Zero Carbon Analytics

Briefing · June 2024

Existing gas supplies to meet EU demand under 2040 emissions target

Key points:

- EU gas demand is forecast to decline by 66% from 2023 levels to 117 billion cubic metres (bcm) of gas per year if the EU reduces greenhouse gas emissions by 90% by 2040, as proposed by the European Commission.
- Existing gas fields in the EU, Norway and Algeria and already agreed long-term contracts are expected to supply the EU with 118 bcm of gas in 2040.
- As a result, no new gas extraction projects or additional gas supply contracts would be required to meet EU gas demand in 2040. Any further expansion of gas production would threaten the Paris climate agreement goals.
- The EU would have 244 bcm of spare liquified natural gas (LNG) import capacity in 2040, with terminals running at just 19% of capacity. Despite this huge overcapacity, 19 bcm of new LNG import capacity is due to start operation in the EU between 2026 and 2030.
- LNG supply from existing contracts is set to exceed demand as soon as 2027, if the EU achieves the gas demand reduction targets in its REPowerEU strategy. However, European buyers have agreed 11 contracts totalling nearly 20 bcm per year of new gas supplies in the last year alone, with five of them continuing into the 2050s.
- Current and prospective gas exporters cannot rely on future EU demand for their gas and face significant risks of these projects becoming stranded assets. Countries that are planning to expand gas flows to the EU include Algeria, Azerbaijan, Canada, the Republic of Congo, Mauritania, Mozambique, Nigeria, Norway, Qatar, Senegal, the US and Tanzania.

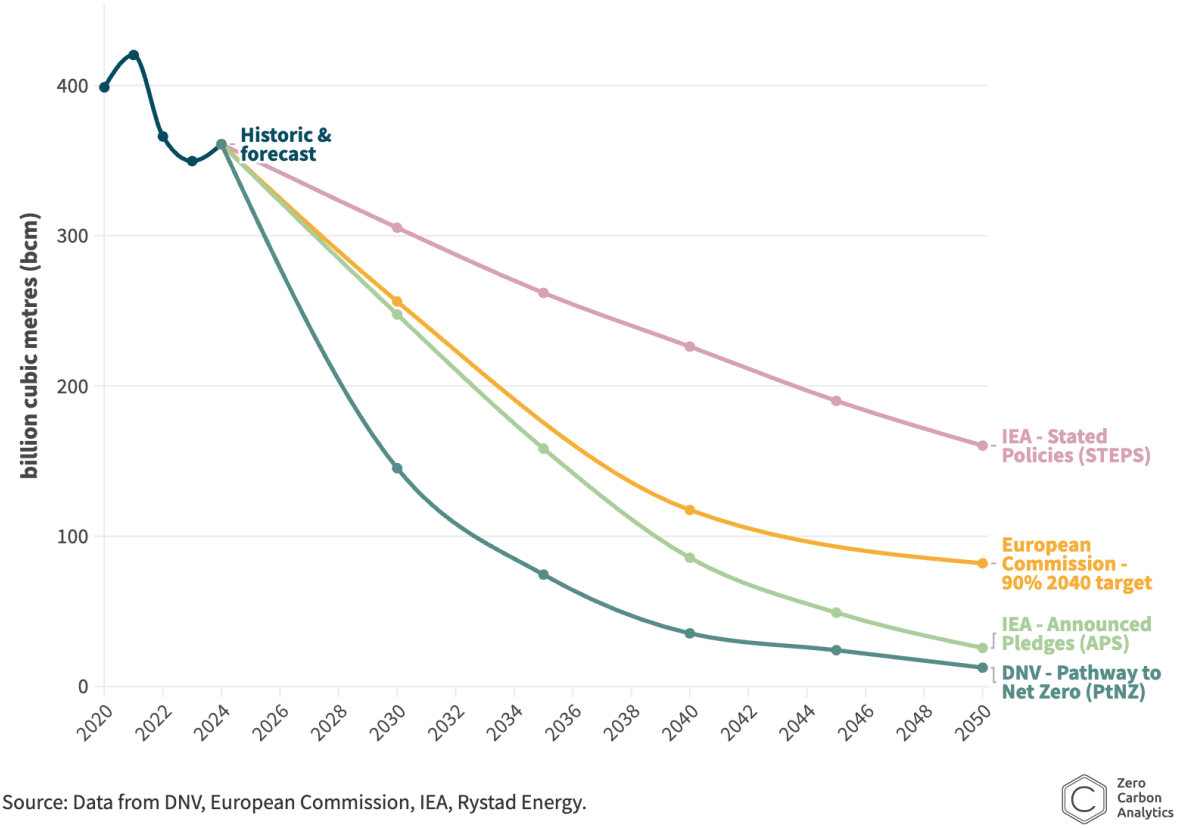
In February 2024, the European Commission proposed setting a target for reducing the region's greenhouse gas emissions by 90% by 2040, relative to 1990. Achieving this goal would result in a significant reduction in the EU's consumption of natural gas. At the same time, Europe is expanding its LNG import capacity and signing new long-term gas supply contracts. Around the world, countries are also seeking to expand exports of, or begin exporting, LNG to supply the European market. This analysis assesses the implications for gas importers and exporters of the proposed 2040 target.[1]

Declining gas demand

The European Commission's scenario for achieving a 90% reduction in emissions by 2040 forecasts that gas demand would be 101 million tonnes of oil equivalent, or 117 bcm of gas, per year. This represents a 66% decline from 2023 levels.

[1] This analysis is produced by Zero Carbon Analytics in collaboration with WWF Norway. Our methodology assesses the total volume of supply and demand to the EU as a whole, as gas demand data from scenarios such as the International Energy Agency (IEA) are not provided at a country level. As a result, it cannot make conclusions about gas supply and demand for individual EU member states.

Fig. 1: EU gas demand 2020-2050



Source: Data from DNV, European Commission, IEA, Rystad Energy.

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The level of gas demand under the EU's 90% target is significantly lower than in the International Energy Agency (IEA)'s Stated Policies Scenario (STEPS), which reflects current policies. However, gas demand is 37% higher than the IEA's Announced Pledges Scenario (APS), which is based on the EU meeting its existing 2030 and 2050 climate targets.[2] This is surprising, as the new 2040 target is intended to strengthen the EU's climate policy framework and could be expected to result in lower gas demand. The level of demand under the 90% target is three times higher than in the consultancy DNV's Pathway to Net Zero (PtNZ) scenario, where the EU achieves net zero emissions by 2043 as its fair share of achieving global net zero by 2050.

One potential reason for the difference between the IEA APS and the Commission scenarios is that the Commission's gas demand includes biomethane, produced from the breakdown of organic matter, whereas the IEA only includes natural gas. In its REPowerEU strategy, in which the EU aims to end its reliance on Russian fossil fuels by 2027, the European Commission set a target of 35 bcm of biomethane production by 2030. If we assumed this level of production in 2040, then natural gas demand in the Commission's scenario would be 4% lower than in the APS scenario.

For this analysis, the headline figure of 117 bcm is used as the Commission does not break this down between natural gas and biomethane, and the 35 bcm figure is an aspirational target, not a legislative requirement. However, for these reasons it is likely that natural gas demand would be significantly lower than the projections in this briefing.

[2] IEA EU gas demand data from the World Energy Outlook 2023 Extended Dataset

Existing supply meets demand

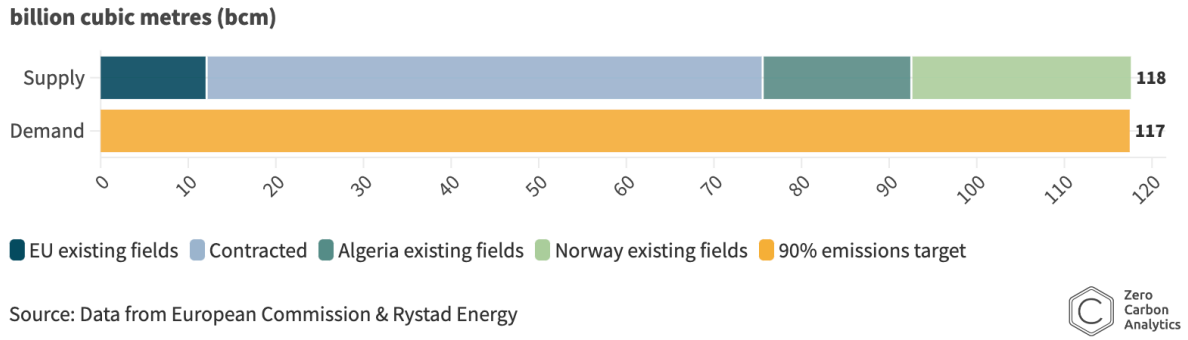
This analysis aims to identify whether the EU can meet demand in 2040 using existing supplies of gas. It includes supplies from gas projects already in production and from long-term gas supply contracts that have already been agreed. The focus on existing projects is important as multiple studies have found that new oil and gas extraction projects are incompatible with limiting warming to 1.5°C.

Data on gas production, demand, exports and existing supply contracts is sourced from consultancy Rystad Energy. This analysis assumes that the EU will phase out imports of Russian gas by 2027, and that there are no imports from Russia in 2040.

The EU's gas supply comes from a diverse range of sources, which we have categorised as:

- **EU existing fields** – projects within the EU that are already producing gas, or are under development. These projects are the EU's most secure source of supply and are forecast to produce 12 bcm of gas in 2040, nearly two thirds of which is from projects in the Netherlands and Romania.[3]
- **Contracted** – gas that sellers have committed to supply to buyers in the EU under long-term contracts that were agreed by April 2024. These gas contracts include pipeline supplies from countries such as Azerbaijan and Norway and LNG supplies from countries like Qatar and the US. In total, buyers in the EU have already contracted 63 bcm of gas for delivery in 2040.
- **Uncontracted pipeline supplies from existing fields** – this assessment of the volume of gas that can be supplied to the EU from its regional pipeline suppliers, including projects that are already in production or under development, above the levels that have already been contracted. The uncontracted supplies are calculated based on forecast production from existing fields, minus forecast domestic demand and already contracted exports, and assuming that the share of exports by pipeline to the EU will remain consistent with 2023 levels. We find that only Norway and Algeria have additional capacity, which combined can supply 42 bcm of gas to the EU in 2040.

Fig. 2: EU gas supply and demand in 2040



In total, these existing sources are forecast to supply the EU with 118 bcm of natural gas, roughly equal to forecast total gas demand under the Commission's assessment. As a result, the analysis finds that **no new gas extraction projects or additional gas supply contracts are required to meet demand.**

[3] Production from the Netherlands does not include the onshore Groningen field, due to be permanently closed, with more than two thirds of production in 2040 coming from offshore fields. More than two thirds of Romania's production in 2040 is forecast to come from projects that are currently under development, including the giant Neptun Deep project approved in June 2023.

Excess LNG import capacity

The EU is currently undergoing a massive expansion of LNG capacity as it tries to phase out imports of Russian gas. Yet the expansion is not necessary in either the short or long term.

LNG import capacity for the EU's 27 member states is forecast to rise by 15% between 2024 and 2030, reaching 300 bcm. In total, LNG capacity is forecast to rise to 81% above 2021 levels by the end of the decade. These figures exclude the UK and Turkey, which can also import LNG and then re-export the gas to the EU by pipeline.

Table 1: EU LNG import capacity expansion projects planned for operation after 2025

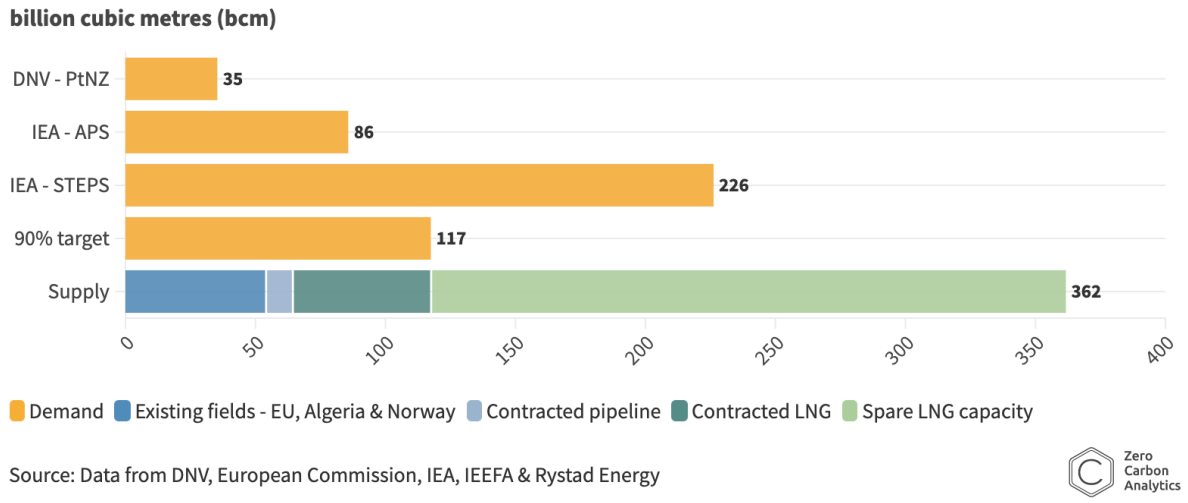
Country	Terminal	Capacity (bcm/year)	Start up year
Belgium	Zeebrugge expansion	1.8	2026
Germany	Stade onshore		2026
Greece	Thessaloniki FLNG	5.1	2026
Netherlands	Gate expansion	4.3	2026
Lithuania	Klaipėda expansion	1.3	2027
Poland	Gdańsk	6.5	2028
Total		**19**	

Source: EU Agency for the Cooperation of Energy Regulators (ACER): Analysis of the European LNG market developments - 2024 Market Monitoring Report.

However, LNG imports to the EU would drop by 59% by 2040, with an average utilisation rate for import terminals of just 19%. In total, the EU would have 244 bcm of unused LNG capacity by 2040, as shown in Figure 3, assuming that LNG capacity remained constant with 2030 levels. In reality, utilisation rates would likely be even lower as some of the EU's gas demand would be met through LNG terminals in the UK or Turkey.

The findings are consistent with those of the EU Agency for the Cooperation of Energy Regulators (ACER), which found that the EU's demand for LNG will peak in 2024 at over 120 bcm and would fall to below 60 bcm per year by 2030 if the targets in the REPowerEU strategy are met.

Fig. 3: Gas imports and LNG capacity in 2040 compared to demand scenarios



Source: Data from DNV, European Commission, IEA, IEEFA & Rystad Energy

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There are significant risks that LNG projects will end up as stranded assets if the EU expands its import capacity. In order to avoid those risks, national and European regulators should rapidly re-assess whether proposed LNG expansion projects are still necessary and where possible prevent further development.

Over-contracting EU gas imports

Long-term LNG contracts already agreed in April 2024 would provide the EU with sufficient supply in 2040, alongside domestic production and capacity from existing fields in Norway and Algeria. The agreement of any further long-term gas supply contracts would then lead to an oversupply of gas to the EU.

The EU is already set to be over-contracted in the near term. Analysis by ACER shows that contracted LNG supplies will exceed demand by 2027, reaching 41 bcm a year of surplus LNG supply by 2030 if the EU achieves the goals of the REPowerEU strategy.

However, European buyers are continuing to secure additional long-term LNG supplies. In the last 12 months, buyers in Europe have concluded negotiations for 11 new contracts for 14.6 million tonnes per year (mtpa) - 19.9 bcm - of LNG supplies, according to data from Bloomberg.[4] These contracts are for an average duration of 19 years, with five of them running into the 2050s, beyond the EU's target net zero date.

Only four of these contracts are 'free on board', meaning that buyers have the flexibility to re-route cargo to another destination if it is not needed. Without that freedom, buyers are tied to shipping the LNG to the specific destination or paying a penalty for not taking the LNG. Given the long-term risk of over contracted supplies, energy regulators in Europe should consider whether further steps are needed to review and approve further long-term LNG contracts.

[4] Data from Bloomberg Terminal, converted using BP's Statistical Review of World Energy Approximate conversion factors

Table 2: European LNG contracts agreed in 2023

Import market	Export market	Volume (mtpa)	End year
Germany	Oman	0.4	2029
Europe	Unspecified	1	2035
UK	US	1	2041
Netherlands	US	0.9	2043
Europe	US	0.8	2043
Germany	US	2.3	2045
Italy	Qatar	1	2052
Netherlands	Qatar	1.8	2052
Netherlands	Qatar	1.8	2052
France	Qatar	1.8	2052
France	Qatar	1.8	2052

Source: Bloomberg Terminal, accessed May 2024.

Risks to current and prospective gas exporters

Many current or prospective gas-producing countries are aiming to increase their gas exports or start exporting LNG, citing expected European gas demand as a justification.

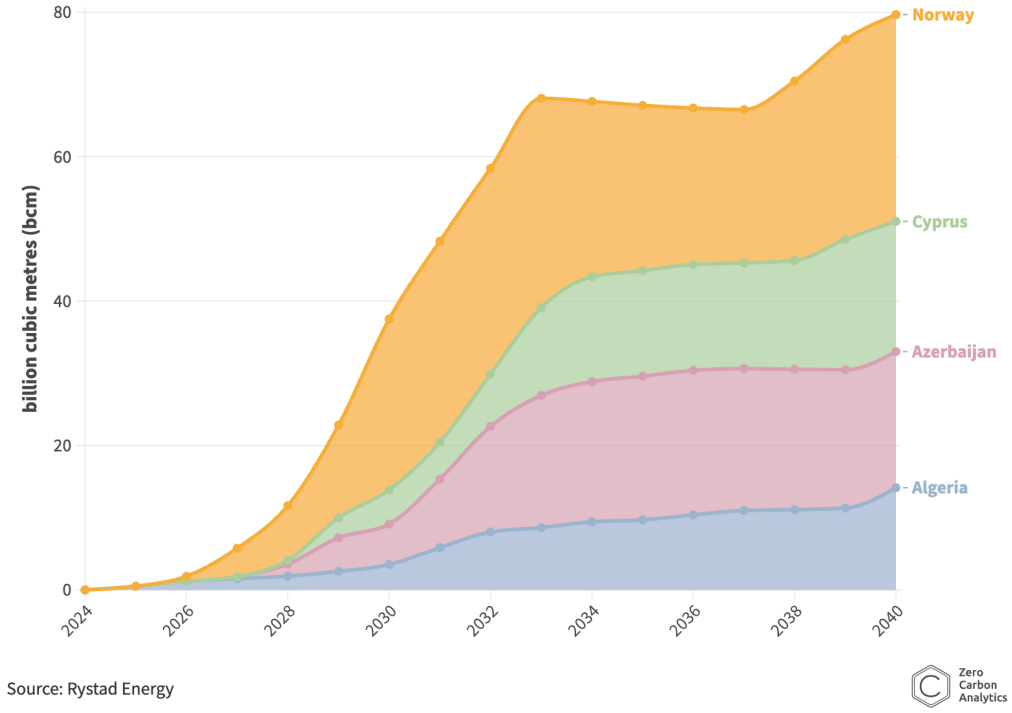
Gas producers in and neighbouring the EU

Despite the decline in EU demand, many countries within the EU and its main neighbouring pipeline suppliers – Algeria, Azerbaijan, Libya and Norway – are forecast to increase gas production, according to data from Rystad Energy.

Within the EU, Cyprus is expected to see by far the largest volume of new gas from fields that are not yet in production, accounting for more than half of the total for the member states between now and 2040. In total it is forecast to produce 142 bcm of gas from new projects, with production still rising throughout the 2030s.

Of its regional pipeline suppliers, Norway is forecast to produce the most gas from new projects – 305 bcm before 2040. Azerbaijan follows with 190 bcm and Algeria with 111 bcm of production from projects that are not already producing or in development.

Fig. 4: Top four producers of gas from new fields in the European region 2024-2040



As Figure 4 illustrates, production from these new projects is set to peak in 2040, when demand in the EU will have dropped to a third of its current levels. All of these projects put the 1.5°C goal of the Paris agreement at risk. They also face significant financial risks as sales to the European market is the only option for many of these projects through existing pipelines. Some of these countries may be able to expand their LNG export capacity to diversify away from Europe; however, as noted below, they would be exporting into an already oversupplied LNG market.

Norway

The Norwegian government and oil and gas industry have argued that the expansion of petroleum activities, including opening the northern region of the Barents Sea for oil and gas exploration, is needed in response to the energy crisis in Europe. Rystad Energy forecasts that Norway could produce an extra 24 bcm of gas per year from now to 2050 from new fields that are not currently in production or development.

Azerbaijan

The state-owned oil and gas company SOCAR is aiming to increase gas exports to the EU by 17% from 2024 to 2026, on its way to a goal of exporting 20 bcm a year by 2030, double 2022 levels. In March 2024, the EU and Azerbaijan released a statement reaffirming their commitment to work together on developing infrastructure and gas fields to increase gas flows. This briefing has only included the 10 bcm per year supplied under current contracts, as achieving the planned increase in exports to the EU would require new gas extraction projects.

Cyprus

Gas was first discovered offshore Cyprus in 2011, and the country's energy minister hopes that production could begin at the Cronos field in 2026 or 2027. The Cypriot government has explored multiple options for exporting its gas, including most recently suggesting the construction of pipelines connecting gas fields in the Eastern Mediterranean to a proposed LNG terminal in Greece to ship gas to Europe.

Algeria

In 2022, Italian energy company Eni and the Algerian state-owned oil and gas company Sonatrach agreed to increase gas exports from the North African country by around 40%. They also plan to collaborate on developing new gas fields to bring an additional 3 bcm per year to Italy. Sonatrach is aiming to reach 20 bcm per year of new shale gas production by 2030, with the aim of supplying the European market.

LNG exporters

The EU has also sought out new supplies of LNG as part of the REPowerEU strategy, citing countries such as Nigeria, Senegal and Angola as offering "untapped potential" and aiming to secure additional supplies from Egypt and Israel.

Industry and governments have claimed that this expansion in gas production and export is needed to meet demand in the EU. However, these plans are extremely risky in the context of collapsing European LNG demand and a huge growth in global LNG supply. The EU would not need additional LNG supplies to meet demand should the 90% emissions reduction target be achieved. At the same time, global LNG export capacity is set to increase by 40% by 2028, significantly exceeding long-term forecast demand for LNG.

The following countries are all aiming to increase gas exports to Europe. This expansion would either raise gas consumption elsewhere in the world - driving dangerous increases in carbon emissions - create stranded assets for the exporting countries, or both.

United States

The US became the world's largest LNG exporter in 2023 and its export capacity is set to almost double over the next four years. Earlier this year, US President Joe Biden's administration announced a pause on government approvals of new LNG export permits, a policy that does not affect terminals already under construction. Any decision about the future US policy on LNG permit approvals would be in the context of exporting into the global market in the 2030s and 2040s.

Biden's pause has been heavily opposed by the oil and gas industry, citing Europe's supposed need for LNG. LNG Allies, a trade association which represents LNG exporters, said that as a result of the pause "Europe and Asia will burn more coal, global greenhouse gas emissions will rise, and our European allies will be forced to continue importing Russian LNG." (Coal is almost completely phased out by 2040 in the European Commission's impact assessment for the 90% target).

The American Petroleum Institute described the government policy as "a win for Russia" and referred to studies sponsored by the oil industry that show that "both Europe and Asia face long-term natural gas supply gaps that threatens their energy security."

Qatar

Qatar provided 5% of the EU's gas in 2023 and is planning an 85% expansion in LNG output from its massive North Field project, bringing total output to 142 mtpa by 2030. Announcing the expansion, QatarEnergy President and CEO Saad Sherida Al-Kaabi said: "We still think there's a big future for gas for at least 50 years forward and whenever we can technically do more, we'll do more. We see that Europe is going to need gas for a very, very long time."

Nigeria

Two additional LNG export terminals are under development in Nigeria, with a combined capacity of 10 bcm per year, both aiming to start operating in 2027. The managing director of Nigeria LNG, Dr. Philip Mshelbila, said his company was committed to "harnessing the immense potential of natural gas" and creating "more opportunities for gas supply" working with stakeholders from Europe.

As well as expanding LNG capacity, the Nigerian government is hoping to fast track the decision to build a 5,600-km offshore gas pipeline to Morocco and Spain. The pipeline would cost USD 25 billion to build, with a capacity of 30 bcm per year, but would not be completed until 2046. While the pipeline would also connect Nigeria to countries along the West African coast, there would be no market for providing this gas to the EU in the 2040s.

Mozambique

Mozambique exported its first LNG cargo to Europe in November 2022, and a further two LNG terminals are now planned in the country:

- TotalEnergies' Mozambique LNG with a 12.9 mtpa capacity aiming to start operation in 2028, with the potential for expansion to 43 mtpa.
- ExxonMobil's Rovuma LNG with a proposed 15.2 mtpa capacity, the start date for which is unknown.

The EU has played a critical role in supporting LNG development in Mozambique, including providing EUR 106 million to support the country's armed forces in responding to militants linked to Islamic State which have hampered the development of gas projects.

Senegal & Mauritania

The Greater Tortue Ahmeyim LNG project spans the border between Senegal and Mauritania and is aiming to start operations in late 2024. The project is initially expected to produce 2.3 mtpa of LNG, with the potential for expansion to as much as 10 mtpa. Micky Sall, while President of Senegal, said that the vast majority of gas initially produced would be exported to Europe.

In Mauritania, the BirAllah gas field is expected to reach a final investment decision in 2025. If approved, the project would start production in 2028 with more than three quarters of production expected to be exported as LNG, according to analysis by GlobalData.

Tanzania

Shell, Equinor and ExxonMobil are looking to build a USD 42 billion LNG terminal in Tanzania with a capacity of 10 mtpa. Construction on the project was originally planned to start in 2022, but it has been delayed multiple times. The project had been due to reach a final investment decision in 2025, but earlier this year the Tanzanian government delayed signing key agreements relating to the construction of the terminal. The Tanzania Petroleum Development Corporation aims for the LNG to be exported to Europe and Asia.

Republic of Congo

Eni's Congo LNG terminal exported its first cargo in February 2024, with the company aiming to reach a full capacity of 3 mtpa by 2025. Eni's CEO Claudio Descalzi said the project is "destined to significantly contribute to both Italy and Europe's energy security and industrial competitiveness."

Canada

The CEO of the industry group the Canadian Association of Petroleum Producers has argued that"Countries are looking to Canada to ramp up natural gas and LNG production and export" amid Europe's expansion of LNG import capacity. "Canada can become a major supplier of natural gas to allies and trading partners in Asia and Europe," Lisa Baiton said.

Canadian MP Shannon Stubbs, who is the Conservative shadow minister for natural resources, has also said that "Poland [...] wants Canadian LNG from Canada, which could be a reliable and stable partner in energy and national security."

Canada Action, a pro-oil and gas advocacy group, has cited Greece, Germany, Poland and Latvia as "supporting or asking for" Canadian LNG as part of its campaign in support of a proposed LNG terminal in British Columbia. However, as British Columbia is on the Pacific Coast, it would be very poorly placed to supply European markets, even if there was sufficient demand for its exports. If built, it would likely instead supply Asian markets.