

# CARBON-NEUTRAL LNG AND OIL: THE FUTURE OF HYDROCARBONS IN THE WORLD OF ENERGY TRANSITION?

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## Overview

With the development of climate policies and various barriers to carbon-intensive products (for instance, the Carbon Border Adjustment Mechanism in the EU) in traditional energy importing countries, the carbon footprint of hydrocarbon products started to gain an increasingly crucial role, influencing the competitiveness of the key energy exporters. The rapid expansion of renewable energy sources and the creation of a new market for hydrogen is expected to have a negative impact on the demand for traditional energy sources. This research focuses on one of the methods of managing emissions in the energy sector – the evolving practice when traditional hydrocarbon producers are introducing carbon-neutral versions of conventional products: carbon-neutral oil and carbon-neutral natural gas (mainly LNG).

The carbon-neutral LNG market is new, but still much more developed than carbon-neutral oil or LPG and condensate. Despite being quite a new phenomenon (the first carbon-neutral LNG cargo was announced by Shell in June 2019), the carbon-neutral LNG market is rapidly developing. As of August 2022, 32 such cargoes were supplied worldwide, with Asia as a leading destination. However, despite the boom of carbon-neutral cargoes in 2021, this nascent market experienced a significant shrinkage in 2022, with only one cargo delivered and no new deliveries announced. In this research, we discuss the reasons for this drastic decrease, which go far beyond economics and geopolitics.

In this work, we show that the carbon-neutral hydrocarbons market faces some significant challenges. Among them is the lack of established standards on what to consider a carbon-neutral cargo, how to achieve its carbon neutrality, how to measure the emissions, to report and verify them. Despite multiple possible ways to manage emissions (e.g. introduction of such technologies as carbon capture, utilization and storage (CCUS), energy efficiency, or direct air capture (DAC)), so far all carbon-neutral LNG and oil cargoes used carbon offsets as a method of achieving carbon neutrality. These challenges lead to a lack of transparency in the market and, as a result, a lack of credibility, which becomes a barrier to its expansion.

In this research, we achieve several targets:

- Describe current practices established in the carbon-neutral hydrocarbons market
- Show what standards are needed for the market to expand
- Produce estimates for the cost of a typical carbon-neutral LNG and oil cargo under different methods used to achieve carbon neutrality (offsetting with carbon credits VS introducing CCUS)
- Discuss the impact of the introduction of different approaches to managing emissions on the rebalancing of the traditional supply curves in the LNG and oil markets.

The rationale behind the research is to quantify the impact of carbon policy on hydrocarbon value chains in the hydrocarbon trade. Regulations to decarbonize the oil and gas sector are expected to impose additional costs for producers and consumers. The aim of the study is to understand the implications of carbon-neutral hydrocarbon cargoes and generate a new “energy map” under these conditions. Applying different approaches to mitigating emissions from fossil fuel products can lead to different outcomes for the economics of future carbon-managed hydrocarbon markets.

## Methods

In the first stage of research, we use the case study method to describe the current practice in the carbon-neutral trade of hydrocarbons. Simultaneously we scrutinize the role of existing carbon regulation and carbon offsetting. This helps us understand the parameters for potentially acceptable “carbon neutral” products, identify the technologies that can contribute to carbon neutrality, and the implications for supply chains.

In the second stage, we explore the consequences of carbon regulation for the LNG and oil market. We generate scenarios around the potential costs of carbon offsets and CCUS in different regions and use Nexant’s World Gas Model to analyze possible restructuring of the LNG market due to the introduction of obligatory carbon regulation. A new LNG supply curve under different scenarios of carbon prices is produced.

## Results

We show that under current conditions rebalancing of the market is unlikely as “carbon neutrality” status for cargos is derived from the cancellation of carbon credits, issued from similar projects based in developing countries.

Future pricing is highly dependent on rules in the market. Because there is a lack of rules, producers seek the cheapest ways to offset emissions that don’t affect the market. Currently, purchasing the offsets adds only up to 6% of the total cost of an LNG cargo.

Due to these reasons, such cargoes can be price competitive, especially under current market price conditions.

Only after changes in rules (e.g., if an obligation to offset emissions where production or consumption takes place is introduced) reconfiguration of price structure and supply chain of carbon neutral LNG or oil will occur.

## Conclusions

The research highlights multiple challenges existing in the carbon-neutral hydrocarbon markets – such as the lack of standards on what is “carbon neutrality”, how to achieve it (what emissions and from what elements of the value chain need to be managed, who – the buyer or the seller is responsible for it. These challenges prevent the market from developing and decrease its attractiveness to potential investors and clients. However, in case recently developed standards (for instance, the joint methodology developed by Pavilion Energy, Qatar Energy, Chevron, and a methodology proposed by GIIGNL) manage to become universal, the market of carbon-neutral hydrocarbons could compete with conventional hydrocarbon products over the coming decades. Moreover, global emission mitigation targets of the countries and companies are still in place, and solutions to cut emissions will be a priority, especially after a weak performance in 2022. Once natural gas prices are normalized, importers will most likely focus again on their climate pledges, highlighting the benefits of carbon-neutral hydrocarbons again.

## References

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