

# LNG Unlimited

LNG JOURNAL PUBLICATION

17 December 2019

## Chevron warns on write-downs and likely Kitimat LNG divestment

Energy major is evaluating strategic alternatives for various projects  
**LNG Journal editor**

Chevron Corp., a leading liquefied natural gas operator in Australia, said it was downgrading investment plans for other ventures such as the Kitimat LNG project in Western Canada, its US Appalachia shale activities in the US North-east and some overseas projects.

Chevron, the operator of the Gorgon plant the Wheatstone facility in Western Australia, revealed its new strategy to travers its downward revision of global commodities prices while still investing \$20 billion during 2020.

### Discipline

"As a result of Chevron's disciplined approach to capital allocation and a downward revision in its longer-term commodity price outlook, the company will reduce funding to various gas-related opportunities including Appalachia shale, Kitimat LNG and other international projects," said the San Ramon, California-based company.

"Chevron is evaluating its strategic alternatives for these assets, including divestment," it added.

The announced plan also carried a profits warning, which was likely to be part of the fourth-quarter statement in early 2020.

Canadian regulators recently approved an application from Chevron for a 40-year licence to export LNG from the proposed Kitimat LNG project on the Pacific Coast of British Columbia despite environmental opposition.

Chevron is the operator of the Canadian Kitimat project and has



**Chevron Chairman and CEO Michael Wirth plans overhaul**

continued to progress with the joint venture first proposed with Apache Corp. of the US on the traditional land of the Haisla First Nation.

Chevron's partner in Kitimat is now Woodside Petroleum, the Australian LNG operator. They recently submitted their new detailed project plan to the provincial regulators with proposals for a revised plant design with an initial three LNG processing Trains instead of two.

The Bish Cove plant would have export capacity of 18 million tonnes per annum and the configuration includes use of a compact, all-electric drive design.

The future shareholdings in Kitimat LNG is now expected to change in 2020 as Woodside said in September 2019 that it was willing to sell part of its 50 percent stake in the project as it only held large shareholdings in ventures where it was the operator.

Feed-gas for the Kitimat liquefaction plant will come from the large upstream shale-gas resources in the 322,000 net acres held by the project in the Horn River and Liard Basins of northeast BC.

Chevron said the profit warning also took in the performance of its

Big Foot oil assets in the deepwater US Gulf of Mexico.

"The revised oil price outlook resulted in an impairment at Big Foot," said Chevron Chairman and Chief Executive Michael Wirth.

"Combined, these actions are estimated to result in non-cash, after tax impairment charges of \$10 billion to \$11 billion in its fourth quarter 2019 results, more than half related to the Appalachia shale," added Wirth.

Wirth said that the 2020 budget supports a "robust portfolio" of upstream and downstream investments.

He highlighted Chevron's "world-class" Permian Basin US shale position in West Texas and New Mexico and the company's major capital project in Kazakhstan, the Central Asian former Soviet republic.

The Chevron CEO said he was positioning Chevron to win in any environment by investing in the highest return, lowest risk projects.

"This will be the third consecutive year with organic capital spending held flat at \$20Bln, continuing our capital discipline through the cycle," stated Wirth.

## UNLIMITED AGENDA

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# Vitol broadens African LNG portfolio with Nigerian deal and adds to Angola and Mozambique accords

LNG Journal editor

Vitol, the global commodities company, has signed a 10-year deal with Nigerian LNG to buy 500,000 tonnes per annum as the Swiss-based trader expands its portfolio in the medium-term and spot cargo markets.

Volumes will be purchased from Trains 1, 2 and 3 of the NLNG plant at Bonny Island in the Niger Delta and have remarketed as some of the current Nigerian contracts are due to expire.

## Suppliers

Vitol already has volumes from Houston-based Cheniere Energy and other exporters. It additionally has shipment accords with other projects in the US, Russian and Africa.

Tony Attah, Chief Executive of NLNG, and Pablo Galante Escobar, Global Head of LNG at Vitol, signed the contract at an event witnessed by executives of both companies.



**Nigeria LNG CEO Tony Attah is planning future contracts**

The volumes will be delivered ex-ship whereby Nigerian tankers will supply the cargoes to regasification terminals commencing in October 2021 and for a period of 10 years.

Vitol had around 7.8 million tonnes per annum of LNG available to trade last year and this was rising in 2019 to around 10 MTPA.

Its portfolio also includes supply deals with Angola LNG in southwest Africa and future cargoes from the Driftwood plant in Louisiana being developed by Tellurian.

"The agreement underscores NLNG's drive for mutually beneficial partnerships to deliver LNG on a global scale in a low carbon world where gas-LNG will continue to be the preferred complementary energy source alongside renewables," said NLNG.

Vitol LNG's Escobar said he was delighted to be partnering with Nigeria.

"We look forward to working together to build on new opportunities. Vitol has a long history of investing in Africa and of participating in Nigeria's energy sector,"

Escobar added. NLNG is a joint venture owned by Nigerian National Petroleum Corp, Royal Dutch Shell, French major Total and Italy's Eni.

Vitol in September 2019 set up a joint venture with the National Hydrocarbons Company of Mozambique (ENH) to market LNG from the stakes held by the Mozambicans in the various LNG projects under development in the country.

The venture called ENH Energy Trading will initially be owned 51 percent by ENH and 49 percent by Vitol.

Mozambique has an estimated 125 trillion cubic feet of technically recoverable gas resources in the offshore Rovuma Basin and LNG projects initially include the Coral South FLNG venture and the onshore liquefaction plant a Pemba.

The first phase of LNG developments in the southeast African nation will produce significant quantities of gas including 30 MTPA of LNG.

# Global commodities trader Trafigura reports rapid growth of LNG driven by US and Russian cargoes

Trafigura Group, the global commodities market participant, said the global LNG market continued to grow rapidly in size and complexity in 2019, driven by abundant new flows from the US and Russia, the development of a more liquid spot market in the Far East and sustained low natural gas prices.

Trafigura said that one consequence of this was that more LNG was delivered to Europe and more spot cargoes were traded. One of the company's main bases is Singapore.

"We maintained our market leadership in key growth segments such as LNG, while further building our strength as a leading player in the US, now a key hub of the global industry thanks to rising production of shale oil and gas,"

said Trafigura. The company's annual trading report said it made gross profit of US\$2.97 billion, a 25 percent increase on 2018. Net profit in its energy trading was steady at US\$867.8 million, in line with the performance of 2018 and 2017.

"More countries are buying LNG, and buyers are becoming more flexible and more willing to buy from the spot market as opposed to traditional long-term contracts, recognising that security of supply can better be provided on a liquid, open and transparent spot market," said Trafigura.

"With supplies plentiful and prices low, a significant driver of demand was gas-for-coal switching among power utilities both in Eu-

rope and across Asia," added the company.

"The LNG team strongly increased volume, with growth up 27 percent to 12.6 million metric tonnes equivalent," it added.

Trafigura noted that this year marked the start of shipments under its 15-year offtake agreement with Cheniere and several other mid-term contracts.

"With weak demand in Asia redirecting trade flows, the European market absorbed the bulk of our Atlantic cargoes, often in conjunction with our natural gas desk, while we continued to build our position in the Far East with regionally sourced LNG," said the company.

"Given the greater integration of global gas prices, we reaped considerable benefits from our in-

tegrated approach to trading LNG and natural gas in one team," explained Trafigura.

The company's natural gas book grew significantly during the year, both in scale and scope.

Volume traded grew by 147 percent to 17.1 million metric tonnes equivalent of LNG.

Trafigura stated that it was again the largest supplier of natural gas to Mexico from the US, while in Europe it expanded the business in particular in Spain, Italy and the UK.

"Trafigura's core strategy is to globally provide logistical services to producers and consumers of energy and industrial raw materials," said Jeremy Weir, Trafigura's Chairman and Chief Executive.

## Sabine gets extension of permit timing for Train 6

Cheniere Energy has been granted an extension to its permit for the completion of the sixth processing Train at the Sabine Pass export plant in Louisiana.

The Federal Energy Regulatory Commission said it had sent a letter to Cheniere subsidiary, Sabine Pass Liquefaction Expansion LLC, saying the construction permit was now valid until December 31, 2023.

Cheniere's main liquefaction plant engineering contractor, Bechtel, has already been given a notice to proceed with construction of Sabine Pass Train 6.

The Houston-based company is expected to pay around \$2.5 billion for the final Sabine Pass Train to take capacity at the Gulf Coast facility to 27 million tonnes per annum.

Cheniere has already arranged five-year senior secured credit facilities with 29 banks and financial institutions to cover Train 6 construction as well as the development of a third jetty.

Some of the volumes from the sixth Train are expected to be taken up by Malaysian energy company Petronas and the international commodities firm Vitol, according to previous accords signed by Cheniere.

At its second export plant, the Corpus Christi facility in Texas, Cheniere has completed the second Train and the development of a third Train is underway.

The FERC also recently approved what the Houston-based company calls its Stage 3 project, comprising seven mid-scale liquefaction Trains adjacent to the Corpus Christi plant, each with an expected nominal production capacity of around 1.4 MTPA of LNG.

## Saudi Aramco shares surge to top limit in stock exchange debut

LNG Journal editor

Shares in Saudi Aramco, the oil company of Saudi Arabia, surged in their debut on the Saudi Tadawul stock exchange, reaching a 10 percent daily limit for the company that has expressed interests in LNG trading and investment.

Aramco shares traded at 35.20 Saudi riyals (\$9.40) for the first day high after debuting at 32 riyals in the sale of 1.5 percent of the company's shares.

### Huge value

The first day share price brought Saudi Aramco's value up to \$1.88 trillion.

The \$25.6 billion initial public offering became the biggest in history and made it the world's most valuable company.

The value of Aramco is more than the top five energy majors, ExxonMobil, Royal Dutch Shell, Chevron, Total and BP.

The IPO has been targeted at



First share price brought Aramco's value to \$1.88 trillion

Saudi nationals as well as some strategic investors, though investment bankers failed to draw in international buyers.

Saudi Aramco plans to be a supplier and trader of LNG and with its first customer expected to be Bangladesh.

It has recently issued an expression of interest to charter up to 12 LNG carriers from 2025, through its shipping subsidiary, Bahri.

The Bahri shipping business comprises 90 vessels delivering oil and chemicals and dry-bulk cargoes.

It includes more than 40 very large crude carriers, 35 chemical-product tankers as well as other specialized ships.

Saudi Aramco and ACWA Power also signed a \$3 billion deal in October 2019 with Bangladesh Power Development Board to develop a 3,600-megawatt LNG-based power plant and terminal in the country.

While the announcement of that deal did not specify who would supply the LNG Aramco has confirmed its intention to become an LNG trader.

## Freeport plant in Texas starts Train 2 output and cargo due

McDermott International and Zachry Group of the US, along with Chiyoda Corp. of Japan, say that Train 2 at the Freeport liquefaction and export plant on Quintana Island in Texas has begun producing LNG and its first cargo would be shipped soon as Gulf Coast output increases from the plant build-out.

The companies said that "this significant project achievement" is a precursor to a first cargo being shipped from the new Train.

"First liquid for Train 2 is another great accomplishment for the Freeport LNG project," said Mark Coscio, McDermott's Senior Vice President for North, Central and South America.

"As we progress to first cargo for Train 2, we applaud the diligence and commitment of the project team for driving Freeport LNG toward a safe completion," he added.

The current Freeport engineering contract includes three liquefaction Trains with a total of 15 MTPA of capacity, a second loading berth and a 165,000 cubic metres full containment LNG storage tank.

The original Freeport terminal was completed in 2008 as an import facility with one berth and two storage tanks, each of 160,000 cubic metres capacity.

The Freeport project is led by US oil and gas entrepreneur Michael Smith, who is Chairman

and Chief Executive of the development company.

Zachry Group, as the joint venture leader, partnered with McDermott for the pre-front-end engineering and design for Freeport in 2011, followed by FEED works to support the early development stage for Trains 1 and 2.

"Later, Chiyoda joined the partnership for work related to Train 3," added McDermott.

"The project scope includes three pre-treatment trains, a liquefaction facility with three Trains, a second loading berth and a 165,000 cubic metres full containment LNG storage tank," added McDermott.



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## NEWS NUDGES

### LNG for bulk carrier

The American Bureau of Shipping has granted approval in principle to Finnish company Deltamarin and French LNG storage tank firm GTT for a dual-fuel Newcastlemax bulk carrier design with LNG capability. Deltamarin, GTT and ABS have been cooperating on the development of this LNG-fueled bulk carrier. It is intended to meet current and future environmental targets by introducing GTT membrane-type LNG tanks designed to ABS Class.

### Norway gas contract

The Europe-based offshore development company Subsea 7 SA has been awarded a contract by Aker BP for the Aerfugl Phase 2 natural gas field development, located about 210 kilometres west of Sandnessjøen in the Norwegian Sea. Norway is one of the largest pipeline natural gas suppliers to Western Europe, along with Russian company Gazprom, and both sources compete with LNG shipments. The Subsea 7 engineering, procurement, construction and installation contract is a long-distance tie-back involving the application of Subsea 7's Electrically Heated Traced Flowline (EHTF) technology for a distance of 13.5km from the subsea location to the existing Skarv infrastructure.

### Osaka Gas shale move

Osaka Gas, the Japanese utility and LNG buyer, has completed the purchase of a US upstream oil and gas firm, Sabine Oil and Gas Corp. from its parent company Sabine Holdings. As part of the sale, Osaka Gas said its US subsidiary would retain the current Sabine executive team and employees.

## Woodfibre LNG awaits permit amendment for worker Flotel

### LNG Journal editor

The British Columbia Environmental Assessment Office extended the public comment period by six days for the amended permit request proposed for the Canadian Woodfibre LNG project. The comment period ended at midnight on December 15.

The EAO said the extension was because of an interruption in access to its computer system for the request to site a floating hotel near the project that was not in the original plan.

### Application

The purpose of the amended application was for Woodfibre to include a temporary self-contained floating worker accommodation, known as a Flotel and with associated onshore and offshore facilities.

Woodfibre LN is a small-scale venture with plans to export to Asia. It is to be sited near the town of Squamish and was granted a permit in July 2019 by the provincial authorities to proceed with construction.

However, it had not taken into account the high level of accom-



The floating hotel would be berthed near the former pulp mill with ancillary onshore and offshore facilities

modation that would be needed for the workforce.

The Woodfibre liquefaction plant will be on the site of a former pulp mill about 7 kilometres from Squamish and 70km north of Vancouver.

It will comprise a facility with output of 2.1 million tonnes per annum and LNG and storage tanks with 250,000 cubic metres of capacity.

Woodfibre is a Canadian subsidiary of Pacific Oil & Gas, a unit of the Royal Golden Eagle group of Indonesian businessman Sukanto Tanoto and whose headquarters are in Singapore.

Woodfibre has had close cooper-

ation in the environmental assessment process with the native North American Squamish First Nation.

The Flotel request is for a vessel with around 400-600 beds and associated mooring infrastructure, workforce accommodation and an onboard a marine construction vessel, onshore drinking water treatment and pedestrian access path to the Flotel.

The location of the proposed changes to the permit are all within the certified project area assessed in the application.

"No new significant adverse effects were identified as a result of the amendment," said the EAO.

## Japan spot LNG prices are halved since 2018 but up on previous month

Japanese spot liquefied natural gas cargoes delivered in November cost almost half the price of a year ago but edged higher compared with the previous month as global prices remained flat amid abundant supplies.

Spot cargoes delivered to Japan in November 2019 cost \$5.50 per MMBtu compared with \$5.40 per MMBtu in October 2019, while the delivered price in November 2018 had been \$10.60 per MMBtu.

No monthly numbers were released for contracted spot cargoes that had not yet been delivered, suggesting the level of trade was

too low to have a reliable price.

In November 2018, contracted prices had been \$10.80 per MMBtu and delivered cargoes were estimated at around the \$10.60 per MMBtu as delivered cargo numbers were not released for November 2018.

The price of spot cargoes contracted in October 2019 averaged \$5.50 per MMBtu versus \$10.70 per MMBtu in October 2018, while the September 2019 contracted price was \$5.40 per MMBtu.

The monthly spot cargo numbers come from the commerce division of the Japanese Ministry of Economy, Trade and Industry and

are only issued if a minimum number of two trades are recorded.

Overall LNG imports by Japan declined in October (the last official numbers available) at the expense of thermal coal imports even as LNG cost the nation 20 percent less than a year ago as long-term contract prices remained much higher than spot prices.

The total volume of LNG cargoes delivered to Japan in October fell by 3.6 percent to 6.30 million tonnes compared with 6.53MT in October 2018. This volume of deliveries amounts to around 90 cargoes.



# Gazoduq project to transport feed gas from Ontario for Québec LNG starts open season

## LNG Journal editor

Gazoduq, the Québec natural gas pipeline developer, has launched an open season to solicit non-binding expressions of interest for firm transportation services on its proposed 780-kilometre underground natural gas line leading to the GNL Québec liquefaction and export plant.

The line will run from the northeast of the Canadian province of Ontario to Saguenay in Québec where the GNL Québec export project is planned.

### Requests

"Non-binding requests for service will be accepted from December 4, 2019, until 5pm Eastern time on January 6, 2020," stated Gazoduq.

Gazoduq and GNL Québec are two companies proposing to transport feed-gas from Western Canada and export it as LNG from Saguenay, a town located about 200



Pipeline plan will open up huge Western Canada resources

miles north of Quebec City on a tributary leading to the St Lawrence River.

Both Gazoduq and GNL Québec had previously filed preliminary documents with the former regulatory regime, the Canadian National Energy Board.

The NEB has been replaced by the new Canadian federal energy

body, the Impact Assessment Agency of Canada, backed up by the Canada Energy Regulator (CER).

Gazoduq is the pipeline builder and will operate the transmission line from an inter-connection with the existing mainline near Ramore, Ontario, owned by Canada's largest

pipeline operator, TC Energy.

Gazoduq will bring feed-gas to the liquefaction plant in the French-speaking province to what will be its main customer, GNL Québec.

The natural gas pipeline is designed to transport around 51 million cubic metres (1.8 billion cubic feet) of natural gas per day.

Gas transportation services on the new transmission line will also be available for contracting by local distribution companies in northern Ontario and Québec.

Gazoduq is a Quebec-based company offering far-reaching benefits for Quebec and its investment alone in the project will total C\$5 billion (US\$3.8Bln).

Gazoduq has said that the full extent of the economic benefits stemming from the gas and LNG project will be presented in 2020 within the framework of the impact study.

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## DNV GL class society starts project with China yard

European classification society DNV GL entered into a joint development project with Chinese Huangpu-Wenchong Shipbuilding Co. for LNG dual-fuel containership.

The project is for a 5,000 twenty-foot equivalent units (TEU) vessel and the accord was signed at a Shanghai trade fair by Wu Ronghui for the Huangpu-Wenchong yard and Falk Rothe, Head of DNV GL's Technical Centre in China.

According to the agreement, HPWS and DNV GL will jointly develop a new energy-efficient 5,000 TEU Panamax container ship for the intra-Asia trade routes.

"In order to minimize energy consumption, emissions to air, and achieve maximum cargo capacity with lower OPEX, the vessel will use LNG as ship fuel, have an hydrodynamically optimized low resistance ship line, and a more effective structural design," said DNV GL.

"Enhanced ergonomic design features for greater crew comfort, as well as cutting edge intelligent ship technology are further highlights of this new green and smart ship," it added.

Wang Yi, the Huangpu-Wenchong yard's Director for Science and Technology, said the project marks another advance in strategic cooperation.

Huangpu-Wenchong Shipbuilding is a subsidiary China State Shipbuilding Corp. (CSSC), one of the largest global shipbuilding companies.

"It is trust and synergies stemming from our powerful partnership that makes this happen and I am positive there is more to come in the near future," added Wang.

## Australian Gorgon LNG completes maintenance and ramps up plant

LNG Journal editor

The Western Australian Gorgon LNG plant on Barrow Island is ramping up after a scheduled maintenance programme at a time when spot prices are at a low level, though steady oil prices are underpinning long-term contract values.

Operator Chevron Corp. completed its maintenance after shutting some production from October 11 to the start of December and with customer deliveries taken account of during the work.

### Customers

Gorgon's long-term customers include the largest Japanese utilities, Jera Co. Inc., Tokyo Gas and Osaka Gas.

The Gorgon plant, one of the world's largest and with a carbon-dioxide lock-in system that was only fully started up in August 2019, has a nameplate capacity of 15.6 million tonnes per annum of LNG.

The main shareholders in addition to Chevron are ExxonMobil Corp and Royal Dutch Shell.

Further maintenance sessions



**Gas processing and LNG output at Gorgon started in July 2016. The facility is a key shipper to Japan's utilities**

are scheduled for 2020 when between May 23 and July 11 some capacity equivalent to about one-and-a-half Trains will be shut down.

The CO2 injection system was a key foundation for the approval of the Gorgon project by the Western Australia Environmental Protection Agency.

It is capable of capturing and storing 100 percent of reservoir CO2 from gas processing operations and at least 80 percent of CO2 from operations over a five-year average.

Gas processing and LNG output at Gorgon started in July 2016 and all three Trains were on stream two years later in mid-2018.

One year after that and following a delay due to technical issues, the CO2 injection system at the Chevron operated Gorgon facility became operational in August 2019.

Chevron also operates the Wheatstone LNG plant near Onslow in the Pilbara region of Western Australia.

## LNG plant operator Woodside again reveals tax payments

Woodside, the Western Australia LNG liquefaction and export plant operator with stakes in three companies, has again voluntarily revealed its corporate income tax payments as a "proud" Australian company.

The company, based in the state capital, Perth, said its taxes were paid by three entities.

They are its stakes in the 90 percent-owned Burrup Facilities Company, Burrup Train 1 Pty Ltd, which reflects the joint ventures it operates and Woodside Petroleum Ltd.

The three Woodside corporate

units had combined taxable income of A\$2.93 billion (US\$2.02Bln) and income tax of A\$493 million (US\$340M).

The company noted that over the five years to 2018, Woodside paid a total of A\$4.9 billion (US\$3.38Bln) in Australian taxes and royalties.

Woodside operates the North West Shelf plant and Pluto LNG on the Burrup Peninsula and is a big supplier of clean energy to nations such as China and Japan while also boosting Australia's balance of payments with export revenues.

"We know that to keep the trust of our employees, contractors, suppliers and customers we need to be open, transparent and accountable," said Chief Executive Peter Coleman.

"We are a proud Australian company and we do the right thing when it comes to paying our taxes," he said.

Woodside explained that the data was reported in the Australian Tax Office (ATO) 2017-18 review of entity tax information in respect of the financial year ended 30 June 2018.



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# Indian quest for cleaner air helped by LNG from Qatar as landmark 2,000th cargo arrives

LNG Journal editor

Qatargas, the leading global liquefaction and LNG export company, has achieved a landmark 2,000th cargo delivery to India to help the Asian nation's transformation to the use of cleaner fuel and to reduce pollution in cities such as Mumbai.

The cargo, transported on board the 155,000 cubic metres capacity vessel "Aseem" was loaded at the Ras Laffan Port and was delivered to the Dahej import terminal, north of Mumbai, for India's state-controlled Petronet.

## Historic

"We are delighted to reach this historic milestone in our relationship with India with whom we have established a strong partnership since July 1999," said Khalid bin Khalifa Al Thani, Chief Executive of Qatargas.



The vessel "Aseem" delivered the Qatargas cargo to Dahej

"India is a key market for Qatargas, given its geographical proximity and growth potential," added the CEO,

"As India continues to make big strides towards achieving its ambitious target of 15 percent natural gas in the country's overall energy mix, we are committed to extending all possible support by reliable

delivery of this clean fuel," added Al Thani.

"As the world's premier LNG company, Qatargas continues to play a major role in ensuring energy security for countries across the globe," stated Al Thani.

Qatargas has a 25-years long-term, free-on-board (FOB) sale and purchase agreement with

India and ships around 116 cargoes per year under this accord, in addition to supplying significant volumes into the short-term and spot markets.

The Qataris have been prominent in supplying shipments to most of Asia's import facilities, including the commissioning cargo to the first Indian East Coast regasification facility at Kamarajar port, 25 kilometres north of Chennai, in the state of Tamil Nadu.

India's other regas terminals or on the West Coast, including Dahej, Hazira and Dabhol, all near Mumbai.

Currently Indian LNG import costs amount to around \$800 million per month compared with a monthly \$1 billion a year ago.

The monthly total of cargoes recently received at Indian terminals averaged about 28 shipments.

# US forecasts high natural gas levels and low prices and considers IMO sulfur cap impact

The latest US Government short-term energy outlook addressed issues such as high US natural gas inventories and output as well as low prices and the impact on refined fuel from the forthcoming International Maritime Organization sulfur cap to reduce pollution in ports.

On natural gas storage, estimates gauged the total working gas inventories at 3,616 billion cubic feet at the end of November, according to the Energy Information Administration.

This level was about equal to the five-year (2014-2018) average and 19 percent higher than a year ago.

The report expects storage withdrawals to total 1.9 trillion cubic feet from the end of October 2019 to the end of March in 2020, which is less than the five-year average winter withdrawal.

"A withdrawal of this amount would leave the end-of-March inventories at almost 1.9 Tcf, which would be 8 percent higher than the five-year average," said the EIA.

The US benchmark Henry Hub natural gas spot price averaged \$2.64 per million British thermal units in November, up 31 cents per MMBtu from October.

"Prices increased as a result of November temperatures that were colder than the 10-year (2009-2018) average and the EIA forecasts the Henry Hub spot price to average \$2.45 per MMBtu in 2020, down 14 cents per MMBtu from the 2019 average," added the report.

On the natural gas production front, the report forecasts that annual output of dry natural gas would average 92.1 billion cubic feet per day in 2019, up 10 percent from 2018.

However, the report also expects that natural gas production would grow much less in 2020 because of the lag between changes in price and changes in future drilling activity.

"Low prices in the third quarter of 2019 will reduce natural gas-directed drilling in the first half of 2020," the report noted.

It also estimated that natural gas production in 2020 would average 95.1 Bcf per day.

The EIA additionally referred to the IMO sulfur cap from January to enact the Annex VI of the International Convention for the Prevention of Pollution from Ships.

This convention lowers the maximum sulfur content of marine fuel oil used in ocean-going vessels from 3.5 percent of weight to 0.5 percent.

Ships can use lower-sulfur fuel emission-cleaning systems of

cleaner fuels such as liquefied natural gas.

"The EIA expects that starting in the fourth quarter of 2019, this regulation will encourage global refiners to increase refinery runs and maximize upgrading of high-sulfur heavy fuel oil into low-sulfur distillate fuel to create compliant bunker fuels," stated the report.

The report forecast that US refinery runs will rise by 3 percent from 2019 to a record level of 17.5 million barrels per day in 2020, resulting in refinery utilization rates that average 93 percent in 2020.

It expects the most significant effects of the regulation to be on diesel wholesale margins, which rise from an average of 45 cents per gallon in 2019 to a forecast peak of 61 cents per gallon in the first quarter of 2020.