New Trends on the Global Market of LNG Carriers

The Covid-19 pandemic has brought new challenges for the global gas industry, with the LNG shipping market not being an exception. Because of the Covid-19 pandemic, the market witnessed a reduction in the global gas demand in 2020, which resulted in a slowdown of the global LNG trade and lower-than-expected demand for LNG carriers. These developments, coupled with the commissioning of a large number of new carriers, led to the oversupply of LNG carriers in the shipping market. However, a recovery of LNG demand in early 2021 has raised a question: where is the LNG shipping market drifting, and whether in the short- and medium-term there will be enough LNG carriers on the market to transport liquefied natural gas.

The last three years witnessed the record commissioning of LNG carriers, with 134 LNG carriers coming on line. As a result, at the beginning of 2021, there were over 600 LNG carriers operating in the global market (Figure 1).

In the short- and medium-term, the global LNG shipping market is anticipated to be balanced due to the upcoming commissioning of new LNG carriers. At least 142 LNG carriers, ordered recently, are expected to come on line between 2021 and 2025. Out of the total number, 46 LNG carriers are to be commissioned in 2021 followed by 38 carriers in 2022. South Korean shipbuilders account for the majority of LNG carriers on the order book. Hyundai, Samsung and Daewoo are going to build 110 carriers, while the Russian firm Zvezda has orders for 15 carriers and China's Hudong for 11 carriers.

The ratio of global LNG exports to the number of LNG carriers gives an indication of the average volume of LNG transported by one LNG carrier throughout a specific year. A higher ratio indicates a tighter LNG shipping market. Over the last decade, the LNG shipping market has loosened, supported by the increasing availability of LNG carriers. From 2011 to 2020, the ratio fell from 0.73 to 0.59, which implies that in 2020 one LNG carrier transported on average 0.59 million tonnes per annum (mtpa) (Figure 2).

The global LNG carrier fleet is renewed on a regular basis, with old carriers being scrapped and new ones continuously being added. The construction of LNG carriers has always been associated with the commissioning of new LNG liquefaction capacity. The building of LNG carriers in the mid-2000s was largely driven by the completion of LNG plants in Qatar, while in the late 2010s it was driven by the completion of LNG plants in Australia, U.S., and Russia. As a result, various groups of LNG carriers operate on the market depending on commissioning date. Currently, at least four (4) carriers in operation today were commissioned in the 1970s, 10 carriers in the 1980s, 54 carriers in the 1990s, 244 carriers in the 2000s, and 294 carriers commissioned in the 2010s.

The combined capacity of LNG carriers has also increased consistently. Over the last decade, capacity more than doubled – to 43 mtpa in 2020 – driven by the commissioning of a large

number of LNG carriers and higher capacity of new LNG carriers (Figure 3).

There are different types of LNG carriers depending on their capacity. Various factors have an impact on the choice of shipping companies to build and charter LNG carriers with specific capacity. The liquefaction and regasification capacity of LNG plants and terminals, depth of berths, movement through Suez and Panama canals or through Northern Sea Route, all play an important role in the vessel design. The larger the capacity of the involved LNG carriers, the less LNG shipments and carriers are needed for specific trade routes.

In this context, the largest group of LNG carriers is the one with capacity ranging from 166,000 million cubic metres (cbm) to 182,000 cbm, which comprises 219 carriers. Besides, 191 LNG carriers have capacity from 125,000 to 150,000 cbm, while 125 LNG carriers have capacity of 150,000 cbm up to 165,000 cbm. It is worth highlighting that Qatar's gas transportation company Nakilat owns all 45 Q-Flex and Q-Max LNG carriers operating in the world – with capacity of 210,000-217,000 cbm and 263,000-266,000 cbm, respectively – individually or jointly with international shipping companies. The average capacity of LNG carriers reached 71.2 kilotons (158,200 cbm) in 2020 compared to 54.4 kilotons (120,900 cbm) in 2000. Thus, the rising capacity of new LNG carriers leads to lower demand for new LNG carriers.

Various types of LNG carriers exist depending on the propulsion systems. Steam turbine LNG carriers, which dominated the LNG shipping market for many decades, remain the most popular ones, with 239 carriers operating on the global market. However, their dominance has been broken over the last decade, driven by the emergence of alternative, more efficient propulsion systems. Suffice to note that only 15 LNG carriers of this type were commissioned in the 2010s. Because of these new trends, today many of steam turbine LNG carriers,

especially the old ones, are being converted into FSU or FSRU (floating storage/ regasification unit). Since the mid-2000s, the global shipping industry developed alternative types of LNG carriers, driven by its aspiration to increase operational efficiency, decrease the consumption of bunker fuels, optimise the size of engine room, and expand cargo capacity. The first of them was a dual-fuel diesel electric (DFDE) propulsion system, which came on line in 2004. Later, the industry introduced other propulsion systems for LNG carriers, including tri-fuel diesel electric (TFDE), M-type, electronically controlled, gas injection (MEGI), diesel with re-liquefaction (DRL), in addition to some other types (Figure 4).

The anticipated increase in global liquefaction capacity, LNG trade and number of LNG shipments are key factors that will influence the LNG shipping market and incentivise market players to build new LNG carriers in the short- and medium-term. In this context, the GECF Member Countries will remain key players in the market. These countries have various policies towards the transportation of LNG. First, some of them do not own or operate LNG carriers. Second, others do not own but operate the fleet. Third, others own but do not operate LNG carriers. Finally, some of them both own and operate the fleet.
The planned expansion of LNG liquefaction capacity in some GECF Member Countries, mainly in Qatar and Russia, will have a huge impact on the LNG shipping market in the medium-term.

Today, the leader of the global LNG transport market is undoubtedly Qatar’s Nakilat. It owns 69 LNG carriers, individually or jointly with other international shipping companies, with a combined capacity exceeding four mt. Other companies, such as Maran Gas from Greece, GasLog from Monaco, and MISC from Malaysia, lag far behind the Qatari company. Qatar plans to expand its LNG liquefaction capacity by 49 mtpa to 126 mtpa by 2027. Such huge additions to the country’s LNG liquefaction capacity will require new LNG carrier fleet to transport LNG to the global markets. In this context, in 2020,

Qatar entered into agreements with global shipbuilders, mainly from South Korea, for over 100 new LNG carriers. These contracts will be worth nearly US$20 billion, which means that it will be the largest LNG-shipbuilding programme in the industry's history. As a result, Qatar secured around 60% of the global LNG ship construction capacity through 2027. That could lead to the tightening of the LNG shipbuilding market, which should be taken into account by other shipping companies planning to order new LNG carriers.

Russia also has plans to expand its LNG liquefaction capacity, which will require additional LNG carrier fleet. The Russian shipping company Sovcomflot has already ordered 15 icebreaking LNG carriers for the Arctic LNG 2 project from the Russian Zvezda Shipbuilding Complex, with the South Korean Samsung Heavy Industries being a technology partner of Zvezda in this project. These LNG carriers will be delivered between 2023 and 2025. Sovcomflot will own one vessel individually and 14 other carriers jointly with its partner Novatek. These carriers will enable the delivery of LNG to buyers in Asia in 15 days through the Northern Sea Route, which reduces transportation costs and transit time by half, compared to the traditional Suez Canal route. This instance will be the first time a Russian shipbuilding company will construct LNG carriers.

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New QFC member set to become global portfolio manager of

spot LNG

A Qatar Financial Centre (QFC) newcomer will establish its position as a global portfolio manager of spot LNG, or liquefied natural gas trades that will have immediate local knock-on effects, after Doha expands its LNG production from the present 110mn tonnes per annum.

This outcome is one among the “unsung” economic benefits that will follow North Field Expansion (NFE), which is also set to enhance the prospects of asset management industry in the country, the QFC said in an article.

The NFE project will not only bring up natural gas from underground, but also other valuable hydrocarbons for export and domestic use, it said, pointing out that associated hydrocarbons destined for export include 260,000 barrels per day of condensate and 11,000t/d of liquefied petroleum gas, valued at roughly $3.05bn annually (using posted 2020 average prices).

“The additional income earned through hydrocarbon exports will increasingly make Qatar a destination for asset managers and other financial institutions,” the QFC said. As imports of construction inputs and machinery wane with most

infrastructure projects coming close to completion, Qatar's trade surplus is likely to register bigger in the years ahead.
"Once NFE-related exports commence in late 2025, export earnings are destined to reach still higher. Whereas much of the immediate proceeds are destined to the Ministry of Finance and Qatar Investment Authority, there is a progressively stronger case for specialised asset managers to locate in Doha close to their future investors," QFC said.
In tandem, it said, financial institutions in the country will increasingly be called upon to provide a variety of sophisticated products to Qatari firms with a growing international footprint.
As Qatar's economy continues to grow at home in terms of complexity, and abroad with its varied connections, the financial sector is set to grow substantially.
As Qatar looks ahead, it is destined to leverage its natural gas-focused competitive cost advantages, global network, existing industrial base, innovative focus and high-profile investments to become an attractive and rewarding business destination.
The QFC plays a key part of the country's development journey, which it looks forward to supporting with vigour and indirectly offering firms on its platform noteworthy prospects.
The first certain phase concerns the North Field East that comprises an approximate $28.75bn of investments – half of which has received a final investment decision as of February 2021.
Beyond that, Qatar Petroleum, or QP, is appraising different areas of the North Field to possibly award a subsequent expansion phase within the next three years.
The QP has made this NFE investment at an opportune time, which will allow it to capture more global LNG market share and gain footholds in new markets as many competitors pull back from major projects, according to the QFC article.
Another "unsung" benefit is the North field's expansion would drive local manufacturing opportunities. Additionally, there

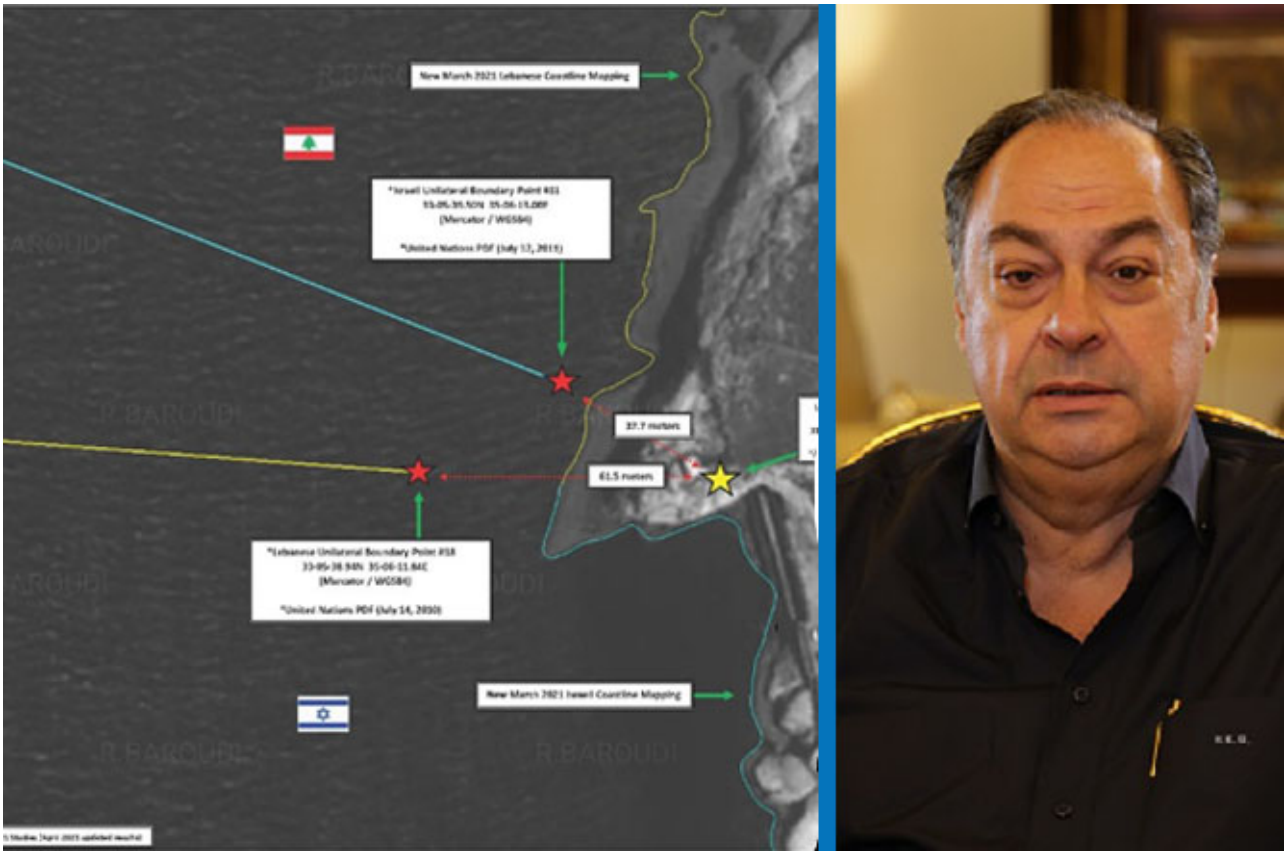
will be 4,000t/y of ethane for use as feedstock in Qatar's growing petrochemicals sector. This hike equates to nearly 50% of existing 2020 export capacity, or 36.4% of current domestic base quantities.

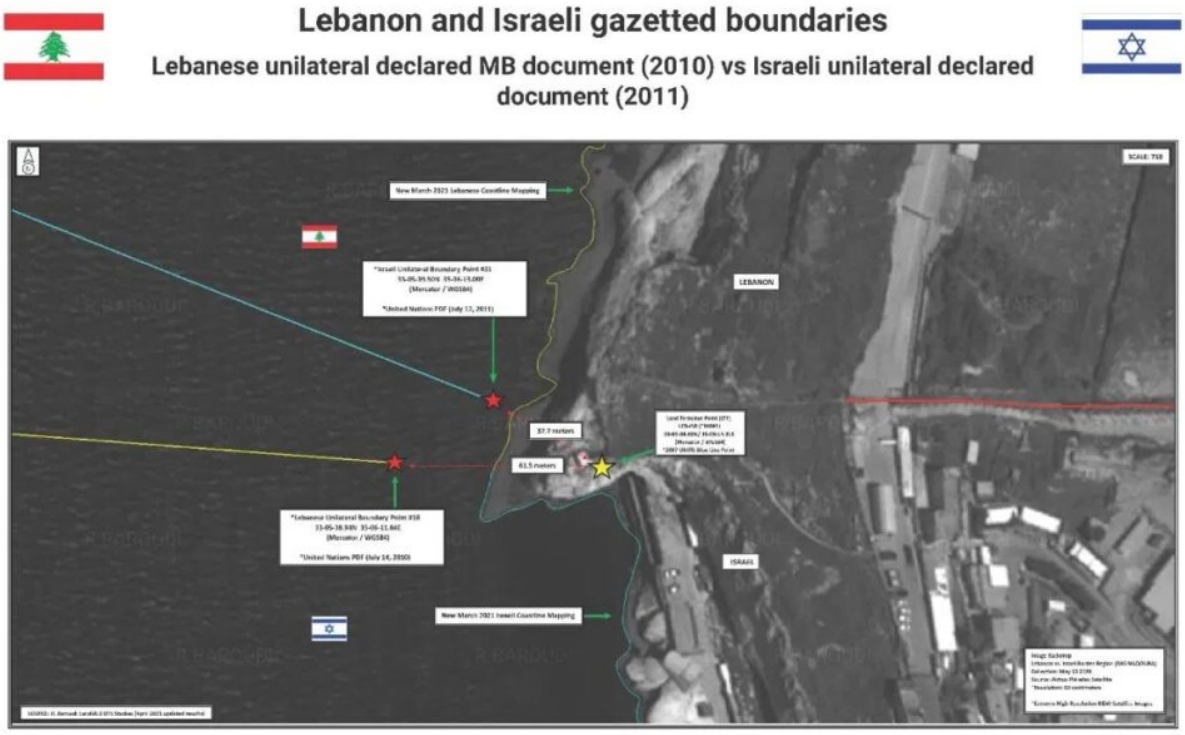
A combination of these NFE ethane volumes and those from Barzan enables Qatar to produce in future a greater variety as well as more complex petrochemicals, such as those that will originate from the joint venture with Chevron Phillips (70% owned by QP) using the Middle East's largest 1.9mn t/y ethane cracker in Ras Laffan to start production in 2025.

This is critical to the local economy, according to Gulf Petrochemicals and Chemicals Association, which recently outlined that with oil at $65 a barrel, crude producers can earn $15 per barrel by refining their output and an extra $30 a barrel on top of that by converting it into petrochemicals.

"As Qatar continues its drive to diversify economically, local manufacturing will play a key role," the QFC article said.

Lebanon vs. Israel both need to update Maritime Boundaries





Lebanon vs. Israel both need to update Maritime Boundaries – Lebanese political circles are in a tangle once again, this time over whether Lebanon should provide the United Nations with new coordinates defining the country's offshore Exclusive

Economic Zone (EEZ). In reality, two questions need answering:

1) Does Lebanon have the right to update its maritime claims to the UN?

2) If so, should Lebanon avail itself of that right in the present circumstances?

The issue is of critical importance, not only because it relates directly to Lebanon's (currently stalled) maritime boundary talks with Israel, but also because it stands to impact the speed with which it can begin to obtain tangible benefits from any undersea hydrocarbons within its EEZ.

Helpfully, the first question is the easiest. Lebanon's right to update its territorial submissions to the UN is not only enshrined in the UN Convention on the Law of the Sea (UNCLOS), but also protected by Customary International Law (CIL), and established by innumerable precedents as a standard practice of countries seeking to define and defend their maritime claims, not least because continual technological advance allows increasingly accurate mapping.

It is important to note, too, that Presidential Decree 6433 of 2010, under which Lebanon's claim was last expressed to the UN, expressly envisaged the possibility of future updates. Article 3 leaves no room for interpretation whatsoever, reading: "As needed, and in the light of negotiations with the relevant neighboring States, the borders of the exclusive economic zone may be refined and improved and, consequently, the list of its coordinates amended, if more precise data becomes available." Lest there be any doubt, and as we will see below, such data has become available.

What is more, when Lebanon's Permanent Mission to the UN submitted the claims authorized under Decree 6433, its accompanying letter included the following advisory: "There is

a need to conduct a detailed survey, using a global positioning system, of the shore contiguous to the southern limit, including all islands and spurs, with a view to updating the nautical charts and the baseline accordingly in the future." Again, to be perfectly clear: such survey work has been conducted.

Also, while Israeli officials have sought (not very convincingly) to question Lebanon's right to update its claim, their country's own October 2010 EEZ agreement (itself based on Israeli coordinates which we now know to be incorrect and which would therefore be rejected by any court or tribunal) with Cyprus also expressly recognizes the fact that under CIL, such coordinates are subject to change. Article 1 (e) of that agreement reads as follows: "Taking into consideration the principles of customary international law relating to the delimitation of the Exclusive Economic Zone between States, the geographical coordinates of points 1 or 12 could be reviewed and/or modified as necessary in light of a future agreement regarding the delimitation of the Exclusive Economic Zone by the three States concerned with respect to each of the said points."

In addition, in a subsequent unilateral submission to the UN, Israel's own mission to the world body not only referred to "the relevant provisions of Article 1 (e)", but also reproduced the language, virtually verbatim. The submission even repeated mention of "the three States concerned", which in context can only indicate Lebanon as the third state.

On Lebanon's right to submit new coordinates, then, the verdict is inescapable: it definitely has that right. Realistically, anyone who argues otherwise is either opposed to the best interests of Lebanon (which needs to develop this resource), the Lebanese (who deserve to reap the attendant economic rewards), and the Lebanese Armed Forces (which are heavily invested in a positive outcome); ignorant of the facts and the rules; or pursuing some other political, financial,

and/or other personal/partisan advantage.

Next question: should Lebanon exercise its right at this particular juncture?

On the surface, this answer is almost as clear. In 2011, just months after the Israel-Cyprus deal and Lebanon's last submission to the UN, the Lebanese government received expert analysis and advice regarding the United Kingdom Hydrographic Office charts – long considered the gold standard of maritime cartography – for the area. What the experts found is that both Lebanon and Israel had used erroneous coordinates as starting points for their maritime boundaries (please see attached map): where such points should be situated at the shoreline, both countries had placed them dozens of meters offshore. This may not sound like much, but by the time a line drawn out to sea from such a misplaced starting point reaches what should be the trijunction – where the EEZs of Cyprus, Israel, and Lebanon meet – the error could amount to several nautical miles.

Ipso facto, both Lebanon and Israel have based their previous maritime claims on faulty coordinates, which makes everything that flows from them obsolete, what the French would call "caduc" – meaning null and void. To both, this imparts not only a right to update their claims before the UN, but also an obligation to do so based on each side's own best interest. In addition, recent experience demonstrates that, especially with such evidence that their respective claims were fatally flawed, if the current talks failed and the two countries went to court or arbitration over the issue, the first thing asked of them would be to replace their faulty maps by carrying out detailed surveys and analyses in order to precisely determine any points of contention.

In the technical sense, then, yes, Lebanon should definitely move quickly to update the maritime claims it has previously submitted to the UN. But other considerations also need to be

weighed.

For instance, while Lebanon is a sovereign country, it cannot afford to entirely ignore the positions of outside actors. When these run contrary to its own wants and needs, it must weigh the pros and cons and decide accordingly. In this instance, Israeli officials have sought to discourage Lebanon from updating its claims or otherwise delaying the resumption of the aforementioned talks, raising the prospect that doing so could forestall progress, worsening tensions and forcing a longer wait for any offshore oil and gas development.

The latter point could be of particular significance because of what an energy boom could mean for the Lebanese population. Lebanon's economy has shrunk by an estimated 25% over the past year, following a debt default that led to the collapse of its currency and consumer price increases that qualify as hyperinflation. Worse, the political class has demonstrated little stomach for the kinds of reforms required to secure a bailout by the International Monetary Fund (IMF).

The current Cabinet, led by Prime Minister Hassan Diab, resigned seven months ago over an explosion at the Port of Beirut that damaged or destroyed tens of thousands of homes, so it operates in a caretaker capacity. His designated successor is also his predecessor, former Prime Minister Saad Hariri, who himself resigned in the face of popular protests that gripped the country in late 2019. While he enjoys considerable support in certain foreign capitals, Hariri's domestic position can only be described as weak, and the mere fact that he has been unable to form a Cabinet after more than half a year leaves little doubt that even if he succeeds, he largely will be incapable of decisive action on significant issues.

So we have another question: should Lebanon forego some of its rights in order to hasten an agreement that allows it to start earning some badly needed revenues from offshore resources?

The answer to that should be a resounding “no”. The border area contains some of Lebanon’s most promising offshore acreage, and in any event, there is no guarantee that giving it up would grease the wheels for a diplomatic breakthrough – and even if did, the outside investment required to get an energy industry up and running depends on a whole other set of prerequisites, not least the reforms that no one has been able to see through.

Also, in addition to the 2011 analysis, the Lebanese Armed Forces have carried out detailed studies of their own, which have significantly strengthened the Lebanese position. Senior LAF officers also have acquitted themselves with a high degree of professionalism in their US-mediated dialogue with the Israelis. In tandem with newly deposited coordinates, the quality of the LAF’s work might actually hasten the negotiating process by demonstrating that the Lebanese side will not bluster, but nor will it be bullied or bamboozled. No one expects that Washington will abandon its close relationship with Israel, but the LAF’s all-business approach, unsullied by the vagaries of Lebanese politics, encourages the Americans to be as even-handed as possible.

Again, the case for a timely and assertive amendment of Lebanon’s maritime submission seems airtight, but only if the issue can be inoculated against Lebanon’s dysfunctional politics.

Given the history of Lebanese politics, it is natural that even good-faith actors want to ensure they have sufficient political cover before making any important move. While this is certainly a step of consequence, however, its merits are so obvious that it should require only a bureaucratic and/or legal decision by the appropriate people at the Foreign Ministry. The fact that it requires higher authorization should not be an excuse for yet another chicken-and-egg standoff along the lines of those that have alienated, frustrated, impoverished, and quite literally killed hundreds

of thousands of Lebanese over the past half-century.

Rather, it should spur officials to get creative about how to make progress today without hanging people out to dry tomorrow. There are ways to compromise on procedure without sacrificing accountability, integrity, or transparency, and the stakes are so high that finding such a formula will be worth whatever effort it requires. And for once, the people of Lebanon might be able to believe their leaders are acting for purely national reasons, not personal ones.

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Qatar, Iran to drive Middle East gas production to 1,150bcm by 2050: GECF

Driven by Qatar and Iran, the Middle East gas production is expected to rise to 1,150bcm by 2050, Gas Exporting Countries Forum said Wednesday.

The two main contributors to natural gas production in the region are Iran and Qatar, with 50% and 30% respectively of total growth, GECF said while launching its Global Gas Outlook 2050's fifth edition.

Europe, on the other hand, has been seeing declining gas production in the last ten years. This downward trend is expected to continue over the Outlook period with production falling from over 200bcm in 2019 to around 70bcm in 2050.

Cyprus is the only European country to see a growth in production by over 10 bcm over the forecast period, it said.

In Asia-Pacific, only China, Australia and India are expected to significantly expand production. China is expected to account for more than 85% of the growth of gas production in the region, particularly on account of its potential to produce gas from unconventional resources. Total Chinese gas production is expected to reach 370bcm by 2050, of which 72%

will be unconventional gas.
Total Asia-Pacific production growth to 2050 is forecast to be 224bcm, of which only net growth of 20bcm is outside China. Australia is expected to grow production by 50bcm to reach almost 200bcm by 2050.
In North America, all three countries in the region (the US, Canada and Mexico) are expected to increase their production, with much of the growth being driven by new LNG export projects and new pipeline infrastructure.
Total production is expected to grow by 560bcm to reach 1,670bcm by 2050. Gas production in Eurasia is expected to increase by almost 40%, amounting to just under 1,300bcm by 2050.
Russia and Turkmenistan will source more than 78% and 17% of this expansion, respectively.
The impact of Covid-19 in 2020 is estimated to have led to around a 7% reduction in global energy-related CO2 emissions. This decline will be short-lived with a rebound in 2021 and 2022 as energy demand recovers.
In the reference case scenario (RCS), emissions grow moderately until 2030 before stabilising and plateauing at around 33.7GtCO2 over the 2030-2050 period.
Natural gas will contribute the least to emissions by 2050 (32%), despite its higher role in the hydrocarbons mix (39%), while coal will still account for a high share (33%) although its contribution to the hydrocarbons mix is much lower (23%). Further penetration of natural gas will lead to a greater potential for carbon mitigation.
The GECF has developed a Carbon Mitigation Scenario (CMS), assessing the future role of natural gas in reducing emissions. The CMS outlines the potential to mitigate emissions by 6.8GtCO2 in 2050 with an increasing penetration of gas and renewables.
These two fuels are set to increase their shares to 14% and 30%, respectively, by 2050, from 10% and 28% in the RCS. Although natural gas will play a role in reducing long-term emissions, with larger dissemination of proven and well-established technologies, there is a need to consider further decarbonization potential, including through blue hydrogen and CCUS options.

30-year total investment in gas to reach $10tn by 2050: GECF

Global natural gas production is forecast to grow by around 1,900bcm to reach more than 5,900bcm by 2050, Dohabased GECF said yesterday. Total investment in gas (including upstream and midstream activities) between 2020 and 2050 will reach a cumulative $10tn, the Gas Exporting Countries Forum said, unveiling its 2020 edition of the 'Global Gas Outlook 2050' yesterday. The GECF said in Asia-Pacifi c, only China, Australia and India are expected to signifi cantly expand production.

Total Asia-Pacifi c production growth to 2050 is forecast to be 224 bcm, it said. In North America, all three countries (the US, Canada and Mexico) are expected to increase their production. Total production is expected to grow by 560bcm to

reach 1,670bcm by 2050. Gas production in Eurasia is expected to increase by almost 40%, amounting to just under 1,300bcm by 2050. According to the GECF, the Middle East gas production is expected to rise to 1,150bcm by 2050.

Europe's downward trend is expected to continue with production falling from over 200bcm in 2019 to around 70bcm in 2050. Africa will grow from 250bcm (6.4% of global production) in 2019 to around 600bcm (just over 10% of global supply) by 2050. Natural gas production in Latin America is expected to increase by over 110bcm to reach 280bcm by 2050. The 'Global Gas Outlook 2050' revealed that energy transition is underway and natural gas together with renewables will gain in importance and will be the major contributors to incremental growth in global energy demand, together accounting for more than 90% of the additional 3,520mn tonnes oil equivalent (Mtoe) through to 2050.

The Forum said natural gas and renewables will make up 60% of the electricity supply, changing the global power generation mix by 2050. Natural gas, it said, will overtake coal in 2025 and become the largest global primary energy source by 2047, with oil plateauing around 2040 and then beginning its irreversible decline. According to the GECF, renewables' share in the global energy mix will rise from 2% in 2019 to 10% in 2050.

Natural gas demand will rise by 50%, reaching 5,920bcm in 2050, and will expand specifi – cally across the Asia Pacifi c, North America and Middle Eastern markets, which together will provide more than 75% of additional gas volumes through to 2050. The Asia Pacifi c region, given its enormous potential, will become the largest gas consumer, doubling its consumption to 1,660bcm by 2050. The share of traded LNG will increase to approximately 48% of all traded gas in 2030 and 56% in 2050, respectively, the GECF said. LNG regasifi cation from existing, under construction, potential, proposed, stalled and speculative projects is expected to be around

1,398mtpy.

It is projected that over the outlook period, 1,990bcm out of around 5,920bcm global natural gas demand will be imported, including 1,105bcm from the GECF member countries. In his overview of the latest fi ndings of the Outlook 2050, GECF secretary general Yury Sentyurin highlighted the vital role natural gas will play in the global energy mix by raising its share from currently 23% to 28% by 2050, thanks to its remarkable features of abundance, fl exibility, aff ordability, and environmental effi ciency. Sentyurin said, "The complexity of factors and the multiplicity of stakeholders within the energy sector results in myriad shifting strategies that are shaping the new architecture of the future.

Nevertheless, the mid- and longterm fundamental factors that favour natural gas remain unchanged. This plentiful, adaptable and, crucially, clean source of energy will expand across Asia Pacifi c, North American and Middle Eastern markets." The GECF Global Gas Outlook 2050 was launched at an online event attended by energy ministers and senior representatives from the Forum's member countries together with a bevy of dignitaries and gas industry stakeholders yesterday. Its detailed quantitative assessments account for national energy strategies, environmental and climate policies, and investments and business decisions. The forecast remains the fl agship publication of the association of 19 member countries, which together represent 70% of the world's proven gas reserves, 44% of its marketed production, 52% of pipeline, and 51% of LNG exports in the world.

النفط والغاز في شرق المتوسط ثروة للتقدم والرخاء | فيديو

Qatar on track to be world’s largest LNG producer: Rystad Energy

Qatar’s move to sanction the $28.7bn North Field Expansion project puts the country on track to return as the world’s largest LNG producer by 2030, the Oslo, Norway-based Rystad Energy has said in a report.

Qatar’s liquefaction capacity will rise to 110mn tonnes per year (tpy), or 18% of the global total, which is for now estimated at 600mn tpy at the end of the decade. Still, more projects are expected to be sanctioned as LNG demand will grow faster than supply, it said.

The North Field Expansion (NFE) project is also making the Middle East, the world’s top region for oil and gas project sanctioning in 2021, Rystad Energy said.

The independent energy research and business intelligence firm expects rising oil prices to trigger sanctioning of global projects worth about $100bn this year, of which the Middle East is set to contribute almost 40%, or $40bn.

More than 26 Middle Eastern projects worth a total of about $50bn have been delayed over the past year, with NFE making up the lion’s share as it was pushed to 2021. As this year got under way, the region had projects worth $98bn, due for sanctioning from 2021 to 2023.

Among global LNG producers, Australia currently has the largest operating capacity of 88mn tpy, but will be surpassed

by Qatar and the US in the coming decade as new liquefaction capacity is commissioned.

The only Australian project Rystad Energy expects to reach a final investment decision in 2021 is Woodside's 4.5mn tpy Pluto Train 2 project, which would be developed together with the Scarborough upstream asset.

The US currently has 107mn tpy of sanctioned LNG capacity, including 36mn tpy under construction. Port Arthur LNG, Driftwood LNG, Plaquemines LNG and Freeport T4 have all signed long-term contracts or secured equity from LNG buyers, but would still need new deals to secure financing and move forward.

According to Rystad Energy's base case, global LNG demand will reach about 580mn tonnes by 2030, leaving significant room for bringing new LNG projects forward.

"We forecast that 104mn tpy of new LNG supply must be sanctioned in the coming five years to meet the gap between actual supply and demand in 2030," says Sindre Knutsson, vice president at Rystad Energy's gas markets team.

To tap the supply capacity deficit, there are almost 1,000mn tpy of new proposed capacity that will compete to attract buyers and investors to secure financing in the years ahead.

After a "poor sanctioning year" in 2020, Rystad Energy believes that the optimism is back in the market and that more final investment decisions for LNG projects will follow after Qatar's NFE.

"Qatar, however, is also likely to add extra skin in the game, as it aims to increase its LNG output capacity to 126mn tpy from the current 77mn tpy through two expansion phases of the North Field. The recently sanctioned first phase includes four new liquefaction trains to raise capacity to 110mn tpy, while the second phase will include another two new trains currently in the front-end engineering design stage," the report said.

Rystad Energy estimates the two phases collectively to reach the capacity targets by 2028 or 2029, if the second phase also gets the go-ahead.

Carbon-Neutral Or Green LNG: A Pathway Towards Energy Transition

LNG producers have started to look for ways to minimise or counterbalance their carbon footprints, says Dr Hussein Moghaddam, Senior Energy Forecast Analyst, Energy Economics and Forecasting Department

According to the latest, 2020 edition of the GECF Global Gas Outlook 2050, the demand for natural gas is expected to rise by 50% from 3,950 billion cubic metres (bcm) in 2019 to 5,920 bcm in 2050, as gas remains the cleanest-burning hydrocarbon. In spite of that, meeting global targets for climate change mitigation is one of the biggest challenges. Significant

emissions are released through the combustion of gas to drive the liquefaction process, while any carbon dioxide (CO^2) detached before entering the plant is frequently emitted into the atmosphere.

Subsequently, investors, regulators, and customers exert mounting pressure on the gas industry, as it needs to do more to accomplish climate objectives and focus on reducing emissions.

More than 120 countries have already developed a climate risk strategy that sets target to reduce greenhouse gas (GHG) emissions to net-zero by 2050. As natural gas has a central role to play in mitigating carbon emissions, LNG producers have started to look for ways to minimise or counterbalance their carbon footprints, thus ongoing LNG decarbonisation efforts are likely to expedite. Accordingly, top LNG producers, traders, and consumers have indicated their plans in order to decarbonise the LNG supply chain. This is being done in two ways: by offsetting emissions from individual cargoes retrospectively, as well as by building low-emission liquefaction terminals. As a result, the “Green LNG” term has appeared as a new product within the LNG industry.

The carbon-neutral or Green LNG market is an emerging prospect whereby “Green” indicates either the reduction of GHG, or the offset of GHG emissions, linked to some, or all elements of the LNG value chain – from production of upstream gas and pipeline transportation, to liquefaction, transportation, regasification, and downstream utilisation of natural gas.

Companies in the LNG value-chain can diminish GHG emissions in numerous ways. For instance, by using biogas as feedstock; by decreasing emissions from upstream, pipeline, and liquefaction facilities; by applying renewable energy to power their liquefaction plants; respectively, by using carbon capture, and storage (CCS), or carbon capture, utilisation and storage

(CCUS) technologies by reinjection of CO^2 into the subsurface after it had been detained during the processing of the feed gas before liquefaction.

Therefore, it should be taken into account that carbon-neutral does not mean that the LNG cargo generates zero emissions, rather that LNG sellers can counterbalance their GHG emissions by obtaining offsets to compensate for all or part of their GHG emissions or the utilisation of carbon credits, which reinforce reforestation, afforestation or other green projects.

It is worth nothing that last year the leaders of the G20 endorsed the concept of the circular carbon economy (CCE) and the GECF is the part of this process. The CCE aims to include a wide range of technologies such as CCS/CCUS as a way to promote economic growth and to manage emissions in all sectors.

In contrast, Qatar Petroleum (QP) is the company that applies a combination of strategies to reduce its emissions. Its future LNG production will be low-carbon based, as the company is building a CCS facility alongside its 126 mtpa liquefaction capacity expansion by 2027.

As part of its new sustainability strategy, QP has announced that its aim is to reduce the emissions intensity of its LNG facilities by 25% by 2030. The capture and storage of CO^2 from its LNG facilities of about 7 mtpa by 2027 is another goal. Furthermore, QP aims to drop emissions at its upstream facilities by at least 15%, as well as cut flaring intensity by over 75% by the end of this decade. Additionally, by 2030, QP is attempting to abolish routine flaring, and by 2025, the company would like to minimise fugitive methane emissions along the gas value-chain by establishing a methane intensity target of 0.2% over all of its facilities.

In certain supply contracts of the company, environmental

considerations are incorporated as well. In November 2020, QP signed the first long-term deal with “specific environmental criteria and requirements”, which was designed to minimise the carbon footprint of the LNG supplies with Singapore’s Pavilion Energy, and to provide 1.8 mtpa of LNG over a 10-year period.

In order to fulfil the objectives of decreasing GHG emissions, CCS also helped the case in Australia. Chevron is the operator of the 15.6 mtpa Gorgon LNG offshore Western Australia and has injected more than 4 million tonnes of CO2 in the CCS facility since its commissioning in August 2019.

Meanwhile, NOVATEK has embraced a long-term methane emissions reduction target by 2030 in Russia, mainly to diminish methane emissions per unit of production by 4% in the production, processing and LNG segments. Moreover, the company aims to decrease GHG emissions per tonne of LNG produced by 5% [5]. In this regard, NOVATEK and Baker Hughes, which provides engineering and turbomachinery at Yamal LNG, signed an agreement to introduce hydrogen blends rather than solely running methane from feed gas into the main process for natural gas liquefaction to reduce CO2 emissions from NOVATEK’s LNG facilities.

Bio-LNG will have a significant role in the coming years to form the heavy road and water transport in the Netherlands. The construction of the first Dutch bio-LNG installation was launched in Amsterdam last November. Renewi (the waste management company), the Nordsol (for processes the biogas into bio-LNG) and Shell (to sell this bio-LNG at its LNG filling stations) have developed this project. Biogas is made up of roughly 60% methane and 40% CO2. An additional CO2 cutback takes place due to the recycling of the CO2 by-product in the market, which results in a 100% CO2 neutral fuel [7].

Inpex, which is Japan’s biggest oil and gas producer, has recently disclosed its strategy to become a CO2 net-zero company by 2050 by developing its renewable and hydrogen

energy together with the utilisation of carbon capture technologies. Japan has also stated in October 2020 that the country would become carbon-neutral by 2050.

Two major LNG importer regions, namely Asia-Pacific and Europe, have already set policies regarding long-term decarbonisation targets. It is worth noting that most of the carbon-neutral LNG cargoes have been supplied by companies are in Asia to a certain extent, where carbon policies and investor pressure are fairly fragile.

According to the 2020 Edition of the GECF Global Gas Outlook 2050, it is forecasted that LNG imports to Asia will increase to about 800 bcm (585 mt) by 2050, and with 71% of global LNG imports, the region is set to be the driving engine for global LNG demand growth. As concerns with air quality rise in numerous Asian countries, the most realistic solution to attain a decarbonised society in the future by minimising the level of CO2 on a global scale, is the combination of natural gas and renewable energy. Thus, emissions and cleaner-burning fuels are going to be the centre of attention.

Europe could be the predecessor for carbon-neutral LNG in the long-term, by sticking to its new methane strategy, which was revealed by the European Commission (EC), and in accordance with their 2050 carbon-neutral goal. Importantly, the EC suggested LNG producers to engage with their international partners to explore possible standards, targets, or incentives for energy supplies to the EU.

Which part of the LNG value-chain should take responsibility?

An LNG seller will probably need to diminish and offset GHGs, which emphasises the need for robust offset markets in order to be completely carbon-neutral through the entire LNG value-chain.

Accordingly, this highlights challenges for legacy LNG projects with limited means to decrease carbon, making them

dependant on expensive market mechanisms. LNG producers have to keep the balance between the competitive fuel pricing and the expensive emissions reduction initiatives. Therefore, the question of who pays the additional costs to produce Green LNG is yet to be decided.

As noted, the balance of carbon emission is feasible for any LNG facility and can lead to carbon-neutral LNG cargoes. Although, this is probably not a sustainable long-term process and does not directly cope with the project's emissions, it is a good transformation for general LNG decarbonisation.

However, the GECF proposes that both sellers and buyers have to contribute to achieving emission targets. The discussions with respect to these issues should involve all LNG industry players, such as sellers, buyers, traders and policymakers, respectively. A more focused perspective that targets minimising emissions in upstream and liquefaction might be more feasible for LNG producers. This will also associate with the already ongoing efforts from them, as they have to control their carbon footprints under more pressure from the public and investors.

In conclusion, as LNG demand keeps expanding, the demand for Green LNG will grow as well. Green LNG can help ensure that natural gas preserves its role as a crucial part of the energy mix, supporting climate goals over the energy transition period. As stated in the 2019 Malabo Declaration, at the 5^{th} GECF Summit of Heads of State and Government in Equatorial Guinea [10], the GECF Member Countries, reiterate the strategic role of the development, deployment and transfer of advanced technologies for more effective production, and the utilisation of natural gas to enhance its economic and environmental benefits.

QP sees LNG bunkering a promising solution for shipping industry

Qatar Petroleum is actively pursuing to replace its existing bunker fuel for ships with LNG in a phased manner, which will significantly reduce QP's total shipping emissions in the LNG value chain by around 28%. Once the fleet is converted to LNG, the total CO2 reduction through this initiative will amount to approximately 1.9mn tonnes of CO2 equivalent per year, QP said in its Sustainability Report.

With a growing population, the demand for transport is anticipated to expand. More emissions also cause poor air quality, causing adverse effects on the environment and human health.

Meeting the increasing demand for transport while reducing emissions will only be achieved with a variety of solutions and technologies, such as lower-emissions liquid fuels,

biofuels, and natural gas.
“More than ever, we are committed to decarbonise the transport sector by shipping LNG to destinations in a cost-effective, efficient and environmentally friendly way,” QP said.
In 2019, QP and Shell entered into an agreement to establish an LNG bunkering venture. The creation of a joint venture company, owned equally by both parties, demonstrates QP’s firm commitment to curbing emissions from the transport segment.
On the role of natural gas in power generation, the report said the electricity share of total energy demand is around 19% but is responsible for 40% of the overall energy sector’s GHG emissions. When generated from lower-carbon energy sources, increased use of electricity will support emission reduction in the power sector, as well as in end-use industries through indirect emissions.
In addition, the combustion of fossil fuels and coal releases several pollutants that negatively affect air quality. QP monitors pollutants at affiliated power plants via a continuous emissions monitoring system (CEMS).
As of 2019, natural gas remains the only fuel to be burnt in gas turbines in Qatar, where pollutant levels are significantly lower than from oil or coal, making natural gas the key to maintaining good air quality.
“We strive to further enhance the environmental benefits of gas-fired plants, eg through lowering NOx emission,” the report noted.
“We consider the industrial sector to be crucial for providing vital products for daily lives, from aluminium, steel, and cement to food packaging, paints, and others. However, metals, cement, chemicals and transport industries are also significant consumers of energy and hence emitters of GHG emissions.
“In 2019, the industrial sector accounted for 52% of domestic gas consumption and 19% of total CO2 emissions in Qatar (metals and petrochemicals only). Reducing energy demand and emissions from the industrial sector over the long term, without impacting economic and social development goals, will

require effective implementation of energy efficiency strategies, switching to lower carbon fuels and raw materials, and leveraging the best available technologies for GHG reduction.

“Our use of cleaner gas in these industries offers an unrivalled advantage to operate at significantly lower GHG emission and pollutant levels compared to those in coal or oil-based industries. Besides, the use of natural gas in industry has other significant benefits: gas almost completely combusts, while coal produces large volumes of ash and slag, which require costly handling and disposal and gas boilers supplied by pipelines do not require on-site fuel storage, loading, or waste disposal,” QP said.

GECF commences educational campaign on benefits of natural gas

The Gas Exporting Countries Forum (GECF) has activated a new communication campaign on its social media channels that raises awareness about the benefits of natural gas as well as simplifies the facts of an industry often perceived as data heavy.

Being run on GECF's Twitter and LinkedIn channels, the 'Did You Know…?' series of posts provide easy-to-understand facts, figures, and data on an energy source that likely powers the batteries of the phones users will read the information on. It also calls to attention any misconception around this important source of energy found in abundance in pockets around the world.

"In the midst of an 'infodemic' it is increasingly hard to differentiate facts from the noise. Further, due to the complexity of energy systems, end-users rarely get to glimpse at the processes that eventually power most aspects of their daily lives, such as electricity at home, prospects for front-running technologies, fuelling of vehicles and so on," said GECF secretary general Yury Sentyurin.

Scientifically-grounded data and insights are championed at the GECF, which was established to bring a better understanding about technology that underpins the full spectrum of energy areas, to promote natural gas as the fuel

of choice, as well as to promote cooperation at all levels of global energy system.

The forum recently entered a landmark MoU with Unesco to further enhance its role in environmental protection and to cultivate a “culture of energy responsible behaviour”.

“Our campaign’s goal is to de-mystify the world of energy and, really, democratise it for every one’s understanding. Today, as we live in times of rising appetite for energy, ever-increasing struggle for climate protection and better future for all, social media has become a tool in global geopolitics.

The ‘Did You Know…?’ campaign aims to empower the community around the world with a new appreciation and understanding about an element that holds such a powerful impact on people’s quality of life,” the forum’s representative noted.

According to the latest available projections, quantified through the use of unique and highly granular GECF Global Gas Model, fossil fuels will maintain a leading role in the global energy mix, accounting for at least 71% in 2050 (against 81% in 2019) of the world’s energy need.

Meanwhile, natural gas will be the only hydrocarbon resource to increase its share from 23% today to 28% in 2050.

“Natural gas is often lumped together with other traditional fuels due to its origins as a hydrocarbon fuel without recognising the attributes that distinguish it for its low-emissions and dynamic flexibility. As a platform dedicated to promoting the use of this cleanest of the fossil fuels, we felt it is important to broaden people’s understanding of its economic and environmental advantages,” Sentryurin emphasised.

To follow the ‘Did You Know…?’ campaign, visit the GECF website www.gecf.org, Twitter @GECF_News, and GECF LinkedIn page.