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100,000 tonnes of CO₂ a year, for testing, qualification and development of a large-scale plant for carbon capture. The Norwegian Ministry of Petroleum and Energy and Statoil have agreed on the common goal that a large-scale plant will be completed in 2014. This will have sufficient capacity to capture more than 2 million tonnes of CO₂ annually. The emissions from Mongstad will then be reduced to 0.5 million tonnes of CO₂ a year.

“Statoil will cover costs corresponding to the company’s alternative CO₂ costs as they would have been if we had not implemented CO₂ handling,” explains Egil Sæl.

The government will take chief responsibility and cover all the investment and operating costs relating to the capture, transportation and disposal of CO₂ over and above the costs covered by Statoil. The government will take chief responsibility and cover all the investment and operating costs relating to the capture, transportation and disposal of CO₂ over and above the costs covered by Statoil. The CO₂ could either be stored in an underground geological formation or used for enhanced oil recovery (see *International Gas*, April 2007, pp166-174).

● **Modernisation**

The refinery, which was built in the 1970s and upgraded in the 1980s, has spent an average of €100,000 daily on modernisation for the past 15 years. The new CHP station will make it possible to further modernise the refinery and to implement energy efficiency measures.

“If the energy facility here were to be built in an EU country, we could have received many hundreds of millions of kroner in support because of the good environmental profile,” Egil Sæl points out, citing calculations from Delta Energy and Environment in support.

“Once the large-scale carbon capture plant is finally defined at the end of 2012 and the construction of the plant is finished as soon as

possible thereafter, it will ensure that Mongstad is the world leader in terms of climate measures,” maintains Egil Sæl. He assures us that there would be room for more energy plants with carbon capture facilities on site, if that should become necessary.

● **Cooperation with the government**

Statoil and the Norwegian government are in the process of forming a technology company that will identify, develop and qualify technology for carbon capture.

“We will use Mongstad as an arena for the development of technology. Although our binding collaboration is limited to five years, our vision is to also create viable technology for the future,” says Bjørn-Erik Haugan, Director of Gassnova, the Norwegian Centre for Gas Power Technology.

Gassnova will follow up the first stage of the Mongstad project, namely the building of a plant for the capture of up to 100,000 tonnes of CO₂. He believes the main challenge facing the collaboration on technology consists of reducing the large costs associated with carbon capture.

The investment costs for the first capture plant, which is scheduled for completion as close as possible to completion of the CHP station, are an estimated €90 million. The operating costs will amount to around €12 million a year for the first five years. Statoil will pay 20% of these costs.

Statoil will also pay for the preparation of its own facilities, such as the refinery’s cracker and reformer units, for future carbon capture. By 2008, the company will also have a plan ready for future carbon capture from the Mongstad facilities. A decision on the building of these large-scale facilities will be made in 2012.

Knut Barland is the Chairman of PGC A and Kari Lindøe Hunsbedt is the Committee’s Secretary.



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The International Pipeline and Offshore Contractors Association

By Luc E. Henriod

As gas and oil demand continue to climb, the number of pipeline industry projects around the world is escalating. Safety, environmental issues and a huge lack of manpower are among the most complex challenges that operators and all those involved in pipeline construction have to face on a daily basis.

The major pipeline construction companies, members of the International Pipeline and Offshore Contractors Association (IPLOCA), are anxious to address these challenges through their industry Association which provides the perfect forum for tackling these and other challenges.

The world has been transformed since 1966, when companies active in the international pipeline construction industry first gathered in Paris and founded IPLOCA. Likewise, the Association is changing, modifying its services and outreach to members and transforming the role that it plays in supporting them.

Now headquartered in Geneva, IPLOCA has 107 corporate members – the key international pipeline and offshore contractors as well as their subcontractors – and 119 associate members who represent the suppliers of vital products, equipments and services to the pipeline industry. It also has three academic members.

The Association is truly international and the membership includes companies in 40 countries. While previously the Association was best known in the industry for its annual convention – being held this year in Sydney, October 1-5 – where the key industry players gather each year, it is now making some significant changes in both internal structure and in services and outreach to members, focusing more closely on business challenges.



Luc Henriod, Executive Secretary of IPLOCA.

● New initiatives

To stimulate innovation in the technology and processes required for execution of these mammoth onshore projects, IPLOCA is striving to engage all those who contribute to the pipeline construction supply chain. The ultimate goal is to enable development and delivery of improved technology, equipment and supporting processes for the benefit of all. Now its members are now stepping forward to volunteer their services under the IPLOCA umbrella in a number of new initiatives designed to move the industry forward.

In spite of technological advances in almost every field, including pipeline design and construction, pipe laying methodology has changed little in the last 30 years.

While it is true that high strength and high toughness pipe, better coatings, automatic welding, massive offshore lay barges, pipe reeling, double jointing, rock-saws, padding equipment and horizontal directional drilling have come into



play, there are still many opportunities for improvement.

IPLOCA, along with a major operator, is providing a platform for its members to foster ideas regarding possible improvement of the entire pipeline construction value chain. The main goals of this initiative include: increased pipe laying speed; predictability of onshore pipeline quality; a reduction in accidents; the minimisation of impact on the environment; and overall project cost reduction.

Currently these goals apply to pipes with diameters ranging from 24" to 48", cross-country hydrocarbon pipelines, and existing international design codes and material standards.

Around the world, major pipeline owners and developers are seeking ideas from contractors and suppliers to achieve greater certainty of result in terms of project time and cost, cheaper pipelines through better specifications and innovative technology, and high levels of safety along with low environmental impact, and the *Novel Construction* initiative is gathering some significant interest and expertise from both operators and IPLOCA members.

Among other very important areas in which IPLOCA is engaging its members are the issues surrounding owner-contractor relationships, including risk sharing and encouragement of much earlier involvement of the contractor. IPLOCA can play a key role in fostering dialogue with the major customers of its members, and in so doing is striving to engage both parties in discussion to the ultimate benefit of all.

Whether the topic is fundamental Health & Safety and the establishment of common standards, environmental

management and standardisation of processes or the funding and social considerations of a project, dialogue is the first step to agreement and change.

● **Challenges**

Perhaps the most serious challenge for the pipeline construction industry is the lack of manpower. IPLOCA, along with many industry players, is seeking solutions in this area and has incorporated a public discussion forum on its website to gather comments and opinions from around the world.

IPLOCA is proud to represent the companies that are part of its membership base worldwide. The challenges for the industry are significant but dialogue and collaboration under the IPLOCA umbrella can do much to turn those challenges into opportunities.

Luc E. Henriod is the Executive Secretary of the International Pipeline and Offshore Contractors Association and can be contacted at luc.henriod@iploca.com.

INTERNATIONAL PIPELINE AND OFFSHORE CONTRACTORS ASSOCIATION (IPLOCA)



<i>Founded:</i>	1966 in Paris
<i>Member Companies:</i>	107
<i>Associate Member Companies:</i>	119
<i>Country Representation:</i>	Algeria, Argentina, Australia, Austria, Belarus, Belgium, Brazil, Bulgaria, Canada, China, the Czech Republic, Denmark, Ecuador, Egypt, France, Germany, Greece, Hungary, India, Iran, Italy, Japan, Kazakhstan, Lebanon, Malaysia, Mexico, the Netherlands, Panama, Qatar, Romania, Russia, Saudi Arabia, Singapore, Spain, Switzerland, Turkey, Ukraine, the UAE, UK and USA.
<i>2006/2007 Leadership:</i>	<i>President:</i> Andrew Lukas, AJ Lucas Group Ltd <i>First Vice President:</i> John Reed, Heerema <i>Second Vice President:</i> Jean-Claude Van de Wiele, Spie Capag <i>Treasurer:</i> Phil Bond, Pipeline Induction Heat <i>Immediate Past President:</i> Issam Shammas, C.A.T.
<i>Website:</i>	www.iploca.com

Platts: New European Gas Hubs See More Trade

New European gas hubs are seeing increasing interest from traders as the continental gas market grows in activity and transparency.

On June 18, 2007, energy information provider Platts launched day-ahead and month-ahead price assessments for four new hubs, to reflect this growing interest.

The new price points are France's PEG North, Germany's BEB and E.ON Ruhrgas hubs and Italy's PSV. These add to previous price assessments for the UK NBP, Belgian Zeebrugge and Dutch TTF hubs.

UK spot trading grew from around 1996, as the end user market was liberalised, allowing customers to switch supplier. Platts price assessments date back to August 1996, for prices at the National Balancing Point hub. The NBP is a notional point representing gas anywhere within the UK's gas transmission pipeline network. Counting the whole network as a "single point" hub made buying and selling much easier, allowing many more parties to take part, while the system balancer worried about the technical issues in making sure there was enough gas in each physical area.

Platts has assessed Belgian Zeebrugge gas prices since October 1999. The Zeebrugge hub is a physical point, representing a pipeline hub at Zeebrugge at the end of the UK-Belgium gas Interconnector pipeline. Zeebrugge also receives gas from a liquefied natural gas import terminal and many continental pipeline networks. It has remained a much smaller market than the UK, however, trading mostly as a basis spread to the UK NBP.

Trade in Germany at the Bunde/Oude pipeline point was the next area to grow and Platts price

assessments began in July 2000. However, difficulties for foreign companies in accessing the complicated German gas pipeline networks held back the growth of trading. After the Dutch gas transporter launched its own national balancing point for the entire Dutch gas network in January 2003 – "the Title Transfer Facility" – much of the trade in the region eventually migrated there instead, thanks to the greater ease of use of the virtual hub. Platts TTF assessments date back to January 2004.

More recently, a number of new hubs have started to show increasing activity, as competition has grown across Europe.

In France prices are now quoted at a number of PEGs (Points d' Exchange de Gaz), with the PEG North the most closely linked to other northwest European market hubs such as Zeebrugge and the TTF.

In Germany pipeline access is becoming simpler, with the number of different "zones" into which the national networks are divided shrinking step-by-step. The BEB hub represents a region in the north of the country based on pipelines operated by Shell/ExxonMobil joint-venture BEB. There are three E.ON Ruhrgas hubs: North, Middle and South, expected to shrink to one later this year.

Further south, Italy has now launched its own virtual hub, representing the entire pipeline network, like the NBP and the TTF. This is the PSV or "Punto di Scambio Virtuale".

For further information on Platts gas price assessments please telephone +44 (0) 20 7176 6111 or visit www.platts.com.

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Revisiting the History of Gas

By Adrian Giddings

"History is never past. History is what connects past and present, history shows the way to the future."

JACQUES LE GOFF, FRENCH HISTORIAN

As the slogan for the successful WGC2006 in Amsterdam put it: "Gas: powers the people, preserves the world", but what about preserving the past? In a rapidly developing global industry characterised by market liberalisation, consolidation and technical innovation, a growing network of volunteers is uniting to do just that.

● Spreading the word

The Gas Historical Network – GHN (which we first wrote about in the April 2005 edition of *International Gas*) mounted an exhibition at WGC2006 with the generous support of the National Organising Committee (NOC) aimed at both promoting



Jacob Fentz, Chairman of the Gas Historical Network is seen (LEFT) at the WGC2006 exhibition with Robert Doets, NOC Chairman for WGC2006, Fritz Verweel, a volunteer at the Energetica Museum in Amsterdam, and Hanne Thomsen, Director of the Danish Gas Museum (RIGHT).

the Network and also at encouraging other like-minded people in the industry to join.

Staged in the Ruby Lounge of the RAI Convention Centre, the exhibition consisted of 13 posters charting the history of the gas industry including the early experiments of William Murdoch and Phillippe Lebon, the changing uses of town gas for cooking and heating in the home, and the various industrial uses of gas up to the early 20th century. Russian development of underground coal gasification in the 1930s was highlighted as was the move from town gas to natural gas and more recent advances in the industry. Three showcases containing gas appliances on loan from the collections of the Danish Gas Museum, Energetica and Copagaz were also on display.

The exhibition was a great success with more than 50 new contacts added to the Network and suggestions made as to organisations and collections to be contacted in the future. Moreover, Eduardo Ojea Quintana, NOC Chairman for WGC2009, invited GHN to create a new, larger and more comprehensive exhibition for Buenos Aires.

If you missed the exhibition or were unable to attend the World Gas Conference, most of the material is available for download as a PDF from GHN's website (www.gashistory.org).

● Origins

GHN's origins go back to 2003 when the Danish Gas Museum, under the directorship of Hanne Thomsen, came up with the idea of a virtual network dedicated to safeguarding the history of gas and its changing role in society. The aim is to link the world's gas museums and collections through www.gashistory.org and to provide information to the general public on the history and development of gas usage around the world.

Though still in the early stages of growth, the site already has links to five European gas museums and collections and also to Fundación Gasco, a non-profit organisation set up by Gasco in Chile, which is creating an exhibition on the

history of the company, natural gas and LPG. There are links to other gas-related sites on the web, from organisations such as IGU, Eurogas and IANGV to pages focused on gas history. The website also links to publications from the Danish Centre for Energy and Society and the UK's Institution of Gas Engineers and Managers, which publishes the quarterly *Historic Gas Times*.

The website aims to be the first port of call for all those interested in the development of gas usage through the years and is constantly looking for new material. To increase the usefulness of the site as a resource, GHN is inviting all museums and collections which provide public access to submit contact details, a brief description of their collections and photographs, so that they can be added to the growing list of organisations linked to from the site. GHN is also actively seeking new members from across the world who believe it is important to preserve this heritage for the future and who wish to share their time, knowledge and expertise.

GHN has been supported through contributions from a number of organisations including the British Gas Museum, Energetica in The Netherlands, Copagaz/Afegaz in France and Russia's Gazprom. Many professionals throughout the gas industry have also lent their support.

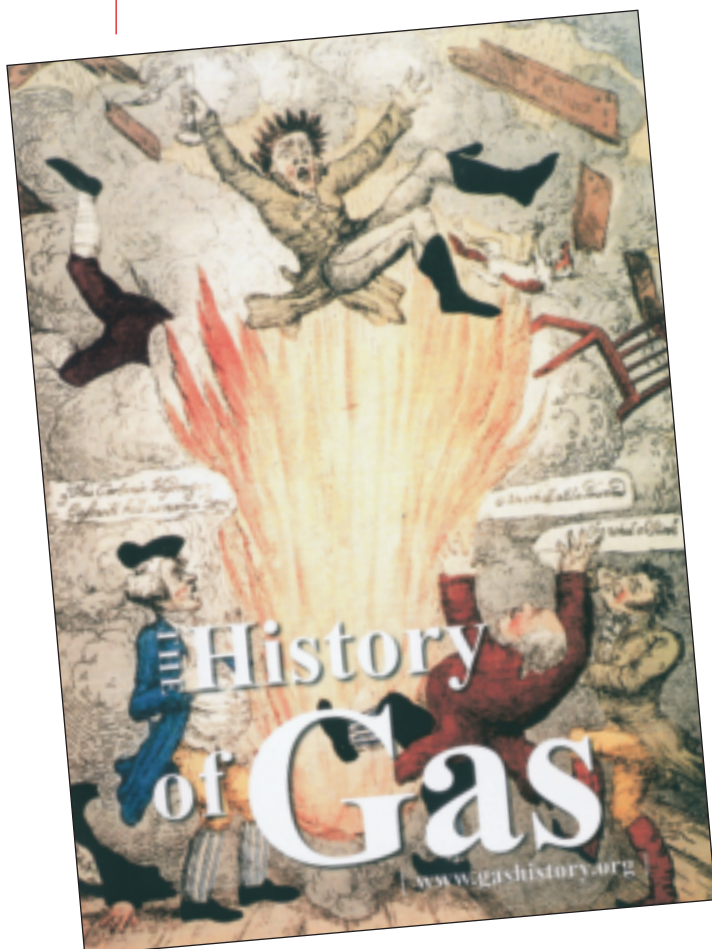
● A bright past

The preservation of history can often seem like an unnecessary use of time and money in the fast-



Promoting domestic gas use in the 1920s.

paced modern world that we live in, more suited to academics in universities than to industry. However, the opportunity to stop, if only for a short while, and look objectively at the past can provide great insight into possible future avenues for development. New technological innovations can be applied to old concepts and current projects can be seen in



GHN is promoting itself via traditional media such as this brochure as well as via the web.

context as the pinnacles of years of progress and part of ongoing work stretching into the future.

Though natural gas has been in use for thousands of years, with seepages of gas fuelling the eternal fires of the Zoroastrians, the history of the gas industry as we know it can be traced back some 215 years to one man, William Murdoch (1754-1839), a Scottish engineer and inventor who first developed gas lighting in 1792.

It is interesting to note that as gas lighting flourished as the fuel of choice for factory illumination and some people foresaw the possibility for lighting whole streets and towns by mains-fed gas produced in large gasworks, William Murdoch thought differently. He envisioned individual buildings each having their own means of gas production for their

own lighting needs. As we have seen in David Sweet and Jeff Bell's article on decentralised energy (see pages 152-166), this approach can have great benefits both to the consumer and the environment. The development of mini-CHP installations for home use thus has its antecedents in the earliest days of the gas industry.

● Informing the public

As Marc Hall points out in his article on the changing face of IGM, the public's perception of the activities of gas companies and the industry as a whole is of great importance in ensuring market share in an increasingly competitive arena. The public is becoming more and more concerned about the environment and especially the possible role of hydrocarbon usage in global warming.

Initiatives such as the Gas Historical Network and, in particular, its website will allow the general public to make informed choices about their energy usage and show them how the industry has moved to create ever-cleaner energy throughout its history.

Highlighting recent developments such as commercial GTL production – with its roots in the work of Franz Fischer and Hans Tropsch in the 1920s – and increased NGV usage, especially in Latin America, will show that this trend is continuing. Carbon capture and storage techniques demonstrate how the gas industry is striving to minimise the environmental impact of its activities.

Finally, as was presented in the exhibition at WGC2006, a look forward to the "hydrogen society" of tomorrow will show that natural gas in all its forms is truly the fuel of the future.

Adrian Giddings is a Contributing Editor at International Systems and Communications. The Chairman of the Gas Historical Network is Jacob Fentz, International Coordinator at Naturgas Midtnord, who can be contacted by email at jaf@midtnord.dk. For information about the website contact the webmaster, Jens Utoft, at postmaster@gashistory.org.

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Kiwa Gas Technology: Your Partner for Progress

Kiwa Gas Technology is a service company with an international reputation in the area of gas technology, including natural gas, LPG, biogas and hydrogen. The activities comprise consultancy, research, engineering, testing, training and contract product development. The market served by Kiwa Gas Technology consists of gas producers, gas transport and distribution companies, commercial and industrial gas consumers, manufacturers, energy-intensive businesses, the gas and heating equipment industry, authorities and other companies that require gas-related expertise. The key values we always apply to our services are professionalism, independence and trust.

Kiwa Gas Technology employs a permanent staff of about 60 highly qualified professionals. Its office is established in Apeldoorn, the Netherlands, where also all fully-equipped test laboratories for gas distribution materials and gas appliances and equipment, as well as for gas measurements and analysis, are located.

Kiwa Gas Technology is part of the Kiwa company, a Dutch-based international orientated company with worldwide more than 550 employees, its core business being Certification of products, systems, processes and persons.

▶ **International reputation**

In many projects all over Europe, in Asia (Far East, Middle East) and in North & South America, Kiwa Gas Technology has already played a key role as the owner's or contractor's engineer, independent engineer, banker's engineer, project manager, supervisor, advisor, specialist, consultant or testing agency, all on a senior level.

Examples of projects in which we played a key role are:

- ▶ BMW: Development & construction of a hydrogen boil-off safety system for the hydrogen fuel tank of the new 7 series model with hydrogen combustion engine;
- ▶ Shell: Assistance with the evaluation whether to participate in natural gas distribution in the People's Republic

of China (2003);

- ▶ Large Dutch energy companies: Due Diligence for merger with another large energy company. Valuation and technical assessment of natural gas distribution and maintenance systems (2003-2005);
- ▶ IGDAS (Turkey) & Dutch gas companies: Gas courses and management training;
- ▶ Wintershall: Calibration of flow measurement and gas quality designation at the gas producing fields of Wintershall. (1997-2006).

Kiwa Gas Technology also participates in several international networks of experts, such as IGU, ISO, Groupe Européen de Recherches Gazières (GERG), Marcogaz and CEN.

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Publications and Documents Available from IGU

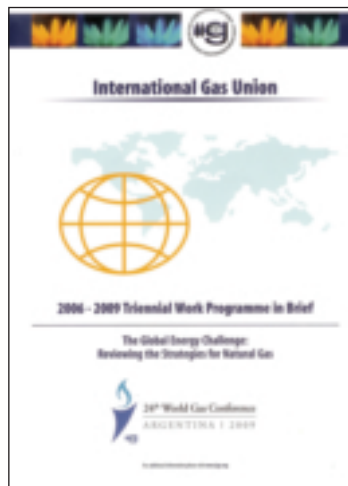
As a non-commercial organisation promoting technical and economic progress in the gas industry worldwide, IGU offers its publications free of charge and you are invited to order the IGU publications currently available from the Secretariat. (All documents are A4 format unless stated otherwise and those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

Ms Barbara Anette Schmid
IGU Secretariat
c/o StatoilHydro ASA
Oslo
Norway

As the contact details for the new offices of the Secretariat were being finalised at presstime, readers are advised to check the IGU website (www.igu.org) for the latest information before ordering publications.

2006-2009 Programme

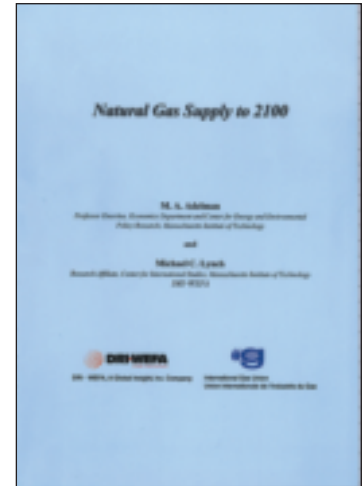
- Strategic Guidelines 2006-2009.
- Triennial Work Programme in Brief.



- 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, April 2007, (200 pages). The seventh issue of the IGU Magazine.

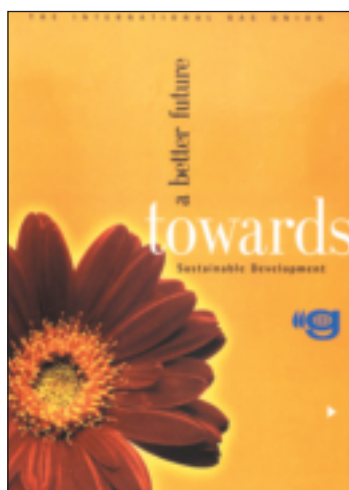


IGU organisational information

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

Apart from being available in print format, the following publications can also be downloaded from www.wgc2006.nl/sprb:

- 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



Alcatel-Lucent – Providing Future-Proof Delivery

The energy industries are currently experiencing unprecedented opportunities and challenges. The oil and gas industries are responding to increased demand by:

- ▶ investing more in the upstream business, like deeper and more remote exploration, including the growth of unmanned rigs and facilities; and
- ▶ building new plants and investing in plant upgrade.

At the same time, these businesses are also addressing the implications of a transformation of the operational landscape, including:

- ▶ business continuity concerns complicated by expansion into more challenging territories and geo-political threats;
- ▶ new regulatory requirements, including environmental imperatives and legislation;
- ▶ the need for better integration between up and down stream businesses;
- ▶ meeting emerging demands from customer – e.g. smart grids and smart metering; and
- ▶ migration and transformation from aging technologies and high opex services.

To optimize advantage and meet these challenges, Alcatel-Lucent argues the oil and gas business needs to leverage the reliability and opex benefits of advanced converged network technologies.

The case for robust, cutting-edge technology to serve the oil and gas industry is well rehearsed. This is a high-risk business and investing in field-tested solutions that can improve the chances for success or reduce the possibility of disaster is now integral to its business model.

After all, extreme operating conditions require innovative solutions.

This is a world in which pipelines must withstand appalling weather conditions across thousands of miles of diverse and inhospitable terrain. Drilling operations now descend thousands of feet on land and offshore. Fortunately, today's plethora of optical technologies excel in such harsh conditions.

This is a business that is fuelled by mission critical information. In recent years, through the applied use of enhanced measurement technologies, there has been an exponential increase in well and pipeline

data. Smart sensors can now detect valve positions, measure fluid flow and detect seismic activity.

Today, we see an increase in the number of unmanned facilities along pipelines. This is only possible through a reliable and high-speed communication link from the field to the onshore operational centre.

Alcatel-Lucent is focused on the development of integrated communications solutions, which transform the role of the communication network into a strategic tool that drives operational excellence and reduces inflated opex to improve returns.

Benefits include:

- ▶ **unified communications** – linking all field operations in the upstream and downstream businesses; and
- ▶ **disaster recovery** – anytime and any location access to real-time data, facilitating analysis and faster, informed intervention: e.g. real-time well data can be used to increase reservoir recovery.

▶ **Keep it simple**

By simplifying multiple networks into unified management at a central point, and by using intuitive yet advanced OA&M tools, network managers are much less burdened with time consuming man management logistics and more able to focus on the critical components supporting the core business.

Alcatel-Lucent solutions start from the assumption that with voice services and an increasing number of control applications like SCADA becoming IP-based, IP convergence allows the simplification and collapse of a traditionally multi-network infrastructure into a single converged network. This is an approach that not only reduces capital and operational costs but also improves productivity.

Let's briefly consider the broad categories of functionality these converged networks must deliver.

Increasingly sophisticated control systems enable oil and gas operators to monitor and control their operations and to immediately react in emergency situations. The efficacy of SCADA systems is predicated on efficient and robust connectivity. These are systems comprised of sensors attached to pumps

and valves, which are in turn connected to remote terminal units (RTUs). The RTUs are in turn connected to a central monitoring facility via a transmission network. It's clear that without robust, carrier grade connectivity, faults will go unreported and unaddressed – and extended downtime means diminished returns.

Next up are technologies like PABX and UHF/VHF delivering anytime, anywhere access. This is about enabling, for example, field maintenance crews to obtain remote technical support and field engineers using laptops to download geological data. It's about improved real-time productivity.

Finally, with a growing trend towards remote and unmanned facilities, maintenance security technologies are becoming an increasingly important part of the business. The new converged networks must support security systems that include video surveillance cameras and monitoring consoles, intrusion detection, and access security devices. These security devices are connected to a central monitoring centre via the transmission network, helping to increase security and decrease costs.

▶ **Mission critical functionality**

To deliver this level of functionality, the basic elements for such a network must include:

- ▶ **A unified management system** providing a centralized point for monitoring and performance control over any type of transport node (terrestrial or submarine) and any network topology;
- ▶ **A single transport network** aggregating a spectrum of services for internal and external communication and for increasing safety and security. Both evolutionary (to EoSDH) and transformation (to IP MPLS) migration solutions are required; and
- ▶ **Seamless convergence** of different fixed and mobile

(WiFi, WiMAX, microwave connectivity) traffic – voice, data and video – in real time within and between production, transportation and processing facilities.

Broadly speaking, the architecture of such a network can be described in three layers. The core network layer provides the conduit to transport information (video, data, voice) between all field facilities, personnel and remote operational centres. The network conduit can be fibre, radio or satellite, or a combination of the three.

The second layer consists of the subsystems that send or receive information. These might include surveillance cameras, handheld radios, computers, monitors, remote terminal units and so forth.

The third layer is the central network operations centre, where software applications broadcast and help operators interpret data to ensure continuous real-time monitoring and control.

The past decade has seen the introduction of an overwhelming new array of communication technologies. With the support of Alcatel-Lucent, the oil and gas industry has a communications expert to help select, design, supply, integrate, install and maintain these technologies to deliver the savings, security and compliance today's business demands.

For more information please visit www.alcatel-lucent.com





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.





2007

October 22-25 IGU Council Meeting St Petersburg, Russia

November 9-15
World Energy Congress (WEC
2007)
Rome, Italy

November 27-29
2nd Biennial Conference and
Exhibition of the Asia-Pacific NGV
Association (ANGVA 2007)
Bangkok, Thailand

December 3-14
13th session of the Conference of the
Parties to the UNFCCC (COP 13)
Bali, Indonesia

December 6
Eurogas General Assembly
Brussels, Belgium

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the appropriate page numbers are given in
brackets after each source.

2008

March 26-28 IGU Executive Committee Port of Spain, Trinidad and Tobago

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

September 22-25 IGU Council Meeting Gyeongju, Korea

October 8-9 IGU Research Conference 2008 Paris, France

2009

June 3-5 IGU Executive Committee London, UK

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Innovation Norway; Sleipner East gas
treatment plant – Statoil; gas-fired combined
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– Naturkraft as/Ingarth/www.ettoyeblikk.no.

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Call for Papers Now Open for IGRC 2008:
Amélie Dupont/Paris Tourist Office.

IGU Events and IGU-related Events 2007-2009

October 5 IGU Council Meeting Buenos Aires, Argentina

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

You can find links to many of the
above 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

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PTT Group synergizes our business operations for top class performance, ensuring minimum cost and maximum value added. Our competitiveness in the international arena is indisputably rooted in our high operational efficiency. Ultimately, our efficiency lies in our strength in directing the infinite human intelligence to best manage the bounded natural resources. Bangkok GASTECH 2008 is the world stage for us to unveil the strength within.

GASTECH2008
Bangkok, Thailand 10-13 March 2008



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