

This week we start by getting our first glimpse of winter. This is the time of the season when all the major energy meteorologists start lining up to give their first view of which way winter goes. There are obviously varying views out there, but today we start with details from our friends at the World Climate Service (WCS).

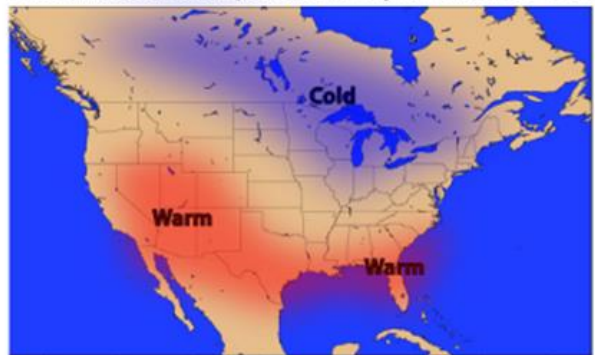
Hit this link to get the full report, which includes their view on the European Weather: preliminary winter forecast summary

This is the WCS assessment of likely winter outcomes based on current information; hence their confidence level of the current projection is moderate. The next update will be provided in mid-November.

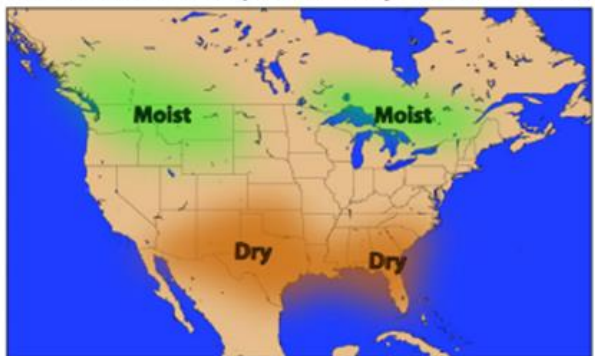
Summary:

- Warm in the Southwest and along the Gulf Coast (lingering influences of the La Nina)
- Cold from central Canada to the Great Lakes (chance of numerous cold air intrusions into the Ohio Valley)
- Wet in the Northern Rockies and in southeastern Canada; dry across the southern U.S.
- Above-normal wind from the Pacific Northwest to the Plains, calm near Newfoundland

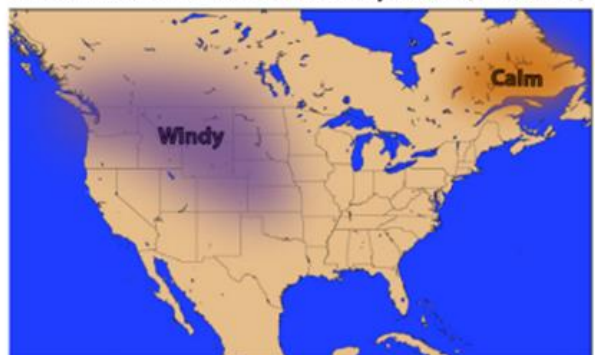
World Climate Service Temperature Anomaly Outlook (Dec-Jan-Feb)



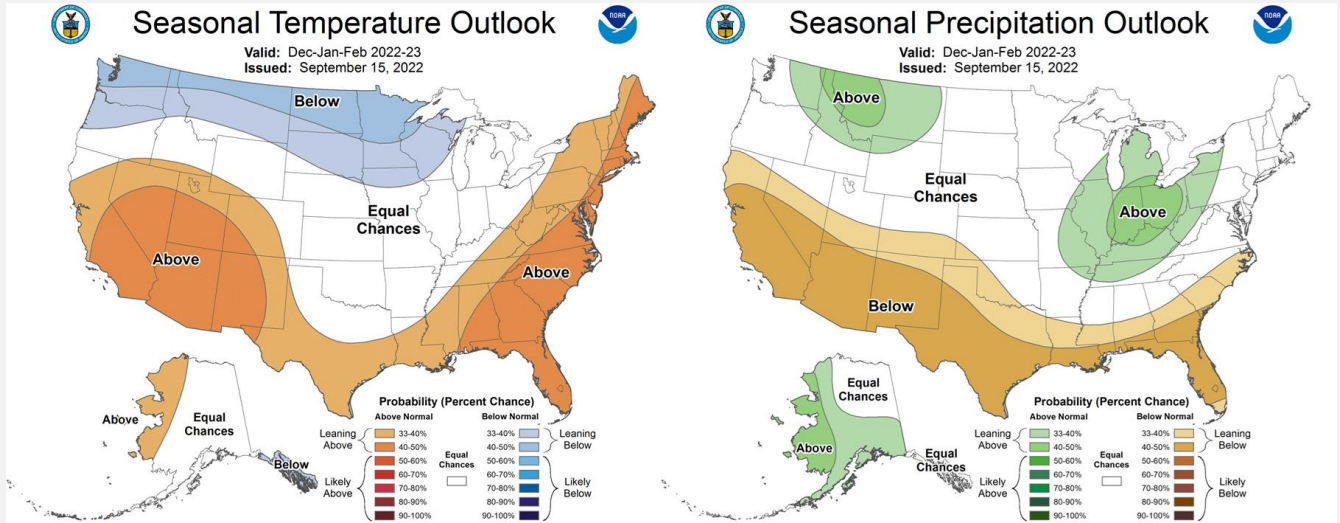
World Climate Service Precipitation Anomaly Outlook (Dec-Jan-Feb)



World Climate Service 100m Wind Anomaly Outlook (Dec-Jan-Feb)

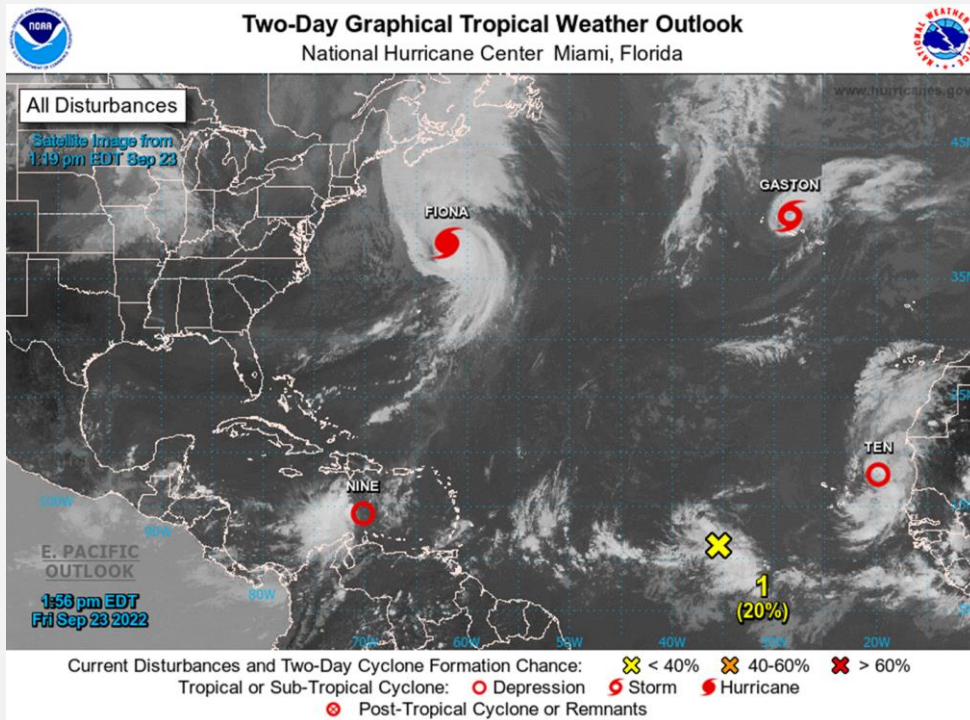


For comparison here is the latest outlook for Dec-Jan-Feb from NOAA, which looks very similar.



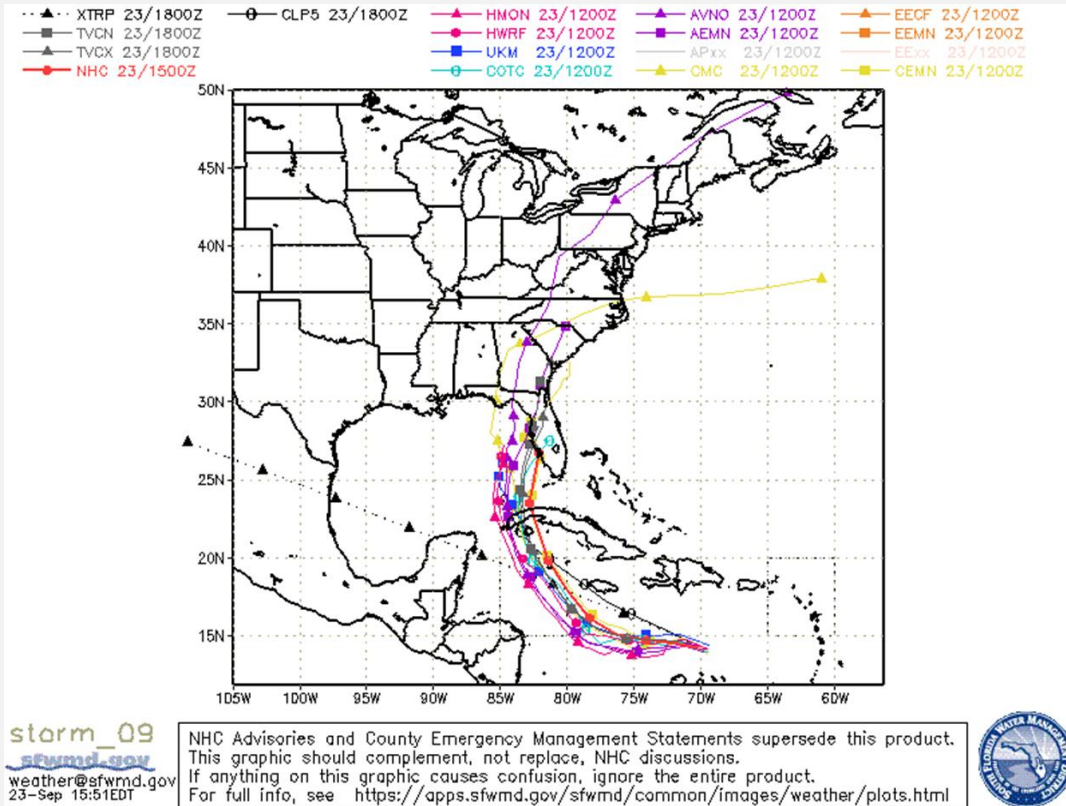
We also wanted to touch on something a bit more immediate, i.e. the rising activity in the Atlantics. Compared to the previous season, August and September have been unusually quiet even with the early calls for a very active hurricane season.

Currently, 5 storms are being tracked in the Atlantic by NOAA.



Source: <https://www.nhc.noaa.gov/gtwo.php?basin=atlc&fdays=2>

The paths for the storm are winding with the majority taking it into the Gulf of Mexico. The impact on energy markets are hard to predict as it could be net bullish or bearish to markets. In recent years, hurricanes have impacted demand by slowing LNG exports (damage to facilities or delaying cargoes) and/or reducing gas consumption with cooler temps and power outages. The majority of paths now show the storm winding into Western Florida.

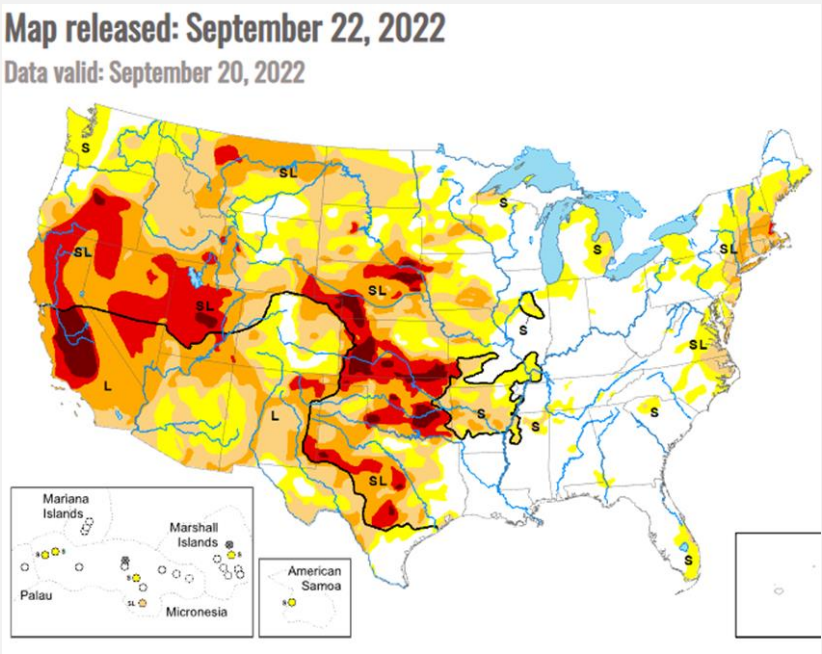


Source: <https://www.sfwmd.gov/weather-radar/hurricane-model-plots>

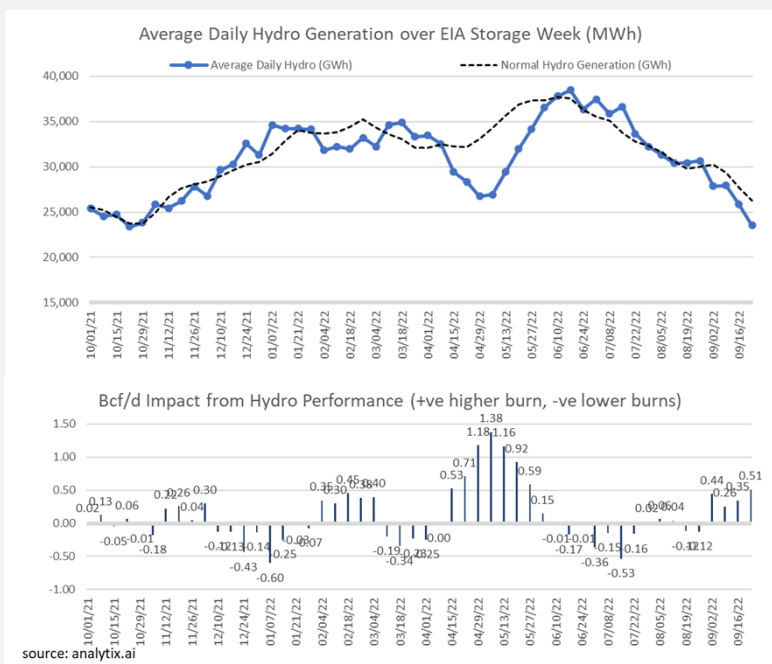
A good source to keep track of impacts to offshore production is the Bureau of Safety and Environmental Enforcement (BSEE) which tracks shut-in oil/gas production and the status of rigs/platforms daily. BSEE surveys 19 companies each day by 12:30pm ET and provides a report to their Newsroom by 2pm ET.

Link: <https://www.bsee.gov/newsroom/news-items>

Lastly, I wanted to touch on the dry conditions still present across much of Pacific, West, and South Central. Here is the current look:



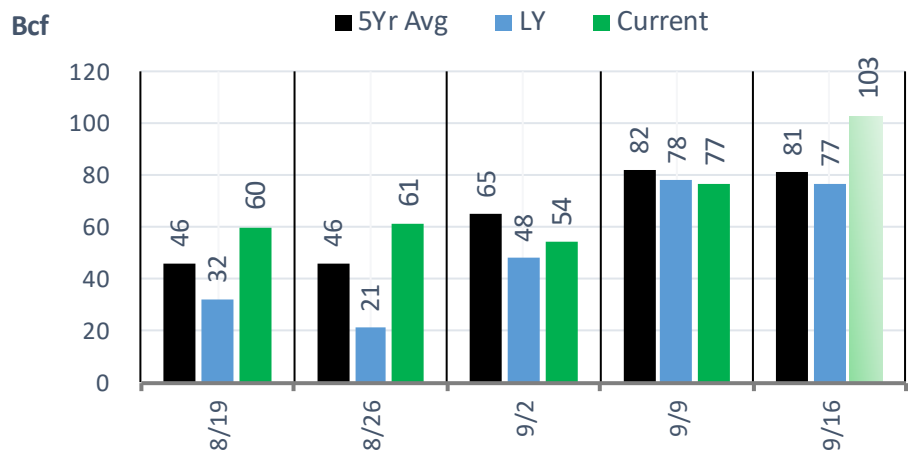
As a result of these conditions, we have seen hydro gen underperform much of the summer leading to higher power burns (assuming natgas gen is the marginal power unit). The chart below is the average GWh produced from US hydro generation each EIA compared to the expected levels based on history. The resulting over/under performance in terms of gas burns is shown in the 2nd accompanying chart.



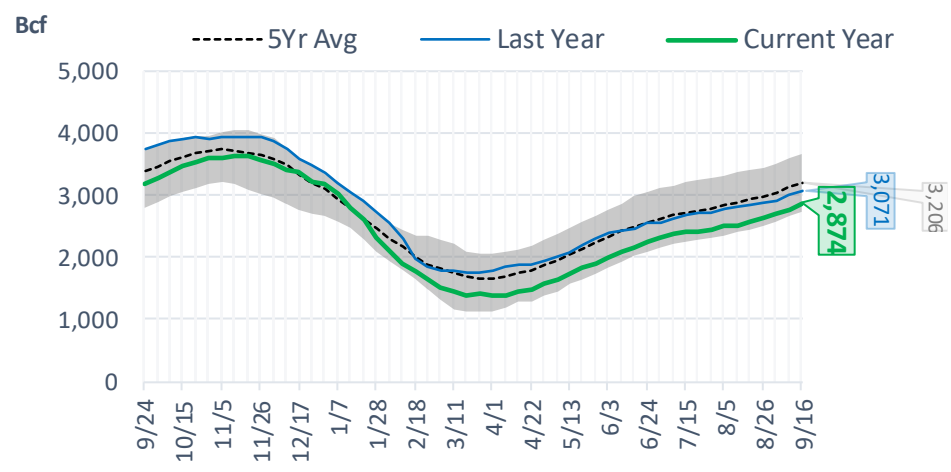
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## EIA Storage Report

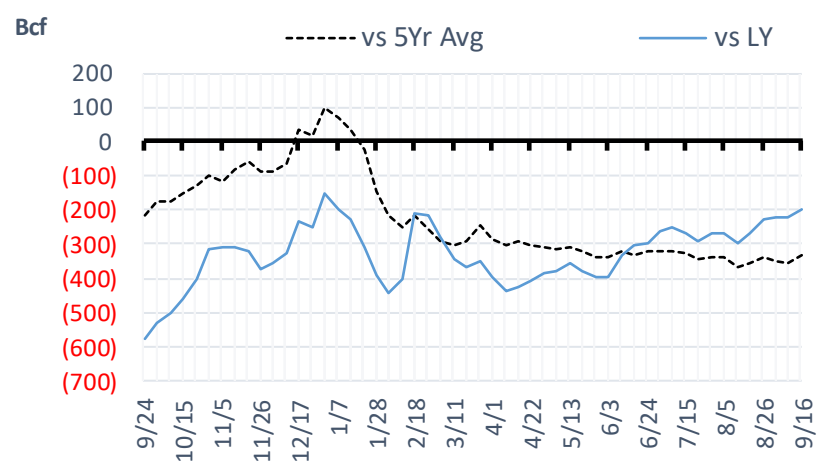
### Total Lower 48 YoY Weekly Change



### Total Lower 48 Storage Levels



### Total Lower 48 LY Surplus/Deficit

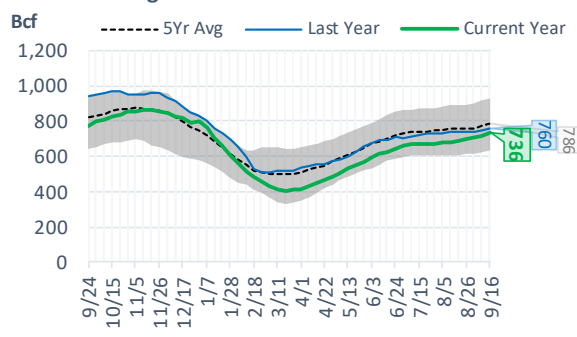


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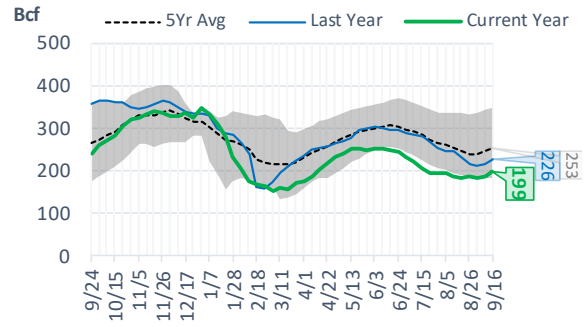
## Natural Gas Storage Stats - Last 5 Weeks

Week Ending	Current 16-Sep	Week - 1 9-Sep	Week - 2 2-Sep	Week - 3 26-Aug	Week - 4 19-Aug	Week - 5 12-Aug
<b>Total Lower 48 Storage Level</b>	<b>2874</b>	2771	2694	2640	2579	2519
<b>Weekly Change</b>	<b>+103</b>	+77	+54	+61	+60	+18
<b>vs LY</b>	<b>-197</b>	-223	-222	-228	-268	-296
<b>vs 5Yr Avg</b>	<b>-332</b>	-354	-349	-338	-353	-367
<b>S. Central Salt Storage Level</b>	<b>199</b>	187	182	185	184	185
<b>Weekly Change</b>	<b>+12</b>	+5	-3	+1	-1	-8
<b>vs LY</b>	<b>-27</b>	-29	-27	-31	-47	-59
<b>vs 5Yr Avg</b>	<b>-54</b>	-59	-56	-54	-62	-68
<b>S. Central NonSalt Storage Level</b>	<b>736</b>	717	705	696	687	681
<b>Weekly Change</b>	<b>+19</b>	+12	+9	+9	+6	0
<b>vs LY</b>	<b>-24</b>	-29	-30	-39	-55	-59
<b>vs 5Yr Avg</b>	<b>-50</b>	-57	-57	-60	-68	-72
<b>Midwest Storage Level</b>	<b>844</b>	809	776	747	714	684
<b>Weekly Change</b>	<b>+35</b>	+33	+29	+33	+30	+21
<b>vs LY</b>	<b>-56</b>	-62	-62	-62	-72	-78
<b>vs 5Yr Avg</b>	<b>-63</b>	-67	-67	-64	-71	-74
<b>East Storage Level</b>	<b>690</b>	661	635	614	598	571
<b>Weekly Change</b>	<b>+29</b>	+26	+21	+16	+27	+7
<b>vs LY</b>	<b>-58</b>	-67	-64	-62	-61	-72
<b>vs 5Yr Avg</b>	<b>-94</b>	-98	-100	-97	-91	-96
<b>Mountain Storage Level</b>	<b>168</b>	163	159	157	153	151
<b>Weekly Change</b>	<b>+5</b>	+4	+2	+4	+2	+3
<b>vs LY</b>	<b>-28</b>	-30	-32	-33	-35	-37
<b>vs 5Yr Avg</b>	<b>-31</b>	-32	-32	-31	-33	-32
<b>Pacific Storage Level</b>	<b>237</b>	235	238	241	243	248
<b>Weekly Change</b>	<b>+2</b>	-3	-3	-2	-5	-4
<b>vs LY</b>	<b>-3</b>	-5	-5	-2	+2	+8
<b>vs 5Yr Avg</b>	<b>-41</b>	-40	-36	-32	-29	-24

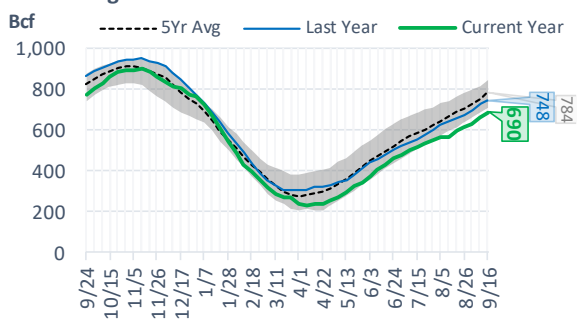
### NonSalt Storage Levels



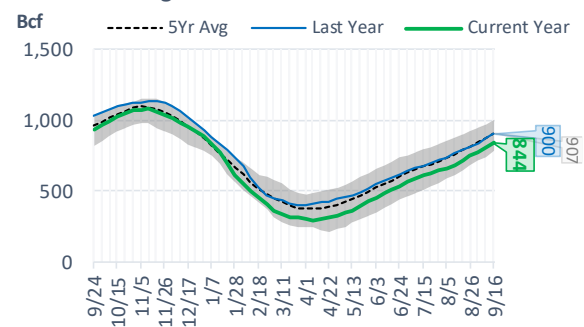
### Salt Storage Levels



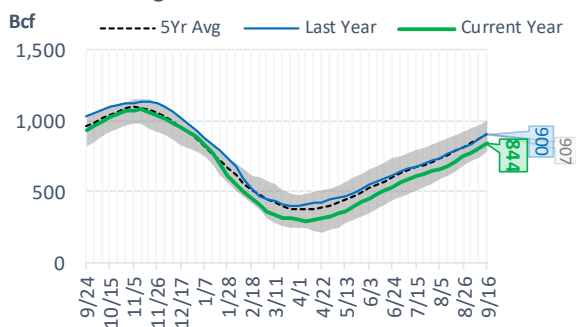
### East Storage Levels



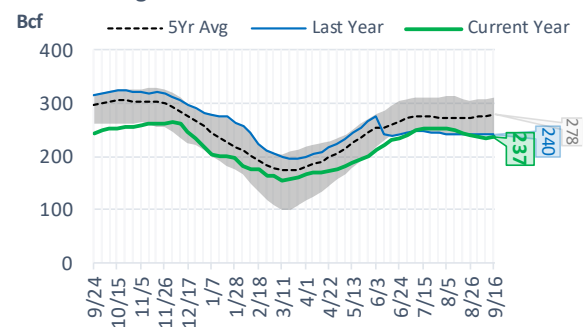
### Midwest Storage Levels



### Midwest Storage Levels



### Pacific Storage Levels



## EIA Storage Week Balances

	LY 17-Sep	19-Aug	26-Aug	2-Sep	LW 9-Sep	Current 16-Sep	WoW	vs. LY
<b>Lower 48 Dry Production</b>	<b>93.3</b>	<b>97.8</b>	<b>98.6</b>	<b>99.8</b>	<b>100.4</b>	<b>100.4</b>	▼ 0.0	▲ 7.1
<b>Canadian Imports</b>	<b>5.0</b>	<b>4.8</b>	<b>5.4</b>	<b>5.7</b>	<b>5.8</b>	<b>5.5</b>	▼ -0.3	▲ 0.4
L48 Power	35.1	39.6	41.2	42.6	41.0	37.9	▼ -3.1	2.8
L48 Residential & Commercial	8.5	8.1	8.2	8.2	7.9	8.2	▲ 0.4	-0.3
L48 Industrial	20.5	21.3	21.0	21.9	21.2	20.4	▼ -0.8	-0.1
L48 Lease and Plant Fuel	5.1	5.3	5.4	5.4	5.4	5.4	▼ 0.0	0.4
L48 Pipeline Distribution	2.4	2.5	2.6	2.7	2.7	2.6	▼ -0.2	0.1
<b>L48 Regional Gas Consumption</b>	<b>71.6</b>	<b>76.8</b>	<b>78.5</b>	<b>80.8</b>	<b>78.2</b>	<b>74.6</b>	▼ -3.6	▲ 2.9
<b>Net LNG Exports</b>	<b>10.2</b>	<b>10.9</b>	<b>11.1</b>	<b>10.9</b>	<b>11.3</b>	<b>11.3</b>	▼ 0.0	▲ 1.1
<b>Total Mexican Exports</b>	<b>6.6</b>	<b>7.0</b>	<b>6.9</b>	<b>6.9</b>	<b>6.6</b>	<b>6.7</b>	▲ 0.1	▲ 0.1
<b>Implied Daily Storage Activity</b>	<b>9.8</b>	<b>7.9</b>	<b>7.6</b>	<b>7.0</b>	<b>10.2</b>	<b>13.3</b>	<b>3.2</b>	<b>3.5</b>
<b>EIA Reported Daily Storage Activity</b>	<b>10.9</b>	<b>8.6</b>	<b>8.7</b>	<b>7.7</b>	<b>11.0</b>			
<b>Daily Model Error</b>	<b>-1.1</b>	<b>-0.6</b>	<b>-1.1</b>	<b>-0.7</b>	<b>-0.8</b>			

## Monthly Balances

	2Yr Ago Sep-20	LY Sep-21	May-22	Jun-22	Jul-22	Aug-22	MTD Sep-22	MoM	vs. LY
<b>Lower 48 Dry Production</b>	<b>88.9</b>	<b>93.6</b>	<b>95.8</b>	<b>96.5</b>	<b>97.1</b>	<b>98.6</b>	<b>100.3</b>	▲ 1.7	▲ 6.7
<b>Canadian Imports</b>	<b>3.8</b>	<b>5.1</b>	<b>5.1</b>	<b>5.7</b>	<b>5.9</b>	<b>5.4</b>	<b>5.8</b>	▲ 0.4	▲ 0.7
L48 Power	34.4	33.1	29.8	38.0	43.7	42.6	38.8	▼ -3.8	▲ 5.7
L48 Residential & Commercial	8.9	8.7	12.4	9.1	9.0	8.3	8.2	▼ -0.1	▼ -0.5
L48 Industrial	19.9	20.2	19.7	18.7	19.5	21.3	21.1	▼ -0.1	▲ 0.9
L48 Lease and Plant Fuel	4.8	5.1	5.3	5.3	5.3	5.4	5.4	▲ 0.1	▲ 0.4
L48 Pipeline Distribution	2.4	2.3	2.4	2.5	2.8	2.7	2.6	▼ -0.1	▲ 0.3
<b>L48 Regional Gas Consumption</b>	<b>70.4</b>	<b>69.5</b>	<b>69.5</b>	<b>73.7</b>	<b>80.2</b>	<b>80.3</b>	<b>76.2</b>	▼ -4.1	▲ 6.7
<b>Net LNG Exports</b>	<b>5.9</b>	<b>10.3</b>	<b>12.5</b>	<b>11.2</b>	<b>10.9</b>	<b>11.0</b>	<b>11.3</b>	▲ 0.4	▲ 1.0
<b>Total Mexican Exports</b>	<b>6.1</b>	<b>6.7</b>	<b>7.0</b>	<b>7.1</b>	<b>7.0</b>	<b>6.9</b>	<b>6.5</b>	▼ -0.4	▼ -0.2
<b>Implied Daily Storage Activity</b>	<b>10.3</b>	<b>12.1</b>	<b>11.9</b>	<b>10.2</b>	<b>4.9</b>	<b>5.8</b>	<b>12.0</b>		
<b>EIA Reported Daily Storage Activity</b>									
<b>Daily Model Error</b>					<b>0.2</b>				

Source: Bloomberg, analytix.ai



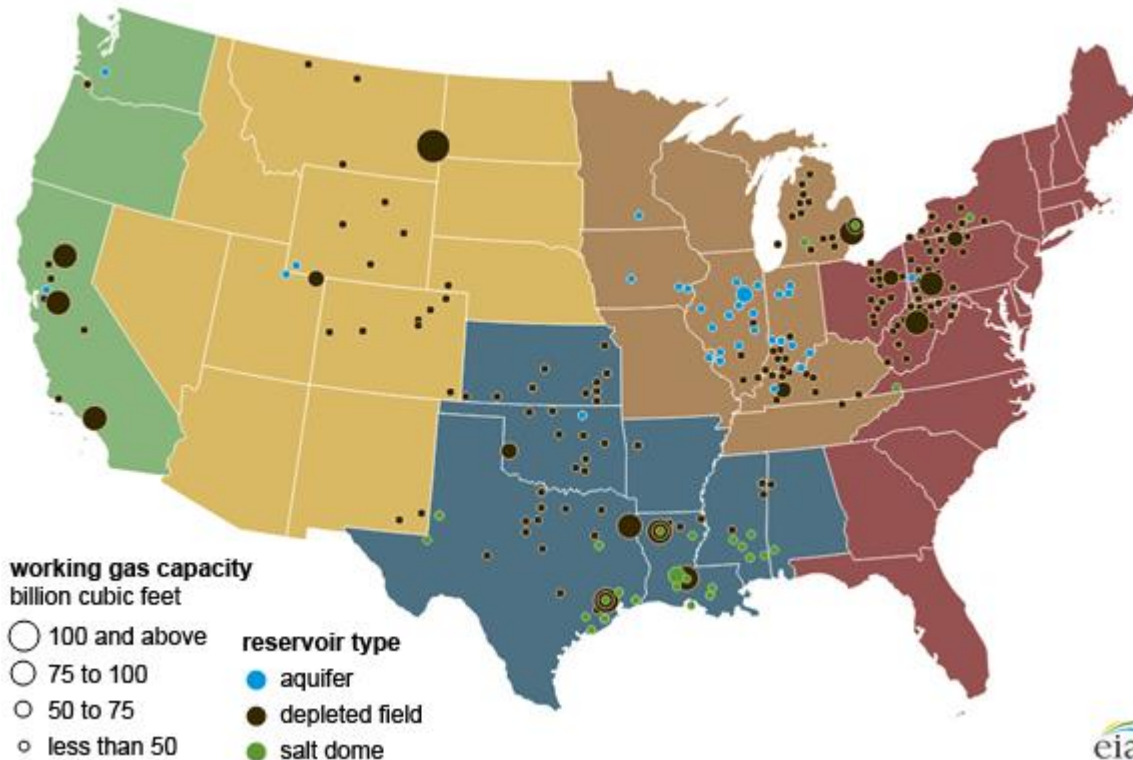
## Regional S/D Models Storage Projection

Week Ending 16-Sep

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	14.4	-0.1	14.3	100
East	2.0	1.8	3.8	27
Midwest	5.3	0.1	5.4	38
Mountain	4.9	-4.2	0.7	5
South Central	1.2	2.8	4.0	28
Pacific	1.0	-0.6	0.4	3

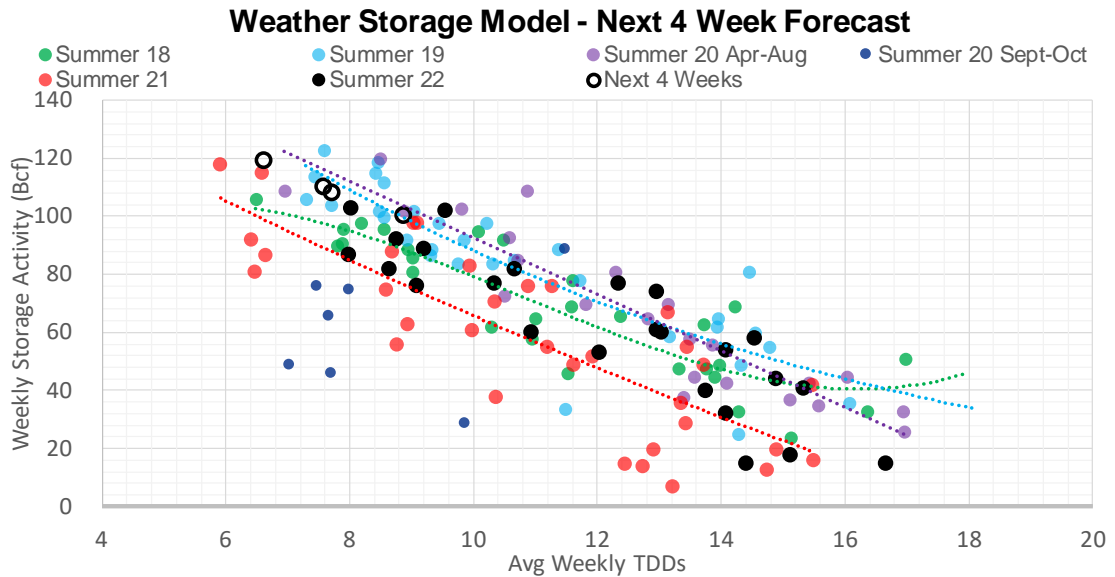
\*Adjustment Factor is calculated based on historical regional deltas

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



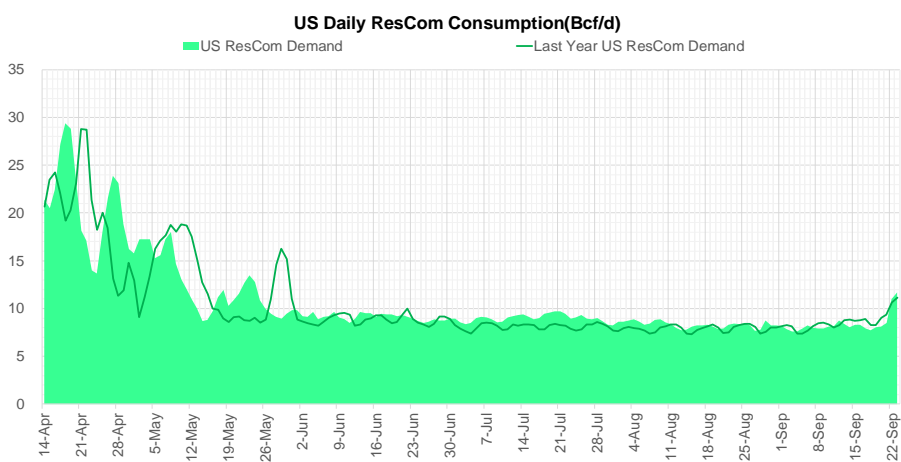
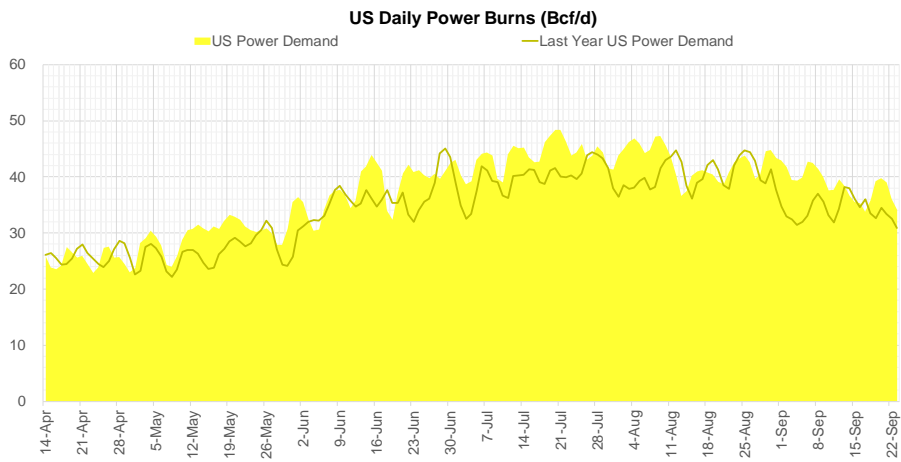
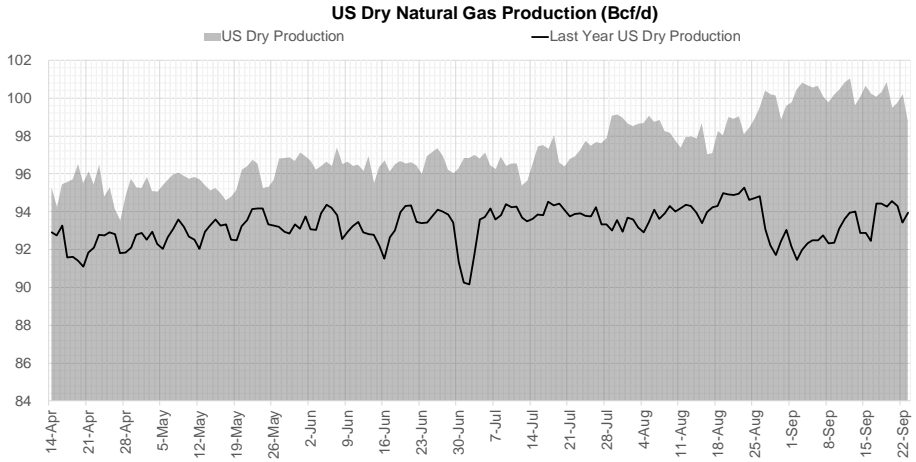
## Weather Model Storage Projection

Next report and beyond		
Week Ending	GWDDs	Week Storage Projection
23-Sep	8.9	100
30-Sep	7.6	110
07-Oct	6.6	119
14-Oct	7.7	108



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

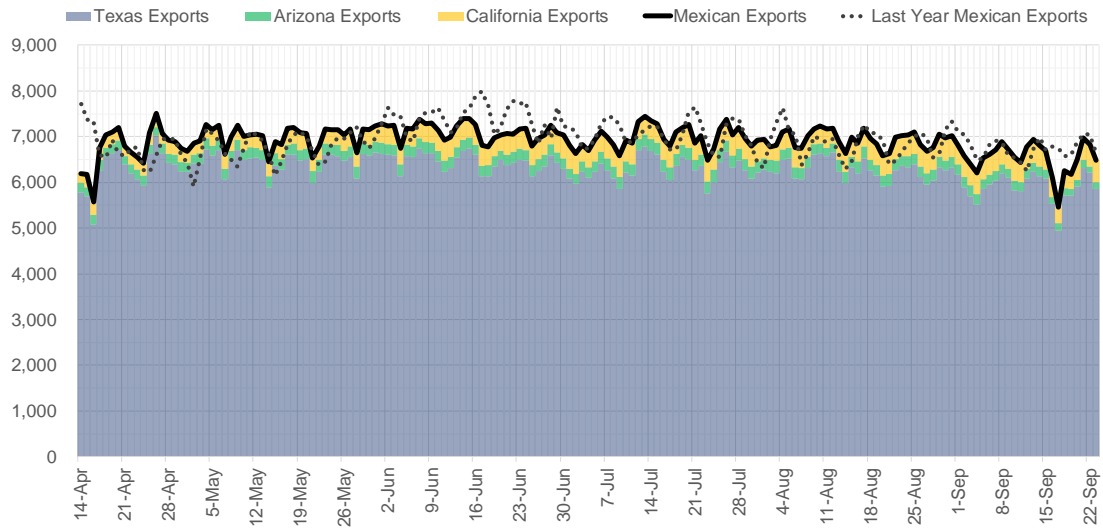
## Supply – Demand Trends



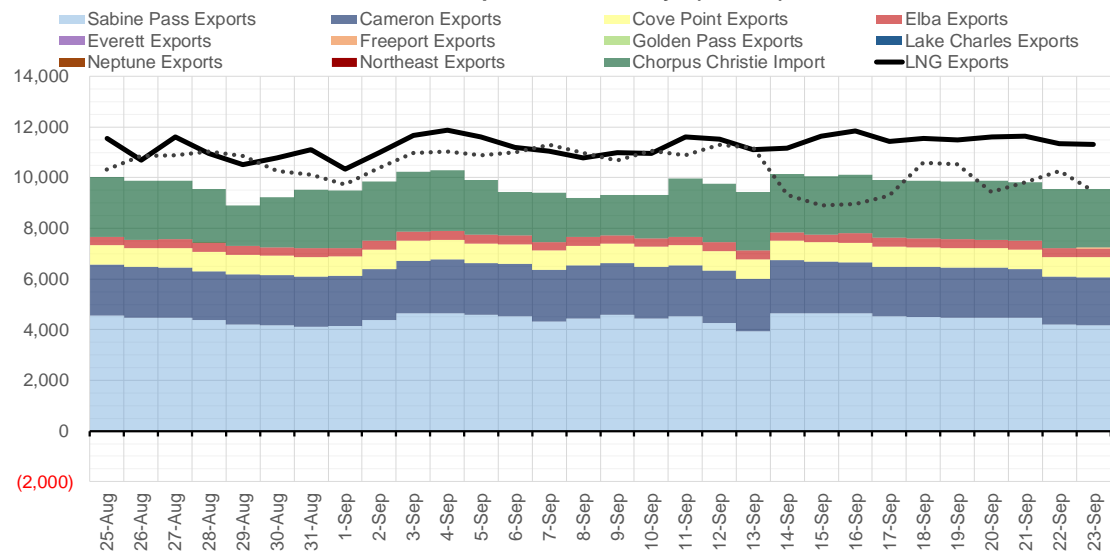
Source: Bloomberg

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### Mexican Exports (MMcf/d)



### Net LNG Exports - Last 30 days (MMcf/d)



Source: Bloomberg

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## Nat Gas Options Volume and Open Interest CME and ICE data combined

CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE VOL	CONTRACT MONTH	CONTRACT YEAR	PUT/CALL	STRIKE	CUMULATIVE OI
10	2022	P	7.00	5068	10	2022	P	3.00	36677
10	2022	P	6.50	4944	10	2022	C	6.00	36013
10	2022	C	8.00	3691	10	2022	P	6.00	35575
10	2022	P	6.00	3033	10	2022	P	5.00	30833
10	2022	P	6.75	2942	10	2022	P	2.50	28006
12	2022	P	7.00	2635	10	2022	C	10.00	25621
10	2022	P	7.50	2241	3	2023	C	10.00	23755
3	2023	P	4.00	2230	10	2022	C	5.00	23569
12	2022	P	6.00	2122	10	2022	C	12.00	22936
11	2022	P	5.25	2003	12	2022	P	5.00	22578
11	2022	P	5.00	1997	11	2022	P	4.00	22475
11	2022	C	10.00	1927	10	2022	P	3.50	22296
12	2022	P	5.00	1811	5	2023	P	2.00	22227
10	2022	C	9.00	1777	10	2022	P	4.00	21627
11	2022	P	7.00	1748	4	2023	P	3.00	21536
11	2022	P	4.50	1724	10	2022	P	7.00	20791
1	2023	P	4.00	1720	10	2022	P	8.00	20369
11	2022	P	6.50	1663	10	2023	P	3.00	20168
10	2022	P	7.25	1494	4	2023	P	3.50	19571
1	2023	P	6.00	1435	10	2022	C	8.00	19162
10	2022	C	9.25	1313	3	2023	C	20.00	19015
2	2023	P	4.00	1220	10	2022	C	9.00	18797
10	2022	C	7.50	1214	12	2022	C	5.00	18222
11	2022	P	6.00	1213	12	2022	P	6.00	18111
10	2022	P	6.25	1097	5	2023	P	3.50	17970
12	2022	P	6.50	1090	11	2022	P	5.00	17902
11	2022	C	8.00	1078	6	2023	P	3.00	17870
4	2023	C	7.00	1075	10	2023	P	2.50	17850
11	2022	P	5.75	1072	5	2023	P	3.00	17848
12	2022	P	4.50	1052	3	2023	P	3.00	17759
10	2022	P	5.50	1030	1	2023	C	10.00	17666
9	2023	C	7.00	1030	3	2023	P	4.00	17475
5	2023	C	7.00	1025	7	2023	P	3.50	17470
6	2023	C	7.00	1025	8	2023	P	3.50	17470
7	2023	C	7.00	1025	9	2023	P	3.50	17460
8	2023	C	7.00	1025	6	2023	P	3.50	17445
10	2023	C	7.00	1025	10	2023	P	3.50	17435
11	2022	C	18.00	1006	10	2022	P	2.00	16759
10	2022	C	10.50	1004	10	2022	P	5.50	16627
12	2022	C	10.00	926	12	2022	P	4.00	16612
1	2023	P	5.00	768	7	2023	P	3.00	16450
10	2022	C	8.75	758	8	2023	P	3.00	16250
3	2023	P	4.50	750	9	2023	P	3.00	16250
11	2023	C	7.00	750	12	2022	C	4.00	16194
12	2023	C	7.00	750	10	2023	P	4.00	16011
11	2022	C	9.50	720	11	2022	C	12.00	15968
3	2023	P	5.00	710	11	2022	C	4.00	15755
1	2023	C	15.00	705	2	2023	C	10.00	15700
3	2023	C	10.00	695	1	2023	P	4.00	15574
					1	2023	P	5	15570

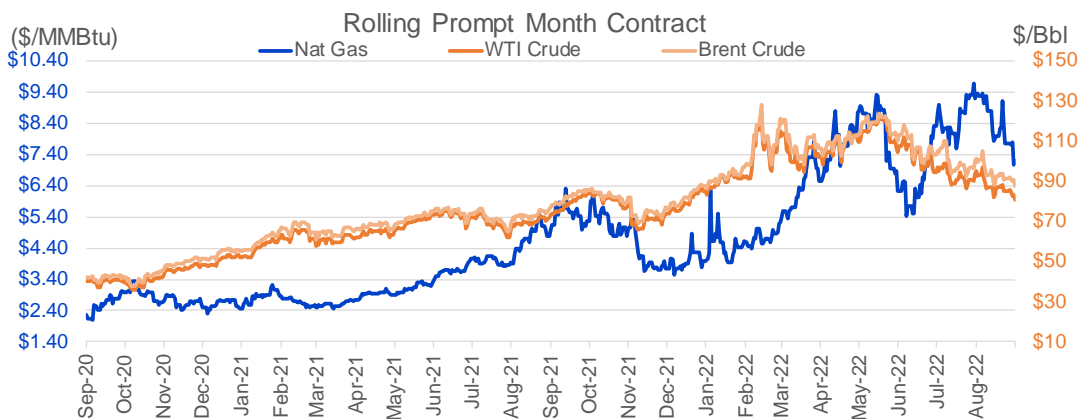
Source: CME, ICE

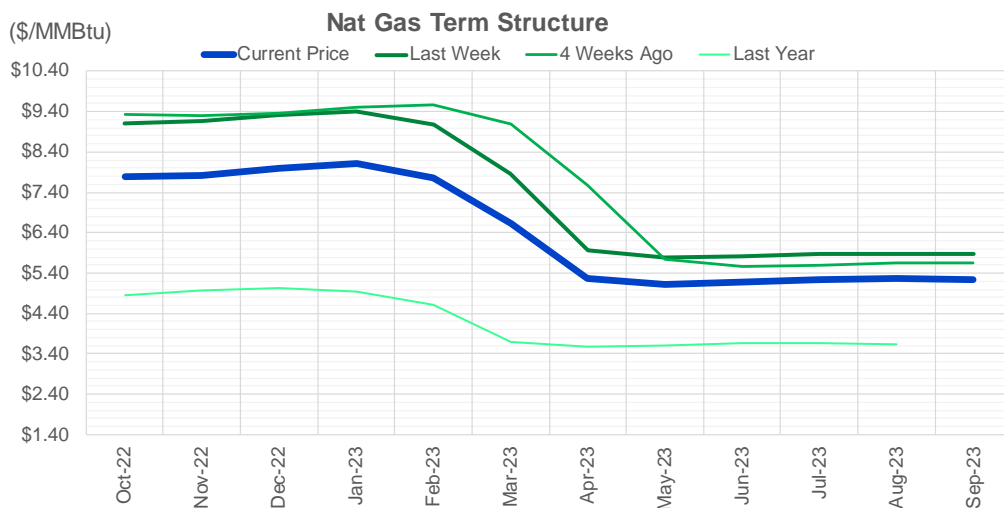
## Nat Gas Futures Open Interest

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
OCT 22	21762	36551	-14789	OCT 22	72885	72955	-70
NOV 22	158271	159475	-1204	NOV 22	73155	71209	1946
DEC 22	65938	65905	33	DEC 22	69214	68517	697
JAN 23	87560	85847	1713	JAN 23	64946	65477	-532
FEB 23	40010	39410	600	FEB 23	65840	66337	-497
MAR 23	72594	71741	853	MAR 23	56287	56511	-224
APR 23	76461	76209	252	APR 23	52503	52556	-53
MAY 23	79574	78985	589	MAY 23	52670	53097	-427
JUN 23	23331	23432	-101	JUN 23	44963	45093	-129
JUL 23	24009	23748	261	JUL 23	44126	44042	84
AUG 23	19761	19684	77	AUG 23	42831	43108	-278
SEP 23	21895	22201	-306	SEP 23	42683	42615	69
OCT 23	54868	54568	300	OCT 23	52406	52164	242
NOV 23	18158	17318	840	NOV 23	46865	47181	-316
DEC 23	14700	14438	262	DEC 23	40546	40769	-223
JAN 24	25116	24972	144	JAN 24	42577	42009	568
FEB 24	9135	9248	-113	FEB 24	30853	30769	84
MAR 24	18752	18700	52	MAR 24	36635	36523	112
APR 24	14847	14890	-43	APR 24	29346	29276	70
MAY 24	7518	7657	-139	MAY 24	27971	27899	72
JUN 24	2849	2926	-77	JUN 24	25280	25210	70
JUL 24	3595	3512	83	JUL 24	24869	24799	70
AUG 24	3574	3418	156	AUG 24	24560	24490	70
SEP 24	2290	2236	54	SEP 24	24286	24216	70
OCT 24	8839	8734	105	OCT 24	28265	28088	177
NOV 24	4904	4882	22	NOV 24	25446	25360	86
DEC 24	8200	8200	0	DEC 24	28797	28739	58
JAN 25	17320	17251	69	JAN 25	23155	23106	49
FEB 25	1580	1579	1	FEB 25	15665	15601	65
MAR 25	5188	5218	-30	MAR 25	17949	17835	114

Source: CME, ICE






	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
<b>Current Price</b>	<b>\$7.779</b>	<b>\$7.827</b>	<b>\$7.990</b>	<b>\$8.109</b>	<b>\$7.753</b>	<b>\$6.631</b>	<b>\$5.257</b>	<b>\$5.124</b>	<b>\$5.183</b>	<b>\$5.243</b>	<b>\$5.254</b>	<b>\$5.229</b>
Last Week	\$9.114	\$9.167	\$9.310	\$9.407	\$9.073	\$7.850	\$5.954	\$5.779	\$5.823	\$5.872	\$5.882	\$5.861
vs. Last Week	-\$1.335	-\$1.340	-\$1.320	-\$1.298	-\$1.320	-\$1.219	-\$0.697	-\$0.655	-\$0.640	-\$0.629	-\$0.628	-\$0.632
4 Weeks Ago	\$9.330	\$9.300	\$9.369	\$9.504	\$9.570	\$9.079	\$7.578	\$5.740	\$5.551	\$5.596	\$5.642	\$5.653
vs. 4 Weeks Ago	-\$1.551	-\$1.473	-\$1.379	-\$1.395	-\$1.817	-\$2.448	-\$2.321	-\$0.616	-\$0.368	-\$0.353	-\$0.388	-\$0.424
Last Year	\$4.805	\$4.855	\$4.969	\$5.042	\$4.952	\$4.628	\$3.696	\$3.578	\$3.612	\$3.657	\$3.663	\$3.643
vs. Last Year	\$2.974	\$2.972	\$3.021	\$3.067	\$2.801	\$2.003	\$1.561	\$1.546	\$1.571	\$1.586	\$1.591	\$1.586

	Units	Current Price	vs. Last Week	vs. 4 Weeks Ago	vs. Last Year
NatGas Jul21/Oct21	\$/MMBtu	2.224	▲ 0.000	▲ 0.000	▲ 0.865
NatGas Oct21/Nov21	\$/MMBtu	0.361	▲ 0.000	▲ 0.000	▲ 0.294
NatGas Oct21/Jan22	\$/MMBtu	-1.817	▲ 0.000	▲ 0.000	▼ -2.073
NatGas Apr22/Oct22	\$/MMBtu	1.753	▼ -1.235	▼ -2.255	▲ 1.795
WTI Crude	\$/Bbl	83.49	▼ -1.610	▼ -9.030	▲ 10.190
Brent Crude	\$/Bbl	90.46	▼ -0.380	▼ -8.880	▲ 13.210
Fuel Oil, NY Harbour 1%	\$/Bbl	97.18	▲ 0.000	▲ 0.000	▲ 0.000
Heating Oil	cents/Gallon	341.15	▲ 20.630	▼ -53.760	▲ 116.240
Propane, Mt. Bel	cents/Gallon	1.01	▼ -0.036	▼ -0.081	▼ -0.267
Ethane, Mt. Bel	cents/Gallon	0.47	▼ -0.032	▼ -0.132	▲ 0.092
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					
9/23/2022					
Baker Hughes 					
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago
Oil	602	3	599	181	421
Gas	160	-2	162	61	99
Miscellaneous	2	0	2	1	1
Directional	46	1	45	26	20
Horizontal	693	-2	695	222	471
Vertical	25	2	23	-5	30
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago
Oil	148	2	146	52	96
Gas	67	2	65	2	65
Miscellaneous	0	0	0	-1	1
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago
Ardmore Woodford	3	-1	4	1	2
Arkoma Woodford	8	1	7	6	2
Barnett	3	0	3	3	0
Cana Woodford	25	2	23	5	20
DJ-Niobrara	17	0	17	5	12
Eagle Ford	72	0	72	35	37
Granite Wash	6	-1	7	3	3
Haynesville	71	0	71	24	47
Marcellus	36	1	35	10	26
Mississippian	2	0	2	1	1
Permian	344	1	343	84	260
Utica	11	-1	12	-1	12
Williston	39	-1	40	16	23