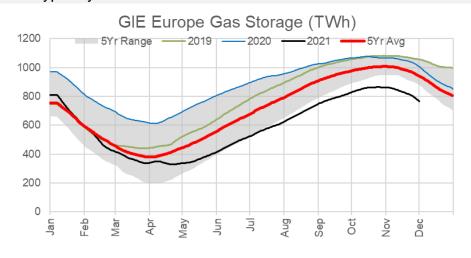


This week we take a look at US LNG as it become an even more crucial energy supply source for some global destinations.

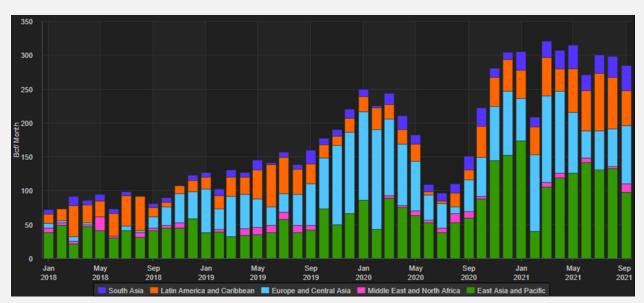
Throughout the summer, European and Asian benchmarks have been trading at an immense premium to Henry Hub to attract every last cargo. JKM followed TTF prices which kept rising with concerns of low storage levels ahead of winter. At the moment, Europe is in a massive storage deficit and the cool weather is exacerbating the situation. Current levels are at 68% full or the level typically seen in late December.



The strong power burns in Europe due to rising carbon prices and geopolitical tension with Russia led to the lowest end of Oct European storage levels. As traders started seeing the tight nature of the market, TTF and NBP started to rise to reduce gas demand and any spot LNG cargos. There was a bit of hope towards the end of summer that Nord Stream 2 commenced by the end of this year, but that faded quickly when Germany's regulator announced a temporary suspension of the certification process of the pipeline in November and the US government imposed new sanctions on linked companies. Some more details on that:

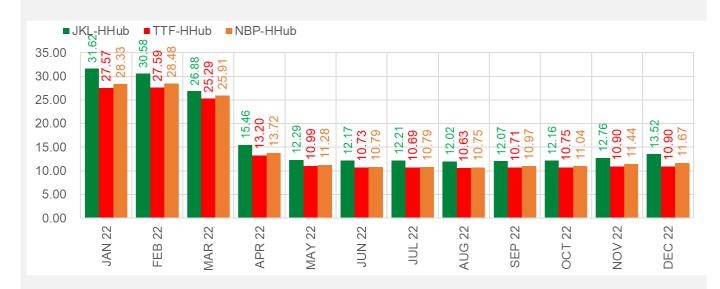
- 1) The Federal Network Agency is the German regulatory office for electricity, gas, telecommunications (BNetzA) concluded that the certification of an operator of the Nord Stream 2 pipeline would only be possible if the operator is organized legally under German law. NS2 is currently organized out of Switzerland. Timing-wise, the regulator currently has four months from Sept 8th to make a draft decision and then submit it to the European Commission, who then has up to four months to send BNetzA its opinion, after which BNetzA has another two months to make a final decision. So it looks like we are far from seeing any flows on this pipe. [info from the ICIS team on enelyst.com]
- 2) The US looks to be concerned with Russia's potential influence over the European region by using its energy supplies to pressurize countries within the area. Europe has become a major destination for US LNG, and new flows from Russia could reduce US-to-Europe flows.





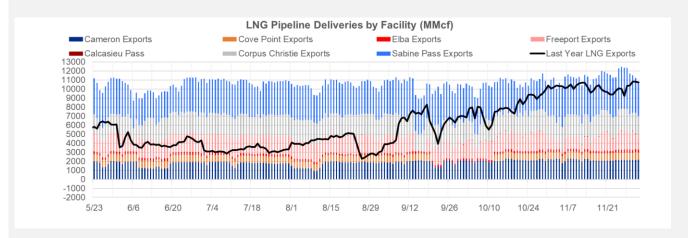
Source: Refinitiv, EIA

Global LNG prices continue to stay elevated even as Henry Hub retreats with warm weather and robust domestic supply. As seen below, the price spread indicates strong US LNG exports even past this winter.

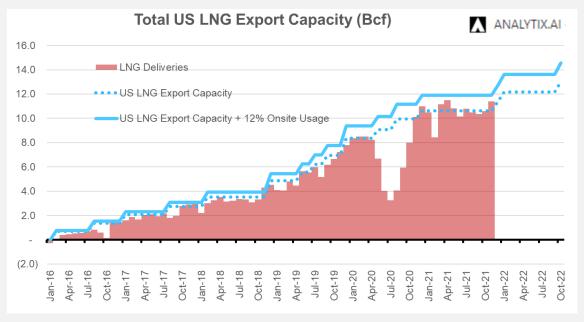




Now back to the US. With the existing terminals and two that are in the start-up phase, we hit a new LNG feedgas delivery record this past week. On November 26th, total feedgas levels hit 12.47 Bcf/d. This day marked Freeport being up and fulling functional and Sabine's Train 6 starting up. Additionally, we see Calcasieu Pass LNG's first 2 modules taking 20-25 MMcf/d.



With US Spot prices coming off their highs and European/Asian prices remaining strong, we anticipate high utilization of the US LNG fleet. The average historical plant utilization during the winter is roughly 87%, but with the strong global LNG price spreads, we are factoring in a 90% plant utilization.



Our average net LNG feedgas forecast for the winter after adding plant use and netting the small level of imports is 12.1 Bcf/d (Nov = 11.3 to Mar = 12.5). In other news:

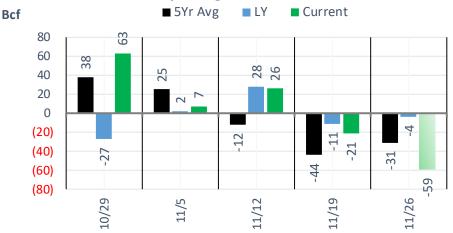


Pembina Pipeline is canceling plans to build its Jordan Cove LNG export project and related pipeline in Oregon, after 8 years of ongoing regulatory setbacks. On Wednesday, Pembina asked FERC to drop its 2020 authorizations for the export terminal and the Pacific Connector pipeline that would have supplied the facility from WestCan and the Rockies. Jordan Cove was aiming to be the first natural gas export facility on the US West Coast, which is closer to key demand centers in Asia. The terminal was designed to liquefy and export up to 1.04 Bcf/d. So for the time being, LNG tankers are going to have to traverse the Panama Canal.

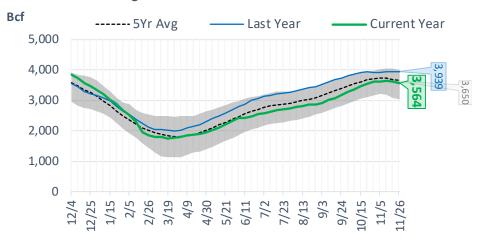


### **EIA Storage Report**

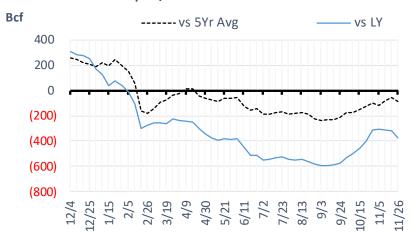
#### **Total Lower 48 YoY Weekly Change**



#### **Total Lower 48 Storage Levels**



#### **Total Lower 48 LY Surplus/Deficit**

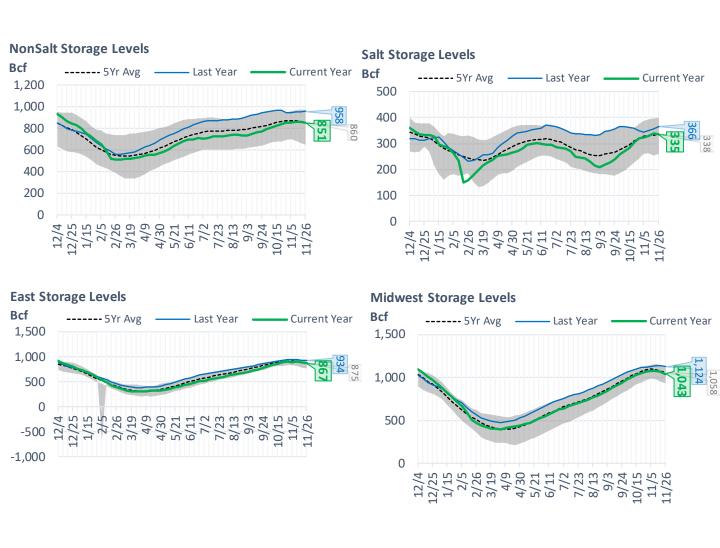


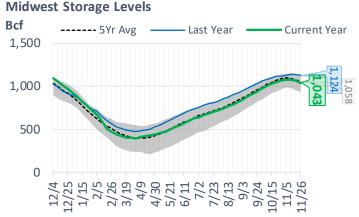


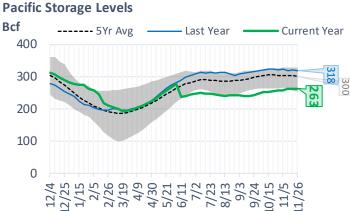
### **Natural Gas Storage Stats - Last 5 Weeks**

	Current	Week - 1	Week - 2	Week - 3	Week - 4	Week - 5
Week Ending	26-Nov	19-Nov	12-Nov	5-Nov	29-Oct	22-Oct
Total Lower 48 Storage Level	3564	3623	3644	3618	3611	3548
Weekly Change	-59	-21	+26	+7	+63	+87
vs LY	-375	-320	-310	-308	-313	-403
vs 5Yr Avg	-86	-58	-81	-119	-101	-126
S. Central Salt Storage Level	335	338	331	324	320	304
Weekly Change	-3	+7	+7	+4	+16	+21
vs LY	-31	-17	-18	-21	-30	-56
vs 5Yr Avg	-3	+8	+1	-4	+1	-4
S. Central NonSalt Storage Level	851	859	860	850	852	840
Weekly Change	-8	-1	+10	-2	+12	+15
vs LY	-107	-97	-95	-98	-96	-128
vs 5Yr Avg	-9	-6	-11	-23	-17	-25
Midwest Storage Level	1043	1066	1079	1075	1071	1052
Weekly Change	-23	-13	+4	+4	+19	+25
vs LY	-81	-68	-58	-51	-48	-64
vs 5Yr Avg	-15	-9	-12	-21	-15	-18
East Storage Level	867	889	900	897	899	885
Weekly Change	-22	-11	+3	-2	+14	+23
vs LY	-67	-48	-51	-46	-47	-53
vs 5Yr Avg	-8	-1	-8	-18	-14	-21
Mountain Storage Level	206	210	212	213	213	212
Weekly Change	-4	-2	-1	0	+1	+1
vs LY	-34	-32	-29	-30	-28	-33
vs 5Yr Avg	-12	-10	-8	-9	-8	-9
Pacific Storage Level	263	262	261	258	256	255
Weekly Change	+1	+1	+3	+2	+1	+2
vs LY	-55	-58	-58	-64	-64	-68
vs 5Yr Avg	-37	-40	-42	-46	-48	-50











EIA Storage	Week Balances	

	29-Oct	5-Nov	12-Nov	19-Nov	26-Nov	3-Dec	WoW	vs. 4W
Lower 48 Dry Production	94.5	95.1	95.9	95.1	96.2	96.9	<b>0.7</b>	<b>1.4</b>
Canadian Imports	5.6	5.5	5.1	4.9	5.5	5.6	▲ 0.0	▲ 0.3
L48 Power	29.0	29.6	27.5	27.8	29.2	28.7	▼-0.6	<b>0.2</b>
L48 Residential & Commercial	18.0	24.3	23.6	28.0	33.3	33.1	▼-0.2	<b>5.8</b>
L48 Industrial	19.6	21.3	21.3	23.0	22.3	22.4	<b>0.1</b>	<b>0.4</b>
L48 Lease and Plant Fuel	5.1	5.2	5.2	5.2	5.2	5.3	<b>0.0</b>	<b>0.1</b>
L48 Pipeline Distribution	2.5	2.9	2.7	3.0	3.3	3.2	▼ -0.1	<b>0.3</b>
L48 Regional Gas Consumption	74.2	83.2	80.4	86.9	93.4	92.7	▼ -0.7	<b>6.7</b>
Net LNG Exports	10.8	10.9	11.2	11.1	11.7	11.8	<b>0.1</b>	<b>0.6</b>
Total Mexican Exports	6.9	6.1	6.2	6.1	6.0	6.4	<b>0.3</b>	<b>0.3</b>
Implied Daily Storage Activity EIA Reported Daily Storage Activity Daily Model Error	8.3 9.0 -0.7	0.4 1.0 -0.6	3.2 3.7 -0.5	-4.1 -3.0 -1.1	-9.5 -8.4 -1.0	-8.4	1.1	

Monthly Balances									
	2Yr Ago	LY					MTD		
	Dec-19	Dec-20	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	MoM	vs. LY
Lower 48 Dry Production	95.9	91.6	94.0	93.4	94.0	95.9	96.0	<b>0.2</b>	<b>4.5</b>
Canadian Imports	4.5	5.8	5.1	5.1	5.4	5.3	5.1	▼-0.2	▼-0.7
L48 Power	29.3	28.0	40.1	33.0	30.2	28.7	28.2	▼-0.6	<b>0.2</b>
L48 Residential & Commercial	39.1	40.3	7.9	8.7	13.2	29.5	26.9	<b>▼</b> -2.7	<b>▼</b> -13.4
L48 Industrial	24.6	23.4	21.5	20.3	20.3	21.9	20.2	<b>▼</b> -1.7	<b>▼</b> -3.2
L48 Lease and Plant Fuel	5.2	5.0	5.1	5.1	5.1	5.2	5.2	▼ 0.0	<b>0.2</b>
L48 Pipeline Distribution	3.4	3.4	2.6	2.3	2.3	3.1	2.7	▼-0.4	<b>-</b> 0.7
L48 Regional Gas Consumption	101.6	100.0	77.2	69.4	71.2	88.5	83.2	▼-5.3	▼-16.8
Net LNG Exports	7.8	11.0	10.5	10.3	10.6	11.4	11.1	▼-0.3	<b>▲ 0.1</b>
Total Mexican Exports	4.9	5.8	6.9	6.7	6.6	6.1	6.6	<b>0.5</b>	▲ 0.8
Implied Daily Storage Activity EIA Reported Daily Storage Activity Daily Model Error	-13.8	-19.5	4.6	12.1	10.9	-4.9	0.2		

Source: Bloomberg, analytix.ai

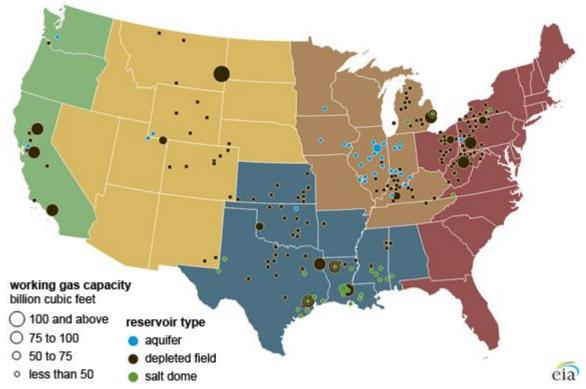
### Regional S/D Models Storage Projection

Week Ending 3-Dec

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	-8.6	1.1	-7.5	-52
East	-5.1	1.7	-3.5	-24
Midwest	-3.5	0.3	-3.2	-23
Mountain	3.3	-3.6	-0.3	-2
South Central	-4.1	2.9	-1.2	-8
Pacific	0.8	-0.1	0.7	5

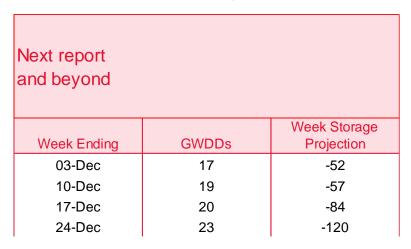
<sup>\*</sup>Adjustment Factor is calcuated based on historical regional deltas

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

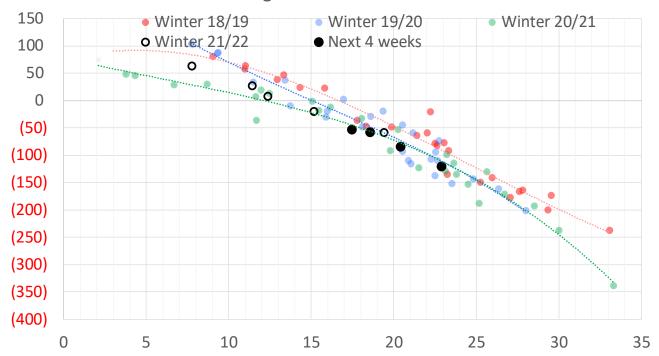




### Weather Model Storage Projection



### Weather Storage Model - Next 4 Week Forecast

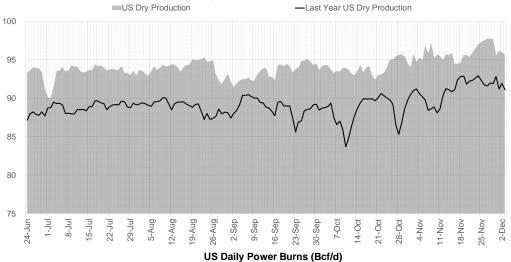


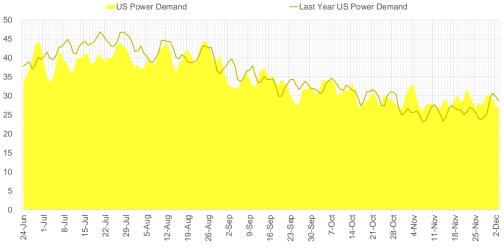
Note: this is not our official end of season forecast. This chart signifies where storage levels end with 10-year normal weather and current market tightness relative to last year



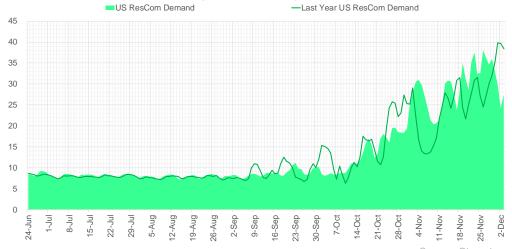
### Supply - Demand Trends

#### US Dry Natural Gas Production (Bcf/d)





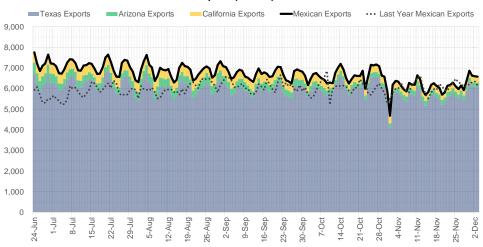
#### US Daily ResCom Consumption(Bcf/d)

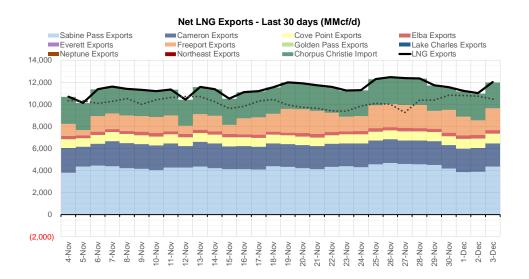


Source: Bloomberg



#### Mexican Exports (MMcf/d)





Source: Bloomberg



# 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
1	2022	Р	4.00	4201	3	2022	С	10.00	34456
1	2022	C	5.00	3214	1	2022	P	4.00	26030
1	2022	P	3.50	2900	3	2022	C	8.00	25397
3	2022	Р	3.00	2853	1	2022	C	6.00	23660
5	2022	C	5.00	2825	1	2022	P	2.75	23328
3	2022	P	2.50	2790	3	2022	С	5.00	23268
1	2022	Р	3.75	2706	1	2022	С	5.00	22098
1	2022	C	4.50	2664	1	2022	Р	3.00	22092
2	2022	Č	7.00	2408	12	2022	С	5.00	20449
1	2022	P	3.25	2361	2	2022	С	5.00	19712
3	2022	C	6.00	1861	4	2022	С	3.00	19710
3	2022	Č	14.00	1624	1	2022	Р	3.50	19483
1	2022	Č	6.00	1599	1	2022	С	7.00	19159
3	2022	C	5.00	1518	3	2022	С	6.00	19156
1	2022	P	3.00	1390	3	2022	Р	2.50	18712
1	2022	C	4.75	1348	4	2022	С	5.00	17160
1	2022	P	4.75 4.25	1303	1	2022	С	10.00	17101
2	2022	P	3.50	1244	3	2022	Р	4.00	16549
2	2022	C		1244	3	2022	Р	3.50	16189
	2022	C	5.00 9.00	1190	3	2022	Р	3.00	16110
1					2	2022	Р	3.50	15945
2	2022	С	4.50	1174	3	2022	С	4.00	15572
1	2022	С	10.00	1107	4	2022	Р	2.50	15389
1	2022	С	7.00	1106	2	2022	С	6.00	15197
2	2022	P	4.00	1037	2	2022	Р	4.00	14926
3	2022	С	9.00	1008	5	2022	С	5.00	14733
3	2022	С	7.00	1000	1	2022	С	8.00	14666
3	2022	С	8.00	989	3	2022	С	7.00	14630
3	2022	С	4.75	930	1	2022	С	4.00	14378
1	2022	С	8.00	876	6	2022	С	5.00	13782
3	2022	С	4.25	851	5	2022	С	3.00	13733
4	2022	C	5.50	850	3	2022	Р	5.00	13558
1	2022	С	6.25	762	6	2022	С	3.00	13438
1	2022	Р	3.60	757	12	2022	С	4.50	13392
1	2022	Р	4.20	749	1	2022	Р	3.25	13330
1	2022	С	4.25	713	12	2022	С	5.25	13263
3	2022	Р	3.50	704	7	2022	С	3.00	13230
3	2022	С	4.50	694	8	2022	С	3.00	13226
1	2022	С	4.40	683	9	2022	С	3.00	13225
1	2022	С	4.60	679	3	2022	С	3.00	13177
2	2022	С	5.25	657	2	2022	С	4.00	13162
1	2023	С	10.00	650	2	2022	С	10.00	13127
2	2023	С	10.00	650	10	2022	C	3.00	13114
3	2023	С	10.00	650	5	2022	P	3.00	12853
1	2022	С	5.50	632	1	2022	Р	4.50	12808
2	2022	С	6.50	616	3	2022	С	5.50	12445
2	2022	С	10.00	601	4	2022	P	3.00	12438
4	2022	С	8.00	601	1	2022	С	6.10	12185
2	2022	С	19.00	600	1	2022	С	5.50	11918
5	2022	С	6.00	600	1	2022	Р	2.5	11822.25

Source: CME, Nasdaq, ICE



### Nat Gas Futures Open Interest

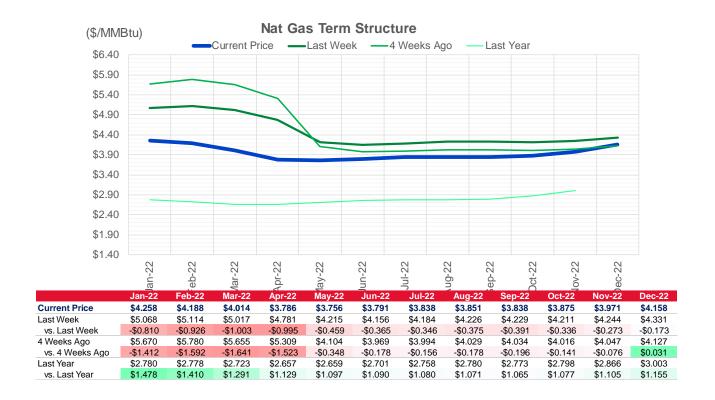
CME, ICE and Nasdaq Combined

CME Henry	Hub Futures (1	0 000 MMRtı	ı)	ICE Henry	Hub Futures Con	tract Equiva	lent (10 000 MM
OWE HOMY	Current	Prior	Daily Change	TOL TICITIY	Current	Prior	Daily Change
JAN 22	245867	249597	-3730	JAN 22	101914	102932	-1018
FEB 22	82436	84330	-1894	FEB 22	71270	71134	136
MAR 22	166581	168169	-1588	MAR 22	82978	83361	-384
APR 22	116273	119999	-3726	APR 22	75405	76401	-996
MAY 22	127612	132429	-4817	MAY 22	71711	71941	-230
JUN 22	48552	48316	236	JUN 22	53820	53796	24
JUL 22	43044	42819	225	JUL 22	56283	56172	111
AUG 22	33858	34087	-229	AUG 22	54721	54908	-188
SEP 22	39101	39189	-88	SEP 22	56109	56020	89
OCT 22	82881	84623	-1742	OCT 22	63333	62768	566
NOV 22	34519	34633	-114	NOV 22	48342	48187	155
DEC 22	28979	27733	1246	DEC 22	51206	51167	39
JAN 23	43897	43650	247	JAN 23	43106	42620	486
FEB 23	11837	11910	-73	FEB 23	34113	33960	153
MAR 23	27048	26890	158	MAR 23	38551	38412	139
APR 23	19176	18556	620	APR 23	39435	39325	111
MAY 23	12704	12257	447	MAY 23	35268	35123	146
JUN 23	9600	9530	70	JUN 23	31824	31664	160
JUL 23	7194	7110	84	JUL 23	31498	31395	103
AUG 23	5049	4861	188	AUG 23	32403	32467	-64
SEP 23	6652	6764	-112	SEP 23	30848	30704	144
OCT 23	10918	11038	-120	OCT 23	34962	34817	145
NOV 23	5950	5929	21	NOV 23	33932	33785	147
DEC 23	8348	8368	-20	DEC 23	31385	31234	151
JAN 24	5505	4894	611	JAN 24	21652	21387	265
FEB 24	1464	1462	2	FEB 24	15676	15550	126
MAR 24	9051	8906	145	MAR 24	20826	20738	89
APR 24	4543	4668	-125	APR 24	14823	14748	75
MAY 24	2050	2050	0	MAY 24	15720	15630	90
JUN 24	927	927	0	JUN 24	16105	16053	53

Source: CME, ICE







				vs. 4 Weeks	
	Units	<b>Current Price</b>	vs. Last Week		vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	2.224	<b>0.000</b>	<b>0.000</b>	<b>2.175</b>
NatGas Oct21/Nov21	\$/MMBtu	0.361	<b>0.000</b>	<b>0.000</b>	<b>0.282</b>
NatGas Oct21/Jan22	\$/MMBtu	-1.785	<b>▼</b> -1.058	<b>▼</b> -1.770	<b>▼</b> -2.117
NatGas Apr22/Oct22	\$/MMBtu	0.100	<b>a</b> 0.071	<b>0.142</b>	<b>0.038</b>
WTI Crude	\$/Bbl	66.50	<b>-11.890</b>	<b>▼</b> -12.310	<b>2</b> 0.860
Brent Crude	\$/Bbl	69.67	<b>▼</b> -12.550	<b>-</b> 10.870	<b>2</b> 0.960
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Heating Oil	cents/Gallon	210.34	<b>-27.960</b>	<b>▼</b> -30.320	<b>~</b> 71.010
Propane, Mt. Bel	cents/Gallon	0.97	<b>-</b> 0.307	<b>-</b> 0.400	<b>0.379</b>
Ethane, Mt. Bel	cents/Gallon	0.35	<b>-</b> 0.054	<b>-</b> 0.084	<b>0.164</b>
Coal, PRB	\$/MTon	12.30	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Coal, PRB	\$/MMBtu	0.70			

Source: CME, Bloomberg



### **Baker Hughes Rig Counts**

	Rotary Rig 12/3/202			Baker	· Hughes 🍃
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	467	0	467	221	246
Gas	102	0	102	27	75
Miscellaneous	0	0	0	-2	2
Directional	31	-3	34	13	18
Horizontal	513	0	513	224	289
Vertical	25	3	22	9	16
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago
0"	440	-	400	70	40
Oil	113	7	106	73	40
Gas	67	2	65	5	62
Gas Major Basin Variances	67 This Week	+/-	65 Last Week	+/-	62 Year Ago
Gas Major Basin Variances Arkoma Woodford	67 This Week	2 +/- 0	65 Last Week	5 +/- 3	62 Year Ago 0
Gas  Major Basin Variances  Arkoma Woodford Barnett	This Week  3 1	2 +/- 0 0	65 Last Week 3 1	5 +/- 3 1	62 Year Ago 0 0
Gas  Major Basin Variances  Arkoma Woodford Barnett Cana Woodford	This Week  3 1 23	2 +/- 0 0 -1	65 Last Week 3 1 24	5 +/- 3 1 14	62 Year Ago 0 0 9
Gas  Major Basin Variances  Arkoma Woodford Barnett Cana Woodford DJ-Niobrara	67 This Week  3 1 23 11	2 +/- 0 0 -1 0	65 Last Week  3 1 24 11	5 +/- 3 1 14 5	62 Year Ago 0 0 9 6
Gas  Major Basin Variances  Arkoma Woodford Barnett Cana Woodford DJ-Niobrara Eagle Ford	67 This Week  3 1 23 11 42	0 0 0 -1 0	65 Last Week  3 1 24 11 42	5 +/- 3 1 14 5 19	62 Year Ago 0 0 9 6 23
Gas  Major Basin Variances  Arkoma Woodford Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash	67 This Week  3 1 23 11 42 3	0 0 0 -1 0 0	65 Last Week 3 1 24 11 42 3	5 +/- 3 1 14 5 19 3	62 Year Ago 0 0 9 6 23 0
Gas  Major Basin Variances  Arkoma Woodford Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash Haynesville	3 1 23 11 42 3 46	0 0 0 -1 0 0 0	65 Last Week  3 1 24 11 42 3 46	5 +/- 3 1 14 5 19 3 6	62 Year Ago 0 0 9 6 23 0 40
Gas  Major Basin Variances  Arkoma Woodford Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash Haynesville Marcellus	67 This Week  3 1 23 11 42 3 46 30	2 +/- 0 0 -1 0 0 0 0	65 Last Week  3 1 24 11 42 3 46 30	5 +/- 3 1 14 5 19 3 6 5	62 Year Ago 0 0 9 6 23 0 40 25
Gas  Major Basin Variances  Arkoma Woodford Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash Haynesville Marcellus Permian	67 This Week  3 1 23 11 42 3 46 30 283	0 0 0 -1 0 0 0 0 0 3	65 Last Week  3 1 24 11 42 3 46 30 280	5 +/- 3 1 14 5 19 3 6 5 119	62 Year Ago  0 0 9 6 23 0 40 25 164
Gas  Major Basin Variances  Arkoma Woodford Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash Haynesville Marcellus	67 This Week  3 1 23 11 42 3 46 30	2 +/- 0 0 -1 0 0 0 0	65 Last Week  3 1 24 11 42 3 46 30	5 +/- 3 1 14 5 19 3 6 5	62 Year Ago 0 0 9 6 23 0 40 25