

December 2022 – Executive Summary

# Natural gas: what supply risks for the European Union?

 **THE SHIFT PROJECT** For the



with the support of **BRGM** and **RTE**

# Executive summary and conclusions

**The European Union (EU) is at risk of enduring a situation of permanent and severe competition between natural gas importing countries, or even a chronic shortage of liquefied natural liquid (LNG) gas on the global market at short, mid and long term.**

This results from the highly unpredictable **future of Russian import contracts**. It is also a by-product of **two decades of a declining gas production in Western Europe**, as well as **the equally long-standing delay in implementing climate targets** aiming at fossil fuel substitution.

**Europe currently faces a dilemma: it may either transform its economic system to make it more energy- and material-efficient, or remain highly vulnerable to the geopolitical and environmental evolution of the continent.** Such is the conclusion of our risk analysis report, conducted by the Shift Project, under the supervision of the Ministry of Armed Forces, with the support of the French Electricity Transmission Network company (RTE, *Réseau de transport d'électricité*) and the French Geological Survey (BRGM, *Bureau de recherches géologiques et minières*).

## **Assessment of the vulnerability of future gas supplies to the EU**

The analysis of gas supply risks for the EU, conducted by the Shift Project, a French think-tank working on energy transition, is based on November 2022 data provided by Rystad Energy, a leading business intelligence company.

We compared various **assumptions regarding the evolution of EU demand** with the share of this demand **that might be covered by domestic production** or by ongoing or very likely **medium- and long-term** (> 1 to 2 years) supply **contracts**.

**We attempted to assess the degree of vulnerability of this EU supply pattern.**

*Nota bene: It is normal that a significant part of future demand is not covered by existing contracts. In a normal situation, at any given moment, **about one third of the current demand is covered by spot contracts or short-term contracts (< 1 to 2 years)**. In such contracts, **prices are very sensitive to fluctuations in the immediate balance between supply and demand**. By definition, Rystad Energy's prospective data reveals very few existing short-term contracts. But they provide assumptions of future production volumes likely to be contracted, for short or long term delivery.*

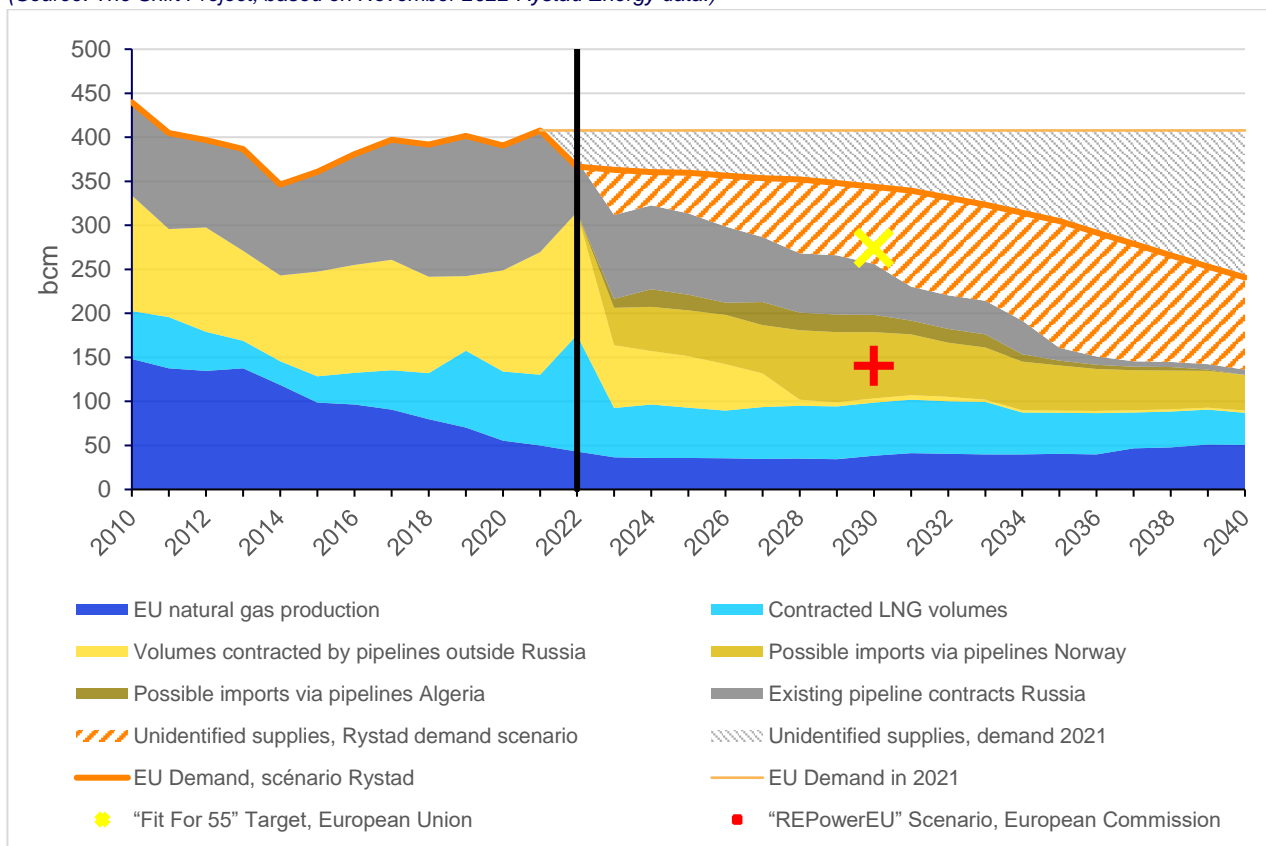
**Should the volumes contracted with Russia fail to be delivered**, the proportion of unidentified supplies would reach 40% of the EU demand by 2025 as expected by Rystad.

If Russian supply volumes were to be quickly restored to the level expected by existing contracts, and if EU demand were to decline significantly, albeit at a slower pace than set by its climate targets, 12% of EU supply by 2025 would remain unidentified, 25% by 2030 and 50% by 2035. Should EU's demand remain at its 2021 level, the proportion of unidentified supplies would rise to a quarter of that demand by 2025 and then to almost a third by 2030.

If the EU members successfully meet their climate commitments pledged under the "Fit for 55" plan, they may significantly reduce their exposure to a partial or total default of Russian supply.

**Figure 1. Comparison of EU demand and supply over the 2010-2040 period.**

(Source: The Shift Project, based on November 2022 Rystad Energy data.)<sup>1</sup>



*In order to assess the unidentified future supply volumes, we added up the projected future EU production, its ongoing import contracts, and volumes potentially available for contracting from Norway and Algeria, via pipeline. The gap between this sum of identified sources and the projected evolution of EU demand provides the estimate of unidentified sources of supply.*

*The EU imports a very large share of its natural gas consumption, with about 70% of imported volumes currently coming via pipeline primarily from three countries: by decreasing order of importance, Russia, Norway and Algeria.*

*Therefore, the unidentified volumes of supply we have estimated might be provided through future contracts on the global LNG market delivered by tanker, or through a hypothetical normalisation of relations with Russia.*

<sup>1</sup> Unless otherwise noted, all graphs in this report were constructed by The Shift Project based on November 2022 data provided by the Norwegian business intelligence firm Rystad Energy. Gas volumes are given in billion cubic meters (bcm). For a given quantity of gas, this unit corresponds to the volume that it would occupy at 15°C and at atmospheric pressure.

We then compared the unidentified supply volumes for the EU and the rest of the world with an estimate of **LNG export volumes available for contracting**: see Figure 2 below. This comparison reflects the **potential level of tension on the global LNG market**, barring any normalisation of relationships with Russia.

## Better contractual coverage of Chinese demand A threat of economic wars over supply

Asia and Europe (outside of Russia) are currently on a par as the two largest global natural gas importers. With a significant growth in the past two decades, China's demand is expected to increase strongly in the near future.

The plausible development of massive new needs in other parts of Asia (India, Pakistan, Thailand, Bangladesh, Indonesia, etc.) during this decade would greatly increase global LNG demand.

The coverage by ongoing long-term contracts of expected future demand appears to be significantly better for China than for the EU.

**Table 1. Rates of coverage by existing supply contracts of gas demand, as expected by Rystad Energy.**

	2025	2030	2035	2040
<b>EU with Russian contracts</b> (with potential new pipeline contracts with Norway and Algeria)	87 %	75 %	53 %	57%
<b>EU without Russian contracts</b> (with potential new pipeline contracts with Norway and Algeria)	61 %	58 %	48 %	54 %
<b>China</b>	100 %	85 %	70 %	63 %
<b>East Asia</b>	95 %	80 %	63 %	52 %

In a tight supply market, the more an importer has to resort to short-term contracts, the more it is exposed to high and volatile prices.

It is a source of concern that fierce supply competition in the LNG market will develop between Western Europe and East Asia, between these two regions and importing developing countries, and finally within the European Union itself. Competition for supplies between importing countries is already very sharp, hurting some vulnerable economies in South Asia and Europe.

In this respect, we should emphasize that the surge in gas prices that marks the beginning of the current energy crisis is not concomitant with the February-March 2022 invasion of Ukraine by Russia, but dates back to the early autumn of 2021, when global demand resumed once the peak of the COVID crisis was over. Moscow managed to seize the opportunity of these structural tensions to impose its pressure upon Europe.

**Supply tensions are likely to grow**, given the expected growth in Asian import needs on the one hand, and the slow implementation of European fossil fuel phasing-out targets on the other. Such prospect confirms the coming of a **geostrategic system systematically operating under energy and material availability constraints**. This is a highly problematic situation for the importing countries.

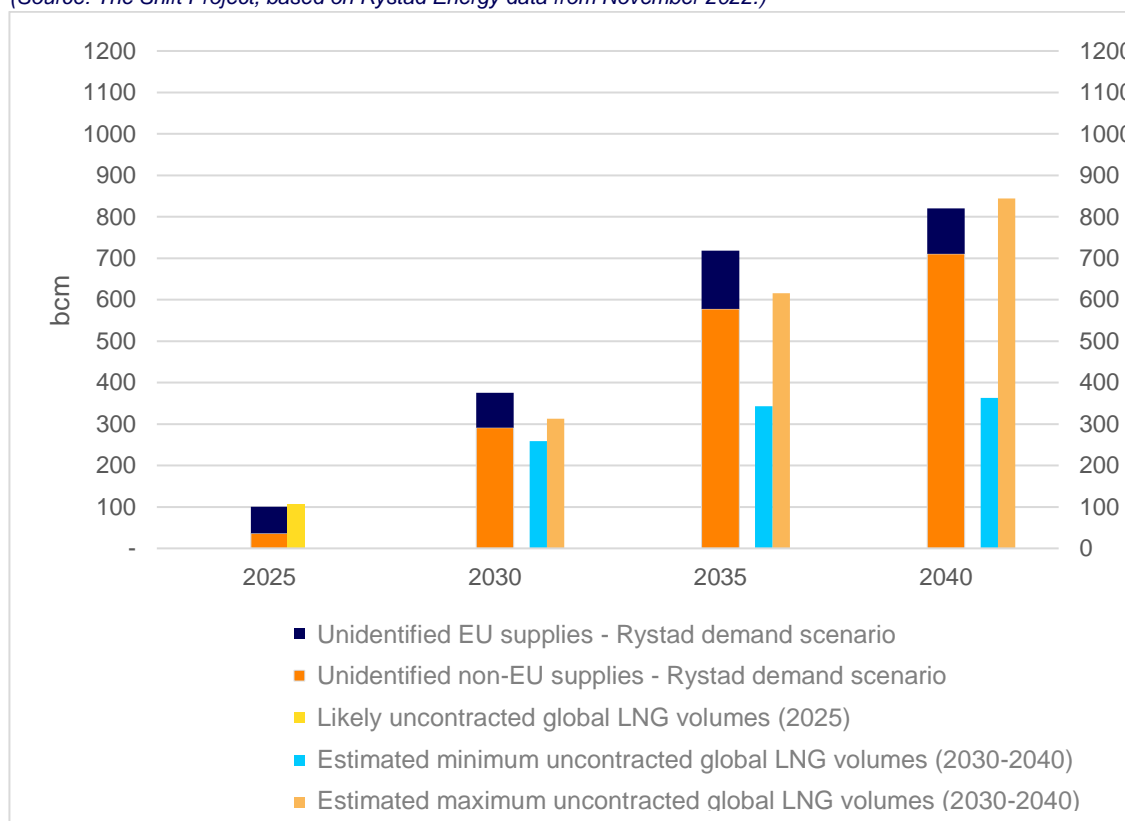
## Potential structural deficit on the global LNG market

A comparison between our estimate of unidentified global supply volumes (EU and non-EU) and future LNG export volumes available for contracting reveals **a highly uncertain situation on the global LNG market by 2025**, followed by **a potential significant mismatch between available supply and currently anticipated demand**.

In the event of a sustained shutdown of Russian supplies, global LNG demand is likely to experience endemic and severe supply shortfalls.

Assuming that Russia’s exports to the EU would be limited to the volume of existing contracts, the overall balance on the global LNG market, which might barely be achieved by 2025, could easily turn into chronic deficits, for example in the event of harsh winters in both Western Europe and Asia, or dry summers in Brazil. Besides, with the indefinite shutdown of the Nord Stream 1 & 2 pipelines, this assumption of compliance with the volume of existing contracts is probably already partially out of reach by 2025.

Figure 2. Comparison between EU and non-EU unidentified future supplies, and the global uncontracted LNG volumes, assuming that existing contracts between Russia and the EU are fulfilled, and following Rystad demand scenario. (Source: The Shift Project, based on Rystad Energy data from November 2022.)



### Fog of war & related uncertainties – Achieving decarbonisation: planning a step towards peace

This report merely aims to outline a risk, and doesn’t claim to predict the future. Obviously, the evolution of the situation in Ukraine and the development of relations between Russia and the EU generate major uncertainties: this report is a snapshot of the situation, with grey areas, and is just as valuable for its “off-camera” part.

The first area of uncertainty lies in the future of overall Russian gas supplies, with the crucial unknown being the fulfilment of current contracts. The situation as of early December 2022 clearly backs the assumption that a significant portion of the volumes contracted between Russia and the EU will not be delivered over the next few years.

This consideration immediately brings up the second source of uncertainty: the extent to which natural gas demand in European economies might be destroyed – whether involuntarily or deliberately. So far, a large part of EU’s industrial and economic model was based on Russia’s significant natural gas

export capacities at reasonable price. This model collapsed, presumably beyond recovery, with the February 2022 invasion of Ukraine.

**The evolution of gas prices**, itself highly uncertain, will be a decisive parameter in this respect. Taking into account the current trends in futures contracts, Rystad Energy, like other sources, expects prices in Western Europe to remain at the current non-standard levels until 2024, before reverting to normal levels around 2025. Beyond that date, these price assumptions include a perpetuation, in long-term contracts, of the strong disadvantage that gas prices in Europe represent vis-à-vis the United States<sup>2</sup>.

The **evolution of prices on spot and short-term contracts**, erratic by nature, promises to be dependent on the extent to which Western European and Asian demand levels are **not covered by long-term contracts**, and on their absolute and relative **solvency**.

The **nature and the extent of the potential destruction of demand** affecting Europe are equally uncertain. The **negative signals** as reported by the daily news happen to be no less numerous nor less significant than the positive ones. Whole sectors of the European industry as well as numerous craft activities are under threat. Peaks are observed in – often unsatisfied – demand for insulation work or heat pumps, while the use of fuel oil and coal is increasing. Unfortunately, in such context, the issue of **greenhouse gas emissions “imported” by LNG** appears to be pushed to the background (LNG transport often generates more emissions than pipeline transport, provided that the pipes do not leak; the opposite is often the case in Russia).

To this date, **the development of natural gas supply in the short, medium and long term** represents another major source of uncertainty. Rystad Energy has significantly raised some of its production forecasts since the beginning of the gas price boom. New discoveries and projects will undoubtedly come on stream, perhaps beyond the assumptions already factored into Rystad Energy’s projections taken into account in the current report.

**Half of the world's conventional natural gas production appears to be "mature" today, and is therefore by definition destined to decline.** This conventional production seems to be **on an undulating plateau since 2010, barely growing**.

Therefore, shale gas producers and large producers of non-mature conventional gas reserves will play a decisive role in meeting growing global demand. Therefore, **the US and Qatar could occupy increasingly dominant positions in the global LNG market**.

Regarding the **identified risk of a supply deficit on the LNG market**, the development of production capacity appears to be the first-order variable governing the future volumes available for export, while the development of **liquefaction infrastructure** appears to be a second-order variable.

Whether an adequate **regasification infrastructure** can be developed to meet the EU’s LNG import needs, will likely remain a factor of uncertainty until at least 2025. Problems with the availability of **LNG tankers, storage capacity and transportation capacity after regasification** can lead to numerous bottlenecks, the identification of which is beyond the scope of this report.

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<sup>2</sup> Overview of price assumptions underlying the projections provided by Rystad Energy (long-term contracts, US\$ / MMBtu) :

**TTF, reference prices Continental Europe**

2023 \$51 ; 2024 \$26 ; 2025 \$12 ; 2026 \$9 ; 2027 \$9 ; 2028 \$9 ; 2029 \$10 ; 2030 \$11 ; 2035 \$12 ; 2040 \$14

**Henry Hub, reference prices, United States**

2023 \$5 ; 2024 \$3,5 ; 2025 \$3,5 ; 2026 \$4 ; 2027 \$4,5 ; 2028 \$5 ; 2029 \$5,5 ; 2030 \$6 ; 2035 \$7 ; 2040 \$7,5

**East Asia LNG prices, reference prices, East Asia**

2023 \$25 ; 2024 \$16 ; 2025 \$13 ; 2026 \$11 ; 2027 \$10 ; 2028 \$10 ; 2029 \$10 ; 2030 \$10 ; 2035 \$12 ; 2040 \$14

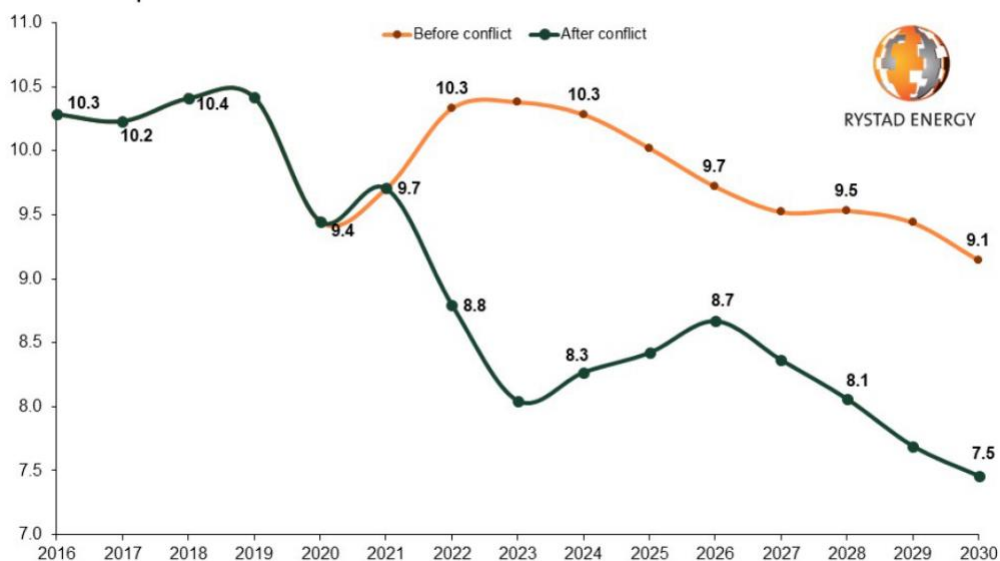
Finally, **the future of Russia's gas production capacity** could itself be a source of uncertainty, as Western investor and technology companies pull out. This issue is equally beyond the report's scope of this report.

In a closely related area, the security of the EU's oil supply<sup>3</sup>, the EU's readiness **to consistently implement the announced boycott of Russian oil remains in doubt at this time**. On the other hand, according to Rystad Energy, there is concern that **Russia's aging oil production capacity is to experience a sharp decline**, also due to the ongoing withdrawal of Western companies and investors.

Figure 3. Scenario of Russia's crude oil production before and after the war: graph published by Rystad Energy in May 2022.

### Russia crude production outlook before and after invasion of Ukraine

Million bpd



Source: Rystad Energy research and analysis; Rystad Energy UCube

Considering the combination of major risks and uncertainties that mark our current hazardous situation a **shift towards an energy- and material-efficient economy, along with the systematic though inevitably constrained development of competitive low-carbon energy sources, represents a crucial challenge for the European Union.**

<sup>3</sup> See also on this subject the two previous reports authored by the Shift Project under the supervision of the DGRIS of the French Ministry of the Army : [« The Future of oil supply in the European Union »](#), May 2021; [« The European Union can expect to suffer oil depletion by 2030 »](#), June 2020.



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**The content, conclusions and views expressed in this report are only those of The Shift Project.**



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**The Shift Project** is a French think tank advocating the shift to a post-carbon economy. As a non-profit organisation committed to serving the general interest through scientific objectivity, we are dedicated to informing and influencing the debate on energy transition in Europe. The exponential development of digital technology, and its potential interactions with the decarbonization targets of our societies, is one of the key issues of the carbon transition.

Our members are large companies that want to make the energy transition their priority.

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