



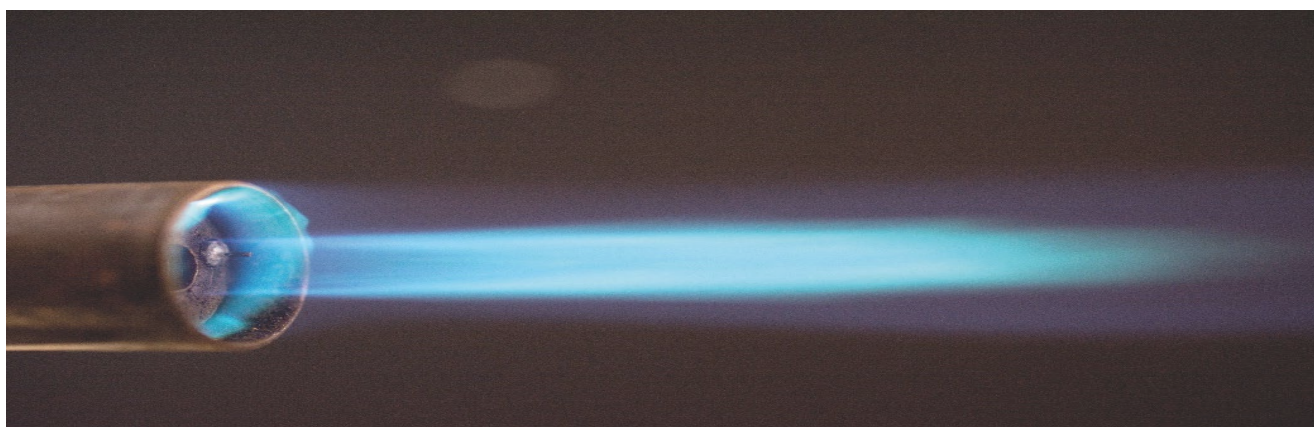
# How much can the Mediterranean region substitute Russian gas supplies to the EU?

*JUNE 2022*

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## INTRODUCTION

Soon after Russia's military attack to Ukraine, there has been fear of a potential energy crisis globally. Since then, extreme fluctuation in natural gas prices driven primarily by security risks in the supply of natural gas from Russia to Europe have become a hot topic.

Several scenarios and plans to cope with a possible curtailment or complete cessation of gas flows from Russia to Europe have been prepared. In general, those scenarios call for accelerating the energy transition and diversifying and ensuring security of supply in the short (until the end of 2022), mid (until 2027) and long term (from 2027 and above).

Whether Russia cutting of gas supplies to Europe (as was witnessed on 27 April 2022 when Gazprom halted gas exports to Poland, Bulgaria and later on some other countries and companies over their refusal to the Russia's proposed ruble payment scheme), or Europe banning Russian gas imports brings about the question how European countries would cope with the loss of Russian gas to meet their energy needs.

This paper presents the options available to the EU to bring gas from alternative supply sources in quantitative terms, with a focus on the role and significance of the South Mediterranean region.



# Importance of Russian supplies to the EU gas markets

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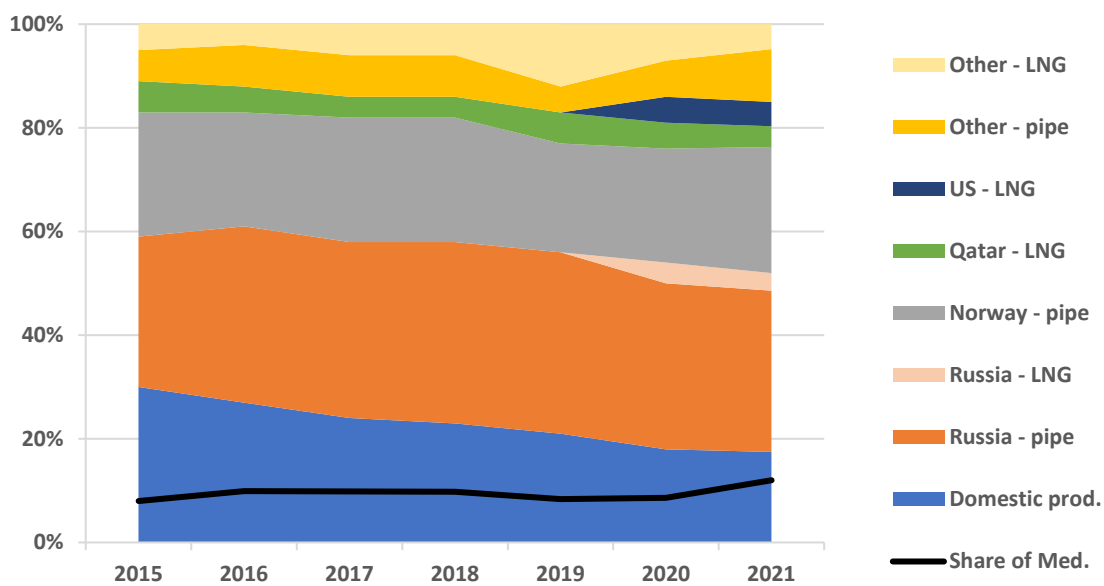
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The EU depends heavily on Russian gas to meet its needs, which is around 400 billion cubic meters (bcm). According to Acer, domestic production accounted for 17% of the EU-27 gas supply in 2021. The shares of gas imports by pipelines and via LNG were 65% and 17% respectively.

Russia accounted for more than a third of the EU gas supply, both by pipelines and via LNG. In physical volumes, this translates into around 155 bcm, according to the IEA.<sup>1</sup> Germany is the biggest gas consumer and importer of Russian gas in the EU.

The share of the Mediterranean region plus Azerbaijan was 12%.

Figure 1: EU gas supply sources



Source: ACER, OME.<sup>2</sup>

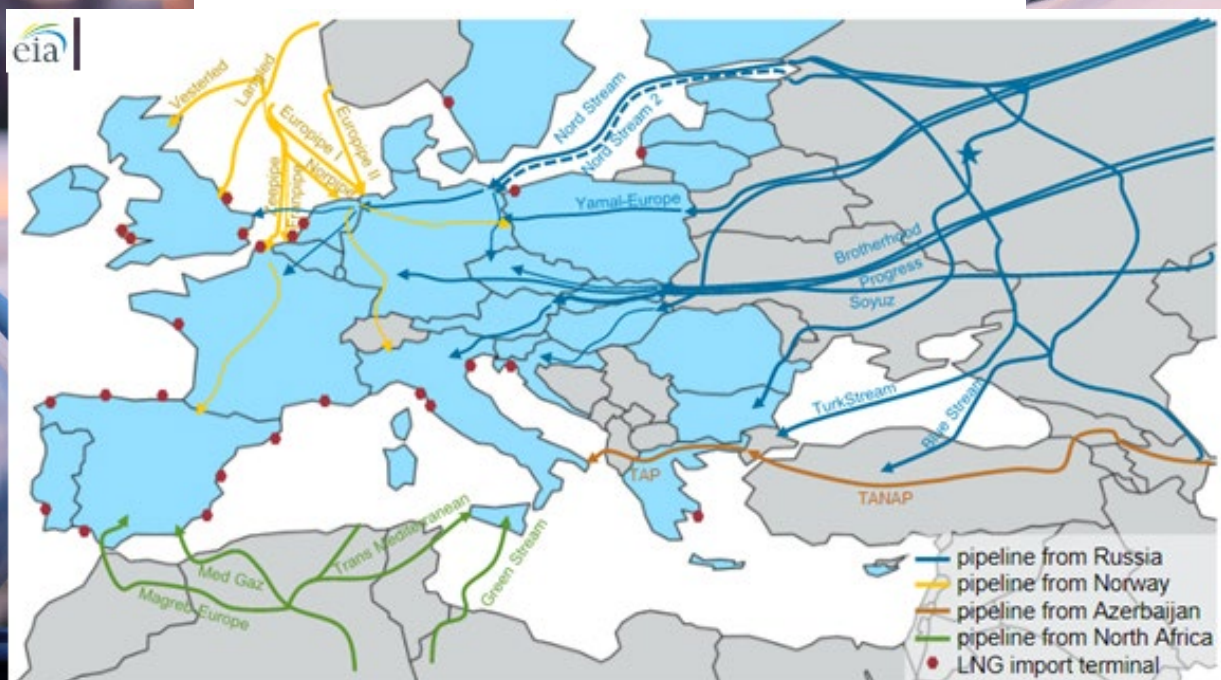
As from the physical gas imports perspective, the percentages change but the order remains: Russia provided around 45% of the EU's total gas imports in 2021 (or some 40% of its consumption). Over the past years, this number has been on average around 40%. The other main gas suppliers to the EU were Norway (23%), Algeria (12%), the United States (6%) and Qatar (5%).

<sup>1</sup> Around 140 bcm by pipeline and 15 bcm via LNG. <https://www.iea.org/reports/a-10-point-plan-to-reduce-the-european-unions-reliance-on-russian-natural-gas>

<sup>2</sup> <https://app.powerbi.com/view?r=eyJrIjoiaWJmYmYwQ4NjctYWlwNC00ZmNjLWl5MmMtODVmOTQ0M2Q5Yml4IiwidCI6ImU2MjZkOTBjLTcwYWUtNGRmYy05NmJhLTAYzjE4Y2MwMDA3ZSIsImMiOjI9>

# Natural gas delivery routes into the EU

Figure 2: Major gas delivery routes into the European Market



Source: EIA (<https://www.eia.gov/todayinenergy/detail.php?id=51258>)



Natural gas is brought to the EU markets from its major supply sources through **four main pipeline corridors and via LNG**.

Russian gas is imported into the EU through several **major pipeline routes**:

**(1)** Two pipelines deliver gas into Central and Western Europe: Nord Stream 1, which extends across the Baltic Sea into Germany; and the Yamal-Europe pipeline (which enters into Europe via Belarus and Poland). The recently completed Nord Stream 2 is likely to remain non-operational as Germany suspended certification of the pipeline for the first time in Nov. 2021, when the operator was requested to set up as a German company, and then in February 2022 in response to Russia's invasion of Ukraine.

**(2)** Legacy pipelines that run through Ukraine. The part of the Ukrainian Gas Transmission System that is involved in gas transit through the country can be divided into corridors: Western Transit Corridor (Soyuz, Urengoy-Pomary-Uzhhorod and Progress gas pipelines); and Southern transit corridor (Yelets – Kremenchuk – Kryvyi Rih, Shebelynka – Dykanka – Kryvyi Rih – Izmail, Ananyiv – Tiraspol – Izmail, Kremenchuk – Ananyiv (AB) and Rozdilna-Izmail gas pipelines).<sup>3</sup> Those pipeline corridors were designed to supply gas to Central and Eastern Europe.

**(3)** Transit through Turkey. There are three natural gas pipelines running from Russia to Turkey across the Black Sea: TurkStream-1, TurkStream-2, and Blue Stream. Of these the TurkStream-2 pipeline supplies Russian gas to Balkan states with onward connections to central Europe while the other two supply the Turkish market.

**(4)** In addition, there are pipelines for direct deliveries to the Baltic states and Finland. Some of the countries who rely primarily on gas deliveries through those pipelines and have limited or no access to LNG imports would be vulnerable to an abrupt loss of Russian supplies. Recently, Finland, Estonia and Lithuania improved interconnections and are about to quit their dependence on Russian gas supplies.

In 2021, Russia delivered 58.1 bcm of gas via Nord Stream 1, 26.5 bcm via the Yamal-Europe pipeline, 37.5 bcm via Ukraine, 12.1 bcm via Turkey (TurkStream-1) to the EU member states of South-Eastern Europe, and 4.3 bcm directly to the Baltic states and Finland (plus another 2 bcm or so for Kaliningrad). A residual 3.7 bcm was delivered to Poland via Belarus. Deliveries via Ukraine accounted for 26% of the 142.2 bcm of pipeline gas that Russia delivered to the European market excluding Turkey in 2021.<sup>4</sup>

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<sup>3</sup> <https://tsoua.com/en/about-us/history/>

<sup>4</sup> <https://www.oxfordenergy.org/publications/quarterly-gas-review-issue-16/>. Russia's 26.5 Bcm deliveries to Turkey were made via the Blue Stream and TurkStream-1 pipelines.

# How can the EU wean itself off Russian gas?





**There are several combinations of alternatives to mitigate the loss of Russian gas.**

The first option to look at is supply diversification. However, since finding alternative supply sources would be extremely difficult to replace the gas volumes imported from Russia, some additional measures would be needed to curtail demand or replace gas by other means. Almost all these will come up with significant costs and uncertainties and will require strong government intervention.

The impact of a loss in Russian gas imports and options for possible remedies have recently been investigated in a range of scenarios by several institutions and experts.<sup>5</sup>



Aurora Energy Research, for instance, has analysed alternative scenarios – from the suspension of Nord Stream-2, to possible disruption in flows through Ukraine, to an extreme case of a total loss of gas supplies from Russia in the short term, next winter. In the extreme case that Russian gas imports cease suddenly, due to a decision by either Russia or European governments, this would leave a gap of over 100 bcm next winter to be met by other sources or demand reductions. Articles by the Atlantic Council take a mid-term horizon, arguing that a reduction of annual

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<sup>5</sup> Main scenarios center around disruption of supplies through Ukraine to disruption of all gas supplies from Russia, among others, see for instance, Frank Umbach, [What if Russia cuts off gas to Europe? Three scenarios](https://www.atlanticcouncil.org/blogs/energysource/rapid-response-the-future-of-european-energy-security/), 14 February 2022; Rapid Response: The future of European energy security, <https://www.atlanticcouncil.org/blogs/energysource/rapid-response-the-future-of-european-energy-security/>, 28 February 2022; Olga Khakova, [DeRussification of European natural gas imports by 55 bcm in 5 years: A three-pronged strategy to reduce, reroute, and reserve supplies](https://auroraer.com/media/reducing-europes-dependency-on-russian-gas/), 7 March 2022; <https://auroraer.com/media/reducing-europes-dependency-on-russian-gas/>; Oxford Institute for Energy Studies Quarterly Gas Review: Impact of Conflict in Ukraine and the Short-Term Gas Markets, February 2022 <https://www.oxfordenergy.org/publications/quarterly-gas-review-issue-16/>

natural gas imports from Russia by 55 bcm in the mid-term, 5 years, will require efficiency, electrification, deployment of renewables and nuclear energy, a ramp up of LNG imports, and optimization of gas storage facilities. These actions are summarized with a three-pronged strategy: reduce, reroute, and reserve.

**The International Energy Agency's 10-Point Plan**, spanning gas supplies, the electricity system and end-use sectors, is estimated to result in the EU's annual call on Russian gas imports falling by more than 50 bcm within one year, which is equivalent to more than one-third of Russian gas supplies to the EU in 2021. If the EU were to take these additional steps, then near-term (IEA does not precise what the time span it entails) Russian gas imports could be reduced by more than 80 bcm, or well over half.

On 8 March 2022, **the European Commission proposed an outline of a plan (REPowerEU)**<sup>6</sup> to make Europe independent from Russian fossil fuels well before 2030, starting with gas. REPowerEU seeks to diversify gas supplies, speed up the roll-out of renewable gases and replace gas in heating and power generation. This could reduce EU demand for Russian gas by two thirds before the end of 2022.

The EC plan is based on two pillars: (1) diversifying gas supplies, via higher LNG and pipeline imports from non-Russian suppliers, and larger volumes of biomethane and renewable hydrogen production and imports;<sup>7</sup> (2) reducing faster the use of fossil fuels by boosting energy efficiency, increasing renewables and electrification, and addressing infrastructure bottlenecks. Those measures are expected to gradually remove at least 155 bcm of fossil gas use, which is equivalent to the volume imported from Russia in 2021.

The EC put forward a detailed REPowerEU plan on 18 May 2022.<sup>8</sup> Contrary to the proposed outline in March 2022, this plan does not specify clearly the timing of the targets. Short-term mostly refers to as soon as possible/before the end of 2022, medium-term refers to before 2027, and longer-term until 2030 or by 2027 & beyond.

The EC plan targets importing 50 bcm more non-Russian LNG (e.g., from Qatar, USA, Egypt, West Africa) and 10 bcm more in pipeline gas imports from diverse sources

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<sup>6</sup> Communication on REPowerEU: Joint European Action for more affordable, secure and sustainable energy, COM(2022) 108 final, 8 March 2022, [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_1511](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1511)

<sup>7</sup> The REPowerEU Plan prepares the ground for achieving both the increased target of 10 million tonnes of domestic renewable hydrogen production and 10 million tonnes of renewable hydrogen imports by 2030 which can replace approximately 27 bcm of imported Russian gas by 2030. Under the action plan, the EC promotes co-operation with neighboring and accession countries, and supports the development of three major hydrogen import corridors by 2030 via the Mediterranean, the North Sea area and, when the conditions allow, with Ukraine. It also aims to achieve 35 bcm of annual bio-methane production by 2030 to save 17 bcm of gas imports. See, Biomethane Action Plan, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD%3A2022%3A230%3AFIN&qid=1653033922121>

<sup>8</sup> [https://energy.ec.europa.eu/communication-repowereu-plan-com2022230\\_en](https://energy.ec.europa.eu/communication-repowereu-plan-com2022230_en)

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(e.g., Azerbaijan, Algeria, Norway), promoting implementation of PCI projects to address missing EU interconnections and to end energy isolation (for Ireland and Cyprus).

The other measures would make up the rest.<sup>9</sup> In this sense, the EC has already engaged or is expected to engage with a range of partners around the world to diversify supplies of gas through pipelines or through LNG, including the US, Norway, Qatar, Azerbaijan, Algeria, Egypt, Korea, Japan, Nigeria and Israel.

In sum, almost all possible remedies scenarios could in fact be separated into two parts – one is the possibilities to replace some Russian gas volumes by domestic resources and non-Russian supply sources; and the other is compensating parts of the missing volumes through demand management measures and switching to alternative fuels. Our focus in this article is the first part, with a particular attention to the role of South Mediterranean countries.

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<sup>9</sup> Reducing demand by 20 bcm by adding 480 GW of wind power capacity and 420 GW of solar capacity and eliminating 14 bcm with energy efficiency measures. The rest of the measures would replace or reduce another 7.5 bcm of gas demand.

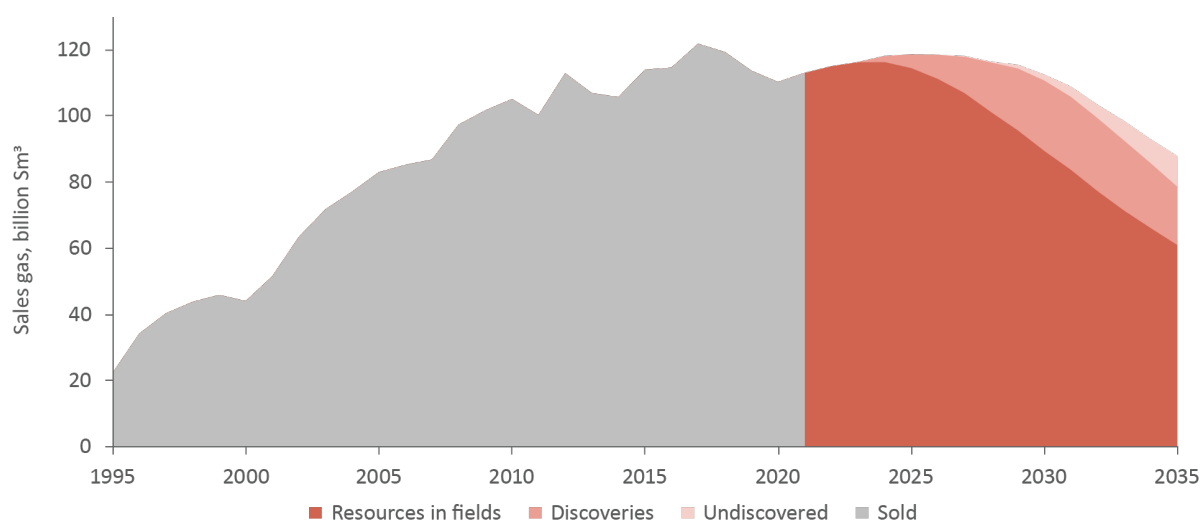


# An overview of alternative gas supplies

There are **three ways to replace gas supplies from Russia** with physical volumes of gas –from domestic sources, by additional withdrawals from storage, and by increasing imports from alternative supply sources, i.e., the global LNG market and additional pipeline imports from non-Russian other suppliers.

**Increasing domestic gas production** in the EU would be quite challenging simply because the gas production is already in terminal decline. A possible short-term increase in the Netherland’s Groningen gas field would not bring additional gas into the EU total gas production, as we need to take into account the natural decline in the other fields in the EU. Similarly, withdrawals from storage facilities in the EU would not provide a remedy because they are already at very low levels and need to be filled in before the upcoming winter season. However, in some countries, for instance Italy, the revamping of the development of domestic gas resources could contribute to compensate existing mature declines and add some volumes in the medium term. This is why all attention is paid to how much gas could be additionally imported into the EU from alternative non-Russian sources and routes.

**Figure 3: Expected volumes of gas production from Norwegian fields**



Source: The Norwegian Petroleum Directorate (<https://www.norskpetroleum.no/en/production-and-exports/exports-of-oil-and-gas/>)

The first place to look at is the **EU’s second largest gas importer – Norway**. Pipeline gas supplies from Norway appear to be running already at full capacity. Since gas export capacity could not be increased further via pipelines, the other way to import gas from Norway is LNG, mainly to terminals in Europe. However, Norway did not export any LNG since a fire broke out at Equinor’s Hammerfest LNG plant at Melkøya (also known as Snøhvit LNG) in September 2020. As a result, there has been no production from Snøhvit field in the Barent Sea since then. The restart of the 4.3 Mtpa Hammerfest LNG plant took place in May 2022. If all goes as planned, it is reasonable to expect an increase of gas imports at around 6 bcm both by

pipeline and LNG from Norway to the EU by the end of 2022. Although more than half of all undiscovered resources in Norway is located in the Barents Sea, in the medium-long term perspective there is policy uncertainty over the development of the Norwegian Barents Basin. Moreover, since Norwegian gas production is expected to peak in the next few years and decline afterwards, the EU will need to search for alternative sources, this time to replace the lost gas imports from Norway as well.

**LNG imports** into the EU have already risen sharply since late 2021 as some of the LNG supply constraints in 2021 began to unwind and demand growth from Asia and elsewhere in the world eased (lockdowns and greater gas pipe flows in China). Significantly higher prices in European markets compared to Asian prices have been instrumental in attracting cargoes to Europe. For these reasons, the heavy reliance on LNG as the savior to reduce or eliminate reliance of the EU on Russian gas has attracted much attention.

Indeed, despite hyped expectations, the scope for greater LNG imports into the EU within one year appears limited, even though the EC's plan foresees 50 bcm of incremental LNG imports. In an already tight global LNG market it would be extremely challenging to divert that many cargoes from other markets to EU markets because of available global production and export capacity,<sup>10</sup> availability of destination flexible cargoes, regasification capacity in the EU (the LNG terminals seem to be currently running at or very close to full available capacity) and the connectivity of LNG import facilities to pipelines in order to get the gas where it is needed most, in addition to the costs due to possible competition between Asian and European markets. What more, additional risks such as exposure to maintenance, weather conditions and security risks as well as to the implied price volatility given by the global market are not adequately addressed.

The EU-27 currently has a total annual LNG import capacity of 160 bcm, according to GIIGNL data.<sup>11</sup> Since September 2021, LNG imports grew significantly, doubling in January-February 2022 year-on-year mainly because of lower pipeline imports, especially from Russia (which was reluctant to supply additional gas above long-term contractual volumes). LNG imports reached a new record high in April 2022 in response to high European gas hub prices, driven by strong demand to fill storages and fluctuation in Russian pipeline flows. While the 2021 average utilisation rates at regasification plants stood at less than 50%, in April 2022 the system was stressed to work above 80% levels. Although this might give the impression that

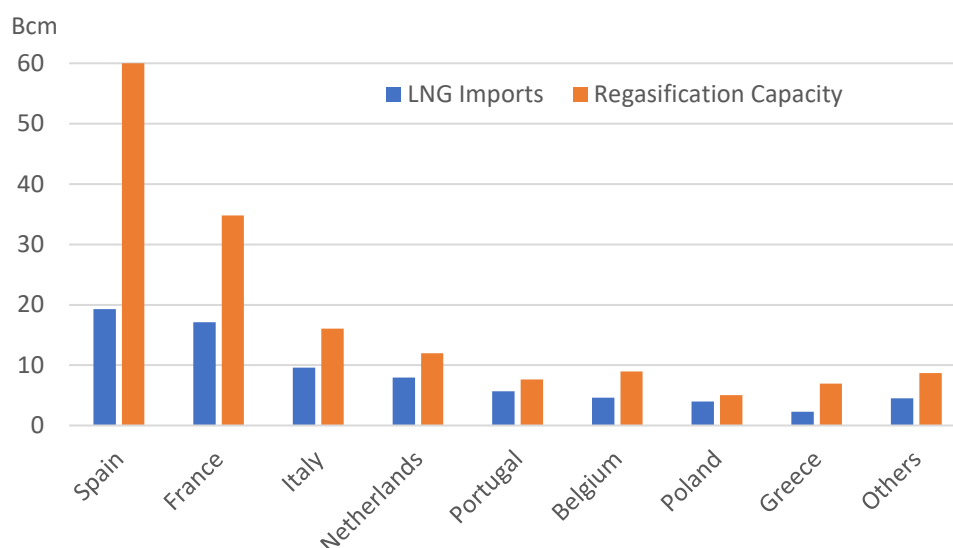
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<sup>10</sup> As stated in OIES study, there is little scope for increasing the amount of LNG available on the global market in 2022. There is more scope in 2023 as more LNG supply comes on. The increase in European LNG imports, therefore, almost all comes from diversions from other countries in Asia.

<sup>11</sup> GIIGNL 2022 Annual Report, 5 May 2022, [https://giignl.org/wp-content/uploads/2022/05/GIIGNL2022\\_Annual\\_Report\\_May5.pdf](https://giignl.org/wp-content/uploads/2022/05/GIIGNL2022_Annual_Report_May5.pdf)

there is some spare capacity to import more LNG into the EU, in practice, this may not mean much if lack of interconnection with neighboring countries hinders to ease the shortfall elsewhere in Europe.

**Figure 4: European regasification capacity vs. 2021 LNG imports**



Notes: Imports are net of re-exports. El Musel terminal in Spain (6.9 bcm annual capacity) is mothballed and therefore not taken into account in the total.

Source: OME based on GIIGNL 2022 annual report.

Spain is the best example: The bulk of EU-27 regasification capacity is in Spain (37%). As can be seen from the figure above, in 2021 Spain imported almost 20 bcm, well below its regasification capacity of 60 bcm. More LNG could be imported into Spain (in April 2022, imports reached new heights surpassing 50% of utilisation rates, according to Enagas) but the limited interconnection capacity from Spain to France constrains the use of Spanish regasification capacity for imports to other European countries.

If market integration between France and the Iberian Peninsula could be enhanced, additional gas could enter the Northern and Central Europe from the Western Mediterranean through the capacities between France at its Northern borders. The project MidCat (Midi-Catalonia) and its first step project STEP (South Transit Eastern Pyrenees), both aimed to increase interconnection capacity between France and the Iberian Peninsula. Those two projects were part of the 3rd PCI list issued in 2017. However, in 2019, the National Regulatory Authorities of Spain and France decided that the concept was not yet mature and both France and Spain opposed the inclusion of new gas projects in subsequent EU lists of projects of common interest.<sup>12</sup> It was also considered expensive, invasive for the environment

<sup>12</sup> [https://www.europarl.europa.eu/doceo/document/P-9-2022-000910-ASW\\_EN.pdf](https://www.europarl.europa.eu/doceo/document/P-9-2022-000910-ASW_EN.pdf)

and not essential to the gas supply of France and Europe.<sup>13</sup> Therefore the project was abandoned in 2019. After the recent challenges facing the European gas market as the conflict in Ukraine escalates there are signs that the project could be reconsidered especially if it is used for hydrogen. Another project recently also considered is an undersea pipeline linking Spain and Italy.<sup>14</sup> None of those projects can be realised in the short term.

Excluding Spain and Portugal in the Iberian Peninsula will leave the EU with about 40 bcm of available spare capacity. This suggests that at best, even one assumes 100% utilisation of regasification plants, the EU would be able to increase LNG imports by a similar number, which falls far short of the volumes imported from Russia in 2021. Besides, the EU will need to compete aggressively for these volumes.

As the EU is determined to diversify away from Russian gas since March 2022 it is highly likely that more investment will flow in regasification infrastructure in Europe. Germany has already announced plans to build two to three LNG import terminals. Italy is right behind in terms of the magnitude of the future regasification projects, with up to 16-24 bcm LNG import potential. Likewise, France, Poland, Greece, the Netherlands can accelerate LNG import terminal deployment. However, it will take some time and will not help any shortfalls in Russian gas flows this year. Besides, the new entering points and routes will require a rapid reconfigurations of gas flows within the European gas network through expansion of some transmission capacities, additional interconnection projects and storage facilities.

This brings us to the South Mediterranean region which can help replacing a significant part of Russian gas in the EU gas supply in the short, mid and longer term.

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<sup>13</sup> <https://pgjonline.com/news/2022/march/france-spain-in-talks-to-resume-construction-on-midcat-gas-pipeline-project>

<sup>14</sup> Snam/Enagas signed MoU May 2000, <https://www.reuters.com/business/energy/snam-signs-deal-with-enagas-study-spain-italy-gas-pipeline-2022-05-12/>



# How much help can the South Mediterranean region offer?

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The South Mediterranean region holds the EU's other traditional pipeline gas suppliers and has a bridge to Caspian gas suppliers. In the Mediterranean region, the EU has three traditional suppliers (Algeria, Libya and Egypt). Azerbaijan has become another pipeline gas supplier to the EU at the end of 2020. Gas supplies from Azerbaijan to the EU is transited through a Mediterranean country, Turkey. Besides, another Mediterranean country, Israel, is a potential source of additional gas in the short, mid and long term. The question is whether they could help protect the EU from potential gas shortages and how much in quantitative terms. Except for Libya, all those suppliers have already expressed a willingness to increase their natural gas exports to the EU.

**Algeria** is the EU's third-largest gas supplier, after Russia and Norway. Algerian gas exports rose by 43% in 2021 to a decade-high around 55 bcm, with more than 80% going to Europe.

There are **three cross-border gas pipelines connecting Algeria's gas fields to Europe**.

- The **Trans-Mediterranean gas pipeline** (Algeria-Tunisia-Italy) with a 33.0 bcm/y capacity. In 2020, almost 12 bcm of gas were exported to Italy through this pipeline. In 2021, it is estimated at over 21 bcm.
- The **Gas Maghreb Europe (GME) pipeline** (Algeria-Morocco-Spain-Portugal) with 12.0 bcm/y capacity: Gas exports from this line in 2020 were 3.67 bcm. In 2021, they were increased to 6 bcm. As the contract for the pipeline between Algeria and Morocco came to an end on 31 October 2021 and was not extended,<sup>15</sup> no more gas is delivered through this line.
- The **Medgaz gas Pipeline** (Algeria – Spain) with 10.0 bcm/y capacity. In 2020, 5.39 bcm of gas was exported to Spain/Portugal. In 2021, exports through Medgaz were estimated at 8.1 bcm.

Looking at these gas pipeline connections with large nominal capacities to Italy and Spain and its proximity to Europe in terms of LNG supplies, there are significant opportunities for Algeria to increase gas supply to its customers in Europe.

The Medgaz pipeline capacity is currently fully used (it runs above capacity at 11 bcm/y), while there are no signals that the GME pipeline will be used as in the past. In such case, no additional pipeline gas deliveries to Spain from Algeria can be envisaged. On the other hand, deliveries through the Trans-Mediterranean gas pipeline, which has almost 10 bcm of spare capacity, could potentially be increased. In addition, Algeria could potentially increase LNG deliveries to its European customers. Algeria has a large LNG export potential, with a nominal capacity of

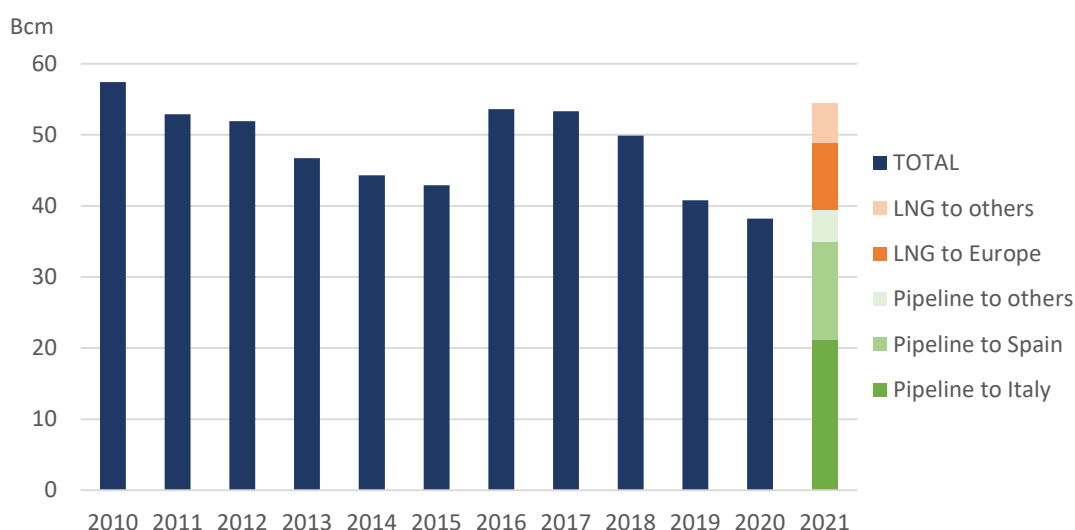
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<sup>15</sup> <https://www.reuters.com/world/africa/algeria-end-gas-supplies-morocco-supply-spain-directly-sources-2021-10-25/>

almost 33 bcm per year. About half of that (17.9 bcm) remained unutilized in 2021. Therefore, currently there is a large underutilized or unutilized gas export capacity in Algeria (a part of capacity is unavailable, off service). In 2021, Algeria supplied some 1.2 bcm of LNG to Italy.<sup>16</sup> Most of these volumes are under term contracts but some supplies are also sold spot.

The question is whether Algeria can rump further up exports to its customers in Europe. This will depend on two factors – production and domestic consumption. Although several new upstream gas startups over the past two years pushed Algeria’s gas production to a record 100 bcm for 2021, domestic consumption has also soared over time reaching today about 45% of production.<sup>17</sup> There are further significant gas resources available in the country that require higher level of activity, gathering infrastructure and advanced technology. If annual gas consumption growth rate continues at its current pace (around 5%), that could limit the volumes available for exports. According to Platts Analytics, Algeria could provide an additional 7 bcm of gas to Europe in 2022, largely through higher shipments via the Transmed pipeline.<sup>18</sup> In April 2022, Eni has signed an additional supply agreement gradually providing increasing volumes of gas from mid-2022 (3 bcm/y) up to 9 bcm/y in 2023-24. In the mid to longer term, more gas volumes could be made available for export. Besides increasing exploration and production, this could be achieved by reducing gas flaring, replacing gas with alternative fuels for domestic consumption, reducing gas reinjection for oil production, and increasing renewables for power generation.

**Figure 5: Algeria gas exports**



Source: MEES, OME

<sup>16</sup> Italy is Algeria’s largest gas customer and unlike Spain, it is much more reliant on Russian gas.

<sup>17</sup> MEES, 4 March 2022, p6.

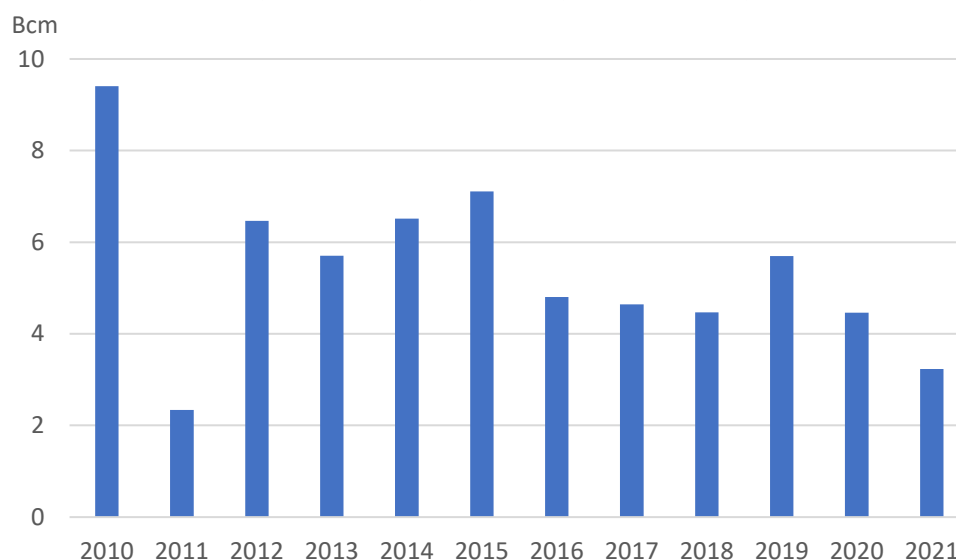
<sup>18</sup> <https://www.spglobal.com/commodity-insights/en/market-insights/latest-news/energy-transition/012822-as-europe-seeks-alternatives-to-russian-gas-algeria-has-pipeline-capacity-to-spare>.

In summary, in the best case some 10 bcm of additional gas could potentially be exported into Europe if the spare capacity in the Transmed pipeline is fully utilized. More could be achieved via underutilized LNG capacity if domestic production consumption balance permits.

The expectations from *Libya* are less ambitious, as the country's gas exports have been recently quite unstable. The local market is served with priority, while the remainder gas volumes are exported to the Italian market via the 11 bcm/y Greenstream pipeline, with exports averaging 4.4 bcm in 2020. In 2021, exports decreased sharply to 3.2 bcm, the lowest annual figure since 2011.

This leaves nearly 7 bcm of unutilized gas capacity for exports from Libya to Europe. In addition, the 2011 revolution in the country, followed by civil war and political instability have put obstacles to Libyan NOC and foreign companies to develop next generation gas projects leveraging on significant resource endowment, especially in the offshore basins.

**Figure 6: Libya gas exports to Italy**



Source: SNAM, OME

*Egypt* is another country in the South Mediterranean that could help Europe. Increasing gas production in the country after start up of production from Zohr and other fields, combined with subdued domestic demand allowed Egypt to achieve a natural gas surplus and become again a gas exporter in 2019. Egypt achieved record LNG exports in 2021 which hit a 10-year high of about 9 bcm (almost 7 million tons), meaning that there could still be about 8 bcm of unutilized LNG capacity in the country.

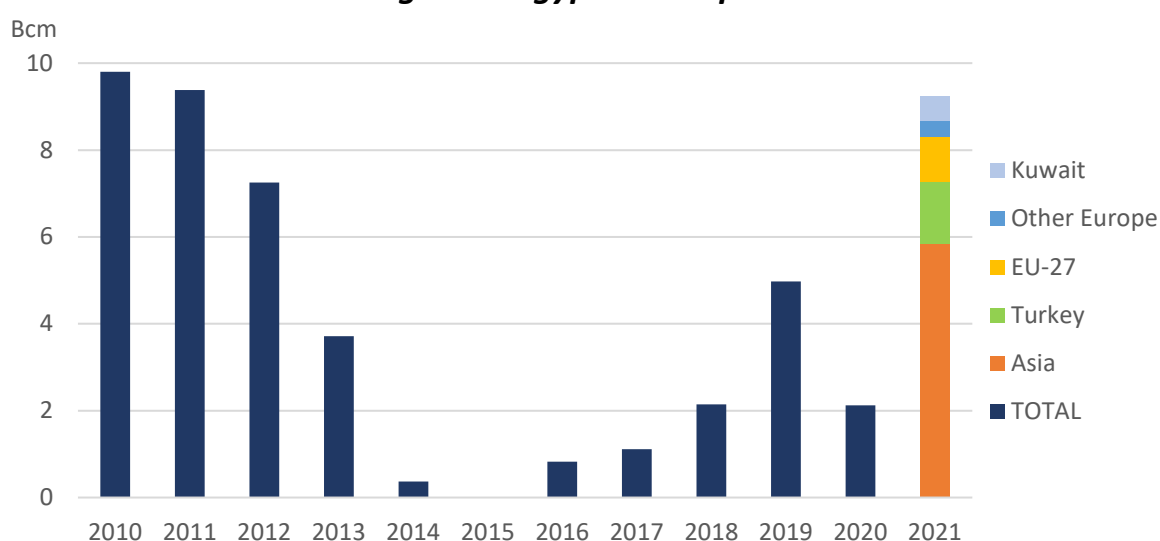
Egypt's gas production is estimated to surpass 70 bcm in 2021 thanks to the near full capacity production from the Zohr field and the start of the production in the

Raven field in April 2021. On the exploration front, new blocks awarded between 2018 and 2021 will hopefully succeed to find additional resources to replace the decline of production in maturing fields and increase the country's gas production in the near future.

Since Egypt is not connected to Europe by gas pipelines, its exports to the EU can only be in the form of LNG, and there is a big potential for Cairo to increase its LNG exports, leveraging on the spare capacity at the existing plants. In 2021, more than half of Egypt's LNG was sold to China and Turkey. LNG exports from Egypt to the EU-27 plus the UK were estimated at over 1 million tons, or 1.4 bcm in 2021. More LNG cargoes could be destined to the LNG terminals in the EU member States in 2022 and following years. Since LNG from Egypt is mainly sold in spot market this will depend on whether European market is attractive pricewise. Under current market conditions this is the case: much will depend on how the market will evolve in the future, considering that Egypt is already exporting, 9 bcm in 2021 to Europe, accounting for more than 50 percent of the total export potential. If attractive, even cargoes under long-term supply contracts could be renegotiated and diverted to the EU markets.

In addition, Egypt imported some 4 bcm of gas from Israel in 2021. Gas deliveries from Israel are slated to increase starting from July 2022 as the current contractual agreement stipulates. To further increase gas imports from Israel to Egypt, domestic pipeline bottlenecks and alternative routes are being assessed.<sup>19</sup>

**Figure 7: Egypt LNG exports**



Source: MEES, OME

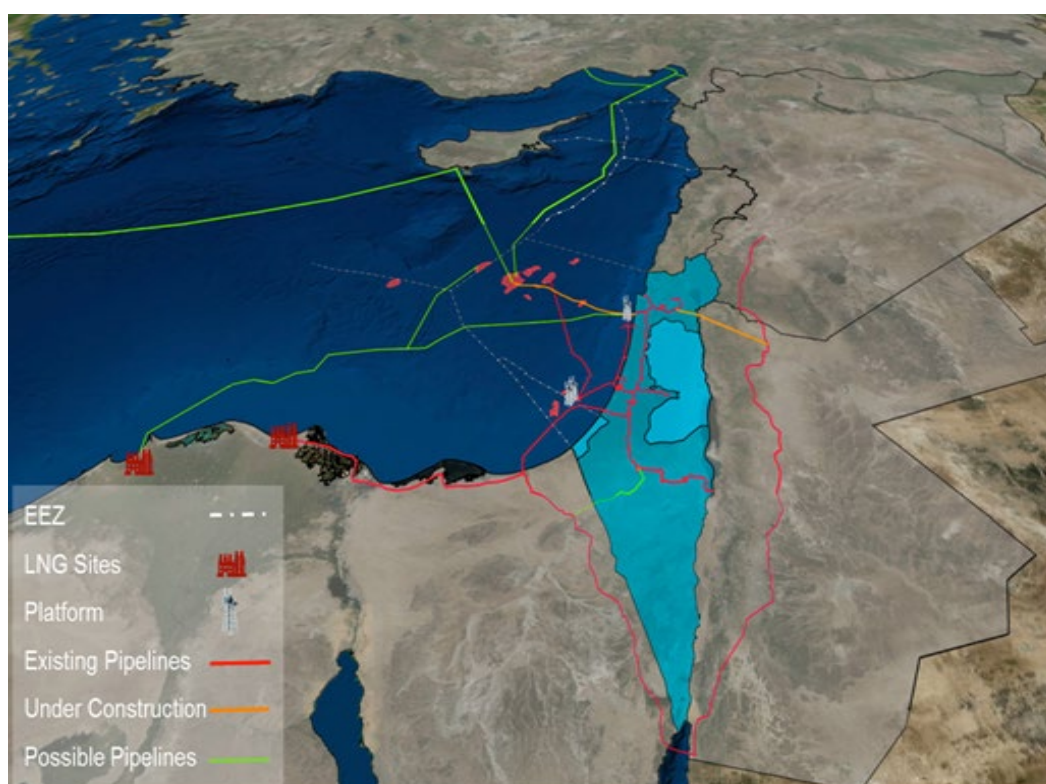
<sup>19</sup> MEES, 11 March 2022, pp 4-5.

**Israel** will likely play an important role to fully utilize the LNG export capacity in Egypt,<sup>20</sup> together with the increases in Egyptian domestic gas production.

Expanding the production capacity in the Leviathan field in Israel from 12 bcm/y to approximately 24 bcm/y and channelling the incremental production (in full or in part) from the field to Egypt's currently under-utilized LNG plants (by a new offshore pipeline tying back the Leviathan platform) is an option under consideration. It is not only the Leviathan partners that considers Egypt's LNG facilities for their excess production.

In December 2021, Energean signed a MOU with EGAS for the sale and purchase of up to 2 bcm/y of natural gas on average for a period of 10 years, commencing with initial volumes of up to 1 bcm/y. This also represents a commercialisation option for possible gas resources discoveries in the 2022/23 Israel drilling campaign.<sup>21</sup> Moreover, if a final investment decision will be taken for the development of the Aphrodite field in **Cyprus** by the field's partners and produced gas from the field is directed to Egypt's LNG plants, then the volume of LNG exports from Egypt could have longer duration with near full capacity. All these are in line with OME's estimate for Egypt's export potential approaching 20 bcm in the early 2030s.<sup>22</sup>

**Figure 8: export options from Israel**



Source: NewMed Energy

<sup>20</sup> On 15 June 2022, a memorandum of understanding between the EU, Egypt, and Israel was signed to increase gas exports to Europe, [https://energy.ec.europa.eu/eu-egypt-israel-memorandum-understanding\\_en](https://energy.ec.europa.eu/eu-egypt-israel-memorandum-understanding_en).

<sup>21</sup> Energean Annual Report 2021, April 2022.

<sup>22</sup> OME, Mediterranean Energy Perspectives to 2050, Paris, 2021.

There are other plans and ongoing projects for increasing the production capacity in Israel. These include expanding production capacity in the Tamar field from 11 bcm/y to 16 bcm/y and start of production from the Karish, Karish North and Tanin fields with a capacity of over 8 bcm/y. Those additional volumes would exceed the existing LNG infrastructure capacity in Egypt, and hence call for the realization of new gas export solutions like additional liquefaction capacity at the existing LNG plants, new grassroots LNG plants, or direct pipeline connections to the European markets, such as the Eastmed-Poseidon Pipeline (PCI project), depending on the size of the available gas surplus in Israel, the role that gas will play over time as a bridge fuel and, last but not least, the evolving relations in the region.

In addition to using the LNG facilities in Egypt, the Leviathan partners are working to develop an FLNG (floating LNG) facility for the Leviathan project.<sup>23</sup> If FLNG or a pipeline project from Israel is realised, then gas exports from Israel to the markets in Europe could be further increased in the mid to longer term.


Another country to alleviate the possible gas supply crisis of the EU is **Azerbaijan**.

The Southern Gas Corridor project to bring gas from the Caspian region to Europe through Turkey has become a reality on 31 December 2020, when the flow of gas through the Trans Adriatic Pipeline (TAP) pipeline, which is the extension of TANAP pipeline, has begun. The capacity of TAP is 10 bcm/y. The pipeline transported 8.2 bcm of gas to Europe in 2021. Of this, over 7.2 bcm reached Italy, while approximately 1.0 bcm was delivered to Greece. The full capacity of TAP will be achieved in 2022 carrying 10 bcm of gas to Europe each year, with 8 bcm of that volume going to Italy. The market test to double the capacity of TAP and evaluation to fill the additional 10 bcm by the gas originating from Azerbaijan's own production is ongoing. The integrated capacity doubling project requires substantial investments with a time to market between 3-4 years.

Another country in Caspian, **Turkmenistan**, can provide a big help to increase gas supplies from Caspian region to Europe. Abundant Turkmen gas resources could be connected to Azerbaijan through a new pipeline to be built across the Caspian Sea. The project has been on the table for decades. In this regard, the Memorandum of Understanding signed in January 2021 represents a first step towards the development of the straddling offshore fields and opening the discussions on the Turkmen gas flows to EU via Azerbaijan. Another possibility to transport Turkmen gas to Europe could be through Iran. In all cases, as a Mediterranean country, Turkey will play a key role in the transit of natural gas from the Caspian Sea region to the EU.

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<sup>23</sup> NewMed Energy 2021 Annual Report, March 2022.

A close-up photograph of industrial machinery, likely a gas valve or wellhead. The main components are painted blue, with large, curved handles painted a reddish-brown color. A circular pressure gauge with a white face and black markings is visible on the right side. The background is a bright, cloudy sky. A white rectangular box with a yellow border is centered over the image, containing the text.

# Concluding Remarks



If the natural gas that the EU currently receives from Russia is cut off, limited options are available to make up for the physical gas shortfall. The EU would be hard pressed to compensate for the loss of imports from Russia in full. Only a very small part, a few bcm, of the lost supply could be replaced with additional production in the EU and by stock withdrawals. Besides, gas storage in the EU could run down fast and leave the EU with a very difficult situation in the coming winter.

The European Commission's proposed plan, REPowerEU, aims to replace two-thirds of Russian gas imports of 155 bcm by the end of 2022 and fully by the end of 2027. Large volumes of gas are needed to be brought to the EU from elsewhere by pipeline and LNG imports. The EC estimates that 60 bcm of Russian gas can be replaced physically by diversification of supply sources – 50 bcm via LNG and 10 bcm by pipelines - both in the short and mid-term. It will be a big challenge for the EU to acquire those volumes within the targeted time frame.

LNG can, to some extent, be diverted from Asia but only in limited amounts and with price premium. Importing more LNG from the U.S. and other major suppliers may in theory be possible provided that the price remain attractive. Even then this option would put additional pressure to regasification facilities in Europe that are reaching their practical upper limit, mainly due to the gas pipeline infrastructure bottlenecks especially from Spain, which holds a third of the EU LNG regasification capacity, to the other parts of the EU. As for the pipeline gas, there is only limited potential additional supply available from the EU's second largest gas supplier, Norway. This is why, other non-Russian gas suppliers in the vicinity of the EU have become more and more important.

South Mediterranean countries like Algeria, Egypt, Libya, Israel as well as the Mediterranean neighbor Azerbaijan can play a fundamental role in alleviating the energy crunch in the EU. Those countries have a large potential to compensate any partial or complete curtailment of Russian gas supplies to the EU, particularly in the mid-term.

In the short term, until the end of this year, several initiatives and agreement will allow increasing gas supplies from Mediterranean region and Azerbaijan to the EU; will likely increase by at least 6 bcm (3 bcm from Algeria, 3 bcm from Egypt and the rest from Libya). In addition, incremental flows from Azerbaijan (1.8 bcm) will reach agreed plateau level, to its full capacity.

However, this figure could potentially reach up to 50 bcm in the mid to longer term (9 bcm or more from Algeria, 8 bcm from Libya, 8 bcm from Egypt, 8 bcm or more from Israel, 10 bcm or more from Azerbaijan/Turkmenistan, and additional LNG from the region). This amount, representing almost one third of the gas imported

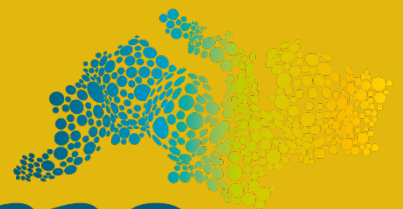
by the EU from Russia in 2021, is neither small, nor negligible. To realise those volumes will require overcoming several infrastructural and political challenges.

For the above-mentioned potentials to be achieved, there is need for a better coordination and cooperation between the EU and south Mediterranean region. To this end, the EU aims, before this summer, to conclude a trilateral agreement with Egypt and Israel on supplying Europe with LNG. In addition, the EU will aim to restart the energy dialogue with Algeria and will intensify cooperation with Azerbaijan in the light of the strategic importance of the Southern Gas Corridor.<sup>24</sup>

Being the Voice of the energy industry and a Think Tank of reference in the Mediterranean region, and also serving as the secretariat of the Union for the Mediterranean Gas Platform, OME will continue to promote such regional cooperation and dialogue allowing a more secure, transparent and integrated gas market in the Euro-Mediterranean region.

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<sup>24</sup> EU external energy engagement in a changing world, JOIN(2022) 23 final, 18 May 2022, [https://energy.ec.europa.eu/joint-communication-eu-external-energy-engagement-join202223\\_en](https://energy.ec.europa.eu/joint-communication-eu-external-energy-engagement-join202223_en)



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