

THE NEW IGU TRIENNium

Since joining IGU in 1986, Malaysia has played an increasingly active role in the Union culminating in the current Triennium by chairing PGC C and having representatives serving on all the other Committees and Task Forces except WOC 2. Now Malaysia is poised to assume the Presidency and the incoming President and Chairman of the Coordination Committee set out the plans for the 2009-2012 Triennium. A breakdown of the study topics proposed for the Committees and Task Forces is included, and we round off with a profile of the Malaysian Gas Association.



Malaysia Assumes the Presidency

By Datuk (Dr) Abdul Rahim Hj Hashim

The energy industry has witnessed rapid and dramatic changes in recent years, following huge swings in the global economic cycles. With the recent global economic and financial crisis weighing heavily on businesses, industries and the populace as a whole, the demand for energy has been in sharp decline, resulting in long-term impact on future investment growth, not only for the gas industry but also other key sectors of the economy.

Reflecting the global nature of the gas industry, the Presidency of IGU shifts to Asia for the second time in its history. With more than half the world's human population, relatively low energy intensity and areas of potentially very high economic growth, there is a challenge for Asia which is of interest to the whole world. The Malaysian Presidency will continue to maintain the high standards of excellence of our predecessors to support the mission of IGU and in striving to achieve the vision of being "the most influential, effective and independent non-profit organisation, while serving as the spokesman for the gas industry worldwide". In this respect, IGU needs to continually reinvent itself to remain relevant to the industry and its members. Efforts to change the organisation and strategy have been initiated and some of these changes will be made during the Malaysian Triennium.

● The fuel of choice

Natural gas will continue to play a vital role in meeting the world's expanding energy needs while helping to cut greenhouse gas emissions, a persistent threat to global growth, life and environmental sustainability. Despite intense



Datuk (Dr) Abdul Rahim Hj Hashim: energy industry has witnessed rapid and dramatic changes in recent years.

interest in accelerating the development of "green energy" for the creation of a low-carbon economy, natural gas is expected to continue its dominance as the fuel of choice in the coming decades. This is primarily driven by its premium as an abundant and clean source of energy that is being delivered to consumers via advanced technology and infrastructure fully supported by global expertise. Furthermore, constant innovation and technological breakthroughs have continued to enhance natural gas future sustainability from the economic, social, technical and environmental aspects that will significantly contribute towards global economic growth.

Against this backdrop, the Malaysian IGU Presidency has set the theme "Gas: Sustaining Future Global Growth" as the foundation for the work during the 2009-2012 Triennium. The theme inherently portrays gas as the engine for global growth which has to be sustained in its

availability through innovation, technology and competent human capital.

● **Challenges and opportunities**

Despite the challenges brought about by the crises, we are confident that IGU will be able to ride out the storm and turn them into opportunities and upsides for the benefit of the global community. Issues such as global warming and climate change, technology and innovation, geopolitics as well as talent sourcing and management for the gas industry will remain at the forefront. We are committed to promote a constructive intellectual discourse in addressing

these issues, provide reference tools for decision makers, strengthen networking and relationship building and add value for all our members.

I am confident that with the full and continuous support from members of IGU and its fraternity, the Malaysian Triennium will be able to steer IGU towards greater heights and a promising future for the world.

Datuk (Dr) Abdul Rahim Hj Hashim is the Vice President of IGU and will become President at the close of the 24th WGC.



Malaysia is one of the world's largest LNG exporters. The Malaysia LNG plant in Bintulu, which first started production in 1983, has been steadily expanded.

GAS NATURAL and UNION FENOSA: *the Birth of a Leading Integrated Gas and Power group with over 20 million Customers*

The merger of GAS NATURAL and UNIÓN FENOSA has brought about the creation of the largest integrated gas and electricity company in Spain and one of the top ten European utility companies, with a presence in 23 countries around the world. The company created as a result of the merger holds a leading position in downstream activities and has over 20 million customers – 8.9 million in Spain and 11.3 million in other countries – with installed power generating capacity of almost 17,000 MW.

With this merger GAS NATURAL has achieved its objective of integrating its gas and electricity businesses in a group with extensive experience in the energy sector, capable of competing efficiently in energy markets subject to a process of increasing integration, globalisation and levels of competition.

The transaction will double the size of GAS NATURAL, making it the largest global LNG operator in the Atlantic basin, and one of the largest operators of combined cycle generation in the world. Of the 17,000 MW of installed power generating capacity, 5,200 MW are in combined cycle gas turbines in Spain, and 4,074 MW in combined cycle gas turbines abroad.

GAS NATURAL's portfolio, which includes 25 bcm of gas and UNION FENOSA's access (together with ENI) to a portfolio of 6.5 bcm make the new group one of the leading utility companies in Europe, strongly positioned in the gas business, conventional power generation and the integrated management of fuel supplies.

► **International presence**

The new group already has a strong international presence, operating in 23 countries on five continents. The two companies have highly complementary positions in key markets, such as Spain, Mexico and Colombia. In addition to Spain the new group will operate in France, Italy, Portugal, Argentina, Brazil, Puerto Rico, Colombia, Mexico, Guatemala, Nicaragua, Costa Rica, Panama, the Dominican Republic, Algeria, Morocco, Egypt, Angola, South Africa, Kenya, Oman, the Republic of Moldova, and Australia.

The transaction will lead to significant synergies, worth €300 million a year, and will allow completion of GAS NATURAL's 2008-2012 Strategic Plan and UNION FENOSA's "Bigger" Plan to be brought forward to 2009.

The company formed as a result of the merger has a balanced business and geographical mix, with a 21% contribution to EBITDA from upstream and midstream activity, 11% from power distribution in Spain, 20% from gas distribution in Spain, 23% from generation in Spain, 24% from international activity and 1% from other activities.

The new company's position in the Spanish energy sector is very near the market leaders and it has a better business profile thanks to its diversification in gas and electricity and to the advantages of a generation mix which includes combined cycle, hydroelectric, nuclear, coal, and wind power.



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Gas Natural and Unión Fenosa have merged to become the largest integrated gas and electricity company in Spain and Latin America. Combining our resources, we have become the world's second biggest liquefied natural gas operator. And after joining our experience, we are now the leading gas operator in the Atlantic basin. And this is only the beginning, because we will go very far. And we will do it with all the energy in the world.



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The Strategic Guidelines for the Malaysian Triennium

Gas plays a vital role in meeting the world's expanding energy needs. As the world economy recovers and expands, the need for clean, efficient energy will continue to grow. In an increasingly carbon constrained world, as global warming translates into policy, gas has significant advantages over other fossil fuels. Gas remains a key element in the fuel mix to drive future global growth, and gas for power generation is by far the largest growth sector.

Global energy needs continue to make increasing demands on gas supply. Future growth of the industry must be sustainable which means taking account of the economic, environmental and social aspects, so that welfare can continue to improve throughout society. Sustainable growth aims to improve conditions in the present without

compromising the ability of future generations to meet their own needs. This entails not only the enhanced availability of gas, through the development and implementation of gas technology, but also the human resources needed to ensure that all the critical elements are operating at the optimum level throughout the value chain.

In line with IGU's Vision and the theme for the Malaysian Triennium "Gas: Sustaining Future Global Growth", four Strategic Guidelines have been identified to sustain future global growth. These are to:

- 1 Enhance the role of gas for sustainable development, balancing the needs of all stakeholders;
- 2 Improve availability of gas and access to markets;
- 3 Maximise efficiency throughout the expanding gas value chain; and
- 4 Ensure adequate human capacity to enable the growth and integrity of the industry.

These Strategic Guidelines are briefly described below.

● Enhancing the role of gas

Gas is in an increasingly complex and competitive global market in which there are regional differences in the fuel mix and the sectors that prefer the use of natural gas. Globally and locally there is a strong interplay with the cost/price, availability/reliability and environmental impact of other primary fuels. IGU is in a strong position to enhance the role that natural gas plays to achieve widely sought objectives of enhanced security of energy supply, improved economic performance and in particular to mitigate the environmental impact of climate change. Although some answers may well have a different emphasis throughout the world, these regional issues need to be investigated and communicated clearly. But climate change is a global issue. If there is to be an international agreement for a transition to a low-carbon world, natural gas will have to play the pivotal role, combining with investment in renew-



Natural gas plays a vital role in meeting expanding energy needs and currently provides 26% of the world's commercially traded primary energy.



LNG tankers load up in Bintulu (ABOVE) and the Dornum gas junction in Germany (BELOW) – some 28% of the world’s internationally traded gas is transported as LNG and 72% by pipeline.

able energy sources to deliver economic and environmentally efficient solutions.

Gas has an impact on a wide range of people both inside and outside the gas industry. The needs of these stakeholders are sometimes quite diverse, and for growth to be sustainable, a balance needs to be obtained between what the stakeholders want. There are several ways to achieve this ranging from carefully constructed government-to-government agreements or reliable long-term relationships between monopolies or dominant companies, through to establishing robust traded markets that will allocate resources among many participants at fair prices in the most efficient way.

● **Improving availability of gas**

Availability of gas concerns both access to upstream supplies and access to downstream markets. During the first decade of the 21st century, we have seen an increased interest by many governments in taking active control of the energy resources in their own country. This trend towards energy nationalism among the oil and gas producing countries is in marked contrast to the trend of liberalisation of the downstream energy markets,

particularly for electricity and gas. Whatever regime or market design is in place, for the gas industry to flourish, gas supplies need to be available from gas producers at the “right” price and customers need to be able to receive the necessary volumes of gas delivered to their homes and businesses when they need it.

The world has abundant natural gas resources, which could last well beyond this century. The currently proven recoverable natural gas reserves are, however, equivalent to only about 60 years of global production. Furthermore, not all these





proven gas reserves are readily available, for example reserves might be theoretically recoverable but in environmentally hostile locations with no downstream markets that could accept large quantities of gas within thousands of kilometres. Conventional gas production in some parts of the world is now in decline but global gas production continues to increase. Gas is increasingly available from unconventional sources (like coal-bed methane) or technology has moved the boundary of what can now be produced as a conventional natural gas reservoir (tight sands or even source rocks). What other technical or political measures might be put in place to improve the economic availability of the large but remote gas resources that are believed to exist on our planet?

Access to markets can be improved in many different ways: in particular through the development and application of new technology, via collaboration on major projects, through confidence in the right investment climate and by ensuring that the regulatory regime is appropriate. Reduced costs for gas transportation and improved access to downstream markets have an influence on the viability of upstream gas resources, just as reduced development and production costs that improve economic supply availability would stimulate downstream growth.

● Maximising efficiency

This guideline encompasses two related topics:

- 1 How can the use of natural gas best be expanded?
- 2 How can we optimise the efficient use of gas throughout the value chain?

The components of the value chain vary, particularly in terms of the end-user markets. What are the prospects for developing or re-establishing certain market sectors in different countries or regions? What new uses will there be for gas, and where will they be applied given the differing climatic, socio-economic and other conditions in existing energy markets? The continuing expansion of gas sales in

a world market that is increasingly environmentally conscious and cost sensitive requires the gas industry to leverage on technology and innovation and to target certain sectors for growth. Energy policy, regulation, gas pricing and risk management might have important influences on the success of any strategies for expanding downstream markets whether they are in NGVs, power generation, cooling systems or new industrial uses. Such an expansion of the gas sector portfolio also introduces new challenges and risks that will need to be identified and managed.

There is no doubt that the efficient use of natural gas is an imperative for sustainable growth. The gas price can be an important lever as the price level impacts on gas demand, provides investment signals, encourages more efficient use and leads to innovation that reduces overall costs. In traded markets a gas price that is responsive to supply and demand enables risk management to be developed across the value chain and more innovative ways of coping efficiently with volatility.

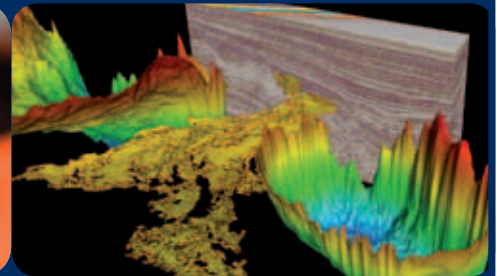
Technical innovation and optimisation of efficiency is traditionally focused on gas utilisation and improvement in the performance of end-user appliances. As the gas industry strives for ever-improving efficiency, innovation and optimisation are increasingly applied throughout the gas chain. The challenge is to provide a growing customer-base with optimal volumes of gas, whilst lowering operating costs and at the same time maintaining and investing in plant and equipment.

● Ensuring adequate human capability

In the middle of the first decade of the 21st century a technical skills shortage began to affect several engineering and energy industries. In the gas industry some countries have already experienced acute problems with gaps in the expertise available in almost every part of the value chain. For the gas industry, in which safe operation is paramount, it is essential to ensure that trained

Part of the A.P. Moller - Maersk Group, and active since 1962, Maersk Oil operates some 800,000 barrels of oil equivalent per day. Maersk Oil has activities in the Danish, British and Norwegian Sectors of the North Sea, Qatar in the Middle East, and several other countries including Kazakhstan, Algeria, Brazil, Angola and the US Gulf of Mexico.

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personnel are available in a timely manner to sustain industry growth and to ensure the continued safe operation of plant.

The problem is being exacerbated both on the supply side, with demographics leading to the retirement of many experts, and on the demand side, with the growth in the gas market leading to increased requirements for trained staff for new projects. At the same time qualified personnel are required to ensure that the existing pipeline infrastructure, which is continuously ageing, is maintained in a safe operational state.

As these factors come together it is increasingly complex to identify the specialised skills that will be needed, to ensure that such people are available when the industry needs them and that they can be retained with mutual benefits in the gas industry. What interactions are there with other industries? Should collaborative measures be put in place or will commercial solutions be

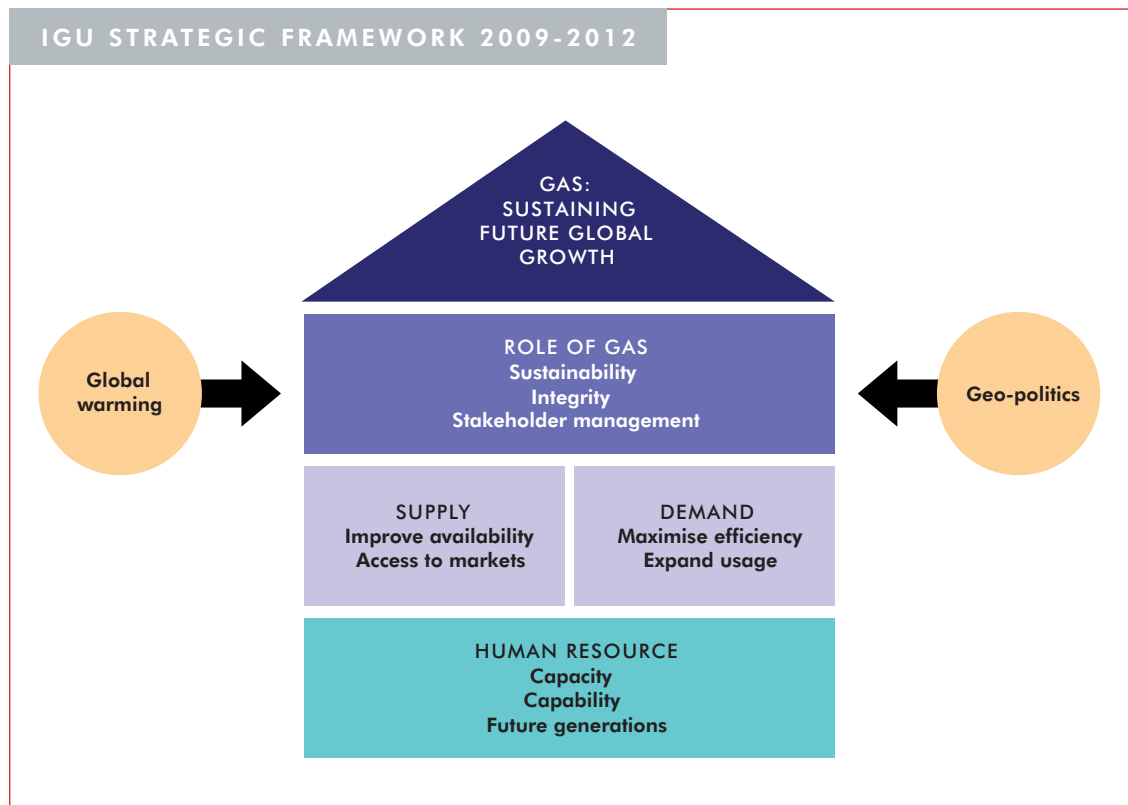
possible? Is there an inter-governmental role to support technology training? What approach to human resources will be best to support sustainable growth?

The challenge is twofold. Firstly, to intensify skill development efforts to ensure that both the numbers and level of knowledge of staff will be sufficient for all parts of the future global gas industry. Secondly, to provide the foundations for longer-term prosperity and success by nurturing the interest of future generations in science and technology careers in the energy industry and the world of gas in particular.

● **Strategic framework**

These principles provide the framework (see Figure 1) upon which the incoming Malaysian Presidency has developed the Triennial Work Programme (TWP) and initiated special projects for the Triennium. The TWP is outlined in the next article.

RIGHT
Figure 1.



Powering the future, empowering India



Only young hearts can dream big. ONGC fuels these dreams and shapes them into future opportunities. To energise this young generation ONGC is striving for energy security of India.

- Produces 1.2 million barrels of Oil and Oil equivalent Gas per day
- Meets 80% of India's domestic production of Oil and Gas
- Discovered 6 of the presently 7 producing Basins of India

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A Brighter Tomorrow

» खोज के लिए साहस

» श्रेष्ठता के लिए ज्ञान

» उत्कृष्टता के लिए तकनीक

Subsidiaries



Joint Ventures





The Triennial Work Programme 2009-2012

By Ho Sook Wah

The 2009-2012 TWP has been put together as a result of highly constructive discussions with the outgoing and incoming Committee authorities, subject matter experts and IGU Management. The objective is to ensure continuity of work done

BELOW
Table 1.

LEADERSHIP OF IGU COMMITTEES 2009-2012

Committee	Chair	Vice Chair
WOC 1 Exploration and Production	Kamel Eddine Chikhi Algeria	José Jorge de Moraes Jr 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	
TF 2 Nurturing Future Generations	Tengku Nasariah bt Tengku Syed Ibrahim Malaysia	
TF 3 Geopolitics of Natural Gas	Mel Ydreos Canada	



Ho Sook Wah: Malaysian Triennium begins at a very challenging time.

during the Argentine Triennium coupled with the need to ensure the currency and relevance of the studies to the Strategic Guidelines and current environment. We would like to acknowledge the support and contribution of the Argentine Presidency with whom we have always maintained a constructive engagement and whose inputs have been most valuable in ensuring a smooth transition. To fulfil IGU's Mission, the TWP aims to:

- Actively promote the technical and economic progress of the global gas industry;
- Improve the competitiveness of gas in the world energy markets by promoting the development and application of new technologies and best practices, optimising the economics of the entire gas chain, while emphasising sound environmental performance, safety and reliability; and
- Serve as a global information clearing-house, promoting transfer of technology and know-how.

The official launch of the 2009-2012 TWP will take place upon approval by the IGU Council on October 5, immediately prior to the 24th WGC in Buenos Aires. (See Tables 1 and 2 for details of the leadership of the Committees and their study

STUDY GROUP SUMMARY FOR THE 2009-2012 TRIENNIUM
(SUBJECT TO APPROVAL BY THE IGU COUNCIL)

LEFT
Table 2.

<i>Committee</i>	<i>Study Group</i>	<i>Topic</i>
WOC 1	SG 1.1	Recent advances in exploration and production of natural gas
WOC 1	SG 1.2	Most significant E&P new gas projects
WOC 2	SG 2.1	Updating and improving UGS database and promoting it as a reference
WOC 2	SG 2.2	Definition of some best practices in UGS operations and design
WOC 2	SG 2.3	Skills and competencies for UGS activities
WOC 3	SG 3.1	Strategic gas transmission infrastructure project
WOC 3	SG 3.2	Integrity of gas transmission system and environmental footprint reduction
WOC 3	SG 3.3	Securing sufficient expertise to operate gas transmission systems safely and adequately
WOC 4	SG 4.1	Gas distribution safety management system
WOC 4	SG 4.2	Smart metering system: characteristics, technologies and costs
WOC 4	SG 4.3	Unaccounted for gas: identification, measurement, calculation and management
WOC 5	SG 5.1	Industrial utilisation
WOC 5	SG 5.2	Domestic and commercial utilisation
WOC 5	SG 5.3	Natural gas vehicles (NGVs)
PGC A	SG A.1	Sustainability and investment
PGC A	SG A.2	Integrating other gases into the natural gas grid
PGC A	SG A.3	Reduction of gas emissions (a comprehensive industry guide)
PGC B	SG B.1	World gas supply, demand and trade
PGC B	SG B.2	Wholesale gas price formation
PGC B	SG B.3	Corporate strategy and regulation
PGC C	SG C.1	Gas markets in ASEAN and north-east Asia
PGC C	SG C.2	Gas markets in North America
PGC C	SG C.3	Gas markets in Europe and Russia
PGC D	SG D.1	Enhance terminal compatibility
PGC D	SG D.2	Penetrate new markets for LNG
PGC D	SG D.3	Enhance efficiency in LNG value chain
PGC E	SG E.1	Natural gas and renewables
PGC E	SG E.2	Marketing campaigns
PGC E	SG E.3	Image of natural gas
TF 1	Special Project	Building Strategic Human Capital
TF 2	Special Project	Nurturing Future Generations
TF 3	Special Project	Geopolitics of Natural Gas



The Secretary of the Coordination Committee for 2009-2012 will be Ungku Ainon Ungku Tahir.

topics.) All IGU Charter and Associate Members are warmly invited to nominate delegates to join and support the work of the Committees and Task Forces.

Two important concerns have emerged in developing our plans for the Triennium. They are the human resource challenge and the influence of geopolitics in the evolution of the gas industry. We believe these areas will have serious implications on the future sustainability of the industry and therefore merit further consideration. We have therefore captured these concerns by initiating three special projects to study the issues, impact and challenges.

A further concern is climate change, the seriousness of which has captured the attention of policy makers, international organisations and NGOs the world over. While the world will continue to depend on fossil fuel for most of its energy needs in the foreseeable future, we believe natural gas has an important role to play in mitigating climate change. Therefore, the IGU Presidency and Secretariat, together with the Sustainability Committee (PGC A) will step up efforts in important fora such as the UNFCCC (COP) meetings to increase our visibility and promote the use of gas.

Likewise, in achieving our work programme, we will continue the collaborative efforts with other international organisations such as the International Energy Agency (IEA), International Energy Forum (IEF), World Petroleum Council (WPC), World Energy Council (WEC) and other similar bodies.

● Organisation structure

The basic structure of the Programme Committees and Working Committees has remained largely unchanged from the 2006-2009 Triennium. However, the scope of work of some of these Committees has been streamlined and defined to ensure greater clarity. In addition, effective from the Malaysian Triennium, the IGU Marketing Committee will be brought into the main structure as the new Programme Committee E. The role of PGC E is to identify and develop ideas, tools and products for the promotion and sale of natural gas.

By bringing what is now the IGU Research Conference (IGRC) under the auspices of the Union, IGU has been successful in shaping the perception of all players along the gas chain about the need for ongoing research, particularly in areas related to the environment, rational and efficient use of natural gas, and safety. After the successful organisation of IGRC 2008 in under the revised approach and new organisational structure, the formula will continue to be adopted in the new Triennium.

● Conclusion

No one is isolated from today's global challenges. In times of great adversity and unprecedented challenges, there are also opportunities. IGU will use these opportunities to further promote the technical and economic progress of the gas industry.

Ho Sook Wah is the Vice Chairman of the Coordination Committee and will become Chairman at the close of the 24th WGC.



Zenorai Rambli, MGA Secretary General.

The IGU Charter Member for Malaysia

The Malaysian Gas Association (MGA) was formed in July 1986 as a non-profit organisation with the objective of serving as an effective platform to bring together key industry players to work towards a common vision of promoting and further developing natural gas to fuel Malaysia's transformation into a fully developed nation by 2020.

MGA has an impressive stable of founder members – with names such as Petronas, Shell, Esso, BP and Caltex – while early members include Malaysia LNG Sdn Bhd, Petronas Gas Bhd, Gas Malaysia Sdn Bhd, Segari Energy Ventures, Tenaga Nasional, Dialog, Delcom and Murphy Oil. MGA has charted two decades of promoting the gas industry and gas utilisation as a clean and efficient source of energy for economic and social development and nation-building. Today, according to Zenorai Rambli, its Secretary General, the Association has more than 130 corporate and honorary members hailing from the gas and gas-related fraternities covering companies from the following sectors: gas and oil exploration, production, processing and transmission; industrial consumers; power generation, distribution and reticulation; logistics services; engineering, procurement and construction; consultancy, research and

academia; materials; equipment; trading; and regulatory agencies.

Globally, MGA is an active member of IGU and its first representative, then President Muri Muhammad, was elected to the Executive Committee in 2000. Two years later, MGA hosted the Council meeting in Kuala Lumpur and bid for the Presidency in an election that was won by Argentina. Then, at the 2005 Council meeting held in Tianjin, China, MGA was elected to the Presidency of IGU for the 2009-2012 Triennium and to host the 25th World Gas Conference in Kuala Lumpur in 2012.

For MGA, securing the bid for the IGU Presidency was a culmination of years of hard work. MGA President and incoming IGU President Datuk Abdul Rahim Hashim says the election demonstrated the Association's ability to offer strong leadership to IGU.

Dick Benschop, Managing Director of Shell MDS and Vice President of MGA, agrees, adding that winning the IGU Presidency is a recognition of the world-class qualities of Malaysia's gas industry. "Now it is incumbent on us to live up to this reputation. MGA reflects the development and the growth of the gas industry in the country. The gas industry itself is a metaphor for the country – a growing success story. The Presidency will require hard work, but we should be confident about the result. And, in the end, it will be Malaysia's inimitable hospitality that will carry the day in 2012," he says.

Besides IGU, MGA is also an active member of GASEX (Gas Information Exchange in Western Pacific Area). GASEX's membership comprises 11 countries/gas associations from Australia, Brunei, China, Indonesia, Japan, Malaysia, New Zealand, Papua New Guinea, the Philippines, Taiwan and Vietnam. Over the years, MGA has also established close rapport with regional and global gas associations within IGU.

About Romgaz

S.N.G.N Romgaz is a joint stock company of national interest. The main shareholder is the Romanian Government represented by the Ministry of Economy and Finance. Romgaz's main fields of activity are: geological research for the discovery of the new gas reserves, production underground storing of natural gas. Romgaz's objectives are:

- o Ensuring safety, continuity and flexibility of the gas supply;
- o Developing international cooperation relationships for exploration and production projects outside Romania;
- o Improvement of production recovery and optimization factor by state of the art technologies
- o Enhancement of underground gas storage performances in terms of withdrawal rate
- o Further expansion of international operations on emerging markets
- o Clear policy for mitigating environmental impact
- o Consolidating the position as leader in the Romanian gas market;



Economic performance, environment protection and social responsibility

Romgaz's strategy is based on the concept of sustainable development by simultaneously applying three basic principles: economic performance, environment protection and social responsibility.

Economic performance

The company is developing by implementing state of the art technologies in the field of geological exploration, production and underground gas storage which are financed by its own sources or external sources. The company's economic and financial position is characterized by a very sound profitability and liquidity and its development strategy is focused on the increase of geological research expenses aiming at discovering new resources, on performing environment protection works, on improving the gas quality by means of installing gas dehydration stations and on developing the underground storage activity.

Environment protection

Success and economic prosperity of the business framework derives from a healthy environment in which Romgaz carries out its activity. Environment protection together with high quality products and services are Romgaz's major concerns. Thus, annually, Romgaz invests significant amounts in new research and production technologies.

Such activities warrant the care for the most valuable inheritance that Romgaz wishes to leave for the future generation, namely an unharmed environment.

Social responsibility

Romgaz considers that all the processes and operations carried out must take in consideration the interests of the customers, employees and their families, as well as those of the community in which the company runs its activity.

Romgaz gives a great importance to labour safety and health, thus providing an adequate work environment both for its employees and for its partners. In this way, Romgaz applies different programs for the benefit of the community, showing its support to the communities in the locations it operates in.

Romgaz's vision

Romgaz is the sole state owned company which fulfilled all economical growth conditions and which entered the Top 100.

In accordance with the development strategy of the company, the investments will be mainly made for geological research drilling. Moreover, the company's prospects aim at upgrading the natural gas underground storage capacity, the surface infrastructure relating to natural gas, both by means of its own resources and through partnerships with major international companies.



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ROMGAZ

1909-2009

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of Romanian gas.
A century of
supremacy and power



LE SYNDICAT PROFESSIONNEL DU GAZ EN FRANCE

- L'AFG est le syndicat professionnel de l'ensemble des acteurs de la filière gazière (Gaz Naturel et GPL).
- L'AFG rassemble l'ensemble des entreprises, industriels, professionnels et associations professionnelles intervenant sur le marché français.
- L'AFG est le lien entre tous les acteurs de ce secteur et contribue à sa promotion.
- Etre adhérent de l'AFG, c'est être représenté dans tous les domaines de l'industrie gazière.
- L'AFG représente l'industrie gazière française au sein de l'Union Internationale de l'Industrie du Gaz (UIIG).
- L'AFG est membre d'Eurogas (Union Européenne de l'Industrie du Gaz Naturel), de Marcogaz (Association Technique de l'Industrie Européenne du Gaz Naturel) et d'EASEE – gas (Association Européenne pour la Rationalisation des Echanges d'Energie – gas). Elle est ainsi en mesure de mettre en valeur, de promouvoir et de défendre l'industrie française au niveau européen et, plus largement à l'international.

THE GAS TRADE ASSOCIATION IN FRANCE

- The AFG is the trade association for all those involved in the gas sector (Natural Gas and LPG).
- It includes all businesses, manufacturers, companies and trade associations operating on the French market.
- The AFG is the link between all participants in this sector and contributes to promoting it.
- Being a member of the AFG means being represented in all fields of the gas industry.
- The AFG represents the French gas industry in the International Gas Union (IGU).
- The AFG is a member of Eurogas (European Union of the Natural Gas Industry), of Marcogaz (Technical Association of the European Natural Gas Industry) and EASEE – gas (European Association for the streamlining of Energy Exchange – gas). It is thus able to enhance, promote and defend the French industry in Europe and, more broadly international.

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FEATURES

After a tight 2008 – when several projects were delayed – 2009 is seeing a major increase in LNG capacity. This issue's feature section has a focus on LNG with a review of the production, shipping and liquefaction stages of the chain. We also have contributions from the Society of International Gas Terminal and Tanker Operators, Eurogas and Marcogaz, Pipeline Research Council International and the World Alliance for Decentralised Energy, while IGU Charter Member the Japan Gas Association writes about a programme to commercialise residential fuel cells. The Task Force on Gas Market Integration continues its series of case studies and in this issue we have three, looking at North America, the Trans-ASEAN pipeline project and LNG market integration from the Asian perspective. An update on GTL developments follows, and then there is a contribution from the new Charter Member for Libya. As usual, we round up with a description of the publications and documents available from IGU and the events calendar.

Golar LNG



- * Diverse and balanced portfolio
- * Full LNG chain participation
- * Clear growth opportunities
- * Capturing value for customers, investors, and partners



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LNG in 2009 – From Famine to Feast but For How Long?

By Andy Flower

The year 2009 has been seen for some time as a year of change for the LNG business as some 44 mtpa of new capacity, for which final investment decisions (FIDs) were made in 2005, begins to come on stream. However, no one could have predicted that the surge of new capacity would arrive at a time of weakening demand, as the recession hits the economies of major LNG importing countries. The result has been a dramatic turnaround in LNG trading flows, despite the delays in the start-up of some of the new liquefaction trains and a shortfall in production from operating plants in the first half of 2009.

It is only just over a year ago, in mid-2008, that buyers were competing for any available cargoes of short-term LNG and receiving terminals

in the US and the UK were sitting idle, despite prices in those markets running at over \$11 per million BTU. Now buyers are exercising downward flexibility under their long-term contracts, which is releasing cargoes into the short-term market. As a result, sellers have been competing to find buyers able to offer prices higher than those available from sales to the UK or the USA, which are effectively acting as markets of last resort for uncommitted LNG.

However, the anticipated surge in supply has been delayed not cancelled; and it looks as though the build-up in supply has now started and will gather momentum into 2010. What impact will this have on LNG trading flows and will we ever see a return to the tight markets of 2007 and 2008?

● LNG in 2008

For the last quarter of a century, LNG activity has been on a strong upward trend, growing at an average rate of 7.4% per annum from 1980 to 2008, a doubling every nine years. In 2008, growth



This year is set to see some 44 mtpa of new liquefaction capacity come on stream including both trains of Sakhalin II (ABOVE the first export cargo leaves onboard *Energy Frontier* and the first train of Yemen LNG (OPPOSITE).

came to a halt. The various organisations that produce estimates of annual LNG supply and demand disagree on whether it increased marginally, fell marginally or was unchanged, but they all agree that any change compared with 2007 was small – less than 1%. The reason that growth came to a halt was entirely down to problems with supply side. There was unused capacity in regasification terminals in markets such as the UK and USA to receive large volumes of additional LNG, had it been available, at prices which would have offered sellers an attractive return on their investments.

The reasons that supply did not increase in 2008 were a combination of delays in the start-up of new capacity, technical problems at some operating plants and a shortfall of gas supply at others. The only new liquefaction capacity to come on stream in 2008 was the fifth train at Australia's North West Shelf plant, which started producing LNG in September, too late to contribute more than a few cargoes to LNG supply for the year.



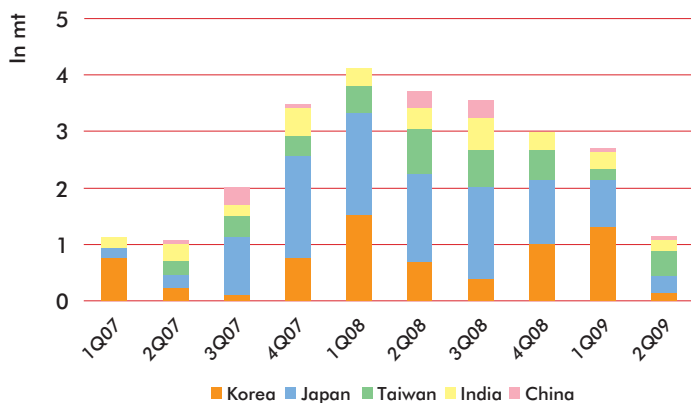
The only new liquefaction capacity to come on stream in 2008 was the fifth train at Australia's North West Shelf plant.

The slowdown in supply growth had its largest impact in Asia where the continuing decline of production from Indonesia's two liquefaction plants, at Bontang and Arun, meant that Pertamina was unable to meet the contractual commitments to its long-term buyers in Japan, Korea and Taiwan. At





IMPORTS OF ATLANTIC BASIN LNG BY ASIAN BUYERS - 2007 TO 2009



ABOVE
Figure 1.

the same time, demand was increasing in Asia, especially in the first half of the year, as economies continued to expand. Furthermore, Japan needed additional LNG imports, in the power sector, to compensate for the loss of nuclear output as Tokyo Electric's 8.2 GW nuclear complex at Kashiwazaki-Kariwa, which was hit by a powerful earthquake in July 2007, remained out of action for the whole of 2008.

Producers in the Pacific Basin and the Middle East had limited capacity to respond to the additional demand from buyers in Asia, and they had to turn to the Atlantic Basin producers. As Figure 1 shows, the result was a rapid build-up of LNG moving eastwards, from around 1 million tonnes per quarter (six cargoes per month) in the second quarter of 2007 to over 4 million tonnes per quarter (approximately 23 cargoes per month) by the first quarter of 2008.

The flow of cargoes declined over the last nine months of 2008, down to 3 million tonnes per quarter by the final quarter of the year. The volume moving from the Atlantic Basin to Asia remained at a relatively high level in the first quarter of 2009, as deals done before the full extent in the downturn in demand in Japan, Korea and Taiwan became evident. However, in the second quarter of 2009, the volumes returned to

the same level as in the first half of 2007. Most of the cargoes delivered in the second quarter of 2009 were under medium-term supply deals.

Figure 1 also shows that all five of Asia's LNG importing countries have been active in the short-term market. Japan was the largest buyer of Atlantic Basin cargoes in 2008 followed by Korea, whose purchases are mainly in the winter months when the demand for natural gas from downstream customers peaks. In terms of supply, all of the producers in the Atlantic Basin, with the exception of Libya, sold cargoes to Asia in 2008. Even Norway's Snøhvit plant, which was producing well below capacity in 2008 because of technical problems, supplied two LNG cargoes to Japan.

The increase in the inter-regional trading of LNG cargoes over recent years has created a situation where there is effectively a global pricing basis for short-term LNG. This contrasts with the continuing regional nature of prices of LNG sold under long-term contracts. The availability of unused receiving terminal capacity in the UK and the USA has meant that producers and sellers can always deliver uncommitted cargoes to these markets, where they will receive a price based on either the National Balancing Point (NBP) price in the UK or the Henry Hub price in the USA. Whichever of these prices is highest effectively provides a floor price for short-term LNG. Buyers in other markets looking for additional supplies have had to pay a premium over this floor price. The premium has to cover any additional freight costs and provide a margin for the seller. In 2008, the average premium for Atlantic Basin cargoes diverted to Asia is estimated to have been around \$3.30 per million BTU.

● The slowdown in FIDs for new liquefaction capacity

Last year was another disappointing one for FIDs with only Algeria's 4.7 mtpa GL3Z plant at Arzew reaching that important milestone. In 2007, FIDs were made on only three plants – Australia's 4.3



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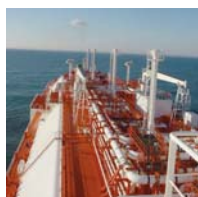
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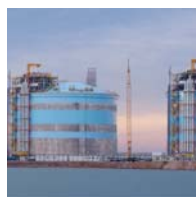
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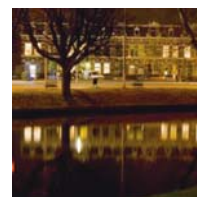
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mtpa Pluto LNG, a 4.5 mtpa train at Algeria's Skikda facility to replace three trains destroyed in an explosion in January 2004 and the 5.2 mtpa Angola LNG plant. In 2006, the outcome was just one FID, for the 4.4 mtpa Peru LNG plant. In total, commitments were made to just 23.1 mtpa of new capacity over the three years from 2006 to 2008. This compares with over 50 mtpa in 2005, when Indonesia's Tangguh project, Yemen LNG, the fifth train at Australia's North West Shelf project and the last four of Qatar's mega-trains all reached FID.

There are a number of reasons for the slow-down in FIDs. The escalation of costs is a major factor with the cost of constructing of new capacity increasing from between \$200 and \$300 per tonne per annum of production capacity in the period 2000 to 2003 to between \$700 and \$1,400 per tonne per annum by 2008. Faced with these costs, companies planning new liquefaction capacity have delayed FIDs as they carry out studies to identify ways of bringing them back

down. It seems likely that costs will begin to fall as a result of the global recession, but in the middle of 2009, there was no clear evidence that this had begun to happen or, when it does, to what extent we might eventually see them decline.

A shortage of experienced people to plan and construct LNG plants has gone hand-in-hand with the increase in costs. Contractors and equipment manufacturers have enjoyed full order books and they have not had to compete as aggressively for new business. The new capacity is, in many cases, in more challenging locations both geographically and environmentally, which also adds to costs. Government indecision is also a factor behind the delay of projects especially in the increasing number of countries where export versus domestic gas use is a hot political issue.

● **Regasification capacity**

Regasification terminals have faced strong opposition in a number of countries, most notably the



Argentina became the first South American country to start LNG imports in May 2008 through Exceleerate Energy's Bahía Blanca GasPort which uses the regasification vessel *Excelsior*.

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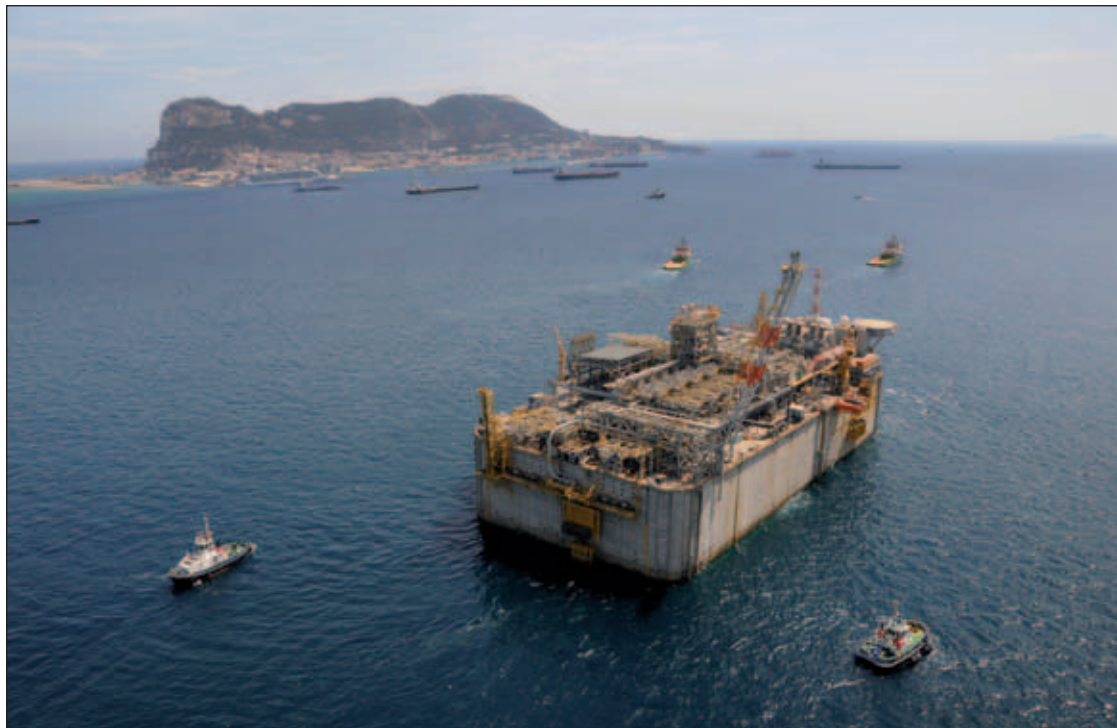
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The offshore Adriatic LNG receiving terminal (seen here being towed from the fabrication yard in Spain to Italy) received its first cargo on August 10.

USA and Italy. Although some terminal projects in these countries have been abandoned or severely delayed, others are now coming into service. In 2008, the first new onshore terminals in the USA for 27 years received their first cargoes. The Sabine Pass terminal in Louisiana and the Freeport terminal in Texas together added 4.1 bcf/d (31 mtpa) of new capacity. They were joined by the Cameron terminal, also in Louisiana, in June 2009, taking total LNG import capacity in the USA to around 90 mtpa (11.7 bcf/d). In the first six months of 2009, the USA imported 5.1 million tonnes of LNG, an average rate of only 1.3 bcf/d.

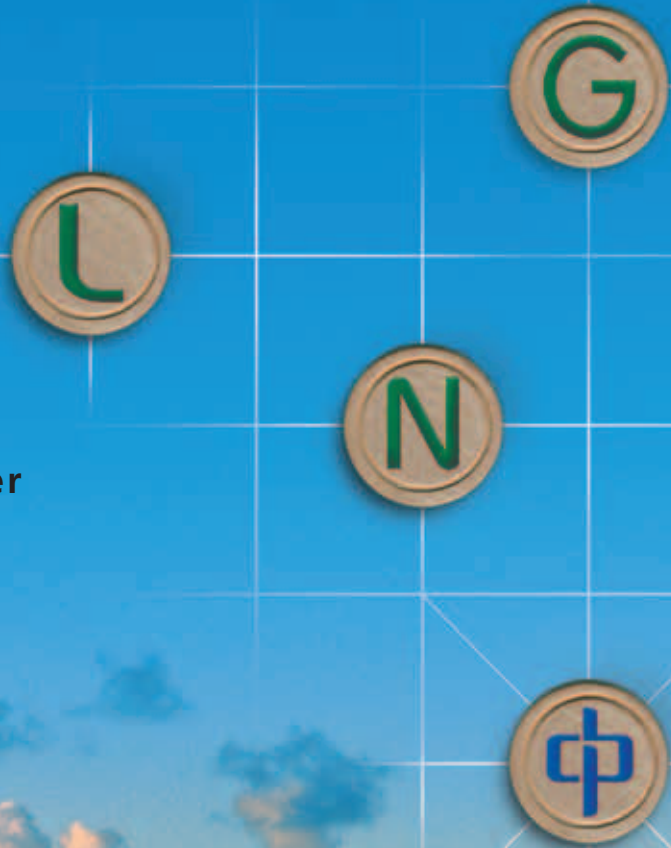
The country now has the capacity to deal with even the most optimistic forecasts of US import levels. The Golden Pass terminal in Texas and the Pascagoula terminal in Mississippi and expansions of existing terminals will add a further 50 mtpa (6.5 bcf/d) of capacity by 2011.

In addition to the terminals in the USA itself, Sempra's Costa Azul terminal in Baja California,

Mexico, which received its first cargo in April 2008, and the Canaport terminal in Canada's New Brunswick Province, which received its first cargo in June 2009, are well-placed to deliver regasified LNG to California and New England respectively. Each of these terminals has the capacity to import 1 bcf/d (7.8 mtpa) of LNG.

In 2008 and the first half of 2009, new terminals came into operation in Argentina (May 2008), Brazil (January and March 2009) and Chile (July 2009), adding to import capacity in the Americas. The demand for gas in these markets is in the southern winter months, a time when demand is low in a number of markets in the northern hemisphere. In Argentina and Brazil, a fast start-up of LNG imports has been achieved by using ships with on-board regasifiers as FSRUs (Floating Storage and Regasification Units).

Europe is also expanding its receiving terminal capacity. The UK, which restarted importing LNG



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Table 1.

LNG CAPACITY SCHEDULED TO START-UP 2009-2013

Country	Facility	Capacity (mtpa)	Start-up
2009			
Russia	Sakhalin II Train 1	4.8	Started-up March 2009
Russia	Sakhalin II Train 2	4.8	Started-up May 2009
Qatar	Qatargas 2 Train 1	7.8	Started-up May 2009
Indonesia	Tangguh Train 1	3.8	Started-up July 2009
Yemen	Yemen LNG Train 1	3.35	September 2009
Qatar	RasGas 3 Train 1	7.8	4Q09
Qatar	Qatargas 2 Train 2	7.8	4Q09
Indonesia	Tangguh Train 2	3.8	4Q09
Total 2009		43.95	
2010			
Qatar	RasGas 3 Train 2	7.8	1Q10
Yemen	Yemen LNG Train 2	3.35	1Q10
Malaysia	Dua debottleneck	1.2	2Q10
Qatar	Qatargas 3	7.8	2H10
Peru	Peru LNG	4.4	2H10
Total 2010		24.55	
2011			
Australia	Pluto	4.3	1Q11
Qatar	Qatargas 4	7.8	2011
Total 2011		12.1	
2012			
Algeria	Skikda rebuild	4.5	2H12
Angola	Angola LNG	5.2	1H12
Total 2012		9.7	
2013			
Algeria	Arzew 3	4.7	1H13
Total		95.0	

in 2005 after a gap of over 15 years, will, by the end of 2009, have four terminals in operation with the capacity to import around 35 mtpa of LNG, equivalent to 50% of the country's total natural gas consumption in 2008.

The offshore, gravity-based Adriatic LNG, Italy's first new LNG import terminal for nearly 40 years, was due to start importing LNG from Qatar at presstime; while France's first new terminal for 20 years, at Fos Cavaou, received its first cargo in July.

In Asia the two newest importers, India and China, are adding new receiving terminals and expanding existing facilities. Thailand is building its first facility and Singapore's plans to start importing LNG are well advanced. The largest buyers in the region, Japan and Korea, are able to increase the throughput at their operating terminals, although plans are in hand in both countries for the construction of new facilities.

Meanwhile, in the Middle East, Kuwait and Dubai in the UAE are both going down the route of using FSRUs to enable LNG imports to start quickly to meet the summer peak in gas consumption in the power sector.

The International Energy Agency (IEA) estimated in its *Natural Gas Market Review 2009*, which was published at the end of June, that global regasification capacity at the beginning of 2009 was 472 mtpa, 2.7 times actual LNG imports in 2008. This means that terminals were on average operating at a 37% load factor, although the range for individual terminals was wide, with some empty for the entire year and others operating at close to full capacity.

● LNG shipping

Ship-owners and ship-yards responded quickly to the anticipated increase in LNG activity and the capacity of the LNG shipping fleet had, by the middle of 2009, expanded over three-fold compared with 2000. Over the same period, LNG production increased by 75%. Some of the

additional shipping capacity was needed because the growth in output from the Middle East and in inter-regional trading resulted in average voyage distances increasing from 5,700 kilometres in 2000 to 7,130 kilometres in 2008. However, together with the increased receiving terminal capacity, it provided the flexibility the LNG business needed to support the expansion of short-term trading, which grew from 5.4 million tonnes in 2000 to 29.7 million tonnes in 2008.

● **The LNG outlook 2009 to 2013**

The period 2009 to 2013 will see the start-up of 17 liquefaction trains plus the debottlenecking of the Malaysia LNG Dua plant. In total, some 95 mtpa of liquefaction capacity will have been added by 2013. The capacity and expected start dates of the trains are shown in *Table 1*. As has

been seen with the four trains commissioned in the first seven months of 2009, the start dates are subject to change even at a late stage in the commissioning process, so some of the dates shown in the table should be seen as indicative at this stage.

Half the new capacity coming on stream is from Qatar's six mega-trains. The timing of these projects will, therefore, have a considerable influence on the build-up of new supply over the next few years. The first of the mega-trains, Qatargas 2 Train 1, started commissioning in September 2008 but did not produce LNG consistently until late May 2009. The expectation in Qatar is that the lessons learnt from this train will enable the remaining trains to start-up more smoothly, but only time will tell whether this will happen.



HH Sheikh Hamad bin Khalifa Al Thani presided over the inauguration ceremony for the first of the Qatargas mega-trains at Ras Laffan on April 6.

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One of Sonatrach's LNG plants located in Arzew, Algeria.

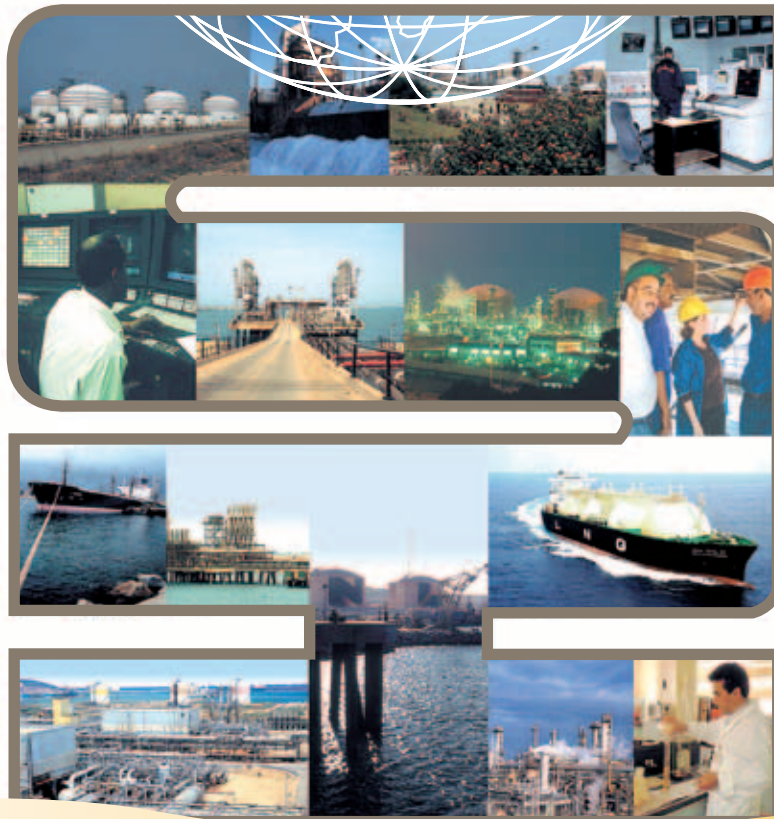


A drilling rig in the south of Algeria.



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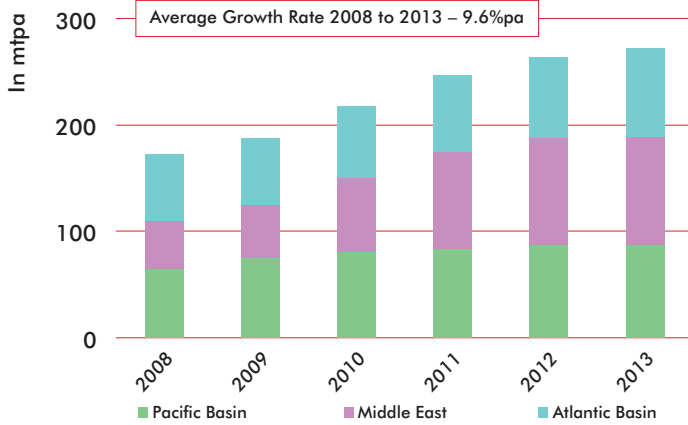
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GLOBAL LNG PRODUCTION FROM LIQUEFACTION TRAINS IN OPERATION OR UNDER CONSTRUCTION IN MID-2009

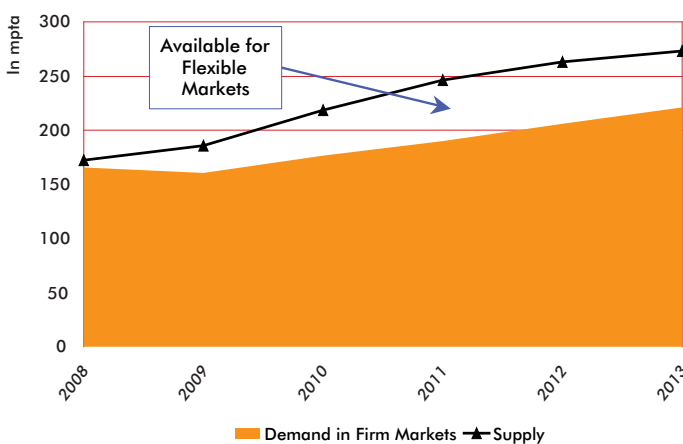


ABOVE
Figure 2.

Figure 2 shows the potential build-up of production from trains in operation and under construction in mid-2009. These days, it typically takes at least four years to construct a new liquefaction train, which means that projects now at the planning stage will not make a significant contribution to supply until 2014, at the earliest. The commissioning of Qatar’s six mega-trains and the two smaller trains in Yemen will result in the Middle East becoming the largest regional

BELOW
Figure 3.

DEMAND IN FIRM LNG MARKETS AND AVAILABLE SUPPLY 2008-2013



producer of LNG by 2011. In 2013, Middle East production of just over 100 mtpa, will represent 37% of the world total, the Pacific Basin will have a share of 32% and the Atlantic Basin 31%.

The average annual growth rate of LNG production over the five-year period 2008 to 2013 is 9.6% per annum, an acceleration compared with the average rate of 7.4% per annum from 1980 to 2008. This new supply is coming on stream at a time of weak demand. This raises the question, to which markets will the additional LNG production go?

LNG markets can be divided into two broad categories. The firm markets, which include Asia, southern Europe, South America, the Caribbean and the north-east of the USA, either have no access to pipeline gas or their access is limited. These markets have to have LNG and, as was seen in 2008, buyers will pay the price needed to ensure the requirements of their downstream customers are met. The flexible markets, which include the UK, the USA and Belgium, have a choice between LNG and pipeline gas supply and their imports of LNG will depend on the volume of LNG available after demand in firm markets has been met.

Figure 3 shows that the volume of LNG available for the flexible markets will increase over the next few years. In 2008, when the demand in Asia resulted in cargoes being diverted from the UK and USA, it amounted to only 7 million tonnes. By 2012, it could reach over 56 million tonnes (7 bcf/d). However, as the commissioning of new trains slows down from 2011, the firm markets will take an increasing share of the production, reducing the volume of LNG available for the flexible markets.

The trends in LNG trade flows that are likely to become established over the period to 2013 were already evident in the first half of 2009, despite the surge in new supply being delayed. Imports into Japan, Korea, Taiwan and Spain were down by a total of just over 6 million tonnes while



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5.00%



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imports into the UK, the USA and Belgium were up by over 5 million tonnes.

The question of into which of the flexible markets the LNG will flow will largely be determined by comparative prices in those markets and the revenues producers will receive after deducting shipping and regasification costs. Prices in the UK and the USA have fallen by up to a third since the middle of 2008/ to around a third of their mid-2008 levels, reducing the revenues for sellers but also creating the opportunity for some buyers in the firm markets to secure LNG at prices that will allow them to compete for market share with other fuels.

● **Summary**

This is proving to be a year of change for LNG, a change which could continue well into the next decade. In 2008, the global LNG market was tight as LNG production stagnated for the first time in over a quarter of a century. Buyers in Asia had to turn to Atlantic Basin producers to meet the demand, leaving terminals in the UK and USA

operating at low throughput levels.

Now we are seeing the start of a surge of new supply, which will see 95 mtpa of liquefaction capacity added by 2013. The new supply is coming on stream when demand is weak as a result of the economic recession. LNG is already flowing back from the firm markets into the flexible markets of the UK and the USA. Demand growth will resume as economies recover and new importing countries emerge and expand. However, the increase in LNG supply should ensure we will not see a return to the very tight markets of 2007 and 2008 for many years and it may never happen.

Andy Flower is an independent consultant specialising in the LNG business, whose areas of expertise include strategy, marketing, project structures, shipping, pricing, supply and demand and project economics. He retired from BP in 2001 after 32 years' service, including 22 in its LNG and natural gas business activities. He can be contacted at andy.flower@virgin.net.

