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The advantages and uncertainties of gas in Europe's energy transition

During the [high-level conference](#) organised in Paris in September, the International Energy Agency (IEA), the European Central Bank (ECB) and the European Investment Bank (EIB) hailed the speed with which the European Union has freed itself from its energy dependence on Russia. According to the three institutions, the task now will be to consolidate and perpetuate this autonomy, which was achieved so quickly and to the surprise of many observers. The IEA also recalled the staggering amounts of annual investment needed to implement the energy transition, and the budgetary efforts required by the European Union in this area, in reference to the commitment to devote at least 30% of its 2021-2027 budget to climate action.

The Covid-19 pandemic had already disrupted European discourse on the energy transition, just a few months after Ursula von der Leyen's inaugural speech on the [The European Green Deal](#) in 2019 and the advent of a just transition in Europe. Despite the health context and strong political opposition in the Member States over the place to be given to the energy transition in regard to short-term economic recovery, the European Union has maintained the course of an ambitious energy transition and strengthened its intermediate objectives for 2030, ([Fit for 55 - The EU's plan for a green transition - Consilium](#)), with a 55% reduction in greenhouse gas emissions).

In February 2022, the war in Ukraine sparked a new energy crisis: faced with the risk of disruption to gas supplies, the need to simultaneously decarbonise the economy and the energy mix, once again became a political imperative for the European Union. Energy efficiency and the

promotion of energy-saving policies were identified as necessary and complementary ways of securing the continent's gas supplies.

At the heart of long-standing political debates in Europe, the future of gas is inevitably being shaped by a downward trend: even in the scenario of complete substitution of fossil gas by green gas, the decarbonisation scenarios in Europe all point to a reduction in the use of the latter by 2050. Structural effects, such as global warming and the resulting tendency for milder winters, and cyclical effects, such as the energy crisis and the recent rise in prices experienced by households, are already pointing to a decline in the demand for gas, as a result of efforts to economise or consumers switching from gas.

However, gas continues to provide services to the European energy system, in particular to satisfy [heating requirements and energy for cooking](#) by producing electricity during peaks in demand, or in the industrial sector where its complete substitution is not yet possible.

This article provides a summary of three of the main issues surrounding the future of gas in the European Union: changing energy dependency; competition between gas and other energies in the European energy mix; and the development of green gas and its political future in a context of electrification.

1. EUROPE'S DEPENDENCE ON NATURAL GAS IS CHANGING

While Russia has long been the main supplier of gas to many European Union Member States, accounting for up to 45% of imports, Ukraine has been the

[main country of transit](#). Of the 412 billion cubic metres consumed by the countries of the EU in 2021, 83% were imported, and 50% of these imports came from Russia, i.e. approximately 155 billion m³.

Before the war, Ukraine was carrying between 80 and 93 billion m³ of Russian gas to Europe every year, sometimes as much as 80% of the volume of Russian gas exported to Europe, thanks to the world's most extensive gas transit infrastructure. Hence Ukraine alone has long played a colossal role in Europe's energy security. However, the early 2000s were marked by several gas conflicts that challenged the reliability of this privileged energy route.

Despite its high level of dependence on Russian gas and Ukraine, the European Union has implemented a series of measures designed to reduce the risk of disruption to its gas supply, as part of the [REPower EU](#) plan. Among them was the increase in short-term gas storage capacity, that aimed to meet European demand during the winter of 2022-2023. The [European regulation of 24 June 2022](#) set itself the target of filling underground storage facilities to 80% of their capacity before the onset of winter, a target that was already achieved in September. In January 2023, despite the winter period, the Member States' [storage levels](#) remained higher than 80% on average. Last August, storage levels had already reached 90% in anticipation of the winter of 2023-2024.

In addition to this regulation, new liquefied gas storage and reception capacity was built in just a few months. Germany, for example, built its first floating LNG terminal, the *Hoegh Esperanza*, which was inaugurated on 15 December 2022 in Wilhelmshaven, carrying 165,000 m³ of LNG loaded in Spain. Other initiatives aimed at redirecting European gas flows, particularly along a North-South axis, have been launched or revived. Indeed, since the early 2010s, the countries of Central and Eastern Europe have been campaigning for gas infrastructures to evolve in this manner, despite the fact that these have historically been governed by East-West flows due to Russian exports to the countries of the former Soviet bloc. [The three seas initiative](#), launched in 2016 by twelve Member States to promote regional cohesion and solidarity in Central and Eastern Europe through the development of infrastructure, particularly

for natural gas, has nevertheless been hampered by a number of difficulties that are dampening its dynamism, such as regional dissension between the signatory states.

At the same time, the gas interconnector between France and Germany at Obergailbach, initially designed to carry gas from the East to the West, has been technically adapted to reverse its direction of operation and allows gas to be carried from France to Germany, as part of the [bilateral solidarity agreement](#) signed in the autumn of 2022.

This return to the forefront of the diversification of European energy routes and the strengthening of continental interconnections is directly in line with the operational translation of the objectives of the REPowerEU plan, which aims to achieve "*investments in an integrated and adapted network of gas and electricity infrastructures*" by 2027.

The drying up of Russian gas supplies has led to a shortfall that American LNG has immediately succeeded in filling: exports to the European Union rose by almost 120% between 2021 and 2022, to the detriment of [exports](#) to other regions of the world that also import LNG from the United States. Over the same period, Asian imports fell by 46%. As a result, the European Union is strengthening its position as a fully-fledged competitor in a highly globalised gas market, thanks to the development of LNG.

Similarly, new commercial agreements concerning gas supply have been signed since 2022, in response to the need for Member States to find new energy partners. Proof of this is to be found in the [agreement signed between Germany and Nigeria](#) on 21 November last, which paves the way for gas deliveries from 2026 and for Germany to invest \$500 million in the development of renewable energies in Nigeria. The agreements recently signed by Italy with Libya, Qatar and Algeria also bear witness to the transformation of Europe's energy relations when it comes to gas supplies.

The capacity of an LNG terminal is certainly not likely to replace Russian supplies via the Nord Stream pipelines, which are no longer in operation. But the growing number of projects to create or adapt strategic gas infrastructures

in Europe, and the diversification of supplies undertaken by the Member States, have demonstrated both the capacity of infrastructures to change to meet constant energy requirements, and the capacity of Member States to implement structuring political decisions, even if these are more bilateral than concerted at Community level.

2. REFOCUSING GAS USE ON THE MOST CARBON-INTENSIVE SECTORS

In addition to the conditions surrounding natural gas supply, the medium-term question of the place of gas in the energy mix remains. Some applications can do without natural gas altogether, and switch directly to electricity: this is particularly true of personal transport (where the transition from internal combustion engines to electric vehicles has become the industrial and economic benchmark) and heating (electrification of heating is technologically and economically viable in many types of housing).

Some sectors that are still heavily carbon-intensive can benefit from natural gas to reduce their carbon footprint, although on a large scale the alternatives are not immediately available or profitable: this is the case with public transport and road haulage, or river and sea transport, where electrification would require the use of particularly heavy and bulky batteries.

In situations such as these, gas is a transitional energy source, enabling compliance with an increasingly demanding regulatory environment. This is the case with natural gas for vehicles ([NGV/bioNGV](#)), in line with most of the low-emission zones being developed in Europe thereby helping to reduce emissions from road transport, public transport and commercial vehicles, especially if bio-NGV is used.

It is therefore desirable that, with a view to decarbonising the economy, gas be [substituted](#) wherever possible and that its development be undertaken as a priority in sectors that are still dominated by more carbonised energies such as coal and fuel oil. However, this development is causing infrastructure problems, such as the need to provide a European network of CNG/bioNGV charging stations: in the European Union as a whole, there are thought

to be almost a million vehicles running on methane gas, but only 3,000 charging stations. As with electric mobility, the development of [gas mobility](#) is based as much on the industrial-scale production of affordable and efficient vehicles as on the deployment of a recharging infrastructure that can cope with them.

Similarly, if gas is to continue to be used over a large part of the country, as a result, for example, of the conversion of part of mobility needs from fuel oil to gas, a gas transmission and distribution infrastructure must be maintained throughout the country, the use of which will decline as demand for gas falls and is refocused on certain sectors. At the same time, the development of alternatives to gas will itself determine the competitiveness of gas as a transition energy, for the transport and industry sectors, compared with other low-carbon energies such as green hydrogen.

3. THE GREENING OF GAS

As well as redefining the sources of natural gas supply and the role to be given to gas (fossil, renewable or low-carbon) in the energy mix, there is a fundamental issue that determines the place that gas will occupy in Europe's energy supply: the potential for green gas production sectors to emerge and produce local renewable gas on a large-scale and sustainable basis.

At present, the [biogas](#) production sector based on methanisation (via the recovery of livestock effluents, crop residues or sewage plant sludge) is the main lever for greening gas consumption, and has reached a high level of maturity. Europe is the world's leading region in terms of biogas and biomethane production (biogas being used mainly for electricity and heat production, with conversion into biomethane for injection into gas networks remaining a minority). As part of the REPowerEU plan the European Commission presented its [biomethane action plan](#), which aims to produce 35 billion m³ per year by 2030, compared with 3.5 billion m³ in 2021. In France, [the law regarding the energy transition for green growth \(LTECV\)](#) sets a production target to meet 20% of France's gas consumption by 2030, while installed production capacity in [France](#) accounts for around 2% of total gas consumption.

In Germany the production of [biomethane](#) is already equivalent to almost 10% of the volume of natural gas consumed in the country in 2021. Italy, one of Europe's leading biogas producers, announced in autumn 2022 that it would be stepping up its policy of support for the biomethane sector by mobilising a total budget of €4.5 billion, divided between feed-in tariffs and investment aid, and partly funded by the [recovery and resilience facility](#).

The advantages claimed by renewable and low-carbon gases are threefold: local production helps to reduce energy dependency and meet domestic demand; green gas replaces natural gas that is no longer extracted and contributes directly to moving the industry away from fossil fuels; and finally, it means that various effluents and waste can be recycled, via energy production, and as such it forms part of a virtuous circular economy. This last point needs to be qualified however, because biomethane production can also come from dedicated agricultural crops. The question of the pressure on the availability of biomass is already being raised, and even more so in the long term [with governance requirements on a European scale](#).

The geopolitical context in Europe since the war in Ukraine has highlighted the need to radically redefine the way in which the continent is supplied with natural gas. The European Union must also continue the rapid reduction in its overall gas consumption and refocus it on the most

carbon-intensive sectors, where electrification is not cost-effective or available on a large scale, if it hopes to achieve its goal of carbon neutrality by 2050. Similarly, the targets for greening gas by 2030 are ambitious and presuppose an acceleration in the installation of new production capacity that is difficult to anticipate, despite proactive public policies in several European gas-consuming countries.

Long seen as a source of stability, based as it was on mutual dependence, Europe's dependence on Russia for its gas supplies was in fact a precarious balance, already under strain since the early 2000s as a result of conflictual relations between Russia and its main transit country, Ukraine. Since 2022, the dynamics of energy diversification observed on an unprecedented scale have raised new questions about the strengths and weaknesses of the Member States in their new or strengthened bilateral or multilateral commercial relations with partners likely to take over from Russia in the supply of gas to the continent. The proliferation of trade agreements with various exporting countries, in return for the development of renewable energies, does not in itself mean greater security for the European Union, especially when the Member States enter into contracts separately rather than together.

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