

NGI's LNG INSIGHT



Bringing a North American Focus to International LNG

THURSDAY, JULY 2, 2020 - VOL. 1, NO. 182

Daily Rundown

- An increase in LNG spot trading last year led to a decline in natural gas purchases tied to oil prices
- The IGU's annual wholesale price survey found that gas buyers paid an average of \$3.88/MMBtu last year
- Eni SpA has struck natural gas in its first exploration well in the North El Hammad offshore Egypt

HOLIDAY NOTICE

In observation of the U.S. Independence Day holiday on Friday, July 3, the next issue of NGI's LNG Insight will be published on Monday, July 6.

MARKETS

IGU Again Finds Gas-on-Gas Competition Increasing as LNG Spot Deals Grow

The world again saw an increase of natural gas buying at prices tied to dominant hubs and indices last year as the number of purchases linked to competing fuels like crude oil declined in an ongoing shift influenced by a sharp spike in liquefied natural gas (LNG) spot trading, according to the International Gas Union (IGU).

The IGU's latest Wholesale Gas Price Survey released Thursday found that "gas-on-gas" (GOG) competition's share of the global market increased by 1 percentage point to 48.4% between 2018 and 2019, while "oil price escalation" (OPE) declined by about 1 percentage point to 18.5% over the same time.

While IGU's definition of GOG includes a variety of price mechanisms, it generally refers to purchases conducted on a daily, monthly or annual basis at prices linked to global gas hubs or indices. OPE is defined as gas prices that are linked to the cost of competing fuels, typically crude oil, or even coal or electricity.

The rise of GOG in LNG imports continued a trend that IGU has seen over the last three years. In 2016, the total GOG share of LNG imports was just 25%, but by 2019 it had risen to 41%.

"The rise between 2016 and 2018 was all due to rising spot LNG imports, while in 2019 the increase was split equally between spot LNG imports and the rush of LNG to Europe's traded markets," IGU said.

IGU's flagship publication, the survey covered responses from 91 countries that represent 98% of the world's natural gas consumption. It found that about 59% of LNG imports are linked to the cost of oil, while 41% are linked to gas. The bulk of oil-linked LNG is sold in the Asia Pacific, while gas-linked LNG is largely imported in North America and Europe, along with other countries

...cont' pg. 4

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Prompt Month Statistics - Previous 5 Trading Days					
	26-Jun	29-Jun	30-Jun	1-Jul	2-Jul
Max GOM Netback (\$US/MMBtu)	1.375	1.563	1.591	1.537	1.518
L48 LNG Feedstock Deliveries (dth/d)	4.83	4.20	4.47	3.26	3.27
Futures (\$US/MMBtu)					
Henry Hub	1.544	1.709	1.751	1.671	1.734
JPN/KOR	2.200	2.200	2.150	2.200	2.200
NBP	1.766	1.981	2.011	1.961	1.916
TTF	1.811	2.002	2.031	1.934	1.958
Shipping (\$US/MMBtu)*					
Sabine Pass to Tokyo	0.917	0.917	0.917	0.918	0.918
Sabine Pass to Milford Haven (U.K.)	0.421	0.424	0.425	0.425	0.424
Sabine Pass to Gate (NW Europe)	0.436	0.440	0.441	0.439	0.439
Landed Price Arbitrage (\$US/MMBtu)**					
Sabine to Tokyo	-0.493	-0.682	-0.781	-0.639	-0.712
Sabine to Gate	-0.401	-0.403	-0.423	-0.426	-0.476
Europe Fundamentals					
Gas in Storage (TWh)***	866.0	877.1	880.8	883.3	887.0
% Full	78.3%	79.3%	79.6%	79.8%	80.2%
Difference to Last Year (TWh)	98.8	96.9	96.3	93.9	92.6
Gas in LNG Storage (10 ³ m ³)***	5487.33	5457.1	5068.1	4901.5	4893.5
% Full	58.5%	58.2%	54.1%	52.3%	52.2%
Spark Spread (Eur/MWh)	21.53	20.58	21.58	22.34	22.10
Clean Spark Spread (Eur/MWh)	10.58	8.79	9.72	10.18	10.09
Dark Spread (Eur/MWh)	14.94	15.05	16.46	16.57	16.09
Clean Dark Spread (Eur/MWh)	-11.18	-13.06	-11.84	-12.45	-12.55
PVB/TTF Premium (%)	40.3%	30.5%	30.5%	27.9%	28.8%
NW Europe Mean Temp (°F)	65	63	63	66	TBD
% Diff From 30-Yr Normal	3.4%	-0.5%	-0.2%	3.4%	N/A
Asia Fundamentals					
JKM/KOR Oil Parity Slope	5.4%	5.3%	5.2%	5.2%	5.1%
Brent Oil Price Parity (\$US/MMBtu)	7.06	7.17	7.08	7.23	7.42
JKM/KOR Futures (\$US/MMBtu)	2.20	2.20	2.15	2.20	2.20
Japan Coal Price (\$US/MMBtu)	2.95	2.94	2.91	2.89	2.94
Beijing Mean Temp (°F)	74	77	83	82	77
% Diff From Normal	2.9%	-0.5%	0.5%	-6.6%	-3.1%
Seoul Mean Temp (°F)	70	73	69	69	73
% Diff From Normal	-0.1%	2.6%	-3.6%	-2.7%	2.0%
Tokyo Mean Temp (°F)	76	77	77	78	79
% Diff From Normal	4.7%	5.5%	5.4%	5.9%	6.9%
Latin America Fundamentals (\$US/MMBtu)					
Mexico					
East (Altamira) DES	1.46	1.70	1.72	1.70	1.68
West (Manzanillo) DES	1.87	2.11	2.12	2.11	2.09
Argentina DES	1.87	2.11	2.13	2.12	2.10
Brazil DES	1.66	1.90	1.92	1.91	1.89
Chile DES	1.95	2.19	2.21	2.20	2.18
Colombia DES	1.50	1.74	1.76	1.75	1.73
Panama DES	1.53	1.77	1.78	1.77	1.75

Current prompt month prices are for Aug, unless otherwise noted.

*Assumes full freight for both laden and ballast legs.

**Excludes regas fees.

***Most recent data available. Typically delayed by two calendar days.

NGI's LNG INSIGHT

U.S. Gulf Coast LNG Netback Prices (12-Month Strip) 2-Jul-2020

Futures Settle (\$US/MMBtu)

Est Shipping Cost from Gulf Coast (\$US/MMBtu)

Gulf Coast Netback (\$US/MMBtu)

Netback Less Henry Hub Futures (\$US/MMBtu)

Spot Month (shipping based on spot market vessel rate)

Month	JPN/KOR	NBP	TTF	JPN/KOR	NBP	TTF	JPN/KOR	NBP	TTF	Max	Chg	HH	Diff (Margin)
Aug-20	\$2.200	\$1.916	\$1.958	\$0.918	\$0.424	\$0.439	\$1.282	\$1.492	\$1.518	\$1.518	(\$0.018)	\$1.734	(\$0.216)
Rest of Curve (shipping based on 1-Yr vessel rate, adjusted for seasonality)													
Sep-20	\$2.525	\$2.182	\$2.180	\$1.185	\$0.565	\$0.590	\$1.340	\$1.617	\$1.590	\$1.617	(\$0.002)	\$1.785	(\$0.168)
Oct-20	\$3.040	\$2.658	\$2.710	\$1.450	\$0.706	\$0.742	\$1.590	\$1.953	\$1.969	\$1.969	\$0.005	\$1.884	\$0.085
Nov-20	\$3.750	\$3.847	\$3.692	\$1.563	\$0.772	\$0.810	\$2.187	\$3.074	\$2.882	\$3.074	(\$0.013)	\$2.297	\$0.777
Dec-20	\$4.400	\$4.492	\$4.074	\$1.492	\$0.734	\$0.765	\$2.908	\$3.758	\$3.310	\$3.758	\$0.026	\$2.773	\$0.985
Jan-21	\$4.765	\$4.705	\$4.169	\$1.317	\$0.638	\$0.660	\$3.448	\$4.067	\$3.509	\$4.067	\$0.026	\$2.907	\$1.160
Feb-21	\$4.950	\$4.771	\$4.163	\$1.192	\$0.570	\$0.585	\$3.758	\$4.201	\$3.578	\$4.201	\$0.057	\$2.907	\$1.294
Mar-21	\$4.540	\$4.448	\$4.123	\$1.059	\$0.500	\$0.516	\$3.481	\$3.947	\$3.607	\$3.947	\$0.015	\$2.768	\$1.179
Apr-21	\$4.150	\$4.055	\$3.960	\$0.997	\$0.468	\$0.484	\$3.153	\$3.587	\$3.476	\$3.587	\$0.030	\$2.490	\$1.097
May-21	\$4.155	\$3.862	\$3.912	\$1.016	\$0.475	\$0.494	\$3.139	\$3.387	\$3.418	\$3.418	\$0.055	\$2.457	\$0.961
Jun-21	\$4.030	\$3.697	\$3.876	\$1.076	\$0.506	\$0.530	\$2.954	\$3.191	\$3.346	\$3.346	\$0.070	\$2.495	\$0.851
Jul-21	\$4.000	\$3.723	\$3.838	\$1.093	\$0.516	\$0.540	\$2.907	\$3.207	\$3.298	\$3.298	\$0.065	\$2.540	\$0.758
NTM Avg	\$3.875	\$3.696	\$3.555				\$2.679	\$3.123	\$2.958	\$3.150	\$0.026	\$2.420	\$0.730

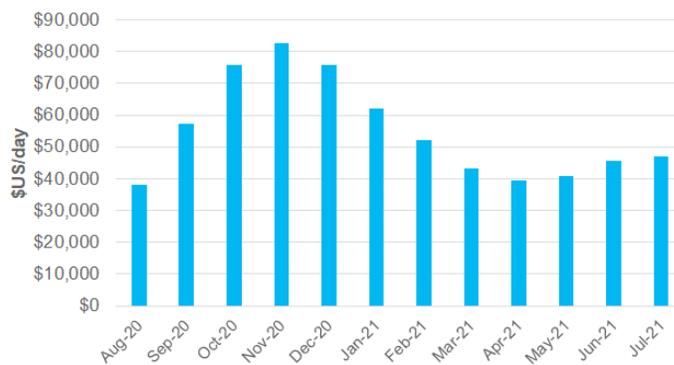
West of Suez Spot 174K XDF/MEGI Day Rate: \$38,000

West of Suez 1-Yr TC 174K XDF/MEGI Vessel Rate: \$55,000

Spot Month Sabine Pass Export Landed Price Arbitrage Continuation Chart



West of Suez LNG Vessel Rate Curve



Note: Based on 174,000 m³ XDF/MEGI vessels. This is not an actual traded curve. Figures represent NGI's estimate of a laden leg forward curve based on current spot market and 1-yr charter rates, adjusted for historical seasonality. The simple average of all months equals the 1-yr charter rate.

Source: NGI calculations, CSI, Fearnleys

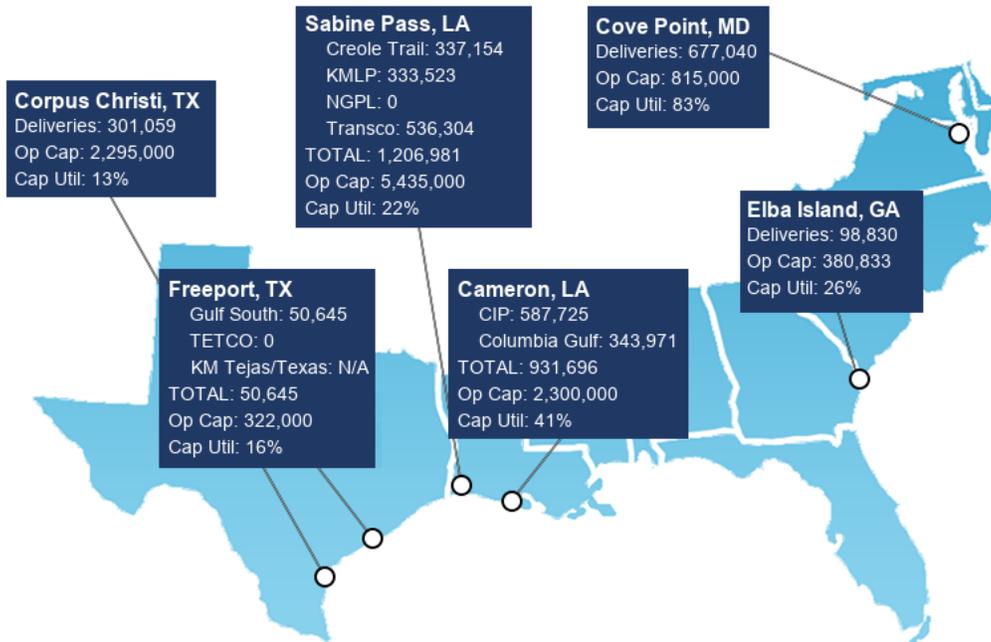
Other North America LNG Netback Prices 2-Jul-2020

	Netback to NGI's AECO				Netback to NGI's SoCal				Netback to NGI's Transco				NGI's Waha
	Western Canada	Forwards	Diff	Diff	Costa Azul	Border Forwards	Diff	Diff	Cove Point	Zn 5 Forwards	Diff	Diff	Forwards
	\$US/MMBtu	\$US/MMBtu	\$US/MMBtu	%	\$US/MMBtu	\$US/MMBtu	\$US/MMBtu	%	\$US/MMBtu	\$US/MMBtu	\$US/MMBtu	%	\$US/MMBtu
Aug-20	\$1.822	\$1.346	\$0.476	35%	\$1.755	\$1.868	-\$0.113	-6%	\$1.606	\$1.691	-\$0.085	-5%	\$1.373
Sep-20	\$2.056	\$1.359	\$0.697	51%	\$1.969	\$1.751	\$0.218	12%	\$1.768	\$1.701	\$0.067	4%	\$1.255
Oct-20	\$2.533	\$1.404	\$1.129	80%	\$2.438	\$1.712	\$0.726	42%	\$2.239	\$1.821	\$0.418	23%	\$1.231
Nov-20	\$3.117	\$1.758	\$1.359	77%	\$2.994	\$2.210	\$0.784	35%	\$3.292	\$2.345	\$0.947	40%	\$1.656
Dec-20	\$3.716	\$1.875	\$1.841	98%	\$3.582	\$3.313	\$0.269	8%	\$3.894	\$3.476	\$0.418	12%	\$2.189
Jan-21	\$4.119	\$1.927	\$2.192	114%	\$3.992	\$3.373	\$0.619	18%	\$4.141	\$4.783	-\$0.642	-13%	\$2.381
Feb-21	\$4.388	\$1.918	\$2.470	129%	\$4.280	\$3.209	\$1.071	33%	\$4.278	\$4.656	-\$0.378	-8%	\$2.358
Mar-21	\$4.044	\$1.843	\$2.201	119%	\$3.951	\$2.432	\$1.519	62%	\$4.009	\$3.098	\$0.911	29%	\$2.083
Apr-21	\$3.715	\$1.661	\$2.054	124%	\$3.636	\$1.930	\$1.706	88%	\$3.668	\$2.654	\$1.014	38%	\$1.804
May-21	\$3.744	\$1.562	\$2.182	140%	\$3.669	\$1.905	\$1.764	93%	\$3.527	\$2.493	\$1.034	41%	\$1.714
Jun-21	\$3.612	\$1.559	\$2.053	132%	\$3.535	\$2.120	\$1.415	67%	\$3.484	\$2.547	\$0.937	37%	\$1.858
Jul-21	\$3.552	\$1.615	\$1.937	120%	\$3.470	\$2.670	\$0.800	30%	\$3.419	\$2.356	\$1.063	45%	\$2.047
NTM Avg	\$3.368	\$1.652	\$1.716	104%	\$3.273	\$2.374	\$0.898	38%	\$3.277	\$2.802	\$0.475	17%	\$1.829

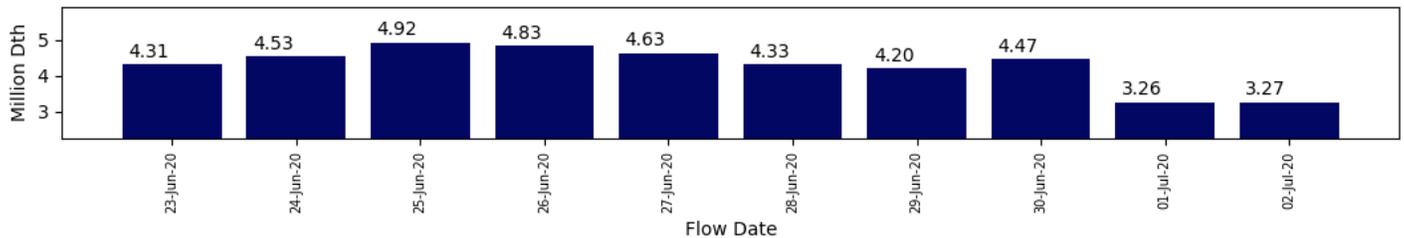
Note: Netbacks are based on deliveries to Asia & Europe. LNG Canada and Costa Azul liquefaction facilities are not expected to be in-service until 2025 and 2023, respectively. But the above calculations give an indication of how LNG may be priced on an FOB basis if those locations were operational. NGI's Forward Look has 10-year forward curves for more than 60 locations in North America. For more information, please visit our Forward Look product page at natgasintel.com/product/forward-look

Source: NGI's Forward Look, CSI, Fearnleys, NGI calculations

NGI's LNG INSIGHT U.S. LNG EXPORT TRACKER 02-Jul-2020



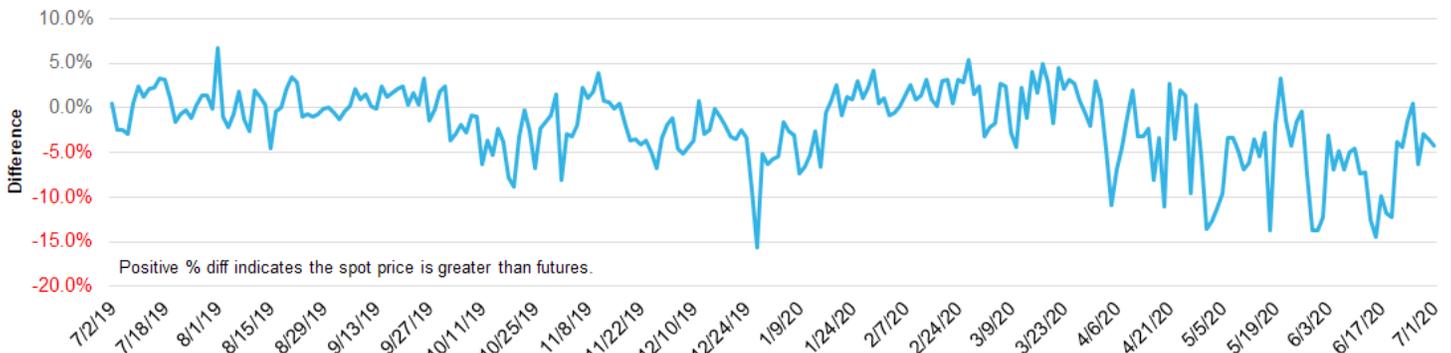
Daily Summary (Volumes Listed in Dekatherms)	
Total Deliveries to U.S. LNG Export Facilities:	3,266,251
Previous Day:	3,264,273
Change:	1,978



Note: Figures are NGI's estimates of gas delivered to each respective LNG liquefaction facility, listed in dekatherms, and based on best available cycle as of the morning of each listed gas day.

Source: Pipeline EBBs, NGI calculations

NGI's Daily Henry Hub Spot Index vs. Prompt (CME) Futures Contract 2-Jul-2020



Interested in the data behind this chart? NGI publishes daily and monthly spot market prices for Henry Hub and more than 140 other locations in North America. Please go to natgasintel.com/product/daily-gpi for more details.

Source: NGI's Daily Gas Price Index, CSI, NGI calculations





LNG Freight Costs for Selected Routes

2-Jul-2020

Trade Route (\$ / MMBtu)	174k MEGI			160k TFDE			145k ST		
Bonny / Montoir	0.393	0.001	▲	0.407	0.001	▲	0.446	0.002	▲
Bonny / Tokyo	0.803	0.003	▲	0.889	0.006	▲	1.011	0.010	▲
Ras Laffan / Montoir	0.427	0.000	◀	0.440	0.001	▲	0.467	0.001	▲
Ras Laffan / Tokyo	0.321	0.001	▲	0.346	0.001	▲	0.392	0.002	▲
Dampier / Tokyo	0.277	0.001	▲	0.298	0.002	▲	0.346	0.003	▲
Zeebrugge / Bahia Blanca	0.473	0.002	▲	0.547	0.004	▲	0.628	0.006	▲
Zeebrugge / Dahej	0.510	0.002	▲	0.573	0.004	▲	0.703	0.006	▲
Zeebrugge / Tokyo	0.800	0.003	▲	0.935	0.006	▲	1.056	0.010	▲
Sabine / Bahia Blanca	0.469	0.002	▲	0.551	0.004	▲	0.624	0.006	▲
Sabine / Dahej	0.705	0.003	▲	0.833	0.005	▲	0.924	0.009	▲
Sabine / Tokyo	0.692	0.003	▲	0.814	0.005	▲	0.913	0.009	▲
Sabine / Zeebrugge	0.394	0.003	▲	0.499	0.005	▲	0.602	0.008	▲
Port Moresby / Tokyo	0.274	0.001	▲	0.295	0.002	▲	0.339	0.003	▲

Source: Fearnleys (www.fearnleys.com). Assumes cold vessel. Speed used is 17 knots on laden passage and 16 knots on ballast passage.



Spot LNG Vessel Rates (\$USD/day)

2-Jul-2020

Vessel Rates		
Vessel Type / Region	WEST	EAST
174k XDF / MEGI	38,000	38,000
155k - 165k TFDE	33,000	30,000
138k - 145k ST	23,000	21,000

Pacific Voyage Parameters

Fuel and 50% Hire on Ballast Bonus to Singapore

Middle East Voyage Parameters

Fuel and 50% Hire on Ballast Bonus to Fujairah

Atlantic Voyage Parameters

Fuel and 50% Hire on Ballast Bonus to Load Port; or to Gibraltar for voyages staying within the Atlantic basin

Source: Fearnleys (www.fearnleys.com)

West of Suez LNG Vessel Rate Curve 2-Jul-2020

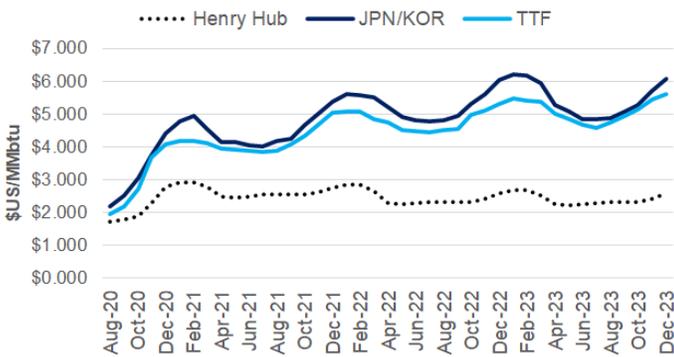
Month	2-Jul	1-Jul	Chg
Aug-20	38,000	38,000	0
Sep-20	57,163	57,163	0
Oct-20	75,809	75,809	0
Nov-20	82,625	82,625	0
Dec-20	75,845	75,845	0
Jan-21	61,977	61,977	0
Feb-21	52,249	52,249	0
Mar-21	43,261	43,261	0
Apr-21	39,508	39,508	0
May-21	40,909	40,909	0
Jun-21	45,672	45,672	0
Jul-21	46,982	46,982	0
Average	55,000	55,000	0

Note: Based on 174,000 m³XDF/MEGI vessels. This is not an actual traded curve. Figures represent NGI's estimate of a laden leg forward curve based on current spot market and 1-yr charter rates, adjusted for historical seasonality. The simple average of all months equals the 1-yr charter rate.



Source: NGI estimates based on Fearnleys data

Global Futures Settles Through 2023 2-Jul-2020



Contract	Date	12-Month Strip*	CY2021	CY2022	CY2023
Henry Hub	2-Jul-20	\$2.420	\$2.631	\$2.451	\$2.406
	1-Jul-20	\$2.399	\$2.628	\$2.446	\$2.391
	Chg	\$0.021	\$0.003	\$0.005	\$0.014
JPN/KOR	2-Jul-20	\$3.875	\$4.505	\$5.259	\$5.450
	1-Jul-20	\$3.853	\$4.463	\$5.209	\$5.401
	Chg	\$0.022	\$0.043	\$0.050	\$0.049
TTF	2-Jul-20	\$3.555	\$4.170	\$4.809	\$5.102
	1-Jul-20	\$3.511	\$4.122	\$4.773	\$5.080
	Chg	\$0.043	\$0.049	\$0.036	\$0.022

*Aug 2020 through Jul 2021

Source: Bloomberg, CSI, NGI calculations



Global LNG & NatGas Futures Prices (Aug 2020) 2-Jul-2020

Contract	Cur/Unit	Settle	Chg	% Chg	Settle (\$US/MMBtu)
JPN/KOR	\$US/MMBtu	\$2.200	\$0.000	0.0%	\$2.200
NBP	pence/therm	15.37p	-0.35p	-2.2%	\$1.916
TTF	Eur/MWh	€ 5.944	€ 0.081	1.4%	\$1.958
Henry Hub	\$US/MMBtu	\$1.734	\$0.063	3.8%	\$1.734

NBP & TTF converted to \$US/MMBtu using same month forex futures contracts.

Source: NGI calculations, CSI



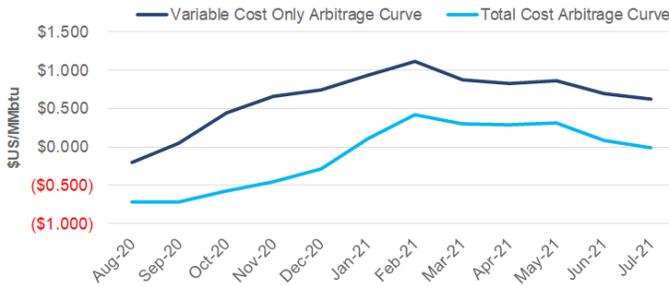
... from MARKETS - IGU Again Finds Gas-on-Gas Competition Increasing, pg. 1 that take in spot cargoes.

Spot LNG volumes were heavily concentrated in Asian markets last year, IGU said, with China the largest spot buyer, followed by Japan and India. Spain, South Korea, Italy, France and Turkey also imported significant spot volumes last year. Together, the eight countries accounted for 83% of all spot LNG deals in 2019, which accounted for 31.3% of all LNG imports.

The survey also tracks how domestic production

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Estimated Sabine Pass / Asia 12-Month Forward LNG Arbitrage Curves 2-Jul-2020



Note: Assumes title changes hands at sea, so no regas fees. Negative GOM/Asia spreads may not increase the risk of GOM LNG shut-ins as much as those between GOM and Europe, since Europe has much more storage capacity than Asia. As such, Europe often serves as the market of "last resort." Variable costs assume vessels have been chartered, and include fuel, boiloff, Panama Canal and port fees only. Total costs includes variable expenses and fixed vessel chartering fees.

Month	115% HH Shipping Costs			Variable Only Landed		Total Landed		Variable Arbitrage Spread		Total Arbitrage Spread	
	Futures	Variable	Fixed	Cost	Cost	Futures	Spread	Spread	Spread	Spread	
Aug-20	\$1.994	\$0.409	\$0.509	\$2.403	\$2.912	\$2.200	(\$0.203)	(\$0.712)			
Sep-20	\$2.053	\$0.419	\$0.766	\$2.471	\$3.238	\$2.525	\$0.054	(\$0.713)			
Oct-20	\$2.167	\$0.434	\$1.016	\$2.601	\$3.617	\$3.040	\$0.439	(\$0.577)			
Nov-20	\$2.642	\$0.455	\$1.108	\$3.097	\$4.205	\$3.750	\$0.653	(\$0.455)			
Dec-20	\$3.189	\$0.475	\$1.017	\$3.664	\$4.681	\$4.400	\$0.736	(\$0.281)			
Jan-21	\$3.343	\$0.486	\$0.831	\$3.829	\$4.660	\$4.765	\$0.936	\$0.105			
Feb-21	\$3.343	\$0.492	\$0.700	\$3.835	\$4.535	\$4.950	\$1.115	\$0.415			
Mar-21	\$3.183	\$0.479	\$0.580	\$3.662	\$4.242	\$4.540	\$0.878	\$0.298			
Apr-21	\$2.864	\$0.467	\$0.530	\$3.331	\$3.861	\$4.150	\$0.819	\$0.289			
May-21	\$2.826	\$0.468	\$0.548	\$3.293	\$3.842	\$4.155	\$0.862	\$0.313			
Jun-21	\$2.869	\$0.464	\$0.612	\$3.333	\$3.945	\$4.030	\$0.697	\$0.085			
Jul-21	\$2.921	\$0.463	\$0.630	\$3.384	\$4.014	\$4.000	\$0.616	(\$0.014)			

Source: NGI calculations, CSI, Fearnleys

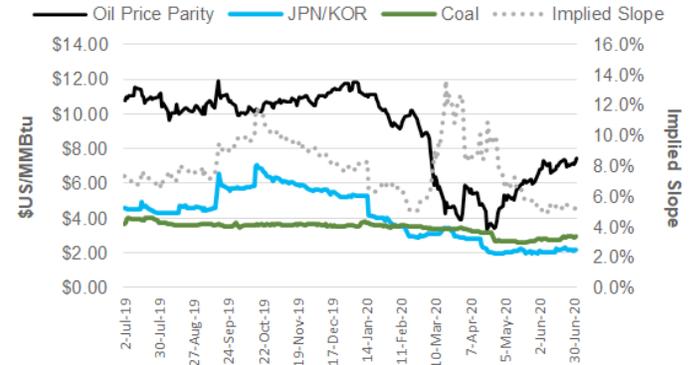


Daily Prompt Oil Linked Asia Parity Prices 2-Jul-2020

Current Spot Month Japan/Korea Futures Contract Price (Aug): **\$2.200**
 Current Spot Month Brent Crude Oil Futures Price (Sep): **\$43.14**
 Current Spot Month Japan Coal Price (Jul): **\$2.94**
 Implied Current Japan/Korea Slope to Brent: **5.1%**

Crude Mo.	Oil Price		Oil Parity Price (17.2% Slope)	
	3 Mo Avg JCC	Brent	3 Mo Avg JCC	Brent
Sep-20	\$58.23	\$43.14	\$10.02	\$7.42

Trailing 12M Daily Prompt Japan/Korea Futures



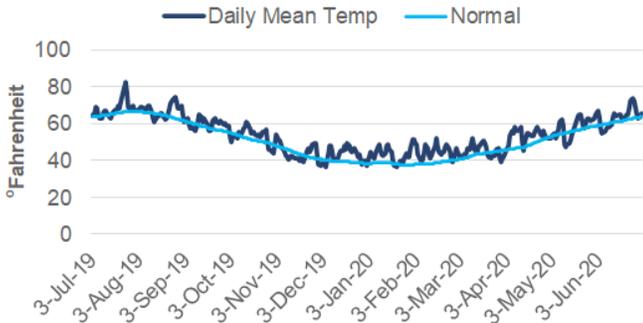
Note: Oil linked parity figures tend to serve as a cap on Asian LNG market prices, while coal prices can help act as a floor.

Source: NGI calculations, ICE, CSI, METI

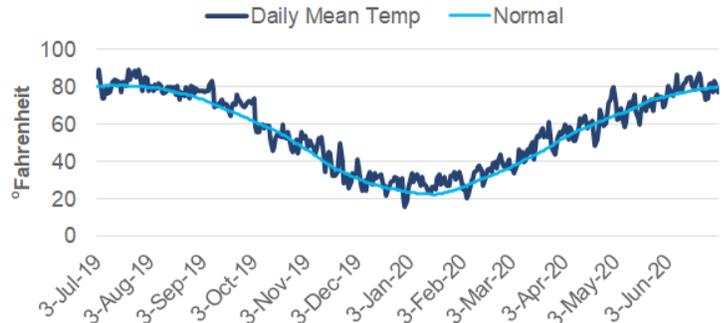


Europe & Asia Weather Data 2-Jul-2020

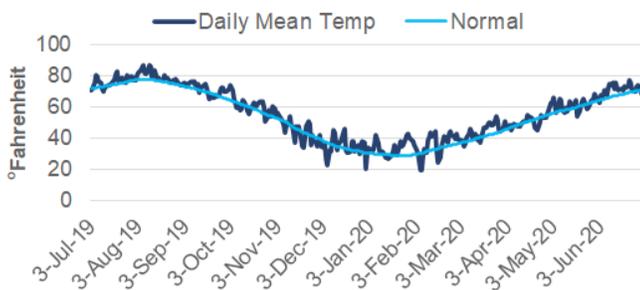
Trailing 365 Day Mean Temperatures - Northwest Europe



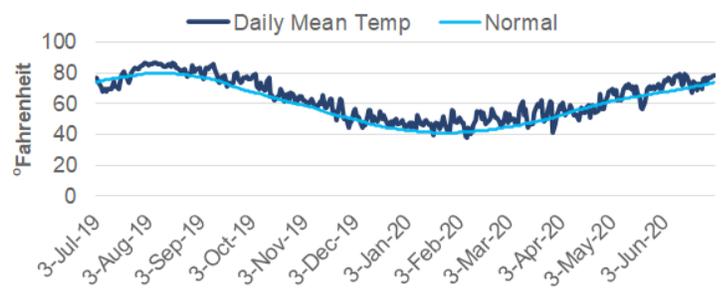
Trailing 365 Day Mean Temperatures - Beijing



Trailing 365 Day Mean Temperatures - Seoul



Trailing 365 Day Mean Temperatures - Tokyo



Source: NGI calculations, Bloomberg



U.S. Landed vs. European Prices Aug 2020 2-Jul-2020

Estimated U.S. LNG Landed Price (\$US/MMBtu)

Source	Pricing Point	HH Price	Gate Landed Price (GLP)
GOM	Henry Hub	\$1.734	\$2.142

European NatGas Futures Prices (Eur/MWh & Pound/therm)

Country	Pricing Point	Local Price MWh or therm	Local Price \$US/MMBtu	Diff to GLP* \$US/MMBtu
Belgium	ZTP	€ 5.79	\$1.907	-\$0.235
Czech Rep	CZ VTP	€ 6.29	\$2.072	-\$0.070
France	PEG	€ 5.88	\$1.935	-\$0.207
Germany	NCG	€ 6.00	\$1.975	-\$0.168
Italy	PSV	€ 6.95	\$2.290	\$0.148
Netherlands	TTF	€ 5.94	\$1.958	-\$0.185
Slovakia	CEGH VTP	€ 6.55	\$2.157	\$0.015
Spain	PVB	€ 7.66	\$2.521	\$0.379
UK	NBP	15.37p	\$1.916	-\$0.226

Euro Exchange Rate: 1.12385
Pound Exchange Rate: 1.24650



Note: U.S. landed price is to the Gate Terminal in the Netherlands, and exclude any regas or European pipeline grid access fees. We estimate the variable portion of such charges range between \$0.10-\$0.50 per MMBtu. All local European prices are Eur/MWh, except UK, which is pence/therm.

**Negative numbers indicate imported U.S. LNG is more expensive than the local price.

Source: NGI calculations, CME, ICE, EEX, Powernext, CSI, Fearnleys

and pipeline imports are priced. Overall, it found that wholesale natural gas prices declined in 2019, “largely due to the impact of rising global gas supply leading to sharp falls in spot prices around the world.” Global gas prices averaged \$3.88/MMBtu, the second lowest recorded in the survey’s history, which dates back to 2005.

The highest prices were paid by those purchasing gas linked to oil prices at an average of \$7.40, or more than double the GOG average which was \$3.55 last year.

...cont' pg. 7

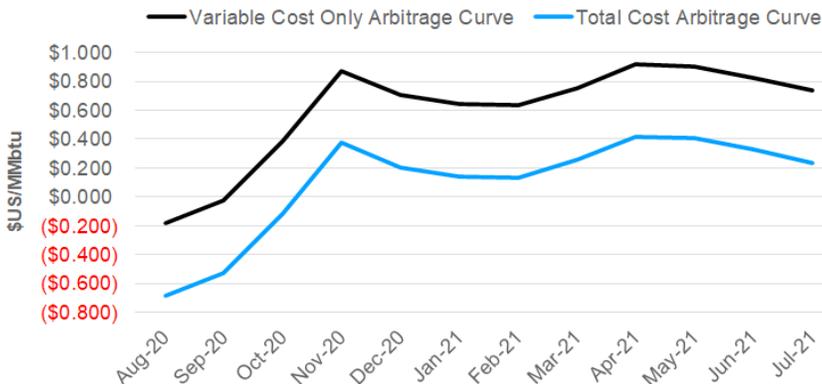
Spanish PVB vs. Dutch TTF Futures 2-Jul-2020

Period	PVB \$US/MMBtu	Chg	TTF \$US/MMBtu	Chg	PVB/TTF Premium (\$)	PVB/TTF Premium %
Aug-20	\$2.521	\$0.047	\$1.958	\$0.024	\$0.564	28.8%
Sep-20	\$2.731	\$0.055	\$2.180	\$0.041	\$0.550	25.2%
Oct-20	\$3.025	\$0.000	\$2.710	\$0.033	\$0.314	11.6%
4Q20	\$3.667	-\$0.001	\$3.492	\$0.029	\$0.175	5.0%
1Q21	\$4.396	\$0.034	\$4.152	\$0.037	\$0.245	5.9%
2Q21	\$4.116	\$0.075	\$3.916	\$0.064	\$0.199	5.1%

Source: NGI calculations, CSI



Estimated Sabine Pass / Europe (Gate) 12-Month Forward LNG Arbitrage Curves 2-Jul-2020



Note: Negative spreads increase the odds of U.S. Gulf of Mexico sourced LNG cargoes being shut-in. Variable costs assume vessels have been chartered, and include fuel, boil-off, and port fees only. Total costs include both variable expenses and fixed vessel chartering fees. Both exclude regas fees, which we estimate would add another \$0.10-\$0.50 in additional costs to each arbitrage curve calculation.



Month	115% Henry Hub Futures	Shipping Costs Variable	Shipping Costs Fixed	Variable Only Landed Cost	Total Landed Cost	TTF Futures	Variable Arbitrage Spread	Total Arbitrage Spread
Aug-20	\$1.994	\$0.148	\$0.291	\$2.142	\$2.642	\$1.958	(\$0.185)	(\$0.685)
Sep-20	\$2.053	\$0.152	\$0.438	\$2.205	\$2.705	\$2.180	(\$0.024)	(\$0.524)
Oct-20	\$2.167	\$0.161	\$0.581	\$2.327	\$2.827	\$2.710	\$0.383	(\$0.117)
Nov-20	\$2.642	\$0.177	\$0.633	\$2.818	\$3.318	\$3.692	\$0.873	\$0.373
Dec-20	\$3.189	\$0.183	\$0.581	\$3.372	\$3.872	\$4.074	\$0.702	\$0.202
Jan-21	\$3.343	\$0.185	\$0.475	\$3.528	\$4.028	\$4.169	\$0.641	\$0.141
Feb-21	\$3.343	\$0.185	\$0.400	\$3.528	\$4.028	\$4.163	\$0.635	\$0.135
Mar-21	\$3.183	\$0.184	\$0.332	\$3.367	\$3.867	\$4.123	\$0.755	\$0.255
Apr-21	\$2.864	\$0.181	\$0.303	\$3.045	\$3.545	\$3.960	\$0.916	\$0.416
May-21	\$2.826	\$0.181	\$0.314	\$3.006	\$3.506	\$3.912	\$0.906	\$0.406
Jun-21	\$2.869	\$0.180	\$0.350	\$3.049	\$3.549	\$3.876	\$0.827	\$0.327
Jul-21	\$2.921	\$0.179	\$0.360	\$3.100	\$3.600	\$3.838	\$0.737	\$0.237

Source: NGI calculations, CSI, Fearnleys

European Spark/Dark Spreads (Aug 2020) 2-Jul-2020

EUA Carbon Price (Eur/mt): 27.28

Nation	Eur/MWh	Eur/MWh	Spark Spread		Clean Spark Spread	
			Eur/MWh	Eur/MWh	Eur/MWh	Eur/MWh
BE	32.65	5.790	20.86	19.78	9.76	7.53
CZ	35.55	6.292	22.74	21.57	11.64	9.32
FR	35.00	5.875	23.04	21.94	11.94	9.70
DE	33.28	5.995	21.08	19.96	9.97	7.71
IT	37.32	6.953	23.17	21.87	12.06	9.62
NL	31.55	5.944	19.45	18.34	8.35	6.09
SK	37.30	6.550	23.97	22.74	12.87	10.50
ES	36.08	7.655	20.50	19.07	9.40	6.82
UK*	35.91	5.817	24.07	22.99	4.85	1.77
Average			22.10	20.92	10.09	7.67

Nation	Eur/MWh	Eur/MWh	Dark Spread		Clean Dark Spread	
			Eur/MWh	Eur/MWh	Eur/MWh	Eur/MWh
BE	32.65	51.95	13.78		-12.71	
CZ	35.55	51.95	16.68		-9.81	
FR	35.00	51.95	16.13		-10.36	
DE	33.28	51.95	14.41		-12.08	
IT	37.32	51.95	18.45		-8.04	
NL	31.55	51.95	12.68		-13.81	
SK	37.30	51.95	18.43		-8.06	
ES	36.08	51.95	17.21		-9.28	
UK*	35.91	51.95	17.05		-28.83	
Average			16.09		-12.55	

Belgium (BE) / Czech Rep (CZ) / France (FR) / Germany (DE) / Italy (IT) / Holland (NL) / Slovakia (SK) / Spain (ES) / United Kingdom (UK)

*UK clean spark and dark spreads incorporate the cost of the UK Carbon Price Support levy. See methodology for all assumptions.

Source: NGI calculations, CSI



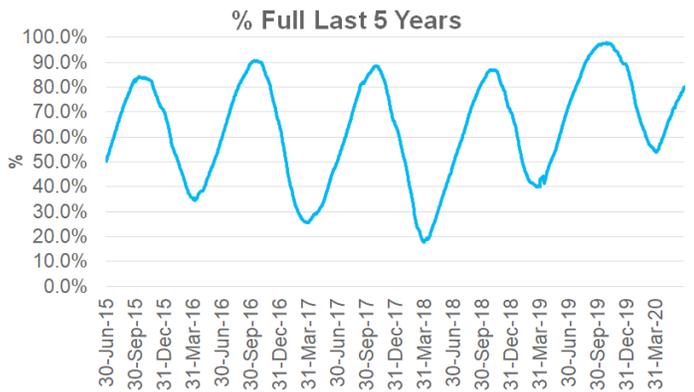
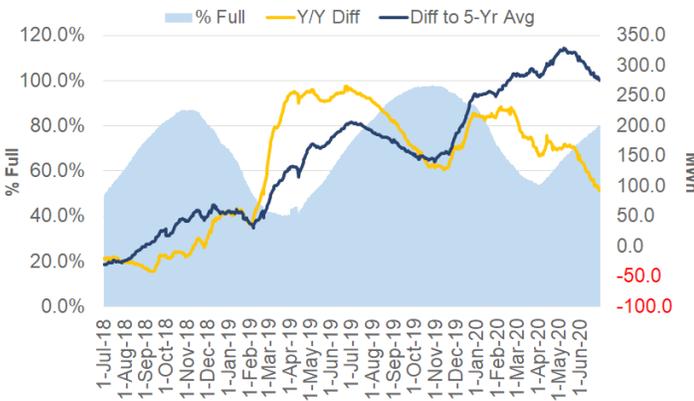
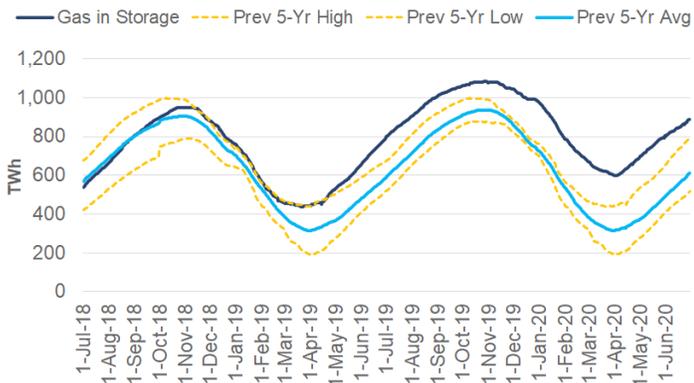
“While the GOG category is heavily influenced by the relatively low prices in North America and Russia, the collapse in spot prices has also widened the gap,” IGU said. “If these were excluded then the balance of GOG prices would be on average \$6.02.”

Buyers in the Asia Pacific region paid the highest prices for natural gas at just under \$8.00, while those in Asia paid more than \$7.00 given that OPE is the primary pricing mechanism in those regions. ■

European Union Gas Storage

Data as of 30-Jun-20 Chart Last Updated 2-Jul-20

Volumes in TWh	Gas in Storage		Working Gas		Gas in Storage		Prev 5-Yr	
	30-Jun-20	Volume	% Full	30-Jun-19	Y/Y Diff	5-Yr Avg	Avg Diff	
Europe	887.03	1106.36	80.2%	794.39	92.64	612.16	274.87	



% Full As of	30-Jun-15	50.3%	30-Jun-16	59.8%	30-Jun-17	50.4%	30-Jun-18	48.9%	30-Jun-19	72.8%	30-Jun-20	80.2%
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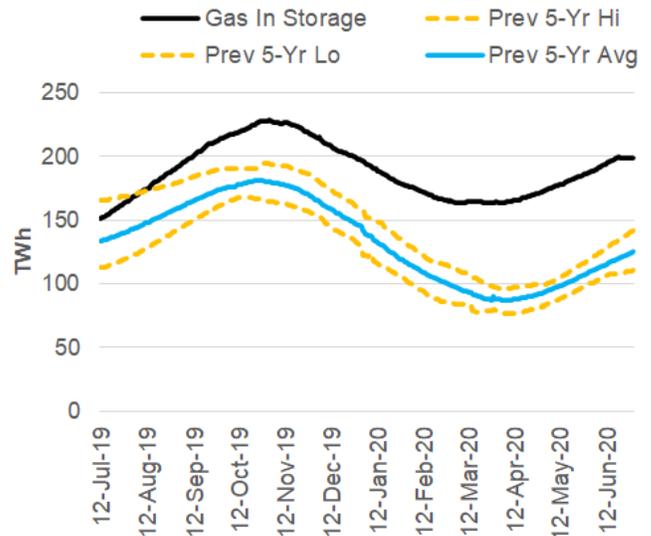
Source: NGI calculations, GIE



Ukraine Gas Storage

Data as of 30-Jun-20 Chart Last Updated: 2-Jul-20

30/6/20	Volumes in TWh			Y/Y Diff	Prev 5-Yr Avg	5-Yr Avg Diff
	WG Vol	% Full	30/6/19			
199.19	320.17	62.2%	141.84	57.36	125.34	73.85



NGI's LNG INSIGHT

European Union LNG Regas Terminal Storage

Data as of 30-Jun-20 Chart Last Updated: 2-Jul-20

Country	Terminal	Inventory		Max Cap		% Util
		(10 ³ m ³)	Chg	(10 ³ m ³)		
Belgium	Zeebrugge	318.5	28.2	562.2	56.7%	
France	Dunkerque	353.3	-13.2	586.1	60.3%	
	Fos Tonkin	63.5	-4.3	80.0	79.4%	
	Montoir	186.7	-21.9	360.0	51.9%	
	Fas Cavaou	127.7	-6.2	330.0	38.7%	
Greece	Revythoussa	127.3	0.0	225.0	56.6%	
Italy	Porto Levante	174.5	30.7	250.0	69.8%	
	Panigaglia	21.6	7.6	40.0	54.0%	
	Toscana	41.8	0.0	137.2	30.5%	
Lithuania	Klaipėdos	32.5	-9.6	167.1	19.5%	
Netherlands	Gate	405.1	-6.9	540.0	75.0%	
Poland	Swinoujście	132.6	-21.2	320.0	41.4%	
Portugal	Sines	162.0	-21.2	390.0	41.5%	
Spain	Barcelona	0.0	0.0	0.0	0.0%	
	Bilbao	0.0	0.0	0.0	0.0%	
	Cartagena	0.0	0.0	0.0	0.0%	
	Huelva	0.0	0.0	0.0	0.0%	
	Mugardos	236.0	39.4	300.0	78.7%	
	Sagunto	0.0	0.0	0.0	0.0%	
	TVB (Virtual)	1347.9	60.8	3307.9	40.7%	
	UK	Grain	748.3	-15.6	1026.4	72.9%
	South Hook	414.2	-54.9	751.7	55.1%	
Total		4893.5	-8.0	9373.5	52.2%	

Source: NGI calculations, GIE



E&P NEWS

Eni's Natural Gas Discovery Offshore Egypt Adds to Plethora of Eastern Med Opportunities

Italian supermajor Eni SpA has struck natural gas in its first exploration well in the North El Hammad offshore Egypt in the Nile Delta, adding to a gusher of opportunities in the region.

Eni, which operates the block in the Eastern Mediterranean (Med) with partners BP plc and Total SA, said the discovery at Bashrush further extends to the west the gas potential of the Abu Madi formation reservoirs from the Great Nooros Area.

Bashrush, seven miles from the coast, is around 7.5 miles northwest of the Nooros field and about half a mile west of the Baltim South West field, both already in production, Eni noted.

The well, discovered in a single gas column about 500 feet thick, was "within the Messinian age sandstones of the Abu Madi formation with excellent petrophysical properties," it said.

Eni and its partners, in coordination with the Egyptian Petroleum Sector, plan to begin screening development options, with an aim to fast track production and use existing infrastructure. In parallel with the development, Eni plans to drill another Great Nooros prospect this year in the Abu Madi West concession.

LNG Possibilities

Discoveries within the gassy Eastern Med have been coming fast and heavy in the last few years, enough to offer the potential for liquefied natural gas (LNG) exports.

Houston super independent Noble Energy Inc. already has **two mega gas projects** offshore Israel underway, with the Tamar field reaching a milestone of 2 Tcf last year and first volumes from the **Leviathan field** ramping up. Leviathan, southeast of Cyprus off the Israeli coast, is to include four subsea wells, each capable of flowing more than 300 MMcf/d.

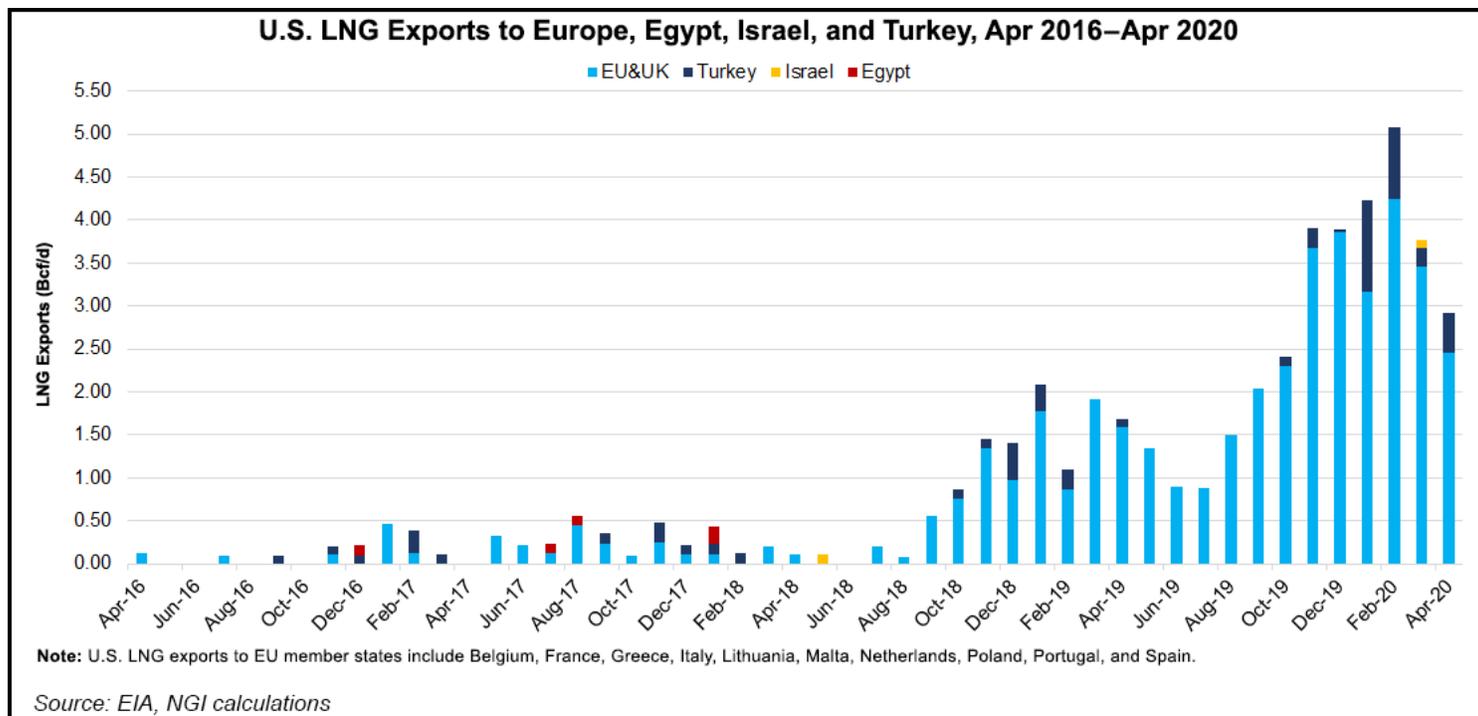
2020 EDITION

NGI'S MAP OF NORTH AMERICAN NATURAL GAS PIPELINES, LNG FACILITIES & SHALE PLAYS

- 48 PROPOSED PIPELINES
- 177 OPERATIONAL PIPELINES
- 163 NORTH AMERICAN MARKET HUBS
- 53 LNG IMP/EXP TERMINALS
- PERMIAN ZOOMED PIPELINE INSET
- LA & TX LNG DETAILS
- 47 IMP/EXP BORDER POINTS
- BORDER VOLUMES FOR ALL BORDER POINTS

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Also last year **ExxonMobil** secured more than 1.7 million acres offshore Egypt to build its portfolio, including acreage in the North Marakia Offshore block, five miles offshore Egypt's ...cont' pg. 10



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northern coast in the Herodotus Basin, and in the North East El Amriya Offshore Block in the Nile Delta.

Early last year ExxonMobil and Qatar Petroleum also reported a huge gas discovery offshore Cyprus that could hold 5-7 Tcf. The gas-bearing reservoir of 436 feet was discovered at the **Glaucus-1 well** in Block 10. ExxonMobil and Qatar were said to be pondering ways to use the reserves to feed a two-train LNG plant.

Eni and Total made a similar giant gas discovery in the neighboring block in 2018. A partnership also would echo collaboration at ExxonMobil and Eni's LNG developments in Mozambique; the partners sanctioned **Coral South LNG** in 2018. ■

Latin America DES Prices 2-Jul-2020

Country	Terminal	\$US/MMBtu					
		Aug	Chg	Sep	Chg	Oct	Chg
Argentina	Bahia Blanca	2.10	-0.01	2.20	0.00	2.55	0.01
Brazil	Pecem	1.89	-0.02	1.99	0.00	2.34	0.01
Chile	Quintero	2.18	-0.02	2.28	0.00	2.63	0.01
Colombia	Colombia	1.73	-0.02	1.83	0.00	2.18	0.01
Mexico East	Altamira	1.68	-0.02	1.78	0.00	2.13	0.01
Mexico West	Manzanillo	2.09	-0.02	2.19	0.00	2.54	0.01
Panama	Costa Norte	1.75	-0.02	1.85	0.00	2.20	0.01



For more regional coverage of Latin America, please see NGI's Mexico Gas Price Index at natgasintel.com/news/mexico-gas-price-index

Source: NGI calculations, CME Group, CSI, Fearnleys



NGI's LNG INSIGHT

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