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1. Introduction

Natural gas exporters from the Middle East and North Africa (MENA) region have played an important role in the supply response to the loss of Russian pipeline gas imports into Europe since 2022, in the wake of the Ukraine crisis. As Russian gas exports to the continent declined that year, the European Union (EU) sought to draw additional supply from other existing pipeline gas and LNG exporters. Surging gas prices, EU gas demand management and storage policies helped to balance the European gas market¹ by drawing in additional LNG supplies from the US and Qatar, while North African pipeline gas suppliers and Azerbaijan maximized volumes into southern and southeastern Europe.

Yet while security of supply has been a greater priority for European policymakers since 2022 and given added impetus to the renewable power build-out, the multi-year slide in European gas demand, has reasserted itself and switched that narrative dramatically. While avoiding a physical shortfall in volumes was the immediate priority in 2022 and 2023, this year's extended decline in European gas consumption, coupled with the looming delivery of a slate of new LNG projects in Qatar and the US over the next five years, means that *omnibus paribus*, gas balances will be softer. This will in turn force gas exporters into Europe to compete for market share on price, volume and contract flexibility.

On top of this multi-year market challenge, Europe's progressive efforts to decarbonise its energy system and regulate the methane emissions of its gas suppliers are a secondary problem that could over time reduce the volume of gas exports from some MENA gas exporters, with significant negative impacts for those undiversified, oil and gas export-based economies. The Ukraine crisis marked not just the end for the vast bulk of Russian gas export volumes to Europe, but also sparked renewed determination by European policymakers to reduce reliance on natural gas in general, as laid out in the REPowerEU plan².

Europe's plan to move away from unabated natural gas is in large part driven by the decarbonisation and methane emission reduction strategy that is at the heart of EU climate policy. New green policy and regulations in Europe have made assessing gas demand more difficult and while there are significant variations between scenarios of the decline in gas demand, as shown in Figure 1, the direction of travel for Europe's long-term natural gas demand is clear. As pressure to reduce the greenhouse gas (GHG) footprint of gas imports grows over time, MENA's gas exporters will have to show they are committed to measure and reduce emissions from their own operations. The challenge of compliance with these EU regulations will imply additional cost, just at the time when MENA gas exporters are facing a shrinking European gas market.

In the face of these looming challenges, MENA's main gas exporters to Europe fall into two distinct groups. First, North African gas exporters including Algeria, Egypt³ and Libya hold relatively limited gas reserves and are all constrained by rising domestic gas demand and limited upstream investments. These constraints have and will to varying degrees limit North Africa's long-term export prospects as natural field declines and strong domestic market growth crimp volumes available for export. Second, gas exporters from the Gulf Cooperation Council (GCC) area including Qatar, the United Arab Emirates (UAE) and Oman to a certain extent, boast larger reserves relative to their domestic gas markets, and well capitalised state energy companies. While the latter group has in large part designed its LNG expansion projects to comply with tighter emissions standards with the aim of being best in class, progress for the North African countries has been slower and less profound, reflecting a broad regional discomfort with the potential external imposition of green regulations on their energy exports.

Given the market expectation that the contraction in European gas demand is a trend that is unlikely to be bucked, the looming global surge in LNG projects and the real prospect that gas imports into Europe

¹ Europe has natural gas markets with different characteristics. For simplicity, in this paper, we use the aggregated term of 'European gas market'.

² European Commission (2022). "REPower EU: Affordable, secure and sustainable energy for Europe."

https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

³ Egypt was a net exporter until recently.



will face tighter methane emission scrutiny, this paper examines the outlook for MENA's main natural gas exporters to Europe, namely Algeria, Libya, Egypt⁴, and Qatar, and identifies both the market and regulatory challenges ahead. It should be noted that the context and conclusions of this paper apply not only to the main existing MENA natural gas exporters to Europe, but also to other potential MENA gas exporters, especially those located in the GCC subregion.





Source: Oxford Institute for Energy Studies (OIES), International Energy Agency (IEA), Shell.

2. Europe's shrinking gas market and expanding regulation

2.1 European gas market context

The most pressing context for any discussion of the outlook for MENA gas exporters to Europe is the near three-year decline in gas demand since the Ukraine crisis erupted in 2022 and sent gas hub prices to historic highs. Europe's gas demand dropped by over 100 billion cubic metres (bcm) between 2021 and the first of September 2024, posing the question whether some of this gas demand has been permanently destroyed.⁶ This fall in gas demand took place mainly in the power sector and that continues to be the case. According to the Agency for the Cooperation of Energy Regulators (ACER), during the first half of 2024, gas use for electricity generation in the EU decreased by 16 per cent compared to the same period in 2023.

While gas demand declined, the resumption of operation of French nuclear plants over the period, the continued build-out of Europe's renewable power capacity and an improvement in the utilisation of the continent's hydro-electric assets could "suggest a more structural squeeze to gas' market share in the power sector" is underway.⁷

⁶ Oxford Institute for Energy Studies (2024a). "Quarterly Gas Market Review: Tracking Key Metrics", April. <u>https://www.oxfordenergy.org/wpcms/wp-content/uploads/2024/04/OIES-Quarterly-Gas-Review-Issue-24-2024-04-15.pdf</u>

⁴ See footnote 3.

⁵ OIES (DPS): declared policies scenario; OIES (FRAG): fragmented scenario; OIES (NZwth CCS): Net Zero with CCS; IEA (STEPS): stated policies scenarios; IEA (APS): announced pledges scenario.

⁷ Oxford Institute for Energy Studies (2023). "European Gas Market Supply & Demand: Winter Outlook 2023/24", December. https://www.oxfordenergy.org/publications/european-gas-market-supply-demand-winter-outlook-2023-24/



In April 2024, ACER indicated that Europe could be reaching an LNG import peak because of the demand reduction trend.^{8,9} It remains to be seen whether this is really a structural transformation or a short-term situation in which demand could rebound under a potential economic recovery scenario in the coming years. If over the rest of this decade this structural change in Europe's gas demand is confirmed, the shrinking of Europe's natural gas market will accelerate due to the increasing focus on the reduction of greenhouse gas emissions, assuming continued gains in Europe's wider deployment of renewable energy.

2.2 European green regulation of gas imports

The EU's decarbonisation and methane emission reduction strategy emerged from the Paris Agreement of 2015 on climate change. It then evolved as the European Green Deal in 2019, which included "a package of policy initiatives, which aims to set the EU on the path to a green transition, with the ultimate goal of reaching climate neutrality by 2050."¹⁰ The European gas market was derailed first by the COVID pandemic and subsequently by the Russia - Ukraine war, which sharpened policy-makers' focus on reducing gas import dependence, which had grown from 40 per cent in 1992 to 80 per cent in 2022,¹¹ and boosting security of supply through the build out of renewable power capacity.

The Ukraine gas crisis forced the EU to seek out new import sources as a short-term means of securing volumes to replace lost Russian supply, paradoxically contradicting earlier moves to discourage upstream oil and gas developments in support of the 2050 net zero target. ¹² The EU also responded to the potential gas shortfall by issuing the REPowerEU plan, which through renewables and other measures sought to reduce the bloc's gas demand by 30 per cent by 2030 and to accelerate the EU's move away from all fossil fuels.

2.3 EU green regulation and focus on fossil fuels

Since 75 per cent of the EU's GHG emissions are caused by the production and consumption of energy, the implementation of the Green Deal's objectives into law centres on the energy sector and more specifically fossil fuels. The EU's Fit for 55 package, a key part of its Green Deal, "aims to decrease EU greenhouse gas emissions by at least 55% by 2030." As a result, the European Commission recommended a 90 per cent net greenhouse gas emissions reduction by 2040 compared to 1990 levels.¹³ Most of the regulations and directives outlined below are EU laws that when fully implemented will directly impact gas imports into Europe.

2.3.1 Emission Trading System

The Emission Trading System (ETS) was introduced in 2005 and established the world's first and largest carbon market. It is "a cornerstone of the EU's policy to combat climate change and is a key tool for reducing greenhouse gas emissions cost-effectively."¹⁴ In 2023, the ETS regulation was amended to include maritime transport activities.¹⁵ The implementation of this amendment will be phased in from

https://www.consilium.europa.eu/en/policies/green-deal/#what

⁸ Stuart Elliott (2024). "EU LNG imports could be near peak on structural gas demand reduction: ACER", *European Gas Daily*, Platts, S&P Global, 19 April.

⁹ ACER (2024). "ACER's monitoring shows EU LNG imports might be near its peak", 19 April. <u>https://www.acer.europa.eu/news-</u> and-events/news/acers-monitoring-shows-eu-lng-imports-might-be-near-its-peak

¹⁰ Council of the European Union (2019). "European Green Deal", December.

¹¹ Oxford Institute for Energy Studies (2024b). "Key Themes for the Global Energy Economy in 2024." January.

https://www.oxfordenergy.org/publications/key-themes-for-the-global-energy-economy-in-2024/

¹² Ouki, Mostefa (2022). "African gas supplies to Europe: between hopes and hard realities", Energy Comment, Oxford Institute for Energy Studies. <u>https://www.oxfordenergy.org/publications/african-gas-supplies-to-europe-between-hopes-and-hard-realities/</u>

¹³ European Commission (2024). "Commission presents recommendation for 2040 emissions reduction target to set the path to climate neutrality in 2050", press release, 06 February. <u>https://ec.europa.eu/commission/presscorner/detail/en/ip_24_588</u>

¹⁴ https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

¹⁵ https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R0957&qid=1711619880988



2024 to 2026 and, in addition to carbon dioxide, it will be extended to two other greenhouse gases: methane and nitrous oxide.

The amended EU ETS regulation will raise the cost of shipping LNG to EU member states and will therefore have an impact on international gas market price spreads and LNG trade flows.¹⁶ Depending on ETS carbon price movements and gas market conditions in Europe, this EU GHG emission cost could in the short to medium term push LNG exporters to focus on non-EU markets.¹⁷ However, in the case of some MENA gas exporters heavily reliant on EU importing markets, accessing alternative markets like those of Asia could be difficult and will take time.

2.3.2 Methane emissions regulation

Due to the high global warming potency of methane emissions compared to carbon dioxide (CO₂), there has been a growing focus on this category of GHG emissions. In November 2021, the Global Methane Pledge was launched at COP 26 to address it. At present, more than 150 countries (including several oil and gas exporters) have joined this pledge with the objective of "taking voluntary actions to contribute to a collective effort to reduce global methane emissions at least 30 per cent from 2020 levels by 2030."¹⁸

In Europe, as part of the EU's Fit for 55 package, a proposed new methane regulation was put forward in December 2021 to "reduce energy sector methane emissions in Europe and in [the EU's] global supply chains." ¹⁹ This regulation was adopted by the European Parliament in April 2024 and by the Council of the European Union in May 2024. The regulation was officially issued in July 2024 and entered into force in August 2024.²⁰

The methane regulation is potentially the EU regulation that could most constrain gas exporters to Europe. Article 27 and Annex IX outline the following restrictions that will be imposed on importers of gas, including the MENA region:

"...as regards crude oil and natural gas, information whether the producer or the exporter, as applicable, is carrying out source- and site-level measurement and quantification, whether that data are subject to independent third-party verification, whether its methane emissions are reported, either independently or as part of commitments to report national greenhouse gas inventories in line with UNFCCC²¹ requirements, and whether they are in compliance with UNFCCC reporting requirements or with OGMP 2.0 standards; ..."

The methane emission regulation will require EU gas importers to provide detailed information on the methane emissions of its external sources of natural gas supplies. Non-compliance with an EU methane intensity standard, yet to be defined by the European Commission, for natural gas placed on the European Union market would be penalised. The methodology to calculate this intensity at the producer level is to be issued three years after the entry into force of the methane regulation, or in 2027. The estimation of the methane intensity and "methane intensity profiles" will be based on data collected by importers on their different sources of gas supply.

Although the EU methane emission regulation will not be fully implemented before 2030 and it is not clear how quickly each member state would then apply it, it is already posing a serious long-term challenge for existing and future gas exporters to Europe that are not yet prepared to address the EU

¹⁶ Timera Energy (2024). "LNG market impact of new shipping emissions rules", 04 March. <u>https://timera-energy.com/blog/ing-market-impact-of-new-shipping-emissions-rules/</u>

¹⁷ Wood Mackenzie (2024). "Call of duties: how emission taxes on imports could transform the global LNG market", Horizons, March. <u>https://www.woodmac.com/horizons/emission-taxes-could-transform-global-Ing-market/</u>

¹⁸ The Global Methane Pledge. <u>https://www.globalmethanepledge.org</u>

¹⁹ European Commission (2021). "Proposal for a Regulation of The European Parliament and of the Council on methane emissions reduction in the energy sector and amending Regulation (EU) 2019/942", 15 December. <u>https://eur-lex.europa.eu/resource.html?uri=cellar:06d0c90a-5d91-11ec-9c6c-01aa75ed71a1.0001.02/DOC_1&format=PDF</u>

²⁰Official Journal of the European Union (2024). "Regulation (EU) 2024/1787 of the European Parliament and of the Council of 13 June 2024 on the reduction of methane emissions in the energy sector and amending Regulation (EU) 2019/942, 15 July. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401787

²¹ United Nations Framework Convention on Climate Change.



regulatory reporting requirements and standards. At present, only Norway appears to be prepared for such a challenge.²²

In the US, the Environmental Protection Agency (EPA) issued a final rule²³ in December 2023 which is expected to reduce significantly methane emissions in oil and gas operations. In May 2024, the EPA announced a final rule for methane emission reporting, a key part of the US' Inflation Reduction Act's methane emission reduction programme.²⁴ It remains to be seen whether all the new US regulatory measures will meet the EU methane emission reduction standards.²⁵ It is important to note that although the US has the same concerns as MENA's gas exporters about the EU green regulations, it has adopted a strategy of discussing these concerns directly with the European Commission and possibly negotiating an agreement on this matter.²⁶ An approach the MENA gas exporters may consider.

In the MENA region, new low carbon liquefaction units have been announced in the United Arab Emirates and Oman. Nevertheless, MENA's main gas exporters to Europe are yet to be fully prepared for the EU's methane emission regulation.

2.3.3 Carbon Border Adjustment Mechanism (CBAM)

Another key part of the EU's Fit for 55 package that will affect fossil fuel producers, though not oil and gas exports is the Carbon Border Adjustment Mechanism (CBAM) that focuses on carbon dioxide. The CBAM regulation, issued in May 2023²⁷ and entered into application on the first of October 2023, is one of the EU regulations put in place to address emissions outside the bloc for products imported into the EU. CBAM is a mechanism that targets imports of products from six carbon-intensive industries: iron and steel; cement; fertilisers; aluminium, hydrogen production; and electricity. The CBAM mechanism ensures "... that imported products are subject to a regulatory system that applies carbon costs equivalent to those borne under the EU Emission Trading System (ETS), resulting in a carbon price that is equivalent for imports and domestic products." ²⁸ This legislation will become fully operational in January 2026. Imports of oil and gas are not covered by this CBAM legislation and are unlikely to be included since the CBAM regulation is aimed at "reducing the risk of carbon leakage." With the long-term fall in the EU's indigenous hydrocarbon production, there would be limited or no incentives to protect declining domestic EU production. There are no large EU gas exporters to protect from the risk of unfair competition from outside the EU.

However, the CBAM regulation will affect several MENA gas producers that are exporters of products targeted by CBAM and that use natural gas as a fuel and/or feedstock in the manufacturing of these products. For example, Qatar, Egypt and Algeria who are three of the world's largest exporters of nitrogenous fertilisers, will be affected by this regulation. Furthermore, other sectors such as refining, and petrochemicals could be added to the CBAM law, further financially impacting MENA's hydrocarbon producers.

content/EN/TXT/PDF/?uri=CELEX:32023R0956

²² Stern, Jonathan (2022). "Measurement, Reporting, and Verification of methane emissions from natural gas and LNG trade: creating transparent and credible frameworks", Oxford Institute for Energy Studies, January.

https://www.oxfordenergy.org/publications/measurement-reporting-and-verification-of-methane-emissions-from-natural-gas-and-Ing-trade-creating-transparent-and-credible-frameworks/

²³ United States Environmental Protection Agency (2024). "EPA's Final Rule for Oil and Natural Gas Operations Will Sharply Reduce Methane and Other Harmful Pollution", 02 December. <u>https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-operations/epas-final-rule-oil-and-natural-gas</u>

²⁴ United States Environmental Protection Agency (2024). "Biden-Harris Administration Announces Final Rule to Cut Methane Emissions, Strengthen and Update Greenhouse Gas Emissions Reporting for the Oil and Gas Sector", EPA news release, 06 May. <u>https://www.epa.gov/newsreleases/biden-harris-administration-announces-final-rule-cut-methane-emissions-strengthen-and</u> and

²⁵ Cahill, Ben (2023). "Europe Wants Cleaner Gas. Can the United States Provide It?", Center for Strategic and International Studies, 05 June. <u>https://www.csis.org/analysis/europe-wants-cleaner-gas-can-united-states-provide-it</u>

²⁶ Center for Strategic & International Affairs (2023). "Cutting Methane Emissions from Oil and Gas: U.S. and EU Cooperation", 12 July. <u>https://www.csis.org/analysis/cutting-methane-emissions-oil-and-gas-us-and-eu-cooperation</u>

²⁷ Official Journal of the European Union (2023). "Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism." <u>https://eur-lex.europa.eu/legal-</u>

²⁸ Official Journal of the European Union (2023).



The EU CBAM regulation underlines that the "CBAM is a climate measure which should support the reduction of global greenhouse gas emissions and prevent the risk of carbon leakage, while ensuring compatibility with World Trade Organization [WTO] law."²⁹ This statement is likely to be challenged by hydrocarbon exporters. Thus, this new EU green regulation is another layer of commercial risks that some of MENA's gas exporters to Europe must address and prepare for. However, there could be opportunities for MENA countries that manage to address this CBAM regulation and offer low-carbon products that would be allowed to access European markets.³⁰

2.3.4 Directive for the internal markets for renewable gas, natural gas and hydrogen (RNGH)

To reach carbon neutrality by 2050, the European Union has developed another legislative text that will restrict, *inter alia*, the long-term trade of natural gas. It is the EU directive for the internal markets for renewable gas, natural gas and hydrogen (RNGH) that is part of the Fit for 55 set of laws and regulations. This directive was approved by both the European Council and European Parliament and issued in July 2024.³¹ It lays down the initial regulatory framework for an EU hydrogen market and the long-term restriction of imports of unabated gas. With that in mind, the package stipulates "that no long-term contracts for supply of unabated fossil gas are concluded with a duration beyond 31 December 2049." Though this is a very distant horizon for gas exporters with limited natural gas reserves\resources, it will nevertheless impact gas exporting countries attempting to secure long-term contracts that will start during the next decade, given that these contracts typically extend beyond 20 years.

The International Association of Oil and Gas Producers (IOGP) recommends that the new European Parliament should favour long-term gas supply contracts as a necessity in terms of supply diversification and cost competitiveness, especially for gas imports from North Africa and Azerbaijan, but this is opposed by Non-Governmental Organisations, who call for an end to the signing of new long-term gas contracts by EU member states.³²

Over the coming decades, this is unlikely to greatly affect existing North African gas exporters, whose volumes available are expected to decline. But it could be a constraining factor for GCC LNG exporters such as Qatar, potentially forcing shorter term contracts complying with the 2050 cutoff, something which Oman has already started to comply with.³³ While most GCC LNG producers are predominantly Asia-focused, it is still another regulatory hurdle that MENA's natural gas exporters will have to address, even if it is less relevant for North African gas exporters.

2.4 Reassessing natural gas import risks

The Russia-Ukraine and Israel-Gaza conflicts have focused European gas buyers on the potential for geopolitical conflicts to undermine security of supply.

In addition to EU regulatory measures either in place or planned to reduce the GHG footprint of Europe's gas imports, MENA's gas exporters to Europe could face an additional challenge, reignited by geopolitical crises, that they are themselves a high-risk producer or located in a high-risk region. This could lead European importers to switch to or to increase their imports from countries considered lower risk friends or allies and possibly accept a price premium resulting from this strategic choice.

³² Contexte (2024). "It is necessary to promote long-term gas supply contracts", 26 February.

https://www.contexte.com/edition/energie/

²⁹ Official Journal of the European Union (2023).

³⁰ The Al-Attiyah Foundation (2024). "The EU Carbon Border Adjustment Mechanism: Implications for MENA", July. <u>https://www.abhafoundation.org/media-uploads/reports/Energy-07_2024_July-Print.pdf</u>

³¹ Official Journal of the European Union (2024). "Directive (EU) 2024/1788 of the European Parliament and of the Council of 13 June 2024 on common rules for the internal markets for renewable gas, natural gas and hydrogen, amending Directive (EU) 2023/1791 and repealing Directive 2009/73/EC", 15 July. <u>https://eur-lex.europa.eu/eli/dir/2024/1788/oj</u>



This "friend-sourcing"³⁴ approach would discriminate against some natural gas exporters and could be challenged through international institutions such as the World Trade Organization as a discriminatory measure. But it is a realpolitik strategy that has already been considered for other economic activities (e.g. "friend-shoring"³⁵). It cannot be ignored as a possible scenario, even if these friendly sources of gas supply are not as cost-competitive as other sources. This would be consistent with a more interventionist European energy policy prompted by the natural gas crisis resulting from the Russia – Ukraine war and the challenges to fulfil Europe's decarbonisation and methane emission reduction objectives.

3. MENA's gas exporters to Europe

3.1 Market share and export dependency

Norway is currently Europe's largest supplier of natural gas. Europe purchases gas from various other regions, including the Middle East and North Africa. In 2023, its MENA sources of gas were mainly Algeria, Qatar, Egypt and Libya, as shown in Figure 2. Oman and the United Arab Emirates have also supplied gas to Europe but in much smaller volumes and mainly on a spot sale basis.





Continued unrestricted access to European gas markets for their exports is critical for MENA's main gas exporters. As depicted in Figure 3, most of these gas exporters are highly or moderately dependent on Europe. Although Europe's share of Qatar's gas exports is already about 20 per cent, the European gas market is likely to be a part of Qatar's gas export diversification strategy as it further expands its LNG export capacity.³⁶

³⁴ See "Security of supply concerns and friend-sourcing of gas" in Ouki, Mostefa (2023): "Italy and its North African gas interconnections: A potential Mediterranean gas 'hub'?", Oxford Institute for Energy Studies, March, page 5. <u>https://www.oxfordenergy.org/publications/italy-and-its-north-african-gas-interconnections-a-potential-mediterranean-gas-hub/</u>

³⁵ Kessler, Sarah (2022). "What is friendshoring", *The New York Times*, 18 November.

https://www.nytimes.com/2022/11/18/business/friendshoring-jargon-business.html

³⁶ Ratcliffe, Verity (2024). "Qatar Has Eyes on More Long-Term Deals as It Bets Big on LNG", *Bloomberg News*, 26 February. <u>https://www.bnnbloomberg.ca/qatar-has-eyes-on-more-long-term-deals-as-it-bets-big-on-lng-</u>





Figure 3: Europe's (*) share of MENA's total gas exports (main exporters) - 2023

Source: ENTSOG & Kpler

(*): EU plus the UK.

3.2 GCC LNG export capacity expansion

Qatar's total LNG export capacity will almost double from the current 77 million tons per annum (mtpa) to 142 mtpa by the end of 2030. In addition to Qatar's significant LNG export capacity expansion, other GCC exporters are also increasing their export capacity with a focus on low-carbon LNG. The UAE is developing a new LNG export complex in Ruwais,³⁷ which is expected to become "one of the lowest-carbon intensity LNG plants in the world".³⁸ With the Ruwais LNG plant, the UAE will more than double its LNG export capacity to just above 15 mtpa.

It should be noted that the UAE is presently a gas importer, but it is aiming to achieve gas "selfsufficiency" by 2030 through an increase of its indigenous gas supply availability and a reduction of its domestic gas use. Gas demand by the UAE's power sector has already started to decrease due to an important increase in the share of nuclear and renewable sources of energy in its electricity supply.³⁹ Thus, the UAE will increase its gas export potential not only to Asia, its present main export region, but it could also target a share of Europe's gas market.

In July 2024, Oman announced the expansion of its LNG export capacity by a third to leverage the increasing supply potential of its recent upstream gas developments. Oman LNG is planning the addition of a fourth train to its existing LNG complex⁴⁰ and is also developing a new 1 mtpa low-carbon LNG project, Marsa LNG,⁴¹ mainly for LNG bunkering business activities through its national hydrocarbon company OQ and France's TotalEnergies.

Although not an LNG exporter, Saudi Arabia is increasingly interested in the LNG business, including the possibility of developing its own LNG export project.⁴² In 2019, Saudi Aramco signed a preliminary

³⁷ Ingram, Jamie (2023). "Adnoc Shifts Planned LNG Export Terminal from Fujairah to Ruwais", *MEES*, 05 May. <u>https://www.mees.com/2023/5/5/refining-petrochemicals/adnoc-shifts-planned-lng-export-terminal-from-fujairah-to-</u>

ruwais/a24d4300-eb3e-11ed-ad90-15945957a93c

³⁸ *European Gas Daily* (2024). "Japan's Mitsui to take 10% stake in UAE's Ruwais LNG project", Platts, S&P Global, 24 April 2024.

³⁹ Ingram, Jamie (2024). "Abu Dhabi Power Sector Gas Demand Tumbles Amid Nuclear, Solar Boom", *MEES*, 29 Mar 2024. <u>https://www.mees.com/2024/3/29/power-water/abu-dhabi-power-sector-gas-demand-tumbles-amid-nuclear-solar-boom/df900360-edd6-11ee-8ebf-3bbdcc586bd4</u>

⁴⁰ *LNG Prime* (2024). "Oman LNG to boost capacity with new train", 29 July. <u>https://lngprime.com/middle-east/oman-lng-to-boost-capacity-with-new-train/118488/?utm_source=substack&utm_medium=email</u>

⁴¹ TotalEnergies (2024). "Marsa LNG, an LNG Production Plant with a Low-Carbon Design", press release, 26 April. https://totalenergies.com/news/news/marsa-Ing-Ing-production-plant-low-carbon-

design#:~:text=In%202021%2C%20TotalEnergies%20signed%20an,renewable%20electricity%2C%20with%20a%20capacity ⁴² Ingram, Jamie (2024). "Aramco Considers Saudi-Based LNG as International Growth Moves Ahead", *MEES*, 16 February. <u>https://www.mees.com/2024/2/16/corporate/aramco-considers-saudi-based-Ing-as-international-growth-moves-ahead/7ce0f990-<u>cccf-11ee-9365-379ba4400c4c</u></u>



agreement with the US Sempra LNG to offtake LNG from Phase 1 of the Port Arthur LNG project.⁴³ In September 2023 it announced its interest in acquiring a minority stake in the US LNG company MidOcean Energy, completing the deal in May 2024.⁴⁴ A month later, it signed two non-binding agreements with two US LNG companies, to acquire a 25% equity stake in Sempra LNG's planned expansion project⁴⁵ and to offtake 1.2 mtpa of LNG from NextDecade's Rio Grande LNG plant in Texas.⁴⁶ Saudi Aramco has also unsuccessfully bid for the acquisition of Singapore's LNG trader, Pavilion Energy.⁴⁷

A Saudi Arabia-based LNG export project is unlikely to be developed any time soon, but with the big expansion of its indigenous gas production, a Saudi LNG export scheme could still be a longer-term option. This will depend on domestic and international gas market conditions and Saudi Arabia's strategic priorities.

The GCC's LNG export potential is expected to increase beyond the Qatari LNG capacity expansion projects and includes new expanded capacities in the UAE and Oman. Though it is not clear what markets these additional sources of GCC LNG exports will target, the European gas market could potentially be considered. Therefore, the issues arising from a shrinking European gas market and the EU decarbonisation and methane emission reduction measures will potentially affect not only MENA's existing natural gas exporters to Europe, but also the UAE and Oman as they expand their LNG export capacity.

3.3 North Africa's long-term export uncertainties

Contrary to the ongoing sizeable expansion of the GCC's LNG export capacity, North African gas exporters Algeria, Egypt and Libya are beset with uncertainty over their long-term gas export prospects to Europe.

Among the current four main MENA gas exporters to Europe, Qatar is by far the largest natural gas reserve holder, as shown below. North Africa's relatively more modest proven gas reserves, slow upstream gas development and persistent growth in domestic gas demand are key constraints on the long-term gas export capability of this MENA subregion. In the case of Libya, there is the additional adverse impact of the country's internal political conflict and the related issue of lack of infrastructure maintenance and refurbishment.

⁴³ Saudi Aramco (2019). "Sempra LNG and Aramco Services Company sign heads of agreement for Port Arthur LNG", press release, 22 May. <u>https://www.aramco.com/en/news-media/news/2019/sempra-Ing-asc-port-arthur</u>

⁴⁴ Ingram, Jamie (2024). "Aramco Finalizes LNG Investment", *MEES*, 10 May. <u>https://www.mees.com/2024/5/10/news-in-brief/aramco-finalizes-Ing-investment/b7e648b0-0ec9-11ef-a8b9-854f40540770</u>

⁴⁵ Reem Shams Eddine, Reem (2024). "Saudi Aramco Signs Another Big US LNG Deal", *Energy Intelligence*, 26 June. <u>https://www.energyintel.com/00000190-54ed-df74-a79f-5ffd7c3c0000</u>

⁴⁶ Aramco (2024). "Aramco and NextDecade announce Heads of Agreement for offtake of LNG from Rio Grande LNG Facility", press release, 13 June. <u>https://www.aramco.com/en/news-media/news/2024/aramco-and-nextdecade-announce-heads-of-agreement-for-offtake-of-lng-from-rio-grande-lng-facility</u>

⁴⁷ Tani Shotaro and Mercedes Ruehl (2024). "Shell beats Saudi Aramco to Temasek's LNG business", Financial Times, 18 June. <u>https://www.ft.com/content/2a4ffd8f-2453-4f6c-b376-984ef4929f93</u>



30,000 25,000 20,000 15,000 5,000 5,000 - Algeria Libya Egypt Qatar

Figure 4: Proved gas reserves of MENA's main gas exporters to Europe - 2023 (bcm)

Source: OPEC & APS.

As shown in Figure 5, gas use as a percentage of marketed gas production is already high for all North African gas exporters, especially Egypt. The current very challenging situation of Egypt's gas balance has resulted in its return to the status of gas importer.⁴⁸



Figure 5: MENA's main gas exporters to Europe - % gas use relative to production - 2023

Source: OPEC

Unless major upstream hydrocarbon investments take place in the next few years resulting in a proving up of additional gas reserves and effective efforts are deployed to manage domestic gas consumption growth, North Africa's gas available to export beyond 2030 or 2040 will be limited. This situation is illustrated in the OIES scenarios presented in the figure below. It should be stressed that these are scenarios and not forecasts.

⁴⁸ Stevenson, Peter (2024). "Cairo plans bumper winter LNG imports, but power cuts may return", *MEES*, 13 September. <u>www.mees.com</u>





Figure 6: Scenarios for North Africa's potential long-term gas exports (bcm)⁴⁹

Source: OIES, ENTSOG, GIIGNL

3.4 Other potential MENA sources of gas exports to Europe

In June 2022, the European Union signed a tripartite agreement with Egypt and Israel to boost European gas imports from them within the framework of the Eastern Mediterranean Gas Forum.⁵⁰ At present, the only East Med source of gas exports is Israel, which has become Egypt's largest source of gas imports. Israel also exports smaller volumes of gas to Jordan. Potential non-Egyptian sources of natural gas exports from the East Mediterranean to Europe - Israel and perhaps eventually Cyprus - require major investment in new gas export infrastructure that is unlikely to materialise soon, especially in view of the ongoing Middle East conflict.

Egypt's relatively large gas supply infrastructure and under-utilised liquefaction facilities could be utilised to channel East Med gas supplies to Europe but this will depend on whether there will be a commercially viable European demand for East Med gas as large volumes of additional LNG supplies from the US and Qatar become available by the end of this decade. Natural gas supplies from the East Mediterranean will probably continue to be traded within the subregion, with Egypt being the largest market for gas use and gas imports.⁵¹

3.5 GCC – Largest long-term source of MENA gas exports

The above overview of the long-term prospects of natural gas exports from the MENA subregions shows that by 2030 and beyond, the GCC's gas exporters could potentially emerge as the largest MENA source of gas supplies to Europe. This does not mean that exports from North Africa will stop altogether. But North Africa's share of gas supplies to Europe would diminish considerably over the coming decades, unless major upstream gas developments take place and the issue of North Africa's unabated rapid domestic gas demand growth is effectively addressed.

Therefore, in the long-term, EU green regulations may not be that relevant for non-GCC gas exporters, as their share of gas supplies to Europe declines over the next twenty years. However, it is still important that all MENA gas producers continue to pay attention to EU decarbonisation and methane emission reduction measures, as they will also affect gas development investments in these countries. Fortunately, MENA's policy makers have already started looking at these international climate change-related regulations to reduce their GHG footprint, not only to secure the continuation of their hydrocarbon exports, but also to address their own energy transition process.

⁴⁹ Fulwood, Michael (2024). "Energy Transition Scenarios: Impact on Natural Gas", OIES, June. <u>https://www.oxfordenergy.org/publications/energy-transition-scenarios-impact-on-natural-gas/</u>

⁵⁰ Samir, Sarah (2022). "Egypt Signs Tripartite Deal to Boost Natural Gas Exports to Europe", *Egypt Oil & Gas*, 15 June.

https://egyptoil-gas.com/news/egypt-signs-tripartite-deal-to-boost-natural-gas-exports-to-europe/ ⁵¹ Bowden, Julian and Elad Golan (2024). "East Mediterranean gas: a triangle of interdependencies", OIES, May.

https://www.oxfordenergy.org/publications/east-mediterranean-gas-a-triangle-of-interdependencies/



4. Reducing MENA gas exporters' GHG footprint

4.1 Regional climate change context

The economies of most MENA hydrocarbon producing countries are poorly diversified. Even petrochemicals (including fertilisers) and other industries such as aluminium and steel depend on the supply of low-priced hydrocarbon-based feedstock and energy. Therefore, these countries rely heavily on their oil and natural gas endowment to develop their economies and meet their rapidly growing domestic energy and feedstock needs. Revenue generated by oil and natural gas exports has for decades funded the bulk of their economic development projects. For these countries, environmental regulation has been considered but not ranked as highly as revenue generation.

Several decades ago, the focus on the reduction of gas flaring and CO₂ removal projects in the MENA region were mainly motivated by financial considerations rather than by climate policy. For example, in the 1970s, Saudi Arabia launched a major initiative to stop the flaring of associated gas produced with crude oil and developed what is today one of the world's largest industrial zones - Jubail Industrial City -⁵² to use the recovered gas and extracted liquids in large scale chemical complexes. MENA's first hydrocarbon-related carbon capture and storage project was launched in Algeria in 2004, but for safety reasons was stopped in 2011.⁵³ It was built to extract and store CO₂ from the gas produced at the In Salah site in southwest Algeria. The reduction of the CO₂ content of the gas was required to obtain pipeline quality natural gas that could be transported and marketed.

More recently, MENA governments have become more sensitive to the question of climate change, which is already affecting them significantly through an increasing and worsening number of extreme weather events.⁵⁴ There is a "*prise de conscience*" in the MENA region that the issue of climate change cannot be ignored, and that mitigation and adaptation actions are urgently needed.

But these countries are faced with a very challenging dilemma. On one side, they are experiencing in real time the negative impact of climate change, but they also remain heavily dependent on oil and gas as their main source of revenue. This difficult situation will inevitably result in different energy transition pathways and implementation schedules being adopted in these hydrocarbon producing countries.

Most of the MENA gas exporters have signed the Paris Agreement and started developing legal and regulatory frameworks to develop cleaner energy solutions, such as the introduction or expansion of renewable sources of electricity and other decarbonisation projects.

Various MENA countries have set up renewable energy plans with ambitious targets. MENA's gas exporting countries are planning to increase the share of renewables in their electricity generation capacity mix substantially, as indicated in Table 1. If these objectives are attained, the increasing share of renewable energy in the generation mix will reduce natural gas demand by the power sector and potentially make additional volumes of natural gas available for exports, a possible trend that is slowly starting to emerge in some GCC gas producing countries (e.g. the UAE).

⁵² Bechtel. "Jubail Industrial City, Saudi Arabia", <u>https://www.bechtel.com/projects/jubail-industrial-city/</u>

⁵³ IEEFA (2022). "The Carbon Capture Crux: Lessons Learned", September. <u>https://ieefa.org/resources/carbon-capture-crux-lessons-learned</u>

⁵⁴ Dourian, Kate (2024). "Moving Heaven and Earth to Manage Mena Climate Change Risk', MEES Insights, 09 May. <u>www.mees.com</u>



	share	date
Algeria	27%	2035
Qatar	30%	2030
Egypt	~ 60% ⁵⁵	2030
Libya	6.6 GW	2030
UAE	50%	2050
Oman	35% - 39%	2040

Table 1: Targeted renewable energy share (or capacity) in total electricity generation capacity

Sources: TCN Algeria⁵⁶, Business Today⁵⁷, IRENA^{58 59}

Implementation progress varies from country to country. Some countries have limited financial resources, expertise, adequate technologies, and policy incentives to put in place the relevant decarbonisation and methane emission reduction projects. In fact, the Nationally Determined Contributions submitted by some of these countries to the United Nations Framework Convention on Climate Change contain mitigation actions that are conditional. Their implementation will depend on the provision of external funding and technologies. Regarding the reduction of greenhouse gas emissions, some MENA countries and/or their national oil and gas companies have announced net-zero targets, though with different target dates.

It is important to stress that MENA countries, like all other Global South countries, feel very strongly about the fact that they should decide themselves what their energy transition pathways and implementation horizons should be. This has been a major issue in all climate change conferences, especially during the COPs. It is expressed in the text of the COP 28 final declaration where there is a call on "Parties to contribute to the following global efforts, in a nationally determined manner, taking into account the Paris Agreement and their different national circumstances, pathways and approaches..."⁶⁰ "Transitioning away from fossil fuels in energy systems" will have to be done in "a just, orderly and equitable manner..."⁶¹

4.2 Emission reduction actions

In the MENA hydrocarbon producing countries, efforts to reduce the GHG footprint of their oil and natural gas operations differ from one country to another. In each country, these efforts are conducted by the national oil and gas company (NOC) on its own or jointly by the NOC and the international oil and gas companies operating in their energy sector.

These GHG emission reduction plans, strategies and/or actions have been preceded by each country's preparation of the relevant legal and regulatory framework at the national level, reflecting its Nationally Determined Contribution.

⁵⁷ Business Today (2024). "Egypt to increase renewable energy by 60% within energy mix by 2030", 20 February.

⁵⁵ New higher target. It was initially 42% by 2035.

⁵⁶ Ministere de l'Environnement et des Energies Renouvelables (2023). "Troisieme Communication Nationale de l'Algerie", October 2023. <u>https://unfccc.int/sites/default/files/resource/TCN_Alg%C3%A9rie%20VF%2022102023%20rev%207.pdf</u>

https://www.businesstodayegypt.com/Article/1/4095/Egypt-to-increase-renewable-energy-by-60-within-energy-mix ⁵⁸IRENA (2023). "Renewable energy markets: GCC 2023", December. <u>https://www.irena.org/Publications/2023/Dec/Renewable-energy-market-analysis-GCC</u>

⁵⁹ IRENA (2023). "North Africa: Policies and Finance for Renewable Energy Deployment", December. https://www.irena.org/Publications/2023/Dec/North-Africa-policies-and-finance-for-renewable-

energy#:~:text=The%20brief%20by%20IRENA%2C%20highlights,energy%20in%20the%20coming%20years.

⁶⁰ The principle of "*common but differentiated responsibilities*" included in Article 2 of the 2015 Paris Agreement and which relates

to "*different national circumstances, pathways and approaches*" stated above, is not a new concept. It was officially adopted in 1992 when the UNFCCC was created.

⁶¹ UNFCCC (2023). "Outcome of the first global stocktake", COP 28, 13 December.

 $[\]underline{https://unfccc.int/sites/default/files/resource/cma2023_L17_adv.pdf}$



Some of the MENA gas exporting countries have joined international initiatives, such as the *Global Methane Pledge*⁶², the *Oil & Gas Methane Partnership 2.0*⁶³, the *COP 28 Oil and Gas decarbonisation Charter*⁶⁴, and the *Zero Routine Flaring by 2030 Initiative*⁶⁵ launched in 2015 by the World Bank-led Global Flaring and Methane Reduction Partnership (GFMR)⁶⁶.

Most of the MENA gas exporting countries are still at the announcement or planning stage for decarbonisation and methane emission reduction measures. However, countries in the GCC appear to have progressed more than others and are likely to be in a relatively better position to address EU green regulations.

The reduction of associated gas flaring and venting and the repair of methane leaks⁶⁷ is easier for MENA gas exporters to achieve than other actions like the development of CO₂ capture projects. Other measures to reduce the GHG footprint of gas export chains would also be more complex and costlier and would vary significantly from one country to another and even from one LNG plant to another within the same country.

4.2.1 CCS or CCUS

Installing Carbon Capture and Storage (CCS) or Carbon Capture, Utilisation and Storage (CCUS) facilities – a key decarbonisation measure - at adequate scale along key segments of the gas export chain remains challenging to achieve.⁶⁸ At present, there are four operational CCUS projects in the MENA region.⁶⁹ They are all located in the GCC subregion (Qatar, Saudi Arabia and the UAE) and Iraq, with only two of them set up in gas exporting countries (Qatar and the UAE). But only one of these projects, the Ras Laffan CCS project in Qatar, is presently covering gas export segments (gas treatment and LNG).⁷⁰ Another gas export-related CCS project is under construction in Qatar and is expected to come on stream in 2025.

According to QatarEnergy's latest Sustainability Report, QatarEnergy aims "to reduce the carbon intensity of [its] operations (Scope 1 and 2 emissions) by 35% across [its] LNG facilities and by 25% across [its] upstream facilities, by 2035." ⁷¹ Qatar is planning to expand its CCS capacity significantly over the next ten years from a current 2.2 mtpa to over 11 mtpa by 2035. 3.2 mtpa are already included in the North Field East and North Field South projects. Ongoing studies are taking place for the existing LNG trains with a potential carbon capture capacity of 4 mtpa. The remaining 2 mtpa CCS capacity is presently classified as projects in the pipeline.⁷²

In the UAE, two CCS projects at gas treatment facilities, where some of the gas supply will be for LNG exports, are under construction and are expected to become operational during the second half of this decade.

There are no ongoing or firmly planned CCS or CCUS projects in North Africa's gas exporting countries. Early this year studies were announced by Algeria's Sonatrach jointly with Equinor, to identify CCUS

https://www.worldbank.org/en/programs/gasflaringreduction/about

⁶² https://www.globalmethanepledge.org/

⁶³ https://ogmpartnership.com/

⁶⁴ https://www.cop28.com/en/news/2023/12/Oil-Gas-Decarbonization-Charter-launched-to--accelerate-climate-action

⁶⁵ https://www.worldbank.org/en/programs/zero-routine-flaring-by-2030/about

⁶⁶ Formerly known as the Global Gas Flaring Reduction Partnership (GGFR).

⁶⁷ International Energy Agency (2024). "Global Methane Tracker 2024," March. <u>https://www.iea.org/reports/global-methane-tracker-2024</u>

⁶⁸ Fattouh, Bassam; Muslemani, Hasan; and Raeid Jewad (2024). "Capture Carbon, Capture Value: An Overview of CCS Business Models", OIES, February. <u>https://www.oxfordenergy.org/wpcms/wp-content/uploads/2024/02/CM08-Capture-Carbon-Capture-Value_Final.pdf</u>

⁶⁹ There is a small CO₂ recovery unit operating in Kuwait to recover CO₂ from the Equate petrochemical plant. <u>https://www.gulfcryo.com/projects/co2-recovery-plant-kuwait</u>

⁷⁰ International Energy Forum (2024). "Market Assessment for CCUS in MENA region", IEF, March. <u>https://www.ief.org/ief-news/analysis-reports</u>

⁷¹ QatarEnergy (2023). "Sustainability Report 2022 - Securing a Sustainable and Cleaner Energy Future".

https://www.qatarenergyIng.qa/english/sustainability/Sustainability%20Reports/Sustainability%20Report%202022_English.pdf.pdf

⁷² QatarEnergy (2023).



opportunities at two gas producing sites (In Salah and In Amenas).⁷³ In 2022, the Egyptian government announced the development in partnership with Eni of a pilot CCS project at the onshore Meleiha hydrocarbon field in the Western Desert.⁷⁴ Eni has included a CCS unit in its latest major gas development project in Libya.⁷⁵ Thus, the CCS or CCUS decarbonisation option in North Africa remains at the planning or study level. MENA's further CCS or CCUS capacity development is likely to be concentrated in the GCC area.

4.2.2 Reducing the carbon footprint of gas liquefaction

Reducing the carbon footprint of the LNG production process presents complex technical and financial challenges depending on the age of the liquefaction facilities considered. Building new LNG plants directly with clean electrically-driven trains is much easier than the conversion of old and inefficient LNG plants using mechanical drives (steam or gas turbines).⁷⁶

Most of North Africa's LNG export plants are old facilities that have start-up dates ranging between the late 1970s and the early 2000s.⁷⁷ Several refurbishments of these plants have already been carried out. Their conversion to electrically-driven systems would be a major challenge. However, the supply of clean electricity to gas production sites, gas processing facilities and LNG plants along the LNG export chain and the establishment of more efficient and lower emission power systems are being considered in Algeria⁷⁸ and Egypt⁷⁹. It should be noted that LNG exports presently account for only about 30 per cent of Algeria's total gas exports. The bulk of its gas supplies to Europe is exported through cross-border gas pipelines. All of Libya's gas exports are transported by cross-border gas pipeline.

In the GCC, Qatar is focusing on the capture of CO₂ from its LNG plants and the clean electrification of its oil and gas installations. A 458 MW solar photovoltaic power plant is being built in Ras Laffan Industrial City, Qatar's natural gas industry hub, and is expected to be commissioned by the end of this year.⁸⁰ There is no detailed information on Qatar's new LNG trains, but they are or will undoubtedly be designed to be energy efficient with low emission rates. In the UAE, the new Ruwais LNG plant will have electrically driven systems supplied with renewable and nuclear-based electricity.⁸¹ Oman is also expected to have a new LNG plant (Marsa LNG) using electric drives supplied with electricity from a solar energy source. But this small plant's output is planned to supply mainly the bunkering market.⁸²

⁸¹ Ingram, Jamie (2023).

⁷³ Sonatrach (2024). "Partenariat SONATRACH-Equinor Signature d'un MoU relatif à la réduction des GES", press release, 11 February.

https://sonatrach.com/presse/partenariat-sonatrach-equinor-signature-dun-mou-relatif-a-la-reduction-des-ges

⁷⁴ Enterprise (2022). "Oil Ministry announces launch of Egypt's first pilot carbon capture project with Eni + raft of other green energy initiatives", 08 May. <u>https://enterprise.press/stories/2022/05/08/oil-ministry-announces-launch-of-egypts-first-pilot-</u> <u>carbon-capture-project-with-eni-raft-of-other-green-energy-initiatives-70415/</u>

⁷⁵ Carbon Capture Journal (2023). "Eni launches a major gas development project in Libya", 30 January.

https://www.carboncapturejournal.com/news/eni-launches-a-major-gas-development-project-in-libya/5394.aspx?Category=all ⁷⁶ Vincent, John and Leonardo Bergman (2023). "De-risking E-Drive Retrofits at Aging LNG Plants: Lessons Learned from Feasibility Studies", Gastech, 05 September. <u>https://www.gastechevent.com/media/2hmfdizk/john-vincent-ergina_siemensenergy.pdf</u>

⁷⁷ Only Algeria's mega LNG trains in Skikda and Arzew started in 2013 and 2014, respectively.

⁷⁸ Algerie Presse service (2023). "Solarisation de 80% des sites de production de Sonatrach à l'horizon 2030", 03 October. <u>https://www.aps.dz/economie/160780-solarisation-de-80-des-sites-de-production-de-sonatrach-a-l-horizon-2030</u>

⁷⁹ Bechtel (2022). "Shell, EGAS and Petronas award Idku Energy Hub project FEED to Bechtel-led coalition", press release, 08 September. <u>https://www.bechtel.com/newsroom/press-releases/shell-egas-and-petronas-award-idku-energy-hub-project-feed-to-bechtel-led-coalition/</u>

⁸⁰ *Power Technology* (2024). "Power plant profile: Ras Laffan Industrial City (RLIC) Solar Project, Qatar", 05 February. <u>https://www.power-technology.com/data-insights/power-plant-profile-ras-laffan-industrial-city-rlic-solar-project-qatar/</u>

⁸² TotalEnergies (2024).



4.2.3 Reducing methane emissions

The reduction of methane emissions has become a key focus of some NOCs and international energy companies⁸³ operating in MENA's gas exporting countries. In North Africa, Algeria's Sonatrach is presently preparing regular Leak Detection and Repair (LDAR) programmes to detect and repair methane leakages. In 2023, a Sonatrach-Eni LDAR campaign was initiated, and four main gas transmission pipeline systems were identified for detection and repair.⁸⁴ In Egypt, the reduction of methane emissions is one of the key elements of Egypt's Ministry of Petroleum and Mineral Resources' decarbonisation strategy.⁸⁵

In the GCC area, Qatar, the subregion's largest gas exporter participates in the Oil and Gas Methane Partnership OGMP 2.0 and has "voluntarily committed to achieving OGMP 2.0's gold standard and has published its methane emission data in the second annual OGMP 2.0 Report."⁸⁶ QatarEnergy has ongoing Leak Detection and Repair programmes.

The UAE's national oil and gas company, ADNOC, is committed to "achieve near zero methane emissions in [its] operations by 2030". It has already reduced its upstream methane emission in 2023 by 20 per cent through several measures, including carrying out "LDAR surveys and repair interventions" and an "enhancement of the accuracy of methane emissions data based on actual measurement". ADNOC participates also in the Oil and Gas Methane Partnership OGMP 2.0 and has achieved its gold standard pathway status over the last two years.⁸⁷

In Oman, Energy Development Oman (EDO)⁸⁸ is a signatory of the Oil and Gas Methane Partnership OGMP 2.0. and attained the gold standard pathway status in 2023. EDO conducted a "methane management campaign" including satellite, drone and LDAR surveys and is committed to achieve "near zero methane emissions by 2030".⁸⁹ Oman LNG has an LDAR programme and undertakes "the identification, screening, and evaluation of potential GHG reduction and energy efficiency improvement opportunities for the different emission sources via the adoption of the Greenhouse Gas and Energy Management Plan."⁹⁰

Actions to reduce methane emissions in MENA gas exporting countries are at different stages. Apart from a few countries, most of them are far from achieving the methane intensity targets set by the Oil and Gas Climate Initiative (OGCI) established by a group of leading energy companies.⁹¹ Some MENA countries are at the planning stage, whilst in others, emission identification and reduction programs have already been initiated. But detailed information and data on these programs are presently limited and not always up to date. To the best of our knowledge, there are no Measurement, Reporting and Verification (MRV) systems implemented yet in MENA's gas exporting countries.

⁸³ Eni (2023). "Eni and Sonatrach sign strategic agreements to accelerate emissions reduction and strengthen energy security", press release, 23 January. <u>https://www.eni.com/en-IT/media/press-release/2023/01/eni-sonatrach-sign-strategic-agreements-accelerate-emissions-reduction.html</u>

⁸⁴ Sonatrach News (2023). "Sonatrach reaffirme son engagement pour la reduction des GES", No. 42,

August/September/October. <u>https://sonatrach.com/wp-content/uploads/2023/12/SH-NEWS-N%C2%B042-1.pdf</u> ⁸⁵ Egypt's Ministry of Petroleum and Mineral Resources (2023). "Efforts Toward a decarbonized future", June. https://egyptoilgas.com/reports/ministry-of-petroleum-and-mineral-resources-efforts-toward-a-decarbonized-

future/#:~:text=Egypt%20is%20accelerating%20its%20decarbonization,which%20were%20launched%20in%202015 ⁸⁶ Qatar Energy (2023). "Sustainability Report 2022".

⁸⁷ ADNOC (2024). "Sustainability Report 2023". <u>https://www.adnoc.ae/en/sustainability-report</u>

⁸⁸ Previously known as Petroleum Development Oman or PDO.

⁸⁹ EDO (2024). "Sustainability Report 2023". https://edoman.om/wp-content/uploads/2024/07/Sustainability-Report-2023.pdf

⁹⁰ Oman LNG (2023). "Oman LNG Sustainability Report 2022".

⁹¹ Chen, Zichong *et al.* (2023). "Satellite quantification of methane emissions and oil–gas methane intensities from individual countries in the Middle East and North Africa: implications for climate action", *Atmospheric Chemistry and Physics*, 31 May. https://acp.copernicus.org/articles/23/5945/2023/



4.3 Different stages and focus

The above brief overview of how MENA's gas exporters to Europe are addressing their GHG footprint shows different levels of planning, focus and action, with limited up-to-date information and data available. Nevertheless, it shows that GCC gas exporters are more advanced in their actions to implement decarbonisation and methane emission reduction measures than their peers in North Africa. GCC gas exporting countries are expected to be relatively more prepared to address existing and future EU green regulations. But in addition to the key issue of Europe's shrinking gas market, meeting these regulations will still be a long process, and key questions remain unanswered. These are how and when will the EU green regulations be implemented and how relevant will they be in the long-term for MENA's gas exporting countries.

5. EU regulations - implementation uncertainties 92,93

5.1 How and when?

The main European Union green regulation that is a key concern for gas exporting countries is the recently issued EU methane emission regulation. This regulation has links with some of the other EU regulations outlined in this paper (i.e. the amended European Union's ETS legislation and the EU directive for the internal markets in renewable gas, natural gas and hydrogen).

The EU methane emission regulation will not become fully effective before 2030 since an EU methane intensity standard will have to be defined by the new European Commission whose delegated act on the methodology of how to calculate this methane intensity is planned to be issued in the Summer of 2027. The penalties for non-compliance with this regulation and how and when they will be designed and applied by EU member states also remain to be defined.

5.2 Close collaboration critical

The setting up of "methane intensity profiles" of different gas suppliers to Europe will depend on emission data collected by importers from these supply sources. Given the extraterritoriality of this challenging task, a much closer relationship between gas importers and exporters will be required.

The new EU methane intensity standard will depend on the adequate measurement, reporting and independent verification of the gas exporters' methane emissions along the gas supply chain. The MRV process' "credibility will require a detailed account of how emissions are measured, how they are reported, and whether they have been verified by an independent accredited technical body or regulatory authority." ⁹⁴ MENA's gas exporters to Europe do not have MRV systems in place. The implementation of such a system to comply with a yet-to-be defined and calculated EU methane intensity standard is undoubtedly going to be a challenging and protracted process. Close collaboration among all the stakeholders is critical for the process to move forward.

In March 2024, a new satellite, MethaneSAT⁹⁵, was launched with the objective of tracking methane leaks and emissions from the activities of the oil and gas industry.⁹⁶ The developers of this new satellite indicate that it has "the ability to precisely measure methane levels with high resolution over wide areas, including smaller, diffuse sources that account for most emissions in many regions." This performance

⁹² Olczak, M; Piebalgs, A; and J. Stern (2024). "Analysing the EU Methane Regulation: what is changing, for whom and by when?", OIES, June. <u>https://www.oxfordenergy.org/publications/analysing-the-eu-methane-regulation-what-is-changing-for-whom-and-by-when/</u>

⁹³ Cahill, Ben and Hatley Post (2024). "EU Methane Rules: Impact for Global LNG Exporter", CSIS, May.

https://www.csis.org/analysis/eu-methane-rules-impact-global-Ing-exporters

⁹⁴ Stern, Jonathan (2022).

⁹⁵ There is also the Methane Alert and Response System (MARS) system launched by the UNEP's International Methane Emissions Observatory at COP27. <u>https://www.unep.org/topics/energy/methane/international-methane-emissions-observatory/methane-alert-and-response-system</u>

⁹⁶ MethaneSAT (2024). "IN ORBIT: Successful MethaneSAT launch represents groundbreaking mission to protect the climate", 04 March. <u>https://www.methanesat.org/project-updates/methanesat-is-launching-today-on-groundbreaking-mission-to-protect-the-climate/</u>



improvement in satellite tracking of methane emissions is a welcome development that will help identify difficult-to-assess sources of emissions. However, it could also be used to "name and shame" emitters, as already publicly expressed.⁹⁷ This confrontational approach could be counterproductive and slow down the whole process of emission reduction. Working closely with producing countries would better help the common global objective of accelerating the reduction of GHG emissions. In fact, collaborative efforts, like the EU's "You Collect, We Buy" scheme⁹⁸, have already been initiated.⁹⁹

5.3 Long-term contracts & regulation ambiguities

Apart from the uncertainties related to how and when methane intensity will be defined and calculated for gas supply contracts signed after the entry into force of the EU methane regulation, the case of existing gas export contracts to Europe concluded before this date is not clear.

For these operational supply contracts, Article 28 of the methane emission regulation stipulates that "importers shall undertake all <u>reasonable efforts</u> to require that crude oil, natural gas or coal is subject to monitoring, reporting and verification measures applied at the level of the producer that are equivalent to those set out in this regulation." Furthermore, the same article indicates that "those efforts may include the amendment of those contracts", a delicate contractual matter to address.

The undefined concept of "all reasonable efforts" could be subject to different interpretations. It could lead to some form of discrimination against exporting countries that are considered, rightly or wrongly, not to have acceptable or "equivalent" GHG emission regulations. This could also result in the "friend-sourcing" of gas supplies, as indicated earlier in this paper.

5.4 Europe's gas market and regulations' implementation timeline

The EU's methane emissions regulation will clearly not become fully effective before 2030. Beyond this date, it is not clear how much natural gas will be consumed in Europe. Nevertheless, it should be stressed that natural gas is highly unlikely to disappear completely from Europe's energy mix over the next three decades, even under a worst-case scenario for gas, as shown in Figure 1. The critical elements to consider are, how much gas Europe would need to import and who would still be able to supply it over this period. Furthermore, whether Europe's gas market would be able to continue to attract existing and potential new gas exporters.

A highly optimistic decarbonisation and methane emission reduction scenario that assumes the fasttrack implementation of EU green deal regulations and a significant reduction of Europe's gas market size would raise a fundamental question about the future role and relevance of Europe in international natural gas trade.¹⁰⁰ Why would MENA's gas exporters to Europe, especially those with limited gas reserves, continue to invest in future gas exports to a shrinking natural gas market with constraining green regulations?

For MENA gas exporters, the uncertainty surrounding the impact of EU decarbonisation and methane emission regulation on the one hand, and the shrinking size of the European gas market on the other, raise questions about the timeline, which will affect MENA's gas suppliers quite differently.

The long-term application of EU decarbonisation and methane emission regulations would have a limited impact on gas exporters in North Africa, where there would potentially be declining gas volumes available for exports. They could also have no impact, if in the long term, North African gas producers decide to switch their gas exports, or whatever volumes they will have available for exports, to non-European gas markets with limited green regulation. But moving away from their natural market in

 ⁹⁷ Damien Carrington (2024). "Satellite to 'name and shame' worst oil and gas methane polluters", *The Guardian*, 04 March.
<u>https://www.theguardian.com/environment/2024/mar/04/satellite-to-name-and-shame-worst-oil-and-gas-methane-polluters</u>
⁹⁸ European Commission (2023). "EU announces €175m financial support to reduce methane emissions at COP28", 02

December. https://ec.europa.eu/commission/presscorner/detail/en/ip_23_6057

⁹⁹ Further developments are expected to be announced about this scheme at the forthcoming COP29.

¹⁰⁰ Boussena, Sadek and Catherine Locatelli (2024). "Le gaz et la guerre en Ukraine: Ou va le marche international?", L'Harmattan, Paris. <u>https://www.editions-harmattan.fr/livre-</u>

le gaz et la guerre en ukraine ou va le marche international sadek boussena catherine locatelli-9782336436791-79200.html



Europe will be a challenging task to achieve. Moreover, it raises the question of the future of North Africa's existing cross-border gas pipelines from Algeria and Libya to Europe. The Algerian cross-border gas pipelines to Italy (TransMediterranean) and Spain (Medgaz) supplied in 2023 over 30 bcm of natural gas to Europe, a non-negligeable volume in times of supply crisis. These pipelines that are transporting a relatively large supply of gas to Europe are valuable gas supply diversification assets. With that in mind, Italy and Spain's natural gas importing companies, possibly with support from the European Commission, may decide jointly with Algerian stakeholders, how to best address EU green regulations that could affect these gas trade assets.

6. Conclusions

MENA gas exporters are facing long-term market and regulatory challenges in Europe. The near threeyear continuous decline in Europe's gas demand since the beginning of the Ukraine crisis is a key challenge for these exporters who are concerned about whether this fall in gas consumption is a structural market transformation that will reduce significantly the size of Europe's long-term gas market.

Natural gas exporters to Europe will also be facing the impact of new EU green regulations. Although this will be a long-term impact and is likely to affect some exporters more than others, it is still a source of concern for MENA's oil and gas exporters, who are not the only exporters expressing concerns about EU green regulations. US LNG exporters are also affected. But it is interesting to note that the US has adopted a strategy of direct communication and cooperation with the European Commission to possibly negotiate an agreement on how to address this regulatory issue. This is a strategy that MENA gas exporters may consider.

In recent years, MENA hydrocarbon producing countries have become very conscious and concerned about the adverse impact of climate change on their economies, as several of them are already experiencing an alarming rise in extreme weather events. But these countries' poorly diversified economies remain heavily dependent on hydrocarbons as their main source of revenue. It is this challenging dilemma and the interrelated issue of Europe's shrinking gas market that MENA gas producers must address as Europe deepens what is the world's most ambitious decarbonisation and methane emission reduction programme.

An overview of how MENA gas exporters are tackling the issue of reduction of the GHG footprint of their hydrocarbon operations shows different levels of planning, focus and actions among the different MENA subregions. Although there are limited detailed and up-to-date information and data available on this subject, it appears that the GCC gas exporters are more advanced in their actions to implement decarbonisation and methane emission reduction measures than North Africa's gas exporters.

The pertinent EU green legislations are the methane emission regulation, the amended Emission Trading System or ETS and the EU directive for the internal markets for renewable gas, natural gas and hydrogen. The EU's new regulation on carbon border adjustment mechanism or CBAM does not cover natural gas imports, but it cannot be ignored. It will affect MENA gas exporters who are also exporters of products that utilise natural gas and that are covered by the CBAM legislation (e.g. fertilisers). Any negotiations between the EU and MENA gas exporters on the reduction of GHG emissions will undoubtedly bring up the issue of the CBAM regulation. Though, for MENA countries that can offer low-carbon products complying with the CBAM regulation, there could be advantages in terms of access to European markets. But the EU green legislation that concerns MENA gas exporters the most is the recently issued methane emission regulation.

According to the timeline announced, the EU green regulations and the EU directive for the internal markets for renewable gas, natural gas and hydrogen are unlikely to be fully implemented before 2030. Moreover, given the implementation ambiguities that have emerged so far, it is possible that the effective implementation timeline of the EU's green deal regulations could be further delayed.

These uncertainties regarding a realistic implementation timeline for EU decarbonisation and methane emission regulations will affect gas exporters in the MENA subregions quite differently. Based on announced implementation schedules, in the long-term, application of these regulations would have a limited impact on North Africa's gas exporters. There is also the possibility that they would have no



impact on North African gas producers, if they decide to switch their gas exports to non-European gas markets. This change of export focus, which would not be easy, raises the issue of what to do with North Africa's existing cross-border gas pipelines from Algeria and Libya to Europe. The Algerian cross-border gas pipelines to Italy and Spain are valuable gas supply diversification assets that transport a relatively large volume of gas supply to Europe. Therefore, Italy and Spain's importing companies, possibly with support from the European Commission, may decide jointly with Algerian stakeholders, how to best address EU green regulations that could affect these gas trade assets through collaborative initiatives.

In the long-term, as North Africa's gas export potential declines, EU green regulations will be more relevant for MENA's GCC gas exporters, particularly for Qatar, one of the world's largest natural gas reserve holders. It would also apply to other GCC gas exporters that are currently expanding their LNG export capacity. But, in the long-term, would there be enough natural gas demand in Europe for existing and potential new exporters, as gas export capacities increase significantly in the US and the GCC and in other regions of the world?

The expected long-term shrinking of Europe's gas market is a significant market transformation that may render compliance with EU green regulations irrelevant for some gas exporters. However, it is important to stress that decarbonisation and methane emission reduction measures will not only affect natural gas exports to Europe. They are also critical for the whole process of mobilising new international upstream investments for both MENA's domestic gas markets and potentially for gas exports to other regions that may decide in the future to introduce new decarbonisation and methane emission legislations, even if these measures are not as ambitious as those of the European Union.

The growing scrutiny by financing and insurance institutions of project compliance with Environmental, Social and Governance (ESG) principles could become a challenging and costly barrier to overcome in the funding of hydrocarbon development projects. Therefore, regardless of what Europe's gas market size will be in the coming decades and the potential impact the EU green deal legislations may have on different groups of MENA natural gas exporters, it is still important and necessary that all MENA natural gas producing countries continue their efforts to reduce their GHG footprint.