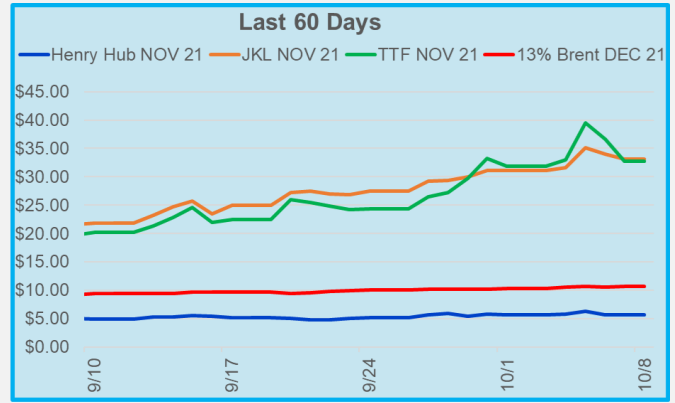
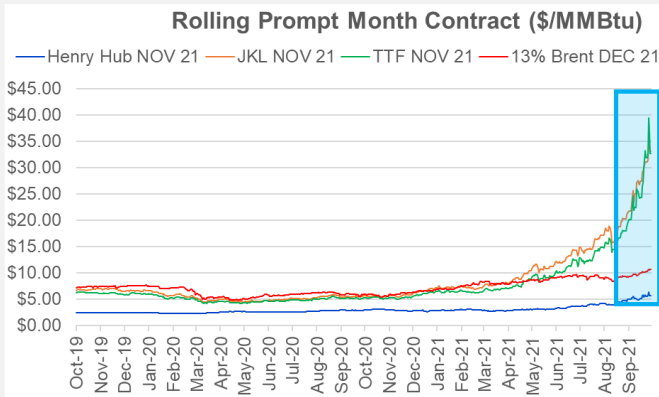
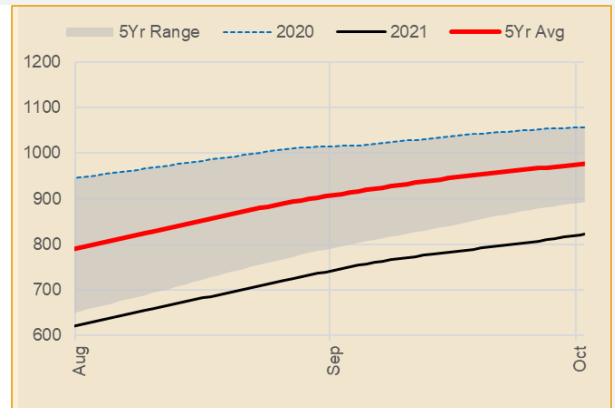
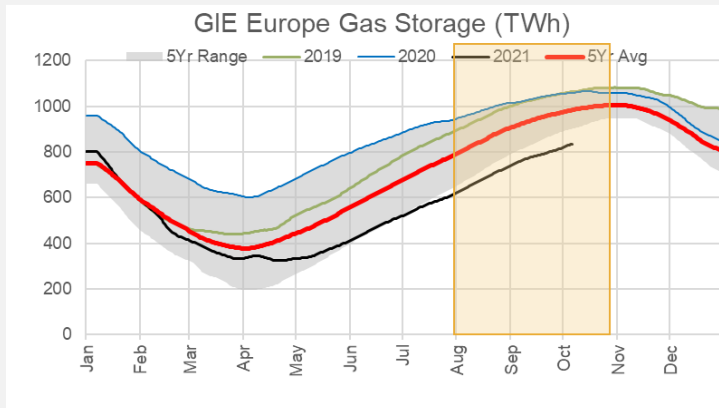


European gas markets hit new highs as potential supply shortages and cooler October turned up the pressure on potential gas shortages this coming winter. The Nov TTF contract exploded this week to gas markets hit a record, but closed the week.



The price relief was partly due to headlines that Putin would begin increasing supply to Europe in the coming weeks/months. The message from Putin was unclear on exactly how since Russia's Gazprom is still looking to fill storage at home. The market quickly suspected that the offer to increase supplies to Europe was likely intended to put pressure on Germany to certify the Nord Stream 2 gas pipeline for use, as Russia is waiting on Germany's energy regulator to authorize. This political pressure could be a method of fast-tracking something that could take several months otherwise.

European gas storage levels are currently sitting 19% below last year, and 14% below the 5Yr average. Looking at some of the larger storage hub countries such as Germany and the Netherlands we see the situation to be even worse. German and Netherland's storage is currently 25% and 33% behind last year, respectively.



The exploding prices have caused panic as these fragile economies are still recovering from the impacts of COVID. European industries are being hit with surging energy costs and in some cases shutting down production, while power/gas retailers are failing with inadequate hedges to cover their short position. In response, France, Spain, Romania, the Czech Republic, and Greece have issued a joint statement to address the rally in gas and wholesale electricity prices this summer.

They are suggesting a five-pillar approach to the problem, which includes:

Pillar 1 - Full European Approach

A common approach to the problem at the European level will be needed, such as a "European policy toolkit" that would coordinate national responses to react immediately when prices surge

Pillar 2 - Addressing Gas Prices

With regards to natural gas, they are calling for an investigation into the functioning of the European gas market to "understand why current gas contracts have been insufficient." They also want to build in common guidelines for gas storage to "mitigate and smooth price increases." Lastly, they want to better coordinate gas purchases to increase bargaining power.

Pillar 3 - Reform Wholesale Electricity Market

The electricity market needs to be "improved to better establish a link between the price paid by consumers" and the "average production cost" for power within individual nations. They cited that this is a massive item since the decarbonization movement will increase electricity use within Europe.

Pillar 4 - Energy Independence

They call for Europe to focus on "achieving energy independence" by investing in a diversity of energy supply and cut reliance on gas-exporting nations "as fast as possible." Wind and solar are their key focus with regards to this push.

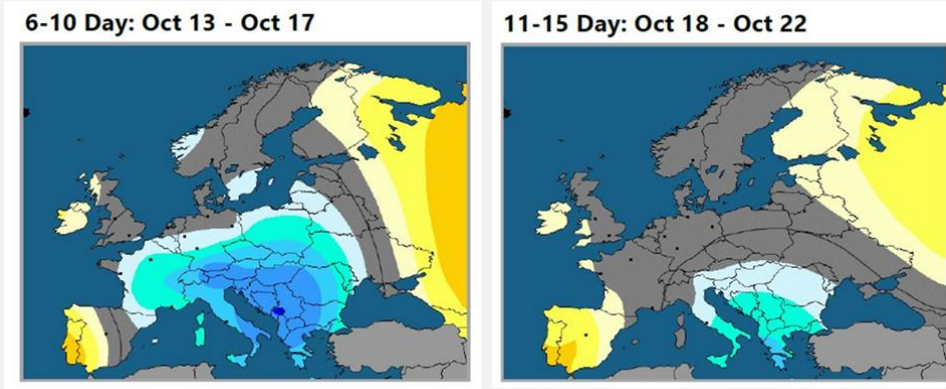
Pillar 5 - Stabilize Carbon Pricing

They want to provide a more "predictable carbon price" and avoid excessive volatility with carbon pricing in order to allow stakeholders to plan ahead and shift investments into low carbon activities.

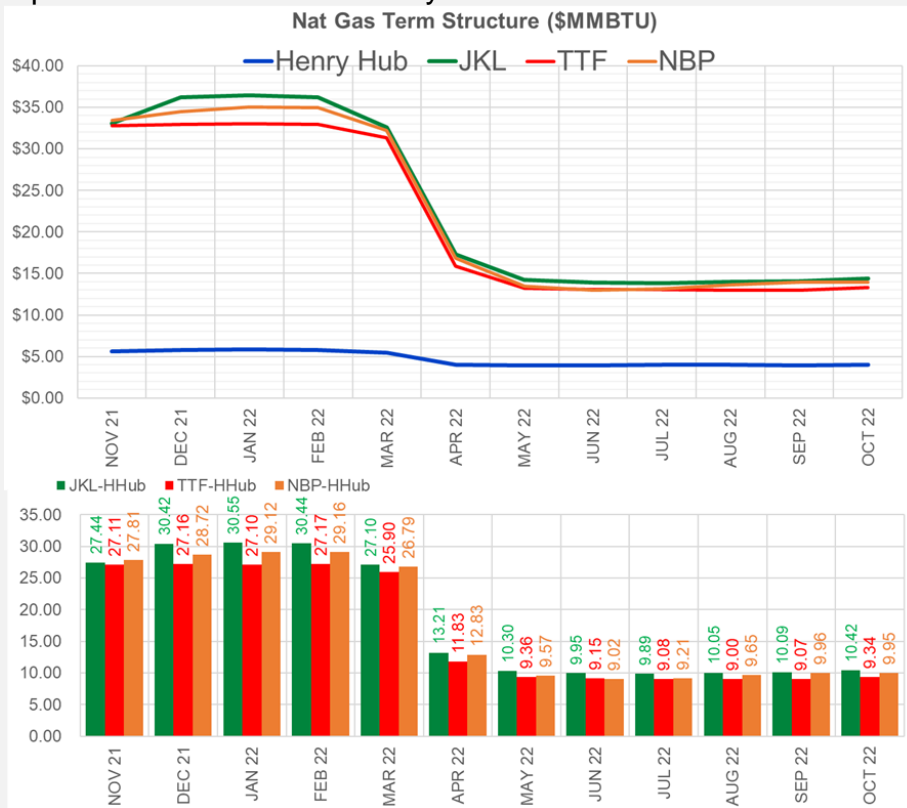
Maybe a bit too lower for this winter.

So the question remains, how can Europe back on path?

Weather is not going to be helping. Here is the short-term forecast from Maxar:



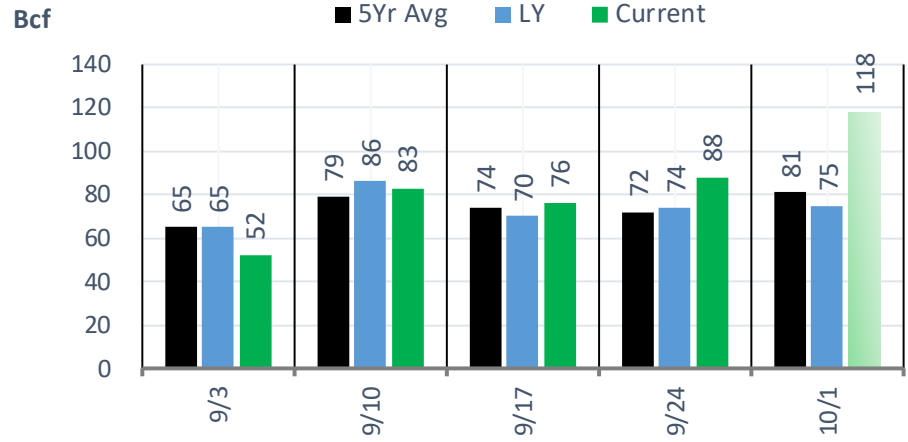
LNG are not able to help with Asian and South American buyers paying a premium to divert cargoes away. For the rest of winter, JKM is pricing above TTF. Every time TTF rises it can only hold a premium over JKM for a very short time.



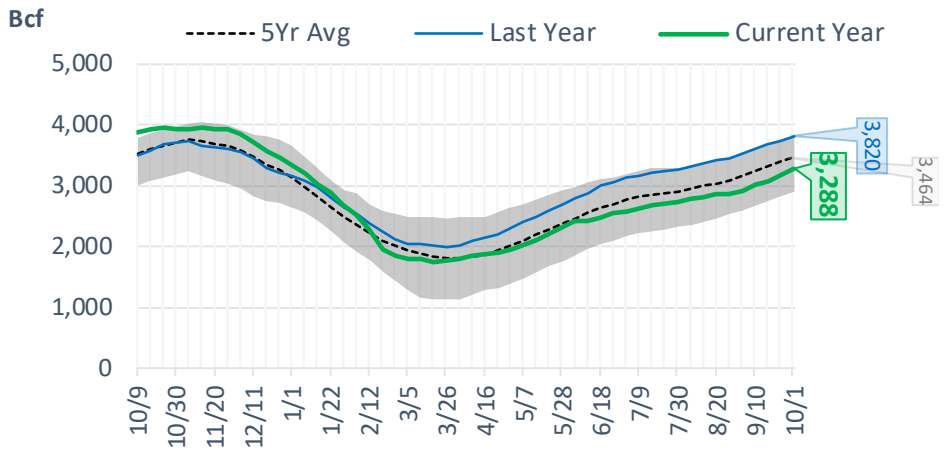
Norway is trying to bring on more production (already raised its annual permitted production levels), but Russia is the only potential source of meaningful incremental pipeline supply volumes across this winter. This story is still playing out, and with it, the US price benchmark will continue to stay volatile.

EIA Storage Report

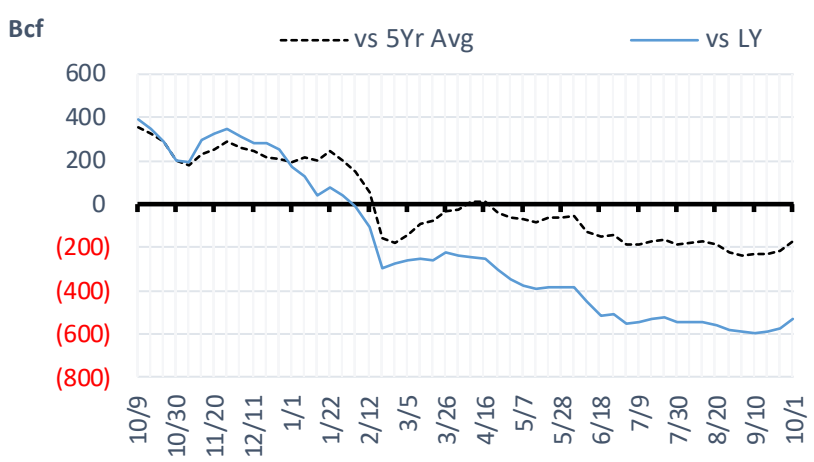
Total Lower 48 YoY Weekly Change



Total Lower 48 Storage Levels



Total Lower 48 LY Surplus/Deficit

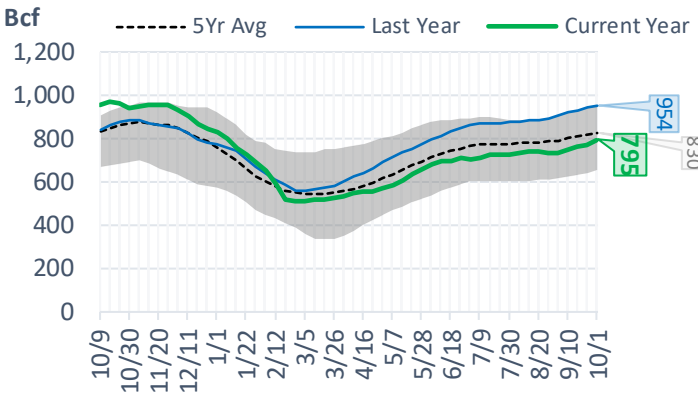


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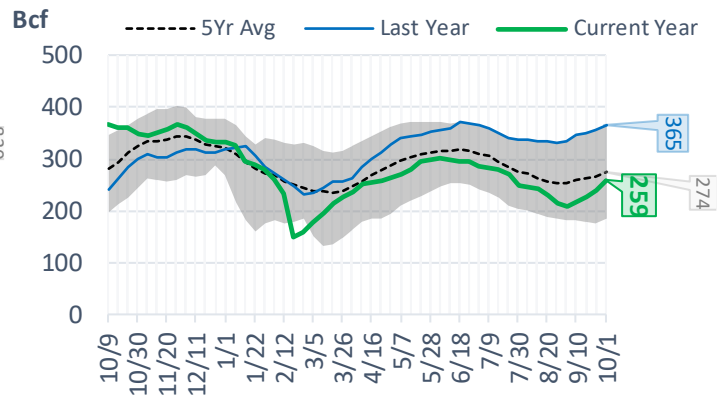
Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 1-Oct	Week - 1 24-Sep	Week - 2 17-Sep	Week - 3 10-Sep	Week - 4 3-Sep	Week - 5 27-Aug
Total Lower 48 Storage Level	3288	3170	3082	3006	2923	2871
Weekly Change	+118	+88	+76	+83	+52	+20
vs LY	-532	-575	-589	-595	-592	-579
vs 5Yr Avg	-176	-213	-229	-231	-235	-222
S. Central Salt Storage Level	259	239	228	217	208	214
Weekly Change	+20	+11	+11	+9	-6	-15
vs LY	-106	-118	-121	-130	-126	-117
vs 5Yr Avg	-15	-27	-35	-44	-45	-39
S. Central NonSalt Storage Level	795	774	762	748	735	734
Weekly Change	+21	+12	+14	+13	+1	-8
vs LY	-159	-169	-171	-176	-171	-160
vs 5Yr Avg	-35	-45	-50	-55	-57	-52
Midwest Storage Level	971	934	904	876	842	812
Weekly Change	+37	+30	+28	+34	+30	+22
vs LY	-87	-96	-101	-103	-107	-109
vs 5Yr Avg	-19	-24	-24	-21	-23	-22
East Storage Level	810	779	751	732	703	678
Weekly Change	+31	+28	+19	+29	+25	+17
vs LY	-80	-90	-96	-90	-100	-109
vs 5Yr Avg	-45	-52	-56	-51	-57	-60
Mountain Storage Level	206	201	196	193	191	190
Weekly Change	+5	+5	+3	+2	+1	+2
vs LY	-29	-29	-28	-27	-24	-22
vs 5Yr Avg	-9	-10	-10	-9	-7	-5
Pacific Storage Level	248	243	240	240	243	243
Weekly Change	+5	+3	0	-3	0	+2
vs LY	-70	-72	-72	-70	-64	-61
vs 5Yr Avg	-53	-55	-54	-51	-45	-44

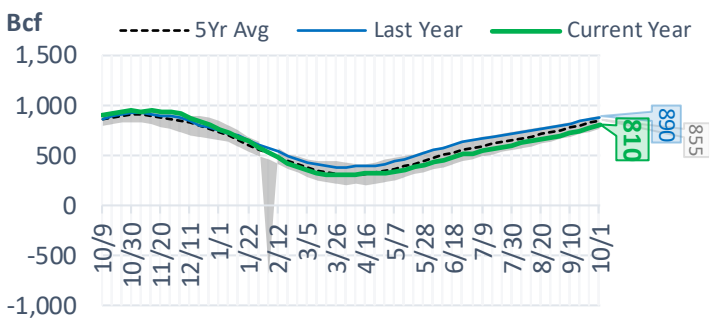
NonSalt Storage Levels



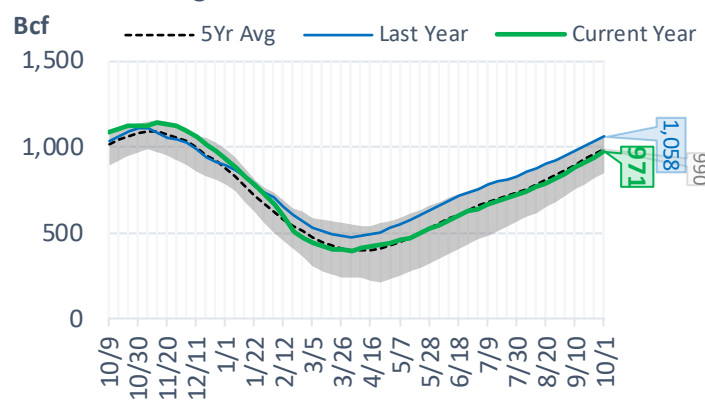
Salt Storage Levels



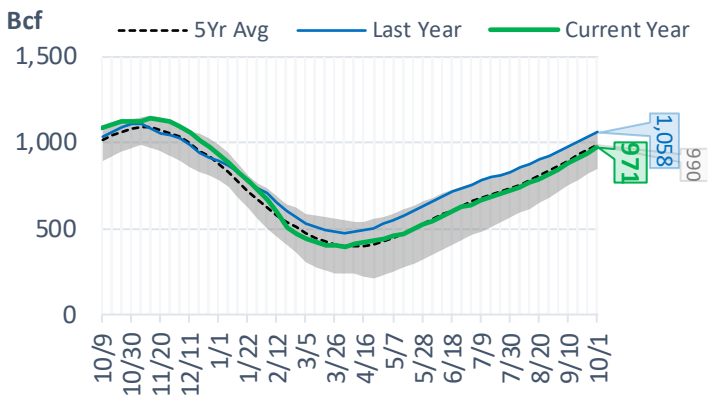
East Storage Levels



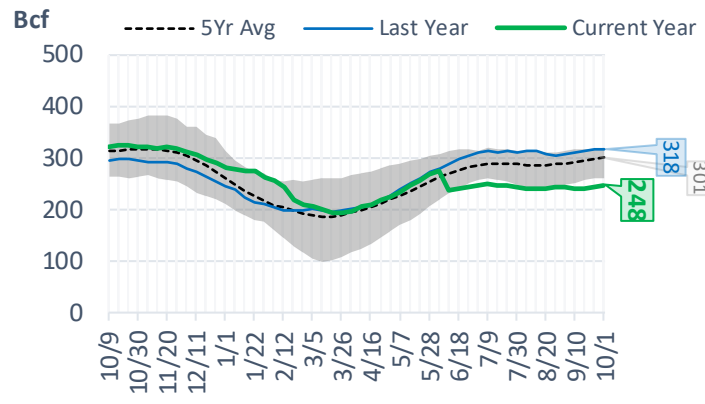
Midwest Storage Levels



Midwest Storage Levels



Pacific Storage Levels



EIA Storage Week Balances

	3-Sep	10-Sep	17-Sep	24-Sep	1-Oct	8-Oct	WoW	vs. 4W
Lower 48 Dry Production	90.9	91.3	91.8	92.9	93.2	92.8	▼-0.4	▲0.5
Canadian Imports	5.0	4.8	5.2	5.2	5.7	5.3	▼-0.4	▲0.1
L48 Power	38.1	33.8	35.0	33.2	30.2	32.5	▲2.3	▼-0.5
L48 Residential & Commercial	7.4	6.9	7.2	8.0	8.3	8.1	▼-0.3	▲0.5
L48 Industrial	18.9	19.6	20.8	20.6	20.2	21.5	▲1.3	▲1.3
L48 Lease and Plant Fuel	5.0	5.0	5.0	5.1	5.1	5.1	▼0.0	▲0.0
L48 Pipeline Distribution	2.4	2.2	2.3	2.3	2.1	2.2	▲0.1	▼-0.1
L48 Regional Gas Consumption	71.7	67.5	70.3	69.1	66.0	69.4	▲3.4	▲1.2
Net LNG Exports	10.5	11.0	10.2	9.9	10.3	9.9	▼-0.4	▼-0.4
Total Mexican Exports	7.0	6.7	6.6	6.8	6.7	6.6	▼-0.1	▼-0.1
Implied Daily Storage Activity	6.7	10.9	9.8	12.2	16.0	12.3	-3.7	
EIA Reported Daily Storage Activity	7.4	11.9	10.9	12.6	16.9			
Daily Model Error	-0.8	-1.0	-1.0	-0.4	-0.9			

Monthly Balances

	2Yr Ago Oct-19	LY Oct-20	Jun-21	Jul-21	Aug-21	Sep-21	MTD Oct-21	MoM	vs. LY
Lower 48 Dry Production	95.1	88.3	93.3	93.3	92.4	92.2	92.7	▲0.5	▲4.4
Canadian Imports	4.6	4.3	4.9	5.2	5.1	5.2	5.3	▲0.1	▲1.0
L48 Power	30.3	30.8	35.9	39.4	40.2	33.1	32.5	▼-0.6	▲1.8
L48 Residential & Commercial	15.3	15.3	8.8	8.1	7.7	7.6	8.2	▲0.5	▼-7.1
L48 Industrial	23.5	22.6	20.5	20.8	20.2	20.2	21.5	▲1.3	▼-1.1
L48 Lease and Plant Fuel	5.1	4.8	5.0	5.1	5.0	5.0	5.0	▲0.0	▲0.2
L48 Pipeline Distribution	2.4	2.5	2.4	2.5	2.5	2.2	2.2	▼-0.1	▼-0.3
L48 Regional Gas Consumption	76.6	75.9	72.7	76.0	75.7	68.1	69.4	▲1.2	▼-6.5
Net LNG Exports	6.7	8.0	10.2	10.8	10.5	10.3	10.0	▼-0.3	▲2.0
Total Mexican Exports	5.4	6.0	7.4	7.1	6.9	6.7	6.6	▼-0.2	▲0.6
Implied Daily Storage Activity	11.1	2.7	7.8	4.6	4.5	12.1	12.0		
EIA Reported Daily Storage Activity									
Daily Model Error									

Source: Bloomberg, analytix.ai

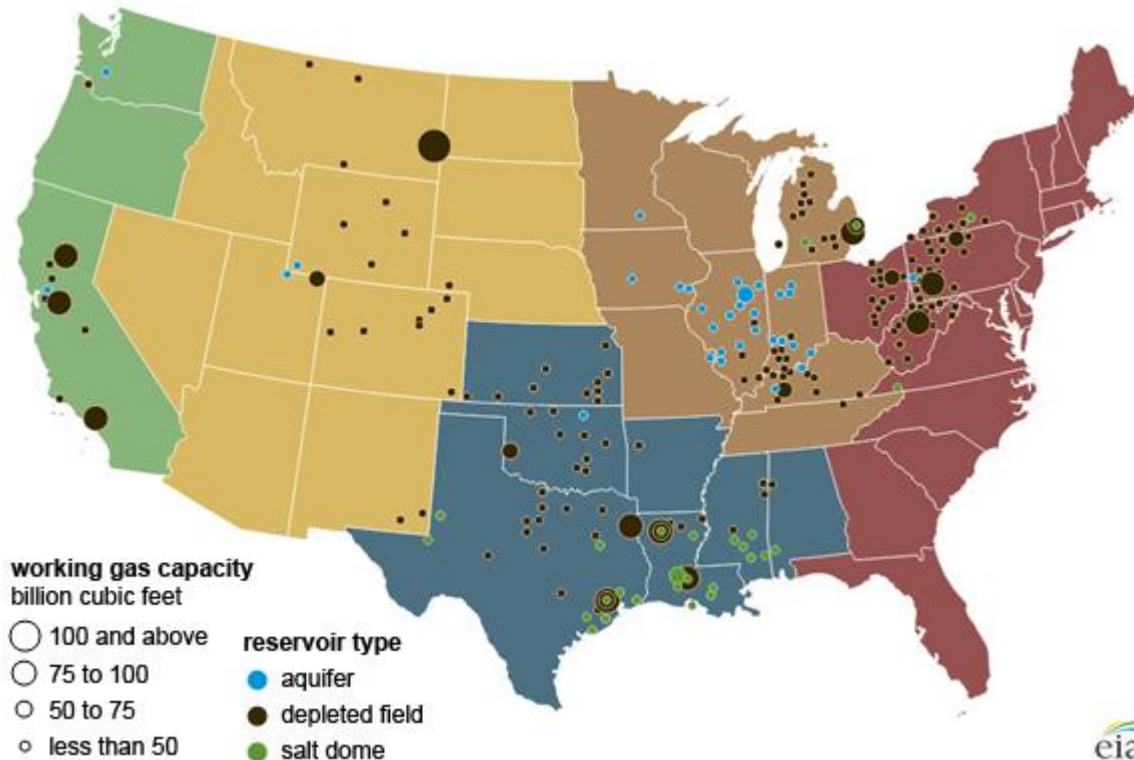
Regional S/D Models Storage Projection

Week Ending 8-Oct

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	12.0	1.2	13.2	92
East	3.1	0.6	3.6	25
Midwest	4.5	-0.7	3.7	26
Mountain	3.7	-3.2	0.5	4
South Central	-0.3	5.2	4.9	34
Pacific	0.9	-0.5	0.4	3

*Adjustment Factor is calculated based on historical regional deltas

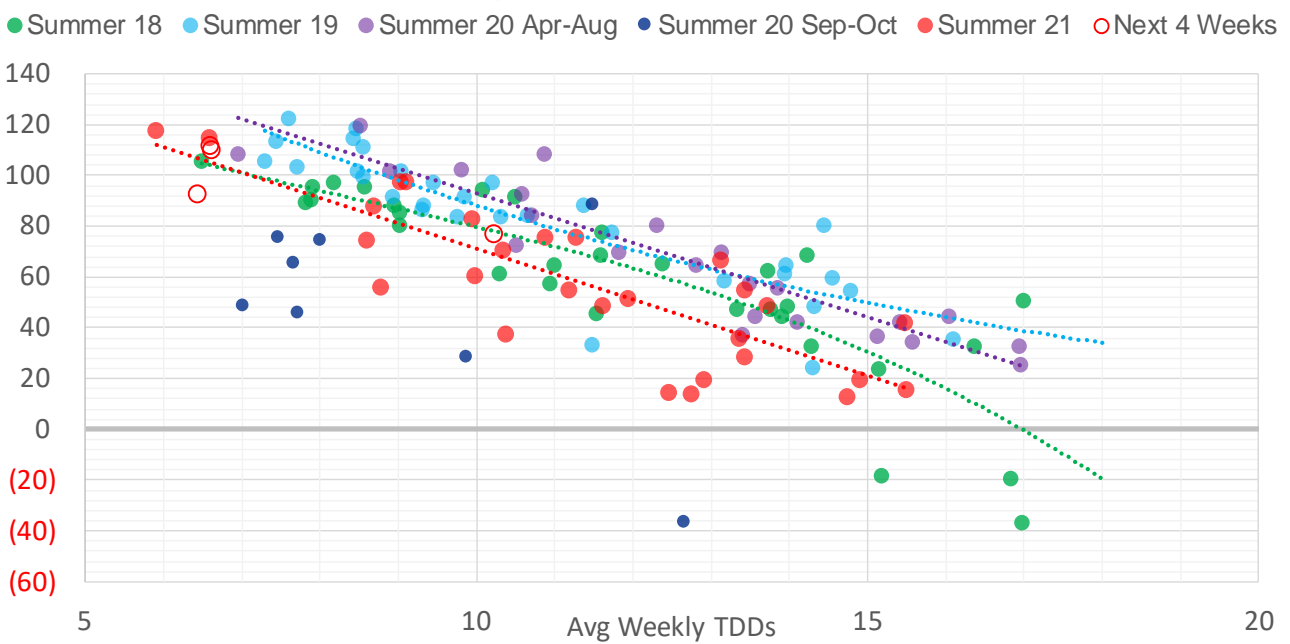
U.S. underground natural gas storage facilities by type (July 2015)



Weather Model Storage Projection

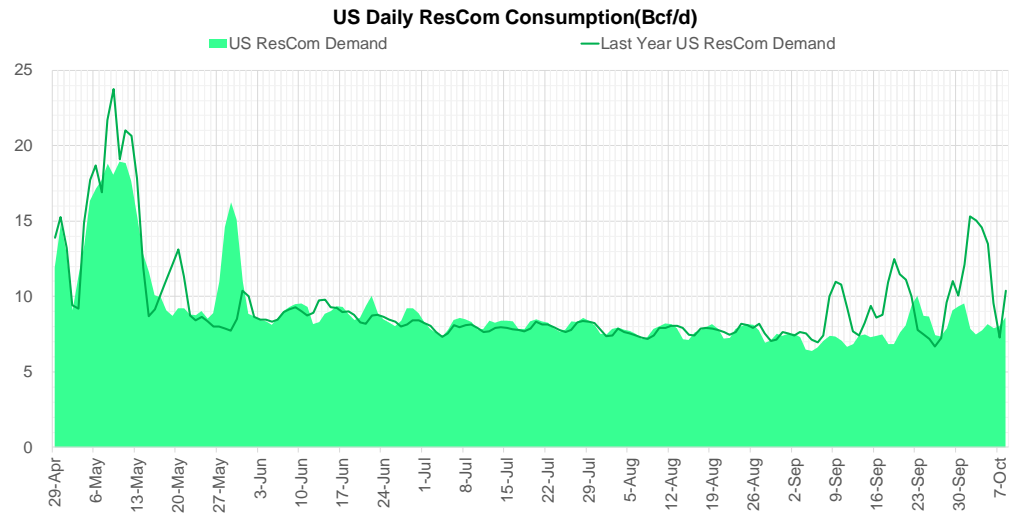
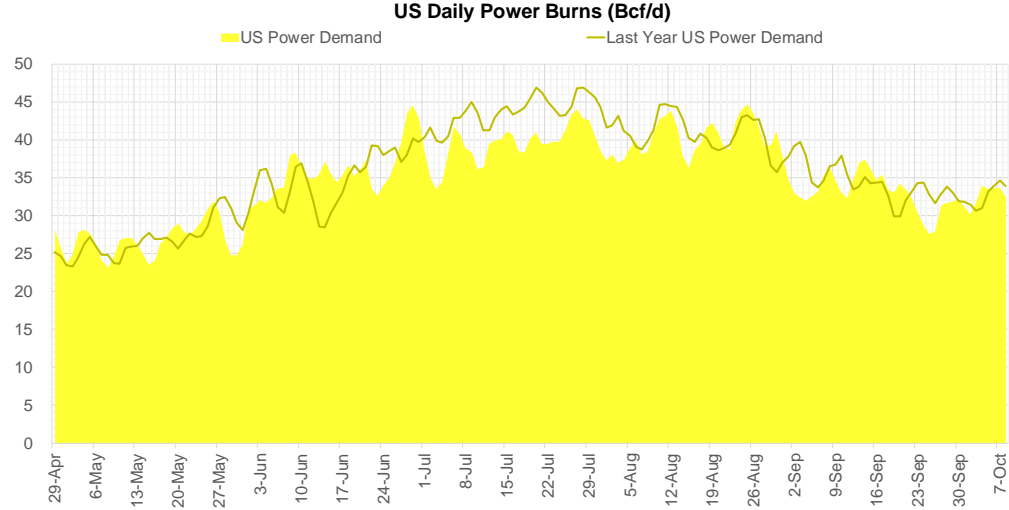
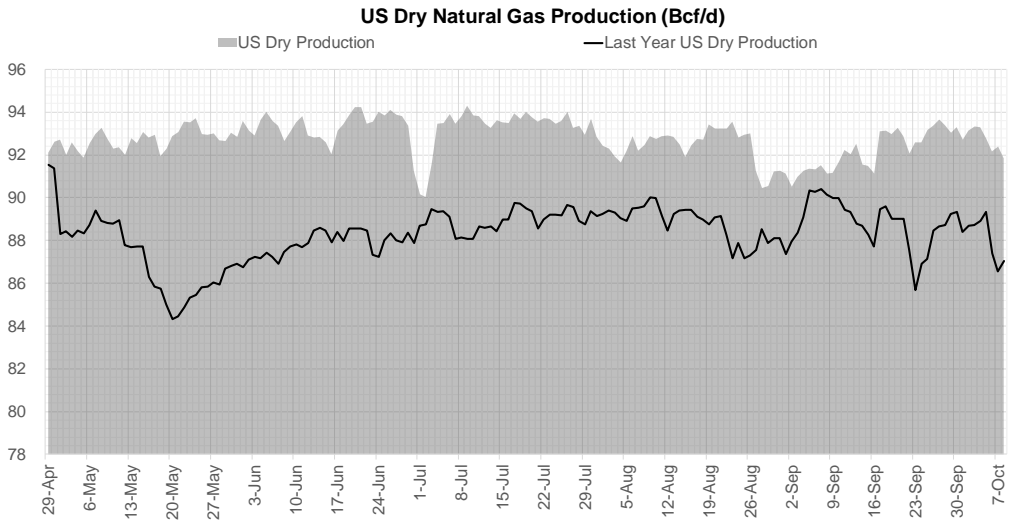
Next report and beyond		
Week Ending	Temp	Week Storage Projection
15-Oct	6.6	111
22-Oct	6.6	110
29-Oct	10.2	77

Weather Storage Model - Next 4 Week Forecast



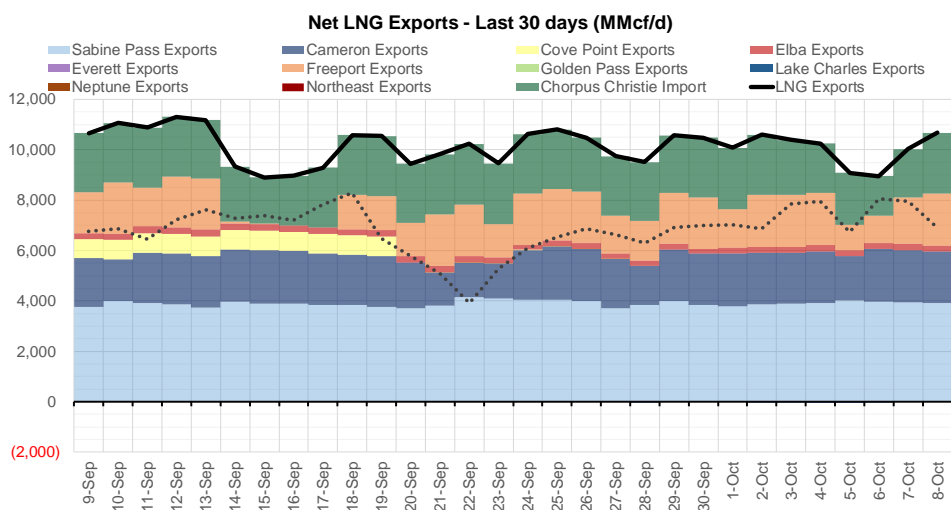
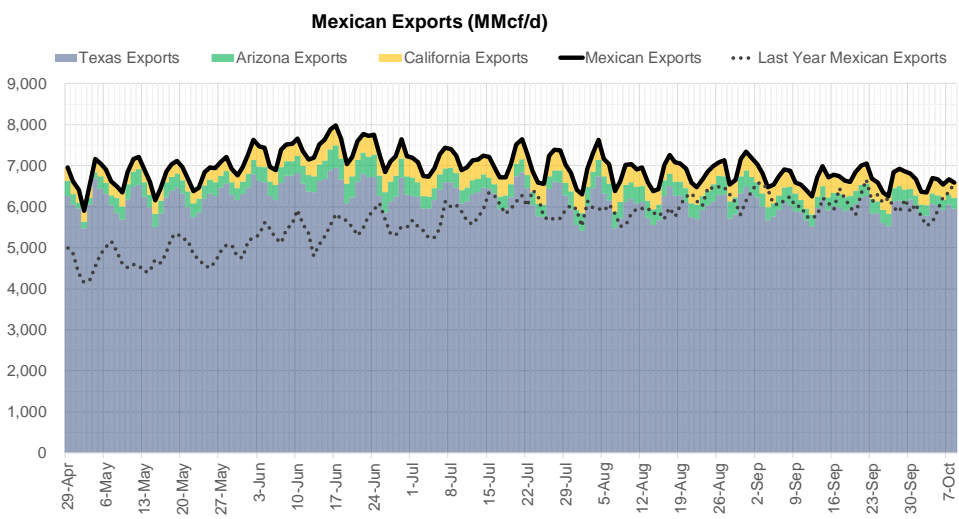
Note: this is not our official end of season forecast. This chart signifies where storage levels end with 10-year normal weather and current market tightness relative to last year

Supply – Demand Trends



Source: Bloomberg

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Source: Bloomberg

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Nat Gas Options Volume and Open Interest CME, ICE and Nasdaq Combined

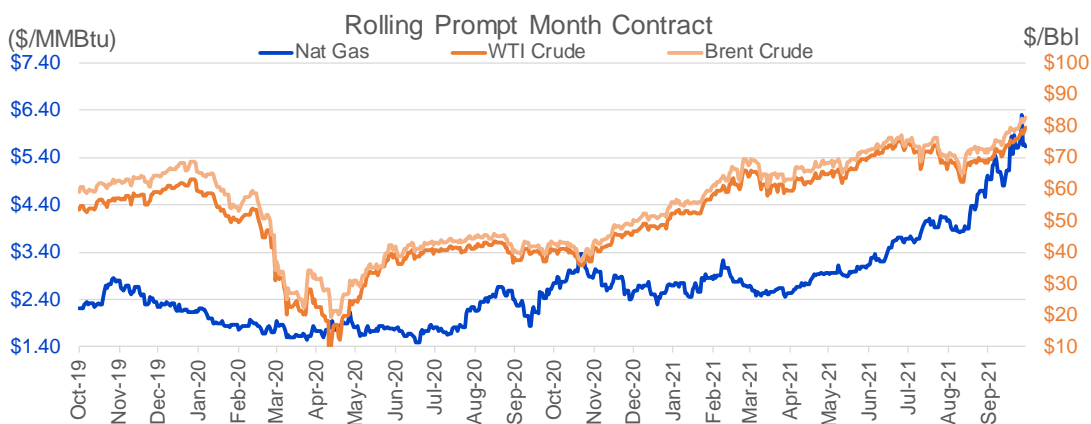
CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE VOL	CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE OI
3	2022	P	3.00	3301	12	2021	P	2.75	43912
11	2021	C	7.00	3096	12	2021	P	2.50	38567
12	2021	C	15.00	2937	12	2021	P	3.00	32186
11	2021	P	5.00	2801	12	2021	P	4.00	31274
11	2021	C	8.00	2676	3	2022	C	10.00	31237
11	2021	P	4.00	2585	11	2021	P	3.00	30167
11	2021	C	9.00	2540	11	2021	P	4.00	27463
12	2021	P	5.00	2281	3	2022	C	8.00	26530
3	2022	P	4.00	2270	11	2021	P	4.50	25871
11	2021	C	6.00	1986	12	2021	P	3.50	25611
11	2021	P	4.50	1945	11	2021	P	5.00	25180
12	2021	P	4.00	1867	11	2021	C	7.00	24048
11	2021	P	4.60	1693	3	2022	C	5.00	22926
11	2021	P	4.25	1679	12	2021	C	4.00	22526
1	2022	P	4.50	1522	11	2021	P	3.50	20293
2	2022	P	4.25	1450	11	2021	C	4.00	20146
6	2022	P	3.50	1450	4	2022	C	3.00	19760
1	2022	P	5.00	1418	11	2021	C	6.00	19159
2	2022	P	3.25	1400	1	2022	P	3.50	18461
12	2021	C	10.00	1373	1	2022	C	5.00	18070
11	2021	P	4.75	1363	3	2022	P	3.50	17917
12	2021	P	4.50	1274	2	2022	P	3.50	17855
12	2021	C	8.00	1248	12	2021	C	6.00	17731
11	2021	C	6.50	1207	2	2022	C	5.00	17376
5	2022	P	3.50	1200	3	2022	P	2.50	16788
1	2022	P	4.25	1072	3	2022	P	4.00	16534
11	2021	C	8.50	1061	12	2021	C	7.00	16388
11	2021	C	10.00	1050	3	2022	C	4.00	15831
2	2022	C	5.00	1025	1	2022	C	6.00	15513
2	2022	C	6.00	1013	11	2021	C	5.00	15149
11	2021	C	5.00	1002	11	2021	C	4.50	14903
12	2021	C	5.00	1001	1	2022	C	4.00	14503
3	2022	C	5.00	1001	11	2021	P	2.50	14488
11	2021	C	3.40	1000	11	2021	C	3.75	14479
12	2021	C	3.40	1000	4	2022	C	5.00	14474
1	2022	C	3.40	1000	12	2022	C	5.00	14372
1	2022	C	5.00	1000	4	2022	P	2.50	14225
2	2022	C	3.40	1000	11	2021	P	3.25	14214
3	2022	C	3.40	1000	1	2022	P	4.00	13945
1	2022	C	15.00	963	12	2021	P	2.00	13885
3	2022	C	10.00	950	11	2021	C	5.50	13686
3	2022	C	8.00	925	3	2022	P	5.00	13619
2	2022	C	8.00	920	12	2021	C	8.00	13530
1	2022	C	8.00	902	2	2022	C	6.00	13379
11	2021	P	5.10	901	11	2021	C	4.25	13282
1	2022	C	5.75	880	12	2022	C	5.25	13241
2	2022	C	5.75	880	12	2022	C	4.50	13115
12	2021	C	7.00	866	5	2022	C	3.00	13110
1	2022	C	6.00	864	2	2022	C	4.00	12914
					12	2021	C	5	12872.5

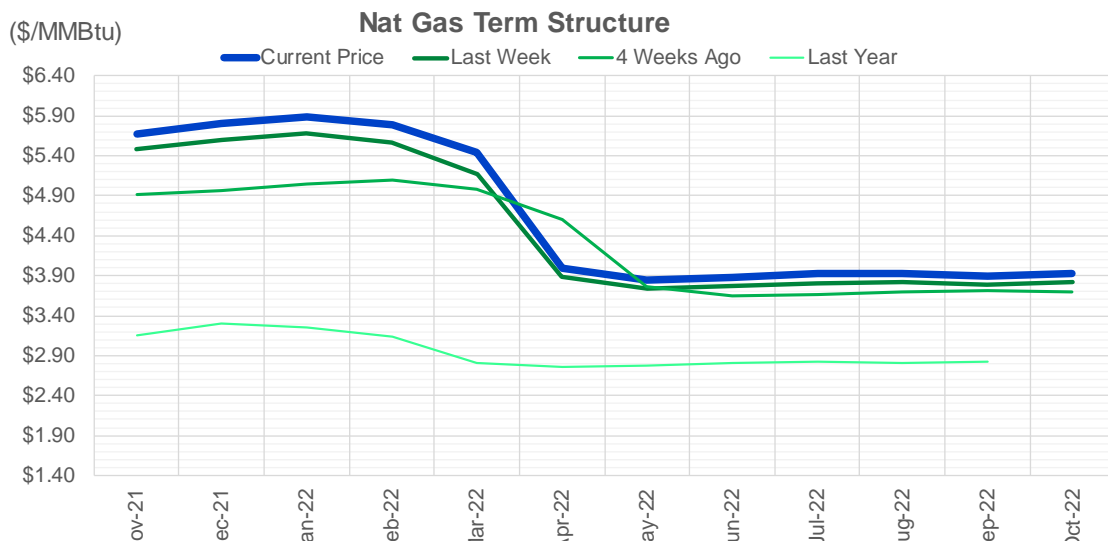
Source: CME, Nasdaq, ICE

Nat Gas Futures Open Interest CME, ICE and Nasdaq 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
NOV 21	212671	238250	-25579	NOV 21	86329	85991	339
DEC 21	117441	110482	6959	DEC 21	83469	80680	2789
JAN 22	179419	173179	6240	JAN 22	93277	94372	-1095
FEB 22	62980	62246	734	FEB 22	69613	69662	-49
MAR 22	134929	131026	3903	MAR 22	74831	75100	-269
APR 22	121303	122854	-1551	APR 22	74893	74754	140
MAY 22	118592	120351	-1759	MAY 22	70283	70448	-165
JUN 22	40452	39111	1341	JUN 22	54926	54798	128
JUL 22	33003	32758	245	JUL 22	56819	56822	-3
AUG 22	30404	31138	-734	AUG 22	55964	55964	1
SEP 22	34714	34710	4	SEP 22	56862	56886	-24
OCT 22	81984	82185	-201	OCT 22	62716	62509	207
NOV 22	31429	31226	203	NOV 22	48567	48545	22
DEC 22	25776	25606	170	DEC 22	51804	51815	-11
JAN 23	23353	22703	650	JAN 23	38298	38255	43
FEB 23	10252	10212	40	FEB 23	31682	31671	12
MAR 23	12862	12758	104	MAR 23	33170	33391	-221
APR 23	12807	12766	41	APR 23	33359	33002	357
MAY 23	7857	7901	-44	MAY 23	31937	31875	63
JUN 23	6495	6276	219	JUN 23	29678	29626	52
JUL 23	4326	4296	30	JUL 23	29909	29855	54
AUG 23	3877	3883	-6	AUG 23	29715	29662	53
SEP 23	4198	4196	2	SEP 23	28837	28785	52
OCT 23	5675	5689	-14	OCT 23	31902	31841	62
NOV 23	2662	2668	-6	NOV 23	30281	30258	23
DEC 23	2317	2363	-46	DEC 23	28206	28181	25
JAN 24	1212	1180	32	JAN 24	15713	15680	34
FEB 24	1180	1071	109	FEB 24	13467	13369	98
MAR 24	3368	3361	7	MAR 24	18209	18149	60
APR 24	3007	3422	-415	APR 24	12390	12347	43

Source: CME, ICE






	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22
Current Price	\$5.675	\$5.803	\$5.888	\$5.787	\$5.437	\$3.997	\$3.841	\$3.877	\$3.919	\$3.922	\$3.901	\$3.931
Last Week	\$5.477	\$5.595	\$5.675	\$5.560	\$5.166	\$3.886	\$3.730	\$3.764	\$3.807	\$3.812	\$3.793	\$3.822
vs. Last Week	\$0.198	\$0.208	\$0.213	\$0.227	\$0.271	\$0.111	\$0.111	\$0.113	\$0.112	\$0.110	\$0.108	\$0.109
4 Weeks Ago	\$4.914	\$4.962	\$5.046	\$5.103	\$4.985	\$4.609	\$3.761	\$3.641	\$3.667	\$3.698	\$3.706	\$3.691
vs. 4 Weeks Ago	\$0.761	\$0.841	\$0.842	\$0.684	\$0.452	-\$0.612	\$0.080	\$0.236	\$0.252	\$0.224	\$0.195	\$0.240
Last Year	\$2.606	\$3.149	\$3.294	\$3.248	\$3.130	\$2.804	\$2.752	\$2.779	\$2.815	\$2.820	\$2.804	\$2.830
vs. Last Year	\$3.069	\$2.654	\$2.594	\$2.539	\$2.307	\$1.193	\$1.089	\$1.098	\$1.104	\$1.102	\$1.097	\$1.101

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	2.224	▲ 0.000	▲ 0.810	▲ 2.203
NatGas Oct21/Nov21	\$/MMBtu	-0.164	▼ -0.190	▼ -0.205	▼ -0.220
NatGas Oct21/Jan22	\$/MMBtu	0.069	▼ -0.163	▼ -0.116	▼ -0.221
NatGas Apr22/Oct22	\$/MMBtu	-0.061	▲ 0.022	▼ -0.020	▼ -0.067
WTI Crude	\$/Bbl	78.30	▲ 3.270	▲ 10.160	▲ 37.110
Brent Crude	\$/Bbl	81.95	▲ 3.430	▲ 10.500	▲ 38.610
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	245.96	▲ 11.790	▲ 34.590	▲ 126.730
Propane, Mt. Bel	cents/Gallon	1.47	▲ 0.178	▲ 0.268	▲ 0.948
Ethane, Mt. Bel	cents/Gallon	0.44	▲ 0.047	▲ 0.063	▲ 0.241
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					
10/8/2021					
Baker Hughes 					
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	433	5	428	240	193
Gas	99	0	99	26	73
Miscellaneous	1	0	1	-2	3
Directional	22	0	22	1	21
Horizontal	483	9	474	250	233
Vertical	28	-4	32	13	15
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago
Oil	95	-2	97	56	39
Gas	72	4	68	31	41
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago
Ardmore Woodford	2	0	2	2	0
Arkoma Woodford	2	0	2	1	1
Cana Woodford	20	0	20	14	6
DJ-Niobrara	12	0	12	8	4
Eagle Ford	38	1	37	25	13
Granite Wash	3	0	3	2	1
Haynesville	47	0	47	11	36
Marcellus	27	1	26	2	25
Mississippian	1	0	1	1	0
Permian	266	3	263	136	130
Utica	11	-1	12	5	6
Williston	23	0	23	12	11