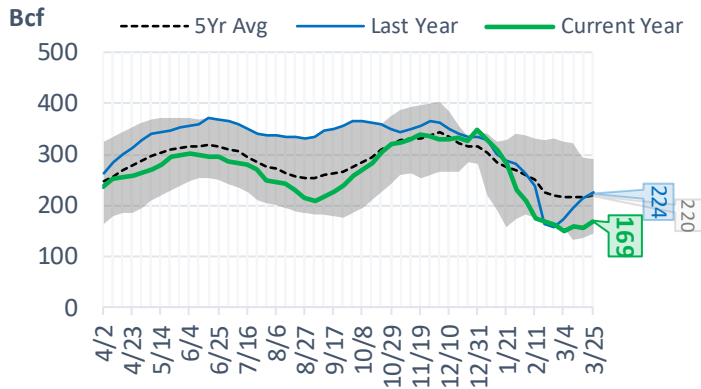
Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 25-Mar	Week - 1 18-Mar	Week - 2 11-Mar	Week - 3 4-Mar	Week - 4 25-Feb	Week - 5 18-Feb
Total Lower 48 Storage Level	1415	1389	1440	1519	1643	1782
Weekly Change	+26	-51	-79	-124	-139	-129
vs LY	-347	-366	-344	-281	-216	-209
vs 5Yr Avg	-244	-293	-304	-290	-255	-214
S. Central Salt Storage Level	169	156	159	151	163	168
Weekly Change	+13	-3	+8	-12	-5	-5
vs LY	-55	-56	-35	-23	+5	+6
vs 5Yr Avg	-51	-60	-56	-65	-57	-58
S. Central NonSalt Storage Level	412	404	412	431	457	487
Weekly Change	+8	-8	-19	-26	-30	-29
vs LY	-110	-115	-106	-78	-55	-43
vs 5Yr Avg	-89	-92	-87	-68	-52	-34
Midwest Storage Level	317	318	337	364	404	450
Weekly Change	-1	-19	-27	-40	-46	-46
vs LY	-85	-90	-91	-80	-67	-70
vs 5Yr Avg	-61	-77	-86	-85	-77	-65
East Storage Level	268	268	290	317	358	396
Weekly Change	0	-22	-27	-41	-38	-39
vs LY	-39	-42	-41	-38	-31	-37
vs 5Yr Avg	-17	-35	-43	-48	-39	-32
Mountain Storage Level	89	87	87	93	96	105
Weekly Change	+2	0	-6	-3	-9	-9
vs LY	-23	-25	-27	-21	-22	-20
vs 5Yr Avg	-10	-12	-14	-10	-13	-10
Pacific Storage Level	161	157	155	162	164	176
Weekly Change	+4	+2	-7	-2	-12	-1
vs LY	-33	-37	-45	-44	-47	-46
vs 5Yr Avg	-14	-16	-19	-16	-19	-15

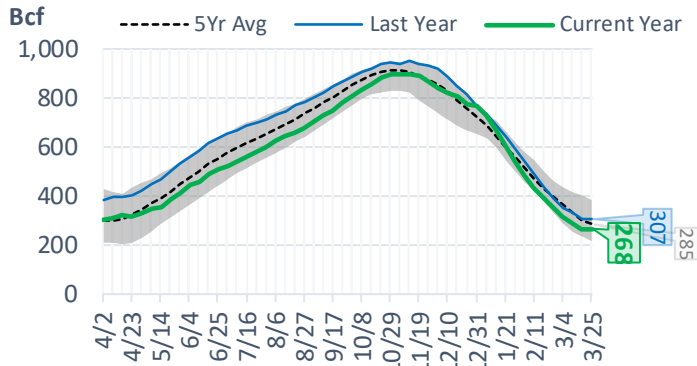
NonSalt Storage Levels



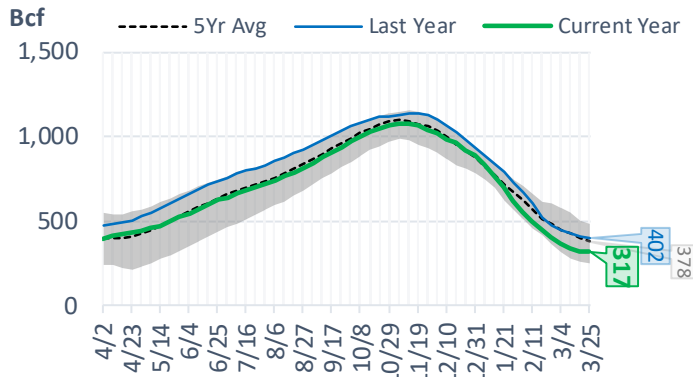
Salt Storage Levels



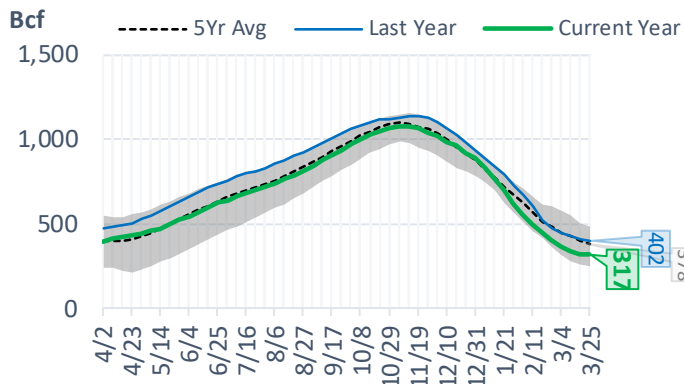
East Storage Levels



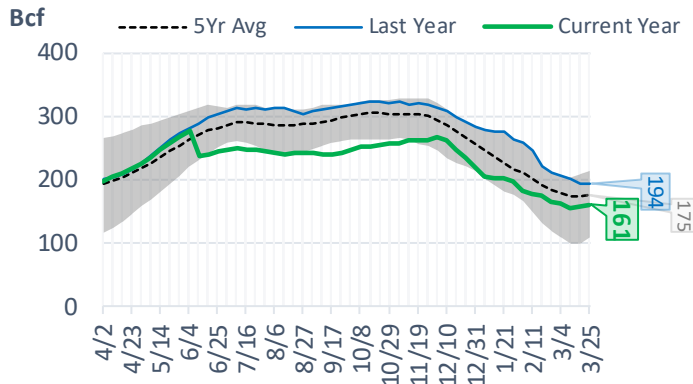
Midwest Storage Levels



Midwest Storage Levels



Pacific Storage Levels



EIA Storage Week Balances

	25-Feb	4-Mar	11-Mar	18-Mar	25-Mar	1-Apr	WoW	vs. 4W
Lower 48 Dry Production	94.3	94.2	94.8	93.9	95.4	95.9	▲ 0.5	▲ 1.4
Canadian Imports	6.4	5.9	5.2	5.2	4.8	5.7	▲ 0.9	▲ 0.4
L48 Power	28.7	29.4	27.6	27.3	25.6	26.9	▲ 1.3	▼ -0.6
L48 Residential & Commercial	41.1	38.1	33.2	31.5	23.5	29.7	▲ 6.3	▼ -1.8
L48 Industrial	25.3	23.1	22.7	20.6	20.7	20.7	▲ 0.0	▼ -1.1
L48 Lease and Plant Fuel	5.2	5.1	5.2	5.1	5.2	5.2	▲ 0.0	▲ 0.1
L48 Pipeline Distribution	3.3	3.3	3.2	3.1	2.6	2.9	▲ 0.4	▼ -0.1
L48 Regional Gas Consumption	103.5	99.0	91.8	87.6	77.5	85.5	▲ 8.0	▼ -3.5
Net LNG Exports	11.7	12.5	12.8	12.9	13.0	13.1	▲ 0.1	▲ 0.3
Total Mexican Exports	6.1	6.4	6.6	6.6	6.5	6.3	▼ -0.2	▼ -0.2
Implied Daily Storage Activity	-20.6	-17.9	-11.2	-7.9	3.2	-3.3	-6.5	
EIA Reported Daily Storage Activity	-19.9	-17.7	-11.3	-7.3	3.7			
Daily Model Error	-0.8	-0.2	0.1	-0.7	-0.5			

Monthly Balances

	2Yr Ago Apr-20	LY Apr-21	Nov-21	Dec-21	Jan-22	Feb-22	MTD Mar-22	MoM	vs. LY
Lower 48 Dry Production	92.7	92.5	95.6	96.0	93.5	93.5	95.0	▲ 1.4	▲ 2.5
Canadian Imports	4.0	4.7	5.3	4.8	6.7	6.6	5.2	▼ -1.4	▲ 0.6
L48 Power	25.6	25.0	29.2	28.7	31.4	29.0	26.9	▼ -2.1	▲ 1.9
L48 Residential & Commercial	20.5	19.6	28.0	33.9	48.6	42.7	29.6	▼ -13.2	▲ 10.0
L48 Industrial	20.4	21.4	23.2	22.5	25.4	25.2	21.6	▼ -3.5	▲ 0.3
L48 Lease and Plant Fuel	5.0	5.0	5.3	5.3	5.1	5.1	5.2	▲ 0.1	▲ 0.1
L48 Pipeline Distribution	2.4	2.5	2.9	3.2	3.8	3.4	2.9	▼ -0.4	▲ 0.5
L48 Regional Gas Consumption	74.0	73.5	88.6	93.6	114.3	105.3	86.2	▼ -19.1	▲ 12.7
Net LNG Exports	8.2	11.5	11.4	12.1	12.4	12.4	12.9	▲ 0.5	▲ 1.4
Total Mexican Exports	4.8	6.7	6.1	6.2	6.3	6.2	6.5	▲ 0.3	▼ -0.2
Implied Daily Storage Activity	9.7	5.5	-5.3	-11.0	-32.8	-23.8	-5.4		
EIA Reported Daily Storage Activity									
Daily Model Error									

Source: Bloomberg, analytix.ai

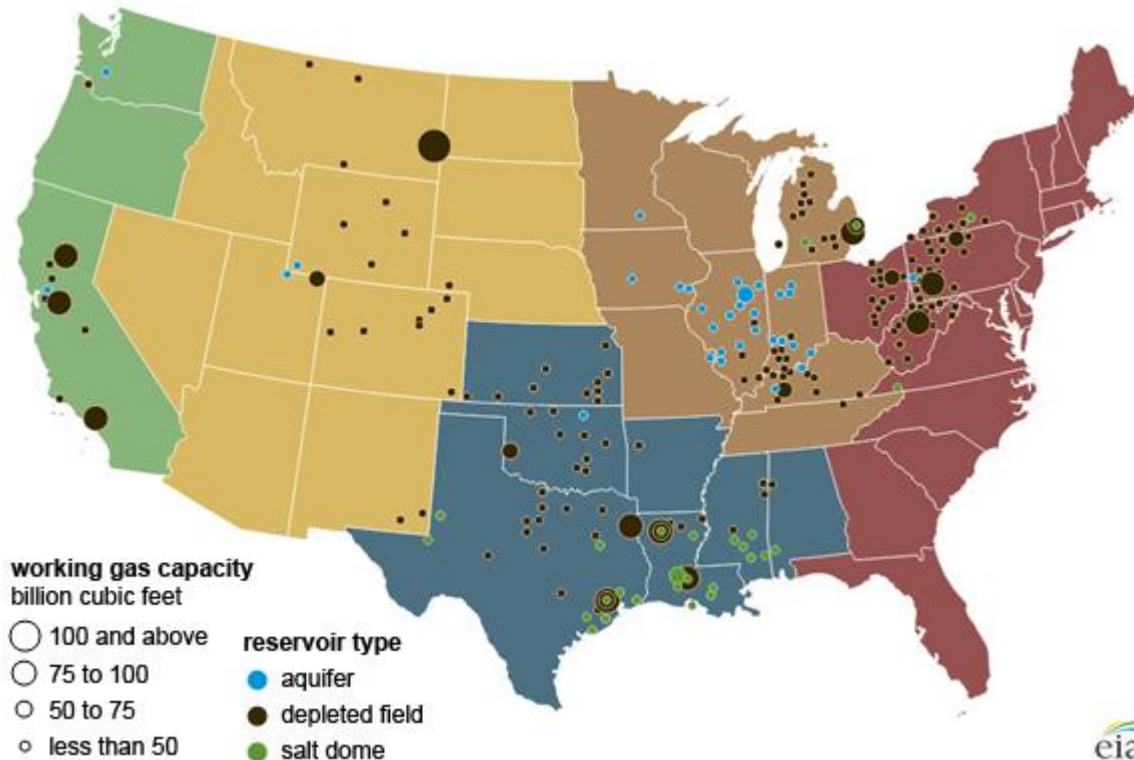
Regional S/D Models Storage Projection

Week Ending 1-Apr

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	-2.9	0.1	-2.7	-19
East	-6.1	1.8	-4.2	-30
Midwest	-2.1	-0.8	-2.9	-20
Mountain	3.6	-3.2	0.4	3
South Central	1.2	2.0	3.2	22
Pacific	0.5	0.2	0.8	5

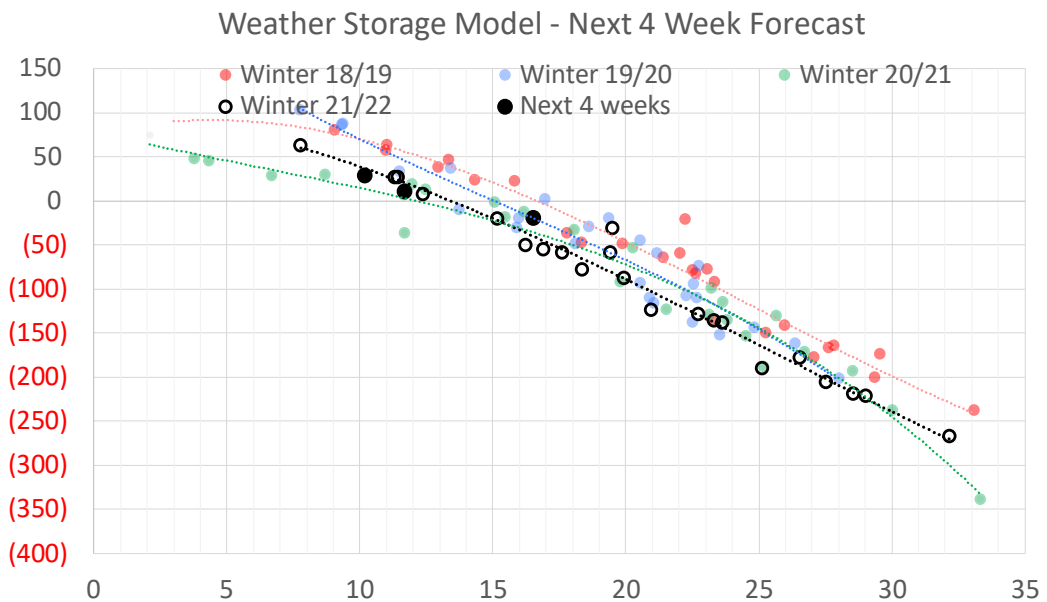
*Adjustment Factor is calculated based on historical regional deltas

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



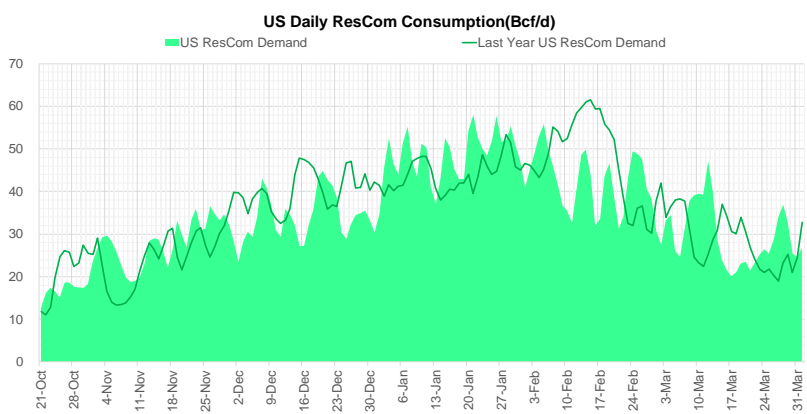
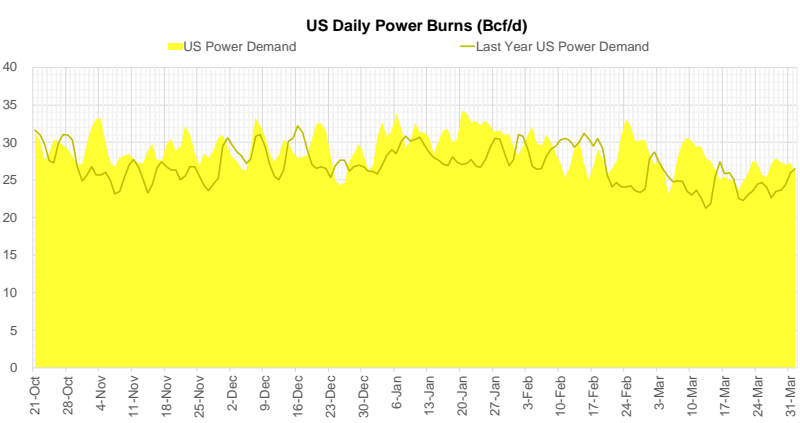
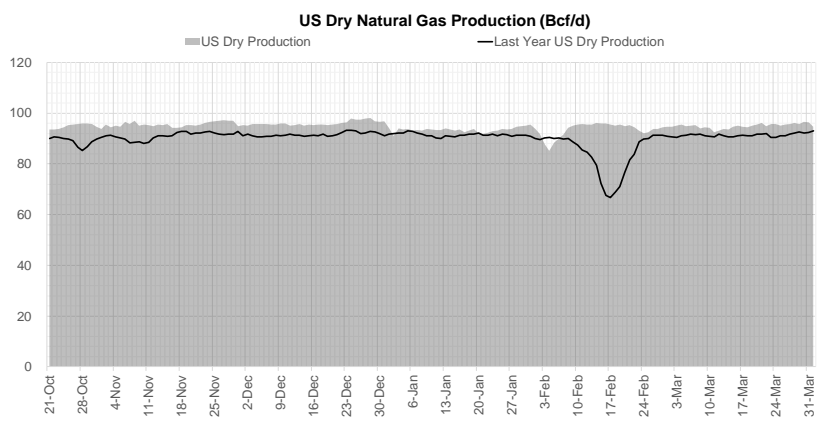
Weather Model Storage Projection

Next report and beyond		
Week Ending	GWDDs	Week Storage Projection
01-Apr	17	-19
08-Apr	12	12
15-Apr	10	29



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

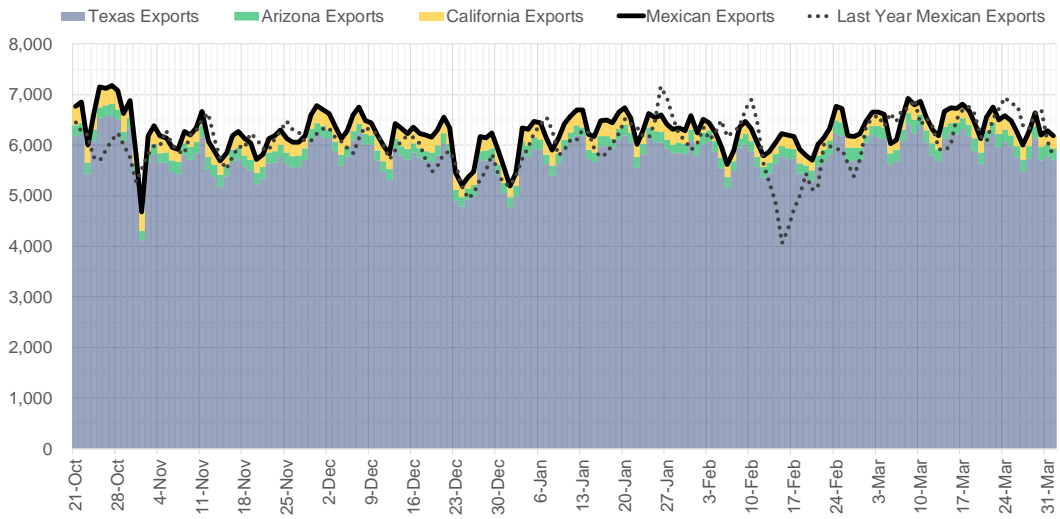
Supply – Demand Trends



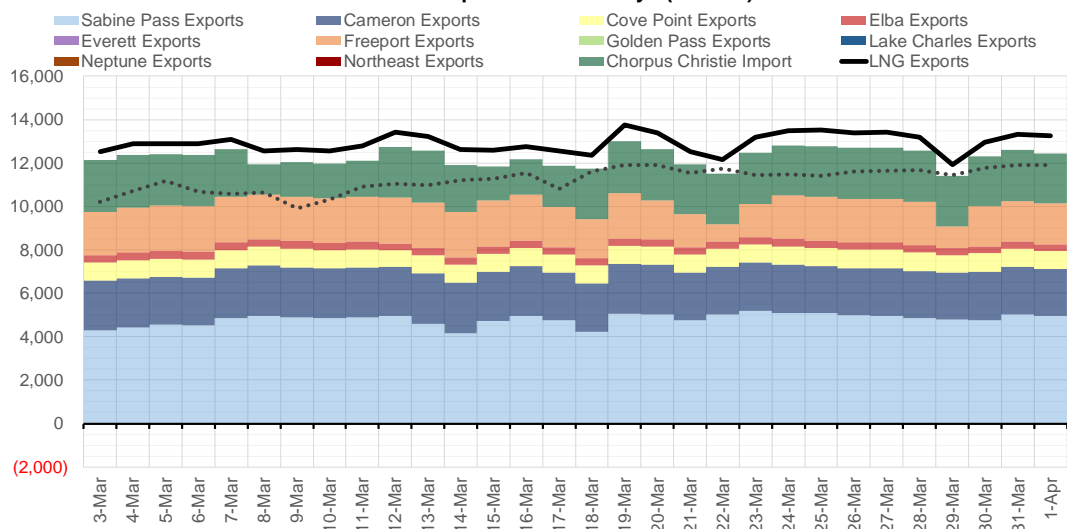
Source: Bloomberg

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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

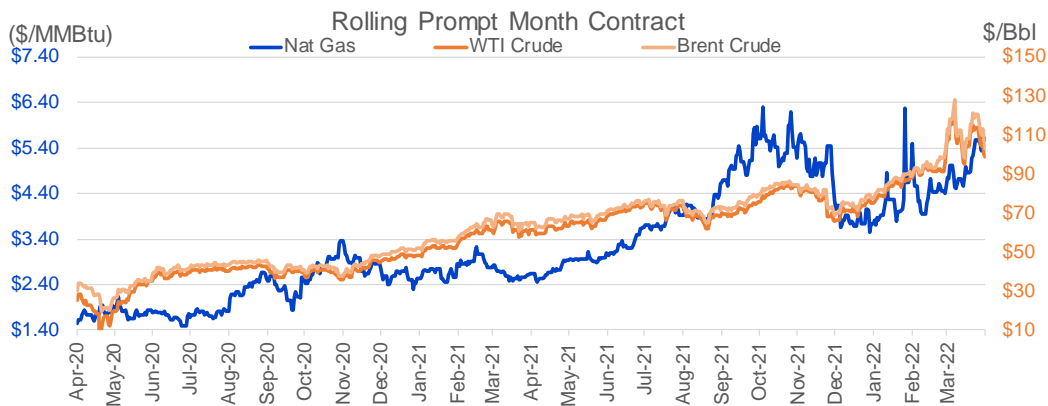
CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE VOL	CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE OI
8	2022	C	10.00	31507	10	2022	C	6.00	28778
8	2022	C	10.50	31382	10	2022	C	5.00	27711
5	2022	C	8.00	8410	5	2022	P	4.00	27227
6	2022	C	8.00	6362	5	2022	C	6.00	25213
5	2022	C	7.00	5988	9	2022	C	6.00	23487
5	2022	C	6.00	5058	5	2022	P	3.00	22661
6	2022	P	4.00	3837	6	2022	C	6.00	22618
5	2022	P	5.00	3369	8	2022	C	6.00	21969
6	2022	C	10.00	3065	5	2022	C	5.00	21857
6	2022	C	7.00	2812	5	2022	P	4.50	20999
5	2022	C	6.50	2771	10	2022	P	3.00	20826
6	2022	P	3.75	2622	5	2022	P	2.50	19874
5	2022	P	5.50	2542	7	2022	C	6.00	19785
10	2022	P	5.00	2060	6	2022	P	4.00	19758
6	2022	P	4.50	1842	5	2022	C	7.00	19308
6	2022	P	5.00	1756	5	2022	P	3.50	18138
6	2022	P	5.50	1668	6	2022	C	5.00	17822
5	2022	C	7.50	1564	12	2022	C	5.00	17768
5	2022	P	5.25	1563	5	2022	P	2.75	17685
5	2022	P	4.50	1558	7	2022	P	3.25	17514
7	2022	P	5.00	1547	10	2022	P	2.50	17361
7	2022	P	5.50	1547	6	2022	P	3.00	17220
5	2022	C	6.25	1474	8	2022	C	7.00	17028
12	2022	C	8.00	1360	9	2022	C	7.00	16267
12	2022	C	10.00	1355	10	2022	P	4.00	16104
6	2022	C	6.50	1277	5	2022	P	3.75	16065
10	2022	C	6.00	1187	6	2022	P	3.50	15950
5	2022	C	7.75	1076	1	2023	C	6.00	15769
5	2022	C	7.25	1058	9	2022	P	2.50	15366
5	2022	C	6.10	1003	1	2023	C	5.00	15340
8	2022	C	6.00	936	10	2022	C	7.00	15336
5	2022	C	5.75	925	9	2022	P	2.75	14933
5	2022	C	5.50	905	10	2022	P	3.50	14648
8	2022	P	5.00	831	10	2022	P	2.00	14575
4	2023	P	3.00	825	7	2022	P	3.50	14531
5	2023	P	3.00	825	12	2022	C	6.00	14495
6	2023	P	3.00	825	6	2022	P	3.75	14327
7	2023	P	3.00	825	6	2022	C	7.00	14308
8	2023	P	3.00	825	8	2022	P	3.00	14172
9	2023	P	3.00	825	7	2022	P	3.00	13763
10	2023	P	3.00	825	5	2022	C	3.00	13733
9	2022	P	5.00	802	7	2022	C	5.00	13727
7	2022	C	5.75	800	6	2022	P	3.25	13517
5	2022	C	6.75	789	6	2022	C	3.00	13438
10	2022	P	4.50	774	6	2022	C	4.50	13371
2	2023	C	6.25	760	5	2022	C	4.00	13259
2	2023	C	7.25	760	7	2022	C	3.00	13231
5	2022	C	5.00	729	8	2022	C	3.00	13226
4	2023	C	6.00	725	9	2022	C	3.00	13225
					9	2022	P	3	13114

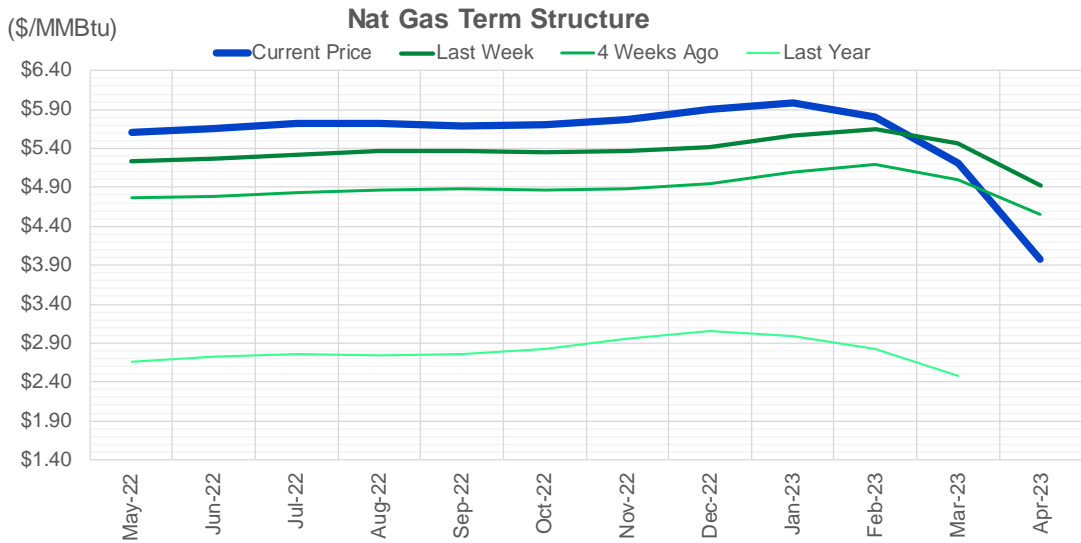
Source: CME, ICE

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
MAY 22	233959	235066	-1107	MAY 22	84922	85696	-774
JUN 22	76390	75397	993	JUN 22	68624	69483	-859
JUL 22	102873	101045	1828	JUL 22	68673	68425	249
AUG 22	46312	47880	-1568	AUG 22	60176	60289	-114
SEP 22	74750	76289	-1539	SEP 22	64960	64913	47
OCT 22	79995	79417	578	OCT 22	72471	71609	862
NOV 22	44197	43471	726	NOV 22	53298	53166	132
DEC 22	47040	47023	17	DEC 22	59194	59782	-588
JAN 23	65965	64381	1584	JAN 23	67289	66749	541
FEB 23	20318	20664	-346	FEB 23	46470	46316	154
MAR 23	41138	39957	1181	MAR 23	51838	51694	144
APR 23	50743	49257	1486	APR 23	50642	50544	98
MAY 23	28900	28293	607	MAY 23	44796	44859	-63
JUN 23	17101	17143	-42	JUN 23	41532	41505	27
JUL 23	14356	14176	180	JUL 23	40927	40908	19
AUG 23	10961	11063	-102	AUG 23	40546	40531	16
SEP 23	14725	14376	349	SEP 23	40375	40363	12
OCT 23	30799	29218	1581	OCT 23	44822	44816	6
NOV 23	11563	11323	240	NOV 23	41294	41296	-2
DEC 23	13694	14106	-412	DEC 23	36604	36497	107
JAN 24	20258	19665	593	JAN 24	33304	33165	140
FEB 24	4559	4462	97	FEB 24	23457	23364	94
MAR 24	15227	15002	225	MAR 24	29387	29010	377
APR 24	10629	9285	1344	APR 24	22171	21851	320
MAY 24	2514	2386	128	MAY 24	20841	20768	73
JUN 24	1646	1303	343	JUN 24	20989	20714	275
JUL 24	1637	1491	146	JUL 24	21703	21287	416
AUG 24	2978	2859	119	AUG 24	21869	21453	416
SEP 24	1322	1198	124	SEP 24	20437	20235	202
OCT 24	6595	6071	524	OCT 24	22307	22175	132

Source: CME, ICE






	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23
Current Price	\$5.605	\$5.658	\$5.714	\$5.717	\$5.695	\$5.702	\$5.766	\$5.903	\$5.992	\$5.808	\$5.204	\$3.970
Last Week	\$5.232	\$5.274	\$5.316	\$5.366	\$5.371	\$5.350	\$5.362	\$5.423	\$5.562	\$5.653	\$5.474	\$4.925
vs. Last Week	\$0.373	\$0.384	\$0.398	\$0.351	\$0.324	\$0.352	\$0.404	\$0.480	\$0.430	\$0.155	-\$0.270	-\$0.955
4 Weeks Ago	\$4.762	\$4.787	\$4.826	\$4.874	\$4.880	\$4.859	\$4.879	\$4.953	\$5.102	\$5.199	\$5.001	\$4.561
vs. 4 Weeks Ago	\$0.843	\$0.871	\$0.888	\$0.843	\$0.815	\$0.843	\$0.887	\$0.950	\$0.890	\$0.609	\$0.203	-\$0.591
Last Year	\$2.608	\$2.667	\$2.732	\$2.753	\$2.740	\$2.755	\$2.830	\$2.961	\$3.049	\$2.992	\$2.818	\$2.483
vs. Last Year	\$2.997	\$2.991	\$2.982	\$2.964	\$2.955	\$2.947	\$2.936	\$2.942	\$2.943	\$2.816	\$2.386	\$1.487

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	2.224	▲ 0.000	▲ 0.000	▲ 2.202
NatGas Oct21/Nov21	\$/MMBtu	0.361	▲ 0.000	▲ 0.000	▲ 0.289
NatGas Oct21/Jan22	\$/MMBtu	-1.817	▲ 0.000	▲ 0.000	▼ -2.104
NatGas Apr22/Oct22	\$/MMBtu	0.404	▲ 0.276	▲ 0.303	▲ 0.364
WTI Crude	\$/Bbl	100.28	▼ -12.060	▼ -7.390	▲ 38.830
Brent Crude	\$/Bbl	107.91	▼ -11.120	▼ -2.550	▲ 43.050
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	369.12	▼ -46.220	▲ 18.780	▲ 185.960
Propane, Mt. Bel	cents/Gallon	1.44	▼ -0.007	▼ -0.093	▲ 0.492
Ethane, Mt. Bel	cents/Gallon	0.43	▼ 0.000	▲ 0.009	▲ 0.204
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 
4/1/2022						
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago	
Oil	533	2	531	196	337	
Gas	138	1	137	47	91	
Miscellaneous	2	0	2	0	2	
Directional	35	0	35	16	19	
Horizontal	613	3	610	222	391	
Vertical	25	0	25	5	20	
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago	
Oil	64	-12	76	40	24	
Gas	60	-4	64	15	45	
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago	
Ardmore Woodford	1	0	1	1	0	
Arkoma Woodford	2	0	2	2	0	
Barnett	3	0	3	2	1	
Cana Woodford	25	1	24	13	12	
DJ-Niobrara	14	0	14	7	7	
Eagle Ford	56	0	56	23	33	
Granite Wash	4	0	4	3	1	
Haynesville	66	-1	67	22	44	
Marcellus	37	1	36	7	30	
Mississippian	1	0	1	1	0	
Permian	323	4	319	99	224	
Utica	11	0	11	2	9	
Williston	33	-1	34	19	14	