



The Bazargan metering station on the border with Turkey.

kilometres of 40-inch pipeline between Bijar and Miandoab. Other segments with diameters of at least 30 inches will boost pipeline lengths planned for this region to 950 kilometres.

● Gas processing projects

A number of gas processing plants are being completed or are under construction in Iran. The Parsian plant began treatment operations in 2003, dehydrating 20 mcm/day of gas from Tabnak field and stabilising 12,000 b/d of condensates.

Construction of new processing facilities followed in two phases, one with an inlet capacity of 48 mcm/d and the other, 28 mcm/d, and completion was due at presstime. The complex is designed for annual yields of 85,000 tons of ethane, 11 million barrels of pentanes-plus, 310,000 tons of butane, and 450,000 tons of propane.

The Bidboland II plant will sweeten and process 57 mcm/d of gas at facilities that will be built about 14 kilometres south-east of the existing Bidboland plant. Fed by gas from the Pazanan, Gachsaran and Bibi Hakimeh fields, the new plant has design output capacities of 15 bcm of sweet gas, 1.48 million tons of ethane, 1.51 million tons of propane and butane, and 860,000 tons of natural gasoline. It is due for completion in 2010.

About 6 bcm per year from the plant are targeted for oil-field injection, the rest for delivery into the gas grid. Ethane will go to a petrochemical

plant at Arvand. The other products will be exported through Bandar Mahshahr.

In a separate project, NIGC is building a gas processing plant 25 kilometres north-west of the city of Ilam to process gas from the Tange Bijar and Kamankooch fields. Being built in two phases, the first of which was due for completion at presstime, it will have an inlet capacity of 10 mcm/d and will supply dry gas to cities in Ilam Province and the transmission network, and liquids to a petrochemical plant at Ilam.

NIGC finished a small processing plant at Masjed Soleiman with inlet capacity of 1 mcm/d in 2006 and is studying a plant able to process 14 mcm/d at South Gesho sour gas field in Hormuzgan Province. The South Gesho facility, near an existing plant at Sarkhon, would have two trains with identical inlet capacities. After removal of 600 tons/day of sulphur and 9,000 b/d of condensate, sweet gas would move to markets in the south-eastern part of the country, including some to a power plant at Bandar Abbas.

● Storage projects

NIGC has identified several reservoirs that might be converted for underground gas storage. One of them is the Sarajeh gas and condensate field, about 40 kilometres east of Qom, where production rates have been restricted by surface equipment for about 45 years. NIGC believes that by working over old wells and drilling new ones it can deplete the reservoir and convert it to storage.

Also under evaluation is the Yortsha Dome saltwater reservoir 25 kilometres south of Varamin. NIGC has acquired 2D and 3D seismic data over the reservoir and plans to drill vertical and horizontal wells to prepare it for storage.

Another saltwater reservoir under study for use as gas storage is the Talkheh Dome in central Iran, which also contains negligible amounts of light and heavy hydrocarbons. A single well drilled in 1960 found the structure. NIGC has 2D seismic data from the area and plans a 3D survey.

Other areas that NIGC thinks might have reservoirs amenable to gas storage are in the provinces of Abardjano, Siahkooch, Marehtapeh, Prandak and East Azerbaijan.

● **Increasing exports**

NIGC is seeking to develop new markets for pipeline exports, which it believes could reach 110 bcm per year by 2020, and to enter the LNG business.

On the pipeline front there are plans to export gas to Europe via Turkey, while talks are underway with Bahrain about a new pipeline by 2015. However, long-mooted proposals to build a pipeline to supply Pakistan and India are on hold. An agreement has also been signed with Oman for a combined pipeline/LNG project, under which gas from Iranian offshore fields would be piped to Oman's Qalhat LNG plant for conversion and then marketed by a joint company. The agreement also calls for joint petrochemical projects.

For direct LNG exports three liquefaction plants are planned with China, India and Thailand targeted as customers. Pars LNG is a two-train, 10 mtpa project with Total (40%) and Petronas (10%) as foreign partners. Subject to final financial approval the plant will be built at Tombak, 60 kilometres north-west of Assalouyeh for a 2011 start-up. A preliminary deal has been signed with foreign partners Royal Dutch Shell (25%) and Repsol YPF (25%) for the Persian LNG project with an initial capacity of 8



mtpa, while there is a longer term 100% Iranian project.

To respond fully, Iran's gas sector needs investments, especially in upstream development, technology transfer, and export and import facilitation. Iran, under any circumstances, is set to become a key gas exporter.

Hedayat Omidvar heads the National Iranian Gas Company's strategic studies, research, and technology department, and is a member of the IGU Marketing Committee.



ABOVE AND TOP Iran is set to become a key gas exporter.

Natural Gas comes naturally to EnergySolutions

Energy Solutions International, Inc., the Houston-based leading global supplier of pipeline management software, is a natural when it comes to supporting natural gas clients. That's because the company applies more than 30-years' experience in designing and developing applications for the oil and gas industries. More than 250 clients in 45 countries rely on EnergySolutions technologies for operational efficiency, transaction management, throughput management and safety of the world's oil and gas pipeline system.

In fact, when Freeport LNG Development, L.P. (FLNG), was evaluating scheduling software for the first LNG terminal to be built in the United States in more than 25 years, it selected PipelineTransporter® for Gas from EnergySolutions. EnergySolutions announced in June that Freeport would deploy PipelineTransporter to manage gas redelivery nominations at the Freeport LNG terminal under construction on Quintana Island outside Freeport, Texas. PipelineTransporter is a web- and Windows®-based data management system utilized to administer pipeline nominations, scheduling and allocations.

One of the largest natural gas projects in the Middle East recently deployed EnergySolutions' full suite of gas applications to assist with pipeline management and supply chain management. In addition to PipelineTransporter for Gas, this project uses PipelineManager® for pipeline management and optimization and TransactionManager® to improve the collection, analysis, tracking and reporting associated with purchase and sale transactions.

Numerous organizations spanning the globe have selected PipelineStudio®, the recognized industry-leading simulation application for natural gas and liquid pipeline design and analysis. New customers

include Sirte Oil Company, Libya's largest oil, gas and petrochemical enterprise; Sinopec Shandong Gas Pipeline Company in China; Total Infrastructure Gas France; PT Erraenersi Konstruksindo of Indonesia; and W S Atkins, Penspen International Ltd., and Zakum Development Company, all of the Middle East.

Since developing the world's first real-time pipeline simulation system in 1980 – now marketed as PipelineManager – EnergySolutions' mission is to continue to be the recognized leader in decision-support software for the design and operation of oil and gas pipelines as well as management of customers' supply chains. The company's strength lies in its ability to deliver extremely complex and robust technology in an easy-to-use manner. Every application is designed to be intuitive for the user and easily and rapidly integrated with adjacent systems used by pipeline companies. Pipeline assets worldwide are designed, planned, maintained and optimized using EnergySolutions applications, with leading organizations selecting these technologies to protect the environment, safeguard the health of workers, and help ensure their financial well-being and reputations.

EnergySolutions' portfolio includes software for pipeline design, planning, leak detection, monitoring, scheduling, optimization and transaction and risk management. These applications support essential workflows by integrating with each other and third-party applications, including systems from all major SCADA vendors (including Invensys, Siemens, Honeywell, ABB, SAIC, Yokogawa and Telvent) and ERP vendors (including SAP and JD Edwards).

For more information about EnergySolutions and its products and services, please visit www.energy-solutions.com.



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A Profile of New Associate Member INGAA

By Donald Santa

The Interstate Natural Gas Association of America (INGAA) is the trade organisation that advocates regulatory and legislative positions of importance to the natural gas pipeline industry in North America.

INGAA has 28 member companies, which represent virtually all of the interstate natural gas transmission pipelines operating in the United States, as well as comparable companies in Canada and Mexico. Its members transport over 95% of North America's natural gas through a network of 200,000 miles (320,000 kilometres) of pipelines.

The interstate natural gas pipeline industry in the US has two principle federal regulators: the Federal Energy Regulatory Commission (FERC) is responsible for the economic regulation of pipelines, while the Pipeline and Hazardous Materials Safety Administration (PHMSA) within the US Department of Transportation oversees the industry's safety efforts. In addition to these two principal regulators, US natural gas transmission pipelines are affected by a variety of other federal, and sometimes state, agencies that issue the environmental and land use permits that must be obtained in order to construct pipelines, that regulate the air emissions from pipeline operations and that oversee the security of pipeline infrastructure.

An affiliated organisation, the INGAA Foundation, Inc., was formed by INGAA in 1990 to advance the use of natural gas for the benefit of the environment and the consuming public. The INGAA Foundation now has more than 100 member companies representing natural gas pipeline operators, construction companies, engineering firms, pipe and compressor manufacturers, accounting firms, companies providing information technology



Donald Santa: INGAA is excited to be an Associate Member of IGU.

services and other suppliers of goods and services to the pipeline industry. The Foundation's primary activity is to sponsor research that focuses on issues such as the environmental impacts of energy use, improved pipeline construction practices, pipeline safety procedures, new technologies and market opportunities for natural gas.

INGAA is headquartered in Washington, DC and has a staff of 13. The staff includes professionals with expertise in law and regulation, operations, safety and environment, and legislation. They bring to INGAA a depth of experience developed while working previously for the FERC, the US Congress and within the natural gas pipeline industry.

As a result of natural gas wellhead decontrol enacted by the US Congress during the 1970s and 1980s and the subsequent restructuring of the natural gas industry by FERC, interstate pipelines operate as unbundled, open access

transporters of natural gas and no longer buy and sell natural gas at wholesale. Today, the US natural gas market is characterised by a dynamic, deregulated commodity market. While the market for interstate pipeline transportation services remains subject to economic (i.e., public utility-type) regulation, competition for pipeline services, both to serve new markets and along many existing corridors, is robust and pipelines today face business risks similar to those facing companies competing in unregulated segments of the US economy.

On behalf of its members, INGAA promotes laws, regulations and policies that facilitate the efficient, market-responsive construction and operation of interstate natural gas pipelines. INGAA also promotes economic regulation that enables pipeline companies to attract capital and to offer innovative services to their customers. Another primary goal of INGAA is the development and implementation of standards that support the continued safety and reliability of the US natural gas pipeline infrastructure.

Together with other segments of the US natural gas industry, INGAA actively supports public policies that facilitate access to additional natural gas resources and the ability to construct the pipeline, storage and import terminal infrastructure necessary to supply consumers with natural gas. INGAA is actively engaged in following and informing the development of Greenhouse Gas policy in the US, particularly as it affects the market for

natural gas and GHG emissions attributable to natural gas.

INGAA is excited to be an Associate Member of IGU. The globalisation of the natural gas industry through the growth in LNG trade and the common issues faced in connection with energy security and environmental policy developments provide opportunities for sharing knowledge and perspectives with our international counterparts in the natural gas industry. Similarly, INGAA and its members can contribute to, and benefit from, the discussion on pipeline safety, construction and maintenance and other operational issues.

Donald Santa is the President of the Interstate Natural Gas Association of America. He served as a Commissioner at FERC earlier in his career.

The screenshot shows the INGAA website homepage. At the top, there is a navigation menu with links for Home, About, News, Calendar, Members, Reports, and Filings. A search bar is located in the top right corner. The main content area includes a 'Welcome to INGAA' banner with a photo of a man in a hard hat, a section titled 'NEW TO THE NATURAL GAS PIPELINE INDUSTRY?' with a description of the association, and a 'Recent Filings' sidebar listing regulatory updates. The footer contains contact information and copyright details.

For more information on INGAA's activities go to www.ingaa.org.

Oilserv



Oilserv limited is an indigenous Nigerian Oil and Gas, engineering, procurement, construction and commissioning company that operates under the laws of the Federal Government of Nigeria. The company was incorporated in 1992 and

has pools of expertise of highly experienced engineers, technicians and other support personnel to provide Total Quality Services (TQS) to her valued customers in the Oil and Gas Industries.



Oilserv limited is managed by a man of vision, dynamic, energetic and seasoned managing director by name; Engr. Chukwuemeka Okwuosa.

Oilserv limited has integrated its strength in pipeline/ flow line technology including pipeline construction/ maintenance of Oil and Gas facilities, fabrication, procurement and project management to offer single



point responsibility under stringent delivery schedules with ISO 9001:2000 accreditation. Our detailed design and front end engineering (FEED) support is provided by our sister company called Frazimex limited.

Oilserv is one of the giants in Pipeline constructions and facilities maintenance. Our strong determination to give new definition to the Nigerian content plan and directives has not only help in putting us on the fore front of our local contemporaries but has also provided reasons for us to enhance our resource base in order to meet the status of the multinationals.

The importance of Quality control and Quality Assurance (QA/QC) as well as Safety management constitutes the main focus of our company operation.

OUR MISSION STATEMENT

OILSERV provides the following services in the oil and gas industry; project management, engineering, procurement, construction/fabrication, installation, commissioning and maintenance.

These services are offered on land and swamp terrain. We are in the process of developing our capabilities in offshore terrain.

OILSERV always strives to perform its services to the highest quality standards in the industry in accordance with internationally acceptable standards.

OUR MAIN GOAL

Our ultimate goal is to deliver our services to our clients according to specifications while meeting the high quality standard as well as



health, safety, environment and security concerns of our personnel and the immediate host community around our areas of operation. At the same time we follow known and acceptable standard in protecting the environment as well as meeting the concerns of the host community. We bring to our work a proud heritage accomplishment, integrity, excellence and commitment to our customers interest.

Finally, we bring to our work, a strong team relationship with our clients in providing the most reliable, sound, as well as detailed engineered solutions to problems and together achieve higher level of productivity and profitability within business.

OUR MAJOR CLIENTS

Currently our major clients are:

- ◆ Shell Petroleum Development Company of Nigeria, Eastern and Western Division
- ◆ Agip Oil Company Limited
- ◆ Gaslink Nigeria Limited
- ◆ Unicem Nigerian Limited
- ◆ Notore Chemical Industries
- ◆ NLNG

OPERATIONAL AREAS

A summary of the services we provide to the oil and gas and non oil and gas industries are as follows:

- ◆ Pipeline construction/repair
- ◆ Flowline construction/repair

- ◆ Mechanical fabrication
- ◆ Flow station construction/upgrade
- ◆ Process pipe work
- ◆ Crude oil/product storage tank construction/repair
- ◆ Associated civil/structural works
- ◆ Associated electrical/instrument works
- ◆ Procurement/supply of associated materials and equipment
- ◆ Maintenance of Oil and Gas Facilities

These projects cover project management, engineering, procurement, construction/fabrication, installation, commissioning and maintenance.

For more information about Oilserv Limited, please visit our website:

www.oilservltd-ng.com,

and our future plan is to continue developing these services in a way that will make us remain the premiere company in our areas of operation while continuing to expand our services to West Africa countries and beyond.





The World LP Gas Association

By James Rockall

“Natural gas in a bottle” is a description often given to liquefied petroleum gas – the sibling rival that in reality is not a rival at all. LP gas – a mixture of propane and butane – shares many positive attributes with its big brother, being clean, modern energy. Where LP gas differs is that its unique physical characteristics allow it to be liquefied and bottled at relatively low pressures, providing it with the key value of portability. Portability allows LP gas to be used in areas where natural gas has little access – mountainous regions or small island nations. It also makes LP gas an ideal fuel for



James Rockall, Managing Director of the WLPGA.

WORLD LP GAS ASSOCIATION



Founded 1987 in Dublin

Headquartered: Paris

Member companies: 175

Country representation: >90

2007/2008 leadership:

President: Mr Lon Greenberg, Chairman & CEO, UGI Corp, USA

First Vice President: Mr Sarthak Behuria, Chairman, Indian Oil Corporation, India

Vice President and Treasurer: Mr Loïc Driebeek, CEO, SHV Gas, The Netherlands

Vice President: Mr Ramon de Luis Serrano, Executive Director LPG, Repsol YPF, Spain

Vice President: Mr Alan Beale, Managing Director, Elgas, Australia

Managing Director: James Rockall

Website: www.worldlpgas.com

Forum website: www.lpgasforum2008.com

mobile requirements e.g. automotive and leisure. This article describes the role of the World LP Gas Association (WLPGA) and focuses on a key WLPGA activity – namely our annual Forum, with a look back at a successful event held last year in Cape Town as well as a preview of the forthcoming Forum to be held in Seoul in September.

● Role and objectives

The role of the WLPGA is to promote the use of LP gas to foster a cleaner, healthier and more prosperous world. As the unique body that represents this industry worldwide, we have a key responsibility to assist our members in the following areas:

- Enhancing the awareness of LP gas as a clean, all-purpose and efficient source of energy;
- Identifying and supporting LP gas market development opportunities;
- Promoting good business and safety practices in the industry;
- Representing the industry in policy formulation; and
- Facilitating information exchange and communication.

With our organisation comprising 175 members operating in more than 90 countries across the globe, the WPGA can genuinely claim to be representative of the industry. Our staff in Paris manages a range of programmes, often leading working groups of members to achieve the Association's objectives. A key objective is that of facilitating information exchange and communication and for this our annual Forum is an essential activity.

● LP Gas – Fuelling Life: The 20th World LP Gas Forum

Cape Town in South Africa was the venue for the 20th World LP Gas Forum, which was held October 24-26, 2007. More than 500 delegates from 54 countries came together to learn, share experience and network under the theme of "LP Gas – Fuelling Life". For the first time, an additional day was devoted to LP Gas for African Development. Sessions were delivered on topics such as African supply and demand of LP gas, how LP gas can improve women's lives and the role it can play in reducing indoor air pollution and associated ill-health. Speakers also highlighted a number of case studies on the successful use of LP gas in Africa.

● LP Gas for African Development Day

The LP Gas for African Development Day opened with a call for the LP gas industry to partner with African governments to ensure a secure, reliable and affordable supply of LP gas. The call came from the Honourable Buyelwa Sonjica, Minister of Minerals and Energy in South Africa, who delivered the keynote address.

Only 37.8% of Africans have access to electricity, hence Africa is known as "the dark continent". The Minister reminded delegates that access to a reliable source of energy is fundamental to the socio-economic development of the continent: "Energy poverty and poverty are inextricably linked." She recognised that issues such as supply and infrastructure need to be addressed before LP gas can achieve its potential in Africa. However,

she was also optimistic that governments and the LP gas industry can work together to overcome these obstacles.

The opening session of the day focused on how LP gas could fuel development in Africa. Chaired by Philip Dobie, Director, UNDP/UNEP Poverty-Environment Facility, United Nations Development Programme (UNDP), the panel covered the following:

- Boubacar Barry, Totalgaz, outlined current and future supply and demand for LP gas in Africa.
- Brenda Doroski, Partnership for Clean Indoor Air, explained how a switch to LP gas could help combat indoor air pollution. More than 1.6 million people die each year from respiratory disease – a move to LP gas could dramatically cut this figure.
- Wendy Annecke, Gender and Energy Research and Training, delivered a paper on the contribution LP gas can make to improving the lives of women in Africa. According to Ms Annecke,



Muzi Mkhize, Deputy Director General, Ministry of Minerals and Energy, South Africa, addresses the 20th World LP Gas Forum.



Panelists on the roundtable held during the LP Gas for African Development Day included (FROM LEFT TO RIGHT): Erwin Friederich, Shell Gas (LPG); Mourad Belguedj, World Bank; Elizabeth Marabwa, DME; and Kimball Chen, ETG.



one of the main benefits of LP gas is that it frees women from the responsibility of collecting firewood. In this way, women would have more time to spend on childcare and education, paid work, or even leisure.

- Dr Philip Lloyd from the University of Cape Town gave a presentation on how LP gas is a safe, efficient fuel for Africa. In particular, he highlighted how it is a much safer alternative to paraffin, which regularly causes fires in townships across South Africa.

The second session on “Putting ideas to work – lessons from Africa” was chaired by Erwin Friederich, Vice President, Shell Gas (LPG). The panel delivered a series of case studies on what works and some lessons learned on a variety of LP gas-related projects:

- Rachid Idrissi, Afriquiagaz explained how micro-finance helped bring clean, modern LP gas to small businesses in Morocco. The initiative enabled agri-tourism schemes and artisan craftspeople to purchase LP gas and equipment which made a positive difference to their businesses.
- Kwame Asubonteng, UNDP, delivered an interesting presentation on public-private partnerships and how they have worked in Africa.
- Erik Charras, VidaGas, shared his experience of setting up an LP gas distribution company in Mozambique. He established VidaGas in order to ensure a clean, reliable energy source to provide light and refrigeration for health clinics across the countryside.
- Anthony Leon, BP, gave an insightful presentation on successful African distribution strategies.

In the afternoon, Kimball Chen, Chairman of ETG, USA, chaired a roundtable on “Unleashing the power of LP gas” Panellists included Elizabeth Marabwa, Petroleum Policy Director, Department of Minerals and Energy (DME) SA, Mourad Belguedj, The World Bank, Erwin Friederich, VP Shell Gas (LPG), UK, Hugo de Meyer, Totalgaz, South Africa and Philip Dobie, UNDP.

They addressed issues such as:

- The importance of governmental energy policy and regulatory framework, as well as overall security. These are all significant factors considered by any company considering an investment in a new country.
- Developing a product which meets the demand and habits of the local population. For example, Totalgaz created a multipurpose tool which can be used for cooking, lighting and heating.
- Putting the infrastructure in place to ensure reliable supply and economies of scale. Without this infrastructure, suppliers do not have access to the marketplace, which in turn means there is no real competition. As a result, the price remains prohibitively high for many.
- Barriers to the availability of LP gas in South Africa, which are also opportunities for the industry. These include, price and infrastructure, security of supply, as well as the establishment of supportive industry for the manufacture of gas cylinders and appliances in South Africa. All panellists were agreed on the necessity for stakeholders to work together and share a common vision.

Scholastica Kimaryo, the Resident Representative of UNDP activities in South Africa wrapped up proceedings by announcing the establishment of a new LP gas investment facility in South Africa. The initiative aims to:

- Focus on market development;
- Remove obstacles to market investment; and
- Encourage investment for local development.

The facility should reduce risk to investors and provide seed capital to encourage local entrepreneurship.

Minister Sonjica summed up the mood by the end of the day when she said: “The time to invest in Africa is now....It is within our grasp to promote and fuel economic empowerment.” She thanked the WLPGA for bringing the World Forum to South Africa and for dedicating a day to discussing issues central to African development.



In his keynote address to the Forum, Tokyo Sexwale declared LP gas to be the ideal fuel for many in Africa today.

● Outstanding keynote addresses

During the Forum, outstanding keynote addresses were delivered by Ms Buyelwa Sonjica, Minister of Minerals and Energy, South Africa, who spoke on the importance of energy in African development and Mr P. Raghavendran, President, Refinery Business, Reliance Industries Limited, India who shared his market perspective from another developing country, India. Mr Tokyo Sexwale, Chairman, Mvelaphanda Group Limited, South Africa and one of the forerunners in the upcoming South African Presidential race painted a very positive picture of Africa in the 21st century. According to him, LP gas is the “convenient truth” and the ideal fuel for many in Africa today.

● Informative, stimulating presentations

Over the course of the three days, 35 presentations and two roundtable discussions covered a wide range of topics. In addition to the sessions on LP Gas for African Development, leading experts also spoke on:

- The global and regional outlook for LP gas;
- New prospects and growth opportunities;
- New product development and innovation;
- Good practices for sustainable growth; and
- Fuelling clean cities.

● Networking a priority

One of the principle benefits for many who attend the World LP Gas Forum is the networking opportunities and the WLPGA was particularly happy with

some of the meetings that were hosted between the local stakeholders as side events during the Forum.

As always, the social events were well attended by delegates eager to make the most of their visit to the “Jewel of Africa”. The WLPGA members’ dinner was held in the Castle of Good Hope, while the Arabella Sheraton Hotel set the scene for the welcome reception. Guests were treated to the finest South African food, wine, music and dancing in the Moyo at Spier for the Gala Dinner.

● Next Forum: Seoul, South Korea

The WLPGA was delighted with the success of the 20th World Forum. The LP Gas for African Development day helped pave the way for the further development of the LP Gas industry which will improve the quality of life for many in Africa. The Forum delivered an outstanding quality of speakers and presentations which delegates have now come to expect from the World LP Gas Forum.

Our 21st Forum will take the industry to Seoul, Korea. “Clean Energy for a Low Carbon World” is the theme of the 2008 Forum which will be jointly organised with the Korea LPG Association. Within the broad context of LP gas as fuel that can contribute to reducing climate change, experts from across the world will cover issues such as: global supply and demand; regional developments; market segment analysis; and good practices. In addition, following the enormous success of our first Global Technology Conference (GTC) at our 19th Forum in Chicago in 2006, we shall organise a second GTC in conjunction with the 21st Forum in Seoul, showcasing new developments and innovation in the LP gas business from across the world.

We expect these three days to deliver one of the most complete events ever organised for the LP gas industry. This conference and exhibition represents enormous value and is an unrivalled opportunity which you simply cannot afford to miss.

James Rockall is the Managing Director of the World LP Gas Association (www.worldlpgas.com).

GTL – a cleaner future for transport fuel

With fifty thousand barrels per day of built capacity and a further one hundred and seventy four thousand barrels per day of capacity under construction, Gas to Liquids (GTL) technology has come a long way since the foundation stone for ORYX GTL was laid in 2003.

From being a largely theoretical proposition at the end of the Twentieth Century, in 2008 GTL is now accepted as a mainstream, commercially proven, gas monetization option which produces a range of high value premium energy and chemical products. At the time of writing, GTL projects have successfully attracted finance from the international money markets and world-scale facilities are either ramping-up or are under construction on two continents. GTL products are now in the marketplace and vehicle manufacturers and regulators alike are looking at the role that GTL and the wider synthetic fuel family might play in a cleaner transport future.

Using GTL technology, natural gas can be converted into a range of products, the characteristics of which include a higher performance than their crude oil-derived counterparts. The three-stage GTL process involves combining natural gas with oxygen and steam to form a syngas (a mixture of hydrogen and carbon monoxide). This syngas is then subject to a Fischer-Tropsch conversion to produce a waxy syncrude which is then, in the final stage of the process, cracked down into a range of products which can include diesel, naphtha, lubricant base oils, kerosene and waxes. A small amount of LPG is also produced. The overall gas conversion rate is approximately 10,000 standard cubic feet per barrel of GTL product produced.

GTL products are high quality. The naphtha is a highly paraffinic (95%+) material with a very low sulphur, naphthene and aromatic content. This makes it suited for ethylene cracking, producing a

high ethylene yield with extended runs due to the low coking tendency. GTL lubricant base oils are high quality and particularly noted for their ultra-high viscosity index and stability when subjected to high temperatures, which makes them popular with engine manufacturers. It is, however, in the area of ultra-clean, high-performance diesel, and what it might mean for the global transport fuels markets, that GTL has created the greatest interest so far.

GTL diesel can be used in conventional compression ignition (diesel) engines and it has a very high cetane number (over 70) and a very low sulphur and aromatic content. These qualities enable significant reductions in exhaust gas emissions with considerable potential benefits for the environment. It is compatible with existing fuel distribution infrastructures and with current and envisaged-future engine and exhaust gas after-treatment technologies. GTL diesel can also be used as an efficient blend component for upgrading marginal middle distillate streams to on-road diesel fuel quality.

A GTL facility allows a gas owner to monetise gas reserves which are not amenable to a pipeline solution and allows gas owners to target products at the lucrative transport fuels market in a form that is compatible with existing drivetrain technology.

In addition to these benefits, GTL diesel is likely to sustain its value proposition over the long term since it offers a high quality energy solution in a market, transport, which, unlike the energy markets targeted by LNG, is not so susceptible to fuel switching. Credible short and medium term challenges to GTL are unlikely to develop and if, as some predictions suggest, an additional capacity of 25 million barrels per day will be required by 2030 to meet global transport fuel demand, even a long-term challenge will be muted. The future transport fuels slate will be made up of a range of alternative

options working together and GTL diesel, with its low emissions, high performance profile will be foremost among them.

The advantages of GTL diesel have long been apparent to vehicle manufacturers in Europe, the world's most dieselized transport fuels market. Under the aegis of the Alliance for Synthetic Fuels in Europe (ASFE), fuel makers and vehicle manufacturers have combined to educate and inform regulators about the opportunity that GTL represents and, through the work of this body, a further and significant environmental benefit from GTL has become apparent.

The diesel produced using the GTL process can also be produced using Coal to Liquids (CTL) and Biomass to Liquids (BTL) technology. The three-stage production method is fundamentally the same, though BTL and CTL have an additional stage which involves gasifying the feedstock at the front end. Because of the similarity of the production methods, both CTL and BTL are likely to benefit from the cost reductions achieved by the advancing commercialization of GTL. This is

particularly important for BTL since it is currently very expensive and would benefit greatly from cost reductions realized through commercial operating experience. If BTL could be commercialized, CO₂ emissions reductions of up to 90% compared to traditional crude-derived diesel might be achieved.

GTL may therefore have a role to play as the enabler of a technology which will deliver massive CO₂ reductions and it will further support this development by helping to provide the overall product volumes which will be needed if synthetic fuel is to deliver its full potential as a key component of the future fuels slate.

The GTL industry is in its infancy but it has progressed successfully from the pilot stage to commercial reality. It is a technology with much to contribute to a cleaner transportation future and it is active in making both regulators and vehicle manufacturers aware of that potential. The global transport fuel sector asks some difficult questions about reducing overall emissions but, in GTL, the energy industry has certainly found one of the answers.



▶ Leopard release - one of Sasol Chevron's GTL diesel-powered Mercedes at work with the De Wildt Cheetah and Wildlife Trust.

Publications and Documents Available from IGU

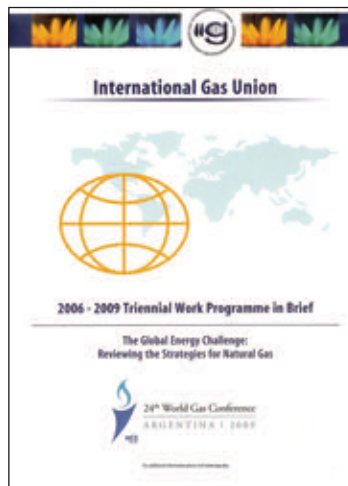
As a non-commercial organisation promoting technical and economic progress in the gas industry worldwide, IGU offers its publications free of charge and you are invited to order the IGU publications currently available from the Secretariat. (All documents are A4 format unless stated otherwise and those that can be downloaded from the IGU website are indicated.)

Ms Barbara Anette Schmid
 IGU Secretariat
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2006-2009 Programme

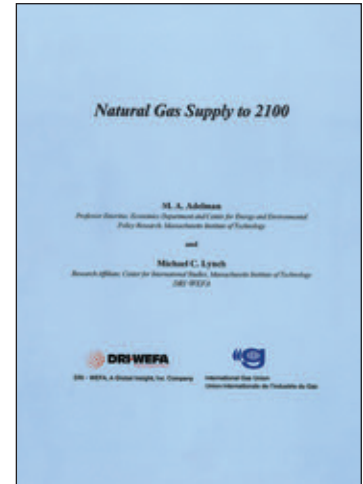
- Strategic Guidelines 2006-2009.
- Triennial Work Programme in Brief.



- Triennial Work Programme.

Scientific and technical papers and documentation

- Natural Gas Supply to 2100, M. A. Adelman and Michael C. Lynch, DRI-WEFA, IGU, October 2002, (51 pages 18 x 25.7 cm). This booklet outlines the authors' assessment of a long-term supply curve for natural gas.
- Seven Decades with IGU, ISC 2003, (186 pages). IGU's 70th anniversary fell in 2001 and at the next World Gas Conference in 2003 this book was launched containing articles on the organisation's history and on contemporary issues facing the international gas industry.
- Proceedings of the 20th World Gas Conference, Copenhagen 1997, (CD-ROM).
- Proceedings of the 21st World Gas Conference, Nice 2000, (CD-ROM).



- Proceedings of the 22nd World Gas Conference, Tokyo 2003, (available on www.igu.org).
- Proceedings of the 23rd World Gas Conference, Amsterdam 2006, (CD-ROM).
- Worldwide Underground Storage (UGS) database, (available on www.igu.org).
- Gas to Power Global Outlook, (brochure, 12 pages).
- Sustainable Development and the Role of Gas, (brochure, 12 pages).
- The Art of Regulation, (brochure, 8 pages).
- International Gas, ISC, October 2007, (196 pages). The eighth issue of the IGU Magazine.



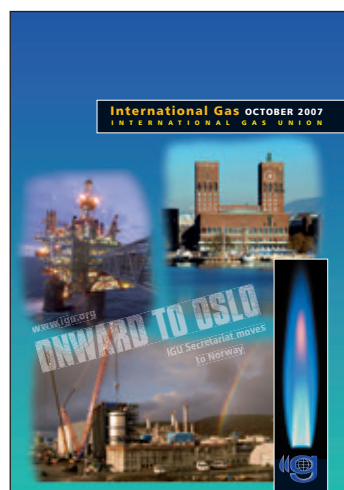
- News, Views and Knowledge on Gas – worldwide, (3 pages). This general brochure gives a concise introduction to the organisation together with its Vision and Mission.
- A Better Future Towards Sustainable Development, (5 pages). This brochure highlights IGU's position in promoting natural gas as a part of the solution to climate change.
- IGU Organisation Chart 2006-2009, (4 pages).

Individual publications from WGC 2006

- Gas to Power Africa
- Gas to Power China
- Gas to Power Europe
- Gas to Power India
- Gas to Power Japan
- Gas to Power Korea
- Gas to Power North America
- Gas to Power North East Asia – Taiwan, China
- Gas to Power Russia
- Gas to Power South America
- Gas to Power South East Asia and Australasia
- Report Regulation
- Report Sustainability
- The Paradigm Change in International Natural Gas Markets and the Impact on Regulation
- Micro CHP in Perspective

IGU organisational information

- IGU Articles of Association, (A5, 28 pages).
- IGU Guiding Principles for Sustainable Development, October 2003, (A5, 12 pages).





PAKISTAN

THE ASIAN ENERGY HUB AND CORRIDOR

Strategically located, Pakistan is fast emerging as the future energy hub and corridor of Asia. The proposed energy corridor links the energy supply source countries of the Middle East and Central Asian Republics with high energy demand centres, such as China, India and of course Pakistan.

The economic boom in Pakistan is expected to further accelerate the growing domestic demand for energy. Today, more than 74 % of primary energy needs are met locally. However, the country's recoverable indigenous oil and gas reserves are not likely to meet the growing demand and an energy gap is emerging, resulting in shortages by 2010. This shortage will continue to rise if not bridged with imports of oil and gas.

To overcome this projected shortfall, the Government of Pakistan has laid strong emphasis

on importing gas from neighbouring countries through Trans-National gas pipelines, as well as in form of LNG.

The IPI project is moving ahead and initial agreement has been made by Iran, Pakistan and India on the modalities.

Meanwhile Pakistan Mashal LNG Project is planned to bring in 3.5 mtpa LNG by 2011-12 in phase-I, to be followed by phase-II with an additional 3.5 mtpa. World class companies are participating in the project to gain a firm entry in Pakistan's rapidly growing LNG and natural gas market.

To find out more about the many opportunities and mega projects in Pakistan's energy sector, drop an e-mail to md@ssgc.com.pk or info@mpnr.gov.pk.





2008

June 3-5
IANGV Biennial Conference and
Exhibition (NGV 2008)
Rio de Janeiro, Brazil

June 29-July 3
World Petroleum Congress (WPC
2008)
Madrid, Spain

September 22-25
IGU Council Meeting
Gyeongju, Korea

October 8-10
IGU Research Conference 2008
Paris, France

December 1-12
14th session of the Conference of

the Parties to the UNFCCC
(COP 14)
Poznan, Poland

December 5
Eurogas General Assembly
Brussels, Belgium

2009

June 3-5
IGU Executive Committee
London, UK

October 5
IGU Council Meeting
Buenos Aires, Argentina

October 5-9
24th World Gas Conference
Buenos Aires, Argentina

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Hans Riddervold: *Senior Advisor*
Erik Gonder: *Advisor and Webmaster*
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Message from StatoilHydro – The New Host of the IGU Secretariat: Dag Magne Søyland/StatoilHydro (36), Allan Klo/StatoilHydro (37 upper), Eiliv Leren/StatoilHydro (37 lower).

Council Delegates Celebrate the Growth of IGU: Gazprom.

The IGU Gas Efficiency Award: Institut Français du Pétrole (53 upper), Tognum (53 lower).

IGM: IGU.

IGU and Affiliated Organisations: Raveendran/AFP/Getty Images (60), Gas Natural (61).

24th WGC: IAPG (68 upper & 69 upper), www.sectur.gov.ar (68 lower, 69 lower & 70).

Progress Report: IAPG (74 upper), Gazprom (74 lower), NIGC (80), IGU (81, 82, 84, 90, 92, 100, 102 upper), Promgaz (86), Heatric/Studio PWD Ltd 01202 382731 (102 lower),

IGU Events and IGU-related Events 2008-2009

You can find links to many of these events by visiting www.igu.org and clicking on "Events". Under "Energy-related Events" in the side menu you can also find a link to the WEC Events Calendar displaying a multitude of energy-related events.

Acknowledgements

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A New Dimension to Trinidad and Tobago's Gas Sector: Atlantic LNG (120), National Gas Company of Trinidad and Tobago (121).

Adding Value to IGU Membership: IGU.

Why Does LNG Quality Matter?: Fluxus (136).

Russia and Germany: A Solid Regional Energy Partnership: Wintershall Holding AG (139).

Gas and the Attractions of Project Finance: Hammam Ashkar (144), Photo for Yemen LNG by Thierry Gonzalez (145), Qatargas Operating Company Limited (148), Sakhalin Energy Investment Company Ltd (149), Cheniere Energy (102), Shell Photographic Services, Shell International Ltd (154), Wintershall Holding AG (156).

Fresh Impetus for Methane Hydrates: The Hindu Photo Archives (158), US Geological Survey (159), US Navy, Office of Naval Research (160), JOGMEC, Natural Resource Canada and Aurora College (162).

IT in the Gas Industry: Wintershall Holding AG (167), Intermec Technologies (169).

Iran's Natural Gas Expansion Plans: NIGC.

A Profile of New Associate Member INGAA: INGAA.

The World LP Gas Association: WLPGA.

Atlantic LNG Company of Trinidad and Tobago

P.O. Box 1337, Port of Spain,
Trinidad and Tobago
Telephone: 868-624-2916
www.atlanticlng.com

A part of society Atlantic LNG

Atlantic LNG is the 5th largest LNG producer in the world, and the largest producer of LNG imported into the USA. We are a liquefied natural gas (LNG) operating company generating value for and fostering positive relationships with our shareholders, employees and the community in which we operate. We remain focused on attaining excellence as a reliable and efficient supplier of LNG to our customers.

Atlantic LNG is ISO 114001 certified for environment management. The company's Environmental Management Plan sets out how to effectively manage environmental matters, which includes sampling and monitoring to ensure that all discharges from the plant are within approved limits. Striving for a safe working environment at all times remains the backbone of our company.

Being a part of society, that is, a corporate entity in Point Fortin, we believe we have a corporate social responsibility to our wider community. This is evidenced by our continuing commitment towards the development of our surrounding community, its people and the economy, and the society that we are a part of.

Atlantic LNG has been developing programmes in the area of cricket and football for the young people in the area. Our annual Bursary programme and motivational vacation camp also support students and help secure a brighter future for Point Fortin. Already Atlantic LNG has contributed over \$86 million and is estimated to contribute an additional \$110 million over the next twenty years, to various educational programs for the benefit of the citizens of Trinidad and Tobago.

With the development of Community recreational centers the people of the community are able to foster stronger ties with each other and their community. Throughout the years we have instituted programmes that have focused on people and the environment, education, sport and the general well-being of our larger community.

From our co-sponsored "Saving Sight Foundation®" that provides free visual testing for all the children in the Point Fortin community to improving the Techier Village Park, Atlantic LNG remains dedicated towards working and improving the society of which they are a part.



ATLANTIC LNG
COMPANY OF TRINIDAD AND TOBAGO

CHEETAHS AND GTL

SUPERIOR PERFORMANCE NATURALLY



Sasol Chevron's business is GTL diesel – the cleanest high-performance diesel in the world.

Fuelled by GTL diesel, the De Wildt Cheetah and Wildlife Trust conservation programme can track cheetahs across South Africa with lower vehicle emissions. Using natural gas and not crude oil, GTL is one of the most advanced fuel technologies in the energy business and success demands a blend of expertise, experience and partnerships.

A cheetah race is a new one for us but, when international rugby star and De Wildt supporter Bryan Habana offered to race our sponsored cheetah, Cetane, to raise awareness for cheetah conservation, De Wildt turned to Sasol Chevron to plan and manage a safe event.

Using and adapting our corporate expertise, we helped De Wildt and Bryan make headlines around the world.

SASOL CHEVRON – GTL IS OUR BUSINESS, QUALITY IS OUR STYLE



www.sasolchevron.com

www.dewildt.org.za/Tracker.htm