The 26th session of the Conference of Parties (COP26), the U.N. climate talks, ended on November 13, 2021, with a concluding resolution that for the first time targeted fossil fuels as the key driver of global warming. Despite the influence of coal-reliant countries in amending the language regarding coal to "phase down" rather than "phase out," the final document from COP26 signals that the era of fossil fuels is ending. Sooner or later, the emerging consensus around ending the era of fossil fuels, raises the obvious question of the future of the natural gas industry and its enormous infrastructure in a decarbonizing energy mix. The answer to this question is not such an obviously negative one as might be assumed.

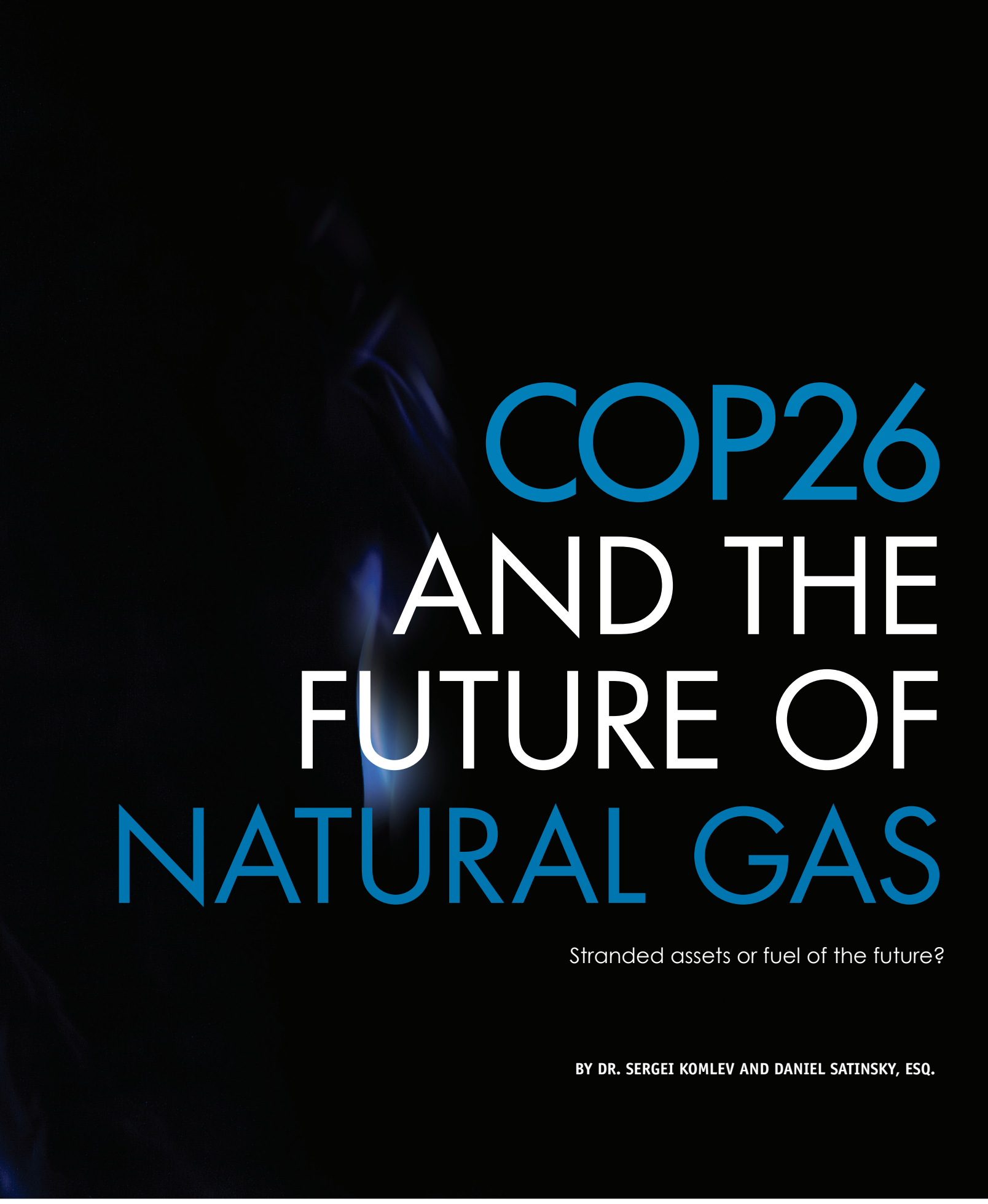
The focus of the COP26 resolution was on coal, raising the issue of which fossil fuel is next to line for the international energy blacklist? The oil and natural gas industries are the next obvious candidates for follow up rounds of phasedown.

In the International Energy Agency's 2021 Net Zero Scenario, the maximum peak demand for gas will be reached in 2025 and is projected to drop sharply. In this projection, gas will continue to play a role in the energy mix among global leading nations until such time as they reach carbon neutrality and then will slip out of their energy mix. However, these are only projections, and they depend upon many factors, including technical and political ones, with wide time horizon divergence among different countries for reaching a carbon neutral fuel mix. An additional factor will be the response of the natural gas industry itself.

Politicians from the EU have long claimed that natural gas is incompatible with the goal of full decarbonization by 2050. "I want to be crystal clear: fossil fuels have no viable future," Frans Timmermans, EU climate chief told participants at a gas industry conference in March 2021. "And that also goes for fossil gas, in the longer run," he added. Timmermans' views fully correspond with the mindset of influential groups in the OECD countries. Like the EU, many countries acknowledge natural gas, the least polluting carbon fuel, as a transitional source of energy but believe that natural gas is poised for marginalization in the fuel mix.

Does this mean that one day natural gas will share the status of coal, with its infrastructure of gas pipelines decommissioned, closed gas-fired plants and LNG producing and receiving terminals demolished as stranded assets like coal plants? Our answer is no, and here is why.

Gas occupies a secure position in the energy mix of gas-producing nations as domestic low-cost energy. Meanwhile gas-consuming nations will keep gas as a transitional fuel in the energy mix as a less carbon emitting fuel than coal and oil. In countries reducing reliance on nuclear power, natural gas can fill the gap in baseline energy production.



COP26 AND THE FUTURE OF NATURAL GAS

Stranded assets or fuel of the future?

BY DR. SERGEI KOMLEV AND DANIEL SATINSKY, ESQ.

While all these factors point to a continuing role for natural gas in the energy mix, there are certain transitional risks that if neglected could undermine its future. These risks refer to the specifics of pricing mechanisms that operate reasonably well in other industries but fail to produce a sustainable price signal for natural gas. This is a problem that we have addressed in detail in our book, "Foundations of Natural Gas Price Formation — Misunderstandings Jeopardizing the Future of the Industry" (Anthem Press, 2020, available on Amazon).

Pricing Dilemma for Natural Gas

In current conditions and moving forward, there is a risk of underinvestment resulting from hyper volatility of gas prices in Europe and Asia. This volatility began to characterize the gas industry over the last several years as the pricing paradigm began to shift on a broad scale from oil-indexed to hub-based mechanisms. The break from the historical oil indexation resulted in pricing sensitive to supply/demand balances exactly as intended by the advocates of this change. In the past, the use of six- to nine-month averaging mitigated price swings of oil/oil products resulting in the benefit of relative gas price stability.

The general rule is that in a tight market, hub-based gas prices reside well above the prices of long-term contracts. While on a loose market, they stay well below the prices of long-term contacts. The dependence of demand for gas on unpredictable regional weather conditions makes the alternation of tight and loose periods the norm. The new hub-based pricing mechanism is highly sensitive to these weather-determined demand swings, overreacting even to the minor imbalances and thus sending conflicting signals to investors.

The table below shows the hyper volatility of gas prices on the most liquid European Hub TTF. The table indicates that from the start of 2019 to the end of 2021 the trajectory of prices were changing. Day-ahead prices dropped from the local maximum in January 2019 by 7 times in May 2020 and then skyrocketed 56 times in December 2021.

Also contributing to the volatility of the market is choking off of international financing for natural gas. It comes as the result of lobbying activities of powerful green energy groups worldwide, which are causing disinvestment in the industry at a time when gas is still in need. The idea of equating the fight against greenhouse gas (GHG) emissions synonymous with a fight against the gas industry has proved to be a mistake in Europe in 2021, as it has led to accelerated decreases in its domestic gas production. Tight supply of natural gas in the face of rising demand has resulted in stratospheric gas prices. These prices brought demand destruction in the industries using it as input, not to mention inflationary pressure on the global economy. The wildly fluctuating behavior of gas prices poses a problem with the ability of gas prices to serve as an instrument of optimal resource allocation in an industry requiring large-scale infrastructure planned for long-term use. Unstable prices undermine the ability to finance this infrastructure at the same time as the sources of finance are under pressure to divest from all forms of fossil fuel.

One possible solution for a viable future for the natural gas industry in the energy mix could be production of blue hydrogen and its by-products, based on the low-cost inputs available in gas-producing countries. In this scenario, the natural gas industry can contribute to the energy future, rather than ending up as a dying industry saddled with stranded assets.

The Natural Gas Industry Must Decarbonize Itself

There are two approaches to mitigate climate change. One approach focuses on reduction of GHG emissions associated with the anthropogenic activities of a man. This approach includes substitution of fossil fuels with renewables, carbon capture and storage (CCS) and eradication of methane leakage. Another approach focuses on natural solutions through assisting the forces of nature in their routine processes of absorbing CO2. That approach involves "negative emissions" technologies for removal of the excess CO2 from atmosphere

Table 1. Ups and downs of hub-based prices on TTF, 2019-2021.

Contract	17.01.2019 (1)	21.05.2020 (2)	21.12.2021 (3)	(1)/(2) Times	(3)/(2)Times
Day-ahead	264.8	38.0	2124.5	7.0	55.9
Front month	263.7	55.8	1345.2	4.7	24.1
Quarter	253.1	53.9	2044.0	4.7	37.9
Summer	251.7	126.4	1461.3	2.0	11.6
Winter	278.5	121.3	1455.5	2.3	12.0
Gas year	258.6	123.9	953.0	2.1	7.7
Calendar year	255.3	135.2	1609.9	1.9	11.9

** Compiled by the authors based on data from Bloomberg*

and refers to a wide range of "natural climate solutions," including planting trees, restoring peat lands and direct air capture (DAC). DAC is a technology in which machines suck CO2 out of the atmosphere and then bury it underground and/or use the CO2 as feedstock for production of low carbon hydrogen-based fuels. Effective combination of these two approaches opens a unique opportunity to upgrade the ecological impact of blue hydrogen (produced using natural gas) to the same level as green hydrogen (produced using renewable energy sources).

Achieving the net-zero carbon emissions targets will be prohibitively expensive using only green hydrogen. At the current state of technology, a global market for green hydrogen cannot take off without government subsidies to support scaling up and technological improvement of production processes to allow it to be cost-competitive in the market, the "chicken and egg" problem. Carbon neutral blue hydrogen can provide a kick-start to the growth of the hydrogen market because it offers solutions, which are from two to three times less costly than current green hydrogen prices. According to Platts, the average price for green hydrogen is $4.5/kgH2, while for blue hydrogen, it is less than $1.5/kgH2. At some point, green hydrogen may become as cheap as blue hydrogen, but no one can guarantee that it will really happen. The established benchmark for cost-competitive hydrogen is $2/kg at the plant gate. Blue hydrogen is capable of meeting this threshold right now. In the gas-producing countries, blue hydrogen can be produced at costs below $1/kg, due to the availability of cheap feedstock.

The major drawback of blue hydrogen is emissions. However, with 90 percent CO2 abatement by CCS blue hydrogen becomes a green fuel source. Another new technology, Auto Thermal Reforming (ATR), is a ready-to-use technology for abatement of up to 95 percent of the emissions. However, even with ATR there is still the issue of capturing fugitive emissions that originate upstream in the production and transportation of natural gas. This means that greening of blue hydrogen also requires carbon removal from the air utilizing DAC. On November 13, USA administration set a goal for driving down the cost of DAC to $100/ton by the end of the decade. That means for the American producers that the price of blue hydrogen could remain within the cost competitive $2/kg range.

Implementation of the final COP26 resolution would in fact facilitate the transformation of the natural gas industry from a producer of simple methane fuel into a producer of blue hydrogen, as a product of gas chemistry supplemented by carbon capture, ATR and DAC. If settled rules for carbon markets emerge from COP26, they can potentially unlock trillions of dollars for protecting forests, building renewable energy facilities and other projects to combat climate change. If the natural gas industry adopts the path forward outlined here, it can play a major complementary role in the worldwide fight against climate change. ✪

Dr. Sergei Komlev is group leader on Pricing of the Strategy Committee of the International Gas Union, resident of St. Petersburg, Russia, and author of "Foundations of Natural Gas Price Formation: Misunderstandings Jeopardizing the Future of the Industry."

Daniel Satinsky is a Boston-based consultant and author. He was the editor of "Foundations of Natural Gas Price Formation: Misunderstandings Jeopardizing the Future of the Industry" and longtime collaborator with Dr. Komlev.