TRIENNIAL WORK PROGRAMME 2012 - 2015

26th

WORLD GAS CONFERENCE

PARIS - FRANCE

1 - 5 june 2015

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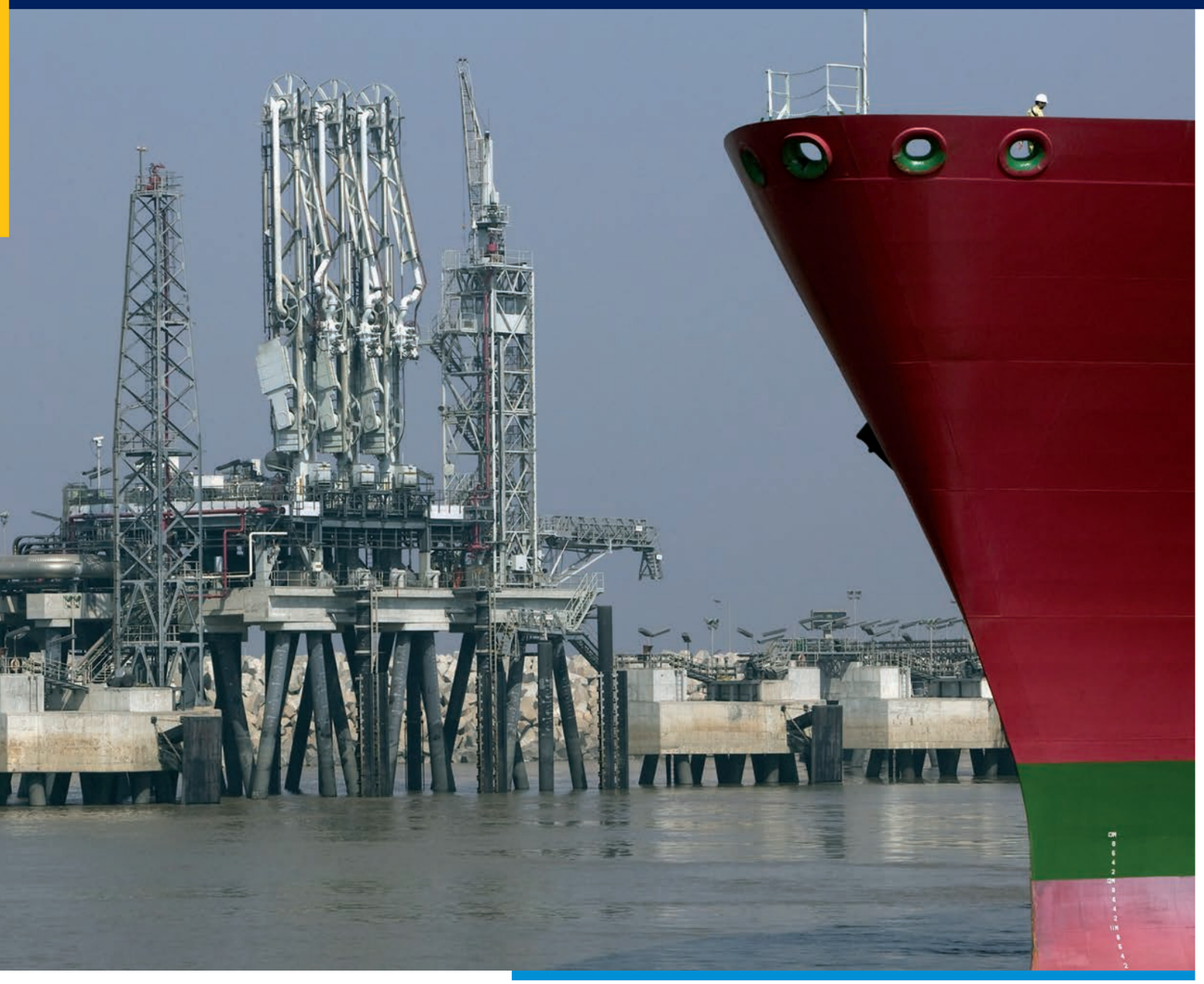
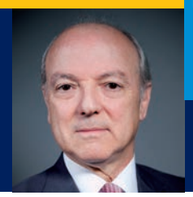
INTRODUCTION



FOREWORD
FROM THE IGU PRESIDENT



Dear Colleagues

A few months after having been entrusted by the Union with the responsibility to promote the gas industry on a global basis during the 2012-2015 Triennium, I am feeling that, if I may paraphrase President Kennedy, we should not ask what governments, international agencies and policymakers can do for our industry but what our industry can do for the people.

iIt is indeed an exciting and challenging role to advocate the development of natural gas, not only as a destination fuel, but also as a key long-term solution for sustainable economic growth and a more secure energy future for most people, and in all regions.

The future, as we see it, should be environmentally friendly for the air, water and landscape, job creating, highly innovative and offer to customers all the benefits that they can expect in the internet era.

We have to place gas in the hearts, as well as in the minds of everyone and advocate on the basis of tangible facts and figures that can be easily understood, conveyed and promoted across the board. For instance, when addressing the issue of substituting coal for natural gas in power generation, we should demonstrate that we act in favour of climate mitigation and the environment on two fronts: air quality, of course, but also the use of precious water, which is reduced by between 60% and 100% with combined-cycle gas turbine (CCGT) and cogeneration technologies.

I am therefore convinced that natural gas should be associated not only with competitiveness but also with innovation.

We should not leave the promotion of innovative solutions to the field of renewables, but work actively to enhance the role of gas in ensuring the integration of different energy and transportation systems through a series of active interfaces. We need to work with the electricity network on the storage of hydrogen to optimise the use of renewable capacities, with the road transport sector to encourage the use of heavy-duty natural gas vehicles (NGVs) and in the residential sector to develop microcogeneration and fuel cells.

To this end, we have prioritised our actions in three directions, aiming respectively at:

- Promoting at the political level, the "gas + renewable" paradigm as the best option for meeting the climate imperative in the most affordable conditions. For this purpose, I had a meeting with the Director General for Energy of the European Commission, Mr Philip Lowe. Our meeting allowed us to propose a more active contribution of IGU in following-up the EU 2020 and 2050 roadmaps and to express our concern about the surge of coal in the electricity generation mix, which is making it more difficult to achieve the environmental targets set by the Commission;

- Enhancing the capacity of IGU to work in full synergy with international institutions, offering our assistance and the experience of our members as regards the best technical, regulatory and contractual practices for using natural gas to foster the development of emerging countries. Our initial discussions with Dr Kandeh K. Yumkella, UNIDO Director General, opened avenues for IGU's contribution contribution to the UN initiative on "Sustainable Energy for All", placed under his authority. We have also met UNESCO representatives to explore cooperation between this institution, IGU's Task Force 1 and our promising Youth Programme;

- Gathering feedback from members on their experiences and successful projects, which could be used for the benefit of other members. The invitations that have been kindly extended to me to address all the most important gas conferences worldwide, have convinced me of the strong desire for cooperation among our members and of the merits of our internal networking.

The French team has been working on these objectives since 2012 and is fully committed to continue promoting effectively and convincingly the benefits of natural gas.

Jérôme FERRIER,
President of the IGU

FOREWORD
FROM THE IGU COORDINATION COMMITTEE

1. Introduction

The French triennium begins against a background of economic crisis, the second in 3 years. The first was an unprecedented financial and economic crisis that affected even the energy industry, including natural gas, while the second is more global, hitting Europe hardest but also affecting North America and new pillars of world development, such as China and India. A global gas bubble was created by a combination of contracting demand and the emergence of new resources (shale gas, LNG, …), but supplies tightened following the Japanese disaster in March 2011. Nevertheless, natural gas still appears to have a more favourable position in the future world energy mix than it did a few years ago, as it is viewed as a transition fuel by some institutions (European Commission) and environmental associations. Natural gas could also emerge as a future destination fuel, as highlighted in the mid-2011 IEA study, "A golden age of gas?"

2. 2012 - 2015 Theme and Strategic Guidelines

Within this context and in line with the theme presented by the French candidates in 2008, we remain optimistic and the theme for the French Presidency is:

"Growing together towards a friendly planet".

As the need for clean, efficient energy continues to grow, gas has a vital role to play in meeting the world's expanding energy requirements. Gas offers significant advantages over other fossil fuels in an increasingly carbon constrained world where climate change is a cornerstone of energy policies.
The resources are available today and for a number of years in the future. Gas remains an AAA[1] energy and key part of the fuel mix that will drive future global growth. Gas as a source of power generation is by far the largest growth sector.

Gas CARES[2] about the future. Growth must be sustainable and shared between continents. The benefits of gas must be as widespread as possible.

It must be affordable, particularly when combined with renewables. Global energy requirements continue to make increasing demands on gas supplies. Because future industry growth must be sustainable, economic, environmental and social factors must be taken into account to improve welfare throughout society. Sustainable growth aims to improve current conditions without compromising the ability of future generations to meet their own needs. This entails not only improving the availability of gas, by developing and implementing new gas technologies, but also recruiting the critical human resources needed to ensure that all the essential elements are in place and can be operated safely at optimum levels throughout the entire value chain.

To support this theme and reinforce the IGU's role in the gas industry, we have identified four strategic guidelines to sustain future global growth.
These are to:

I. **Obtain official recognition for natural gas as a destination fuel for sustainable development**
II. **Promote an appropriate mix of gas and renewables and electricity**
III. **Improve the availability of natural gas in new areas and in developing countries**
IV. **Attract human resources and reduce staff turnover.**

These four pillars form the framework of our technical programme, including special triennium projects.

1 - Available, Affordable, Acceptable
2 - Clean, Acceptable, Reliable, Efficient & Secure

3. Triennial Work Programme

This document presents the detailed programme for the triennium, including outline objectives, the scope of the studies and projects that will be carried out. These activities will be implemented by Programme Committees, Working Committees and Task Forces, with representatives drawn from the IGU membership. The programme is the result of highly constructive discussions with the outgoing committee authorities as well as brainstorming sessions with the incoming committee authorities, subject experts and IGU management. The objective is to build on the progress made by the previous Argentinean and Malaysian triennia and to ensure that the strategic guideline studies and environment remain current and relevant. We would like to acknowledge the support and contributions of the Malaysian and Argentinean Presidencies with whom we have always maintained a constructive dialogue. Their input has always been extremely valuable in ensuring the smooth transition between the triennia.

Like our Malaysian colleagues before us, we believe that human resources and education are key for the future of our industry. In this complex world and globalized gas market, geopolitics are a driving force behind gas industry developments. With serious potential implications for the future sustainability of the industry, we believe these are areas that merit further consideration. We are therefore maintaining the two Task Forces responsible for these special projects during this triennium so that they can continue to study the issues, impact and challenges in these fields. We will also be proposing to the Council that we create a new Human Capital Programme Committee during the next triennia.

Another concern is the image of natural gas: how policy makers, international organisations and NGOs the world over, perceive natural gas. While the world will continue to depend on fossil fuel for most of its energy requirements in the foreseeable future, we believe natural gas has an important role to play in mitigating climate change. We are therefore setting up a new Task Force dedicated to Gas Advocacy. This Task Force, under the umbrella of the IGU Presidency and Secretariat, will consult experts and Programme Committee leaders, particularly the Sustainability (PGC A) and Marketing and Communication Committees (PGC E). This Task Force will increase our visibility and promote gas use by maintaining, improving and adapting the key arguments developed during the Malaysian triennium and by launching lobbying activities at major forums such as the UNFCCC (COP) meetings.

To complete our work programme, we will continue to collaborate with other international organisations such as the International Energy Agency (IEA), the International Energy Forum (IEF), the World Petroleum Council (WPC), the World Energy Council (WEC) and other like minded organisations.

4. Changes to the Organisation Structure

The basic structure of Programme Committees (PGCs) and Working Committees (WOCs) will remain largely unchanged. However, the scope of some of these committees' work has been streamlined and redefined. In addition, with effect from the French triennium, a new Programme Committee (PGC F) has been introduced named "R&D and Innovation" in recognition of the work carried out by the former Technical Programme Committee of the IGU Research Conference (IGRC) in Paris in October 2008 and in Seoul in October 2011. This Programme Committee will be responsible for preparing the programme for the next IGRC conference in Denmark (October 2014) and for steering R&D and Innovation work towards the 2015 WGC.

5. Conclusion

In a difficult climate we're facing a wide variety of challenges, including extending the benefits of our industry to emerging countries, and paving the way for a harmonious energy mix with renewables and electricity. Working together to find solutions to these challenges will provide the IGU with the new ingredients it requires to ensure that natural gas is recognized as a key element in a future and sustainable world energy mix.

Georges LIENS
Chairman, IGU Coordination Committee

LETTER
FROM THE IGU SECRETARY GENERAL

The International Gas Union (IGU) has been promoting the technical and economic progress of the gas industry all over the world since 1931. The IGU's vision is to become the most influential, effective and independent non-profit organisation, while serving as the public voice of the gas industry worldwide.

The IGU has also become an active contributor to policy formulation with an increased focus on political and strategic challenges. Current priorities include the promotion of the long-term role of gas in a low-carbon energy future, and the continuous improvement of corporate performance towards sustainable development.

The IGU has more than 125 members – national associations and gas corporations – and affiliated organisations, drawn from countries on every continent. They represent 95% of the global gas market. The IGU working organisation covers all aspects of the gas value chain from exploration and production, transmission, storage, distribution and use as well as sustainability, strategy, gas markets, LNG, R&D and marketing. Separate Task Forces have been set up to address issues of special relevance, such as gas advocacy, geopolitics and human resources.

The IGU enjoys extensive cooperation with other international organisations including, among others, the United Nations, the International Energy Agency, the World Bank, the International Energy Forum and the Worldwatch Institute.

The World Gas Conference is the most important global gas event. Every three years the industry convenes for this renowned conference, which is arranged by one of the IGU Charter members. Several thousand industrial and political leaders, gas executives, specialists in many fields, and exhibitors will get together for the 25th World Gas Conference in Kuala Lumpur, Malaysia, on 4-8 June 2012.

France will take over the IGU Presidency at the close of the 25th World Gas Conference. During the 2012 - 2015 Triennium, the IGU will continue to promote and further develop the gas industry's technical, economic and political progress. The 2012–2015 Triennial Work Programme (TWP), which you are now reading, establishes the framework for the professional work to be undertaken by the IGU over the coming three-year period. I am confident that it will produce results that will benefit and be of interest to all IGU members and the gas industry in general. More than 900 industry experts participated in this programme during the last triennium.

The Committees and Task Forces are managed and coordinated by the Coordination Committee. This report will provide you with an overview of the IGU's structure and members, as well as the Working Committees (WOCs), Programme Committees (PGCs) and Task Forces (TFs) for the 2012-2015 Triennium. The result of the TWP's work will be shared with IGU members and presented at the 26th World Gas Conference in Paris in 2015.

In order to provide the best possible support for these efforts, I strongly encourage IGU members to nominate representatives for the IGU committees. They offer a unique opportunity for networking and for contributing to the global progress of the gas industry.

Torstein INDREBØ
Secretary General, IGU

LIST OF IGU CHARTER MEMBERS
(AS OF MARCH 2013)

1. Albania (ERE, Albanian Energy Regulator)
2. Algeria (Association Algérienne de l'Industrie du Gaz (AIG))
3. Angola (Sonangol Gás Natural (Sonagas))
4. Argentina (Instituto Argentino del Petróleo & del Gas)
5. Australia (Australian Gas Industry Trust c/o Energy Networks Association)
6. Austria (Österreichische Vereinigung für das Gas und Wasserfach (ÖVGW))
7. Azerbaijan (SOCAR, State Oil and Gas Company)
8. Belgium (Association Royale des Gaziers Belges)
9. Bosnia and Herzegovina (Gas Association of Bosnia and Herzegovina)
10. Brazil (Associação Brasileira das Empresas Distribui doras de Gás Canalizado (ABEGAS))
11. Brunei (Brunei Energy Association)
12. Bulgaria (Overgas Inc)
13. Cameroon (Société Nationale des Hydrocarbures)
14. Canada (Canadian Gas Association)
15. China, People's Rep. of (China Gas Association)
16. Columbia (Asociacion Colombiana de Gas Natural – Naturgas)
17. Croatia (Croatian Gas Association)
18. Cyprus (Ministry of Commerce, Industry and Tourism)
19. Czech Republic (Czech Gas Association)
20. Denmark (Dansk Gas Forening - Danish Gas Association)
21. Egypt (Egyptian Gas Association)
22. Equatorial Guinea (Sociedad Nacional de Gas G.E. (SONAGAS))
23. Estonia (Estonian Gas Association)
24. Finland (Finnish Gas Association)
25. France (Association Française du Gaz (AFG))
26. Germany, Fed. Rep. of (Deutsche Vereinigung des Gas und Wasserfaches e.V. (DVGW))
27. Greece (Public Gas Corporation of Greece S.A. (DEPA))
28. Hong Kong, China (The Hong Kong & China Gas Co. Ltd.)
29. India (Gas Authority of India Ltd. (GAIL))
30. Indonesia (Indonesian Gas Association (IGA))
31. Iran (National Iranian Gas Company (NIGC))
32. Ireland (Irish Gas Association - Bord Gais Eireann)
33. Israel (The Israel Institute of Petroleum & Energy)
34. Italy (Comitato Italiano Gas (CIG))
35. Ivory Coast (Société Nationale d'Opérations Pétrolière de la Cote d'Ivoire – PETROCI Holding)
36. Japan (The Japan Gas Association)
37. Kazakhstan (KazTransGas)
38. Latvia (Latvijas Gaze)
39. Libya (National Oil Corporation of Libya)
40. Lithuania (Lithuanian Gas Association)
41. Macedonia (Macedonian Gas Association)
42. Malaysia (Malaysian Gas Association - c/o Petronas)
43. Mexico, (Asociación Mexicana de Gas Natural, A.C.)
44. Monaco (Société Monégasque de l'Électricité et du Gaz (SMEG))
45. Mongolia (Baganuur Joint Stock Company)
46. Morocco (Fédération de L'Énergie de la Confédération Générale des Entreprises du Maroc)
47. Mozambique (Empresa Nacional de Hidrocarbonetos, E.P. (ENH))
48. Netherlands, The (Koninklijke Vereniging van Gasfabrikanten in Nederland (KVGN))
49. Nigeria (Nigerian Gas Association c/o Nigerian LNG Ltd.)
50. Norway (Norwegian Petroleum Society - Norwegian Gas Association)
51. Oman, Sultanate of (Oman LNG L.L.G.)
52. Pakistan (Petroleum Institute of Pakistan)
53. Peru (Perúpetro)
54. Poland (Polish Gas Association (PZITS))
55. Portugal (AGN – Associacao das Empresas de Gas Natural)
56. Qatar (Qatar Liquefied Gas Company Ltd. (Qatargas))
57. Republic of Korea (The Korea Gas Union)
58. Romania (S.N.G.N. Romgaz S.A.)
59. Russian Federation (JSC Gazprom)
60. Saudi Arabia (Saudi Aramco - Development Department)
61. Serbia (Gas Association of Serbia)
62. Singapore (Power Gas Ltd.)
63. Slovakia (Slovak Gas and Oil Association)
64. Slovenia (GEOPLIN)
65. South Africa (CEF Ltd.)
66. Spain (Spanish Gas Association - Asociation Española del Gas (SEDIGAS))
67. Sweden (Energigas Sverige - Swedish Gas Association)
68. Switzerland (SWISSGAS)
69. Taiwan, China (The Gas Association of the Republic of China, Taipei)
70. Thailand (PTT Public Company Ltd. - Petroleum Authority of Thailand)
71. Timor-Leste (The Secretariat of State for Natural Resources (Government of the Democratic Republic of Timor-Leste)
72. Trinidad and Tobago (The National Gas Company of Trinidad and Tobago Limited)
73. Tunisia (Association Tunisienne du Pétrole & du Gaz (ATPG) c/o ETAP)
74. Turkey (BOTAŞ)
75. Ukraine (Naftogaz of Ukraine)
76. United Arab Emirates (Abu Dhabi Liquefaction Company Ltd. (ADGAS))
77. United Kingdom (The Institution of Gas Engineers and Managers)
78. USA (American Gas Association)
79. Uzbekistan (Uzbekneftegaz (UNG))
80. Venezuela (Petróleos de Venezuela S.A. (PDVSA))
81. Vietnam (Vietnam Oil and Gas Company)

LIST OF IGU
ASSOCIATE MEMBERS (AS OF MARCH 2013)

1. Australian Petroleum Production & Exploration Association (APPEA) (Australia)
2. Bayerngas GmbH (Germany)
3. BG Group plc (BG) (United Kingdom)
4. BP Gas, Power & Renewables (United Kingdom)
5. Bursagaz (Turkey)
6. Cheniere Energy, Inc. (USA)
7. Chevron Corp. (USA)
8. China National Petroleum Corporation – CNPC (P.R. of China)
9. ConocoPhillips Company (USA)
10. DanaGas (United Arab Emirates)
11. Det Norske Veritas (DNV) (Norway)
12. E.ON Ruhrgas AG (Germany)
13. Eurogas
14. ExxonMobil Gas & Power Marketing (USA)
15. Gaslink - Gas System Operator Ltd (Gaslink) (Ireland)
16. GasTerra (The Netherlands)
17. GAZBIR- Association of Natural Gas Distribution
18. Companies of Turkey (Turkey)
19. GDF SUEZ (France)
20. IGDAŞ - Istanbul Gas Distribution Co. (Turkey)
21. Indian Oil Corporation (India)
22. Instituto Brasileiro de Petróleo, Gás eBiocumbustíveis (Brazil)
23. KEMA Nederland BV (The Netherlands)
24. Liander N.V. (The Netherlands)
25. NV Nederlandse Gasunie (The Netherlands)
26. OMV Gas & Power (Austria)
27. Origin Energy Limited (Australia)
28. Petróleo Brasileiro S.A. - Petrobras (Brazil)
29. Repsol (Spain)
30. Russian Gas Society (Russia)
31. RWE Deutschland AG (Germany)
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33. Sonorgás (Portugal)
34. Spetsneftegaz NPO JSC (Spetsneftegaz) (Russia)
35. Swiss Gas and Water Industry (Switzerland)
36. TAQA, Arab Company for Energy (Egypt)
37. TBG - Transportadora Brasileira Gasoduto Bolivia-Brasil S/A (Brazil)
38. TOTAL S.A. (France)
39. Vopak LNG Holding BV (Vopak LNG) (The Netherlands)
40. Wintershall (Germany)
41. Woodside Energy Ltd. (Australia)

LIST OF IGU
AFFILIATED ORGANISATIONS (AS OF MARCH 2013)

1. Energy Delta Institute (EDI)
2. European Gas Research Group (GERG – Groupe Europeen de Recherches Gazieres)
3. Gas Infrastructure Europe (GIE)
4. Gas Technology Institute (GTI)
5. Groupe International des Importateurs de Gaz Naturel Liquefie (GIIGNL)
6. NGV Global
7. International Pipeline & Offshore Contractors Association (IPLOCA)
8. Marcogaz
9. Pipeline Research Council International, Inc. (PRCI)
10. Russian National Gas Vehicle Association (NGVRUS)

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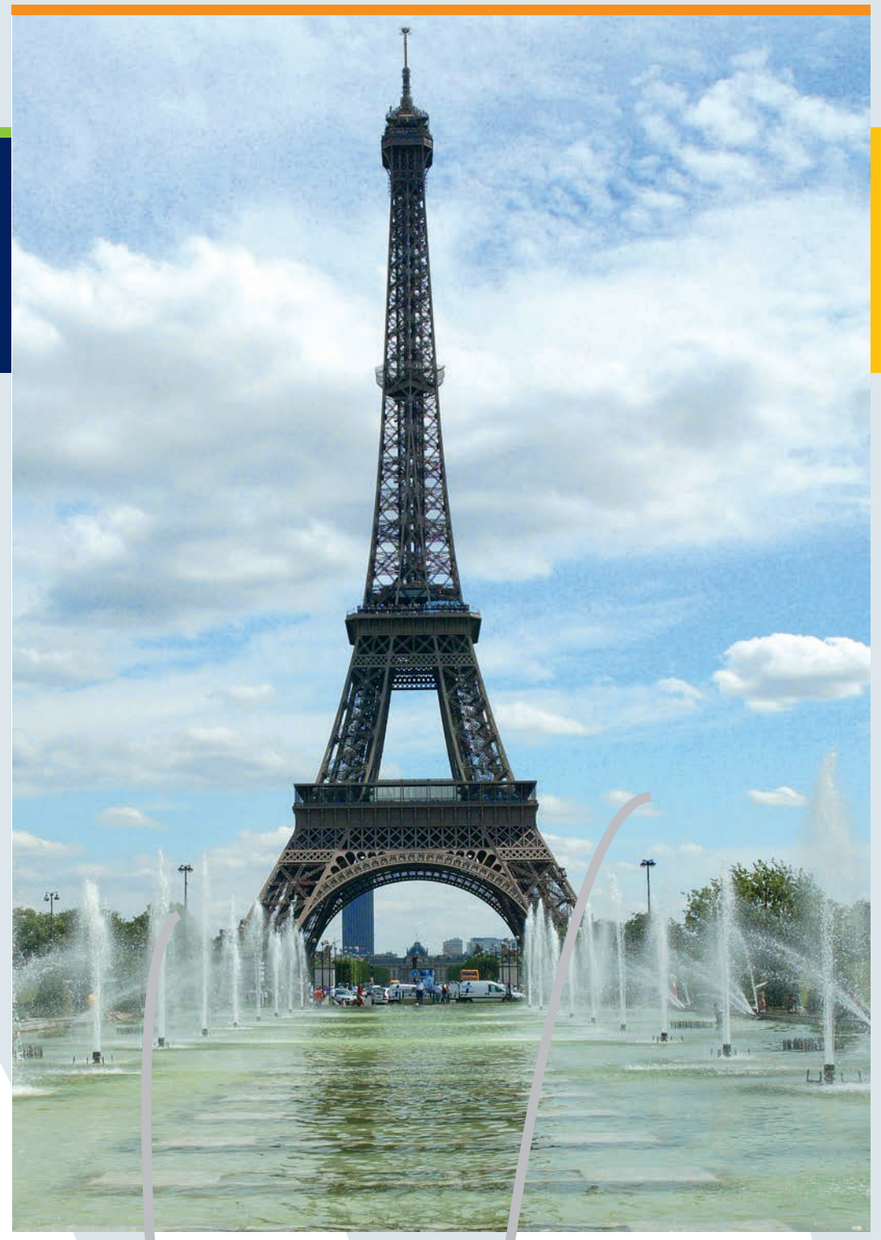


2012 - 2015
TRIENNIAL WORK PROGRAM

OVERVIEW
OF THE GAS INDUSTRY

The natural gas industry is a phenomenal success story and has grown to become a vital part of the global economy, providing over 20% of the world's energy needs. The gas industry now finds itself in a new and challenging global context throughout the entire delivery chain, from exploration and production through to an increasing variety of market sectors.

Natural gas remains the largest growing fuel source for electricity generation, and links with electricity markets are growing stronger in many parts of the world. Oil companies have expanded into the gas market, many gas and electricity utilities have merged and power generators are increasingly adding natural gas to their portfolio. Market liberalization, unbundling and re-bundling of activities along different lines, has also changed the structure of the business and commercial shape of the gas industry, which has responded by adopting new approaches throughout the gas chain.

The global recession, which started in 2008 and hit again in 2011, has dampened energy demand, and the dramatic earthquake in Japan (March 11) and its consequences led to an upheaval in the energy sector. This, combined with the fall in capital investment in new gas projects, the postponement of project commitments, cut-backs in manpower and other fields, may have negative long-term consequences for the sustainability and security of energy supplies. Natural gas, with its economic, efficiency and environmental benefits, its new abundance due to unconventional sources and expanding infrastructure, should play a vital role in meeting the world's expanding energy needs. However, the future growth of the gas market cannot be taken for granted. The dynamics of geopolitical and economic developments worldwide are both a challenge and a responsibility.

Will natural gas make an optimum contribution to the future global energy mix in association with renewables? In addition, natural gas must develop an increasingly strong case, particularly in the policy arena, if it is to become THE key fuel in the energy mix. The gas industry must not assume that the inherent advantages of natural gas will automatically make it the solution of choice. The future of natural gas will depend not on economics alone but, more importantly, on policy choices by governments and policy makers. It is therefore crucial that the IGU continues to act as the worldwide voice of the gas industry, and cooperates with governments, policy makers and international energy-related organisations in preparation for the next phase of natural gas growth, extending environmental and economic benefits to new countries and the global community.

INTRODUCTION
TO THE TRIENNIAL WORK PROGRAMME (TWP)

This "Triennial Work Programme" (TWP) is the core document that defines the action plan that the IGU will implement during the next three years.

Its objective is to support the organisation's mission, as we strive to fulfil our vision to become "the most influential, effective and independent non-profit organisation, while serving as the public voice of the gas industry worldwide".

The 2012 - 2015 TWP aims to promote progress, competitiveness and value in favour of the global society and gas industry, through the development and exchange of knowledge and information.

The Strategic Guidelines for 2012 - 2015, which constitute the cornerstone of this TWP, are explained in further detail in Section 4. These Strategic Guidelines were presented to the IGU Management Team and Executive Committee in Dubrovnik, Croatia in October 2011.

The 2012 - 2015 TWP will be officially launched, following approval by the Executive Committee, on 15 March 2012 in Houston and presentation to the Council on 4 June 2012 in Kuala Lumpur.

The Technical Committees and Study Groups will implement this programme according to the descriptions and scope outlined later in this document. They will cover all gas chain issues, as well as all the major "horizontal issues" affecting the gas industry worldwide.

The work will be conducted through a global network of knowledgeable professionals representing the Charter and Associate IGU members.

Committee members will work in Study Groups to identify and collect the relevant information in their field of expertise in relation to the topics chosen for the triennium. Representatives will share the information with their respective groups and analyse their findings with the Committee to prepare the deliverables for presentation at the World Gas Conference.

The IGU Presidency and Secretariat warmly encourage all Charter and Associate members to nominate individuals from their ranks to join and support the work of the Committees. Each Committee Member must decide which Committee Study Group he/she would like to join. It is preferable to appoint an active representative (and deputy) who will be free to attend at least one full Committee meeting and one Study Group meeting every year. We have observed that the personal contact, group interaction and cultural/social experiences of active participation in IGU working meetings, are a significant source of added value for the representative's company. Not only does this IGU experience help develop their key staff's international outlook, but the increased knowledge and insight acquired by sharing information with technical and commercial peers from other countries provides a unique opportunity for improving future decision making skills and enhancing business relationships.

THE THEME FOR 2012 – 2015

In line with the International Gas Union mission, the theme for the 2012 - 2015 Triennium leading up to the 26th World Gas Conference (WGC) to be held in Paris in June (1 to 5) 2015 is:

"Growing together towards a Friendly Planet"

The rationale behind this theme is as follows:
Gas has a key role to play in the fuel mix to drive **economic and sustainable growth throughout the world**.
Natural gas is increasing its share of the global fuel mix. It is growing in importance due to its availability, its environmental qualities in the context of climate concerns, its economic and efficiency benefits and its expanding infrastructure. Gas offers an immediate, cheap, efficient, clean, low-carbon, secure and flexible solution that can satisfy the needs of new developing countries in particular, in combination with intermittent renewable energy sources for power generation, heating and cooling.

Sustainability is a major factor in ensuring robust future global growth. The proven and enhanced availability of gas will influence sustainable growth objectives, not least through the development and implementation of gas technology and resources **throughout the entire gas chain from production to end- use**. Sustainable growth aims to improve current conditions without compromising the ability of future generations to meet their own needs. Sustainability therefore relates to the continuity of economic, social, institutional and environmental aspects of human society, as well as the non-human environment.

The challenges are both immediate and long-term. The gas industry is a long-term business, with investments in major projects taking many years to reach payback. A constantly changing world creates not just economic and technical challenges but also political risks for investors in long-term international projects or downstream infrastructures that rely on remote upstream supplies. Natural gas is clearly viewed as the fuel of choice, but that perception has been confused by some adverse publicity and global gas market developments.

Can gas regain its clear position as the fuel of tomorrow? In some regions where natural gas is considered as a depleting resource, the result has been to encourage approaches that maximize value and enhance energy efficiency. The longer-term sustainability of the gas industry requires short-term policy decisions that will encourage the investment that will benefit the world for generations to come.

To fulfil its mission, the 2012 – 2015 IGU TWP aims to:

- Actively promote the global gas industry's technical and economic progress
- Improve the competitiveness of gas in world energy markets, including new emerging countries, by:
  - Promoting the development and application of new technologies and best practices,
  - Optimizing the economics of the entire gas chain,
  - While emphasizing sound environmental performance, safety and reliability
- Serve as a global information clearinghouse, promoting the transfer of technology and know-how.

The IGU aims to provide its members and gas customers with maximum value through their active participation in the 2012 - 2015 TWP, professional support provided by the IGU Secretariat and the coordination of all technical activities by the French Presidency.

The IGU will also make a special effort during the French Presidency to enhance partnerships with industry and manufacturers, and to promote cooperation with Governments, policy makers and international energy related organisations, particularly on regional and global issues.

STRATEGIC GUIDELINES

The drawing above illustrates the Strategic Framework for the French triennium. It summarises the Theme **"Growing together towards a Friendly Planet"** and the Strategic Guidelines that constitute the basis for the Triennial Work Programme.

The four Strategic Guidelines the four pillars of our common bulding, are as follows. To:

1. Obtain official recognition for natural gas as THE destination fuel for sustainable development
2. Promote an appropriate mix of gas and renewables and electricity
3. Improve the availability of natural gas in new areas and in developing countries.
4. Attract human resources and reduce staff turnover.

By promoting understanding and awareness of the problems and solutions in these four areas decision makers, both inside and outside the industry, will have a powerful foundation for taking the action needed to help build and sustain regional and global growth.

These four pillars are outlined in brief below:
Despite the global crisis, the world economy will continue to grow. The world population was 7 billion on 30 October 2011 and will grow to 9 billion by 2050.

Natural gas has earned a special position in the future energy mix, thanks to its intrinsic qualities, increased reserves from new unconventional sources, and changed perceptions following the consequences of the March 2011 Japanese earthquake. Storable and available, natural gas is the perfect complement to intermittent solar and wind energies.
Natural gas solutions are cheap, quick to develop and flexible.
As the need for clean, efficient energy continues to grow, gas has a vital role to play in meeting the world's expanding energy requirements. Gas offers significant advantages over other fossil fuels in an increasingly carbon constrained world where climate change is a cornerstone of energy policies.
The resources are available today and for a number of years in the future. Gas remains an AAA[3] energy and key part of the fuel mix that will drive future global growth. Gas as a source of power generation is by far the largest growth sector.

4.1 Natural Gas, THE Destination Fuel for Sustainable Development

The industry has reached a crossroads. As the industry determines its future role, it desperately needs to adopt a consistent voice and message on natural gas. The IGU is in a strong position to be the industry advocate and enhance the role that natural gas plays in responding to the demand for greater security of energy supplies, better economic performance and, in particular, in mitigating the environmental impact of climate change. Although the emphasis may vary throughout the world, there is a need for research and clear communications on these regional issues.
Climate change is a global issue. In a low-carbon world, natural gas will play a pivotal role – gas will be combined with investment in renewable energy sources to deliver economic and environmentally efficient solutions.
The French Presidency recognises the importance of gas advocacy and will continue to improve the IGU's gas industry advocacy programme, building on the key attributes and merits of natural gas and developing a communication strategy that will target each stakeholder group's requirements.

Efforts must be maintained in all areas of the gas chain to maintain and develop the role and the competitiveness of natural gas: E&P, Storage, LNG, Transmission, Distribution, Commercialization, Marketing and Communication and Gas Use.

4.2 An appropriate Combination of Gas, Renewables, and Electricity

Natural gas must be combined with renewables and the electricity vector to maintain its pivotal role. If gas is to provide a future source of "friendly" energy for the world's population, then one of the main future challenges for the industry is to grow alongside renewables.
Increasingly, gas players are integrating their activities either upstream with oil companies or downstream with power companies.
The gas industry has to provide the right answers if it is to deliver the shiny promised future for its product. All industry efforts should be pooled to achieve this goal.
There is still a need to provide better access to markets. This can be done in a number of ways and in particular, through the development and application of new technology, via collaboration on major projects, through confidence in the right investment climate and the appropriate regulatory environment. The viability of upstream gas resources can been improved by lower costs for gas and LNG production, transportation, storage and distribution, just as better access to downstream markets can improve economic supply availability and stimulate downstream growth. These are all factors that can help make gas more acceptable. Natural gas can play a key role in reducing road transport emissions and in high efficiency distributed energy schemes. But these benefits will not be realised if gas industry development is unduly constrained.

A larger, more integrated global gas industry will be well placed to help make the transition to a carbon neutral society. Upstream reservoirs can be used to store CO2, transmission pipelines can handle certain processed biogases or be used to transport hydrogen in the future, distributed natural gas can be converted into hydrogen for use in fuel cells to provide combined heat and power to energy efficient homes and businesses. These and other technology breakthroughs could provide economic solutions.

We must develop and promote clean gas and green gas technologies together with more efficient appliances, CCS coupling and biogas or syngas production and distribution.

4.3 Natural Gas available everywhere

Gas CARES[4] about the future. Growth must be sustainable and shared between continents. The benefits of gas must be as widespread as possible. It must be affordable particularly when combined with renewables in emerging and new gas countries, notably in Africa.

Global energy requirements continue to make increasing demands on gas supplies. Because future industry growth must be sustainable, economic, environmental and social factors must be taken into account to improve welfare throughout society.

3 - Available, Affordable, Acceptable
4 - Clean, Acceptable, Reliable, Efficient & Secure

Sustainable growth aims to improve current conditions without compromising the ability of future generations to meet their own needs. This entails not only improving the availability of gas, by developing and implementing new gas technologies but also by recruiting the critical human resources needed to ensure that all the essential elements are in place and can be operated safely at optimum levels throughout the entire value chain.

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? To further drive gas sales in an increasingly environmentally conscious and cost sensitive world market, the gas industry must leverage technology and innovation and target specific growth sectors. Energy policy, regulation, gas pricing and risk management could have a major impact on the success of strategies for expanding downstream markets, whether in NGVs, power generation, cooling systems or new industrial uses. Such growth in the gas sector portfolio is accompanied by the need to identify and manage a range of new challenges and risks. There is no doubt that efficient use of natural gas is vital for sustainable growth. Gas prices can be an important lever since they affect demand, provide investment signals, encourage more efficient use and stimulate the innovations that reduce overall costs. On traded markets where gas prices are sensitive to supply and demand, risks can be managed across the entire value chain, with effective innovative techniques used to handle volatility.

Traditionally, the focus for technical innovation and efficiency optimization has been gas use and performance improvements in end-user appliances. Increasingly, that focus is being applied throughout the entire gas chain to bring improvements throughout the industry. The challenge is to provide a growing customer base with optimal volumes of gas, whilst lowering operating costs and simultaneously maintaining and investing in plants and equipment.

4.4 Human Resources for the Future

The first decade of this century has seen a shortage of technical skills hit a number of engineering and energy industries. Some countries have already experienced acute shortages in gas industry expertise, with the affects felt in almost every section of the value chain. Safe operation is paramount. It is therefore essential to ensure that trained personnel are available in a timely manner to sustain industry growth and ensure that plants and equipment continue to be operated safely.

The problem is being exacerbated on both the supply side and the demand side. On the one hand, ageing demographics and experts reaching retirement is coupled with fewer students enrolling on technical/engineering courses. While on the other, more trained staff are needed to handle new projects caused by the growth in the gas market. At the same time, existing pipelines and equipment require maintenance by qualified personnel to ensure safe operational conditions. As these factors come together, it is increasingly difficult to identify the specialized skills that will be required and to make sure that personnel is available when the industry needs them, and to reduce turnover by offering mutual benefits. How does the gas industry interact with other industries? Do we need to collaborate or will commercial solutions be found? Should governments get together to promote technology training? What approach to human resources will provide the best solution for sustainable growth?

The challenge is two-fold. Firstly, to ensure sufficient staff numbers and expertise for all parts of the future gas industry by increasing the emphasis on skills development. Secondly, to provide the foundations for longer-term prosperity and success by encouraging future generations to choose careers in science and technology in the energy industry, and the world of gas in particular.
The French triennium will continue to study and propose solutions to this vital industry question.

GEOPOLITICS

To a large extent, resources and technology won't hold back a rapid shift to a world economy increasingly powered by gas.

The technological and economic viability of gas is well established, but the central issues are political and institutional. Global energy security is the key concern for producing and consuming countries alike. Political agendas will be dictated by competition for control of, and access to, natural gas resources, supply routes and markets. Will the pursuit of energy security lead to strategic manoeuvring with major powers, international oil companies, national oil companies and consuming countries pitched against each other? How will Governments resolve these geographical tensions?

A special project will be introduced to continue the work started during the Malaysian triennium, with regional workshops organised to consider this important issue. Experts from each zone will be asked to participate to maximize industry understanding.

COOPERATION WITH OTHER INTERNATIONAL ENERGY ORGANISATIONS

The IGU will continue to work closely with other international energy organisations such as the World Petroleum Council (WPC), the World Energy Council (WEC), LNG Conferences (of which IGU is a major sponsor), the International Energy Agency (IEA), the International Energy Forum (IEF), the United Nations and several regional and environmental entities.

RESEARCH AND DEVELOPMENT

The IGU Research Conference (IGRC) has been successful in shaping opinion among gas chain players on the need for ongoing research and innovation, particularly in areas relating to the environment, rational and efficient use of natural gas and safety.
The Coordination Committee will continue to provide support by reinforcing this message.

The PGC F will head preparations for the next Conference in Denmark to steer R&D and Innovation work around the 2015 WGC.

CONCLUSION

The world is undergoing unprecedented change with global recession affecting every nation in the world. Although the effects have been felt by the energy industry, future natural gas prospects remain positive. In the years to come, as the world recovers and integrates the post Fukushima effects, natural gas will become increasingly important in supplying the energy demands of the growing world population while at the same time striving for lower carbon emissions.

In this context, **the IGU will continue to evolve and be the "voice of gas"** for the world gas industry, while contributing to its technical and economic progress. The IGU's activities will generate valuable resources and tools. These will help strategic thinking and decision-making by management, while strengthening the synergies among its members and generating conditions for continuous improvement.

So the gas industry will arrive in Paris for the WGC 2015 with new perspectives.

STRUCTURE AND ORGANISATION

A total of eleven Committees, comprising Programme and Working Committees, as well as three Task Forces have been set up to support the work defined in the Triennial Work Programme (TWP). These were presented to the Executive Committee for approval in October 2011.

Programme Committees (PGC) deal with the IGU's external image and topics outside the gas chain. There are 6 PGCs altogether covering Sustainability, Strategy, Gas Markets, LNG, Marketing & Communication and R&D and Innovation. **Working Committees (WOC)** focus on the gas chain and cover the entire chain from Exploration & Production, Storage, Transmission, Distribution to Gas Use. The 5 WOCs will set up **Study Groups (SG)** to carry out their identified tasks. The 34 SGs planned for this triennium will carry out a wide range of studies on gas industry issues.

One notable organisational change, is the creation of the new PGC F for R&D and Innovation. From the 2012 – 2015 Triennium onwards, PGC F will take over the activities of the former IGRC (IGU Research Conference) Technical Programme Committee (TPC). During the French Triennium, it will work with the other WOCs (4 & 5) and PGC (A, B) to study: "The efficiency and convergence of gas with renewables and electricity".

The scope of some Committees has been redefined to ensure that the work of the Malaysian triennium is continued. For example, PGC E will now also cover communications, messages and techniques, particularly in relation to gas advocacy. It will also lead a study on "The e-gas industry".

PGC B will extend its long-term studies through to 2050. The "2050 Natural Gas Prospective" carried out in collaboration with other WOCs and PGCs, will provide our vision for the gas industry by 2050 showing that gas has a strong share of the global energy mix. PGC C will take the lead in a study with PGC A and D, on: "Natural gas, a key factor for sustainable development in emerging countries".

The PGC A will continue to work on developing a sustainable approach to natural gas and the concepts of "clean gas" and "green gas", as well as assembling and promoting best practices.

During the French triennium, three Special Projects will be initiated and undertaken by **Task Forces (TF)**. In accordance with the Strategic Guidelines, two of the Special Projects will address Human Resources and Gas Advocacy. TF1 Human Capital, which will be established in this triennium, is the culmination of the merger between the Malaysian triennium's TF1 and 2, and PGC H.

The third Special Project follows on from the Malaysian triennium and covers "Geopolitics and Natural Gas". This is a subject of major importance given the global nature of the gas industry and the shift towards a gas intensive world.

The Coordination Committee (CC), has overall responsibility for the performance of the Committees. It comprises the Chairman, Vice-Chairman, Secretary and the Chairs of all the PGCs, WOCs and TFs. The CC holds at least two meetings per year, to exchange lively on the topics of the triennium, to evaluate the progress of the Committees and to plan the deliverables for the triennium (articles for the IGU magazine, workshops…) and World Gas Conference.

Working Committee (PGC/WOC) and Task Force representatives are drawn from the membership. During the course of the triennium, these representatives will be involved in various meetings, forums and discussions and liaise with associated external organisations. The members of the Working Committees (PGC/WOC)and Task Forces will benefit from a collaborative private JT platform its main goal is to ease the relationship between all the members, including transversally between committees.

COMMITTEE CHAIRS AT THE SECOND MEETING OF THE INCOMING CC IN PARIS ON 19-20 JANUARY 2012

SCOPE AND DELIVERABLES

The bulk of the Committees' work will be presented at the 26th World Gas Conference, in Paris on 1 - 5 June 2015.

Deliverables consist mainly of comprehensive reports providing sharp insights into selected topics, identifying the key lessons to be learned and, in some cases, delivering a set of proposals for future developments or improvements. Other deliverables include case and benchmark studies, best practices and statistical data.

The objective is for the deliverables to highlight an appropriate balance between strategic considerations, and business and technology issues.

The information produced will be made available to IGU members via the website **(www.igu.org)** as well as via other channels. Information of special importance and general interest may be published in accordance with the IGU publication policy. In addition, symposia, seminars and workshops as well as the IGU magazine may be used to present intermediate deliverables on specific issues.

Georges LIENS
Chairman IGU Coordination Committee

Yves TOURNIE
Secretary IGU Coordination Committee

III COMMITTEES AND TASK FORCES: TERMS OF REFERENCE

WORKING COMMITTEE 1 (WOC1)
EXPLORATION AND PRODUCTION

INTRODUCTION

The 21st Century has been marked by an extended search for sustainable and environmentally safe solutions to the world's growing energy requirements. In this context, the forecasts are very promising for the growth of the global gas market.

Many natural gas E&P projects are currently being implemented and are under development to meet this potential future demand. But there is still room for more exploration and production projects worldwide. Furthermore, the successful economic and technical exploitation of unconventional shale gas reserves in North America, together with equally large prospective volumes of unconventional gas in other parts of the globe, suggest that natural gas supplies should be safe for the foreseeable future.

Nevertheless, technical and environmental issues are increasingly affecting successful exploration activities and economically feasible production projects. Therefore, the natural gas industry has had to adapt its activities in line with new, more stringent quality, safety and environmental standards. It has had to continually pursue new exploration and production technologies for exploiting reserves in increasingly hostile regions, as well as responding to stricter requirements for CO_2 emissions, aquifer contamination and the disposal of E&P residues.

Working Committee 1 (WOC-1) will therefore focus on the strategies for developing current and future natural gas projects, as well as on recent technological advances for natural gas exploration and production activities. Two Study Groups have already been set up to handle these issues:

STUDY GROUP 1.1

RECENT ADVANCES IN NATURAL GAS EXPLORATION & PRODUCTION ACTIVITIES - TECHNOLOGY

Leader: Adif Zulkifli, Petronas, Malaysia

Scope and Purpose

The objective of SG 1.1 is to share the lessons and best practices learned from natural gas exploration and production activities, both in conventional and unconventional reserves. It will also review new technologies and standards associated with the development of recent natural gas projects.

The Study Group will focus on E&P activities for assessing, developing and exploiting new gas resources. Real field technology trials will be highlighted together with techniques that have a major impact on sustainable development and environmental preservation.

It's worth noting that, from a technological perspective, the challenges faced by E&P companies lie not only in exploiting unconventional reserves such as tight sands, shale gas, hydrates and coal-bed methane (CBM), but also in de-stranding and developing conventional reserves in harsh environments and difficult conditions, such as distant offshore, deepwater or permafrost. This study aims to cover all these challenges and provide a comprehensive overview of what is being done to enhance Brownfields' productivity and handle with gas with a high CO_2 content.

STUDY GROUP 1.2

DEVELOPMENT OF CURRENT AND FUTURE NATURAL GAS EXPLORATION & PRODUCTION ACTIVITIES - STRATEGY

Leader: Dr Mohamed Kced, Sonatrach, Algeria

Scope and Purpose

SG1.2 aims to assess both conventional and unconventional natural gas reserves and resources, and to update estimates made during the previous triennia.

The Study Group will focus on identifying exploration and discovery trends, highlighting current hotspots and new natural gas exploration barriers. It will also identify significant projects under development, analyse their impact on regional and global gas industry activities and on the future availability of natural gas.

In the wake of the unconventional gas revolution, one of the main challenges for this Study Group will be the provision of more accurate estimates of available resources of unconventional gas, such as tight sands, shale gas, CBM and hydrates.

Finally, the group will examine initiatives for associated gas flaring reductions as a means of sustaining enhanced gas supplies.

STUDY GROUP 1.3

GAS RENT AND MINERAL PROPERTY RIGHTS

Leader: Marcos de Freitas Sugaya

Scope and purpose:

The literature is rich in the development of models designed to maximise the intake of governments, where much of the art is related to the creation of an attractive atmosphere for business which will actually develop a win-win situation for governments and serious investors.

There are basically two fiscal regimes of relevance. In the concession regime, the investor sells the production for a price, deducts costs, pays taxes and keeps what is left to himself. In the sharing regime, however, the operator receives part of the oil produced as a compensation for his costs, and another part of the production is passed on to him as a payment for his services, after taxes.

As to the fiscal instruments, a large arsenal is readily available for policy makers. Usually a mixture of them is used, including signature bonuses, royalties and taxes on profits of varied nature, such as the resource rent taxes of Australia. Even the obligation of acquiring goods and services in the local market can be considered as a form of taxation.

The exploration, development and production of gas reserves seem to require a differentiated treatment from fiscal policy makers, which must ensure a proper balance of risks and rewards to promote the development of their projects. Conditions may vary dramatically from associated to non-associated gas, or if an NOC is included or not in the model.

This study group will compare the solutions adopted by a number of countries, and the results obtained by them.

Topics of interest include:

- Identification of regulatory tendencies;
- Assessment of business models for exploration and production of gas;
- Critical analyses of fiscal instruments;
- Development of upstream policies for gas rent.

Denis Krambeck DINELLI
Chair, WOC 1

WORKING COMMITTEE 2 (WOC 2)
STORAGE

STUDY GROUP 2.1
UNDERGROUND GAS STORAGE DATABASE
Leader: Ladislav Goryl, NAFTA, Slovakia

Scope and purpose:
Since 2000, the world gas storage database has been regularly developed. Today, it contains unique sets of storage data and technical parameters. The database also covers new projects in addition to data on storage operations. Other deliverables include the possibility of visualising geo-referenced storage facilities and their parameters.

The objective of this triennium is to continue the work started under previous triennia. To update the database and use it as the basis for defining general and technical storage trends and making storage prognoses. The Study Group will also highlight the unique role of storage in the gas chain by assessing its interaction with other sources of flexibility.

STUDY GROUP 2.2
TECHNIQUES AND NEW OPPORTUNITIES
Leader: Fabien Favret, EDF, France

Scope and purpose:
The objective of this Study Group is to improve storage facility performance and efficiency by continuously promoting and sharing techniques within the storage community. This will help them to meet market demand, safety and environmental standards.

A special focus will be put on new developments in a variety of fields, including several topics associated with storage performance modelling, storage integrity management, asset management, increased automation and new techniques to enhance efficiency or reduce environmental footprints.

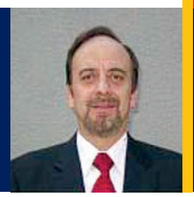
New planned storage opportunities will also be defined, which would further support the integration of natural gas with renewables and sustainable development. The contribution of storage facilities will be further expanded. One issue that could be addressed is quality standards for the gas injected into storage facilities. Since natural gas can be stored, unlike all other energy sources, there could be a new role for storage in additional to the tradition one of balancing or securing supplies.

STUDY GROUP 2.3
HUMAN RESOURCES: ATTRACTING STUDENTS TO WORK IN GAS STORAGE
Leader: Nikita Barsuk , Gazprom, Russia

Scope and purpose:
This Study Group will continue the work, started during the previous triennium, of promoting the gas storage industry and highlighting it as a sector of interest to engineering students. Given the limited number of study programmes dedicated solely to underground gas storage, this Study Group might focus on how to attract students with engineering backgrounds. We need to develop specific skills in specialist fields such as reservoir engineering, drilling and engineering, process engineering, etc.

Ladislav GORYL
Chair, WOC 2

WORKING COMMITTEE 3 (WOC 3)
TRANSMISSION



INTRODUCTION

The world needs more and more energy every day. Governments are ready to implement new natural gas projects to meet this growth in demand.

The use of natural gas has become widespread because it is one of the cleanest, safest, cheapest and most useful energy sources. Thanks to its physical, technical and ecological properties it has a wide range of residential and industrial uses.

Natural gas is easy to manage at a wide variety of pressures and temperatures. Sometimes it can even be converted into a liquid and back into a gaseous form (liquefaction – regasification process). New projects for liquefied natural gas (LNG) make it very versatile and possible to use in a number of different locations worldwide. Extensive use of LNG has crossed (and demolished) trade barriers (volumes have doubled over the past 10 years).

In addition, the development of unconventional gas has produced a dramatic change in the US gas market. This has had a collateral impact on global markets.

Natural gas has also proved to be the ideal fuel for industries such as petrochemicals, electricity production, steam generation, the food industry and metal smelting, since they require a clean environment, carefully controlled processes, and highly reliable and efficient fuels.

Natural gas can also be converted into hydrogen, ethylene and methanol - the raw materials for manufacturing several different kinds of plastics and fertilizers.

For all these reasons natural gas is increasingly being included in energy matrices worldwide.

Natural gas reservoirs have been identified in remote regions, far from consumers and in some cases far out to sea. Gas pipelines sometimes even cross country borders and entire continents. Natural gas transportation systems are therefore of vital importance. On the one hand, new systems need to be designed to transport large quantities of gas economically in an environmentally friendly way. On the other hand existing systems need to be upgraded to avoid accidents.

We therefore need to focus on Pipeline Integrity.
These are the Working Committee's major objectives.
Other important issues include compressor stations, as these are a part of the transportation system.
We have therefore set up 3 different Study Groups to address all of these issues.

STUDY GROUP 3.1 (SG3.1)

NEW TRANSPORTATION PROJECTS

Leader: Peter Toth, Eustream a.s., Slovakia

Scope and Purpose

All new gas transportation projects are both complex and unique due to their specific characteristics. Sometimes new projects involve laying high pressure gas pipelines across particularly long distances, difficult terrain or densely populated areas. Some projects encompass all of these problems. The purpose of this Study Group is to gather information on new gas transportation projects (pipelines and compressor plants) to analyse the proposed solutions and exploit the best future industry construction practices.

TRANSMISSION INFRASTRUCTURES:

- To report on strategic transmission infrastructure projects
- To deal with the problem of technology acceptance and technical construction.
- To study the feasibility of building new pipelines across short distances and densely populated areas.
- To study improvements in compression processes, turbo machinery, performance optimisation and emissions.

STUDY GROUP 3.2 (SG3.2)

INTEGRITY MANAGEMENT SYSTEMS

Leader: Abderrahmane Taberkokt, Société Algérienne de Transport, Algeria

Scope and Purpose

It is necessary to enhance Integrity Plans and introduce an Asset Management approach to reduce the risks of failure and accidents.

INTEGRITY MANAGEMENT:

- To define an Asset Management approach.
- To provide information on new developments to reduce the gaps in integrity threat management.
- To propose strategies to prolong the life of ageing pipelines or to reclassify the ones in use.
- To describe what Governments, companies and suppliers are doing to improve "Third party damage prevention" (including the application of new rules).
- To identify the critical tasks that affect integrity management
- To provide appropriate training for personnel performing specialist tasks

This Study Group will take over the work currently carried out by the **SG 3.3** to build on strategies that support effective **IMS HR** issues.

In addition, this Study Group will be responsible for building and maintaining a **DATABASE OF IGU** Member **TRANSMISSION SYSTEMS**, containing information on transmission networks (physical data, performance, projects, new rules, etc).

STUDY GROUP 3.3 (SG3.3)

PUBLIC ACCEPTANCE and NEW TECHNOLOGIES

Leader: Alessandro Moretti , SAM, Italia

Scope and Purpose

The time has come to obtain the best public acceptance of gas transmission systems. That is why this Study Group will analyse gas industry growth from two production chain perspectives: firstly, the legal requirements surrounding the provision of new unconventional gas sources (shale and other indigenous sources of gas) such as environmental, economic or other factors; and secondly, the new gas industry technologies used to transport greater quantities of gas, and its components, in a safe and reliable way.

PUBLIC ACCEPTANCE:

- To communicate effectively with the public
- To show that pipelines are the most economic method of transporting energy.
- To report on the different measures companies are taking to reduce their environmental footprints.

THE IMPACT OF THE NEW SOURCES ON TRANSMISSION STSTEMS

- To compile a list of the new gas reserves worldwide.
- To analyse and present potential future issues such as cross country tolls, long haul tariffs, environmental regulations, regulations for open access with free flow of gas and hubs.

NEW TECHNOLOGIES APPLIED TO TRANSMISSION SYSTEMS

- To discuss new pipe materials
- To propose alternative uses for the pipeline (e.g. CO_2).

Benjamín GUZMAN
Chair, WOC 3

WORKING COMMITTEE 4 (WOC 4)
DISTRIBUTION

INTRODUCTION

Gas distribution covers the part of the gas production and delivery system that is most visible to the end client, as this is the part they have contact with. To encourage clients to choose gas as their source of energy, it is important that gas distribution services are perceived as being competitive and of top quality. This must continue to be the case even after economic environments have changed. WOC 4 will examine some of the changes in progress and how these can be exploited to help further improve services.

In many countries, regulations are becoming increasingly important and affect not only gas transportation but also gas distribution systems. Distribution requirements however, differ from transport requirements thereby making it more difficult to leverage market regulations and liberalisation to maintain promising economic distribution prospects. Some of the requirements include:

- Third party access is a pre-requisite in many countries, but the conditions often vary enormously from country to country;
- Regulatory authorities are also demanding that services be unbundled on a distribution level, despite the fact that they usually comprise a far more detailed grid structure;
- Diversified gas supplies: moving away from a single or possibly dual quality gas supply distribution grid to a multiple supply grid with many entry points;
- The political decision-making trend is to move towards carbon-free energy supplies leading to other regenerative sources of methane gas supplies and even to non-carbon combustible gases in the system;
- In order improve the quality of customer service, more electronic measuring equipment and control tools are being introduced, called "smart grids". Industry personnel will require appropriate training and qualifications to use such tools.

WOC 4 will conduct studies to assess the factors that will have an impact on our immediate future. The study findings will be published in the form of recommendations applicable to all gas distribution companies worldwide, leading to the development of a code of conduct for dealing with the regulatory authorities, best practices for managing new supply situations, and solutions to enhance the technical abilities of distribution companies.

During this triennium, WOC 4 will carry out three studies:

- Regulation of Third Party Access to Gas Distribution Networks – A Standard Approach
- Diversification of Gas Quality and Non-conventional Sources in a Carbon-free Future
- Smart Grids in Gas Distribution

STUDY GROUP 4.1 (SG 4.1)

REGULATION OF THIRD PARTY ACCESS TO GAS DISTRIBUTION NETWORKS – A STANDARD APPROACH

Leader: José Carlos Broisler Oliver, COMPAS, Brazil

Scope and Purpose

In most member countries, national Governments have introduced regulatory measures that affect the entire energy industry. This Study Group will examine how the regulation of third party access to gas distribution networks has been developed over the past decade, with emphasis on different developments in the member countries such as for example:

- Access of gases other than natural gas
- Development of marketing/charging areas
- Change of energy balance and cost transfer options
- Unbundling of distribution companies
- Personnel training and qualification
- Other elements.

The long-term objective is to develop an "IGU Network Code".

STUDY GROUP 4.2 (SG 4.2)

DIVERSIFICATION OF GAS QUALITY AND NON-CONVENTIONAL SOURCES IN A CARBON-FREE FUTURE

Leader: Peter Flosbach, RWE, Germany

Scope and Purpose

For decades, the source of natural gas supplies to given locations remained unchanged. Generally, distribution grids comprised one or possibly two sources of supply, based on long-term delivery contracts. In many parts of the world, this is no longer the case. The situation has changed over the past few years and is continuing to change. The reasons for this change are multiple:

- Growing diversification of gas quality
- Different sources of supply due to short-term contracts
- Change between pipeline-based and LNG-based supplies
- Development of local gas fields (e.g. shale gas)
- Increasing injection of gases from non-conventional sources in a move towards a carbon-free future
- Bio-methane
- Hydrogen
- SNG

This Study Group will examine the different options available for managing this diversification of gas quality, and ways distribution companies can address this growing challenge to secure stable gas supplies for their customers.

STUDY GROUP 4.3 (SG 4.3)

SMART GRIDS IN GAS DISTRIBUTION SCOPE AND PURPOSE

Leader: Pascal Vercamer, GDF SUEZ, France

"Smart grids" are a widely discussed issue in the gas industry. Based on smart gas meters that were the object of a WOC 4 Study Group during last triennium, this Study Group will examine the options available for further developing smart gas distribution grids.

- Are smart grids feasible for a distribution grid at a reasonable cost?
- Is smart gas distribution grid development likely to be coherent with electric power grids?
- Are clients ready for smart grids?
- Do personnel have the appropriate training?

Dietmar SPOHN
Chair, WOC 4

WORKING COMMITTEE 5 (WOC 5)

UTILISATION

INTRODUCTION

Gas use is the ultimate objective of the international gas industry. This is where the ingenuity, work and dedication of millions of gas industry employees meet their final destination – the billions of end customers scattered around the globe. This is where gas is used to power and heat public buildings and homes, to cook food and power vehicles.

During the 2012 – 2015 triennium, WOC 5 will continue to monitor existing and future gas uses to further develop the global gasmarket and improve our customers' quality of life.

Customer testimonials, best practices, promising technologies and future potentials on gas use will be researched and the findings distributed worldwide for the benefit of end gas users.

WOC 5 will continue working with other IGU Working and Programme Committees, Task Forces, international businesses and local politicians.

IGU WOC 5 believes that:

- End users should be able to enjoy all the benefits of CH4 regardless of the origin of the molecule.
- Methane should be available, accessible, and affordable.
- Gas use technologies should be efficient, clean, and safe.

MECHANISMS
AVAILABILITY
REGULATIONS
KNOWLEDGE
ECONOMICS
TECHNOLOGIES
STUDIES

STUDY GROUP 5.1:

INDUSTRIAL USES

Leader: Egidio Adamo, Italy

Objective:

To help stimulate gas demand and eco-efficient use of gas by heat & power plants, as well as large and medium sized industrial customers worldwide.

Contents

During the 2012 – 2015 triennium, Study Group 5.1 will:

- Prepare a World Report on industrial gas usage trends
- Gather information on natural gas technologies
- Compare international energy efficiency initiatives (technologies & regulations)
- Explore combining natural gas with renewables
- Study 'gas to power' technologies & techniques
- Investigate the role of energy services in industry
- Advocate broader use of gas
- Issue information to IGU members via the established channels
- Write an article for the IGU Magazine

STUDY GROUP 5.2

DOMESTIC AND COMMERCIAL USES

Leader: Martin Seifert, Switzerland

Objective:

To help expand this market segment worldwide by building awareness among politicians, managers, engineers and citizens, on the inherent environmental and economic benefits of natural gas.

Contents

During the 2012 – 2015 triennium, Study Group 5.2 will:

- Prepare a World Report on new gas appliances and their launch
- Monitor the performance of the launch of gas heat pumps and micro-CHPs
- Research gas appliances with condensing and modulating properties for use in combination with other appliances such as electric heat pumps (hybrid systems)
- Monitor adsorption heat pumps
- Study "smart" micro-CHP features
- Check and research business models for new technologies and associated services
- Advocate broader use of gas
- Issue information to IGU members via the established channels
- Write an article for the IGU Magazine

STUDY GROUP 5.3

NATURAL GAS VEHICLES

Leader: Olivier Bordelanne, France

Objective:

To promote the use of natural gas powered on- and off-road, marine/inland water, airborne, railroad, and farming vehicles to create cleaner, safer and cheaper mobility solutions

Contents

During the 2012 – 2015 triennium, Study Group 5.3 will:

- Prepare the Global 2012-2015 NGV Report
- Monitor the global NGV market
- Propose an Action Plan for NGV/CNG in Europe (5% market share in 2020/2025)
- Research CNG/LNG/BioM technologies, economics, local policies & incentives
- Study LNG potential for ground, air, water, rail and other applications
- Study the 'NG +' concept: NG + H2, BioMet, Diesel, e-power Hybrid CNG and others that may emerge
- Exploit the synergies between OEM and retrofit vehicles
- Communicate success and failure stories from fleet operators, drivers, local authorities, etc.
- Research and compare the different gas composition requirements
- Advocate broader use of gas
- Issue information to IGU members via the established channels
- Organise a special session at the WGC in Paris
- Write an article for the IGU Magazine

TT1

RENEWABLE ENERGY, CO_2 EMISSIONS, HYDROGEN

Leader: Aksel Pedersen, Denmark

Objective:

To develop strategic elements for the smooth and steady integration of renewable and other gases into the world gas industry. This is a way to meet objectives for reducing CO2 emissions.

Contents

During the 2012 – 2015 triennium, Topic Team 1 will work with other IGU structures to:

- Gather information about global production and use of "green gases" in association with natural gas
- Investigate how renewables can be incorporated into the natural gas grid
- Analyse the status of hydrogen/methane production from renewable power ("Integration of power into the natural gas network").
- Analyse the status of electrolyzing technologies (ALE, PEM and SOEC – technology, efficiency, cost)
- Analyse the status of technologies to convert CO2 + H2O to CH4 (CO2 sources, efficiency and cost)
- Prepare a global overview of ongoing projects for the integration of renewable gas into the local natural gas grid – including a status check on technology upgrades
- Advocate broader use of gas
- Issue information to IGU members via the established channels
- Organise a special session at the WGC in Paris
- Write an article for the IGU Magazine

TT2

GAS QUALITY

Leader: Jean Schweitzer, Denmark

Objective:

To help develop international gas quality standards, that will cover gases of all types. These standards will stimulate the growth of the gas market and eliminate poor products or services.

Contents

During the 2015 – 2015 triennium, Topic Team 2 will work with other IGU structures to:

- Gather information on worldwide gas quality issues
- Collect data on new regulations or initiatives to standardise gas quality
- Study the impact of gas quality variations on existing appliances and new technologies
- Review the effects of adding hydrogen or new gases to the grid
- Advocate broader use of gas
- Issue information to IGU members via the established channels
- Organise a special session at the WGC in Paris
- Write an article for the IGU Magazine

Eugene PRONIN
Chair, WOC5

PROGRAMME COMMITTEE (PGC A)

SUSTAINABILITY

INTRODUCTION

Economic and population growth are driving our need for more energy. At the same time, global warming is accelerating due to increasing concentrations of atmospheric greenhouse gases.

In this context, natural gas has gained prominence in public debate as a form of clean energy that emits half as much carbon dioxide as coal and is free of particulates and toxic heavy metals. Natural gas is often described as a form of bridge or transition energy to a low-carbon society based on **renewable energy.** Accompanied by innovative technologies like **carbon capture and storage**, natural gas can even be a form of "destination" energy.

Recoverable reserves of natural gas have increased tremendously in recent years, thanks to technology developments in the recovery of **shale gas**. Natural gas, both conventional and unconventional, will be used as a form of primary global energy well into the future.

As natural gas gains prominence, the world gas industry is expected to play an ever-increasing role in securing the supply, safety, and environmental integrity of the natural gas chain, from exploration and production to gas use.

PGC-A will set up 4 Study Groups to address these issues:

STUDY GROUP 1

CARBON CAPTURE AND STORAGE

Leader: Hiromichi Kameyama, Tokyo Gas, Japan

During the previous triennium, this Study Group published the "CCS Roadmap" outlining the progress on various ongoing CCS projects and highlighting the issues and challenges.

During this triennium, the Study Group will cover the various aspects of ongoing projects and their progress, and suggest preferred directions for future gas industry CCS developments.

STUDY GROUP 2

NATURAL GAS AND RENEWABLE GAS

Leader: Elbert Huitzer, Liandon, The Netherlands

The report published by this Study Group during the last triennium provided an overview of the technological developments in production and distribution, as well as the legislative, economic, environmental and social aspects of renewable gases. During this triennium, the Study Group will build on this initial study by addressing quality standards and economic and LCA aspects. Case studies will be conducted, including off-grid bio-methane project studies in developing countries.

STUDY GROUP 3

LCA STUDY OF THE NATURAL GAS CHAIN

Leader: Anne Prieur Vernat, GDF SUEZ, France

This Study Group will use life cycle analysis (LCA) to demonstrate the environmentally benign aspects of natural gas.

The Study Group will establish a framework for data collection and create an international natural gas chain LCA database. It will also share knowledge on LCA methodology with International Gas Union members. It will study 3 key regions: North America, Southeast Asia and Western Europe. This study will be based on the Marcogaz-Eurogas study and will benefit from exchanges with other Study Groups within PGCA and other PGCs.

STUDY GROUP 4

ENVIRONMENTAL ASPECTS OF UNCONVENTIONAL GAS

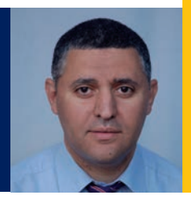
Leader: Mauro G. Soares, TECPETROL, Argentina

Shale gas has become a "game changer" in a global natural gas market. Shale gas reserves are everywhere and abundant. Although this will enhance supply security and price stability, various environmental aspects (i.e. chemicals used in fracking, leakage of methane in production) have not yet been fully examined. This Study Group will examine the environmental impact associated with shale gas and document best practices.

Satoshi YOSHIDA
Chair, PGC A

PROGRAMME COMMITTEE B (PGC B)

STRATEGY



INTRODUCTION

Committee Objective

The Committee's principal objectives are
1) to analyse the forecasts, policies and economics affecting regional and global **gas supplies, demand and trade**;
2) to examine **wholesale gas price formation** and gas pricing trends for both indigenous production and international trade;
3) to share information on **company strategies** in relation to commercial and regulatory change;
4) to coordinate work on **the 2050 natural gas prospective.**

We have outlined the work to be carried out by 3 Study Groups and the Coordination Committee to achieve PGCB objectives:

Firstly, Global and Regional Gas Supplies, Demand and Trade Scenarios (from 2000 to 2035). This study aims to:

- Develop gas demand scenarios based on different economic growth possibilities including the price elasticity of demand, potential development of alternative and renewable energy in the power sector, environmental regulation, etc.
- Analyse strategic issues related to the growth of global supply and demand of unconventional gas.

Secondly, Gas Price Formation and Trends. This Study aims to:

- Assess the alternative methods for indexing wholesale gas prices (oil, spot gas price, coal, etc.) and their impact on power generation baseload choices
- Acknowledge Government / regulatory involvement in wholesale prices in consuming and producing countries. Assess the true extent of subsidies
- Assess the conditions required for fully traded gas markets, and the recent contracting trends

Thirdly, Analysis of Corporate Strategies. This Study aims to:

- Analyse the strategies of companies involved in natural gas (case studies)
- Assess how regulatory and other risks are managed
- Assess cooperation prospects in the competitive environment

And lastly, to coordinate the 2050 natural gas prospective to define a number of long-term scenarios.
The following Study Groups will address these objectives:

STUDY GROUP 1

THE WORLD GAS SUPPLIES, DEMAND & TRADE STUDY GROUP

Leaders:
Thomas Dirksmeyer, Anne-Sophie CORBEAU, IEA

SG 1 will:

- Continue to analyse regional scenarios and levels of uncertainty in gas supplies, demand and trade, by considering both the 2000 – 2035 timescale and identifying future scenarios that include the BAU and IGU green scenario
- Identify government policies and company strategies that affect:
- Indigenous gas supplies and exports including non conventional gas
- Local market development
- Development of alternative energies in the power generation sector
- Inter-regional trade
- Other stakeholders

STUDY GROUP 2

THE WHOLESALE GAS PRICE FORMATION STUDY GROUP

Leaders: Floris Merison, Mike Fulwood, Nexant Ltd, England

SG 2 will:

- Assess the potential and implications of gas market globalisation, by considering LNG infrastructures and trade developments in particular, and also potential price convergences across global gas hubs
- Develop a better understanding of the price elasticity, price volatility and price drivers of gas on different markets and future gas price determinants,
- Continue to survey national wholesale prices and gas price formation methods in every country worldwide. This survey will include:
- Identifying the lessons to be learned and forecasting future trends
- Local gas price determinants in producing countries
- Develop a better understanding of the fuels that rival gas as a source of energy and their price elasticity, the true cost/benefits of price volatility, price drivers in different markets and their impact as well as the impact of different price mechanisms and indexation on baseload power generation

STUDY GROUP 3

THE STRATEGY AND REGULATION STUDY GROUP

Leader :Francisco de la Flor, Enagas, Spain

SG 3 will:

- Assess natural gas market reforms
- Develop case studies covering corporate responses to the technical, commercial and regulatory changes affecting the gas industry
- Share best industry experiences, by Identifying strategies to mitigate commercial and regulatory risks
- Identify the potential for cooperation between natural gas players with a focus on success stories between IOCs, NOCs and Service Providers
- Assess the effects of globalisation on the world gas supply chain, by understanding how industry structures will evolve, and how this will affect the number of firms in the gas business

PGC-B

THE 2050 NATURAL GAS PROSPECTIVE

Leaders: Fethi Arabi, Ulco Vermeulen

This study aims to identify scenarios for the gas market by 2050. This study will focus on aspects that were not given in-depth coverage in the 2035 supply/demand study. It will therefore look at qualitative rather than quantitative issues and in particular very long-term future issues and assess disruption possibilities.

The 2050 Gas Prospective will:

- Analyse the role of technology and innovation in terms of the gas industry's ability to meet future challenges and its market impact (supply - unlocking new supply sources- and demand sides -efficiency, energy mix, etc.-)
- Identify long-term future signs and signals

This study is based largely on expert opinion. A structured approach will be required, with experts consulted and their views collected and analysed.

Fehti ARABI
Chair, PGC B

PROGRAMME COMMITTEE C (PGC C)

GAS MARKETS

INTRODUCTION

The basic objective of Programme Committee C (PGC C) is to identify and analyse the emerging issues and key market drivers facing both developed and developing gas markets, and to provide insights into how those gas markets can be promoted.

During the 2012-2015 Triennium, PGC C will turn its attention to the impact of specific worldwide issues on regional gas markets. This will allow comparative analyses to be made across regional gas markets, rather than simply focusing on how they are changing. The following issues will be examined:

- The impact on natural gas of the worldwide anti-nuclear trend
- The implications of expansion in unconventional gas
- The security of gas supply and demand
- Energy poverty and lack of access to gas

PGC C will be working closely with other IGU Programme and Working Committees (especially PGC B and WOC 1) to fulfil these objectives.

STUDY GROUP C.1

THE ROLE OF NATURAL GAS IN THE ELECTRICITY GENERATION MIX

Leader: Alexy Bitteryanoy, Gasprom, Russia

Scope

- Summarise the current situation and changes to nuclear policies in regional gas markets
- Analyse changes to the electricity generation fuel mix
- Analyse their impact on the supply-demand balance and prices in both regional and global gas markets
- Examine the implications for emerging gas markets

STUDY GROUP C.2

IMPLICATIONS OF DEVELOPING UNCONVENTIONAL GAS

Leader: Shigeki Sakamoto, JX NIPPON, Japan

Scope

- Identify the supply potential and characteristics for unconventional natural gas resources worldwide
- Analyse changes in government policies and energy mixes in countries with abundant unconventional gas resources
- Identify the issues and challenges in relation to developing unconventional natural gas
- Analyse the potential impact on the gas supply demand balance and prices in both regional and global gas markets

STUDY GROUP C.3

SECURITY OF GAS SUPPLY AND DEMAND

Scope

- Provide an overview of the gas supply-demand balance in regional gas markets
- Identify the emerging issues that could challenge the security of gas supplies
- Apply the lessons learned from previous experiences
- Examine possible strategies and options for enhancing gas supply security and reliability
- Examine pipeline schemes that could advance the integration of regional gas markets

STUDY GROUP C.4

ENERGY POVERTY AND LACK OF ACCESS TO GAS

Scope

- Identify the nature and current status of energy poverty worldwide
- Identify the obstacles and challenges to providing better access to natural gas
- Draw the lessons learnt from successful gas markets
- Examine possible strategies and options for improving access to gas

Dr. Gi Chul JUNG
Chair, PGC C

PROGRAMME COMMITTEE D (PGC D)

LIQUEFIED NATURAL GAS (LNG)

INTRODUCTION

The LNG industry has gone through a phenomenal growth and several evolutions in the last 10 years. From a regional business which was primarily focused in the Pacific basin, it is now a global business. The global financial and economic crises, have presented new challenges to the business but this industry is a resilient one, having survived these types of global events. The existing LNG/Gas glut is temporary according experts in the industry and gas use will continue to increase over the coming years. The role of LNG as a source of supply will strengthen in the wake of the growing gas demand, irrespective of the nuclear power supply concerns raised after the Japanese natural disaster and heavy coal lobby activities, as the cleanest fossil fuel.

PGCD's role is to monitor and promote the development of the LNG business. The committee suggests studying topics of current importance and interest to the LNG industry participants and observers from other segments of the natural gas industry. The output of the committee studies will provide for a clear understanding of the global LNG industry and the challenges ahead.

PGC D WILL ORGANIZE 4 STUDY GROUPS:

STUDY GROUP 1

REMOTE LNG

Leader: Jean-Yves Capelle, TOTAL, France

Objectives SG.1:

To provide an overview at the end of the Triennium of potential issues and recommendations to develop LNG projects in arctic conditions and remote (low cost) locations to be presented by the study group in a report. Topics to be covered:

- LNG projects in higher latitudes which will be developed in Russia, Norway, Greenland or offshore in arctic conditions will definitively increase in the coming years. These projects will have to be approached in a lot of different manners than "past" projects in term of design, construction and operations due to harsh, remote and difficult environment.
- Also in more remote areas where the traditional pipeline gas supplies are not or cannot be developed for economic reasons different approaches, such as LNG by truck or barge, could bring gas to such remote locations, regions or countries.

STUDY GROUP 2

LNG AS FUEL

Leader: Richard Lammons, Chevron, USA

Objectives SG.2:

To provide a two-fold report at the end of the Triennium on land transport fuel opportunities, bunkering opportunities, as an answer to the worldwide pressure on reducing the use of fossil fuel for propulsion and reduce the CO2 emissions and other air pollution (NOx and SOx) by using oil based (standard) fuels. Topics to be addressed are:

- Alternative fuels for trucks and public transport to avoid further pollution of the air in densely populated areas. Several cities have put stringent targets for 2020 on their contribution to the environment. Switching to LNG as the "cleanest" fossil fuel seems a logic choice.
- Also Shipping bunkers are perceived to be one of the most environment unfriendly fuels. Ship owners could, for price and environmental reasons, become very interested in LNG as alternative fuel. In some part of specific Europe (Baltic, North Sea) legislation will be implemented to reduce the "NOx" and "SOx" emission from standard transport modes, such as ferries, tugs and port vessels.

STUDY GROUP 3

SMALL-SCALE LNG

Leader: Wouter Meiring, Shell, The Netherlands

Objectives SG.3:

Provide an overview of potential regions/countries of interest as well as tailor made technical requirements/solutions for small scale LNG projects. These small scale terminals will mainly supply regional users such as local industry, power generation or a city and will be located in remote areas and not easily be accessible by large LNG carriers. Also the quantity of LNG required per terminal/offloading point will be limited in the range of 2000 to 10000 tons. Neither infrastructure nor transportation modes are very well equipped to handle such small streams. A solution with breaking bulk in a larger receiving terminal (hub), into smaller shipping sizes and receiving terminals (satellites) are required to penetrate these markets with LNG (creation of mini – hubs for local LNG distribution) as well as smaller liquefaction units (for some areas). .

STUDY GROUP 4

LNG LIFECYCLE ANALYSIS

Leader: Ted Williams, American Gas Association, USA

Objectives SG.4:

A LNG Life Cycle Analysis (LCA) report initiating a detailed LNG life cycle analysis to:

- Make an overall assessment of environmental impacts "well to wheel" of the LNG chain, and map the impact
- Identify the main lines for potential improvements that could be made
- Provide reliable data for comparison of LNG to other types of fuel for transportation use.

Such a study, shared by the profession could be a valuable contribution for any study including LNG in any LCA. If published by IGU, the results will have a worldwide impact and will be a reference for a long time.

The life cycle analysis is a tool formalized through two international standards (ISO 14040 & 14044) and recognized by governments, NGOs and more generally by the consumer, aiming at quantifying the potential impacts of a "product " (whether it is a property, a service or even a process), from the extraction of the raw materials that compose it, to its elimination at the end of its life, through stages of distribution and use, or as to say "from cradle to grave".

SPECIAL REPORT D. A:

LNG TERMINAL REPORT IN CO-OPERATION WITH GIIGNL & SIGTTO

Leader: Philippe Corbière , TOTAL, France

Content of the report:

This report aims to ensure the most up to date information on LNG facilities and carriers and is the next version of the report to be delivered in 2012 (Petronas).

Dirk van SLOOTEN

Chair, PGC D

PROGRAMME COMMITTEE E (PGC E)

MARKETING AND COMMUNICATION

INTRODUCTION

The programme committee on marketing for IGU (PGC-E) is responsible of a twofold objective: On the one hand, to identify and develop ideas, tools and products for a successful promotion and sale of natural gas. On the other, to define ways to effectively convey the merits of natural gas and its role in sustainable development, and in a clean economy[5].

The Committee will divide its work into three study groups (SG), each of them focused on the following key topics

SG1. Marketing natural gas and promoting new usages – the search of best practices
SG2. Competing with other energies – what can we learn?
SG3. The case for natural gas – advocacy and effective communication strategies

The works of the study groups will be largely based on success stories, evaluating the key drivers behind them.

At the end of the triennium the work and studies developed will contribute to promote the important role of natural gas in the future energy mix.

STUDY GROUP E.1

MARKETING NATURAL GAS AND PROMOTING NEW USAGES
The search of best practices of Marketing & Promotion campaigns and its uses
Leader: Luis Pinto

Scope and Purpose:

The study group will analyse marketing & promotion campaigns for the use of natural gas. Provide special attention to relevant market differences such as growing and mature markets, cold and warm weather markets, etc

Analysis of market-applied innovation and new technologies, including hybrids. Profitability analysis of technologies relative to the level of usage covered

The study group will also develop a handbook with Key success factors and Compendium of best practices for international use.

STUDY GROUP E.2

COMPETING WITH OTHER ENERGIES - *WHAT CAN BE LEARNED?*
Leader: Barbara Jinks

Scope and Purpose

The study group will analyse the advocacy activities of the energy sector and their results. The study will be mainly focused on coal, oil, nuclear and renewables.

For each energy, the report will analyse how the communication activity is organised and coordinated and which are the main prime audiences, channels, topics & arguments used.

The study group will also analyse the marketing and promotion activities of each energy sector (coal, oil, nuclear, renewables, others) in order to expand their activity and attract new customers.
The study group will develop a comparative analysis and Benchmark handbook on other energies.

STUDY GROUP E.3

THE CASE FOR NATURAL GAS – *ADVOCACY AND EFFECTIVE COMMUNICATIONS STRATEGIES*
Leader: Hansch Van der Velden

Scope and Purpose

Specific proposals on how to build and maintain a constant flow of communication to improve the image of NG on a regional & national level (associations), so to improve communication with regulatory bodies and others stakeholders
Special attention to the impact of unconventional gas development on the communication activities

The study group will develop and Advocacy and Communication Plan proposal and a Communication handbook for local implementation
The work will be done in cooperation with TF2 – Gas Advocacy.

e-gas Industry: Contribution to a Special Report
Transversal topic covered by the three study groups on the impact of on-line and new media on the gas industry. PGCE also aims to give continuity to the report produced by SG3 / PGC-E on 2011 "IGU Online Proposal".

Alfredo INGELMO TORRES
Chair, PGC E

5 - During the 24th World Gas Conference in Buenos Aires in 2009, the IGU concluded that: "gas needs to have a more effective and consistent voice"

PROGRAMME COMMITTEE F (PGC F)

R-D INNOVATION

INTRODUCTION

The aggregate impact of global research and development efforts anticipate that natural gas demand will grow at about twice the rate of other primary energy sources. The goals of the PGC F include fostering information exchanges and international collaboration on research and innovation, promoting best practices, and raising awareness of how research and innovation promotes the growth and sustainability of the global gas industry.

The main deliverable for PGC F is the 2014 International Gas Research Conference. For over 30 years, IGRC conferences have provided a unique forum for highlighting the latest advances in the gas industry. The IGU has actively supported recent conferences, and under the current triennium, the IGRC conferences are now formally incorporated into IGU. The PGC-F will address its other goals through new working committees.

As a new IGU committee, we look forward to coordinating our activities with experts from other PGCs, WOCs, and Task Forces. We would like to extend an invitation to them to help us shape the future of the gas industry.

STUDY GROUP 1

TECHNICAL PROGRAMME COMMITTEE FOR THE INTERNATIONAL GAS RESEARCH CONFERENCE (2014 IGRC)

Leader: Dr Jack Lewnard

The main focus for the PGC F is to develop a well structured and up-to-date technical programme for the 2014 IGRC, scheduled for 17-19 September, 2014 in Copenhagen. The scope of the IGRC includes technology developments, as well as innovations in products, services, and business models across the entire gas value chain. This Study Group is responsible for: structuring the conference; issuing the call for papers; selecting papers and speakers for technical sessions and workshops; and administering awards, including the Young Researcher Prize and the Dan Dolenc Best Paper Prize. The group will coordinate its activities with the IGU Executive Committee and the Danish National Organising Committee.

The gas industry is experiencing rapid advances in technical and commercial innovations. For example, the global gas supply is expanding due to the development of unconventional resources such as coal bed methane, tight sands, and shale gas, as well as technological advances in deepwater and Arctic areas. On the demand side, innovations are creating wider opportunities for gas in traditional markets as well as rapidly growing markets such as transportation, either directly through CNG or LNG, or indirectly via gas-to-liquid processes. Gas R&D continues to focus on the safety of both existing infrastructures and the rapidly expanding transmission and distribution systems in developing countries.

STUDY GROUP 2

ENHANCING THE EFFECTIVENESS OF GAS INDUSTRY R&D

Leader: Rod Rinholm

This Study Group will continue to address the research and development issues first explored by the Research and Development Task Force in the 2003-2006 triennium, and further developed by the R&D Task Force during the 2006-2009 triennium. Over the last decade, there has been a decline in R&D investment by the gas industry, particularly in relation to gas use. The previous two Task Forces identified a number of reasons for this, including industry deregulation and a decline in government R&D support. The objective of this Group is to review, identify and assess ways to effectively promote R&D inside the gas industry. The first task is to establish the baseline by creating an inventory of global R&D programmes and facilities. Following on from that, gas R&D business models will be examined to establish what drives them in the short and long-term, as well as the intrinsic value from research and technology investments. Deliverables will include frameworks for inter-company and international cooperation and collaboration in gas R&D.

STUDY GROUP 3

THE ROLE OF GAS IN A SUSTAINABLE ENERGY FUTURE

Leaders: Dr Jack Lewnard - Dr Gerald Linke

Natural gas is critical for developing sustainable energy infrastructures. The objective of this Group is to identify R&D initiatives and new business models that anchor gas as part of the future energy mix. For example, zero-carbon renewable gas, produced from biomass via anaerobic digestion or gasification/methanation, can be integrated into the existing gas infrastructure. Gas can augment renewable geothermal and solar energy for heating and cooling loads. It can also back up intermittent electricity production from renewable sources such as solar, wind, and wave power. In addition, the gas grid has enormous potential to provide energy storage for the electric grid by converting the energy from "excess electrons" into gaseous fuel components. Given these scenarios, gas infrastructures become critical for integrated energy grids that holistically manage electricity and thermal loads. Specific tasks for this Group will include identification of the most innovative technology and business models to maximize the value of gas assets in future energy systems.

Jack LEWNARD

Chair, PGC F

TASK FORCE 1 (TF 1)
HUMAN RESOURCES

INTRODUCTION

The past three years have had a major impact on the oil and gas industry. They have put human resources and flexibility back in the spotlight.

Over the next decades, we will face a talent crunch in Sciences Technology Engineering & Mathematics (STEM) in most parts of the world. Highly qualified people will be increasingly mobile. Furthermore, the oil and gas industry suffers from negative perceptions as an old fashioned industry, unfriendly to women. Ageing demographics further exacerbate the problem and will see many industry experts going into retirement. Mirroring the ageing global population trend, age distributions in the current STEM workforce show that approximately 42% of scientists and engineers are in the '45-64' age group and are fast approaching retirement age. With only slightly over 30% of scientists and engineers in the '35-44' age group, it will be difficult to fill the vacuum left by retirements.

The global gas industry will have to take a long-term view that delivers a strategic response to the problem of attracting, retaining and developing its talents.

Scope

Metrics were designed for the 2012 WGC to measure the lack and loss of expertise in the industry. Using these metrics and the expertise of the HR representatives in each WOC, PGC and TF, we will be able to:

- Map the critical talent and human resources required to deliver projects and business across the gas value chain, from production to use.
- Understand which skills are necessary to develop the gas business of the future, especially in relation to gas industry forecast projections for strategic developments and geopolitics.
- Develop talent for the future by identifying the best practices across the gas value chain and regions.

The issue of the impending 'war for talent' calls for an industry response. A worldwide study looked at the major forces that affect the STEM talent pipeline for the gas industry. The 2012 WGC proposed immediate, innovative solutions for attracting and understanding young talent.

- Negative perceptions of the industry hinder the ability to meet the growing STEM workforce demand. According to Gallup, Oil & Gas has been perceived as the industry with the most negative image over the last decade. Conversely, the computer industry has consistently been perceived as the industry with the most positive image, followed by the Internet and telecommunications industries.

  - To develop a more modern image for the gas industry, through an active online presence in particular, and by maintaining traffic on the IGU youth website www.itsnotmagicitsscience.

- According to The Stanford Center on Longevity, growth of the working-age population will slow down everywhere. Among the large industrialised economies, only Canada and UK will experience growth in their working-age populations, albeit at a slow rate. Countries such as Brazil and China will experience an increase, followed by a significant decline in their working-age populations over the next 60 years.

Generation Y and C account for 52% of the global population. This indicates the significant availability of human resources for the future workforce.

Promote STEM education.
Meanwhile, the percentage of women in work is increasing. Women account for around 55% of graduates in all educational fields. A solution could be found by increasing the proportion of women in the industry workforce from the current level of around 25%:

Reposition the industry as female friendly to attract women to science and to our industry.
Our challenge is to transform this diagnosis into a practical action plan.

The results of the report will be presented to the 2015 WGC and will include a continuous rolling HR review of our industry.

Specific youth oriented programmes will be organised during the 2012-2015 triennium and at the 26th World Gas Conference. They will aim to bring together people at different stages in their careers to provide the next generation with a comprehensive view of the gas industry.

Agnès GRIMONT
Chair, TF 1

The objectives have been defined as theorical as well as practical contribution:

STUDY GROUP 1
Theorical contribution:
Report/book on best practices
Leader: Agnès Grimont

TF1 will analyse the situation of youth and female workers in the industry to share and highlight best practices across the industry in the area of Human Capital Development.

STUDY GROUP 2
Pratical contribution:
Education and communication

STUDY GROUP 2.1:
Youth campaign and Youth Event
Leader: Abdulaziz Mohammed Al-Manna

TF1 will take action and will play an active part in communicating and involving youth with the industry.

- to raise the youth awareness through the website itsnotmagicitsscience and social media
- Be aligned with the task force 'gas advocacy'
- Organise a Youth Pavilion following the very successful event organised in Kuala Lumpur

STUDY GROUP 2.2
Female campaign
Leader: Marius Popescu

TF1 will contribute in developing tool to consolidate the female workforce and making the industry more female friendly.

- Aligned with the task force 'gas advocacy': production of promotional campaign advertising success stories of female workers in the gas industry

TASK FORCE 2 (TF 2)
GAS ADVOCACY

INTRODUCTION

The energy sector is set to face increasing challenges that will lead to structural changes in the natural gas market. Mitigating climate change has become one of the most important international political issues, as well as security of supply and access to energy at reasonable prices.

The aim of Task Force 2 is to demonstrate and endorse the essential role of natural gas in the forthcoming transformation of the energy system.

Natural gas is commonly recognised as the most environmentally friendly, affordable, reliable, efficient and secure fossil fuel. Accordingly, policy debates must recognise the present and potential role of natural gas. The characteristics of natural gas must be reiterated and its role emphasised as a fuel that promotes both growth and decarbonisation.

Task Force 2 has been established to be the "voice" of natural gas in the institutional and regulatory forums of interest and to coordinate support and promote this position. For this process to be effective, it is important to develop an overall IGU vision of the role of natural gas and subsequently develop targeted messages based on the following basic elements:

- Structure of the energy market, with particular reference to factors such as the maturity of the market, degree of regulation, gas-to-gas competition and inter-fuel competition.
- Cultural evaluation of natural gas (taking into account the results of the analysis done by the PGC E during the previous triennium).
- Type of stakeholder; e.g. National Authorities, Governments, Financial Institutions.

Considering that natural gas will play a fundamental role as a key fuel in the long-term energy mix, TF2 intends to stimulate the debate on the:

- Role of natural gas in the fuel mix. The characteristics of natural gas make this fuel an important player in the future fuel mix. Affordability and reliability are crucial factors in markets where access to energy is a major issue. Where competition is a central element, the flexibility of natural gas could be a strategic factor. Finally, since natural gas is the ideal partner for renewables, it is a viable fuel even in those economies facing the challenge of eliminating fossil fuels.
- Role of natural gas for security of supply and, consequently, the fundamental need for investment upstream and in infrastructures and proper regulation (with a particular focus on relations between the bankability of investments and security of supply).
- Policies with direct and indirect impacts on inter-fuel competition. Major impacts on the natural gas market could be caused by the design of incentives to RES, and mechanisms to evaluate and trade CO2 emissions, as well as policies on technological research and fuel taxation configurations.
- Technological development. Investments in technologies such as carbon capture and storage, residential gas heat pumps and biogas are important elements in the forthcoming market transformation.

The Task Force will use this triennium to encourage area representatives to help develop the IGU's strong internal collaboration with technical entities and the PGC E on communication activities.

Outside the IGU, the main objective will be to strengthen relations with institutional stakeholders. We intend to present the IGU vision of the role of natural gas in the energy mix to all the organisations that, in different ways, help to define energy policy, including: national authorities, governments, financial institutions and regional bodies. Furthermore, Task Force 2 will prepare position papers on the key stages of the decision making process (e.g. public consultations).

Michele PIZZOLATO
Chair, TF 2

TASK FORCE 3 (TF 3)
GEOPOLITICS AND NATURAL GAS

INTRODUCTION

Although natural gas may be abundantly available worldwide, not every region is equally endowed with this resource. It can be quite a challenge to get the gas from producing regions to consuming countries. When nation states and/or international organisations try to influence international gas flows to their benefit, this can be regarded as a geopolitical action. The aim of Task Force 3 is to better understand these actions and to identify key developments worldwide that define the geopolitical setting - the so-called game changers. During the next triennium, Task Force 3 will continue the work prepared for Kuala Lumpur with a few notable changes in scope.

- The Study Group will focus on economic issues as well as politics - geo-economics as well as geopolitics.
- The Study Group will expand its coverage to the Far East, the Americas and Africa, with a special focus on south-south interaction and developments in the Pacific region.
- Cooperation along the value chain (upstream to downstream) between national and international oil corporations.

Task Force 3 also aims to complete the round of global debates in regions that have not been visited so far, and where the links between the IGU and the regional authorities could be strengthened. The debates will take place in high-level meetings between experts, local authorities and industry representatives. The local moderator will produce a regional discussion paper presenting the conclusions from the meetings. In addition, a wider study of natural gas and geopolitics will be carried out by the French think tank IFRI (French institute of international relations) and the Dutch think tank CIEP (Clingendael international energy programme). A final report will be presented in Paris in 2015.

Geert GREVING
Chair, TF 3

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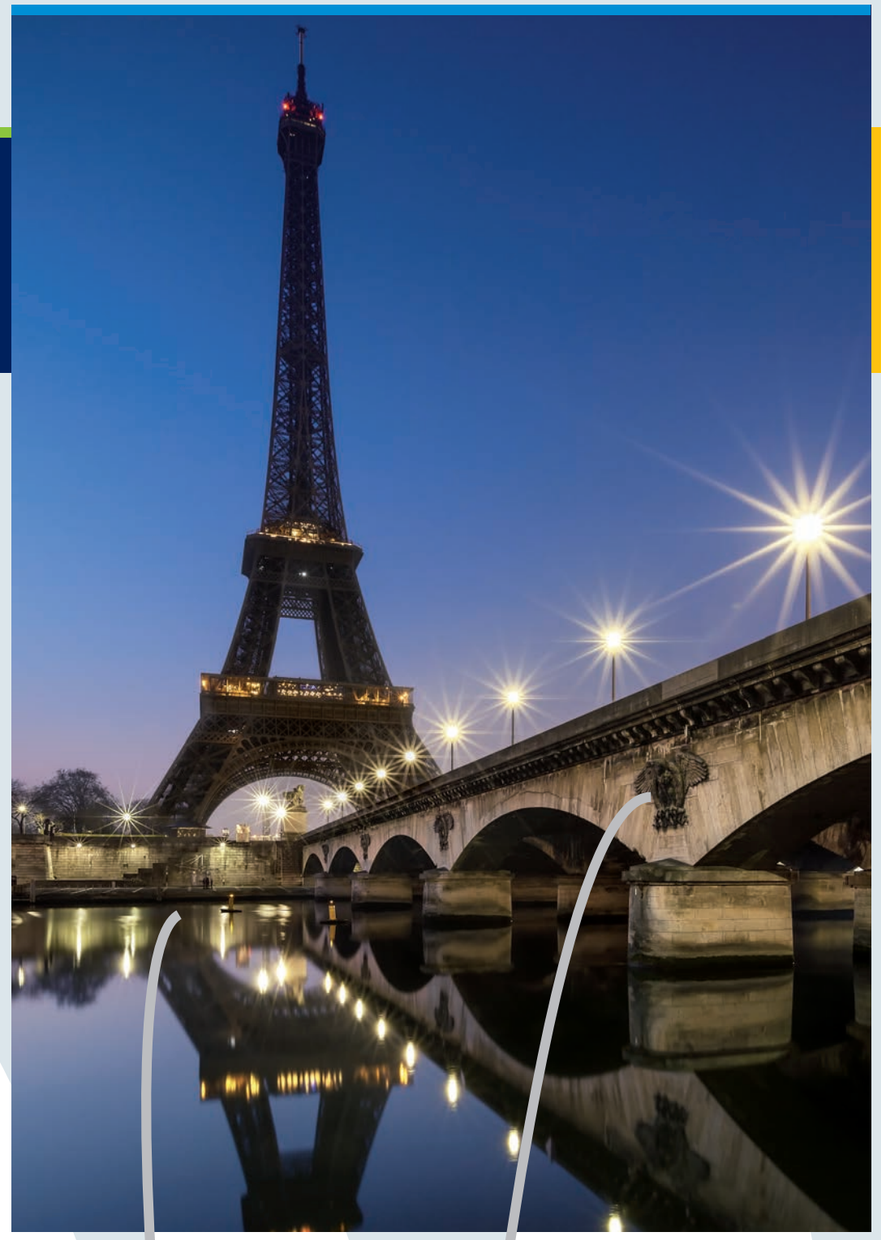
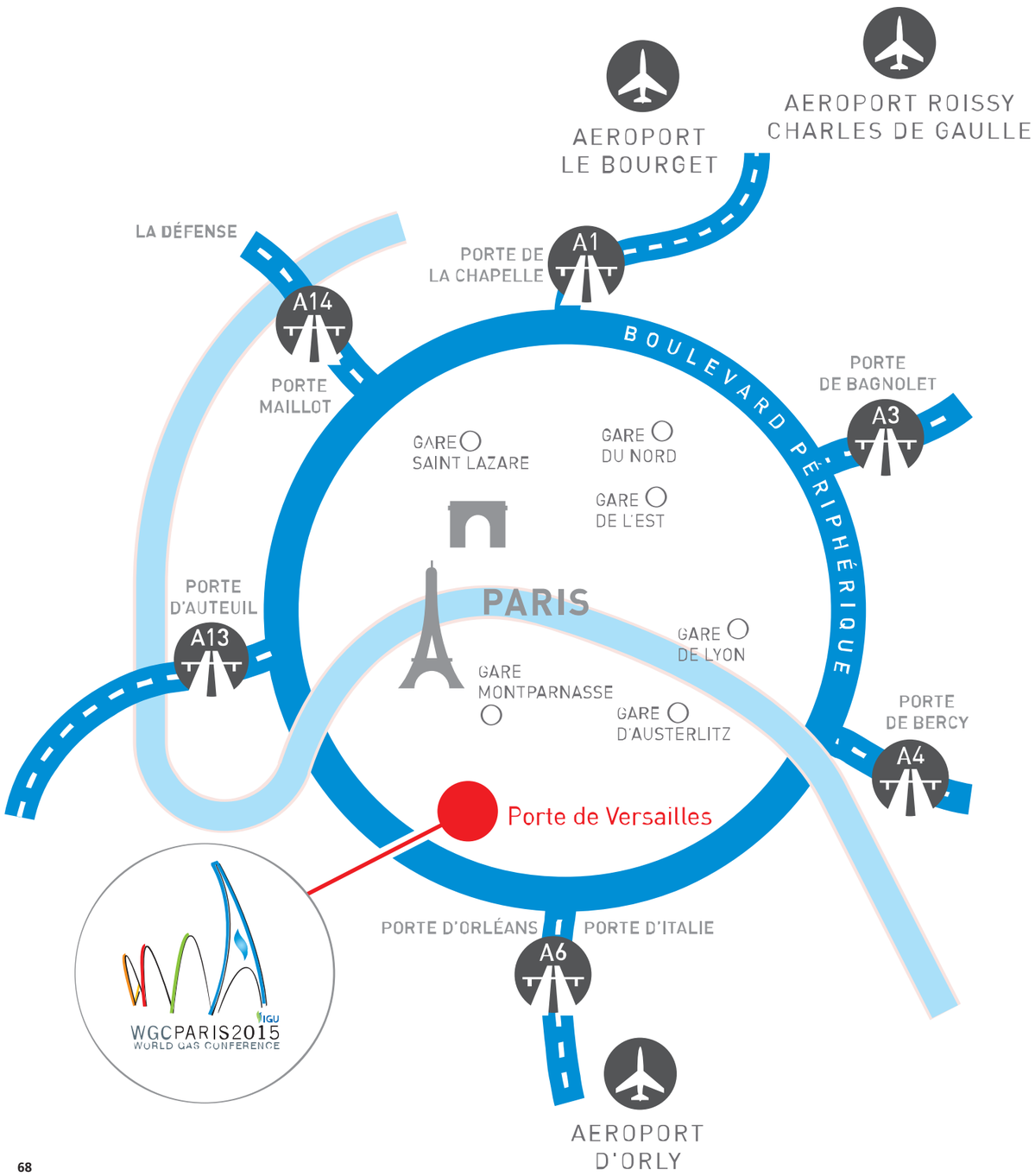
VENUES OF IGU MEETINGS DURING THE 2012 - 2015 TRIENNIUM

IGU MEETINGS 2012 – 2015 TRIENNIUM	EXECUTIVE COMMITTEE MEETINGS	COUNCIL MEETINGS 2012
2012	17 October, Ottawa, Canada	16 - 19 October, Ottawa, Canada
2013	9 - 11 April, Sevilla, Spain	
	23 October, Beijing, P.R. China	22 - 25 October, Beijing, P.R. China
2014	1-3 April, Brisbane, Australia	
	15 October, Berlin, Germany	14 - 17 October, Berlin, Germany
2015	24 - 26 March, Cairo, Egypt	1 June, Paris, France



V 26TH WORLD GAS CONFERENCE



MESSAGE FROM THE NOC CHAIRMAN

26TH WORLD GAS CONFERENCE
PARIS – PORTE DE VERSAILLES
1 - 5 JUNE 2015

Dear IGU friends,

I will be personally happy and proud to welcome you in Paris for the 26th World Gas Conference that will be held from 1st to 5th of June 2015 in the Palais des Sports and the Parc des Expositions of the **"Porte de Versailles"** in PARIS. This is the well-known location where the most important events usually take place in Paris, like for example the "Mondial de l'Automobile", the major car exhibition in the World.

It is the first time the magnificent city of PARIS will host the event since 1937, although France had hosted it twice in the last 60 years. Useless to say that we will make this event an unforgettable one, either by the quality of the program, by the size of the exhibition and the number of exhibitors, or – last but not least – by the enjoyment that you will have to discover, or more probably rediscover the charms of Paris during these days you will spend with us.

WGC 2015 will mark the end of the French triennium that is placed under the motto **"growing together towards a friendly planet"**. We are convinced that the increase of the use of natural gas is a key factor for a sustainable growth of economy associated to a better protection of environment.

All the topics around the best use of natural gas will be debated during the French triennium and the results will be presented to you at WGC 2015. It will be a fantastic opportunity for you to become an actor of the future of our planet.

The size of the exhibition halls will give us the possibility to have a very large surface of exhibition and you can count on numerous exhibitors coming from all over the World either from the major energy companies or from companies more involved in technical aspects, both on upstream and downstream businesses.

Of course, I will not forget the social aspect of the event for all participants and especially your companions. We are currently preparing a large choice of visits all over France, not only in Paris, but also in many other places like the Loire Valley and its Chateaux, Champagne or Burgundy with their vineyards.

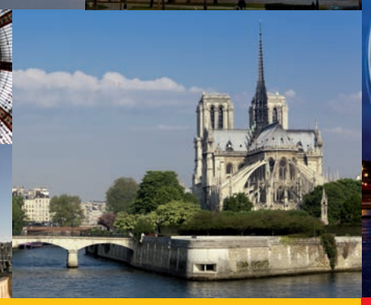
Once more, you will be astounded by all these opportunities and all the enjoyment you will have in visiting the "City of Lights" or other parts of France.

The National Organization Committee works under the umbrella of the French Gas Association with a strong help and commitment of the two major French gas companies, TOTAL and GDF SUEZ. I will personally be at your disposal to make your stay in France the most enjoyable and do not hesitate to contact me or the Secretary of the NOC, Annie LOUYS for any help or information you will need.

Daniel PACCOUD
Chairman of the NOC

WELCOME TO PARIS

Paris is seduction and grace, as simple as a love song, as complex as a symphony, as mysterious as the carvings on Notre Dame.



Walk out on the Pont des Arts in the early morning, when île de la Cité rises out of the mist on the Seine; or on a soft summer night, when music floats up from somewhere and the city is lit with a thousand lights. It doesn't really matter when : Paris will be beautiful, whenever you get there.

Paris is the most intoxicating of the cities, the most exciting, the most contradictory, the most romantic, the most magnifique!

Paris is fashion, Paris is champagne and celebration, Paris is grand monuments and mansard roof, marvelous museums and medieval street.

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“Growing together towards a friendly planet”

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