

# Natural Gas – Trends of Business Model Changes

## Erdgas – Trends der Geschäftsmodelländerungen

Nikolay Kambosev

FDIBA, Technical University of Sofia  
Sofia, Bulgaria, e-mail: kambosev@gmail.com

**Abstract** — This article intends to illustrate the current trend of change in the model of distribution and delivery of natural gas. It analyses the natural gas consumption and the market response in the changed environment of demand and supply of natural gas. It summarizes the forthcoming large projects in this business niche that include the construction of new Liquefied natural gas (LNG) terminals and their auxiliary infrastructure. It also outlines the European union efforts to make Europe a climate neutral continent.

**Zusammenfassung** — Dieser Artikel beschreibt den aktuellen Trend der Veränderung des Verteilungs- und Lieferungsmodells von Erdgas. Dieser Artikel analysiert auch den Erdgasverbrauch und die Marktreaktion im veränderten Umfeld von Nachfrage und Angebot von Erdgas. Er informiert über die bevorstehenden Großprojekte in dieser Geschäftsnische, die den Bau neuer LNG-Terminals und der dazugehörigen Infrastruktur umfassen. Dieser Artikel beschreibt auch die Bemühungen der Europäischen Union, Europa zu einem klimaneutralen Kontinent zu machen.

### I. INTRODUCTION

Within the European geopolitical situation, the need of rapid change of the business model for natural gas supply is one of the “hot” topics globally. The secure and resilient supply of natural gas is becoming a crucial for many countries. Nowadays, the natural gas demand is not only economical factor but also political and social because it has a significant influence on the daily life. This article illustrates the current trend of change in the model of distribution and delivery of natural gas; summarizes forthcoming large LNG projects and outlines the alternatives.

### II. CHANGING BUSINESS MODEL OF NATURAL GAS MARKET OF USE

The European Union (EU) sanctions against Russian Federation and its response decreasing the quantity of natural gas supply lead to an unstable market and a rapid change in the business model of natural gas supply. This situation in Europe has a tremendous impact on the global natural gas market.

The anticipated growth in demand for natural gas worldwide is driving the process of changing the existing market model. Up to now the supply model through long-term supply contracts with monopoly enterprises to secure the country natural gas demand is obsolete.

Figure 1 illustrates the global natural gas demand and production by region and key countries. As per the forecast shown in the same figure, the global demand and production will be increased in next two years.

According to EU Communication as of 2016 related to liquefied natural gas and gas storage - the diversification of the EU's natural gas supply remains a key objective, particularly as domestic production in the EU will continue to decline in coming decades. Vulnerability due to increasing import dependency can be mitigated if the gas system remains flexible and able to respond to fluctuations in supply. The exploitation

of the potential of liquefied natural gas (LNG) and gas storage will make the EU gas system more diverse and flexible, thus contributing to the key Energy Union objective of a secure, resilient and competitive gas supply [1].

	2019	2020	2021	2022	2023	2024
Africa	164	161	169	172	177	183
Asia Pacific	835	841	895	907	935	962
of which China	306	325	364	377	395	416
Central and South America	155	142	153	147	148	150
Eurasia	608	584	634	619	614	624
of which Russia	482	460	501	484	479	487
Europe	586	573	604	549	556	545
Middle East	545	548	564	582	596	609
North America	1 106	1 080	1 084	1 108	1 101	1 105
of which United States	888	869	867	887	878	880
<b>World</b>	<b>3 999</b>	<b>3 930</b>	<b>4 103</b>	<b>4 083</b>	<b>4 127</b>	<b>4 178</b>

World natural gas demand by region and key country (bcm)

	2019	2020	2021	2022	2023	2024
Africa	252	241	262	267	275	283
Asia Pacific	637	630	651	670	674	676
of which China	174	189	205	214	220	225
Central and South America	167	150	147	150	152	156
Eurasia	921	866	955	858	859	883
of which Russia	738	692	762	668	665	684
Europe	249	230	223	227	218	217
Middle East	671	674	694	712	729	739
North America	1 174	1 154	1 178	1 208	1 223	1 241
of which United States	968	954	973	1 006	1 028	1 042
<b>World</b>	<b>4 071</b>	<b>3 945</b>	<b>4 110</b>	<b>4 092</b>	<b>4 132</b>	<b>4 195</b>

World natural gas production by region and key country (bcm)

Fig. 1. Summary tables of world natural gas demand and production [1]

However, currently only a limited number of EU Member States (Spain, France, Italy, the Netherlands, Belgium) have effective liquid markets. In other parts of Europe, gas markets are far less developed [1].

As shown on Figure 2, EU remains dependent on Russian natural gas which has been increasing, reaching its peak of nearly 50% by 2019.

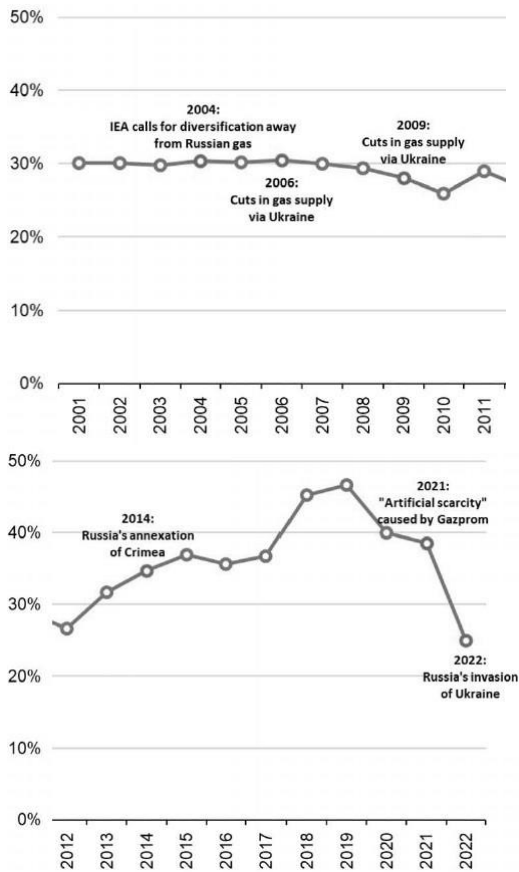


Fig. 2 Share of EU gas demand met by Russian supply, 2001-2022 [2]

The EU delayed with the diversification of natural gas supplies because of the lower prices of gas delivered through pipelines or the close political relations of some of EU member states with Russia. In the context of the changed geopolitical situation in Europe in the early 2022, the LNG terminals in the EU member states are urgently required leading to expedited performance of the delayed LNG projects.

For example, the first LNG terminal “Wilhelmshaven” in Germany, being the Europe’s largest national economy, is expected to be launched before this Christmas, 2022. The type of the LNG terminal is Floating Storage and Regasification Units (FSRU) which relatively new type of business model of natural gas supply.

In the global context, as of 2021 Russia is the world’s leading exporter of gas, exporting 201.7 billion cubic meters of gas via pipelines, and 39.6 billion cubic meters of liquefied natural gas (LNG). The United States is the second-largest natural gas exporter, followed by Qatar and Norway. Japan, China, and South Korea make up more than half of the LNG import market share worldwide. Australia is the country with the largest operating LNG export capacity worldwide [3].

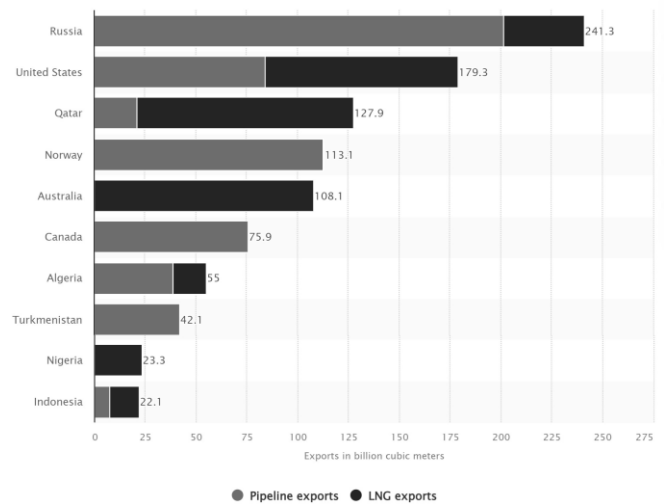


Fig. 3. Leading gas exporting countries in 2021, by export type [3]

### III. LARGE LNG PROJECTS

Several major LNG projects are underway globally, however five major of them deserve to keep an eye on in 2022:

#### 1. North Field Expansion LNG Project – Qatar

The North Field Expansion Project is the world’s largest LNG project. When it comes operational in 2025 (asscheduled), it will make Qatar the largest LNG exporter globally, with a LNG production capacity of 110 million tons per year (tpy). Additionally, this LNG project will also use renewable energy and carbon capture to limit emissions [4].

#### 2. Jafrabad Floating Storage and Re-gasification Unit – India

It will process and ship 47.5 million tonnes per annum across the region. This makes it one of the boldest LNG projects on the market in 2022 [4].

#### 3. Rio Grande LNG Plant – United States

Rio Grande LNG in Brownsville, Texas, represents the next step in LNG infrastructure in the USA. It will produce 27 million tpy, and the LNG plant is said to reduce emissions by over 90% with carbon capture storage which makes it the “greenest” LNG in the world. The LNG project is expected to be operational in 2023 [4].

#### 4. Arctic LNG 2 – Russia

Arctic LNG 2 is projected to produce 19.8 million tpy by 2025, Novatek’s Utrenneye onshore field is expected to be operational in 2023, however the international sanctions against Russia will probably impact the project closure (the main EPC Technip Energies expects to fully exit the project). This LNG project is part of a more extensive trans-arctic LNG shipping development by Novatek. Additionally, it will employ new technologies to make the natural gas liquefaction process more efficient [5].

#### 5. Brunsbüttel LNG Terminal – Germany

Heavily reliant on imports for over 90% of its domestic natural gas consumption, Germany is seeking to become more self-reliant with the construction of its Brunsbüttel LNG Terminal in 2023. As a result, the terminal will have an operational capacity of 5.1 million tpy and be one of many LNG projects to come [4].

#### IV. MEASURES TO REDUCE THE EU'S RELIANCE ON RUSSIAN NATURAL GAS SUPPLY

International Energy Agency published in March 2022 a 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas. The plan provides recommendations how to secure Europe's gas balance for next winter, showing the concrete policy actions needed to ensure storage sites are filled to 95% capacity by the beginning of the 2023-24 heating season and to structurally reduce gas consumption during the winter [6].

##### Action 1 - No new gas supply contracts with Russia

Impact: Taking advantage of expiring long-term contracts with Russia will reduce the contractual minimum take-or-pay levels for Russian imports and enable greater diversity of supply. Measures implemented this year could bring down gas imports from Russia by over one-third, with additional temporary options to deepen these cuts to well over half while still lowering emissions.

##### Action 2 - Replace Russian supplies with gas from alternative sources

Impact: Around 30 bcm in additional gas supply from non-Russian sources

##### Action 3 - Introduce minimum gas storage obligations to enhance market resilience

Impact: Enhances the resilience of the gas system, although higher injection requirements to refill storage in 2022 will add to gas demand and prop up gas prices

##### Action 4 - Accelerate the deployment of new wind and solar projects

Impact: An additional 35 TWh of generation from new renewable projects over the next year, over and above the already anticipated growth from these sources, bringing down gas use by 6 bcm

##### Action 5 - Maximise generation from existing dispatchable low-emissions sources: bioenergy and nuclear

Impact: An additional 70 TWh of power generation from existing dispatchable low emissions sources, reducing gas use for electricity by 13 bcm.

##### Action 6 - Enact short-term measures to shelter vulnerable electricity consumers from high prices

Impact: Brings down energy bills for consumers even when natural gas prices remain high, making available up to EUR 200 billion to cushion impacts on vulnerable groups.

##### Action 7 - Speed up the replacement of gas boilers with heat pumps

Impact: Reduces gas use for heating by an additional 2 bcm in one year.

##### Action 8 - Accelerate energy efficiency improvements in buildings and industry

Impact: Reduces gas consumption for heat by close to an additional 2 bcm within a year, lowering energy bills, enhancing comfort and boosting industrial competitiveness.

##### Action 9 - Encourage a temporary thermostat adjustment by consumers

Impact: Turning down the thermostat for buildings' heating by 1°C would reduce gas demand by some 10 bcm a year.

##### Action 10 - Step up efforts to diversify and decarbonise sources of power system flexibility

Impact: A major near-term push on innovation can, over time, loosen the strong links between natural gas supply and Europe's electricity security. Real-time electricity price signals can unlock more flexible demand, in turn reducing expensive and gas-intensive peak supply needs [6].

#### V. LIFE NEUTRAL FROM FOSSIL ENERGY

Many major LNG projects are currently underway globally as the world looks for a temporary fuel to transition to a low-carbon renewable future. Countries worldwide hope that new infrastructure will help meet growing demands and shift their energy solutions. While incumbents in the sector have robust advantages in light of the changes, incumbency alone is likely not sufficient to assure success. New businesses may well find fertile ground for innovation in LNG in the short- to medium-term. Production, transport and reprocessing of LNG are high energy-consuming and technically demanding due to the storage temperature, which leads to increasing CO<sub>2</sub> emission. In long term perspective, this conflicts with the European climate and environmental regulations aiming "Life Neutral from Fossil Energy".

To tackle climate change and build a strong green economy and society, the European Green Deal and the NextGeneration EU Recovery Plan aim to make Europe a climate-neutral continent by 2050.

The European Commission is proposing to cut net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels, up from our current target for 2030 of at least 40% [7].

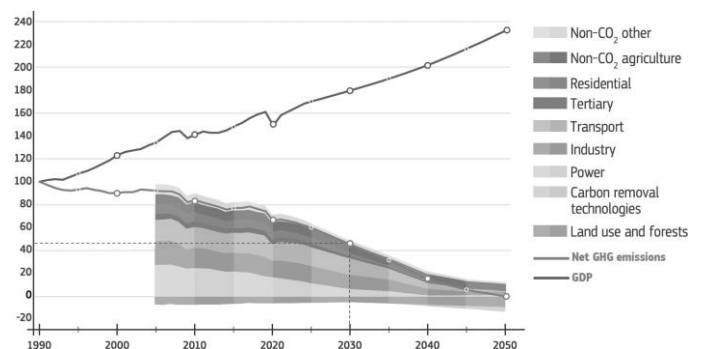


Fig. 4. EU Climate Target Plan [7]

According to the EU Climate Target Plan 2030:

- Energy sector causes 75% of CO<sub>2</sub> emissions:
  - Burning fossil fuels is the largest source of greenhouse gas emissions in the EU;
  - The energy system plays a central role in the transition to a climate-neutral economy

## VI. CONCLUSION

- Buildings sector:
  - The building sector is responsible for 40% of final energy use
  - This sector has a large and cost-effective potential to become more energy-efficient and reduce emissions
- Transport sector:
  - The transport sector has the lowest share of renewable energy use
  - It will need to increase its renewable energy share to around 24% by 2030
- Land Use Sector
  - Nature absorbs CO<sup>2</sup> and is vital to the fight against climate change
  - To achieve climate neutrality by 2050, it is needed to grow the carbon sink to reach 300 million tons CO<sup>2</sup> by 2030 [7].

Increasing attention to LNG terminals with the existing technologies is a mid-term global solution. That may not necessarily comply with the long-term vision of the European Union to be a climate-neutral continent by 2050. Therefore, use of LNG in lorries and shipping reducing the emissions of various pollutants and, in the case of shipping, decreasing the sulphur and nitrogen content in marine fuels used in the Emission Control Areas, and/or new technologies in LNG sector should be considered to in place to balance the most cost efficient and, at the same time, environment friendly way to do business in this sector.

## REFERENCES

- [1] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS on an EU strategy for liquefied natural gas and gas storage, SWD(2016)23, [Online]. Available at: [https://ec.europa.eu/transparency/documents-register/detail?ref=COM\(2016\)49&lang=en](https://ec.europa.eu/transparency/documents-register/detail?ref=COM(2016)49&lang=en)
- [2] INTERNATIONAL ENERGY AGENCY, “Gas Market Report, Q3-2022” (2022), [Online]. Available at: <https://iea.blob.core.windows.net/assets/c7e74868-30fd-440c-a616-488215894356/GasMarketReport%2CQ3-2022.pdf>
- [3] Leading gas exporting countries in 2021 (2022), [Online]. Available at: <https://www.statista.com/statistics/217856/leading-gas-exporters-worldwide/>
- [4] 5 Major LNG Projects to Keep an Eye on in 2022 (2022), [Online]. Available at: <https://energytracker.asia/5-major-lng-projects-to-keep-an-eye-on-in-2022/>
- [5] Technip Energies signs deal to leave Arctic LNG 2 project in H1 2023 (2022), [Online]. Available at: <https://www.reuters.com/business/energy/technip-energies-eyes-exit-arctic-lng-2-project-h1-2023-2022-10-20/>
- [6] Europe needs to take immediate action to avoid risk of natural gas shortage next year (2022), [Online]. Available at: <https://www.iea.org/news/europe-needs-to-take-immediate-action-to-avoid-risk-of-natural-gas-shortage-next-year>
- [7] EU Climate Target Plan 2030 (2020), [Online]. Available at: [https://ec.europa.eu/commission/presscorner/detail/en/fs\\_20\\_1610](https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1610)
- [8] Historical trends and future projections of EU greenhouse gas emissions (2022), <https://www.eea.europa.eu/data-and-maps/figures/figure-1-historical-trends-and-1>

The figure 5 shows the greenhouse gas emission targets, historical and future trends for the EU Member States.

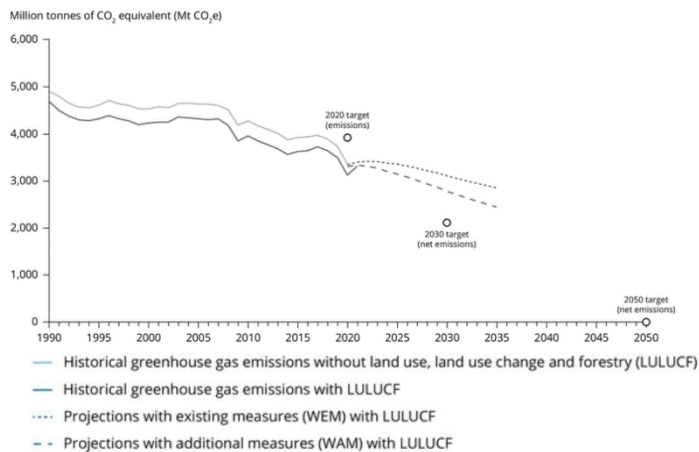


Fig. 5. Greenhouse gas emission targets, historical and future trends for the EU Member States [8]