Global Voice of Gas

BY THE INTERNATIONAL GAS UNION

ISSUE 4 | VOL 03

2023: FRAGILE EQUILLIBRIUM WITH UNCERTAINTY AHEAD

Global Gas Year in Review: One Year Closer to Crisis End?

COP28 brings new commitments on methane emissions

Policy support spurs clean tech development

Innovation at the heart of emissions reduction

Message from the President

Dear readers, welcome to the final issue of the *Global Voice of Gas* quarterly magazine in 2023.

The COP28 concludes as this issue goes to production.

The world needs a technology-neutral and outcome-focused approach to solve climate change, one of its greatest challenges. The world needs efficient climate policy frameworks to incentivise aggressive and urgent emissions reductions throughout the entire economy and across regions. To succeed, the COP process must empower action in a way that does not deny the unique sets of priorities across parties. It most of all needs to be realistic and achievable, focusing on what can be done now to effectively drive real change.

It has been a highly constructive experience for me personally to be in Dubai during this COP and to join the industry representatives who were welcomed as the necessary contributors to solving the common challenges of decarbonising the global economy. The IGU has co-hosted two key events, in both stressing the urgency of the gas value chain methane emissions abatement and elimination. This is something that the IGU has started to advocate in 2016, and we intend to do more in the coming years to close the gaps between the highest performing players and those that could be doing more.

The urgency of climate change leaves no room for the kind of divisive debate that we have been witnessing over choosing technology paths. At the same time, the emissions from coal have continued to rise for a second year in a row.

Global GHG emissions in 2022 reached a record of 57.4 Gt of CO2e and are expected to rise further this year. This is about 40% higher than where the world needs to be by 2030 to be on track to 1.5 Degrees.

We need to act now to develop a technologically and financially savvy plan for delivering an ambitious and achievable energy transition toward a truly low-carbon economy. We need to go after emissions, not spend time debating technology paths, which will inevitably differ around the world.

This stems from the reality that there remain large disparities between costs and benefits of energy production and use around the world, and even larger disparities between emissions distribution and accountabilities. The bottom 50% of the world's population contributed just 12% to the global carbon budget, while the top 10% contributed 48% of the emissions. Hundreds of millions in that bottom 50% still have no access to modern energy, clean cooking, or infrastructure, and are living in extreme poverty. They will need more energy, and it is not possible to meet that need with renewables alone with the technologies we have today.

From the U.S. to China, and across the globe, gas has played a key role reducing emissions when it replaced coal, oil, and biomass, and supported large scale renewables growth, fuelling industry, buildings, and transport, and providing reliable flexible energy reserve for maintaining secure energy access during periods of fluctuating demand and other sources supply. There is a major role for gas in this energy transition, because vast areas of the world still have high need for energy and for the benefits that gas provides.

As we leave Dubai and conclude another big year, the gas industry will plan for a 2024 that is focused on action to drive down emissions and supply the cleanest-possible, reliable, flexible, and efficient fuel to our customers, while working with them to support their decarbonisation goals and advance our own.

Li Yalan,
IGU President

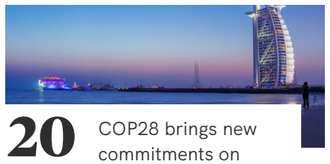
Contents

FEATURES

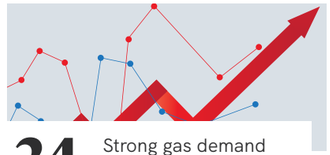
10 Global Gas Year in Review: One Year Closer to Crisis End?

14 Supply dynamics overview: changing trade flows over 2023

18 Carbon Markets. Pricing emissions is critical to achieving the goals of the Paris Accord



20 COP28 brings new commitments on methane emissions



24 Strong gas demand supports further upstream FIDs

28 Israel-Hamas conflict brings geopolitical risks to energy securityto the fore.

32 Crisis highlights need for better energy planning: IGU Global Gas Report

36 Policy support spurs clean tech development

40 EU biomethane target of 35 bcm by 2030 is achievable

Decarbonising Energy: Innovation and Start-ups

44 Innovation at the heart of emissions reduction

From the President **2**
Editor's Note **4**
Events **6**

Regional Update
Latin America **8**

The opinions and views expressed by the authors in this magazine are not necessarily those of IGU, its members or the publisher. While every care has been taken in the preparation of this magazine, they are not responsible for the authors' opinions or for any inaccuracies in the articles.

Editors' Note

Welcome to the 14th issue of the *Global Voice of Gas* magazine, an International Gas Union publication, produced in collaboration with Natural Gas World (NGW). Its release comes shortly after the conclusion of the UN COP28 climate summit in Dubai, which yielded important commitments on accelerating climate action, and also provided more food for thought for the industry for how to ensure that its work and commitments to being a part of the solution to climate are heard and recognised.

We are coming to the end of another highly turbulent year for the global energy industry, as the world continues struggling to strike a balance on the energy trilemma of security, affordability and sustainability. 2023 is a year of high uncertainty that ends in an unstable equilibrium for the global gas markets.

In this *GVG* issue we are pleased to feature reflections on the year's events in gas and what it can mean for the coming years, written by Ian Nathan, Director for Gas and LNG Research at *Energy Intelligence*. We are also happy to include an interview with Dean Pick, the CEO of Canadian gas cleantech start-up Kinitics, which has developed an electric valve actuator that has the potential to significantly reduce field-level methane emissions – solidifying the now permanent innovation corner feature in the *GVG*.

We also zoom in on this year's shifting trade global supply and demand dynamics, which have seen US LNG supplant Russian pipeline supply in Europe, the welcome final investment decisions that were reached during the year on additional production, and the geopolitical risks to energy security that have been demonstrated by the Israel-Hamas conflict.

As gas had come of age as a global commodity and the crisis has reminded the world about the implication that now must be considered in prudently planning for regional and global energy security, it is high period for wise policy choices and long-term horizon planning for a sustainable, stable and prosperous future.

Another very timely topic we are happy to include in this issue is a discussion of the importance of carbon markets and measurable emissions pricing by Marie-Louise du Bois, Head of Carbon Pricing for S&P Global Commodity Insights. As discussions about offsets trading and accountability for decarbonisation and net-zero pledges come sharp in focus, this topic is one to know in the energy transition journey.We also recap the significant commitments that the oil and gas sector made at COP28 on tackling their methane emissions – one of the key outcomes of the summit.

We further explore how the US Inflation Reduction Act of last year has helped to galvanise investment in low-carbon technologies, and how this support pares up to equivalent incentives provided by other jursidictions, such as the EU. Another important story in this issue is the outlook for biomethane development in Europe. Proponents of this low-carbon energy source say the 35 bcm by 2030 target set by REPowerEU can be achieved, under the right market conditions and with sufficient policy support that duly values emissions reductions it helps to deliver across the economy.

We then delve into the IGU's flagship Global Gas Report of 2023, produced in collaboration with Snam and Rystad Energy. The comprehensive analysis of various possible energy futures in different decarbonisation assumption scenarios led to the conclusion that the outlook for gas demand is highly uncertain, and without prudent energy planning that ensures sufficient supply is available ahead of demand curve growth, energy security and affordability will continue to be compromised. The current volume of supply of natural gas in development will not be sufficient to meet demand scenarios that diverge from a 1.5 Degree trajectory after 2030.

We hope you enjoy this final issue of *GVG* for 2023, and we wish you and your families a pleasant holiday season.

Tatiana Khanberg,
Strategic Communications and Membership Director, IGU

Joseph Murphy,
Editor, Natural Gas World

TUMBES BASIN

The Tumbes, Talara and Lancones basins are part of the North Peruvian forearc system (Figure 1). Originally related to plate tectonics, the action of the South American and the Nazca plates, override the subduction oceanic crust and they extend from the Peru Chile trench to the Western cordillera volcanic arc with a total width of 200 km (Figure 2).

The Tumbes and Talara basins are separated by the Zorritos and Carpitas basement highs. The outer Tumbes basin extends northeast offshore, towards the Progreso basin in Ecuador, and is limited westward by the Banco Peru.

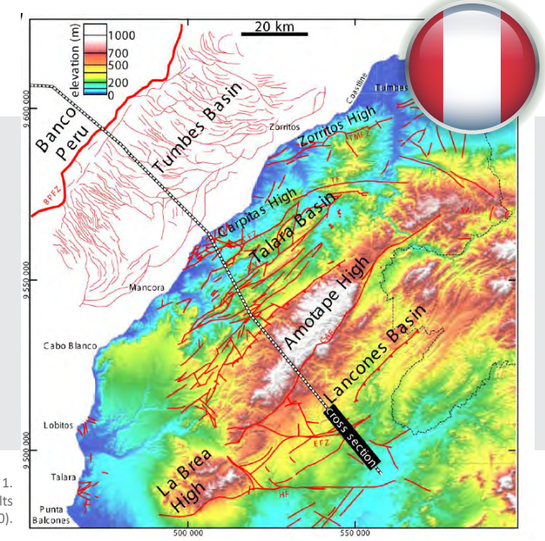


Figure 1.
Morphology map of Tumbes, Talara and Lancones Basins with main mapped faults (Lemgruber-Traby, 2020).

The oil and gas accumulated production till September 2023, in Tumbes basin (Peru) is 389 MMSTB and 1494 BCFG (Perupetro, 2023).

There is still a remaining oil and gas potential in the basin that is been promoted for exploration and production activities.

Presence of good siliciclastic reservoirs, excellent quality source rocks, trapping mechanism and abnormal high temperature gradient create particular conditions to form a unique giant oil basin with a strong presence of gas in some regions.

The Tumbes Basin includes thick sedimentary stratigraphic sequences of sediments of Paleozoic to Tertiary age, that extend offshore and onshore along the coastal region. Thickness of the late Oligocene to Pliocene age in the Tumbes Basins reaches 7100 m, all the sections deposited in approximately 30 my.

A more complex petroleum system, or more than one, is interpreted to be present in the Tumbes Basin to account for the oil produced. Various oil and gas tests and numerous hydrocarbon shows are detected in the Oligocene and Miocene stratigraphic sequence.

Source rocks and siliciclastic reservoirs of these ages are documented in the whole section, possibly superimposed on older petroleum systems. The geochemical analyses, hydrocarbon occurrences and basin modeling indicates the presence of active kitchens in deeper portions of the basin where various source rocks acquired maturity to generate and expulse hydrocarbons.

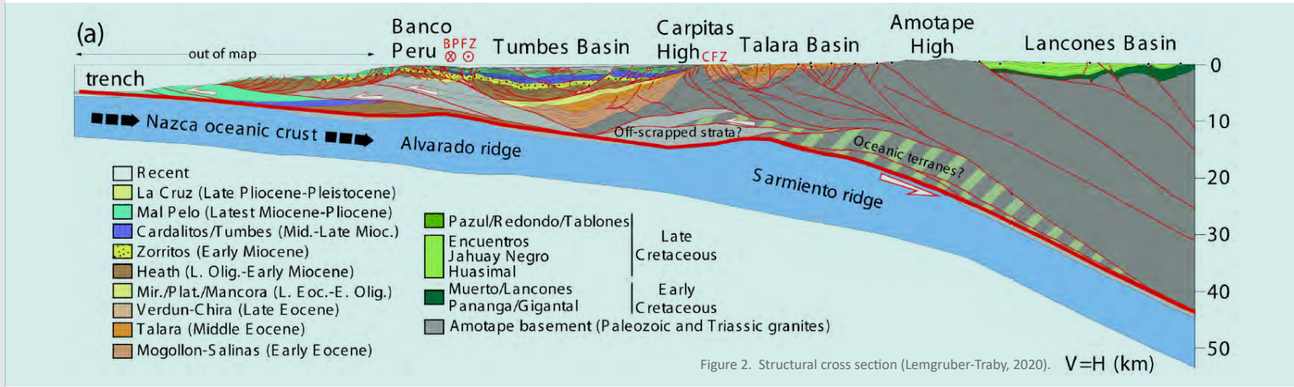


Figure 2. Structural cross section (Lemgruber-Traby, 2020).

Perú petro
Visit our Investor Site
www.upstreamopportunities.pe
Follow us in LinkedIn
PERÚPETRO S.A — Oficial
Contact our Promotion Executive
Vilma Ruiz Burneo (vruiz@perupetro.com.pe)

A busy year ahead

RODNEY COX
Director of Events,
International Gas Union

IGU's Flagship Event for Research, Development and Innovation (IGRC2024) comes to Canada in May 2024 – the right event at the right time for the global gas industry as we address its challenges and opportunities. Through the global reach and diversity of IGU's RD&I Committee a record number of excellent abstracts were submitted delivering a powerful and innovative programme to challenge and inform IGRC2024 delegates – if you are involved in delivering the solutions that drive your company forward you can't afford to miss it. Delegate registration is now available, so why not tick that off your to do list before the year's end – www.IGRC2024.org.

While the IGU's next World Gas Conference is not until 2025, the good news is you can access the Call for Abstracts information now and start to prepare your submission. We understand many of you need to have your internal discussions before finalising your submissions so start that conversation this month and you can get things rolling in the new year, ahead of the May 30, 2024 deadline. All the details at www.wgc2025.com.

Next year will also see the roll out of LNG2026 Doha, following the success of LNG2023 this year. We will keep the industry updated early in 2024 but if you have any early enquiries you can always contact me at Rodney.Cox@IGU.org.

Best wishes for 2024 and we look forward to working with you to advance our industry

WGC2025 – Abstract submission is now open

The 29th World Gas Conference 2025 (WGC2025) is set to ignite the gas industry stage from May 19-23, 2025 at the China National Convention Center, Beijing.

Themed "Energising a Sustainable Future", the International Gas Union's (IGU) World Gas Conference promises an unparalleled platform for knowledge exchange. The conference is expected to draw over 3,500 delegates from 70 countries and regions and WGC2025 offers a golden opportunity to showcase your technical prowess and industry insights to gas experts and leaders.

With seven abstract themes to choose from you can select the one that best highlights your expertise. The themes include:

- Supply, demand, market and prices
- Gas narratives under the new context
- New momentum for LNG
- Digital transformation
- New gases in energy transition
- Methane emission mitigation
- Best practices through the whole value chain.

Click here for more information on the abstract categories and themes.

Start your planning to submit your abstract by May 30, 2024. To assist your planning click here for more details on timing and procedures.

Seize the moment to be a driving force in shaping the future narrative of the gas industry.

Looking at exhibiting or sponsoring at WGC2025? Then email Jason Berman for the latest details on the exhibition floorplan and sponsorship prospectus.

www.wgc2025.com #WGC2025

International Gas Research Conference 2024
Banff, AB, Canada | May 13-16, 2024

FUELLING
THE INNOVATION AGENDA

IGRC2024
BANFF
MAY 13-16, 2024 | WWW.IGRC2024.ORG

Innovation takes centre stage in the heart of the Canadian Rockies

With record number of high caliber papers submitted from across the world, the conference promises a technical showcase and program like no other. Here is what awaits you:

- **Engaging technical sessions:** Explore insightful technical sessions and papers in a panel format, promoting higher delegate engagement.
- **Poster presentations:** Interact with quality presenters during daily happy hours.
- **Exclusive early access to technical papers:** Registered delegates get exclusive advance access to technical papers via the conference app.
- **Global Cleantech Challenge winners:** Connect with the winners of this inaugural challenge.
- **Insightful global sessions and leadership dialogues:** Delve into the energy trilemma and other hot topics in sessions led by renowned voices.
- **Network receptions:** Connect with industry professionals while experiencing Canadian hospitality and culture.

Register now for IGRC2024:

Connect. Collaborate. Innovate.

Register now!

Uncover the latest research, leading practices and transformative insights to fuel innovation in the natural gas and gaseous energy industry.

@IGRC2024 IGRC2024 www.igrc2024.org

Latin America

CARLOS CORTES SIMON
Executive Chairman at Asociacion De Empresas De Gas Natural and IGU Regional Coordinator

Latin American and Caribbean LNG trade followed the same trade in the first half of 2023 as in 2022, importing 5 bcm, of which 68% came from the US, and exporting 6 bcm, mainly from Trinidad and Tobago. But there was a disruption this year in deliveries to the GNL Mejillones terminal in Chile, owing to TotalEnergies defaulting on a long-term LNG supply contract with Engie. Many hydrogen refuelling station (H2V) projects are being developed across the region, with Chile making significant advances. Brazil, Argentina and Colombia have also stepped up biogas development.

Transport capacity from Argentina's Neuquen basin has been increased, but a gas deficit in the country's north persists.

» Domestic gas supply in Argentina has remained within its historical seasonal range, with gross averages of 118 mcmpd in the summer and reaching a peak of 137 mcmpd in September.

» Transport capacity from the Neuquen basin has increased by 11 mcmpd, following the launch of the Presidente Néstor Kirchner Gas Pipeline in July.

» A gas deficit in north Argentina persists, which is currently covered with imports from Bolivia. Bolivian production is falling, however, which will result in lower exports to Argentina. The latter is therefore taking further steps to supply more gas from Neuquen to its northern regions, as well as north Chile. That requires reversing the flow of the North Pipeline.

» Argentina has bought 42 LNG cargoes this year for around $1.8bn.

Brazil is expanding the role of natural gas with the aid of more LNG import capacity and greater use of domestic supply, while also working to reduce its carbon footprint and setting out plans to develop hydrogen.

» The natural gas market in Brazil is in the process of opening up, amid the energy transition and a global energy crisis.

» President Lula's administration has announced two government programmes that aim to boost the use of natural gas produced in the country, stimulate national industry and generate jobs and income.

» The government is also working to reduce Brazil's carbon footprint. Among the proposals under discussion is the replacement of diesel oil by natural gas in the transportation mix.

» By the end of the year, Brazil will have seven LNG import terminals (all FSRUs) with a capacity of 123 mcmpd up and running. This capacity is twice the level of average LNG consumption this year.

» In August, the Ministry of Mines and Energy announced the 2023-2025 goals for the National Hydrogen Plan, with a focus on the production of low-carbon hydrogen, the implementation of pilot projects and the development of hydrogen hubs by 2035. The government expects to implement a legal framework by 2025.

Chile has seen a significant growth in natural gas demand in the power sector, owing to a lack of transmission capacity limiting utilisation of solar power and increased availability of Argentinean gas.

» During the first half of 2023, around 85% of Chile's total gas consumption was imported, in LNG form (44%) or from Argentina (41%), in line with what was seen in 2022.

» Firm gas exports from Argentina to Chile have been delivered throughout 2023, with an authorised allowance of 10 mcmpd in the summer (October to April) and 4 mcmpd in the winter (May to September), continuing the path to build an integrated energy system between the two countries.

» There has been significant growth in the consumption of natural gas for power generation, surpassing even coal and renewable sources. At the end of September natural gas accounted for 22% of the total electricity demand.

» There are two reasons for this. There is a lack of sufficient transmission capacity to fully utilise solar power generated in the north, and there was increased availability of Argentinean gas in the first half of the year.

Offshore exploration offers Colombia great potential to expand its natural gas reserves. Meanwhile, the country is betting on biomethane to further decarbonise its economy.

» Natural gas coverage in Colombia has reached more than 11mn residential users, benefiting around 38mn people. This is the highest coverage rate in Latin America.

» The upcoming dry season (El Niño) will increase natural gas demand as thermal power plants will need to back up hydroelectric power plants, which by the end of September continued working under 70% of capacity.

» There is still a huge opportunity for Colombia to increase its natural gas reserves with offshore exploration. An ambitious exploration campaign by Shell and Ecopetrol, as well as activity undertaken by other operators, could see the country unlock a potential 100 tcf of resources.

» Colombia is betting on biomethane as a renewable natural gas to decarbonise its economy and overcome energy poverty in remote areas.

» In Medellín, biomethane generated from the sludge of a wastewater treatment plant is injected into the city's natural gas network, benefiting more than 40,000 families. Projects like these are about to be developed in Manizales, Boyacá, and Bogotá.

Trinidad and Tobago needs more gas supply to support its LNG and petrochemical industries. The Cascadura field's launch, exploration plans by BP and Shell, and joint development of the Dragon field with Venezuela, should support this end.

» The country's total natural gas production in the first half of the year was 13 bcm, of which 52% was used domestically and 48% exported in LNG form.

» Touchstone commenced production from its Cascadura field in September and achieved its forecasted gross natural gas production rate.

» Last month a BP and Shell joint venture signed an agreement with the government to explore three deepwater blocks for hydrocarbon production.

» Trinidad and Tobago and Venezuela signed a government agreement in September to jointly explore the Dragon gas field.

» Progress on the Calypso Deepwater project continues to be of high interest with the country's energy minister meeting Woodside Energy executives in August.

Global Gas Year in Review: One Year Closer to Crisis End?

The long-term outlook is considerably brighter. Close to 200 MTPA of new liquefaction capacity under construction, along with a universe of projects in the pipeline, including several imminent FIDs, will drive the next supply wave. This will bring much greater liquidity, lower prices and important support for demand by the late 2020s.

IAN NATHAN, DIRECTOR, GAS AND LNG RESEARCH, ENERGY INTELLIGENCE

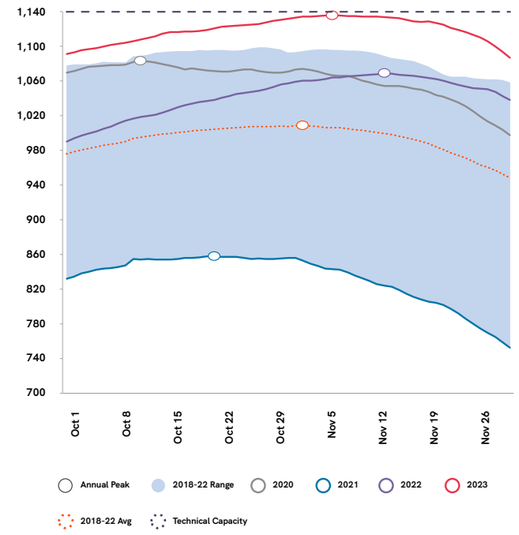
As 2023 draws to a close, key developments reveal both short-term victories and market headwinds – along with longer-term opportunities and risks for the global gas and LNG industry. The year began amid a wave of uncertainty as European gas prices resumed their welcome descent from August 2022 highs. Still, attention was already fixed on growing risk of Europe-Asia competition for LNG supply in a structurally tight market – particularly concerns about re-emerging Chinese demand impact on prices. If anything, there was greater certainty about the duration of market tightness given expectation for a significant wave of liquefaction capacity set to launch by 2026 – adding volumes and liquidity while lowering prices, ending the crisis.

A year with full European storage shows a resilient gas and LNG system. Several liquefaction project FIDs and voluminous supply agreements, even if driven in part by crisis, are still evidence of expectations for LNG longevity. The launch of several new markets illustrates key LNG demand drivers and critical headwinds to greater market development. We are also reminded of the necessity of new, diverse liquefaction capacity sources as challenges stalk veteran, maturing LNG supply provinces.

European gas storage filled to the brim

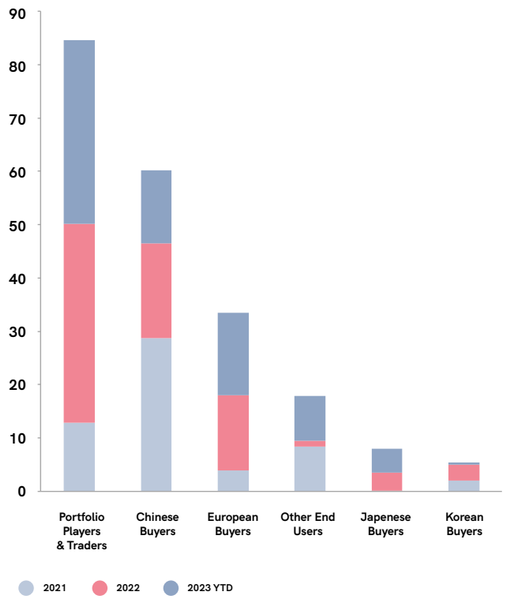
EU gas inventories reached 99% of capacity by the time withdrawal season started in early November. This, along with use of Ukrainian storage, represents a remarkable achievement in European energy security amid doubt last year that inventories could build sufficiently in the absence of "typical" Russian pipeline gas flow. Notwithstanding mandates implemented to reach high storage thresholds, the combination of elevated LNG deliveries, additional pipeline gas from non-Russian sources, along with lower

Europe: Gas Storage, October - November (TWh)



Source: GIE AGSI

Long-Term LNG Supply Agreements, 2021-2023 YTD (MTPA)



*Includes both publicly announced firm and preliminary agreements, which are not double-counted. Total volumes are approximate. Source: Energy Intelligence Gas and LNG Research

demand in both Europe and Asia, drove success. The resulting drop in prices, which saw TTF briefly drop below €24/MWh (around $7.50/MMBtu), generated the illusion of a crisis resolved.

Such thinking is premature. Europe's gas withdrawal last winter reached only 41 bcm, the smallest since 2013-14. Furthermore, TTF spiked throughout the year from two-year lows as structural supply tightness kept markets on edge, despite the storage success. Extended maintenance in Norway, labour action in Australia, and, most recently, disruption to Israeli gas flows to Egypt, have all contributed to volatility. Moreover, still-elevated prices continue to hold back more robust demand from Asia, which would challenge Europe for marginal LNG supply.

US project FIDs ensure growth in LNG supply and flexibility

In the US, Plaquemines Phase 2, Port Arthur Phase 1 and Rio Grande Phase 1 reached FID, adding close to 40 MTPA to date. This makes 2023 the most successful year for US LNG advancement, with progress also evident with several other greenfield and expansion projects.

The ongoing appeal of US liquefaction is clear, supported by long-term agreements from all types of offtakers. Portfolio players, traders and non-traditional LNG firms dominating foundation agreements show confidence in long-term demand for LNG, with volumes to be lifted well into the 2040s. For Chinese buyers, volumes offset expiring agreements, contribute to expected demand requirements and add to flexibility, which supports the country's growing role as a swing market. US progress is even more notable in an environment of rising costs and tensions among buyers, sellers and lenders.

But the US projects sanctioned this year (along with several expected to reach FID soon) also demonstrated how to navigate development and financing pitfalls, with several also revealing the growing importance of equity financing to offset debt requirements. Higher costs will really hit less advanced projects with still evolving commercial support, particularly if they need to rely on a more traditional debt/equity split amid a dearth of creditworthy offtakers. Ability to execute sooner rather than later is an advantage given changes to the US Department of Energy criteria for consideration of non-free trade agreement licence extensions and growing concerns about long-term feed gas availability.

Long-term agreements: LNG into the 2050s

The frenzy of long-term supply agreements continued →

in 2023. Offtakers committed to more than 77 MTPA, opting for energy security and revealing confidence in LNG longevity. Foundation deals with US ventures have dominated in recent years, but the uptick in non-US deals was also evident in 2023. Supply agreements (both preliminary and firm) known to source LNG from outside the US have exceeded 28 MTPA to date, compared to around 14 MTPA in 2022. QatarEnergy has led the charge with agreements totaling around 17 MTPA, with several deals delivering LNG well into the 2050s. With that, the company has now allocated close to half of its North Field expansion capacity.

But Oman LNG stands out, with the venture having signed up almost 9 MTPA, or close to 80% of its capacity, since December 2022. These are well timed with expiring agreements and rejuvenated feed gas supply. But the availability of shorter agreements of 10 years or less, in addition to flexibility and oil indexation, appeals to buyers not only seeking relative pricing stability and diversity but greater optionality in the 2030s.

New markets illuminate LNG demand drivers and risks

Germany received the lion's share of attention as a new LNG market this year given its acute gas needs. It imported its first cargo at the end of 2022 and now sports three operating terminals, with several more on the way. But initial LNG deliveries to Hong Kong, the Philippines and Vietnam also illuminate critical LNG demand drivers in a region expected to support LNG demand while also revealing several ongoing risks to robust long-term growth aside from renewables development.

The Philippines is turning to LNG to offset declining gas output at its Malampaya field, from which significant power generation is fueled. Similarly, Vietnam, while seeking to use LNG to navigate acute electricity demand growth, is also counting on LNG to bridge a gas supply gap – which also obviates the need for incremental coal use. Gas supply diversification and coal displacement are key to Hong Kong's LNG and transition strategies.

It has not been smooth sailing. High LNG prices have contributed to delays in inaugurating imports, while regulatory and commercial hurdles to more rapid implementation in countries like Vietnam remain elevated. Still, bridging gaps where gas supply needs to be shored up to fuel strategic segments is indicative of the outlook for LNG in larger, established growth markets like India, Bangladesh and Thailand.

Australia's challenging year

Australia emerged as a source of market uncertainty this year. The country, which, at one time, was the world's largest LNG exporter, encountered important regulatory regime changes, growing concerns about maturing ventures and labor action that added volatility to already edgy markets in Europe and Asia.

Growing intervention in the gas and LNG trade upended the policy environment. This included a temporary wholesale gas price cap, reforms to the Australia Domestic Gas Supply Mechanism, regulation of negotiations through a new code of conduct, adjustment to the Petroleum Resource Rent Tax, along with more stringent emissions rules. Short-term implications are limited, but the broader message for longer-term investment has become cloudier.

This is important when considering upstream requirements to meet both domestic gas supply, which remains a significant concern, particularly in eastern Australia, and backfill to feed maturing LNG ventures. Feed gas issues are not new for Darwin and North West Shelf, among others, but the environment has become more complicated for project developers. More broadly, backfill shortfalls only increase the need for new capacity developments elsewhere.

Finally, there was not a significant expectation that labor action at Gorgon, Wheatstone and North West Shelf ventures earlier in the year would be durable or impactful from a supply standpoint. However, this did not stop both European and Asian markets from reeling, particularly in August, reflecting ongoing supply concerns.

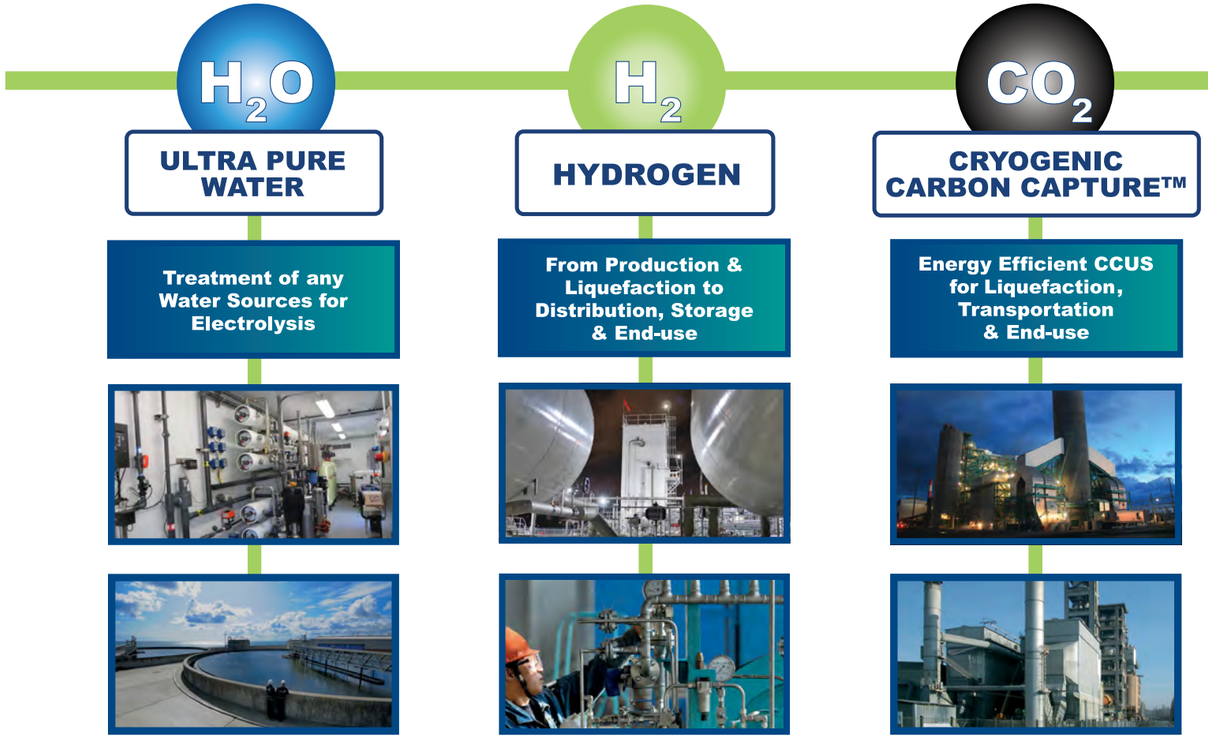
It has not been smooth sailing. High LNG prices have contributed to delays in inaugurating imports...

Outlook for 2024 and beyond

The global gas crisis that emerged with post-pandemic recovery in 2021 and exploded into chaos following Russia's invasion of Ukraine in 2022 is not over. Prices down from their record August 2022 highs, full European gas storage without significant Russian pipeline gas and European gas demand off by 20% from 2021 all suggest the worst is behind us. But near-term market volatility will be a persistent headache for consumers in Europe and clearly unhelpful for industry grappling with long-standing competitiveness challenges. The same is true for price-sensitive Asian LNG markets.

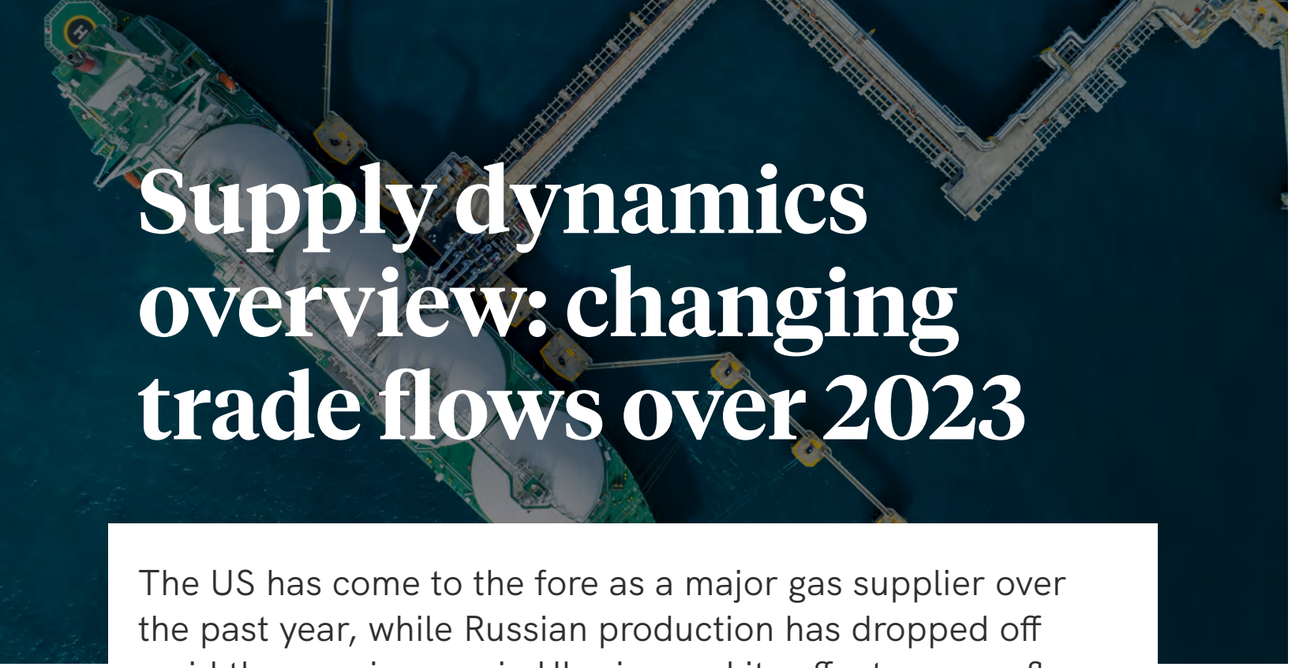
The long-term outlook is considerably brighter. Close to 200 MTPA of new liquefaction capacity under construction, along with a universe of projects in the pipeline, including several imminent FIDs, will drive the next supply wave. This will bring much greater liquidity, lower prices and important support for demand by the late 2020s. ■

CHART® Cooler By Design®
Howden A Chart Industries Company



NEXUS OF CLEAN™

CHART DELIVERS CLEAN SOLUTIONS FOR
Power Water Food Industrials
chartindustries.com
howden.com



Supply dynamics overview: changing trade flows over 2023

The US has come to the fore as a major gas supplier over the past year, while Russian production has dropped off amid the ongoing war in Ukraine and its effects on gas flows.

ANNA KACHKOVA

Natural gas trade flows continued to shift over the course of 2023, in part as a continuation of changes that materialised in 2022 in the wake of the Russia-Ukraine war. Most notably, Russian gas production dropped further in 2023, continuing a trend that started in 2022, as European countries continued efforts to reduce their dependence on imports from Russia.

The US producers stand to benefit from Europe's pivot away from Russia, as LNG developers have been taking further steps to bring new liquefaction capacity online to export gas to both European and Asian buyers.

The coming US supply surge

The US LNG producers have been announcing new offtake agreements, with certain new projects also reaching the final investment decision (FID) stage as they locked in enough buyers to proceed with construction. Three US projects reached FID in 2023 so far – Phase 1 of Sempra's Port Arthur LNG, Phase 2 of Venture Global LNG's Plaquemines facility and Phase 1 of NextDecade's Rio Grande LNG. This accounts for a combined 37.3mn tonnes/year of LNG that could be brought to market by 2027.

Developers on the Gulf Coast are working towards FIDs for yet more liquefaction capacity. Meanwhile, the US gas exports continue to break new records. According to the US Energy Information Administration (EIA), the US exported 20.4bn cubic feet/day on average in the first half of 2023, up 4% on the first half of 2022 and also a higher figure than the country's gas exports over the same period of any previous year.

The US' ongoing rise as a major global supplier has not come as a great surprise, according to Rapidan Energy Group's director of global gas, Alex Munton.

"It's as we expected, with Europe still importing LNG at record levels to compensate for reduced Russian flows," Munton tells *Global Voice of Gas* (*GVG*). "US LNG has been critical to European gas security of supply. In both percentage and volumetric terms, US LNG exports to Europe have been roughly the same this year as last, with 50mn tonnes of US LNG being shipped to Europe, equal to around two thirds of US LNG production."

In the short term, Munton expects this trend to continue, and in the longer term, he expects some of the pressure on European buyers to ease as more supply enters the market.

"Next year will be a similar story, with Europe continuing to rely heavily on US LNG to meet gas demand," he says. "The picture starts to change from 2025, when global supply growth (including from the US) begins increasing more rapidly, which will help to reduce competition between Europe and Asia for US LNG, easing European gas prices also."

Russian decline

While the US has been establishing itself as a larger supplier, Russia has continued to see its role as a supplier to Europe in particular decline. Russia's state-owned Gazprom said recently that its gas production in the first half of 2023 had fallen by 24.7% year on year to 179.45bn cubic metres, levels not seen since the 1970s. Over the same period, Gazprom reported that its gas supplies to both domestic and foreign markets had fallen by 26.5% year on year to 166 bcm.

Munton notes, however, that Russian gas continues to make a significant contribution to European supply for now.

"Russian gas exports to Europe via Ukraine have proven to be more stable than anticipated, at roughly 1.5 bcf/d, despite the effects of the war, although we don't rule out the potential for disruption," Munton says. "We note that overall Russia continues to supply ~10% of the European gas market (around 4 bcf/d including Ukraine, TurkStream and LNG flows)."

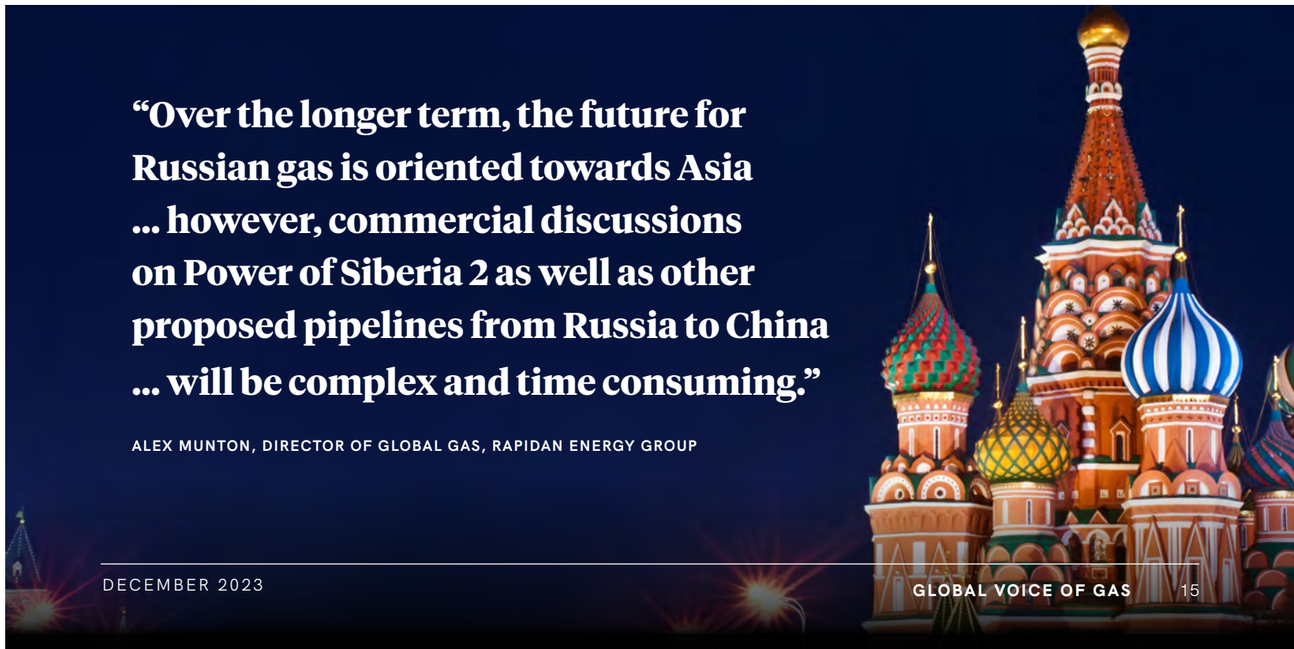
The EU has prioritised gas storage inventories ahead of the upcoming winter, hitting its target of filling storage facilities to 90% of their capacity by August, over two months ahead of schedule. This strengthens Europe's position as winter approaches, but it remains vulnerable to various factors, including cold weather and potential actions from Moscow.

"Further curtailment is a potential 'gas weapon' the Kremlin may choose to use this winter to weaken EU support for Ukraine," says Munton.

Russia is already working on expanding its Asian markets, notably in China, but this process is expected to take time.

"Over the longer term, the future for Russian gas is oriented towards Asia," says Munton. "However, commercial discussions on Power of Siberia 2 as well as other proposed pipelines from Russia to China (e.g., from Sakhalin oil and gas fields) will be complex and time consuming. China would seem to hold an advantage in those negotiations, as it is now Russia's only real alternative to Europe as a major gas market. The prospects of these pipelines being built may rest on Russia's willingness to make concessions on price and financing arrangements."

European countries still need to prove their willingness to fully phase out Russian gas, and there has been speculation about flows to Europe rebounding once the war in Ukraine ends, especially in the form of LNG shipments. However, as things currently stand, significant volumes of Russian gas appear at risk of being stranded, and this could compel Russia to offer concessions to Chinese buyers. →



Choke points

Events in Russia and the US dominated the global gas supply picture over the past year, but there have also been developments worth watching elsewhere. Currently, the impact of these developments has been comparatively small, but there is scope for them to lead to greater disruption further down the line.

For example, the conflict in Gaza resulted in the disruption of Israeli gas flows to Egypt in October, which in turn affected Egyptian LNG exports. Egypt had been shipping most of its LNG to Europe since last year, but its prospects of ramping up supplies appear to be diminished for now.

However, the US remains advantaged by the relatively large number of LNG developers already trying to advance new export terminals on the Gulf Coast before the war in Ukraine started. In Egypt's case, the country has been positioning itself as a regional energy hub and major LNG exporter, but these efforts have been slowed by disruptions to production and increased domestic demand for power amid a heatwave over the summer of 2023.

Extreme weather is also causing challenges to global gas flows. A severe drought has forced the Panama Canal to reduce the number of daily ship transits, causing congestion along the route towards the end of 2023. This is starting to affect LNG cargoes enroute from the US Gulf Coast to Asia.

"We're closely watching maritime choke points (Panama Canal, Suez/Gulf of Aden, and Hormuz) and potential disruption of LNG flows," says Munton. "The drought-affected Panama Canal is already influencing trade flows, forcing more Asia-bound cargoes from the US to take the longer journey via the Suez Canal or Cape of Good Hope. Meanwhile, heightened military activity in the Red Sea could deter LNG carriers intending to use the Suez Canal, causing them to reroute via the Cape of Good Hope. The longer journey times involved would result in slower delivery of cargoes."

On top of this, Munton acknowledges the possibility – albeit a remote one – of the Gaza conflict spreading in a way that could affect additional LNG flows.

"If the Gaza conflict spreads further, there is an outlier risk Iran could attempt to disrupt shipping via the Strait of Hormuz, impacting ~20% of global LNG exports," Munton says. ■

S&P Global
Commodity Insights

An Integrated Natural Gas Solution

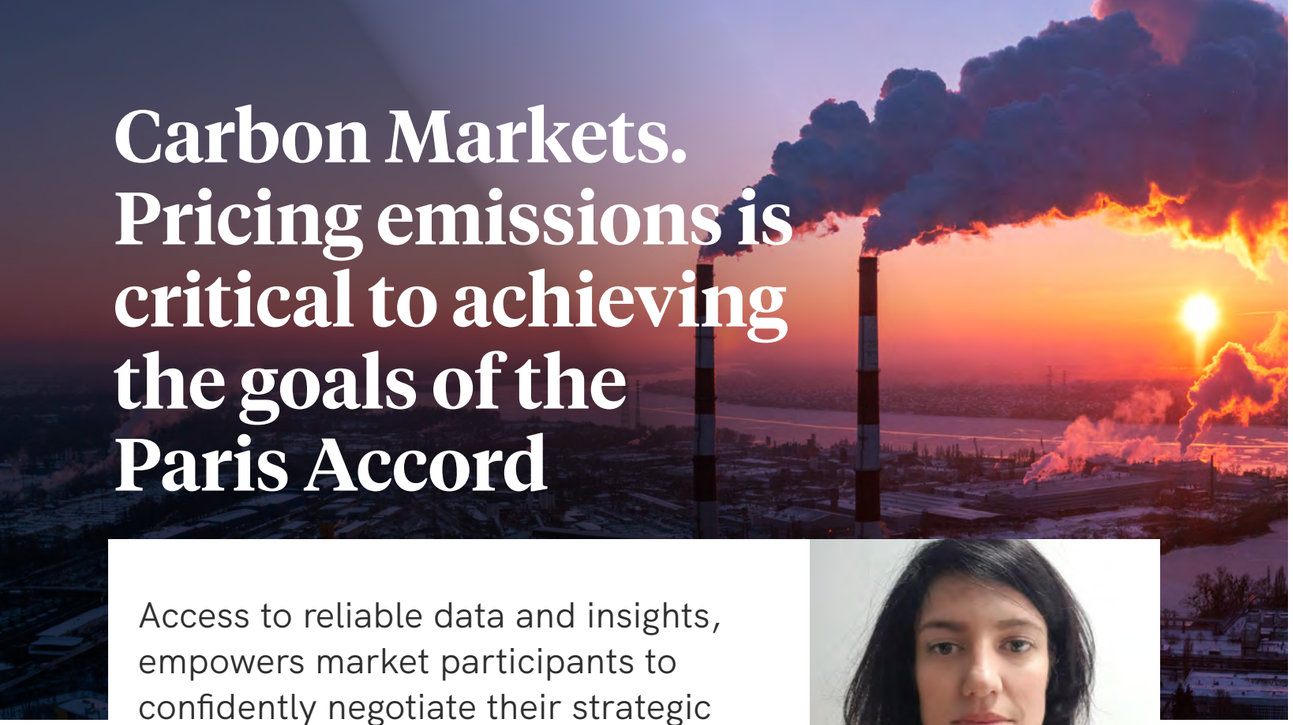
Natural gas indices across 130 locations in North America.

40+ daily power price indices in on-peak and off-peak markets.

Outlooks and strategic analysis for power, gas, LNG and clean energy markets.

News coverage on gas and power companies, infrastructure, policies, and regulations.

5-year short-term and 30-year long-term fundamentals and price forecasts.



Carbon Markets. Pricing emissions is critical to achieving the goals of the Paris Accord

Access to reliable data and insights, empowers market participants to confidently negotiate their strategic decisions within this increasingly complex landscape.

MARIE-LOUISE DU BOIS, HEAD OF CARBON PRICING FOR S&P GLOBAL COMMODITY INSIGHTS

The world has gathered in Dubai for COP28, as companies and states are all looking to boost action on climate change. COP28 has included the global stocktake, where countries, for the first time, reported back on how they are doing in terms of meeting their pledged emission reductions agreed to under the Paris Climate agreement. Also, this COP has resulted in specific commitments on methane reduction – with the Global Methane Pledge bringing national commitments to 155.

All of this has brought the question of how to measure emissions, whether they be carbon or methane, and account for them accurately, into sharp focus. To decarbonize effectively and efficiently, for instance, countries and companies, need a transparent view of how much they are emitting, and achieve the net zero ambition. And they need to understand the cost of doing so, which is where having a reliable price for Carbon is crucial.

Just like any market, that uses price signals to guide investment decisions, effective carbon markets provide a mechanism to drive investments into GHG reductions that can meet decarbonization targets at lower costs – and in the process, unlock greater decarbonisation ambition and bankable business cases. Compliance Carbon markets continue to expand globally, as countries look to cap emissions over time and meet their own future reduction targets. In parallel, a Voluntary carbon market offers the option of offsetting emissions that cannot otherwise be reduced – however, it has seen prices plummet amid integrity concerns. Questions around accurate measures and the accuracy of actual emission reductions or avoidance claims have been central to the controversy that has surrounded the developing issue of carbon markets in 2023, once again highlighting the need for accurate verifiable quantification of the valued reduction. While regulators are considering welcome ways to strengthen integrity and trust in the market, this has widened the gap between the Carbon price observed in many Compliance markets vs those observed in the Voluntary offset market.

Price reporting agencies play a role in bringing greater transparency to the traded market on what is being traded and how the market values different types of Carbon credits, for instance. By bringing greater visibility to the price of carbon across different regimes, such as the EU

We see prospects for carbon intensity to one day be viewed as a core commodity specification attribute to natural gas and other commodities, much like heating value is to natural gas today.

compliance market as well as the voluntary market, we can also calculate the implicit price or premium of having a lower carbon profile. Measuring and pricing the Carbon Intensity of different commodities has become one of the ways the market has started to measure GHG emissions from specific types of production.

Having visibility of the Carbon Intensity profile across different commodities, shipping and trade routes, as well as per basin, allows companies to make informed decisions about where to achieve decarbonization within their supply chain.

It is important to note that carbon intensity measures are not static. They can change as natural gas flows into key market locations shift month to month and they change over time, for instance. Also, as an example, within the Gas industry, any individual natural gas company's carbon intensity pathway, for instance, can vary dramatically from the overall average.

Once we know the varying Carbon Intensity of different gas flows, how do we make informed decisions about decarbonization investments and balance the cost of carbon reductions, offsets, and making net-zero commitments? With carbon intensity measures and associated carbon-accounted price assessments, market participants can better understand the relative carbon intensity of key natural gas hubs, the drivers of that carbon intensity, and the associated spot physical market price value -- all of which enable more informed business decisions. The price of offsets, such as the Platts CRC, which reflects tech-based Carbon Capture, which was recently assessed at $13/mt$CO_2$3, helps inform decisions around decarbonization vs offsetting, for instance.

We see prospects for carbon intensity to one day be viewed as a core commodity specification attribute to natural gas and other commodities, much like heating value is to natural gas today. In the US for example, this feature is progressing with good momentum, and not only are the new carbon intensity values and price assessments aimed at bringing transparency to the carbon footprint of the North American natural gas market, but also the US liquefied natural gas (LNG) export markets. US LNG has become the key supply source for meeting European natural gas import needs and the market interest around de-carbonization of imports is rapidly expanding, especially with the nascent carbon border adjustment and relevant methane emissions adjustments on imports.

As our ability to measure emissions and to understnd where they occur in the value chain improves, we would be in a better position to make collective decisions that drive decarbonization without incurring an unnecessary cost in doing so. Having visibility of different Carbon Intensities, as well as the associated price premium, allows concrete decision making around the most practical and cost-effective ways to reduce emissions.

Tools such as Agora, a Carbon Intensity platform, enable companies to model the commercial impacts with carbon price testing of policy measures such as the EUs Carbon Border Adjustment Mechanism (CBAM). CBAM has been described by the EU as the bloc's "landmark tool to put a fair price on the carbon emitted during the production of carbon intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries". CBAM entered into application in its transitional phase on 1 October 2023, with the first reporting period for importers ending 31 January 2024. In parallel, as of 2024, the EU Emission Trading System will encompass shipping activities within the European Economic Area, consisting of EU member states, Iceland, Liechtenstein, and Norway. As a result of this, ship operators will be required to monitor and report their emissions and surrender allowances for every ton of CO_2e they emit. This also means that they will have to start paying for Carbon, or the value that it is priced at, as part of their fuel, for the very first time.

In this rapidly evolving landscape, companies need to be able to accurately account for their emissions and to understand the business impact of their carbon footprint. As the challenging exercise of the COP28 global stocktake has already shown, having an accurate view of emissions is critical for effective action towards decarbonization. Access to reliable data and insights, empowers market participants to confidently negotiate their strategic decisions within this increasingly complex landscape. ■

COP28 brings new commitments on methane emissions

Fifty oil and gas companies have committed to near-zero methane emissions by 2030, in a boon for climate action at COP28.

JOSEPH MURPHY

At COP28, important strides were made on the climate-critical issue of addressing methane emissions, including those associated with the energy industry.

The summit in Dubai saw the launch of the landmark Oil and Gas Decarbonisation Charter (OGDC), championed by the COP28 Presidency – the United Arab Emirates and Saudi Arabia. The charter is dedicated to accelerating climate action across the oil and gas sector. Fifty companies representing 40% of global oil production have already signed up to it, committing them to net-zero emissions operations by 2050 at the latest, and eliminating routine flaring and achieving near-zero upstream methane emissions by 2030.

This builds on initiatives such as OGCI whose members – Saudi Aramco, BP, Chevron, CNPC, Eni, Equinor, ExxonMobil, Occidental, Petrobras, Repsol, Shell and TotalEnergies – announced in 2022 on a target of reaching near-zero upstream emissions by the end of the decade. Notably the new charter saw the largest-ever number of national oil companies (NOCs) commit to a decarbonisation initiative, with them representing more than 60% of the signatories.

"The launch of the OGDC is a great first step - and whilst many national oil companies have adopted net-zero 2050 targets for the first time, I know that they and others, can and need to do more," COP28 President Dr. Sultan Al Jaber said in a statement. "We need the entire industry to keep 1.5C within reach and set even stronger ambitions for decarbonisation."

In addition to the core commitments, signatories have agreed on continuing their work in achieving industry best practices in reducing emissions and a number of key actions, including:

- Investing in the energy system of the future including renewables, low-carbon fuels and negative emissions technologies.
- Increasing transparency, including enhancing measurement, monitoring, reporting and independent verification of greenhouse gas emissions and their performance and progress in reducing emissions.
- Increasing alignment with broader industry best practices to accelerate decarbonisation of operations and aspire to implement current best practices by 2030 to collectively reduce emission intensity.
- Reducing energy poverty and providing secure and affordable energy to support the development of all economies.

What sets the agreement apart from many earlier commitments is that compliance will be monitored using technology and data, with the assistance of the United Nations Environment Programme (UNEP)'s International Methane Emissions Observatory (IMEO), the Environmental Defence Fund and the International Energy Agency.

The NOC signatories included: ADNOC, Bapco Energies, Ecopetrol, EGAS, Equinor, GOGC, INPEX Corporation, KazMunaiGas, Mari Petroleum, Namcor, National Oil Company of Libya, Nilepet, NNPC, OGDC, OMV, ONGC, Pakistan Petroleum Limited (PPL), Pertamina, Petoro, Petrobras, Petroleum Development Oman, Petronas, PTTEP, Saudi Aramco, SNOC, SOCAR, Sonangol, Uzbekneftegaz, ZhenHua Oil and YPF.

Meanwhile the international oil companies (IOCs) that signed up were: Azule Energy, BP, Cepsa, COSMO Energy, Crescent Petroleum, Dolphin Energy Limited, Energean Oil & Gas, Eni, EQT Corporation, Exxonmobil, ITOCHU, LUKOIL, Mitsui & Co, Oando plc, Occidental Petroleum, Puma Energy (Trafigura), Repsol, Shell, TotalEnergies and Woodside Energy Group.

OGDC is an initiative that comes under the Global Decarbonisation Accelerator (GDA) plan that was launched on December 2 at COP28's World Climate Action Summit.

Global Methane Pledge

Important progress on methane emissions has also been made on a governmental level at COP28. Romania, Turkmenistan, Kazakhstan, Kenya and Angola joined the Global Methane Pledge at the summit, bringing the total number of participants to 155. That commits them to cutting anthropogenic methane emissions by at least 30% by 2030, using 2020 levels as a baseline.

Romania, Turkmenistan, Kazakhstan and Angola are significant oil and gas producers, meaning their participation may have important implications for the energy sector. Turkmenistan in particular has faced a lot of scrutiny concerning its high level of oil and gas industry-associated methane emissions in recent years, in relation to its relatively small contribution to global production.

These commitments should be followed up with action, to ensure that natural gas fulfils its potential as not only the most affordable and secure source of energy supply, but also a sustainable one that provides pathways to further decarbonisation in the future.

The EU adopted its first-ever methane regulations for the energy sector in November – an agreement that was years in the making, coming after the European Commission set out its EU methane strategy in 2020 and then presented a proposal for regulation of energy sector emissions the following year. It set out new rules for oil, gas and coal operators to measure, report and verify their emissions, and put in place measures to eliminate those emissions. Over time the regulation will also extend to hydrocarbon suppliers to the EU, with the goal of establishing an import standard by the end of the decade.

In the US, the government has announced final standards to cut methane emissions from oil and gas operations by 80% versus the level expected without the role, while Canada has released draft regulations aimed at cutting upstream methane emissions by three-quarters below the 2012 level by 2030.

Brazil's National Council of Energy Council said it would establish guidelines on methane emissions reduction in the oil and gas sector by the end of next year, and by that same point, Egypt intends to develop domestic oil and gas methane regulations. Nigeria continues work on a gas flare commercialisation programme, while Kazakhstan has announced it will cooperate with the US to develop national standards for eliminating non-emergency venting of methane and put in place leak detection and repair requirements for the oil and gas sector as soon as possible before 2030.

These industry-led and national-led efforts show good progress in pushing forward with commitments, but these commitments should be followed up with action, to ensure that natural gas fulfils its potential as the not only the most affordable, secure source of energy supply, but also a sustainable one that provides pathways to further decarbonisation in the future. ■

In pursuit of regional energy security

In 2022, following the Russian invasion of Ukraine, the disruption of energy supply chains in Europe triggered a continental scramble to find alternatives to Russian oil and gas. The resultant tightening of energy supply, logistical challenges and soaring prices undermined European energy security. Caribbean and Latin American territories have noted the European crisis and begun to assess their own energy needs and vulnerabilities, asking the question – are *we* energy secure? ?

What is energy security?

In the Caribbean and Latin America, there are several factors that weaken our energy security.

Dependence on imported fuels

At present, many Caribbean islands still depend heavily on imported crude for power and transportation. This dependency impacts the region's short-term energy security. Heavy reliance on external suppliers, coupled with insufficient domestic supply/capacity to meet demand, puts countries at the mercy of the market. Importation of fuels also has implications for the cost of energy.

Weather events

In recent years, Latin American and Caribbean territories have begun to increase investment in renewable energy technologies. Of the energy sources being harnessed, solar, wind and hydropower are most prevalent. However, the infrastructure used in these systems is vulnerable to extremes of weather. For example, wind turbines currently on the market were not designed to withstand the force of Category 5 hurricane winds.[1] Severe storms can also damage solar arrays. Hydropower plants, which leverage flowing water, can be impacted by changes to the hydrological cycle due to global warming.

Investment

If the region hopes to achieve a degree of energy independence in the near future, there needs to be heavy investment in renewables today. Under the Caribbean Sustainable Energy Roadmap and Strategy, the region is targeting a renewable energy electricity penetration of 47% by 2027.[2] However, the region is not on track to easily achieve this goal. An annual investment of US$1.2 billion – sixteen times the current investment level - will be needed.[3]

How can we become more energy secure?

So how do we address some of these challenges and build our short and long-term energy security?

High on the agenda should be accelerating progress toward greater self-sufficiency in energy. This includes developing regional hydrocarbon resources to help supply the market. Looking within the region for energy supplies – at Trinidad and Tobago, Guyana and Suriname, for example – can mitigate the supply chain and logistics risks associated with importing fuels from distant locations.

At the same time, it is understood that we need to diversify our region's energy mix and increase our installed capacity in renewable energy. The region has enormous potential in this area. The challenge is, of course, ensuring that any new capacity installed is climate resilient. Innovation will be key in this regard.

Decentralised systems which allow for more independent power producers to supply the grid, can further build resilience by creating a distributed power generation base - akin to sharing one's eggs among multiple baskets.

Importantly, governments have a responsibility to create enabling environments, to encourage all the investment that must happen if the region is to become more energy secure. Regional collaboration could be key, as a combined market has more purchasing power and allows for economies of scale, while standardisation of certain regulations and processes can significantly improve the ease of doing business. ■

THE NATIONAL GAS COMPANY OF TRINIDAD AND TOBAGO LIMITED

NGC GREEN AGENDA

1: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017GL073537
2: https://www.ccreee.org/our-work/policy-implementation/
3: https://www.caribank.org/newsroom/news-and-events/speeches/keynote-energy-transition-caribbean-challenges-and-opportunities

This article is brought to you by The National Gas Company of Trinidad and Tobago Limited (NGC).
The opinions and views expressed in this article do not necessarily reflect those of the IGU or the publisher.

THE NATIONAL GAS COMPANY OF TRINIDAD AND TOBAGO LIMITED

NGC+ENERGY = **A Sustainable Future**

Our journey began with a pipeline and a dream.

We took an underutilised resource and created exceptional national value.

NGC is now up to the challenge of transforming our business for the evolving energy landscape.

This means optimising the value of our core business in natural gas while transitioning into the green energy space.

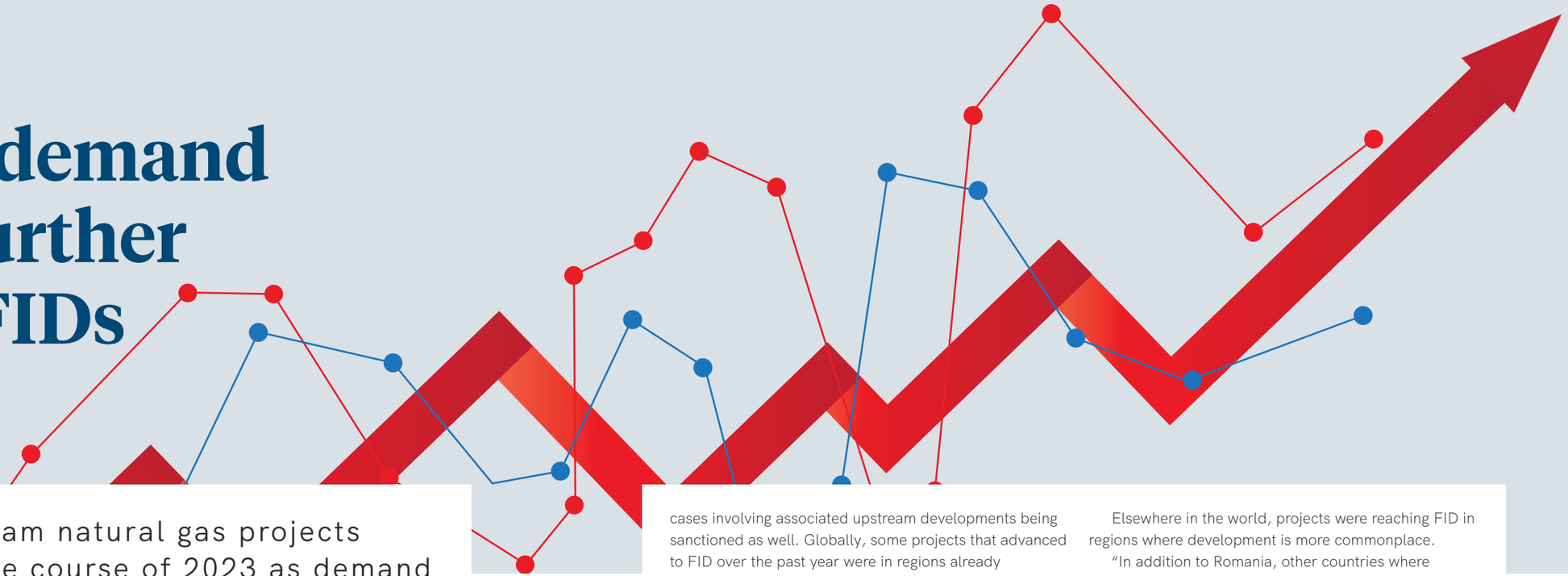
NGC will endeavor to implement a sustainability vision by:

- Reducing our carbon emissions/footprint
- Supporting T&T's targets for Nationally Determined Contributions (NDCs)
- Exploring green investments and financing
- Pursuing partnerships for sustainable development
- Investing in carbon capture, energy efficiency and green hydrogen

PHOENIX PARK GAS PROCESSORS LIMITED
LA BREA INDUSTRIAL DEVELOPMENT COMPANY LIMITED
Trinidad and Tobago NGL Limited
NGC CNG Company Limited
National Energy CORPORATION OF TRINIDAD AND TOBAGO

MEMBERS OF THE NGC GROUP OF COMPANIES

Strong gas demand supports further upstream FIDs



A number of new upstream natural gas projects were sanctioned over the course of 2023 as demand remained high amidst the ongoing energy crisis.

ANNA KACHKOVA

The current tightness in the market has come out of the trend in the recent years where natural gas supply additions were lagging the demand growth. With the loss of Russian pipeline gas supply to Europe due to the war in Ukraine pushing the market into major crisis and driving up prices to record highs. These conditions helped stimulate more new supply projects reaching final investment decision (FID) over the course of 2023. There are views with concern of a risk that this could push the market into oversupply; however, growing energy needs and the strong socio-environmental case for greater gas use in the developing world where it would replace dirty coal and help support growth of renewables, are likely to mitigate that risk and absorb new affordable supply of natural gas.

There is a potential for decline in gas demand in mature markets, as renewable energy capacity rises and steps are taken to reduce demand for hydrocarbons. On top of this, publicly listed operators remain under pressure to demonstrate capital discipline, often resulting in a focus on a smaller number of higher-return projects.

Nonetheless, recent upheaval in gas markets supports conditions for new natural gas projects to advance and are still favourable for now as Europe seeks to reduce dependence on Russian gas imports.

Energy Intelligence's director of gas and LNG research, Ian Nathan, tells *GVG* that upstream gas development has been in line with his expectations over the past year.

"This includes projects that have reached FID, those that are in the project queue and recent discoveries with development potential," Nathan says. "During and immediately following the pandemic, we expected that there could be corporate strategic shifts impacting upstream spending priorities. But we have seen upstream gas development priorities elevated in importance following Russia's invasion of Ukraine and subsequent interruption of gas supply to Europe."

Prominent projects

As noted in the previous feature, the US led the way in taking FIDs on new LNG projects this year, in some cases involving associated upstream developments being sanctioned as well. Globally, some projects that advanced to FID over the past year were in regions already inundated with a significant amount of gas production. Others, meanwhile, are advancing in regions with limited oil and gas activity, perhaps illustrating how current market conditions have boosted their attractiveness. Romania's Neptun Deep is one such project.

"Neptun Deep offshore Romania stands out as a key contributor," says Nathan. "With an expected plateau of 8 bcma, it is important given its proximity to the important EU demand centre. It is a rare gas development in a region where indigenous gas output decline has accelerated in recent years. Successful efforts in turning gas demand erosion into demand destruction will amplify its importance."

Neptun Deep, which is being jointly developed by operator OMV Petrom and state-owned Romgaz, is Europe's largest upstream FID of 2023. The project, which entails output from the Domino and Pelican South reservoirs, is expected to cost EUR4bn ($4.4bn) to develop. It is anticipated to turn Romania into the European Union's largest gas producer and a net exporter after it enters service, targeting 2027.

In total, Neptun Deep is anticipated to supply around 100 bcm of gas, as well as increasing the share of natural gas production in OMV Petrom's portfolio to around 70% by 2030. In a presentation to accompany the FID announcement, the company touted the potential for this to help lower the carbon intensity of its upstream portfolio.

Elsewhere in the world, projects were reaching FID in regions where development is more commonplace.

"In addition to Romania, other countries where projects have reached FID include Brazil, UAE and Indonesia," says Nathan. "Brazil is an interesting case as its BM-C-33 project (sanctioned in May) could be impactful in helping to offset LNG import requirements."

The pre-salt BM-C-33, which is located in Brazil's Campos Basin in water depths of up to 2,900 metres, is operated by Norway's Equinor, in partnership with Repsol Sinopec Brasil and Petrobras. In September, the partners submitted development plans for the project to regulators, which call for a floating production, storage and offloading (FPSO) unit to be installed at the concession.

Equinor intends to develop two areas within BM-C-33 – known as Raia Manta and Raia Pintada – and has said that the developments have the potential to meet 15% of the total Brazilian gas demand when they enter production. The project is expected to cost around $9bn to develop, creating up to 50,000 local jobs over its full life cycle. Start-up is targeted for 2028.

Other significant FIDs reached this year include the Hail and Ghasha offshore sour gas project in the UAE. The development is part of Abu Dhabi's Ghasha concession, which operator ADNOC expects to produce more than 1.5 bcfd of gas before the end of the decade, contributing to the UAE's gas self-sufficiency. The state-owned company also touted the FID as the world's first on an upstream gas project aiming to operate with net zero greenhouse gas (GHG) emissions. Plans for the project include a new carbon capture capacity of 1.5 MTPA. →

There remains a pressing need for many countries to reduce coal use, with a resurgence in coal demand during the ongoing energy crisis, as a result of high gas prices, undermining climate action plans.

Oversupply/undersupply risks

As developers continue to sanction upstream gas projects, including to underpin new LNG export capacity, there are concerns about oversupply emerging in the coming years. But equally, lower prices could spur more demand growth, creating a risk that the market could swing back to undersupply if FID momentum is not sustained. It is also important to note that some of the new production capacity will be replacing the natural decline in existing producing fields, and as such the net growth will be smaller.

The International Energy Agency (IEA) said in its Medium-Term Gas Market Report 2023, released in October, that it anticipated global LNG supply to grow by 25%, or 130 bcma, between 2022-26, with 70% of this increase coming in 2025-26. The IEA describes LNG export projects as a key driver of upstream developments.

Nathan also notes the connection between oversupply risk and LNG export capacity growth.

"Oversupply risk already exists from both LNG projects under construction and those we expect to be sanctioned in the near term, even with maturing ventures underperforming," he says.

There is a wave of LNG construction currently underway, notably on the US Gulf Coast, where various developers are still trying to bring additional liquefaction facilities towards FID. While US LNG developers are using shale gas as feedstock and do not typically rely on major new upstream gas projects being sanctioned, they are nonetheless helping spur ongoing drilling in regions such as the Permian Basin, as well as the Haynesville shale play. And with further US LNG export projects on the drawing board, this gas output also threatens to contribute to a global surplus.

Elsewhere in the world, meanwhile, backfill projects are required to help support maturing LNG projects dependent on individual upstream projects for feedstock.

"Importantly, failure to greenlight backfill projects supports the requirement for new liquefaction capacity," says Nathan. "However, additional sanctioning of such projects obviates that need and could further support oversupply. That said, oversupply could be short-lived if resulting lower prices support incremental demand."

However, while pricing is one of the factors that will play into demand trends, the impact of the energy transition on demand also needs to be considered. At the moment, gas is treated by many countries as a bridging fuel that is expected to help pave the way to a lower-carbon future. This can be seen in the various upstream projects whose decarbonisation credentials are being touted as they move to construction.

Going forward, the increasing uptake of renewables could reduce growth in gas demand. On the other hand, there remains a pressing need for many countries to reduce coal use, with many markets seeing a resurgence in coal demand during the energy crisis because of high gas prices, undermining climate action plans. Gas offers a reliable, flexible, dispatchable generation alternative that is lower-emissions and massively less polluting than coal – a function that will be increasingly more needed as the shares of intermittent renewables in grids increases. Gas can also be decarbonised more efficiently, using renewably produced biomethane, carbon capture, and low-carbon hydrogen blending. ■

PETRONAS

Forge towards a sustainable future with a progressive partner

PETRONAS is accelerating the shift towards a lower-carbon future with reliable energy solutions to meet customers' sustainability needs.

Balancing surging energy demands while embracing the global call for emissions reduction poses a significant challenge for many industries. At PETRONAS, we proudly stand as your ideal partner in this journey towards a lower-carbon energy future.

With liquefied natural gas (LNG) as our cornerstone, we pave the way to a more sustainable tomorrow. Over four decades, we've grown to become one of the world's largest suppliers of natural gas, with a global production capacity exceeding 40 MTPA. Our track record boasts over 12,600 successful deliveries to more than 25 countries, a testament of our commitment to customers' needs.

At PETRONAS, customer-centricity lies at the heart of everything that we do. Our unwavering commitment revolves around crafting tailor-made solutions that cater to every customers' sustainability needs, ranging from innovative delivery methods, pricing options, and contracting approaches. From LNG bunkering to ISO tank delivery and ship-to-ship transfers, our specialised services extend the advantages of LNG accessibility far and wide.

As the first energy company in Southeast Asia to pledge Net Zero Carbon Emissions by 2050, we have pursued multiple pathways to reach our goal. We have pledged zero routine flaring in new oil developments and existing oil production sites by 2030, implemented digital solutions and process equipment advancements, invested in the electrification of our assets, and embarked on carbon capture and storage (CCS) projects for CO_2 sequestration in our operations.

Above all, we are driven by a passion to create sustainable value for businesses, societies, and the planet. Our efforts and actions resonate with our partners' Environmental, Social, and Governance goals, without compromising on energy security. Together with PETRONAS, let's put passion into progress as we move towards a more sustainable future.

Connect with us at
lngenquiry@petronas.com
to progress your business holistically and sustainably.

Passionate about Progress

Israel-Hamas conflict reignites risks to energy security

Geopolitical risks have been rising in recent years, which has significant implications for energy security.

JOSEPH MURPHY

Fallout from the Ukraine-Russia conflict demonstrated the impact that geopolitical events can pose to the security of energy supply to an unprecedented degree for modern times. Europe lost 80-85% of its Russian pipeline gas imports as a result of the conflict, contributing to record high gas and power prices and prompting countries to build out LNG import capacity at breakneck speed.

Now, a new potential threat is posed by the Israel-Hamas conflict that broke out in October. These tragic events have so far had only a modest impact on the global energy supply. But there is a risk of greater, long-term ramifications, if the conflict is prolonged and potentially sees further escalation.

So far, the conflict led to the Israeli government shutting down production at the offshore Tamar gas platform on October 9, owing to the facility's vulnerability to rocket attacks from the Gaza Strip. The closure lasted five weeks, affecting gas supplies to Israel's domestic market, leading the government to look at alternative fuel sources to cover power demand, but also caused Israeli gas exports to drop by 70%.

This in turn made it difficult for Egypt to meet domestic demand and export LNG – a hit to its already struggling economy. The disruption led to immediate power cuts and reductions in gas supplies to Egypt's energy-intensive industries, including fertiliser production. Egypt even received a rare, imported cargo of LNG on November 3.

These events contributed to a rise in European gas prices, due to lost Egyptian LNG exports and market concerns over the length of the shutdown. But prices quickly subsided, as the continent's now full gas storage sites and subdued demand provide a buffer against such supply shocks.

The closure highlighted Egypt's dependence on Israeli gas. Having not made any major new gas discoveries since Zohr in 2015, and with production at existing projects falling and energy demand rising as a result of fast population growth, Egypt now finds itself increasingly exposed to the risk of energy shortages.

Fortunately, Israeli gas supplies have now been restored close to the normal, pre-conflict level of around 23 mcmd. This allowed Egypt to resume LNG exports on November 21. Even so, BloombergNEF warned on November 22 that LNG exports from Egypt could be 40% lower this winter than predicted a month earlier. The country delivered 10 bcm of LNG to the global market last year, contributing under 2% of global LNG trade but supplying around 5% of the EU's LNG imports.

Israeli gas production reached 22 bcm in 2022, with 40% of that volume exported. Besides Tamar, other producing fields are Leviathan and Karish, which ramped up production while Tamar was offline, helping Israel avoid its own energy shortages. Rystad Energy wrote in a commentary in October that shut-ins at Leviathan and Karish were also possible if the conflict deepens, however.

Until recently, East Med gas was like a regional glue, drawing Israel and its neighbours close together in energy cooperation – the hostilities throw this into doubt.

HAMISH KINNEAR, SENIOR MENA ANALYST AT RISK INTELLIGENCE COMPANY VERISK MAPLECROFT.

Regional energy cooperation

As mentioned, growing energy cooperation between Israel and its neighbours in recent years had supported improved political relations and led to greater regional stability.

"Until recently, East Med gas was like a regional glue, drawing Israel and its neighbours close together in energy cooperation – the hostilities throw this into doubt," explains Hamish Kinnear, Senior MENA Analyst at risk intelligence company Verisk Maplecroft. "If the situation drags on, Arab governments are likely to feel rising pressure from their citizens to take a harder line on relations with Israel and regional energy cooperation could be a casualty."

No other countries have been drawn directly into the conflict so far. But there has been an increase in cross-border fire between Israel and the Lebanon-based Hezbollah. Iran has called for other Islamic countries to boycott trade with Israel, though that call has so far gone unheeded. Meanwhile, Turkey has harshly criticised Israel over events in the Gaza Strip, threatening proposed energy cooperation between the two countries – including on the proposed EastMed pipeline to Europe.

Other projects are also at risk of being stalled, casting a shadow over the further development of the East Mediterranean's abundant gas resources. This would be to the detriment of the global energy market, as the region accounts for a not insignificant 2% of global gas reserves.

Upcoming projects include Chevron's plan to expand gas exports to Egypt from around 8 bcm in 2022 to 20 bcm by 2027, through further development at Tamar and Leviathan. Leviathan Phase 2 may involve the installation of a floating LNG facility that would produce 4.6 MTPA of LNG for global markets – particularly Asia. It would also provide additional gas for the Israeli domestic market and for Egypt. The US major's vice president for midstream, Colin Parfitt, confirmed in November that its plans in Israel remain the same, noting that the company was taking a long view on its activities in the country.

Cyprus is considering a joint development with Israel of a pipeline to send gas from its offshore Aphrodite field and other deposits to Egypt, where it could be liquefied.

Rystad drew attention to the risk that the conflict posed to the further expansion of Leviathan and Tamar, however, adding that the Karish field had benefited from a recent agreement to resolve Israel and Lebanon's longstanding border dispute – a deal that could be jeopardised if the situation escalates.

Still, Rystad said "a potential cause for optimism stems →

A potential cause for optimism stems from the fact that governments in the region may still be keen on the normalisation of relations with Israel and the associated economic benefits, which would mean a broader escalation of the crisis to the extent of the 1973 Arab-Israeli War is less likely.

RYSTAD ENERGY

from the fact that governments in the region may still be keen on the normalisation of relations with Israel and the associated economic benefits, which would mean a broader escalation of the crisis to the extent of the 1973 Arab-Israeli War is less likely."

Israel's government meanwhile remains confident in the prospects for further exploration and development of its gas resources. The energy ministry announced at the end of October it had awarded 12 exploration licences to six firms to search for gas in its exclusive economic zone. The companies in question were BP, Azerbaijan's SOCAR, Israel's NewMed and Ratio Energies, Italy's Eni and Korean-owned Dana Petroleum. BP meanwhile said in October it was still committed to acquiring a 50% interest in NewMed in a deal with Abu Dhabi's ADNOC.

All considered, it is hard to predict what the broader implications of the conflict will be for energy. But with geopolitical risks growing, the situation highlights what such risks might mean for energy security. Regions exposed to these risks can mitigate the impact through diversification of supply, in collaboration with ample and flexible global energy supplies.

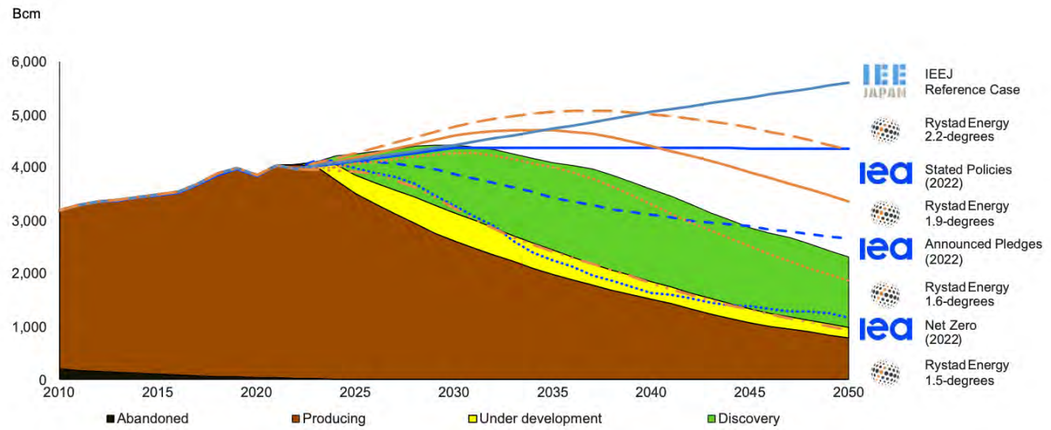
On the other side, it is worth highlighting that cooperation on gas developments has acted like a critical facilitator of diplomacy in the region, and the significant mutual benefits that stand to be gained from continuing to build regional energy markets, providing an important lever for de-escalation. ■

Crisis highlights need for better energy planning: IGU Global Gas Report

With the outlook so uncertain, there must be prudent energy planning that involves supply being developed ahead of demand, so that energy security and affordability are not overlooked.

JOSEPH MURPHY

Global gas demand scenarios from various institutions versus operational, approved and discovered assets (2010 - 2050)[1]



Source: IEA: IEE Jpan: Rystad Energy

1: All historical and forecasted values are scaled to be identital in 2022 to account for different hearting and caloric assumptions.

The unprecedented uncertainty about future global demand for natural gas was one of the key takeaways from the International Gas Union's Global Gas Report 2023, released in October. The report therefore stressed the need for supply to be developed ahead of demand, as well as "comprehensive and balanced energy planning" to avoid supply crises.

"Analysis of future potential trajectories of global gas demand from a wide range of existing energy transition outlooks towards 2030 and beyond reveals unprecedented uncertainty and illustrates that continued investments in the natural gas value chain are needed to cope with natural supply decline, global demand dynamics, and likely growth in several regions," concluded the report, produced by the IGU in collaboration with Snam and Rystad Energy.

Gas demand scenarios have important implications for policy decisions. If the resulting energy planning is not prudent enough, there may not be enough supply developed to meet demand. This would not only lead to high energy prices and shortages, but also increased emissions as countries resort to dirtier fuels such as coal as an alternative.

"Restoring a sustainable balance in the global gas market is imperative and requires addressing the existing supply shortfall, an outcome of a prolonged under-investment period," the report said.

"The most turbulent year"

The natural gas industry endured the most turbulent year in its history in 2022, subject to unprecedented supply and price shocks, the report said. Though the industry has come out of that year more agile and adaptable than ever, the global market remains in an unstable equilibrium in 2023.

Global gas demand dropped by 1.5% in 2022 as a result of high prices, with the largest declines registered in Europe and Asia, offset by strong growth in North America. Regions hardest hit by the energy crisis saw demand continue to fall in the first half of 2023, as a result of industrial slowdown and decreased heating demand.

European demand dropped by nearly 12% last year, owing to supply and price shocks resulting from the Russia-Ukraine conflict. This led to demand destruction and gas-to-coal switching, having negative implications for both the economy and environment. Asia also saw demand drop by 1.9%, with some countries in South Asia finding themselves no longer able to afford LNG, leading to more coal use, energy shortages and blackouts.

Meanwhile global gas production stayed flat in 2022, with only a margin increase of 0.5%. Decline in Russia was offset by growth in North America and Middle East, as well as an incremental increase in Europe and a modest rise in Asia. →

Analysis of future potential trajectories of global gas demand from a wide range of existing energy transition outlooks towards 2030 and beyond reveals unprecedented uncertainty and illustrates that continued investments in the natural gas value chain are needed to cope with natural supply decline, global demand dynamics, and likely growth in several regions.

IGU GLOBAL GAS REPORT 2023

Demand contraction, marginal supply growth and infrastructure debottlenecking helped the market ease back into a fragile, unstable equilibrium, it said.

LNG supply was also crucial in navigating a way through the crisis, helping to cover gas shortages in Europe, it continued. But while LNG was "instrumental in keeping the lights on in Europe, the unaffordable prices left some countries in Asia in the dark."

Meanwhile, global energy CO_2 emissions continued on an upward trajectory in 2022, rising by 1.1% to a new record, in part due to gas-to-coal and gas-to-oil switching.

"Coal usage growth shows the importance of stability in global gas markets in minimising emissions," the report said.

Policy lessons

Prior to the crisis, policy was focused rightfully on sustainability, but security and affordability were deprioritised as they appeared assured at the time. However, events since have returned both into sharp focus in 2022.

Beyond the supply and price shocks associated with the Russia-Ukraine conflict, the crisis is the culmination of years of underinvestment in natural gas that has left the global market undersupplied and "highly sensitive" to fluctuations in both supply and demand, the report said. Investment in gas supply has fallen by 58% between 2014 and 2020, it estimated, with spending only beginning to pick up in 2021. Without additional investment, the current total existing and approved gas production level is projected to decline to 3,100 bcm in 2030, from an expected 4,100 bcm this year. A further decline to 1,850 bcm in 2040 and under 1,000 bcm in 2050 is forecast.

"As evidenced by growing coal use and emissions, sustainability cannot be fully realised without the pillars of security and affordability, and therefore all three need to be in balance," the report said. "Natural gas, low carbon, and renewable gases are crucial contributors in this sense, as they enable development and industrialisation in developing regions, enhance sustainability by addressing air quality problems from coal use, make the grids more resilient to support massive scale-up of renewables, and foster competitive industry decarbonisation."

The report continued saying that decarbonisation policies had "disproportionately focused on the supply side, while energy conservation and demand-response have been overlooked as powerful tools for emissions reduction through reducing overall energy use."

Through proactive demand management, energy use can be made more efficient, reducing the tightness of the global gas market by lowering demand in a way that is economically and industrially sustainable. In parallel, efforts should be made to increase supply through optimisation.

Furthermore, the report stressed that the acceleration of low-carbon gaseous energy development would have an essential role in the energy transition.

"Abated natural gas with CCUS, green and blue hydrogen (including derivatives like clean ammonia), biomethane and e-methane, will play an increasingly significant role in an achievable and just transition, offering a viable decarbonisation option in many applications such as power generation, reactant/feedstock need, heating, and heavy transport, provided they are accessible in sufficient quantities and are cost-effective.".

New gas and LNG infrastructure should be designed to be compatible with these gases, future-proofing these investments by guaranteeing their long-term use during the transition. ■

Fueling today with tomorrow in mind.

At Chevron, we're helping bring lower carbon energy solutions to customers around the world. As global demand for LNG rises, we're expanding our gas portfolio while also increasing production of other renewable fuels. Meeting today's energy needs, while forging new paths to the future — in ways that are affordable, reliable, and ever cleaner. That's Energy in Progress

CHEVRON, the CHEVRON hallmark and The Human Energy Company are trademarks of Chevron Intellectual Property LLC. © 2023 Chevron USA Inc. All rights reserved.

Policy support spurs clean tech development

The US Inflation Reduction Act has been a game-changer for low-carbon technologies, and other countries and regions are trying – but often struggling – to compete.

ANNA KACHKOVA

The energy transition continues to drive policy support, of which the US Inflation Reduction Act (IRA) of 2022 remains the most significant. Indeed, the IRA is viewed as a gamechanger for the US and its role in the global push to decarbonise.

Other regions are also introducing their own policies and incentives to help drive investment in* local initiatives including clean hydrogen and carbon capture, utilisation and storage (CCUS). It is difficult, however, to compete with the level of incentives the IRA offers, but despite this, the general expectation is that a race to attract clean energy investment will be good for the transition globally. Such policy support can also help spur efforts to cut emissions of methane and other greenhouse gases (GHGs).

It is also worth noting, the path forward will not be straightforward, and there are still considerable challenges to navigate. This includes various planned technologies that are in a nascent stage of development and are unproven at large scale, and massive amounts of liquidity required to finance these efforts. There are concerns that as competition between low-carbon technologies, renewables and natural gas for investment intensifies, funding could be impacted.

Gamechanger

The IRA was signed into law in August 2022 and its impact was immediate. The act made $250.6bn available to the clean energy industry and a total of $393.7bn when including related industries such as environmental, transport and electric vehicles, according to an analysis by McKinsey & Co. The funds on offer are available through a mix of tax incentives, grants and loan guarantees.

These incentives came as a significant boost to emerging industries that required government support to establish themselves. These included CCUS and clean hydrogen, which benefit from the updated 45Q tax credit for carbon dioxide (CO_2) sequestration and the new 45V hydrogen production tax credit respectively.

"We would agree that the IRA changed the game for those stakeholders looking to enter both the CCUS and clean hydrogen spaces," an Enverus Intelligence Research (EIR) senior geology associate, Evan MacDonald, tells *Global Voice of Gas* (*GVG*). "The projects are quite expensive, compared to traditional energy offerings, and require engagement and involvement from many partners," he continues. "Thus, the amplification of the 45Q tax credit made the upfront investment much more palatable and resulted in a surge of project announcements, and as we're seeing today, a dramatic increase in Class VI permits being evaluated".

Indeed, in research published in late November, EIR said that applications for Class VI permits – which apply to CO_2 injection – were up 500% since 2021, averaging four per month in 2023. This is in line with broader findings that CCUS activity has risen in the US since the IRA came into force.

"I think for CCUS in general, there has been an increase in the US that we can observe in the Global CCS Institute's report," Anne-Sophie Corbeau, a global research scholar at the Center on Global Energy Policy at Columbia University's School of International and Public Affairs (SIPA), tells *GVG*. "The US has the largest number of facilities operating, under construction and in planning (+73 facilities in one year)." She describes this as good progress that can be attributed in part to the IRA.

Clean hydrogen, meanwhile, is lacking progress in the US, with the industry at an earlier stage of development.

"For sure, when the IRA was announced, many investors in other regions started to look at the US," says Corbeau. "But I note that we have a certain number of projects in the pipeline – as shown in the IEA hydrogen review – with a clear advantage to fossil + CCUS projects in the US, because of the uncertainty regarding the rules on renewable hydrogen which have still to be finalised."

Corbeau notes that clean hydrogen projects still need to secure demand. MacDonald also highlights similar hurdles.

"The IRA incentivises supply but falls short on bolstering demand," says MacDonald. "Implementation, especially for green hydrogen, remains a bit uncertain and there is concern that the restrictive guidance may negatively impact project development. Incentivising investors will be an early challenge, but once commercial successes become realised by first movers at a commercial scale, we'd expect more interest for the investment community across the board."

Competition

Other regions are also increasing efforts to attract clean energy investment. The EU remains a leader in this respect, with the additional incentive of phasing out Russian gas imports, while still pursuing its net zero emission targets. The EU introduced REPowerEU in May 2022, with three main aims – saving energy, producing clean energy and diversifying its energy supplies.

There are concerns that as competition between low-carbon technologies, renewables and natural gas for investment intensifies, this could affect the availability of funding. We would agree that the IRA changed the game for those stakeholders looking to enter both the CCUS and clean hydrogen spaces.

EVAN MACDONALD, SENIOR GEOLOGY ASSOCIATE, ENVERUS INTELLIGENCE RESEARCH

REPowerEU included a target of producing 10 MT of low-carbon hydrogen production domestically by 2030, with an additional 10 MT through imports.

"REPowerEu has set lofty hydrogen targets, which we believe should support demand, however, the pathway remains uncertain," says MacDonald. "The EU is considering contracts for difference for green hydrogen offtakers, which should support the demand case, but they have also adopted strict hydrogen guidance in order to qualify the commodity as 'green' hydrogen, the latter of which may provide a headwind to uptake."

The EU is also making strides forward in cutting methane emissions, notes Corbeau, and also points to some progress in the US, adding that it may be too early to tell what impact the IRA is having.

"I think there is a need for sticks and carrots, but maybe more sticks," Corbeau says. "If the EU and other big LNG importers take steps in the direction of being stricter on GHG emissions, then they would have to make progress given that the US will represent around a fourth of global LNG export capacity by 2028."

Further regions to watch globally for the deployment of clean energy include China – a leader in solar installation and deployment – and India, whose "ability to recently self-supply their nation with renewable energy →

“I imagine as green technology continues its growth and more projects come online that are considered commercial successes, the funds will open up, but with that, an increase in competition will likely follow.”

tech has surprised to the upside,” MacDonald says He also cites efforts in Canada to develop CCUS hubs, though the federal and provincial incentives available there are “not as clean cut” as the 45Q tax credit in the US.

“Generally, we view the appetite for CCUS to be much greater in the US, and the structure in place to develop projects from both regulatory and incentivisation sides to be further along than Canada and the EU. We wouldn’t consider it a race, but we would expect the EU to pay close attention to the continued evolution of the industry in the US, try and mimic some of the strategies and learn from shortcomings.”

Obstacles

There are expectations that as low-carbon technologies advance and deployed universally, this will also help unlock more investment amid rising confidence in the industry. However, concerns remain around the distribution of investment on a global scale.

“What I see as a major problem to tackle during COP28 is to ensure that Global South countries have access to more affordable finance. Otherwise, a rift may emerge between them and the West. There is already the matter of the $100bn, which was promised to these countries and maybe has been achieved this year, but there are many more issues,” Corbeau adds, referring to the pledge by developed countries participating in the COP summits to collectively provide $100bn per year by 2020 to developing countries for climate action.

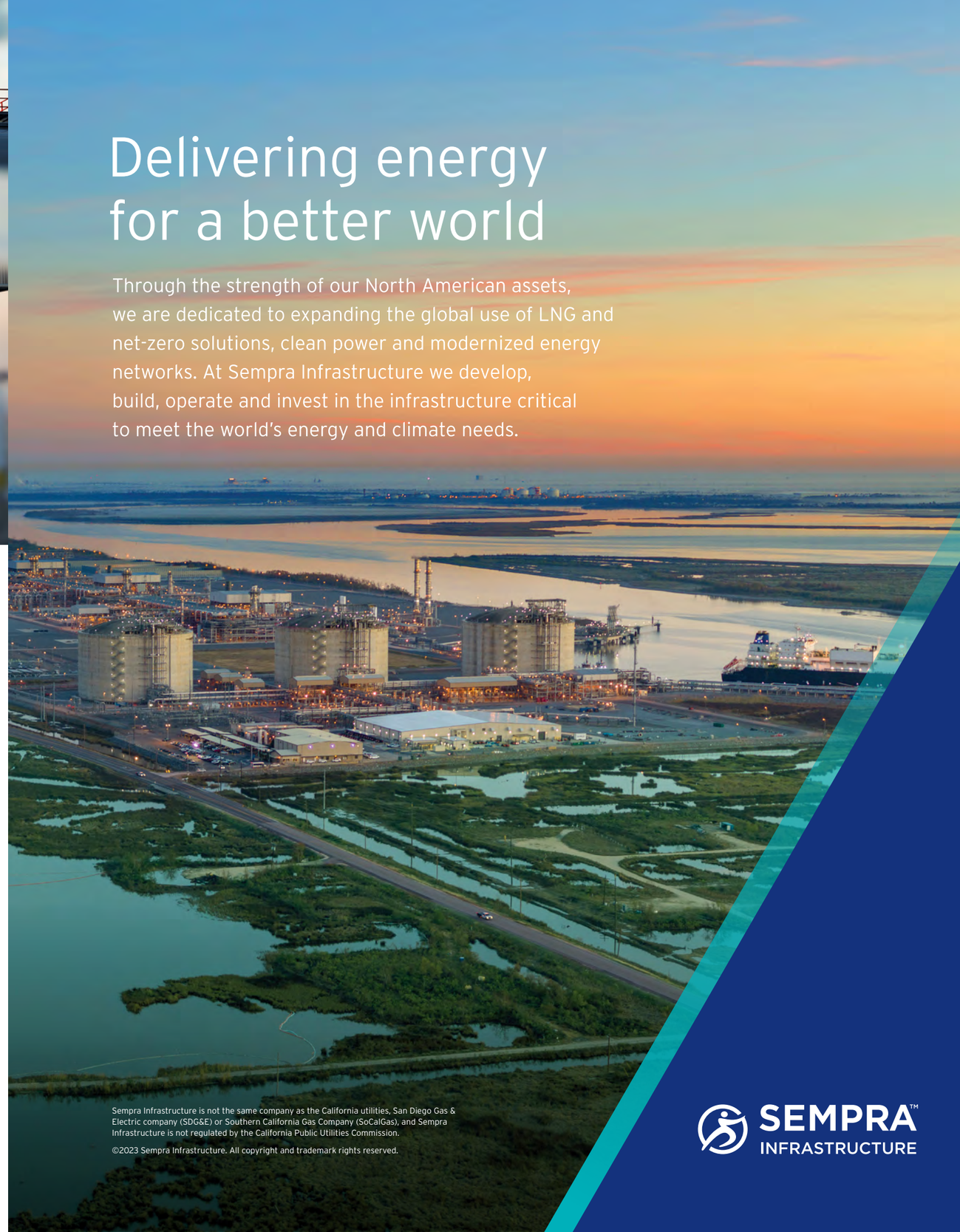
Questions remain over competition between low-carbon industries with investment into renewables and natural gas , and whether there is a risk of a liquidity crunch emerging.

“In some instances, you may have E&P companies operating natural gas-/hydrocarbon-bearing assets that are looking to develop CCS projects,” says MacDonald. “In this case, the dual nature of the operations may provide these operators an ability to access more capital or open themselves up to variable funding options. There will be competition for investments across low-carbon technologies, but that competition may not be the source of a liquidity crunch as much as the smaller volume of funds available to those operators,” he adds.

“ESG and green-related investing ecosystems have been observably tumultuous over the past few years as the investment community is trying to find a balance between traditional (safe) energy assets and more expensive, less proven ‘green’ offerings,” MacDonald adds. “I imagine as green technology continues its growth and more projects come online that are considered commercial successes, the funds will open up, but with that, an increase in competition will likely follow.” ■

Delivering energy for a better world

Through the strength of our North American assets, we are dedicated to expanding the global use of LNG and net-zero solutions, clean power and modernized energy networks. At Sempra Infrastructure we develop, build, operate and invest in the infrastructure critical to meet the world’s energy and climate needs.



Sempra Infrastructure is not the same company as the California utilities, San Diego Gas & Electric company (SDG&E) or Southern California Gas Company (SoCalGas), and Sempra Infrastructure is not regulated by the California Public Utilities Commission.

©2023 Sempra Infrastructure. All copyright and trademark rights reserved.

SEMPRA™ INFRASTRUCTURE

EU biomethane target of 35 bcm by 2030 is achievable

Proponents of biomethane's potential are confident that the REPowerEU target of 35 bcma of production by 2030 can be achieved, with the right market conditions and with sufficient policy support.

JOSEPH MURPHY

The European Commission last year presented a target to expand biomethane production to 35 bcma by the end of the decade, as part of its REPowerEU initiative to replace Russian gas imports while accelerating the energy transition.

Achieving that goal will be no small feat. Biomethane production in the EU came to only 3.4 bcm in 2022. But various industry associations – including Eurogas and the European Biogas Association (EBA) – argue that it can be done, under the right market conditions and with sufficient policy support.

The case for biomethane

As the EBA notes in its manifesto, "biogases, including biomethane, are EU-made renewable energy vectors and have the potential to revolutionise our energy system and drive sustainable practices in agriculture and waste management. Because they can adapt to existing infrastructure, they deliver systemic cost efficiency while leading a transformative shift towards a greener and cleaner Europe."

Biomethane offers many advantages as a pathway towards decarbonisation. Harnessing biomethane as an energy source prevents methane emissions that would otherwise occur naturally from the decomposition of organic matter, while their combustion can achieve additional emissions savings by replacing the burning of more polluting fuels. They have the potential to be carbon-neutral, or in some cases even carbon-negative, fuels.

"Instead of having methane emitted into the atmosphere, you keep it, use it and so you only emit CO_2", which is a less potent climate forcer," Didier Holleaux, President of Eurogas, tells *Global Voice of Gas*.

Biomethane can make use of existing natural gas infrastructure and appliances, and can be lower cost than natural gas – particularly in the recent high-price context. As it is the same fuel chemically, biomethane can be used like natural gas across the entire economy, from heating and power, transport, and buildings to industry. It is also a means by which Europe can enhance its energy security, as the continent can use its own waste and other organic feedstocks to produce its own energy.

The European agricultural sector is characterised by small-scale farms, with some struggling with relatively low revenues, Holleaux says. Producing energy in the form of biomethane gives them an additional revenue stream, creating more employment in rural areas and supporting the countryside economy.

Putting agricultural and food industry waste into an anaerobic digester to produce biogas also provides a digestate that can serve as an excellent fertiliser, he says. This is an alternative to potash and phosphate-based fertilisers, which require energy-intensive mining, or ammonia-based fertilisers derived from natural gas. As the EU is a significant net importer of fertiliser (and natural gas), producing that fertiliser domestically saves on import bills.

In addition, biomethane production relies on relatively inexpensive technologies, using readily available materials and equipment. Plants can also be small-scale and can be ready for operation within 18 months of construction, according to Holleaux.

While there is a long way to go to meet the 35 bcm goal, momentum has been quickly building in recent years. EU production grew by 21% last year and has more than doubled in the last four years, with output rising fastest in France, Italy, and Denmark. The bloc also produces an additional nearly 15 bcm of biogas with some potential to be upgraded into biomethane.

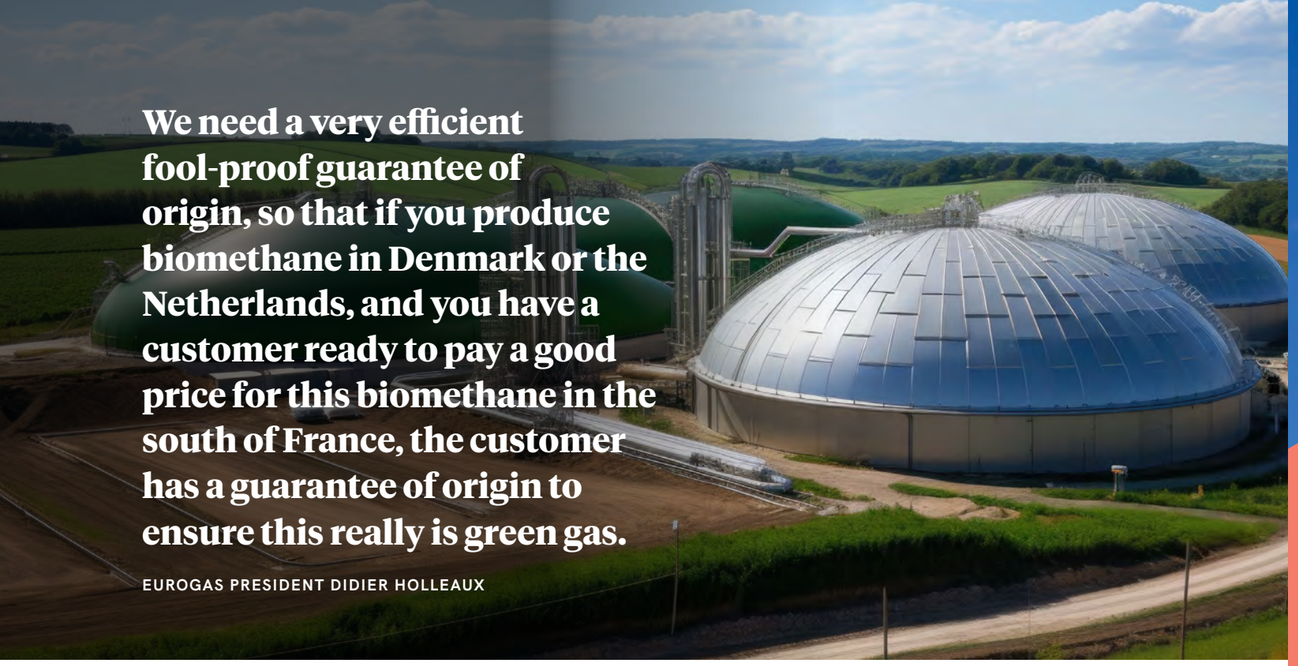
Many existing biogas plants are used to produce only electricity on site and have no need to produce heat, resulting in a low-yield of energy generation. These plants, Holleaux says, make good candidates for upgrading to biomethane plants to produce both heat and power, if it is feasible to connect them to the grid.

There is a substantial pipeline of new projects on the horizon. In June, the EBA estimated that the industry had plans in place to invest €18bn ($19.4bn) in biomethane projects that would contribute towards the 35 bcm target. The biggest investment plans are in France (€1.4bn) and Italy (€1.1bn), where policy and market conditions are favourable, followed by the Netherlands (€951mn), Spain (€948mn), Germany (€658mn), Sweden (€635mn) and Poland (€429mn).

Still, more needs to be done. The EBA estimates that €83bn in total will be needed to reach 35 bcm by 2030, depending on plant size, location and the type of sustainable feedstock used. Annual production growth should also increase to 33.8% between now and the end of the decade. →

Biogases, including biomethane, are EU-made renewable energy vectors and have the potential to revolutionise our energy system and drive sustainable practices in agriculture and waste management.

EUROPEAN BIOGAS ASSOCIATION



We need a very efficient fool-proof guarantee of origin, so that if you produce biomethane in Denmark or the Netherlands, and you have a customer ready to pay a good price for this biomethane in the south of France, the customer has a guarantee of origin to ensure this really is green gas.

EUROGAS PRESIDENT DIDIER HOLLEAUX

Getting policy right

Proponents of biomethane point to a range of policy improvements that could help facilitate the needed growth.

Holleaux stresses the need for a faster permitting process to get biomethane projects up and running sooner, noting that how quickly permits can be secured varies greatly on a country-to-country basis. Fortunately, he believes REPowerEU has propelled efforts to simplify that process. Discussing the main concerns raised by residents and businesses near a proposed biomethane site, he notes that methanisers do not result in additional odours other than those associated with manure and other biomass that occur anyway, and that additional traffic – resulting from deliveries of biomass to the plant – can be avoided by choosing sites with good logistics.

Individual countries should adopt targets for biomethane development in their national energy and climate plans, the EBA recommends. The EU also needs to develop a bloc-wide biomethane market, doing away with barriers to trade within and across its member states, enabling the sector to meet energy demand in a more cost-effective way.

"We need to make sure that biomethane is going to the customers that are keenest to pay for green gas," Holleaux says.

This would involve providing a right to access existing gas grids in all countries and harmonising how the low-carbon value of biogas is documented and marketed, according to the EBA. Biomethane procurement across the bloc should also be made simpler, using tools that already exist, such as guarantees of origin and proof of sustainability. Barriers to purchases should also be removed.

"We need a very efficient foolproof guarantee of origin, so that if you produce biomethane in Denmark or the Netherlands, and you have a customer ready to pay a good price for this biomethane in the south of France, the customer has a guarantee of origin to ensure this really is green gas," Holleaux says.

Holleaux also advocates for sufficiently high feed-in tariffs to support smaller-scale plants, while larger-scale projects should be supported with tender calls, ensuring the most competitive projects are prioritised.

Biogas and biomethane should also be encouraged more as decarbonisation options across sectors, the EBA said in its manifesto, calling for incentives for the use of the low-carbon energy sources in all possible energy-uses, particularly in the most energy-intensive ones. Support is also important for research and innovation in biogas and biomethane technologies.

The association stresses the need for a level-playing field between biomethane and other renewable energy sources when it comes to accessing their emissions-reducing value. It calls for a comprehensive emissions accounting framework based on a technology-neutral lifecycle approach, where emissions reductions are effectively valued all the way from production to utilisation. ■

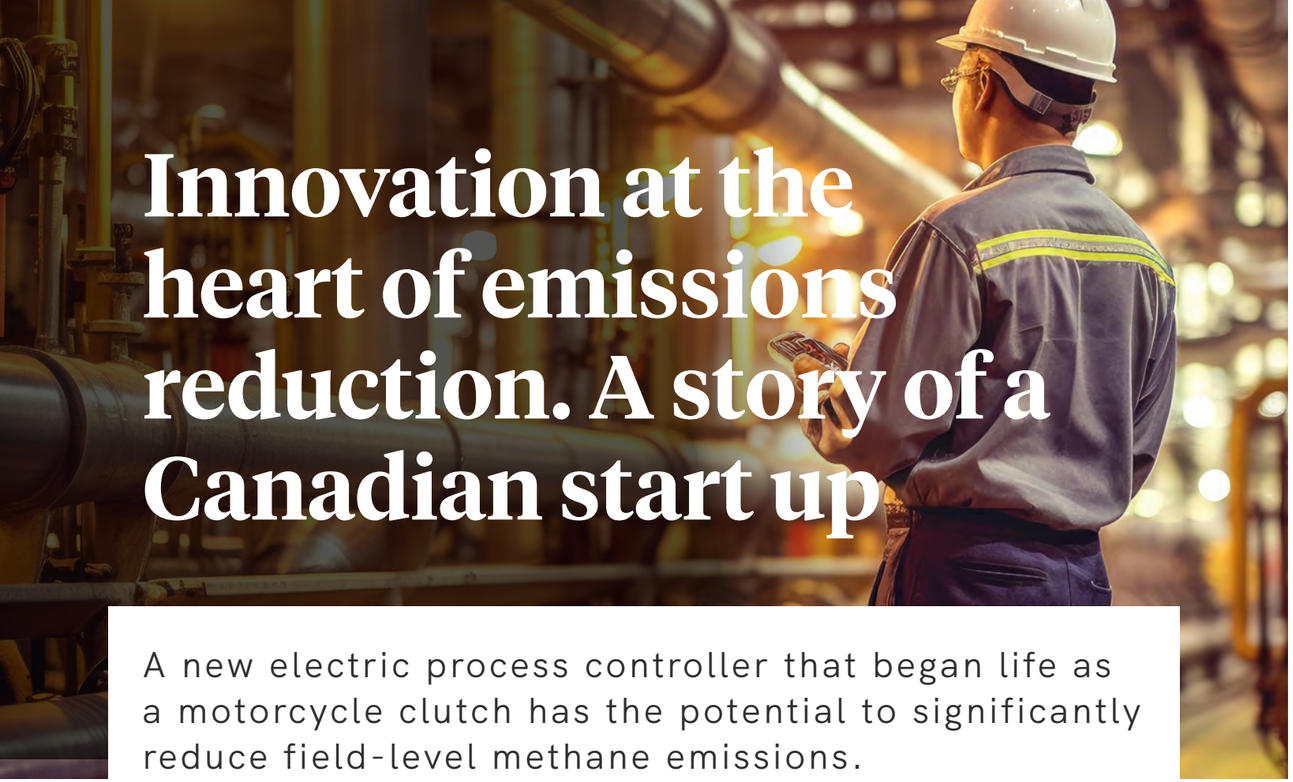
SnapLNG™ by T.EN

We are opening new frontiers in natural gas liquefaction with SnapLNG by T.EN.™
Delivering low-carbon LNG in a new way with an accelerated time to market.

The Solution ZERO

LNG decarbonized production
Pre-engineered and standardized modular solutions
Optimized asset life cycle performance
LNG certainty

T.EN TECHNIP ENERGIES



Innovation at the heart of emissions reduction. A story of a Canadian start up

A new electric process controller that began life as a motorcycle clutch has the potential to significantly reduce field-level methane emissions.

DALE LUNAN

Faced with increasingly stringent emissions rules to address climate change, the natural gas industry has turned to innovation for reliable and economic alternatives to gas-powered pneumatic controllers.

Pneumatic controllers are process control automation devices used widely in the natural gas industry to operate valves that control liquid level, pressure, and other process variables throughout the gas delivery systems. There are a great many of them in any given gas network.

These controllers are most commonly activated by pressurised methane, and if the millions of such devices in use now emitted even extremely small amounts of methane, which is also a potent greenhouse gas, every time they are cycled, it can add up to a notable emission level.

Vancouver-based Kinitics Automation has developed an alternative, powered by electricity, which they explain is a linear valve actuator based on shape memory alloys that i is capable of robust performance in remote settings where grid power may not always be available.

A decade in the making, it is poised to release its first units to Tourmaline Oil, Petronas, Canadian Natural Resources Limited and Tidewater Midstream by the end of this year or early in 2024, CEO Dean Pick tells *Global Voice of Gas*.

"We've got working units now in the shop," he says. "We're dispatching them to our certifier to get the final sticker approval, and we've got a small backlog of orders that we're working to dispatch against as well."

Kinitics has three products in development – a valve actuator, a linear activator and a piston pump – but for now, its main focus is on its Kinitics Valve Actuator (KVA), a spring-loaded electric valve actuator designed to replace methane venting pneumatic actuators.

At the heart of the KVA are bundles of wires made from shape memory alloy which when excited by thermal or electric energy contract in a straight line.

The KVA bundles several of these wires together and assembles them with a standard biasing spring. When an electric current is run through the bundled wires, they contract, compressing the spring and opening the valve.

The journey from motorcyles to reducing methane emissions

The Kinitics valve actuator has been more than a decade in the making, and it emerged from an earlier project Pick was working on to develop an automatic clutch for motorcycles. It was during that project that he came across shape memory alloys, which have been around since the 1950s and are used in a variety of fields, including implantable medical devices where they are used primarily for their elastic properties, Pick says.

"They use it because it's essentially unbreakable – they call it super elastic – and that works to our advantage as well because we don't want things that break."

Pick eventually designed a clutch assembly for motorcycles – it's not yet in commercial use – and in 2013 began thinking of broader industrial applications for shape memory alloys. His engineers came up with hundreds of possible use cases, but it wasn't until he created Kinitics and put the early concept of the valve actuator into generic process control channels that he began to hear back from a few industrial sectors.

"We had a concept for something, but we really had no idea where it might be applicable, so we formed Kinitics with the intention of finding a home for this concept," he says. "The aerospace (industry) echoed back interest and the natural gas industry echoed back interest."

Support from NGIF

NGIF, the Natural Gas Innovation Fund established by the Canadian Gas Association (CGA) in 2016 to bring innovative technologies together with its natural gas industry partners, was the source of that "echo-back", and in 2019 it approached Kinitics with an idea for an electric valve actuator. That was the genesis, Pick says, of a productive and positive partnership.

NGIF and Emissions Reduction Alberta (ERA) provided early start-up funding, while the National Research Council of Canada's Industrial Research Association Program and the Clean Resource Innovation Network have since provided additional funding.

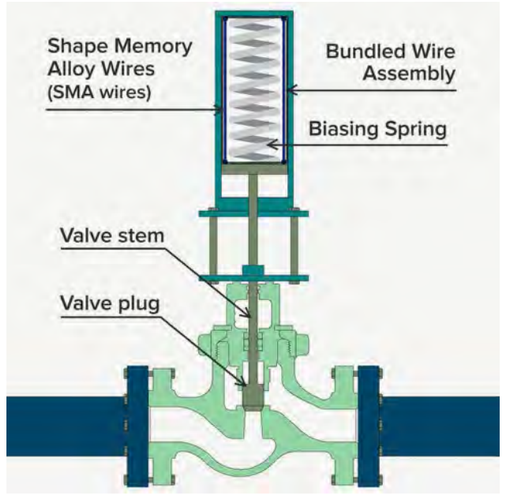
"All told, I think, we've picked up C$1.3mn in non-dilutive funding, and we love non-dilutive funding," Pick says.

Equally important, however, was the access NGIF provided to potential end-users and engineers who had a clear idea about what the industry needed to replace methane venting pneumatics.

While the early funding was invaluable to the development of the KVA, even more important was the access the NGIF partnership provided to the people who actually needed an answer to gas-based pneumatic controllers, Pick says.

"I don't think we would have been able to produce a product that ticks so many boxes if we didn't have the engineers at the gas companies at the front end, through our involvement with NGIF, basically telling us that we need this, we need this and we need this," he says. "I want to hear that at the front end, not at the back end where they say you missed this, you missed this, you missed this – it's so hard to engineer those fixes in after the fact."

Kinitics' KVA actuator

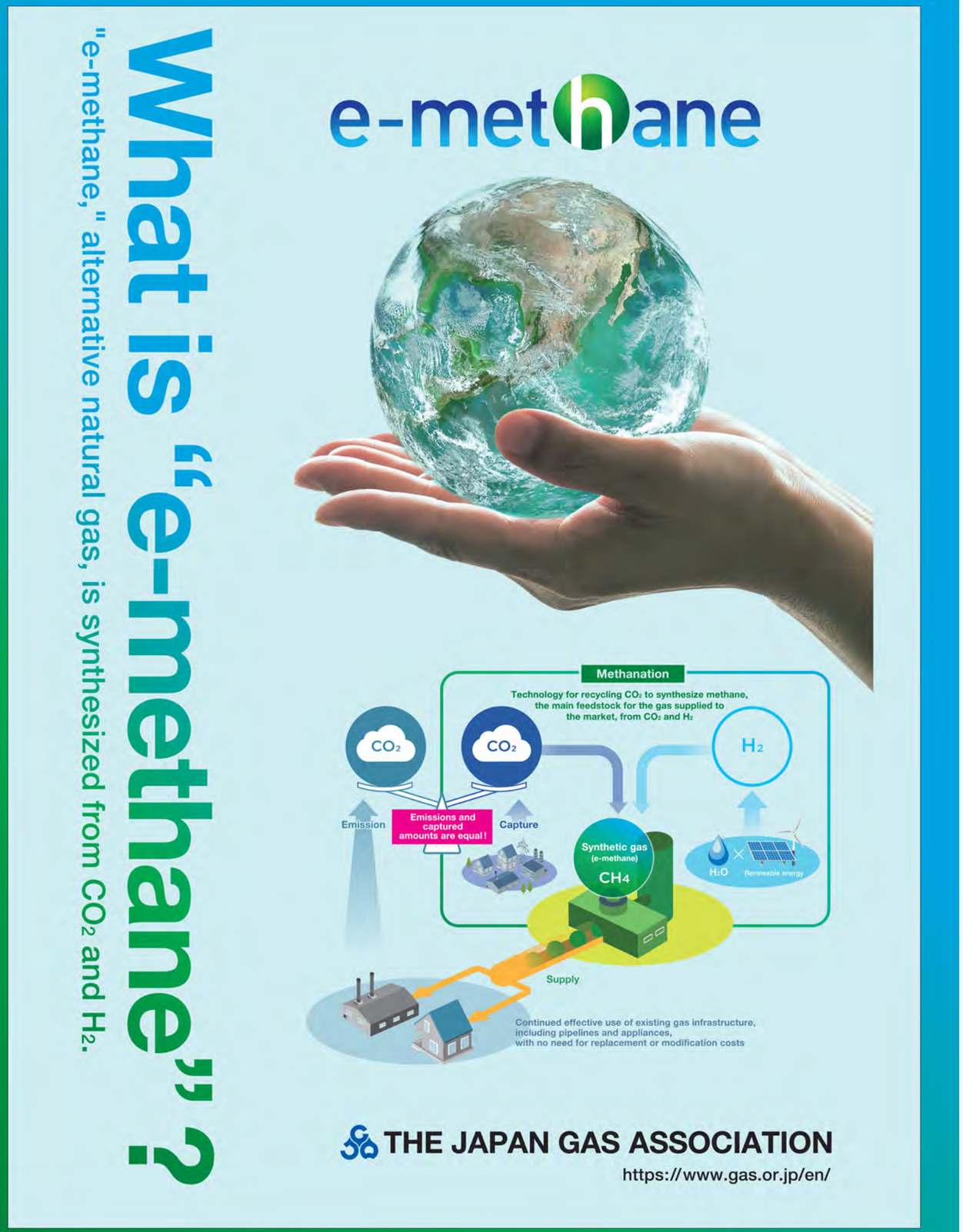


"I don't think we would have been able to produce a product that ticks so many boxes if we didn't have the engineers at the gas companies at the front end, through our involvement with NGIF, basically telling us that we need this, we need this and we need this."

KINITICS AUTOMATION CEO, DEAN PICK.

The NGIF connection also gave Kinitics the opportunity to bench-test its technology at the University of Calgary and field test it at the NGIF Emissions Testing Centre at Tourmaline's West Wolf Lake natural gas processing plant. The success of those tests resulted in others in the gas industry – CNRL, Petronas and Tidewater Midstream among them – taking notice of the technology and its potential to significantly reduce venting emissions.

"What we're seeing is that half of the methane released from production is attributable to the venting pneumatics," Pick says. "I think with our equipment the industry can eliminate two-thirds of venting from pneumatics, which represents a third of all methane from industry sources. That's a big number." ■



A Publication of the International Gas Union (IGU) in collaboration with Minoils Media Ltd.

IGU Editorial Team

Strategic Communications and Membership Director

Tatiana Khanberg

IGU Leadership

Interim Secretary General

Mel Ydreos

President

Li Yalan

Vice President

Andrea Stegher

Minoils Media

Advertising and Sponsorship Inquires

Greg Klausmeyer

inquiries@naturalgasworld.com

Editor, *Global Voice of Gas* and Editor-in-chief, Natural Gas World

Joseph Murphy

Publisher

Minoils Media Ltd.

Senior Editors

Dale Lunan

Ross McCracken

Vice President, Strategy & Engagement

Joao Salviano

President

H. Rick Gill

Global Voice of Gas

BY THE INTERNATIONAL GAS UNION

ISSUE 04 | VOL 03

International Gas Union
44 Southampton Buildings,
WC2A 1AP London, United Kingdom
E-mail: info@igu.org
Website: www.igu.org

Minoils Media Ltd.
c/o 595 Burrard St, Suite #700,
Vancouver, B.C. V7X 1S8
Canada
Telephone: + 1 604.644.6624
E-mail: engagement@naturalgasworld.com
Website: www.naturalgasworld.com

Copyright © 2023.
The entire content of this publication is protected by copyright, full details of which are available from the publisher. All rights reserved. No part of this publication may be reproduced, stored in retrieval systems or transmitted in any form or by any means – electronic, mechanical, photocopying, recording or otherwise – without the prior permission of the copyright owner

IGU
INTERNATIONAL GAS UNION
UNION INTERNATIONALE DU GAZ

NATURAL GAS WORLD