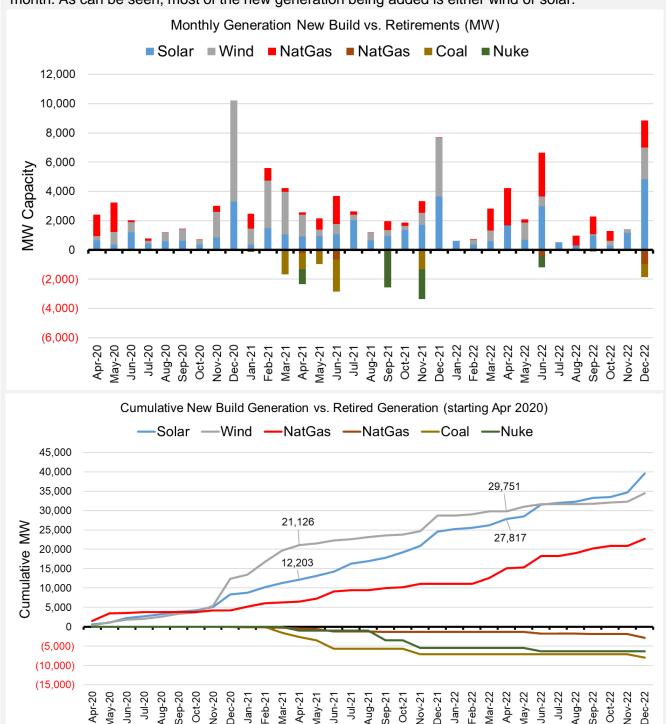


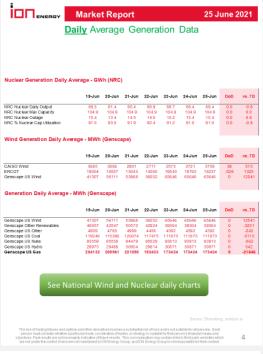
The addition of more renewables to the power stack is adding one more variable to track to keep on top of week-to-week fundamental demand changes. Wind and solar additions directly impact weekly gas burns and ultimately the amount of natural gas that goes in or out of storage daily. Below is data from the EIA-860 report showing the new generation and the retiring generation by fuel type each month. As can be seen, most of the new generation being added is either wind or solar.





This week we review some new data added to the daily report. Starting on pages 4 will be nuclear daily output data and generation data by fuel type. With this data, we will now have more visibility on the impacts on gas burns related to varying renewables output and nuclear outages.

The data will be displayed in tabular format to show daily changes vs past years, and also by storage week to show week-on-week changes impacting gas burn levels.





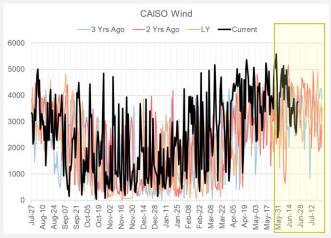


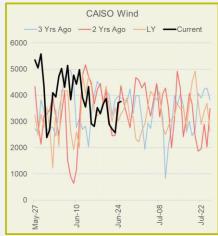


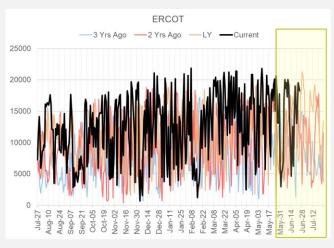


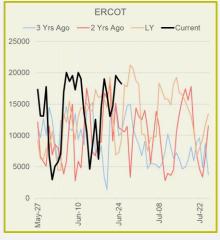
Wind is becoming a very important piece of the power stack. We have good visibility into CAISO, ERCOT, and the national level in the report now. Ultimately, this data can help us understand how the variability in renewable energy will impact real-time gas generation.

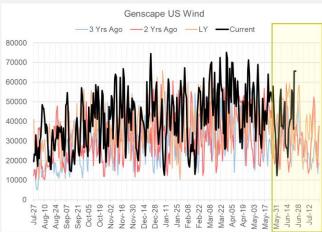
(this chart will be shown on page 15)

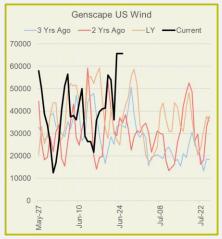














To better understand the gas impact, we have calculated the week-on-week gas burn impact in Bcf/d. We assume a 7.0 heat rate gas plant is on the margin at all times; hence it toggles on and off to correct for the wind and solar variations.

This right-most column in the table below (shown on page 5 of the report) gives us a proxy of how much gas burns were influenced by the delta in renewables generation and nuke outages.

Nuclear Generation Weekly Average - GWh (NRC)										
	21-May	28-May	4-Jun	11-Jun	18-Jun	25-Jun	WoW	WoW Bcf/d Impact		
NRC Nuclear Daily Output	81.7	86.7	89.2	88.6	86.7	89.9	3.2	-0.5		
NRC Nuclear Max Capacity	104.9	104.9	104.9	104.9	104.9	104.9	0.0			
NRC Nuclear Outage	23.2	18.1	15.7	16.3	18.1	15.0	-3.2			
NRC % Nuclear Cap Utilization	0.1	0.1	0.1	0.1	0.1	0.1	0.0			

#### Wind Generation Weekly Average - MWh (Genscape)

	21-May	28-May	4-Jun	11-Jun	18-Jun	25-Jun	WoW	WoW Bcf/d Impact
CAISO Wind	4429	4045	4012	4607	3723	3254	-470	0.1
ERCOT	15638	18210	9217	17072	10749	16549	5800	-1.0
Genscape US Wind	44217	54606	29242	43337	32707	51377	18670	-3.1

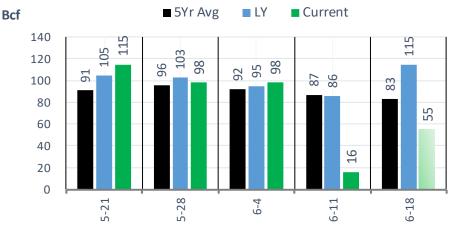
#### **Generation Weekly Average - MWh (Genscape)**

	21-May	28-May	4-Jun	11-Jun	18-Jun	25-Jun	WoW	WoW Bcf/d Impact
Genscape US Wind	44217	54606	29242	43337	32707	51377	18670	-3.1
Genscape US Solar	12784	13553	15426	15643	7817	11293	3476	-0.6
Genscape US Other	5356	5615	5443	5942	5201	4729	-472	0.1
Genscape US Coal	87761	101192	91844	118938	120230	118114	-2116	0.4
Genscape US Nuke	85515	90607	93111	92667	90822	94023	3201	-0.5
Genscape US Hydro	28694	27300	28202	32469	29459	30561	1102	-0.2
Genscape US Gas	155670	176363	167948	212241	210769	198426	-12343	2.1
Genscape US Total	419998	469236	431216	521236	497006	508523	11517	

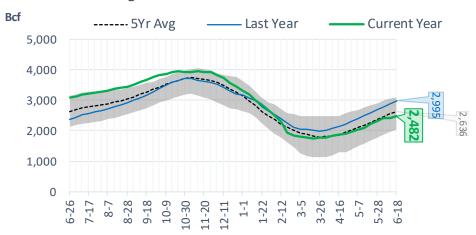


#### **EIA Storage Report**

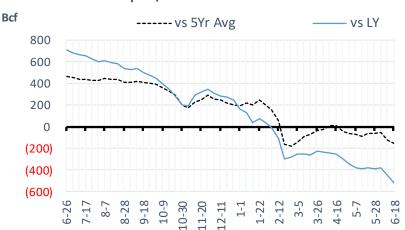
#### **Total Lower 48 YoY Weekly Change**



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



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

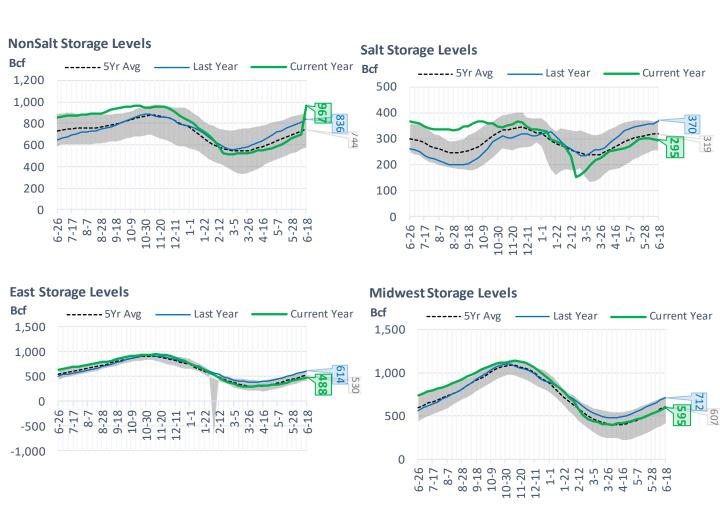


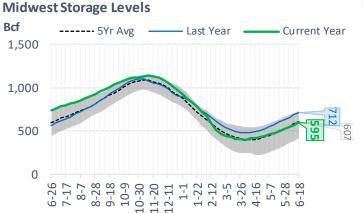


#### **Natural Gas Storage Stats - Last 5 Weeks**

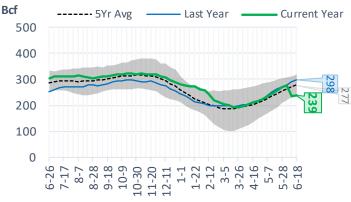
	Current	Week - 1	Week - 2	Week - 3	Week - 4	Week - 5
Week Ending	18-Jun	11-Jun	4-Jun	28-May	21-May	14-May
Total Lower 48 Storage Level	2482	2427	2411	2313	2215	2100
Weekly Change	+55	+16	+98	+98	+115	+71
vs LY	-513	-453	-383	-386	-381	-391
vs 5Yr Avg	-154	-126	-55	-61	-63	-87
S. Central Salt Storage Level	295	299	302	300	296	280
Weekly Change	-4	-3	+2	+4	+16	+11
vs LY	-75	-59	-54	-52	-52	-64
vs 5Yr Avg	-24	-18	-13	-12	-12	-24
S. Central NonSalt Storage Level	967	696	681	659	635	608
Weekly Change	+271	+15	+22	+24	+27	+20
vs LY	+131	-116	-113	-116	-119	-126
vs 5Yr Avg	+223	-33	-31	-36	-40	-48
Midwest Storage Level	595	570	547	522	499	472
Weekly Change	+25	+23	+25	+23	+27	+14
vs LY	-117	-114	-111	-108	-103	-101
vs 5Yr Avg	-12	-11	-7	-4	+2	+1
East Storage Level	488	461	445	413	385	358
Weekly Change	+27	+16	+32	+28	+27	+11
vs LY	-126	-122	-114	-118	-114	-109
vs 5Yr Avg	-42	-42	-31	-35	-34	-34
Mountain Storage Level	169	165	160	151	144	135
Weekly Change	+4	+5	+9	+7	+9	+4
vs LY	+5	+10	+13	+12	+13	+12
vs 5Yr Avg	+10	+12	+13	+11	+10	+7
Pacific Storage Level	239	236	276	268	256	247
Weekly Change	+3	-40	+8	+12	+9	+12
vs LY	-59	-53	-4	-4	-6	-4
vs 5Yr Avg	-38	-34	+13	+14	+11	+11













#### **EIA Storage Week Balances**

	21-May	28-May	4-Jun	11-Jun	18-Jun	25-Jun	WoW	vs. 4W
Lower 48 Dry Production	91.7	92.4	92.2	92.6	91.9	92.7	8.0	<b>0.4</b>
Canadian Imports	4.6	4.5	3.9	4.8	5.1	4.7	▼ -0.5	<b>▲ 0.1</b>
L48 Power	26.5	29.5	27.8	34.4	34.8	34.5	▼-0.3	<b>2.9</b>
L48 Residential & Commercial	10.5	9.4	11.8	8.4	8.2	8.3	<b>0.1</b>	<b>▼</b> -1.1
L48 Industrial	20.0	20.1	18.0	21.5	23.0	20.2	<b>▼</b> -2.8	<b>-</b> 0.4
L48 Lease and Plant Fuel	5.0	5.1	5.1	5.1	5.1	5.1	<b>0.0</b>	<b>0.0</b>
L48 Pipeline Distribution	1.9	2.0	2.0	2.1	2.1	2.1	▼ 0.0	<b>0.1</b>
L48 Regional Gas Consumption	63.9	66.0	64.7	71.5	73.1	70.3	▼ -2.9	<b>1.4</b>
Net LNG Exports	10.4	10.5	11.0	9.4	9.6	10.3	<b>0.7</b>	▲ 0.1
Total Mexican Exports	6.8	6.7	7.2	7.3	7.5	7.6	<b>0.0</b>	<b>0.4</b>
Implied Daily Storage Activity EIA Reported Daily Storage Activity Daily Model Error	15.2 16.4 -1.2	13.6 14.0 -0.4	13.3 14.0 -0.7	9.1 2.3 6.8	6.8 7.9 -1.1	9.2	2.4	

Monthly Balances									
-	2Yr Ago	LY					MTD		
	Jun-19	Jun-20	Feb-21	Mar-21	Apr-21	May-21	Jun-21	MoM	vs. LY
Lower 48 Dry Production	91.5	87.7	85.2	91.8	91.7	91.9	92.4	<b>0.5</b>	<b>4.6</b>
Canadian Imports	4.7	4.0	6.3	4.8	4.7	4.5	4.7	<b>0.2</b>	8.0 🛋
L48 Power	33.1	35.0	27.8	24.2	25.1	27.0	34.1	<b>7.1</b>	▼-0.8
L48 Residential & Commercial	9.0	8.8	47.1	29.3	20.0	13.1	8.3	<b>▼</b> -4.8	<b>-</b> 0.5
L48 Industrial	22.5	19.9	21.3	19.7	20.5	19.2	21.2	<b>1.9</b>	<b>1.3</b>
L48 Lease and Plant Fuel	5.0	4.8	4.7	5.0	5.0	5.0	5.1	<b>0.1</b>	<b>a</b> 0.3
L48 Pipeline Distribution	2.1	2.2	3.3	2.5	2.2	2.1	2.1	<b>0.0</b>	<b>▼</b> -0.1
L48 Regional Gas Consumption	71.7	70.7	104.1	80.9	72.8	66.4	70.8	<b>4.3</b>	<b>0.1</b>
Net LNG Exports	5.5	4.0	8.6	11.1	11.5	10.8	9.9	▼-0.9	<b>5.9</b>
Total Mexican Exports	5.2	5.5	5.8	6.5	6.7	6.8	7.5	<b>0.7</b>	<b>2.0</b>
Implied Daily Storage Activity EIA Reported Daily Storage Activity Daily Model Error	13.8	11.5	-27.0	-2.0	5.4	12.4	8.9		

Source: Bloomberg, analytix.ai

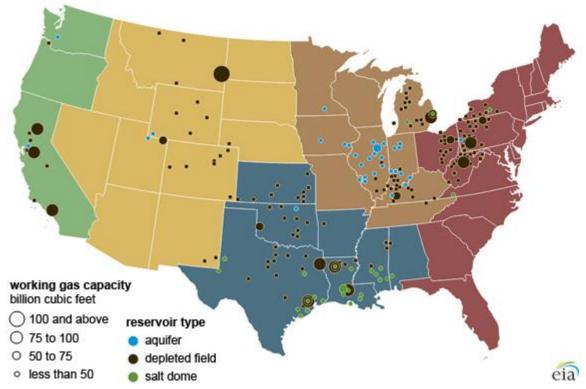
#### Regional S/D Models Storage Projection

Week Ending 25-Jun

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
<u>L48</u>	8.9	1.1	10.1	70
East	2.7	0.7	3.4	24
Midwest	4.4	-0.4	4.0	28
Mountain	4.8	-3.8	1.0	7
South Central	-3.6	4.7	1.1	8
Pacific	0.7	-0.2	0.5	4

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

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

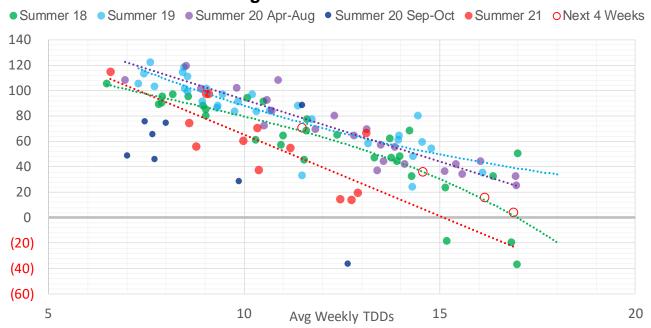




#### Weather Model Storage Projection

Next report and beyond		
		Week Storage
Week Ending	Temp	Projection
02-Jul	16.9	4
09-Jul	16.2	16
16-Jul	14.6	36

#### Weather Storage Model - Next 4 Week Forecast

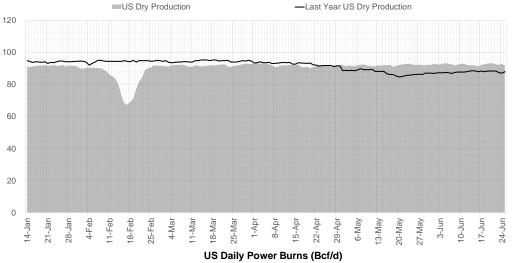


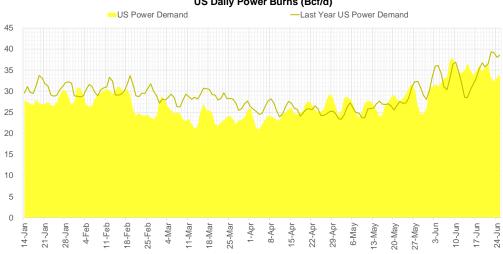
Note: this is not our official end of season forecast. This chart signifies where storage levels end with 10-year normal weather and current market tightness relative to last year



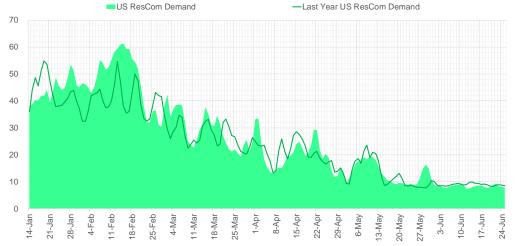
#### Supply - Demand Trends







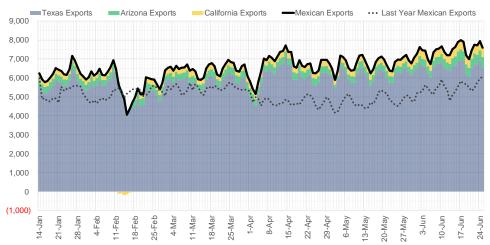
#### US Daily ResCom Consumption(Bcf/d)

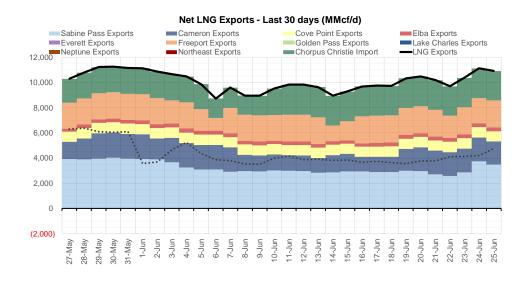


Source: Bloomberg



#### Mexican Exports (MMcf/d)







# 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	CUMULAT
7	2021	С	3.50	8154	10	2021	С	4.00	4656
7	2021	P	3.30	6374	8	2021	C	3.50	4282
8	2021	Р	2.90	6234	8	2021	C	4.00	422
8	2021	C	3.50	5307	9	2021	C	4.00	4078
7	2021	P	3.25	4901	10	2021	Č	3.50	342
10	2021	r P	2.75	4355	7	2021	Č	3.50	3383
7	2021	C	3.40	4204	10	2021	P	2.50	325
10	2021	C	4.50	3677	8	2021	Р	3.00	308
					8	2021	C	3.75	3079
11	2021	P	2.75	3510	7	2021	P	2.90	2948
11	2021	С	4.50	3500	8	2021	, P	2.50	2933
8	2021	С	4.00	3377	10	2021	C	3.25	290
8	2021	С	3.75	3022	7	2021	P	2.50	2879
7	2021	С	3.45	3011	7		C		
7	2021	С	3.35	2944		2021		4.00	2847
7	2021	С	3.30	2536	7	2021	С	3.25	2808
9	2021	Р	3.10	2449	10	2021	C	5.00	2802
4	2022	С	4.00	2150	9	2021	C	3.50	2650
11	2022	С	3.25	2100	7	2021	Р	2.75	2617
9	2021	P	2.90	1935	8	2021	С	3.25	2489
10	2021	Р	3.00	1810	10	2021	Р	2.75	2472
10	2021	Р	2.50	1794	10	2021	Р	2.00	2368
10	2021	P	3.25	1787	7	2021	Р	2.85	2367
9	2021	C	3.75	1773	8	2021	Р	2.90	2364
10	2021	C	5.50	1717	7	2021	Р	2.80	2345
		P			9	2021	Р	2.50	2340
7	2021	•	3.40	1631	7	2021	Р	3.00	232
7	2021	P	3.35	1606	12	2021	С	4.00	2270
8	2021	P	2.75	1550	7	2021	С	3.75	2184
8	2021	Р	3.25	1518	7	2021	С	3.00	2132
1	2022	Р	3.25	1450	9	2021	P	2.00	2042
3	2022	С	4.00	1450	8	2021	P	2.75	2037
9	2021	С	3.50	1390	9	2021	C	3.25	2032
9	2021	С	4.00	1354	10	2021	Č	4.50	2002
8	2021	Р	3.20	1353	10	2021	P	2.25	1974
8	2021	Р	3.10	1336	11	2021	C	4.00	1972
8	2021	С	5.00	1251	8	2021	P	2.00	1966
7	2021	Č	2.75	1229	4	2021	C	3.00	1962
8	2021	Č	4.25	1218			P		
9	2021	Č	4.50	1158	8	2021		2.25	1947
8	2021	C	3.85	1117	10	2021	С	3.00	1801
3	2022	P	2.25	1100	3	2022	С	4.00	1705
					10	2021	С	6.00	1619
5	2022	С	4.00	1100	8	2021	C	3.00	1618
6	2022	С	4.00	1100	7	2021	Р	2.00	1603
7	2022	C	4.00	1100	8	2021	С	3.30	1552
8	2022	C	4.00	1100	11	2021	Р	2.50	1547
9	2022	С	4.00	1100	7	2021	Р	2.70	1536
10	2022	С	4.00	1100	10	2021	С	3.75	1496
8	2021	Р	3.00	1093	3	2022	С	3.00	1479
4	2022	С	3.25	1000	1	2022	С	4.00	1462
5	2022	С	3.25	1000	3	2022	С	5	1401

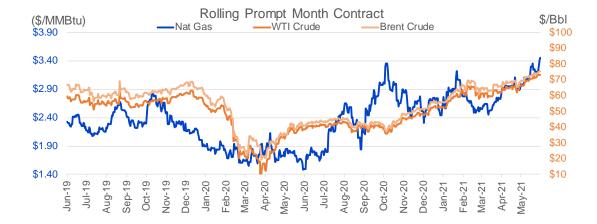
Source: CME, Nasdaq, ICE



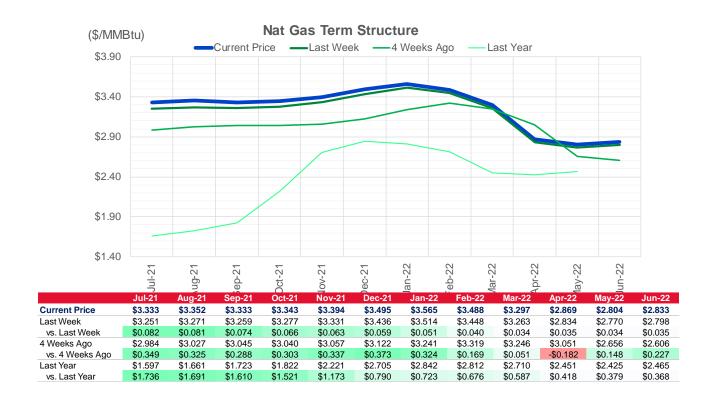
# Nat Gas Futures Open Interest CME, ICE and Nasdaq Combined

CME Henry H	lub Futures (1	10,000 MMBt	٦)	ICE Henry I	Hub Futures Cont	ract Equiva	alent (10,000 MM
	Current	Prior	Daily Change		Current	Prior	Daily Change
JUL 21	15786	24569	-8783	JUL 21	85332	87460	-2129
AUG 21	217719	215142	2577	AUG 21	87167	85038	2129
SEP 21	204533	204327	206	SEP 21	83996	85668	-1671
OCT 21	148120	145608	2512	OCT 21	97473	97265	208
NOV 21	92890	92545	345	NOV 21	71876	71553	323
DEC 21	65326	65369	-43	DEC 21	68607	68331	276
JAN 22	100067	100385	-318	JAN 22	83435	84699	-1264
FEB 22	39759	38003	1756	FEB 22	65366	65649	-283
MAR 22	84249	83333	916	MAR 22	65065	64911	154
APR 22	76087	75821	266	APR 22	59826	59186	640
MAY 22	55934	53751	2183	MAY 22	57277	55588	1689
JUN 22	24701	24824	-123	JUN 22	51666	51761	-95
JUL 22	18234	17900	334	JUL 22	50465	49969	496
AUG 22	18370	17745	625	AUG 22	50871	50381	490
SEP 22	16087	15762	325	SEP 22	50974	50478	496
OCT 22	49050	49284	-234	OCT 22	55859	57004	-1145
NOV 22	20113	20138	-25	NOV 22	44511	44270	241
DEC 22	14918	14609	309	DEC 22	47195	47102	93
JAN 23	10039	9379	660	JAN 23	27016	26527	490
FEB 23	3443	2910	533	FEB 23	24455	24197	258
MAR 23	7649	7576	73	MAR 23	27621	27352	269
APR 23	8758	8654	104	APR 23	21923	21705	217
MAY 23	4682	4686	-4	MAY 23	22182	21941	241
JUN 23	1173	1177	-4	JUN 23	20722	20462	261
JUL 23	1885	1885	0	JUL 23	20581	20314	267
AUG 23	969	969	0	AUG 23	20544	20308	236
SEP 23	1364	1364	0	SEP 23	20189	19929	260
OCT 23	2307	2307	0	OCT 23	21157	20881	276
NOV 23	816	816	0	NOV 23	19762	19559	204
DEC 23	1133	1133	0	DEC 23	20138	19927	211

Source: CME, ICE







				vs. 4 Weeks	
	Units	<b>Current Price</b>	vs. Last Week	Ago	vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	0.004	<b>▼</b> -0.020	<b>-</b> 0.029	<b>-</b> 0.015
NatGas Oct21/Nov21	\$/MMBtu	0.047	-0.006	<b>-</b> 0.019	<b>-</b> 0.003
NatGas Oct21/Jan22	\$/MMBtu	0.216	<b>-</b> 0.016	<b>-</b> 0.053	<b>-</b> 0.071
NatGas Apr22/Oct22	\$/MMBtu	0.015	<b>-</b> 0.009	<b>-</b> 0.026	<b>-</b> 0.035
WTI Crude	\$/Bbl	73.30	<b>2.260</b>	<b>6.450</b>	<b>34.580</b>
Brent Crude	\$/Bbl	75.56	<b>2.480</b>	<b>6.100</b>	<b>34.510</b>
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Heating Oil	cents/Gallon	216.23	<b>9.550</b>	<b>1</b> 0.590	<b>1</b> 00.670
Propane, Mt. Bel	cents/Gallon	0.97	<b>0.019</b>	<b>0.142</b>	<b>0.468</b>
Ethane, Mt. Bel	cents/Gallon	0.28	-0.001	<b>0.016</b>	<b>0.057</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	Count			
	6/25/202	21		Baker	Hughes 🤰
Lagation	Week	. 1	Week	. 1	Year
Location		+/-		+/-	
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	372	-1	373	184	188
Gas	98	1	97	23	75
Miscellaneous	0	0	0	-2 -2	2
iviiscenaneous	U	U	U	-2	4
Directional	30	5	25	10	20
Horizontal	421	-4	425	191	230
Vertical	19	-1	20	4	15
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago
Oil	82	8	74	78	4
Gas	44	1	43	35	9
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago
Ardmore Woodford	4				
	1	-1	2	0	1
Arkoma Woodford	1	0	1	1	0
Barnett	1 0	0 -1	1 1	1 -2	0 2
Barnett Cana Woodford	1 0 17	0 -1 2	1 1 15	1 -2 11	0 2 6
Barnett Cana Woodford DJ-Niobrara	1 0 17 9	0 -1 2 0	1 1 15 9	1 -2 11 5	0 2 6 4
Barnett Cana Woodford DJ-Niobrara Eagle Ford	1 0 17 9 32	0 -1 2 0 0	1 1 15 9 32	1 -2 11 5 21	0 2 6 4 11
Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash	1 0 17 9 32 2	0 -1 2 0 0	1 1 15 9 32 2	1 -2 11 5 21 2	0 2 6 4 11 0
Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash Haynesville	1 0 17 9 32 2 49	0 -1 2 0 0 0	1 15 9 32 2 49	1 -2 11 5 21 2 17	0 2 6 4 11 0 32
Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash Haynesville Marcellus	1 0 17 9 32 2 49 27	0 -1 2 0 0 0 0	1 15 9 32 2 49	1 -2 11 5 21 2 17	0 2 6 4 11 0 32 27
Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash Haynesville Marcellus Permian	1 0 17 9 32 2 49 27 236	0 -1 2 0 0 0 0 0	1 15 9 32 2 49 27 237	1 -2 11 5 21 2 17 0 105	0 2 6 4 11 0 32 27 131
Barnett Cana Woodford DJ-Niobrara Eagle Ford Granite Wash Haynesville Marcellus	1 0 17 9 32 2 49 27	0 -1 2 0 0 0 0	1 15 9 32 2 49	1 -2 11 5 21 2 17	0 2 6 4 11 0 32 27