



# ANNUAL SNAPSHOT

# 2022



● PM Narendra Modi inaugurated the 533 km-long Bokaro-Angul gas pipeline section

## IN THE NEWS

- PM Narendra Modi inaugurated Asia's largest bio-CNG plant in Indore, MP
- GAIL began India's maiden project of mixing hydrogen into the natural gas
- Piped gas project started in Latur city of Maharashtra's Marathwada region
- Indian Oil Adani Gas Private Limited (IOAGPL) started domestic distribution of natural gas

- Africa's first floating LNG plant arrived in Mozambique in January 2022
- Blue Energy Motors launched India's first LNG-fuelled green truck manufacturing plant
- BPCL launched EV Fast-Charging Corridors on Chennai - Trichy - Madurai highway
- Algeria signed a long-term sale and purchase contract in February with Greece's DEPA
- FM Logistic became the first logistics company in Spain to have a hydrogen refuelling station



## CITY GAS DISTRIBUTION/ BIO-CNG

**Adani Total Gas won licences to expand its CGD network to 14 new GAs** in the 11th round of CGD bidding in January 2022 and would invest ₹20,000 crore in the city gas sector in the next eight years.

**Indian Oil Corporation announced in January 2022 that it will invest over ₹7,000 crore** in setting up CGD networks in 9 additional GAs won in the 11th round.

**North Delhi Municipal Corporation signed a memorandum of understanding with IGL** in January 2022 for setting up a compressed biogas plant and integrated CBG-CNG fuel station on three acres of land in Ghogha dairy in Delhi.

**GAIL began India's maiden project of mixing hydrogen into the natural gas system** at Indore, MP in February 2022. This is a first-of-its-kind project in the country and GAIL has already obtained the necessary regulatory permissions to commence the project.



**Natural Gas Society organised an O&M conference**, sponsored by GAIL on O&M Activities (Natural Gas Trunk Pipelines and CGD Networks) on February 23 & 24, 2022 (in virtual mode). More than 450 participants from across the Oil and Gas/CGD industry were present.



**PM Narendra Modi inaugurated Asia's largest bio-CNG plant in Indore, MP** in February 2022, saying efforts were being made under the Swachh Bharat-2 campaign to remove piles of garbage from vast chunks of land in several cities and turn them into green zones.

**Bharat Petroleum Corporation Limited launched gas distribution networks in Aurangabad and Ahmednagar** districts of Maharashtra in March 2022 and will invest ₹4,000 crore (approx.) for the completion of the projects.

**Indraprastha Gas Limited received a letter of Intent (LoI) from PNGRB** in March 2022 for grant of authorization to the company for the development of CGD network in the geographical area of Banda, Chitrakoot and Mahoba in Uttar Pradesh.

**Piped gas project** started in Latur city of Maharashtra's Marathwada region in March 2022 on a pilot basis. The project, initiated by the Latur Municipal Corporation, is being rolled out by Ashoka Gas (Unison Enviro Pvt Ltd).

**IOC opened its first CNG kit retrofitting station** for heavy vehicles in Coimbatore, Tamil Nadu in May 2022.

**PNGRB issued letters of intent (LoI) to BPCL, HPCL & GAIL** in April 2022 for retailing CNG and PNG in five GAs under the 11A round.

**Bengal Gas Company**, a JV of GAIL & Greater Calcutta Gas Supply Corporation, announced in April 2022 that it is developing a CGD in the Kolkata Municipal Corporation area. The investment for the project is Rs 5,000 crore.





**Varanasi is fast becoming a CNG city.** As of July 2022, it had 371 diesel engine boats (DEBs) converted to CNG & over 12,000 vehicles using CNG as fuel. Besides, piped CNG is being delivered to 12,500 houses & there are around 900 motor boats that run on the River Ganga in Varanasi. 500 CNG-fuelled boats launched in Varanasi are being supplied CNG from India's first floating CNG station built by GAIL at Namoh Ghat.

**Bihar State Road Transport Corporation (BSRTC)** said in July 2022 that it has started replacing diesel-run buses with CNG in Patna. It has procured 50 CNG buses.

**HPCL announced a cow-dung to CBG project** at Sanchole in Rajasthan in August 2022 under the waste-to-energy portfolio. The plant is proposed to utilize 100 tonnes/day of cowdung to produce biogas

at Pathmeda, Jalore district of Rajasthan.

**IOC signed an MoU with AA Bioenergy** in August 2022, to buy 2.4 tonnes of CBG/day for consumption in Kanpur Dehat & Kannauj. Another firm, Bhadauria Natural Gas & Products based in Kannauj is set to launch CBG production by December end.

**Indian Oil Adani Gas Private Limited (IOAGPL)** started domestic distribution of natural gas to households in Unnikulam grama panchayat in Kozhikode. The group expects to connect more than 25,000 households in the district to the network by June 2023.

**AG & P Pratham signed an MoU with Karnataka government** in November to develop a CGD network in 15 districts of the state.

## NATURAL GAS/ PIPELINES/ COMPANY NEWS

**ONGC became the first company in India** to trade domestically produced gas on the Indian Gas exchange (IGX) in May 2022.

**BPCL commissioned a 26 km long natural gas pipeline** starting from the tap-off point IP-02 station on Dabhol-Bangalore pipeline in July. The pipeline connects South India to the national gas grid, with City Gate Station (CGS) at Mouje Vadgaon village in Kolhapur District.

**Work has started on a pipeline that would bring natural gas to Mysuru city.** Within Mysuru, a 500-km pipeline will be laid. Natural gas will be supplied to the city from Bidadi in Bengaluru through a 103-km pipeline.

**GAIL laid a pipeline to supply natural gas** to HPCL Mittal Energy (HMEL) Bathinda refinery in



**Natural Gas Society organised 1st Natural Gas (NG) Summit on August 5, 2022 at CSOI, New Delhi**

Punjab in June 2022. This pipeline is a spur line of Dadri-Bawana-Nangal Pipeline (DBNPL).

**GAIL has started laying a gas pipeline** along Nagpur-Mumbai super communication expressway, popularly known as Samruddhi Mahamarg.

**Underground natural gas deposits were detected** in August 2022 at two places in Gop block, Puri district during a survey by Oil India Limited.

**IOC achieved the milestone of commissioning 2.8 km** of steel pipeline for CNG and the first online CNG retail outlet in Tamil Nadu in Coimbatore in July. It also laid an underground natural gas pipeline for up to 75 km in Coimbatore.





## PM Narendra Modi inaugurated

the 533 km-long Bokaro-Angul gas pipeline section in July 2022, a part of the PM Urja Ganga project in July 2022. The pipeline covers 243 km in Jharkhand & 290 km in Odisha in 11 districts, with an investment of ₹2,500 crores.



field held by Gujarat State Petroleum Corporation (GSPC) to Oilex.

**ONGC signed a gas-selling agreement with GAIL and Assam Gas Company Limited** in July 2022 wherein ONGC will supply 50,000 SCM/day of gas to GAIL and AGCL and a total of 0.1 mscmd gas from its gas well at Khubal under Panisagar of North Tripura.

**Oil & Natural Gas Corporation signed a Heads of Agreement (HoA) with ExxonMobil** in August 2022 for deepwater exploration in the east and west coasts of India. The collaboration areas focus on the Krishna-Godavari & Cauvery Basins (eastern offshore) & Kutch-Mumbai region (western offshore).

**Oilex company has restarted production & sales of gas** at the Cambay field, Gujarat and the government has approved the transfer of assignment of the 55% participating interest in the Cambay



**Shri Sandeep Kumar Gupta assumed charge** as the chairman and managing director of GAIL (India) Limited in October 2022.

## POLICY MATTERS/GAS PRICING/OTHERS

**PNGRB has made amendments** in its three regulations namely Natural Gas Pipeline Tariff, Authorisation and Capacity Regulations. Through these amendments the implementation of Unified Tariff regulations will be pushed which will be effective from April 1, 2023. To address the settlement issues for implementation of Unified tariff, an industry committee has been constituted.

**Gujarat announced a 10% VAT decrease on CNG and PNG in October 2022.**

**The government put up** as many as 42 oil and gas blocks for exploration and development through

international competitive bidding in November. This includes 26 oil and gas blocks offered under the Open Acre Licensing Policy (OALP), along with 16 blocks for prospecting for coal-bed methane.

**Maharashtra announced a drastic cut** in value-added tax (VAT) on natural gas from 13.5% to 3% effective from April 2022.

**To simplify the implementation of unified tariff**, entity level Integrated natural gas pipeline tariff has been introduced in the said regulations which will act as a building block for unified tariff at national level. The number of unified tariff zones have been increased from two to three. In addition, other amendments like allowing unaccounted gas, moratorium period, ramp up in capacity, etc., have been incorporated.

**MoPNG set up a committee** under energy expert Sh. Kirit Parikh to review the current gas pricing formula in September 2022.





## LNG USE/ LNG DEVELOPMENT AND SHIPPING

**Maharashtra Natural Gas Ltd (MNGL)** started a trial operation of its LNG-CNG conversion plant at Pathardi in March 2022, after getting all the necessary permissions. The trials of the LNG processing plant started and around 18,000 kg CNG was produced on the first day.

**Rawmatt Industry**, an alternative fuel technology provider, joined hands with GoSuperBus, a luxury bus travel service company, in January 2022 to convert 5,000 buses to LNG to curb vehicular emissions and promote green vehicles across a period of three years. The first LNG converted bus was launched in Nagpur.

**Indian Railways** has allowed the transport of LNG through its network, enabling cheaper delivery of the fuel to areas that lack pipelines. While this initiative will allow the ports to attract more gas shipments,

it will also ensure delivery of the fuel at low costs to areas that do not have pipelines. Currently, the delivery of LNG is done by trucks.

**Blue Energy Motors** launched India's first LNG-fuelled green truck manufacturing plant in Chakan, Pune in September. BEM launched its first LNG trucks with BS VI-compliant engines.

**Petronet LNG's Dahej** import & regasification terminal in Gujarat received its 3000th cargo in July. The Dahej LNG terminal has a capacity of 17.5mn metric tonnes/year.



**NGS participated as Knowledge Partner at LNG India Summit 2022 organized by messe frankfurt at New Delhi. ED NGS expressed his views at the event.**

**Petronet LNG announced** in September 2022 that it would invest ₹40,000 cr in the next five years for expanding LNG import infrastructure as well as foraying into new business to boost its profitability.

## ELECTRIC MOBILITY/ HYDROGEN/BIO-METHANE/OTHERS

**IOC is gearing up** to provide EV charging facilities at 10,000 fuel stations in the next three years. It has installed more than 1,000 electric vehicle charging stations (EVCS) across the country.

**The green hydrogen policy** announced by the Centre in March 2022 marks an important step towards realising the Panchamrit goals outlined by India at the COP26 summit. The policy focuses on providing easy access to and reducing the cost of renewable energy (RE), which currently accounts

for about 60% of green hydrogen production costs. The policy also provides a stimulus to RE developers looking at scaling up their portfolios, as they plan to produce 5 MT of green hydrogen annually by 2030.

**Delhi government** issued a draft Motor Vehicle Aggregators Scheme, 2021 in January 2022, which has called on online passenger and commercial vehicle operators to increasingly adopt electric vehicles (EVs). According to the draft scheme, electrification targets will apply only for new cars being brought under the ambit of operators such as Uber, Olacabs & others. Older vehicles already registered under these aggregators will, for the time being, continue operating.

**The Bengal government** announced exemptions on registration fees and road tax for both electric and CNG vehicles in March 2022, for two years starting from 2022-23.





**IPICOL and GAIL signed an MoU for cooperation in January 2022 in the space of green hydrogen, green ammonia etc, for the development of eco-friendly fuels in Odisha.**

**BPCL launched EV Fast-Charging Corridors** on Chennai - Trichy - Madurai highway in February, with the rollout of CCS-2 DC Fast chargers of its conveniently located fuel stations along the 900 Km route on both sides of the highway.

**Japanese Suzuki announced** in March 2022 that it planned to invest an estimated 150 billion yen (\$1.26 billion) to produce electric vehicles as well as batteries in India.

**Oil India Limited commissioned India's first 99.99% pure green hydrogen pilot plant**, with an installed capacity of 10 kg per day at its Jorhat Pump Station in Assam in April 2022. The plant produces green hydrogen from the electricity generated by the existing 500kW solar plant using a 100 kW Anion Exchange Membrane (AEM) Electrolyser array. The use of AEM technology is being used for the first time in India.

**Ladakh Administration signed an MoU with the National Hydroelectric Power Corporation (NHPC)** in July 2022 for the establishment of 2 pilot green hydrogen technologies.

**Indraprastha Gas partnered** with Pune-based electric vehicle manufacturer Kinetic Green to launch a battery-swapping station, called Energy Café in Delhi in March. The facility will replace discharged batteries of two & three-wheeler EVs with fully charged ones.



**Tripura government adopted the Tripura Electric Vehicle Policy 2022** in May 2022 becoming 15th state in the country & 3rd in the northeastern region following Assam & Meghalaya to adopt the electric vehicle policy.

**United Arab Emirates (UAE) based META4** announced investments of Rs 250 crore in Telangana in June to set up an electric two-wheeler manufacturing facility.

**Adani Enterprises announced** in June that it plans to invest over \$50 billion over the next 10 years in green hydrogen. French energy major TotalEnergies would pick up a 25% stake in the newly launched Adani New Industries Ltd (ANIL) from Adani Enterprises and in the initial phase, ANIL will develop a green hydrogen production capacity of 1 million tpa before 2030.

**The biggest bio-energy plant in India was inaugurated** in Lehragaga, Punjab in October. Coming up with an investment of Rs 220 crore, the plant is being set up by Germany-based Verbio AG's Indian subsidiary. It will use crop residue to produce biogas and manure.



**In July, NTPC said its Kawas Gas blending project would blend hydrogen with PNG for domestic usage.** This is the first kind of project in the country that would blend hydrogen with PNG. Initially, 5% hydrogen of the total gas supply will be blended which will be gradually increased to 20%.

**Ashok Leyland's electric mobility arm Switch Mobility** launched its EiV 12 electric bus range in August for the Indian market.

**In September 2022, Delhi government launched** an Open Database Facility for EV charging & battery swapping stations on its Switch Delhi portal for electric vehicles in Delhi. Users may use apps to locate more than 2500 charging points and battery swapping stations across Delhi.





## NATURAL GAS / TRANSNATIONAL PIPELINES/OTHERS

**Malaysia:** Malaysian oil and gas firm Petronas' subsidiary Petronas Carigali Sdn Bhd (PCSB) announced a gas discovery in Block SK411, offshore Malaysia, after drilling the Hadrah-1 well in January 2022.

**Greece:** Construction of the interconnector Greece-Bulgaria (IGB) natural gas pipeline got completed in September. The gas interconnector is 182 km long and is part of the Trans-Adriatic Pipeline (TAP). It would transport Azerbaijani natural gas through Greece to Bulgaria.

**Azerbaijan:** The Trans Adriatic Pipeline AG transported its first 10 bcm of natural gas from Azerbaijan to Europe in March through the Kipoi interconnection point located at the Greek-Turkish border. It is also the same point where TAP connects to the Trans Anatolian Pipeline (TANAP).

**UK:** Britain's regulator approved Shell's revised plan in June 2022 to develop Jackdaw gas field, a North Sea natural gas field as the government seeks to boost domestic energy output.



**Poland:** The construction of the Poland-Slovakia gas pipeline was completed in Strachocina in August and would transport 5.7 bcm of gas annually to Poland and 4.7 bcm to Slovakia.

### Saudi Arabia:

Saudi Arabian Oil Company Aramco discovered a number of natural gas fields in the Empty Quarter in February 2022, near its northern border and in the eastern region.



**Iran:** A 150-km gas pipeline major gas pipeline along Caspian Sea near Azerbaijan got completed in August and would play a major part in Iran's gas supply arrangements with Azerbaijan.

**Hungary:** Hungary signed a deal with Russia's Gazprom for 5.8 bcm of extra natural gas in September 2022.



**US:** The West Virginia Department of Environmental Protection granted a permit in January 2022 for the construction of the controversial Mountain Valley Pipeline that will run 300 miles and will enter Virginia.

**China:** China's CNOOC's Dongfang 1-1 gas field southeast zone and Ledong 22-1 gas field south block started production in September. The projects are located in Yinggehai, western South China Sea and are expected to reach peak production of 44mn ft<sup>3</sup>/day of natural gas.

**China:** Chinese state energy company CNOOC announced the discovery of a deep-water deep-stratum gas field with proven reserves exceeding 50 billion cubic metres in the sea southeast of Hainan Province in October. The Baodao 21-1 gas field is located in the Baodao Sag, Qiongdongnan basin, in the western South China Sea.





## NATURAL GAS/LNG UTILISATION

**Russia: NOVATEK Gas & Power Asia Pte. Ltd., and ENN LNG (Singapore) Pte. Ltd. signed a long-term LNG sale and purchase agreement (SPA) in January 2022 for the LNG produced from the Arctic LNG 2 project. The SPA stipulates the supply of approximately 0.6 million tpy of LNG from the Arctic LNG 2 project for a term of 11 years. The LNG will be delivered on a DES basis to ENN's Zhoushan LNG Receiving Terminal in China.**

**US: U.S. Gain announced in February 2022 that its renewable natural gas supply would be used as a feedstock into hydrogen production, enabling a greener fueling solution for the California transportation market.**

**Kosovo: HAM Group launched a new concept of mobile and transportable service station in February, which allows the refuelling of LNG and CNG. The new mobile unit, which is called EDUX, has been developed by HAM Criogénica.**

**Canada: Clean Energy Fuels Corp. signed an agreement in February to fuel United Parcel Service (UPS) Canada delivery fleet vehicles with CNG at its London, Ontario station. UPS Canada has already converted 25 package delivery vans to operate on natural gas.**



**Singapore: Pavilion Energy Trading & Supply Pte Ltd and Zhejiang Hangjiixin Clean Energy Co. Ltd signed a deal in January 2022 for the supply of up to 0.5 million tpy of LNG to Hangjiixin's 1 million tpy Jiaxing LNG Terminal in Zhejiang, China from 2023.**



**Algeria: Algeria signed a long-term sale and purchase contract in February with Greece's DEPA, without indicating the volumes contracted. Algeria is the top LNG supplier in the Greek market.**

**Equatorial Guinea: Nigeria and Equatorial Guinea agreed in March 2022 to bring Nigerian gas to the Punta Europa LNG terminal in Equatorial Guinea.**

**China: China became the largest LNG importer in 2021-22 overtaking Japan. China's LNG imports averaged 10.5 billion cubic feet per day (Bcf/d), a 19% increase compared with 2020-21.**

**Australia: Beach Energy signed LNG SPA with BP Singapore in August for 3.75 million tonnes of LNG from the Waitsia Stage two project.**



**France: French energy company TotalEnergies & South Korea's Hanwha Energy Corporation signed a 15-year SPA in May to supply LNG. 600,000 metric tons of LNG per year will be delivered to the Tongyeong regasification terminal in South Korea.**

**China: China Gas Hongda Energy Trading Co. Ltd., entered into an LNG Sale & Purchase Agreement (SPA) with Energy Transfer LNG Export, LLC in June related to its Lake Charles LNG project wherein Energy Transfer would supply 0.7 million tonnes of LNG per annum on a free-on-board (FOB) basis.**





## GLOBAL LNG DEVELOPMENT

**Africa:** Africa's first floating LNG plant arrived in Mozambique in January 2022.

**Norway:** KN, the operator of Lithuania's only LNG import facility, announced in October that it has decided to acquire the FSRU Independence from Höegh LNG after its lease ends.



**Italy:** The Italian company ENI signed an LNG deal with Republic of Congo in April 2022 to increase gas production and exports by more than 4.5 bcm a year, primarily through the development of an LNG project, in Congo.

**US:** Sempra Infrastructure and Comisión Federal de Electricidad (CFE) signed a deal in June for the proposed Vista Pacífico LNG project in Topolobampo-Sinaloa and rerouting of the Guaymas-El Oro pipeline in Sonora, also covering the development of an LNG terminal in Salina Cruz, Oaxaca.

**China:** China National Offshore Oil Corp (CNOOC) started to construct the world's largest LNG or LNG storage tanks in February in Yancheng Binhai Port Industrial Park in East China's Jiangsu province. The project includes six new ultra-large tanks with a total storage volume of 270,000 cubic metres and reach a height of 60 metres.

**Taiwan:** Taiwanese gas supplier CPC Corp. received the Environmental Protection Agency's approval in March to build a new LNG import terminal near an algal reef off the coast of Datan.



**Tanzania:** Tanzania government signed an LNG deal with energy giants Shell & Equinor in June that will expedite the start of the construction of a \$30bn LNG export terminal.

**Estonia:** Phase one of the construction of Paldiski LNG terminal in the port city of Paldiski was completed on August 31.

**Germany:** Germany will start construction of the country's first two LNG import terminals to reduce energy dependence on Russia and diversify supply sources. Germany currently has no LNG receiving and regasification capacity.

**Sweden:** In August, Avenir LNG has agreed on preliminary terms on building an LNG terminal in the Swedish port of Oxelosund.

**USA:** Delfin Midstream and Devon Energy executed HoA in September for long-term liquefaction capacity in Delfin's first Floating LNG vessel and a pre-Financial Investment Decision strategic investment by Devon in Delfin.

**Romania:** Romanian state-owned gas producer Romgaz and Azerbaijan's state energy firm Socar have agreed to jointly explore the feasibility of developing a LNG project in the Black Sea and the two have signed a MOU to undertake a feasibility study.

**Germany:** Germany has completed construction of its first floating terminal to receive LNG over the winter months. It is the first of five planned floating terminals at the North Sea port of Wilhelmshaven to find alternatives to Russian pipeline gas.





**Germany: Excelerate Energy Inc. and the German government have signed a 5-year contract** to charter 5-billion cu m/year floating storage and regasification unit (FSRU) Excelsior, starting first-quarter 2023. The 138,000-cu m vessel will be berthed in the Port of Wilhelmshaven.

**Mozambique: BP has started the shipping of LNG cargo from the \$8bn Coral South floating**

**LNG (FLNG) project** in the Rovuma basin, off the coast of Mozambique, country's first LNG project. BP will purchase 100% of the LNG produced from the Coral Sul FLNG, which is expected to produce 450 billion cubic metres of natural gas for next 20 years.

**South Africa: Renergen has started operations at South Africa's first commercial LNG plant.**

## LNG AS A MARINE FUEL/SHIPPING

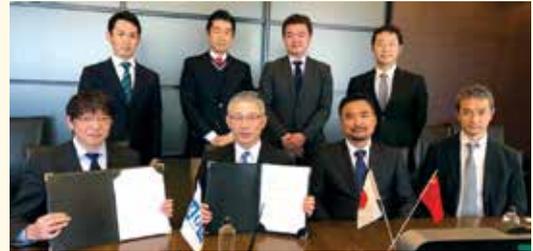
**USA: LNG marine fuel usage for ships is growing.** LNG as marine fuel is being adopted quickly by the shipping & cruise industries. An international multi-sector industry coalition created to accelerate the adoption of LNG as a marine fuel, 2021 marked exponential growth in LNG-fueled deep-sea vessel orders. These include containerships, tankers, cruise ships, bulk carriers, car carriers & ferries.

**UK: The Society for Gas as a Marine Fuel (SGMF) released version 3.0 of its 'LNG as a marine fuel – Safety and Operational Guidelines – Bunkering' publication** in January 2022.

**UK: GasLog signed a new charter deal** in January 2022 for its LNG carrier, 2010-built GasLog Savannah with a capacity of 155,000 cbm.

**Titan LNG & Brittany Ferries signed a long-term agreement in May for the supply of LNG & liquified biomethane (LBM)** to two new LNG-fuelled hybrid Ro-Pax vessels. The two 194.7 m, 1400 passenger LNG-hybrid ships would join the fleet in 2024 & 2025, replacing two of the longest-serving vessels, Bretagne (1989) & Normandie (1992).

**Hong Kong: Containership owner Seaspac Corporation ordered four "ultra-modern" 7,700 TEU dual-fuel LNG containerships** in May from an unnamed "major" shipyard scheduled to be delivered in 2024.



**Japan: Japanese shipping & logistics firm NYK signed a long-term time-charter contract** in May with CNOOC Gas & Power Singapore Trading & Marketing Pte. Ltd. for six LNG carriers, in addition to a shipbuilding contract for the vessels with Hudong-Zhonghua Shipbuilding (Group) Co. Ltd. This is NYK's first long-term time-charter contract for an LNG carrier with CNOOC.

**South Korea: Daewoo Shipbuilding & Marine Engineering (DSME) received a 649.5-billion-won (\$494.8-million) order** from a European shipping company in July for two large LNG carriers.

**South Korea: Samsung Heavy Industries Co. bagged ₩862.3 bn (billion-won), (US\$671 million) order** in May to build three LNG carriers in Africa. Samsung Heavy would deliver them by January 2026.

**South Korea: Knutsen NYK Offshore Tankers (KNOT) took the delivery of a dual-fuel LNG shuttle tanker** in August. The tanker was built at Daewoo Shipbuilding & Marine Engineering yard in South Korea. The vessel has been named "Sindre Knutsen" and would be a dual-fuel shuttle tanker that will use LNG as fuel.





**USA:** In August, the Port of Long Beach welcomed Pasha Hawaii's MV George III, the first container ship powered by LNG to refuel on the West Coast.

**South Korea:** Korea Shipbuilding & Offshore Engineering (KSOE) received an order worth 1.96 trillion won (\$1.5 bn) in August from an Asian shipper to build 7 LNG carriers.

**China:** GTT received an order from its partner the Hudong-Zhonghua Shipbuilding (Group) Co. Ltd. in September for the tank design of four new LNG carriers on behalf of an Asian ship owner. GTT will design the tanks with a capacity of 174000 m3.

**South Korea:** In August, GTT received an order from its partner the Korean shipyard Hyundai Heavy Industries for the tank design of eight new LNG carriers. As part of this order, GTT will design the tanks of the vessels, which will offer a cargo capacity of 174 000 m3 each.



**Japan:** Japan's Mitsui O.S.K. Lines signed a long-term charter contract in September for building three new LNG carriers with ENN LNG (Singapore). The vessels would be constructed at Hudong-Zhonghua Shipbuilding (Group) Co. Ltd of China.

**China:** China Merchants Energy Shipping (CMES) landed a long-term charter agreement in August with Sinochem Petroleum Shipping Singapore, for three of its LNG carrier newbuilds. The deal involves the 175,000 m3 trio built by Dalian Shipbuilding Industry Corporation (DSIC).

In September, DSME became the first shipbuilder to win orders for Qatar's LNG carrier project for 4 LNG carriers with a cargo capacity of 174,000 cubic metres from a Korean consortium consisting of H-Line Shipping, Pan Ocean & SK Shipping. The total contract value stood at US\$857.9 million.



**China:** China completed its first conversion project of an LNG gas carrier into an LNG bunker vessel. The Hai Yang Shi You 301 (16,250 dwt) became the largest LNG bunkering vessel and the first in China to support the broader international ocean-going ship market.

DSME also won a 1.85 trillion-won (US\$1.3 billion) order to build six LNG carriers from Asia and Europe in November.

**China:** China's first LNG carrier and refuelling vessel, "Offshore Oil 301", completed its refitting and was put into use, which will provide flexible refuelling service for the country's offshore LNG vessels. LNG refuelling vessels are an important class of infrastructure to promote the use of LNG as shipping fuel.

**Japan:** Japanese shipping company NYK & Q United Energy Supply & Trading (QUEST), signed a multi-year time charter contract in September for a new LNG carrier. The 293-metre-long ship would be built at the South Korean shipyard Samsung Heavy Industries (SHI) & delivered in 2024.





## TECHNOLOGICAL DEVELOPMENT FOR CLEANER AND GREENER ENVIRONMENT/ ELECTRIC MOBILITY/ HYDROGEN / BIO-METHANE

**Europe: 64 operational biomethane plants projected in Spain by 2024:** In Europe, the number of biomethane plants has grown by 17% in just one year, reaching a total of 992 plants (as of January 2022), of which 306 belong to France and 242 to Germany. Despite Spain's obvious delay compared to European countries, there is a clear commitment by companies to the development of this green energy. Moreover, the forecasts for 2024 show 64 biomethane plants in operation, which will generate a total capacity of 2,077 GWh/year compared to the current 162 GWh/year.

**Netherlands: Ignitis will import biomethane into Lithuania from the Netherlands.** SG dujos will be the first company in the country to use the biomethane to replace natural gas.



**Germany: World's first zero-emission hydrogen fuel cell push boat tested in Berlin:** The testing of the innovative hydrogen fuel cell push boat Elektra began in May. With 750 kg of usable gaseous hydrogen at a pressure of 500 bar on board and a battery capacity of 2,500 kilowatt hours, the ship has a range of approx. 400 km.



**Spain:** In May, FM Logistic became the first logistics company in Spain to have a hydrogen refuelling station. Located in its warehouse in Illescas, Toledo, would be able to dispense up to 45 kg/week of hydrogen.

**Russia: Russian scientists of the National University of Science and Technology (NUST) said in February 2022 that they have created a new nanoporous material for natural gas storage. The new material allows increased gas absorption at low pressure and room temperature, thus eliminating the need for heavy, thick-walled cylinders. A lightweight cylinder with such a nanofiller will not explode and can be used in passenger cars.**

**Germany: World's first full-scale pilot plant for extracting hydrogen from natural gas pipeline:** Germany-based Linde Engineering started up a full-scale pilot plant in Dormagen in January 2022 to showcase how hydrogen can be separated from natural gas streams using its membrane technology.

**UK: Winlaton first to integrate hydrogen into public natural gas network:** The Hydrogen Deploy project saw up to 20% hydrogen blended with natural gas on a public gas network in Winlaton in August 2022. Winlaton has become the first community in the UK to receive hydrogen blended with natural gas.

