

This week we take a look at the state of Europe and US LNG exports for this upcoming winter. Higher demand from Asia and South America has drawn away LNG from hitting the European shores leaving storage levels at subpar levels. As of Oct 21st, European storage levels are sitting at -17% YoY or -15% vs the 5 Yr average. The storage levels are quite uneven across most of the countries.

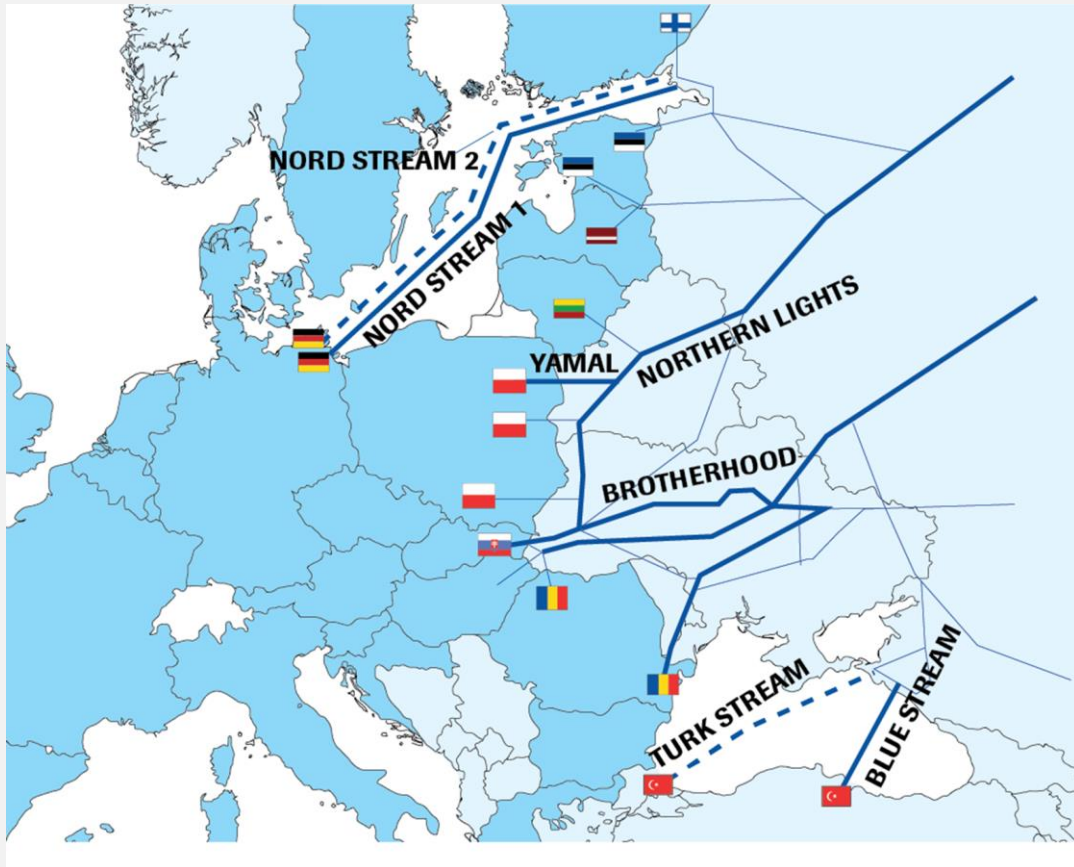
European Natural Gas Storage Levels

Country	Level (TWh) 10/21/2021	Capacity (TWh) 10/21/2021	% Utilization 10/21/2021	YoY	vs. 5Yr Avg
Europe	855.5	1105.9	77%	-17%	-14%
Germany	163.3	230.3	71%	-23%	-23%
Italy	173.3	197.7	88%	-11%	-10%
Netherlands Gas Storage (T	88.1	143.8	61%	-25%	-33%
France	122.6	128.5	95%	0%	4%
Austria	54.4	95.5	57%	-33%	-31%
Hungary	53.9	67.7	80%	-18%	1%
Slovakia	27.9	38.7	72%	-22%	-17%
Czech Republic Gas Storage	31.4	36.0	87%	-10%	-9%
Poland	34.6	35.8	97%	0%	-2%
Spain	27.2	34.2	80%	-15%	-3%
Romania	24.6	33.0	74%	-20%	-6%
Latvia	20.2	21.5	94%	94%	94%
United Kingdom Gas Storage	9.9	9.6	100%	10%	8%
Denmark	7.5	9.1	82%	-11%	-13%
Belgium	8.3	9.0	92%	-6%	9%
Bulgaria	4.7	6.3	75%	-22%	-13%
Croatia	4.3	5.2	83%	-12%	-11%
Portugal	2.2	3.6	62%	-38%	-13%
Ireland	1.6	1.8	87%	87%	87%
Sweden	0.0	0.0	66%	-28%	6%
Non-EU					
Ukraine	142.3	318.7	45%	-33%	-16%

[Note: 1000 TWh = 3412 Bcf]

As with North America, the natural gas withdrawn during the winter is not mainly dependent on weather. Europe is not a net producer; hence it imports a vast majority of its supplies via pipeline and LNG. Domestic gas production in Western Europe has been declining due to natural depletion and political pressure, creating a supply shortfall that has been mostly taken up by Russian piped gas. New supply sources have been recently constructed from the Eastern Mediterranean and the Balkans, but it still leaves a big gap that can only be filled by Russian piped supplies.

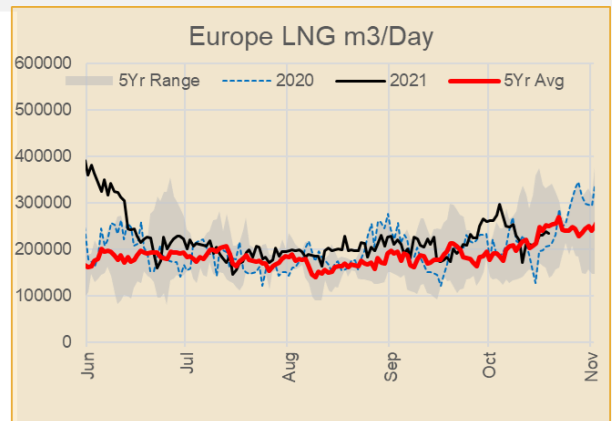
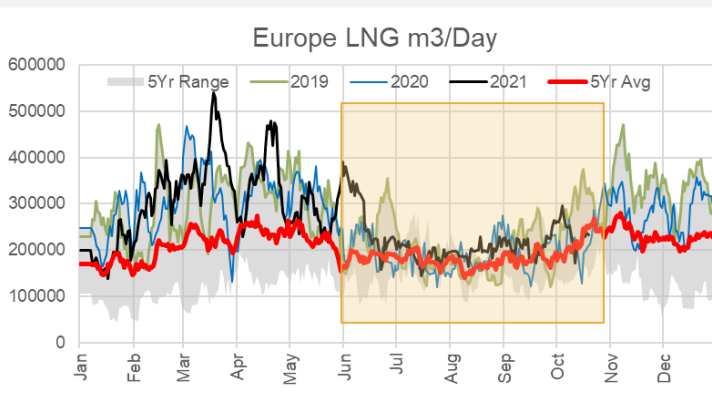
Russia's Gazprom transports gas via the westerly route via Ukraine, the northwesterly TurkStream, and the Nord Stream in the Baltic Sea. And with the recent completion of Nord Stream 2, Europe will be even more tied to Russian. At the moment, this supply source is tied up in political limbo.



Source: <https://spectator.clingendael.org/pub/2018/2/the-role-of-gas/>

The market is not expecting increased Russian supply to Europe this winter, particularly given muted flows this summer (April–September 2021). Gazprom has stated they have needed the supplies to refill their domestic gas storage. Last week Reuters reported, “Gazprom's domestic storage is almost full, giving the Russian state gas giant leeway to increase exports this winter”. No one is holding their breath for more Russian supplies this winter unless Europe agrees to more long-term contracts and for the certification of the recently completed Nord Stream 2 pipeline.

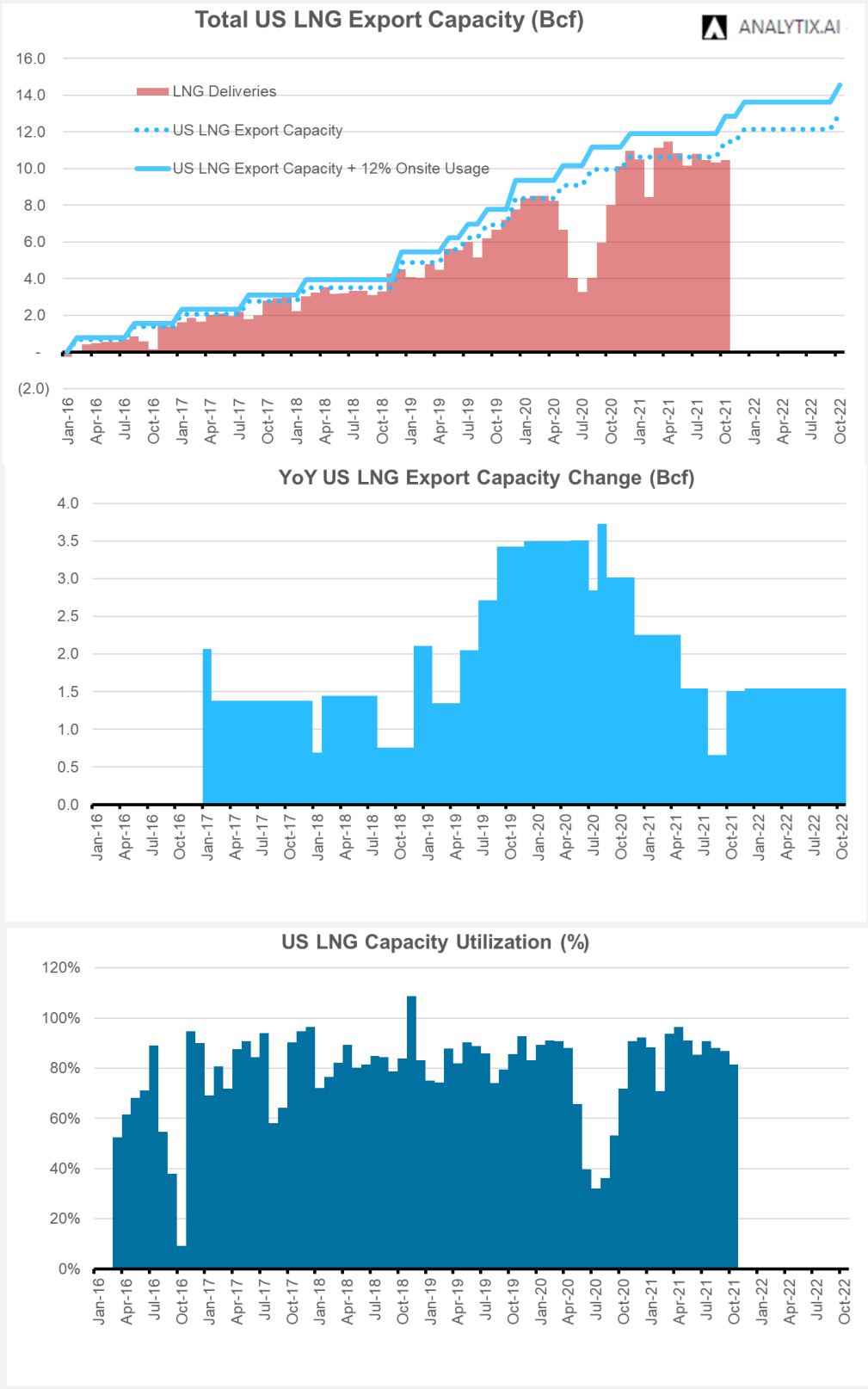
The EU has been looking to diversify its energy with declining domestic production, hence looking to LNG imports as the savior. With financial incentives for LNG receiving terminal construction, Europe now has 28 existing LNG receiving terminals and 22 in various development stages. Unlike summer 2020 when COVID led to LNG import cancellation, this past summer was quite the opposite. Europe has been in a constant struggle with Asia and South America for any flex LNG cargo. Any price move to make LNG more economic to head to Europe was matched by these other global destinations.



Since June, LNG deliveries averaged 30 m3/day which ties it with the record set in 2019 (for the same period). Unfortunately, this has not been enough with the increased power demand due to EU policy phasing out coal and making operation coal plants uneconomical with increasing carbon prices.

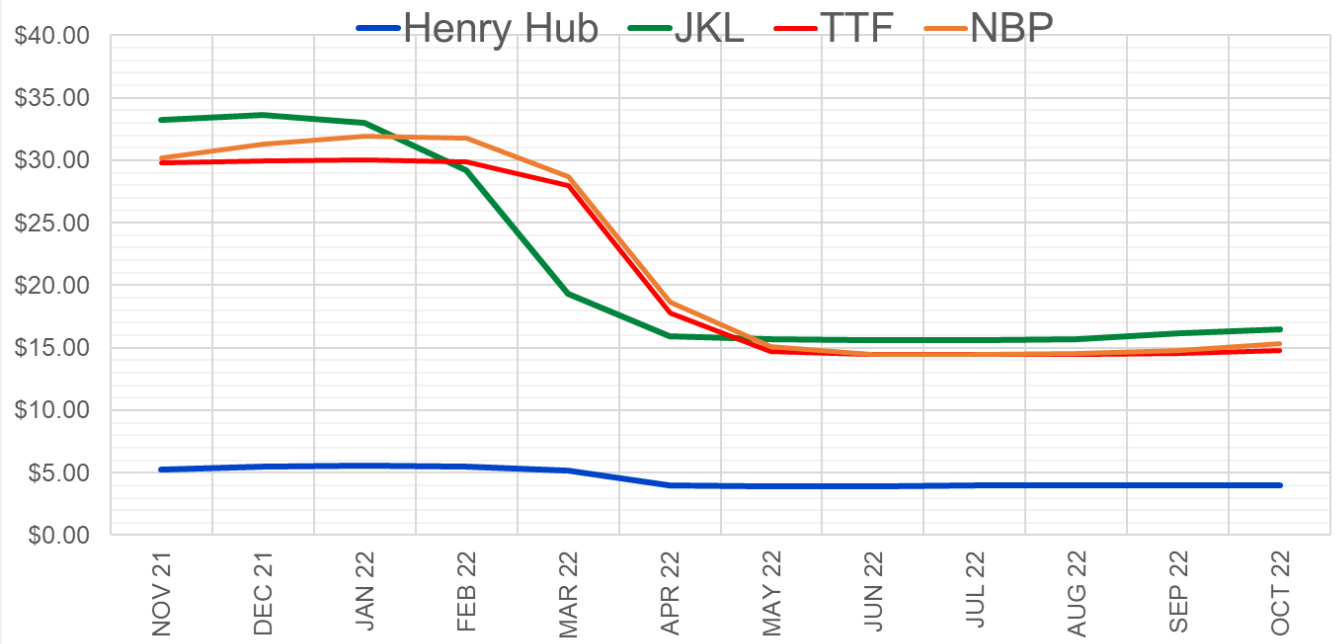
More of the US export supplies were suppose to be destined for Europe, but that just has not been the case with the strong Asian demand and drought in South America. This coming winter we could see a small bump up in US to Europe exports with new additional capacity coming online. We already see small flows to the Calcasieu Pass and we are expecting Sabine Pass' T6 to start up in late Q4.

Our expectation is for feedgas levels to average 12.1 Bcf/d this winter with the new capacity coming online, and the overall capacity being utilized 90% on average. Typical winter utilization is 84-89%, but we are assuming a higher utilization with the strong global spreads.

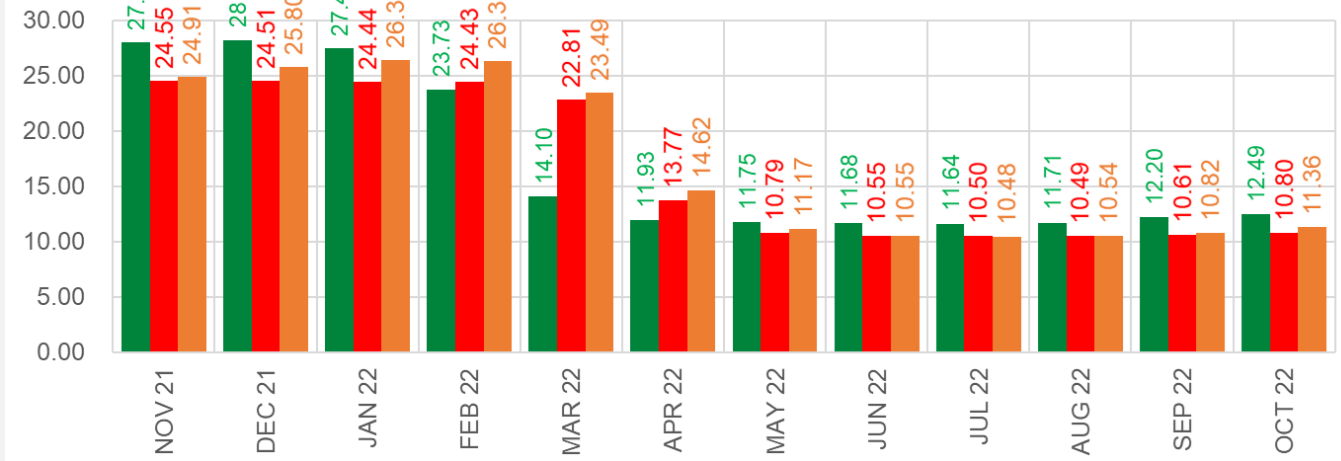


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Nat Gas Term Structure (\$MMBTU)



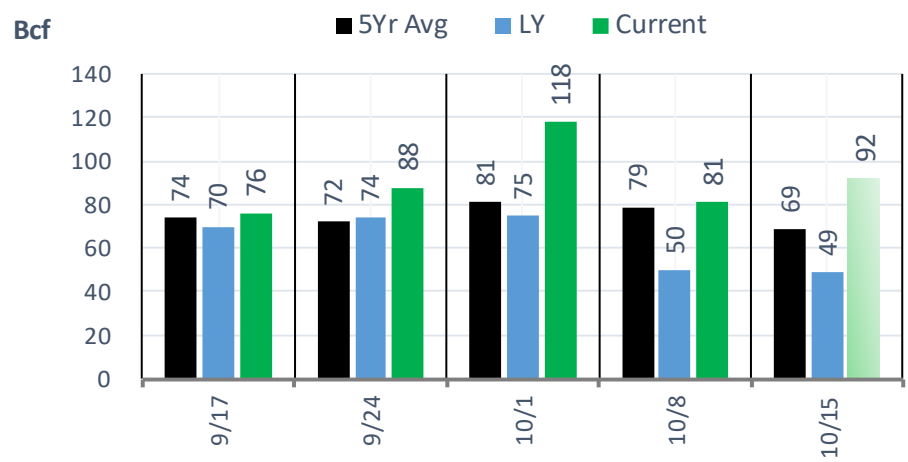
JKL-HHub, TTF-HHub, NBP-HHub



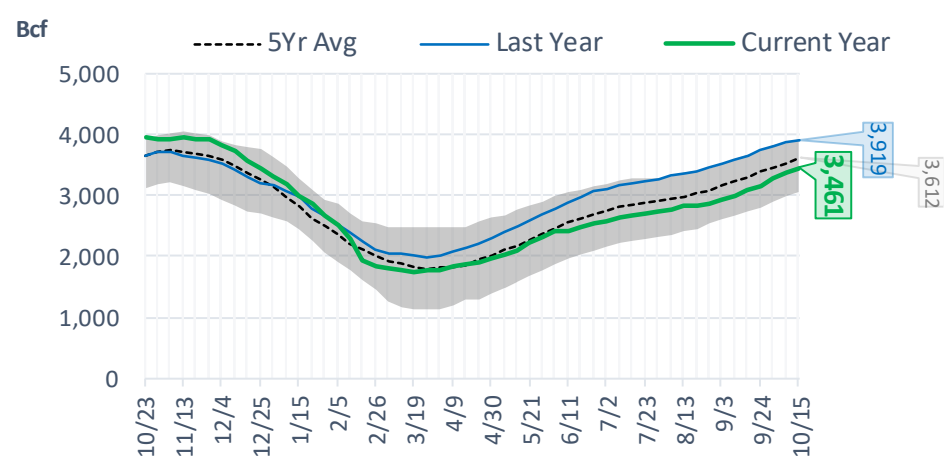
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EIA Storage Report

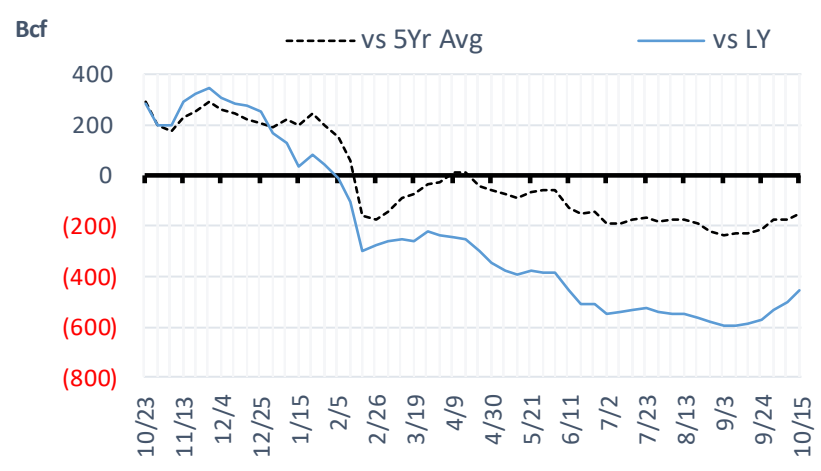
Total Lower 48 YoY Weekly Change



Total Lower 48 Storage Levels



Total Lower 48 LY Surplus/Deficit

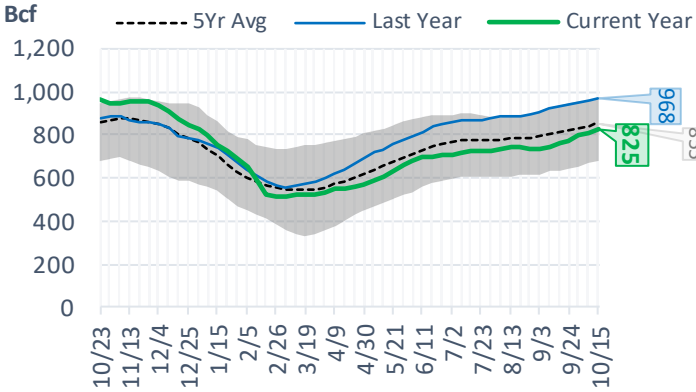


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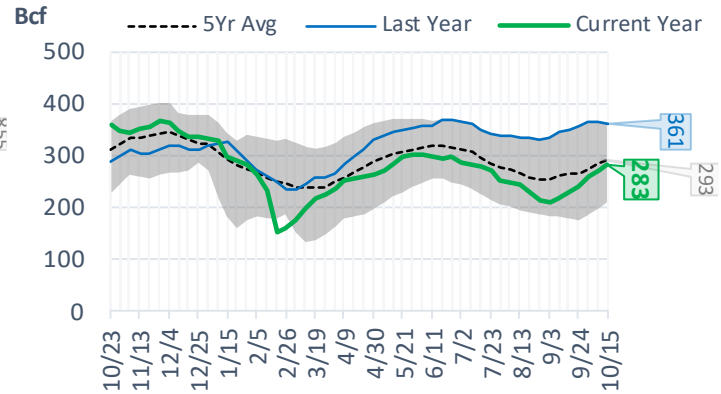
Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 15-Oct	Week - 1 8-Oct	Week - 2 1-Oct	Week - 3 24-Sep	Week - 4 17-Sep	Week - 5 10-Sep
Total Lower 48 Storage Level	3461	3369	3288	3170	3082	3006
Weekly Change	+92	+81	+118	+88	+76	+83
vs LY	-458	-501	-532	-575	-589	-595
vs 5Yr Avg	-151	-174	-176	-213	-229	-231
S. Central Salt Storage Level	283	269	259	239	228	217
Weekly Change	+14	+10	+20	+11	+11	+9
vs LY	-78	-97	-106	-118	-121	-130
vs 5Yr Avg	-10	-14	-15	-27	-35	-44
S. Central NonSalt Storage Level	825	810	795	774	762	748
Weekly Change	+15	+15	+21	+12	+14	+13
vs LY	-143	-149	-159	-169	-171	-176
vs 5Yr Avg	-30	-33	-35	-45	-50	-55
Midwest Storage Level	1027	997	971	934	904	876
Weekly Change	+30	+26	+37	+30	+28	+34
vs LY	-75	-81	-87	-96	-101	-103
vs 5Yr Avg	-20	-23	-19	-24	-24	-21
East Storage Level	862	834	810	779	751	732
Weekly Change	+28	+24	+31	+28	+19	+29
vs LY	-59	-72	-80	-90	-96	-90
vs 5Yr Avg	-30	-42	-45	-52	-56	-51
Mountain Storage Level	211	210	206	201	196	193
Weekly Change	+1	+4	+5	+5	+3	+2
vs LY	-33	-30	-29	-29	-28	-27
vs 5Yr Avg	-8	-7	-9	-10	-10	-9
Pacific Storage Level	253	251	248	243	240	240
Weekly Change	+2	+3	+5	+3	0	-3
vs LY	-70	-69	-70	-72	-72	-70
vs 5Yr Avg	-52	-52	-53	-55	-54	-51

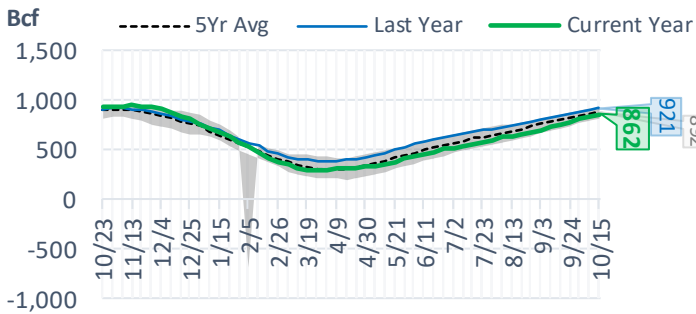
NonSalt Storage Levels



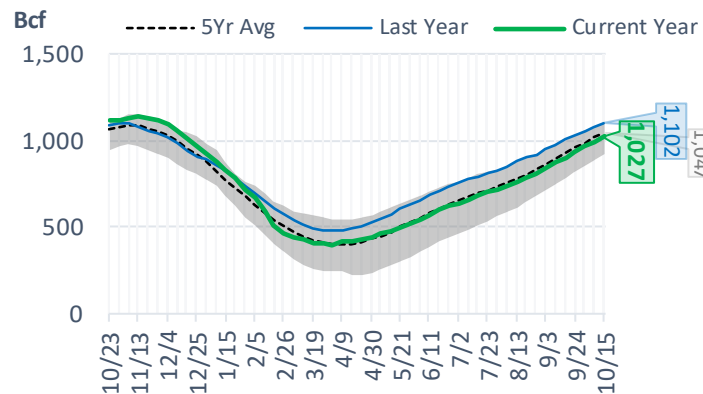
Salt Storage Levels



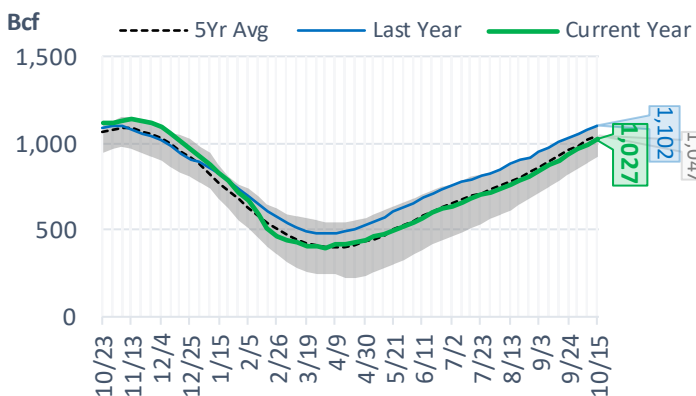
East Storage Levels



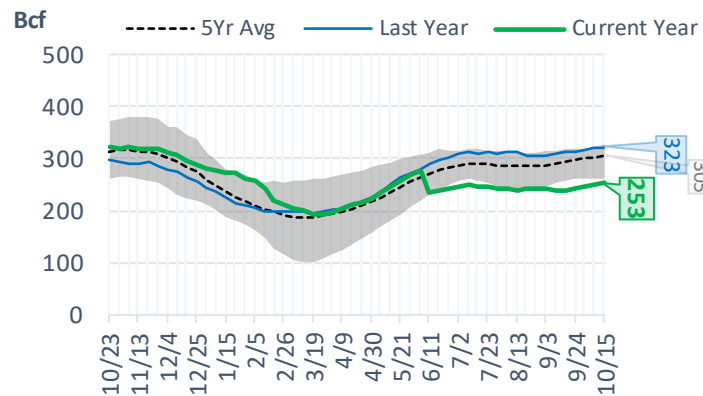
Midwest Storage Levels



Midwest Storage Levels



Pacific Storage Levels



EIA Storage Week Balances

	17-Sep	24-Sep	1-Oct	8-Oct	15-Oct	22-Oct	WoW	vs. 4W
Lower 48 Dry Production	92.0	93.0	93.3	92.9	92.6	92.3	▼ -0.2	▼ -0.6
Canadian Imports	5.0	5.2	5.7	5.3	4.9	5.6	▲ 0.6	▲ 0.3
L48 Power	35.0	33.3	30.3	32.9	31.7	28.9	▼ -2.8	▼ -3.1
L48 Residential & Commercial	7.1	8.1	8.4	8.2	9.5	13.9	▲ 4.3	▲ 5.3
L48 Industrial	20.8	20.6	20.1	21.9	19.7	18.1	▼ -1.5	▼ -2.4
L48 Lease and Plant Fuel	5.0	5.1	5.1	5.1	5.0	5.0	▼ 0.0	▼ 0.0
L48 Pipeline Distribution	2.3	2.3	2.1	2.2	2.2	2.3	▲ 0.1	▲ 0.1
L48 Regional Gas Consumption	70.3	69.3	66.0	70.1	68.2	68.2	▲ 0.0	▼ -0.2
Net LNG Exports	10.2	9.9	10.3	9.9	10.7	10.8	▲ 0.1	▲ 0.6
Total Mexican Exports	6.6	6.8	6.7	6.5	6.6	6.6	▼ 0.0	▼ -0.1
Implied Daily Storage Activity	9.9	12.2	16.0	11.6	12.0	12.3	0.3	
EIA Reported Daily Storage Activity	10.9	12.6	16.9	11.6	13.1			
Daily Model Error	-1.0	-0.4	-0.9	0.0	-1.1			

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	92.5	92.3	92.5	▲ 0.2	▲ 4.2
Canadian Imports	4.6	4.3	4.9	5.2	5.1	5.1	5.3	▲ 0.2	▲ 1.0
L48 Power	30.3	30.8	35.9	39.4	40.2	33.1	30.9	▼ -2.2	▲ 0.2
L48 Residential & Commercial	15.3	15.3	8.8	8.1	7.7	7.6	11.1	▲ 3.5	▼ -4.2
L48 Industrial	23.5	22.6	20.5	20.9	20.3	20.2	19.8	▼ -0.4	▼ -2.8
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	▲ 0.0	▼ -0.2
L48 Regional Gas Consumption	76.6	75.9	72.7	76.0	75.8	68.2	69.1	▲ 0.9	▼ -6.8
Net LNG Exports	6.7	8.0	10.2	10.8	10.5	10.3	10.5	▲ 0.1	▲ 2.4
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	12.2	11.7		
EIA Reported Daily Storage Activity									
Daily Model Error									

Source: Bloomberg, analytix.ai

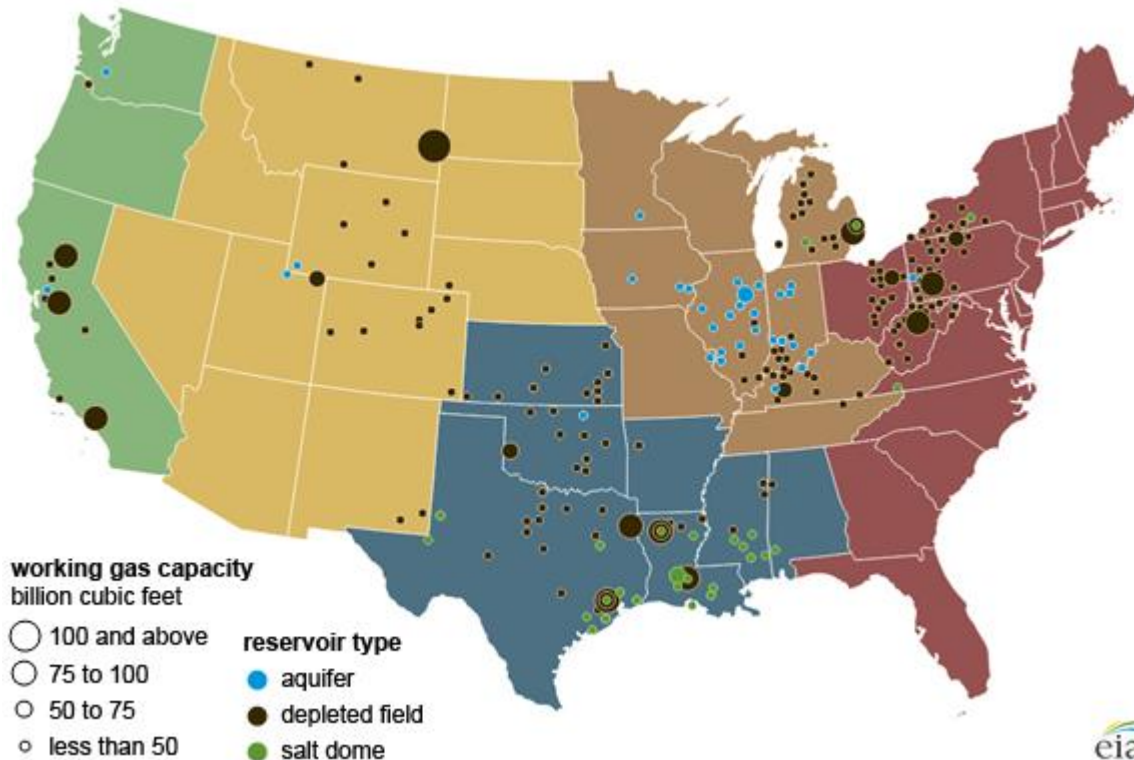
Regional S/D Models Storage Projection

Week Ending 22-Oct

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	12.0	1.0	13.0	91
East	3.3	0.3	3.6	25
Midwest	3.4	-0.4	3.0	21
Mountain	3.4	-3.0	0.4	3
South Central	1.0	4.4	5.4	38
Pacific	0.9	-0.4	0.5	4

*Adjustment Factor is calculated based on historical regional deltas

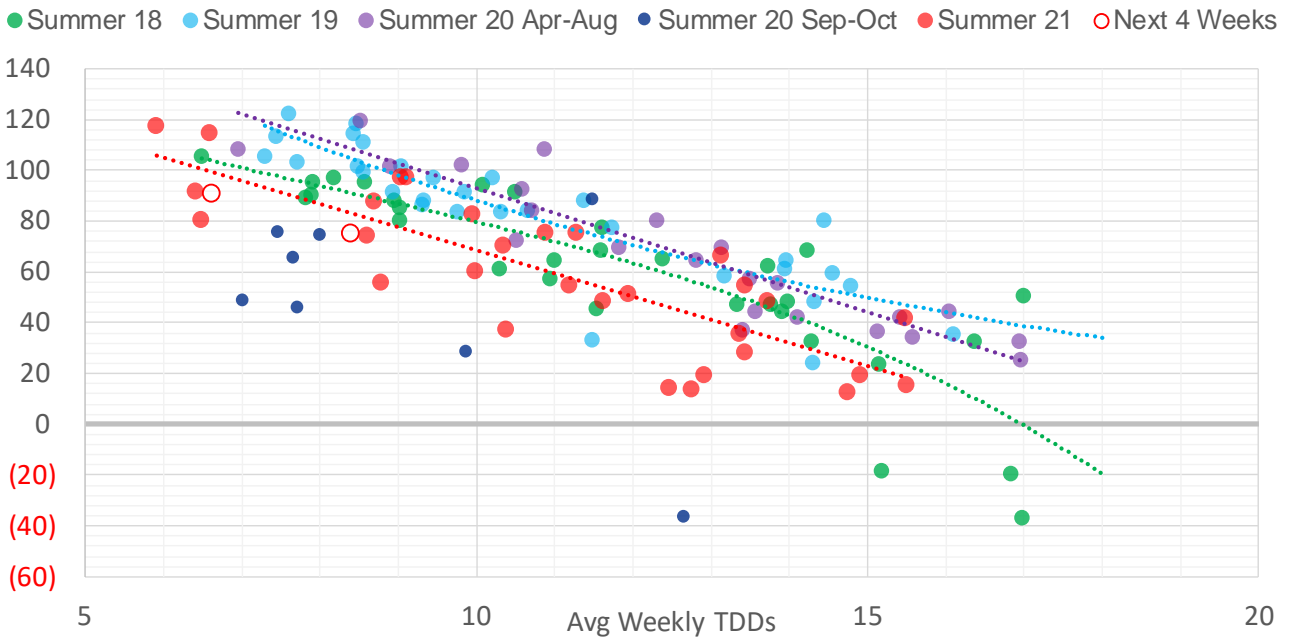
U.S. underground natural gas storage facilities by type (July 2015)



Weather Model Storage Projection

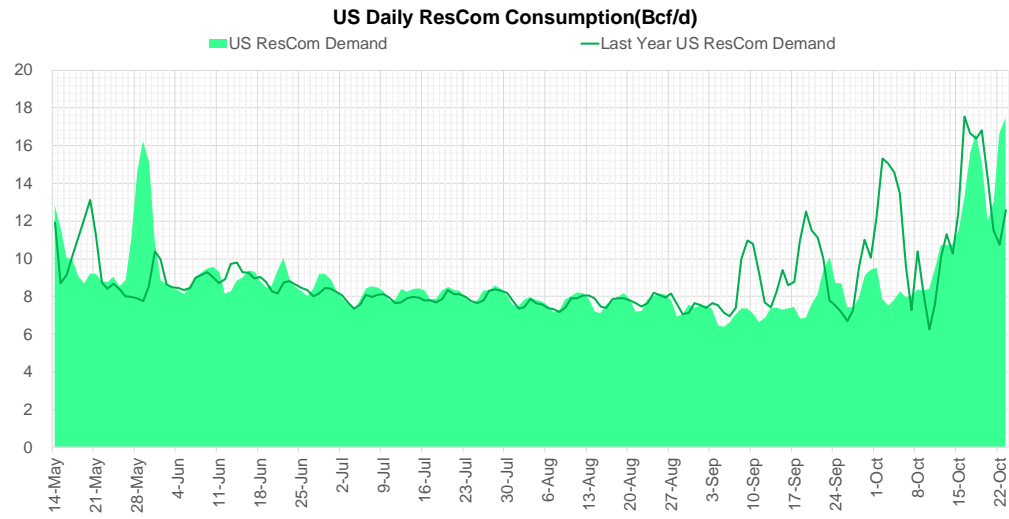
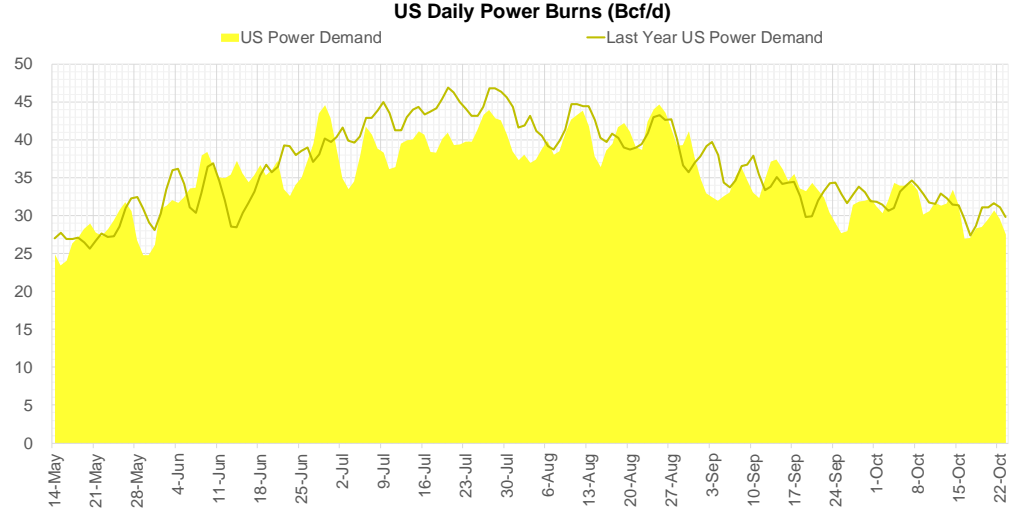
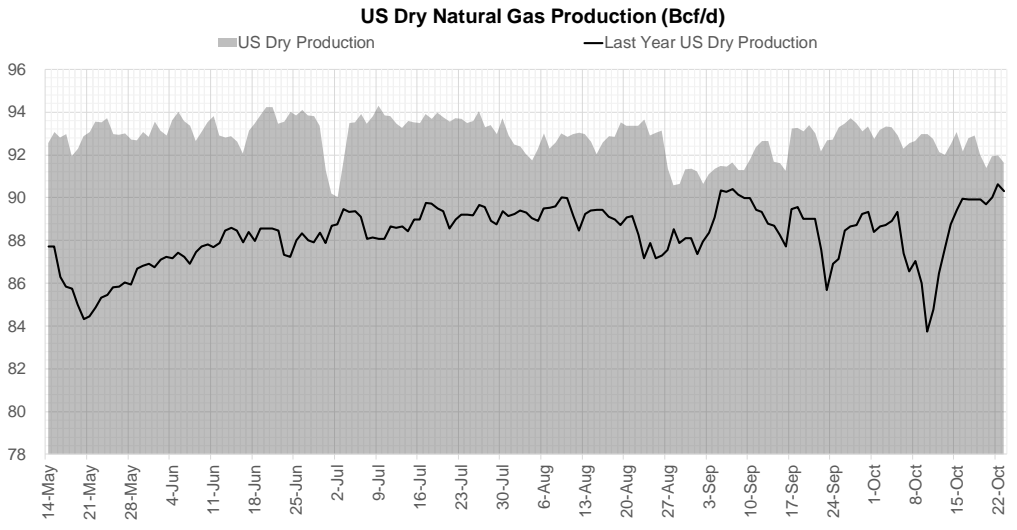
Next report and beyond		
Week Ending	Temp	Week Storage Projection
29-Oct	8.4	75
05-Nov	11.2	35
12-Nov	11.8	29

Weather Storage Model - Next 4 Week Forecast



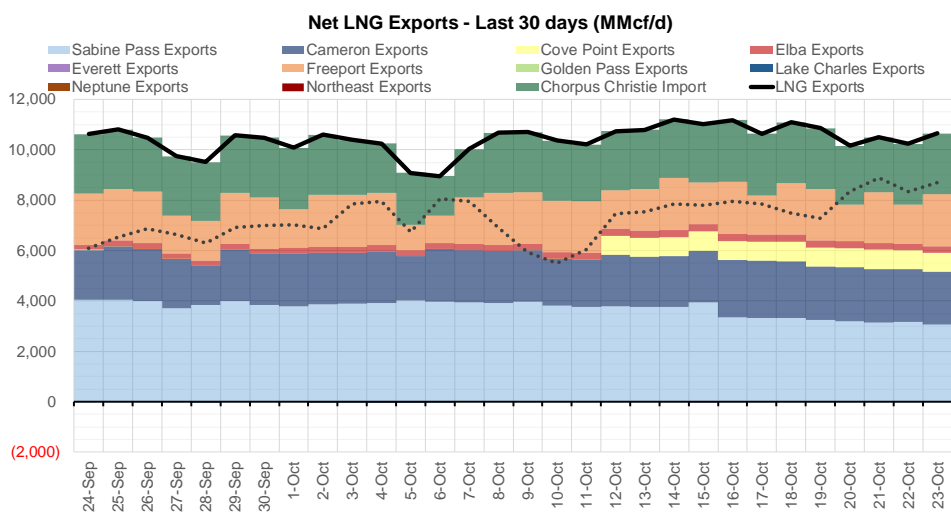
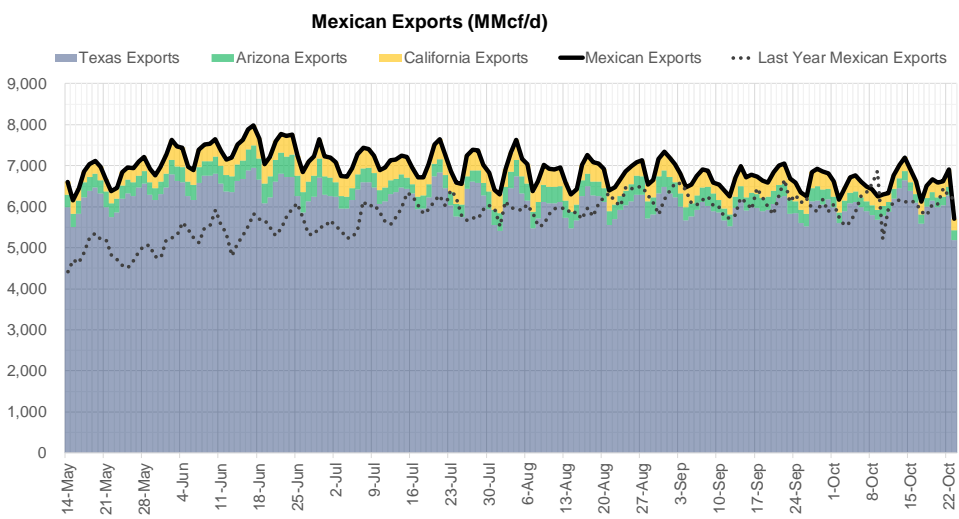
Note: this is not our official end of season forecast. This chart signifies where storage levels end with 10-year normal weather and current market tightness relative to last year

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

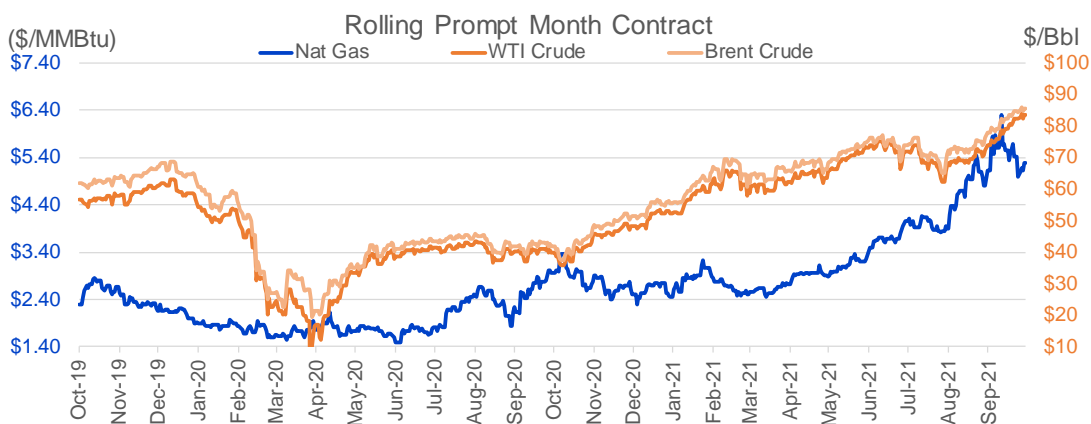
CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE VOL	CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE OI
11	2021	C	5.50	5262	12	2021	P	2.75	54042
11	2021	C	5.25	5009	12	2021	P	3.00	42318
11	2021	C	6.00	4928	12	2021	P	2.50	39421
11	2021	P	4.75	4835	12	2021	P	4.00	39230
11	2021	P	5.00	4201	12	2021	P	3.50	30492
12	2021	C	7.00	4058	11	2021	P	3.00	30166
2	2022	P	3.50	2950	3	2022	C	10.00	29132
12	2021	P	4.00	2843	11	2021	P	5.00	28641
1	2022	C	6.00	2378	11	2021	P	4.00	27654
1	2022	C	7.00	2351	11	2021	C	6.00	27253
2	2022	C	7.00	2002	11	2021	P	4.50	26958
11	2021	P	4.50	1920	11	2021	C	7.00	24995
12	2021	C	11.00	1856	3	2022	C	8.00	24785
1	2022	C	8.00	1751	12	2021	C	4.00	22527
11	2021	C	5.00	1734	3	2022	C	5.00	22350
12	2021	P	4.75	1733	11	2021	P	3.50	20150
12	2021	C	6.00	1699	11	2021	C	4.00	20144
1	2022	C	10.00	1604	1	2022	P	2.75	20007
6	2022	P	3.50	1600	4	2022	C	3.00	19760
12	2021	C	8.00	1572	1	2022	P	3.50	19466
2	2022	C	8.00	1550	1	2022	C	6.00	18688
4	2022	P	2.50	1355	3	2022	P	2.50	18386
1	2022	P	4.50	1351	1	2022	P	3.00	18154
5	2022	P	2.50	1350	12	2021	C	6.00	18149
12	2021	P	4.50	1343	3	2022	P	3.50	17825
11	2021	P	4.00	1327	1	2022	C	5.00	17820
11	2021	C	5.35	1256	11	2021	C	5.00	17264
10	2022	P	3.00	1251	2	2022	P	3.50	17225
7	2022	C	5.00	1200	3	2022	P	4.00	16887
11	2021	C	5.75	1150	12	2021	P	2.00	16879
2	2022	C	6.00	1150	2	2022	C	5.00	16764
3	2022	P	3.00	1150	11	2021	C	5.50	16634
4	2022	C	5.00	1125	12	2021	C	8.00	15743
5	2022	C	5.00	1100	3	2022	C	4.00	15631
6	2022	C	5.00	1100	4	2022	P	2.50	15486
8	2022	C	5.00	1100	11	2021	P	4.75	15393
9	2022	C	5.00	1100	1	2022	P	4.00	15279
10	2022	C	5.00	1100	12	2022	C	5.00	15232
1	2022	P	4.25	1059	11	2021	C	4.50	14922
1	2022	P	5.50	1020	12	2021	P	5.00	14668
1	2022	C	6.10	1003	4	2022	C	5.00	14654
6	2022	P	2.50	1000	12	2021	C	7.00	14592
7	2022	P	2.50	1000	11	2021	P	2.50	14488
8	2022	P	2.50	1000	11	2021	C	3.75	14478
9	2022	P	2.50	1000	1	2022	C	4.00	14463
10	2022	P	2.50	1000	11	2021	P	3.25	14311
4	2022	P	3.00	951	12	2021	P	4.50	14034
5	2022	P	3.00	951	2	2022	C	6.00	13605
6	2022	P	3.00	951	2	2022	P	4.00	13600
					3	2022	P	5	13402

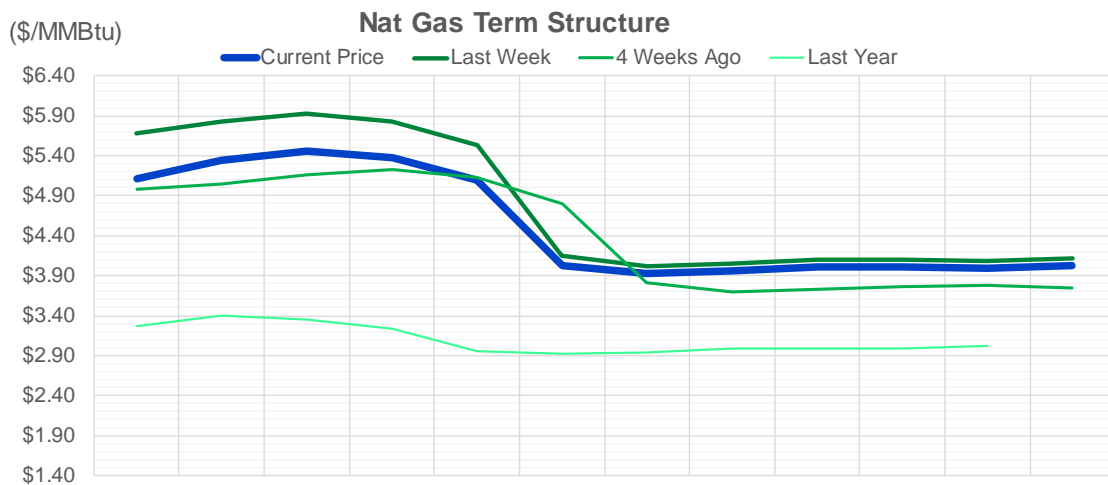
Source: CME, Nasdaq, ICE

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	34526	46379	-11853	NOV 21	85082	85656	-574
DEC 21	167185	164650	2535	DEC 21	89894	92140	-2246
JAN 22	232556	234435	-1879	JAN 22	92433	93129	-696
FEB 22	72553	70964	1589	FEB 22	69540	69511	29
MAR 22	152248	152693	-445	MAR 22	76275	76027	248
APR 22	113427	114307	-880	APR 22	75967	75880	87
MAY 22	113472	113577	-105	MAY 22	70784	70667	117
JUN 22	40983	40785	198	JUN 22	54043	54081	-38
JUL 22	38566	38492	74	JUL 22	56699	56547	152
AUG 22	29279	29345	-66	AUG 22	55325	55380	-55
SEP 22	32624	32599	25	SEP 22	56546	56554	-8
OCT 22	81695	80847	848	OCT 22	61963	61952	11
NOV 22	34402	34267	135	NOV 22	48748	48842	-95
DEC 22	25678	25330	348	DEC 22	52128	52160	-32
JAN 23	28960	28972	-12	JAN 23	39145	39023	123
FEB 23	10516	10528	-12	FEB 23	32160	32168	-8
MAR 23	15956	15771	185	MAR 23	33958	33843	115
APR 23	14894	14170	724	APR 23	35014	33056	1958
MAY 23	8747	8815	-68	MAY 23	33849	33443	406
JUN 23	7062	7080	-18	JUN 23	30085	30024	61
JUL 23	4881	4856	25	JUL 23	30267	30205	62
AUG 23	3898	3896	2	AUG 23	31268	30079	1189
SEP 23	4701	4445	256	SEP 23	29305	29229	76
OCT 23	5922	6169	-247	OCT 23	32984	32988	-5
NOV 23	3299	3329	-30	NOV 23	32250	31785	465
DEC 23	4135	4061	74	DEC 23	28232	28158	75
JAN 24	1386	1379	7	JAN 24	16421	16240	181
FEB 24	1166	1161	5	FEB 24	13788	13726	63
MAR 24	4631	4628	3	MAR 24	18489	18273	217
APR 24	3502	3502	0	APR 24	12901	12803	98

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	\$5.115	\$5.346	\$5.461	\$5.375	\$5.095	\$4.027	\$3.926	\$3.963	\$4.004	\$4.008	\$3.990	\$4.021
Last Week	\$5.687	\$5.837	\$5.936	\$5.835	\$5.527	\$4.149	\$4.023	\$4.057	\$4.097	\$4.102	\$4.086	\$4.118
vs. Last Week	-\$0.572	-\$0.491	-\$0.475	-\$0.460	-\$0.432	-\$0.122	-\$0.097	-\$0.094	-\$0.093	-\$0.094	-\$0.096	-\$0.097
4 Weeks Ago	\$4.976	\$5.043	\$5.157	\$5.232	\$5.132	\$4.793	\$3.819	\$3.693	\$3.724	\$3.766	\$3.772	\$3.751
vs. 4 Weeks Ago	\$0.139	\$0.303	\$0.304	\$0.143	-\$0.037	-\$0.766	\$0.107	\$0.270	\$0.280	\$0.242	\$0.218	\$0.270
Last Year	\$3.007	\$3.272	\$3.397	\$3.356	\$3.239	\$2.956	\$2.916	\$2.945	\$2.984	\$2.994	\$2.982	\$3.019
vs. Last Year	\$2.108	\$2.074	\$2.064	\$2.019	\$1.856	\$1.071	\$1.010	\$1.018	\$1.020	\$1.014	\$1.008	\$1.002

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	2.224	▲ 0.000	▲ 0.701	▲ 2.186
NatGas Oct21/Nov21	\$/MMBtu	-0.561	▼ -0.130	▼ -0.621	▼ -0.624
NatGas Oct21/Jan22	\$/MMBtu	-0.276	▼ -0.143	▼ -0.527	▼ -0.574
NatGas Apr22/Oct22	\$/MMBtu	-0.016	▲ 0.001	▲ 0.030	▼ -0.042
WTI Crude	\$/Bbl	83.76	▲ 1.480	▲ 9.780	▲ 43.910
Brent Crude	\$/Bbl	85.53	▲ 0.670	▲ 7.440	▲ 43.760
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	253.89	▼ -3.480	▲ 27.180	▲ 138.760
Propane, Mt. Bel	cents/Gallon	1.45	▼ -0.025	▲ 0.177	▲ 0.929
Ethane, Mt. Bel	cents/Gallon	0.43	▼ -0.009	▲ 0.046	▲ 0.216
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					
10/22/2021					
Baker Hughes 					
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	443	-2	445	232	211
Gas	99	1	98	26	73
Miscellaneous	0	0	0	-3	3
Directional	32	0	32	11	21
Horizontal	482	1	481	237	245
Vertical	28	-2	30	7	21
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago
Oil	93	-5	98	51	42
Gas	71	1	70	30	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	22	0	22	15	7
DJ-Niobrara	11	-1	12	8	3
Eagle Ford	40	0	40	24	16
Granite Wash	3	0	3	3	0
Haynesville	46	0	46	9	37
Marcellus	27	0	27	1	26
Mississippian	1	0	1	1	0
Permian	268	1	267	135	133
Utica	10	0	10	4	6
Williston	23	0	23	11	12