

Empty oil tanks at key storage hub show speedy demand rebound



Crude storage tanks that were brimming a year ago when the pandemic grounded flights and kept drivers at home are beginning to empty in the main U.S. distribution hub, the latest sign of strengthening demand in the world's biggest oil-consuming country.

For the first time since before the pandemic, empty tanks are being offered for lease at Cushing, Oklahoma, the delivery point for West Texas Intermediate oil futures. At least 1.4 million barrels of storage is up for rental starting in July, for roughly 12 cents per barrel a month, said Steven Barsamian, chief operating officer at storage brokerage Tank Tiger. That's a stark contrast to at least 60 cents charged when there was little space left about a year ago.

Americans are taking to the roads and skies at increasing numbers as the summer nears and the country emerges from months of lockdowns, with oil refiners speeding up fuel making to meet the rising demand. This week, California, America's most populous state, re-opened its economy, while New York ended most of its curbs.

It's a dramatic turnaround from a market crash that saw traders storing unwanted crude in tankers at sea, and U.S. producers at one point having to pay for customers to take their oil last year.

Meanwhile, shale producers are sticking to their pledges to focus on balancing their books and boosting returns to shareholders, rather than increasing output. U.S. production is 15% below its peak last year, limiting flows to the storage center.

So, traders are rapidly draining their storage tanks to supply refineries with every barrel of crude feedstock they need.

Empty tanks are typical of a market where demand is outpacing supplies and traders are getting a premium on the nearest deliveries, making it unprofitable to keep oil in storage – a pattern known as backwardation.

A year ago, when traders were storing as much oil as possible to wait for better prices, the nearest deliveries for WTI were selling at a discount to longer-dated ones. That structure is known as contango.

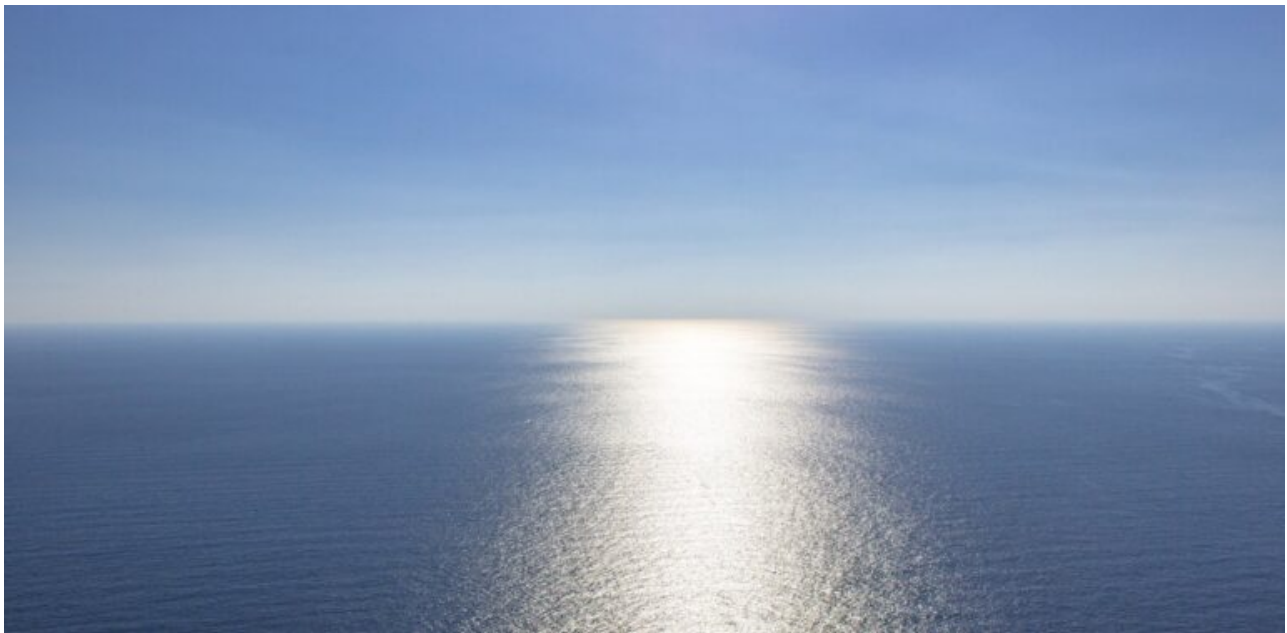
These patterns affect especially the commercial storages used in speculative trading, such as the ones in Cushing.

"Typically, in a backwardated market, it's the storage that isn't being used for operational purpose like the ones in Cushing, Oklahoma, that get emptied out first," Barsamian said. "Storage at most other locations such as in Houston and Midland in Texas are used for operational purposes and get

emptied out later.”

Traders might see more of the bottom of tanks across America in the coming months. Global oil demand is expected to recover to pre-pandemic levels late next year, according to the International Energy Agency. The agency sees a supply shortfall starting from the second half of this year, with OPEC and its allies still keeping part of their production capacity offline.

Roudi Baroudi: Μπλε οικονομία στη Μεσόγειο



Οι χώρες της Μεσογείου πρέπει να είναι από τους μεγαλύτερους νικητές στη μετάβαση από τα ορυκτά καύσιμα στις ανανεώσιμες πηγές ενέργειας, δήλωσε ειδικός σε θέματα ενέργειας την Τετάρτη σε ένα βασικό συνέδριο πολιτικής.

«Εδώ στην περιοχή της Μεσογείου, η μετα-άνθρακα εποχή έχει στην πραγματικότητα τεράστιες ευκαιρίες όσον αφορά την μπλε

οικονομία», δήλωσε ο βετεράνος της βιομηχανίας **Roudi Baroudi** στο εικονικό All Things Energy Forum. Πρόσθεσε ότι ενώ η συμβατική αιολική και ηλιακή ενέργεια θα έχουν «βασικό ρόλο να διαδραματίσουν», η εγγύτητα της θάλασσας προσέφερε μια άλλη διάσταση.

“Υπάρχουν και άλλες πολλά υποσχόμενες ενεργειακές τεχνολογίες, όπως η βροχή, τα κύματα και η παλιρροϊκή ενέργεια, καθώς και η υποθαλάσσια γεωθερμία”, δήλωσε ο κ. Baroudi, ο οποίος έχει διετελέσει σύμβουλος σε κυβερνήσεις, πολυμερείς οργανισμούς και μεγάλες διεθνείς εταιρείες για την ενεργειακή πολιτική.

«Μερικές από τις πιο υποσχόμενες αντικαταστάσεις για τα ορυκτά καύσιμα περιμένουν στη θάλασσα, αν μόνο έχουμε τη σοφία και την προνοητικότητα να τις αναπτύξουμε».

Η μεγάλη εγγύτητα μιας μεγάλης θάλασσας όπως είναι η Μεσόγειος δίνει στα παράκτια κράτη της βασικά πλεονεκτήματα σε σχέση με άλλα κράτη που είναι εγκλωβισμένα στην ξηρά, εξήγησε, επειδή έχουν πολλές περισσότερες επιλογές για παραγωγή ηλεκτρικής ενέργειας χαμηλής ή χωρίς άνθρακα.

Ο 40χρονος βετεράνος της περιφερειακής ενεργειακής σκηνής προέβλεψε ότι με ισχυρή ηγεσία, **οι περιφερειακές χώρες θα μπορούσαν να χρησιμοποιήσουν αυτό το δυναμικό για την πλήρη ηλεκτροδότηση όλων των κατοικημένων περιοχών τους.**

Αυτό το είδος πρόσβασης, στην ηλεκτρική ενέργεια, αποτελεί βασική προϋπόθεση για το είδος της οικονομικής ανάπτυξης που θα βοηθήσει εκατομμύρια ανθρώπους – ακόμη και δεκάδες εκατομμύρια – από τη φτώχεια», δήλωσε.

«Θα μειώσει επίσης τη ροή των Αφρικανών μεταναστών που δεσμεύονται για την Ευρώπη δημιουργώντας νέες οικονομικές ευκαιρίες για αυτούς στην έδρα τους».

Ο κ. Baroudi προειδοποίησε, ωστόσο, ότι παρέμειναν σημαντικά εμπόδια εάν η περιοχή επρόκειτο να πραγματοποιήσει το πλήρες δυναμικό της για υπεράκτια παραγωγή ενέργειας, κυρίως επειδή

περίπου τα μισά από τα θαλάσσια σύνορα της Μεσογείου παραμένουν αδιευκρίνιστα.

Όπως και με τις προοπτικές για υπεράκτιο φυσικό αέριο, εξήγησε, οι επενδυτές αποφεύγουν τέτοια διαφιλονικούμενα σύνορα επειδή η αμφισβητούμενη ιδιοκτησία μιας περιοχής ενέχει πολύ μεγάλο κίνδυνο. Για αυτόν τον λόγο, είπε, και επειδή η πίεση χτίζεται για μορατόριουμ για την ανάπτυξη νέων πεδίων πετρελαίου και φυσικού αερίου, **οι περιφερειακές χώρες χρειάστηκαν να υιοθετήσουν τη διπλωματία και να καταρτίσουν συνθήκες που ορίζουν τις αντίστοιχες αποκλειστικές οικονομικές ζώνες τους.**

Δεδομένου ότι το φυσικό αέριο αναμένεται να παραμείνει βασικό καύσιμο μετάβασης για τουλάχιστον δύο δεκαετίες, εξήγησε, περιφερειακές χώρες θα μπορούσαν επίσης να κερδίσουν δισεκατομμύρια έσοδα από υπεράκτιες καταθέσεις – αλλά ορισμένες εξακολουθούν να χρειάζονται συμφωνίες ΑΟΖ για να ξεκινήσουν.

Δεν υπάρχει ανάγκη να είναι πιο πιεστική, ειδικά επειδή ο διάλογος και οι συμβιβασμοί που απαιτούνται όχι μόνο θα ανοίξουν την ανάπτυξη του φυσικού αερίου, αλλά θα έθεταν επίσης τα θεμέλια για στενότερη συνεργασία σε άλλους τομείς – αυτό ακριβώς απαιτεί η Μπλε Οικονομία για να αξιοποιήσει πλήρως τις δυνατότητές του», δήλωσε ο κ. **Baroudi**, ο οποίος είναι επί του παρόντος διευθύνων σύμβουλος της Energy and Environment Holding, ανεξάρτητης συμβουλευτικής εταιρείας στη Ντόχα.

Τα πλεονεκτήματα από την ηρεμία στη Μεσόγειο

«Ως μπόνους, μια πιο ήρεμη, φιλικότερη Μεσόγειος θα επέτρεπε επίσης την κατανομή ευθυνών και τη συγκέντρωση πόρων και δεδομένων, τα οποία θα βελτιώσουν σημαντικά τα αποτελέσματα σε όλα, από τη μετανάστευση, την πρόγνωση καιρού και την

αναζήτηση και διάσωση σε συστήματα προειδοποίησης για τσουνάμι και την προστασία καλωδίων επικοινωνίας», είπε.

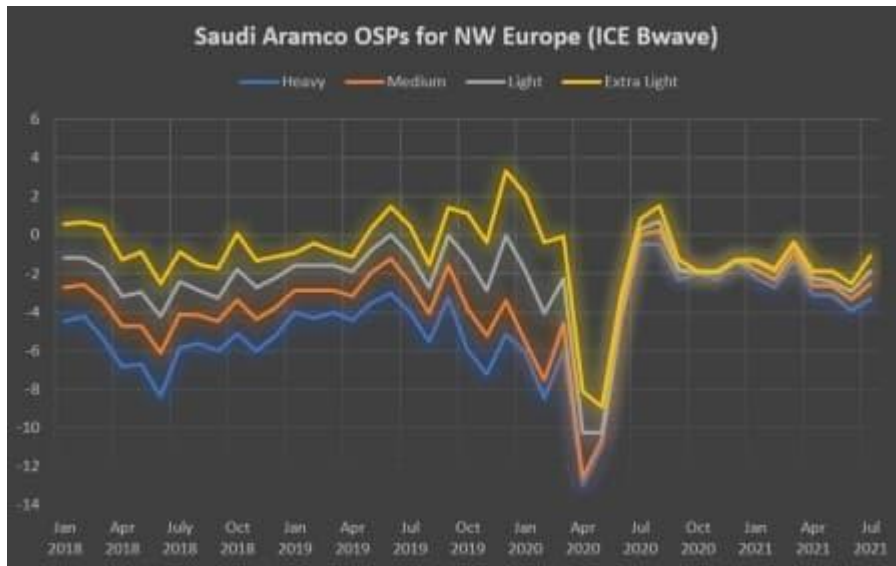
«Τότε θα μπορούσαμε απλώς να δούμε ολόκληρη την ευρωμεσογειακή περιοχή να γίνει ένας από τους καλούς γείτονες, ένα μέρος αμοιβαίων στόχων, διευθετημένων παραπόνων και ακόμη και γεωστρατηγικής συνεργασίας.

Τολμώ να το πω, κυρίες και κύριοι, η Μεσόγειος θα μπορούσε να είναι απόλυτα ειρηνική στη ζωή μας”.

Η εκδήλωση, της οποίας οι ομιλητές περιελάμβαναν διακεκριμένους ακαδημαϊκούς και ανώτερους ηγέτες επιχειρήσεων και ενέργειας, καθώς και βασικούς κυβερνητικούς υπουργούς, πραγματοποιήθηκε την Τετάρτη.

Ο Roudi Baroudi έχει περισσότερα από 40 χρόνια εμπειρίας στον τομέα της ενέργειας και βοήθησε στη χάραξη πολιτικής για μεγάλες διεθνείς εταιρείες πετρελαίου, κυβερνήσεις και πολυμερείς θεσμούς. Σήμερα υπηρετεί ως Διευθύνων Σύμβουλος της Ενέργειας και Περιβάλλον Διαθέτοντας ανεξάρτητη συμβουλευτική εταιρεία.

Soaring Mideast Heat May Roil Oil Market as Demand Surges



(Bloomberg) – Soaring temperatures in one of the world’s top energy-producing regions could drive fuel prices higher as countries there burn more oil and natural gas to keep homes cool.

Saudi Arabia, the United Arab Emirates and Kuwait are all experiencing weather that’s hotter than normal. That has coincided with a tightened crude market, with the Organization of Petroleum Exporting Countries and its allies continuing to hold back millions of barrels of supply.

“Demand this summer will be stronger than last year,” Ahmed Mehdi, a Middle East analyst at the Oxford Institute for Energy Studies, said of the region.

Electricity consumption in OPEC member Kuwait this week surpassed its previous peak as the early onset of scorching heat prompted greater use of air conditioners. Iraq, which suffered crippling blackouts last summer, also relies on burning crude and fuel oil to keep its power plants running.

Temperatures in the oil-producing states around the Persian Gulf can reach 50 degrees Celsius (122 Fahrenheit) during the region’s steamiest months of July and August. Top OPEC producer Saudi Arabia burned as much as 25% more crude in its power plants last year and said at the time that it could use up to 1 million barrels a day to generate electricity.

Energy use rose across the region in 2020 as coronavirus lockdowns kept residents at home through the torrid summer months – when many usually travel – and the enduring restrictions mean many are still staying put.

Oil is currently trading around \$70 a barrel as much of the world recovers from the pandemic and the OPEC+ alliance keeps barrels off the market. OPEC's own analysis indicates that crude consumption is rising faster than supply, forcing buyers to pull barrels out of storage.

Gulf producers are using more natural gas for power as well, and as OPEC+ gradually restores oil output, countries like Saudi Arabia and Iraq are pumping more of the fuel that's found together with the crude.

The Gulf states have taken steps to prepare for oppressive heat and to make their energy infrastructure more efficient – and more profitable. Kuwait is set to start a liquefied natural gas import facility, while the United Arab Emirates connected its first nuclear power plant to the national grid this year.

For now, OPEC+ isn't committing to more crude supply. The group decided at a meeting this month to go ahead with an already agreed output increase for July, but stopped short of allowing a further hike. That will leave Saudi Arabia and its neighbors buying more of what they're producing without necessarily providing the market any extra slack.

"OPEC+ is still sitting on more than 5 million barrels a day of spare capacity, mostly in the Gulf and particularly Saudi Arabia," said Carole Nakhle, chief executive officer of London-based consulting firm Cystal Energy. "The Saudis can do what they want," though pumping more crude just to burn it for power isn't their best option, she said.

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OPEC sticks to forecast of oil demand surge in second half of 2021



LONDON- OPEC stuck to its prediction of a strong world oil demand recovery in 2021 led by the United States and China, although it cited uncertainties around the path of the pandemic.

In a monthly report on Thursday, the Organization of the

Petroleum Exporting Countries said demand would rise by 5.95 million barrels per day (bpd) this year, or 6.6%. The forecast was unchanged for a second consecutive month.

The report's forecast comes even after a slower-than-expected recovery in the first half of this year, and as it warns of "significant uncertainties," around the pandemic, such as the potential emergence of new variants.

"Global economic recovery has been delayed due to the resurgence of COVID-19 infections and renewed lockdowns in key economies, including the Eurozone, Japan and India," OPEC said in its monthly report.

"Overall, the recovery in global economic growth, and hence oil demand, are expected to gain momentum in the second half," it said.

OPEC sees 2021 world economic growth at 5.5%, unchanged from last month, assuming the impact of the pandemic will have been "largely contained" by the beginning of the second half.

Oil was trading above \$72 a barrel before the report was released. The price has gained 39% this year on rising demand and supply cuts by OPEC and its allies, known as OPEC+.

OPEC+ agreed in April to gradually ease oil output cuts from May to July and confirmed the decision at a meeting on June 1. Most of its output cuts will remain after July.

The efforts of OPEC+ have "have substantially led the way towards a market rebalance," OPEC said.

The report showed higher OPEC oil output, reflecting the decision to pump more and gains from Iran, exempt from making voluntary cuts due to U.S. sanctions. Output in May rose 390,000 bpd to 25.46 million bpd, OPEC said.

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NFE project to 'reposition' Qatar as world leader in LNG liquefaction capacity: IGU



The multi-billion dollar North Field East (NFE) project will “reposition Qatar as the world leader” in terms of liquefaction capacity, overtaking Australia, the International Gas Union (IGU) has said in a report.

Qatar Petroleum has taken the final investment decision for the NFE project, the world’s largest LNG project, which will raise Qatar’s LNG production capacity from 77mn tonnes per year (mtpy) to 110mtpy.

The project involves the construction of four new LNG mega-trains with a capacity of 8mtpy, the IGU said in its ‘World LNG Report 2021’.

This year's global LNG trade increased to 356.1mn tonnes, a small increase of 1.4mn tonnes compared to 2019, but another year of consecutive growth in LNG trade despite Covid-19 related impacts on the supply and demand sides, noted Joe M Kang, president, IGU.

This was mostly supported by increased exports from the US and Australia, together adding 13.4mn tonnes of exports.

Asia Pacific again imported the most volumes in 2020, together accounting for more than 70% of global LNG imports. Asia also accounted for the largest growth in imports in 2020 – adding 9.5mn tonnes of net LNG imports compared to 2019.

Global LNG market pricing experienced a turbulent year. Spot prices of cargoes trading in the Atlantic and Asia Pacific basins plummeted to record lows in the first six months, before reaching record highs at the start of 2021.

Pricing responded to Covid-19 impacts on demand, an initially well-supply market, and high storage levels in some markets, followed by a cold winter and shipping constraints.

While 20mn tonnes per year in liquefaction capacity was brought onstream in 2020, all in the US, start-up of several liquefaction trains in Russia, Indonesia, the US and Malaysia were delayed as a result of the pandemic.

The only project that was sanctioned in 2020 was the 3.25 mpta Energia Costa Azul facility in Mexico, and early 2021 Qatar took FID on four expansion trains totalling 32mn tonnes per year, the IGU said.

With additional new projects proposed, global pre-FID volumes stand at 892.4mn tonnes per year, most of which are in North America, the IGU noted. With some 35 new vessels added to the LNG shipping fleet in 2020, the total number of active vessels reached 572 at the end 2020, including 37 FSRUs and 4 FSUs.

Notably, with the exception of one, all new vessels are equipped with membrane containment systems, and 23 of them feature X-DF propulsion systems. Membrane containment systems capitalise on improved fuel efficiencies and lower emissions.

The number of LNG voyages, however, only increased by 1%, largely due to demand impact of Covid-19. Global

regasification capacity increased by 19mn tonnes per year in 2020, bringing the total to 850.1mn tonnes per year as of February 2021.

Four new terminals and four expansion projects at existing terminals started importing cargoes – with the majority in the Asia Pacific region. There are now 39 markets that are equipped with LNG receiving capabilities.

As of February 2021, there was 147.3mn tonnes per year of regasification capacity under construction, of which 72.3mn tonnes per year have communicated start-up dates in 2021, some of which is in new importing markets such as Ghana, El Salvador, Vietnam and Nicaragua.

Offshore regasification capacity increased by 5.6mn tonnes per year, bringing the global floating and offshore regasification capacity to 115.5mn tonnes per year as of February 2021, the IGU said.

Aramco raises \$6bn with debut global sukuk to fund dividend



Saudi Arabian oil giant Aramco locked in another \$6bn yesterday to help fund a large dividend as it returned to the international debt markets with its first USdollar-denominated sukuk sale, a document showed.

The debt issuance, which will help fund a \$75bn dividend commitment that will mostly go to the government, comprises tranches of three, five and 10 years, a document from one of the banks arranging the deal and seen by Reuters showed.

Aramco sold \$1bn in the three-year tranche at 65 basis points (bps) over US Treasuries (UST), \$2bn in the five-year portion at 85 bps over UST and \$3bn in 10-year paper at 120 bps over UST.

Initial price guidance was around 105 bps over UST for the three-year bonds, around 125 bps over UST for the five-year notes and around 160 bps over UST for the 10-year tranche.

The spreads were tightened after the deal attracted combined orders of more than \$60bn.

Aramco last year maintained its promised \$75bn annual dividend to shareholders despite lower oil prices, and is expected to shoulder significant domestic investments in Saudi Arabia's plans to transform the economy.

Fitch assigned Aramco's sukuk issuance programme an A1 rating with a negative outlook, in line with the negative outlook on

existing Aramco ratings and tracking a change in Saudi Arabia's sovereign outlook to negative in May last year.

"The company has displayed a strong commitment to pay \$75bn in annual dividends, which in Moody's view is not sustainable should oil prices fall and remains significantly below \$60/bbl," Fitch said.

"Interlinkages between Saudi Arabia and the company imply that any change in rating outlook on the government of Saudi Arabia would be mirrored on SaudiAramco's rating outlook."

The company chose to issue Islamic bonds over conventional ones due to high demand for the instrument as a result of the low number of dollar sukuk sales in the Gulf this year, a source told Reuters on Monday.

Aramco has been widely expected to become a regular bond issuer after its debut \$12bn issuance in 2019 was followed by an \$8bn, five-part transaction in November last year, also used to fund its dividend.

A source had told Reuters that Aramco was expected to raise up to \$5bn with the deal, which had 29 active and passive bookrunners working on it.

Active bookrunners on the deal included Citi, HSBC, JPMorgan, NCB Capital and Standard Chartered Bank.

Iran plans oil output hike as it sees nuclear talks progress



Bloomberg / Tehran

Iran said it's preparing to hike oil production even as talks with world powers over how to lift sanctions curbing the nation's crude exports have so far failed to clinch an agreement.

Parties to the 2015 nuclear deal, led by the European Union, are attempting to fully restore the landmark accord that all but collapsed after then-President Donald Trump withdrew three years ago. The negotiations in Vienna aim to ease US sanctions on the Islamic Republic's economy and scale back a significant expansion of its atomic activities.

In Tehran, President Hassan Rouhani's chief of staff, Mahmoud Vaezi, said that while there had been "great progress" on some economic issues, the fate of oil sanctions hadn't yet been resolved, according to the semi-official Iranian Students' News Agency.

The comments, and an industry report showing another fall in US crude inventories, saw crude extend its gains.

Iran's national oil company, though, laid out plans to revive oil production in the event that US sanctions are removed, starting with an output hike to 3.3mn barrels a day within one month of the penalties being lifted, the official Shana news

agency reported.

In a gesture to Iran's leaders, Washington's top diplomat to the International Atomic Energy Agency acknowledged late Tuesday that trust needs to be rebuilt after the damage caused by Trump's policies and appealed to Iran to accept a "mutual return" to the agreement.

Iran's lead negotiator in the talks, Abbas Araghchi, said yesterday that diplomats are set to reconvene in the Austrian capital at some point from Saturday, without giving further details.

"The negotiations are at a point where some key issues still remain outstanding and decisions need to be made regarding those," Araghchi told reporters after briefing lawmakers in Tehran.

The talks coincide with Iran's fast-approaching June 18 presidential election that is widely expected to replace President Hassan Rouhani – a champion of the nuclear deal – with a hardliner who's been very critical of the accord.

Oil markets are closely watching the talks as the removal of sanctions could trigger a flood of Iranian oil onto markets as the Opec founder-member seeks to reclaim the market share it had before the Trump era.

Libya Oil Production Picks Up After Pipeline Leak Fixed



(Bloomberg) – Libya has cut crude production by nearly 20% due to maintenance at its largest oil field and leaks on pipelines linking other desert deposits to the Mediterranean coast.

The OPEC producer began reducing output at fields operated by the Waha Oil Co. over the last two days because of leaks, Mustafa Sanalla, chairman of the country's National Oil Co., said in an online conference. Production has also dropped at its biggest field, Sharara, over the past two weeks, he said. The outages total more than 200,000 barrels a day, according to people with knowledge of the matter.

Libya holds Africa's largest crude reserves, but it's struggled to pump a fraction of the oil it produced under late dictator Moammar Qaddafi. Fighting between rival factions has put the country's oil fields, ports and workers in the firing line, and faltering sales have starved the nation of the income needed to rebuild its infrastructure. Freeing up access to investment would help expand the country's output beyond previous levels, Sanalla said.

"The NOC is facing tremendous challenges in the rehabilitation and restoration of oil installations," Sanalla said. "The lack of funds needed for the projects" and the country's fragile security situation hurt its ability to complete needed work and upgrades, he said.

That means the country is missing out on taking full advantage of oil prices that have surged by 40% this year. Production cuts by the Organization of Petroleum Exporting Countries and partners like Russia have pushed crude to about \$70 a barrel

as economies exit coronavirus-linked lockdowns and energy demand recovers.

Production Capacity

Libya pumped 1.14 million barrels a day in May, according to data compiled by Bloomberg. The country wants to boost production capacity to 2.1 million barrels a day over the next few years but faces enormous obstacles to that aim, Sanalla said. Analysts surveyed by Bloomberg estimate the country can pump at most 1.3 million barrels daily.

With the latest problems, production at Sharara is down by about 50,000 barrels a day, Sanalla said, without saying when output might be restored.

Fields operated by Waha Oil have cut production to about 140,000 barrels a day from normal output of 300,000 barrels, according to two people with knowledge of the situation who asked not to be identified discussing operational matters.

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Renewables boom unleashes war over talent for green jobs



Clean energy giants are finding a shortage of workers with the skills needed to support their ambitious growth plans.

The renewables jobs market is heating up and candidates with the right abilities are becoming harder to find, according to Miguel Stilwell, chief executive officer at Portuguese clean-energy firm EDP Renovaveis SA. The company is one of the world's top installers of green power and plans to hire 1,300 employees over the next two years.

"There's a war over talent globally," Stilwell said in an interview on May 28. "The renewable sector, given the massive amount of growth that is expected, doesn't have enough people."

As countries funnel billions of dollars into developing renewable power, policymakers are banking on the sector to create new jobs that are crucial for the post-pandemic economic recovery. Solar generation capacity is expected to triple by the end of the decade, while wind capacity is expected to more than double over the same period, according

to clean energy research group BloombergNEF.

Green supermajors such as NextEra Energy Inc, Iberdrola SA, Enel SpA and EDP are leading the race to electrify the global economy. But some large oil companies are starting to get into the sector too, with BP Plc announcing last month it's looking to fill 100 offshore-wind jobs in the U.K. and the U.S., a figure that could double by the end of the year.

Engineering skills such as energy assessment, project management and project design are in high demand, EDP's Stilwell said. Good business developers who understand clean energy technologies are also a scarce resource. Other roles, such as managing mergers and acquisitions, or back office tasks, can easily be hired from other industries.

"We're having to bring in people from other sectors, whether it's oil and gas or other parts of the energy industry, or recruiting directly from universities," Stilwell said. "There's a lot of competition out there."

Engineering and chemistry graduates working on a masters degrees in renewables at the Universitat Politecnica de Catalunya in Barcelona are often hired while they're still in school, or right after they finish, according to Professor Jordi Llorca. The university has partnerships with other colleges in Europe and students often get hired to work in other countries like the U.K. or Denmark, said Llorca, who is also the director of an engineering research center at the university.

"We need to be fast to adapt the contents of our programs on the energy transition and renewable energies to make sure our graduates are competitive in the market," Llorca said. "We're constantly looking at the contracts and agreements we have with different industries to see what's needed."

The university launched a masters in hydrogen energy last year after professors realized very few people have the skills in

mechanics and chemistry that the fast-growing sector will need very soon. "There's always a moment of vacuum whenever a new technology comes in, but we're able to put together new programs in just a few months."

Offshore wind farms are another growth area. The projects involve erecting and maintaining wind turbines the size of skyscrapers miles out to sea. A single turn of one of the massive blades could power a house for two days. The industry was pioneered in Europe, but is now rapidly expanding to Asia and the east coast of the U.S.

Those new markets don't have people with experience. That means that developers are often sending British and European employees to lead the way, according to Clint Harrison, director at renewable energy-focused recruitment firm Taylor Hopkinson. But as business takes off there's pressure to hire locally.

The limits of a well-trained workforce could end up being a bottleneck in an industry that is key to slashing emissions.

"There's a sense of urgency," Harrison said. "The market is growing very, very quickly and we need to ensure we have the right people across various projects and regions to ensure projects move forward and aren't delayed."

In the U.K. alone, around 200,000 skilled workers will be needed in the offshore energy sector by 2030, up from 160,000 today, according to a recent report by the Robert Gordon University in Aberdeen. About half the jobs are expected to be filled by people transferring from the oil and gas sector and about 90% of current workers in the fossil-fuel sector can be retrained for renewables, said author Paul de Leeuw.

"Demand for courses on renewable energy and the energy transition is ramping up rapidly and at the same time we see demand for oil courses declining," he said. "It's a societal and industry shift mirroring in the education system."

Engine No. 1 converts tiny ExxonMobil stake into big win



NEW YORK: ExxonMobil has spent more than two decades sparring with activists over climate change, turning back virtually every shareholder challenge at its annual meeting each spring.

But late last month, the oil giant, which has shunned renewable energy investments embraced by some rivals, suffered a landmark defeat when upstart investment fund Engine No.1 successfully won election of three of its four board candidates, overcoming fierce campaigning from management.

A newly formed San Francisco-based investment group, Engine No.1 is a relative minnow in the world of finance, but now stands poised to steer the iconic US petroleum heavyweight in a new direction.

Its victory points to the increased vulnerability of incumbent energy players to insurgent investors as public concern mounts over climate change.

Engine No. 1's stake in ExxonMobil amounts to 0.02 percent of total shares, a pittance that may have led the Texas company to underestimate the broader investor frustration it faces after it was kicked out of the prestigious Dow index last year.

"It's ironic that an entity with such a small stake was able to effect such change," said CFRA Research analyst Stewart Glickman, who noted that BlackRock and other funds with large stakes sided with Engine No.1 and played a critical role in its victory.

"They used institutional investors that are more climate change-focused to get this done," Glickman added.

Andrew Logan, a veteran of shareholder campaigns at ExxonMobil as director of the oil and gas program at activist investor group Ceres, said Engine No.1 's newness was an advantage.

"With Exxon, everyone has a history," Logan said. "Having a new face without that baggage led them to open doors."

Engine No. 1's board nominees were not environmentalists, but longtime corporate executives with energy industry experience. The group was skillful in tying ExxonMobil's carbon policy to a broader corporate strategy that struck investors as out-of-touch, Logan said.

Engine No. 1 "struck a powerful balance of nodding to climate change, but they focused on the core issue of Exxon's capital plan and its strategy," he said.

– Arguing for diversification –

Named for San Francisco's first firehouse, Engine No. 1 was founded last year by Christopher James, a wealthy technology investor.

Another key player in the ExxonMobil campaign was Charlie Penner, a former partner with activist hedge fund Janus who is

well known to key asset managers.

The firm currently has \$240 million under management and just 22 employees, according to a securities filing.

Neither James nor Penner were available for an interview, but Engine No. 1 pointed AFP to earlier statements that criticized ExxonMobil's investments on low-return petroleum projects and its lack of a plan in case government climate mitigation policies are accelerated.

ExxonMobil should "seriously explore opportunities to profitably diversify... with the assistance of new directors with notable track records of agile and adaptative innovation in energy," Engine No. 1 said in its initial letter to the company.

The three nominees elected by ExxonMobil shareholders are Gregory Goff, the former chief executive of refiner Andeavor; Kaisa Hietala, a former Neste executive who oversaw the company's expansion into renewable fuel; and Alexander Karsner, a strategist at Alphabet's X innovation lab and a former US assistant energy secretary.

Anders Runevad, former chief executive of Vestas Wind Systems, was not elected.

ExxonMobil deemed that none of Engine No. 1's nominees "meet the standards or needs of the company's board," according to a securities document. The board named two other candidates, who were elected last week by shareholders, along with the three Engine No. 1 candidates and seven other incumbents.

Engine No. 1 noted during the campaign that ExxonMobil did not meet with its nominees, and said the company's picks lack a "diverse track record of success in the energy industry who can position the company for success in a changing world."

– What will change? –

ExxonMobil has changed its tone since Engine No. 1's victories, saying, "We welcome the new directors to the board and look forward to working with them constructively and collectively to benefit all shareholders."

Only time will tell exactly how much the company shifts course and whether it will follow other oil majors into renewable energy, focus on executing long-discussed efforts at carbon capture, or go in a different direction.

The vote "means the status quo is no longer acceptable," said Dan Pickering, founder of Pickering Energy Partners in Houston. "The net impact is more of their capital is directed at energy transition or carbon abatement of some sort and less goes to the oil and gas business."