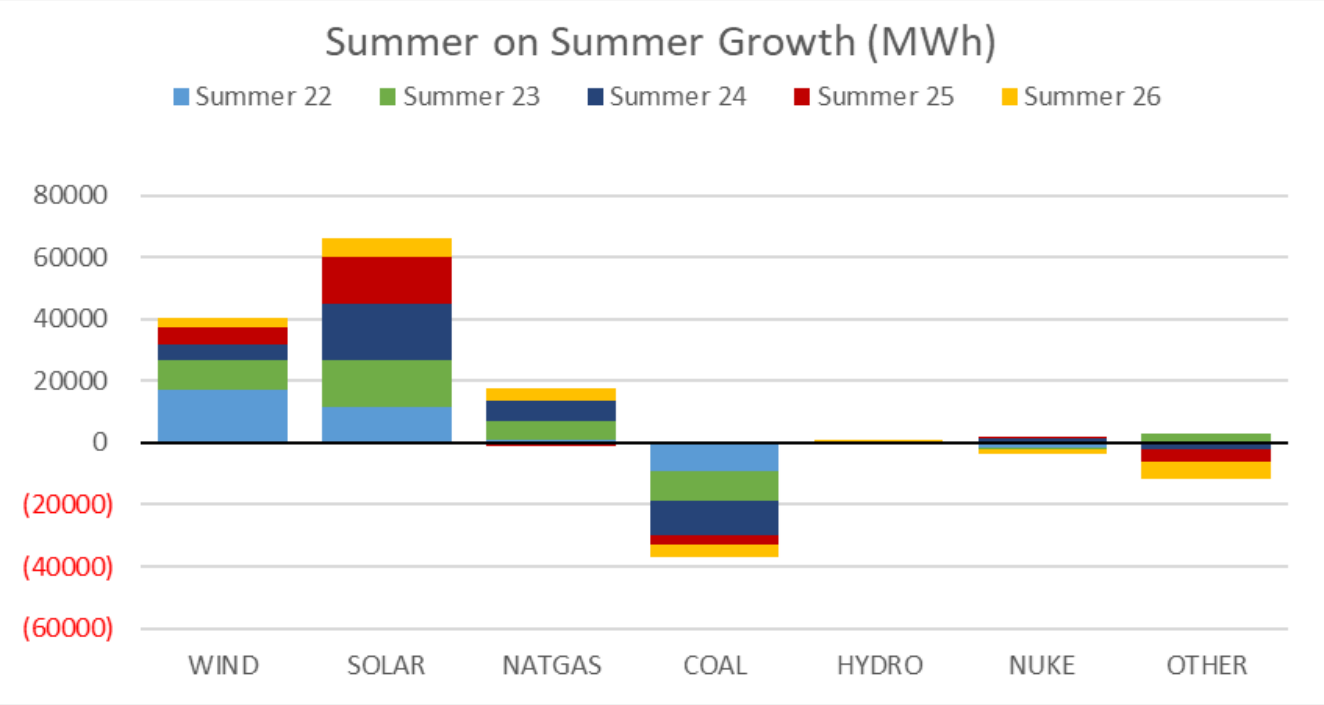
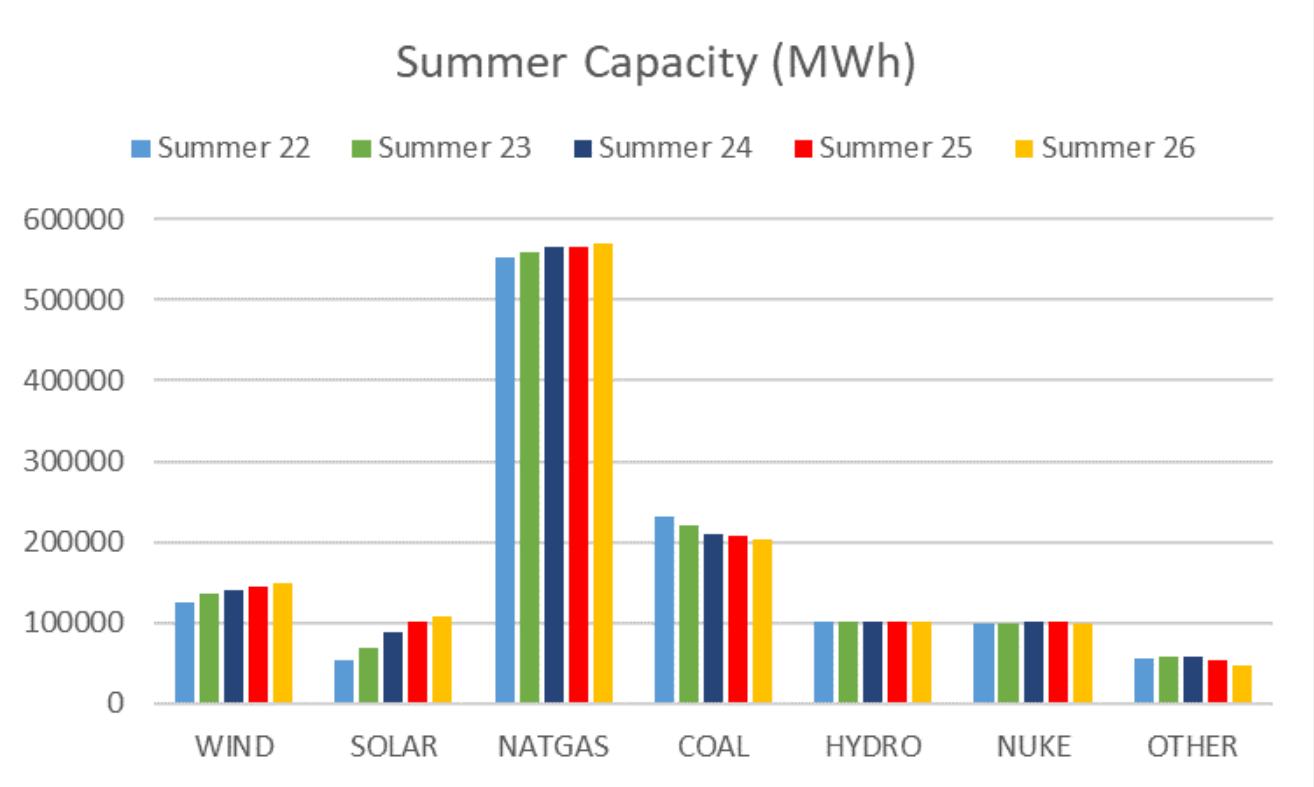
This week, we look at the Monthly Electric Generator Inventory EIA 860m dataset which monitors the current status of existing and proposed generating units at electric power plants. This monthly dataset (last published in Dec 2021) gives a good glimpse of the current US power stack, and how it might evolve in the future. The changing power stack has a direct influence on natgas markets as the level of power burns changes drastically based on the type of generation added and retired over time.

Let's first start by looking at the expected changes with incoming renewables and coal retirements. The next 5 years are transformational with wind and solar being developed at a rapid pace, while coal is further retired. The chart below shows the capacity change from each generation type summer on summer starting from summer 2021.



As can be seen, there is a total of 40GW of wind to be added between Summer 2021 and Summer 2025, and 66GW of solar over the same timeframe. The difficult part of renewables is their reliability. The typical utilization of both assets is not entirely predictable as both have daily variations and annual seasonality. These daily renewable variability changes have a direct influence on natgas power burns. This issue only gets more problematic as more wind and solar enter the power stack.

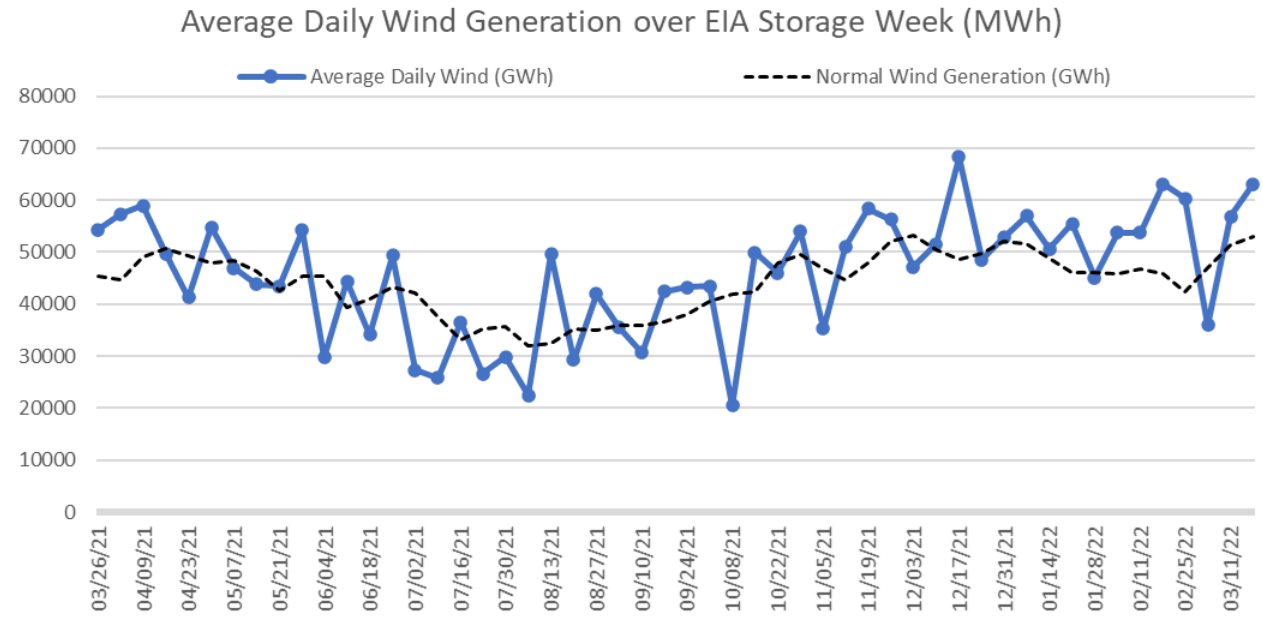
Nat gas will remain the dominant generation source even with the addition of renewables. Here is how the capacity picture will look:

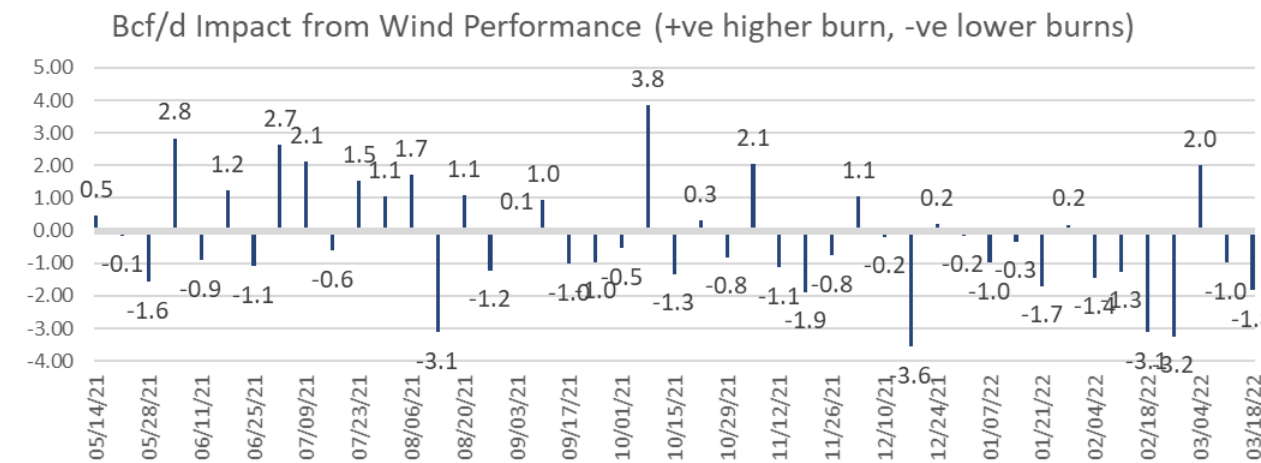


[remember that the capacity factor of renewables is much lower than fossil fuel generation]

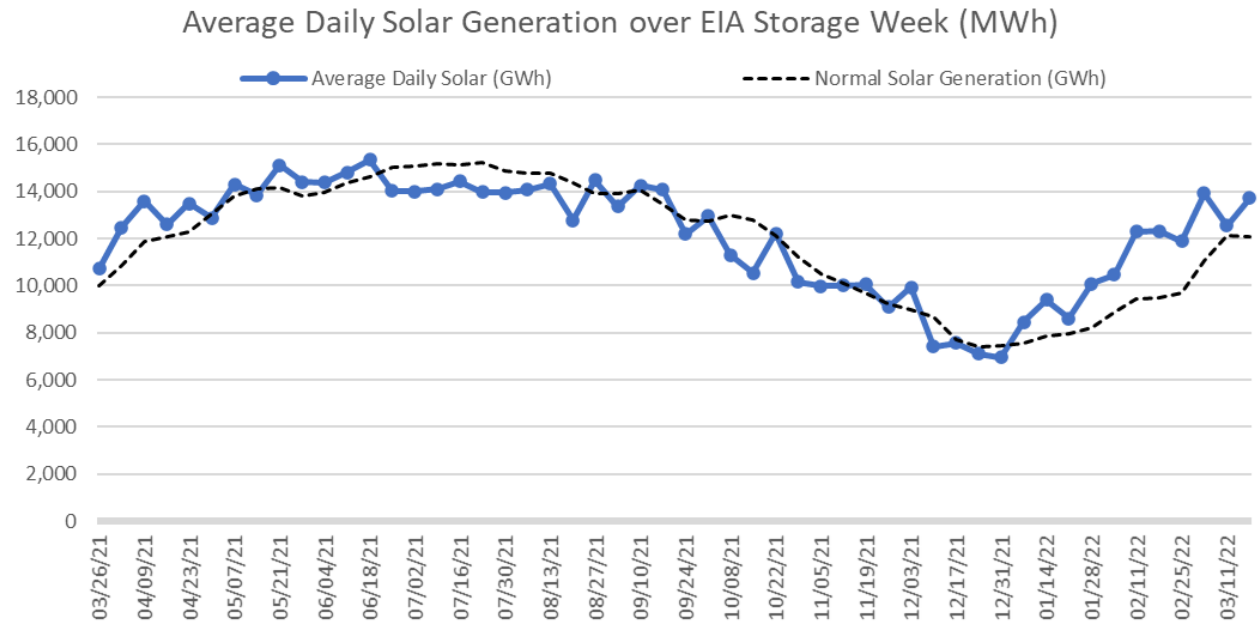
During summer 2021, the variability of renewables made a big impact on gas consumption, the weekly storage report, and ultimately expected end-of-season storage levels. To get a good understanding of how wind and solar are performing daily, we first calculated the "expected" utilization of both asset types to get the baseline. The next two chart packages show the weekly wind and solar performance versus our "expected" level and the potential impact on gas burns. As seen weekly performance bounces around a seasonal capacity factor pattern [wind (24-42%) peaks in the winter and dips in the summer and solar (12-29%) the opposite]. The 2nd chart in each package calculates the weekly natgas power burn impact based on the over or underperformance of each asset.

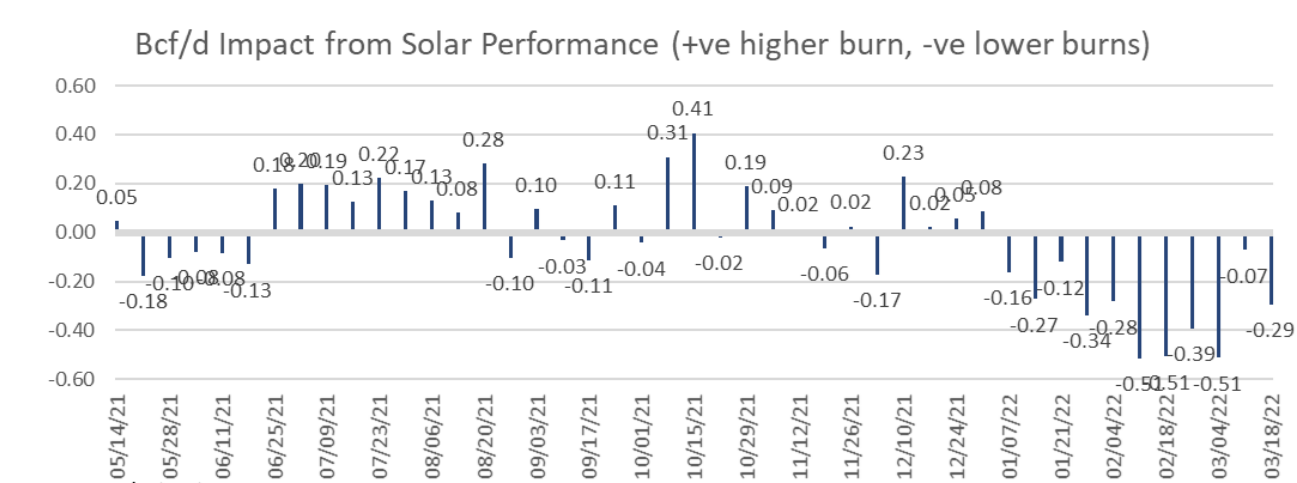
For the summer, both wind and solar on average performed very close to the "expected" level but there were periods where wind and solar stayed above or below normal for some time. A good example is the month of July when both wind and solar underperformed leading to 1.2 Bcf/d of more burns on average. This additional gas burns, along with the low coal and hydro generation painted a very tight (bullish) picture.





source: analytix.ai





source: analytix.ai

We have similar charts for hydro and nuclear generation.

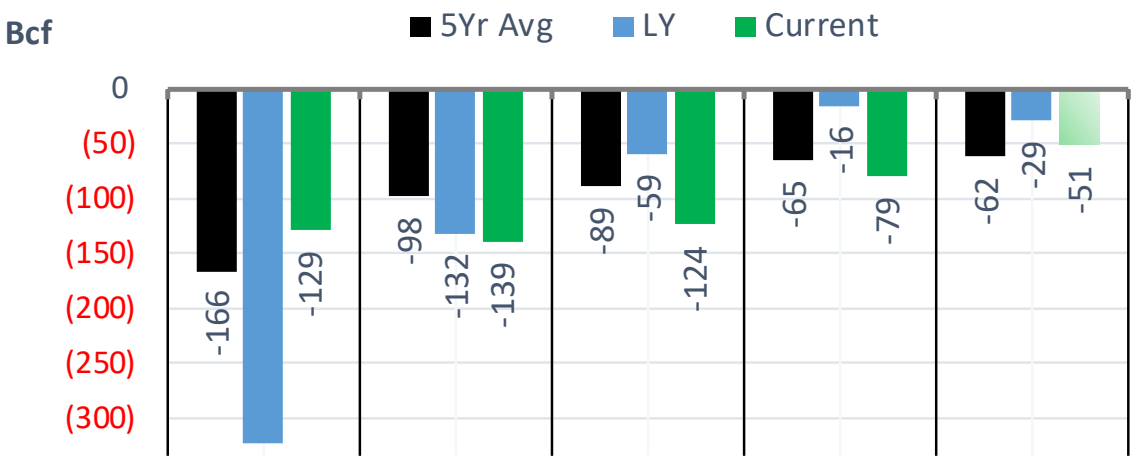
Drop me a line (email: het@analytix.ai) and I'll send them over. Hydro is especially interesting due to the low hydro conditions last year.

So now we get to what this means for this coming summer relative to last summer if we get normal wind and solar levels. We used the EIA 860m report to understand the amount of renewable capacity added (i.e the new available capacity) and the apply our monthly "expected" capacity factor for both to get a forecast for this coming summer. We then compared that to last year's actual wind + solar generation to our forecast to get an idea of the YoY change by month. The last step is we assume a 7.5 HR gas plant is either activated or displaced based on the renewable capacity change.

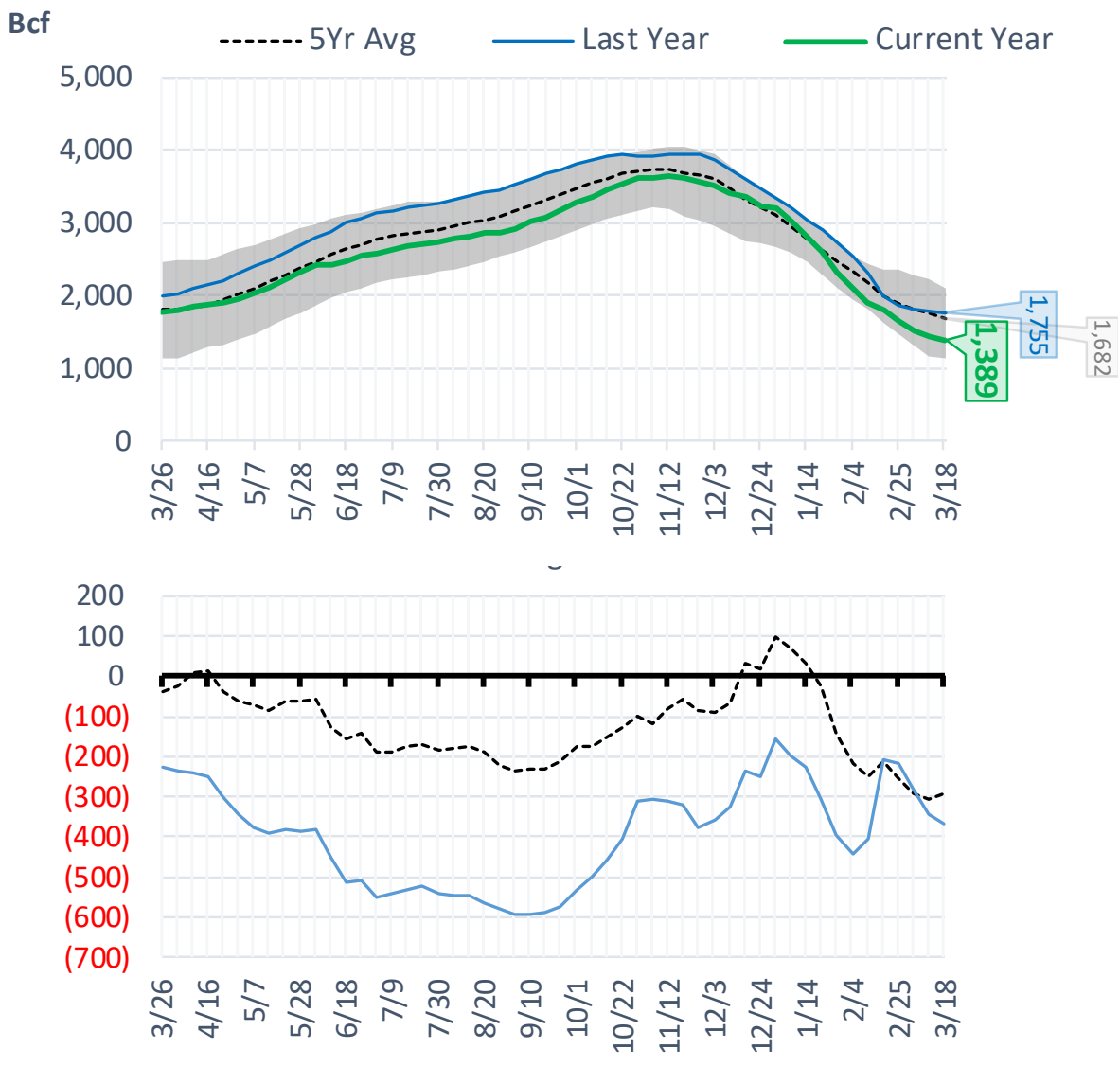
Month	WIND Actuals + Forecast	WIND Gen YoY	WIND Bcf Impact @ 7.5 HR	SOLAR Actuals + Forecast	SOLAR Gen YOY	SOLAR Bcf Impact @ 7.5 HR	WIND & SOLAR Actuals + Forecast	WIND + SOLAR Gen YOY	WIND & SOLAR Bcf Impact @ 7.5 HR
Apr-21	50654			13181			63835		
May-21	46090			14429			60519		
Jun-21	37335			14509			51844		
Jul-21	29214			14152			43366		
Aug-21	35830			13794			49623		
Sep-21	40251			13389			53640		
Oct-21	43144			11059			54204		
Nov-21	49976			9689			59666		
Dec-21	54708			7375			62083		
Jan-22	51045			9476			60521		
Feb-22	56538			12088			68626		
Mar-22	52883			13500			66383		
Apr-22	54437	3783	-0.7	16173	2992	-0.5	70610	6775	-1.2
May-22	50085	3995	-0.7	18323	3894	-0.7	68408	7889	-1.4
Jun-22	45080	7745	-1.4	19682	5173	-0.9	64762	12918	-2.3
Jul-22	38068	8854	-1.6	20205	6053	-1.1	58273	14907	-2.7
Aug-22	36300	470	-0.1	18952	5159	-0.9	55252	5629	-1.0
Sep-22	40281	30	0.0	17636	4246	-0.8	57917	4276	-0.8
Oct-22	48185	5041	-0.9	16116	5057	-0.9	64301	10098	-1.8

The net impact is a gas burns lower by an average of 1.6 Bcf/d through the summer or 400 Bcf lower. Just to reiterate, this is purely the impact of gas burns due to the growth of renewables. We still need to include the impacts from the coal prices/availability and hydro levels.

Total Lower 48 YoY Weekly Change



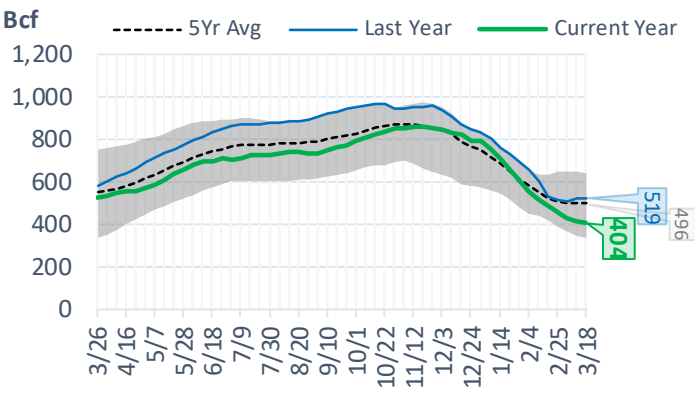
Total Lower 48 Storage Levels



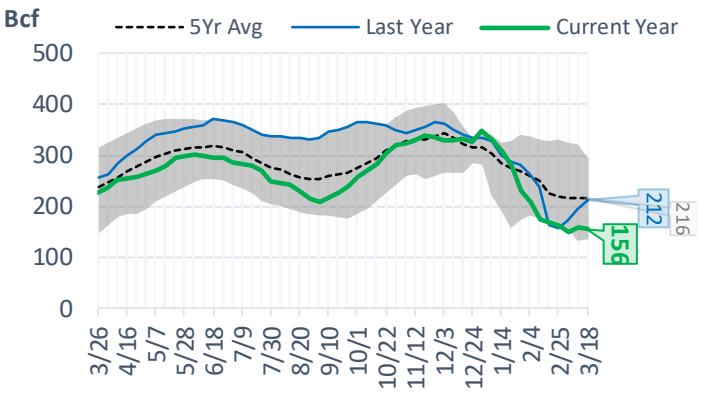
Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 18-Mar	Week - 1 11-Mar	Week - 2 4-Mar	Week - 3 25-Feb	Week - 4 18-Feb	Week - 5 11-Feb
Total Lower 48 Storage Level	**1389**	1440	1519	1643	1782	1911
Weekly Change	**-51**	-79	-124	-139	-129	-190
vs LY	**-366**	-344	-281	-216	-209	-404
vs 5Yr Avg	**-293**	-304	-290	-255	-214	-251
S. Central Salt Storage Level	**156**	159	151	163	168	173
Weekly Change	**-3**	+8	-12	-5	-5	-34
vs LY	**-56**	-35	-23	+5	+6	-64
vs 5Yr Avg	**-60**	-56	-65	-57	-58	-76
S. Central NonSalt Storage Level	**404**	412	431	457	487	516
Weekly Change	**-8**	-19	-26	-30	-29	-40
vs LY	**-115**	-106	-78	-55	-43	-86
vs 5Yr Avg	**-92**	-87	-68	-52	-34	-35
Midwest Storage Level	**318**	337	364	404	450	496
Weekly Change	**-19**	-27	-40	-46	-46	-56
vs LY	**-90**	-91	-80	-67	-70	-104
vs 5Yr Avg	**-77**	-86	-85	-77	-65	-69
East Storage Level	**268**	290	317	358	396	435
Weekly Change	**-22**	-27	-41	-38	-39	-50
vs LY	**-42**	-41	-38	-31	-37	-56
vs 5Yr Avg	**-35**	-43	-48	-39	-32	-36
Mountain Storage Level	**87**	87	93	96	105	114
Weekly Change	**0**	-6	-3	-9	-9	-7
vs LY	**-25**	-27	-21	-22	-20	-25
vs 5Yr Avg	**-12**	-14	-10	-13	-10	-10
Pacific Storage Level	**157**	155	162	164	176	177
Weekly Change	**+2**	-7	-2	-12	-1	-4
vs LY	**-37**	-45	-44	-47	-46	-69
vs 5Yr Avg	**-16**	-19	-16	-19	-15	-25

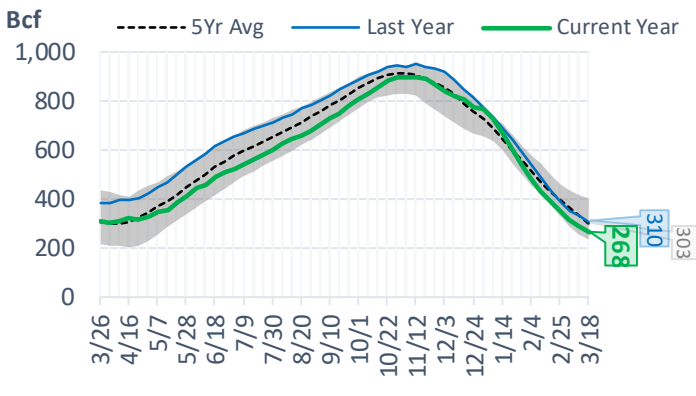
NonSalt Storage Levels



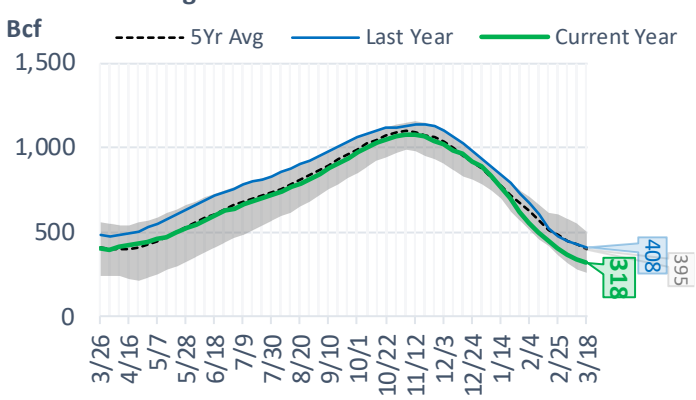
Salt Storage Levels



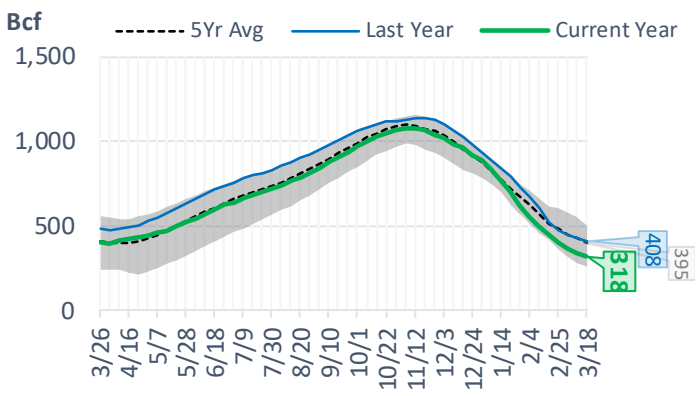
East Storage Levels



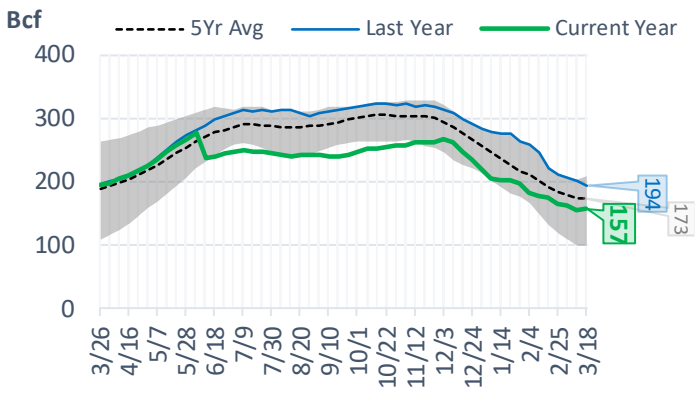
Midwest Storage Levels



Midwest Storage Levels



Pacific Storage Levels



EIA Storage Week Balances

	18-Feb	25-Feb	4-Mar	11-Mar	18-Mar	25-Mar	WoW	vs. 4W
Lower 48 Dry Production	**95.8**	**94.4**	**94.4**	**95.0**	**94.0**	**95.3**	**1.2**	**0.8**
Canadian Imports	**6.2**	**6.4**	**5.9**	**5.2**	**5.2**	**4.8**	**-0.4**	**-0.8**
L48 Power	26.8	27.3	28.8	27.7	27.4	25.5	-1.9	-2.2
L48 Residential & Commercial	40.3	41.4	38.7	33.3	31.6	23.4	-8.1	-12.8
L48 Industrial	26.1	26.2	23.1	22.6	20.6	21.2	0.6	-1.9
L48 Lease and Plant Fuel	5.2	5.1	5.1	5.2	5.1	5.2	0.1	0.0
L48 Pipeline Distribution	3.2	3.2	3.3	3.2	3.1	2.6	-0.5	-0.6
L48 Regional Gas Consumption	**101.6**	**103.2**	**99.0**	**91.9**	**87.8**	**77.9**	**-9.9**	**-17.6**
Net LNG Exports	**13.0**	**11.7**	**12.5**	**12.8**	**12.9**	**13.0**	**0.1**	**0.5**
Total Mexican Exports	**6.1**	**6.1**	**6.4**	**6.6**	**6.6**	**6.5**	**-0.1**	**0.1**
Implied Daily Storage Activity	**-18.6**	**-20.2**	**-17.6**	**-11.1**	**-7.9**	**2.7**	**10.6**	
EIA Reported Daily Storage Activity	**-18.4**	**-19.9**	**-17.7**	**-11.3**	**-7.3**			
Daily Model Error	**-0.2**	**-0.4**	**0.1**	**0.2**	**-0.6**			

Monthly Balances

	2Yr Ago Mar-20	LY Mar-21	Nov-21	Dec-21	Jan-22	Feb-22	MTD Mar-22	MoM	vs. LY
Lower 48 Dry Production	**94.2**	**91.3**	**95.7**	**96.2**	**94.5**	**93.7**	**94.8**	**1.1**	**3.5**
Canadian Imports	**4.1**	**4.8**	**5.3**	**4.8**	**6.7**	**6.6**	**5.1**	**-1.5**	**0.4**
L48 Power	28.3	24.5	29.2	28.5	30.7	28.2	27.0	-1.2	2.5
L48 Residential & Commercial	27.6	28.9	28.4	33.8	49.1	43.1	29.6	-13.4	0.7
L48 Industrial	22.3	19.3	23.0	22.9	26.4	25.6	21.1	-4.4	1.9
L48 Lease and Plant Fuel	5.1	5.0	5.3	5.3	5.2	5.1	5.2	0.1	0.2
L48 Pipeline Distribution	2.9	2.8	2.9	3.2	3.9	3.4	2.9	-0.4	0.2
L48 Regional Gas Consumption	**86.2**	**80.4**	**88.8**	**93.7**	**115.2**	**105.3**	**85.8**	**-19.4**	**5.4**
Net LNG Exports	**8.5**	**11.1**	**11.4**	**12.1**	**12.4**	**12.4**	**12.8**	**0.4**	**1.7**
Total Mexican Exports	**5.4**	**6.5**	**6.1**	**6.2**	**6.3**	**6.2**	**6.5**	**0.4**	**0.1**
Implied Daily Storage Activity	**-1.9**	**-2.0**	**-5.3**	**-11.0**	**-32.6**	**-23.5**	**-5.3**		
EIA Reported Daily Storage Activity									
Daily Model Error									

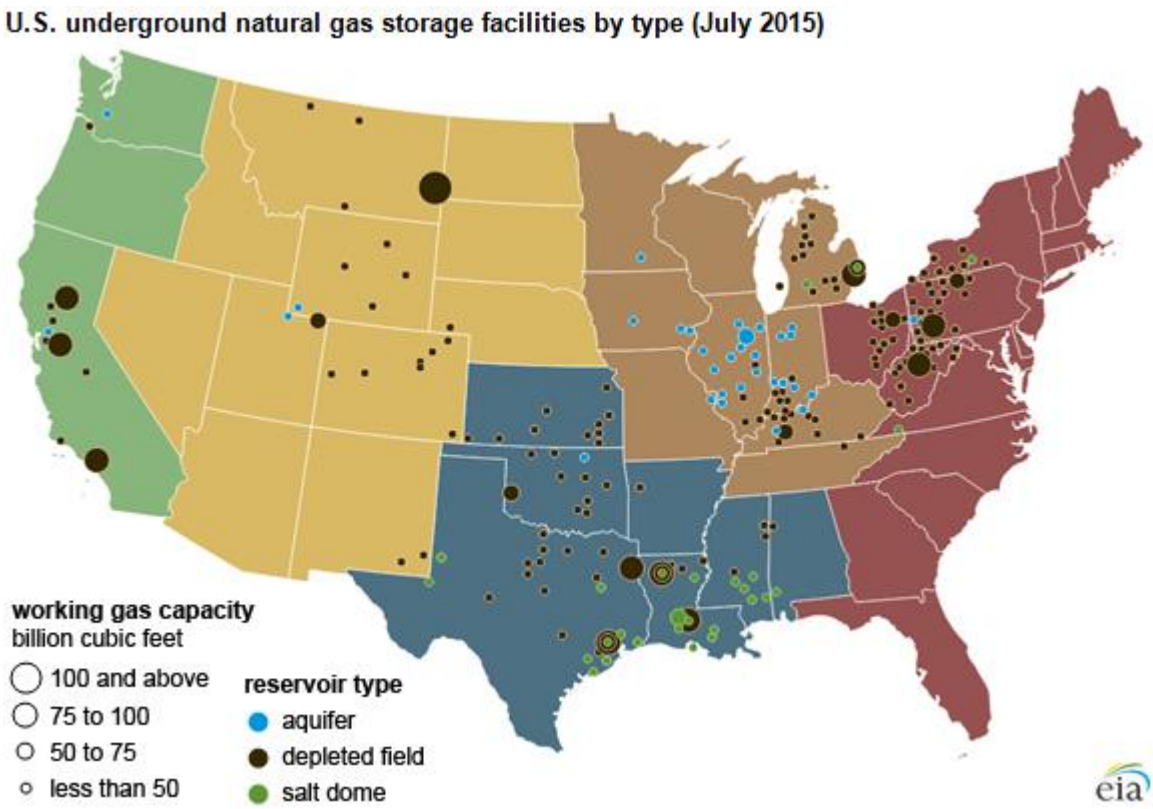
Source: Bloomberg, analytix.ai

Regional S/D Models Storage Projection

Week Ending 25-Mar

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	3.1	0.0	3.1	22
East	-2.4	2.1	-0.2	-2
Midwest	1.1	-0.4	0.7	5
Mountain	3.5	-3.7	-0.2	-2
South Central	0.4	1.9	2.3	16
Pacific	0.5	0.2	0.7	5

*Adjustment Factor is calcuated based on historical regional deltas

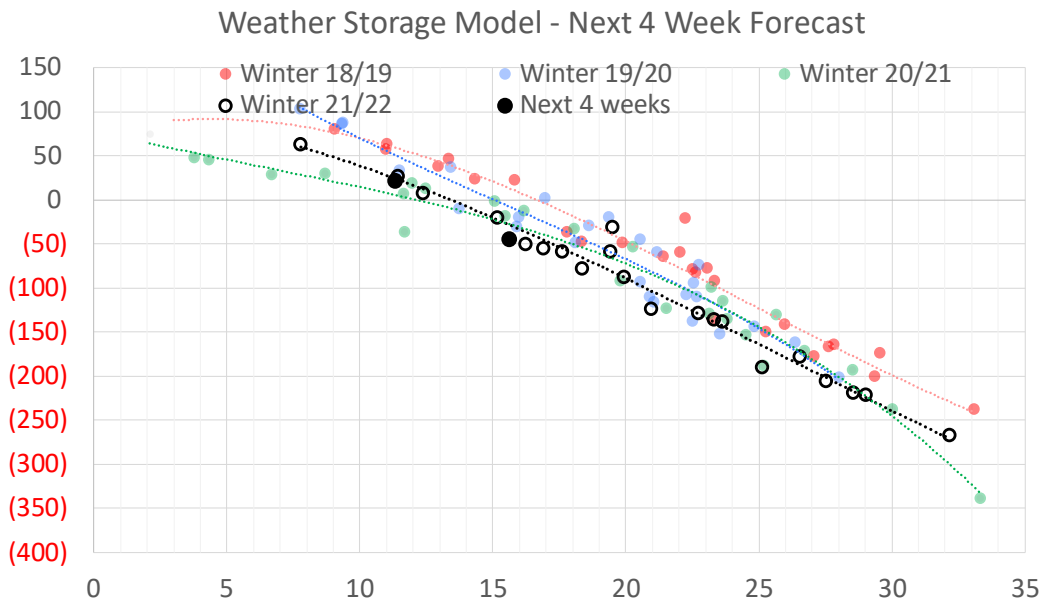


Weather Model Storage Projection

Next report and beyond

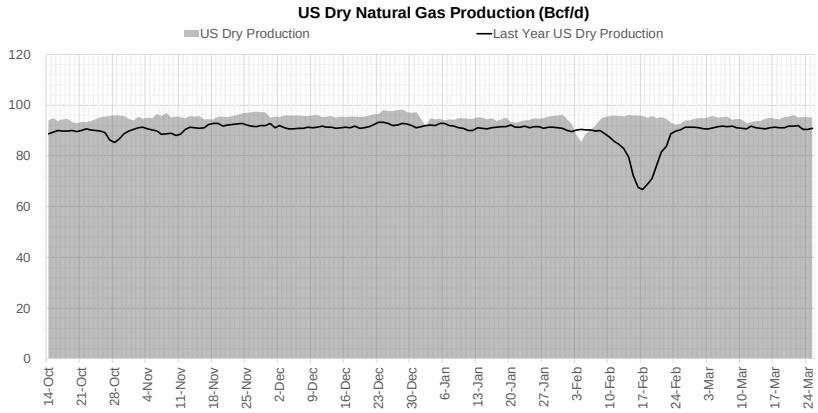
Week Ending	GWDDs	Week Storage Projection
25-Mar	11	22
01-Apr	16	-44
08-Apr		
15-Apr		

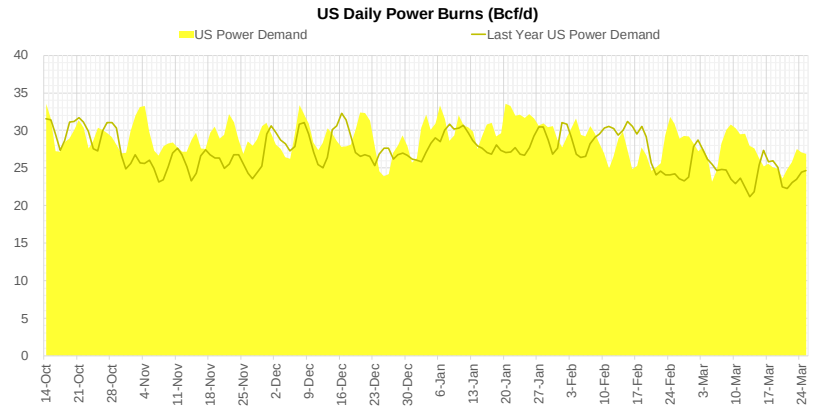
Summer Model next week

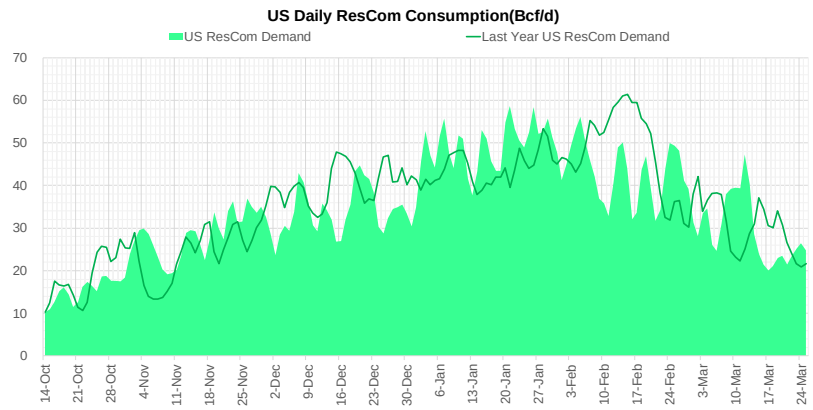


Note: this is not our official end of season forecast. This chart signifies where storage levels end with 10-year normal weather and current market tightness relative to last year

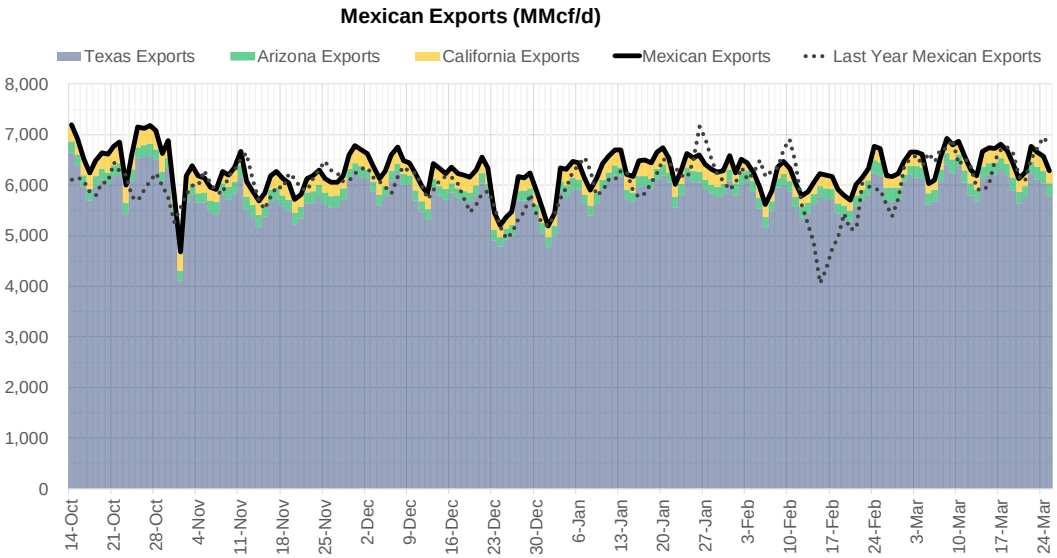
Supply – Demand Trends

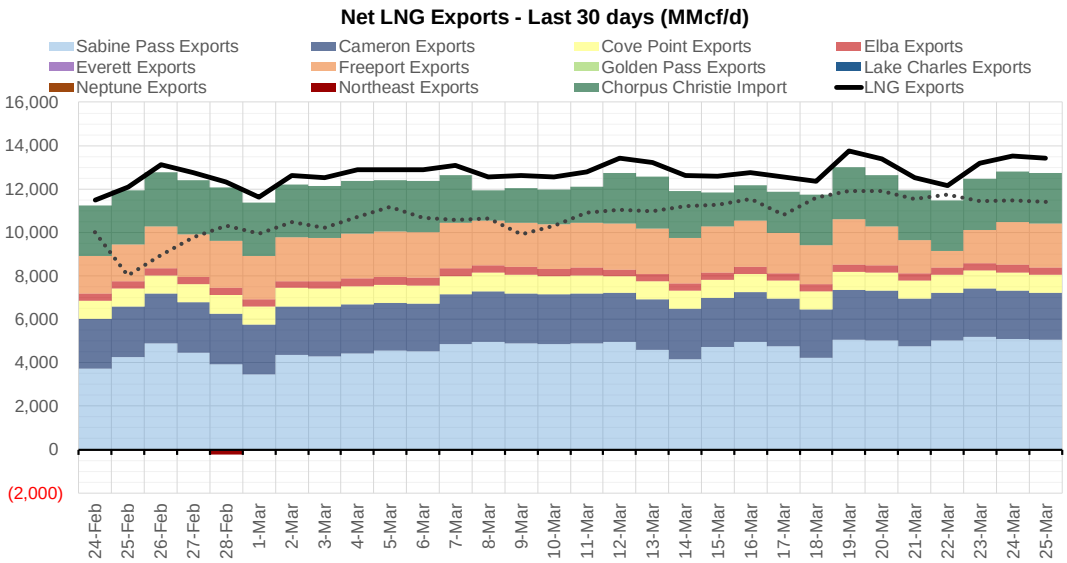






Source: Bloomberg





Source: Bloomberg

Nat Gas Options Volume and Open Interest

CME and ICE data combined

CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE VOL
4	2022	C	6.00	6869
4	2022	C	5.50	6034
7	2022	C	6.00	5253
9	2022	C	7.00	4501
7	2022	C	6.50	4423
10	2022	P	3.00	4216
9	2022	C	6.00	4185
8	2022	C	6.00	3933
4	2022	C	5.75	3401
4	2022	P	5.00	3361
6	2022	C	6.00	2921
5	2022	P	4.25	2865
8	2022	C	7.00	2859
5	2022	C	6.00	2349
5	2022	P	4.50	2085
10	2022	P	3.50	2084
10	2022	C	6.00	2001
4	2022	C	5.25	1989
5	2022	P	4.00	1844
5	2022	P	4.90	1779
4	2022	P	4.75	1761
5	2022	P	3.50	1712
5	2022	P	4.75	1632
4	2022	C	5.00	1551
4	2022	P	5.10	1504
4	2022	P	4.90	1399
4	2022	P	5.25	1301
8	2022	C	8.00	1282
1	2023	C	10.00	1280
7	2022	P	4.00	1279
7	2022	C	7.50	1250
6	2022	P	4.75	1239
5	2022	C	5.50	1202
10	2022	C	7.00	1197
6	2022	C	7.00	1151
6	2022	P	4.00	1133
6	2022	C	5.50	1104
6	2022	C	5.75	1100
9	2022	P	5.00	1078
5	2022	P	3.75	1044
5	2022	P	5.25	1039
9	2022	C	8.00	1023
6	2022	C	5.90	1016
7	2022	C	8.00	1012
9	2022	P	2.50	1000
9	2022	P	2.75	1000
4	2022	P	4.85	980
4	2022	P	4.50	948
5	2022	C	5.25	902

CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE OI
4	2022	P	3.50	34160
4	2022	C	4.75	30105
10	2022	C	6.00	29179
4	2022	P	3.00	28297
4	2022	C	5.00	27926
4	2022	C	6.00	26084
10	2022	C	5.00	26039
4	2022	P	4.00	24926
5	2022	P	4.00	24719
4	2022	P	3.75	23646
6	2022	C	6.00	23378
5	2022	C	6.00	23312
4	2022	P	4.50	23110
5	2022	P	3.00	22913
5	2022	C	5.00	22347
7	2022	C	6.00	21742
9	2022	C	6.00	21300
6	2022	P	4.00	21262
8	2022	C	6.00	20959
10	2022	P	3.00	20950
5	2022	P	2.50	19874
5	2022	P	3.50	19460
4	2022	C	5.50	19242
5	2022	C	7.00	17984
6	2022	C	5.00	17885
12	2022	C	5.00	17768
5	2022	P	2.75	17685
4	2022	C	4.50	17621
7	2022	P	3.25	17613
4	2022	C	3.00	17511
6	2022	P	3.00	17505
4	2022	P	2.50	17245
4	2022	P	4.25	17140
10	2022	P	2.50	16881
4	2022	P	3.25	15846
10	2022	P	4.00	15754
6	2022	P	3.50	15567
10	2022	C	7.00	15556
4	2022	C	8.00	15546
9	2022	P	2.50	15136
10	2022	P	3.50	15041
9	2022	P	2.75	14933
6	2022	P	3.75	14860
5	2022	P	3.75	14852
8	2022	C	7.00	14765
10	2022	P	2.00	14571
8	2022	P	3.00	14497
4	2022	C	7.00	14331
7	2022	P	3.00	14149
6	2022	C	4.5	14045

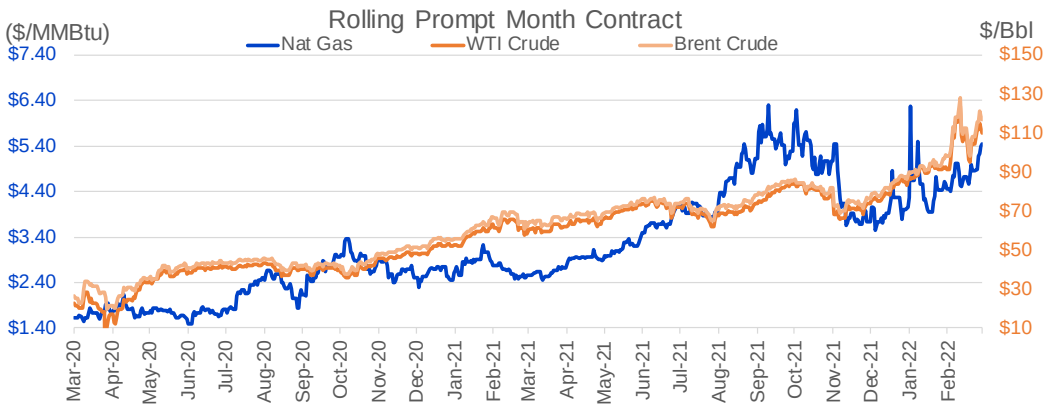
Source: CME, ICE

Nat Gas Futures Open Interest

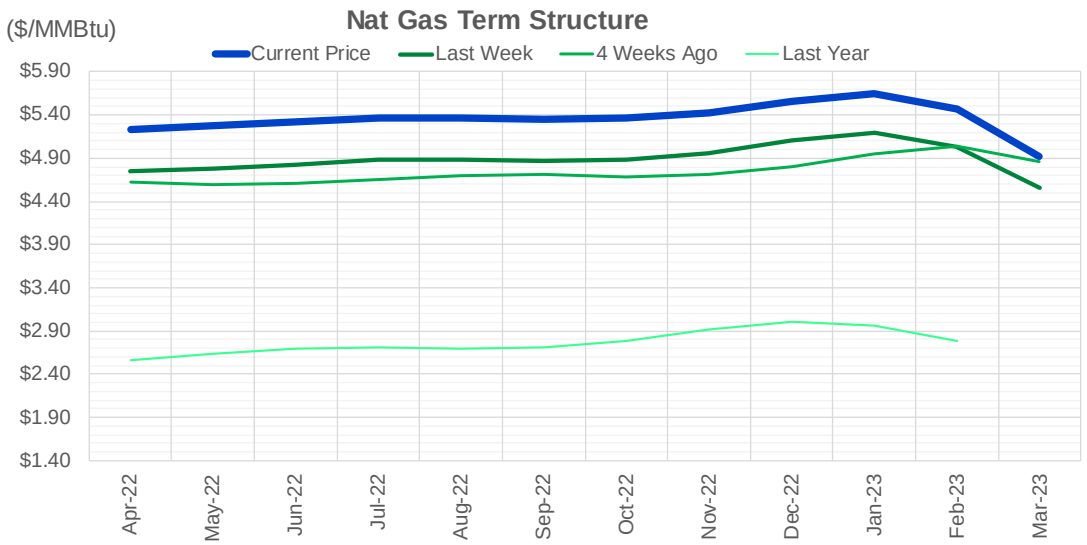
CME and ICE data combined

CME Henry Hub Futures (10,000 MMBtu)				ICE Henry Hub Futures Contract Equivalent (10,000 MM			
	Current	Prior	Daily Change		Current	Prior	Daily Change
APR 22	19344	28764	-9420	APR 22	75775	76403	-629
MAY 22	232058	229048	3010	MAY 22	84546	83541	1005
JUN 22	72216	71762	454	JUN 22	70934	71244	-310
JUL 22	93184	91543	1641	JUL 22	67543	67084	459
AUG 22	45162	43914	1248	AUG 22	60719	60682	37
SEP 22	77208	76461	747	SEP 22	64718	64840	-123
OCT 22	81314	79642	1672	OCT 22	69351	69176	176
NOV 22	42708	42996	-288	NOV 22	53694	53862	-168
DEC 22	46233	46346	-113	DEC 22	63118	63171	-52
JAN 23	63600	62379	1221	JAN 23	66073	65006	1067
FEB 23	20606	20393	213	FEB 23	46033	45669	365
MAR 23	37543	38023	-480	MAR 23	50817	50742	75
APR 23	47123	46553	570	APR 23	49851	49274	577
MAY 23	28255	27902	353	MAY 23	43959	44001	-42
JUN 23	15734	15665	69	JUN 23	41252	41005	247
JUL 23	13884	13676	208	JUL 23	40484	40257	228
AUG 23	10925	10996	-71	AUG 23	40106	39777	328
SEP 23	13910	13616	294	SEP 23	39973	39740	233
OCT 23	25673	24702	971	OCT 23	44266	44138	128
NOV 23	10509	10518	-9	NOV 23	40928	40925	3
DEC 23	14240	14219	21	DEC 23	36200	36194	6
JAN 24	18668	18511	157	JAN 24	32487	32287	201
FEB 24	4183	4169	14	FEB 24	22821	22727	94
MAR 24	15051	14568	483	MAR 24	27930	27674	256
APR 24	7881	7896	-15	APR 24	21163	20959	204
MAY 24	2280	2356	-76	MAY 24	19709	19642	67
JUN 24	1304	1199	105	JUN 24	19913	19770	143
JUL 24	1489	1489	0	JUL 24	20312	20164	147
AUG 24	1556	1576	-20	AUG 24	20478	20330	147
SEP 24	1204	1204	0	SEP 24	19610	19538	72

Source: CME, ICE



Market Report



	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Current Price	**$5.232**	**$5.274**	**$5.316**	**$5.366**	**$5.371**	**$5.350**	**$5.362**	**$5.423**	**$5.562**	**$5.653**	**$5.474**	**$4.925**
Last Week	$4.748	$4.784	$4.829	$4.880	$4.888	$4.870	$4.885	$4.956	$5.104	$5.198	$5.027	$4.558
vs. Last Week	$0.484	$0.490	$0.487	$0.486	$0.483	$0.480	$0.477	$0.467	$0.458	$0.455	$0.447	$0.367
4 Weeks Ago	$4.623	$4.593	$4.605	$4.647	$4.697	$4.705	$4.688	$4.709	$4.795	$4.944	$5.040	$4.862
vs. 4 Weeks Ago	$0.609	$0.681	$0.711	$0.719	$0.674	$0.645	$0.674	$0.714	$0.767	$0.709	$0.434	$0.063
Last Year	$2.518	$2.568	$2.630	$2.691	$2.708	$2.698	$2.714	$2.787	$2.919	$3.013	$2.960	$2.788
vs. Last Year	$2.714	$2.706	$2.686	$2.675	$2.663	$2.652	$2.648	$2.636	$2.643	$2.640	$2.514	$2.137

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jul21/Oct21	$/MMBtu	2.224	▲ 0.000	▲ 0.000	▲ 2.208
NatGas Oct21/Nov21	$/MMBtu	0.361	▲ 0.000	▲ 0.000	▲ 0.290
NatGas Oct21/Jan22	$/MMBtu	-1.817	▲ 0.000	▲ 0.000	▼ -2.107
NatGas Apr22/Oct22	$/MMBtu	0.128	▲ 0.003	▲ 0.008	▲ 0.083
WTI Crude	$/Bbl	112.34	▲ 9.360	▲ 19.530	▲ 53.780
Brent Crude	$/Bbl	119.03	▲ 12.390	▲ 19.950	▲ 57.080
Fuel Oil, NY Harbour 1%	$/Bbl	97.18	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	415.34	▲ 66.600	▲ 125.650	▲ 240.560
Propane, Mt. Bel	cents/Gallon	1.45	▲ 0.043	▲ 0.129	▲ 0.527
Ethane, Mt. Bel	cents/Gallon	0.43	▲ 0.004	▲ 0.027	▲ 0.210
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

3/18/2022

Baker Hughes

U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	524	-3	527	206	318
Gas	137	2	135	45	92
Miscellaneous	2	1	1	1	1
Directional	36	3	33	22	14
Horizontal	606	-1	607	234	372
Vertical	21	-2	23	-4	25

Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago
Oil	103	-24	127	62	41
Gas	73	-6	79	22	51

Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago
Ardmore Woodford	1	1	0	1	0
Arkoma Woodford	2	0	2	2	0
Barnett	3	0	3	2	1
Cana Woodford	28	0	28	17	11
DJ-Niobrara	14	0	14	7	7
Eagle Ford	55	-1	56	23	32
Granite Wash	3	0	3	3	0
Haynesville	66	1	65	21	45
Marcellus	36	0	36	6	30
Mississippian	1	0	1	1	0
Permian	316	0	316	100	216
Utica	12	0	12	3	9
Williston	33	-1	34	20	13