



**Figure 1.** The Krk LNG terminal has the capacity to send up to 2.6 billion m<sup>3</sup>/y of natural gas into the national grid.

# Opening up OPPORTUNITY

**Mario Matkovic, MET Group, Croatia,** considers the impact of volatile LNG prices, as well as discussing how the Krk terminal in Croatia is helping to bring a new era of energy independence to the country.

**O**ver the past year, energy prices have become increasingly correlated, in particular LNG and natural gas.

This is particularly true in the current energy crisis where prices are on an upward trend – as one price is climbing, the other tends to move in the same direction. So, as gas prices are breaking new all-time highs month after month, it continues to affect LNG pricing.

In addition, in the case of Europe, LNG not only acts as a security of gas supply but also as a political lever to alter the negotiation dynamics between suppliers and buyers in the region.

MET Croatia is seeing a change in gas flows in the area. Before the Krk terminal was built, excluding domestic gas production, natural gas could reach Croatia only through pipelines from Hungary or Slovenia.

Currently, the Krk terminal can be supplied from a large number of sources, which means there should be no supply problems if the pipeline transport fails. In 2021, cargoes arrived to Krk from the US, Qatar, Belgium, France, Trinidad and Tobago, Nigeria, and Egypt.

The first year of the terminal's operation was marked by 100% booked capacity, but also by the redirection of cargoes to Asian markets in 1Q21. MET Croatia booked an

overall 2.67 billion m<sup>3</sup> of regasification capacity at the Krk LNG terminal for a period of seven years.

MET delivered its first cargo in April 2021. In the first calendar year of operation, a total of 19 cargo deliveries were successfully performed, delivering approximately 2.5 million m<sup>3</sup> of LNG to the terminal. This equals to approximately 1.6 billion m<sup>3</sup> of natural gas to the transmission system.

With post-COVID-19 economic growth in Asia, the Asian regions have practically absorbed all LNG capacity from the global market. This has also affected the Krk LNG terminal, which saw cargo cancellations early on in 2021 as a result of the increasing demand in Asia.

Looking at the current situation for the second gas year of operation, i.e. from 1 October 2021 to 30 September 2022, there is an annual delivery plan with steady cargo arrivals approximately every two weeks. MET Croatia expects that 24 vessels will arrive in total, out of which the company plans to deliver seven.

MET Group's presence at the Krk terminal is important for the company, because the top priority is to link the Group's portfolio in the Mediterranean area to the global LNG market. The other potential markets for LNG placement are neighbouring countries with existing or planned interconnections to Croatia, and a high gas import dependence.

Booking capacities at the terminal was an excellent business decision, as 2021 proved that LNG is a key supply for European natural gas. LNG is good for Croatia and the wider region as it increases supply diversity.

The Group has been an active importer of LNG into Spain and Italy ever since its trading desk was set up in 2016 and currently has contracts with different market participants. However, Central and Eastern Europe has remained a core business region for the company which is why securing capacity at the Croatian terminal will enhance synergies in its Mediterranean LNG portfolio.

Croatia's first LNG terminal has the capacity to send up to 2.6 billion m<sup>3</sup>/y of natural gas into the national

grid. The LNG terminal project cost €233 million, with the EU providing €101 million.

The LNG market volume-wise is relatively balanced in the short- to medium-term. Nevertheless, high volatility of prices from gas and other energy markets, on top of potential weather-related demand-pulls in the Pacific and the Atlantic basin, creates an environment of uncertainty among players. This leads to prompt imbalances in LNG, and big moves in prices.

MET Group expects to see high volatility in LNG prices as long as demand continues to grow in Asia and Europe without a significant influx of LNG supplies. Market tightness is unlikely to abate in 2022, due to high restocking needs in Europe, along with low LNG capacity additions and supply uncertainties.

## About the terminal

The commissioning of the LNG terminal on the Island of Krk at the end of 2020 and the arrival of the first LNG carrier at the beginning of 2021 marked a new era of natural gas market development and energy independence in the Republic of Croatia. The terminal has a geopolitical and strategic dimension in the context of strengthening the European energy market by meeting its energy demands and increasing secure and reliable supply through the new natural gas route.

Construction of the terminal lasted from April 2019 to December 2020 when it was successfully commissioned. The terminal consists of several main elements, while the process of regasification takes place on the FSRU vessel *LNG Croatia*. After the LNG is converted from a liquefied to a gaseous state, natural gas is further delivered to the transmission system of the Republic of Croatia through a connecting pipeline.

The terminal consists of the following main elements:

- FSRU vessel *LNG Croatia*.
- Jetty with auxiliary facilities.
- Connecting high-pressure pipeline.
- Connecting water supply system.



**Figure 2.** The *Methane Nile Eagle* vessel at the Krk terminal, delivering MET Croatia's first LNG cargo.

## The FSRU vessel

The FSRU vessel *LNG Croatia* was initially built by the South Korean shipyard Hyundai Heavy Industries in 2005 under the name of *Golar Viking* as a conventional LNG carrier. Following the successfully completed procurement procedure of the FSRU vessel, in early 2020 the *Golar Viking* sailed to the Hudong shipyard in China where its conversion from LNG carrier to FSRU was performed. The two largest modifications related to installation of new equipment included the installation of a regasification module, which was installed

on the bow of the vessel, and the installation of a power module, which was installed on the stern of the vessel.

FSRU vessel *LNG Croatia* consists of equipment for the loading and unloading of LNG, four LNG cargo storage tanks, equipment for regasification, equipment for waste gas handling (boil-off gas), equipment for natural gas send-out and metering, an engine room intended to produce electricity, propulsion equipment, a cargo control room, fire-fighting systems, and all auxiliary facilities.

The total cargo storage capacity of the FSRU vessel is 140 206 m<sup>3</sup>, while the regasification equipment includes three regasification trains with a maximum rate of 451 840 m<sup>3</sup>/h. The FSRU vessel operates with a maximum capacity of up to 300 000 m<sup>3</sup>/h, or 2.6 billion m<sup>3</sup>/y, in accordance with the current capabilities of the gas transmission system of the Republic of Croatia.

## Onshore part of the terminal

The main infrastructure of the terminal, apart from the mentioned FSRU vessel, consists of a jetty that is built on reinforced concrete pillars. The berth itself consists of several elements that are connected into a functional unit, with the main task of enabling safe mooring of the FSRU vessel, continuous and uninterrupted communication with the shore, and reliable send-out of natural gas from the FSRU vessel to the shore. At the same time, the task of the jetty is the indirect acceptance of the LNG carrier, which is moored laterally to the FSRU vessel during the cargo transfer. The jetty itself is designed to be able to accept a wide range of vessels, from small scale feeder vessels to the Q-Max vessels.

On the central part of the jetty, i.e., the jetty head, high-pressure loading arms that connect the gas line between the FSRU vessel and the onshore part of the terminal are located. Through the high-pressure loading arms which are located in the central part of the jetty, and then over the gas pipeline that is laid along the entire length of the access bridge, natural gas is transported to the onshore part of the terminal.

A set of breasting and mooring dolphins located on both sides of the jetty head, on which quick-release hooks and fenders are installed, form the terminal's mooring system.

On the onshore part of the terminal, auxiliary facilities are located, without which the safe operation of the terminal and thus the reliable send-out of natural gas would not be possible. The control building, as a central facility of the onshore part, is an administrative headquarter that ensures 24/7 continuous operational supervision of the entire terminal and management of the terminal through the control system. The auxiliary rooms of the control building serve to accommodate the instrumentation and electrical equipment of the terminal.

## Available capacity

*LNG Croatia*'s available regasification capacity for the gas year 2022/2023 is 0.17 billion m<sup>3</sup>/y, while in the period from 2023/2024 to 2026/2027 it is 0.36 billion m<sup>3</sup>/y. In the years that follow, available capacity is significantly higher at over 1.6 billion m<sup>3</sup>/y. The regulated tariff is €1.05/MWh and covers berthing, storage, and regasification. **LNG**