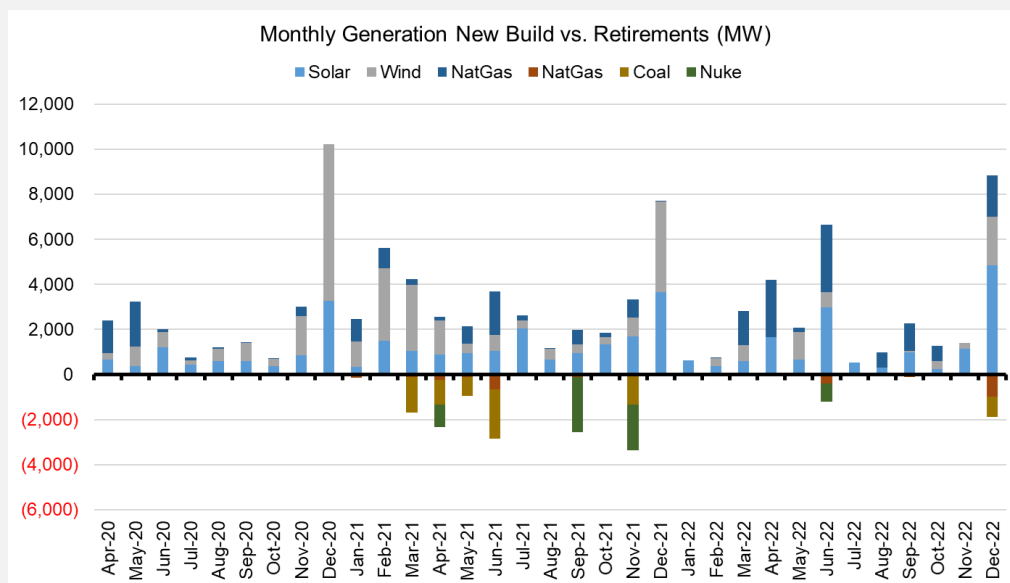
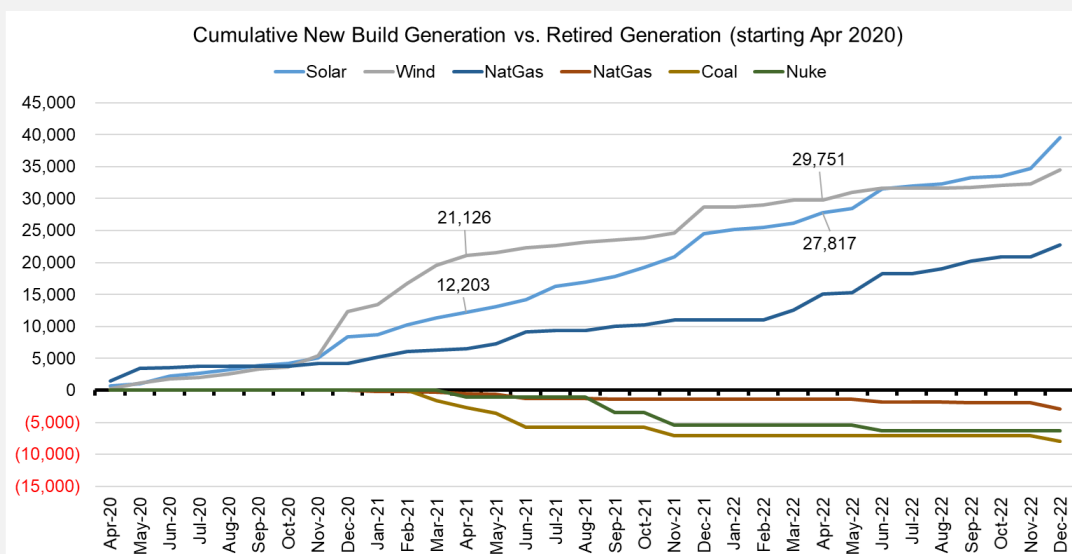


Renewable generation across the US has been steadily rising over the years and shows no signs of slowing in 2021. This will have a definite impact on power burns and storage injection rates this coming summer. To get a better of what's to come, we took close look at the EIA-860 report. The latest report was published in Jan 2021 and can be found here: <https://www.eia.gov/electricity/data/eia860m/>

According to the latest EIA report, wind and solar additions totaled 25GW in 2020, and the trend looks to continue. The data shows a massive push in Dec 2020, with over 10GW added in that month alone. In 2021, the report shows another 16GW of wind, and 16GW of solar coming online. The image below shows the historical and forward-looking monthly build-out of solar, wind, and natural gas generation as well as the retirement of coal and nuke facilities.



Looking at the same data in a cumulative format, we see large amount of capacity of solar and wind being added each month.



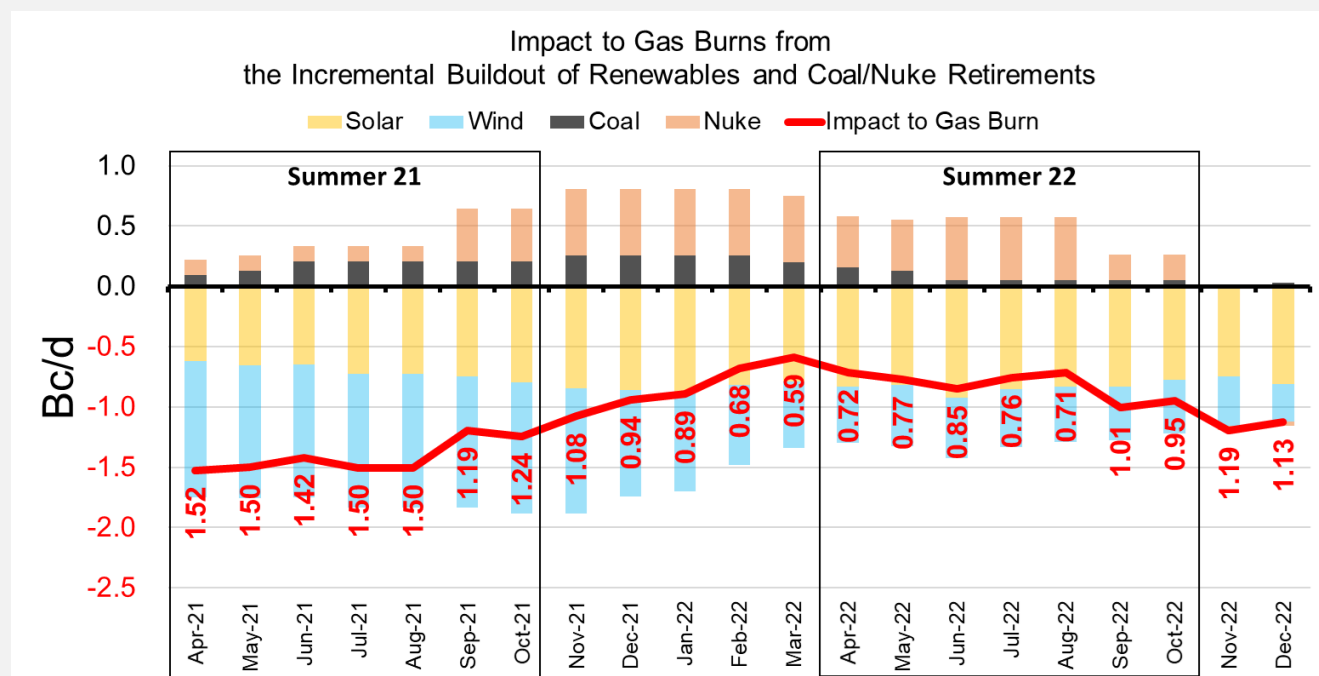
For this report, we want to focus on the year-on-year change in the stack as summer starts. The addition of wind and solar is bearish for nat gas usage, while the retirement of coal and nukes is bullish. As expected, the new renewable builds far out way the retirements.

We estimated the impact of the YoY change in the power stack at the national level. This a very rough estimate, but should serve as a good estimate on the change to power burns purely from the change in the power generation mix.

For this exercise, we estimated the new wind and solar capacity is utilized 30%, the retiring coal capacity was utilized at 20%, and the retiring nuclear capacity was utilized at 80%. For the retiring units, we assume it is replaced with a 7.5 heat rate nat gas unit.

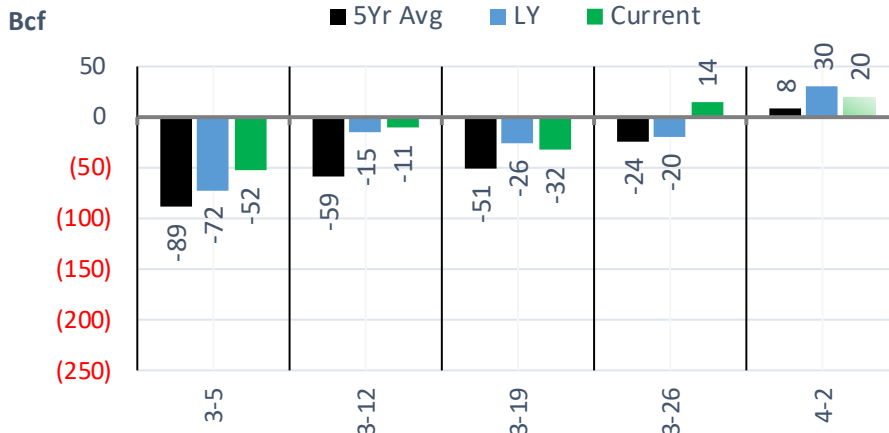
Using these assumptions, we estimate the gas burns will be on average 1.4 Bcf/d lower this summer from the net generation change. The impact to this coming winter will be an average of 0.8 Bcf/d lower.

Here is the monthly breakdown, assuming that the units come on as planned.

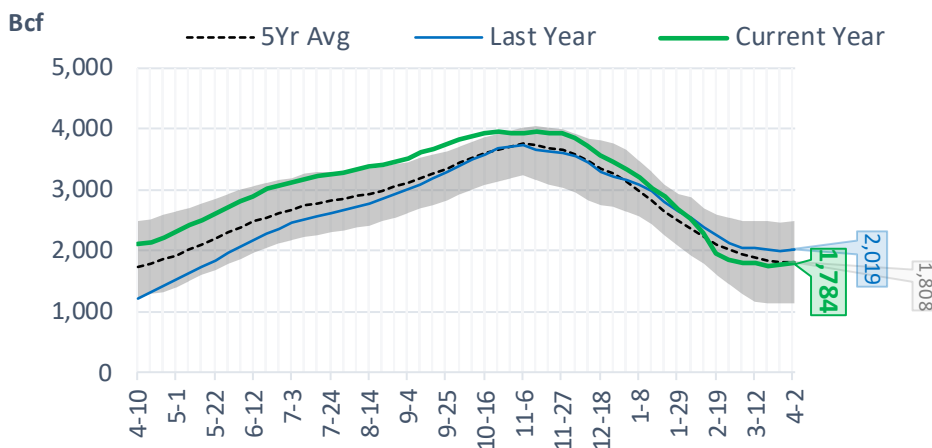


EIA Storage Report

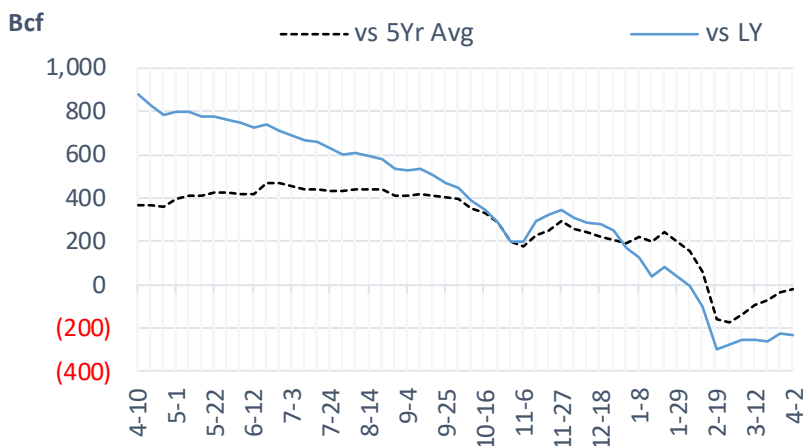
Total Lower 48 YoY Weekly Change



Total Lower 48 Storage Levels



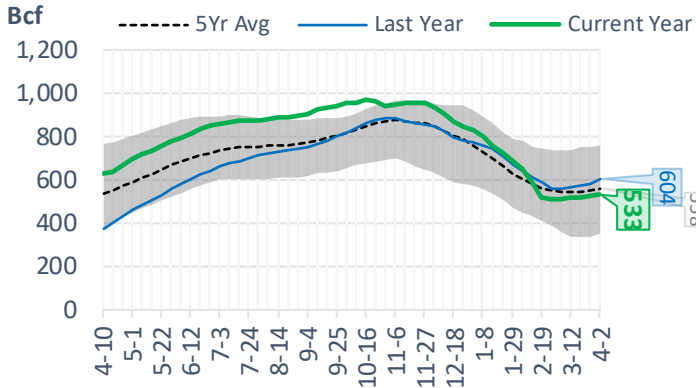
Total Lower 48 LY Surplus/Deficit



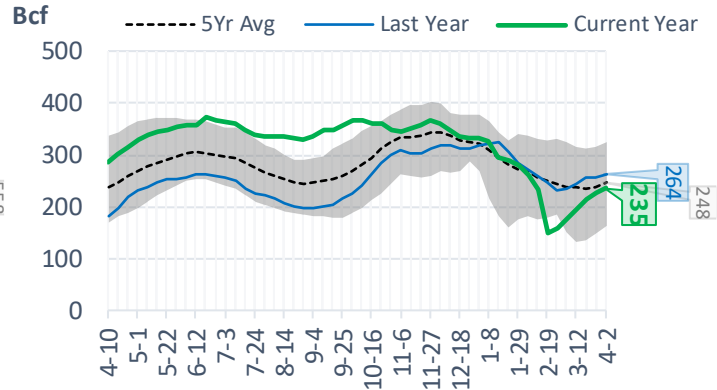
Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 2-Apr	Week - 1 26-Mar	Week - 2 19-Mar	Week - 3 12-Mar	Week - 4 5-Mar	Week - 5 26-Feb
Total Lower 48 Storage Level	1784	1764	1750	1782	1793	1845
Weekly Change	+20	+14	-32	-11	-52	-98
vs LY	-235	-225	-259	-253	-257	-277
vs 5Yr Avg	-24	-36	-74	-93	-141	-178
S. Central Salt Storage Level	235	226	215	197	176	159
Weekly Change	+9	+11	+18	+21	+17	+9
vs LY	-29	-30	-41	-48	-58	-74
vs 5Yr Avg	-13	-13	-21	-40	-62	-86
S. Central NonSalt Storage Level	533	523	519	519	509	511
Weekly Change	+10	+4	0	+10	-2	-9
vs LY	-71	-60	-52	-47	-47	-51
vs 5Yr Avg	-25	-25	-23	-24	-35	-41
Midwest Storage Level	398	401	405	426	440	465
Weekly Change	-3	-4	-21	-14	-25	-43
vs LY	-77	-77	-90	-88	-93	-102
vs 5Yr Avg	-2	-6	-19	-23	-33	-42
East Storage Level	305	307	307	328	350	383
Weekly Change	-2	0	-21	-22	-33	-41
vs LY	-77	-77	-93	-86	-80	-77
vs 5Yr Avg	+2	-3	-22	-25	-32	-32
Mountain Storage Level	115	112	112	114	113	117
Weekly Change	+3	0	-2	+1	-4	-6
vs LY	+23	+20	+19	+18	+15	+14
vs 5Yr Avg	+9	+6	+6	+7	+4	+4
Pacific Storage Level	198	194	193	199	205	210
Weekly Change	+4	+1	-6	-6	-5	-8
vs LY	-4	-3	-2	0	+5	+13
vs 5Yr Avg	+4	+5	+7	+13	+17	+19

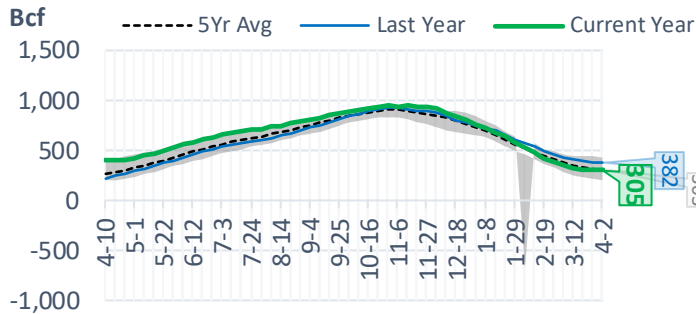
NonSalt Storage Levels



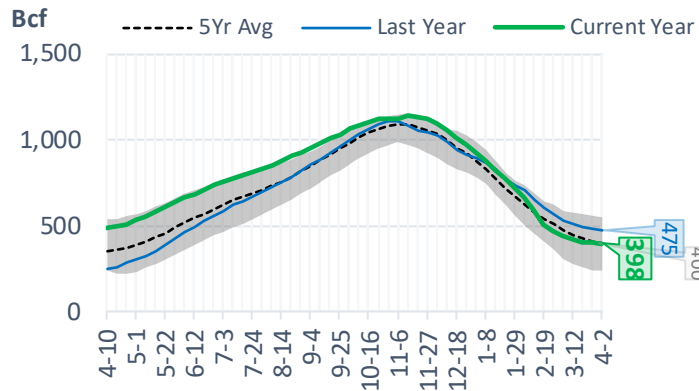
Salt Storage Levels



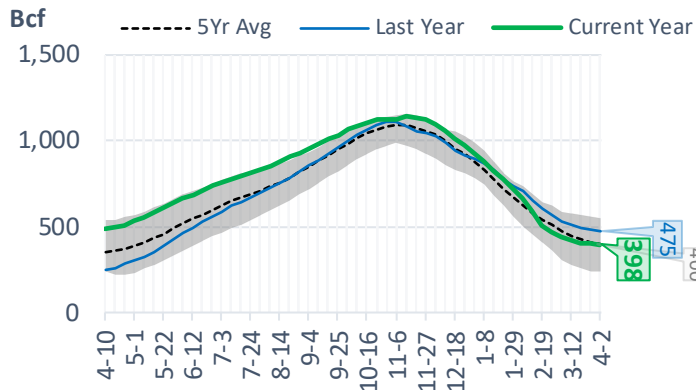
East Storage Levels



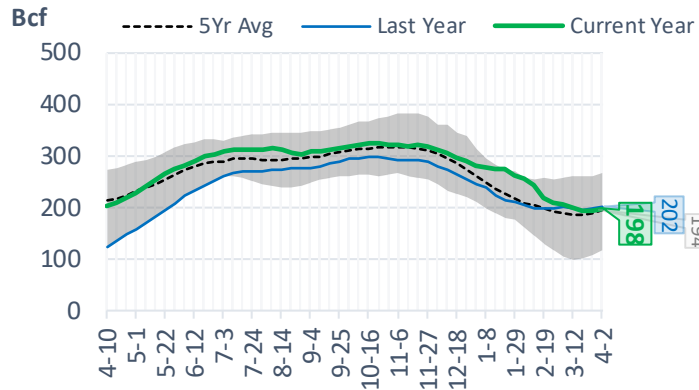
Midwest Storage Levels



Midwest Storage Levels



Pacific Storage Levels



EIA Storage Week Balances

	5-Mar	12-Mar	19-Mar	26-Mar	2-Apr	9-Apr	WoW	vs. 4W
Lower 48 Dry Production	91.7	91.8	91.8	92.0	92.5	91.7	▼-0.8	▼-0.3
Canadian Imports	4.9	4.7	5.0	4.5	4.5	4.2	▼-0.3	▼-0.5
L48 Power	26.3	24.9	24.9	24.1	24.7	23.3	▼-1.4	▼-1.3
L48 Residential & Commercial	34.9	30.2	30.3	24.9	23.2	18.5	▼-4.8	▼-8.7
L48 Industrial	19.4	18.6	21.2	20.1	21.3	20.4	▼-0.9	▲0.1
L48 Lease and Plant Fuel	5.1	5.1	5.1	5.1	5.1	5.0	▼0.0	▼0.0
L48 Pipeline Distribution	2.8	2.6	2.6	2.3	2.3	2.1	▼-0.2	▼-0.4
L48 Regional Gas Consumption	88.6	81.5	84.1	76.6	76.7	69.3	▼-7.4	▼-10.4
Net LNG Exports	10.1	10.6	11.2	11.6	11.7	11.5	▼-0.2	▲0.2
Total Mexican Exports	6.0	6.5	6.3	6.6	6.4	6.0	▼-0.4	▼-0.4
Implied Daily Storage Activity	-8.0	-2.0	-4.8	1.7	2.2	9.1	6.9	
EIA Reported Daily Storage Activity	-7.4	-1.6	-4.6	2.0	2.9			
Daily Model Error	-0.6	-0.4	-0.2	-0.3	-0.7			

Monthly Balances

	2Yr Ago Apr-19	LY Apr-20	Dec-20	Jan-21	Feb-21	Mar-21	MTD Apr-21	MoM	vs. LY
Lower 48 Dry Production	89.1	91.9	91.0	90.5	85.1	91.9	91.3	▼-0.7	▲0.7
Canadian Imports	4.6	4.0	5.8	6.3	6.4	4.7	4.3	▼-0.4	▼-2.0
L48 Power	24.6	25.6	28.0	28.2	27.7	25.0	23.8	▼-1.2	▼-4.3
L48 Residential & Commercial	19.1	20.5	40.0	43.8	47.7	28.3	19.5	▼-8.7	▼-24.2
L48 Industrial	21.5	19.9	23.3	23.4	22.1	20.1	20.5	▲0.3	▼-3.0
L48 Lease and Plant Fuel	4.9	5.1	5.0	5.1	4.7	5.1	5.0	▼0.0	▼0.0
L48 Pipeline Distribution	2.2	2.3	3.1	3.2	3.4	2.5	2.1	▼-0.4	▼-1.1
L48 Regional Gas Consumption	72.3	73.2	99.4	103.7	105.7	81.1	71.0	▼-10.0	▼-32.7
Net LNG Exports	4.5	8.2	11.0	10.5	8.4	11.1	11.5	▲0.3	▲1.0
Total Mexican Exports	4.7	4.8	5.8	6.2	5.7	6.5	6.1	▼-0.4	▼-0.1
Implied Daily Storage Activity	12.3	9.6	-19.5	-23.5	-28.3	-2.0	7.0		
EIA Reported Daily Storage Activity									
Daily Model Error									

Source: Bloomberg, analytix.ai

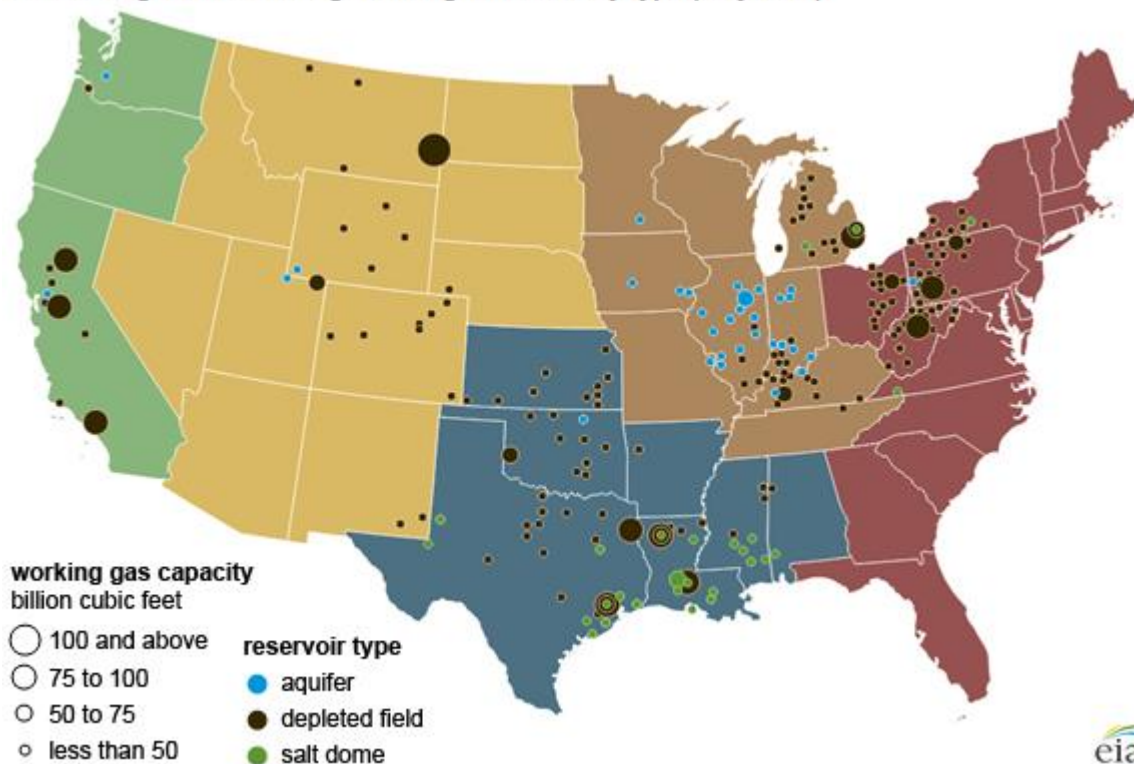
Regional S/D Models Storage Projection

Week Ending 9-Apr

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	8.8	0.8	9.6	67
East	-1.4	1.9	0.5	3
Midwest	2.9	0.1	3.0	21
Mountain	3.0	-2.9	0.1	1
South Central	2.6	2.2	4.8	34
Pacific	1.7	-0.4	1.3	9

*Adjustment Factor is calculated based on historical regional deltas

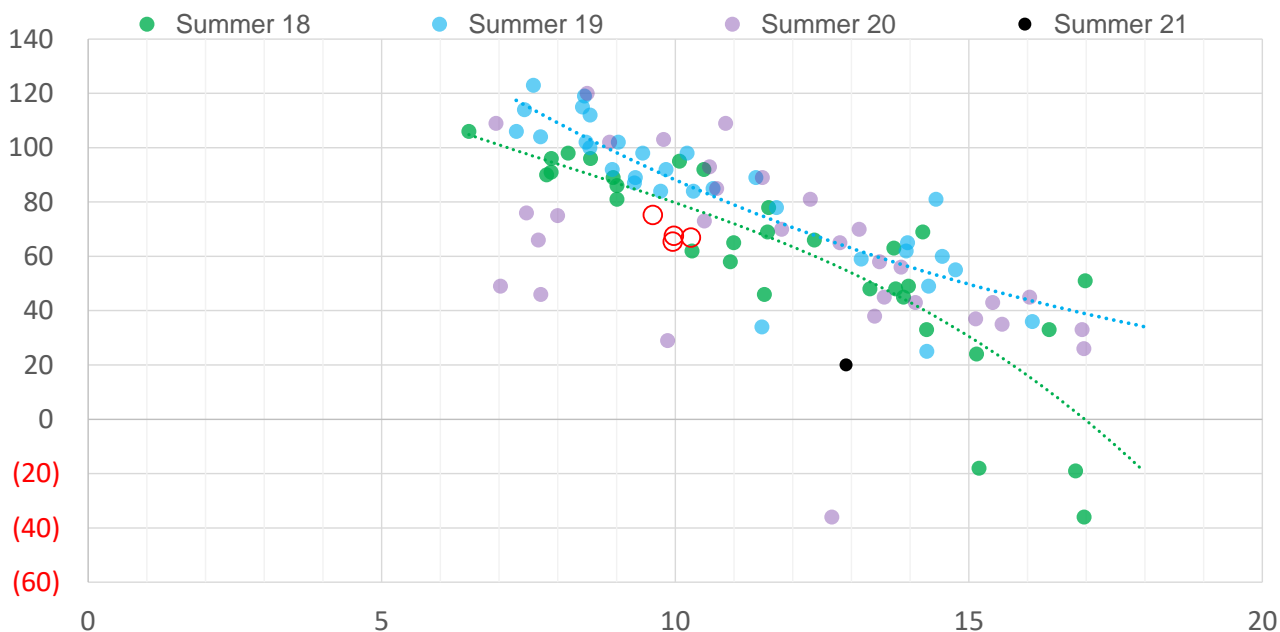
U.S. underground natural gas storage facilities by type (July 2015)



Weather Model Storage Projection

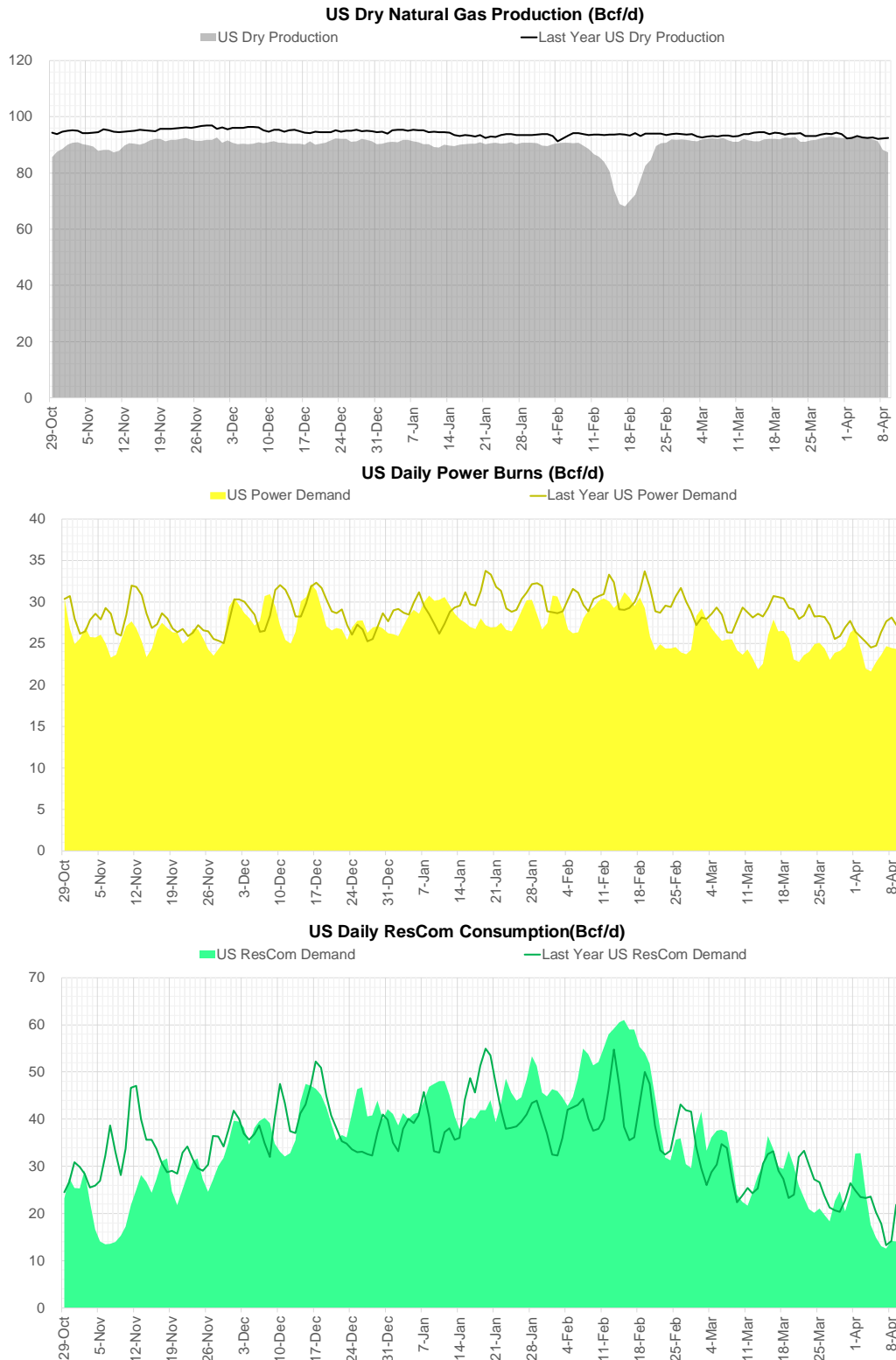
Next report and beyond		
Week Ending	Temp	Week Storage Projection
16-Apr	9.6	75
23-Apr	10.3	67
30-Apr	10.0	65

Weather Storage Model - Next 4 Week Forecast



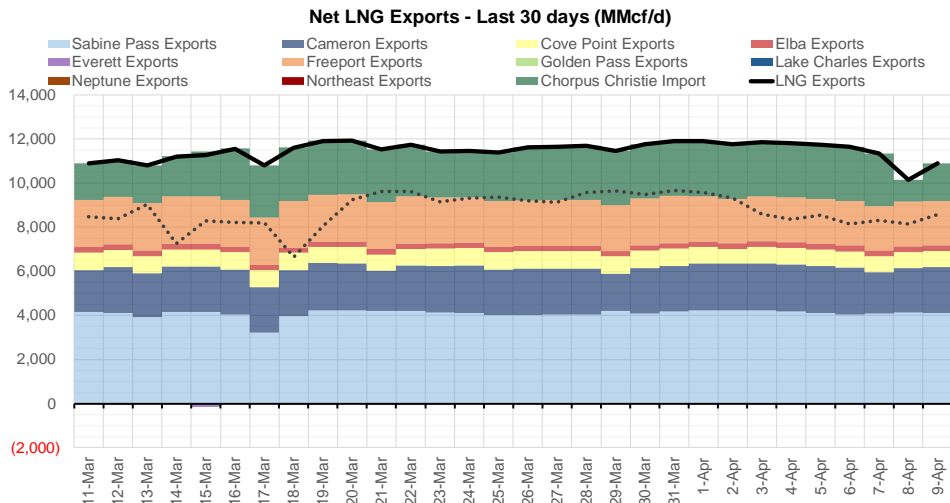
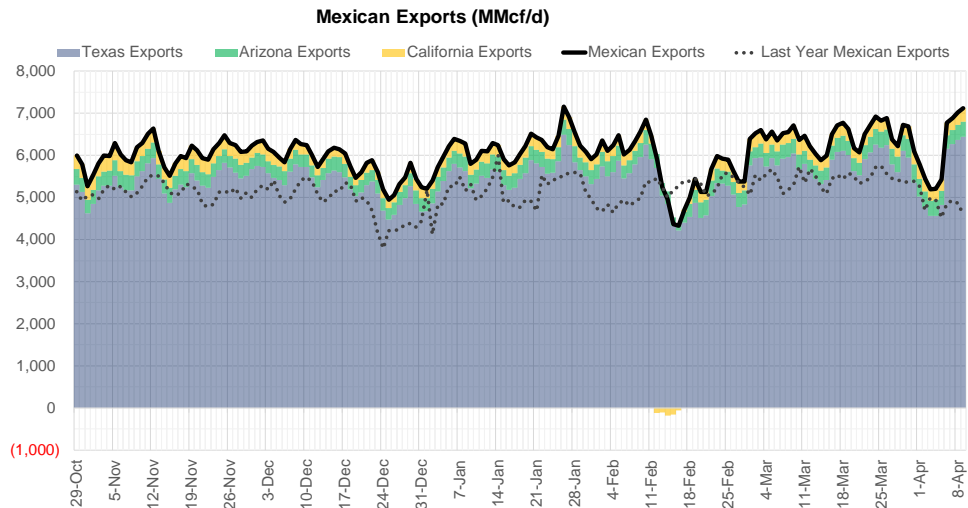
Note: this is not our official end of season forecast. This chart signifies where storage levels end with 10-year normal weather and current market tightness relative to last year

Supply – Demand Trends



Source: Bloomberg

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.



Source: Bloomberg

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

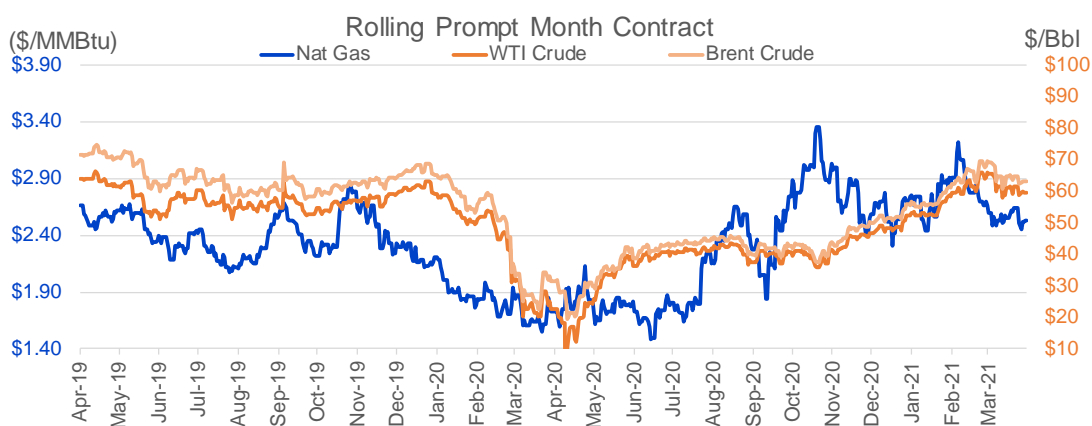
CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE VOL	CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE OI
5	2021	C	2.75	5271	10	2021	C	4.00	38651
5	2021	C	2.50	3837	5	2021	C	3.00	34981
5	2021	P	2.40	3442	8	2021	C	4.00	33978
5	2021	P	2.25	3402	10	2021	C	3.25	29337
5	2021	P	2.50	3305	7	2021	C	4.00	28238
5	2021	C	2.60	2853	6	2021	C	4.00	27953
5	2021	C	2.70	2484	5	2021	P	2.00	27477
6	2021	P	2.00	2452	5	2021	P	2.50	27070
5	2021	P	2.00	2255	5	2021	P	2.25	26612
5	2021	C	2.65	2233	10	2021	C	5.00	26039
5	2021	C	2.85	2140	5	2021	C	3.50	25718
6	2021	P	2.40	1902	5	2021	C	3.25	24962
6	2021	P	1.75	1750	8	2021	C	3.50	24862
5	2021	P	2.35	1689	5	2021	C	4.00	24706
7	2021	P	2.40	1603	6	2021	P	2.50	24091
5	2021	P	2.30	1565	10	2021	C	3.50	23265
6	2021	P	2.50	1435	6	2021	C	3.00	21519
7	2021	C	2.75	1161	8	2021	C	3.25	20863
10	2021	C	2.75	1150	7	2021	C	3.25	20371
8	2021	C	2.75	920	7	2021	P	2.50	20232
6	2021	P	2.25	906	8	2021	P	2.25	20203
6	2021	C	2.75	855	10	2021	C	3.00	19632
6	2021	P	2.30	835	6	2021	P	2.25	19492
5	2021	P	2.45	792	5	2021	C	2.75	19235
5	2021	C	3.00	705	9	2021	C	3.50	18919
9	2021	C	2.75	700	6	2021	C	3.25	18829
7	2021	P	2.50	660	4	2022	C	3.00	18765
8	2021	P	2.40	650	6	2021	C	3.50	18716
5	2021	P	2.20	600	7	2021	C	3.50	18534
7	2021	P	2.30	600	10	2021	P	2.50	18507
6	2021	C	3.00	567	10	2021	P	2.00	18109
5	2021	C	2.55	544	9	2021	P	2.00	17924
10	2021	C	4.00	501	11	2021	C	4.00	17500
10	2021	C	3.25	500	8	2021	C	3.00	17406
10	2021	C	5.00	500	5	2021	P	2.40	17232
6	2021	P	2.60	468	6	2021	P	2.00	16793
7	2021	P	2.25	400	12	2021	C	4.00	16400
11	2021	C	4.00	400	6	2021	C	3.75	15649
5	2021	P	2.05	391	7	2021	C	3.00	15576
6	2021	P	2.35	376	7	2021	P	2.00	15541
8	2021	P	2.50	367	10	2021	P	2.25	15494
7	2021	C	2.70	366	8	2021	P	2.50	15393
9	2021	P	2.40	350	8	2021	P	2.00	14823
10	2021	P	2.40	350	7	2021	P	2.25	14354
8	2021	P	2.45	334	6	2021	C	2.75	14240
10	2021	P	2.30	300	9	2021	C	4.00	14150
6	2021	C	2.90	297	9	2021	C	3.25	13958
9	2021	P	2.50	275	12	2021	P	2.00	13951
10	2021	C	3.00	275	9	2021	P	1.90	13641
					3	2022	C	5	13575

Source: CME, Nasdaq, ICE

Nat Gas Futures Open Interest CME, ICE and Nasdaq Combined

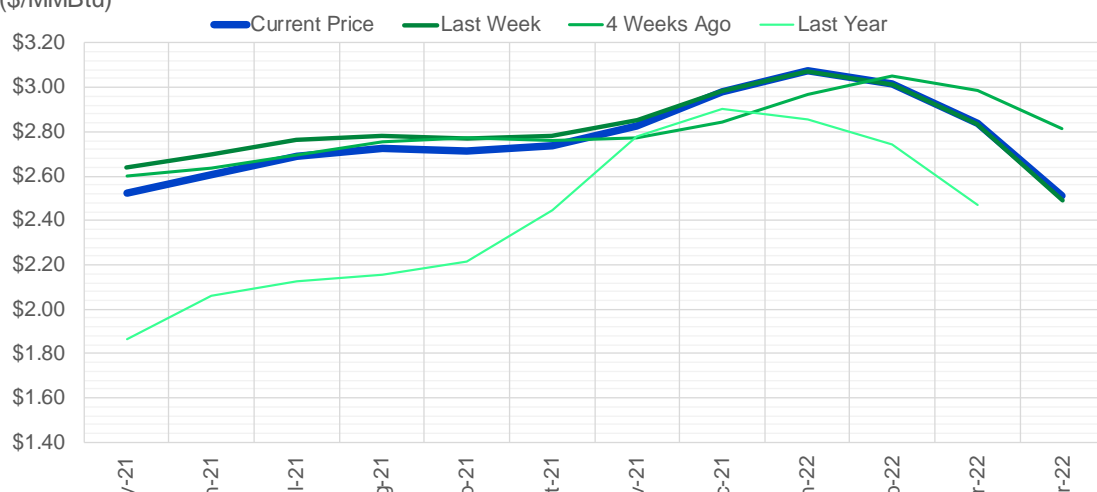
CME Henry Hub Futures (10,000 MMBtu)				ICE Henry Hub Futures Contract Equivalent (10,000 MM			
	Current	Prior	Daily Change	FOR JUNE 26	Current	Prior	Daily Change
MAY 21	245152	271784	-26632	MAY 21	85235	87204	-1969
JUN 21	121107	117251	3856	JUN 21	76873	78104	-1231
JUL 21	118707	106270	12437	JUL 21	85257	82847	2411
AUG 21	60090	60247	-157	AUG 21	76851	76816	34
SEP 21	104594	105001	-407	SEP 21	69288	69412	-125
OCT 21	132064	132541	-477	OCT 21	84211	84169	42
NOV 21	68184	68750	-566	NOV 21	59119	59278	-160
DEC 21	45740	45498	242	DEC 21	58818	58630	188
JAN 22	56344	54406	1938	JAN 22	59909	59444	465
FEB 22	22174	21597	577	FEB 22	44506	44315	191
MAR 22	41346	42062	-716	MAR 22	50339	50139	199
APR 22	47891	48049	-158	APR 22	46535	46472	63
MAY 22	23928	23719	209	MAY 22	39561	39368	193
JUN 22	14178	13948	230	JUN 22	38122	37915	207
JUL 22	8873	8262	611	JUL 22	37560	37402	159
AUG 22	8398	8385	13	AUG 22	37072	36898	174
SEP 22	8856	8694	162	SEP 22	37935	37788	147
OCT 22	20060	19763	297	OCT 22	42923	42732	191
NOV 22	9825	9810	15	NOV 22	33890	33778	113
DEC 22	9340	9343	-3	DEC 22	38643	38655	-12
JAN 23	5758	5812	-54	JAN 23	20474	20396	79
FEB 23	2351	2338	13	FEB 23	19400	19375	25
MAR 23	5082	4946	136	MAR 23	21382	21344	38
APR 23	5302	5219	83	APR 23	17552	17549	4
MAY 23	4024	4025	-1	MAY 23	17419	17408	12
JUN 23	1082	1079	3	JUN 23	16103	16104	-1
JUL 23	1010	1010	0	JUL 23	15976	15994	-18
AUG 23	751	751	0	AUG 23	16351	16352	-1
SEP 23	612	609	3	SEP 23	15528	15517	11
OCT 23	1627	1623	4	OCT 23	16774	16747	27

Source: CME, ICE



(\$/MMBtu)

Nat Gas Term Structure



	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
Current Price	\$2.526	\$2.605	\$2.691	\$2.724	\$2.715	\$2.735	\$2.823	\$2.980	\$3.073	\$3.013	\$2.837	\$2.511
Last Week	\$2.639	\$2.697	\$2.761	\$2.782	\$2.769	\$2.783	\$2.855	\$2.982	\$3.070	\$3.011	\$2.835	\$2.489
vs. Last Week	-\$0.113	-\$0.092	-\$0.070	-\$0.058	-\$0.054	-\$0.048	-\$0.032	-\$0.002	\$0.003	\$0.002	\$0.002	\$0.022
4 Weeks Ago	\$2.600	\$2.636	\$2.695	\$2.752	\$2.771	\$2.761	\$2.775	\$2.843	\$2.965	\$3.048	\$2.987	\$2.813
vs. 4 Weeks Ago	-\$0.074	-\$0.031	-\$0.004	-\$0.028	-\$0.056	-\$0.026	\$0.048	\$0.137	\$0.108	-\$0.035	-\$0.150	-\$0.302
Last Year	\$1.733	\$1.863	\$2.060	\$2.128	\$2.156	\$2.217	\$2.445	\$2.778	\$2.901	\$2.858	\$2.740	\$2.470
vs. Last Year	\$0.793	\$0.742	\$0.631	\$0.596	\$0.559	\$0.518	\$0.378	\$0.202	\$0.172	\$0.155	\$0.097	\$0.041

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	0.044	▼ -0.050	▼ -0.047	▲ 0.007
NatGas Oct21/Nov21	\$/MMBtu	0.088	▲ 0.016	▲ 0.156	▲ 0.128
NatGas Oct21/Jan22	\$/MMBtu	0.338	▲ 0.573	▲ 0.573	▲ 0.518
NatGas Apr22/Oct22	\$/MMBtu	0.034	▲ 0.615	▲ 0.603	▲ 0.520
WTI Crude	\$/Bbl	59.32	▼ -2.130	▼ -6.290	▲ 36.560
Brent Crude	\$/Bbl	62.95	▼ -1.910	▼ -6.270	▲ 31.470
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	180.76	▼ -2.400	▼ -15.990	▲ 83.500
Propane, Mt. Bel	cents/Gallon	0.85	▼ -0.101	▼ -0.105	▲ 0.540
Ethane, Mt. Bel	cents/Gallon	0.23	▲ 0.005	▲ 0.007	▲ 0.124
Coal, PRB	\$/MTon	12.30	▲ 0.000	▲ 0.000	▲ 0.000
Coal, PRB	\$/MMBtu	0.70			

Source: CME, Bloomberg

Baker Hughes Rig Counts

U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	337	0	337	-167	504
Gas	93	2	91	-3	96
Miscellaneous	2	0	2	0	2
Directional	18	-1	19	-17	35
Horizontal	394	3	391	-151	545
Vertical	20	0	20	-2	22
Canada Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	19	-5	24	13	6
Gas	39	-6	45	10	29
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago
Ardmore Woodford	0	0	0	-4	4
Arkoma Woodford	0	0	0	-1	1
Barnett	1	0	1	-1	2
Cana Woodford	12	0	12	3	9
DJ-Niobrara	7	0	7	-9	16
Eagle Ford	33	0	33	-18	51
Granite Wash	1	0	1	-1	2
Haynesville	45	1	44	7	38
Marcellus	30	0	30	-8	38
Permian	224	0	224	-92	316
Utica	10	1	9	1	9
Williston	14	0	14	-27	41