Round-Tables on New Gas Perspectives for the EU Gazprom Imports, LNG Imports, REPOWER EU: What's Next?

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Chair-The Economics of Gas
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Q1: How much does Europe (in total, by country) depend on imported natural gas?

- Imports from non-EU countries in 2020:
  - **Russia: 168.290 Bcm=35.1%**
  - Norway: 78.517 Bcm=16.4%
  - Algeria: 36.751 Bcm=7.7%
  - Qatar: 32.770 Bcm=6.8%
  - **U.S.: 31.364 Bcm=6.5%**
  - Nigeria: 22.922 Bcm=4.8%
  - Trinidad & Tobago: 6.226 Bcm=1.3%
  - TOTAL of 78.6%

Q1: How much does Europe (in total, by country) depend on imported natural gas?

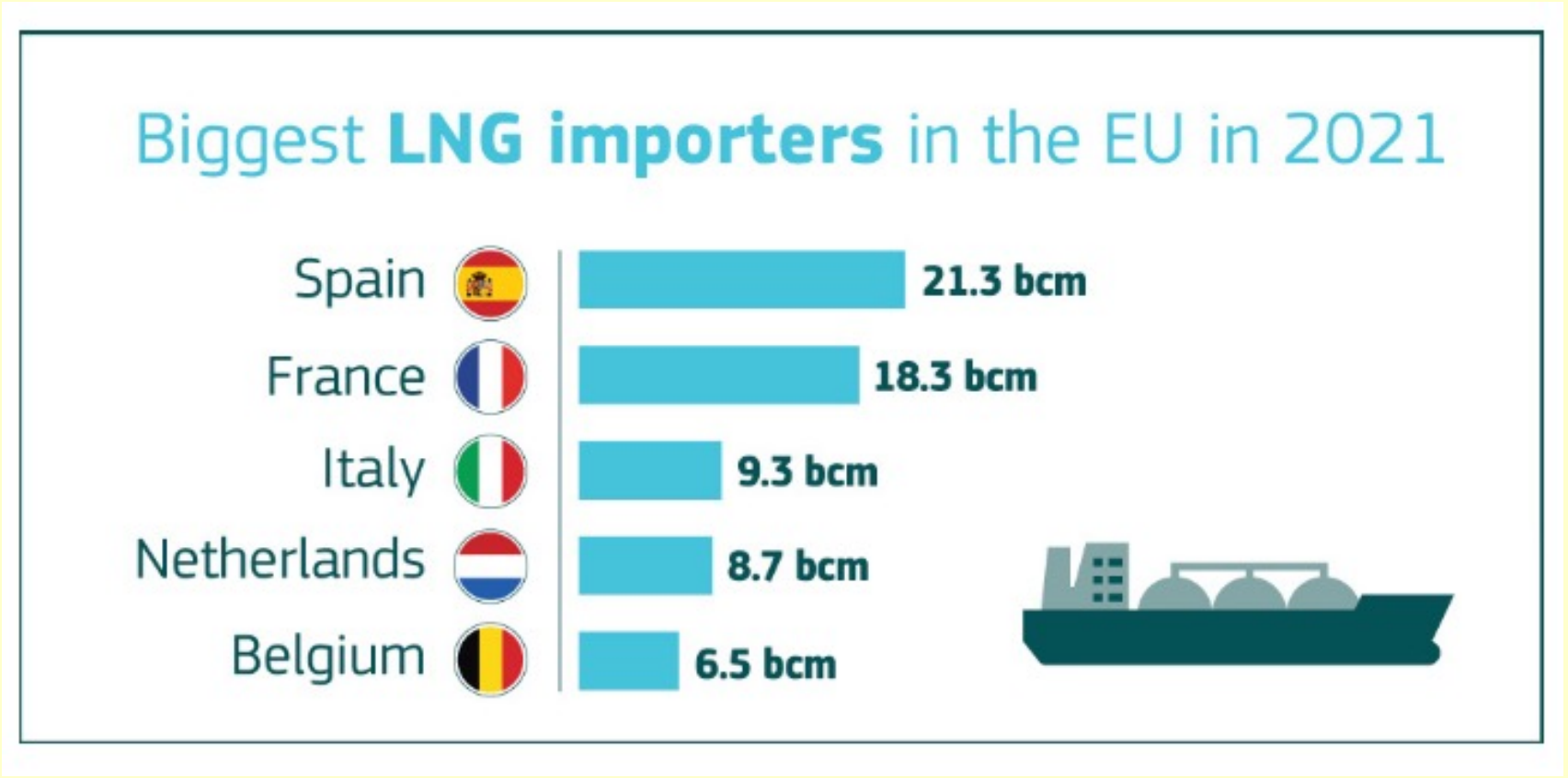
Largest Gas-Consuming Countries in Europe

2020, bcm

	Gas consumption	Pipeline gas from Russia	LNG from Russia	Total gas from Russia	Share of Russian gas supplies in consumption
Germany	86.5	56.3		56.3	65.1%
UK	72.5	4.7	2.9	7.6	10.5%
Italy	67.7	19.7		19.7	29.1%
France	40.7	2.6	5.0	7.6	18.7%
Spain	32.4		3.4	3.4	10.5%
Europe	494.7	152.1	17.0	169.1	34.2%
		30.75%	**3.44%**		

Source: Fitch Ratings, BP's Statistical Review of World Energy

Q1: How much does Europe (in total, by country) depend on imported natural gas?



https://ec.europa.eu/info/news/focus-reducing-eus-dependence-imported-fossil-fuels-2022-apr-20_en

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Q1: How much does Europe (in total, by country) depend on imported natural gas?

- Can the African suppliers of natural gas (Algeria, Egypt, Nigeria) replace the slash in Russian supplies (by 2/3)?
  - No, those 3 would be able to supply < ½ of what Russia supplies to Europe (Carole Nakhle, Energy Economist)– not in the short term
  - However, Italy signed a new gas supply deal with Algeria to increase gas imports by about 40% (April, 2022), still some pipeline transport issues though
  - Nigeria LNG today is just 72% "plant-mobilized" so still 28% capacity to use (but transport issues), new LNG gas project
    - Train 7 to increase production capacity by 35% from the current 22 m tonnes/year by 2025
    - LNG contracts with mainly European buyers, already in place
    - New train 8?
    - Part of the stalled Trans Saharan Pipeline project (4400 km) natural gas p/l from Nigeria, through Niger to Algeria
    - Possible Nigeria-Morocco gas pipeline? (connecting 13 West & North African countries, $25B, 25 years)

https://www.bbc.com/news/world-africa-61334470

Q2: How to Phase Out Russian Gas Imports?

- REPowerEU (March 2022)
  - Cut EU's reliance on Russian gas by 2/3 by 2022
  - Replace about 100 Bcm of Russian gas by 2022
  - Additional 50 Bcm of LNG supplies from somewhere else (U.S.?), rest coming from wind and solar expansion, energy savings, diversification of p/l gas sources
  - Phase out 100% from Russian fossil fuels 'well before 2030'
  - REPowerEU goals:
    - Diversity EU's gas supplies
    - Speed up the rollout of renewable gases
    - Replace gas in heating and power generation
  - U.S., exported 22 Bcm to the EU in 2021, agreed to supply an additional 15 Bcm of LNG to the EU within a year
  - Europe's plan feasible in the medium term
  - IEA similarly, estimates that EU gas imports from Russia can be reduced by 50-80 Bcm within a year

https://www.fitchratings.com/research/corporate-finance/russian-gas-replacement-only-feasible-in-medium-term-in-europe-08-04-2022

Q2: How to Phase Out Russian Gas Imports?

- "Fit for 55:, launched in summer 2021, European Union plan to reduce greenhouse gas emissions by 55% by 2030
- "55 in 5", complements "Fit for 55"
  - Reduction of natural gas imports from Russia by 55 Bcm in 5 years ("55 in 5") from the current 200 Bcm- with anticipated cuts beyond 5 years, will need:
  - Efficiency
  - Electrification
  - Deployment of renewables
  - Nuclear energy
  - Increase of LNG imports
  - Optimization of gas storage facilities
  - "Reduce, reroute, and reserve".

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https://www.atlanticcouncil.org/blogs/energysource/derussification-of-european-natural-gas-imports-part-1/

Q3: What Role Does the U.S. Have in European Natural Gas Markets?

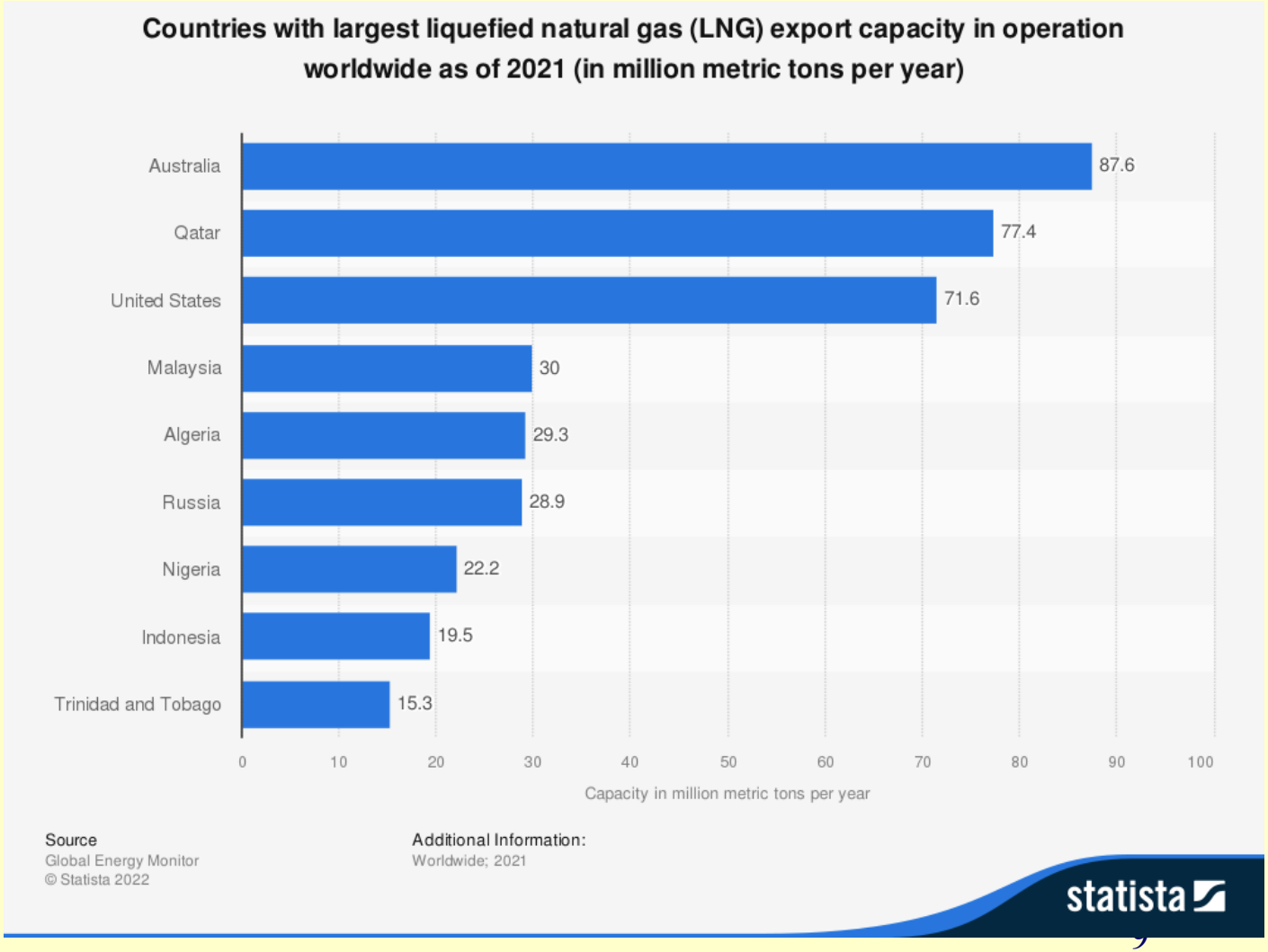
- Total U.S. LNG Export Capacity (mostly Gulf of Mexico)
  - Existing terminals: **130.24 Bcm/year** https://www.ferc.gov/natural-gas/lng
  - Approved, under construction: **73.08 Bcm/year** (22 Bcm (20 m tonnes) under construction and to come online by 2025)
  - Approved but not yet constructed: **223.77 Bcm/year**
  - As of March 2022, all 7 LNG exports plans operating at capacity liquefying about 130 Bcm of gas- higher European prices won't help that in the short term
  - U.S. processing capacity was going to rise to around 135 Bcm by the end of 2022
- Maybe need reallocation of LNG supply
- European LNG terminals have limited available capacity

https://www.csis.org/analysis/how-us-lng-could-help-europe-and-climate#:~:text=The
https://www.reuters.com/business/energy/could-us-ship-more-lng-europe-2022-03-25/

Q3: What Role Does the U.S. Have in European Natural Gas Markets?

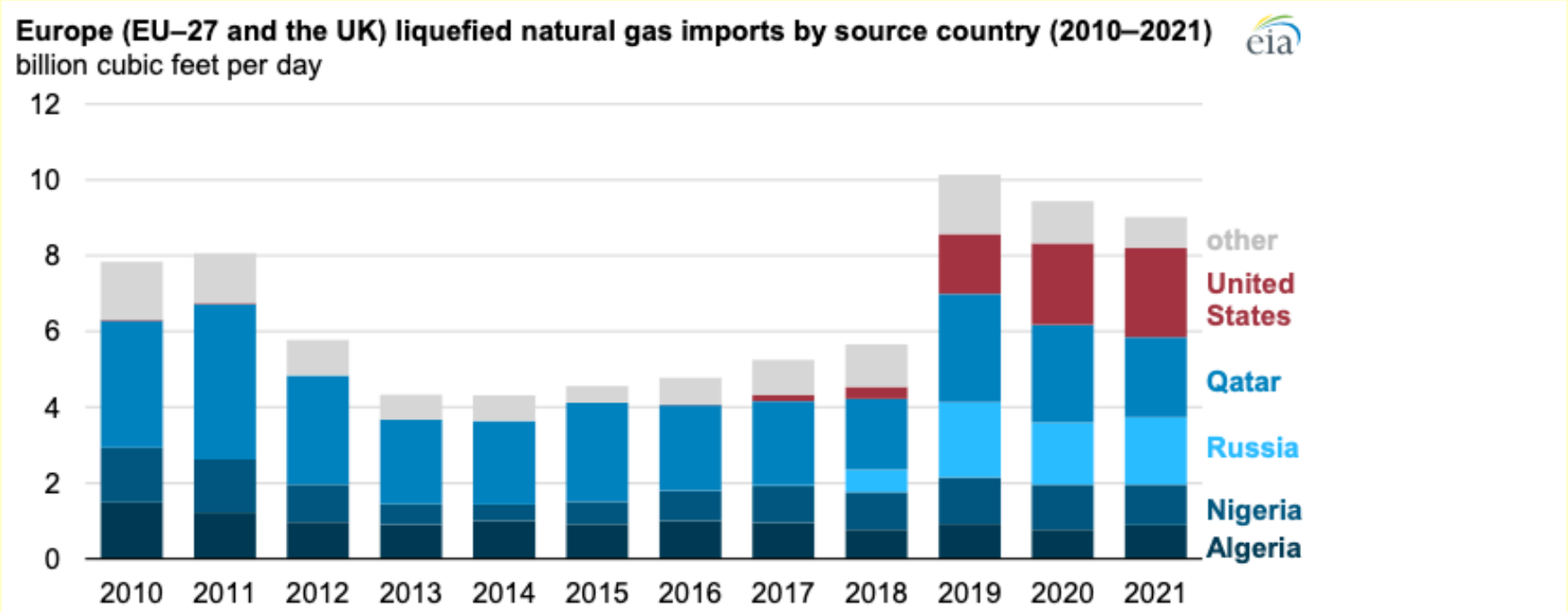
- U.S. LNG export capacity to pass Australia and Qatar in 2022

https://jpt.spe.org/us-will-lead-in-lng-export-capacity-by-end-of-2022



Q3: What Role Does the U.S. Have in European Natural Gas Markets?

- In 2021, U.S., Qatar, Russia➔ almost 70% of Europe's LNG imports (CEDIGAZ)
- In 2021, U.S. was Europe's largest LNG source: 26% of all LNG imported by EU-27 and the UK (Qatar 24%, Russia 20%)
- In January 2022, the U.S. supplied > 50% of all LNG imports into Europe for the month (EIA)
- Title Transfer Facility (TTF) in NL: avg. $28.52/MMBtu (Sept. 2021-Feb. 2022), peak price of $60.20 on 21 Dec. 2021, before avg. $9.28 Jan. -Aug. 2021, $3.28 2020, $4.45 2019



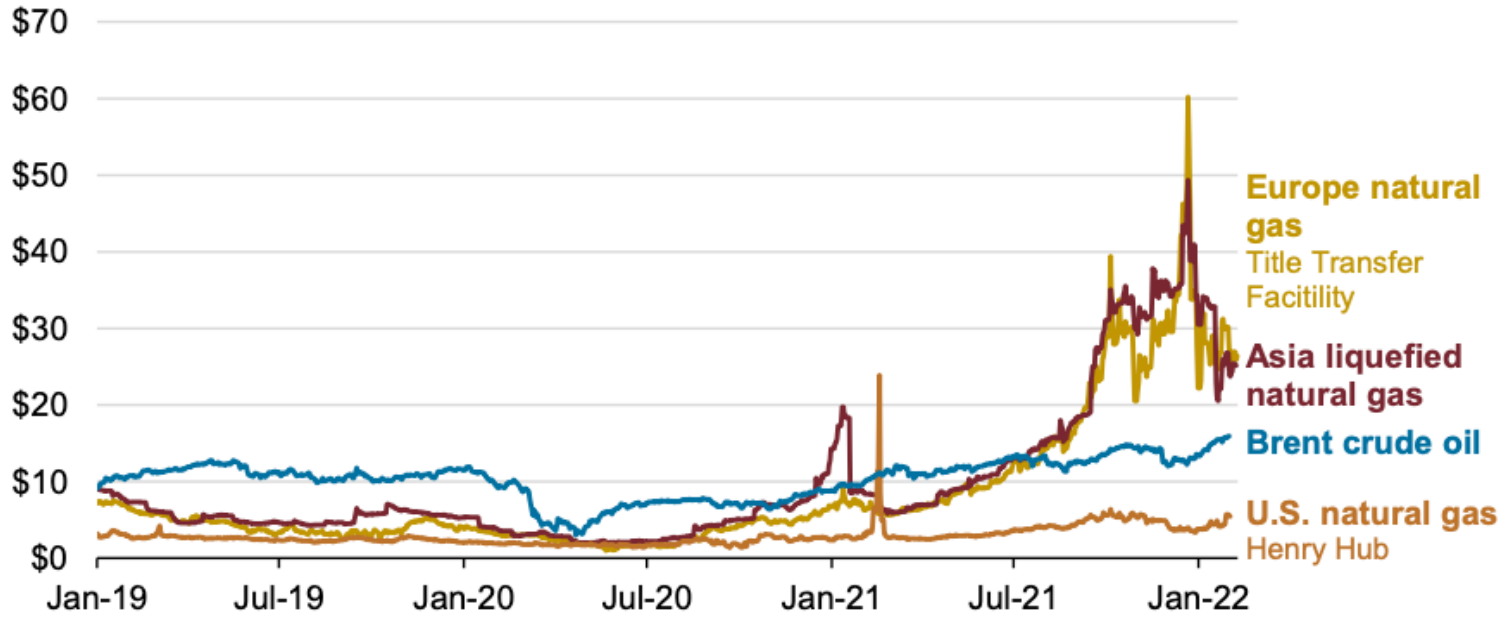
Source: Graph by the U.S. Energy Information Administration, based on data from the International Group of Liquefied Natural Gas Importers (GIIGNL) annual liquefied natural gas trade reports (2010–2020) and CEDIGAZ (2021)

Q3: What Role Does the U.S. Have in European Natural Gas Markets?

- In January 2022, the U.S. supplied > 50% of all LNG imports into Europe for the month (EIA)

Historically, spot natural gas in Europe has traded at prices lower than LNG spot prices in Asia. In recent months, however, natural gas prices in Europe have closely tracked LNG prices in Asia. On some days, the natural gas price in Europe has exceeded the LNG price in Asia, attracting higher volume of flexible LNG supplies to Europe. LNG imports to Europe increased in December 2021 and January 2022, averaging 10.8 Bcf/d and 14.9 Bcf/d, respectively, partly in response to the price at TTF rising above LNG spot prices in Asia.

Daily crude oil, natural gas, and liquefied natural gas spot prices (Jan 2019–Feb 2022)
dollars per million British thermal units



Source: Graph created by the U.S. Energy Information Administration, based on data from Bloomberg Finance, L.P.

Principal contributors: Victoria Zaretskaya, Chris Peterson, Warren Wilczewski

Q3: What Role Does the U.S. Have in European Natural Gas Markets?

- In February 2022, Europe received almost 70% of all U.S. LNG cargoes

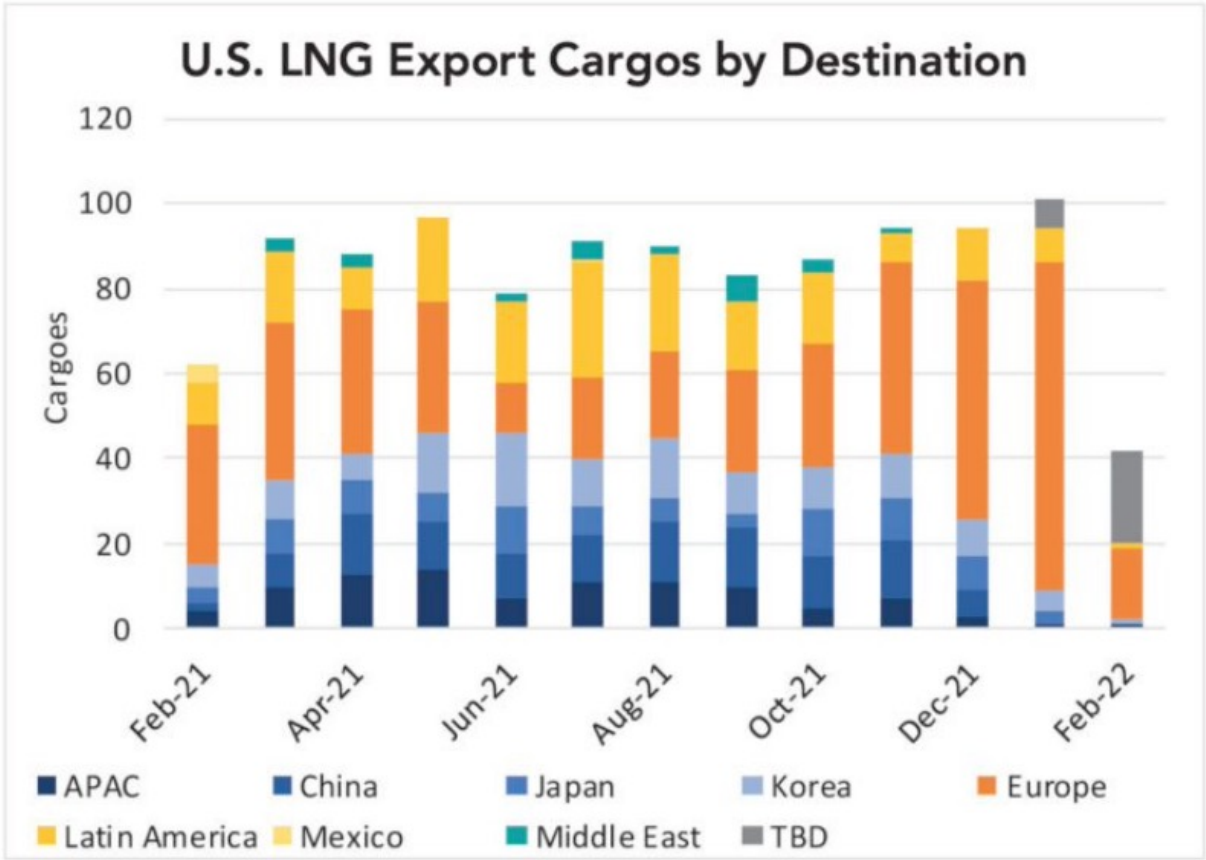
(Center for Liquefied Natural Gas/RBN Energy)

- U.S. LNG exports record high in 2021, 0.27 BCM/d, 102% of nominal capacity, 89% of peak capacity

(Energy Information Administration)

- LNG capacity expansions+increasing demand from outside the U.S., forecast of LNG exports to 166 BCM (5.86 Tcf) by 2033

(Energy Information Administration)



Source: RBN Energy

Q3: What Role Does the U.S. Have in European Natural Gas Markets?

- Joint U.S.-E.U. understanding on natural gas and renewable energy
- The European Commission to work with EU member states to accelerate regulatory procedures to review for LNG import infrastructure
- Joint "Task Force on Energy Security," (President Joe Biden, European Commission President Ursula von der Leyen showed on March 25).
- According to the White House, the joint task force will work
  - "to ensure energy security for Ukraine and the EU in preparation for next winter and the following one, while supporting the EU's goal to end its dependence on Russian fossil fuels."

https://www.powermag.com/u-s-agrees-to-ramp-up-lng-exports-to-europe-actively-reduce-natural-gas-demand/#:~:text=For

Q3: What Role Does the U.S. Have in European Natural Gas Markets?

- Charlie Riedl, executive director of the Center for Liquefied Natural Gas (CLNG), a trade group comprising all aspects of the U.S. LNG supply chain.
  - "The LNG industry can build, but regulators must do their part to help expedite the essential infrastructure that is needed here and in Europe to meet these ambitious goals and help our European allies," Riedl
  - the EU could 'accelerate the regulatory approval process' and support long-term contracting mechanisms with U.S. LNG suppliers. That will 'send a strong signal to our allies in Europe that they can count on U.S. LNG to help with energy security and climate leadership well into the future,' Riedl
- U.S. LNG exports to the EU in 2021 were about 22 bcm
- Russia sent a total of 155 bcm to Europe.
- But sourcing additional LNG volumes with urgency may be compounded by U.S. liquefaction capacity.

https://www.powermag.com/u-s-agrees-to-ramp-up-lng-exports-to-europe-actively-reduce-natural-gas-demand/#:~:text=For

Q4: How can natural gas figure in Europe's energy future (e.g., through 2050) with the help of the U.S.?

- Now-2030's, U.S. LNG-> Europe (and Asia) for filling the gap from Russia
- 2030's and beyond, U.S. LNG->Asia for lowering carbon emissions
- Could also use LNG to make hydrogren with carbon capture

Nikos Tsafos (James R. Schlesinger Chair in Energy and Geopolitics with the Energy Security and Climate Change Program at the Center for Strategic and International Studies in Washington, D.C.)

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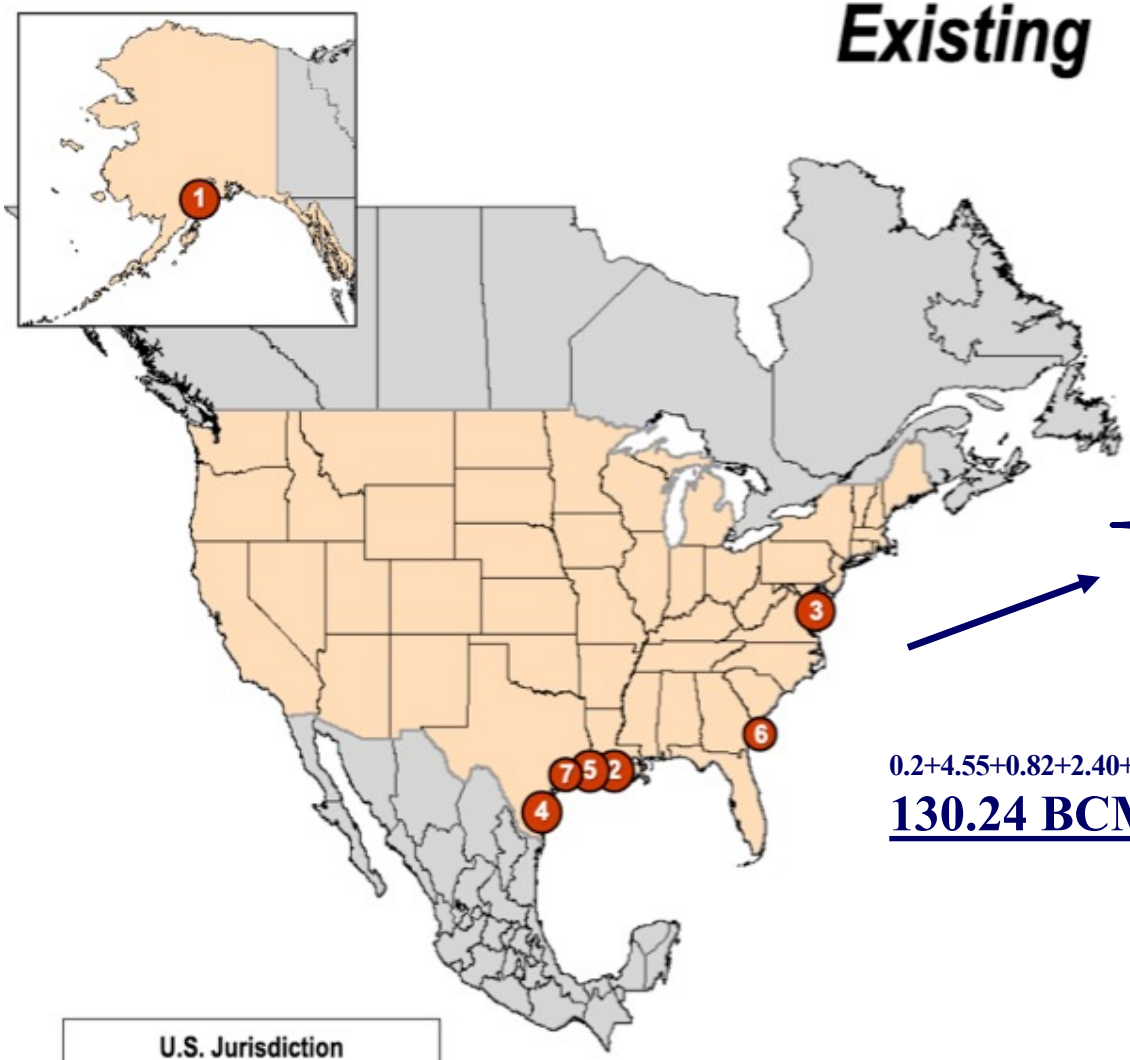
https://www.csis.org/analysis/how-us-lng-could-help-europe-and-climate#:~:text=The

North American LNG Export Terminals

Existing



Export Terminals

UNITED STATES

1. **Kenai, AK:** 0.2 Bcfd (Trans-Foreland)
2. **Sabine, LA:** 4.55 Bcfd (Cheniere/Sabine Pass LNG – Trains 1-6)
3. **Cove Point, MD:** 0.82 Bcfd (Dominion–Cove Point LNG)
4. **Corpus Christi, TX:** 2.40 Bcfd (Cheniere – Corpus Christi LNG Trains 1-3)
5. **Hackberry, LA:** 2.15 Bcfd (Sempra–Cameron LNG, Trains 1-3)
6. **Elba Island, GA:** 0.35 Bcd (Southern LNG Company Units 1-10)
7. **Freeport, TX:** 2.13 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction Trains 1-3)

0.2+4.55+0.82+2.40+2.15+0.35+2.13=12.6 Bcfd or

130.24 BCM/year

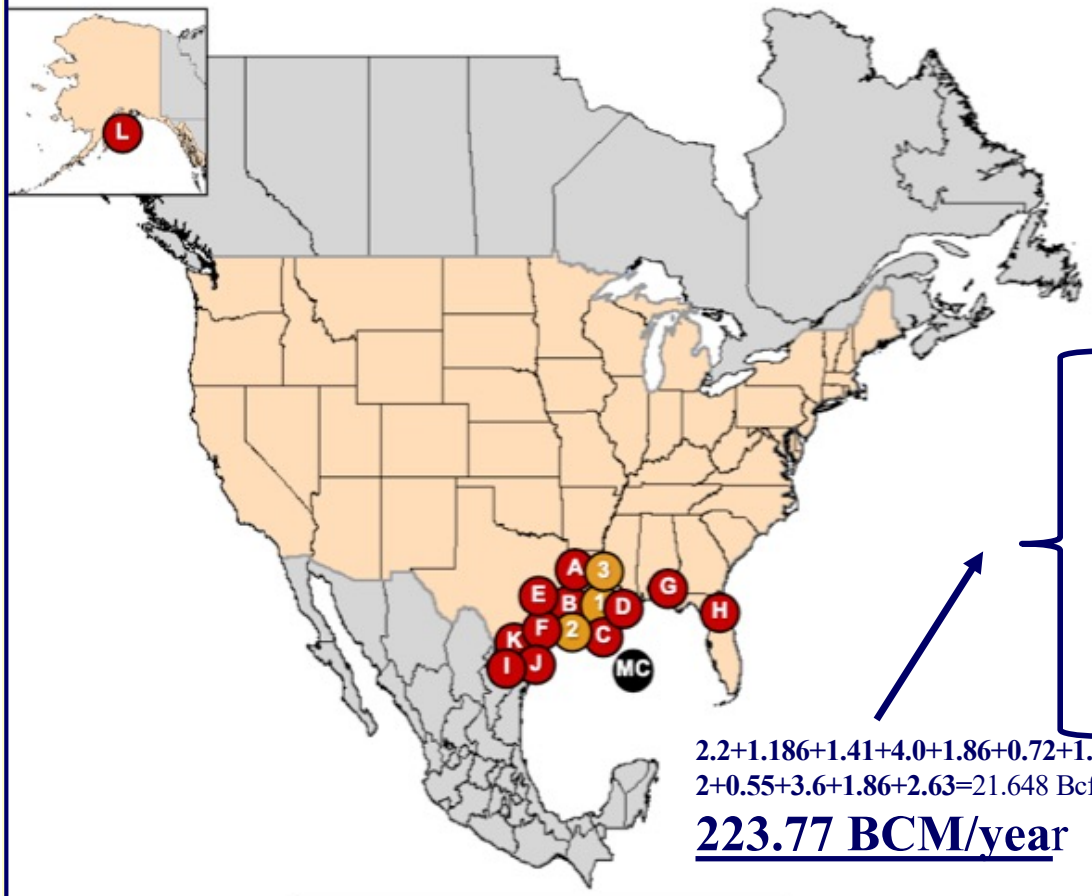
U.S. Jurisdiction

- FERC
- MARAD / U.S. Coast Guard

As of May 3, 2022
No updates since previous issuance

https://www.ferc.gov/natural-gas/lng

North American LNG Export Terminals
Approved, Not Yet Built



Export Terminals 1.41+2.26+3.40 =7.07 Bcfd or **73.08 BCM/year**

UNITED STATES

FERC – APPROVED, UNDER CONSTRUCTION

1. **Cameron Parish, LA:** 1.41 Bcfd (Venture Global Calcasieu Pass) (CP15-550)
2. **Sabine Pass, TX:** 2.26 Bcfd (ExxonMobil – Golden Pass) (CP14-517, CP20-459)
3. **Plaquemines Parish, LA:** 3.40 Bcfd (Venture Global Plaquemines) (CP17-66)

FERC – APPROVED, NOT UNDER CONSTRUCTION

A. **Lake Charles, LA:** 2.2 Bcfd (Lake Charles LNG) (CP14-120)
B. **Lake Charles, LA:** 1.186 Bcfd (Magnolia LNG) (CP14-347)
C. **Hackberry, LA:** 1.41 Bcfd (Sempra - Cameron LNG Trains 4 & 5) (CP15-560)
D. **Calcasieu Parish, LA:** 4.0 Bcfd (Driftwood LNG) (CP17-117)
E. **Port Arthur, TX:** 1.86 Bcfd (Sempra - Port Arthur LNG Trains 1 & 2) (CP17-20)
F. **Freeport, TX:** 0.72 Bcfd (Freeport LNG Dev Train 4) (CP17-470)
G. **Pascagoula, MS:** 1.5 Bcfd (Gulf LNG Liquefaction) (CP15-521)
H. **Jacksonville, FL:** 0.132 Bcf/d (Eagle LNG Partners) (CP17-41)
I. **Brownsville, TX:** 0.55 Bcfd (Texas LNG Brownsville) (CP16-116)
J. **Brownsville, TX:** 3.6 Bcfd (Rio Grande LNG – NextDecade) (CP16-454)
K. **Corpus Christi, TX:** 1.86 Bcfd (Cheniere Corpus Christi Stage III) (CP18-512)
L. **Nikiski, AK:** 2.63 Bcfd (Alaska Gasline) (CP17-178)

2.2+1.186+1.41+4.0+1.86+0.72+1.5+0.13
2+0.55+3.6+1.86+2.63=21.648 Bcfd =
223.77 BCM/year

MARAD/USCG – APPROVED, NOT UNDER CONSTRUCTION

MC. **Gulf of Mexico:** 1.8 Bcfd (Delfin LNG)

CANADA - LNG IMPORT AND PROPOSED EXPORT FACILITIES
https://www.nrcan.gc.ca/energy/natural-gas/5683

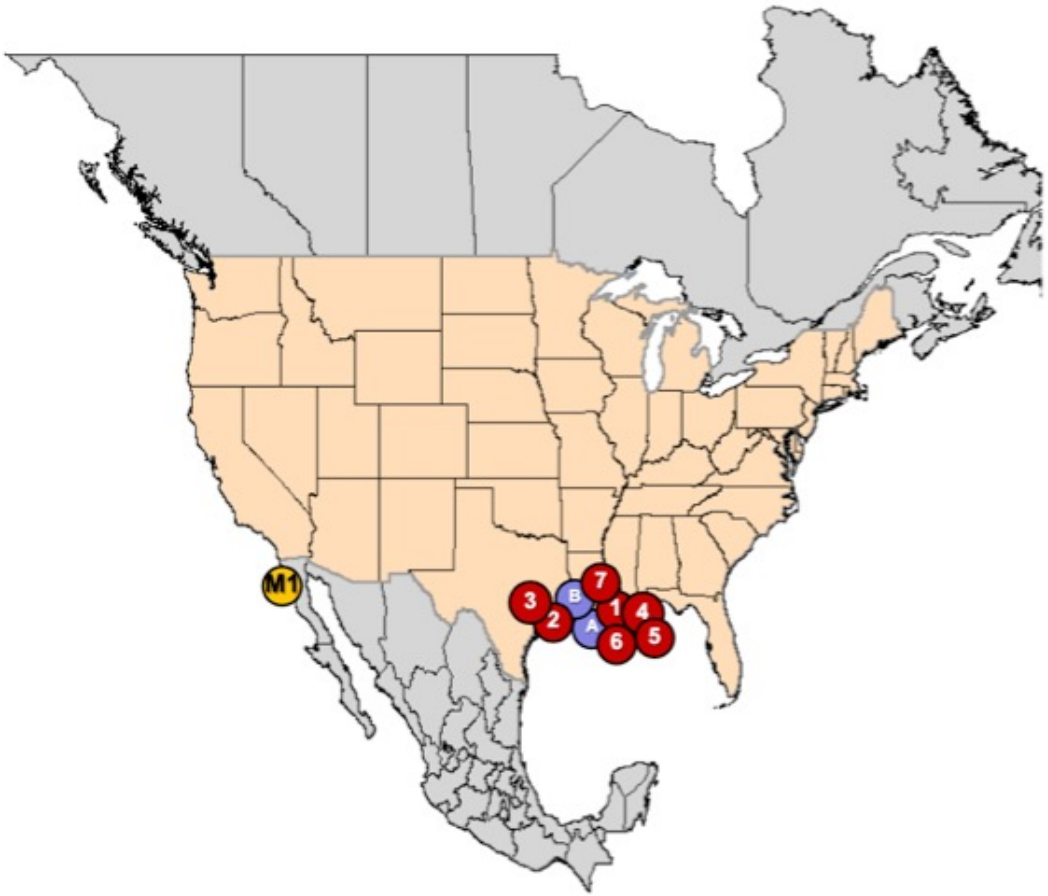
U.S. Jurisdiction & Status

- **FERC** - Approved, Under Construction
- **FERC** - Approved, Not Under Construction
- **MARAD / U.S. Coast Guard**

As of May 3, 2022
No updates since previous issuance

https://www.ferc.gov/natural-gas/lng

North American LNG Export Terminals
Proposed



UNITED STATES

PROPOSED TO FERC
Pending Applications:

1. **Cameron Parish, LA:** 1.18 Bcfd (Commonwealth, LNG) (CP19-502)
2. **Port Arthur, TX:** 1.86 Bcfd (Sempra - Port Arthur LNG Trains 3 & 4) (CP20-55)
3. **Freeport, TX:** 0.24 Bcfd (Freeport LNG uprate) (CP21-470
4. **Cameron Parish, LA:** 1.45 Bcfd (Venture Global CP2 Blocks 1-9) (CP22-21)
5. **Cameron Parish, LA:** .057 Bcfd (Venture Global Calcasieu Pass) (CP22-25)
6. **Hackberry, LA:** -0.45 Bcfd (Sempra - Cameron LNG Vacate T5 & modify T4) (CP22-41)
7. **Plaquemines Parish, LA:** 0.45 Bcfd (Venture Global Plaquemines) (CP22-92)

Projects in Pre-filing:

A. LaFourche Parish, LA: 0.65 Bcfd (Port Fourchon LNG) (PF17-9)
B. Plaquemines Parish, LA: 2.76 Bcfd (Delta LNG - Venture Global) (PF19-4)

CANADA
For Canadian LNG Import and Proposed Export Facilities:

https://www.nrcan.gc.ca/energy/natural-gas/5683

MEXICO (Projects in advanced planning/development stages)
M1. Baja California, MX: 0.4 Bcfd (Sempra – Energía Costa Azul Phase 1)

https://www.ferc.gov/natural-gas/lng

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