News from the Secretariat

The IGU Secretariat's main activities since the last edition of the IGU Magazine (October 2009) are detailed below in news items and information from the Advisor & Press Contact (EG), the Secretary General's Advisor (FD) and the Assistant (JVD) to the Secretary General.

● Presence in Buenos Aires during WGC2009

During the World Gas Conference (WGC) in Buenos Aires the Secretariat had a joint booth with the WGC2012 National Organising Committee. The 84 m² booth enjoyed a prominent position at the entrance to the exhibition area of La Rural and was visited by many of the WGC delegates. This was a good opportunity for the Secretariat to inform delegates about recent IGU developments and to establish contacts, some of which could lead to new members. The booth cooperation with WGC2012 will be repeated during LNG16 in Oran, Algeria, April 18-21.

Members and delegates visiting the IGU/WGC2012 booth appreciated the fact that they were able to pick up the October 2009 issue of the IGU Magazine and the following new IGU publications:

- 2009-2012 Triennial Work Programme;
- Guiding Principles for Sustainable Development (updated October 2009);
- Natural Gas – Part of the Solution to Global Climate Change;
- IGU organisation chart 2009-2012;

Torstein Indrebø, Secretary General.

Hans Riddervold, Senior Advisor.

Erik Gonder, Advisor & Press Contact.

Florijana Đedović, Advisor to the Secretary General.

Jeanet van Dellen, Assistant to the Secretary General.

Åse Nicolaysen, Administration Assistant.

- IGU general brochure;
- IGU Gas Efficiency Award 2008/2009 & Social Gas Award.

For details of all publications and documents available from IGU, please see pages 214-215.

EG

Meetings of the Executive Committee and Council

The last Executive Committee and Council meetings under the Argentine Presidency took place immediately before the WGC opening ceremony.

More than 150 delegates thanked the Argentine Presidency for a successful and excellent Triennium. The Council conferred the title of Honorary President on Ernesto A. López Anadón and the title of Honorary Member on Roberto D. Brandt, while IGU Diplomas were given to the Chairman and Secretary of the 24th WGC National Organising Committee, the outgoing Secretary of the Coordination Committee, the Chairs and Secretaries of the Technical Committees and Task Forces for 2006-2009, Secretariat secondee Florijana Đedović and her sponsoring company Plinacro.

Back in 2005 the Council elected Malaysia to take over the Presidency for 2009-2012. At the 2009 meeting delegates formally acclaimed Datuk Abdul Rahim Hashim as President of IGU for the 2009-2012 Triennium and Ho Sook Wah as the Chairman of the Coordination Committee. The Council also elected new representatives for the 2009-2012 Executive Committee.

In addition, the Council approved a number of innovations for the 2009-2012 Triennium.

The IGU/WGC2012 booth enjoyed a prominent position and was visited by many delegates.

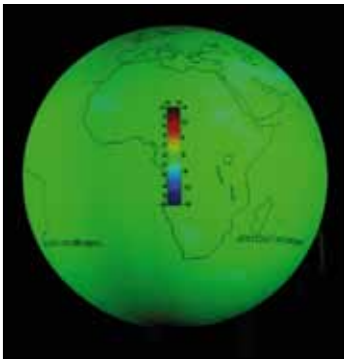
- Regional Coordinators will be appointed for four regions:
  - Europe and the Commonwealth of Independent States (CIS);
  - Asia and Asia-Pacific;
  - North and South America;
  - Middle East and Africa.
- There will be more focus on the role of gas in sustainable development.
- There is an increase in the maximum number of representatives from the Associate Members on the Executive Committee.

For further details, please see pages 44-47.

FD

IGU at COP15

IGU participated actively in the UN Climate Change Conference in Copenhagen (COP15) in December 2009. On its stand and in the corridors of the Bella conference centre, IGU promoted



IGU participated actively in COP15.

natural gas as the cleanest fossil fuel in terms of CO_2 emissions and particulates, while a focus was put on natural gas as being a sustainable long-term energy carrier in addition to playing a major role alongside renewable energy sources as we move towards a low-carbon future.

A new publication on natural gas vehicles (NGVs), together with the other IGU brochures, was distributed to the delegates at COP15. IGU Management also participated in relevant side events together with COP15 delegations and decision makers.

An IGU Gas Event with more than 110 participants was hosted on December 13, 2009, and it included key speakers such as Nobuo Tanaka (IEA), Jos Delbeke (European Commission), CEOs from Dong Energy and Statoil in addition to other high-level speakers. Please see pages 126-129 for a full report.

EG

● 2nd IEF-IGU Ministerial Gas Forum

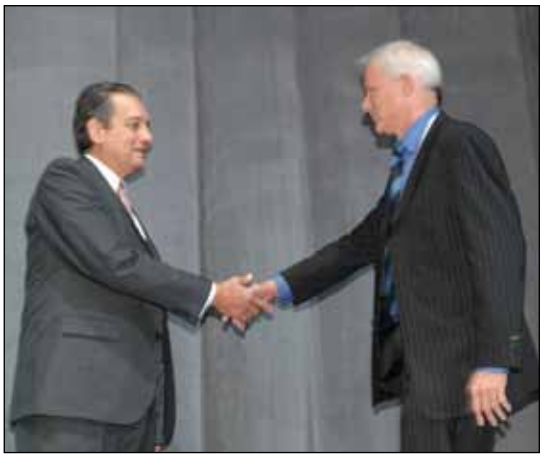
Qatar will host the 2nd IEF-IGU Ministerial Gas Forum thanks to an invitation from HE Dr Mohammed Saleh Al-Sada, Minister of State for Energy & Industry Affairs. The Forum will take place in the capital, Doha, on November 30, 2010, and the theme is expected to be the role of natural gas in a sustainable energy future.

Organised by the International Energy Forum (IEF) and IGU, the Ministerial Forums gather ministers and industry leaders in order to enhance the dialogue between gas producing and gas consuming countries.

The 1st IEF-IGU Ministerial Gas Forum was held in Vienna on November 24, 2008, with over 100 participants including ministers and delegates from gas producing and consuming countries, top executives from industry and senior officials from international organisations.

More information on the 2nd IEF-IGU Ministerial Gas Forum will be published on the IGU website.

EG



Paul Vloon (TOP) and Mohammad Rezaei (ABOVE) received their awards at the 24th WGC.

● IGU Gas Efficiency Award 2008/2009 and Social Gas Award

During the Argentine Triennium, the IGU Gas Efficiency Award and IGU Social Gas Award were launched. For further details, please see previous issues of the IGU Magazine.

The winner of the very best project from all those competing for the IGU Gas Efficiency Award in 2008/09 was Paul Vloon, The Netherlands, while the winner of the IGU Social Gas Award was Mohammad Rezaei, Iran. Both were invited to the 24th WGC in Buenos Aires, where they received their awards from the President and the Secretary General during the opening ceremony.

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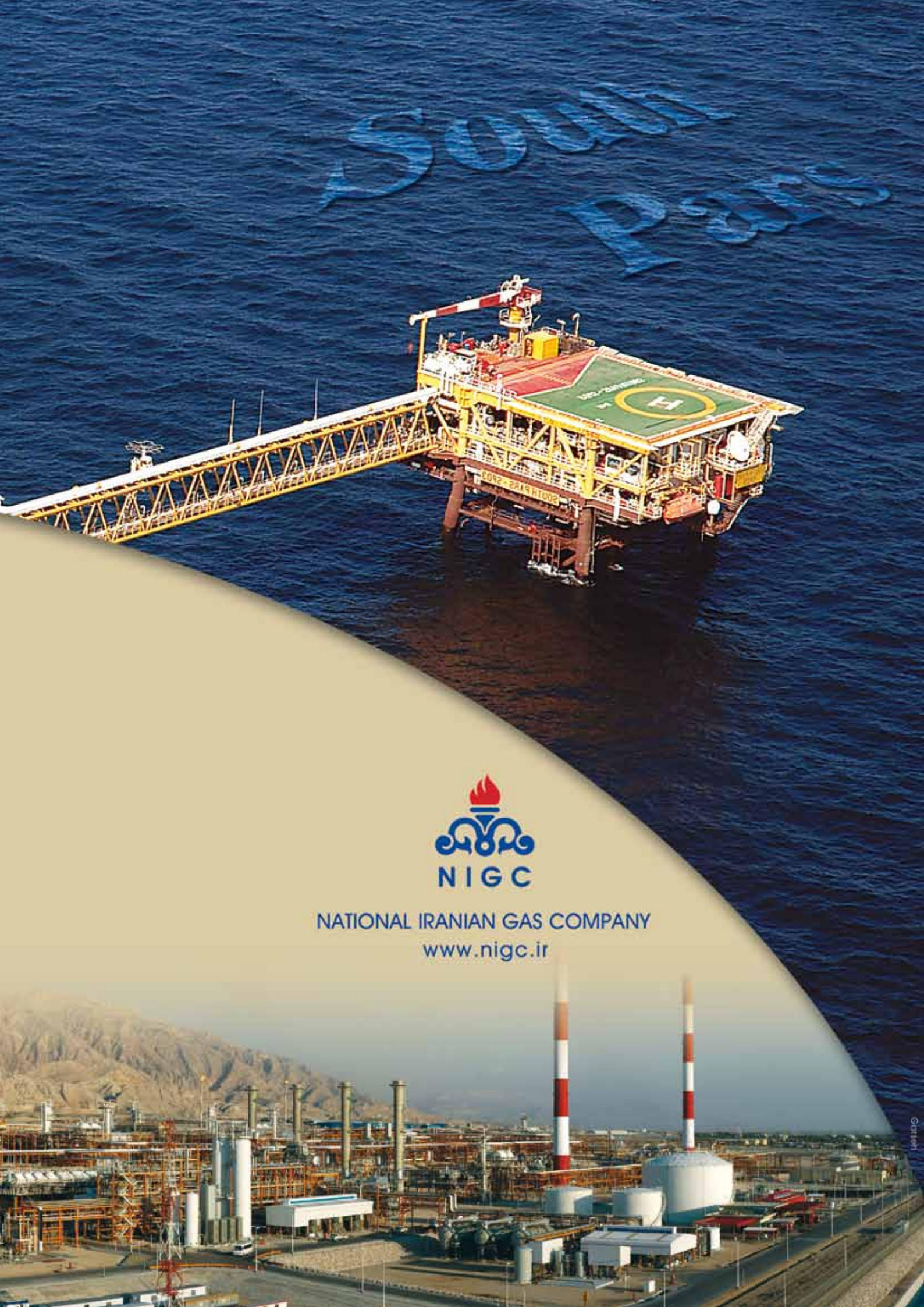
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A booklet was published with abstracts of the proposals received for the IGU Gas Efficiency Award 2008/2009 and the IGU Social Gas Award. This was made available at the 24th WGC and can now be ordered from the IGU Secretariat.

FD

Awards in the Malaysian Triennium

The IGU Gas Efficiency Award and the IGU Social Gas Award will be continued in the Malaysian Triennium, although evaluation of the first awards process has led to revised guidelines. The first important change has been to alter the timeframe from annual to triennial as the culmination of the awards at the WGC was very successful. Furthermore, IGU experts from the IGRC Technical Programme Committee and Programme Committee A on Sustainability will carry out the initial screening of the projects. The full guidelines are available on the IGU website.

As there is a lot of knowledge and many good ideas in the IGU community, we are looking forward to receiving a wide range of interesting proposals for the awards in this Triennium.

JVD

IGU at international events

WEC Executive Assembly

The World Energy Council (WEC) held its 2009 Executive Assembly in Reykjavik, Iceland, September 16-19. The Secretary General attended this event and gave an update from IGU.

DVGW's 150th anniversary

The celebration of 150 years of the German Technical and Scientific Association for Gas and Water (DVGW) took place in Leipzig, Germany, on September 22 & 23, 2009. DVGW was one of IGU's founding members and Germany is one of the most important gas markets in Europe. The Advisor & Press Contact, Erik Gonder, attended the celebration which was an opportunity to meet representatives of the country's gas community.

Eurogas

IGU Charter Member Eurogas held its Annual Policy Conference in Brussels, Belgium, on October 1, 2009. The conference engaged around 200 participants in a wide debate on the global challenges facing the natural gas industry. IGU was represented by the Advisor & Press Contact.

5th Asian Pipeline Conference

The Asian Pipeline Conference (APCE) is an annual event to promote dialogue and information exchange between pipeline professionals within the region, especially the ASEAN countries. The President officiated at the 5th APCE, which was held in Kota Kinabalu, Malaysia, October 28-29, 2009. It was attended by more than 100 participants comprising delegates, speakers, exhibitors and visitors.

Moscow, Russia

The 4th International Energy Week was held in the last week of October 2009 with the support of the Russian Ministry of Energy, Chamber of Commerce & Industry and Academy of Sciences. Vice President Jérôme Ferrier represented IGU and gave a keynote speech entitled "Natural Gas in a Global Perspective".

The Secretary General addressed the 7th Annual International Forum in Moscow in November. He is seen here with Valery A. Yazev, who is the President of the Russian Gas Society and Deputy Chairman of the State Duma.

Moscow was also the venue of the 7th Annual International Forum organised by IGU Associate Member the Russian Gas Society. "Gas of Russia – 2009" was held on November 17, and IGU supported the event with the Secretary General giving a keynote address. The main topics of the forum were "Russia-EU Cooperation – overcoming the trust crisis" and "Developing the Russian Domestic Market".

Autumn Gas Conference, Czech Republic

The annual Czech Autumn Gas Conference took place in Karlovy Vary on November 2 & 3, 2009. It was organised by IGU Charter Member the Czech Gas Association. The President attended this event and gave a keynote speech entitled "Global Gas Perspective: Gas Sources for the Future".

International Energy Week, Malaysia

This international conference was held at the Borneo Convention Centre in Kuching, capital of the Malaysian state of Sarawak, November 3-5, 2009. It was staged in support of the Malaysian Government's initiative to harness the tremendous opportunities in the energy sector in Sarawak. The Chairman of the Coordination Committee, Ho Sook Wah, spoke at the conference.

Sofia, Bulgaria

Following a successful launch in 2008, the international conference "Energy and Climate – New Priorities" was organised for the second time in Bulgaria. This time the conference took place in Sofia on November 4 & 5, 2009. The Advisor & Press Contact represented IGU and gave a presentation on "Natural Gas and Climate".

Ashgabat, Turkmenistan

The 14th Turkmenistan International Oil & Gas Conference 2009 (OGT 2009) took place in Ashgabat, Turkmenistan, November 17-19, 2009. Turkmenistan has the world's fourth largest gas reserves and is a strategically important country as the "fourth corridor" for European supplies (the first three corridors being Russia, the North Sea and North Africa). IGU supported the conference and the Secretary General gave a presentation.

During his visit to Ashgabat in November, the Secretary General met Nury Muhammedov, Chairman of Turkmengaz.

The visit to Ashgabat gave the opportunity of a meeting with Nury Muhammedov, the Chairman of Turkmengaz, to discuss the possibility of Turkmenistan joining IGU. After learning about the Union and its activities, Mr Muhammedov expressed a clear interest in IGU membership.

2nd WPC Youth Forum

The World Petroleum Council held its second Youth Forum in Paris, France, November 18-20, 2009. About 1,200 young professionals, students and experts from 110 countries attended the event, themed "Energise Your Future". IGU was represented by the Chairman of the Coordination Committee and the Chair of Task Force 2.

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REDISCOVERING ENERGY

The President addressed the Slovak Gas and Oil Association's conference in November.

Abuja, Nigeria

IGU Charter Member the Nigerian Gas Association (NGA) celebrated its 10th anniversary on November 23 & 24, 2009, with events including a special symposium on "The Gas Millenium: Strategic Focus for National Development". The symposium had high-level participation at Ministerial level and discussed the gas masterplan of Nigeria and other critical issues related to the domestic use of gas. The Secretary General attended and supported the event. Please see pages 210-211 for a report from the NGA.

Bratislava, Slovakia

A two-day conference organised by the Slovak Gas and Oil Association on November 24 & 25, 2009, focused on the "Safety of Natural Gas Supplies in Central European Countries". The President was invited to be one of the three speakers for a strategic panel session together with the Slovak Minister of Economy and a representative of Gazprom.

10th Annual World LNG Summit

The 10th Annual World LNG Summit took place in Barcelona, Spain, December 1-4, 2009. More than 400 delegates from over 40 countries debated the challenges and opportunities facing the global LNG industry. IGU was represented by the President.

Human Resources Forum

The Oil and Gas Human Resources Forum is organised annually by Schlumberger Business Consulting. The 2009 event focused on "Leadership Development in Turbulent Times" and was held in Paris, France, December 14-16. The President spoke on "Leadership and Business Turbulence". The CC Chairman was also at the event.

UN Economic Commission for Europe (UNECE)

The Working Party on Gas of the UNECE's Committee on Sustainable Energy marked its 20th year jubilee on January 19 & 20, 2010, with

The Advisor to the Secretary General gave a presentation to the UNECE meeting this January.

several round tables and presentations from international organisations. The Secretary General participated in the round table on LNG where he gave a presentation on the LNG activities of IGU and updated the audience on the Union's current organisational structure.

Florijana Đedović, Advisor to the Secretary General, presented IGU's report on how the gas industry can contribute to the mitigation of climate change, explaining the role natural gas can take in a sustainable energy future. The presentation was well received and the management of the UN Sustainable Energy Division expressed strong interest in greater cooperation with IGU in this field.

IGU has enhanced its cooperation with UNECE recently, and many IGU experts provide important support and expertise to the activities of the Working Party on Gas.

FD

Florijana says goodbye

After two years as a secondee it is time to say goodbye to the IGU Secretariat, to Oslo and to Norway. The secondment programme has been the experience of a life-time, giving me the opportunity to obtain international experience and meet the fascinating IGU community.

I started in April 2008 as Assistant to the Secretary General, and was promoted to Advisor to the Secretary General in November 2009. During my secondment I have had a range of different and evolving assignments, from researching data and learning about IGU and the other energy organisations to dealing with my own project and giving speeches at international conferences.

I have had the opportunity not just to observe how a small team of six people works to promote the progress of the gas industry – internally, externally, regionally and globally – but to be a member of that team, helping to prepare a range of gas events. Let me mention only recent ones such as the World Gas Conference 2009 in Buenos Aires and the IGU Gas Event during COP15 in Copenhagen. Moreover, working in cooperation with other organisations and companies has been very interesting and has widened my experience.

My secondment started in one Triennium and is ending in another, so I have had the pleasure of working with both the Argentine and Malaysian Presidents and their respective teams. The monthly video conferences with the Presidency produced many fascinating and fruitful ideas, helping to promote the gas industry worldwide.

The IGU secondment programme is a remarkable opportunity for young professionals to work at the heart of the gas industry at a very dynamic time for the energy world. It also offers their sponsoring companies an opportunity to raise their profiles.

I would like to thank all the colleagues with whom I have worked, including the members of the Executive Committee and Council, and of course the Argentine and Malaysian Presidencies. And finally, a big thank you to each member of the IGU Norwegian Secretariat for their unconditional help and support to a secondee living abroad.

FD

GTI affiliated to IGU

Gas Technology Institute (GTI) of the USA has become the 11th Organisation Affiliated to IGU.

GTI is a non-profit Research & Development organisation dedicated to the development and deployment of technology solutions that contribute to a secure, abundant and affordable energy future. GTI is based in Des Plaines, Illinois, on a campus which includes a headquarters building housing modern laboratory and research facilities, offices, training facilities and an extensive library. In addition, 28 specialised laboratory facilities are used for the development and testing of advanced energy technologies.

GTI seeks to solve important energy challenges and create value by turning raw technology into practical solutions related to the whole industry value chain. Its key objectives are:

- Expanding the supply of affordable energy;
- Ensuring a safe and reliable energy delivery infrastructure; and
- Promoting the efficient use of energy resources.

IGU and GTI have a history of cooperation in organising the IGRC and LNG conferences. This summer IGU will be co-hosting the GTI conference on "Global Unconventional Gas 2010: Unlocking your potential". This conference is designed to further the worldwide development of UCG resources and transfer knowledge and best practices gained in the US to the rest of the world. It will be held in Amsterdam, The Netherlands, June 15-17.

IGU is pleased to put the cooperation with GTI on a more formal footing by welcoming it as an Affiliated Organisation.

For more information on GTI, visit www.gastechnology.org.

JVD

Record Numbers at the 2009 Council Meeting

By Mark Blacklock

IGU Council meetings held immediately before a World Gas Conference traditionally enjoy a bigger turnout than normal but the 2009 event in Buenos Aires surpassed all records with over 150 participants. This also reflected the volume of business including the formal anointing of IGU's new team for the 2009-2012 Triennium, the accession of nine members, agreement to appoint regional coordinators, the creation of a new working group and elections for an expanded Executive Committee.

The Council meeting was held at the Hilton Hotel in the Puerto Madero district of Buenos Aires on October 5, following sessions of the Coordination Committee and the Executive Committee.

Convening his last Council as President, Ernesto López Anadón reviewed events since the previous Council meeting, and invited reports from the Secretary General, Torstein Indrebø, on the 1st IEF-IGU Ministerial Forum and Immediate Past President, George Verberg, on IGRC2008. He then asked delegates to approve the changing of the IGU guard for the 2009-2012 Triennium. They duly acclaimed Datuk Abdul Rahim Hashim as President, Jérôme Ferrier as Vice President and, for the Coordination Committee, Ho Sook Wah as Chairman, Georges Liens as Vice Chairman and Ungku Ainon Ungku Tahir as Secretary.

Taking the floor, Datuk Rahim paid tribute to the outgoing team and declared, "The Malaysian Presidency will carry the torch of IGU ensuring that the Union remains relevant to the industry and its members".

IGU development

Ernesto López Anadón then presented the recommendations of the working group set up to consider IGU's future development.

Ernesto López Anadón convening his last Council as President.

"The gas industry is global but has strong regional characteristics," he pointed out, asking delegates to approve the appointment of four Regional Coordinators for the 2009-2012 Triennium. This they did, and the idea is to see how the initial regional structure (Europe and the CIS, Asia-Pacific, the Americas, Middle East and Africa) works out before formal amendments to IGU's Articles of Association are made for the 2012-2015 Triennium.

Delegates also agreed to enhance the role of Associate Members by increasing the number of their representatives on the Executive Committee from three to five.

And they approved the creation of a new working group for sustainable development. This will be chaired by the Secretary General and will look at ways of enhancing the promotion of one of IGU's key messages: the contribution of natural gas to mitigating climate change.

Finally, delegates considered proposals to split the Presidency and the World Gas Conference, and levy a royalty on the WGC. Since IGU's foundation in 1931, the country holding the Presidency has hosted the WGC at the end of its Triennium. But as hosting and underwriting a WGC demands significant financial as well as managerial resources, this restricts the pool of candidates to Charter Members from wealthier countries. Splitting responsibility would allow those who may have the vision and capabilities to assume the leadership of IGU but are wary of the WGC commitment to bid for the Presidency.

This aroused the most debate with some delegates reluctant to change the traditional structure. However, the option of split responsibilities does not rule out one country bidding for both the Presidency and the WGC, and the proposal was approved as was the power to introduce a WGC royalty. Details will be finalised by the management team, and the changes are likely to take effect from the 2015-2018 Triennium.

There was a record turnout for the 2009 Council meeting.

Executive Committee elections

The Council's approval of increased representation for Associate Members on the Executive Committee set its new size at 26. With five seats reserved for the Associate Members, five seats for IGU's management team (excluding the Secretary General) and 10 seats for the Charter Members chairing the Technical Committees, this left six seats to be contested by other Charter Members. There were 10 candidates and delegates voted in Canada, the Czech Republic, Korea, Norway, Russia and the USA.

The new Triennium

Datuk Rahim and Ho Sook Wah then took the floor to give a presentation on the 2009-2012 Triennial Work Programme (TWP) and seek formal approval for the 32 study topics, which were published in the last issue of the IGU Magazine along with an introduction to the Malaysian Triennium (see October 2009, pages 117-131). Ho Sook Wah reported that nominations to the Technical Committees had got off to an excellent start and that more were welcome: "We want as many IGU members as possible to be involved". He also explained that there had been some changes to the Committee leadership since the TWP was originally published (see box for the updated leadership).

Next up was Datuk Wan Zulkiflee, Chairman of the National Organising Committee (NOC) for

The Council approved the accession of nine members – Ernesto López Anadón welcomes Hans Kristian Danielsen of new Associate Member Det Norske Veritas as the Secretary General looks on.

WGC2012. He briefed delegates on initial preparations for what will be the 25th WGC, which will be held in the Kuala Lumpur Convention Centre, June 4-8, 2012. The venue is conveniently situated with a range of adjacent hotel accommodation. Conference organiser CWC and exhibition specialist ETF have been appointed to work with the NOC.

New members

After the coffee break, the President invited eight of the nine applicants for membership to make short presentations (Gaslink having sent its apologies for not being able to send a representative). Delegates then approved the accession of Sonangol Gás Natural of Angola, Sociedad Nacional de Gas of Equatorial Guinea and the Secretariat of State for Natural Resources, Government of the Democratic Republic of Timor-Leste as Charter Members, and of BG Group (UK), Det Norske Veritas (Norway), Gaslink (Ireland), Sonorgás (Portugal), Spetsneftegaz (Russia) and Vopak LNG Holding (The Netherlands) as Associate Members.

The President said that Bolivia had indicated that it would apply to rejoin soon but that the Charter Member for Hungary and Associate Members the Interstate Natural Gas Association of America (USA) and the Union of Independent Gas Producers (Russia) would cease to be members with effect from the end of 2009. Naturgas Fyn (Denmark) subsequently announced that it would not be renewing its Associate membership, so IGU now has a total of 107 members (74 Charter and 33 Associate) from 73 countries.

Other business

Amongst other business, delegates approved IGU's accounts for 2008 and the budget for 2010. They were informed that IGU's awards scheme is being revised with a single contest in each category (efficiency and social) for the Triennium as a whole rather than having annual winners and then a triennial run-off. And they heard from the Secretary General about plans to develop an external publications strategy. "We should make better use of all the excellent reports produced by the Committees," he said.

Noé van Hulst, Secretary General of the International Energy Forum (IEF), was invited to give a presentation on IEF and its work. "One of our biggest challenges for the coming years is extending the Joint Oil Data Initiative (JODI) to cover gas data," said van Hulst, "we need your cooperation and help." He confirmed that the 2nd IEF-IGU Ministerial Forum would take place on November 30 in Doha, Qatar.

Delegates were also briefed on the final preparations for LNG16 by Dr Chawki Mohamed Rahal, Algeria's representative on the Executive Committee.

Honours

There remained one very important item of business, the formal recognition of all the hard work that had gone into making the 2006-2009 Triennium a great success. The Council conferred the title of Honorary President on Ernesto López Anadón and that of Honorary Member on Roberto D. Brandt, the outgoing Chairman of the

Coordination Committee. IGU Diplomas were awarded to the Chairman and Secretary of the NOC for WGC2009, Eduardo Ojea Quintana and Graciela Ortolá, the outgoing Secretary of the Coordination Committee, Andrés Kidd, and the Chairs and Secretaries of the Technical Committees and Task Forces for 2006-2009.

Diplomas were also awarded to Florijana Đedović, who was seconded to the Secretariat in April 2008 for two years and was attending her last Council meeting, and Jenko Jelić, President of the Board of her sponsoring company Plinacro.

Traditionally the last word at a Council meeting goes to the senior Honorary President present, and John Kean closed the proceedings by thanking Ernesto López Anadón for his work as President.

After lunch, delegates proceeded to the Luna Park auditorium for the opening ceremony of the 24th World Gas Conference.

Mark Blacklock is the Editor-in-Chief of International Systems and Communications.

COMMITTEE LEADERSHIP 2009-2012

Committee	*Chair*	*Vice Chair*
WOC 1 Exploration and Production	Kamel Eddine Chikhi Algeria	Márcio Félix Carvalho Bezerra Brazil
WOC 2 Storage	Hélène Giouse France	Ladislav Goryl Slovak Republic
WOC 3 Transmission	Eric Dam The Netherlands	Jorge Bonetto Argentina
WOC 4 Distribution	Alessandro Soresina Italy	Dietmar Spohn Germany
WOC 5 Utilisation	Tatsuo Kume Japan	Eugene Pronin Russia
PGC A Sustainability	Juan Puertas Spain	Satoshi Yoshida Japan
PGC B Strategy	Dr Colin Lyle UK	Fethi Arabi Algeria
PGC C Gas Markets	João Batista de Toledo Brazil	Jung Gi Chul Korea
PGC D LNG	Alaa Abujbara Qatar	Dirk Anne van Slooten The Netherlands
PGC E Marketing	Marc Hall Germany	Roland Mett Spain
TF 1 Building Strategic Human Capital	Ieda Gomes UK	Rod Kenyon UK
TF 2 Nurturing the Future Generations	Soh Mey Lee Malaysia	Agnès Grimont France
TF 3 Geopolitics of Natural Gas	Mel Ydreos Canada	Geert Greving The Netherlands

Technip: LNG from design to delivery

Technip, in joint venture, is finalising the world's six largest LNG trains (7.8 Mtpa each) through EPC contracts with Qatargas II (Trains 4 and 5), RasGas III (Trains 6 and 7) and Qatargas III and IV (Trains 6 and 7). These projects will allow Qatar to become the world's largest LNG producer with some 77 Mtpa. Also in the Middle East, Technip through its Yemgas joint venture is completing a major lump sum turnkey contract with Yemen LNG Company Ltd (YLNG) for the country's first LNG plant. The first train of YLNG started production in October 2009 and has been producing steadily ever since.

At the other end of the scale, Technip is building a two train mid-scale liquefaction plant in Yinchuan, China.

In the emerging market of floating LNG, Shell signed in July 2009 a master agreement with a consortium comprising Technip and Samsung for the design, construction and installation of multiple Floating Liquefied Natural Gas (FLNG) facilities over a period of up to fifteen years.

Preparing the next generation of onshore LNG plants, Technip is performing engineering studies, pre-FEED's and FEED's, for several projects in Australia, Russia, and elsewhere.

Continuous R&D activities allow Technip to offer innovative solutions for the benefit of investors in LNG production plants:

- Efficient Nitrogen Removal process applied in several Middle East projects
- Cryomax®. Deep NGL extraction integrated into the liquefaction scheme
- Highly efficient refrigerant evaporators and condensers in association with tube manufacturer Wieland
- Increased LNG production with the MLP gas phase sub-cooling cycle
- New technologies for terminals including cryogenic flexible pipe, rigid pipe-in-pipe, and complete transfer systems

Technip is a world leader in the fields of project management, engineering and construction for the oil & gas industry, offering a comprehensive portfolio of innovative solutions and technologies.
With 23,000 employees around the world, integrated capabilities and proven expertise in underwater infrastructures (Subsea), offshore facilities (Offshore) and large processing units and plants on land (Onshore), Technip is a key contributor to the development of sustainable solutions for the energy challenges of the 21st century.
Present in 46 countries, Technip has operating centres and industrial assets (manufacturing plants, spoolbases, construction yard) on five continents, and operates its own fleet of specialised vessels for pipeline installation and subsea construction.
The Technip share is listed on Euronext Paris exchange and over the counter (OTC) in the USA.

A leading LNG plant designer and EPC contractor

With 45 years of experience, Technip is established as a world leader in the conceptual design, engineering and construction of facilities for gas production, processing, liquefaction, regasification, storage and handling.

First International Assignments for IGU's New President

By Zenorai Rambli

The Czech Republic was the scene for Datuk Abdul Rahim Hashim's first international assignment as President after being officially appointed during the closing ceremony of the 24th WGC. He was invited by the Czech Gas Association to be a keynote speaker at its 2009 Autumn Gas Conference, which was held in Karlovy Vary, November 2-3.

There were over 400 participants who attended a workshop on the first day in which high-profile speakers including Datuk Rahim shared their insights and views on key gas issues. In addition, participants had opportunities to address their concerns on technical and commercial issues to speakers through the breakout sessions on the second day.

In his address entitled "Global Gas Perspective: Gas Sources for the Future", Datuk Rahim highlighted the need for natural gas to position itself to become the fuel of choice in the quest to achieve a cleaner environment and a more stable climate. Besides serving as the main engine for economic growth, he said, natural gas will continue to play an important role in satisfying the world's burgeoning needs, while helping to reduce greenhouse gas emissions that remain a persistent threat to global growth, quality of human life and environmental sustainability.

Datuk Rahim addresses the Czech (ABOVE) and Slovak (OPPOSITE) conferences.

He added that the concerted efforts of all stakeholders – suppliers, producers, service providers, customers, policymakers, key regulators and government alike – are crucial to promote natural gas as the fuel of today and of the future.

Slovakia

Datuk Rahim was back in Europe later that month to address a conference organised by the Slovak Gas and Oil Association in Bratislava, November 24-25.

An interruption in gas supplies in early 2009 brought home to the Central European countries known as the Visegrad 4 (the Czech Republic, Hungary, Poland and Slovakia) the need to cooperate more closely on energy security. The Slovak Gas and Oil Association's conference on the "Safety of Natural Gas Supplies in Central European Countries" was a contribution to the debate on ways of achieving closer cooperation. The two-day event was attended by over 100 industry experts and policymakers.

Datuk Rahim was invited to be one of the three speakers for a strategic panel session. Noting that the V4 countries are major gas importers, he pointed out that there is increasing awareness of the key role played by geopolitical issues in ensuring the security of gas supplies. For that reason, he explained, IGU has set up a special Task Force during the 2009-2012 Triennium, which will prepare a study on "Geopolitics and Natural Gas".

With regards to trans-European solutions, Datuk Rahim highlighted the importance of diversification to enhance supply security. This will minimise investment risks along the gas supply chain, covering exploration, development and production as well as transportation to end-users. It is crucial, he said, to ensure that gas infrastructure systems are in place and operational before gas sources are imported or piped to gas consuming countries.

Looking at Central European solutions, Datuk Rahim concluded with the idea of turning the challenges faced by Central European countries into new opportunities via:

- Forging energy cooperation through promoting an on-going dialogue between EU members and Russian gas company, Gazprom;
- Leveraging advanced technology to enhance the security of future gas supplies by commercialising unconventional gas resources; and
- Last but not least, continuing to position natural gas as the "fuel of choice" as part of a long-term solution to fulfil the world's burgeoning energy demands.

Both of these well-organised conferences stimulated valuable debate and helped develop new contacts.

Zenorai Rambli is the Secretary General of the Malaysian Gas Association.

UK Energy Excellence

The UK is home to many of the world's most skilful, experienced and flexible gas contractors, working at every stage of the supply process, from the sub-surface geology to the cooker in your kitchen.

The range of abilities and understanding shown by UK contractors make them the ideal partner for complex and multi-faceted gas projects. These contractors are backed-up by an equally impressive supply chain.

The UK gas supply chain is adaptable, efficient, innovative and offers world-class products and services. This globally respected industry is supported by a tradition of academic, engineering and professional excellence. The UK's specific strengths include project management, major contracting, design engineering, asset and operational management, design and manufacturing of advanced equipment, research and development, training and education, professional and financial services. All delivered with a total commitment to health, safety and the environment. Many UK companies are providing leading edge solutions for the gas industry – smart metering, secure gas storage, carbon capture, reservoir analysis, gas processing, advanced pipeline and network engineering, asset management and maintenance.

Over a number of years the UK has built up a framework for training all levels of the workforce in the key elements of working safely with gas from design engineers to operatives working on pipelines, production plant, drilling rigs or in consumer's premises. Major UK companies and a range of specialist providers deliver both training and continuous professional development. Such training is backed by a number of nationally or internationally accredited schemes to review and assess the competency of the people involved.

The world-class nature of the UK gas sector is well known, but not quite as well known as it should be. This is not due to a lack of ability, but a lack of publicity. UKTI is determined that the UK energy sector generally (and the gas sector specifically) will come to be seen around the world as the most desirable international energy partner. That is the reason for the UK Energy Excellence Marketing Strategy.

UK Energy Excellence

The UK Energy Excellence International Marketing Strategy was launched in December 2007, for everyone working in UK Energy or involved in its future. The strategy's aim is to provide a single, compelling voice that can be heard across the globe announcing the UK as the destination of choice for energy trade and investment. For the purposes of the strategy, UK Energy encompasses: biomass (derived from animal and vegetable products), fuel cells, geothermal sources, hydrocarbons, hydroelectric, nuclear, solar, tidal, wave and wind.

Specific markers of success for the UK energy sector will be: extending its expertise across energy sub-sectors; cutting edge businesses learning from established sectors; increasing R&D capability; an enhanced international reputation; a rise in investment and trade; job creation; increased revenues; and improved customer satisfaction. UK energy companies currently generate revenues of more than £90 billion from domestic and international business and employ 600,000 people. This is expected to rise to £200 billion and one million employees by 2030.

One of the key outputs of the Strategy is the UK Energy Excellence website, to showcase to potential overseas buyers and investors, what the UK energy sector can offer. Through the website, an extensive suite of promotional and marketing material on UK Energy Excellence has been made available online to UK companies.

To find out more, visit:
www.ukenergyexcellence.com

Another important output of the Strategy, so far, is the unified UK Energy brand that was launched last year. This overall brand, along with a framework of associated messaging, unites all of the UK energy sector's skills and capabilities within one distinctive identity, focusing on the key strengths of Innovation, Quality, Adaptability, Sustainability and Knowledge.

UK TRADE & INVESTMENT

UK ENERGY

The UK has always been a pioneer in the energy sector. The eighteenth and nineteenth centuries saw the birth of the industrial revolution powered by water and coal. In the twentieth century we developed new technologies to access the oil and gas reserves of the harsh environment of the North Sea. The twenty first century sees the UK as a world leader in wave and tidal power systems and other low carbon technologies.

Today the UK energy sector has an enviable reputation around the world founded on five key principles:

Innovation

One of our most important abilities is to look at challenges and problems afresh and take a different perspective. We are known for being pioneers.

Quality

We are respected and trusted throughout the world for our quality of work and the reliability this brings. We also have a reputation for working hard to deliver to specification. We are seen as a safe pair of hands.

Adaptability

We are not rigid in our thinking and are considered flexible and open to ideas. The solutions we offer are diverse. Solutions right across the energy mix, solutions that are truly cross-border.

Sustainability

We have a keen eye to the future and are looking for sustainable energy solutions not just for the UK but also worldwide. Whether it is the more sensible use of existing energy sources or the development of new technologies, our focus is on long-term sustainable change, not short-term gain.

Knowledge

Perhaps our most valuable and unique resource is our workforce who underpin our excellence in energy. Their exceptional skills and abilities are founded on a firm foundation of first class education and training. The breadth of our energy expertise means that we are trusted worldwide.

To find out more on partnering with UK Energy visit UK Trade & Investment (UKTI) at **www.ukti.gov.uk** or call **+44 (0)20 7215 8000.**

UK Trade & Investment is the government organisation that helps UK based companies succeed in the global economy and assists overseas companies to bring their high quality investment to the UK.

UK TRADE & INVESTMENT

Delivering energy excellence

News from Organisations Affiliated to IGU

In this issue we have reports from the International Association for Natural Gas Vehicles (IANGV), International Pipeline & Offshore Contractors Association (IPLOCA), European Gas Research Group (GERG) and International Group of LNG Importers (GIIGNL).

Natural Gas Driving Transport Revolution

By Brett Jarman

Over recent centuries mankind has witnessed two major land transport revolutions. First coal made its mark, fuelling the steam train, then came oil as the primary fuel for the internal combustion engine. Right now we are at the threshold of a new age as we witness the natural progression from solid- to liquid- to gas-based fuels. Already fuelling more than 11 million vehicles worldwide and with 65 million projected by the end of this decade, natural gas is making its mark and setting the stage for the third major land transport revolution.

More than 1.3 million NGVs joined the world fleet last year.

The natural gas vehicle (NGV) industry is celebrating this evolving picture on a daily basis, with a highlight this year being IANGV's 12th Biennial Conference and Exhibition, NGV 2010 – "Creating a Revolution in Transport" – in Rome, June 8-10.

A few industry highlights from 2009 show the revolution in action (see over). For IGU members, and other gas industry players, these highlights also signal opportunity for the natural gas industry overall. The dynamics of world energy markets are shifting dramatically and natural gas is set to be the winner. As oil becomes harder and harder to find, natural gas is becoming available in ever increasing quantities, not just in fossil form but also as renewable biomethane. As well as becoming easier to find, it is also becoming easier to transport and to store.

With road transport accounting for more than 16% of world energy demand, the natural gas industry is poised to win big. Often though, the only thing standing in the way of progress for gas industry players is a degree of uncertainty – where to start, what to do, how to overcome barriers to entry, etc. It's a complex field, requiring balance between government policy, vehicle and equipment availability, gas supply dynamics and of course, commercial viability.

As complex as it is, it's clearly not an impossible field to succeed in. Early figures suggest that last year, more than 1.3 million NGVs joined the world fleet, taking us towards our current 2020 estimate of 65 million vehicles, or 9% of the world transport fleet. Countries such as Argentina, Pakistan, Brazil, Iran and India dominate the "top of the table" and prove that cost is not a valid reason to avoid infrastructure investment.

Though they aren't generating such high numbers, developed nations are beginning to pull impressive numbers in percentage terms. Italy, the longest and most established NGV market in the world, saw more than 6% of light duty sales off the showroom floor go to natural

LEFT
This UN approved international road signage for CNG is the outcome of an IANGV-led initiative. An implementation kit for industry members is being prepared by IANGV.

gas vehicles in 2009. This milestone demonstrates a maturing market and will mark a tipping point for a major shift to original equipment manufacturer (OEM) NGVs in this and other developed markets.

In the background of all this dynamic activity sits IANGV, quietly ticking away as an interface between players, a facilitator of information flow and an enabler of industry networks. Together with our regional and national affiliates we're engaged on a daily basis providing lubrication to the industry and removing obstacles to growth. Our involvement ranges from the dynamic, such as our forthcoming conference in June or responding to or creating media opportunities, to the "mundane", such as working with industry worldwide to harmonise industry standards, or working with the United Nations on initiatives such as international road sign conventions.

Another critical element in our work is our interaction with IGU, particularly through Study Group 5.3, focusing on utilisation of NGVs. A report of this group's work for the recently concluded Triennium was released (http://bit.ly/4n53o4) at the 24th World Gas Conference in Buenos Aires last October, coinciding with a Strategic Panel conducted by IANGV at the same event.

The outward changes in the industry are also being reflected on the inside, with IANGV conducting a major review of our rules and the introduction of a long awaited membership portal to allow our members to "associate" more regularly. After witnessing a five-fold increase in NGV numbers worldwide in the last decade, the incoming decade holds promise of even greater success.

Gas industry members are encouraged to become part of this success story. Join us for our conference in Rome this year or contact me directly to find out how you can be part of this exciting transport revolution!

Brett Jarman is the Executive Director of the International Association for Natural Gas Vehicles (www.iangv.org). He can be contacted at bjarman@iangv.org, tel: +61 2 6608 0011. For conference information visit www.ngv2010roma.com and to access weekly NGV industry news visit www.ngvglobal.com.

WHAT'S HOLDING YOU BACK?

Natural gas sales to the NGV sector are increasing worldwide by more than 10% each year, making NGVs a compelling opportunity for the natural gas industry. Despite the scale of the opportunity and its proven success, many gas industry members remain detached from the NGV industry. One of the IANGV projects this year is to find out directly from gas industry members what prevents them from becoming engaged in the NGV transport revolution. It might be due to insufficient policy support at the government level, lack of capital, insufficient know-how within the company, or even a case of "been there, done that, didn't work out". Whatever your reason might be, IANGV is interested in hearing directly from gas industry members to find out what obstacles might be holding them back from taking up the NGV opportunity. Industry members are invited to contact Brett Jarman, Executive Director directly at bjarman@iangv.org or by phone, +61 2 6608 0011.

● 2009 NGV Industry Highlights

AT&T announces world's largest single commitment to NGVs

$350 million spend on 8,000 NGVs over 10 years, 1,000 new or saved jobs for the next five years. AT&T sends signal not just to auto makers but policymakers and fleet operators worldwide.

Turbo charged OEM vehicles enter showrooms

Turbo charged OEM CNG passenger sedans and light commercial vehicles entered the market including releases of Volkswagen's Passat and Touran, Iveco's Daily in the UK and Samand's Soren in Iran. Turbo-charging is widely recognised as creating a quantum leap in the acceptance of diesel passenger vehicles in Europe and indications are that it could have the same impact with NGVs.

Win/win outcomes in motorsports events prove performance of NGVs

Not just a proving ground for NGVs but also a great avenue for publicity, motorsports are playing an increasing role in the NGV industry. OMV in Austria continued their success this year using a Subaru Impreza and a Mitsubishi Lancer Evo IX, both converted to operate on CNG and fuelled by biomethane, to take second position overall in the Austrian rally car championship. Driver and former world group N rally champion, Manfred Stohl, continues to be blown away by the success of the car, claiming at the end of the season "…the future will belong to gas powered cars…".

Meanwhile, it's not just converted CNG vehicles entering competition mode. Volkswagen has made an impressive commitment entering high performance CNG Sciroccos into track events in Germany and Sweden, including a second placing in the Swedish touring car championship. Taking it one step further, Volkswagen will next year commence a "one make" event consisting entirely of biomethane fuelled CNG Sciroccos.

World records

Still on the track, the world's fastest CNG passenger vehicle, a 700 hp Audi A4, clocked 364.6 km/h at the Nürburgring F1 racetrack in Germany. Fuelled by biomethane the success was verified by the Guinness Book of World Records.

VW Passat TSI Ecofuel – proving a winner with motorists and turbo charging the NGV industry.

US policy pendulum swings in favour of NGVs

In the aftermath of the 2007/8 oil price hikes and local financial conditions, alternative fuels reap the rewards of US stimulus package funding, qualifying for 19 of 25 alternative fuels projects under a $300 million programme. This is just one of several policy initiatives in the US indicating growing recognition that NGVs are a solution to many economic, environmental and energy related problems.

It's easy being green

Honda Civic GX proves it is easy being green – taking home the American Council for an Energy Efficient Economy (ACEEE) Greenest Vehicle award for the 6th year in a row – just one of several environmental awards picked up by NGVs in 2009.

Fiat purchase of Chrysler

So far it's had no impact on natural gas vehicles whatsoever but with Fiat's proven commitment to NGVs it's surely just a matter of time before the culture spreads.

Volvo bi-fuels make a welcome return

Just in time for Christmas, Volvo bi-fuel vehicles can be found on showroom floors again. Yes, you do have to go to Sweden to buy one and yes, it is a converted vehicle but, it is endorsed by Volvo Cars Sweden who calls it "the second best solution" after a factory built vehicle.

Volvo Trucks announce Euro V dual-fuel trucks for 2010

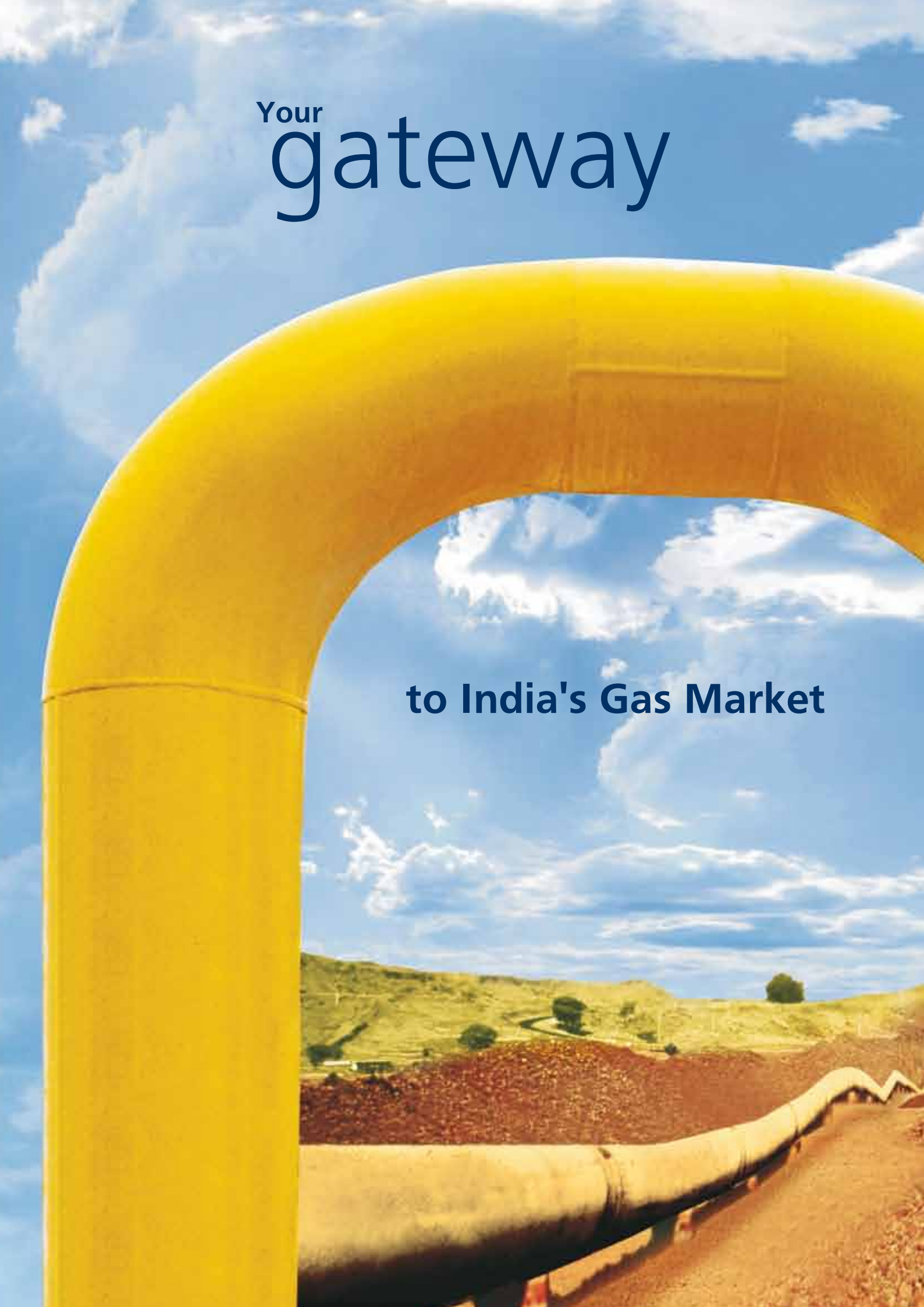
Another Christmas present for the industry – Lars Mårtensson, Environmental Director of Volvo Trucks declares that "methane gas is by far the most accessible fuel as an alternative to diesel" at the same time as he announces plans for Volvo Trucks to launch a dual-fuel natural gas/diesel product in 2010.

Biomethane

Already mentioned in the motorsports section above, biomethane continues to prove itself in a variety of applications as the ultimate renewable transport fuel.

Follow this link for more info on these items: http://bit.ly/8iCiBL.

"The future will belong to gas powered cars…" – Manfred Stohl, former world group N rally champion.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Adam Wynne Hughes, President of IPLOCA.

● IPLOCA Convention – San Francisco

By Adam Wynne Hughes

Six hundred pipeliners, clients and guests attended IPLOCA's 43rd Annual Convention, which was held in San Francisco, September 14-18, 2009. The sold-out event was attended by delegates from all over the world.

I had the honour of taking office as 2009-2010 IPLOCA President, along with a newly-elected Board of Directors.

During the Convention IPLOCA awards were presented for Safety and New Technologies.

Tom Lassu, President of Ledcor Pipeline Limited received the IPLOCA Safety Award sponsored by Chevron from Chevron Pipe Line President, Becky Roberts. The award was given in recognition of Ledcor's work on the Roll Over Protection Structure.

Werner Suhm of Herrenknecht accepted the IPLOCA New Technologies Award sponsored by BP from BP's Mike King for the Herrenknecht entry, Direct Pipe.

The presentations made during the IPLOCA Convention and further details about the awards are available at www.iploca.com/sanfranciscopresentations. The 2010 event will be held in Venice from Monday, September 27 to Friday, October 1.

Adam Wynne Hughes, Managing Director of Land and Marine Project Engineering Ltd in the UK, is the President of IPLOCA.

● The GERG Academic Network

By Klaus Altfeld and Dave Pinchbeck

There has been much discussion in recent years regarding the pool of young, high quality engineers and scientists available to the gas industry. There is, of course, a widely recognised shortage of such potential and expertise, and not just in the gas industry. For R&D the problem is perhaps even more acute, with newly qualified graduates and post-graduates preferring what are considered more prestigious or lucrative careers in the automotive sector, IT or even finance. Indeed, the new IGU Triennium includes two Task Forces specially set up to address the problem of a shortage of talent, considered by many companies to be one of the most important issues facing the industry:

- TF1 – Building Strategic Human Capital – will address the shortage of talent in the industry, which is rapidly becoming a critical business issue; and
- TF2 – Nurturing Future Generations – aims to change the perceptions of the young and emerging generations regarding the gas industry.

GERG, the European Gas Research Group, has been considering this issue for some time and, as part of a local solution, has recently established an academic network to enlarge and strengthen links between selected universities and the

European gas industry's research centres. Its objectives are many, but key amongst them are to:

- ensure that the academic community is aware of gas industry R&D issues;
- encourage a dialogue between experts in industry and academia;
- demonstrate that the gas industry:
  - promotes sustainable energy solutions;
  - is high-tech;
  - invests in R&D;
- show post-graduates that the gas industry offers challenging and rewarding careers.

The GERG Academic Network also offers an opportunity for academics to:

- be a part of the gas industry's contribution to a sustainable energy future;
- have closer links with gas industry experts across Europe;
- share knowledge and problems;
- be aware of international energy issues;
- publish papers and promote successful R&D.

A major part of the new activity is the GERG Academic Network Event, and the first was held in Brussels in June 2009. Post-graduate students working towards a PhD or MSc funded by, or relevant to, the gas industry were invited to present their work. The net result was that 20 students were invited with their supervisors to present their work to a select audience made up of their peers and gas industry R&D experts.

The oversubscribed event, which proved very successful, comprised two days of high quality presentations on research topics, debate and discussion in an intimate atmosphere that encouraged interaction and conviviality. The event took place in the GERG offices in Brussels, which are located in an historic Victor Horta-designed building, correctly known as the Hotel Van Eetvelde.

Three substantial prizes were awarded for the best work, based on the criteria: technical quality, innovation and the presentation itself. The prize-winners, in a closely fought competition, were:

1st Roy Visser, University of Twente, The Netherlands, "Long-term performance of plastic pipes in gas distribution systems";

2nd Patricia Seevam, Newcastle University, UK, "Transporting the next generation of CO_2 for CCS";

3rd Jiexun Di, Oxford University, UK, "Development of highly active natural gas reforming catalyst for internal reforming in low-temperature SOFC".

Abstracts of these papers are in the section over, while all the presentations can be viewed on the GERG website. The 2010 event will take place in Brussels, June 3-4.

Dr Klaus Altfeld is Head of the gas measurement competence centre, E.ON Ruhrgas, and President of GERG. Dave Pinchbeck is the General Secretary of GERG and a member of IGU Task Force 1. For more information on GERG visit www.gerg.eu.

The first prize in the 2009 GERG Academic Network Event being presented to Roy Visser, University of Twente, by GERG President, Dr Klaus Altfeld of E.ON Ruhrgas.

● GERG Academic Network Event – Top Three Papers

1st Roy Visser, University of Twente, The Netherlands, "Long-term performance of plastic pipes in gas distribution systems"

Plastic pipes are extensively used in gas distribution networks all over the world. Huge investments were made in the past to connect millions of households to the grid. With a total length of about 130,000 kilometres, the Dutch gas distribution network is one of the densest networks in the world. The discovery of the Slochteren gas fields at the end of the 1950s led to the fast development of both the gas transportation and distribution networks. Polymers like polyethylene and poly vinyl chloride were and still are used for about two thirds of the distribution network. Initially, the estimated service life of these polymer pipes was 50 years. Currently, the oldest polymer pipes are close to reaching their estimated service lifetime. In combination with the high costs for the replacement of the network, this increases the demand for a method to determine the residual lifetime of the distribution network in a non-destructive way.

The current study focuses on the development of such a method for polymer pipes and more specifically for unplasticised polyvinyl chloride pipes. Four aspects were studied to achieve this goal. Firstly, the material property which limits the lifetime of the pipes was determined. Failure data clearly shows that the amount of spontaneous failures is negligible compared to failures due to third party damage. For this last type of failure the risk of (fatal) accidents is highly dependent on the type of failure which is encountered. A brittle failure induces a higher risk than a ductile rupture. The failure mode is related to the deformation behaviour of the polymer. Therefore, the deformation kinetics, or more specifically the yield stress, was found to be a good indicator for the condition of the pipe.

The second aspect which should be known is how the deformation kinetics evolve during the service life of the pipe. It is known that the resistance against deformation increases as a result of physical ageing. Consequently, the material will behave more and more in a brittle way. The evolution of the yield stress was modelled and validated with experimental data. Thirdly, the critical state which identifies the end of the service life should be known. A certain critical yield stress is related to a certain ductile-to-brittle transition temperature (a measure for the ductility of the polymer). Knowing this critical yield stress, the residual lifetime can be calculated by extrapolating the current yield stress towards the critical value, using the model for the evolution of the yield stress.

The last aspect is obviously to measure the current state of the material (yield stress) in a non-destructive way. Non-destructive testing and yield stress determination are contradictory, making a direct measurement impossible. However, one option which is currently studied is determining the yield stress by microhardness measurements. While still destructive on a micro scale, microhardness measurements are considered to be non-destructive on the macro scale.

With the proposed methodology network service providers can potentially delay and spread replacement investments, while maintaining or even increasing the integrity of the network.

2nd Patricia Seevam, Newcastle University, UK, "Transporting the next generation of CO_2 for CCS"

Climate change has been attributed to greenhouse gases with carbon dioxide (CO_2) being the major contributor. Most of these CO_2 emissions originate from the burning of fossil fuels (e.g. power plants). Governments and industry worldwide are now proposing to

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capture CO_2 from their power plants and either store it in depleted reservoirs or saline aquifers (carbon capture and storage, CCS), or use it for enhanced oil recovery (EOR) in depleting oil and gas fields. The capture of this anthropogenic (i.e. from man-made sources) CO_2 will mitigate global warming, and possibly reduce the impact of climate change. The United States has over 30 years of experience with the transportation of CO_2 by pipeline, mainly from naturally occurring, relatively pure CO_2 sources for onshore EOR. CCS projects differ significantly from this past experience as they will be focusing on anthropogenic sources from major polluters such as fossil fuel power plants, and the necessary CO_2 transport infrastructure will involve both long distance onshore and offshore pipelines. Also, the fossil fuel power plants will produce CO_2 with varying quality/purity depending on the capture technology used. CO_2 pipelines have never been designed for these differing conditions; therefore, CCS will introduce a new generation of CO_2 for transport.

Application of current design procedures to the new generation of pipelines is likely to yield an over-designed pipeline facility, with excessive investment and operating cost. In particular, the presence of impurities has a significant impact on the physical properties of the transported CO_2 which affects: pipeline design; compressor/pump power; repressurisation distance; and pipeline capacity. The quality of CO_2 could also have implications in the fracture control of the pipeline. All these effects have direct implications for both the technical and economic feasibility of developing a CO_2 transport infrastructure onshore and offshore.

The presentation compares and contrasts the current experience of transporting CO_2 onshore with the proposed transport onshore and offshore for CCS. This includes both the regulatory and technical challenges. It will also cover studies on the effect of physical and transport properties (hydraulics) on key technical aspects of pipeline transportation, and the implications for designing and operating a pipeline for CO_2 containing impurities. The studies reported will have significant implications for future CO_2 transportation, and highlight a number of knowledge gaps that will have to be filled to allow for the efficient and economic design of pipelines for this "next" generation of anthropogenic CO_2.

3rd Jiexun Di, Oxford University, UK, "Development of highly active natural gas reforming catalyst for internal reforming in low temperature SOFC"

There is a need to develop solid oxide fuel cells (SOFC), which can operate at low temperatures. This is likely to increase the lifetime of such cells and reduce manufacturing cost. This requires, among others, the development of materials for construction of the cathode, anode and the electrolyte with suitable electrochemical characteristics. There is considerable advantage in the development of an anode which is capable of internally reforming natural gas and other fuels at low temperatures.

Studies in this laboratory have shown that promoted nickel (Ni) catalysts, derived from layered double hydroxides, are capable of steam reforming methane with light off temperatures of 300-350°C. These catalysts may be suitable for incorporation in anodes of such fuel cells. A systematic study has therefore been undertaken with layered hydroxides with Ni:Al ratios of 3:1, 2:1 and 1:1. The study also includes the introduction of various transition metal ions into the Ni+2 sites as well as introducing +4, +3 and +2 ions into the Al+3 sites. The dopant ions have been selected to achieve specific chemical effects. Some results of this fundamental study will be presented.

A New Supplier of World Energy

With the first cargo leaving the Balhaf terminal on 7 November 2009, Yemen LNG has placed the country on the international map of producers and exporters of LNG. Yemeni liquefied natural gas will be exported to Asian and Atlantic markets for the next 20 years which will contribute significantly to the economic and social development of the people of Yemen.

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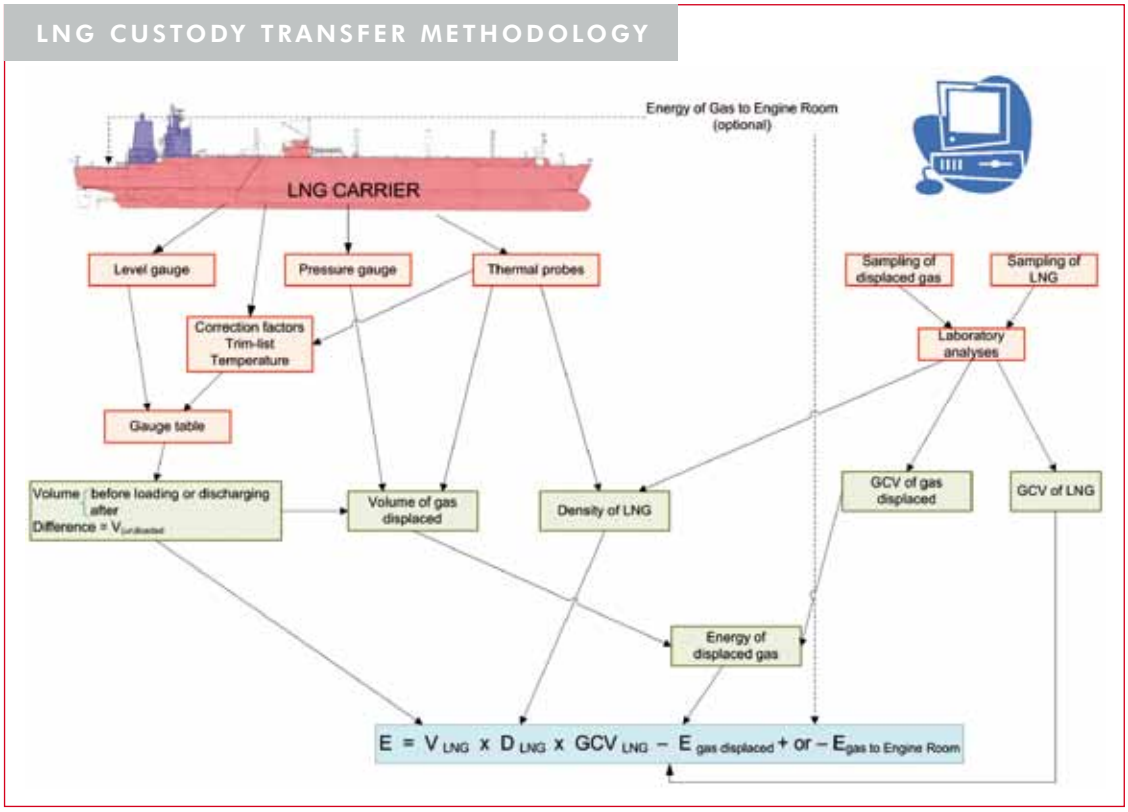
● GIIGNL issues third edition of LNG Custody Transfer Handbook

By Tony Acton

The GIIGNL LNG Custody Transfer Handbook provides practical guidance on the equipment and methodology for determining the thermal energy of LNG transported by ship for the specific purpose of title transfer. The handbook was first developed by a committee of GIIGNL members in the late 1980s and was updated in a second edition in 2001. It has since become a definitive source of information, reflecting practices adopted by the LNG industry in LNG sales and purchase agreements. It is intended to provide this information in the simplest way possible but in no way to replace formal standards or to limit an operator's freedom to source equipment and services. Now, the handbook has been thoroughly updated in a third edition to include new measurement technology, new operational practices and updated international measurement standards. GIIGNL has consulted widely in the process of developing the third edition and the panel responsible for the update, led by Fluxys LNG of Belgium, comprises experts from all across the worldwide LNG industry, including but not limited to, the GIIGNL membership.

Currently accepted LNG custody transfer determination requires the accurate measurement of the volume of LNG in the ship's storage tanks at the beginning and end of LNG transfer, taking account of ship list and trim, the chemical composition of the LNG and its temperature. From these basic measurements, the density and gross calorific value are calculated by standard formulae, leading by multiplication to the total energy transferred. Corrections can be made for the energy of boil-off gas that is generated in and displaced from the receiving tank(s) and returned to source and also for any gas used in a ship's

RIGHT
Figure 1.



GIIGNL studies and promotes the development of activities related to LNG.

engine room to give a more accurate figure for the net energy transferred. *Figure 1* illustrates the methodology adopted.

The third edition of the LNG Custody Transfer Handbook also includes full explanations of the methodology, equipment descriptions and advice on issues related to the energy determination, including various other corrections, gas sampling, instrument recalibration and measurement accuracy.

As a service to the LNG industry, GIIGNL has decided to make the third edition of the LNG Custody Transfer Handbook available at no charge. It can be found on the public area of the GIIGNL website *www.giignl.org* from which it may be downloaded. However, GIIGNL does require that any reproduction of the document or extracts from it include acknowledgement of GIIGNL as its source.

GIIGNL is a non-profit organisation that studies and promotes the development of activities related to LNG, in particular purchasing, processing, importing, transporting, handling, regasification and various uses of LNG. To this purpose, the Group aims to provide its members with an overview of the state-of-the-art technology in the LNG industry and of its general economic state. GIIGNL promotes the exchange of information and experience among its members to enhance the safety, reliability and efficiency of LNG import activities and of the operation of LNG import terminals in particular. The Group has an international focus and its membership currently includes 64 companies in 19 different countries, representing nearly all those in the world active in the import, terminalling and regasification of LNG.

In order to improve its service to the LNG industry, GIIGNL would greatly appreciate feedback from users of the LNG Custody Transfer Handbook. Please send any comments to the Central Office at: GIIGNL, 22 rue Marius Aufan, 92300 Levallois, France, e-mail: *contact@giignl.org*.

Dr Tony Acton is the Chairman of GIIGNL's Technical Study Group.