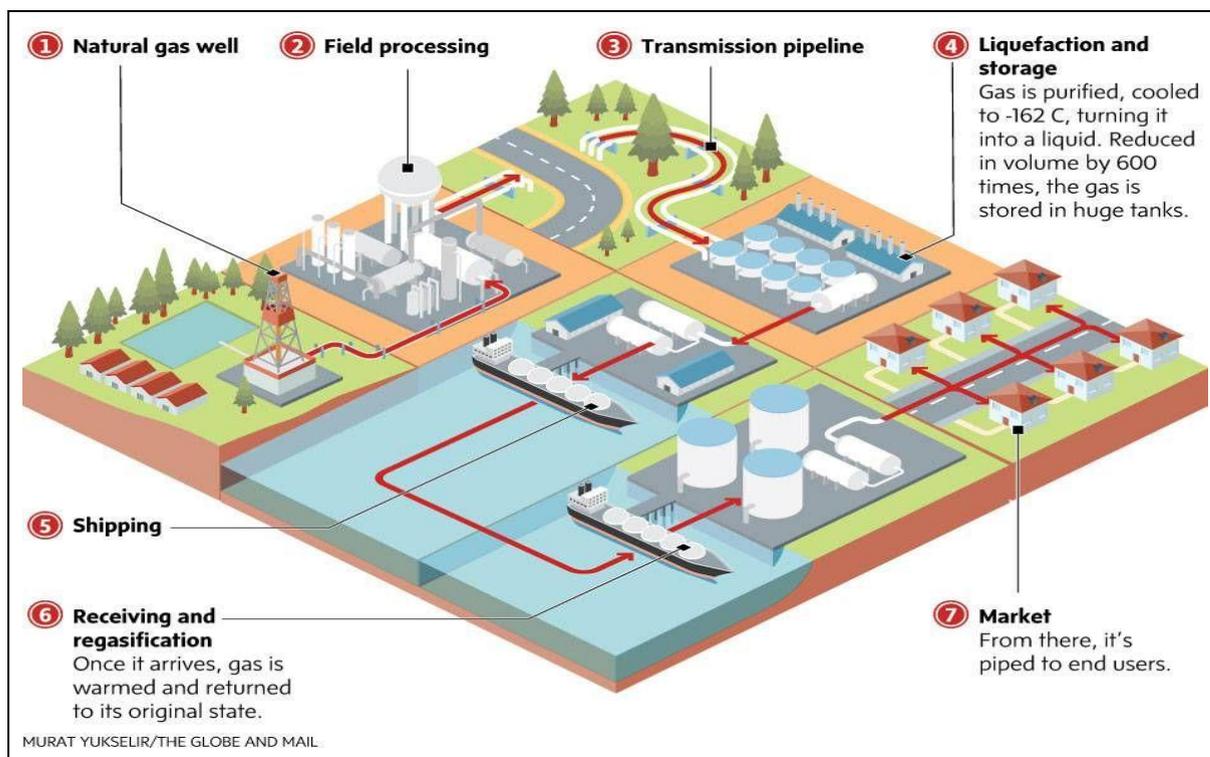


ANALYSIS

GLOBAL LNG MARKETS

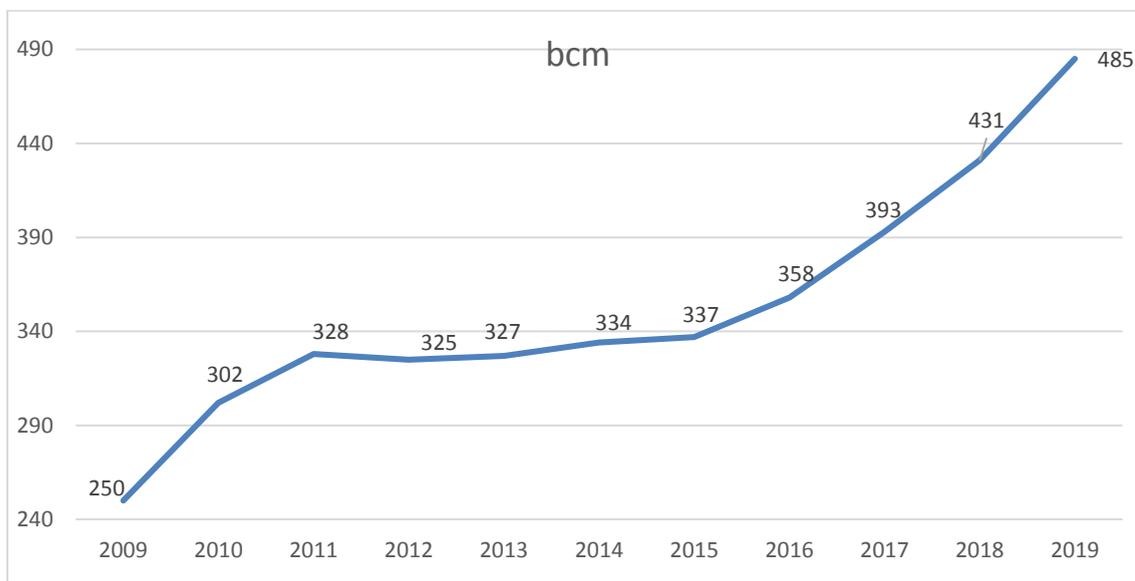
Liquefied Natural Gas (LNG) is a clear, colorless and non-toxic liquid that forms when natural gas is cooled to -162°C . The cooling process shrinks the volume of the gas 600 times, making it easier and safer to store and deliver. The LNG business developed in the wake of the oil crisis of 1973/74 and started to transport markets across the globe. For LNG transportation, liquefaction terminal is required in the exporter country and regasification plant in the importer country. That is why LNG transportation is economically viable for distance more than 4500 km.¹



¹ Talmiz Ahmad, "Advantages of Transnational Gas Pipelines", *The Hindu*, 24.04.2006

In the early 2000s, LNG comprised only 4% of global gas trading, but this figure rose to 38% in 2019. Over the past 10 years, global LNG trade increased by 94%. The global growth of natural gas consumption, particularly in the Asian countries, as well as the development of technologies, have gained competitive advantages to LNG trade over pipelines in long-distance transportation.

Graph 1. Global LNG trade by years



Source: International Gas Union

Given the growing importance of LNG, we will examine global LNG market, while analyzing the advantages and disadvantages of LNG, as well as the future projections about LNG markets. We also will point out the reasons behind the rapid growth of LNG trade.

In this context, the use of "floating storage and re-gasification units" (FSRU) has led to the expansion of the LNG market in the world, especially in developing countries. FSRU, first used by the United States in 2005, which is currently used by several countries such as Lithuania, Egypt, Jordan, Pakistan, Columbia, Turkey, UAE, China, Malta and Bangladesh.

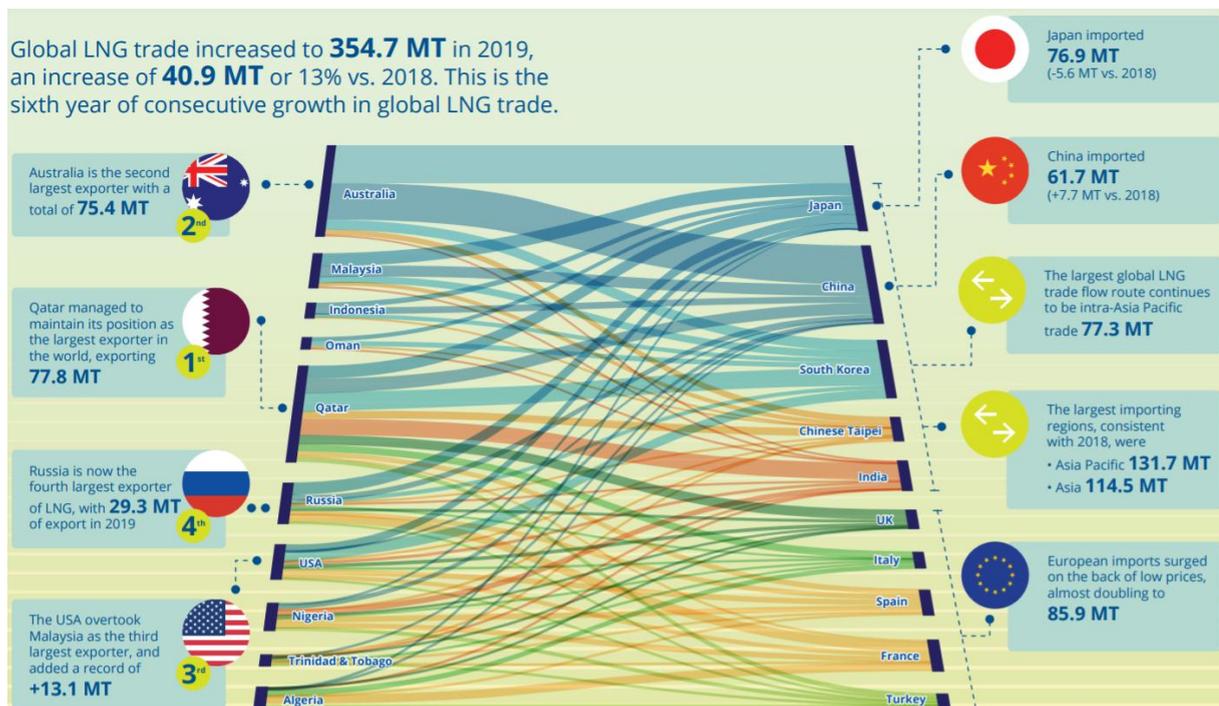
1. FSRU and LNG terminals: Advantages and Disadvantages

The capacity of traditional LNG terminals are larger than FSRU, and they are expandable. An example is the expansion of the Nigerian LNG project at Bonny island from 22 MT/y to 30MT/y. In addition, the

lifespan of LNG terminals can last at least 25 years. Chita LNG terminal in Japan commissioned in 1983 and is still running today. However, the cost of LNG terminals are higher than FSRU, as at least \$1 billion investment is required for construction of LNG terminal. Moreover, construction of LNG terminals can take 4 to 6 years as construction in Europe's largest LNG terminal began in 2004 and commissioned in 2009.

As for FSRU, it can be constructed and deployed under 2 years. The mobility of FSRU vessels allow flexibility in transporting natural gas to new markets. The cost of a new FSRU is just 50-60% of an onshore terminal and that is to be transported in half the time. FSRU costs almost USD 250-300 million that can be built in 25- 40 months.²

On the other hand, FSRU has a limited capacity compared to traditional LNG terminals. FSRU can't also be upgraded as easily as LNG terminals and the lifespan of it is generally 10 to 15 years. According to the estimation, the global FSRU market is expected to increase by almost 3 times, from 85 MTPA in 2018 to 230 MTPA in 2023 due to the increase in demand for natural gas.



Most of the additional exported volumes in 2019 originated from existing exporting markets: the US (+13.1 MT), Australia (+8.7 MT) and Russia (+11 MT). Qatar was able to maintain its position as the largest

² KIAKIAGAS, Comparing LNG Terminal and FSRU Vessels, <https://kiakiagas.com/blog/comparing-lng-terminal-and-fsu-vessels>

exporter in the world (77.8 MT), followed by Australia (75.4 MT). The USA (33.8 MT) overtook Malaysia (26.2 MT) as the third largest exporter, and added record export volumes.

Russia is now the fourth largest exporter of LNG with 29.3 MT capacity increased its export volume by approximately 6 times over the past decade. That is because Russia aims to reduce its dependence of European customers by diversifying its export markets.

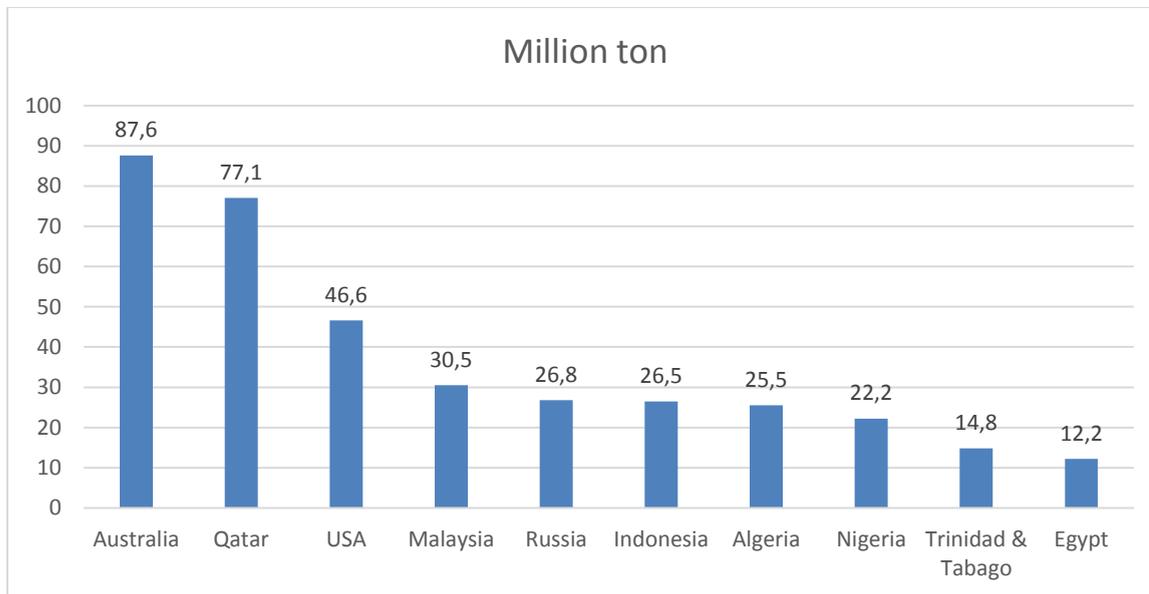
Table 1. Largest LNG exporters in the world

Country	Export volume in 2019 (MT)	Market share (%)
Qatar	77.8	21.9
Australia	75.4	21.3
USA	33.8	9.5
Russia	29.3	8.3
Malaysia	26.2	7.4
Nigeria	20.8	5.9
Indonesia	15.5	4.4
Trinidad& Tabago	12.5	3.5
Algeria	12.2	3.4
Oman	10.3	2.9

Source: International Gas Union

Global liquefaction capacity reached 430.5 MTPA at the end of 2019 and the utilization rate was on average 81.4%. The United States continued to contribute significantly to LNG project sanctions in 2019, totaling 30.1 MTPA, thanks to the availability of abundant shale gas in the region. As of December 2019, 123.3 MTPA of liquefaction capacity was under construction or sanctioned for development. Close to 45% of this capacity is in the United States, and more than 55% is located in North America.

Graph 2. Global operational liquefaction capacity by country in 2019

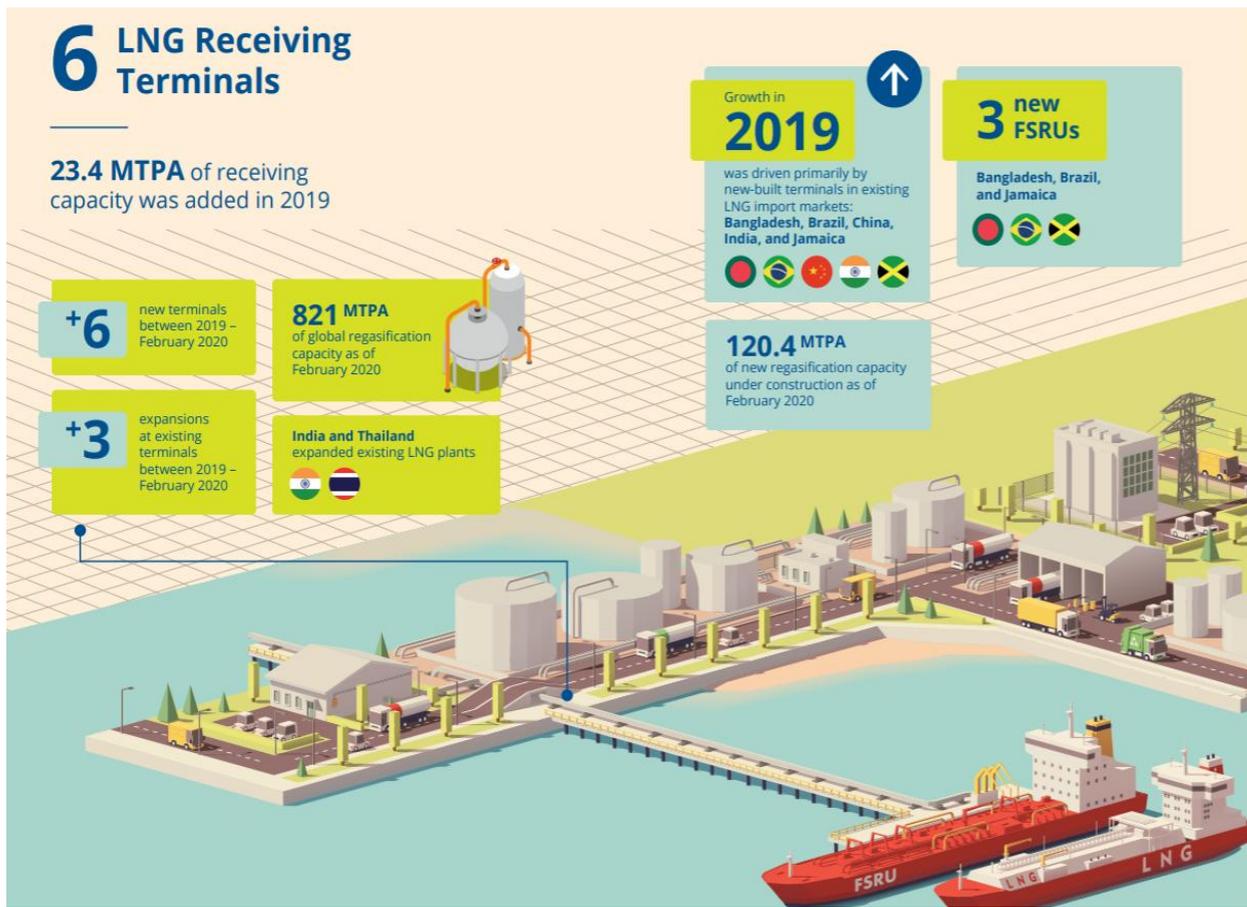


Source: Rystad Energy

According to the IEA, the US will be the second largest LNG exporter in the world (101 billion m³) in 2023 surpassing Australia. The country will cover 57% of the global grow. However, Qatar will keep its position as the largest LNG exporter.

2. LNG regasification terminals

Regasification terminals are constructed in the countries that import natural gas. LNG regasification capacity reached 821 MTPA in 2020 and is expected to continue its growth trend in the future. Average regasification utilization levels in the global LNG markets reached at 43% in 2019, a 3% jump from 2018. The majority of additions in global receiving terminal capacity in 2019 came from Asian markets, particularly India. Japan has the world's largest regasification capacity of 210.5 MTPA as of February 2020, comprising 25% of global regasification capacity.



The growth rate of China’s regasification capacity is one of the most rapid among global LNG import markets, driven by increased use of natural gas for power generation. Since China became the world’s second largest LNG importer in 2017, China has built nine new terminals between 2017 and 2019, adding 24.1 MTPA of import capacity. In addition, China increased its utilization capacity steady as of 2016 to 74%, which is far more than world average utilization capacity. Even though Japan has the largest regasification capacity in the world, it just could utilize 36% of its total capacity. China’s position was the best in the world, followed by India.

Table 2. Countries with largest regasification capacity in the world (2019)

Country	Receiving Terminal Capacity (MT)	Utilization rate (%)
Japan	210.5	36
South Korea	125.8	31
China	77.4	74

USA	45.4	5
Spain	43.8	37
UK	38.1	32
India	33.3	67
France	25	63
Turkey	18.1	46
Mexico	16.8	31

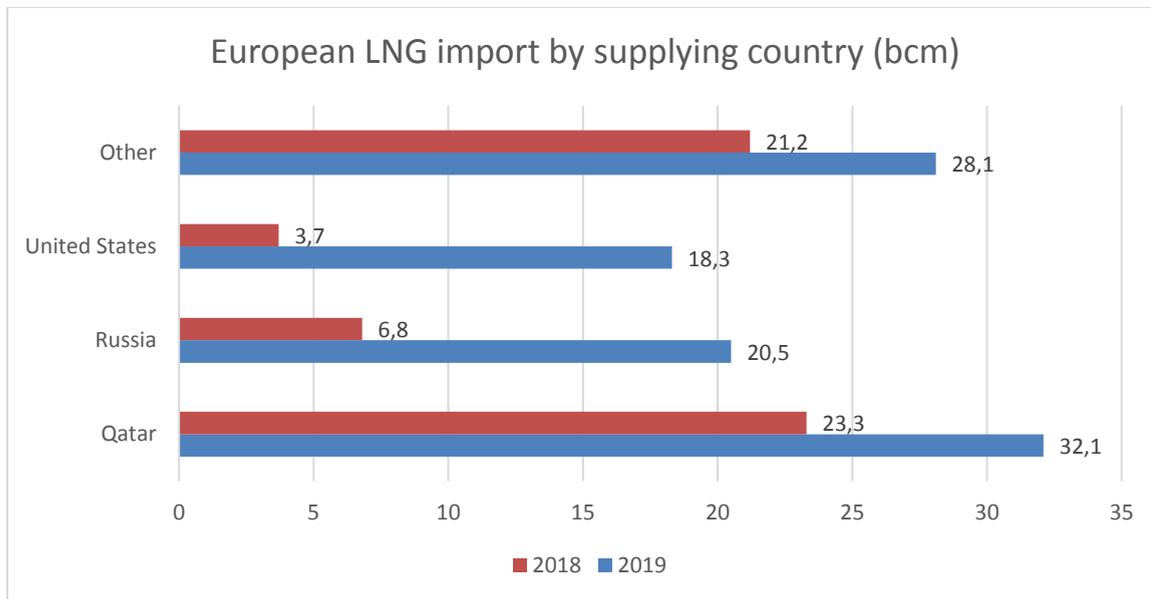
Source: International Gas Union

LNG demand from Asia Pacific was supported through growth in imports into Malaysia, Singapore, Indonesia and Thailand, but was challenged by declining imports in South Korea and Japan, driven by milder weather, the price environment and changes in domestic energy mixes, as well as demand. Asia's market share remained stable with support from China, Pakistan and Bangladesh. 80% of the global growth was driven by Asian countries. The fastest growth was experienced in China, meeting 40% of total growth. Thus, China was the second largest importer of LNG after Japan, surpassing South Korea. Japan, South Korea, China and India all together comprised 63% of the global LNG trade.

2.1. Europe`s existing regasification capacity

There were 22 operational large-scale onshore terminals for the importation of liquefied natural gas (LNG) in Europe as of 2019. In addition to the operational terminals, a further nine such terminals are in the planning or construction phase. The greatest number of import terminals are located in Spain. Spain is home to several of the largest operational liquefied natural gas (LNG) import terminals in Europe.

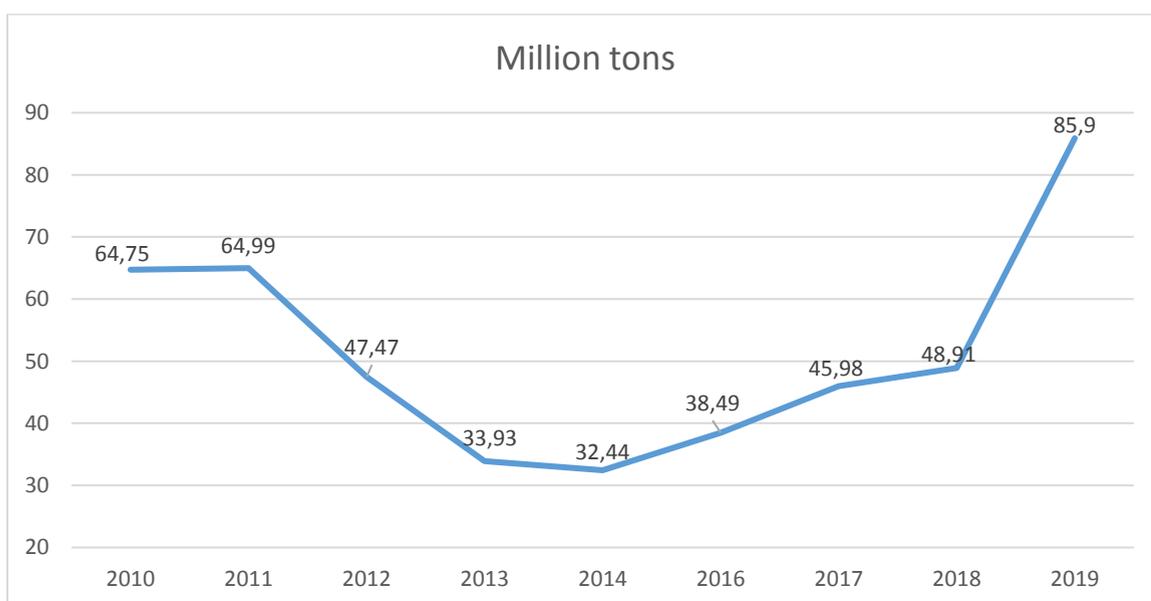
Graph 3. LNG import volumes of Europe by supplying country



Source: Statista

European imports surged on the back of low prices, almost doubling to 85.9 MT from 48.9 MT in 2019, accounting for 90% of the global increase in LNG trade in 2019. Market share wise, this meant an increase from 16% to 24%. This was driven also by declines in domestic production, increased use of storage, additional gas-fired power generation and increases in LNG imports.

Graph 4. LNG imported in Europe by years



Source: Statista

Despite these dynamics, Europe's LNG import terminal capacity has historically been underutilized. In 2015, the average regasified LNG sendout across the biggest terminals of Europe such as Spain, Belgium, Italy, the UK, the Netherlands and France was around 25%. However, in 2020 the average daily sendouts had risen to 54%, more than double the average seen in the decade prior. The increase in deliveries into Europe has largely been driven by a growth in LNG supply across both the Pacific and Atlantic basins, with global liquefaction capacity growing by over 150 bcm/year since 2016, nearly 50% of which was from US projects and another 30% from Australian sources. Furthermore, the entrance of Russia's Yamal LNG also had a major impact on European LNG imports given its proximity to Northwest Europe. ³

In conclusion, taking into consideration of growing importance of natural gas, we analyzed LNG, which has big contribution to development of natural gas trade in the world. As an alternative to pipeline trade in natural gas, LNG trade increased 94.3% over the past 10 years and this trend is expected to continue in the future.

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³ <https://storymaps.arcgis.com/stories/3f3ff30bf1804150878f128aa5e63552>