

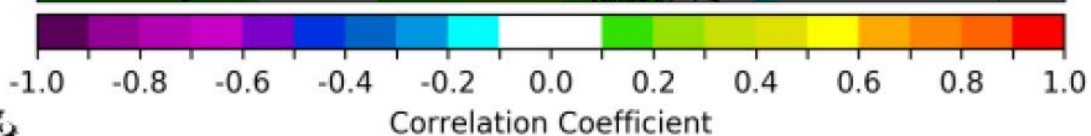
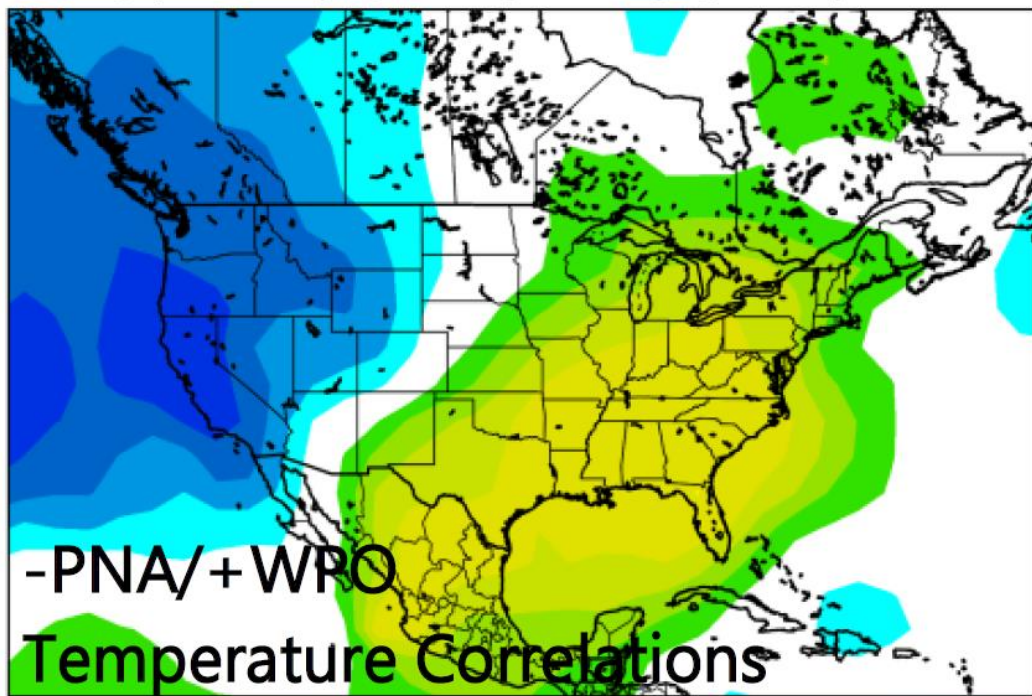
This week we start to take a look at how the weather has taken the driver seat in moving price daily. Since the close of last week, we have seen one warm forecast after another show up leading to prices cratering.

Looking at the price journey, we see that prices were relatively flat in September but then climbed throughout October. The December contract hit a high of 3.14 at the end of October and has fallen off a cliff this past week dropping under \$3. The close on Friday was \$2.884/MMbtu

The change in weather has been the main driver, despite three EIA storage numbers that pointed to tighter than expected balances.

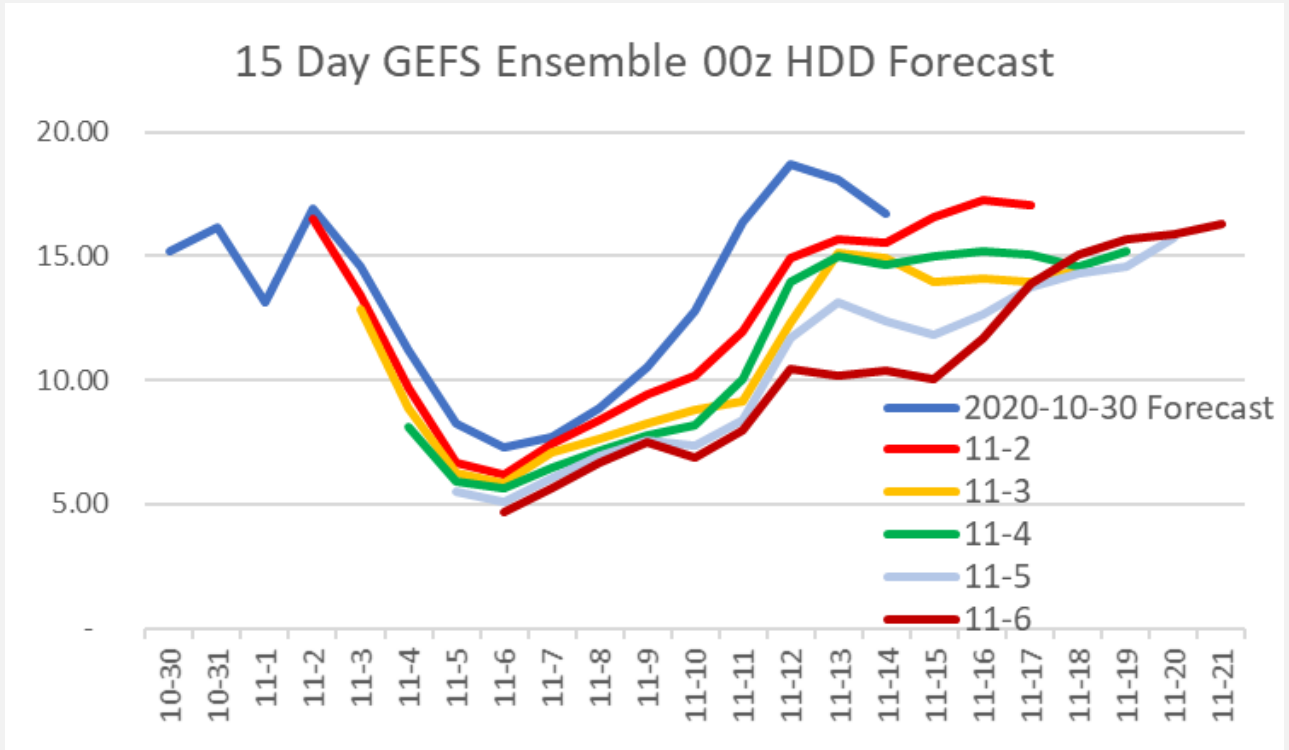
The large weather scale pattern is the characteristics of the -PNA (a common pattern of La Niña in winter) and the +WPO. Associated features influence the orientation and strength of the northern Pacific jet stream, resulting in a colder airflow into the West and above normal temperatures across the Eastern Half.

Combo Index [n pna 50.0% p wpo 50.0%] to Month[11] US Temperature Correlation



Let's go through some charts and tables to show just how influential the weather was this past week.

Let's start with the GEFS Ensemble 15 day forecast. Since last week (looking at trading days only), almost every forecast pointed to warmer temps. Here is a visual picture of the 00z runs.



Note: these are the timing of the model runs each day after last week's time change.

GEFS Ensemble:

12z starts at 10:30 AM EST
 00z starts at 10:30 PM EST
 it takes 3 hours to complete

Euro Ensemble:

12z starts at 1:45 PM EST
 00z starts at 1:45 AM EST
 it takes about an hour to complete

The next table takes the same data and puts it into a format that combines it with actuals (yellow) and 10Y normal (blue). This allows us to see how the first 2/3 of November changed this week.

Rolling Forecast -->

	10-29	10-30	11-2	11-3	11-4	11-5	11-6
10-29	10.0	10.6	10.6	10.6	10.6	10.6	10.6
10-30	14.9	15.2	15.6	15.6	15.6	15.6	15.6
10-31	15.9	16.2	16.2	16.2	16.2	16.2	16.2
11-1	12.8	13.2	13.2	13.2	13.2	13.2	13.2
11-2	16.6	16.9	16.5	16.6	16.6	16.6	16.6
11-3	16.1	14.6	13.4	12.9	12.1	12.1	12.1
11-4	11.4	11.2	9.7	8.9	8.1	7.6	7.6
11-5	8.2	8.3	6.7	6.3	6.0	5.5	5.2
11-6	7.6	7.3	6.2	5.8	5.7	5.1	4.7
11-7	8.4	7.7	7.4	7.1	6.5	6.1	5.6
11-8	9.5	8.9	8.4	7.7	7.2	7.0	6.7
11-9	10.7	10.5	9.4	8.3	7.8	7.6	7.5
11-10	11.9	12.8	10.2	8.8	8.2	7.4	6.9
11-11	14.2	16.4	12.0	9.2	10.1	8.4	8.0
11-12	16.2	18.7	14.9	12.3	13.9	11.7	10.5
11-13	16.8	18.1	15.7	15.1	15.0	13.1	10.2
11-14	18.1	16.7	15.5	14.9	14.6	12.4	10.4
11-15	17.1	17.1	16.6	14.0	15.0	11.8	10.0
11-16	16.1	16.1	17.3	14.1	15.2	12.7	11.7
11-17	16.5	16.5	17.1	13.9	15.0	13.7	13.9
11-18	17.4	17.4	17.4	14.5	14.6	14.3	15.0
11-19	17.9	17.9	17.9	17.9	15.2	14.6	15.7
11-20	18.1	18.1	18.1	18.1	18.1	15.7	15.9
HDD Sum	312.5	315.6	295.2	271.2	269.8	248.2	239.2
Total Daily HDD Change		3.2	-20.4	-24.0	-1.4	-21.6	-9.0
Dec End of Day Price \$	\$ 3.30	\$ 3.35	\$ 3.24	\$ 3.06	\$ 3.05	\$ 2.94	\$ 2.89
Daily Price Change		\$ 0.053	-\$ 0.110	-\$ 0.185	-\$ 0.013	-\$ 0.104	-\$ 0.054

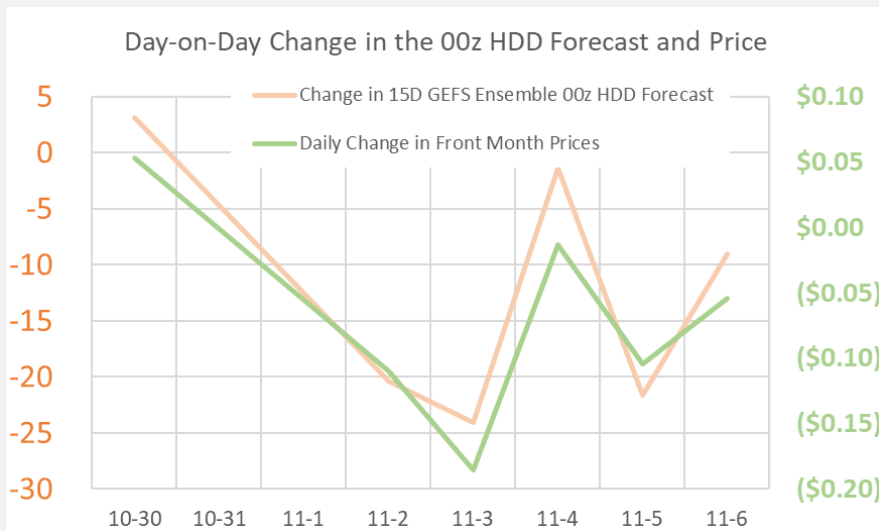
Actual Historical

Rolling 15D Forecast

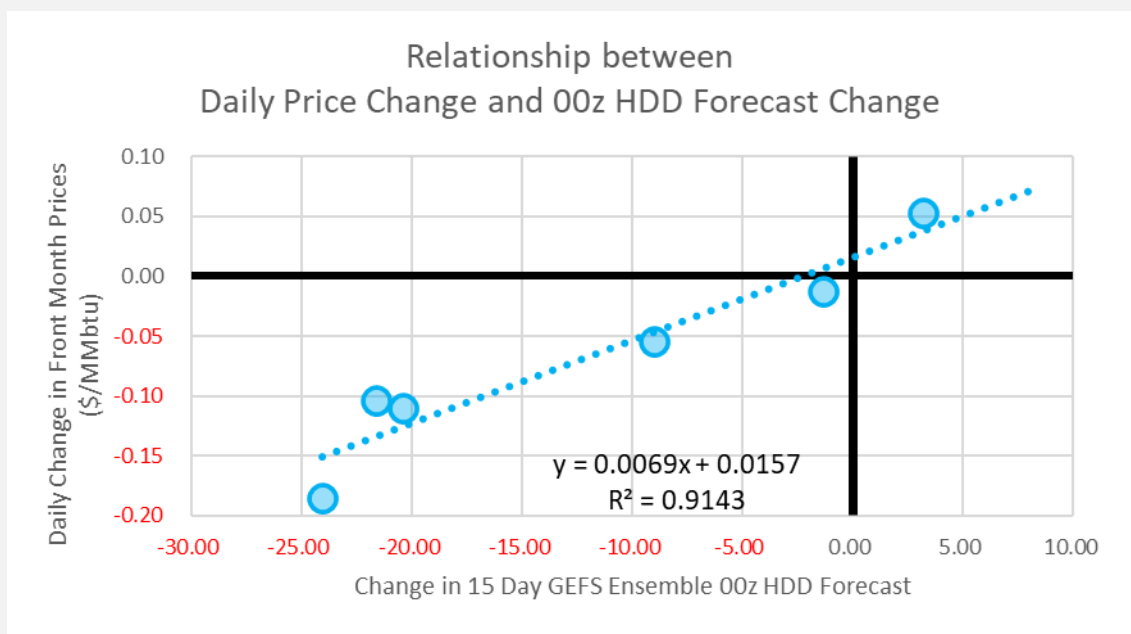
10Y Normal

Charted in the next image

The daily change in HDD is the orange row, while the daily change in price is the green row. When we plot those to on top of each other, the relationship is staggering. This relationship was stronger than we expected but goes to show how the weather has started to take over the conversation.



When we take this relationship and create a scatterplot, we can identify a linear relationship that could help determine where the price should move to each day.

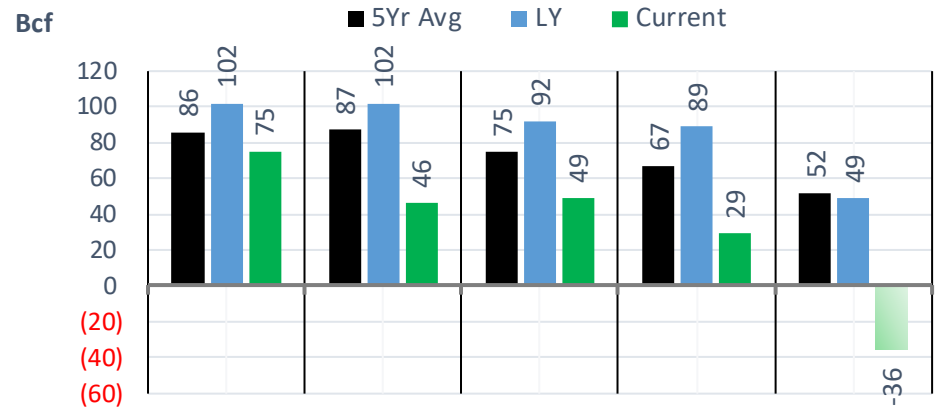


What this shows that a 5 HDD move higher results in a 3.5c price move, and a 5 HDD move lower results in a 3.5 price lower.

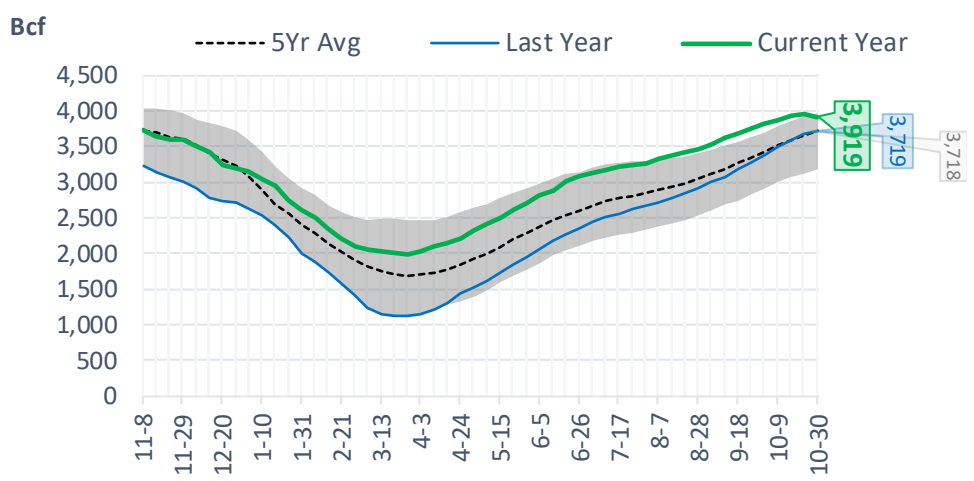
Note: This analysis is just food for thought. Weather is ever so critical this winter especially with a very tight fundamental market and a strong la nina condition.

EIA Storage Report

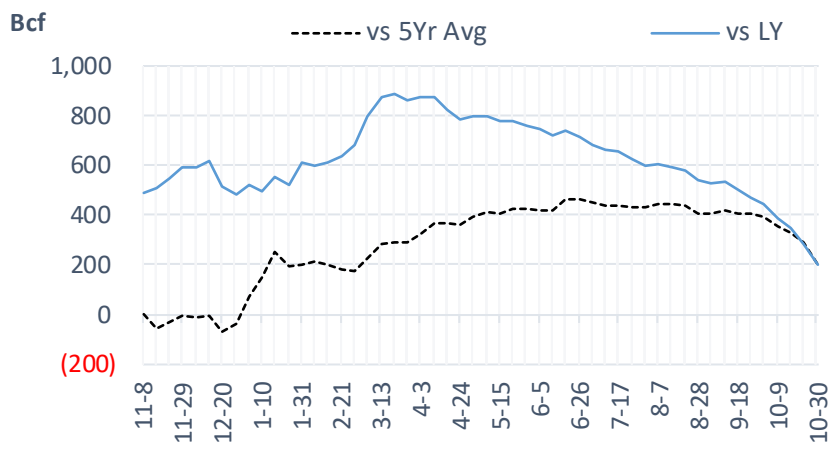
Total Lower 48 YoY Weekly Change



Total Lower 48 Storage Levels



Total Lower 48 LY Surplus/Deficit

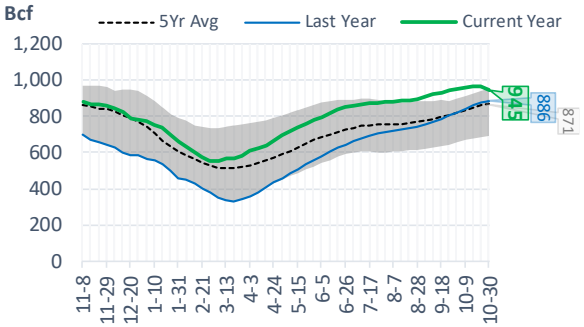


The risk of trading futures and options and other derivatives involves a substantial risk of loss and is not suitable for all persons. Each person must consider whether a particular trade, combination of trades, or strategy is suitable for that person's financial means and objectives. Past results are not necessarily indicative of future results. This communication may contain links to third party websites which are not under the control of and are not maintained by ION Energy Group, and ION Energy Group is not responsible for their content.

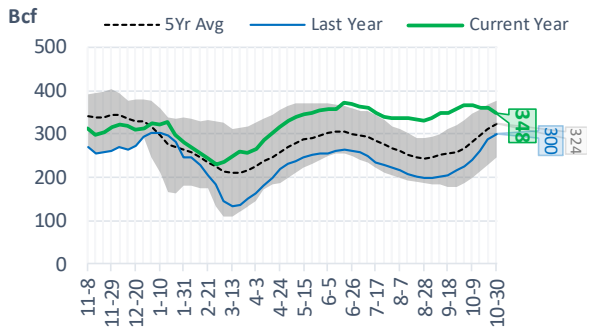
Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 30-Oct	Week - 1 23-Oct	Week - 2 16-Oct	Week - 3 9-Oct	Week - 4 2-Oct	Week - 5 25-Sep
Total Lower 48 Storage Level	3919	3955	3926	3877	3831	3756
Weekly Change	-36	+29	+49	+46	+75	+76
vs LY	+200	+285	+345	+388	+444	+471
vs 5Yr Avg	+201	+289	+327	+353	+394	+405
S. Central Salt Storage Level	348	360	360	366	366	358
Weekly Change	-12	0	-6	0	+8	+9
vs LY	+48	+74	+98	+125	+140	+142
vs 5Yr Avg	+24	+49	+65	+85	+98	+99
S. Central NonSalt Storage Level	945	968	969	960	955	945
Weekly Change	-23	-1	+9	+5	+10	+11
vs LY	+59	+88	+108	+119	+135	+141
vs 5Yr Avg	+74	+107	+120	+125	+136	+139
Midwest Storage Level	1119	1118	1105	1081	1062	1033
Weekly Change	+1	+13	+24	+19	+29	+24
vs LY	+14	+30	+43	+47	+63	+71
vs 5Yr Avg	+36	+54	+66	+70	+83	+87
East Storage Level	947	941	923	908	893	872
Weekly Change	+6	+18	+15	+15	+21	+21
vs LY	+20	+32	+30	+35	+47	+55
vs 5Yr Avg	+39	+41	+34	+35	+41	+45
Mountain Storage Level	240	245	245	241	236	231
Weekly Change	-5	0	+4	+5	+5	+6
vs LY	+32	+35	+38	+37	+34	+33
vs 5Yr Avg	+24	+30	+32	+30	+27	+26
Pacific Storage Level	320	323	323	320	318	316
Weekly Change	-3	0	+3	+2	+2	+4
vs LY	+26	+25	+26	+24	+23	+26
vs 5Yr Avg	+4	+8	+10	+7	+8	+10

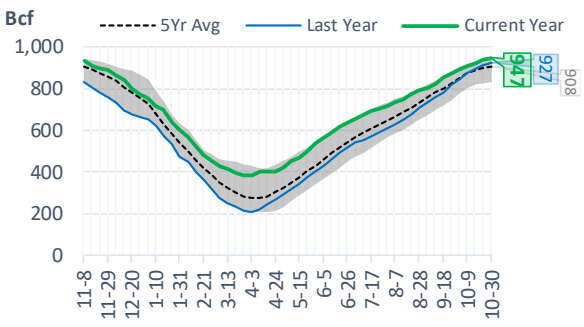
NonSalt Storage Levels



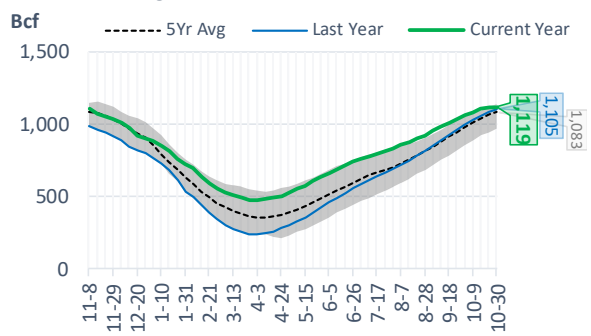
Salt Storage Levels



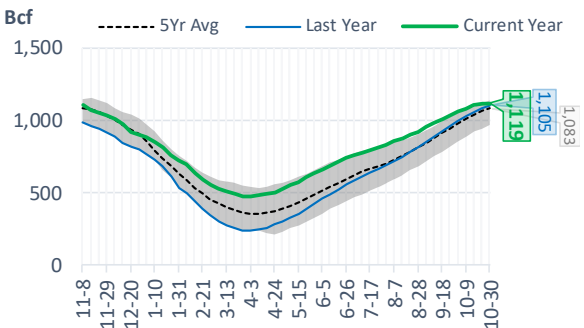
East Storage Levels



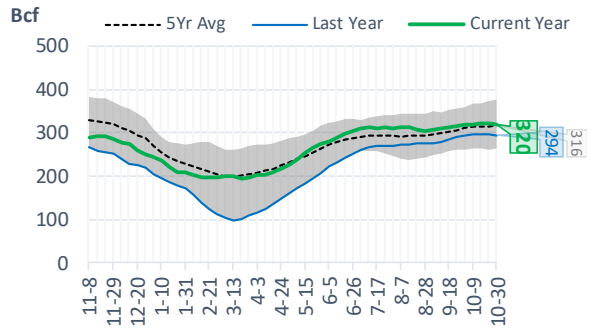
Midwest Storage Levels



Midwest Storage Levels



Pacific Storage Levels

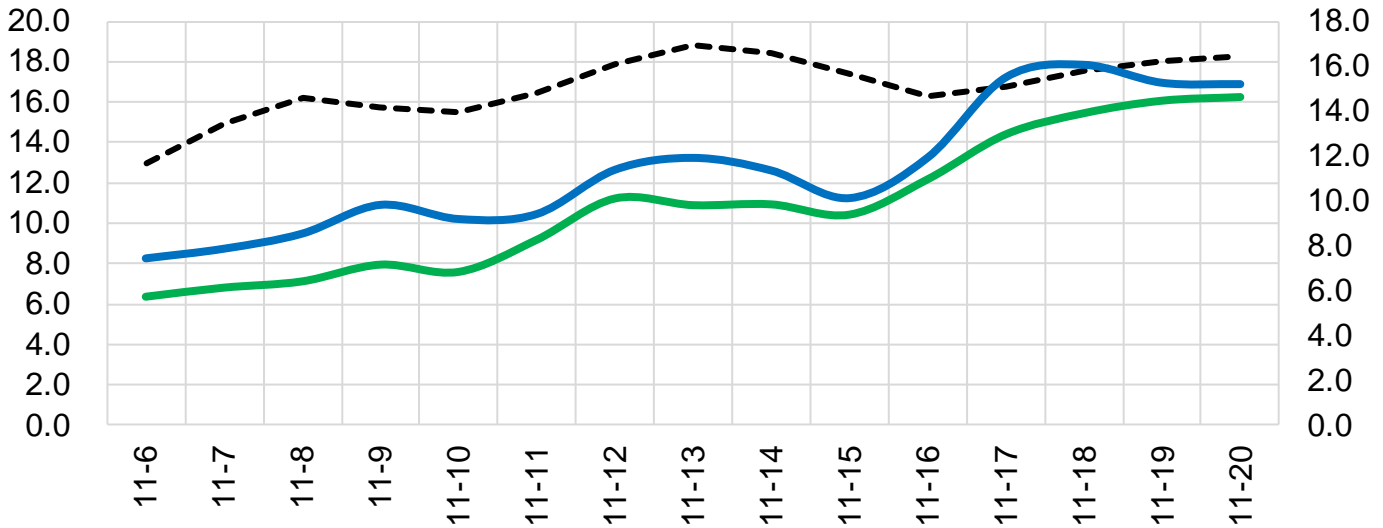


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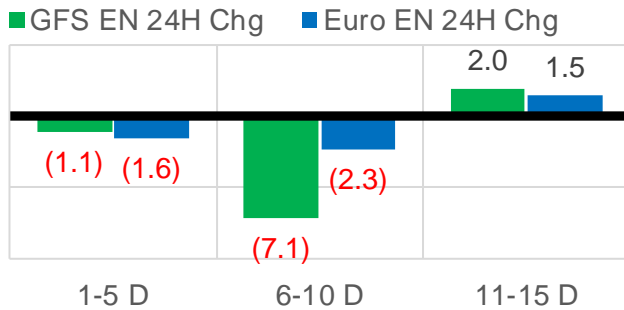
Current Short-term Weather Model Outlooks (00z)

L48 Region

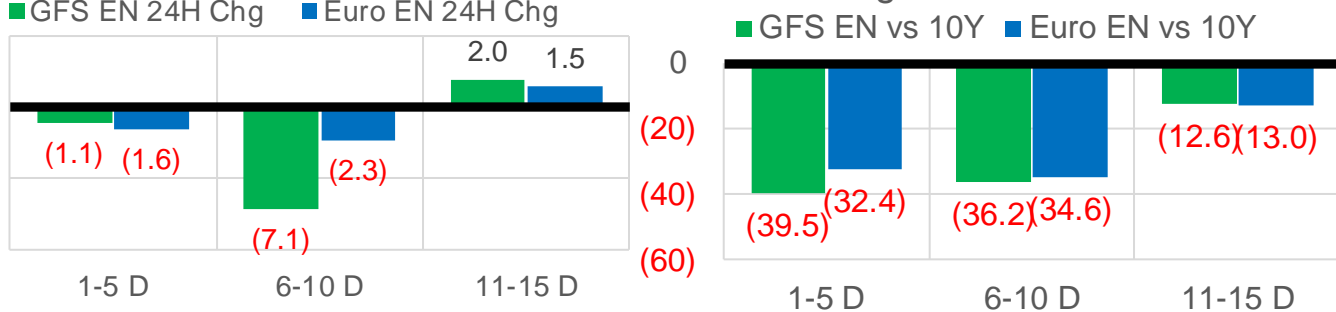
--- 10Y Normal TDD — GFS EN 00z TDDs (Current) — Euro EN 00z TDDs (Current)



L48 Region - 00z TDD vs 24H Ago



L48 Region - 00z TDD vs 10Y N



Source: WSI, Bloomberg

EIA Storage Week Balances

	2-Oct	9-Oct	16-Oct	23-Oct	30-Oct	6-Nov	WoW	vs. 4W
Lower 48 Dry Production	88.2	88.1	86.7	90.0	88.2	90.5	▲ 2.3	▲ 2.2
Canadian Imports	3.9	4.5	4.0	3.6	4.8	4.9	▲ 0.0	▲ 0.6
L48 Power	30.7	31.0	30.5	28.6	28.1	24.8	▼ -3.3	▼ -4.8
L48 Residential & Commercial	9.3	13.4	11.4	16.8	23.3	23.5	▲ 0.3	▲ 7.3
L48 Industrial	23.3	22.5	22.8	23.6	25.6	25.9	▲ 0.3	▲ 2.2
L48 Lease and Plant Fuel	4.8	4.8	4.8	4.9	4.8	5.0	▲ 0.1	▲ 0.1
L48 Pipeline Distribution	2.0	2.2	2.1	2.2	2.5	2.3	▼ -0.2	▲ 0.0
L48 Regional Gas Consumption	70.1	73.9	71.6	76.2	84.3	81.4	▼ -2.9	▲ 4.9
Net LNG Exports	6.8	7.5	6.9	8.0	9.2	10.2	▲ 1.0	▲ 2.3
Total Mexican Exports	6.3	6.2	6.2	6.3	6.2	6.0	▼ -0.2	▼ -0.2
Implied Daily Storage Activity	8.9	5.1	6.0	3.0	-6.7	-2.3	4.4	
EIA Reported Daily Storage Activity	10.7	6.6	7.0	4.1	-5.1			
Daily Model Error	-1.8	-1.5	-1.0	-1.2	-1.6			

Monthly Balances

	2Yr Ago Nov-18	LY Nov-19	Jul-20	Aug-20	Sep-20	Oct-20	MTD Nov-20	MoM	vs. LY
Lower 48 Dry Production	88.1	95.3	88.3	88.6	88.6	88.3	90.8	▲ 2.5	▼ -4.5
Canadian Imports	4.1	4.5	4.4	4.9	3.8	4.3	4.4	▲ 0.1	▼ -0.1
L48 Power	25.4	27.5	43.7	40.7	33.3	29.3	24.8	▼ -4.5	▼ -2.8
L48 Residential & Commercial	32.9	32.8	7.9	7.7	8.5	16.8	20.8	▲ 4.0	▼ -12.0
L48 Industrial	25.1	25.1	19.8	21.3	22.1	23.8	25.7	▲ 1.9	▲ 0.6
L48 Lease and Plant Fuel	5.0	5.3	4.9	5.0	4.9	4.9	5.0	▲ 0.2	▼ -0.2
L48 Pipeline Distribution	2.6	2.8	2.4	2.4	2.1	2.3	2.1	▼ -0.1	▼ -0.7
L48 Regional Gas Consumption	91.0	93.5	78.8	77.0	70.7	77.0	78.5	▲ 1.5	▼ -15.0
Net LNG Exports	4.3	7.2	3.3	4.0	5.9	8.0	10.3	▲ 2.3	▲ 3.1
Total Mexican Exports	4.8	5.3	6.1	6.3	6.4	6.2	6.0	▼ -0.2	▲ 0.8
Implied Daily Storage Activity	-7.8	-6.2	4.4	6.2	9.4	1.4	0.4		
EIA Reported Daily Storage Activity									
Daily Model Error									

Source: Bloomberg, analytix.ai

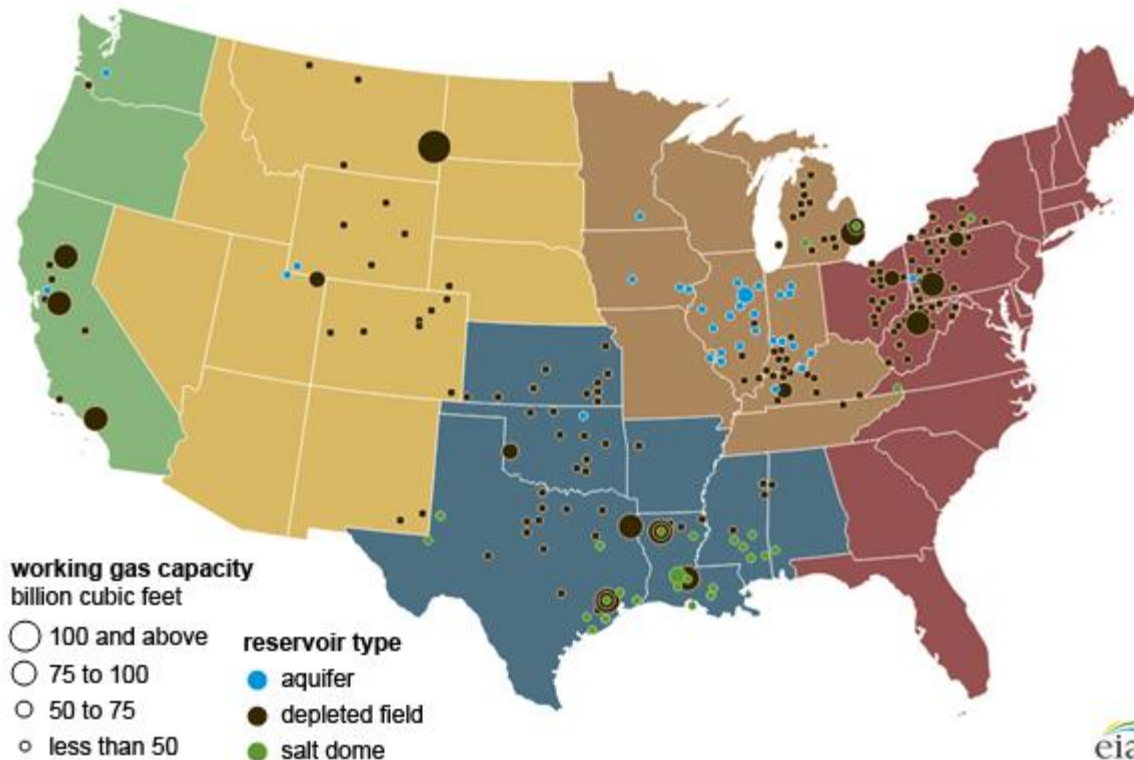
Regional S/D Models Storage Projection

Week Ending 6-Nov

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	-2.6	1.7	-0.9	-7
East	-3.4	2.3	-1.1	-8
Midwest	-0.6	1.6	1.0	7
Mountain	4.0	-3.0	1.0	7
South Central	-2.8	0.5	-2.3	-16
Pacific	0.2	0.3	0.5	4

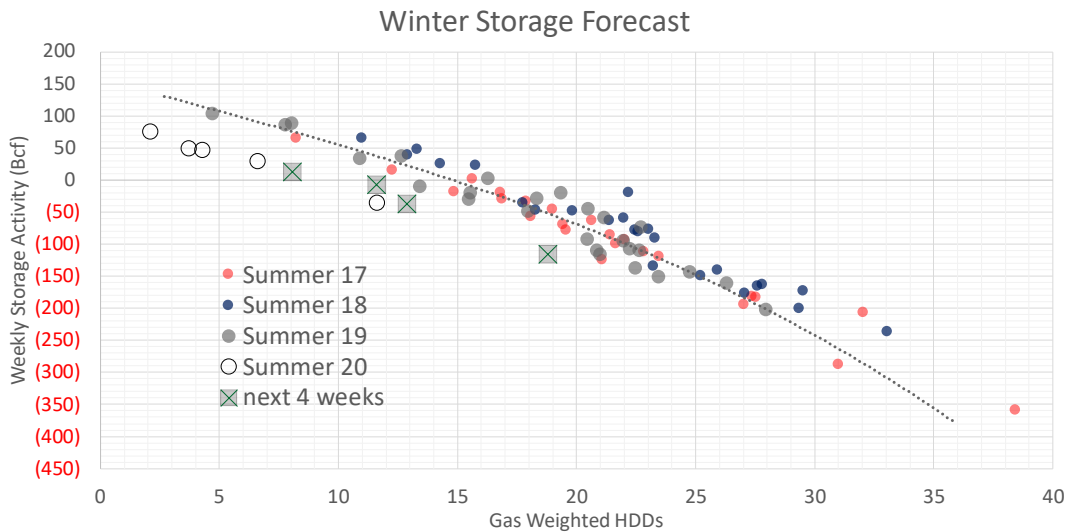
*Adjustment Factor is calculated based on historical regional deltas

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



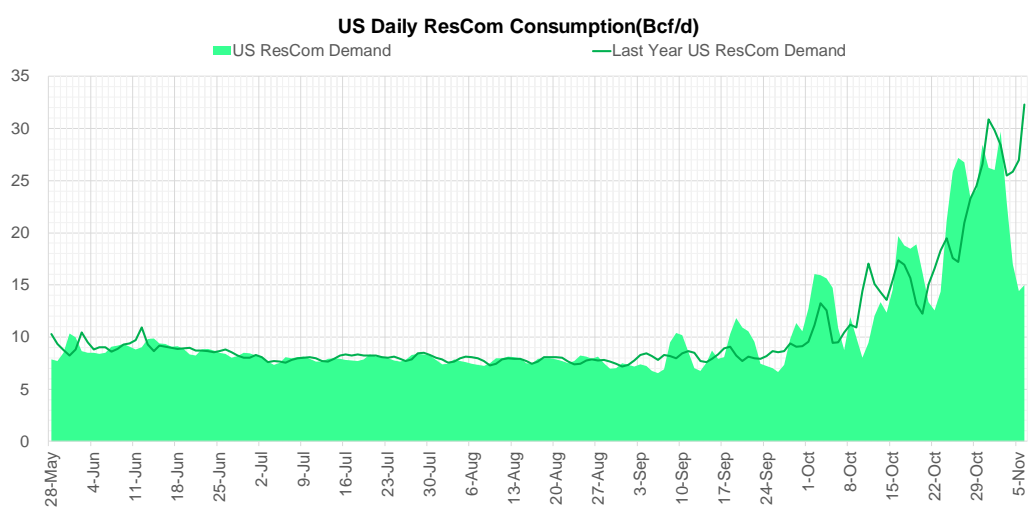
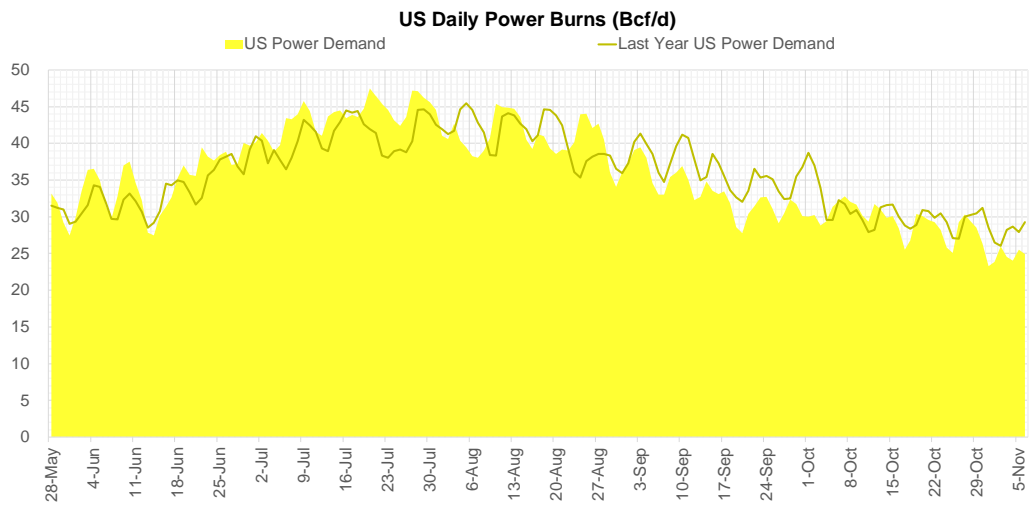
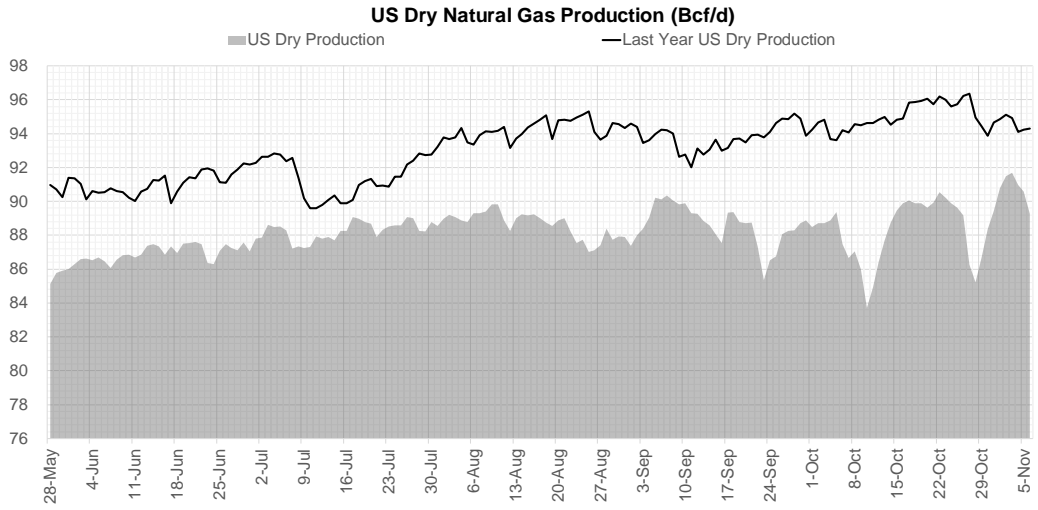
Weather Model Storage Projection

Next report and beyond		
Week Ending	Temp	Week Storage Projection
13-Nov	8.1	12
20-Nov	12.9	-38
27-Nov	18.8	-116



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

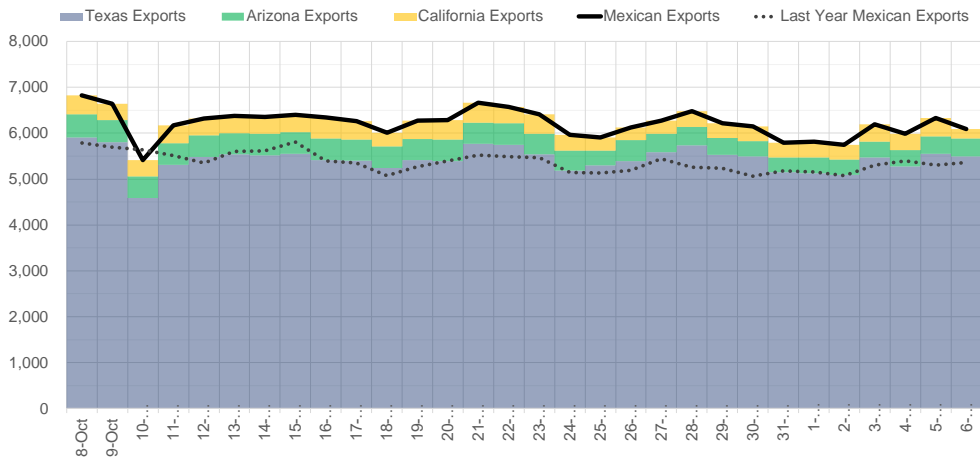
Supply – Demand Trends



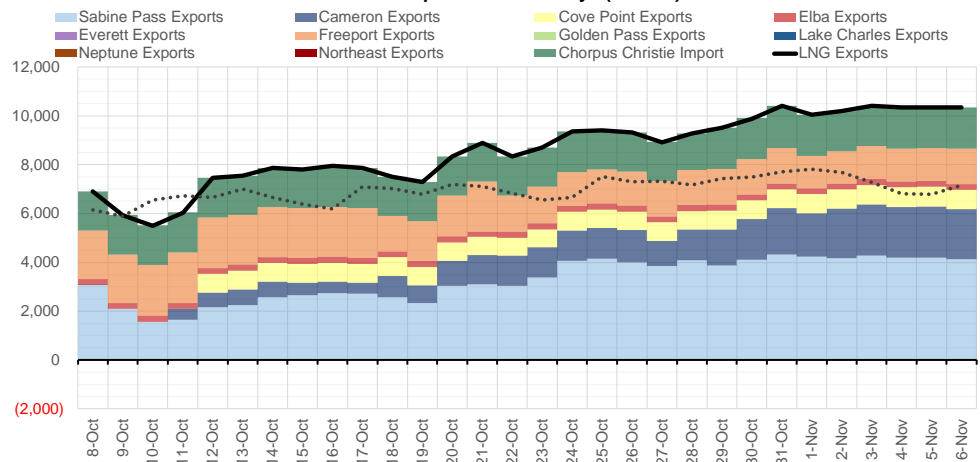
Source: Bloomberg

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Mexican Exports - Last 30 days (MMcf/d)



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



Source: Bloomberg

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

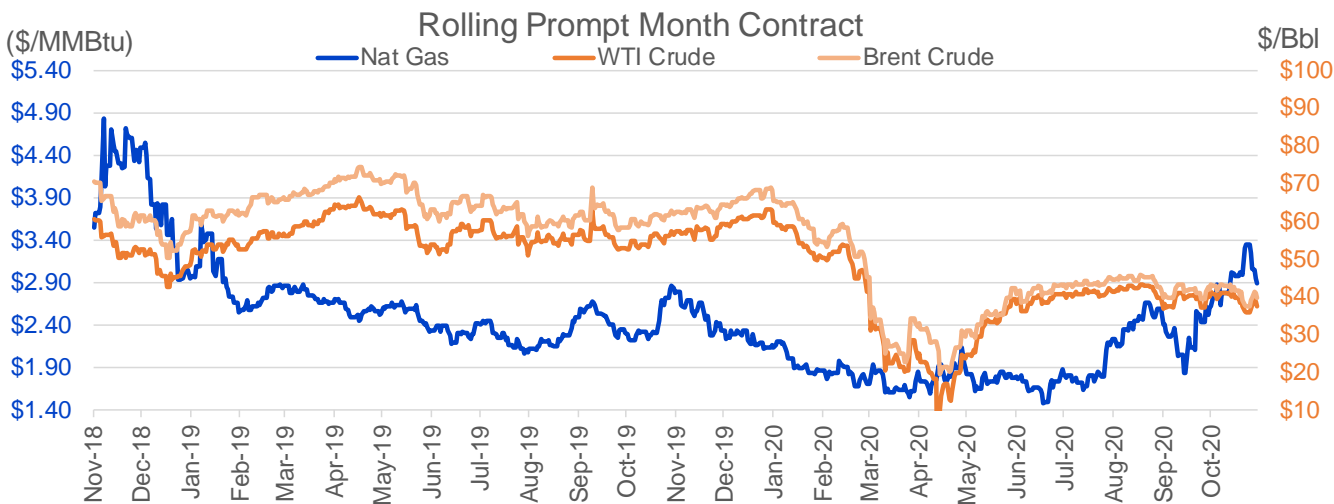
CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE VOL	CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE OI
12	2020	C	4.00	8498	3	2021	P	2.00	38288
1	2021	P	2.50	7480	12	2020	P	2.00	33053
12	2020	C	4.50	7372	3	2021	C	6.00	31445
2	2021	C	4.50	7223	1	2021	C	4.50	30670
1	2021	C	4.00	7088	12	2020	C	4.00	30007
1	2021	C	4.50	6144	3	2021	C	3.25	29824
1	2021	C	3.75	5860	10	2021	C	4.00	28615
12	2020	P	2.50	5264	12	2020	P	2.50	28540
12	2020	C	3.40	5106	3	2021	C	4.00	27801
1	2021	C	5.00	4726	1	2021	C	3.50	27344
2	2021	C	5.00	3456	10	2021	C	3.25	27120
12	2020	P	2.75	3246	4	2021	C	5.00	26672
3	2021	C	6.00	3151	3	2021	C	7.00	25143
3	2021	C	4.75	3150	12	2020	C	3.75	24560
3	2021	C	5.00	2906	4	2021	C	4.00	24070
4	2021	C	4.00	2902	3	2021	C	5.00	23867
1	2021	C	3.50	2613	3	2021	C	4.50	23649
12	2020	C	3.50	2373	12	2020	C	4.50	23499
2	2021	C	3.75	2360	12	2020	C	3.50	22178
3	2021	C	4.50	2333	1	2021	C	5.00	21772
12	2020	C	3.75	1851	1	2021	C	3.75	21591
1	2021	P	2.75	1782	3	2021	C	3.00	21576
12	2020	P	2.70	1666	1	2021	P	2.50	21253
3	2021	C	4.00	1585	3	2021	C	3.50	21146
2	2021	P	2.75	1534	2	2021	P	2.25	20016
1	2021	C	3.25	1534	8	2021	C	4.00	19599
2	2021	C	4.00	1486	12	2020	P	2.75	19514
12	2020	P	2.60	1414	12	2020	P	3.00	19385
2	2021	C	4.25	1377	2	2021	C	5.00	19381
12	2020	P	3.00	1354	1	2021	C	6.00	18451
12	2020	C	3.20	1270	1	2021	P	2.25	18148
12	2020	P	2.80	1232	3	2021	P	2.50	17910
12	2020	C	3.10	1199	8	2021	P	2.25	17742
12	2020	P	2.90	1183	1	2021	C	3.00	17464
12	2020	P	2.25	1164	2	2021	C	3.50	17365
2	2021	C	6.00	1155	1	2021	C	4.00	17172
3	2021	C	5.50	1133	2	2021	C	4.00	17119
1	2021	C	7.00	1088	2	2021	P	2.50	17116
12	2020	C	3.25	1012	10	2021	C	5.00	16853
3	2021	C	3.75	1000	12	2020	C	5.00	15830
1	2021	C	3.00	991	10	2021	C	3.00	14711
1	2021	C	4.25	957	4	2021	C	3.00	14687
1	2021	C	3.80	910	12	2020	P	1.50	14450
2	2021	C	4.75	850	12	2020	C	3.25	14308
1	2021	C	3.20	828	2	2021	C	4.50	14208
12	2020	P	2.95	764	1	2021	C	7.00	14183
3	2021	C	7.00	707	5	2021	C	3.00	13861
2	2021	C	7.00	651	4	2021	P	2.00	13802
2	2021	C	3.25	650	12	2020	C	4.25	13668
					1	2021	P	2	13642

Source: CME, Nasdaq, ICE

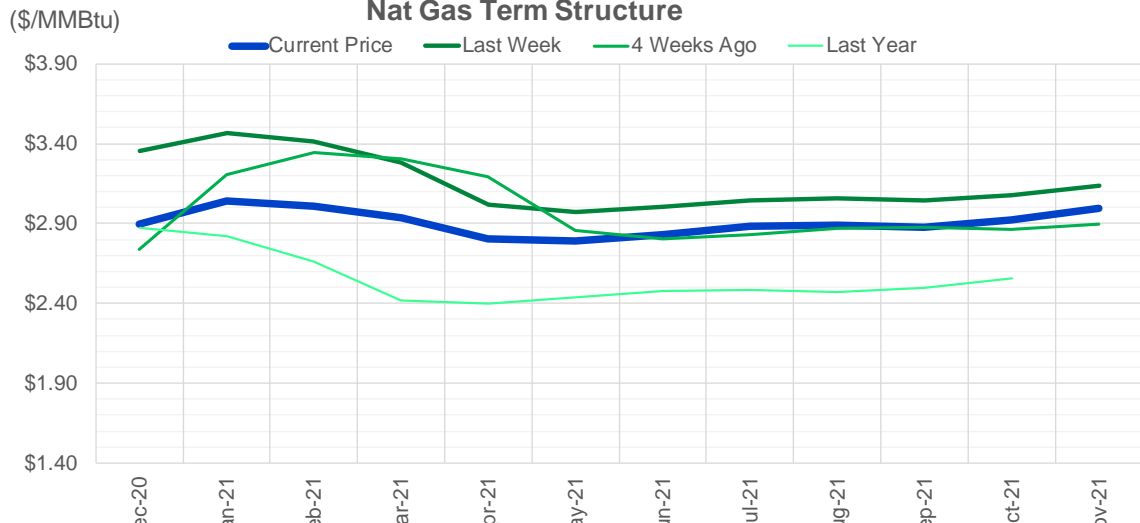
Nat Gas Futures Open Interest CME, ICE and Nasdaq Combined

CME Henry Hub Futures (10,000 MMBtu)				ICE Henry Hub Futures Contract Equivalent (10,000 MMBtu)			
	Current	Prior	Daily Change	FOR JUNE 26	Current	Prior	Daily Change
DEC 20	153996	157978	-3982	DEC 20	76669	79168	-2498.5
JAN 21	219577	212219	7358	JAN 21	92763	93706	-942.75
FEB 21	90494	87629	2865	FEB 21	66514	66375	139.5
MAR 21	141786	137667	4119	MAR 21	93414	93480	-66.5
APR 21	77622	75906	1716	APR 21	70193	68802	1391
MAY 21	56541	55015	1526	MAY 21	71560	70951	608.5
JUN 21	33322	33273	49	JUN 21	58211	58248	-36.25
JUL 21	28878	28999	-121	JUL 21	60444	60457	-13
AUG 21	29224	28934	290	AUG 21	64707	64116	591
SEP 21	37912	38898	-986	SEP 21	58440	58367	73
OCT 21	91254	93457	-2203	OCT 21	68526	67874	652
NOV 21	35883	34669	1214	NOV 21	54460	54080	379.5
DEC 21	31007	30857	150	DEC 21	48205	47988	217.5
JAN 22	32447	32068	379	JAN 22	46547	46034	513.5
FEB 22	23540	22947	593	FEB 22	37572	37196	375.5
MAR 22	23333	23051	282	MAR 22	40811	40174	637.25
APR 22	25225	24614	611	APR 22	41439	40932	507.5
MAY 22	10625	10373	252	MAY 22	29942	29871	71
JUN 22	5674	5582	92	JUN 22	29425	29170	255
JUL 22	4699	4637	62	JUL 22	30560	30608	-48
AUG 22	3646	3552	94	AUG 22	29184	28946	238
SEP 22	3404	3394	10	SEP 22	29207	28952	255
OCT 22	5091	4746	345	OCT 22	33450	33186	264.5
NOV 22	4410	4139	271	NOV 22	29182	28943	239
DEC 22	4705	4593	112	DEC 22	31482	31206	276
JAN 23	4303	4300	3	JAN 23	14982	14973	9.75
FEB 23	1029	1036	-7	FEB 23	13870	13861	9
MAR 23	2305	2311	-6	MAR 23	13938	13921	17.5
APR 23	1557	1552	5	APR 23	12817	12966	-148.5
MAY 23	444	441	3	MAY 23	11454	11469	-14.75

Source: CME, ICE



Nat Gas Term Structure




	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21
Current Price	\$2.895	\$3.038	\$3.011	\$2.937	\$2.805	\$2.790	\$2.831	\$2.880	\$2.892	\$2.879	\$2.921	\$2.995
Last Week	\$3.354	\$3.469	\$3.416	\$3.284	\$3.017	\$2.975	\$3.006	\$3.047	\$3.059	\$3.046	\$3.080	\$3.138
vs. Last Week	-\$0.459	-\$0.431	-\$0.405	-\$0.347	-\$0.212	-\$0.185	-\$0.175	-\$0.167	-\$0.167	-\$0.167	-\$0.159	-\$0.143
4 Weeks Ago	\$2.741	\$3.204	\$3.347	\$3.305	\$3.192	\$2.858	\$2.804	\$2.833	\$2.871	\$2.879	\$2.865	\$2.893
vs. 4 Weeks Ago	\$0.154	-\$0.166	-\$0.336	-\$0.368	-\$0.387	-\$0.068	\$0.027	\$0.047	\$0.021	\$0.000	\$0.056	\$0.102
Last Year	\$2.789	\$2.873	\$2.822	\$2.661	\$2.420	\$2.396	\$2.435	\$2.478	\$2.484	\$2.468	\$2.496	\$2.554
vs. Last Year	\$0.106	\$0.165	\$0.189	\$0.276	\$0.385	\$0.394	\$0.396	\$0.402	\$0.408	\$0.411	\$0.425	\$0.441

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jan21/Apr21	\$/MMBtu	-0.233	▲ 0.219	▲ 0.256	▲ 0.263
NatGas Mar21/Apr21	\$/MMBtu	-0.132	▲ 0.135	▼ -0.466	▼ -0.432
NatGas Oct21/Nov21	\$/MMBtu	0.074	▲ 0.016	▲ 0.021	▲ 0.009
NatGas Apr21/Oct21	\$/MMBtu	0.116	▼ -0.273	▼ -0.338	▼ -0.318
WTI Crude	\$/Bbl	37.35	▲ 1.560	▼ -3.250	▼ -19.890
Brent Crude	\$/Bbl	39.67	▲ 2.210	▼ -3.180	▼ -22.840
Fuel Oil, NY Harbour 1%	\$/Bbl	98.03	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	114.67	▲ 6.540	▼ -4.660	▼ -77.140
Propane, Mt. Bel	cents/Gallon	0.56	▲ 0.040	▲ 0.042	▲ 0.047
Ethane, Mt. Bel	cents/Gallon	0.23	▲ 0.012	▲ 0.031	▲ 0.027
Coal, PRB	\$/MTon	12.30	▲ 0.000	▲ 0.000	▲ 0.050
Coal, PRB	\$/MMBtu	0.70			

Source: CME, Bloomberg

Baker Hughes Rig Counts

Rotary Rig Count						
11/6/2020						
Baker Hughes 						
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago	
Oil	226	5	221	-458	684	
Gas	71	-1	72	-59	130	
Miscellaneous	3	0	3	0	3	
Directional	19	-3	22	-37	56	
Horizontal	259	5	254	-451	710	
Vertical	22	2	20	-29	51	
Canada Breakout Information	This Week	+/-	Last Week	+/-	Year Ago	
Oil	37	-3	40	-60	97	
Gas	49	3	46	6	43	
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago	
Ardmore Woodford	0	0	0	-1	1	
Arkoma Woodford	0	0	0	-3	3	
Barnett	0	0	0	-4	4	
Cana Woodford	10	2	8	-19	29	
DJ-Niobrara	3	0	3	-19	22	
Eagle Ford	19	2	17	-41	60	
Haynesville	37	0	37	-14	51	
Marcellus	25	-1	26	-15	40	
Mississippian	0	0	0	-2	2	
Permian	147	5	142	-265	412	
Utica	5	-1	6	-6	11	
Williston	12	0	12	-40	52	