China: 200 LNG-powered vessels planned in Chongqing by 2020

India
15,000 vehicles converted to CNG in Delhi this year

Emirates
MAN showcases natural gas buses in Dubai
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China: Chongqing plans to deploy 200 LNG-powered vessels by 2020
China’s Chongqing government has set a target to promote the use of 200 LNG-powered river cargo vessels along the Yangtze River by 2020, as part of the province’s overall drive for environmental friendliness, reports said.

As part of the drive to use LNG-powered vessels, the Chongqing government has already built one LNG refueling station in Banan district, south of Chongqing province.

A secondary goal is to encourage the domestic shipowners to build and deploy 100 LNG-fuelled vessels by 2017 plus establishing four LNG bunkering stations at various points along the middle and lower reaches of the Yangtze River crossing Chongqing province.

By 2020, the provincial government aims to see the use of 200 LNG-powered vessels by its domestic shipowners, supported by eight refuelling stations.

Supply and bunkering

As a result of increasing production and new sources of supply, largely from developments in Russia, the United States and Australia, global supply is set to expand over the next few years. Although this boom will support the growing demand for LNG as a bunker fuel, the short-term picture is one of oversupply, particularly if current oil price levels remain.

The market for LNG as a bunker fuel will expand at a rate of more than 60% per year for the next 10 years, and has already been embraced in Northern Europe and North America.

Expanding ECA regions is likely to be a large component of this increased demand, as is the growth of LNG bunkering in Asia due to tighter regulations on sulfur emissions. China has recently published an action plan that promotes LNG as a marine fuel and supports the establishment of China’s own ECAs. Additional proposals have also been put forward to extend ECAs to Japan and Southeast Asia.
Sinopec, state-owned China Petroleum and Chemical Corp., received the first commercial cargo at its newly commissioned Beihai LNG terminal in Guangxi province. The Methane Spirit, loaded with a 160,000 cubic meter cargo from the Australia Pacific LNG project, docked at the terminal on April 19, marking the official start of commercial operations of the first phase of the project.

In the first phase, the plant has a nameplate capacity of 3 million mt/year of LNG that can meet the demand of 22 million households in Guangxi and the western part of the neighboring Guangdong province.

This phase has been delayed by close to a year. The plant had been scheduled to start commercial operations in mid-2015. Sinopec had earlier stated that the second phase of the project would see the terminal capacity increase to 9 million mt/year.

However, Sinopec has not stated a timeline for the second phase. There were no replies to requests for clarification on the status of phase 2 of the project.

Most of the supply for the terminal will come from Australia, where Sinopec has already signed a 20-year sale and purchase agreement with APLNG for 7.6 million mt/year of LNG. As the 3 million mt/year terminal import capacity is currently well below the contracted volumes, Sinopec recently sold some of its term volumes to other buyers in the spot market.

In the future, some contracted volumes would go to Sinopec’s existing LNG terminal in Qingdao, but given the size of the contract, more volumes would most likely be sold, a source close to the company said.

The arrival of the first commercial cargo comes two weeks after the ship delivering the commissioning cargo to the facility left. The BW Pavilion Vanda, which also carried a cargo from the APLNG project, arrived at the Beihai plant on March 28, and left on April 5, cFlow Platts ship-tracking software, showed.
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India: 15,000 vehicles converted to CNG in Delhi since January

Nearly 15,000 petrol and diesel vehicles have been converted to natural gas in Delhi since the first odd-even restriction in January, according to data from the retrofitting centres across the city. There are 200 authorised retrofitting centres in Delhi. In addition to cost saving and CO2 reductions, vehicles that run on CNG are exempt from the rationing scheme.

The second round of odd-even, a plan to curb pollution and congestion, will be implemented from Friday till April 30. Owners of CNG conversion centres said the second round of odd-even has prompted an increase in the number of car owners choosing to switch fuel.

Indraprastha Gas Limited (IGL), the sole supplier of CNG in Delhi-NCR, runs 324 refuelling stations in Delhi and NCR. To meet the rising demand for the fuel, IGL has opened 30 more stations in the past two months.
Officials said 20 more will be commissioned before the second phase of odd-even ends on April 30. To avail of the exemption from odd-even restriction, vehicles will need a special sticker declaring it runs on CNG. The stickers are being distributed at IGL’s CGO Complex station.

**Numbers at CNG workshops**

“The numbers of private vehicle owners coming for conversion has suddenly grown in the past 20-25 days. We are overloaded with requests. Average customers have a lot of enquiries, which started pouring in from March itself,” said Rajeev Sachdeva, who runs Sanbhav Corporation, a conversion centre in Okhla phase-I.

“Around two years ago, we used to get one or two fittings per day. This has now gone up to 8-10 per day in the past month. Now, we have to keep customers in waiting. Because of odd-even there is almost an 80-90% increase in the number of customers,” said Sachdeva.

Shishir Aggarwal, another retrofitting centre owner in Mahipalpur, said, “CNG is 50% cheaper than petrol and it used to be the only reason for people getting their vehicles converted. Now, exemption from odd-even has provided people another reason for getting their vehicles retrofitted with CNG kit,” said Aggarwal.

He said these private cars were in addition to the over 25,000 commercial taxis that will have to be converted to CNG as per the court orders.

The National Green Tribunal (NGT) had ordered all diesel taxis plying in the capital to convert to CNG by March 31.

“Odd-even has given an impetus to CNG sales. There is a 7-8% overall increase in sales from January this year. In order to better infrastructure and increase capacity, we have already commissioned 50 stations to be in use soon. Never before has it been seen that such a large number of stations are opened in such short time. The oil ministry is fast processing approvals for these stations,” said, IGL MD, Narendra Kumar.

### 36 CNG stations opened in NCR

About 36 new natural gas stations in the National Capital Region of Delhi and neighbouring towns were inaugurated in April by Dharmendra Pradhan, Minister of State (Independent Charge) Petroleum and Natural Gas.

Out of these, 30 stations have been installed by Indraprastha Gas Ltd at the retail outlets of oil marketing companies like IndianOil, BPCL and HPCL. Three stations were by Haryana City Gas in Gurgaon, one by GAIL Gas in Sonipat and two stations by Adani Gas in Faridabad and Khurja (Bulandshahr).

Pradhan said that CNG corridors across Delhi-Mathura-Agra-Lucknow-Bareilly, Delhi-Chandigarh, Delhi-Jaipur and Delhi-Haridwar would be opened shortly so that vehicles can run long distances on CNG.
One facility is located at Emirates Driving Institute (EDI), in Dubai, where EDI fleet of 150 vehicles will refuel. The CNG station has a storage capacity of 1,500 cubic meters and is capable of refilling approximately up to 200 NGVs per day.

This state of the art natural gas refueling facility is equipped with the latest technologies including an RFID system to provide fast and efficient CNG refueling with minimum paperwork. It will service passenger cars and light commercial vehicles.

The NGV initiatives by EMGAS and ENOC are path-breaking for its convenience and efficiency, which will contribute to a greener nation. It also underlines their commitment to promote the adoption of natural gas, as a cleaner and greener alternative automotive fuel which is in line with the Government’s vision.

The second mini daughter station, featuring the same technical characteristics as the one at EDI’s, was opened at Al Ahli Driving Institute (ADI) in Al Quoz, Dubai, to supply the organization’s fleet of natural gas vehicles.

This new station is part of an agreement signed by EMGAS and Al Ahli Group in late 2015 aimed at converting the Group’s fleet of 450 vehicles to use environmentally friendly CNG. With a capacity of 1,500 cubic meters, Al Ahli’s mini daughter station is capable of refueling approximately 150 to 200 passenger cars or light commercial vehicles per day.
MAN Truck & Bus Middle East is participating at the UITP (International Association of Public Transport) MENA Transport Congress and Exhibition 2016 which is taking place in Dubai from April 25-27, 2016. MAN is the market and technology leader in natural gas buses and the MENA Transport Congress and Exhibition will be a great platform to understand how MAN is uniquely positioned to offer clean and efficient alternatives to conventional diesel vehicles.

Franz Freiherr von Redwitz, Managing Director of MAN Truck & Bus Middle East will also be speaking about the economical, environment-friendly solutions offered by the company on Tuesday the 26th April at the Expo Forum session 3: ‘Bus Technology,’ where he will share and discuss the latest innovations in natural gas buses from MAN.

Commenting on MAN’s participation, Franz von Redwitz said, “Urbanisation, increasing pressure on transport systems, air and noise pollution and climate change all require new solutions for urban mobility. At MAN, we recognize these challenges and we have over the years developed a well-established industry reputation for offering environmentally friendly vehicles that also meet the standards expected by progressive public transport authorities across the Middle East.”

Franz von Redwitz added, “MAN has the experience of a more than half a century in natural-gas-powered buses and our experience with public transport authorities across the globe has also conclusively proven the viability of CNG as an alternative fuel choice. We look forward to engaging with attendees and actively contribute to a more sustainable future for the region.”

Natural gas technology

The natural gas drive is an alternative to the conventional diesel drive and significantly undershoots the current stringent emission standard without the need for any additional filter technology or operating media. With no need for technical modifications, such buses can also be run on treated biogas - thus making operation virtually CO2 neutral.

MAN is working on integrated natural gas solutions and increasing the number of natural gas buses in operation, as well as ensuring the continued development of the fuel infrastructure for the entire natural gas mobility industry. The “Bus of the Year 2015” award is proof, amongst others, that MAN is right at the forefront in developing use of natural gas. On receiving the award, the Lion’s City GL CNG was noted in particular for its environmentally-friendly, powerful and economical drive.

The Euro 6 CNG engine of a MAN Lion’s City CNG bus offers an environmentally friendly public transport mobility solution with extremely low pollutant levels. When filled up with biogas or e-gas, the articulated bus is virtually carbon neutral; offering emission levels comparable to that of fully electric vehicles. Even without the use of biogas, CO2 emissions are reduced by approximately 17 per cent in comparison to diesel vehicles. As well as being a sustainable fuel source, natural gas is also a particularly economical solution. Due to the significantly reduced fuel costs, over a period of ten years an MAN Lion’s City CNG bus saves approximately 15 per cent on the life cycle costs in comparison to a diesel bus from the same model range.

MAN not only offers reliable technologies, but is also highly proficient and skilled in the servicing and repair of high-pressure gas systems. If requested by the customer, training courses can be arranged to ensure that MAN’s expertise is competently transferred to the customer’s own service personnel or an external service team and a global supply of spare parts for natural gas.

Pilot project of Lion’s City CNG Bus in UAE

In the Middle East, MAN Truck & Bus had earlier been commissioned by Abu Dhabi’s Department of Transport to conduct extensive trials of its Lion’s City CNG bus. The bus operated for eight months in the UAE along with regular diesel-powered buses to achieve a direct comparison; the result showed a higher exhaust gas quality compared to diesel buses and less nitrogen oxides, carbon monoxides and particles in the air.

Additionally, the bus complied with the strictest security standards worldwide - including the ECE-R110 guideline - setting a new standard in road safety in the region.
Qatargas and Shell reinforce collaboration for LNG development as a marine fuel

Qatargas, United Arab Shipping Company and Shell signed a Memorandum of Understanding (MOU) to explore the development of LNG as a marine fuel in the Middle East region.

This is the second such agreement signed by Qatargas and Shell in as many months and establishes another core partnership within the shipping industry. The MOU was signed at a ceremony attended by Qatargas CEO, Khalid Bin Khalifa Al-Thani, United Arab Shipping Company CEO, Jorn Hinge and Managing Director and Chairman of Qatar Shell Companies, Michiel Kool.

Through the joint relationship the partners will explore the development of new markets for LNG to be used as propulsion fuel within the Middle East Region and the conversion of UASC’s existing vessels providing the opportunity to use a cleaner fuel. The MOU envisages LNG supplies for this pioneering initiative to be made available from Qatargas 4, a joint venture between Qatar Petroleum and Shell Gas B.V., with United Arab Shipping Company Line potentially using the fuel for its recently built container ships.

In Comments on this important milestone, Saad Sherida Al-Kaabi, Chairman of Qatargas Board of Directors, said: “LNG as a marine fuel is gaining momentum in the deep sea transportation industry as the best alternative to meeting increasing environmental standards.”

Al-Kaabi added that “this agreement between Qatargas, Shell and United Arab Shipping Company demonstrates our commitment to building LNG fueled vessels and the supply system to support it. Further to our commitment to pioneering new LNG applications and in preparation to fulfilling any upcoming regulatory requirements, we believe that this direction by Qatargas and its industry partners is the right path to support a cleaner environment.”

**Sustainability for next generations**

Khalid Bin Khalifa Al-Thani, Qatargas CEO, said: “Qatargas is pleased to be a partner with Shell and UASC in this second MOU for LNG as a Marine Fuel. LNG as a transportation fuel is growing and we with our partners believe we have the people, tools and resources to make it a reality. Through this effort we know we can make a significant impact on how the shipping industry evolves over the next generation. We see this as our opportunity to support the international efforts to reduce greenhouse emissions and create a cleaner environment for future generations.”

Jorn Hinge, United Arab Shipping Company Group Chief Executive Officer, said: “UASC, with Shell and Qatar Gas, is fully committed to environmental sustainability and developing LNG as a marine fuel. As part of our newbuilding program, UASC has received 13 of 17 new vessels over the past 16 months; seven 15,000 TEU vessels and six 18,800 TEU ultra-large container vessels. We are due to take delivery of a further four 15,000 TEU vessels in the coming months. These ships are the greenest in the world and uniquely LNG-ready, meaning once the infrastructure is ready globally, with a quick and cost-efficient retrofit, they can run on LNG and become even more eco-friendly”.

“We have seen an increased demand on green shipping from our customers in recent years and a focus on how the eco-efficient technologies on our new vessels can help them achieve their own sustainability strategy. Stricter environmental regulations are also expected, something we are well prepared for. Many organizations have already included stricter requirements in their tenders and evaluation criteria, meaning only those carriers with optimum environmental credentials will qualify or be shortlisted”.

Michiel Kool, Managing Director and Chairman of Qatar Shell Companies said: “Shell is delighted to work in partnership with Qatargas and United Arab Shipping Company to create new market development opportunities for the use of LNG as a marine fuel in the Middle East region from its Qatargas 4 venture. Shell has been a pioneer in this area with our investments in LNG for transport infrastructure in Europe and the US, and we look forward to now deploying our expertise to create a regional hub in the Middle East in collaboration with two very strong global partners based in the region, Qatargas and United Arab Shipping Company”.

The signing of this agreement reinforces the commitment and innovative approach that is being undertaken by industry leaders Qatargas, Shell and United Arab Shipping Company to identify and develop new market opportunities through collaboration and strategic partnership.

The partners will continue to work diligently to develop LNG as Marine Fuel and fulfil aspirations of supplying the Merchant Fleet with clean burning fuel before the end of the current decade.
First Wärtsilä X62DF dual fuel engine demonstrated in Korea

On 5th April 2016 Winterthur Gas & Diesel (WinGD), together with Doosan Engine Co., Ltd demonstrated the first low-speed low-pressure Wärtsilä 6-cylinder X62DF (W6X62DF) engine for a commercial application. The event took place at Doosan’s works in Changwon, Korea and the W6X62DF engine is also the first sold X-DF engine for the new generation of very large LNG carriers. It is currently under test by Doosan before delivery and is one of a pair that will power the first of two 180,000 cbm LNG carriers being built by Samsung Heavy Industries Co., Ltd (SHI) in Korea for SK Shipping Co., Ltd and Marubeni Corporation. The vessels are due to operate on long-term charter to Total S.A. of France.

In addition to witnessing the W6X62DF running under a number of load and fuelling conditions, visitors to the X-DF powering the future event also saw validation of its engine control features, tuning, economy and emissions. Key aspects confirmed included the engine’s design fuel consumption, its Tier III NOx emissions compliance in gas mode without any additional exhaust treatment - and its capability to run stably in a wide operating window.

At a technical seminar following the W6X62DF demonstration at Changwon, WinGD and Doosan also stressed the cost benefits of X-DF technology with low-pressure gas admission. Reductions in capital expenditure (CAPEX) of 15 to 20 % are possible compared to other low-speed dual-fuel engine technology, as validated on the new 180,000 cbm LNG carriers. This results from the substantially simpler and lower cost LNG fuel gas handling system needed for gas admission at pressure below 16 bar. On the operating expenditure (OPEX) side, gains are expected, especially for LNG carriers, since no high-pressure gas compression system external to the engine is needed to enable the use of NBOG (Natural Boil-off Gas).

A further advantage, as underlined during the W6X62DF demonstration run, is that WinGD X-DF technology allows stable operation on gas across the entire load range from 5% to 100%, so that there is no need to increase liquid fuel injection under any situation where sufficient gaseous fuel is available. Moreover, at around only 1% of the total heat released during combustion, pilot fuel consumption is lower than with other low-speed dual-fuel engine technology.

During the technical seminar WinGD also announced that a “Fuel-sharing” feature will be available on X-DF engines later in 2016. This feature aims to give vessel operators broad flexibility to use liquid and gaseous fuel at the same time if economically viable at a given time.

The first engine employing WinGD’s X-DF technology with low-pressure gas admission, an RT flex50DF, has already successfully completed Classification Society type approval testing (TAT).
Korean scientists develop innovative engine that operates with hydrogen and CNG

Korean scientists has succeeded in developing a HCNG engine, which fulfills “Euro-6,” European emission regulations for diesel engines, for the first time in the world. This engine is compatible with existing natural gas engines. Thus, it is possible to change natural gas buses into HCNG buses with the new engine.

The research team led by Dr. Kim Chang-ki of the green power development division at the Korea Institute of Machinery & Materials (KIMM) announced on March 24 that it has developed the HCNG engine, which is environmentally friendly and has high performance, based on excellent combustion characteristics and cleanness of hydrogen.

HCNG is a vehicle fuel which is a blend of hydrogen and compressed natural gas. Since it emits less exhaust gases and has better combustion performance than CNG, it can be used as a fuel of existing CNG vehicles. Advanced countries, such as the United States, Germany, France and Norway, consider HCNG the most effective fuel that will lead the future hydrogen energy era. Accordingly, they have been developing a HCNG engine from the early 2000, but they have not developed the engine that meets Euro 6 emission standards yet.

The research team has improved the durability and fuel efficiency by using a “High EGR technology,” which controls the combustion temperature and oxygen concentration by recirculating a portion of an engine’s exhaust gas back to the engine cylinders. The new engine emits 18% less carbon dioxide but has 8 percent higher fuel efficiency than the CNG engine with the same output.

As the researchers reduced its all toxic exhaust emissions to one third of the current Euro 6 emission standards, the new engine is expected to fulfill the Euro 7 emission standards, which will take effect from 2020, with ease. Currently, the research team is test operating the HCNG engine after applying it to two intra-city buses in Ulsan and Incheon.

Kim Chang-ki said, “We have developed a HCNG engine, which satisfies emission regulations after the Euro 6, for the first time in the world. It is meaningful in that we have set a foundation to commercialize HCNG buses. Once HCNG charging infrastructure is constructed, we expect to commercialize them within three years.”
Iwatani Corporation has been working on the development of commercial hydrogen refuelling stations, aiming at an early realization of a hydrogen society. Tohoku region’s first hydrogen refuelling station will be constructed in Sendai, Miyagi Prefecture, and an official signing ceremony was held at the Miyagi Prefectural Government office to recognize the formation of an agreement regarding the construction of the facility. The agreement was signed between Miyagi Prefectural Governor Yoshihiro Murai and Iwatani President Masao Nomura.

Miyagi prefecture is moving forward with a number of initiatives to further the use and effective utilization of hydrogen energy, centred primarily on its core vision “Miyagi’s Vision for Promoting the Use of Hydrogen Energy,” and is aiming to become a pioneering area in achieving the realization of a hydrogen society in the Tohoku region.

It is because these initiatives also match the directionality of Iwatani’s business operations in its aim to usher in the hydrogen energy-based society that Iwatani decided to construct the new refuelling station in Sendai, in support of Miyagi’s efforts. Moving forward, Iwatani will advance construction with support from the Japanese government, as well as construction grants and prefectural land provided by Miyagi Prefecture itself, and aim to complete construction during fiscal 2016.

Because Miyagi Prefecture is a key location linking the Tohoku region to the Greater Tokyo Area, in addition to refuelling by fuel cell vehicle users in Miyagi itself, Iwatani also envisages the station being used by many other users; as a refuelling hub for transport to the Tohoku area, from other areas in which hydrogen stations have already been opened.

The new station will adopt an offsite supply method using liquefied hydrogen, by which the hydrogen fuel for the station will be transported by tank trucks from Iwatani Industrial Gases Corp.’s liquefied hydrogen production plant in Ichihara, Chiba Prefecture.

Since July 2014, Iwatani has been advancing the development of commercial hydrogen refuelling stations, primarily focused around Japan’s four major metropolitan areas. As on this occasion, going forward Iwatani will continue to establish and develop hydrogen refuelling stations in joint cooperation with local governments and strong local companies in various regions; and, by developing and connecting what were until now sparsely placed stations into a continuous line, continue to contribute to the early spread and popularization of FCVs and increased convenience for FCV users.
Japanese investment firm Sparx Group will work with Toyota Motor and Sumitomo Mitsui Banking Corp. to invest in a startup developing fuel cells in a step toward making hydrogen-powered vehicles a regular sight on the roads. A joint fund will put 500 million yen (US$4.4 million) into Exergy Power Systems, founded in 2011 out of the University of Tokyo, through a private placement of new shares. The startup is developing a highly efficient, durable and powerful hydrogen cell. Sparx will send employees to serve as outside directors at Exergy and will seek partnerships with companies including Toyota.

Sparx, Toyota and the Sumitomo Mitsui Financial Group banking unit set up the roughly 13.5 billion yen Mirai Creation Investment Limited Partnership last fall. The fund focuses on such fields as artificial intelligence, robotics, and the creation of a hydrogen-based society. It has made three other investments before, including in a U.S.-based technology startup.
Power station using biogas launched in Japan

One of Japan’s largest power plants using biogas emitted from treating sewage has started operations, boasting a power generation capacity of 840 kilowatts. Around 1.7 billion yen ($16 million) was spent to set up the plant within the compounds of the Kawada Mizu Saisei Centre, a water purification station located in the capital of Tochigi Prefecture in eastern Japan. With eight phosphoric acid fuel cell power generators, the plant can produce a maximum 7.17 million kilowatt-hours a year, enough to power 2,000 regular households.

Commercial operations of the plant began April 1, following an opening ceremony on March 28 attended by Utsunomiya Mayor Eiichi Sato. Sato pushed the switch to bring the plant online.

Known as digestion gas, the fuel used by the power station is a flammable gas mainly comprising methane emitted during sewage treatment. The biogas had been used as fuel for a sludge incinerator operating in the wastewater treatment plant, but the aging furnace was shut down in March. The operator of the facility turned to power generation as a way not to waste the biogas.

2016 marks 100 years since the start of the water supply service and 50 years since sewage treatment began in Utsunomiya. The city government wanted the biogas power station—a special project—to kick off in the landmark year.

Using the central government’s feed-in tariff program, the operator will be able to sell the generated electricity for 20 years, creating up to 300 million yen in benefits for the local economy.

The electricity produced at the plant will be sold to trading house Marubeni Corp. for the first fiscal year. According to the Tochigi prefectural government’s urban development section, digestion gas power generation is currently spreading across Japan.

The latest facility is the sixth one set up in the prefecture. It is also the fourth power plant in Tochigi Prefecture that uses fuel cells, following the three facilities in Kaminokawa, Nikko and Tochigi that began commercial operations between February and April last year.

Fuel cells generate electricity through a chemical reaction of hydrogen from digestion gas and oxygen in the air. Other methods of digestion gas power generation include those using gas engines and gas turbines.

The two plants that began commercial services in the prefecture’s Otawara in May 2015 and Kanuma last June both use the gas engine method. Another gas engine-driven digestion gas power station also started full-scale operations in Sano, Tochigi Prefecture, in April.
Gas Natural Fenosa supports first driving school’s NGV fleet in Spain

The general director of Sustainability and Environmental Control of the City of Madrid, Paz Valiente; the director of Mobility Solutions of Gas Natural Fenosa, José Ramón Freire; and the CEO of Autoescuela Gala, Miguel Ángel Blánquez, presented the driving school’s new vehicles, which are the first in such fleets using natural gas in the country. Autoescuela Gala already has seven NGVs in their centers of the Community of Madrid and plans to expand its fleet with this fuel in the coming years, as driving natural gas vehicles not only involves an economic advantage but also resulted optimal for student learning as Gala found in the first tests with the new fuel in recent months.

This driving school is a family business with over 40 years dedicated to driving and currently has more than 40 branches in the Community of Madrid. Pioneered in the use of teaching aids such as driving simulators, this center is now also a pioneer in the use of natural gas for driving schools’ vehicles.

Currently, the infrastructure of public refueling stations available in Spain is 42 sites that supply natural gas for vehicles. A total of 25 of these stations are operated by Gas Natural Fenosa. In the Community of Madrid there are 10 public stations, eight of them operated by Fenosa.

Source: Gas Natural Fenosa

PennDOT plans 29 new CNG stations through $85M project

Pennsylvania Department of Transportation (PennDOT) Secretary Leslie S. Richards announced at that the Trillium CNG team, which includes Larson Design Group of Williamsport, has been selected for the PennDOT’s CNG transit fueling station Public-Private Partnership (P3) project. Through the $84.5 million project, Trillium will design, build, finance, operate and maintain CNG stations at 29 public transit agency sites through a 20-year P3 agreement.

The stations will be constructed over the next five years and the firm will also make CNG-related upgrades to existing transit maintenance facilities. “The department is excited to partner on this project that will bring benefits for the state, our transit partners and the public for years to come. The project’s aggressive schedule means that we’ll realize cost, environmental and operational benefits quickly,” Richards said.

As part of Trillium’s proposal, CNG fueling will be accessible to the public at seven transit agency sites, with the option to add to additional sites in the future. PennDOT will receive a 15% royalty, excluding taxes, for each gallon of fuel sold to the public, which will be used to support the cost of the project. The team has guaranteed at least $2.1 million in royalties over the term of the agreement. When the project is completed, the fueling stations will supply natural gas to more than 1,600 CNG buses at transit agencies across the state.

PennDOT also expects transit agencies and the department to see significant savings due to the project. Based on current CNG, diesel and gasoline prices as well as fuel usage, agencies can save a total of more than $10 million annually. Due to these expected savings, transit agencies’ sustainability is increased and dependency on state operational subsidies is reduced. After 10 years, the department estimates that the project will pay for itself with the estimated $100 million in savings.

Moreover, using the P3 procurement mechanism allows PennDOT to install the fueling stations faster than if a traditional procurement mechanism was used for each site, resulting in significant estimated capital cost savings of more than $46 million.

Source: PennDOT
Colombia: Medellin transit operator adds five CNG articulated buses

The new vehicles are part of Route 1 and were recently acquired by Metro de Medellín with an investment of approximately USD 2 million. With this addition, there are already 30 articulated buses in Route 1, which had been operating at peak hours with 23 articulated and 10 standard buses, and transport capacity will increase by 6.77%, carrying 3,787 passengers per hour.

The buses run on compressed natural gas, which contributes to reducing emissions of pollutant particles into the atmosphere. Each articulated vehicle has a length of 18 meters, is composed of three axes. The engine offers 320 horsepower and allows to cross slopes during the trip.

Each vehicle has a capacity of 154 passengers, 38 seated and 116 standing. Buses are very similar to those acquired last year and were manufactured in China under the support of the Metro.

The vehicles arrived in February to Medellín, after passing through the port of Buenaventura. In recent days, the company personnel worked on the set-up that included activities such as the installation of the RCC system (collection, control and communication) and other equipment which ensure proper operation.

Thus, Metro continues to apply different strategies and making investments that allow them to strengthen the service that is provided to users.

Source: Metro de Medellín

GAZ Group showcases new CNG refuse truck in Russia

GAZ Group has showcased two vehicle models on the basis of GAZon Next truck at the Russian Public Utilities 2016 exhibition in Saint Petersburg. One of the novelties is a GAZon Next road cleaning vehicle, which is the first modern specialty vehicle of the type that is made on a truck basis.

Moreover, a low-cost and energy efficient YMZ-534 CNG engine was installed to the garbage truck made on the basis of GAZon Next medium-duty truck. The engine capacity is 149 hp. Seven 72.8 m³ gas tank assure a fuel range of at least 370 km. The maximal torque amounts to 190 Nm.

The small sized garbage truck with a rear loading is used for discharging garbage containers with the capacity of up to 1,100 lt. (including 110/120/240/330/660 lt.). Small vehicle size allows reaching hard-to-access containers sites, maneuver at loaded city streets, and follow the routes prohibited to heavy-duty trucks. The vehicle is excellent for large enterprises. The total displacement is 8.7 m³, the trip gear payload is 800 kg, and the garbage weight amounts to 2,800 kg.

CNG vehicle purchase is subsidized within the framework of Automobile Industry subprogram being a part of Industry Development and Competitiveness Increase Russian state program.

Source: GAZ Group
Galileo unveils on-site flare reduction solution at Bakken Shale region

Galileo Technologies, in partnership with SPATCO Energy Solutions – one of its distributors in North America, has just commissioned an innovative solution for Terra Energy in North Dakota’s Bakken shale region to integrate flare gas capture and LNG production right at the wellhead.

The core of this solution, engineered at Galileo Technologies’ headquarters in Buenos Aires, Argentina, includes a ZPTS® Gas Conditioning Plant, and a Cryobox® Nano LNG-Station, which turns natural gas into 7,800 to 8,500 gallons (12.3 to 13.4 Tons) of LNG per day based on production output from the wells. The equipment is fully modular, electric driven and reliable when operating under the harsh conditions of North Dakota’s oil fields, which are home to frigid winters and scorching summers.

Thanks to this innovative design, the LNG produced is stored on-site while the boil-off gas is recovered and liquefied. LNG is then transported and consumed for drill-rig power generation and frac-water heating.

LNG is obtained through the gas from a well pad owned and operated by one of the largest producers and holders of natural gas reserves in the US, located less than 50 miles (80 km) from the sites where LNG is consumed. “This is a complete solution,” said Dustin Hancock, President of Terra Energy Group. “We turned the flaring problem into an opportunity. The technology supplied by Galileo allows us to significantly reduce the waste of flaring using that energy to produce additional oil and gas.”

“The abundance of shale and tight gas sources in these isolated areas can make the laying of gas-gathering lines economically unsustainable and creates an environmental problem”, explained Osvaldo Del Campo, Galileo Technologies CEO.

“In recent years and due to this barrier, more than 25% of the natural gas produced in North Dakota has been flared rather than sold to customers or consumed on-site. We believe that more of the unconventional gas can be monetized through methods such as the ‘Distributed LNG Production’ solution we developed for Terra Energy,” added Del Campo.

“When long distances are involved, our ultra-compact gas conditioning and liquefaction modules allow us to distribute clean natural gas, affordably and without pipelines. This technology facilitates the collection of fuel from scattered sources and its distribution to consumers, applying road distribution logistics similar to those of other liquid fuels”, he concluded.

Source: Galileo Technologies

Hyundai unveils world’s first hydrogen car sharing service

Hyundai Motor’s ix35 Fuel Cell is the star of the world’s first fuel cell powered zero-emission car sharing service BeeZero, to be launched in Munich, Germany this summer. BeeZero, run by a newly founded subsidiary of The Linde Group, will feature 50 Hyundai ix35 Fuel Cell vehicles for public use.

“The new BeeZero car sharing offer is pioneering sustainable mobility,” said Thomas A. Schmid, Chief Operating Officer at Hyundai Motor Europe. “Featuring the Hyundai ix35 Fuel Cell, BeeZero will not only be the first car sharing service using hydrogen-powered zero-emission cars, but will also offer comfortable and reliable transportation for the public’s everyday needs.”

“We expect to gain valuable information from day-to-day fleet operations which we will use to further develop our hydrogen technologies and to help expand the hydrogen infrastructure,” said Christian Bruch, member of the Executive Board of Linde AG. “BeeZero synergizes two mobility trends that are gaining a lot of ground at the moment - car sharing and zero emissions - and will bring the benefits of fuel cell technology to a wider group of potential users.”

The BeeZero car sharing service will be run on a zone-based model. The fleet of fifty ix35 Fuel Cell cars will be available in Munich’s city centre and also in the areas of Schwabing, Haidhausen, Au and Glockenbachviertel. As with conventional car sharing services, the cars can be easily booked online or via a smartphone app.

The Hyundai ix35 Fuel Cell can travel about 600 kilometers on a single tank, making it ideal for longer journeys too, to the Bavarian lakes or the mountains for example, and not just for short trips in the city. Hydrogen fuel for BeeZero is sourced from sustainable production processes, making it completely carbon neutral.

Source: Hyundai
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www.ngvjournal.com
### Asian NGV statistics

#### Worldwide NGV statistics

<table>
<thead>
<tr>
<th>Country</th>
<th>Natural Gas Vehicles</th>
<th>Refueling Stations</th>
<th>Monthly gas consumption (MmNm³)</th>
<th>Last update</th>
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<tr>
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<td>MC/HB Trucks</td>
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<td>Others</td>
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<td>Average consumption (in actual report)</td>
<td>The consumption in theory</td>
<td>Reported consumption</td>
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</tbody>
</table>

#### Key Facts
- **Total NGV Vehicles**: 1,339,553
- **Refueling Stations**: 2,339,200
- **Monthly Gas Consumption**: 3,847,028 MmNm³

### Notes
- The column theoretical monthly consumption is calculating total monthly consumption if cars consume 100, buses 3000, trucks 800, and other vehicles 50 MmNm per month.
- There is, of course, a huge difference between different vehicle types. A 4.4 t truck may consume up to 6000 (not 2000) Nm per month.
## Asian NGV Statistics

<table>
<thead>
<tr>
<th>Country</th>
<th>Natural Gas Vehicles</th>
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<th>VRA</th>
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### Cities with CNG refuelling stations

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### Asia Fuel Prices

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