

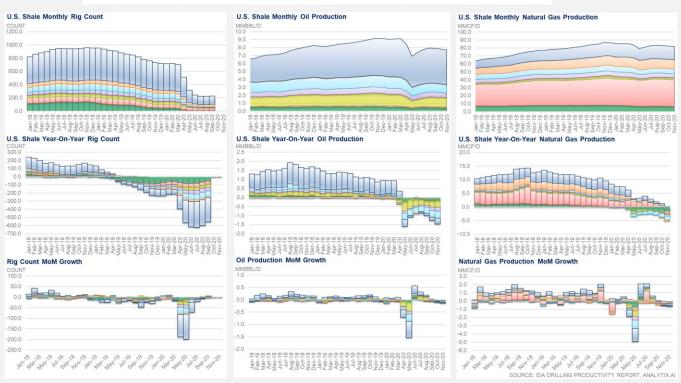
The EIA in its monthly Drilling Productivity Report (DPR) on Tuesday analyzed production trends into November.

According to the latest report, the November 2020 crude oil production and natural gas production in DPR regions is expected to decrease by 0.121mmbbl/d and 0.62 MMcf/d, respectively, compared with October 2020 estimates. The primary inputs used to model these figures come from the Baker Hughes rig count numbers and FracFocus.org filing rates.

	Oil production thousand barre			Gas production million cubic fe		
Region	October 2020	November 2020	change	October 2020	November 2020	change
Anadarko	423	404	(19)	6,382	6,252	(130)
Appalachia	134	133	(1)	33,795	33,646	(149)
Bakken	1,185	1,163	(22)	2,603	2,562	(41)
Eagle Ford	1,048	1,014	(34)	5,903	5,785	(118)
Haynesville	35	35		11,666	11,637	(29)
Niobrara	606	578	(28)	5,300	5,224	(76)
Permian	4,382	4,365	(17)	16,753	16,679	(74)
Total	7,813	7,692	(121)	82,402	81,785	(617)

The chart below shows the production trends for all the major shale regions.

■ Anadarko Region ■ Appalachia Region ■ Bakken Region ■ Niobrara Region ■ Eagle Ford Region ■ Haynesville Region ■ Permian Region



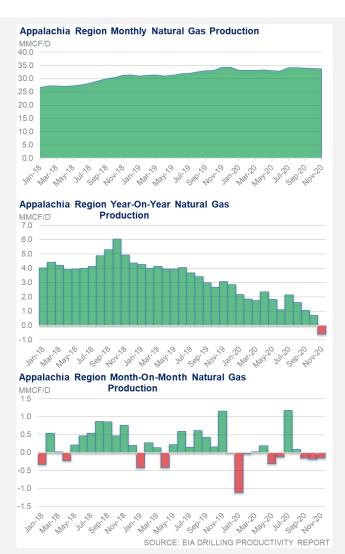


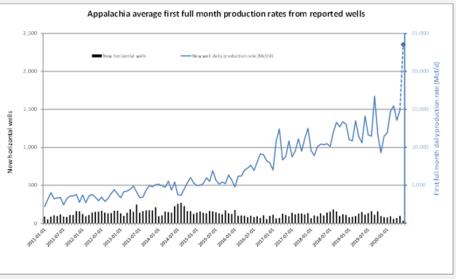
As can be seen, both oil and gas production has held up relatively well despite rig lower by 555 when compared to last September. Producers seem to be relying on the DUC inventory and only drilling in areas where the production characteristics are superior.

Starting with the App basin. After seen multiyear growth from the Marcellus and Utica, production from that region looks to be leveling out. November with an average of 33.65 Bcf/d is expected to be the first month to see a YoY drop since the start of shale production. With rig counts down to 31, or -33 YoY in Sept – we should be pleased with flat YoY production this November.

These are some additional charts provided by the EIA. To the right, we can see how the first full month daily production rates have exponentially grown over time as operators have refined their fracking method by increasing the length of laterals, optimizing their fracking pressures, and focusing on highly productive segments.

According to the chart, a horizontal well's IP rate has jumped from about ~12 MMcf/d in 2018 to a projected ~24 MMcf/d in June of this year. This is what is keeping production strong.





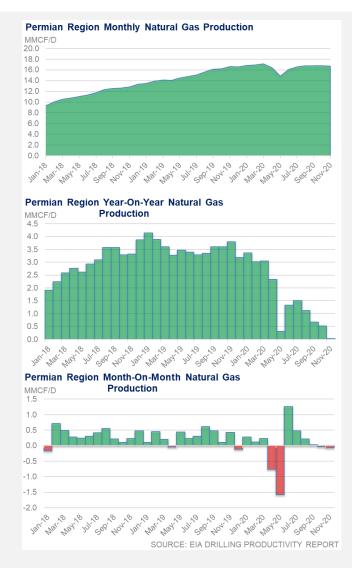


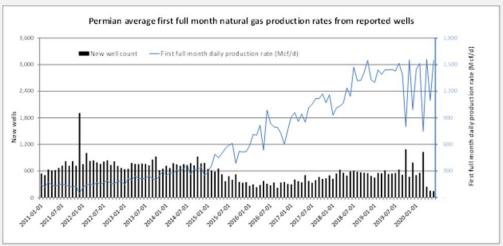
It is hard to say if this high production rate is sustainable because only 32 wells came on in June. The few wells are a small sample set of the best wells, and therefore we expect to continue seeing much volatility in the remainder of the 2020 data.

Next, let's look at the Permian. Natural gas production in November is expected to be 16.7 MMcf/d from this region, which is essentially flat to last year.

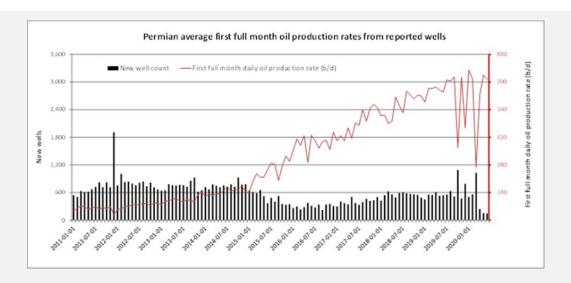
Permian rig counts were 295 lower than last September, yet production is only slightly lower than last year. Below is the Permian showing both oil and natural gas IP rates. It's not as exciting as the App basin, but we see the number of new wells has been dropping while initial production rates have been increasing since 2017.

As with the Appalachian wells, there is lots of volatility in the oil and gas production rates with fewer monthly wells being drilled in 2020.









On a final note, we wanted to show the month-on-month DPR revision summary for the October 2020 update. Natural gas production for October was revised higher by 1.804 Bcf/d, primarily from Appalachian and Permian wells.

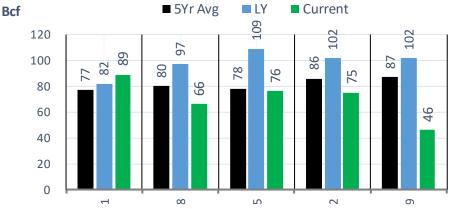
	Oil production (M	b/d)		Natural gas production (MMcf/d)			
	Octobe	r 2020		Octobe	er 2020		
Region	Previous issue	Current issue	Revision	Previous issue	Current issue	Revision	
Anadarko	394	423	29	6,268	6,382	114	
Appalachia	134	134	0	32,835	33,795	960	
Bakken	1,171	1,185	14	2,624	2,603	-21	
Eagle Ford	1,127	1,048	-79	6,115	5,903	-212	
Haynesville	36	35	-1	11,617	11,666	49	
Niobrara	605	606	1	5,128	5,300	172	
Permian	4,173	4,382	209	16,011	16,753	742	
Total	7,640	7,813	173	80,598	82,402	1,804	

	New-well oil prod	New-well natural gas production per rig (Mdf/d)				
	Octobe	r 2020		Octobe		
Region	Previous issue	Current issue	Revision	Previous issue	Current issue	Revision
Anadarko	1016	1031	15	6,461	6,484	24
Appalachia	172	172	-1	26,177	26,177	0
Bakken	2200	2273	73	2,944	3,000	56
Eagle Ford	2430	2449	18	8,584	8,523	-61
Haynesville	20	20	0	11,270	11,269	-1
Niobrara	2029	2028	-2	5,556	5,554	-2
Permian	1192	1199	7	2,144	2,155	11
Rig-weighted average	993	1,001	8	7,438	7,445	7

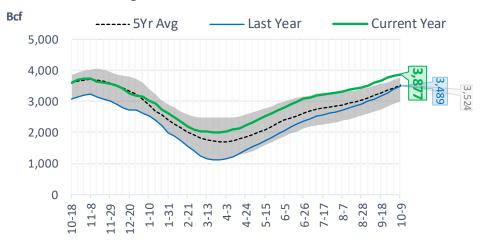


EIA Storage Report

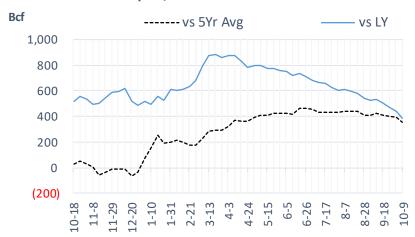
Total Lower 48 YoY Weekly Change



Total Lower 48 Storage Levels



Total Lower 48 LY Surplus/Deficit



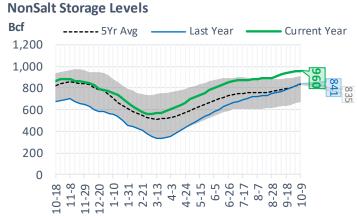


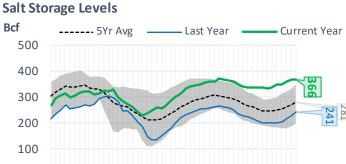
Natural	Gas St	orage	Stats -	last 5	Weeks
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	Current	Week - 1	Week - 2	Week - 3	Week - 4	Week - 5
Week Ending	9-Oct	2-Oct	25-Sep	18-Sep	11-Sep	4-Sep
Total Lower 48 Storage Level	3877	3831	3756	3680	3614	3525
Weekly Change	+46	+75	+76	+66	+89	+70
vs LY	+388	+444	+471	+504	+535	+528
vs 5Yr Avg	+353	+394	+405	+407	+421	+409
S. Central Salt Storage Level	366	366	358	349	349	335
Weekly Change	0	+8	+9	0	+14	+4
vs LY	+125	+140	+142	+144	+149	+137
vs 5Yr Avg	+85	+98	+99	+94	+98	+89
S. Central NonSalt Storage Level	960	955	945	934	927	908
Weekly Change	+5	+10	+11	+7	+19	+13
vs LY	+119	+135	+141	+149	+157	+152
vs 5Yr Avg	+125	+136	+139	+138	+142	+134
Midwest Storage Level	1081	1062	1033	1009	983	953
Weekly Change	+19	+29	+24	+26	+30	+29
vs LY	+47	+63	+71	+85	+95	+100
vs 5Yr Avg	+70	+83	+87	+95	+101	+104
East Storage Level	908	893	872	851	825	805
Weekly Change	+15	+21	+21	+26	+20	+16
vs LY	+35	+47	+55	+66	+69	+73
vs 5Yr Avg	+35	+41	+45	+48	+46	+49
Mountain Storage Level	241	236	231	225	221	216
Weekly Change	+5	+5	+6	+4	+5	+4
vs LY	+37	+34	+33	+33	+34	+35
vs 5Yr Avg	+30	+27	+26	+24	+24	+22
Pacific Storage Level	320	318	316	312	310	308
Weekly Change	+2	+2	+4	+2	+2	+4
vs LY	+24	+23	+26	+28	+32	+33
vs 5Yr Avg	+7	+8	+10	+9	+11	+11

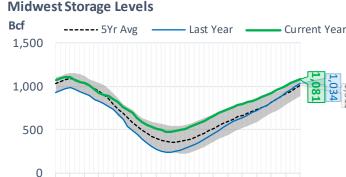


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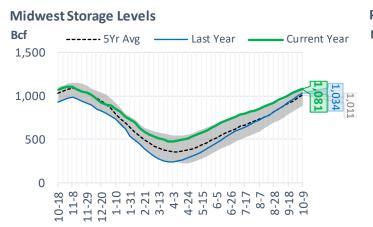


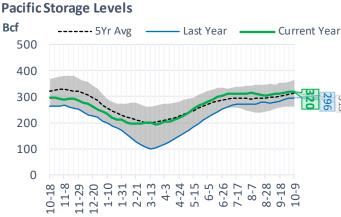


111-8 111-29 12-20 1-10 1-11 2-21 3-13 4-3 4-24 5-15 6-5 6-5 6-5 8-7 8-7 10-9



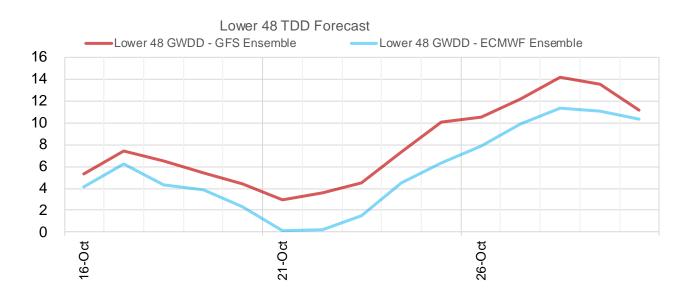
4-3 4-24 5-15 6-5 6-26 7-17 8-7 8-28 9-18

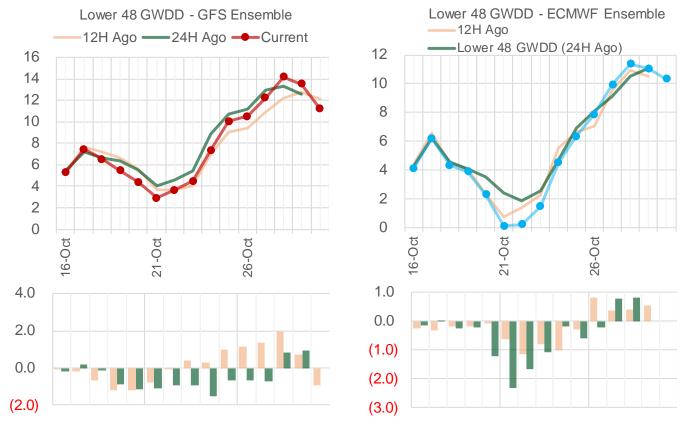






Current Short-term Weather Model Outlooks (00z)





Source: WSI, Bloomberg



EIA Storage Week Balances

	11-Sep	18-Sep	25-Sep	2-Oct	9-Oct	16-Oct	WoW	vs. 4W
Lower 48 Dry Production	89.0	87.8	86.9	87.2	87.2	85.8	▼-1.4	▼-1.5
Canadian Imports	3.8	3.8	3.6	3.9	4.5	4.0	▼-0.5	▲ 0.0
L48 Power	35.4	33.5	30.8	30.6	30.7	30.0	▼-0.7	▼ -1.4
L48 Residential & Commercial	8.4	8.0	9.9	9.6	13.6	11.6	▼ -2.0	1.3
L48 Industrial	19.7	21.3	21.2	22.2	21.5	21.8	0.3	a 0.3
L48 Lease and Plant Fuel	4.9	4.8	4.8	4.8	4.8	4.7	▼ -0.1	▼ -0.1
L48 Pipeline Distribution	2.2	2.1	2.0	2.0	2.2	2.0	▼ -0.1	▼ 0.0
L48 Regional Gas Consumption	70.5	69.7	68.6	69.1	72.8	70.1	▼ -2.7	0.1
Net LNG Exports	5.2	7.3	5.8	6.8	7.5	6.9	▼-0.6	▲ 0.0
Total Mexican Exports	6.4	6.2	6.4	6.3	6.2	6.3	0.1	▲ 0.0
Implied Daily Storage Activity EIA Reported Daily Storage Activity Daily Model Error	10.8 12.7 -1.9	8.3 9.4 -1.1	9.6 10.9 -1.3	8.9 10.7 -1.8	5.2 6.6 -1.4	6.5	1.2	

Monthly Balances									
•	2Yr Ago	LY					MTD		
	Oct-18	Oct-19	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	MoM	vs. LY
Lower 48 Dry Production	86.7	95.0	86.6	87.8	87.7	87.6	86.6	▼-1.0	▼-8.3
Canadian Imports	4.7	4.6	4.0	4.4	4.9	3.8	4.2	0.4	▼ -0.5
L48 Power	28.8	30.7	35.0	43.8	40.6	33.3	30.3	▼ -2.9	▼-0.4
L48 Residential & Commercial	16.1	15.2	8.8	8.0	7.7	8.7	13.0	4.3	▼ -2.3
L48 Industrial	22.6	24.0	19.2	19.2	20.6	20.9	21.6	0.7	▼ -2.4
L48 Lease and Plant Fuel	4.9	5.2	4.8	4.9	4.8	4.8	4.8	▼ 0.0	▼ -0.5
L48 Pipeline Distribution	2.1	2.3	2.2	2.4	2.3	2.1	2.1	0.0	▼ -0.1
L48 Regional Gas Consumption	74.5	77.4	70.1	78.4	76.1	69.8	71.8	2.0	▼ -5.6
Net LNG Exports	3.3	6.7	4.0	3.3	4.0	5.9	7.2	1.3	0.6
Total Mexican Exports	5.0	5.5	5.7	6.1	6.3	6.4	6.3	▼-0.1	▲ 0.8
Implied Daily Storage Activity EIA Reported Daily Storage Activity	8.6	10.0	10.9	4.4	6.2	9.4	5.5		
Daily Model Error									

Source: Bloomberg, analytix.ai

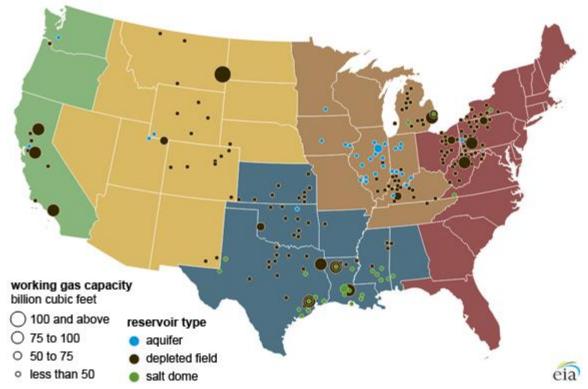
Regional S/D Models Storage Projection

Week Ending 16-Oct

	Daily Raw Storage	Daily Adjustment Factor	Daily Average Storage Activity (Adjusted) *	Weekly Adjusted Storage Activity
L48	6.2	1.6	7.8	55
East	0.3	1.6	1.9	14
Midwest	3.2	1.2	4.4	31
Mountain	3.6	-3.2	0.4	3
South Central	-1.4	2.1	8.0	5
Pacific	0.4	-0.1	0.3	2

^{*}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	Projection						
23-Oct	93						
30-Oct	49						
06-Nov	46						

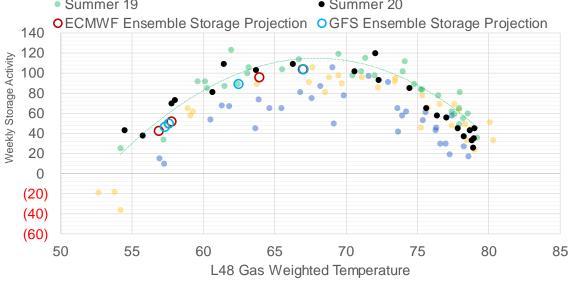
Weather Storage Model - Next 4 Week Forecast



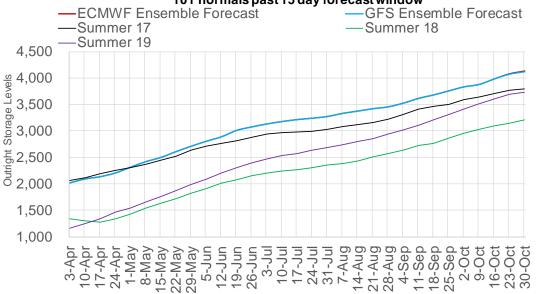
Summer 18

Summer 19

• Summer 20



Weather Based End of Winter Projection (Bcf) 10Y normals past 15 day forecast window





Weather Model Storage Projection to End of Season

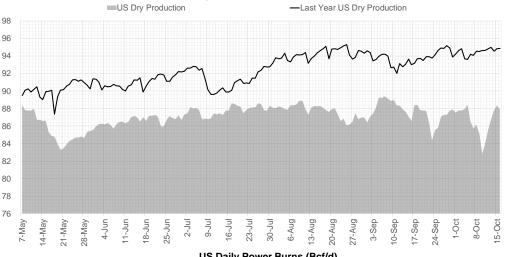
L48 Storage Trajector			Forecast Storage Levels						
	Report		vs 5Yr	Reported	Estimate			5Yr Avg	
	Storage Level	vs. LY	Avg	Chg	Chg *	LY Chg	vs. LY	Chg	vs. 5Yr
3-Apr-20	2024	876	324	38		25	13	6	32
10-Apr-20	2097	876	370	73		73	0	27	46
17-Apr-20	2140	827	364	43		92	(49)	49	(6)
24-Apr-20	2210	783	360	70		114	(44)	74	(4)
1-May-20	2319	796	395	109		96	13	74	35
8-May-20	2422	799	413	103		100	3	85	18
15-May-20	2503	779	407	81		101	(20)	87	(6)
22-May-20	2612	778	423	109		110	(1)	93	16
29-May-20	2714	762	422	102		118	(16)	103	(1)
5-Jun-20	2807	748	421	93		107	(14)	94	(1)
12-Jun-20	2892	722	419	85		111	(26)	87	(2)
19-Jun-20	3012	739	466	120		103	17	73	47
26-Jun-20	3077	712	466	65		92	(27)	65	0
3-Jul-20	3133	685	454	56		83	(27)	68	(12)
10-Jul-20	3178	663	436	45		67	(22)	63	(18)
17-Jul-20	3215	656	436	37		44	(7)	37	0
24-Jul-20	3241	626	429	26		56	(30)	33	(7)
31-Jul-20	3274	601	429	33		58	(25)	33	0
7-Aug-20	3332	608	443	58		51	7	44	14
14-Aug-20	3375	595	442	43		56	(13)	44	(1)
21-Aug-20	3420	580	438	45		60	(15)	49	(4)
28-Aug-20	3455	538	407	35		77	(42)	66	(31)
4-Sep-20	3525	528	409	70		80	(10)	68	2
11-Sep-20	3614	535	421	89		82	7	77	12
18-Sep-20	3680	504	407	66		97	(31)	80	(14)
25-Sep-20	3756	471	405	76		109	(33)	78	(2)
2-Oct-20	3831	444	394	75		102	(27)	86	(11)
9-Oct-20	3877	388	353	46		102	(56)	87	(41)
16-Oct-20					104	92	12	75	29
23-Oct-20					93	89	4	67	26
30-Oct-20					49	49	0	52	(3)
			2137	2596	(459)	2024	113		

^{*} first 15D change is an average of the GFS Ensemble and ECMWF Ensemble

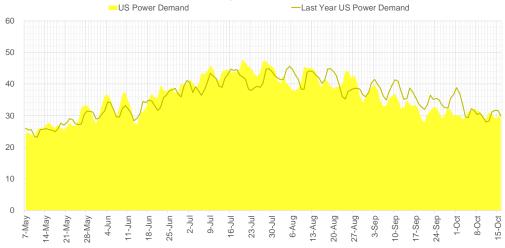


Supply - Demand Trends

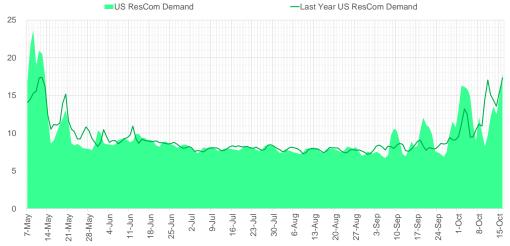
US Dry Natural Gas Production (Bcf/d)



US Daily Power Burns (Bcf/d)



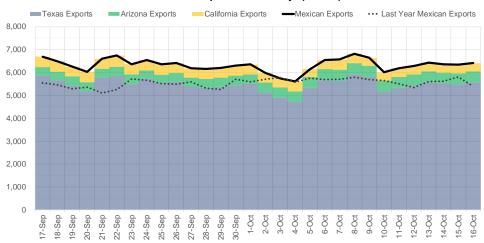
US Daily ResCom Consumption(Bcf/d)

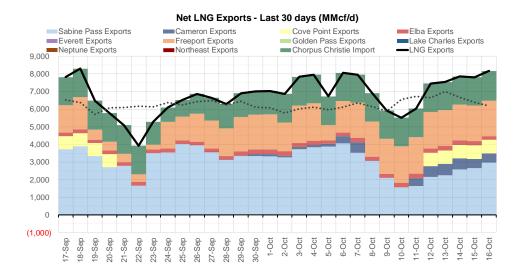


Source: Bloomberg



Mexican Exports - Last 30 days (MMcf/d)





Source: Bloomberg



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	CUN
3	2021	С	5.00	8500	11	2020	Р	2.00	
11	2020	Č	3.00	8244	3	2021	Р	2.00	
3	2021	č	4.75	8000	11	2020	С	3.25	
11	2020	P	2.00	5611	11	2020	Ċ	3.50	
11	2020	Р	2.25	5233	12	2020	P	2.00	
11	2020	C	3.50	4601	3	2021	C	5.00	
11	2020	C	3.25	4341	3	2021	Ċ	6.00	
		P			1	2021	Ċ	4.50	
11	2020		2.50	3971	3	2021	Ċ	3.25	
11	2021	С	4.00	3800	4	2021	Č	5.00	
11	2021	C	5.00	3800	12	2020	P	2.50	
12	2020	C	4.00	3046	3	2020	C	4.00	
11	2020	Р	2.60	2735			C		
11	2020	Р	1.75	2550	1 3	2021	C	3.50	
10	2021	С	4.00	2350		2021		7.00	
10	2021	С	3.25	2250	11	2020	С	4.00	
12	2020	С	3.25	2021	11	2020	С	3.00	
12	2020	С	5.00	1969	12	2020	C	4.00	
11	2020	Р	2.75	1875	11	2020	Р	2.25	
11	2020	С	3.75	1781	2	2021	С	5.00	
11	2020	P	2.40	1715	11	2020	С	5.00	
11	2020	C	2.85	1516	11	2020	Р	1.75	
11	2020	P	2.70	1504	1	2021	С	6.00	
4	2021	C	4.50	1200	3	2021	С	3.00	
					3	2021	С	3.50	
2	2022	С	5.00	1200	12	2020	С	4.50	
11	2020	Р	2.30	1197	4	2021	С	4.00	
12	2020	С	3.75	1141	12	2020	C	3.75	
11	2020	Р	2.55	1117	1	2021	P	2.25	
12	2020	Р	3.25	1110	11	2020	C	2.75	
5	2021	С	4.00	1100	1	2021	Ċ	5.00	
1	2022	С	4.00	1100	2	2021	P	2.25	
2	2022	С	4.00	1100	1	2021	P	2.50	
3	2022	С	4.00	1100	2	2021	C	3.50	
11	2020	С	4.00	1082	12	2021	C	3.50	
12	2020	C	5.50	1059	1	2020	C	3.00	
12	2020	P	2.50	1059	1	2021	C	3.00	
12	2021	C	4.00	1000	11	2021	P	3.75 2.50	
12	2021	č	5.00	1000	2		P P		
1	2022	Č	5.00	1000		2021		2.50	
3	2022	C	5.00	1000	11	2020	P	2.65	
3	2022	P	2.50	900	12	2020	С	5.00	
					3	2021	P	2.50	
11	2020	С	2.80	855	8	2021	C	4.00	
12	2020	С	4.75	827	12	2020	Р	1.50	
2	2021	C	4.00	800	1	2021	С	7.00	
5	2021	С	3.75	795	4	2021	С	3.00	
12	2020	Р	3.00	784	4	2021	Р	2.00	
7	2021	С	3.90	755	5	2021	С	3.00	
4	2021	С	3.90	750	11	2020	С	2.85	
5	2021	С	3.90	750	2	2021	С	4.00	
6	2021	С	3.90	750	11	2020	Р	2.8	

Source: CME, Nasdaq, ICE



Nat Gas Futures Open Interest

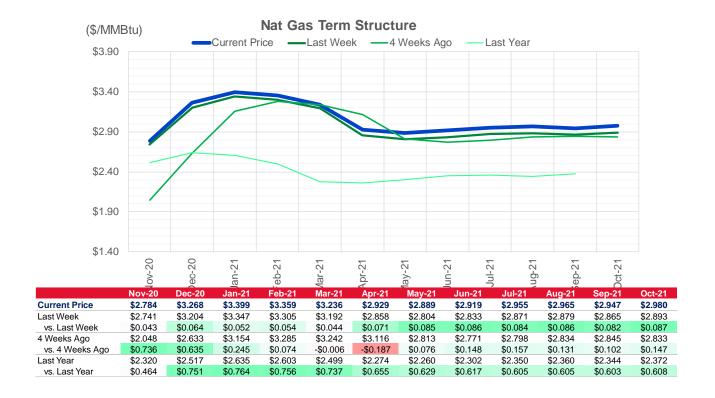
CME, ICE and Nasdaq Combined

CME Henry H	lub Futures (10,000 MMBtu)		ICE Henry Hub	Futures Co	ontract Equiva	lent (10,000 MM
	Current			FOR JUNE 26	Current	Prior	Daily Change
NOV 20	99940	121000	-21060	NOV 20	72702	75350	-2648
DEC 20	166636	164736	1900	DEC 20	75050	75473	-422.5
JAN 21	203000	203115	-115	JAN 21	89727	90446	-719.25
FEB 21	82760	80955	1805	FEB 21	64058	64225	-167
MAR 21	135488	136952	-1464	MAR 21	84393	84872	-479
APR 21	88718	89917	-1199	APR 21	70170	69840	329.75
MAY 21	44533	44313	220	MAY 21	60880	61116	-235.75
JUN 21	33023	33038	-15	JUN 21	55555	55482	72.5
JUL 21	26111	25500	611	JUL 21	57561	57539	22.5
AUG 21	26552	25781	771	AUG 21	60326	60465	-139
SEP 21	37379	37561	-182	SEP 21	55714	55624	90
OCT 21	87377	87592	-215	OCT 21	72456	72084	372.75
NOV 21	32461	32631	-170	NOV 21	48702	48729	-27.25
DEC 21	27449	27233	216	DEC 21	46370	46494	-124
JAN 22	29111	28628	483	JAN 22	42316	41601	715
FEB 22	16888	16346	542	FEB 22	34656	34178	478
MAR 22	19091	18910	181	MAR 22	37789	37314	475.5
APR 22	21653	22237	-584	APR 22	35905	35391	513.75
MAY 22	8320	7831	489	MAY 22	27984	27612	372.25
JUN 22	4795	4717	78	JUN 22	26791	26439	352.5
JUL 22	3873	3732	141	JUL 22	28370	28106	263.5
AUG 22	2724	2657	67	AUG 22	26760	26241	518.75
SEP 22	2533	2374	159	SEP 22	25960	25639	320.5
OCT 22	4018	4251	-233	OCT 22	28962	28358	604.5
NOV 22	3295	3136	159	NOV 22	24756	24352	404.25
DEC 22	3289	3155	134	DEC 22	28428	28114	314.5
JAN 23	3003	3012	-9	JAN 23	13992	13972	19.75
FEB 23	908	897	11	FEB 23	13182	13164	18.25
MAR 23	831	883	-52	MAR 23	13444	13413	31
APR 23	2447	2445	2	APR 23	12460	12445	15.25

Source: CME, ICE







				vs. 4 Weeks	
	Units	Current Price	vs. Last Week	Ago	vs. Last Year
NatGas Jan/Apr	\$/MMBtu	-0.47	0.019	a 0.002	- 0.023
NatGas Mar/Apr	\$/MMBtu	-0.307	a 0.027	- 0.610	- 0.591
NatGas Oct/Nov	\$/MMBtu	0.68	0.043	a 0.098	0.613
NatGas Oct/Jan	\$/MMBtu	1.30	0.052	a 0.061	0.935
WTI Crude	\$/Bbl	40.59	-0.010	- 0.520	▼ -13.190
Brent Crude	\$/BbI	42.71	- 0.140	- 0.440	- 16.710
Fuel Oil, NY Harbour 1%	\$/Bbl	98.03	0.000	0.000	0.000
Heating Oil	cents/Gallon	117.57	▼ -1.760	1.670	▼ -77.140
Propane, Mt. Bel	cents/Gallon	0.53	a 0.007	0.029	0.063
Ethane, Mt. Bel	cents/Gallon	0.21	a 0.018	0.017	a 0.027
Coal, PRB	\$/MTon	12.30	0.000	0.000	a 0.100
Coal, ILB	\$/MTon	31.05	0.000	0.000	- 4.500

Source: CME, Bloomberg



Baker Hughes Rig Counts

Oil rigs increased by 12 this week, while natural gas rigs increased by 1. The weekly changes for the major basins are listed below.

Rotary Rig Count								
	Baker	Baker Hughes 🤰						
U.S. Breakout Information	This Week	+/-	Last Week	+/-	Year Ago			
Oil	205	12	193	-508	713			
Gas	74	1	73	-63	137			
Miscellaneous	3	0	3	2	1			
Directional	21	0	21	-34	55			
Horizontal	240	7	233	-505	745			
Vertical	21	6	15	-30	51			
Canada Breakout	This Week	+/-	Last Week	+/-	Year Ago			
Oil	40	1	39	-58	98			
Gas	40	-1	41	-5	45			
Major Basin Variances	This Week	+/-	Last Week	+/-	Year Ago			
Ardmore Woodford	0	0	0	-2	2			
Arkoma Woodford	1	0	1	-2	3			
Barnett	0	0	0	-4	4			
Cana Woodford	7	1	6	-23	30			
DJ-Niobrara	3	-1	4	-19	22			
Eagle Ford	16	3	13	-44	60			
Granite Wash	0	-1	1	-2	2			
Haynesville	37	1	36	-15	52			
Marcellus	26	1	25	-18	44			
Mississippian	0	0	0	-2	2			
Permian	130	0	130	-292	422			
Utica	6	0	6	-5	11			
Williston	12	1	11	-43	55			