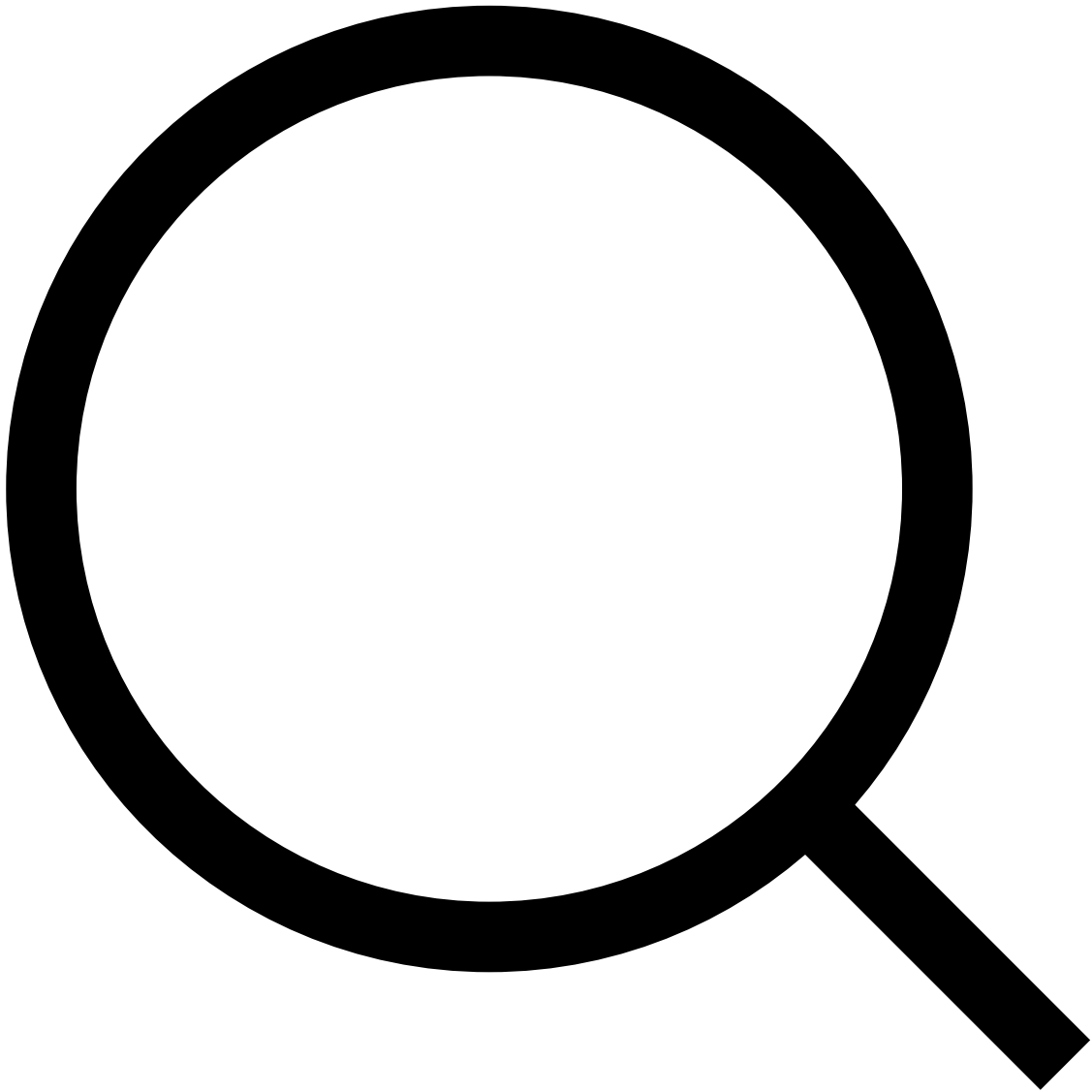


High above Greenland glaciers, NASA looks into melting ocean ice



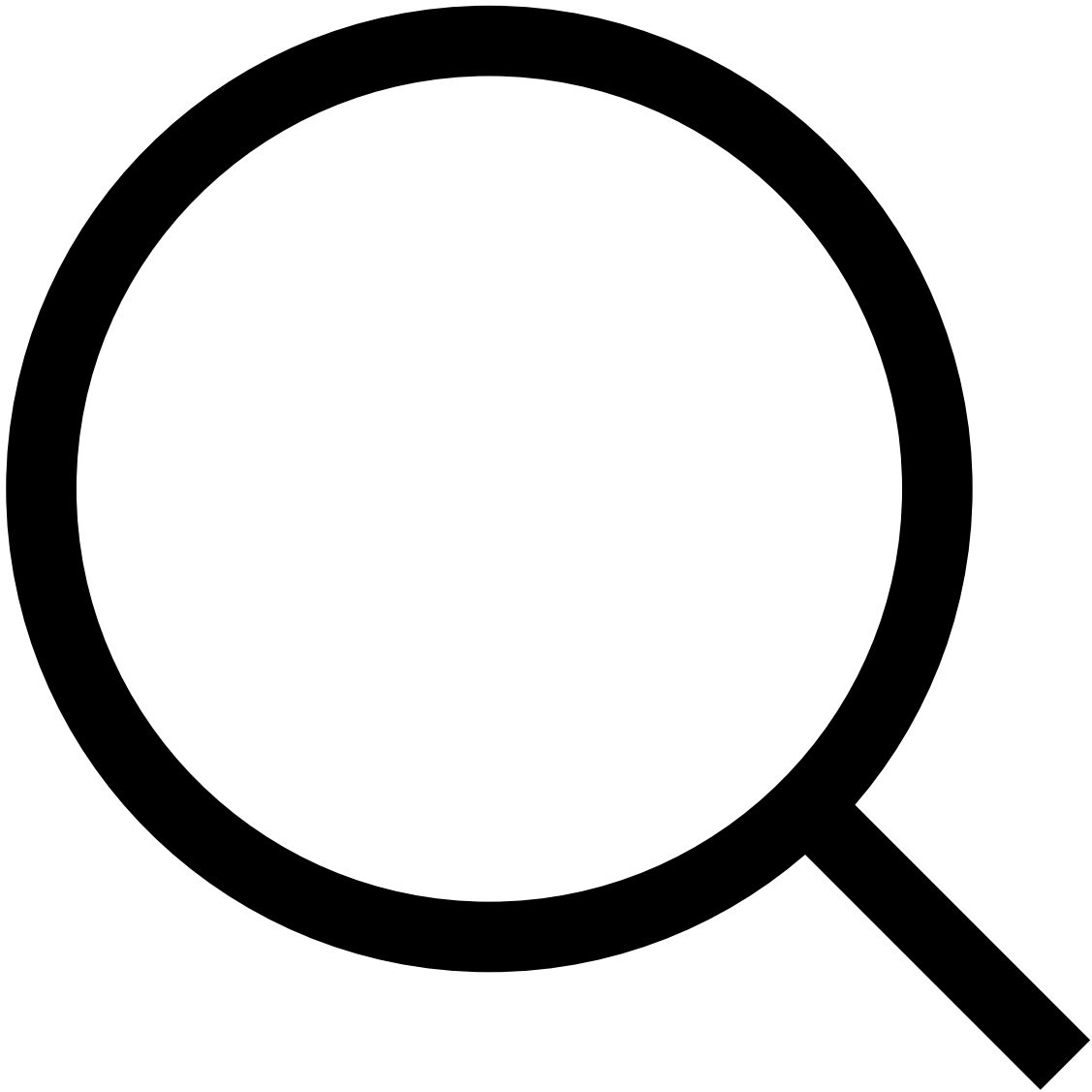
Skimming low over the gleaming white glaciers on Greenland's coast in a modified 1940s plane, three NASA scientists, led by an Elvis-impersonating oceanographer, waited to drop a probe into the water beneath them.

They are part of Oceans Melting Greenland – or OMG – a mission that has flown around the vast island for four summers, dropping probes to collect data on how oceans contribute to the rapid melt of Greenland's ice.



Willis is investigating how warmer layers of water off the coast come into contact with glaciers.

Dressed in a blue jumpsuit and with thick sideburns that give a hint of his occasional pastime impersonating Elvis, Joshua Willis, 44, is the oceanographer from NASA's Jet Propulsion Laboratory behind the project – and, along with his wife, its name.

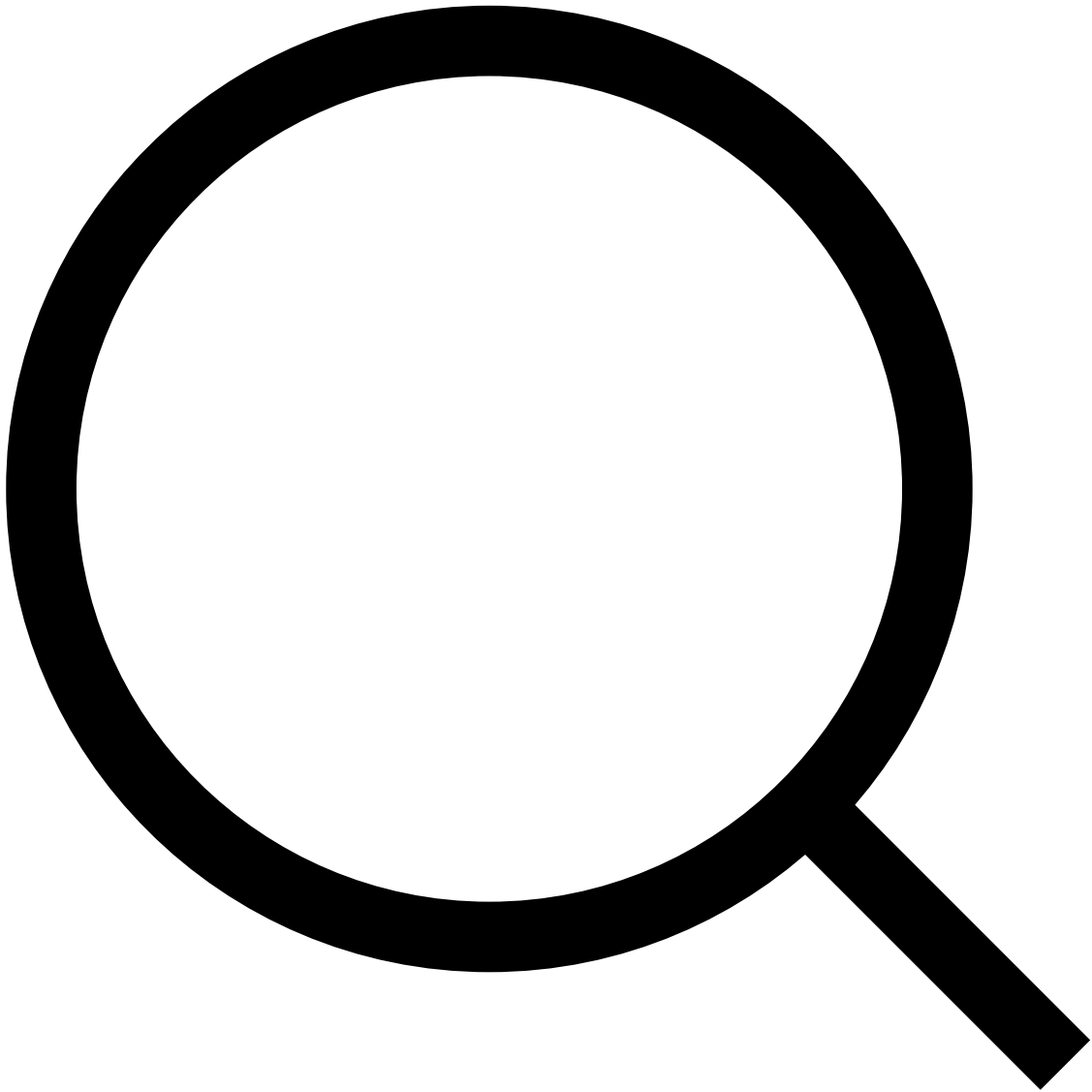


Three NASA scientists drop probes into the Arctic to measure the impact of the oceans on ice melt.

'Ice cube under a hair dryer'

Willis is investigating how warmer layers of water off the coast come into contact with glaciers and how this effects how quickly they melt.

"A lot of people think of the ice here as melting from the air warming, sort of like an ice cube under a hair dryer, but in fact the oceans are also eating away at the ice's edges," Willis said.

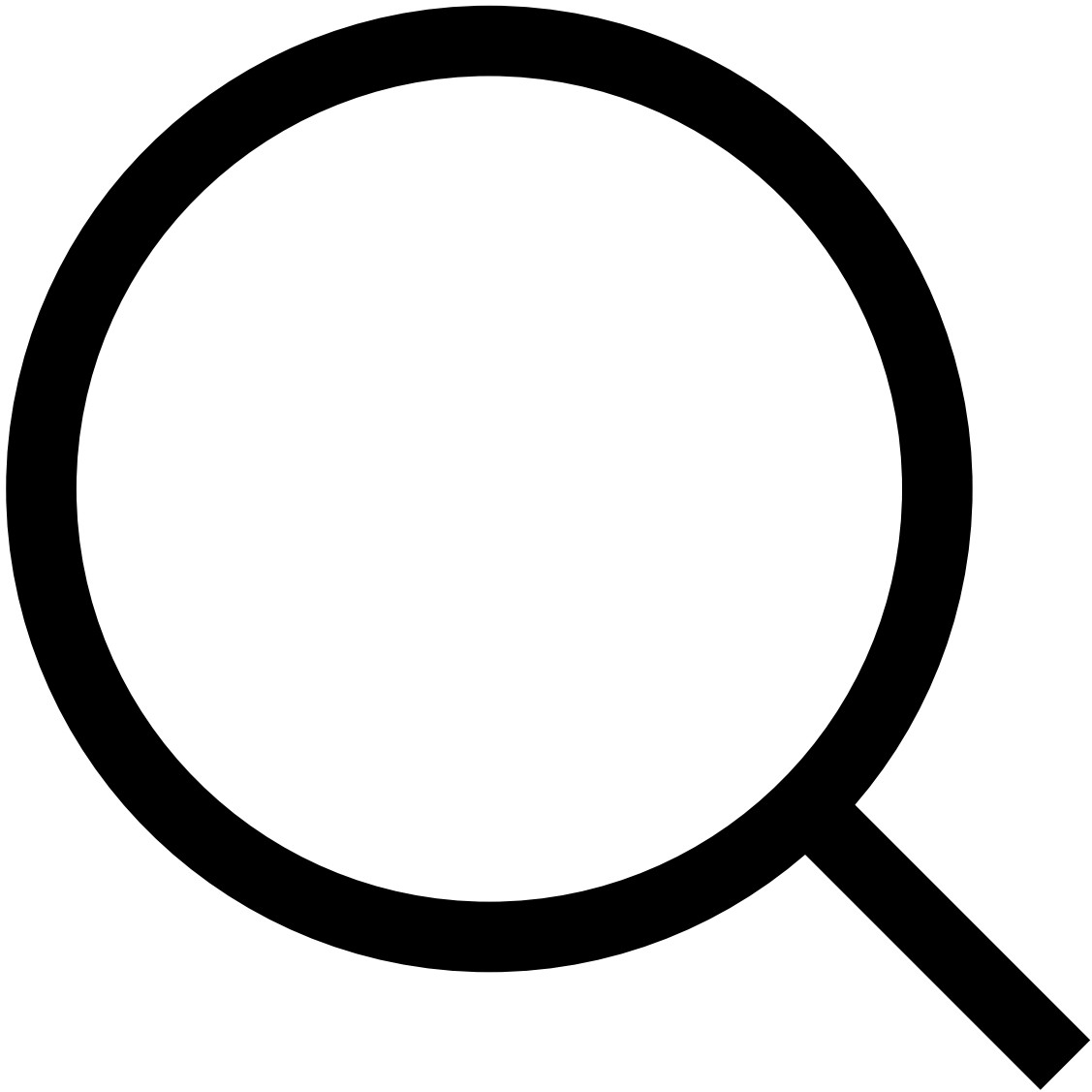


The scientists are part of Oceans Melting Greenland or OMG.

OMG surveys Greenlandic glaciers in the winter, comparing it with the data they collect about the oceans in the summer over a five-year period, which Willis hopes will allow researchers to better predict sea-level rise.

Greenland 'a challenge'

NASA – best known for the moon landings and space travel – started to study the earth's climate in greater depth from the 1970s when its inter-planetary exploration budget was reduced, using its satellites to look at the earth.



With OMG, Willis hopes they can provide data to give better predictions of sea-level rise.

Today it has more than a dozen satellites in orbit monitoring earth's seas, ice, land and atmosphere, along with missions like OMG, which Willis hopes will provide data to give better predictions of sea-level rise around the globe.

Agence France-Presse

Opec+ expects to drain oil stocks as it makes supersized cut



Opec and its allies expect to deplete the global surplus in oil stockpiles sharply as demand holds up and the coalition cuts production by far more than initially planned.

Saudi Arabia, Russia and other producers in the Opec+ alliance have slashed crude output this year to shrink the glut amid faltering economic growth and soaring US shale output. Results have been mixed, with oil prices down more than 20% from this year's peak, trading at about \$59 a barrel in London.

In response, Saudi has reduced output by far more than pledged under the terms of the deal, and the coalition's overall implementation rate last month was 59% above target, according to a statement posted on its website yesterday. That means the alliance cut supplies by about 1.9mn barrels a day.

Opec signaled that the deeper-than-anticipated cutbacks had been necessary because of the extreme upheaval in the global economy.

"This high level of overall conformity has offset uncertainty in the market due to ongoing economic-growth worries," according to the statement from the Joint Ministerial Monitoring Committee, a body set up by Opec and its allies to oversee implementation of their strategy.

“Along with healthy oil demand,” the supply restraints have “arrested global oil-inventories growth and should lead to significant draws in the second half of the year,” the committee said.

World financial markets have been buffeted this year as the US and China become ever more entangled in a trade dispute that’s weighing on growth in both nations, the two biggest oil consumers.

Collectively, the 24 countries in the Opec+ coalition – comprising the 14 nations of the Organisation of Petroleum Exporting Countries and 10 non-members – pump about half of the world’s oil.

The burden for going the extra mile, however, has rested almost entirely on Saudi Arabia, the biggest Opec member. The kingdom reported that it lowered output to 9.58mn barrels a day in July, which means it’s cutting more than twice as much as agreed.

The JMMC will meet to review the strategy on September 12 in Abu Dhabi, and then the full coalition will gather in December to consider any measures for next year.

The committee said that forecasts by major institutions are for “robust” oil-market fundamentals for the rest of this year and 2020.

While it is the case that leading organisations like the International Energy Agency see world oil demand continuing to grow next year in line with recent trends, expectations for another surge in supply create a fragile outlook.

Both the IEA and Opec itself expect that oil supplies, driven by the US, will expand by roughly twice as much as the growth in consumption next year.



Qatar Petroleum signs deals with Total to enter exploration blocks in Namibia



Qatar Petroleum has entered into agreements with Total for a share of exploration and production rights in two blocks offshore the Republic of Namibia.

Under the agreements, which are subject to customary regulatory approvals by the government of Namibia and approvals by the partners in the blocks, QP will hold a 30% participating interest in Block 2913B, with Total (the Operator) holding a 40% participating interest.

The other partners in the block are Impact Oil (20%), and Namcor (10%). A first exploration well is scheduled to be drilled in the first half of next year.



Also under the agreements, QP will hold a 28.33% participating interest in Block 2912, with Total (the Operator) holding a 37.78% participating interest. The other partners in the block

are Impact Oil (18.89%) and Namcor (15%).

On the agreements, HE the Minister of State for Energy Affairs Saad bin Sherida al-Kaabi, also the president and CEO of QP, said, "We are pleased to expand our global exploration activities into Namibia, which further strengthens our presence in Africa. Working on these prospective frontier blocks with our valuable long-term partner, Total, will give another boost to our efforts towards implementing our international growth strategy."

Al-Kaabi added, "We look forward to working together with the Namibian Government and with our partners in these blocks to achieve positive results that meet the interests of all parties."

Blocks 2913B and 2912 sit adjacent to one another offshore Namibia. Block 2913B is 2,600-3,300 metres deep with an area of about 8,215 square kilometres, while Block 2912 is 3,300-3,800 metres deep with an area of about 7,813 square kilometres.

Greece fully lifts capital controls imposed during bailout chaos – PM



PM@ (Updates with statement on lifting)

ATHENS, Aug 26 (Reuters) – Greece is set to fully lift remaining capital controls, Prime Minister Kyriakos Mitsotakis said in parliament on Monday.

“From today, capital controls are a thing of the past,” Mitsotakis told lawmakers.

Athens imposed capital controls in June 2015, when Greece’s government had come to the end of its bailout extension period without agreeing on a further extension with its creditors.

The restrictions have been gradually eased since then. The cap on cash withdrawals was fully lifted in October 2018. But limits on money transfers abroad still remained. The newly elected conservative government has been keen to move swiftly to reassure markets that it intends to adopt business-friendly policies to attract investment, key to boost Greece’s economic recovery.

Athens had imposed the capital controls as Greece was embroiled in dispute with its lenders over bailout terms and

its banks were bleeding cash.

At the time, the European Central Bank decided to pull the plug on emergency funding to Greek lenders, forcing a three week shutdown of banks and a 60 euro per day cap on cash machine withdrawals.

Finance Minister Christos Staikouras told lawmakers he would submit legislation to fully lift the restrictions effective Sept. 1. (Reporting by George Georgiopoulos; Editing by Alison Williams)

Kuwait fans out to Australia and Canada in global gas push



Bloomberg/Kuwait

Kuwait plans to boost production from Canadian shale deposits by two thirds and increase output of natural gas in Australia

as the Opec member ramps up efforts to find and develop overseas deposits of the fuel.

The international upstream arm of state-owned Kuwait Petroleum Corp sees output of almost 20,000 barrels of oil equivalent a day at its Canadian shale gas project by year-end, up from 12,000 currently, Sheikh Nawaf Saud al-Sabah, acting chief executive officer, said in a recent interview in Kuwait City.

“It will rise to about 60,000 or so once we fully develop it, which will be in the mid-2020s,” he said. “We’re just beginning to understand its potential.”

In Australia, the company known as Kufpec won exploration rights to three new blocks in February and April. It’s producing almost 40,000 barrels of oil equivalent a day in that country and aims to raise output and produce more liquefied natural gas for export, al-Sabah said, without specifying targets. Kuwait has long planned to increase its global capacity to produce gas as well as oil. The Gulf nation currently can pump as much as 3mn barrels a day of crude from its wholly owned fields, and KPC targets a daily capacity of 4mn by next year. As a member of the Organization of Petroleum Exporting Countries, however, Kuwait has pledged to cap its oil output as the group seeks to balance the market and prop up crude.

Like many energy producers, Kuwait sees gas as crucial to future growth. Gas use is seen rising faster than demand for oil and coal as policies shift toward lower carbon emissions. The amount of new gas-production capacity investments this year could set a record, according to consultant Wood Mackenzie Ltd.

In Alberta, Canada, Kufpec plans with its joint-venture partner Chevron Corp to start developing the Waskahigan and East Kaybob areas, drilling the first of more than 370 wells over 10 years. The areas are part of the Kaybob Duvernay project producing shale gas and natural gas liquids.

“We continue to look for gas prospects in Australia,” al-Sabah said. Kufpec partnered with Woodside Petroleum Ltd at one of its blocks there, and al-Sabah’s company is exporting gas via

Woodside's Wheatstone LNG facility. Kufpec sells half its production from there under long-term agreements.

"The other half is sold with a break clause that allows us to take those molecules to Kuwait if and when we need it," he said. "Right now the LNG market is essentially a buyers' market, so it doesn't make sense for us to break a long-term contract" just to sell to KPC when it can get competitive pricing elsewhere, he said.

LNG producers have feared that a massive build-out of new export projects, which began a decade ago, will outpace consumption growth and leave cargoes looking for homes. Spot prices have already tumbled since last fall and are at a steep discount to LNG sold on long-term, oil-linked contracts.

Kufpec, known formally as Kuwait Foreign Petroleum Exploration Co, may supply KPC when the global market tightens, possibly by the mid-2020s, al-Sabah said.

The company has total assets of 3.4bn dinars (\$11.2bn) and is well-funded right now for its current plans.

Total starts biofuel plant in France to take on Eni and Neste



Total SA started production at a new biofuel plant in southern France, taking on rivals such as Neste Oyj and Eni SpA for a share of Europe's biodiesel market. The refinery, in La Mede near Marseille, will process vegetable oil, animal fat and used cooking oil to produce as much as 500,000 tonnes a year of so-called hydrotreated vegetable oil, or HVO, which is blended by distributors with diesel to meet government biofuel requirements.

However, the project has been criticised as it will use palm oil for almost half its main feed-stock at the start. "Our biorefinery will allow us to make biofuels in France that were previously imported," Bernard Pinatel, Total's head of refining and chemicals, said on Wednesday in a statement in which he championed the role of biofuels in cutting carbon emissions. In a September report, Total said it wanted to take more than 10% of the European market for HVO production. It has spent €275mn (\$310mn) since 2015 transforming the unprofitable La Mede oil refinery into a biofuel plant, a conversion similar to one carried out by Italy's Eni in

Venice. Finnish companies including Neste operate the most HVO capacity in Europe. Total's refinery has been controversial for its planned use of palm oil, whose production in countries such as Indonesia is slammed by environmental groups for causing deforestation.

Use of the oil also denies Total French tax breaks that apply to other renewable fuels, meaning the facility can't compete with European peers, Chief Executive Officer Patrick Pouyane has warned. The oil major has lobbied the government for a change of stance on the tax break, arguing that it's working with palm-oil producers that are certified under a European Union system that tracks sustainable practices and respect for human rights. Total's plant will use as much as 300,000 tonnes of palm oil a year, and at least 50,000 tonnes of French-grown rapeseed. An analysis by the Palm Oil Transparency Coalition shows European palm-oil importers are unlikely to be able to ensure that the products they sell are "deforestation-free" by a self-imposed goal of 2020. Only about a third of the palm oil imported into Europe by the survey respondents could be traced to the plantation it came from, according to the report.

Kenya's first crude oil export sparks demands over revenue sharing



MOMBASA, Kenya (Reuters) – Kenya exported its first crude oil on Monday, amid pointed speeches by local leaders asking the government to stick to its commitment to share revenues from future shipments equitably.

Although commercial production is years away, the discovery of oil has heightened expectations that citizens, especially those living adjacent to the deposits, will benefit.

President Uhuru Kenyatta in March signed into law a long-awaited petroleum bill that regulates oil exploration and production and outlines how revenues will be shared between the government, local communities and companies.

Of the revenues due to the state, the law allocates 20% to local government, 5% to the communities living where oil was found and 75% to the central government. An earlier draft gave 10% to the communities.

The law also says parliament will review the percentages within 10 years.

The law is required for large-scale oil production but was

delayed by tussles between layers of government and residents of Turkana, the impoverished northern region where the oil deposits were found.

As the first shipment left Kenya's port of Mombasa, three governors, an oil executive and the president compared carving up the profits to sharing a goat.

"When you slaughter a goat, the owner of the goat is left with the leg," Turkana County deputy governor Peter Emuria Lotethiro said. "Turkana want their leg."

Tullow Oil estimates that Kenya's Turkana fields hold 560 million barrels of oil and expects them to produce up to 100,000 barrels per day from 2022.

London-based Tullow said it and its partners had to date invested \$2 billion in Kenya.

"Having spent \$2 billion, the joint venture partners will be able to get a bit of that goat. There is much more investment to come which will create jobs across Kenya," Tullow Chief Executive Paul McDade said.

Mining and Petroleum Minister John Munyes said approval to pump water from neighboring West Pokot County to pressurize oil wells had been granted. The deal is crucial for next year's final investment decision on proceeding to commercial production.

"By 2020 we should have the plans to let us proceed with the construction of the pipeline from Lokichar to Lamu," he said.

Monday's shipment was 250,000 barrels of oil. The crude was trucked to the port since there is no pipeline. The shipment's destination was not announced.

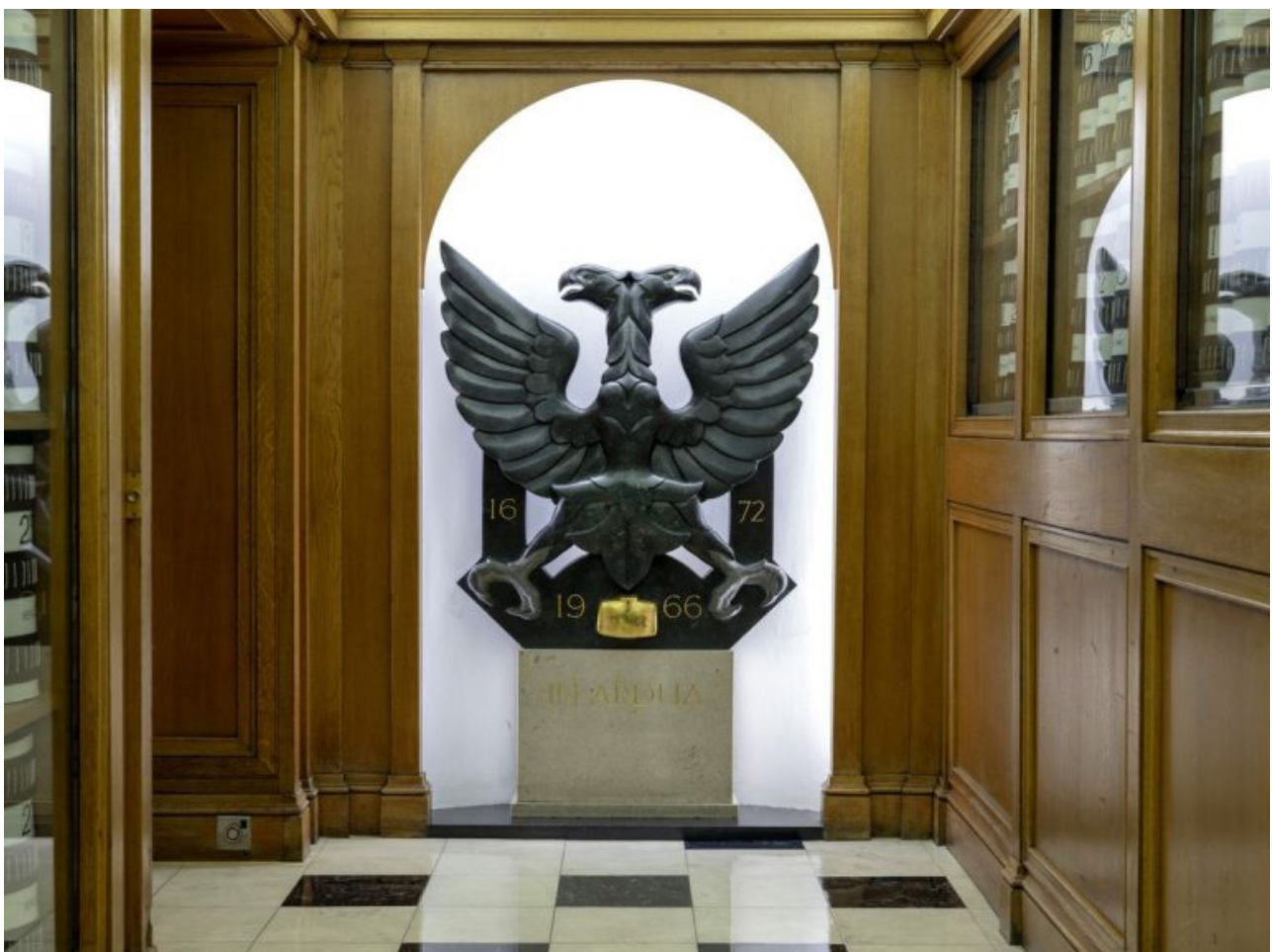
Tullow and partner Africa Oil discovered commercial oil reserves in Turkana's Lokichar basin in 2012. France's Total has since taken a 25% stake in the project.

About two weeks ago, Kenya and a group led by explorer Tullow picked trading company ChemChina UK Ltd to buy its first shipments. ChemChina UK's initial purchases are small-scale, with full commercial shipments due once the pipeline is built.

Writing by George Obulutsa; Editing by Kathariner Houreld and Dale Hudson

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The British Banking Dynasty That's Even Older Than the Rothschilds



C. Hoare & Co. has been in business for more than three hundred years, and the family that founded it is still running the show.

By

Tom Metcalf

In the U.K. there's old money, really old money and then there's C. Hoare & Co.

The London firm was started in 1672 by Richard Hoare and has tended to the affairs of diarist Samuel Pepys, poet Lord Byron and novelist Jane Austen. That's almost a hundred years older than the famous Rothschild dynasty, which was founded in the 1760s. After more than three centuries of continuous operation, the family still runs the show, overseeing about 4.4 billion pounds (\$5.6 billion) of deposits and sticking to a traditional way of doing business.

"You go in and you talk," said Islay Robinson, chief executive officer of Enness, a mortgage broker with dozens of high-net-worth clients who have borrowed from the bank. "They lend their own money and tend to be able to come up with solutions that other banks can't."

The last of the 10th generation of partners retired last year, leaving the bank in the hands of six partners from the 11th generation who have continued its evolution. In March, they opened the first outpost outside London: a Cambridge office designed to serve existing clients but also attract entrepreneurs in a region known for bioscience and technology ventures.

Blending old with new has become vital for C. Hoare, rival Coutts and smaller competitors such as Raphaels and Weatherbys as they vie to serve wealthy clients. Independent banks are also striving to reconcile their highly tailored services to an industry where the prevailing trends are consolidation and rising regulation.

"It's a constant tension because part of what makes us

completely different to the clearing banks is that we are smaller and more personable and more human and more relatable to customers," partner Alexander Hoare, 57, said during an interview in a meeting room festooned with cartoons. "We don't want to be herded and we don't want to grow. We want to be special."

C. Hoare is certainly different. The firm is an unlimited liability partnership, meaning the personal assets of the partners are fair game for creditors. Since at least 1994, the dividend has been fixed at 50 pounds per share or 6,000 pounds total. That's for a business with 26 million pounds of profit in the 12 months through March 31, 2019.

The restraint has built a valuable enterprise. The partnership's latest accounts show a book value of about 370 million pounds, putting the family among the U.K.'s richest on paper. But the Hoares said they have no interest in selling.

"If people were in it for the liquidity event, it would have been sold a long time ago," said Rennie Hoare, 33, who became a partner last year.

His ancestor Richard Hoare first started to trade at the "sign of the golden bottle" in 1672 (it took another century for street numbering to be invented). He rose to dominate the City of London, dabbled in politics and was knighted by Queen Anne.

Succeeding partners furthered this success, so many of whom were named Henry that they accrued epithets like "Henry the Good," "Henry the Magnificent" and "Fat Harry" to distinguish them. While the family dodged the pitfalls associated with the third generation of ownership, the seventh generation's speculative investments proved more problematic, with partner Henry Junior putting money into ventures such as a steam-engine enterprise and a company in Canada that was supposed to revolutionize the leather trade with treated hemlock, according to a family history. The collapse of his personal

finances forced him to resign in 1874.

“Our seventh generation got way too wealthy and burnt through a fantastic fortune,” Alexander Hoare said. “There are two things that can destroy a family business: the business and the family, and they both have to be kept in order.”

Hiccups aside, the firm’s longevity speaks to the enduring strength of family businesses. A 2018 Credit Suisse Group report found that such businesses have outperformed the broader equity markets in the past decade. Certainly Hoare’s conservatism proved an asset during the global financial crisis, when the strength of its balance sheet attracted a steady inflow of funds from troubled lenders like Royal Bank of Scotland.

“During the financial crisis, the smaller banks did extremely well,” said Caroline Burkart, an associate partner at consulting firm Scorpio Partnership. “These family- and partner-owned firms were regarded as a safe haven.”

C. Hoare’s unbroken ownership also gives its partners perspective, with three centuries of experience helping make the perplexities of events such as Brexit seem less foreboding.

“In banking, the cycles do come around,” said Bella Hoare, 50. “The reason we had a good crisis is that we hadn’t forgotten the last one. My father’s father had taught him the lessons from the 1929 crisis.”

They’ve also seen plenty of their rivals disappear, one reason why they’re careful in selecting partners. There are more than 2,000 living descendants of Richard Hoare and the sifting process to find suitable financiers starts pretty much the day a Hoare is born, current partners said. At the same time the bank employs a CEO from outside the family with Steven Cooper joining in January from Barclays Plc.

That blend of nepotism and professionalism mirrors the path between tradition and modernity the partners say they are walking to position the bank for the next era, which included selling the bank's wealth-management arm for 72 million pounds in 2016 to focus on its core banking business.

While the bank strives for personalized service, its structure and size magnifies the burden of regulation and compliance, and missteps are costly. Soon after selling the wealth-management business, the bank discovered it hadn't included the required wording in statements sent to clients, requiring it to refund more than 12 million pounds of interest.

"The sad truth is that the day of the gifted amateur is well and truly over," Alexander Hoare wrote to his clients in January 2018. "The bank is compelled to look increasingly like all other banks in terms of processes, controls and bureaucracy."

A typical client needs about 5 million pounds in U.K. assets to bank with C. Hoare. Another barrier to entry is the meeting with a partner, which enables the family to find like-minded clients they can build relationships with.

"Banking with us is definitely more expensive than banking on the high street," Bella Hoare said. "However, our customers believe that they are getting value for money because we can do something that for another bank wouldn't be possible."

There are other perks, too. Clients visiting the 37 Fleet St. office are reminded it's Britain's oldest surviving independent bank.

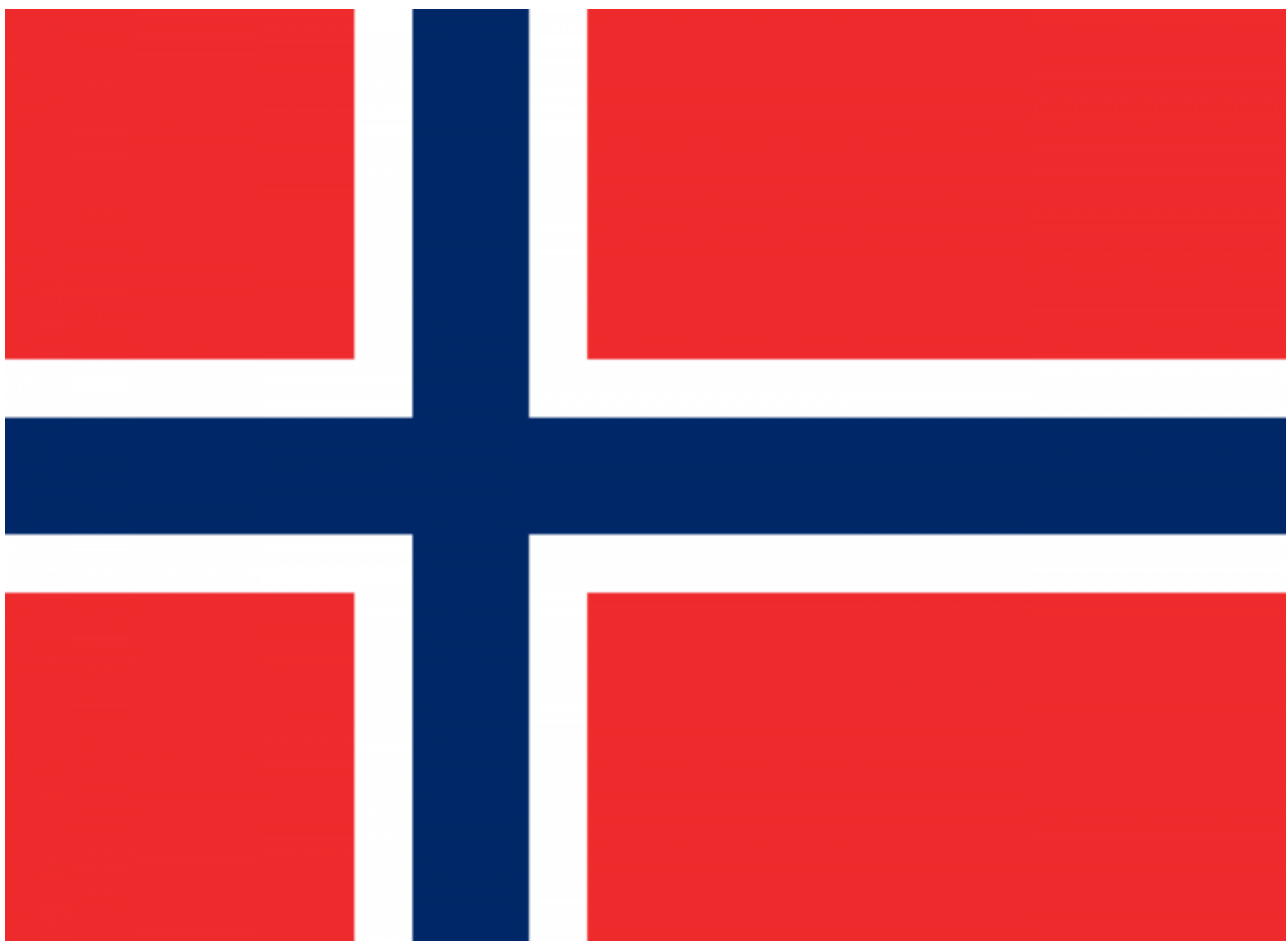
Muskets purchased during the Napoleonic wars to defend the bank adorn the entrance hall, cashiers work behind a 19th century oak counter and an adjacent waiting room looks onto an enclosed garden a world away from the City's hubbub.

You can partake in a three-course meal with your relationship

manager and attend evening talks. The building also houses a museum displaying artifacts and a framed family tree linking today's partners to founder Richard Hoare.

"Look, 95% of our energy is on the hurlyburly of the modern world," Alexander Hoare said. "Preserving the memory is nice to have at the end of the day. It is the icing on the cake."

Norway's \$1tn wealth fund renews private equity bid



Norway's wealth fund proposed changes to its mandate to allow it to buy stakes in unlisted companies after missing out on investments in such companies as Spotify Technology SA. The

advice comes after Norway's government has repeatedly declined to let the world's biggest sovereign wealth fund in on the global private equity market, citing concerns over transparency and management costs. The fund has said it can manage those issues, and its chief executive warned earlier this year that a growing number of companies are opting to stay off exchanges, posing a challenge for investors of its size. In a letter published on Wednesday, the \$1tn fund asked the Finance Ministry to allow it to invest in unlisted shares in "large companies" that aren't yet listed, with a potential limit of 1% of its portfolio. "Companies of this type will often already have other institutional investors as shareholders," the fund said in the letter. "This, in turn, can help generate some liquidity in the shares. Based on experience, it is reasonable to expect some of these companies to go public at a later date." The fund is currently only allowed to invest in unlisted companies that have clearly stated they are pursuing an initial public offering. Since board resolutions on IPOs usually come at a late stage, that restriction has prevented a number of investments that would have made sense for the fund, chief executive officer Yngve Slyngstad and central bank Governor Oystein Olsen said in the letter. The fund also said that its 2012 investment in Formula One owner Delta Topco, which was later probed and much debated in Norway, showed that a company's intention to list shares is no guarantee it will happen. In addition to a limit of 1% of the fund's equity portfolio, the bank said its Executive Board should also issue limits on the companies' minimum size and maximum ownership stakes, as well as guidance on which markets the fund should target. The Finance Ministry will now consider the central bank's proposal, it said in an email. The fund's latest bid to broaden its mandate comes after it was cleared this year to invest in unlisted renewable energy infrastructure in a series of big and smaller changes voted by Parliament. Yet the investor has itself acknowledged that adding new asset classes is becoming less and less of a hot topic after the fund soared in size over the past decade and

won permission to increase its share of stocks to 70% from 60% of the portfolio. In an interview in 2017, as the fund was nearing \$1tn in size, CEO Slyngstad said that “realistically speaking, whether we should invest in infrastructure, private equity or the likes isn’t a very important question.”

Dutch closing Europe’s biggest gas field raises concerns for hub



Vanessa Dezem| Bloomberg

A decision to close Europe’s biggest natural gas field is starting to raise concerns about the impact on the region’s biggest trading hub for the fuel. The Dutch Title Transfer Facility has grown into Europe’s largest gas market in the

past few years, surpassing the U.K., partly because of the scale of flows converging in the Netherlands. A plan to shut down production at the Groningen field in the northeast corner of the Netherlands will make the nation dependent on imported gas. That's prompting questions about how the trading hub will work in the future, according to Annie Krist, chief executive officer at GasTerra, a venture between Royal Dutch Shell Plc, Exxon Mobil Corp. and the Dutch state that handles flows from the field. "The Netherlands has a very liquid and attractive natural gas trading hub," Krist said in a rare interview. "TTF is growing so well, that people seem to forget how we got there. If we don't have Groningen's flows, how is it going to be? Countries that are used to being dependent on imports, have other market mechanisms." After earthquakes caused by the earth settling as gas drained from the Groningen reservoir, the Dutch government has ordered the field to shut down gradually by 2030. That will remove both a source of flows and some flexibility for the market.

Five years ago, GasTerra handled more than a fifth of all the gas produced in Europe. It's already been forced to adapt to output constraints at Groningen when tremors damaged nearby buildings.

But shutting down completely is a bigger step, one that's left Krist concerned about the impact on the broader industry in the Netherlands.

"That was the first moment when we heard about zero. Zero really means no more gas. And that for a country that is dependent on gas."

The giant Groningen field has been fueling Europe's energy needs, and the Dutch budget, since 1963. Its importance, coupled with the development of sufficient infrastructure for gas transportation and trading, helped the TTF take the crown of Europe's biggest market from the U.K.'s National Balancing Point in 2016.

But intensive gas production has generated a series of earthquakes, affecting inhabitants in the region and damaging the image of gas as a source of energy. The insecurity has forced the government to curb production, with output in the year to October seen rising to that limit, which is just a fifth of the field's peak in 1975-76.

The Economy Ministry vowed last year to close Groningen by 2030. Following further tremors related to production, its output after October is uncertain limbo after the nation's highest court demanded the ministry better explain how it weighed safety concerns of people in the region against security of supply.

And not only production levels are unclear. The TTF's role is also in question as the Netherlands goes from an exporter to "a normal European importing country," according to Krist.

"It will be interesting to see what balance we will have in terms of physical flows and how the liquidity in the hub will evolve as we shut down Groningen," Krist said. "Whether or not players will think that the country is still interesting, is yet to be seen."

In 2018, gas imports exceeded exports for the first time in the Netherlands, with the bulk of supplies coming from Norway, according to the Dutch national statistics office. The Netherlands will account for more than 60 percent of the decline in the region's supply from 2018 to 2024, according to the International Energy Agency.

"The main question for me is how quickly the Netherlands will be able to adapt as it becomes a gas importer," said Gergely Molnar, a gas analyst in Europe at the International Energy Agency. "A trading hub is trusted by market participants if it is always able to deliver the physical volumes. So the Dutch gas infrastructure must adapt to the changing trading balance."

The country now needs to build up more import capabilities, conversion facilities and preserve seasonal storage capacity, he said.

So far, Groningen's production reductions hasn't had any effect on TTF's liquidity. The Dutch gas hub's ratio of traded volume to actual physical throughput, known as churn, surpassed 100 for the first time in July, according to Molnar. That compares with a rate of 10 to 30 for the NBP, 50 to 90 for the U.S. Henry Hub and below 1 for the barely liquid Japan-Korea Marker.

"History doesn't show a strong correlation between a gas production cut and the hub liquidity," Molnar said. "TTF has become important because of a number of factors beyond production, including infrastructure, legal framework and the private sector's willingness to invest in gas trading capabilities."

As Groningen ramps down, the Netherlands is becoming more reliant on its so-called small fields to meet export obligations, most of which are in the final phase of their production cycle and produce gas that's too rich to be pumped directly into the region's networks.

"Amid restrictions, we have to decide on a day-by-day basis how much Groningen gas we need to add to other sources to guarantee security of supply," GasTerra's Krist said. "We have to secure the right balance, which is much harder now than it was in the past."

And with the Netherlands losing its role as a large producer, companies are questioning their own future. GasTerra's shareholders are discussing what to do with the whole value chain as Groningen production declines, "including the role of GasTerra in it," Krist said.

The Dutch government last year launched fiscal benefits for investments in gas exploration in the North Sea in order to

try to preserve the offshore gas sector.

“That Groningen production would reduce was foreseen, but it’s happening much sooner than originally was anticipated,” she said. “It has not been business as usual in the last couple of years, and it definitely won’t be. We need to adapt to this situation quite significantly.”