International Gas Union 1931-2021

The history of the global voice of gas

90 YEARS

IGU

INTERNATIONAL GAS UNION

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The history of the global voice of gas

Published by International Systems and Communications Limited (ISC) for the International Gas Union (IGU).

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International Gas Union
The IGU Secretariat is moving from Barcelona to London.
For full contact details visit: www.igu.org

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The International Gas Union

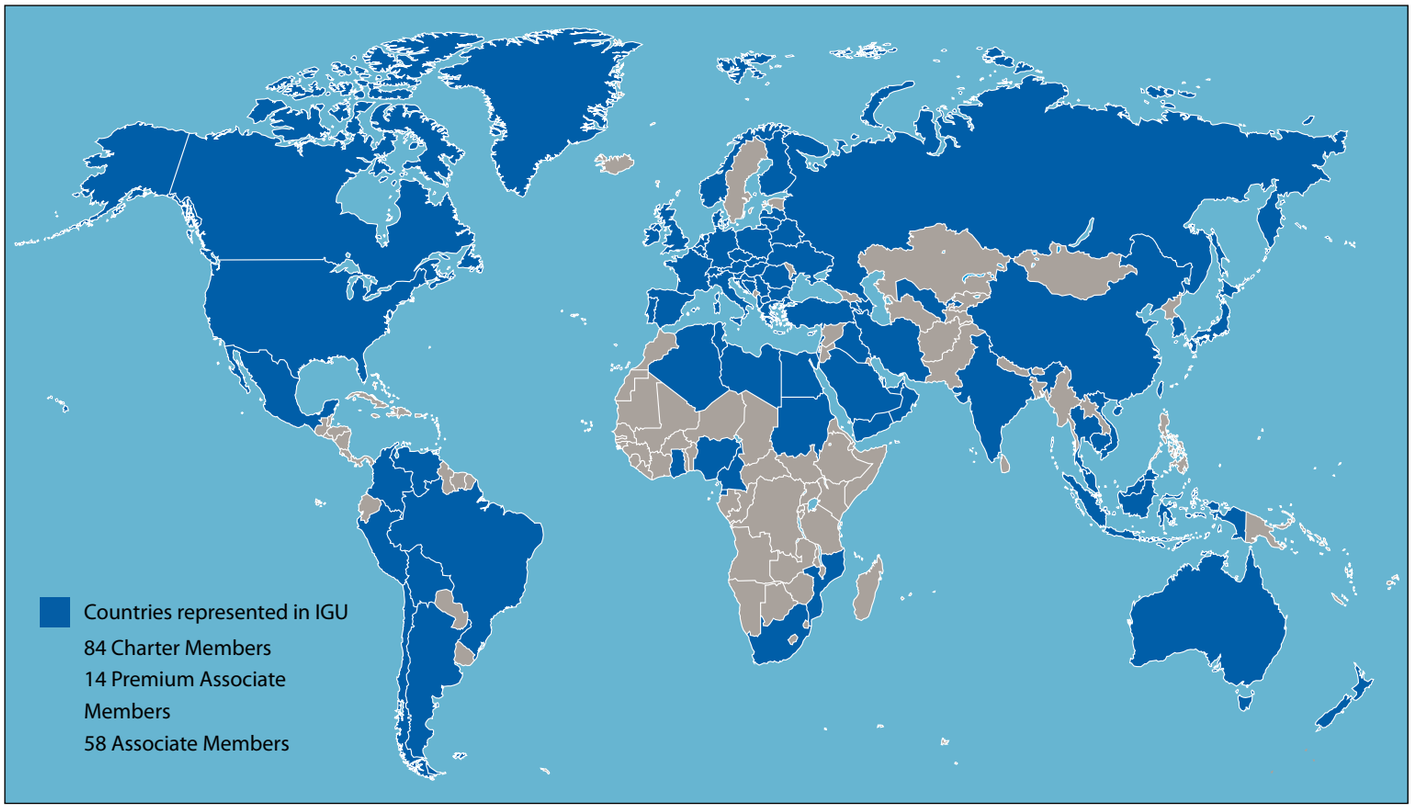
The International Gas Union (IGU) is a worldwide, non-profit organisation promoting the progress of the gas industry. Through its many member countries representing approximately 95% of global gas sales, IGU covers all aspects of the natural gas industry. IGU is registered in Vevey, Switzerland and the Secretariat is currently located in Barcelona, Spain. It will move to London, UK in August 2021.

Vision

As the global voice of gas, IGU seeks to improve the quality of life by advancing gas as a key contributor to a sustainable energy future.

Mission

- IGU is the key and credible advocate of political, technical and economic progress of the global gas industry, directly and through its members and in collaboration with other multilateral organisations.
- IGU works to improve the competitiveness of gas in the world energy markets by promoting transparency, public acceptance efforts and the removal of supply and market access barriers.
- IGU seeks to collaborate with governmental agencies and multilateral organisations to demonstrate the economic, social and environmental benefits of gas in the global energy mix.
- IGU supports and facilitates the development of new technologies and best practices, while emphasising sound environmental performance, safety, reliability and efficiency across the entire value chain.
- IGU maximises the value of its services to members and other stakeholders.



Countries represented in IGU

Albania
Algeria
Argentina
Armenia
Australia
Austria
Azerbaijan
Bahrain
Belarus
Belgium
Bolivia
Bosnia and Herzegovina
Brazil
Brunei
Bulgaria
Cambodia
Cameroon
Canada
Chile
China, People's Republic of
Chinese Taipei
Colombia
Croatia
Cyprus
Czech Republic
Denmark
Egypt
Equatorial Guinea
Finland
France
Germany
Ghana
Greece
Hong Kong, China
Hungary
India
Indonesia
Iran
Iraq
Ireland
Israel
Italy
Japan
Korea, Republic of
Latvia
Lebanon
Libya
Lithuania
Malaysia
Mexico
Monaco
Mozambique
Netherlands, The
New Zealand
Nigeria
North Macedonia
Norway
Oman, Sultanate of
Peru
Poland
Portugal
Qatar
Romania
Russian Federation
Saudi Arabia
Serbia, Republic of
Singapore
Slovak Republic
Slovenia
South Africa
Spain
Sudan
Switzerland
Thailand
Timor-Leste
Trinidad and Tobago
Tunisia
Turkey
Ukraine
United Arab Emirates
United Kingdom
United States of America
Uzbekistan
Venezuela
Vietnam
Yemen

Charter Members

Albania
Enti Rregullator i Energjise (ERE) – Albanian Energy Regulator

Algeria
Association Algérienne de l'Industrie du Gaz – AIG

Argentina
Instituto Argentino del Petróleo y del Gas

Armenia
Union of Gas Companies of Armenia (UGCA)

Australia
Australian Gas Industry Trust

Austria
Österreichische Vereinigung für das Gas- und Wasserfach (ÖVGW)

Azerbaijan
State Oil Company of the Azerbaijan Republic (SOCAR)

Bahrain
National Oil and Gas Authority (NOGA)

Belarus
Gazprom Transgaz Belarus

Belgium
Association Royale des Gaziers Belges

Bolivia
Yacimientos Petrolíferos Fiscales Bolivianos (YPFB)

Bosnia and Herzegovina
Gas Association of Bosnia and Herzegovina

Brazil
Associação Brasileira das Empresas Distribuidoras de Gás Canalizado (ABEGÁS)

Brunei
Brunei Energy Association

Bulgaria
Overgas Mrezhi AD

Cambodia
Cambodian Natural Gas Corp. Ltd

Cameroon
Société Nationale des Hydrocarbures

Canada
Canadian Gas Association

Chile
Asociación de Empresas de Gas Natural (AGN) – Chilean Natural Gas Association

China, People's Republic of
China Gas Society

Colombia
Asociación Colombiana de Gas Natural – Naturgas

Croatia
Hrvatska stručna udruga za plin – Croatian Gas Association

Cyprus
Ministry of Energy, Commerce, Industry & Tourism

Czech Republic
Český plynárenský svaz – Czech Gas Association

Denmark
Dansk Gas Forening – Danish Gas Association

Egypt
Egyptian Gas Association

Equatorial Guinea
Sociedad Nacional de Gas de Guinea Ecuatorial (SONAGAS G.E.)

Finland
Suomen Kaasuyhdistys – Finnish Gas Association

France
Association Française du Gaz (AFG)

Germany
Deutscher Verein des Gas- und Wasserfaches e.V. (DVGW)

Ghana
Ghana National Gas Company

Greece
DEPA Commercial S.A.

Hungary
MVM Csoport, Magyar Földgázkereskedő – MVM Group, Hungarian Gas Trade Ltd

India
Gas Authority of India Ltd (GAIL)

Indonesia
Indonesian Gas Association (IGA)

Iran
National Iranian Gas Company (NIGC)

Iraq
State Oil Marketing Company/Ministry of Oil (SOMO)

Ireland
Gas Networks Ireland

Israel
The Israel Institute of Energy & Environment

Italy
Comitato Italiano Gas (CIG)

Japan
The Japan Gas Association

Korea, Republic of
The Korea Gas Union

Latvia
JSC Latvijas Gāze

Lebanon
Ministry of Energy and Water

Libya
National Oil Corporation

Lithuania
Nacionalinė Lietuvos Energetikos Asociacija (NLEA) – National Energy Association of Lithuania

Malaysia
Malaysian Gas Association

Mexico
Asociación Mexicana de Gas Natural, A.C.

Monaco
Société Monégasque de l'Électricité et du Gaz (SMEG)

Mozambique
Empresa Nacional de Hidrocarbonetos, E.P. (ENH)

Netherlands, The
Koninklijke Vereniging van Gasfabrikanten in Nederland (KVGN) – Royal Dutch Gas Association

New Zealand
Petroleum Exploration and Production Association of New Zealand

Nigeria
Nigerian Gas Association

North Macedonia
Macedonian Gas Association

Norway
Petoro AS

Oman, Sultanate of
Oman LNG L.L.C.

Peru
Perúpetro S.A.

Poland
Polskie Zrzeszenie Inżynierów i Techników Sanitarnych (PZITS) – Polish Gas Association

Portugal
Associação Portuguesa das Empresas de Gás Natural (AGN)

Qatar
Qatar Liquefied Gas Company Ltd (Qatargas)

Romania
S.N.G.N. Romgaz S.A.

Russian Federation
PJSC Gazprom

Saudi Arabia
Saudi Arabian Oil Company

Serbia, Republic of
Gas Association of Serbia

Singapore
SPgroup

Slovak Republic
Slovenský plynárenský a naftový zväz – Slovak Gas and Oil Association

Slovenia
Geoplin d.o.o.

South Africa
South African Gas Development Company (iGas)

Spain
Asociación Española del Gas (SEDIGAS) – Spanish Gas Association

Sudan
Ministry of Petroleum and Gas

Switzerland
Swissgas

Thailand
PTT Public Company Ltd

Timor-Leste
TIMOR GAP, E.P.

Trinidad and Tobago
The National Gas Company of Trinidad and Tobago Ltd

Tunisia
Association Tunisienne du Petrole et du Gaz (ATPG) c/o STIR

Turkey
BOTAŞ

Ukraine
Naftogaz of Ukraine

United Arab Emirates
Abu Dhabi Gas Liquefaction Company Ltd (ADGAS)

United Kingdom
BP Gas Marketing Ltd

United States of America
American Gas Association

Uzbekistan
Uzbekneftegaz

Venezuela
Petróleos de Venezuela S.A. (PDVSA)

Vietnam
PetroVietnam Gas JSC

Yemen
Yemen LNG

Premium Associate Members

- Beijing Gas Group Co. Ltd (China)
- Cheniere Energy Inc. (USA)
- China National Petroleum Corporation (China)
- Enagás S.A. (Spain)
- Engie (France)
- Equinor ASA (Norway)
- ExxonMobil Gas & Power Marketing (USA)
- İGDAŞ – Istanbul Gas Distribution Co. (Turkey)
- Korea Gas Corporation – KOGAS (Korea)
- Naturgy (Spain)
- PT Pertamina – Persero (Indonesia)
- Royal Dutch Shell (The Netherlands/UK)
- The Hong Kong and China Gas Company Limited (Hong Kong, China)
- Total S.A. (France)

Associate Members

- AGL Energy Ltd (Australia)
- Atlas Copco Gas & Process (USA)
- Australian Petroleum Production & Exploration Association – APPEA (Australia)
- Baker Hughes Company (USA)
- Bolsa Mercantil de Colombia
- Bureau Veritas (France)
- Chart Industries (USA)
- Chevron Gas & Midstream Company (USA)
- China Petrochemical Corporation – Sinopec (China)
- COM-therm (Slovakia)
- ConocoPhillips Company (USA)
- Ecopetrol S.A. (Colombia)
- Edison S.p.A. (Italy)
- Egoli Gas Pty (South Africa)
- Enerdata s.a.s. (France)
- Energodiagnostika (Russia)
- Eni (Italy)
- Ente Vasco de la Energía (Spain)
- GasTerra B.V. (The Netherlands)
- GAZBİR – Türkiye Doğal Gaz Dağıtıcıları Birliği (Association of Natural Gas Distribution Companies of Turkey)
- Hanwha Energy (Korea)
- Hermann Sewerin GmbH (Germany)
- Indian Oil Corporation Ltd (India)
- Indonesian Gas Society (Indonesia)
- INPEX Corporation (Japan)
- Instituto Brasileiro de Petróleo, Gás e Biocombustíveis – IBP (Brazil)
- Israel Natural Gas Lines Ltd (Israel)
- Linde AG (Germany)
- Natural Gas Society (India)
- NextDecade Corporation (USA)
- N.V. Nederlandse Gasunie (The Netherlands)
- Oman Gas Company SAOC (Oman)
- ONC Energy (China)
- Origin Energy Ltd (Australia)
- Petróleo Brasileiro S.A. – Petrobras (Brazil)
- Petronet LNG Limited (India)
- Picarro Inc. (USA)
- Posco Daewoo Corporation (Korea)
- Regas (Italy)
- Repsol S.A. (Spain)
- Romet Ltd (Canada)
- Russian Gas Society (Russia)
- Samsung Engineering Co. Ltd (Korea)
- Santos Ltd (Australia)
- Sempra LNG (USA)
- Société Suisse de l'Industrie du Gaz et des Eaux – SSIGE/SVGW (Switzerland)
- Sonorgás (Portugal)
- TAQA Arabia (Egypt)
- TBG – Transportadora Brasileira Gasoduto Bolívia-Brasil S.A. (Brazil)
- TgP – Transportadora de Gas del Perú (Peru)
- The Association of Oil & Gas Exploration Industries in Israel
- The Gas Association of Chinese Taipei
- Tubacex (Spain)
- Turboden (Italy)
- Uniper SE (Germany)
- Vitol S.A. (Switzerland)
- Westnetz GmbH (Germany)
- Woodside (Australia)

Organisations affiliated to IGU

- ARPEL – Asociación Regional de Empresas del Sector Petróleo, Gas y Biocombustibles en Latinoamérica y el Caribe/Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean
- Energy Delta Institute (EDI)
- FIPI – Federation of Indian Petroleum Industry
- Gas Infrastructure Europe (GIE)
- Gas Technology Institute (GTI)
- GERG – Groupe Européen de Recherches Gazières/European Gas Research Group
- GIIGNL – Groupe International des Importateurs de Gaz Naturel Liquéfié/ International Group of LNG Importers
- NGVA Europe – European Association for Bio/Natural Gas Vehicles
- International Pipe Line & Offshore Contractors Association (IPLOCA)
- IPIECA
- MARCOGAZ – Technical Association of the European Natural Gas Industry
- Pipeline Research Council International, Inc. (PRCI)
- Russian National Gas Vehicles Association (NGVRUS)
- World LPG Association (WLPGA)

Presidents of IGU since 1931

From/to	President, country
For the duration of the 1st International Gas Conference in June 1931	Harold E. Copp (UK)
1931-1934	Fritz Escher (Switzerland)
1934-1937	Auguste Baril (France)
1937-1940	Hermann Müller (Germany)
1940-1946	During WWII IGU was dormant
1946-1949	Cyril M. Croft (UK)
1949-1952	Marcel Brabant (Belgium)
1952-1955	Robert W. Hendee (USA)
1955-1958	Mario Boselli (Italy)

From/to	President, country
1958-1961	Bengt M. Nilsson (Sweden)
1961-1964	Jacob van Dam van Isselt (The Netherlands)
1964-1967	Georg Düwel (West Germany)
1967-1970	Alexei I. Sorokin (USSR)
1970-1973	Georges H. Robert (France)
1973-1976	Leslie J. Clark (UK)
1976-1979	James W. Kerr (Canada)
1979-1982	Eric A. Giorgis (Switzerland)
1982-1985	Christoph A. Brecht (West Germany)

From/to	President, country
1985-1988	John Kean (USA)
1988-1991	Herbert Richter (East Germany)
1991-1994	Luigi Meanti (Italy)
1994-1997	Hans Jørgen Rasmusen (Denmark)
1997-2000	Claude Détourné (France)
2000-2003	Hiroshi Urano (Japan)
2003-2006	George H. B. Verberg (The Netherlands)

From/to	President, country
2006-2009	Ernesto López Anadón (Argentina)
2009-2012	Datuk (Dr) Abdul Rahim Hashim (Malaysia)
2012-2015	Jérôme Ferrier (France)
2015-2018	David Carroll (USA)
2018-2022	Joo-Myung (Joe) Kang (Korea)
2022-2025	Li Yalan (China)
2025-2028	Andrea Stegher (Italy)

IGU Secretaries General since 1931

From/to	Secretary General	Country hosting the Secretariat
1931-1937	Pierre Mougin	France
1937-1949	Hermann Zollikofer	Switzerland
1949-1970	Raoul H. Touwaide	Belgium
1970-1979	Albert G. Higgins	UK
1979-1988	Bernard Goudal	France
1988-1994	Jean-Pierre Lauper	Switzerland
1994-2000	John F. Meeder	The Netherlands
2000-2007	Peter K. Storm	Denmark
2007-2014 2014-2016	Torstein Indrebø Pål Rasmussen	Norway
2016-2021	Luis Bertrán Rafecas	Spain
2021-	Andy Calitz	Permanent headquarters

Members of the IGU Wise Persons Group

2004-	Prof. Dr Coby van der Linde
2004-	Dr Daniel Yergin
2012-	Nobuo Tanaka
2010-2015	Dr Kandeh K. Yumkella
2004-2012	Tim Eggar
2006-2010	Dr Rajendra K. Pachauri
2004-2006	Yoshihiro Sakamoto

IGU Regional Coordinators

2009-	Khaled AbuBakr, Africa & the Middle East
2018-	Graeme Bethune, North East Asia & Australasia
2018-	Hazli Sham Kassim, South & South East Asia
2018-	Andrea Stegher, Europe
2014-	Timothy Egan, North America
2018-	Orlando Cabrales Segovia, Latin America & the Caribbean
2012-	Marcel Kramer, Russia, Black Sea & the Caspian area
2015-2018	Li Yalan, Asia & Asia-Pacific
2012-2015	Kang Soo Choo, Asia & Asia-Pacific
2012-2016	Gertjan Lankhorst, Europe
2009-2012	James Kwan, Asia & Asia-Pacific
2015-2018	Javier Gremes Cordero, Latin America & the Caribbean
2014-2015	Cynthia Silveira, Latin America & the Caribbean
2012-2014	Luis Domenech, North & South America
2009-2012	João Carlos de Luca, North & South America
2009-2012	Marcel Kramer, Europe & the CIS

The World Gas Conferences*

Conference	Date	Venue	Total attendance
1st	June 2, 1931	London	28**
2nd	September 2-4, 1934	Zurich	495
3rd	June 12-16, 1937	Paris	697
WORLD WAR II	–	–	–
4th	June 15-17, 1949	London	667
5th	June 16-19, 1952	Brussels	666
6th	September 27-30, 1955	New York	271
7th	September 25-28, 1958	Rome	847
8th	June 27-30, 1961	Stockholm	945
9th	September 1-4, 1964	Scheveningen	1,500
10th	June 6-10, 1967	Hamburg	2,250
11th	June 9-12, 1970	Moscow	3,100
12th	June 4-6, 1973	Nice	2,800
13th	June 7-11, 1976	London	2,800
14th	May 27-June 1, 1979	Toronto	2,300
15th	June 14-18, 1982	Lausanne	3,000
16th	June 24-27, 1985	Munich	3,600
17th	June 6-10, 1988	Washington DC	3,800
18th	July 8-12, 1991	Berlin	4,300
19th	June 6-9, 1994	Milan	5,300
20th	June 10-13, 1997	Copenhagen	4,600
21st	June 6-9, 2000	Nice	4,600
22nd	June 1-5, 2003	Tokyo	5,200
23rd	June 6-9, 2006	Amsterdam	3,900
24th	October 5-9, 2009	Buenos Aires	3,500
25th	June 4-8, 2012	Kuala Lumpur	5,300
26th	June 1-5, 2015	Paris	3,700
27th	June 25-29, 2018	Washington DC	3,800
28th	May 23-27, 2022	Daegu	
29th	May 2025	Beijiing	
30th	2028	Milan	

* From 1931 to 1970 International Gas Conferences were held. The event was renamed World Gas Conference with effect from 1973.

** The figure is for overseas delegates only. The 1st International Gas Conference formed part of the 68th AGM of the Institution of Gas Engineers, which was attended by some 1,500 people in total.

The staff of the IGU Secretariat as of June 2021. *From left to right in the main picture are:* Marcela Martínez Serret, Senior Advisor; Luisa Peris Meléndez, Executive Assistant; Håkon Olav Huglen, Senior Advisor; Emma Siobhan Paños Knowles, Administrative Advisor; Luis Bertrán Rafecas, Secretary General; Luis Calvo Lema, Director Advisor; Hyun-Chang Kim, Senior Advisor.

Left to right from top left:
Andy Calitz, Deputy Secretary General; Rodney Cox, Events Director; Matthew Doman, Public Affairs Director; Tatiana Khanberg, Public Affairs Manager.

The IGU logo

IGU's first logo was commissioned by the German Presidency for the 10th International Gas Conference in Hamburg in June 1967. The job was given to a staff member of the Hamburg Gas Company, who designed a lower case "g" with a grid representing the world and two flames. The Council was impressed and adopted the logo for general IGU use. It went on to serve for four decades.

The name "International Gas Union" generally appeared alongside the logo, but not as part of it, and from 1975 the words "A Worldwide Organisation" were added where appropriate (e.g. on letterheads and other documents). In 2005, the logo was revised by including the name in English and French in a circle around it and adding a 3D effect.

In 2011, a new logo was commissioned as part of an initiative to improve communications with stakeholders outside the gas industry, among others policymakers, international organisations and environmental groups. It was officially launched at the 25th World Gas Conference in June 2012. Subsequently, one-off logos were designed to commemorate IGU's 85th (in 2016) and 90th (in 2021) anniversaries.

Design concept

The current logo retains some elements from the old one such as the colour blue and dual language text, while enhancing the name of the Union and using the three initials, IGU. Its introduction signalled a new chapter in the history of IGU reflecting the dynamic, forward looking and global organisation it has become.

▲
IGU's original logo was launched in 1967.

The logo is meant to:

- Be simple and clean
- Have a clear readable font
- Be reproducible and legible in many sizes and in multiple media
- Be usable with or without text
- Be timeless
- Reflect IGU core values through the utilisation of blue and green colours
- Unify IGU members through a common identity

The logo represents the blue flame of burning gas while use of the green colour conveys the environmentally-friendly properties of gas. Green is the dominant colour for communication related to sustainable development and environment. The blue colour, beyond representing natural gas, is an important communication colour creating security and confidence. The light blue hue gives the impression of new energy and an innovative spirit.

The transparency of the overlapping flames illustrates the integration of the IGU Vision and offers a more dynamic impression. The visibility of IGU is enhanced by clearly putting the letters "IGU" as the main element of the logo. The logo is designed to transmit energy, environmental qualities, stability, credibility and an international dimension.

▲
The logo was revised in 2005.

▲
The current logo was introduced in 2012.

Message from the President and the Secretary General

In June 2021, the International Gas Union celebrated its 90th anniversary – a significant milestone for what began as a grouping of national gas associations from Europe and North America and became an organisation representing the gas industry worldwide.

Back in 1931 when IGU was founded, the gas industry was based mainly on manufactured gas. Each city had its own gas works and local distribution network. But that same year saw the opening of the first long-distance gas pipeline in the USA, bringing natural gas from the Texas Panhandle to Chicago and heralding a period of major change for the industry. As the transportation infrastructure expanded, natural gas became an increasingly popular energy choice used in homes, by manufacturing and processing plants and to generate electricity. Over time natural gas grew to play an influential role in the global economy as one of the world's primary fuel sources.

This rapid expansion was based on the discovery of gas around the world and the construction of the infrastructure to carry this gas to market. A complex network of new national and international pipelines were built, underground storage fields were developed and liquefaction was introduced to transport gas by sea.

Joe M. Kang (*right*) and Luis Bertrán Rafecas.

The history of IGU has been tied closely to the growth of the gas industry. Today, the Union has more than 150 members worldwide on six continents, representing approximately 95% of the world gas market, and truly has become the Global Voice of Gas for a fuel that is safe, sustainable, reliable and affordable and supplies about 24% of global energy demand.

Despite this amazing history, IGU and the gas industry continue to evolve. Over the last 20 years, there has been increased discussion about the environmental impacts of energy production, distribution and end use, with a particular emphasis on CO_2 emissions and their affect on the climate. This concern has led to a shift in focus to using more types of renewable and other forms of cleaner energy. In this context, and particularly since the Paris Agreement in 2015, IGU has promoted the credentials of gas as a clean, efficient, reliable and abundant energy source that is making a

major contribution today in reducing CO_2 and other health-impacting emissions.

But challenges remain and the natural gas industry throughout the world will continue to need a strong voice and and clear message if it is to continue to play a major role in a low-carbon future. It must be made clear that natural gas does not stand in the way of the energy transition but enables it.

As the Global Voice of Gas, IGU will spearhead the industry's effort in making a strong case for the continuing energy role of gas to policymakers, politicians and other stakeholders. It will be very important to highlight our industry's expertise and investment in infrastructure that will be a driver and enabler of new gases like biomethane, synthetic gas and hydrogen and that our members are involved in the development of a wide range of new technologies that will have important roles in decarbonisation.

▲ IGU has participated in all editions of the critical COP forum. COP25 was held in Madrid under the presidency of Chile in December 2019 and activities included an urban air quality event addressed by Luis Bertrán Rafecas (INSET).

New initiatives

Under the USA Presidency from 2015-18, IGU rose to the challenge by implementing new initiatives to more effectively advocate for the broader gas industry. There is a way to go, but our members enthusiastically supported these efforts to provide more powerful messages through strengthening the Global Voice of Gas. Since 2018, the Korean Presidency has brought a new focus to IGU and its advocacy efforts by embracing new renewable gases as part of the IGU gas family and new technologies to decarbonise the gas industry. These changes will allow IGU and the global gas industry to have an important long-term role in the energy transition.

Numerous steps have been taken to realise IGU's new vision. We have:

- Established dedicated resources for policy development and public affairs and institutionalised our capability to serve as the Global Voice of Gas.
- In the light of the Covid-19 pandemic, rescheduled all the flagship events – WGC2022 in Daegu, Korea, LNG2023 in St Petersburg, Russia and IGRC2024 in Banff, Canada, as well as the next cycle of events in 2025 in Beijing, China, in Doha, Qatar in 2026, in Tehran, Iran in 2027 and in Milan, Italy in 2028, to navigate the disruption of the pandemic and change uncertainty to certainty regarding the holding of these flagship events.
- Reorganised the strategic partnership relations with influential global bodies such as the International Energy Agency and the United Nations with a strong focus on the Conference of the Parties (COP) to the UN Framework Convention on Climate Change. We have participated in all editions of this critical forum from COP1 to COP25 (and will be at COP26), while maintaining our influence on G20 Energy Policies, organising G20 Gas Days in 2016, 2018, 2019 and 2021.

These are just some of key elements of the IGU advocacy evolution in recent years. We have also strengthened our institutional capabilities and governance. We have:

- Adopted a new Code of Ethics for Business Conduct, making internal procedures available to all members on the IGU website, and increasing member benefits in different ways, such as the free digital magazine, the *Global Voice of Gas*, discounts for IGU flagship events and building up finances to allow IGU to deliver a professional Secretariat.
- Thanks to close cooperation between the Korean Presidency and Spanish Secretariat, improved management transparency and organisational finances with better service and more benefits.
- Transformed the IGU operations through the establishment of a permanent headquarters in London which will formally take over from the Spanish Secretariat in August 2021. A professional staff will oversee the integration of all IGU operations while supporting the IGU Presidency in its leadership of the Union.

We believe that natural gas industry has a bright future as the world transitions to a low-carbon future. IGU will always work to ensure that our members continue to have a voice and role in the development of a long-term and sustainable future energy mix.

We hope you enjoy reading this updated edition of our long-cherished organisation's history.

On behalf of the International Gas Union

Joe M. Kang	President
Luis Bertrán Rafecas	Secretary General

IGU's Triennial Work Programme

The professional work of IGU is carried out in triennial cycles culminating in the World Gas Conference. For each Triennium, the Presidency sets a theme and strategic focus that provide the framework upon which the Triennial Work Programme (TWP) is developed. The TWP is managed by the Coordination Committee and implemented by standing technical committees and ad hoc task forces. Members serve on a voluntary basis and benefit from gaining access to an international knowledge-base and a network of contacts.

As a consequence of the Covid-19 pandemic, in November 2020 the IGU Council approved the rescheduling of the 28th World Gas Conference to 2022 and the extension of the term of the Korean Presidency by a year. Thus what was originally developed as the TWP for 2018-2021 is now, exceptionally, a quadrennial programme ending in 2022. The triennial cycles will be resumed from 2022-2025.

The theme for the Korea Presidency is "A Sustainable Future – Powered by Gas".

There are three areas of strategic focus and strategic guidelines in order to guide the work and efforts of the committees and task forces:

1 Environmental Leadership

- Overcoming environmental challenges
- Enhancement of energy efficiency
- Advocacy for policy and public acceptance

2 Market Vitality

- Affordability
- Flexibility
- Strategic partnership and policy cooperation

3 Value Creation

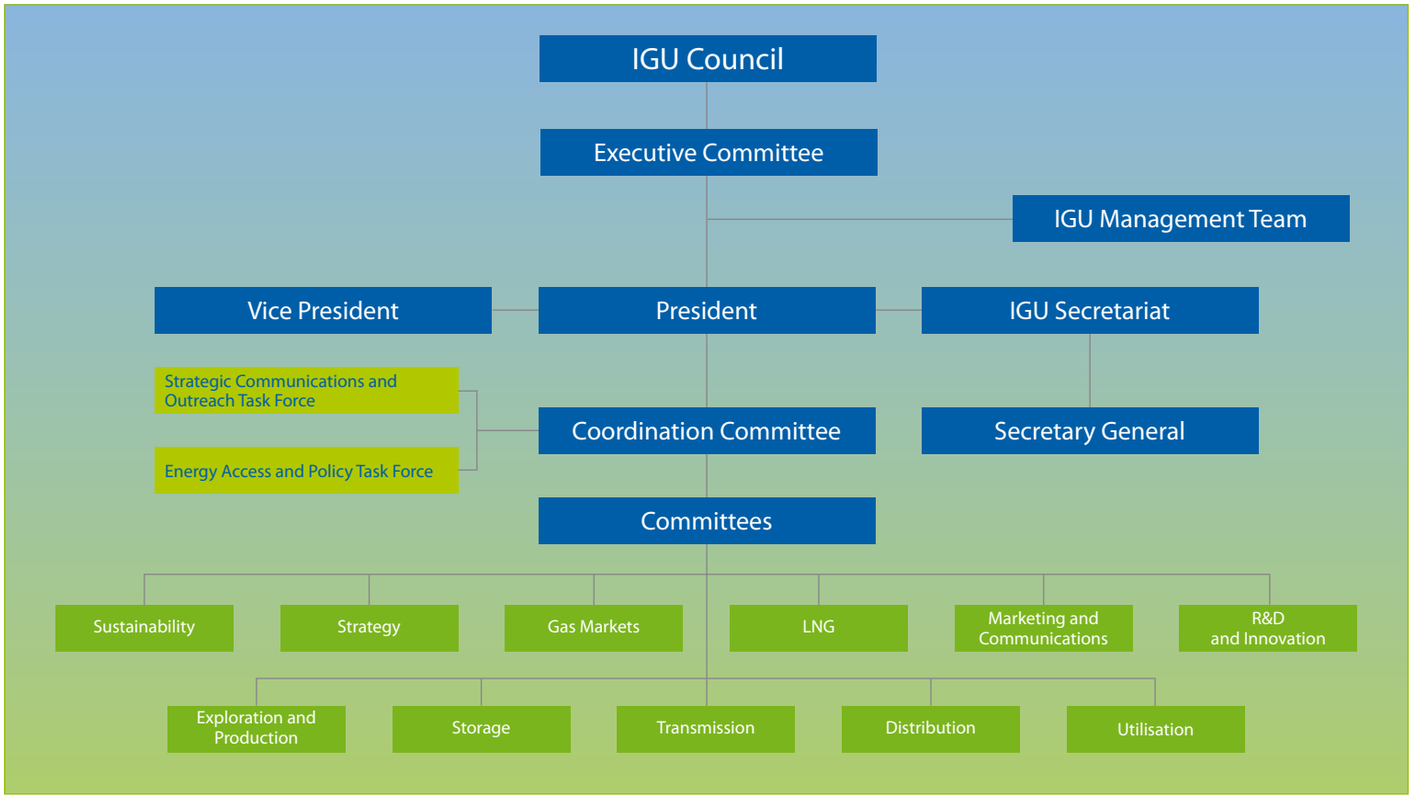
- Technological innovation
- Collaboration with renewable energies
- Accessibility improvement

Over the years, the committee structure has evolved in response to the changing demands of the gas industry. There are currently 11 committees covering the gas chain and other technical, economic and policy issues.

Each committee is chaired by a Charter Member or Premium Associate Member who also provides secretarial services, while the Vice Chair comes from the member who will take over the chair in the next Triennium. Study groups are set up within each committee to deal with specific topics and prepare reports, case studies and best practices.

Task forces are set up to address concerns that emerge when developing plans for a Triennium and that do not come under the direct remit of a standing committee. Under the Korean Presidency there are two task forces, one looking at strategic communications and outreach and the other at energy access and policy.

Throughout the Triennium, the committees and task forces support the IGU management team in raising the global voice of gas with reports, contributions to publications and participation in symposiums, seminars and workshops as appropriate. The final results of their work are presented during the World Gas Conference at the end of the Triennium.



◀ IGU organisation.

Leadership of the Committees

Committee	Chair 2018-22	Chair 2022-25
Distribution	Brazil	Germany
Exploration and Production	Russia	Nigeria
Gas Markets	China	Malaysia
LNG	Algeria	Korea
Marketing and Communications	The Netherlands	Egypt
R&D and Innovation	Japan	Netherlands
Storage	USA	Slovak Republic
Strategy	Germany	Russia
Sustainability	Malaysia	Spain
Transmission	France	Italy
Utilisation	Spain	Brazil

Task Forces 2018-22 and Chairs

Strategic Communications and Outreach	UK
Energy Access and Policy	Australia and Spain jointly

◀ The Chair of the Coordination Committee for 2018-22 is Jeongwook Khang (FAR LEFT). The Vice Chair, Yang Lei (LEFT) will become Chair for 2022-25.

▲▲
Members of the Exploration and Production, Gas Markets and Sustainability committees held a joint meeting in Madrid in September 2019.

▲
Members of the LNG and Transmission committees held a joint meeting in Gyeongju in September 2019.

▲▲
Members of the Marketing and Communications Committee met in Santiago in April 2019.

◀
Members of the Utilisation Committee met in Oporto in September 2019.

▶ Members of the Distribution Committee met in Prague in September 2019. Their group photograph was taken in front of a hydrogen-fuelled bus being trialled by the UJV research institute.

▼ Task Force 1 times its meetings around those of the Council and Executive Committee and met in Yogyakarta in October 2019 when the Executive Committee posed for a group photograph.

▶ Members of the Storage Committee met in St Petersburg in October 2019.

▼ Members of the R&D and Innovation Committee met in Groningen in November 2019.

▶ Members of Task Force 2 met in Bonn in February 2020.

▶▶ Members of the Strategy Committee met in Tel Aviv in March 2020.


IGU
INTERNATIONAL GAS UNION
UNION INTERNATIONALE DU GAZ
IGU Council Meeting
9 - 10 October 2019
The Marriott Hotel, Yogyakarta - Indonesia
"A Sustainable Future – Powered by Gas"
Jeongwook KHANG
Luis Calvo
IGU Director Advisor
Luis Bertrán
Secretary General
Joe M. KANG
President
LI Yalan
Vice President

A Proud History

This section starts with a short overview of the development of the gas industry and the founding of national gas associations, before covering the history of IGU and the World Gas Conferences in four parts. The first part covers the Union's foundation and early years up to the outbreak of World War II; the second takes the story from the ending of hostilities in 1945 to 1970; the third continues to the turn of the century; and the fourth completes the story to 2021. The section is rounded off with chapters looking at the history of the LNG Event Series, of which IGU is a co-owner, and the IGU Research Conference (IGRC).

Let There Be Light

By Hanne Thomsen

Gas use dates back millennia with seepages of natural gas providing the fuel for the "eternal fires" of the Zoroastrians. But the credit for starting the gas industry goes to the Scottish engineer and inventor William Murdoch (1754-1839), who developed gas lighting in 1792. Most inventors in the early days of the industrial revolution tried to use coal as motive power for steam machines. Murdoch was the first to see the potential in producing gas with the particular purpose of using it for lighting, instead of the traditionally used whale oil.

William Murdoch moved to England in 1777 to work in the innovative environment of Birmingham, where he joined the firm of Boulton & Watt which later transferred him to Cornwall.

Murdoch spent a lot of time experimenting at his employers and at home. He worked at developing steam pumping engines, he invented a steam-powered vehicle, and he obtained patents for a process to produce coal tar dyes and for making paint from coal. Then in 1792, he heated coal in a closed iron retort connected with a hollow pipe. The gas which he produced from the heated coal ran from the retort through the pipe to the end where it burned with a steady flame.

Murdoch lit his home in Redruth, Cornwall with gas in 1794, supplying it from a small gasworks in his garden. It was the first practical system of gas lighting in the world. In a possibly apocryphal story he is also said to have astounded the locals by crossing the moors at night in a gas-lit carriage.

In 1798, Murdoch moved to Smethwick to manage Boulton & Watt's Soho Foundry, where he built a gas plant and storage facilities sufficient to provide regular lighting for several of the offices. In 1802, Murdoch installed two gas lamps outside the Soho Factory and on one occasion that year the whole plant was illuminated by gas.

It did not take long before all large factories were using gaslights. While Murdoch was interested in illuminating individual buildings, each with its own gas production, others saw the possibilities of lighting many buildings, whole streets or even towns by gas mains, fed with gas from large gasworks.

Lebon and Winzler

It was not only in England that ideas had been developed for using gas for lighting. Philippe Lebon worked in Paris on the problems of carbonisation and by 1799, he had made sufficient progress to obtain a patent for his work on producing fuel for heating and lighting. In 1801, Lebon demonstrated gas lighting publicly in Paris. Lebon was interested in producing gas from wood, and with this he wanted to light Paris, but he did not gain much support from his compatriots.

The results that Murdoch and Lebon had achieved were spread far and wide in Europe. In 1802, the Czech Friedrich Winzler read a French summary of a lecture given by Lebon about gas lighting in Paris. Winzler went to see Lebon and he managed to absorb sufficient knowledge of Lebon's process of producing gas; afterwards he set himself up as an authority on gas and, realising that there was no more to be gained in Paris, he left for England.

In 1803, Winzler arrived in London where he anglicised his name to Winsor. He obtained a patent for a gas lighting system and soon

Initially the primary use of gas was for lighting.

afterwards began to flood the capital with pamphlets advocating gas lighting. In 1807, he demonstrated the use of gas, and later on he lit parts of Pall Mall with lamps connected by lead pipes to his gasworks. The experiment was a complete success, nothing like it had ever been seen before. However, the indoor lectures were not very successful on account of the violent headaches which afflicted the audience due to the use of unpurified gas. Moreover, there were still several difficulties with the production of gas. Despite these problems, Winsor's practical work began to receive serious attention.

In 1807, Winsor announced the formation of a National Light and Heat Company, making extravagant claims and seeking a Royal Charter. This proved to be more difficult than he had imagined, and in 1809 a new application was made to Parliament for lighting only in London, Westminster and Southwark.

Even the revised project met with a great deal of opposition and it was not until 1812 that Winsor was successful in obtaining a Royal Charter. In 1812, he founded the first gas company in the world, the Gas Light and Coke Company, which built the first gasworks in London. The company's chief engineer was Samuel Clegg, who was a former Boulton & Watt man and invented the gas meter.

Gas lights the world

Within a few years many other cities in the UK, the rest of Europe and the United States had followed suit. Gas lights were lit in Paris in 1815 and in Baltimore – the first US city – in 1816. The expansion continued around the globe reaching Latin America (Buenos Aires) in 1823, Asia-Pacific (Sydney) in 1841 and Africa (Cairo) in 1863. While the focus was on manufactured gas, there were natural gas developments and the US was a pioneer in this field. William Hart drilled the first commercial natural gas well in 1825 in Fredonia, New York State, and used the gas to light shops and a mill.

As the gas industry developed, national associations were set up. The Verein Deutscher Gasfachmänner und Bevollmächtigter Deutscher Gas-Anstalten was established in 1859, followed by the British Association of Gas Managers in 1863, Schweizerischer Verein von Gas- und Wasserfachmännern and Vereniging van Gasfabrikanten in Nederland in 1873, Société Technique de l'Industrie du Gaz en France in 1874 and Association des Gaziers Belges in 1877. The other founding members of IGU, Svenska Gasverksföreningen and Plynárenske a Vodárenske Sdruženi Československé, were set up in 1915 and 1919 respectively.

Hanne Thomsen is the Director of the Danish Gas Museum (www.gasmuseet.dk).

The Foundation and Early Years of IGU

London was enjoying a warm early June in 1931, the pleasant weather in stark contrast to a grim economic situation. The global recession was deepening and most companies were focused on day-to-day survival. But the gas industry was looking ahead and saw the need to enhance international cooperation. On June 2, representatives of the national gas associations of Belgium, France, Germany, The Netherlands, Sweden, Switzerland and the UK met in London for the inaugural Council meeting of the International Gas Union. This was the culmination of cooperative efforts dating back to the beginning of the century, when the primary use of gas was for lighting.

In September 1900, the Société Technique de l'Industrie du Gaz en France[1] organised an International Gas Congress in connection with the Paris Exposition. At the congress it was decided to set up an International Commission on Photometry to coordinate lighting standards. With the development of electric lighting, this body evolved into the International Commission on Illumination in 1913, but international collaboration on other uses of gas continued. The European and North American national gas associations regularly invited foreign representatives to attend key meetings as observers, and also to conferences and exhibitions.

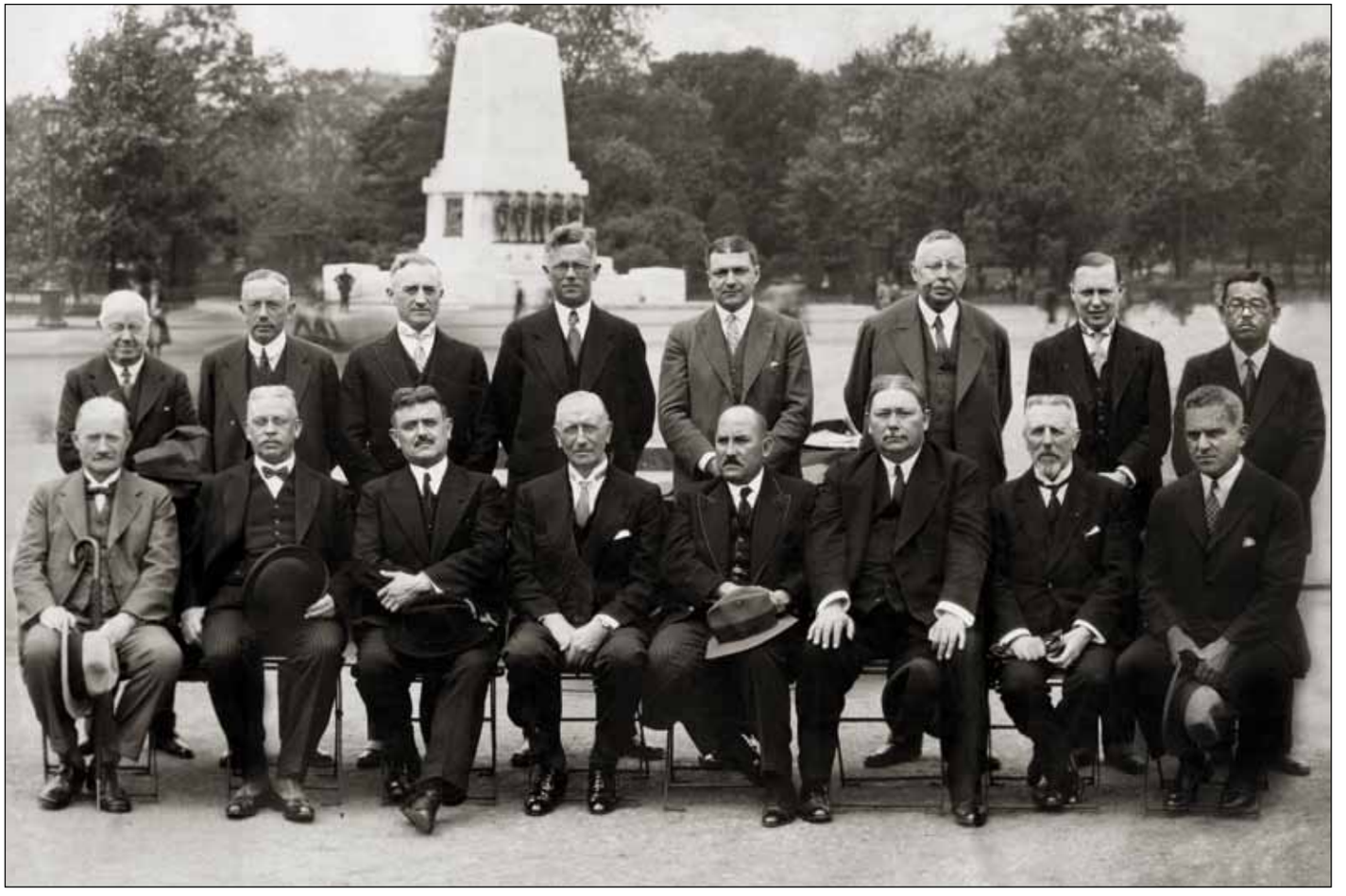
By the late 1920s, there were two schools of thought as to how relations should develop, either by maintaining the existing informal liaisons – an approach favoured by the UK's Institution of Gas Engineers (IGE)[2] – or by setting up a formal international union, an approach promoted by the Union Syndicale de l'Industrie du Gaz en France, an umbrella body for the various French gas organisations.

The French initiative took shape in September 1929 when Auguste Baril, President of the Association Technique de l'Industrie du Gaz en France (ATG) suggested to the Union Syndicale's President Robert Ellissen that the possibility of founding an International Gas Union should be floated with their colleagues in other national gas associations. The idea was to provide a centre for the acquisition, collation and distribution of technical and other information concerning the gas industry and the promotion of its wellbeing generally. Baril started sounding out his foreign colleagues and the responses were encouraging enough to persuade the Union Syndicale's Council to approve the start of formal negotiations. The next step was the convening of a meeting at the Maison du Gaz in Paris on November 25, 1930.

While keeping a watching brief on the French initiative, the IGE, in line with its approach of developing international cooperation within the framework of existing national bodies, decided to devote one day of its 1931 Annual General Meeting (AGM) to international business and to invite overseas representatives. By coincidence, the IGE and Union Syndicale invitations went out to national gas associations within 24 hours of each other at the end of October 1930.

1 In 1927, the Société Technique de l'Industrie du Gaz en France became the Association Technique de l'Industrie du Gaz en France, which changed its name to the Association Française du Gaz with effect from 2001.

2 The British Association of Gas Managers had changed its name to the Gas Institute in 1881. Meanwhile, a separate organisation called the Institution of Gas Engineers had been set up in 1880. These bodies merged in 1903 as a newly constituted Institution of Gas Engineers, which changed its name to the Institution of Gas Engineers and Managers (IGEM) in 2001.



◄ Participants in IGU's first Council meeting and H. Morioka from the Kobe Gas Company (Japan did not join IGU until 1952) pose for a group picture in London on June 3, 1931.

In the back row from left to right are: W. E. Price (UK), Gerardus A. Brender à Brandis (The Netherlands), Alexander Forward (USA), Hermann Zollikofer (Switzerland), Pierre Mougin (France and Secretary General 1931-37), Karl Lempelius (Germany), J. R. W. Alexander (UK) and H. Morioka (Japan).

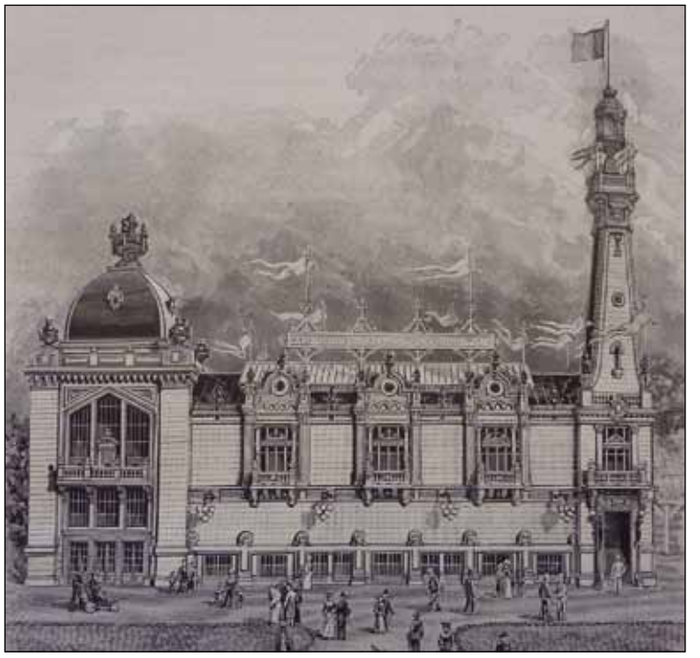
In the front row from left to right are: G. H. Hultman (Sweden), Heinrich Schütte (Germany), Auguste Baril (France), Harold Copp (UK), Fritz Escher (Switzerland and President 1931-34), H. de la Paulle (Belgium), Prosper de Lachomette (France) and Clifford Paige (USA).

The Paris meetings

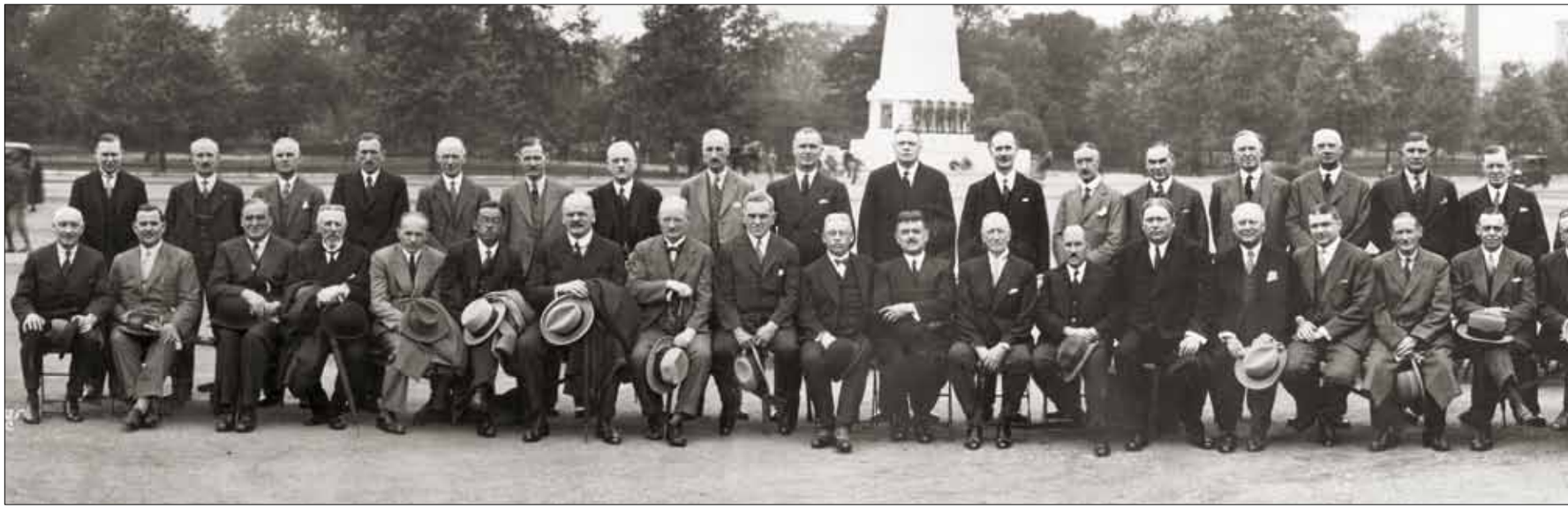
Apart from the French hosts, the meeting convened in Paris by the Union Syndicale was attended by representatives from Belgium, Czechoslovakia, Germany, Greece, Italy, The Netherlands, Switzerland and the United States. Czechoslovakia had a mandate to represent Yugoslavia, while Spain gave Auguste Baril a mandate to act on its behalf. The UK sent a memorandum but no personal representatives as the timing of the meeting conflicted with the IGE's autumn research meeting.

Significant progress was made and a provisional IGU committee was set up with Fritz Escher, a former President of the Schweizerischer Verein von Gas- und Wasserfachmännern (SVGW) and Director of the Zurich city gasworks as President, Vice Presidents from Czechoslovakia, Belgium, France, Germany and Italy and Pierre Mougin, Secretary General of the Union Syndicale, as Secretary General. The Union Syndicale also offered to host the provisional secretariat at its Paris headquarters. Work then started on preparing the draft statutes, and a further meeting was convened in Paris on May 8, 1931.

The second Paris meeting enabled delegates to settle some outstanding matters relating to the draft statutes. The British urged that only the national gas association of each country should be eligible to apply for IGU membership and this was accepted. Additionally the British, Dutch and French wanted the IGU Secretariat to include an office of statistics and documentation while the Germans opposed this. A compromise was reached whereby the



▼ French gas companies and organisations joined forces to have a gas pavilion at the 1900 Paris Expo.



▲ Members of the IGE Council and overseas delegates to the 1st International Gas Conference pose for a group photograph.

statutes allowed for the possibility of creating such an office.

It was agreed that members would be entitled to nominate one or two representatives to the IGU Council, but that each delegation would only have one vote. Every three years the Council would elect a President and a minimum of three and a maximum of seven Vice Presidents who would form the Bureau. The President was given the power to fix the headquarters of the Union and appoint a Secretary General. In addition, it was agreed that the Union would hold conferences at intervals of three years and that the national association holding the presidency would host each conference. However, as part of IGU's inauguration it was agreed that the event being organised by the IGE in conjunction with its forthcoming AGM would be recognised as the 1st International Gas Conference. The official languages were to be English, French, German and the language of the country hosting the triennial conference. The annual subscription was set at 500 Swiss francs.

▶ Harold Copp (1875-1940) was the President of the 1st International Gas Conference and served as an IGU Vice President from 1931 to 1934.

IGU is born

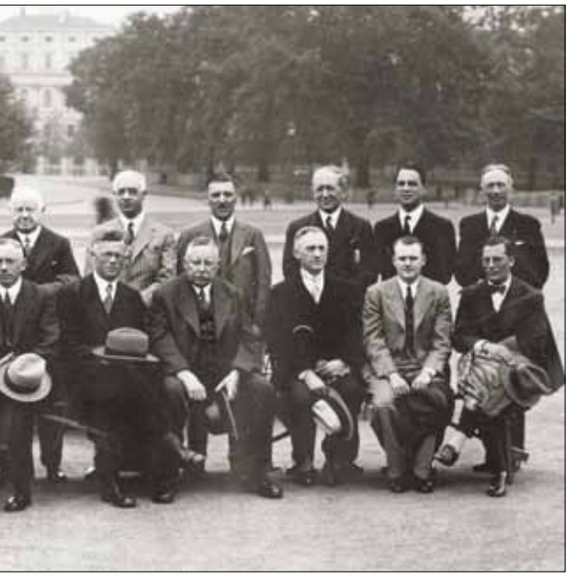
At 10:00 on Tuesday, June 2, 1931, the 68th AGM of the IGE and the 1st International Gas Conference opened in the Great Hall of the Institution of Civil Engineers in London. Later that day, at 17:15, representatives of Belgium, France, Germany, The Netherlands, Sweden, Switzerland and the UK repaired to the IGE headquarters at 28 Grosvenor Gardens to hold the first meeting of the IGU Council. They were accompanied by observers from Norway and the United States.

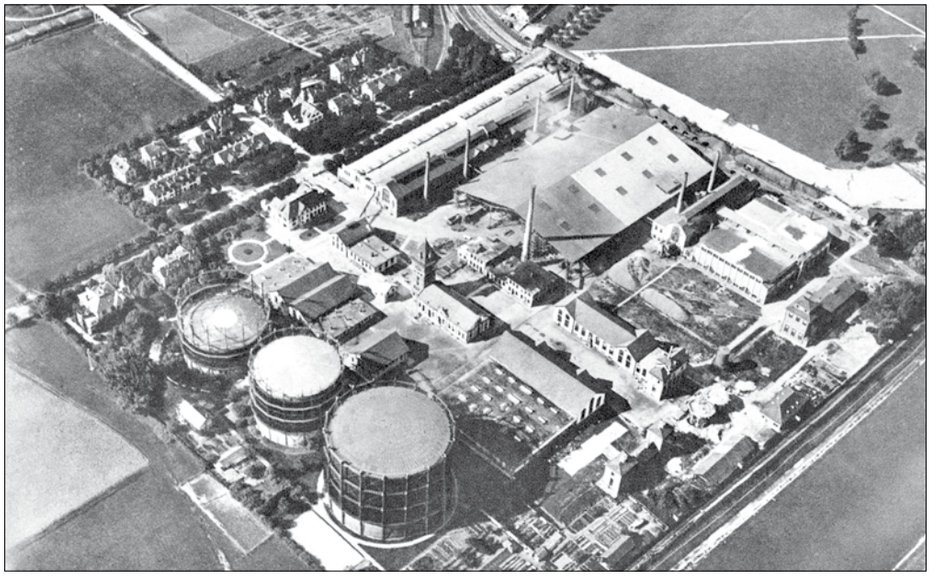
The Council formally approved the IGU statutes, the election of the IGE President Harold E. Copp as President of the 1st International Gas Conference and the election of Fritz Escher as IGU President for the following three years. Pierre Mougin was appointed Secretary General with the Secretariat based in Paris. Belgium, France, Germany and the UK were invited to nominate Vice Presidents.

The day was rounded off with a reception and dance at the Park Lane Hotel hosted by Harold Copp and his wife. The dancing went on until two in the morning!

After the London celebrations, IGU got down to business with a meeting of the Bureau in Paris on October 17, 1931. Czechoslovakia's national association, having been involved in the original discussions to establish IGU, now formally declared its adhesion as a member and was invited to nominate a Vice President. It was agreed that the Union would bank with Crédit Suisse in Zurich.

Areas of technical study were allocated. Three countries were charged with looking at the development of gas usage: Belgium in the industrial field including hotels, the UK in the domestic field and Czechoslovakia in terms of pricing. France's responsibility was the harmonisation of methods for testing gas appliances and the unification of certification standards. Germany was responsible for the coordination and guarantee of methods for testing gas





The programme for the 2nd International Gas Conference included a technical visit to Zurich's municipal gasworks in Schlieren.

manufacturing equipment. Switzerland was given responsibility for reporting on gas safety.

Further new members from Austria, Italy, Poland, the United States and Yugoslavia were welcomed at a Council meeting held in Basle on February 26, 1932, with Italy and the US being invited to nominate Vice Presidents. Preparations for the next conference were discussed and the level of the annual subscription was also raised. It was acknowledged that SFr500 might be too much of a burden for smaller countries and that this level should be reviewed. Canada joined the following year and also entered the debate. Along with The Netherlands, it suggested a reduction to SFr200 and this was agreed in 1934.

Meanwhile, contacts were established with the Joint International Committee for Tests relating to the Protection of Telecommunication Lines and Underground Ducts (CMI from its French initials) and the World Power Conference.

The Zurich conference

The 2nd International Gas Conference and the first to be organised under IGU's auspices took place in September 1934 in Zurich. Hosted by SVGW, it was held in the Swiss Federal Institute of Technology. On September 1, the IGU Council met and elected Auguste Baril as President for 1934-37. As France was assuming the presidency there was a vacant vice presidency which was offered to The Netherlands. The following day the conference started. It ran until September 4 and was attended by 365 delegates and 130 "ladies" (the term accompanying persons was only introduced officially in 1964) from 14 European countries and the US.

Professor Dr Arthur Rohn, President of the Swiss Board of Higher Education was the guest of honour at the opening ceremony, which was also addressed by Fritz Escher, A. Dind, SVGW President, and Auguste Baril. In his address Baril proposed that Escher be elected Honorary President, which delegates approved, thereby starting an IGU tradition of giving the retiring president a lifetime honorary title.

The associations of Belgium, Czechoslovakia, France, Germany, Switzerland and the UK presented reports on the areas of technical study for which they had responsibility, and individual papers were given by Clifford E. Paige of the US on "Coordinated Research and Coordinated Rate Making", Professor Gerardus A. Brender à Brandis of The Netherlands on "A Contribution to the Study of Coal", Italy's Michelangelo Böhm on "The Use of Electricity in the Manufacture of Town Gas" and Poland's B. Klimczak on "The Development of the Gas Industry in Poland".

The official banquet was held in the Grand Hotel Dolder and there was a technical visit to Zurich's gasworks in Schlieren, while social activities included an outing to the Stadttheater for a performance of "Der Rosenkavalier" and a trip to Lugano on the day following the close of business.

Gas consumption in IGU member countries, 1932 (mcm)

USA	70,000
UK	9,000
Germany	3,500
France	1,800
The Netherlands	642
Italy	560
Belgium	500
Austria	300
Sweden	200
Poland	140
Switzerland	140
Czechoslovakia	100
Yugoslavia	13

Source: IGU Council minutes for March 10, 1934.

The 1934-37 Triennium

Two important decisions concerning IGU's work programme were made in the 1934-37 Triennum.

At the Zurich Council meeting, Czechoslovakia, Poland and Yugoslavia had proposed that IGU's activities be expanded to cover water as some member associations covered gas and water but a decision had been postponed. After due consideration, the Bureau recommended that the proposal be rejected and the Council approved this in May 1935.

The other decision was to internationalise committee membership rather than relying solely on the members of the national association in charge of a particular study topic. This brought in a much wider range of experience and helped ease the work load. New topics were added including pipe corrosion, the materials used for pipes and industry promotion in terms of advertising and public relations. A group was also set up to agree a vocabulary of gas terms in English, French and German in order to produce a dictionary for sale.

In 1936, Australia joined while the outbreak of the Spanish Civil War removed any chance of Spain joining in the near future (in the event Spain did not become a member until 1951).

At the end of his three-year term as President, Auguste Baril hosted the 3rd International Gas Conference, which was held in Paris from June 12-16, 1937 in the Arts and Crafts Engineers Hall. It was attended by 526 delegates including the first woman, Madame J.

Pierre Mougin, a pivotal figure in the early days of IGU

Pierre Remi Mougin was IGU's first Secretary General, serving from 1931 to 1937. Born in France in 1892, he graduated from the Paris engineering school (École Centrale des Arts et Manufactures) in 1914 and was called up for military service. After World War I, he worked briefly in an iron foundry before joining the Central Committee of French Coke Plants as an engineer. In 1927, he became Secretary General of the three major French gas organisations: the Association Technique de l'Industrie du Gaz en France, the Syndicat Professionnel and the Union Syndicale. At the ATG his responsibilities included being secretary of the editorial board of the magazine *Journal des Usines à Gaz* (later *Gaz d'aujourd'hui*).

Mougin played a key role in the formation of IGU before taking up the post of Secretary General in 1931 in addition to his national responsibilities. He was succeeded as IGU Secretary General by Hermann Zollikofer in 1937.

Mougin was called up at the outbreak of World War II and served until the armistice, whereupon he resumed his duties with the French gas organisations.

In 1946, when the French gas industry was nationalised and the Syndicat Professionnel and Union Syndicale were dissolved, Mougin stepped down as Secretary General of the ATG, although he continued as Chairman of the magazine's editorial board. He had a number of roles in the nationalised industry and then in 1952 was appointed Inspector General of Gaz de France with responsibility for international

relations. In the same year, he was elected as a Vice President of IGU, in which role he served until 1961.

In 1959, Mougin was appointed Chairman of SEMAREL, a company set up by Gaz de France, the Sahara Methane Company and the Petroleum Research Bureau to study exporting Algerian gas to Europe by pipeline. In the event, Algerian gas was exported as LNG with the first cargo arriving in France in 1965 when SEMAREL was wound up. In retirement he worked on his memoirs which were published in 1966 (Mémoires, Paris: Imprimerie Barneoud).

Mougin was given two IGU honours, being named Honorary Secretary General in 1950 in recognition of his pre-war service and Honorary Vice President in 1961; while the ATG made him an Honorary President in 1955 and in 1971 gave him a medal to commemorate 50 years of membership. He was also made an Officer of the Légion d'Honneur. He died on June 14, 1973.

Czaplicka, a gas engineer from Krakow in Poland, and 171 accompanying persons from 14 European countries and the US.

A Council meeting was held immediately prior to the start of business during which Hermann Müller, a former President of the Deutscher Verein von Gas- und Wasserfachmännern[3], was elected President for 1937-40. The vacant vice presidency went to Sweden. The Council also accepted an offer from SVGW to host the Secretariat in Zurich and appointed Colonel Hermann Zollikofer, Secretary General of SVGW, as IGU's new Secretary General.

The conference opened on Saturday, June 12 with addresses by Auguste Baril, Hermann Müller and Pierre Mougin. There was a lecture by Professor Louis de Broglie of the Sorbonne on "Atomism in Modern Physics". The main business sessions ran June 14-16 during which delegates received reports on the technical study areas and approved the vocabulary of gas terms, while nine individual papers were presented.

The official banquet took place in the gas pavilion of the International Exposition being held that year in Paris, which delegates had a separate opportunity to visit, and there was a reception hosted by the Municipal Council of Paris. Other social activities included visits to the Château de Méry, Royaumont Abbey and a ballet performance at the Paris Opera, while there were technical visits to two gasworks, a research centre and a meter manufacturer.

◄ The 1937 Expo (OPPOSITE PAGE) was being held in Paris at the time of the 3rd International Gas Conference and the conference banquet took place in the exposition's gas pavilion (LEFT) also seen in a sketch on the cover of the ATG magazine (BELOW).

The unfinished Triennium

After the Paris conference, Hermann Zollikofer took up his duties as Secretary General. In November 1937, the first Council meeting of the German presidency was held in Freiburg. It was agreed that the pricing committee would be disbanded and the technical work programme was streamlined into four areas: production (Germany), distribution (Switzerland), use (France) and promotion (UK).

However, the storm clouds were gathering in Eastern Europe. In March 1938, Germany annexed Austria and later that year, following the Munich Agreement, the dismemberment of Czechoslovakia started.

Austria remained a separate member of IGU and hosted a meeting of the Bureau in Vienna in August 1938 when Hungary, which had had informal links with the Union since 1932, joined.

The last Council meeting before the outbreak of World War II took place in Stockholm in June 1939 and among other matters discussed preparations for the 4th International Gas Conference which was scheduled to take place in Berlin, June 18-21, 1940. In the event, the German and Soviet invasion of Poland in September 1939 propelled Europe into war and Berlin had to wait until 1991 to be a host city. When the conferences were resumed in 1949, London was the first post-war venue.

During the hostilities, Hermann Zollikofer maintained the IGU Secretariat in neutral Switzerland. Fortunately the subscriptions and income from the sale of the dictionaries received between 1937 and 1939 were sufficient to cover expenses and provide a reserve until the war was over.


JOURNAL des USINES à GAZ

ORGANE DE L'ASSOCIATION TECHNIQUE DE L'INDUSTRIE DU GAZ EN FRANCE

CONGRÈS de l'INDUSTRIE du GAZ

PARIS 1937

LE PAVILLON DU GAZ

3 The Verein Deutscher Gasfachmänner und Bevollmächtigter Deutscher Gas-Anstalten had become the Verein von Gas- und Wasserfachmännern Deutschlands in 1870 and the Deutscher Verein von Gas- und Wasserfachmännern in 1882. It went on to become the Deutscher Verein des Gas- und Wasserfaches in 1976.

Post-War Recovery

As World War II drew to a close in Europe, the national gas associations started thinking about re-establishing international contacts. First off the mark was the Union Syndicale, which sent a delegation to visit the IGE in London in February 1945.

Once the war was over in Europe and Asia, and with the agreement of Hermann Zollikofer, the Union Syndicale called a meeting in Paris for December 18 and 19. The defeated countries were not invited and representatives of Belgium, France, Switzerland and the UK attended, while The Netherlands and Sweden sent messages of support. It was decided to reorganise IGU and convene a Council meeting in London on June 5 and 6, 1946. This was attended by representatives of Belgium, Canada, Czechoslovakia, France, The Netherlands, Sweden, Switzerland and the UK. Wilfred Philpot of the Canadian Gas Association had a mandate to represent the American Gas Association (AGA), and Norway sent an observer.

The Council meeting was opened by Auguste Baril in his capacity as Honorary President, who asked for a minute of silence to honour those colleagues in the gas industry who had died in the war. Delegates then elected Colonel Cyril M. Croft, President of the UK's IGE, as IGU President for 1946-49, while Belgium, Czechoslovakia, France, The Netherlands, Sweden and the USA were invited to nominate Vice Presidents. The statutes were reviewed and minor amendments made. The main changes were to remove German as an official language and allow the President to appoint a President's Secretary as well as a Secretary General. Cyril Croft appointed the IGE Secretary, Dr Walter T. K. Braunholtz, to assist him and asked Hermann Zollikofer to carry on as Secretary General. The subscription remained at Sfr200 initially but was increased to Sfr500 the following year.

During the 1946-49 Triennium, the gas industries of IGU's second and third highest gas consuming members, the UK and France, were nationalised. Gaz de France was set up in 1946 (whereupon the Union Syndicale was disbanded and the ATG became the French IGU member), while the Gas Act of 1948 reorganised the British gas industry into 12 Area Boards.

Indeed, reorganisation and reconstruction were the major issues of the time as the post-war recovery got underway. It was clear that greater international cooperation was essential to reduce the risk of future conflict, and new global and regional bodies were set up. IGU was keen to start developing links with them. Relationships with CMI and the World Power Conference[1] were re-established; and, in 1949, IGU was granted observer status at relevant meetings of the Coal and Power Division of the UN Economic Commission for Europe (UNECE).

As regards the technical work programme, topics were allocated to national member associations and it would not be until 1951 that the first international committees were set up.

The 1949 conference

Dansk Gasteknisk Forening from Denmark was welcomed as the 10th post-war member in the run-up to the 4th International Gas Conference, which was held in London, June 15-17, 1949. The venue was the same as in 1931 – the

1 From 1968, the World Energy Conference and from 1990, the World Energy Council (WEC).

Delegates to the Council meeting in Brussels, May 6, 1947, pose for a group photograph. IGU's President, Cyril Croft, is at centre with the cigarette; the President's Secretary, Walter Braunholtz, is behind him to the right with glasses; the Secretary General, Hermann Zollikofer, is the second to the right of Cyril Croft.

Institution of Civil Engineers – and the conference was attended by 483 delegates and 184 accompanying persons from 16 countries.

Meeting the day before the opening ceremony, the Council elected Marcel Brabant of Belgium as President for 1949-52 with Vice Presidents from Czechoslovakia, France, The Netherlands, Sweden, Switzerland, the UK and the USA. Marcel Brabant announced that Belgium would take over responsibility for the Secretariat from Switzerland, and appointed Raoul Touwaide, Secretary General of the Association des Gaziers Belges, to succeed Hermann Zollikofer.

The conference was opened by the British Minister of Fuel & Power, Hugh Gaitskell, with Cyril Croft and Marcel Brabant also giving addresses during the opening ceremony. In the subsequent sessions, 21 reports and papers were presented, which had been printed and distributed to delegates in advance to allow immediate discussion. On the evening of the first day, the British Government hosted a reception at the Science Museum, while the official banquet was held the following day in the Dorchester Hotel. There were technical visits to three gasworks and major industrial gas consumers such as the Ford car factory at Dagenham. The social programme included visits to Cambridge, Hampton Court, Windsor Castle and a performance of "Pelléas et Mélisande" at the Royal Opera House.

The Belgian Presidency

The first Council meeting under the Belgian Presidency was held in Brussels in February 1950; and Norway, having been an observer at both the birth of IGU and its revival, was finally welcomed as a member. It was agreed that an information bulletin would be published twice a year, while Walter Braunholtz, Pierre Mougin and Hermann Zollikofer were made Honorary Secretaries.

In 1951, international committees were set up to study the harmonisation of performance tests of gas appliances (otherwise known as the stamping committee) and the development of gas utilisation. Membership grew this year with Austria, Italy, the Saarland (which had been separated from Germany after the war[2]), Spain and West Germany joining or rejoining. IGU also became affiliated to the International Union of Technical and Engineering Associations (UATI). However, sad news was received from Switzerland where Honorary President Fritz Escher died.

International cooperation continued to be developed in 1952, when IGU gained observer

2 The Saarland's separate membership ended when it became part of West Germany on January 1, 1957.

▲ Delegates to the 4th International Gas Conference and accompanying persons pose for a group picture in Horse Guards Parade in London.

status at meetings of the working party on long-distance gas transport of the Organisation for European Economic Cooperation (OEEC). However, this was also the year when Czechoslovakia temporarily reduced its IGU activities pending the establishment of a new professional entity, the Czechoslovak Society for Science and Technology, within the structure of which the Czechoslovak Gas Society was established and authorised as the IGU representative in 1957.

The Belgian Presidency culminated in the 5th International Gas Conference, which was held in Brussels, June 16-19, 1952, as the host association was celebrating its 75th anniversary. To mark the occasion, King Baudouin granted the association the status of a royal society to become the Association Royale des Gaziers Belges (ARGB).

The conference was attended by 476 delegates and 190 accompanying persons from 17 countries. Although overall attendance was similar to the previous conference, the international proportion was higher. Nearly three-quarters of the delegates in 1949 were British, whereas in 1952 the Belgian contingent accounted for around one-third.

Meeting immediately before the opening ceremony, the Council elected Robert W. Hendee of the USA as President for 1952-55 with Vice

▶ Delegates at the opening ceremony of the 5th International Gas Conference in the Palais des Académies in Brussels.

INSET ABOVE

IGU President Marcel Brabant addresses delegates. President-elect Robert Hendee is on the left and Secretary General Raoul Touwaide on the right.

Presidents from Austria, France, Italy, The Netherlands, Sweden, Switzerland and the UK. The Council also welcomed Japan as a new member.

The opening ceremony was held in the Palais des Académies with the Belgian Minister of Economic Affairs, Jean Duvieusart, doing the honours. General Armand Pirot, President of the ARGB, Marcel Brabant and Robert Hendee also gave addresses. The working sessions were held in the Palais des Beaux Arts and 28 papers were presented with the UN Educational, Scientific and Cultural Organisation (UNESCO) providing a grant of $3,000 to help fund the printing of the conference proceedings. A marketing exhibition was also organised with displays of printed matter and screenings of films made by gas companies. Technical visits were offered to a range of coking plants, gas works, foundries and meter manufacturers.

The College of Mayor and Aldermen and the City Council of Brussels hosted an evening reception at the Hôtel de Ville on the first day, and the official banquet was held in the Concert Noble on June 17. The social programme included tours of Brussels as well as visits to Antwerp, Bruges and Namur and a concert given by the National Broadcasting Institute's orchestra.

The first US Presidency

Developments during the 1952-55 Triennium included the first contacts with the European Coal and Steel Community, the granting of consultative status with the UN Economic and Social Council and participation in a UNECE study of the European gas industry. Two new committees were also set up: one within IGU to work on compiling a new edition of the dictionary of gas terms, and one outside the Union's framework.

While the statutes allowed IGU to study all aspects of the gas industry, the Council felt that the Union should concentrate on technical issues and economic issues directly related to them. Consequently, a separate economic research committee was set up in 1954 and this was called Cometec-Gaz after its name in French (Comité d'Études Économiques de l'Industrie du Gaz). The original proposals for Cometec-Gaz envisaged an informal set-up without a secretariat, statutes or subscription, but then it was decided that a secretary was needed and Raoul Touwaide was appointed.

Honorary President Cyril Croft died in 1954; and, in September that year, the Council met in Germany for the first time since the war. Members marked the occasion in Düsseldorf by making Hermann Müller an Honorary President in recognition of his service between 1937 and 1939. This was also the meeting at which Australia was welcomed back as a member.

The 6th International Gas Conference was held in New York, where the AGA was then based, September 27-30, 1955. This was the first time the event had been held outside Europe and attendance fell dramatically to 216 delegates and 55 accompanying persons from 14 countries. IGU's membership was still predominantly European and transatlantic travel was expensive, while US delegates faced the expense of two conferences in quick succession. The AGA scheduled the inter-

▼ Seen at the 6th International Gas Conference in New York are President Robert Hendee (*left*), President-elect Mario Boselli (*centre*) and Raoul Touwaide.

▲
The 7th International Gas Conference was held in Rome in September 1958. ABOVE A group of delegates outside the FAO headquarters where the conference was held. OPPOSITE, TOP LEFT A plenary session underway. OPPOSITE,TOP RIGHT The reception at the Capitol.

▶
OPPOSITE
The Vatican's newspaper *L'Osservatore Romano* carried a report of the audience Pope Pius XII gave to conference delegates.

national conference a month before its own annual convention rather than running the events concurrently as previous host associations had done and as IGU's statutes suggested. When the 17th World Gas Conference was held in Washington DC in 1988, the AGA held its convention at the same time and there was a record US attendance.

For those Europeans who did travel to the USA, the journey was a memorable one with Hurricane Ione battering their liners and delaying their arrival into New York. Sea travel was still preferred for long hauls and it would not be until 1958 that aircraft out-carried ships in the North Atlantic market.

Gas marketing

The International Colloquium on Gas Publicity had its first meeting in 1959. It was later renamed the International Colloquium on Gas Marketing and its terms of reference widened to include public relations. It had a regular slot at the WGCs to present papers. In 1990, the name was changed again to Intergas Marketing, which became an organisation affiliated to IGU in 2003 and was brought back under the Union's umbrella as the IGU Marketing Committee in 2006. Now it is the Marketing and Communications Committee.

At its customary pre-conference meeting, the Council elected Dr-Eng. Mario Boselli of Italy as President for 1955-58 with Vice Presidents from Austria, France, West Germany, The Netherlands, Sweden, Switzerland and the UK. It also decided to put the statistics committee on an international footing. Statistics had previously been Belgium's responsibility and Belgium retained the chairmanship of the new committee.

The opening ceremony was held on September 27 in the North Ballroom of the New Yorker Hotel, which was also the venue for the formal banquet the following day. Robert Hendee asked the deputy US representative to the UN, James J. Wadsworth, to give the welcome speech, and there were addresses by Mario Boselli, Raoul Touwaide and Marion Banks, AGA President. Carl Sorby, Vice President of the George Roper Corporation, a manufacturer of pumps and gas appliances, gave a presentation on marketing and sales promotion, and a film called "Natural Gas on the Move" was shown.

The film reflected the major role natural gas played in US energy supply (accounting for a quarter of primary energy consumption). Natural gas still played a small role in Europe although exploration efforts were gathering pace. There was also discussion during the conference of the prospects for exporting natural gas from the Middle East to Europe either by pipeline or as LNG. Ultimately LNG proved to be the first choice with initial supplies coming from North Africa. When Western Europe did start importing gas via long-distance pipelines it came from the USSR.

The President's report and the report on statistics were given during the opening ceremony, the latter by Raoul Touwaide, and a further 25 reports and papers were presented in subsequent sessions. There was also an extensive programme of technical visits to gas companies and equipment manufacturers in New York, New Jersey, Pennsylvania, Ohio and Illinois.

Italy takes the helm

During the 1955-58 Triennium, three new international committees were set up, a booklet was published to commemorate IGU's 25th anniversary and a two-tier subscription was introduced. Members paid either Sfr500 or Sfr1,250 depending on the size of the gas industry in each country.

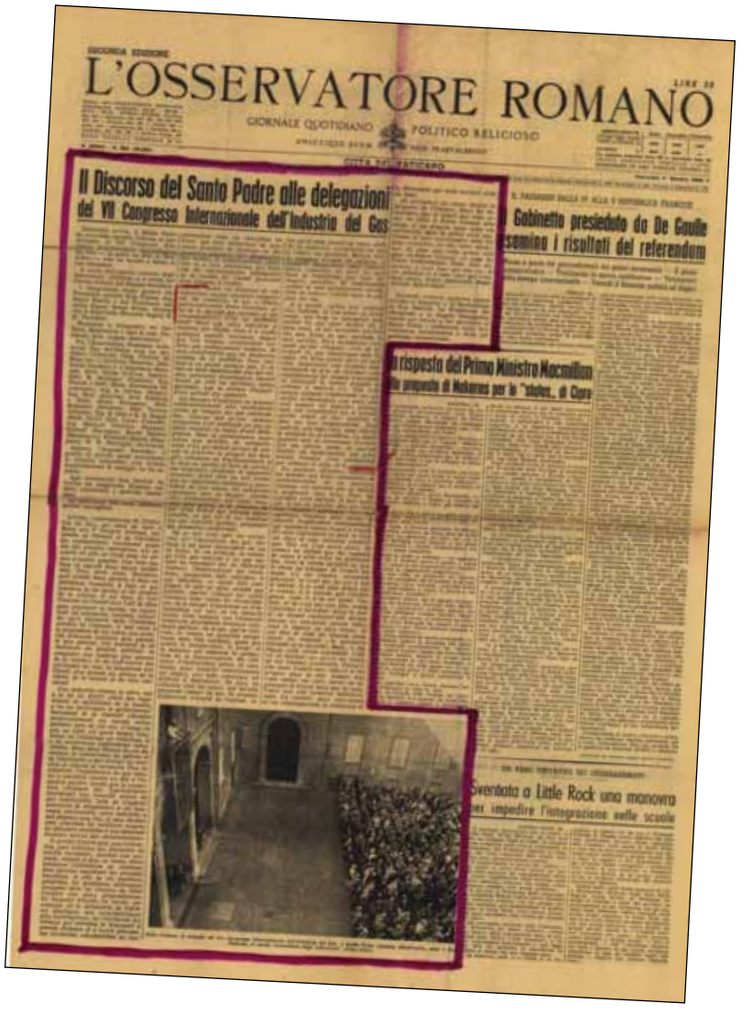
Committees studying new distribution techniques and the interchangeability of gases started work in 1956, followed in 1957 by one on safety in the utilisation of gas. It was also decided that year to leave marketing to Cometec-Gaz. The committee for the development of gas utilisation was disbanded and Cometec-Gaz set up an International Colloquium on Publicity. This body, under various names, cooperated closely with IGU and was ultimately brought back under the Union's umbrella in 2006 (*see box*).

The 7th International Gas Conference was held in Rome, September 25-28, 1958, in the headquarters of the UN Food and Agriculture Organisation (FAO). Attendance recovered from the low of three years previously, with 551 delegates and 296 accompanying persons from 18 countries.

At its pre-conference meeting, the Council elected Bengt M. Nilsson of Sweden as President for 1958-61 with Vice Presidents from Austria, Belgium, France, West Germany, The Netherlands, Switzerland and the UK. It also approved the membership applications of Romania and the USSR.

The opening ceremony was held in the FAO's Aula Magna and was addressed by Mario Boselli, Bengt Nilsson and five dignitaries: Dr Friedrich T. Wahlen, FAO Deputy Director General, Dr-Eng. V. De Biasi, President of the Italian Gas Association, Mr Gatto, Under Secretary of the Ministry for Industry & Commerce, G. de Corval, the UN's official representative to the conference and R. W. Otto, AGA President. Mario Boselli's address included a comprehensive report on the role of gas in IGU member countries. In the subsequent working sessions, a further 46 reports and papers were presented.

On September 25, there was a reception given by the City of Rome in the Capitol and the banquet was held the following day at the Excelsior Hotel. In addition to the usual range of technical and social visits, delegates were granted an audience with Pope Pius XII on September 28 at Castel Gandolfo, the Papal summer residence.


L'OSSERVATORE ROMANO

GIORNALE QUOTIDIANO POLITICO RELIGIOSO

Il Discorso del Santo Padre alle delegazioni del VII Congresso Internazionale dell'Industria del Gas

Gabinetto presieduto da De Gaulle esamina i risultati del referendum

la risposta del Primo Ministro Macmillan

Sventata a Little Rock una manovra per impedire l'integrazione nelle scuole

The Swedish Presidency

The 1958-61 Triennium saw Poland rejoining IGU in 1960 and Finland joining in 1961, and signficant developments on the natural gas front. In 1959, the Slochtern field in the Dutch

Delegates to the IGU Council meeting in London in March 1961 pose for a group photograph. Bengt Nilsson, IGU President 1958-61, is seated sixth from left.

province of Groningen was discovered and there was a successful trial to transport the first LNG cargo across the high seas, while Algeria began production in 1961.

The Triennium also saw requests for IGU's help from the gas committees of the UNECE and OEEC. The UNECE asked IGU to draw up a summary of codes of safe practice for the construction and operation of gas transmission pipelines, while the OEEC asked for input to a study on gas safety.

As regards IGU's own work programme, it was agreed to widen the remit of the committee studying new distribution techniques to include transmission and to work on an edition of the new dictionary in Czechoslovakian, Polish, Romanian and Russian. Proposals were also made to reorganise the committee structure for future triennia with a view to giving a more complete coverage of all the issues in the gas industry.

Two personalities who had been involved in IGU's activities since 1931 retired from the Bureau and were made Honorary Vice Presidents. Gerard Brender à Brandis of The Netherlands was honoured at the Council meeting in November 1959 in Amsterdam, and Pierre Mougin at the pre-conference meeting. This was also when the Council elected Jacob van Dam van Isselt of The Netherlands as President for 1961-64 with Vice Presidents from Austria, Belgium, Czechoslovakia, France, West Germany, Switzerland and the UK.

The 8th International Gas Conference was held in Stockholm, June 27-30, 1961. It was attended by 641 delegates and 304 accompanying persons and the venue was the Folkets Hus conference centre.

The first formal function was a reception given by the President of the City Council in City Hall on June 27. The opening ceremony took place the following day and was addressed by Gösta Agrenius, President of the Industrial Department of the City of Stockholm, K. Neuerburg, Chairman of the OEEC Gas Committee, Bengt Nilsson and Jacob van Dam van Isselt.

Bengt Nilsson presented the new dictionary of gas industry terms in seven languages (English, Dutch, French, German, Italian,

The voyage of the *Methane Pioneer* from Lake Charles, Louisiana to Canvey Island, UK in early 1959 paved the way for the start of commercial LNG trading in 1964.

Mr and Mrs Nilsson make their way into the official banquet of the 8th International Gas Conference.

Portuguese and Spanish). This was published with financial assistance from UNESCO which also helped fund the printing of the conference proceedings. Bengt Nilsson also announced the new committee structure to be implemented with effect from the 1961-64 Triennium (*see box*).

In subsequent sessions, 48 reports and papers were presented. Several gas marketing films were also shown, and an exhibition of gas publicity material was mounted by the International Colloquium on Gas Publicity in the foyer of the Folkets Hus.

Social events included a banquet at City Hall and a performance of Giovanni Battista Pergolesi's "Il Maestro de Musica" at the Royal Court Theatre at Drottningholm, to which delegates travelled by boat. The technical visit programme included a visit to Svenska Skifferolje, whose extraction of crude oil, gas and sulphur from shale was one of the biggest such operations in the world at the time.

Bengt Nilsson addressing the opening ceremony of the 8th International Gas Conference. Seated at bottom left is Raoul Touwaide.

Conference venue change

The Dutch Presidency originally intended to organise the 9th conference in Amsterdam. However, it was decided to switch the venue to Scheveningen, a coastal resort within the Municipality of The Hague, and Amsterdam had to wait until 2006 to host the 23rd World Gas Conference.

During the 1961-64 Triennium, the new committee structure was introduced, and with it a new practice of inviting the chairmen to Council meetings to report on the progress of their work. Although separate committees had been set up for transmission and distribution, both were initially chaired by the same country. However, this proved rather onerous and the Council decided to allocate them to different countries in future.

Other business included the re-admission of Hungary in 1962, the addition of Hungarian and Swedish to the second edition of the dictionary and the establishment of contacts with research organisations such as the European Gas Research Group (GERG, from its initials in French). In 1963, IGU mourned the death of Hermann Zollikofer, the Union's second Secretary General.

Technical Committee structure with effect from the 1961-64 Triennium

Committee and area of study	*Chair 1961-64 and 1964-67*
1 Natural Gases*	USA
2 Production of Manufactured Gases	UK
3 Transmission of Gases	West Germany
4 Distribution of Gases	West Germany (Italy 1964-67)
5 Utilisation of Gases	France
6 Statistics	Belgium
7 Documentation & Sundry Questions	The Netherlands

* From 1964, Natural Gases & Mass Storage

Jacob van Dam van Isselt addressing the opening ceremony of the 9th International Gas Conference (and in close-up INSET). The flowers were orange dahlias, orange being the Dutch national colour.

At the end of the Triennium, the Council was ready to elect Georg Düwel of West Germany President for 1964-67 with the usual seven Vice Presidents when it received offers from France and the USSR to take over the Presidency for 1967-70. This was the first time more than one country had put itself forward and the Council temporarily amended the statutes to allow the election of eight Vice Presidents to ensure both countries were represented while the offers were considered. Thus, Vice Presidents from Austria, Belgium, Czechoslovakia, France, Switzerland, the UK, USA and USSR were elected.

The 9th International Gas Conference was held in Scheveningen, September, 1-4, 1964. The opening ceremony was held in the Kursaal of the Kurhaus hotel and conference centre, and the official reception given by the Dutch Government and the Municipality of The Hague was held in the Knights' Hall (Ridderzaal).

For the first time the number of delegates passed the 1,000-mark at 1,008, together with 505 accompanying persons. There were 57 presentations.

A packed audience for the opening ceremony of the 9th International Gas Conference.

The opening ceremony was addressed by Johannes Bakker, the Dutch Minister of Economic Affairs, Hans Kolfschoten, the Mayor of The Hague, Jacob van Dam van Isselt and Gerard Brender à Brandis, who spoke on mankind and energy over the centuries.

In his welcome address Jacob van Dam van Isselt informed delegates that The Hague was about to switch over from manufactured to natural gas. Indeed, the growth of the natural gas sector and the development of international grids were keenly discussed. There were already pipeline links between Canada and the US and between the USSR and Poland, but now a substantial increase in international gas trading was set to begin. Work on an LNG supply chain linking Algeria with France and the UK had been underway for some time; LNG exports to the UK would start a month after the conference with exports to France following in 1965.

Statutes revised

A key event of the West German Presidency was a revision of IGU's statutes to restructure the Bureau. Henceforth, there would only

be one Vice President, who would succeed the President, and a new position of Immediate Past President was created. The Bureau would also have a representative of each of the countries chairing the technical committees plus representatives of two other countries. Additionally, the new statutes gave the Council rather than the President the power to appoint the Secretary General and made provision for a Deputy Secretary General if required.

The Council agreed this in 1965 and awarded the Presidency for 1967-70 to the USSR and for 1970-73 to France. The following year a new Bureau was elected with Alexei I. Sorokin of the USSR as Vice President.

Membership continued to grow, with Yugoslavia (the last of the pre-war members to be welcomed back) and Pakistan joining in 1965 and Iran in 1967, while a request was received from the UNECE to look at establishing a safety code for compressor and reception stations. This followed IGU's work on the safety code for gas transmission pipelines.

The groundwork was laid for a smooth transition of the Secretariat with the UK's IGE offering to take over as host from the ARGB upon Raoul Touwaide's expected retirement in 1970. Meeting in Barcelona in March 1966 (the same meeting at which the new Bureau was elected), the Council appointed the IGE's Secretary, Albert G. Higgins, as Deputy Secretary General. Higgins had been involved with IGU business since the London conference in 1949, when he worked closely with Walter Braunholtz.

Meanwhile, Georg Düwel and his team were gearing up for the first IGU conference to be hosted in Germany. As part of the preparations a conference logo was designed which the Council liked so much it adopted for general IGU use. This went on to serve for 45 years – with a slight alteration in 2005 – until the current logo was introduced in 2012.

The Council adopted the first logo at the pre-conference meeting during which it elected Alexei I. Sorokin as President and Georges Robert of France as Vice President for 1967-70, with Georg Düwel becoming Immediate Past President.

The 10th International Gas Conference was held in Hamburg, June 6-10, 1967, against the backdrop of the Six-Day War between Israel and Egypt, Jordan and Syria. Indeed, the German

▲ Seen touring a British exhibition of gas appliances with Raoul Touwaide is Albert Higgins (*left*) who became IGU's Deputy Secretary General in 1966 and took over as Secretary General in 1970.

Raoul Touwaide, 21 years of service to IGU

Raoul Henri Touwaide was IGU's longest-serving Secretary General, holding the post from 1949 to 1970. Born in Belgium on January 12, 1900, he graduated as a mining engineer from the University of Liège and initially worked in the coal industry before moving over to the gas industry in 1928. In 1946, he was appointed Secretary General of the Belgian Gas Association and Director of the Belgian Gas Industry Federation (which merged with the Federation of Electricity Producers in 2005 to become Synergrid).

In 1949, the IGU Council accepted the Belgian Gas Association's offer to host the Secretariat. Touwaide was appointed Secretary General of IGU and demonstrated his prodigious capacity for work by retaining his domestic roles and taking on the secretary-ship of Cometec-Gaz when it was set up in 1954. Indeed, an admiring reporter of *Gas World* later observed, "At every triennial conference of the Union Touwaide appears to get younger and more active".

Raoul Touwaide kept in touch with the industry after his retirement. This picture was taken in 1977 at a meeting of the Belgian Gas Association.

He was made an Officer of the Order of the Belgian Crown in 1965 and retired in 1970, whereupon he was made an Honorary Vice President of IGU.

Even in retirement Touwaide was busy and wrote a number of books including an iconographic and typographical analysis of the Belgian editions of Lodovico Guicciardi's descriptions of The Netherlands (*Les éditions belges de la descriptions des Pays-Bas par Lodovico Guicciardi*, published in 1973), a biography of Guicciardi (*Messire Lodovico Guicciardi, gentilhomme Florentin*, 1975) and a study of Guicciardi's cartography (*La cartographie dans les éditions belges de la description de tous les Pays-Bas de Lodovico Guicciardini*,1976). He died in January 1990.

▲ Georg Düwel, IGU President 1964-67.

▶ The opening ceremony of the 10th International Gas Conference was held in Hamburg's Musikhalle. The new IGU logo was on display.

▼ Hamburg's Mayor, Herbert Weichmann (*second left*) greets IGU President-elect Alexei Sorokin (*far right*) watched by IGU President Georg Düwel (*left*) and Hamburg's Senator for Economic Affairs & Transport Helmut Kern (*centre*).

▶ The International Colloquium on Gas Marketing organised an exhibition of gas advertising from around the world during the 10th International Gas Conference.

Minister of Economic Affairs, who was supposed to address the conference, was called away at the last minute to join his European counterparts in discussing an oil embargo announced by Arab states.

The opening ceremony was held in the Musikhalle (today the Laeiszhalle) where the Hamburg Philharmonic State Orchestra welcomed delegates with the Flying Dutchman overture by Wagner before addresses by Georg Düwel, Alexei Sorokin, Gerhard Woratz, Permanent Secretary of the German Ministry of Economic Affairs, and Helmuth Kern, Hamburg's Senator for Economic Affairs & Transport.

The business sessions were held in the Hamburg Conference Centre and there were 77 reports and papers. Attendance sent a new record with 1,771 delegates and 481 accompanying persons from 30 countries.

The official reception was given by the Hamburg Senate in City Hall. There was a special performance of "Orpheus and Eurydice" in the Hamburg State Opera, a banquet at the Hotel Atlantic, an evening boating excursion on the River Elbe and a Baltic cruise farewell party.

The Hamburg conference was marked by a strong Russian presence. Although the USSR had been a member of IGU since 1958, it had previously only sent a handful of delegates to the triennial conferences – four in 1958, six in 1961 and 17 in 1964. In 1967, it sent 302 delegates in a specially chartered ship, the *Mikhail Kalinin*. This was the largest delegation after the German one.

Of course, the USSR was about to take over the Presidency of IGU, but the size of the delegation also reflected plans to increase natural gas exports. Sorokin told delegates that exports to Czechoslovakia would start later in 1967 and that negotiations were underway with Austria, Finland, France and Italy. Subsequently, negotiations were opened with West Germany too.

The Russian Presidency

The first Council meeting of the 1967-70 Triennium was held in Montreal in October 1967. Delegates received the report on the Hamburg conference and appointed Alexis Lihrmann of France Honorary Secretary General in recognition of his assistance to Raoul Touwaide in preparing the minutes of the Council meetings and his work on the compilation of the dictionary.

In 1968, Czechoslovakia suggested that observer members be admitted from countries which had not yet set up a technical gas association, and this was approved by means of a protocol rather than amending the statutes. The same year the first LNG conference was organised by the US Institute of Gas Technology, and IGU subsequently agreed to co-sponsor the event (see the chapter on the history of the international LNG conferences). Cooperation was also started with the Union des Industries Gazières des Pays du Marché Commun (Marcogaz), which was set up to coordinate standards for gas appliances in the European common market and liaise with the European authorities on gas matters.

In November 1969, the Council convened in Karachi, Pakistan, the first time it had met outside Europe and North America. Bulgaria was admitted to statutory membership with effect from the beginning of 1970 and Turkey became the first observer member, while the UK offered to take over the Presidency for 1973-76.

This offer was accepted at the pre-conference Council meeting in Moscow, when Georges Robert was elected President and Leslie J. Clark Vice President for 1970-73. The Council also welcomed East Germany as a new member, admitted India and Portugal as observers and appointed Albert Higgins as Secretary General. Raoul Touwaide was made an Honorary Vice President and his longstanding assistant, Cécile Lacroix, was presented with a gold watch. The Council accepted Alexei Sorokin's proposal of an honorary title for retiring members and elected M. Q. Zaman of the Petroleum Institute of Pakistan as the first Honorary Council member.

Furthermore, the Council decided on a permanent place of registration for IGU. After 21 years in Belgium, the Secretariat was moving to the UK and henceforward was going to be hosted for shorter periods by members. Switzerland was chosen as the Union's finances were already based there and the registered office was changed from Brussels to Vevey in the Canton of Vaud on the north shore of Lake Geneva, near Lausanne. The local gas company, Compagnie Industrielle et Commerciale du Gaz (CICG) and its Managing Director, Eric Giorgis, made sure that everything went smoothly. Today, Philippe Petitpierre, Chairman and CEO of CICG's parent company Holdigaz, liaises with the Swiss authorities on IGU's behalf. He also represents Switzerland on the IGU Council.

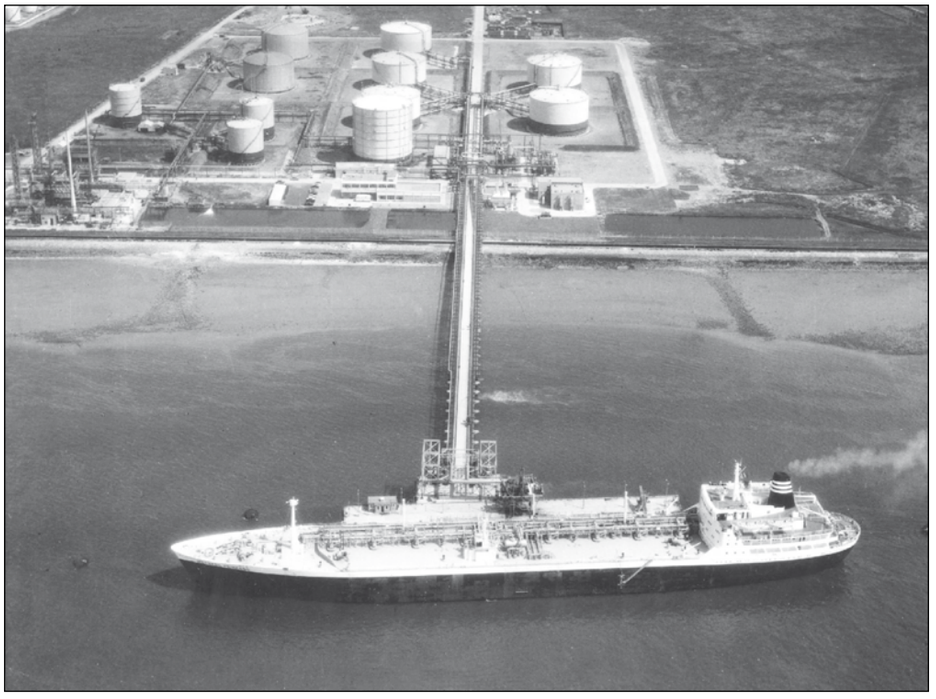
The 11th International Gas Conference opened in the Great Hall of the Kremlin Palace in Moscow on June 9, 1970 and ran until June 12. For the first time an exhibition of gas equipment ran alongside the conference and attendance, boosted by strong local support, reached a new record of 2,756 delegates and 346 accompanying persons.

Raoul Touwaide was given a grand send-off in Moscow, being presented with a specially-commissioned gold medal by Alexei Sorokin during the closing ceremony of the conference

A film has survived in the Gazprom archives of the 11th International Gas Conference which was held in Moscow in June 1970. These frames show (TOP) delegates arriving from Vienna, (CENTRE) the conference hall and (BOTTOM) IGU President Alexei Sorokin giving Raoul Touwaide a gold medal on his retirement as Secretary General.

International LNG trade begins from Algeria to Europe

In 2019, according to IGU's *2020 World LNG Report*, global LNG trade increased 13% to 355 million tonnes and, while the Covid-19 pandemic is impacting demand in the short term, the long-term outlook is for strong growth. The development of the global LNG business is a major technical, financial and commercial achievement and it was Algeria which exported the first commercial cargo in 1964.



Saharan discoveries

Major petroleum resources were found in Algeria in 1956 and a 500km pipeline was built to bring gas from the Hassi R'Mel field in Laghouat Province to supply the country's major conurbations and an export terminal on the Mediterranean coast at Arzew.

"In the early 1960s subsea pipeline technology was not very advanced and negotiations with neighbouring countries on the construction of, and commercial arrangements for, a transit pipeline appeared complicated," explained former Sonatrach Vice President and Algerian Energy Minister Nordine Ait-Laoussine when interviewed in 2014 by Jean-Yves Robin, General Delegate of IGU affiliated organisation GIIGNL. "Although the commercial liquefaction of LNG was still considered as experimental at that time, Algeria's Compagnie Algérienne du Méthane Liquide (CAMEL) project in the early 1960s was to prove its viability on an industrial scale."

On September 14, 1962, Ahmed Ben Bella, the first president of the newly-established Algerian republic, laid the foundation stone for the $89 million CAMEL plant (later known as GL4Z) at Arzew.

The plant had three trains with a total capacity based on 330 days of annual production of 1.1 million tonnes and had cascade cooling and liquefaction technology using propane, ethylene and methane circuits of refrigeration. Operations were underpinned by 15-year sales and purchase agreements with the UK and France for two-thirds and one-third of production respectively. As the World Bank's lending arm IBRD said when approving a $20.5 million loan: "The project has the inherent technical risks of a new process but little, if any, of the usual market risks."

CAMEL had nine founding shareholders: Conch International Methane (in turn owned by Shell, Conoco and Union Stock Yard & Transit) with 40%, Caisse Algérienne de Developpement (20%), Société Nationale de Recherche et d'Exploitation de Pétrole en Algérie (12%), Compagnie Française des Pétroles Algerie (9%), Bureau de Recherches de Pétrole (8%), Air Liquide (6%), Société Algérienne de Developpement et d'Expansion (3%), Compagnie Financiere pour le Developpement Economique de l'Algerie (1%) and Société de Developpement des Régions Sahariennes (1%). CAMEL would later be taken over by Sonatrach.

President Ben Bella inaugurated the plant on September 27, 1964 when the first cargo departed for the UK on board the purpose-built LNG carrier *Methane Princess*. Given the technological challenges of setting up the first LNG export chain, it was a credit to all the parties involved from Algeria, France, the Netherlands, UK and USA that the only significant problem was related to establishing the specific gravity of the cargo. This determines the tonnage and thus the amount billed by the supplier.

"The problem was that while the specific gravity of the LNG was known at the point of issue from the plant, there were doubts about the exact value after it had passed through the pipes to the ship," recalls the Lloyd's Register surveyor on the *Methane Princess*, William Blacklock. "As we argued to three decimal places the delays mounted and in the end we had to sale from Arzew with the ship only 60% full."

The UK Gas Council had organised a welcoming ceremony at the Canvey Island receiving terminal so there was a delivery schedule to meet and the *Methane Princess* discharged the first

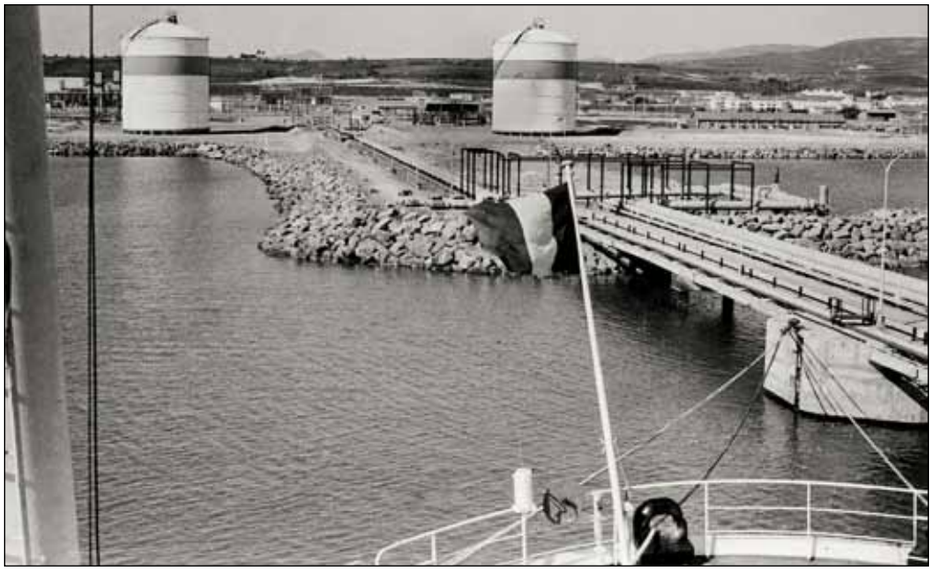
◄ *Methane Princess* at the Canvey Island receiving terminal in Essex, UK. The vessel and its sister ship *Methane Progress* each had a capacity of 27,400m^3 with their cargo containment systems designed by Conch International.

► *Methane Progress* and *Jules Verne* berthed at Arzew. The Jules Verne had a capacity of 25,500m^3.

▼ The CAMEL plant seen from the stern of the *Jules Verne*.

commercial cargo of LNG on October 12. After allowing for reforming into town gas, the Algerian supplies cost up to 30% less than manufactured gas. (This was before the UK discovered large-scale offshore natural gas resources.)

The specific gravity problem was soon resolved and a second ship *Methane Progress* joined the UK trade while the *Jules Verne* began operating between Arzew and the Gaz de France receiving terminal at Le Havre in March 1965.



Algeria went on to build an LNG plant at Skikda, which started up in 1972, and three more at Arzew (GL1Z in 1978, GL2Z in 1981 and GL3Z in 2014). In 2004, there was a gas leak and explosion at Skikda which resulted in the loss of 27 lives and the destruction of three of the six trains. Sonatrach constructed a single large replacement train with an annual capacity of 4.5 million tonnes and this was inaugurated in 2013 when the three surviving trains were decommissioned. Meanwhile, the original GL4Z plant at Arzew had been decommissioned in 2010. The combined annual capacity of the three operational plants at Arzew is 20.8 million tonnes.

The quotes of Nordine Ait-Laoussine were originally published in LNG Shipping at 50 *the 2014 commemorative publication of the International Group of LNG Importers (GIIGNL) and Society of Gas Tanker and Terminal Operators (SIGTTO) to whom grateful acknowledgement is made.*

Development and Expansion

As France took over the Presidency for 1970-73, IGU mourned the death of the Union's first French President, Auguste Baril. Honorary Secretary General Walter Braunholtz also died in 1970, while Honorary President Mario Boselli died in 1971.

This was the Triennium when the global order established after World War II began to change. In 1971, dollar-gold convertibility was formally abandoned, bringing an end to the Bretton Woods system of fixed exchange rates, and the People's Republic of China was recognised at the United Nations.

This was also the Triennium when the countries of the Middle East, long major oil plays, started to develop their natural gas resources for export. In 1970, Abu Dhabi, then one of the Trucial States (the United Arab Emirates would be established in December 1971), announced a policy to work towards ending the flaring of associated gas. This culminated in the shipment of the Middle East's first LNG cargo in April 1977. Meanwhile, Iran started pipeline exports to the Southern Caucasus republics of the USSR in October 1970, although its plans to develop an LNG sector stalled following the 1979 revolution and the subsequent war with Iraq, and Qatar's North Field was discovered in 1971, although exports did not start until 1996.

The second French Presidency saw a broadening of IGU's reach, with Argentina becoming the first member from Latin America in 1970 and Algeria becoming the first African member in 1971. To reflect this, the conference name was changed from "International" to "World".

There was a further reorganisation of the technical committee structure. LNG and LPG were initially covered by a sub-group of the natural gases and mass storage committee, but this was made a full committee in 1972. Work on utilisation was divided between two committees and those for statistics and documentation were merged (*see box*). In addition, a papers committee was set up to coordinate the technical

The Nice conference of 1973 was the 12th in the IGU series and the first to be called "World" (Mondial in French) rather than "International".

▶
The Middle East's first LNG cargo was shipped from the ADGAS plant on Das Island in April 1977. The island plays a major role in the UAE's petroleum industry and has since been extended by land reclamation.

▼
The opening ceremony of the 12th WGC.

programme of what was now the World Gas Conference (WGC). The technical committee chairmen started reporting to this new committee which met immediately prior to the Council.

Other developments included decisions to organise periodic symposiums between WGCs and to enhance cooperation with WEC. The Council also discussed how IGU could help with training and technical advice for the gas industries of developing countries. Offers were received from Canada to take over the Presidency for 1976-79 and Switzerland for 1979-82.

Technical Committee structure as amended in 1972

Committee and area of study	*Chair 1973-76 and 1976-79*
A Natural Gases & Mass Storage*	USSR
B Production of Manufactured Gases	USA
C Transmission of Gases	Italy
D Distribution of Gases	The Netherlands
E Domestic & Collective Utilisation of Gases	France
F Industrial & Commercial Utilisation of Gases	West Germany
G Statistics, Documentation & Sundry Questions	Canada
H Liquefied Gases	UK

Note: The committees were now referenced by letter rather than number.

* From 1975, Production, Treatment and Underground Storage of Natural Gases

▲►
Georges Robert, IGU President 1970-73 (ABOVE) opening the Nice exhibition which featured 185 exhibitors (ABOVE RIGHT).

▲
Leslie Clark, IGU President 1973-76.

The Triennium culminated in the 12th World Gas Conference, which was held in Nice, June 5-9, 1973. Delegates celebrated the enormous strides the industry had made in finding and developing natural gas reserves around the world, but there was some concern that demand would outstrip supply with a number of papers looking at the production of synthetic natural gas from various feedstocks. Overall, a record 146 papers and reports were presented, although attendance fell compared to Moscow with 1,946 delegates and 852 accompanying persons.

At its pre-conference meeting, the Council elected Leslie Clark of the UK President and James W. Kerr of Canada Vice President for 1973-76. The conference was opened at the Palais des Expositions on June 5, and that evening there was a reception with a carnival procession and a traditional battle of flowers. Later in the week, the Municipality of Nice hosted a garden party in Cimiez Park.

The programme for accompanying persons included a visit to Monte Carlo and there was an amusing incident when more people turned up than expected. A group of ladies stood in front of the coaches to prevent the excursion leaving until an extra coach was provided!

►
The 13th WGC was held on London's South Bank, seen here in a water colour painted by Leslie Clark.

Energy moves up the global agenda

The 1973-76 Triennium was marked by the first oil crisis, which pushed energy to the top of the global agenda.

The Triennium had got off to a sad start with the death of Pierre Mougin a few days after the Nice conference. Then, in the wake of the Arab-Israeli War of October 1973, the Organisation of the Petroleum Exporting Countries (OPEC) flexed its new-found muscle to institute an embargo which resulted in a quadrupling of the oil price. Western countries responded by setting up the International Energy Agency (IEA) in 1974 to address disruptions in oil supplies and provide a statistical and information service covering all energy sectors. Overnight, energy conservation became a key issue and IGU was invited to participate in the work of WEC's new International Energy Conservation Commission.

In 1974, the Bureau member for the USSR, Professor Y. P. Korotaev suggested that IGU's name be changed to the World Gas Union just as the conference name had been changed in 1973. Members were consulted and most were against the change. Meeting in Dresden in May 1975, the Council agreed the name should be retained, but that the words "A Worldwide Organisation" should be added on stationery and other printed material where appropriate.

This was also the meeting at which the Council accepted France's offer to be the next host of the Secretariat and appointed Bernard Goudal, Assistant Secretary General of the ATG, as Deputy Secretary General.

Two Honorary Presidents died during the Triennium, Hermann Müller in 1974 and Marcel Brabant in 1975.

As regards membership, Turkey ceased to be an observer, two new observers were welcomed – Iraq in 1974 and New Zealand in 1975 – and Brazil became a statutory member in 1975. However, South Africa's application split the Council. Some members felt that South Africa's experience with coal gasification would be valuable to IGU while others were opposed to the apartheid regime. Rather than going to a formal vote, a compromise was agreed whereby South Africa withdrew its application but was invited to nominate a delegate to the manufactured gases committee, IGU's committee rules allowing experts from non-members to be co-opted.

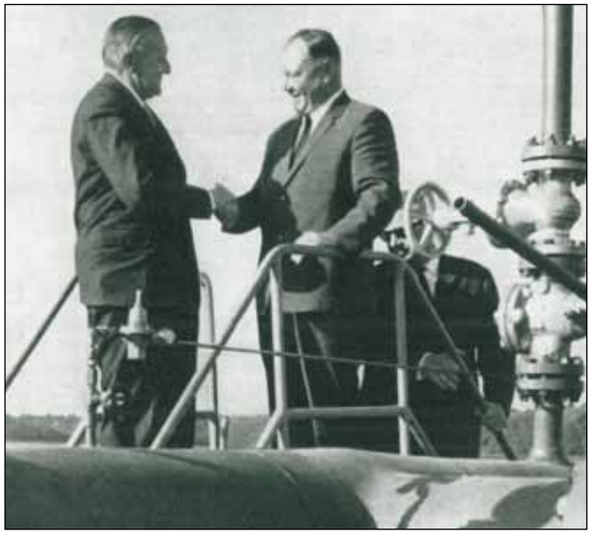
The number of papers presented at IGU's conferences had been steadily increasing, and for the 13th World Gas Conference it was decided to accept no more than 100 to allow each speaker more time. In the event, 89 reports and papers were presented during the 13th WGC, which was held on London's South Bank, June 7-11, 1976. HRH the Duchess of Gloucester formally opened the conference in a ceremony in the Royal Festival Hall. The working sessions were held in the adjacent Queen

Crossing the political divide – gas exports from the USSR to Western Europe

Building pipelines was one thing; the major challenge to developing the USSR's gas exports to the West was political and by bringing together gas engineers and managers in an international forum IGU helped make this possible.

The USSR joined IGU in 1958 when a major prospecting programme was underway to find new petroleum resources. As extensive new natural gas reserves were proved it was clear that there would be a significant surplus to export and that markets would need to be found in Western as well as in Eastern Europe. Moreover, although the USSR was a long-standing player in the international oil market, selling gas internationally was a new venture which would have to be underpinned by long-term bilateral contracts based on mutual trust and confidence.

Through IGU members of the Russian gas community got to meet their Western counterparts and to start talking about trading links. Germany and Italy were already selling large-diameter steel pipes to the USSR and then Western European countries began negotiating long-term contracts to buy gas. The growing importance of the gas industry in the USSR was recognised when a separate Gas Ministry was established in October 1965.



◀ Ludwig Weiss (*left*), Austrian Minister of Transportation and Alexei Kortunov, the USSR's Gas Minister inaugurating the export of gas to Austria on September 1, 1968

▲ ▶ Welding underway at Passo di Sella in 1973 on the pipeline to bring Russian gas into Italy via Austria.

Austria led the way with a 23-year deal signed in June 1968 and started receiving gas in September 1968. Supplies were to build up to 1.5 bcm a year over the first three years. At first the USSR struggled to fulfil the contract but met its international obligation by reducing domestic supplies. Once new pipelines bringing gas from Central Asia and Siberia were completed the supply issue was resolved and as per contract supplies started flowing to West Germany in October 1973, Italy in May 1974, Finland in September 1974 and France in January 1976 (via a swap deal; direct supplies started in 1980).

Russian gas transited the Bratstvo (Brotherhood) USSR-Czechoslovakia pipeline reaching Austria via a connection from Bratislava into the Baumgarten gas hub, West Germany via a junction at Waidhaus, Italy via a Baumgarten to Tarvisio link crossing the Alps at 1,470m and France via Germany with the meter station at Obergailbach. A separate pipeline connected to Finland.

By 1980, deliveries of Russian gas to Western Europe had reached 26 bcm amounting to 46% of the country's gas exports.

▲ James Kerr, IGU President 1976-79.

Elizabeth Hall and National Film Theatre, technical films also being shown in the latter. The exhibition was held in tents on the South Bank. Attendance was similar to Nice with just under 2,000 delegates and over 800 accompanying persons.

Unusually, the Council met on the last day of the conference rather than immediately before, and this was when James Kerr of Canada and Eric A. Giorgis of Switzerland were elected President and Vice President for 1976-79. Council members also approved Bangladesh's application to become an observer.

The Canadian Presidency

An important development of the 1976-79 Triennium was the setting up of task forces to study issues that cut across the work of all the technical committees. A task force to study improved end uses of gases was set up in 1977 and gave a full report at the 14th World Gas Conference in Toronto, while one on energy conservation in the gas industry was set up in 1978 and gave an interim report at Toronto. The Council approved the establishment of a third task force to investigate the future resources of natural gas, methods of transportation and development of markets on a global basis, but work did not get underway until the following Triennium.

Work on the latest edition of the dictionary in nine languages (Czech, Hungarian, Polish, Romanian, Russian and Swedish for the first time with revised English, French and German) was completed, and it was decided to publish separate booklets to save on printing costs.

In 1977, both German states offered to assume the Presidency, West Germany for 1982-85 and East Germany for 1985-88. Meeting in Hamburg in April 1978, the Council formally designated Bernard Goudal (who was now Secretary General of the ATG) to succeed Albert Higgins on his retirement, and approved Hong Kong's application to become an observer. The following year, IGU became one of the co-sponsors of the new International Gas Research Conference (see the chapter on the history of the IGRCs).

The Triennium saw the beginnings of deregulation in the USA with The Natural Gas Policy Act of 1978. Deregulation was to gather pace during the 1980s and culminate in the early 1990s with the abolition of controls on wellhead prices and the separation ("unbundling") of sales and marketing activities from transmission and distribution. Deregulation then spread to Europe and other regions.

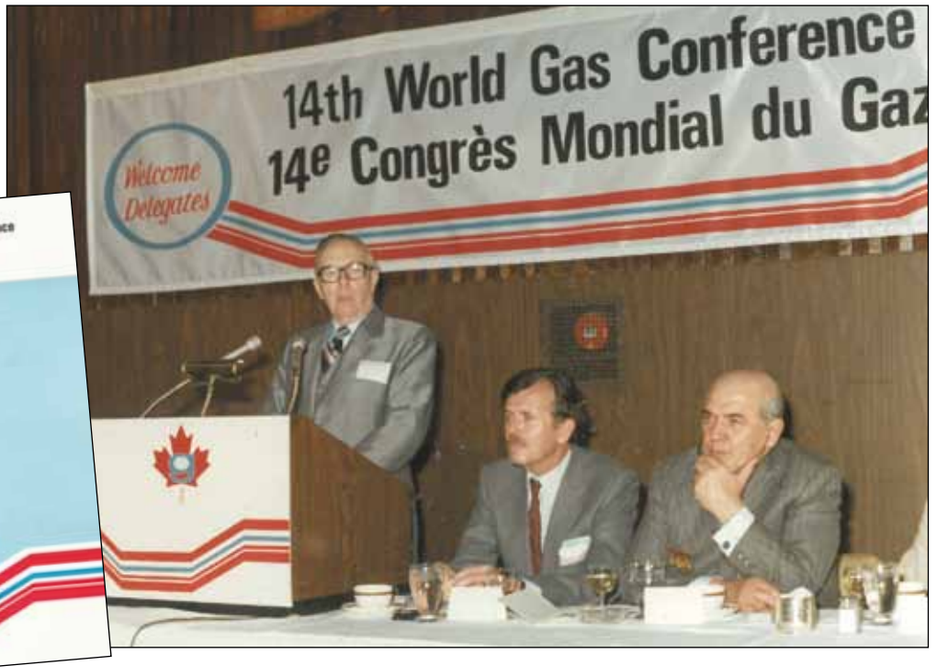
In the run-up to the 14th WGC two major events, the Iranian Revolution and the Three Mile Island nuclear plant accident impacted energy markets.

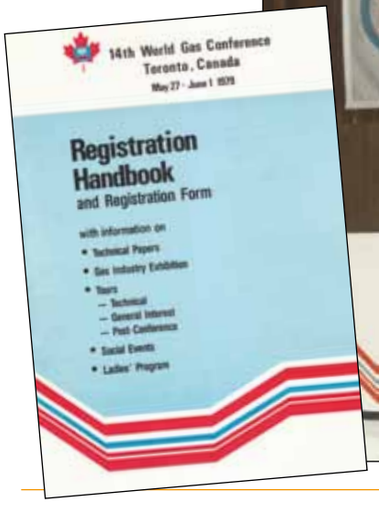
Following increasing unrest in Iran, the Shah was forced into exile in January 1979. Ayotollah Khomeni returned to the country in February and an Islamic Republic was set up. Oil production plummeted and exports stopped. As a result the oil price surged. Then, on March 28, one of the reactors at the Three Mile Island nuclear power plant in Pennsylvania overheated and radiation was released. Although no demonstrable injuries from radiation were observed, the accident increased fears about the safety of nuclear power.

The 14th WGC was held in Toronto, May 27-June 1, 1979, and was opened by William G. Davis, Premier of Ontario. Meeting just before the opening ceremony, the Council elected Eric Giorgis of Switzerland as President and Dr Christoph Brecht of West Germany as Vice President for 1979-82. It also appointed Bernard Goudal as Secretary General with the Secretariat hosted by the ATG in Paris. Albert Higgins was made an Honorary Vice President.

The opening and closing ceremonies were held in Toronto's O'Keefe Centre (today the Sony Centre for the Performing Arts), the conference sessions took place in the Royal York Hotel and the exhibition was held in the convention centre of the Toronto Harbour Castle Hilton Hotel.

A special feature on two days was a delegates' luncheon with an invited speaker, which proved to be very popular. Overall, 1,585 delegates and 719 accompanying persons attended the conference and 66 papers were presented. The technical visit programme included a tour of the Ontario Centre for Resource Recovery, an experimental plant looking at ways to convert waste to energy and material resources.





▶ The 14th WGC was held in Toronto and (INSET) the registration handbook.

There was a moment of high drama for one group of delegates on a post-conference tour of western Canada, who got stuck in a cable car halfway up a mountain near Jasper, Alberta in a raging blizzard. The rescue forces swung into action and they were brought to safety in 50 minutes.

IGU's 50th anniversary

The first Council meeting of the 1979-82 Triennium was held in Algiers in October 1979. Amongst other business on the agenda there was a bid from the USA for the 1985-88 Presidency. As East Germany had already put itself forward, a decision was postponed pending consultations with both parties. It was subsequently agreed that the USA would be the candidate for 1985-88, followed by East Germany for 1988-91.

Sadly, relations between two other IGU members were far from amicable. Iraq invaded Iran in September 1980, starting a war that would last for eight years.

Apart from the normal work of the technical committees, two task forces operated during the Swiss Presidency. Studies continued on energy conservation and started on global gas supply and demand. Preparations also started for a new volume of the dictionary covering a larger vocabulary in English, French, German and Russian. Meanwhile, membership continued to grow. In 1980, Indonesia and Taiwan joined, New Zealand moved from observer to statutory membership and Egypt became an observer. Mexico and Venezuela joined the following year.

IGU turned 50 in 1981 but the celebrations were held over to coincide with the 15th World Gas Conference, which was held in Lausanne, June 14-18, 1982. In the run-up to the conference, the Swiss post office issued a commemorative stamp, while the programme in Lausanne included an audio-visual show celebrating the history of IGU and a 50th anniversary gala dinner.

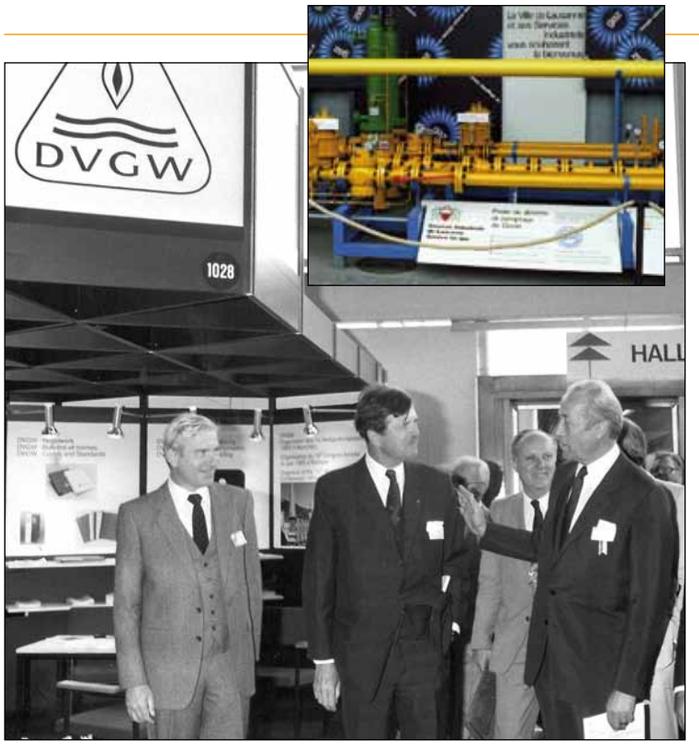
The Council met the day before the conference and elected Christoph Brecht of West Germany as President and John Kean of the USA as Vice President for 1982-85. It also extended the life of the task force on global gas supply and demand.

The 15th WGC began on June 14 with a morning ceremony outside the Palais de

◀ *From left to right in the foreground at the 15th WGC in Lausanne are:* IGU Vice President, Dr Christoph Brecht; Dr Eduard Kiener, Director of the Swiss Federal Office of Energy; Dr W. Hunziker, President of Swissgas; IGU President, Eric Giorgis; and R. Kohler, President of SVGW.

▼◀ The Swiss post office issued a commemorative stamp to mark IGU's 50th anniversary.

▼ Pierre Alby, CEO of Gaz de France, addresses the 15th WGC. Note the special logo designed by the Swiss Presidency to commemorate 50 years of IGU and 15 WGCs.



▲ Eric Giorgis visiting the DVGW stand at the 15th WGC's exhibition. He is talking to Christoph Brecht with Dr Werner Feind, Managing Director Gas of the DVGW at far left. The local industry was also represented (INSET).

▼ A globe sculpture with a flame fed by gas from the Groningen field was a feature of the 15th WGC.

▶ The 16th WGC was held in the Munich Exhibition Centre. RIGHT Christoph Brecht, IGU President 1982-85 (*right*) shakes hands with Vice President John Kean outside the venue and (OPPOSITE, TOP LEFT) the conference in session.

Beaulieu convention centre at which the IGU and conference flags were raised and Roland Mages, Chairman of the National Organising Committee (NOC), lit a gas flame. The burner was mounted on top of a globe and was fed by gas from the Groningen field, symbolising international cooperation in the gas industry. After the 15th WGC, the gas globe was used by regional gas companies, particularly Société du Gaz de la Plaine du Rhône (SGPR), and was featured in events promoting Switzerland's bids to host the 2006 Winter Olympics in Sion (unsuccessful) and the 2020 Winter Youth Olympics in Lausanne (successful). Today, it is installed outside the headquarters of SGPR parent company Holdigaz in Vevey.

Eric Giorgis formally opened the 15th WGC on the afternoon of June 14, with Fritz Honegger, President of the Swiss Confederation, and Marcel Blanc, President of the Canton of Vaud as the guests of honour.

During the working sessions, 84 papers and reports were presented, the latest edition of the dictionary was launched and 17 films were shown. Workshop and roundtable sessions were introduced, providing an opportunity for detailed discussion of topical questions within the terms of reference of the technical committees. The social programme started with a reception and was rounded off on the final evening by a cruise on Lake Geneva with dinner and dancing on board.

Attendance was high at Lausanne, with 2,142 delegates and 835 accompanying persons from 53 countries, while the exhibition was the biggest to date with 243 exhibitors.

Cooperation with the World Bank

IGU established contacts with the World Bank during the 1982-85 Triennium, and the Bank agreed to cooperate in organising a WGC workshop on the problems faced by less developed countries in the development of their gas resources.

Technical Committee structure with effect from the 1985-88 Triennium

Committee and area of study	*Chair 1985-88*
A Production, Treatment & Underground Storage of Natural Gas	USSR
B Production of Manufactured Gases	East Germany
C Transmission of Gases	UK
D Distribution of Gases	West Germany
E Domestic & Collective Utilisation of Gases	USA
F Industrial & Commercial Utilisation of Gases	Canada
G Information & Communication	Italy
H Liquefied Gases	France
J World Gas Supply & Demand	The Netherlands
K Computing & Personnel Services	Czechoslovakia

IGU also launched a new symposium on computing in the gas industry as part of the programme of organising periodic symposia between WGCs. The first was held in Gatwick, UK in April 1984.

In other developments, the new edition of the dictionary was published in Arabic, Italian, Portuguese and Spanish, while the Council agreed a further revision of the technical committee structure to take effect from the 1985-88 Triennium. The task force on global gas supply and demand became a permanent committee and Committee G (covering statistics, documentation and sundry questions) was split into two as its workload was increasing (*see box*).

In 1984, Switzerland offered to take over from France as the next host of the Secretariat, and Italy offered to assume the 1991-94 Presidency. The Council accepted Switzerland's offer but postponed a decision on Italy's. Sadly, 1984 was also marked by the deaths of Honorary Presidents Robert Hendee and Alexei Sorokin.

There were several changes in membership during the 1982-85 Triennium. Ireland joined, Portugal moved from observer to statutory membership and Libya, South Korea and Thailand became observers. However, Mexico and Romania left.

Munich was the venue for the 16th World Gas Conference, which was held in the city's exhibition centre (Messe), June 24-27, 1985. It was attended by 2,504 delegates and 1,065 accompanying persons from 55 countries.

▲▼ Social events during the 16th WGC included a traditional Bavarian evening (ABOVE) and a dinner in the Munich Residenz, the former palace of the Bavarian dukes, electors and kings (BELOW).

▼◄ This ceremonial gas burner for the 16th WGC was built by apprentices of Ruhrgas.

The Asia-Pacific LNG business takes off

LNG first came to the Asia-Pacific region in November 1969 when Japan began imports from Kenai in Alaska. Supplies from LNG projects in Brunei, Abu Dhabi and Indonesia followed in the 1970s, but it was in the 1980s that the business rapidly expanded with Malaysia (1983) and Australia (1989) starting production, Korea (1986) starting imports, Indonesia becoming the world's top exporter and Japan becoming not only the top importer but also the biggest builder of LNG carriers.

Japan

Japan's development of the LNG business was part of a drive to boost the use of cleaner energy sources as the hydropower sector could not keep up with rising demand. The country's post-war recovery had propelled it to number three in the global GDP rankings behind the USA and USSR, but at the cost of increasing air pollution from burning coal (both in gas and power plants) and oil. Switching to natural gas offered the prospect of cleaner skies and its higher calorific value (2.2 times that of manufactured gas) meant that increasing demand could be met without having to expand pipeline capacity.

Initially, Japan used its domestic resources with natural gas from the Higashi-Niigata field reaching Tokyo via pipeline in 1962. The following year Tohoku Electric opened the first power plant to use natural gas, albeit not exclusively, in Niigata. Despite subsequent discoveries, however, domestic resources were limited and Japan turned to LNG imports with the first shipments feeding Tokyo Electric's Minami-Yokohama power plant and supplying Tokyo Gas.

Developing an LNG supply chain was the first step and supplying power plants and big industrial customers was relatively straightforward. However, as Satoshi Yoshida, Senior Adviser at the Japan Gas Association and Japan's representative on IGU's Executive Committee explains, the big challenge was adjusting domestic gas equipment to use natural gas. "Visiting every home and adjusting every piece of gas equipment took 17 years for Tokyo Gas which carried out the first natural gas conversion in 1972," he says. "Conversions were gradually carried out by other gas utilities throughout Japan and by 2007 all the city gas was converted to natural gas after 35 long years."

The 1980s saw Japan's gas use in volume terms doubling, while as a share of primary energy consumption gas increased from 6.7% in 1980 to 11%. By 1990, Japan was buying nearly two-thirds of the world's LNG amounting to 35 mtpa.

Meanwhile, Japan's shipyards were gearing up to build LNG carriers. First into service in 1981 was the *Golar Spirit* built by Kawasaki Heavy Industries at its Sakaide yard with the Moss tank containment system. It transported Indonesian exports for many years before being converted into a floating storage and regasification unit (FSRU) by Keppel in Singapore. Next up in 1983 was the *Echigo Maru* built by Mitsubishi in Nagasaki. As other shipbuilders entered the market Japan became the world's top builder of LNG carriers although it would later cede the crown to Korea.

Japan also diversified into nuclear power generation and the first plant at Tokai started generating commercially in 1966. By 2010, gas accounted for 17% of Japan's primary energy consumption, nuclear for 13% (and hydro for 4%). The human tragedy of the Great East Japan Earthquake and consequent tsunami on March 11, 2011 was compounded by the impact on the energy sector with the loss of nuclear capacity and it was LNG that played a big role in filling the gap.

Indonesia

For Indonesia entering the LNG business was driven by the desire to further the country's economic development and tap new sources of foreign exchange. Pertamina worked

◄
Japan's first LNG cargo was delivered by the *Polar Alaska*, which operated a shuttle service between Kenai and Yokohama with its sister ship *Arctic Tokyo*.

◄▼
Golar Spirit was the first Japanese-built LNG carrier and served for 26 years before being converted into an FSRU.

►
The Badak LNG plant in Bontang, which opened in 1977 with two trains, was expanded significantly in the 1980s with trains C and D entering service in 1983 and train E in 1989.

with production sharing contractors and foreign buyers and the first cargo was shipped to Japan from the Badak plant in Bontang, East Kalimantan in August 1977, with the Arun plant in Aceh following in October 1978. The plants initially had a combined capacity of 8.5 mtpa but this was increased to 23 mtpa in the mid-1980s with Indonesia becoming the world's largest LNG producer in 1984. (It would not be until 2006 that Qatar became number one.)

The achievement was marked by a commemorative publication *Hands Across the Sea: The Story of Indonesian LNG* in which the country's then Minister of Mining and Energy, Mr Soebroto, wrote: "As a developing nation, Indonesia is determined to explore and exploit its natural resources for the maximum benefit of its people. In that context, LNG has provided valuable support to our development goals. It is our second most important source of foreign exchange. It has brought our people new high-level technological skills and has expanded our capabilities in international business. Domestically, the availability of gas has opened new opportunities to develop an agricultural chemicals industry and a petrochemicals industry, and has enabled us to find ways of using natural gas to replace our high consumption of petroleum-based fuels."

Reflecting on the challenges of entering the LNG business and then dramatically increasing capacity, Yenni Andayani, former Pertamina Gas Director, says: "The major challenge for our predecessors to develop the LNG industry in Indonesia was how they could set up a business model that met the country's need, satisfied all parties involved and was valid for decades." She highlights the creation of a financial structure that did not require a guarantee from the Indonesian government or Pertamina but was acceptable to buyers and lenders. "Pricing was also a major issue due to the impact of the rapidly rising price of crude oil since the Indonesian LNG price was linked to Indonesian crudes," she adds.

Indonesia joined IGU in 1980. Asked about the role IGU membership played in the expansion of the country's LNG business, Ms Andayani points to the opportunities to exchange information and promote cooperation with other countries. "In 1983, Indonesia hosted LNG 7 in Jakarta and arranged for delegates to visit the LNG plants," she says. "Indonesia can learn from other countries but other countries can also learn from Indonesia's experience."

▲ ▶ US President Ronald Reagan was the guest of honour at the opening ceremony of the 17th WGC in Washington DC. ABOVE IGU President John Kean introducing Ronald Reagan and ABOVE RIGHT the President giving his address.

Dr Martin Bangemann, Federal Minister of Economics, Anton Jaumann, Bavarian Minister for Economic Affairs and Commerce, and Georg Kronawitter, Mayor of Munich were the guests of honour at the opening ceremony, while the chess grandmaster Anatoly Karpov challenged visitors to the Ruhrgas stand in the exhibition.

Meeting the day before the conference started, the Council elected John Kean of the USA as President and Dr Herbert Richter of East Germany as Vice President for 1988-91. It also accepted Italy's offer to assume the 1991-94 Presidency and appointed Dr Jean-Pierre Lauper, Delegate of the Board of Swissgas, as Deputy Secretary General.

Environmental focus

An important policy of the second US Presidency was to emphasise the contribution natural gas could make to reducing air pollution. Governments were paying increasing attention to environmental issues thanks partly to the work of the World Commission on Environment and Development. Chaired by Gro Harlem Brundtland, then Prime Minister of Norway, the Commission published its report in 1987 and introduced the world to the concept of "sustainable development". IGU needed to show that natural gas had an important role to play as the cleanest of the fossil fuels. Meanwhile, the Chernobyl disaster

▼ Tickets for the opening ceremony and the First Lady's tea party.

▶ A daily newspaper in French and English was produced during the 17th WGC.


le 6 juin 1988

WORLD GAS daily

Organe officiel du 17ème Congrès mondial du gaz

LES ESTATS-UNIS SOUHAITENT LA BIENVENUE AUX DELEGUES DU CONGRES

of April 1986 had renewed fears about the safety of nuclear power.

Another initiative was to reach out to developing countries which needed help to build their gas industries, building on the cooperation already established with the World Bank.

During the Triennium, the Council accepted Denmark's offer to assume the 1994-97 Presidency and received bids from France and Norway for 1997-2000; the People's Republic of China and Malaysia joined, Peru became an observer and South Korea moved from observer to statutory membership; and the latest edition of the dictionary was published in Chinese.

The 17th World Gas Conference was held in Washington DC, June 6-10, 1988 with the theme "Creating a One-World Gas Industry".

Meeting on June 5, the Council elected Herbert Richter of East Germany as President and Luigi Meanti of Italy as Vice President for 1988-91. It also appointed Jean-Pierre Lauper as Secretary General with the Secretariat to be hosted at the Swissgas office in Zurich. Bernard Goudal was made an Honorary Vice President.

President Ronald Reagan was the guest of honour at the opening ceremony in the Sheraton Washington Hotel, which was also addressed by John Kean, the Mayor of Washington DC, Marion Barry, and the AGA President, George Lawrence. Nancy Reagan hosted a tea party for accompanying persons on June 9, and the farewell party was held in the Smithsonian Museum of American History.

Overall attendance set a new record with 2,693 delegates and 1,060 accompanying persons, although the Moscow delegate total had yet to be beaten.

Change sweeps Eastern Europe

The 1988-91 Triennium was a momentous one which saw political change sweep Eastern Europe, with perhaps the most dramatic event being the opening of the Berlin Wall on November 9, 1989. Just under a year later, on October 3, 1990, Germany was unified with the five newly-reconstituted eastern states acceding to the Federal Republic. The East German state apparatus was dismantled and the state-owned enterprises known as Volkseigene Betriebe (VEB) were passed to a special agency called the Treuhand charged with restructuring and privatising them. This meant that local industry support for the 18th World Gas Conference disappeared.

The gas industry in West Germany moved swiftly to help with Rolf Beyer of Ruhrgas, who was Vice President Gas of the DVGW at the time (he later became President), coordinating the efforts. Beyer became co-chairman of the 18th WGC with IGU President Herbert Richter. Honorary IGU President Christoph Brecht was also brought in as a consultant and Jan Kätelhön became co-chairman of the NOC with Dieter Boi.

Change was certainly in the air when the Council convened in Dresden in September 1988 for its first meeting of the Triennium. After all, Mikhail Gorbachev had come to power in the USSR in April 1985 and begun a process of reform. But few people expected the pace to accelerate so quickly.

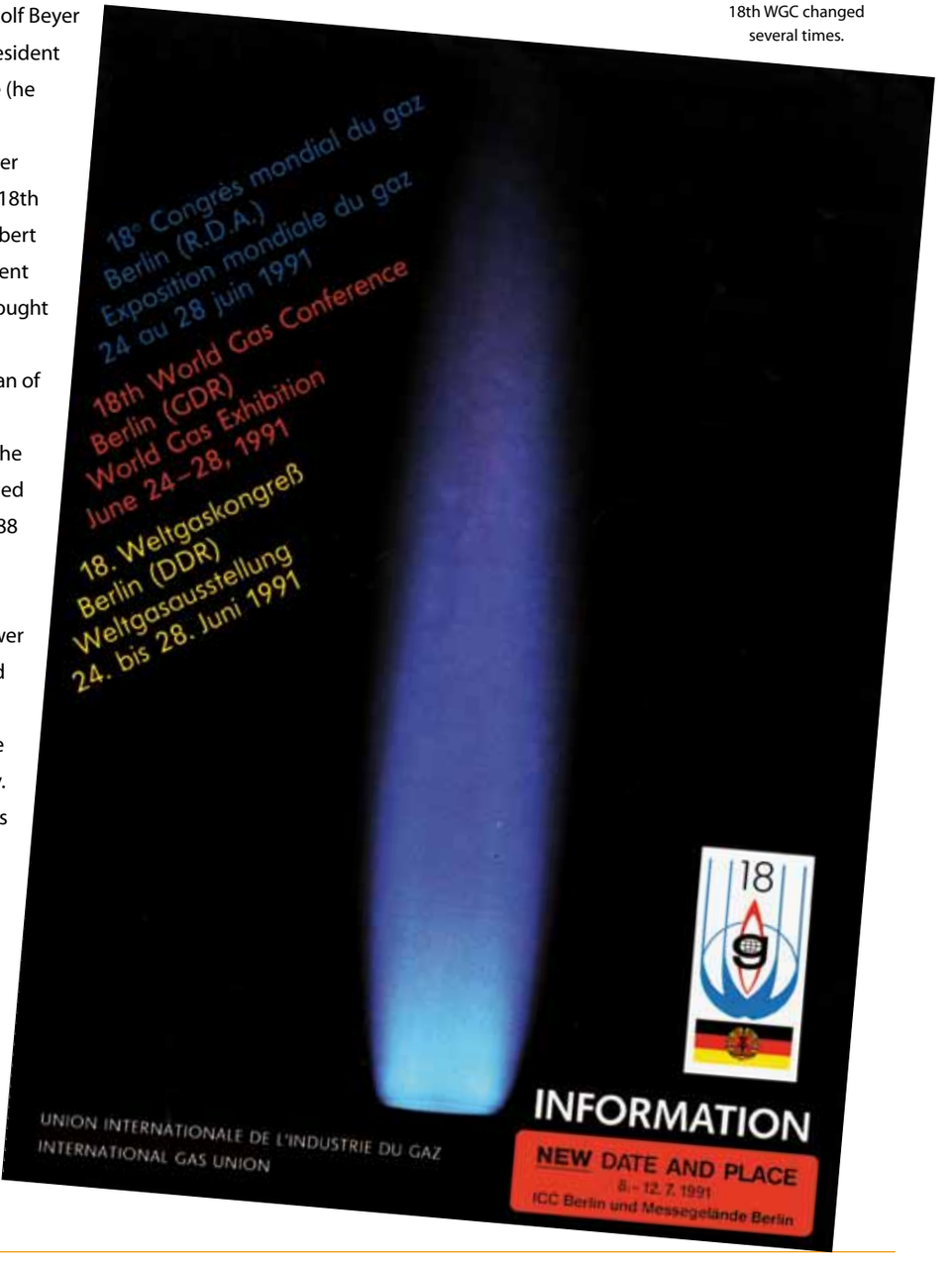
The Dresden meeting was notable for the launch of an IGU prize worth SFr5,000 and Japan's offer to assume the Presidency for 2000-03 – the first country outside Europe and North America to do so.

When he was Vice President Herbert Richter had floated the idea of a prize to recognise the contributions of young scientists to gas research and technology. The Secretariat had then worked on a formal proposal which the Council now approved. The first prize would be awarded at the 18th WGC, which was due to be held in East Berlin in June 1991.

After the dramatic events of 1989, plans for the 18th WGC were changed to include venues in both parts of Berlin. The conference sessions and exhibition were switched to the International Congress Centre (ICC) in West

▲ Herbert Richter, IGU President 1988-91.

▼ The programme for the 18th WGC changed several times.



Berlin, necessitating a slight postponement to July as the ICC was fully booked in June, while some social events remained in East Berlin including a gala dinner in the Palace of the Republic. But the swift move to unification and the closing of the Palace of the Republic forced further amendments to the programme.

On German unification in 1990, the East German IGU member Kammer der Technik ceased its activities and the DVGW became the sole German member of IGU.

▲ ▶ ▼

The 18th WGC was held in the ICC in Berlin. ABOVE A packed plenary session LEFT delegates are greeted by traditional barrel organ players and BELOW a set of commemorative stamps issued by the German post office.

Germany was not the only focus of the world's attention during the Triennium for, in August 1990, Iraq invaded Kuwait. Against this backdrop, IGU's work continued.

The technical committees were asked to study the interaction of gas and the environment in their specific fields, and a dedicated task force was set up. This worked on a publication "Gas – the Solution, A Route to Sustainable Development" and organised an environmental workshop for the 18th WGC. A second task force was set up to look at natural gas vehicles, and cooperation started with the International Association for Natural Gas Vehicles. A long-term review of the technical committee structure was also begun.

The IGU diploma was introduced to honour committee chairmen, secretaries and other people who had dedicated time to IGU work. The first diploma was given to J-P Dartigalongue, who represented IGU on the WEC Programme Committee and stepped down in 1989.

There was a change in a long-standing cooperative relationship in 1990, when Cometec-Gaz was succeeded by a new association called Eurogas with a wider remit to promote the development of the European natural gas industry considering scientific, economic, legal and technical issues. The same year brought the sad news from Belgium of the death of Raoul Touwaide, who had been IGU's longest-serving Secretary General.

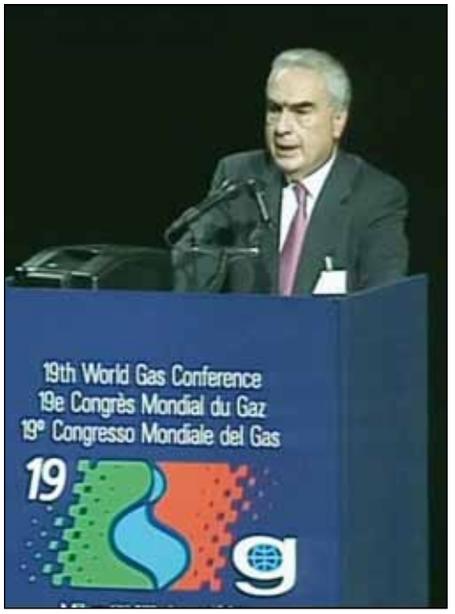
The USSR joined France and Norway in bidding for the 1997-2000 Presidency, the first time three countries had put themselves forward. After discussions, Norway and the USSR switched their bids to 2000-03 and the Council approved France's candidature.

On the membership front, North Korea joined IGU, Egypt moved from observer to statutory membership and Iraq left.

Despite all the challenges, the 18th WGC was a resounding success. Herbert Richter and Rolf Beyer presided at the opening ceremony on July 8, and the guests of honour were Dr Christine Bergmann, Mayor of Berlin and Klaus Beckmann, Secretary of State at the Ministry of Economics.

Records were set for delegates (3,100), accompanying persons (1,200) and the number of exhibitors (380). Apart from the reports of the 10 technical committees, there were 115 individual papers, 74 contributions to workshop sessions, 65 posters and 43 films and videos. The technical visit programme included a tour of Europe's largest facility for the recovery of landfill gas, and the USSR brought the Tupolev Tu-155 to Berlin. This was a test aircraft which used LNG as a fuel.

Meeting the day before the conference started, the Council elected Luigi Meanti of Italy President and Hans-Jørgen Rasmusen of Denmark Vice President for 1991-94. The IGU Prize was awarded to Christine Ribes and the late Eric Siaudeau of France for their work "New criteria for evaluating odorisation techniques and their use in a new odorant". Two other papers were awarded prizes sponsored by the German gas industry and the NOC. A number of



◄◄ FAR LEFT Luigi Meanti, IGU President 1991-94, addresses delegates to the 19th WGC and LEFT presents the IGU Prize to Chris Rose from the UK, and two other prizes to Gabriele Olivieri from Italy and Iromori Kozubo from Japan. The pictures are taken from a video in the Eni archives.

diplomas were also awarded, notably to Olga Huvalé who was retiring from the Secretariat having served as assistant to Bernard Goudal and adviser to Jean-Pierre Lauper.

New states and new Articles of Association

As the 1988-91 Triennium drew to a close, the wars of Yugoslav succession started. Then, in December 1991, the USSR was dissolved followed by Czechoslovakia in December 1992. The three states ultimately became 23 with a big impact on the membership of all international organisations.

As far as the immediate changes in IGU's membership were concerned, Russia assumed the USSR's obligations, the Czech Republic and Slovakia joined and Croatia and Estonia became observers. Additionally, Romania rejoined as an observer, Colombia and Tunisia joined and Brazil left.

IGU's statutes were reviewed during the 1991-94 Triennium. The aim was to improve the running of the Union while retaining the concept of a cost-effective body based on voluntary work backed up by a modest Secretariat. As IGU had grown so had the size of the Council, which was meeting twice a year, while the Bureau lacked executive powers and the Papers Committee did not have statutory status.

It was decided to reduce the number of annual Council meetings to one (except in World Gas Conference years), convert the Bureau into a slightly larger Executive Committee meeting twice a year and create a new organ of IGU, the Technical Coordinating Committee (TCC), to replace the Papers Committee. The members of the Bureau were the President, Vice President and Immediate Past President, representatives of the countries chairing technical committees and two representatives elected from among countries not chairing a technical committee. The new Executive Committee would include two more elected members and the TCC Chairman. Additionally, provision was made to confer the status of Honorary Member of IGU on people who had rendered outstanding service to the Union.

New Articles of Association were approved by the Council in 1993, whereupon the statutory members became known as Charter Members. The revision of the technical committee structure started in the previous Triennium was also completed and approved to take effect from the 1994-97 Triennium (*see box over*). The main change was to bring computing and personnel services under the remit of the information and communication committee (G) in order to dedicate a committee (K) to the utilisation of gases for transport. The life of the task force looking at gas and the environment, which had been extended into the 1991-94 Triennium, was extended again and a new task force set up to study gas and developing countries.

Meanwhile, The Netherlands had offered to take over from Switzerland as the next host of

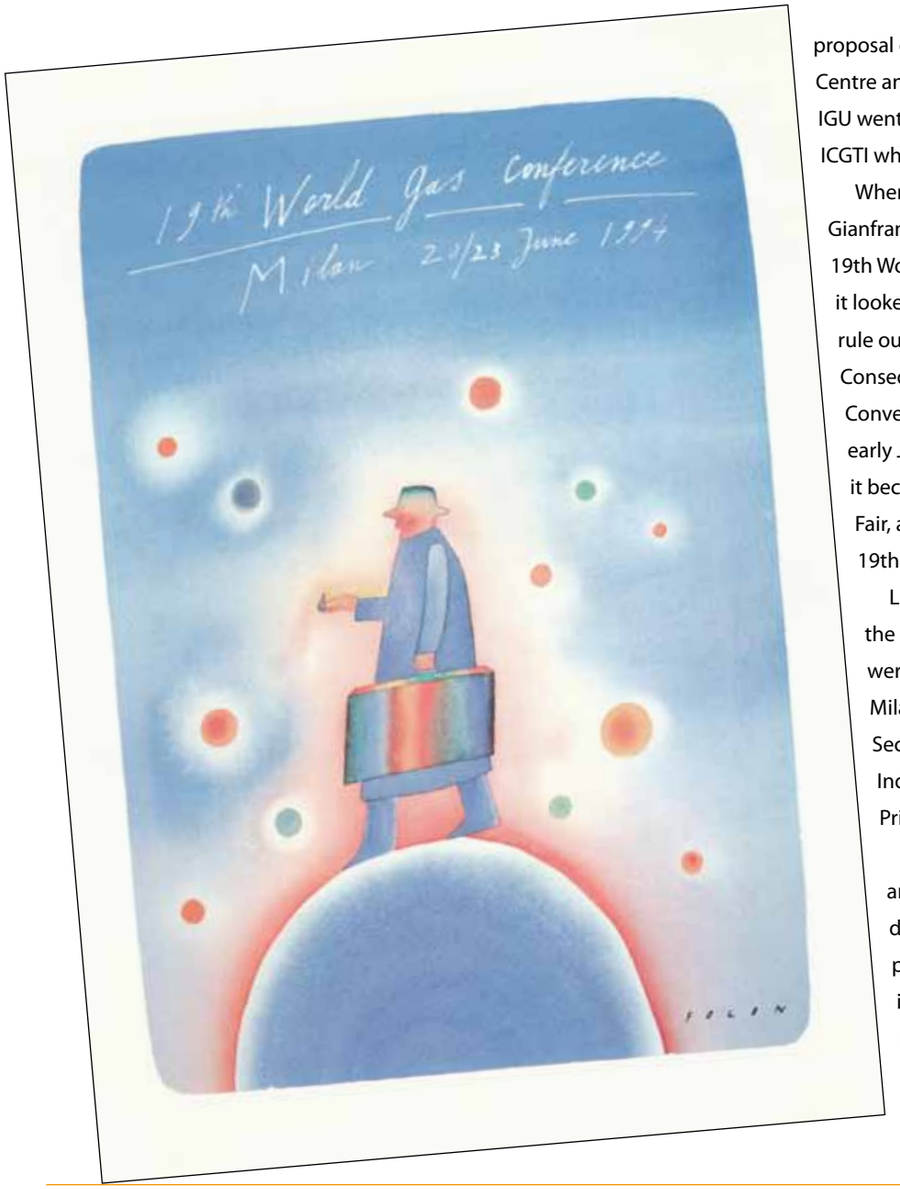
▼ Jean-Pierre Lauper, IGU Secretary General 1988-94 (*left*) makes a point to Luigi Meanti.

the Secretariat and, meeting in Stavanger in June 1992, the Council appointed John F. Meeder, Public Affairs Manager of Gasunie, as Deputy Secretary General. As regards the 2000-03 Presidency, Norway and Russia withdrew their bids and the Council approved Japan's candidature.

Among other developments during the Triennium, two Honorary Presidents died, Leslie Clark in 1992 and Georg Düwel in 1994, and IEA invited IGU to become involved with a new International Centre for Gas Technology Information (ICGTI). This was going to be set up under the IEA's auspices, based on a joint proposal of the Danish Gas Technology Centre and the US Gas Research Institute. IGU went on to become an observer at the ICGTI when it was launched in 1995.

Technical Committee structure for the 1994-97 Triennium

Committee and area of study	*Chair 1994-97*
A Production, Treatment & Underground Storage of Natural Gas	Germany
B Production of Manufactured Gases & Hydrogen	UK
C Transmission of Gases	Canada
D Distribution of Gases	USA
E Domestic & Collective Utilisation of Gases	Italy
F Industrial Utilisation of Gases & Power Generation	The Netherlands
G Information & Communication	Spain
H Liquefied Gases	Japan
J World Gas Prospects, Strategies & Economics	France
K Utilisation of Gases for Transport	Russia



▼ The Belgian artist Jean-Michel Folon designed this poster for the 19th WGC.

When the Italian NOC, chaired by Gianfranco Merri, started planning the 19th World Gas Conference in Milan, it looked as if renovation works would rule out the Milan Fair as a venue. Consequently, the city's Fiori Convention Centre was booked for early June 1994. However, in July 1992 it became possible to book the Milan Fair, albeit two weeks later, and the 19th WGC was held there.

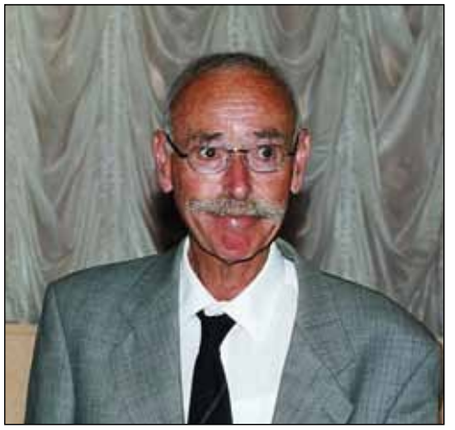
Luigi Meanti's guests of honour at the opening ceremony on June 20 were Marco Formentini, the Mayor of Milan, Giampiero Beccaria, Under Secretary of State at the Ministry of Industry, and Viktor Chernomyrdin, Prime Minister of Russia.

The 19th WGC ran until June 23 and set new records with 3,900 delegates, 1,400 accompanying persons and 420 exhibitors. It also introduced keynote speeches to replace the traditional presentation of national and international papers at the plenary sessions. Faisal Abda'oe, President of Pertamina, gave the first of six keynote speeches on June 20. There were also three luncheon speeches, while 98 reports and papers, 71 posters and 69 videos were presented. A further 15 papers were published together with three handbooks prepared by the information and communication committee (Statistical Data, International Classification for the Documentation of the Gas Industry and IGU Terminology).

The IGU Prize was presented during the closing ceremony to Chris Rose from the UK for his paper, "Establishing the level of methane leakage from the British Gas distribution system". A prize sponsored by IGU's Italian Charter Member went to Gabriele Olivieri from Italy and the prize of the 19th WGC went to Iromori Kozubo from Japan.

The social programme included a special opera recital at La Scala, and technical visits were offered to Snam's gas dispatching centre, a compressor station, cogeneration plants and a pipeline crossing of the Alps.

Meeting the day before the conference started, the Council meeting elected Hans-Jørgen Rasmusen of Denmark President and Jacques Maire of France Vice President for 1994-97. It also elected John Meeder as Secretary General, with the Secretariat to be hosted by Gasunie in Groningen, and appointed the first two Honorary Members of



◄◄◄ Herbert Richter (*left*), IGU President 1988-91, and Hans Jørgen Rasmusen, IGU President 1994-97 at the 19th WGC.

◄◄ John Meeder, IGU Secretary General 1994-2000.

◄ John Meeder presenting a gift to the retiring Secretary General, Jean-Pierre Lauper.

IGU – the retiring Secretary General Jean-Pierre Lauper and Masafumi Ohnishi in recognition of his service to the Japanese gas industry.

IGU raises its profile

An important initiative of the Danish Presidency was to raise the Union's profile between World Gas Conferences. Steps were taken to send IGU representatives to more conferences, increase personal contacts with members, make more efforts to attract new members and develop a press relations strategy. A newsletter and website were launched, a formal statement of IGU's objectives drawn up and an overview of the technical work programme published for worldwide distribution.

Although there had been recent changes to IGU's committee structure, the pace of change in the gas industry was increasing and policy issues were becoming as important as technical ones. A working group was set up to carry out a thorough review of technical activities. The members were the TCC Chairman Peter Hinstrup, Vice Chairman Francis Dewerdt and Jaime Elgström, Chairman of Working Committee G.

The working group recommended that the way in which IGU's technical work programme was developed be changed from a bottom-up to a top-down approach based on strategic guidelines from the President, approved and developed by the Executive Committee. It also reviewed the committee structure and the allocation of committee chairs. The main changes recommended here were to discontinue certain information activities such as the dictionary or make them the responsibility of the Secretariat, and merge two of the utilisation committees, thus allowing committees to be dedicated to gas and developing countries and to the environment, safety and health. Additionally, it was proposed to restrict a country's chairmanship to one Triennium. The idea was to introduce a system of chairs and vice chairs from different countries withthe vice chair in one Triennium taking over the chair in the next.

These recommendations were accepted by the Council at its meeting in Edinburgh in October 1996, and the Articles of Association were amended with the new committee structure taking effect from the 1997-2000 Triennium (*see box on page 58*).

Meanwhile, the annual UN Climate Change Conferences had started, with IGU being granted non-governmental organisation (NGO) status. The United Nations Framework Convention on Climate Change (UNFCCC) had been agreed at the Rio Earth Summit in 1992 and the first Conference of the Parties (COP) to the UNFCCC was held in Berlin in 1995. The chairman of the task force on gas and the environment, Frank Shephard represented IGU at the COPs. The task force also worked on a

▼ The first issue of IGU's newsletter was published in December 1994.

IGU NEWSLETTER

December 1994

From the editor

Welcome to the first edition of our own newsletter. We hope that it may contribute to a further improvement of communication between all those individuals who are interested in and contribute to the mission of IGU, which is: "To promote the technical and economic progress of the gas industry". It may also help to: "Stimulate the exchange of information and cultivate cooperative relations amongst members" as our Articles of Association say. It is our intention to appear twice per year, so wait for the next edition of the "IGU Newsletter". If you find this newsletter of interest, do not hesitate to show it to your colleagues or others.

At the beginning of 1995, the President and the secretariat want to convey their best wishes to all their

"World Gas Conference 1997 will do more for the businessman in gas" says Rasmusen

Hans Jørgen Rasmusen, the new president of IGU believes that in order to appeal to the increasing number of managers in the gasworld who are not technically educated (but are therefore not necessarily less intelligent, note of the editor), the 20th World Gas Conference in Copenhagen will have more to do with the business aspects of technical developments. Gas supply will, to an increasing degree, meet competition from other energy forms. "We must prepare ourselves business-wise for this. Octopus arms, overview and diplomacy will be very necessary as the world gas market is undergoing changes".

The new competitive environment
Social event during Council Meeting at Odense

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Banners at Copenhagen airport welcome delegates to the 20th WGC.

▲ ►
HRH Crown Prince Frederik of Denmark (*left in the foreground*) arrives at the 20th WGC with IGU President Hans Jørgen Rasmusen.

►
The 20th WGC was held in Copenhagen's Bella Center.

joint publication with Eurogas and Marcogaz for the 20th WGC and drafted an environmental charter to underline the commitment of IGU's members to sustainable development and good environmental practice. This charter was adopted by the Council at the Edinburgh meeting.

The efforts to raise IGU's profile entailed an increase in the Secretariat's workload and in turn raised the question of whether IGU should have a full-time Secretary General and a permanent Secretariat in future. Up to now the Secretary General had combined his national job with part-time work on IGU duties, backed up by a full-time assistant. A working group was set up to investigate and seek the views of members.

The drive to increase membership bore fruit with a net increase of seven: Estonia, Croatia

The President's dinner during the 20th WGC was held in the turbine hall of the Gothersgade power station in Copenhagen. In the foreground are: Peter Storm, then NOC Chairman (*left*); his wife Bodil Storm (*centre*); and Ineke Nijbroek, assistant to the Secretary General (*right*).

Seven gas companies brought hot air balloons to the 20th WGC.

▶ The first Council meeting of the 1997-2000 Triennium was held in Deauville in October 1997.

▼ As part of its work in promoting gas, IGU distributed this brochure at COP 4 in 1998.

Hiroshi Urano of Japan as Vice President, when the Council met the day before the 20th World Gas Conference, which was held in Copenhagen's Bella Center, June 10-13, 1997.

In line with its theme "Technology for Business Development", there were a number of innovations for the 20th WGC. The proceedings were published on a CD-Rom which was included in the registration package, while an area called the technology forum was created to group together the poster exhibition, video room and documentation centre. It also included computer facilities and a café.

As a further innovation, the NOC recruited close to 200 volunteers from Danish gas companies and organised them into 30 "service teams" to answer questions and help delegates. They were stationed wherever WGC activities were taking place as well as in the airport and the main hotels.

HRH Crown Prince Frederik of Denmark formally opened the conference on June 10 in a ceremony that was also addressed by Hans Jørgen Rasmusen, Svend Auken, Minister of Environment & Energy and Jens Kramer Mikkelsen, Mayor of Copenhagen. Later that day the technical sessions started, during which the reports of the 10 committees and two task forces were presented along with 80 papers,

and Ukraine became Charter Members, Bosnia and Herzegovina, Israel, Latvia, Lithuania, Qatar and Slovenia became observers and Brazil rejoined as an observer, while Colombia, North Korea and Peru left.

Three Honorary Presidents died during the Triennium, Jacob van Dam van Isselt in 1994, Bengt Nilsson in 1996 and James Kerr in 1997. Among other developments, Jacques Maire stood down as Vice President on becoming CEO of Gaz de France and Claude Détourné was elected Vice President in 1996. He went on to be elected President for 1997-2000, along with

Technical Committee structure with effect from the 1997-2000 Triennium

Committee and area of study	*Chair / Vice Chair 1997-2000*
1 Exploration, Production, Treatment & Underground Storage of Natural Gas*	Norway / Russia
2 Production of Manufactured Gas**	USA / Germany
3 Liquefied Gases	Italy / Spain
4 Transmission	Russia / Italy
5 Distribution	UK / France
6 Utilisation of Gases for the Domestic, Commercial & Transportation Sectors	Canada / The Netherlands
7 Industrial Utilisation & Power Generation	Germany / UK
8 Environment, Safety & Health	The Netherlands / Canada
9 World Gas Prospects, Strategy & Economics	Japan / USA
10 Gas & Developing/Transitional Economy Countries	Algeria / Argentina

* From 2000 Exploration & Production of Gas
** From 2000 Underground Storage of Gas
Note: The committees now reverted to being referenced by number.

Unlocking America's shale gas riches

Commercial development of shale gas has revolutionised the US gas industry, turning the country into a net exporter, and the shale revolution has been extended to oil. It was made possible by a collaborative effort involving government funding, research institutes and the private sector. Many people from academia and industry played important roles but one man's grit and determination came to symbolise the efforts of all. That man was geologist and petroleum engineer George Phydias Mitchell (1919-2013), Chairman and principal shareholder of Mitchell Energy & Development Corporation.

"Mitchell dramatically changed America's energy position," declared IGU Wise Person Dr Daniel Yergin, Vice Chairman of IHS Markit. "As such, he also changed the world energy outlook in the 21st century and set in motion the global rebalancing of oil and gas that is now occurring."

Research into unconventional gas resources in the USA began in the second half of the 1970s, initially targeting coal-bed methane and then shale and tight sands. The Gas Research Institute (GRI) played an important role in developing collaborative research programmes. (GRI merged with the Institute of Gas Technology in 2000 to form the Gas Technology Institute, which is an organisation affiliated to IGU.)

◄◄ GTI presented George Mitchell with a Lifetime Achievement Award in 2010 to recognise his pioneering of drilling and completion technologies that created the shale gas revolution.

◄ The Blakley Estate D2H well in the Barnett Shale was the first well to combine horizontal drilling with hydraulic fracturing. It was drilled and completed by Devon Energy in 2002 after its acquisition of Mitchell Energy and is still producing today.

As Trevor Smith, formerly Programme Manager for Upstream Unconventional Gas at GTI explained, "these programmes led to the development of advanced hydraulic fracturing technology and a fundamental understanding of gas adsorption/desorption in rock formations."

Hydraulic fracturing had originally been developed by the oil industry and was first carried out commercially in Oklahoma in 1949 by Halliburton under a Stanolind patent following trials at the Hugoton field in Kansas. In 1981, Mitchell began experimenting with the technique in the Barnett Shale, a dense formation in north-central Texas, with the aim of cracking the rock and allowing gas to flow freely from the formation. He would experience a decade and a half of frustrations before his company's commitment of time and resources paid off.

▼◄ Following trials at the Hugoton field in Kansas, the petroleum industry's first commercial hydraulic fracturing was carried out in Oklahoma in 1949. The technique would later be used to exploit unconventional gas resources.

"My engineers kept telling me, 'You are wasting your money, Mitchell'," he told Forbes when interviewed in 2009. "And I said, 'Well damn it, let's figure this thing out, because there is no question there is a tremendous source bed that's about 250ft thick'."

Over the years, technology developed by GRI, including microseismic imaging for measuring fracture performance and fracture modelling software, was leveraged by Mitchell and combined with experimentation with different combinations of fracking fluids and proppants. GRI and the Department of Energy also helped Mitchell with a horizontal well in 1991 to gain a better understanding of the Barnett Shale although the company concentrated on vertical wells.

Finally, there was a breakthrough in 1997 when a fracking combination originally developed by Union Pacific Resources and refined by Mitchell's engineers was used which resulted in sustained production increases in a test well. Known as a slick water frack this used a high volume of water compared to earlier experiments using foamed carbon dioxide and gels and was cheaper to perform. By 2001, Mitchell Energy was producing 365 million ft^3 (10.3 million m^3) of gas a day from the Barnett Shale, up 250% in two years.

In 2002, Mitchell sold out for $3.5 billion to Devon Energy which combined hydraulic fracturing with horizontal drilling and further accelerated production in the Barnett Shale. The techniques were adopted by other companies and extended to shale formations across the country with a dramatic increase in production of gas and oil. Today, the USA is a major net exporter of gas and could well surpass Qatar and Australia to become the world's largest LNG exporter by the mid-2020s.

▲
Claude Détourné, IGU President 1997-2000 (*left*) congratulates Francis Dewerdt, TCC Chairman 1997-2000 on being made an Honorary Member during the June 2000 Council meeting in Nice.

▲ ►
Claude Détourné addresses the 21st WGC.

90 posters and 49 videos. There were also 22 roundtables, six keynote speeches and three luncheon speeches, while the last hard-copy edition of the dictionary and the joint IGU/Eurogas/Marcogaz collection of case studies "Climate Change, the Case for Gas" were launched.

As well as the usual technical visit and social programmes, a sporting event was organised. In "The Tour de Gaz" cycle race, 60 contestants from gas companies in five countries set off from Nancy in France on June 4 and arrived at the Bella Center on the last day of the conference.

The 20th WGC was attended by 3,300 delegates, 1,000 accompanying persons and 300 press representatives from 68 countries. The fall compared to the 19th WGC in Milan reflected the smaller size of the Danish gas industry compared to the Italian. However, the 20th WGC did have the highest-ever number of participants from outside the host country.

The third French Presidency

The new technical committee structure came into operation for the 1997-2000 Triennium and a task force on computing was also set up. This took over responsibility for the next IGU-sponsored symposium on computing in the gas industry. Following the first in 1984, similar events had been held in 1988, 1990 and 1996. The fifth would be hosted by the Italian Charter Member in Florence in April 1999.

Work continued under the French Presidency to raise IGU's profile and promote the role of gas.

The Chairman of Working Committee 9, Tsunenori Tokumoto presented a paper at the 15th World Petroleum Congress, heralding deeper cooperation between IGU and the World Petroleum Congresses (WPC).[3] WPC's 15th Congress was held in Beijing four months after the 20th WGC, and preparations were already in hand to have the next edition of the two events in 2000. IGU, WEC and WPC agreed that it would be better to stagger their triennial conferences in future, and WPC moved its 17th Congress from 2003 to 2002 to set up the current cycle. The three organisations also agreed to offer each other a stand free of charge in their respective exhibitions, and to extend standing invitations to address each other's Council meetings. From 2000, IGU started attending the Council meetings of WEC and WPC on a regular basis.

IGU also stepped up its presence at the UN Climate Change Conferences with the aim of promoting the contribution of gas to sustainable development more effectively. For COP 5, which was held in Bonn in 1999, IGU got together with Eurogas to set up a stand and organise a seminar.

The working group looking into the possibility of having a permanent Secretariat ruled this out on the grounds of cost, but in

►
HRH Prince Laurent of Belgium *(left in the foreground)* at the ARGB stand in the exhibition during the 21st WGC with Jacques Peyrat, Mayor of Nice (*centre*) and Claude Détourné.

3 In 2001, the organisation dropped the plural to become World Petroleum Congress and in 2005 changed its name to World Petroleum Council.

Hector Olea, President of Mexico's energy regulator CRE, gives a luncheon speech during the 21st WGC.

future the post of Secretary General would be full-time. Denmark offered to take over as the next host of the Secretariat and, meeting in Buenos Aires in October 1998, the Council elected Peter K. Storm, who had been the NOC Chairman for the 20th WGC, as Deputy Secretary General. This was also the meeting at which a further change to the technical committee structure was approved. With effect from the 2000-03 Triennium, WOC 1 would cover exploration and production of gas, both manufactured and natural, while WOC 2 would cover underground gas storage.

Argentina and The Netherlands made formal bids for the 2003-06 Presidency and for the first time the issue was decided via a secret ballot. Meeting in Cheju Island, Korea in October 1999, the Council listened to presentations by both countries and then chose The Netherlands. The Council also mourned the death of Albert Higgins, who had served as Secretary General between 1970 and 1979. Honorary President Georges Robert died in 2000.

As regards new members, there was a net increase of three during the Triennium: Nigeria joined and Turkey rejoined as Charter Members; Belarus, Chile, Monaco and Singapore joined as observers; Colombia rejoined as an observer; and Bulgaria, Libya, New Zealand and Thailand left. Additionally, Brazil and Lithuania moved from observer to Charter membership.

"Gas, the Energy for the 21st Century" was the theme for the 21st World Gas Conference, which was held in Nice, June 6-9, 2000.

Claude Détourné's guests of honour at the opening ceremony in the Acropolis Convention Centre were Loyola de Palacio, Vice President of the European Commission, and Jacques Peyrat, Mayor of Nice. The increasingly popular roundtable format accounted for 30% of the technical programme, with reports on the triennial activities accounting for 40% and the plenary sessions for 30%. Overall, there were 180 presentations in addition to the luncheon speeches, and the IGU Prize was won by Keith Wild of BG Technology for his paper "Controlling processes that are sensitive to natural gas quality". Attendance was similar to Copenhagen with 3,300 delegates, 1,000 accompanying persons and 350 press representatives, while the exhibition was the largest yet in terms of space sold – a net 17,300 m^2.

Meeting the day before the 21st WGC, the Council elected Hiroshi Urano of Japan President and George H. B. Verberg of The Netherlands Vice President for 2000-03. John Meeder retired as Secretary General and was appointed an Honorary Member. Peter Storm took over from him with the Secretariat to be hosted by DONG in Hørsholm just outside Copenhagen.

Seen outside the Acropolis Convention Centre are (*from left to right*): Jacques Deyirmendjian, President of the ATG; Pierre Gadonneix, Chairman & CEO of Gaz de France; Jacques Peyraut; Claude Détourné; Hiroshi Urano and Guy Peignelin, NOC Chairman.

Speaking for the Gas Industry Worldwide

While IGU had had members from outside Europe and North America since Australia joined in 1936, it was not until 2000 that countries from outside these regions started to lead the Union. Japan held the Presidency for the 2000-03 Triennium, Argentina for 2006-09, Malaysia for 2009-12, Korea for 2018-22 and China will take the helm for 2022-25.

The Japanese Presidency

Under the Japanese Presidency, IGU redoubled efforts to demonstrate that natural gas could support growing energy needs on a global scale over a lengthy time-horizon. The theme for the Triennium was "Catalysing an Eco-Responsible Future", which was reflected in three special projects carried out in addition to the work of the technical committees and task forces.

"Global Energy Scenarios" looked at the potential for natural gas and gas-based technologies to meet the growing need for clean and affordable energy; while "Catalysing Asia's Infrastructure" studied the technical, commercial and policy issues affecting the development of Asia's gas infrastructure. The third special project, "Sustainable Urban Systems Design", was organised as a competition to generate innovative proposals to help resolve the challenges of accelerating urbanisation.

Three task forces operated during the Triennium. One focused on climate change and sustainable development, and produced a set of Guiding Principles for Sustainable Development to supersede the IGU Environmental Charter of 1996. Another looked at information and communication technology (ICT) – a wider concept than the former focus on computing – and prepared a symposium on ICT in the gas industry. This was hosted by the Czech Charter Member in Prague in April 2002. The third task force reviewed IGU's structure in the light of developments in the gas industry. It drafted a new statement of IGU's Vision, Mission and Objectives and recommended major changes to the Articles of Association. The new Articles were approved by the Council when it met in Kuala Lumpur in September 2002.

The most significant change was the introduction of a new category of membership allowing companies and organisations operating in the gas industry from any Charter Member country to join IGU as Associate Members. This would broaden the Union's knowledge-base and network considerably. Observer status was abolished with all observers as of January 1, 2003 automatically becoming Charter Members.

A new technical committee structure was introduced with five Working Committees (WOCs) covering the gas chain and four Programme Committees (PGCs) covering other technical, economic and policy issues, while the TCC became the Coordination Committee. This took effect from the 2003-06 Triennium.

The custom of the principal officers working together to deal with day-to-day business was formalised as the management team comprising the President, Vice President, Immediate Past President, Secretary General and Chairman and Vice Chairman of the Coordination Committee.

English became the working language although French remained an official language, and the convening of electronic Council sessions was formalised. The first electronic Council session had been held in October 2001,

◄ ▼
Tokyo's International Exhibition Centre with its distinctive 58m-high conference tower (LEFT) was the venue for the 22nd WGC (BELOW), the first to be held in Asia.

when many organisations had travel restrictions in place following the terrorist attacks of September 11.

The Kuala Lumpur meeting was also the one during which the ballot was held to decide the 2006-09 Presidency. Argentina, Korea and Malaysia were the contenders and the Council chose Argentina.

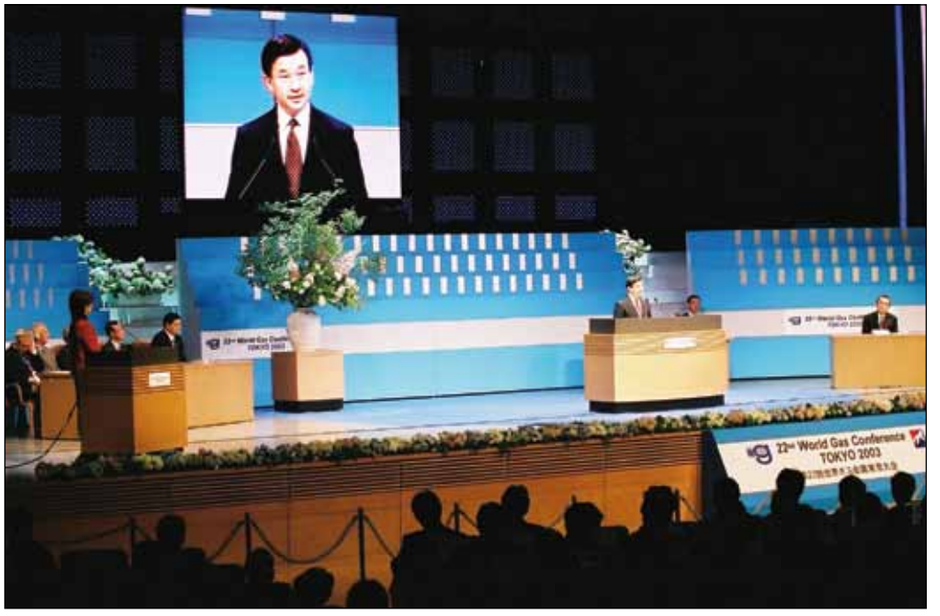
Meanwhile, IGU continued to step up its involvement in the UN Climate Change Conferences and was invited to address a plenary session during COP6, which was held in The Hague in November 2000. Vice President George Verberg gave the presentation. IGU was also granted NGO status at the 2002 World Summit on Sustainable Development.

Among other developments during the Triennium, IGU marked its 70th anniversary in

2001 by publishing a new general brochure on the Union and commissioning a book called *Seven Decades with IGU* to be ready for the next WGC in 2003. However, the last hard-copy edition of the newsletter was published in March 2001 as it was becoming increasingly expensive to produce and distribute. Sadly, 2001 was also marked by the death of Bernard Goudal, who had served as Secretary General between 1979 and 1988.

In 2002, a redesigned website was launched during the ICT symposium that April; and in 2003, the new status of an organisation affiliated to IGU was introduced. The first agreement was signed with Intergas Marketing.

Membership grew significantly with Bolivia, Brunei, Cameroon, Greece, Kazakhstan,



HIH Crown Prince Naruhito of Japan addresses the opening ceremony of the 22nd WGC.

Hiroshi Urano, IGU President 2000-03 (TOP), Chiaki Gomi, TCC Chairman 2000-03 (CENTRE) and Peter Storm, IGU Secretary General 2000-07 (BOTTOM).

Oman, Saudi Arabia, South Africa, Trinidad and Tobago and the UAE joining and Thailand rejoining, although Chile and Colombia left. The first Associate Members were BP Gas, Power & Renewables, ChevronTexaco Overseas Petroleum, İGDAŞ – Istanbul Gas Distribution Co., Naturgas Fyn, NUON, Ruhrgas, Shell International Gas Ltd, Total and Tractebel.

Towards the end of the Triennium, the outbreak of SARS (Severe Acute Respiratory Syndrome) posed a serious threat to global health. The 22nd World Gas Conference was set to take place in Tokyo, June 1-5, 2003, and the NOC had to make the difficult decision to ask people from affected areas to refrain from attending. However, Japanese industry representatives turned out in force and the final total of 4,326

The President's dinner was held in the Tokyo National Museum.

delegates was a record. It was only because the number of accompanying persons fell to 543 that overall attendance did not set a record.

Meeting on the morning of June 1, the Council elected George Verberg of The Netherlands President and Ernesto López Anadón of Argentina Vice President for 2003-06. The opening ceremony of the 22nd WGC was held that afternoon with HIH Crown Prince Naruhito as the guest of honour. Hiroshi Urano, Kunio Anzai, Chairman of the NOC, and Takeo Hiranuma, Minister of Economy, Trade and Industry also addressed delegates.

The technical sessions started on June 2, with the programme designed to provide a broad scope of interest not only to gas industry delegates but also to representatives of government, regulators and international organisations. There were 10 keynote speeches in morning and afternoon plenary sessions followed by a series of strategic roundtables. These addressed the three special projects, fuel cells, the future of natural gas related technology, new LNG markets and business models in the context of deregulation and liberalisation. The committee sessions and technology forum ran in parallel with 284 oral and poster presentations.

▲◄ Peter Hinstrup, TCC Chairman 1994-97 (*left*) in conversation with Francis Dewerdt, TCC Chairman 1997-2000 during the President's dinner.

▲ The Japanese Gas Association set up the Japan Atrium in the 22nd WGC's exhibition.

◄◄ Strategic roundtable panellists at the 22nd WGC included (*from left to right*) Baihaki Hakim, CEO of Pertamina; Tan Sri Dato Mohd Hassan Marican, CEO of Petronas, Faisal Al-Suwaidi, Managing Director of Qatargas; and Linda Cooke, CEO of Shell Gas & Power.

◄ Hiroshi Urano (*left*) and Kunio Anzai, NOC Chairman at the closing ceremony of the 22nd WGC.

A South American challenge: Transporting gas across the Andes

At the turn of the century several pipelines were developed in South America which rose to unprecedented heights to cross the Andes Mountains. The Atacama and Norandino pipelines sending Argentine gas exports to Chile opened in 1999 reaching 5,093m and 5,000m respectively, while the Camisea gas and natural gas liquids (NGL) pipelines in Peru reach 4,868m and opened in 2004. Here we focus on the Peruvian project which fundamentally changed the country's energy matrix.

Camisea

Perúpetro awarded the Camisea contracts – named after the Camisea River – covering gas fields in the region of Cusco in 2000 (Block 88) and 2004 (Block 56). The first phase came on stream in August 2004 piping gas to the Lima/Callao metropolitan area and NGL to a fractionation plant and shipping terminal at Lobería in Pisco Province. Prior to that, Peru's gas industry was limited to the Aguaytía gas and power project in the region of Ucayali and a number of injection projects in the oil industry, with consumption averaging 0.4 bcm/year. By 2019, this had surged to 8.3 bcm amounting to 26% of the country's primary energy consumption. Peru LNG exported a further 5.2 bcm.

"When we first started this project, we knew that we were facing an enormous challenge," says José Luis Lanziani, former Technical Operational Manager for Transportadora de Gas del Perú (TGP). "Building over 1,000km of pipeline is not simple at all, even more in a territory as complicated as ours. But the idea of how this would improve the lives of millions of Peruvians was really exciting for us. We can proudly say that our work totally changed Peru's energy matrix. Today, 50% of the country's electricity comes from the natural gas TGP transports."

Pluspetrol is the upstream operator of Blocks 88 and 56 and its partners are Hunt Oil, Tecpetrol, Repsol and Sonatrach. (SK Energy was originally a partner but sold its stake to Pluspetrol in 2019.) There is a gas processing plant at Malvinas from which product is dispatched via the pipelines which are operated by TGP. The NGL pipeline runs for 560km to Lobería, while the gas pipeline to Lima is 730km long.

The first 210km of the latter were built with a larger diameter to provide reserve capacity and avoid the need for additional pipelaying in a particularly ecologically sensitive area.

"There were many important moments during this project," continues José Luis Lanziani. "I remember when the Chiquintirca compressor plant in the Province of Ayacucho was built – a really outstanding facility, the highest in South America, located 3,000m above sea level, soundproofed and with a capacity to transport 1,270 mcf/d (35.5 mcm/d)."

The Camisea project was challenging on all fronts. The gas fields are in a remote area of unique biodiversity, and to get the gas to market it has to be piped across the Andes before dropping down to sea level. The potential for environmental damage and harm to local people made exploiting the Camisea gas resources controversial from the start, and a comprehensive outreach programme was developed as an integral part of both phases of the project.

"A major challenge we faced was working in a biodiversity hotspot in the jungle," says TGP's General Manager Tomás Delgado. "For the first 220km of the pipeline system we used air transport like an offshore operation and no road was opened. We built an airfield in Kiteni to support the logistics and transport operations for the works mainly in jungle sector."

Apart from using gas for electricity generation, Peru has a large fleet of natural gas vehicles and many industrial and residential consumers. To meet increasing demand, TGP has increased the capacity of the gas pipeline by adding a coastal loop and building a new compressor plant at Kamani. "The equipment for Kamani's 72,000 HP compressor plant, including four turbochargers, was transported by land from the port of El Callao which represented a huge logistical challenge," continues Tomás Delgado.

"Something really important for us is reliability," says Jesús Santeliz, Technical Operational Assistant Manager at TGP. "We must ensure a seamless service, with no interruptions. In order to accomplish that goal, we have a team that monitors the whole transport system, optic fibre all through the pipelines, a satellite back up and the SCADA (supervisory control and data acquisition) system that tracks 13,000 variables in real time."

LNG exports

The reserve capacity in the first section of the TGP pipeline now serves the Peru LNG project, which shipped its first cargo in June 2010 and is led by Hunt Oil with Repsol, SK Energy and Marubeni as partners.

Peru LNG comprises a 408km pipeline branching off the TGP line at Chiquintirca, in Ayacucho region to a single-train liquefaction plant with a nameplate capacity of 4.45 mtpa on the Pacific coast at Pampa Melchorita, 170km south of Lima. The plant is in a zone of high seismic activity and had to be built to withstand an earthquake of up to 8.6 on the Richter scale. It is located on a plateau above sea level to give tsunami protection and there is a 140m drop to the marine terminal which has a 1.3km jetty, a tug boat dock with a 200m breakwater and a main 800m breakwater.

As Peru LNG's former General Manager Barbara Bruce and Deputy General Manager Carlos Lopez-Piñon explained in a paper presented at WGC2009, the target was to raise 60% of the $3.8 billion investment as project finance with the balance as equity, and the deal was then Latin America's largest project financing.

◀ Building the Camisea pipelines, which cross the Andes before dropping down to sea level, was a major technical achievement.

▲ Extensive use was made of air support and this airfield was built in Kiteni.

▶ Pipeline capacity has been increased by a number of developments including this compressor plant at Kamani.

George Verberg (*left*) and Ernesto López Anadón took over as President and Vice President for the 2003-06 Triennium at the end of the 22nd WGC.

The ICT conference was held in Busan in May 2005. Seen addressing the opening ceremony is Kyu-sun Lee, then-President of the Korea Gas Union.

The second Dutch Presidency

The gas industry had changed dramatically since The Netherlands first held the Presidency. Deregulation in the US had been followed by liberalisation and privatisation in Europe, and the move towards competitive markets was accelerating in other regions. In the new environment gas companies were examining every aspect of their expenditure, including the time spent on IGU work. Consequently, a key concern of the Dutch when developing the 2003-06 Triennial Work Programme was to enhance the value that IGU gave members.

The theme for the Triennium was "Gas: Powers the People, Preserves the World, Promoted by IGU". The new technical committee structure came into operation, together with three special project teams and two task forces.

The special projects looked at the use of gas for power generation, the role of gas in a sustainable energy system and the different regulatory regimes around the world. The ICT task force continued from the previous Triennium and was now charged with preparing a global conference on ICT in energy to be hosted by the Korean Charter Member in Busan in May 2005.

Prior to the start of the Dutch Presidency, the incoming leaders of the technical committees met in Amsterdam in January 2003.

The second task force covered research and development.

A collaboration portal was introduced as an adjunct to the website to make it easier for committee members to share reports and comment on them, and a magazine was launched to complement electronic communications. Rather than being a cost as the old newsletter had been, the magazine was contracted to a publishing company and financed by the sale of advertising with a royalty paid to IGU. *International Gas* was launched at the Executive Committee meeting in Doha in March 2004 with a frequency of two issues a year. Amongst other news, the first issue contained the obituary of Honorary President Eric Giorgis who had died in December 2003.

Another innovation was the setting up a panel of independent energy experts to advise the President called the Wise Persons Group (*see box*).

The Dutch Minister of Economic Affairs, Laurens Jan Brinkhorst addressing the opening ceremony of the 23rd WGC (FAR LEFT) and Amsterdam's Mayor, Job Cohen (LEFT) opening the exhibition.

Membership continued to grow during the Triennium, with Eurogas joining and Peru rejoining as Charter Members, although Bolivia left, and 16 new Associate Members. The European Gas Research Group (GERG), Gas Infrastructure Europe (GIE), Marcogaz, NGV Global (International Association for Natural Gas Vehicles) and Pipeline Research Council International (PRCI) became affiliated organisations. Ties with WPC were strengthened, and

Wise Persons Group

The idea for IGU's Wise Persons Group came from the members of the task force set up to produce the Union's new Articles of Association during the 2000-03 Triennium, and it started work in the following Triennium. As IGU's President for 2003-06, George Verberg, explained at the time: "We deemed it appropriate within IGU to have the Presidency advised by an outside group of energy experts from around the world. They are being asked to think about major energy issues, particularly in the natural gas sector, and to give their general viewpoint. It's about broad brush strokes rather than the nitty-gritty and about being thought-provoking rather than drawing definite conclusions. The idea is to start a good discussion among the IGU membership."

The group comprises three experts, two of whom have served since the beginning. These are Professor Dr Coby van der Linde, Director of the Clingendael International Energy Programme, The Netherlands, and Dr Daniel Yergin, Vice Chairman of IHS Markit.

They were initially joined by Mr Yoshihiro Sakamoto, President of Arabian Oil Company Holdings, and the Right Honourable Tim Eggar, Head of Country Coverage for ABN Amro Bank and a former UK Energy Minister. Mr Sakamoto was succeeded by Dr Rajendra K. Pachauri, Chairman of the Intergovernmental Panel on Climate Change, who in turn was succeeded by Dr Kandeh K. Yumkella, Director General of the UN Industrial Development Organisation (UNIDO). Dr Yumkella went on to become Special Representative of the UN Secretary General and CEO of Sustainable Energy for All. He stepped down at the end of 2015.

Coby van der Linde.

Nobuo Tanaka.

Daniel Yergin.

Meanwhile in 2012, Mr Eggar, by then Chairman of Cape plc, was succeeded by Nobuo Tanaka, Global Associate for Energy Security and Sustainability at the Institute of Energy Economics, Japan. Mr Tanaka is now a Special Advisor to the Sasakawa Peace Foundation.

Apart from serving in an advisory role, members also participate in IGU meetings and conferences. Professor van der Linde was the first member of the group to address the IGU Council when she took part in the meeting in Oslo in September 2004. Most recently, Professor van der Linde, Dr Yergin and Mr Tanaka moderated sessions during the 27th World Gas Conference in Washington DC in June 2018.

▼ This picture was taken in Amsterdam just before the opening of the 23rd WGC. Seated are George Verberg, President 2003-06 and John Kean, President 1985-88. Behind them (*from left to right*) are: Ernesto López Anadón, President 2006-09; Hiroshi Urano, President 2000-03; Claude Détourné, President 1997-2000; Hans Jørgen Rasmusen, President 1994-97; and Rolf Beyer, co-chairman of the 18th WGC in 1991.

▶ Professor Coby van der Linde, a member of IGU's Wise Persons Group, addresses a press conference during the 23rd WGC.

▲ Lisbeth Koefoed worked in the Secretariat between 2000 and 2006.

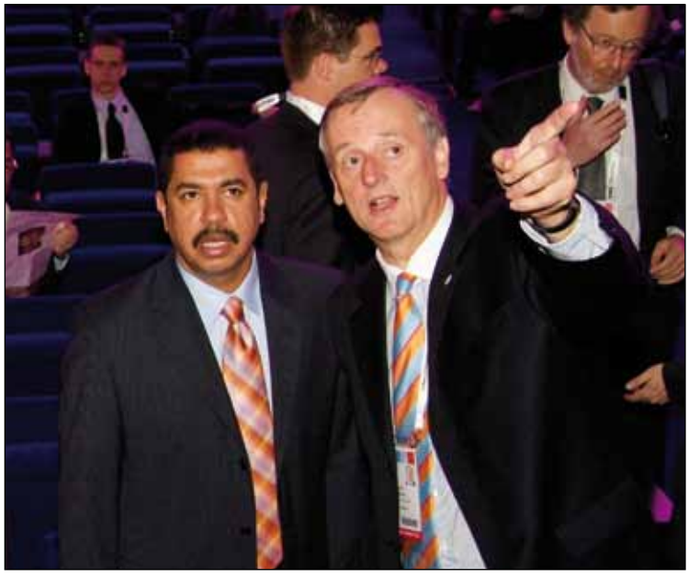
▲ Lotta Hållén-Kragh worked in the Secretariat between 2003 and 2007.

▶ The 23rd WGC was held in Amsterdam's RAI Congress & Exhibition Centre.

IGU organised a natural gas session at the 18th World Petroleum Congress in Johannesburg in September 2005. Indeed, a proposal to merge IGU and WPC was floated, but it was ruled out after evaluation by the management teams of the two organisations.

In 2005, arrangements were made to bring the International Gas Research Conference and Intergas Marketing into the IGU fold with effect from the next Triennium. The former became the IGU Research Conference and its Technical Programme Committee was supported by the Dutch gas industry through the Foundation IGRC which became an organisation affiliated to IGU. Intergas Marketing moved from being affiliated to become part of IGU as a new marketing committee.

As IGU grew so did the work of the Secretariat. The team increased to three people when Peter Storm and his assistant Lisbeth Koefoed were joined by Lotta Hållén-Kragh as webmaster. One of her responsibilities was overseeing the development of a new website to integrate the collaboration portal. A secondment programme was also launched, and members were invited to second a young staff member to the Secretariat in the next Triennium.



Denmark's term as host of the Secretariat was due to end in 2006, and France, Germany and Norway offered to take over. This was the first time there had been more than one candidate so a ballot was called. Moreover, it was decided to switch the changeover date from end- to mid-Triennium to avoid coinciding with the rotation of the Presidency. Meeting in Tianjin in October 2005, the Council elected Norway and extended Denmark's term to 2007. This was also when the election for the 2009-12 Presidency was held. Malaysia and Russia were the contenders and the Council chose Malaysia.

In its following, pre-WGC meeting, the Council elected Ernesto López Anadón of Argentina President and Datuk Abdul Rahim Hashim of Malaysia Vice President for 2006-09, together with Petter Nore as Deputy Secretary General. Mr Nore worked for Hydro which was going to host the Secretariat in Oslo.

The 23rd World Gas Conference was held in Amsterdam, June 5-9, 2006, coinciding with IGU's 75th anniversary. Attendance fell compared to Tokyo because the home delegation was much smaller. There were 3,318 delegates, 356 accompanying persons and 200 press representatives.

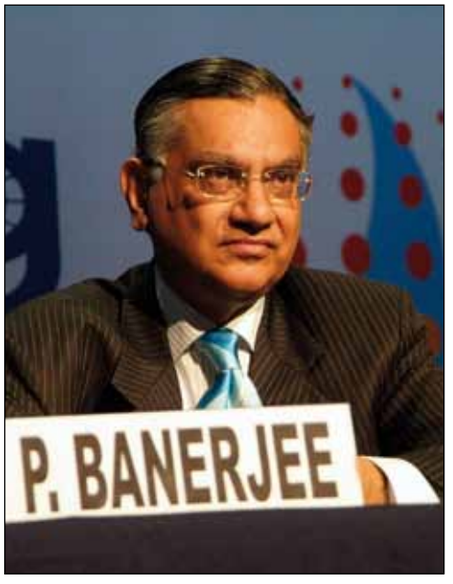
George Verberg's guests of honour at the opening ceremony in the RAI Congress & Exhibition Centre were Laurens Jan Brinkhorst, the Dutch Minister of Economic Affairs, and Viktor Khristenko, the Russian Minister of Energy. The ministers talked about the importance of partnerships and also stressed the need for greater transparency in energy policies and market structures, issues taken up throughout the conference by many of the keynote speakers.

Over the following three days, plenary keynote addresses opened the morning and afternoon sessions followed by strategic panels. The results of the special projects were reported as well as the findings of the R&D task force, and there were also panels looking at ICT, investment, LNG, marketing, NGVs and other fuels. In parallel, the technical committees gave their oral and poster presentations.

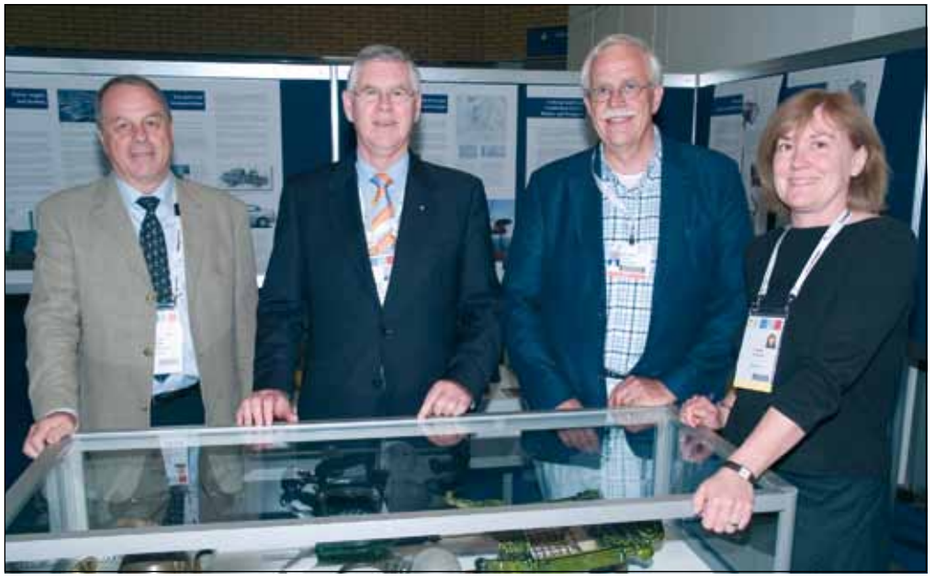
The last day of the conference was dedicated to plenary sessions. In the morning, George Verberg chaired a ministerial panel on natural gas and geopolitics with contributions from the European Commission, Pakistan, Qatar, Yemen

▲◄ George Verberg takes a question while chairing the plenary session addressed by Kunio Anzai, Chairman of the Japanese Gas Association, and Pierre Gadonneix, Chairman & CEO of EDF.

▲ Bert Panman, Coordination Committee Chairman 2003-06, escorting delegates.



◄ Other keynote speakers included Frank Chapman, CEO of BG Group (LEFT) and Proshanto Banerjee, Chairman & Managing Director of GAIL India (FAR LEFT).



▶ As the 23rd WGC coincided with IGU's 75th anniversary, the Global Gas Historical Network organised a small exhibition. Its Chairman, Jacob Fentz (*left*) is seen with (*from left to right*) Robert Doets, NOC Chairman for the 23rd WGC; Fritz Verweel, a volunteer at the Energetica Museum in Amsterdam; and Hanne Thomsen, Director of the Danish Gas Museum.

▼▶ The Council met in St Petersburg in October 2007 (BELOW RIGHT) and during the meeting Ernesto López Anadón presented Peter Storm with an Argentine poncho on his retirement as Secretary General (OPPOSITE TOP LEFT).

and the US, before the panel was opened to industry leaders and international organisations. The session was moderated by Daniel Yergin of IGU's Wise Persons Group. In the afternoon, the incoming Argentine Presidency gave a presentation on the Triennial Work Programme for 2006-09, followed by the closing and prize-giving ceremony. IGU and the Energy Delta Institute sponsored two thesis prizes, each of €10,000, and there were four awards for the best papers and posters. The prize for a thesis on social responsibility was won by Line Friis Lindner-Madsen from Denmark, and the prize for the sustainable development category was won by Giel Ramaekers from The Netherlands.

The Argentine Presidency

Argentina became the first country from South America to assume the IGU Presidency with the theme "The Global Energy Challenge: Reviewing the Strategies for Natural Gas". This was reflected in special projects on CO_2 mitigation, preparing an outlook study for the natural gas industry to 2030, energy efficiency indicators and best practices. The Argentine Presidency also set up two task forces. One looked at how gas market integration could facilitate economic growth, social development and sustainability; and the second looked at how research and development programmes could be supported and enhanced. The standing committees were joined by the new IGU Marketing and IGU Research Conference committees, with the latter tasked with preparing for the IGRC in Paris in October 2008.

The Secretariat started the Triennium by welcoming its first secondee, Barbara Anette Schmid from RWE, and launching the new website. An enhancement to add interactive maps with gas industry information to the website would go live in 2007. However, Petter Nore stood down as Deputy Secretary General for personal reasons. Meanwhile, in Norway, Hydro decided to merge its oil and gas interests with those of Statoil. The new company result-

▲ Ernesto López Anadón, IGU President 2006-09.

▲ Roberto Brandt, Coordination Committee Chairman 2006-09.

Barbara Anette Schmid was the first secondee to the Secretariat (*2006-08, far right*). She was followed by Florijana Dedović (*2008-10, far left*). They are seen here in Oslo with (*from left to right*) Erik Gonder, Åse Nicolaysen, Torstein Indrebø and Hans Riddervold.

ing from the merger was StatoilHydro (later Statoil), which agreed with the Norwegian Charter Member that Torstein Indrebø would be nominated as the candidate for Secretary General. Mr Indrebø had been involved in IGU work since 1994, initially serving as a technical committee member and later as a member of the Council. He was formally elected to succeed Peter Storm, who was made Honorary Secretary General, when the Council met in St Petersburg in October 2007.

The Secretariat moved to Oslo the following month, and additional staff were recruited to deal with the growing responsibilities. Working for Torstein Indrebø were Hans Riddervold, Erik Gonder and Åse Nicolaysen, with Barbara Schmid continuing as a secondee. They were joined in April 2008 by Florijana Dedović, who was seconded from Plinacro. After Barbara's secondment ended, Jeanet van Dellen joined from Gasunie. The secondment programme

Eduardo Ojea Quintana, NOC Chairman for the 24th WGC.

Jeanet van Dellen was seconded to the Secretariat from February 2009 to November 2011.

The September 2008 meetings of the Executive Committee (pictured) and Council were held in Gyeongju, Korea.

was proving of great benefit to IGU, the young people involved and their companies.

During the Triennium, IGU joined the Global Roundtable on Climate Change, strengthened cooperation with IEA, which agreed to participate in the 2030 gas industry outlook study, and developed a new relationship with the International Energy Forum (IEF). This led to the launch of the IEF-IGU Ministerial Gas Forum to enhance the dialogue between governments, organisations and companies involved in the global gas industry. The first forum took place in Vienna in November 2008 (*see the chapter on engaging with international policymakers*).

There were a number of other innovations as IGU worked to increase its engagement with policymakers and stakeholders around the world. The IGU Gas Efficiency Award was launched with the first prizes awarded in 2008, followed by the Social Gas Award in 2009 (*see box below*), and the first regional coordinators were appointed in 2009 (*see box opposite*).

As regards membership, Angola, Bulgaria, Equatorial Guinea, Macedonia, Timor Leste and Vietnam joined, and Libya rejoined, as Charter Members, although Hungary left; while there was a net increase of eight Associate Members. A new type of involvement aimed at companies active in the energy field but which did not fulfil the conditions for membership was trialled when Alcatel-Lucent became a "Supporter of IGU" in 2007. The trial ended in 2009, but the way would be opened for such companies to join IGU when the eligibility for Associate membership was widened in 2015.

The number of affiliated organisations grew, and agreements were signed with the Energy Delta Institute (EDI), International Group of LNG Importers (GIIGNL, from its initials in French), International Pipeline & Offshore Contractors Association (IPLOCA) and Russian National Gas Vehicle Association (NGVRUS).

IGU also signed a protocol to coordinate activities and exchange information on LNG with five organisations: the US Center for LNG, Eurogas, GIIGNL, the LNG infrastructure branch of GIE and the Society of International Gas Tanker and Terminal Operators (SIGTTO).

These positive developments for IGU were taking place against the background of the global financial crisis. This pushed some countries into recession and slowed growth in others, with a consequent impact on energy demand. The crisis reached its most critical stage in September 2008, as the Council was meeting in Gyeongju, but concerted action by governments and central banks around the world laid the ground for recovery to start in 2009.

The IGU Awards Programme

IGU's awards programme started in 2008 when the Gas Efficiency Award was launched calling for new ideas and projects that aimed at obtaining better efficiency in the use of natural gas. All IGU members were invited to nominate projects and 40 were submitted covering all parts of the gas chain.

Prizes of €10,000 each were awarded to a Dutch-German project entitled "A new generation of gas-fired heat pumps" (author Paul Vloon of Bosch Thermotechnik), and a Japanese project entitled "An economical thermal network cogeneration system for apartment buildings" (authors Hideki Yamaguchi and Yoshinori Hisazumi of Osaka Gas). The Dutch-German project was judged the best overall and Paul Vloon was invited to the 24th World Gas Conference.

In 2009, the Gas Efficiency Award was joined by the Social Gas Award. This called for new ideas and projects to encourage people to use gas more efficiently. The winner was Mohammad Rezaei of Mazandaran Gas Company with a project to provide free home insulation for natural gas consumers in Mazandaran Province, Iran. There was no cash prize but he was invited to the 24th WGC.

For the 2009-12 Triennium there was a prize of $5,000 for each award and an invitation to the 25th WGC. The Gas Efficiency Award went to Kunihiro Nishizaki of Tokyo Gas and Kazuhiro Hirai of Osaka Gas for the project "Commercialisation of a residential proton exchange membrane fuel cell for combined heat and power", while the Social Gas Award went to Luis Felipe Fernández Perez of Pluspetrol Norte for the project "Vehicle conversion to dual gasoline/CNG from 150 to 100,000 in five years in Peru".

With effect from the 2012-15 Triennium, the programme was refocused on a single Global Gas Award with the theme for 2012-15 being "Sustainable development and innovative promotion of natural gas". There were more than 500 submissions from which six finalists were selected to present their projects in a dedicated award session during the 26th WGC. The $5,000 prize went to a team of Angus McIntosh, Jamie McAinsh, Richard Mason and Caroline Geddes from the British distributor SGN for the project "Opening up the gas market". This looked at widening the range of gas supplies the UK network can accommodate without processing.

Qiao Jia won the IGU Global Gas Award 2018. She is flanked by David Carroll, IGU President 2015-18, and Luis Bertrán Rafecas, IGU Secretary General.

For 2015-18 the theme was "The role of natural gas in enhancing the quality of life, today and in the future" and there were 150 submissions from which five finalists were selected. The $5,000 prize went to Qiao Jia of the Beijing Gas Group Research Institute for her review of the lessons learned from Beijing's transformational switch from coal to natural gas. The presentation was made during the closing ceremony of the 27th WGC.

The Global Gas Award for 2018-22 will be presented during the 28th WGC in May 2022.

Amongst the business on the agenda in Gyeongju was the election for the 2012-15 Presidency. The contenders were Brazil, France and Qatar, and the Council chose France.

At its following, pre-WGC meeting in Buenos Aires, the Council went on to elect Datuk Abdul Rahim Hashim of Malaysia President and Jérôme Ferrier of France Vice President for 2009-12. The Council also approved the management team's recommendation to levy a royalty on World Gas Conferences from 2018 and to consider joint bids in future for the Presidency and the WGC. This would allow two Charter Members to pool resources with one taking responsibility for the Presidency and the other for hosting the WGC. The tradition of one country bidding for both remains an option.

The 24th World Gas Conference was held in Buenos Aires, October 5-9, 2009, which was somewhat later in the year than usual to coincide with spring in the southern hemisphere. In another change, the programme was half an hour longer each day than the 23rd WGC so that the keynote addresses and strategic panels did not overlap with the technical sessions.

The opening ceremony was held in the Luna Park arena, where Ernesto López Anadón's guest of honour was Argentina's President, Cristina Fernández de Kirchner. The venue for the conference sessions was La Rural Conference and Exhibition Centre. Overall attendance including delegates, accompanying persons and press was just over 3,500, while 351 reports, papers and posters were presented.

As well as reviewing the work done during the 2006-09 Triennium, delegates discussed how they were managing the short-term strains of the financial crisis, while developing the long-term potential of natural gas as the cleanest of the fossil fuels.

IGU's *Natural Gas Industry Study to 2030* was launched during the first of nine strategic panels, and speakers throughout the conference

◀ Ernesto López Anadón handed over as IGU President to Datuk Abdul Rahim Hashim in Buenos Aires in October 2009.

Regional Coordinators

While it is a global organisation, it is important for IGU to have a strong regional presence and understanding of regional gas market developments.

To this end, the IGU Council approved the appointment of Regional Coordinators during its meeting in Buenos Aires in October 2009. An initial four regions were set up and the Executive Committee appointed: Khaled AbuBakr of TAQA Arabia (Africa & the Middle East); James Kwan of the Hong Kong & China Gas Company Limited (Asia & Asia-Pacific); Marcel Kramer then of Gasunie (Europe & the CIS); and João Carlos de Luca of the Brazilian Petroleum, Gas and Biofuels Institute – IBP (North & South America).

For the 2012-15 Triennium the Europe & CIS region was split into two and the Executive Committee appointed: Khaled AbuBakr (Africa & the Middle East); Kang Soo Choo of KOGAS (Asia & Asia-Pacific); Gertjan Lankhorst of GasTerra (Europe); Luis Domenech of ABEGÁS (North & South America); and Marcel Kramer then of South Stream (Russia, Black Sea & the Caspian area).

Khaled AbuBakr.

Graeme Bethune.

Hazli Sham Kassim.

Andrea Stegher.

Timothy Egan.

Orlando Cabrales Segovia.

Marcel Kramer.

In April 2014, the Executive Committee split the Americas region into two and appointed Timothy Egan of the Canadian Gas Association (North America) and Cynthia Silveira of IBP (Latin America & the Caribbean).

For the 2015-18 Triennium the Regional Coordinators were: Khaled AbuBakr (Africa & the Middle East); Li Yalan of Beijing Gas Group (Asia & Asia-Pacific); Gertjan Lankhorst (Europe); Timothy Egan (North America); Javier Gremes Cordero of Transportadora de Gas del Sur (Latin America & the Caribbean); and Marcel Kramer now of the Energy Delta Institute (Russia, Black Sea & the Caspian area).

In 2018, the Asia & Asia-Pacific region was split into two and the current Regional Coordinators are: Khaled AbuBakr (Africa & the Middle East); Graeme Bethune of the Australia Gas Industry Trust (North East Asia & Australasia); Hazli Sham Kassim of the Malaysian Gas Association (South & South East Asia); Andrea Stegher of Snam (Europe); Timothy Egan (North America); Orlando Cabrales Segovia of Naturgas (Latin America & the Caribbean); and Marcel Kramer (Russia, Black Sea & the Caspian area).

The Regional Coordinators are the senior IGU representatives in their respective regions and, in collaboration with the Presidency and the Secretariat, represent IGU at events, visit and communicate with regional governments and international organisations, monitor regional developments, act as a sounding board for IGU advocacy efforts in the region, engage with members and potential new members, advise the Presidency and the Secretariat on regional presentations and contribute to the development of the Triennial Work Programme.

The 24th WGC was opened by Argentina's President, Cristina Fernández de Kirchner who is seen flanked by Ernesto López Anadón, IGU President 2006-09 (*right*), Datuk Abdul Rahim Hashim, IGU President 2009-12 (*far right*) and Torstein Indrebø, IGU Secretary General 2007-14 (*left*).

ence went on to set out a roadmap to tackle carbon emissions by expanding the role of the gas industry, improving its efficiency and working with the renewables sector. A key message of the 24th WGC was the need for the industry to step up its lobbying of policymakers to promote gas as part of the solution to climate change. IGU would go on to play its part with the launch of a gas advocacy initiative in the next Triennium.

Other important messages were the enormous potential of unconventional gas, and the advantages of gas market integration in terms of supply and demand security.

The potential of unconventional gas was brought home to delegates by reports of shale developments in the US, where combining horizontal drilling and hydraulic fracturing with greater understanding of the formations had paid off dramatically; while the task force on gas market integration presented a model based an analysis of nine case studies from around the world to identify the key issues and stages in a successful integration process. The flexibility of LNG was highlighted as one of the factors helping to integrate regional markets, and there was much discussion of the long-term growth prospects for global trade.

Pricing was also discussed given the major disconnect that had developed between gas and oil prices in the run-up to the conference, when gas was trading at around 25% of the equivalent energy value of oil, and the divergence of gas prices across regional markets. Delegates noted that the Gas Exporting Countries Forum, originally set up in 2001 as an informal grouping, had recently become a formal body and intended to study a number of issues including wholesale gas pricing.

The conference sessions were rounded off by a presentation on the Triennial Work Programme for 2009-12 by the incoming Malaysian Presidency, before the official handover from Argentina to Malaysia during the closing ceremony.

Rune Bjørnson, Statoil's Executive Vice President Natural Gas, gave one of four luncheon addresses.

◄ Andrés Kidd, Coordination Committee Secretary for the 2006-09 Triennium (*right*) with the incoming Secretary, Ungku Ainon Ungku Tahir.

▲◄ The 24th WGC was held in La Rural Conference & Exhibition Centre, Buenos Aires.

▲ Energy ministers taking part in the conference included Algeria's Dr Chakib Khelil (*seated left*) and Argentina's Julio de Vido (*seated right*).

The Malaysian Presidency

When developing the theme and work programme for the 2009-12 Triennium, the Malaysian Presidency was conscious of the need to promote technological innovation and efficiency, improve the availability of gas and access to markets, develop human capital and advocate for gas.

The theme was "Gas: Sustaining Future Global Growth", and 900 gas industry professionals took part in the work of the committees and task forces. The marketing committee was brought into the standing committee structure as PGC E, while a work group for sustainable development was set up together with three task forces: two looking at different aspects of the human resource challenge, and one looking at geopolitics and the gas industry.

In a particularly important development, the Triennium saw IGU launch the gas advocacy initiative to give natural gas a more effective and consistent voice and improve communications with stakeholders outside the industry.

◄ The exhibition featured 270 companies and organisations.

▶▶ Torstein Indrebø , IGU Secretary General 2007-14 addressing the second World Shale Gas Conference in November 2011.

▶ Prior to the handover from Argentina to Malaysia, a meeting of the incoming Coordination Committee was held in Kuala Lumpur in February 2009.

It was felt that the benefits of gas, particularly its role in meeting the challenge of providing additional energy supplies and at the same time reducing emissions by replacing more polluting fuels, needed to be communicated more effectively than in the past. The gas advocacy initiative was intended to be a long-term programme aimed at making sure IGU's messages reached policymakers and regulators, NGOs and the general public. These messages were summarised in the slogan "Natural gas CARES for the world" by being a Clean, Affordable, Reliable, Efficient and Secure energy source.

▶ In November 2009, Datuk Abdul Rahim Hashim, IGU President 2009-12, launched preparations for the 25th WGC in Kuala Lumpur.

IGU developed a communications strategy to resonate with each stakeholder group and the centrepiece of the first phase, which started in 2010, was an online gas advocacy "toolkit". This featured presentations and reports which members could download and tailor to suit different audiences and circumstances. As part of the communications strategy, new publications including *Natural Gas Facts & Figures* and the *World LNG Report* were launched.

IGU also teamed up with six gas associations based in Europe (Eurogas, GERG, GIE, GIIGNL, Marcogaz and the International Association of Oil and Gas Producers) in a joint gas advocacy programme called GasNaturally. This targeted the European Commission and Parliament with the aim of ensuring that natural gas was well represented in discussion of the future energy mix in Europe. The first event in the GasNaturally programme was a Member States Gas Forum in Brussels in February 2012.

Meanwhile, the successful IEF-IGU Ministerial Gas Forum continued, with the second held in Doha in November 2010, and the IGRC was held in Seoul in October 2011. IGU also became involved with a new event. The first World Shale Gas Conference – co-sponsored by IGU and co-hosted by the Charter Member for the USA, the American Gas Association, and the CWC

The Malaysian post office issued a set of stamps to commemorate Malaysia's hosting of the 25th World Gas Conference.

Business during the 2011 Council meeting in Dubrovnik included the election of the USA to the 2015-18 Presidency.

Group – was held in Dallas-Fort Worth in November 2010. Later becoming the World Shale Oil & Gas Summit, this was joined by a series of regional shale events.

During the Malaysian Presidency, IGU continued to expand its membership. Cyprus, Mongolia, Morocco, Mozambique and Uzbekistan joined and Mexico rejoined as Charter Members, although Bangladesh left. There was a net increase of five Associate Members, and the Gas Technology Institute (GTI) became an affiliated organisation.

There were several staff changes in the Secretariat. In 2011, Erik Gonder left and Sjur Bøyum took over as Communication Manager and Webmaster, while Åse Nicolaysen left and Silje Storsul took over as Administration Assistant. A new position was created in March 2012 when Mats Fredriksson joined as Senior Advisor to the Secretary General. As regards the secondment programme, Florijana Dedović left in 2010 and Carolin Jeanet Oebel from E.ON Ruhrgas joined, while in 2011 Jeanet van Dellen left and Ksenia Gladkova from Total joined.

In other developments during the Triennium, Honorary President Christoph Brecht died in 2010, and the election for the 2015-18 Presidency was held. Meeting in Dubrovnik in October 2011, the Council considered bids from three contenders – Korea, Qatar and the USA – and elected the USA. The Council also accepted Norway's offer to host the Secretariat for a further three years over its original six-year term, which was due to end in 2013.

In a further development, the UN's Sustainable Energy for All initiative was launched, co-chaired by IGU Wise Person Dr Kandeh Yumkella. Discussions to see how IGU could support the initiative were to bear fruit in the 2012-15 Triennium.

The Malaysian Presidency culminated in the 25th World Gas Conference, which was held in Kuala Lumpur, June 4-8, 2012, against a more positive economic background than that for the 24th WGC in 2009. Overall attendance increased to 5,300 participants from 90 countries, while the technical programme included 79 conference sessions with a line-up of 575 speakers. The venue was the Kuala Lumpur Convention Centre.

The Council met in the morning of June 4 and elected Jérôme Ferrier of France President and David Carroll of the USA Vice President for

Ho Sook Wah, Coordination Committee Chairman 2009-12 (*right*) with Georges Liens, CC Chairman 2012-15.

The 2009-12 IGU Awards were presented during the Council meeting in Kuala Lumpur in June 2012. (LEFT) Kunihiro Nishizaki (*second left*) and Kazuhiro Hirai (*third left*) won the Gas Efficiency Award. They are flanked by Datuk Abdul Rahim Hashim and Torstein Indrebø. (BELOW) Luis Felipe Fernández Perez won the Social Gas Award.

▲ Two secondees joined the Secretariat during the Malaysian Presidency: Carolin Jeanet Oebel in 2010 (TOP) and Ksenia Gladkova (ABOVE) in 2011.

▲ Silje Storsul worked in the Secretariat from 2011 to 2013.

▲ Sjur Bøyum joined the Secretariat in July 2011.

◄ The 25th WGC was opened by the Prime Minister of Malaysia, Dato' Sri Mohd Najib bin Tun Abdul Razak.

► Daniel Yergin, a member of IGU's Wise Persons Group, addressing a conference session.

▼ The Kuala Lumpur International Music & Light Festival was held in conjunction with the 25th WGC.

2012-15. It also approved a revision of IGU's Vision and Mission to incorporate a commitment to gas advocacy. The IGU Awards and the first edition of the history book were presented.

The WGC was opened in the afternoon by the Prime Minister of Malaysia, Dato' Sri Mohd Najib bin Tun Abdul Razak. In a dramatic gesture, he combined his address with the inauguration of an important addition to the host country's gas infrastructure – an LNG receiving and regasification terminal offshore Melaka. Dato' Sri Mohd Najib inaugurated the terminal by video link with the Chief Minister of Melaka, Datuk Seri Mohd Ali bin Mohd Ruskam. The opening ceremony also saw the launch of IGU's new logo.

The conference sessions started on June 5 and each day had a theme – Foundation for Growth, Securing Gas Supply, Enhancing Gas Demand and A Sustainable Future – which the keynote and strategic panel speakers addressed; while the results of the Triennial Work Programme were shared in committee sessions, expert forums and a new type of poster session called the Interactive Expert Showcase. There was also a youth programme for the first time in the series of World Gas Conferences, and a range of activities attended by 200 young professionals and students ran concurrently with the main event.

Although sustainability was officially the theme of the last day, this vital issue was addressed throughout the conference, particularly in relation to the rapid growth of the unconventional gas sector. IGU contributed to the debate by presenting a special report *Shale Gas – The Facts about the Environmental Concerns*.

IGU also released its second *World LNG Report*, which showed that the LNG sector was growing faster than the overall gas market. This was partly due to the shutdown of Japan's nuclear power stations following the tragedy of March 2011, when a massive earthquake and tsunami struck the country and the Fukushima nuclear plant went into meltdown. At the time of the 25th WGC, none of Japan's 50 remaining nuclear reactors were in operation and it was gas which helped to fill the gap in electricity generation and minimise supply disruptions.

Other reports released during the conference included IGU's *Global Vision for Gas*, which outlined a sustainable pathway of energy use through to 2050 and highlighted the pivotal role of gas, and *Wholesale Gas Price Formation*. Delegates debated future pricing strategies and there was an important focus on the role of gas as a transportation fuel.

On the last day, the Malaysian team led by Datuk Abdul Rahim Hashim gave delegates a memorable send-off. They took part in a special song and dance show before handing over to the French team led by Jérôme Ferrier.

▲ Datuk Anuar Ahmad, NOC Chairman for the 25th WGC (TOP) and Zahariah (Liza) Abdul Rahman, Head of the NOC Directorate (ABOVE).

▲◄ Datuk Anuar Ahmad with Peter Voser, CEO of Royal Dutch Shell, and Rex Tillerson, CEO of ExxonMobil.

◄ The 25th WGC was the first to include a youth programme (FAR LEFT) and the Interactive Expert Showcase was also an innovation (LEFT).

◄ During the closing ceremony, Datuk Abdul Rahim Hashim handed over as IGU President to Jérôme Ferrier (*left*).

▲ Mats Fredriksson joined the Secretariat in 2012.

▲
IGU support for the GasNaturally advocacy programme continued in the 2012-15 Triennium – IGU President Jérôme Ferrier addressing a Gas Week event in April 2013.

▲►
Torstein Indrebø, IGU Secretary General 2007-14 and Senior Advisor Ksenia Gladkova were IGU's first representatives in the G20 Energy Sustainability Working Group.

▲►►
Fadwa Abu Ghaida of the Federation of Arab Engineers addressing the IGU-UNESCO workshop on women in engineering in December 2013.

France takes the helm again

France returned to the Presidency for the 2012-15 Triennium with a remit to promote the role of gas in the fuel mix to drive sustainable economic growth throughout the world. This was reflected in the theme "Growing Together towards a Friendly Planet" and a Triennial Work Programme focused on raising the profile and voice of gas, highlighting the importance of research and innovation and mobilising the human resources required for the future development of the gas industry.

The Technical Programme Committee for the IGU Research Conference was brought into the standing committee structure as part of the new PGC F – R&D and Innovation which, in conjunction with the Danish NOC, prepared a successful IGRC in Copenhagen in September 2014. Three task forces were set up looking at gas advocacy, geopolitics and human resources, and membership of the technical committees and task forces exceeded 1,000 for the first time.

The focus of IGU's gas advocacy work during the Triennium was on establishing the Union as the Global Voice of Gas and increasing cooperation with other international organisations.

Under the first phase of the Global Voice of Gas project, a Global Gas Portal accessed via the IGU home page was developed. The aim was to make IGU the first point of call for people looking for information about gas, make it easy to find that information and allow IGU to target specific audiences. The Portal's launch in May 2014 was followed by a six-month digital and social media outreach campaign. Moving into 2015, the next phase of the Global Voice of Gas project was to develop an integrated public affairs and government relations strategy.

As regards external cooperation, the IEF-IGU Ministerial Gas Forum was now a well-established biennial event, with the third held in Paris in November 2012 and the fourth in Acapulco in November 2014. IGU carried on participating in the GasNaturally advocacy programme and, in a notable development, established a relationship with the G20 forum of major economies. IGU joined the Energy Sustainability Working Group (ESWG) in 2013 during the Russian G20 Presidency. This enabled the Union to contribute to the drafting of the G20 leaders' communiqué and a statement on enhancing investments in the power sector. The G20 Presidency rotates each year and IGU representation in each Presidency's energy working group has continued.

Support for the UN's Sustainable Energy for All initiative took shape with the organisation of a competence seminar to assist nations to exploit their gas resources downstream for domestic economic and social development. Covering the West African region, this was held in Abidjan in November 2013 and IGU teamed up with UNIDO, Sustainable Energy for All, the Economic Community of West African States

►
IGU's first gas competence seminar in Abidjan in November 2013 was opened by HE Adama Toungara, Côte d'Ivoire's Minister for Mines, Petroleum and Energy (left). He is seen with Torstein Indrebø.

►►
Pål Rasmussen (*right*) took over from Torstein Indrebø as IGU Secretary General in December 2014.

▲
Anette Sørum Nordal joined the Secretariat in 2013

▲
Three secondees joined the Secretariat during the French Presidency: Khadija Omar Al-Siyabi in 2013 (TOP) and Taeksang Kwon (MIDDLE) and Kristin Sande (BOTTOM) in 2015.

(ECOWAS), the ECOWAS Centre for Energy and Energy Efficiency and Côte d'Ivoire's national oil company, Petroci.

The following month, IGU partnered with the UN Educational, Scientific and Cultural Organisation (UNESCO) to hold a workshop on women in engineering in Africa and the Arab states at UNESCO's headquarters in Paris.

IGU moved to put strategic partnerships on a more formal footing in 2014. That September a memorandum of understanding (MoU) was signed with the World Bank covering collaboration on activities aimed at enhancing technology- and knowledge-transfer. This was followed in 2015 by MoUs covering cooperation with the International Peace Institute (IPI), UN Economic Commission for Europe (UNECE), UN Environmental Programme (UNEP) and UNESCO.

In another initiative, a forum was launched to reach out to high-ranking diplomatic representatives in the host country of the Secretariat. The first one was held in Oslo in February 2013 to publicise the findings of IGU's *Global Vision for Gas* report. A second event in Oslo in December 2014 looked at the role of gas in the present and future energy mix.

Membership grew strongly during the Triennium and the IGU newsletter was restarted as an online publication to improve communication with members. Armenia, Azerbaijan, Albania, Bahrain, Côte d'Ivoire, Kuwait, Lebanon and Yemen joined, and Bolivia, Chile, Colombia, Hungary and Iraq rejoined, as Charter Members. Eurogas moved from Charter to Associate membership and 17 new Associate Members joined although two existing ones left and two merged. NGVA Europe and the World LPG Association became affiliated organisations.

In the Secretariat Hans Riddervold retired as director at the end of 2012, although he continued to work part-time on special projects for two more years. Carolin Oebel became the new director and served until her secondment ended in October 2014, when Mats Fredriksson took over the role. Ksenia Gladkova's secondment also ended in October 2014. Oman LNG seconded Khadija Omar Al-Siyabi for 2013-15 and KOGAS seconded Taeksang Kwon in January 2015. Anette Sørum Nordal took over from Silje Storsul in November 2013 and was appointed to the new role of Information Consultant in March 2015, whereupon Kristin Sande was seconded from Statoil as Administration Consultant.

Meanwhile, Torstein Indrebø had announced his retirement as Secretary General with effect from the end of November 2014. As the Secretariat host, Norway nominated the Chair of the Norwegian Gas Association, Pål Rasmussen,

▲◄
The IGU-UNESCO MoU was signed in May 2015 by Jerôme Ferrier, IGU President 2012-15, and Irina Bokova, UNESCO's Director General.

▲►
Pål Rasmussen, IGU Secretary General 2014-16, with Philip Swanson, Administrator of the CCAC Oil & Gas Methane Partnership hosted by UNEP.

◄
Jérôme Ferrier at the opening ceremony of WGC2015.

▶ Christian Masset, French Vice Foreign Minister, giving a special address on natural gas and COP21.

to be his successor. To ensure a smooth hand-over, the Council elected Mr Rasmussen as Deputy Secretary General during its October 2013 meeting in Beijing. The Council went on to elect Mr Rasmussen as Secretary General in Berlin in October 2014 and to confer the title of Honorary Secretary General on Mr Indrebø.

The Berlin meeting was a particularly important one with the future host of the Secretariat to consider, the election for the 2018-21 Presidency and the launch of an internal review.

Norway's term as Secretariat host was due to end in October 2016 and Spain offered to take over for 2016-22. The Spanish candidate for Secretary General was Luis Bertrán Rafecas, Director of Planning and Services for the Retail Energy Market at Gas Natural Fenosa, which would host the Secretariat in its headquarters in Barcelona. The Council accepted Spain's offer and elected Mr Bertrán Rafecas as Deputy Secretary General to work alongside Mr Rasmussen until the handover.

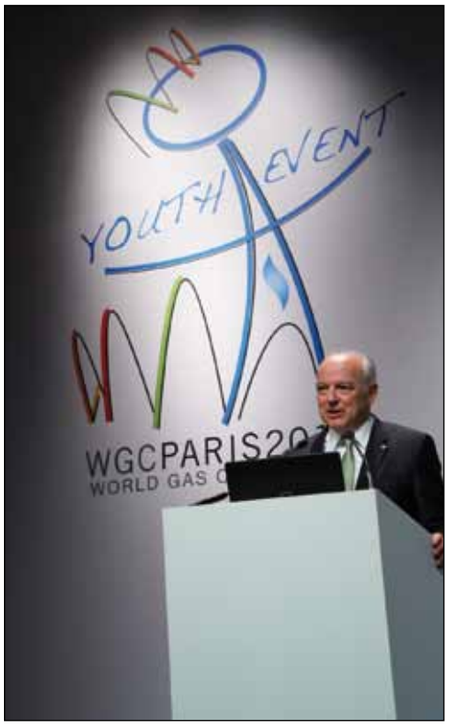
Four countries were bidding for the 2018-21 Presidency – China, Korea, Norway and Russia – and the Council chose Korea. The Council also approved the launch of a comprehensive review called "Building for the Future" to ensure IGU's proper positioning for the future.

At its following, pre-WGC meeting in Paris, the Council approved the first phase of the Building for the Future initiative: a new Vision and Mission statement and a new structure of membership fees and categories. It also confirmed David Carroll of the USA as President and Jae Ho Song of Korea as Vice President for 2015-18.

The 26th World Gas Conference was held in Paris, June 1-5, 2015 at the Porte de Versailles Convention Centre. Although total attendance at 3,700 was down compared to the 25th WGC, the event took on an even greater significance than usual as it came just six months before the landmark UN Climate Change Conference, COP21, in Paris. The programme of 70 sessions with a line-up of 583 speakers included a special address on natural gas and COP21 by the French Vice Foreign Minister, Christian Masset.

Following a gala reception on June 1, the conference sessions started on June 2 and the four daily themes were: Natural Gas as a Core Pillar for a Sustainable Future of the Planet; Gas,

▼ The strategic panel sessions included one on women's place in the gas industry which was chaired by Marie-José Nadeau, Chair of the World Energy Council.



IGU released the 2015 editions of the *World LNG Report* and *Wholesale Gas Price Survey* during the conference as well as the reports *Biogas – from refuse to energy* and *Prospects for Natural Gas*, the latter identifying the key developments that will shape the gas market in 2050.

To improve audience interaction, the Wisembly mobile and web service for online questioning and voting was offered in 42 sessions. Another innovation was the issue of Poken devices to all delegates allowing them to exchange business cards electronically and obtain copies of presentations from touch points throughout the venue. A new feature for the exhibition was the Natural Gas for Transportation Village, which included a presentation area with a free-to-attend seminar programme.

◀ Jérôme Ferrier welcoming delegates to the youth event.

▼ Gérard Mestrallet, Chairman & CEO of Engie, Jérôme Ferrier and Anita George, Senior Director of the World Bank Group's Global Practice on Energy and Extractive Industries opening the WGC2015 exhibition (BOTTOM) which featured 350 exhibitors.

Renewables and Electricity: Together a Perfect Combination; Natural Gas as a Growth Factor for New Economies; and Human Capital for the Future of the Gas Industry. The results of the Triennial Work Programme were presented in thematic sessions and interactive showcases, and the IGU Global Gas Award was presented in a special session.

A major message of WGC2015 was that greater use of natural gas is a fast and effective way to reduce carbon emissions and improve air quality while meeting rising global demand for energy. Moreover, gas is ideally suited to complement intermittent power generation from renewable sources, to extend access to energy in developing and energy-poor countries and to play a bigger role as a transportation fuel. But speakers stressed that the industry needs to work hard to ensure that energy policies and regulatory structures recognise the long-term benefits of gas. Speakers also stressed that the industry needs to reduce costs and improve efficiency, reduce its carbon footprint and address a shortage of technical skills.

▶ Members of the 2012-15 French team at the WGC 2015 closing ceremony *from left to right:* Georges Liens, Coordination Committee Chairman; Yves Tournié, CC Secretary; Jérôme Ferrier, IGU President; and Daniel Paccoud, NOC Chairman).

Building on the success of the first WGC youth event in 2012, a programme of presentations, workshops and social activities was organised for students and young professionals. Running in parallel with the main conference, the youth event was attended by 150 delegates.

The French team took its farewell during the closing ceremony and handed over to the US team led by David Carroll.

▼ David Carroll speaking at the Vienna Energy Forum just after taking over as IGU President for 2015-18.

▼▶ Pål Rasmussen, IGU Secretary General 2014-16, greeting Dr Peggy Oti-Boateng of UNESCO at IGU's second gas competence seminar in Maputo in September 2015.

The third USA Presidency

The US team drew up its plans for the 2015-18 Triennium following extensive consultation and a survey of members, which highlighted access, markets and social licence concerns as the most important issues facing the gas industry. These were the areas of strategic focus around which the Triennial Work Programme was planned under the overall theme "Fuelling the Future".

A key objective was to ensure that the committees and task forces supported the IGU management team with deliverables throughout the Triennium as well as preparing for WGC2018. The distinction between working and programme committees in the standing structure was dropped and two task forces were set up covering strategic communications and outreach, and workforce development. For the first time a member of the Secretariat, Anette Sørum Nordal, was appointed as Secretary of the Coordination Committee. She worked initially with the CC Chair, Menelaos (Mel) Ydreos, but when he took on the role of IGU's first Public Affairs Director in May 2016, the day-to-day activities of the Coordination Committee were overseen by an acting Chair, Rod Rinholm.

In a new initiative two advisory groups for the Presidency were set up. The Global Ambassadors Network consisted of members of the diplomatic corps based in Washington DC and provided guidance on key issues and opportunities in the gas industries of their countries. The Financial Advisory Board was made up of representatives from major banks and energy companies to provide input on a number of the commercial challenges and opportunities facing the global gas industry.

The USA Presidency also continued the policy of the past few years to reduce the time spent on administrative matters in Council and Executive Committee meetings in order to increase the opportunities for discussion of strategic issues with guest speakers in workshops, and to allow ample time for networking.

IGU's gas advocacy and outreach work remained a core priority and David Carroll's first public engagements as IGU President in June 2015 were to take part in the Vienna Energy Forum and GasNaturally Member States Gas Forum in Brussels.

Then, in August 2015, talks with the incoming Chinese presidency of the G20 resulted in agreement for IGU to coordinate a Natural Gas Day in Beijing in June 2016 as part of the official G20 working programme.

◀▼ (LEFT) David Carroll (*right*) and then Coordination Committee Chair Menelaos (Mel) Ydreos (*left*) met the President of Colombia, Juan Manuel Santos in October 2015 just before Colombia hosted the Council meeting in Cartagena de Indias (LEFT, BELOW).

The following month IGU's second gas competence seminar was held in Maputo, this time covering Eastern and Southern Africa. It was organised in collaboration with the World Bank Group and supported by Sustainable Energy for All and the Government of Mozambique.

IGU supported GasNaturally's Gas Week in Brussels in October 2015 and went on to launch a Diplomatic Gas Forum in Washington DC with the support of the Global Ambassadors Network. Its first meeting was held in November 2015 while the Diplomatic Gas Forum in Oslo continued with a third event that December.

COP21 was held in Paris between November 30 and December 11 and IGU's advocacy campaign focused on the contribution of natural gas to improving urban air quality. A special report with case studies from four cities was released (*see the chapter IGU Engages with International Policymakers*).

Advocacy work continued in 2016 with a new report entitled *Case Studies, Enabling Clean Energies*, which was presented to the G20 ESWG in April prior to the G20 Natural Gas Day, which took place in Beijing on June 29. This was co-hosted by IGU and the National Energy Administration of China and organised by Beijing Gas Group, China Gas Society and China Gas Association. Over 300 delegates including energy ministers from the G20 countries, international organisations, key industrial players, consulting and financial companies participated in the event.

Meanwhile, the Building for the Future initiative had moved into its second phase looking at IGU's events portfolio. Meeting in Durban in April 2016, the Executive Committee approved proposals to strengthen the planning and execution of the events and the proposals were implemented by appointing Rodney Cox to the new position of Events Director in August 2016 and establishing steering committees for the individual events.

Later that year the Secretariat started packing up in Oslo in order to start operations from the new base in Barcelona on November 1, 2016. Antonia Fernández Corrales, who had joined in October 2015 on secondment from Gas Natural Fenosa, Anette Sørum Nordal and Taeksang Kwon moved to Barcelona along with Luis Bertrán Rafecas who was now Secretary General. They were joined by two new secondees from Gas Natural Fenosa, Rafael Huarte Lázaro as Director and Luisa Peris Meléndez as Executive Assistant.

A commemorative brochure summarising the major developments during Norway's nine-year hosting of the Secretariat was prepared for the Council meeting in Amsterdam in October 2016. Also distributed at the meeting were a new edition of the history book to mark IGU's 85th anniversary and the 2016 editions of the *Wholesale Gas Price Survey* and *World LNG Report*, which had been launched earlier in the year, the latter during LNG 18 in April. A Diplomatic Gas Forum was held after the Council business.

In November, a second Diplomatic Gas Forum was held in Washington DC, an IGU delegation including David Carroll and Luis Bertrán Rafecas attended COP22 in Marrakech and a second set of case studies on improving

▲ Antonia Fernández Corrales was seconded to the Secretariat in October 2015.

▲ Rod Rinholm, Acting Coordination Committee Chair 2016-18.

▲ Terence (Terry) Thorn, Senior Advisor to the USA and Korean Presidencies.

▲ Menelaos (Mel) Ydreos was appointed Public Affairs Director in May 2016.

▲ Rodney Cox was appointed IGU's Events Director in August 2016.

▲ Rafael Huarte Lázaro and Luisa Peris Meléndez were seconded to the Secretariat in November 2016.

▲ David Carroll and Secretary General Luis Bertrán Rafecas attended COP22 in Marrakech in November 2016.

◀ ARPEL became an organisation affiliated to IGU in April 2017 and its then Executive Secretary Jorge Ciacciarelli (*left*) is pictured with IGU Secretary General Luis Bertrán Rafecas.

▲▶ IGU Secretary General Luis Bertrán Rafecas addressing the Latin America & Caribbean gas conference in Panama City in November 2017.

urban air quality was presented during GasNaturally's Gas Week.

On December 6, the 5th IEF-IGU Ministerial Gas Forum was held in New Delhi, followed by the annual Diplomatic Gas Forum in Oslo and IGU's third gas competence seminar in Abuja, Nigeria. Jointly organised with the World Bank, the seminar looked at ending flaring and making greater use of gas resources in Nigeria. Also that month, Tatiana Khanberg was appointed Public Affairs Manager to assist the Public Affairs Director.

Moving into 2017, IGU launched a report entitled *Enabling Clean Marine Transport* at the G20 ESWG in March setting out the opportunities and challenges of LNG as a marine transport fuel. It also published the booklet *Global Natural Gas Insights* giving an overview of the significant contribution natural gas can make in meeting global energy challenges. The annual editions of the *Wholesale Gas Price Survey* and *World LNG Report* continued.

In April, Asociación Regional de Empresas del Sector Petróleo, Gas y Biocombustibles en Latinoamérica y el Caribe (the Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean – ARPEL) became an organisation affiliated to IGU and in November that year ARPEL and IGU

◀ Rafael Huarte Lazaro addressing the first Diplomatic Gas Forum to be held in Spain in November 2017.

IGU diplomas were given to departing Secretariat staff (*from left to right*) Taeksang Kwon, Anette Sørum Nordal and Antonia Fernández Corrales at the Council meeting in Washington DC in June 2018. They are flanked by Luis Bertrán Rafecas, IGU Secretary General, and David Carroll, IGU President 2015-18

teamed up with international event organiser EnergyNet to stage a Latin America and Caribbean gas conference in Panama City.

In May, IGRC2017 was held in Rio de Janeiro and in June Emma Siobhan Paños Knowles and Hyun-Chang Kim joined the Secretariat, the latter on secondment from KOGAS. Also assisting the Secretariat on a short-term contract was Barbara Jinks, Chair of the Marketing and Communications Committee, who served as Marketing Manager for six months and whose responsibilities included producing a membership brochure.

In September, the third Diplomatic Gas Forum took place in Washington and a media day was organised in London allowing IGU members and journalists to talk about the role of gas in the energy mix.

Important decisions were made at the October Council meeting in Tokyo, where the third phase of Building for the Future was approved, the election for the 2021-24 Presidency held and a new Vice President approved. The Council agreed to move from the model of a hosted Secretariat to a permanent headquarters by 2022 and to form a team led by David Carroll to work with IGU management and governance bodies on the transition. Standing for election were Canada, China and Egypt and Oman jointly. Egypt was bidding to hold the Presidency and Oman to host the WGC, the first time a joint bid had been made since the Council approved the possibility in 2009. The Council elected China. It also approved Korea's nomination of Joo-Myung Kang as Vice President to take over from Jae Ho Song.

In October, two reports were published: *Understanding Methane's Impact on Climate Change* looking at global warming potential; and *The Natural Gas Industry Methane Emissions Challenge* presenting seven case studies on successful methane reduction projects. In November, IGU organised a side event at COP23 in Bonn and, later in the month, David Carroll represented IGU at the inaugural meeting of the Methane Guiding Principles partnership, which is a voluntary, international multi-stakeholder initiative with a focus on reducing methane emissions throughout the natural gas supply chain.

The turn of the year saw three more Diplomatic Gas Forums with the first in Spain, in Madrid in November, the regular event in Oslo in December and the first in Malaysia, in Kuala Lumpur in February 2018. In March, a third set of case studies on improving urban air quality was published. Later in the year, a Natural Gas Day returned to the G20 agenda under the Argentine Presidency and was held in Bariloche on June 12.

There were a number of changes to the Secretariat staff in 2018 with the secondments of Taeksang Kwon ending in January and that of Antonia Fernández Corrales in June, Anette Sørum Nordal also leaving in June and two new secondees arriving: Luis Calvo Lema from Naturgy in April and Flavia Malet de Hvidbo from Royal Dutch Shell in June.

On the membership front, the USA Presidency saw a significant increase with new

Tatiana Khanberg was appointed Public Affairs Manager in December 2016.

Emma Siobhan Paños Knowles joined the Secretariat in June 2017.

Hyun-Chang Kim was seconded to the Secretariat in June 2017.

The WGC2018 welcome reception was held in Washington DC's Union Station.

▲ Luis Calvo Lema was seconded to the Secretariat in April 2018.

▲ Flavia Malet de Hvidbo was seconded to the Secretariat in June 2018.

Charter Members from Cambodia, New Zealand (the latter rejoining) and Sudan although Angola, Estonia and Morocco left, 10 existing Associate Members upgrading to the new category of Premium Associate membership, the granting of complimentary Premium Associate membership to Statoil (which changed its name to Equinor in 2018) and Gas Natural Fenosa (which also changed its name in 2018 and is now Naturgy) to recognise their hosting of the Secretariat and a net increase of 17 Associate Members.

The 27th World Gas Conference was held in Washington DC, June 25-29, 2018 at the Walter E. Washington Convention Center. The event coincided with the 100th anniversary of the American Gas Association (AGA) and the NOC was chaired by AGA's President & CEO, Dave McCurdy. The Executive Director of WGC2018 was Jay Copan. With a total attendance of 3,800, the programme had 115 sessions and 596 speakers. The exhibition was visited by 11,500 people and there were 310 exhibitors.

Meeting on the morning of the 25th, the Council confirmed Joo-Myung Kang of Korea as President and Li Yalan of China as Vice President for 2018-21. Also taking place on the first day for the first time at a WGC were two "Master Classes". These were courses available to delegates for an additional fee looking at the fundamentals of gas and LNG, and structuring and contracting strategies for LNG projects.

The NOC took particular efforts to widen participation in the conference programme with core speakers from the industry and policymakers joined by representatives of the financial community, NGOs and major gas customers. The organisation of the exhibition drew on the experience of the Natural Gas for Transportation Village at WGC2015 with a range of specialist pavilions. These included gas for transportation, sustainable energy with natural gas, robotics and safety as well as a series of national pavilions. The WGC2018 Event App was a central source of information and allowed the number of printed documents to be reduced.

The major themes of cost-competitiveness, security of supply and sustainability were comprehensively debated during the conference with much reference to the host country's gas industry which had been transformed by the unconventional gas

▲▲ David Carroll, IGU President 2015-18, welcoming delegates to WGC2018.

▲ US Secretary of Energy Rick Perry was one of eight ministers to address WGC2018.

► IGU Wise Person Daniel Yergin (*left*) moderating a WGC2018 keynote session with Mike Wirth, Chairman & CEO of Chevron (*centre*) and Darren Woods, Chairman & CEO of ExxonMobil (*right*).

▲
Dave McCurdy, NOC Chair for WGC2018.

▲
Jay Copan, Executive Director of WGC2018.

revolution. Geopolitical and financing issues were also hot topics with the consensus of opinion being that greater diversity of supply helps to ease geopolitical pressures, while innovative structures can fund projects in countries below investment grade. Particular attention was paid to the challenges of building infrastructure to bring gas to markets and the need to make not just a business case but also a social case by reaching out to all stakeholders.

The results of the Triennial Work Programme were presented in industry insight sessions and a Technical and Innovation Centre located on the exhibition floor. Two sessions in the latter were dedicated to the presentation of IGU's new Innovation Awards with 10 categories. An 11th prize, the Industry Choice Award decided by a vote of delegates, was given to the overall winner.

IGU released the 2018 editions of the *Wholesale Gas Price Survey* and *World LNG Report* during the conference as well as a new publication, the *Global Gas Report*.

By now a regular WGC fixture, the Young Professionals Programme ran for two-and-a-half days alongside the main conference and was attended by 120 delegates.

The Global Gas Award for the 2015-18 Triennium was presented during the closing ceremony at the end of which David Carroll and his colleagues handed over to the Korean team led by Joo-Myung Kang.

▲▲
Professor Mark Zoback of Stanford University (*centre*) introducing the panel for a WGC2018 keynote session with (*from left to right*): Rachel Kyte, CEO of Sustainable Energy for All; Ariel Yepez García, Energy Division Chief, Inter-American Development Bank; Omar Mithá, CEO of ENH; and Abdelmoumen Ould Kaddour, CEO of Sonatrach.

▲
David Carroll hands over to Joo-Myung (Joe) Kang during the WGC2018 closing ceremony.

Dave McCurdy, NOC Chair (*left*) and David Carroll, IGU President 2015-18 (*far right*) opening the WGC2018 exhibition with the help of Kimberley Harris, AGA Chair, Frank Fannon, Assistant Secretary of State for Energy Resources, and Nazakhtar Nikakhtar, Assistant Secretary of Commerce for Industry & Analysis.

▲ Jeongwook Khang, Coordination Committee Chair 2018-22.

▲ Dong-Hoon Kim, CC Secretary 2018-22.

▲ Marcela Martínez Serret was seconded to the Secretariat in April 2019.

▶ Orlando Cabrales Segovia, IGU's Regional Coordinator for Latin America & the Caribbean (*third from left*) moderated a panel discussion during LGC2018 in Mexico City.

The Korean Presidency

Joo-Myung Kang, known informally as Joe Kang, chaired a kick-off meeting of the Korean Presidency team and Secretariat team in Jeju in August to launch the goals and objectives for the 2018-21 Triennium.

The Korean team established three areas of strategic focus for their Triennial Work Programme under the theme "A Sustainable Future – Powered by Gas": environmental leadership, market vitality and value creation. They reassumed responsibility for the secretaryship of the Coordination Committee with Dong-Hoon Kim working alongside CC Chair Jeongwook Khang. As well as the standing committees, there were initially three task forces covering strategic communications and outreach (continued from the previous Triennium), energy access and energy policy, although the latter two were subsequently merged.

As from 2018 the Latin America and Caribbean gas conference became an annual event supported by an advisory board of gas industry leaders and finance institutions in the region. Events were organised in Mexico City in October 2018, Lima in November 2019 and online in November 2020.

In November 2018, the 6th IEF-IGU Ministerial Gas Forum was held in Barcelona and in December, IGU was involved in a number of side events at COP24 in Katowice.

In January 2019, Joe Kang and Mel Ydreos took part in a Methane Guiding Principles (MGP) roundtable representing IGU as a supporting organisation. This meeting was of great importance as it set the future direction of the partnership in terms of governance and future activities. An MGP supporting organisation is a global or major regional organisation which does not have responsibilities for the management of methane but which has significant expertise on methane.

Diplomatic Gas Forums were held in Oslo in January and in Seoul in March, the latter being the first in Korea. LNG2019 was held in April in Shanghai, where the 2019 edition of the IGU's *World LNG Report* was released. The following month the latest *Wholesale Gas Price Survey* came out and a G20 Natural Gas Day was organised in Tokyo in June. A second edition of *Global Natural Gas Insights* was published in September.

Meeting in Yogyakarta in October, the Council approved London as the base for IGU's new permanent headquarters and appointed an implementation team led by Joe Kang to recruit a Secretary General to succeed Luis Bertrán Rafecas and set up the new offices in 2021.

A large IGU delegation attended COP25 in December in Madrid, where activities included

the release of the fourth set of case studies on improving urban air quality.

Moving into 2020, IGRC was held in Muscat in February as the Covid-19 crisis was growing and in March the World Health Organisation declared a pandemic. IGU set up a Pandemic Advisory Group chaired by Joe Kang to guide the Union during this unprecedented time (*see "Facing a global pandemic" on page 96*). Without physical gatherings, advocacy activity focused on a new programme of webinars for members and stakeholders, and the publication of reports.

The 2020 editions of the *World LNG Report, Wholesale Gas Price Survey* and *Global Gas Survey* were released in April, July and August, respectively, and a new report *Gas Technology and Innovation for a Sustainable Future* was published in July. In addition, the IGU magazine was relaunched as *Global Voice of Gas* with four issues a year, three digital and one printed the latter aligned with the annual Council meeting, and the website was redesigned with a new IGU Members Portal.

▶ Korea's first Diplomatic Gas Forum was held in Seoul in March 2019.

Meeting in electronic session in November, the Council approved the rescheduling of the 28th World Gas Conference to 2022 and the extension of the Korean Presidency by a year. The next LNG and IGRC events were also put back a year. The election for the 2025-28 Presidency, with Colombia and Italy the contenders, was held and the Council elected Italy.

Also meeting in electronic session in November, the Executive Committee elected Andy Calitz to head IGU's new headquarters. Mr Calitz started working as deputy to Luis Bertrán Rafecas in February 2021 to secure a

▼ The IGU Council met in Yogyakarta in October 2019.

▲ Håkon Olav Huglen was seconded to the Secretariat in February 2020.

▲ Matthew Doman was appointed interim Public Affairs Director in August 2020.

▲ Bong Kyu Park, NOC Chair for WGC2022.

▲► Luis Bertrán Rafecas, IGU Secretary General, makes a point during an LGC2019 panel discussion.

► Mel Ydreos, Public Affairs Director 2016-20, addressing the G20 ESWG workshop in Riyadh in March 2020.

smooth and effective transition. The new offices in London will open in July with operations being transferred from Barcelona during the month and will become fully operational in August when Mr Calitz will become Secretary General.

Meanwhile, the 7th IEF-IGU Ministerial Gas Forum was held in December 2020 as a virtual event coordinated by the Malaysian Gas Association from Kuala Lumpur, and the Federation of the Indian Petroleum Industry became an organisation affiliated to IGU in January 2021.

On the publications front in 2021, IGU commissioned a revised edition of the history book to commemorate the Union's 90th anniversary and the latest editions of the *World LNG Report* and *Wholesale Gas Price Survey* were published. Additionally, a new report on gas and renewables is being prepared in conjunction with the Oxford Institute for Energy Studies for release later in the year.

There have been a number of membership changes during the Korean Presidency. On the Charter front, Ghana joined, Côte d'Ivoire, Kazakhstan, Kuwait, Mongolia and Pakistan left, the member for Hong Kong became a Premium Associate Member, the member for Chinese Taipei became an Associate Member and the UK Associate Member became the country's Charter Member. Three existing Associate Members upgraded to Premium status and there has been a net increase of seven other Associate Members.

On the staff front, in April 2019 Rafael Huarte Lázaro retired and Marcela Martínez Serret joined on secondment from Naturgy. Håkon Olav Huglen joined on secondment from Equinor in February 2020. Mel Ydreos stood down as Public Affairs Director in August 2020 and Matthew Doman was appointed to the post on an interim basis pending the setting up of the permanent headquarters. Flavia Malet de Hvidbo's secondment ended in December 2020.

The Korean Presidency will end in May 2022 with the hosting of the 28th World Gas Conference in Daegu, when China will take over the Presidency.

The venue for the 28th World Gas Conference will be Daegu's EXCO Exhibition & Convention Center.

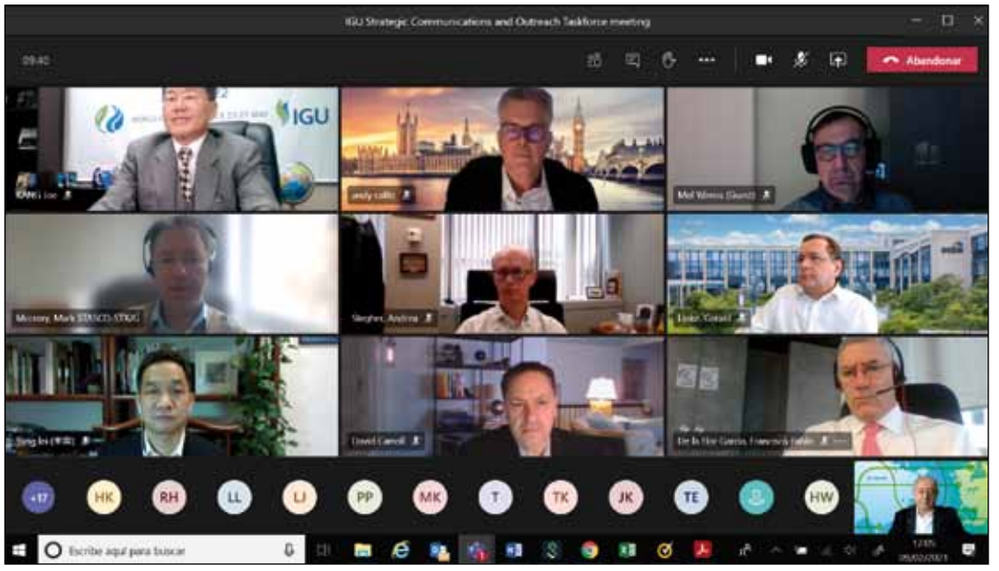
IGU anniversaries

To mark IGU's 90th anniversary the Secretariat commissioned a special logo to be used in external and internal communications. This was designed using different tints and shades of the IGU colours – blue and green. A logo was also designed for the 85th anniversary in 2016, while a special publication marking seven decades of IGU was released at the 22nd WGC in Tokyo in 2003.

Facing a global pandemic

The World Health Organisation declared the outbreak of Covid-19 a Public Health Emergency of International Concern on January 30, 2020 and a pandemic on March 11. As countries around the world went into lockdown, travel plummeted and businesses reduced their activities and in some cases closed, an economic crisis fused with the health crisis in a perfect storm. "This is a historic shock to the entire energy world," said IEA's Executive Director Fatih Birol at the time. "The plunge in demand for nearly all major fuels is staggering." IEA figures would later show that global gas demand fell by an estimated 2.5% or 100 bcm in 2020, its largest drop on record, while prices experienced historical lows and extreme volatility.

The impact on IGU's activities was immediate and a meeting of the Strategy Committee in Tel Aviv in early March turned out to be the last physical gathering for some time. A Pandemic Advisory Group chaired by the President, Joe Kang, was set up to guide the Union during this unprecedented time. The Secretariat staff switched to teleworking from home to ensure the continuation of member services and the first virtual meeting during the pandemic was held on April 16 using Microsoft Teams.



IGU meetings migrated online during the pandemic such as this one of the Strategic Communications and Outreach Task Force.

With the Pandemic Operations Toolkit IGU shared the best practices of the global gas industry in responding to the challenges posed by the Covid-19 pandemic.

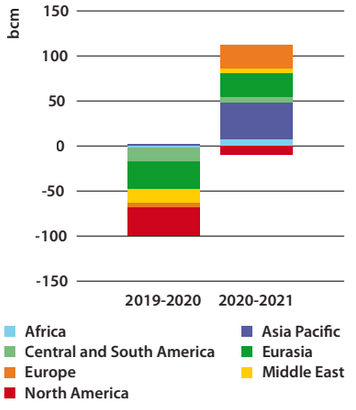
In addition to switching to virtual meetings for IGU's committees, a programme of webinars for members and stakeholders was introduced, while the publication of IGU's regular reports continued as scheduled with distribution via download from the website. The Latin America and Caribbean Gas Conference in November and the Ministerial Gas Forum in December were also organised as virtual events.

Following a survey among members to see how they were maintaining supply and industry operations during the pandemic, the best practices were summarised in a special report backed up by a webinar entitled the "Pandemic Operations Toolkit". The report highlighted that the gas industry's first priority is always the health and safety of staff and customers, while ensuring vital energy supplies are maintained to all sectors of the global economy – particularly the pharmaceutical industry. IGU shared the best practices of the global gas industry in responding to the personnel and operational challenges posed by the Covid-19 pandemic.

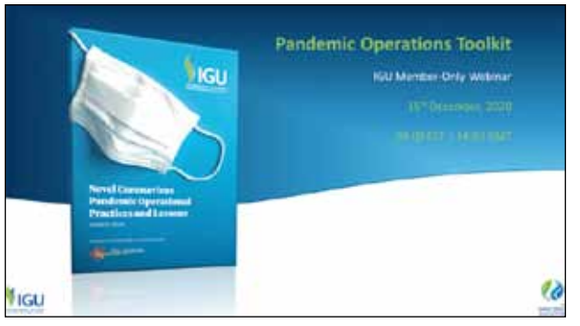
As the pandemic developed it became clear that international travel restrictions would not be eased sufficiently to allow a successful organisation of the 28th World Gas Conference in May 2021. Meeting in electronic session in November 2020, the Council approved the extension of the term of the Korean Presidency to May 2022 and the holding of the WGC then. To maintain the regular cycle of IGU's flagship events the Council also agreed the rescheduling of the next International Conference and Exhibition on LNG to 2023 and the next IGU Research Conference to 2024, while the Chinese Presidency was rescheduled for 2022-25 and the subsequent Italian Presidency for 2025-28.

The pandemic's impact on gas demand was concentrated in the first half of 2020 and some recovery started in the third quarter along with an increase in spot prices. Moving into 2021 with vaccination programmes underway around the world and economies rebounding, gas demand is expected to return to 2019 levels driven by faster-growing markets in Africa, Asia, Central and South America and the Middle East. Mature markets are likely to see a more gradual recovery.

Change in gas demand by region 2019-2020



Source: IEA



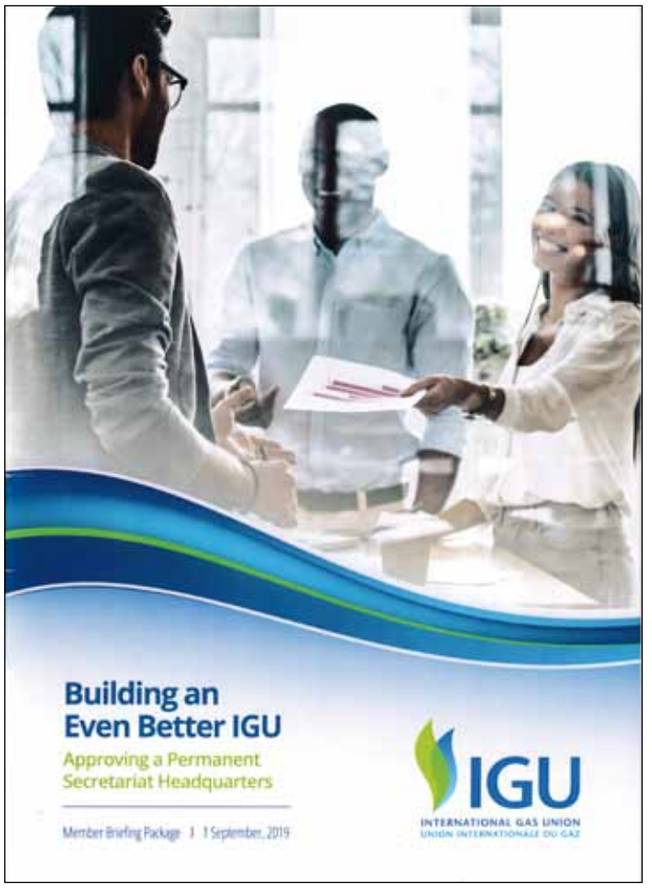
Building for the Future

IGU is a dynamic organisation which has evolved over the years, most particularly in the past decade. The Council gave the go-ahead for the launch of the three-phase Building for the Future initiative in October 2014. A dedicated team led by then Secretary General Pål Rasmussen was appointed comprising a working group and a reference group, the latter representing members from all parts of the gas chain. Their proposals for Phase 1 were approved by the Council in June 2015 together with the appropriate changes to the Articles of Association.

Under Phase I, a sliding scale of membership fees was introduced with higher fees for larger producers and consumers of gas. This strengthened IGU's financial situation to allow for better funding of gas advocacy initiatives. A new category of Premium Associate Member was created carrying the right to vote in the Council and nominate candidates to chair committees. Moreover, eligibility for Associate membership was widened to allow all organisations with an interest in advancing the global gas industry to join IGU, not simply those with assets related to the gas value chain. In addition, a new Vision and Mission statement declaring IGU to be the Global Voice of Gas was approved, a strategy for strategic partnerships developed and the post of Public Affairs Director created.

The working group then moved on to Phase II looking at IGU's events portfolio: the WGC, IGRC and the LNG Event Series (the latter co-owned with GTI and the International Institute of Refrigeration). In April 2016, the Executive Committee approved the group's proposals to strengthen IGU's involvement in the planning and execution of the events by having greater input to strategic policy decisions, event branding and the conference programme, to create strong alignment to the Vision and Mission of IGU and to identify resources to support and follow up each event on behalf of IGU. Phase II was implemented by appointing an Events Director in August 2016 and establishing steering committees for the individual events.

The current Secretary General, Luis Bertrán Rafecas took over leadership of the working group for Phase III. This considered moving from the model of a Secretariat hosted by members on a rotational basis to one of having a permanent base for the Union. The group worked with an international consultancy to prepare recommendations for the Council, which in October 2017 approved the establishment of a permanent headquarters by 2022 and the formation of a team led by then President David Carroll to work with IGU management and governance bodies on the transition.



▲ The last phase of Building for the Future got the go-ahead in 2019.

The transition team considered the staffing requirements of the new headquarters, developed job descriptions, prepared a budget and assessed a range of potential host cities around the world. The team recommended London as the base while retaining IGU's registration as an international not-for-profit organisation in Switzerland. This was approved by the Council in October 2019, which set up an implementation team led by President Joo-Myung (Joe) Kang to recruit a Secretary General to succeed Luis Bertrán Rafecas and set up the new offices. The deadline was brought forward to 2021.

In November 2020, the Executive Committee elected Andy Calitz to head IGU's new headquarters. He started working as deputy to Luis Bertrán Rafecas in February 2021 and will become Secretary General on August 1, 2021.

Bringing Building for the Future to a successful conclusion President Kang declared: "The international gas industry continues to play a critical role in meeting the world's growing energy needs, while enabling emissions reduction and cutting air pollution. The industry requires strong leadership and coordinated advocacy, which our team at the new headquarters, building on the work of their predecessors, will provide."

Message from the incoming Secretary General

Andy Calitz.

After working for 25 years to build the global natural gas industry, working to connect Russia and Australia and Canada to Asia with LNG, I am delighted to join IGU to continue to build the global gas industry. I really believe in the role of gas in the future energy industry serving the needs of society.

The global gas industry has a great deal to be proud of in terms of achievements during the past 90 years. Natural gas has risen to 24% of the world's daily primary energy consumption, meeting the needs of society for heating, power and chemical feedstock.

At the same time change lies ahead, as we contribute to the fight against climate change whilst keeping world energy supplies secure and reliable, affordable, with access to energy.

During the coming years we will see our members transforming their businesses as renewable, decarbonised gases and low-carbon gases form a more important part of the global gas industry, as carbon capture and storage is implemented, as methane emissions are reduced.

Major factors increasing future natural gas consumption include population and economic growth, access to energy in South Asia and Africa, switching from coal (and oil) to gas, the phase-out of nuclear power, production of hydrogen, need for high temperature heat in industry, absence of electricity storage at scale and absence of green hydrogen at affordable prices.

On the other hand, the rise of renewable wind and solar power generation, government policies to constrain natural gas consumption, efforts to constrain lending and finance for natural gas infrastructure, customers constraining their scope 1 and 2 greenhouse gas emissions and the likely future growth of green hydrogen will work to reduce natural gas consumption and supply.

In my view the factors increasing natural gas consumption will outweigh the factors decreasing demand. I foresee that demand for natural gas will increase for quite some time; this is because governments and societies will continue to prioritise security and availability of energy.

The decade ahead is going to be exciting as global society, world governments and the world economy seek to balance energy security, climate change, economic growth and competitiveness and energy access.

New IGU headquarters

From August IGU will be based in London where the first International Gas Conference was held in 1931, with the Secretariat structured around three directorates: for Membership Engagement, for Public Affairs, and for External Events. The times demand that IGU be better connected to members, energy industry associations, affiliates, multilateral institutions, media and think tanks than ever before.

This year we are keenly watching how the energy debate will play out at the G20 meeting in Italy, at the US Climate Summit, at COP26 in Glasgow and at IEA's various events examining pathways to net zero.

Andy Calitz is the Deputy Secretary General of IGU and will become Secretary General when the Secretariat transfers to its permanent headquarters in London with effect from August 2021.

▲ Tighter environmental controls mean that clean-burning LNG is playing a growing role in global shipping. The 23,000 TEU *CMA CGM Jacques Saadé* (pictured under construction) entered service in September 2020 as the first of what will be a fleet of nine LNG-fuelled container vessels for the CMA CGM Group.

◀ With 10 projects including Wheatstone in Western Australia (pictured) Australia is currently the world's top LNG exporter.

Message from the incoming Chinese Presidency

On the occasion of IGU's 90th anniversary on behalf of the Chinese Vice President's office, IGU Chinese members, five million people working in the Chinese gas industry and 3,000 gas companies, I would like to extend the warmest congratulations to IGU and pay tribute to all people who have contributed to the Union's glorious history.

As we celebrate the 90th anniversary, we feel proud of IGU's contributions to the gas industry by promoting research and technology exchanges, fostering dialogues involving all stakeholders, advocating for gas and building partnerships with international and multilateral organisations.

We believe that the global gas industry is set to enter a golden era and, that by 2050, the share of natural gas in global primary energy consumption will increase from today's 24% to 30%, equal to renewable energies and exceeding oil to become the top energy.

Gas in China

China is the third largest gas consumer in the world and the fifth largest gas producer with production in 2020 of 188.8 bcm and consumption of 325.5 bcm. It is the top gas importer with 138.7 bcm in 2020, two-thirds as LNG and the balance by pipeline.

China has announced a target for CO_2 emissions to peak before 2030 and to achieve carbon neutrality before 2060. Replacing high-emitting fuels with natural gas is a realistic choice for China to build a clean, secure, efficient and modern energy system, and ensure sustainable development. China will push forward development of the gas industry. It is estimated that, by 2025, the country's gas production will reach 260 bcm, while annual consumption will be between 450 and 500 bcm.

The Chinese team's work plan

Global and national development trends set the context for our plans. When China takes over the IGU Presidency in 2022, we will carry forward IGU's traditions, and work with IGU members to promote the progress of the industry. Following the theme of "Maximising Gas Benefits", the Chinese Presidency will be committed to promoting the efficiency, cohesion and influence of IGU.

We will promote the role of gas as a fundamental fuel in energy transition giving full play to its advantages such as flexibility, reliability and affordability to unleash its potential, and promote all-round innovation of the gas industry. In all regions around the world we will work to promote infrastructure construction and digitisation, improve resources flow and supply, expand low-carbon and de-carbonised consumption and contribute to the green development agenda and carbon neutrality targets.

We will encourage joint efforts on value-creation and achievements-sharing among members, enhance research capacity and ensure reports and research results are more accessible and influential.

We will encourage members to explore low-carbon energy transition strategies that suit their national or regional conditions and promote regional gas market development.

We will enhance effective and proactive strategic communications with governments, companies and the public, creating a favourable, supportive atmosphere for the development of the gas industry.

We will promote consensus among stakeholders and engage more people in advancing global gas industry progress, so that gas can make a greater contribution to the evolution of the energy matrix, tackling climate change and furthering sustainable development.

Li Yalan is the Vice President of IGU and will become President in May 2022.

◄ Li Yalan will become IGU's President for 2022-25 and Yang Lei, currently Vice Chair of the Coordination Committee, will become Chair.

► Li Yalan and IGU Secretary General Luis Bertrán Rafecas shake hands on the signing of the agreement to host the 29th World Gas Conference at the end of the Chinese Presidency.

► The 29th WGC will be held in Beijing in 2025.

The History of the International Conference and Exhibition on Liquefied Natural Gas

The world's leading forum for the exchange of information on liquefied natural gas is the LNG Event Series of conferences co-owned by IGU, the Gas Technology Institute (GTI) and the International Institute of Refrigeration (IIR).

The first conference was held in Chicago in 1968 and was organised by the Institute of Gas Technology (IGT), which merged with the Gas Research Institute in 2000 to form GTI. IGU and IIR came on board from the second conference in 1970. Originally numbered, the conferences are now named by combining LNG with the year of the event and the next one, LNG2023, will be held in St Petersburg.

Organisation

Three committees run these prestigious and well-attended conferences. The first is the Steering Committee (SC), which has the responsibility for selecting the host countries and venues of future conferences, inviting the keynote and plenary speakers and overseeing all aspects of each conference. The SC is composed of two representatives of each of the three owners with voting rights. Other members and observers of the SC without voting rights are the SC Secretariat, which is provided by the IGU Secretary General, the Programme Committee leadership (the Chair, Vice Chair and Secretary) and representatives of the National Organising Committee for the next two events.

For the early conferences, IGU provided the Conference Chair and IGT provided the Chair of the SC. After LNG 7, the SC Chair alternated between IGT (later GTI) and IGU.

The Programme Committee (PC) is responsible for the conference technical programme, which is the backbone of a successful information exchange. The PC plans all the paper sessions, workshops, poster session and films; solicits, reviews and selects the presentations; organises the sessions; and works with GTI on the preparation of the Conference Proceedings. The Chair, Vice Chair and Secretary are appointed by IIR and they invite 40-50 experts to serve on the PC to perform the required tasks.

The National Organising Committee (NOC), which represents the appointed host country, is responsible for the physical organisation of the event. This includes arranging the conference facilities, securing hotel space and contracting with professional conference and exhibition organisers. The NOC also arranges the opening and closing ceremonies subject to SC approval, hosts the opening and closing receptions and organises post-conference tours. Most importantly, the NOC handles the registrations and manages the revenues from registration and exhibition fees to ensure a sound financial operation. The host country appoints the NOC Chair and Executive Director for the event.

Innovations introduced commencing with LNG2019 include payment of a royalty fee to the owners by the host and the role of Events Director within the SC Secretariat (managed by IGU) to strengthen owner support and engage with the NOC.

From LNG 1 to LNG 18

The very first international conference on LNG, organised by IGT, took place April 7-12, 1968, in Chicago, USA. At the time, the LNG industry was in its infancy. The only exporting nation was

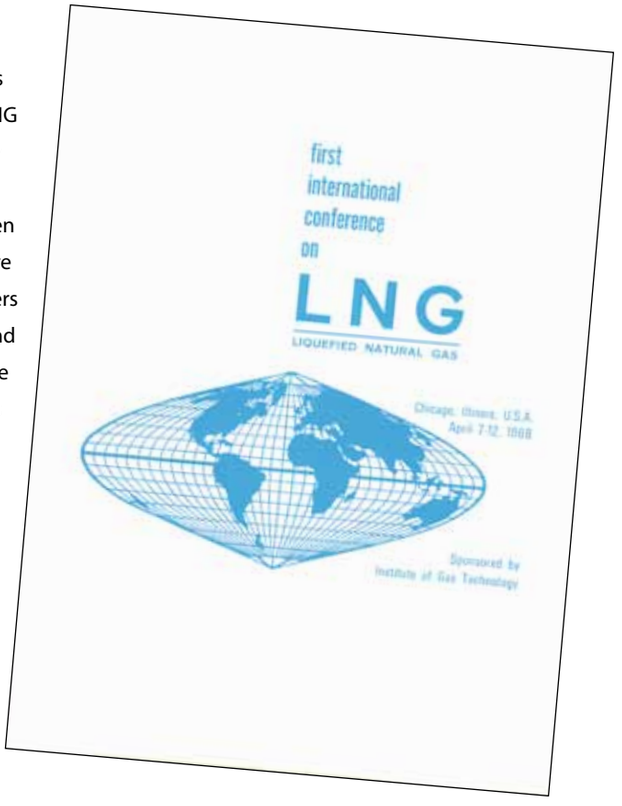
Algeria, which delivered 1.5 bcm/year to the UK and France. However, as one conference participant noted, LNG was already regarded as "the fuel with a great future", and preparations were underway for plants in Alaska and Libya to export to Japan, Italy and Spain.

IGT was an independent not-for-profit energy research and education organisation created by the American gas industry in 1941. IGT researchers had been involved in various LNG projects in the 1950s and 1960s, including basic research on LNG's physical properties, the analysis and improvement of liquefaction and regasification systems, studies of storage systems, and engineering and design work for the construction of storage tanks in Barcelona, Spain. IGT staff members received so many requests for information from gas and oil companies, construction firms, equipment manufacturers and government officials that it was obvious a common forum for the exchange of LNG information was needed.

As a result, an IGT team led by Amanullah (Aman) Khan and Thomas Joyce decided to hold a three-day LNG forum in Chicago. IGT Director Henry Linden was invited to be Conference chair and outstanding people in seven areas spanning the LNG industry were asked to serve as session chairs. Papers were solicited by personal contact and announcements in trade journals. The session chairs reviewed the abstracts submitted and selected the ones they considered to be of greatest interest and importance.

This early conference had seven sessions which are as relevant today as they were in 1968:

- The Role of Natural Gas and LNG in World Gas Supply;
- Operating Plant Experiences;
- Ocean Transportation;



▲ The LNG carrier *Arctic Princess* delivers a cargo – the world's LNG trade is growing strongly.

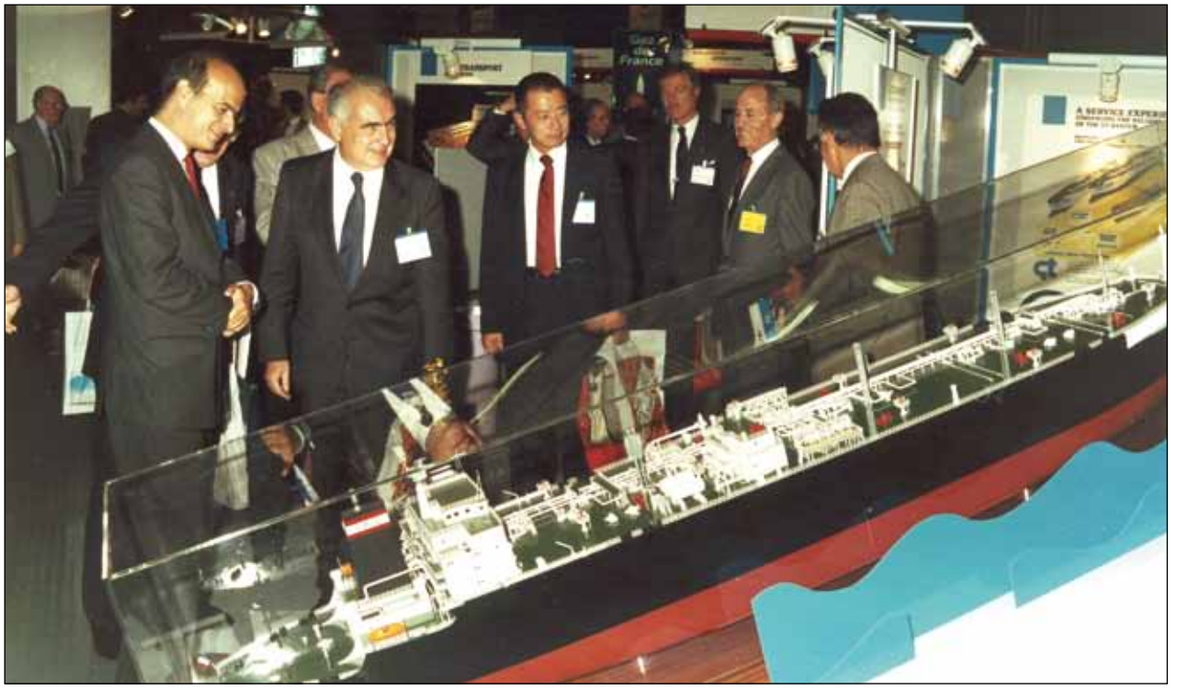
◀ Four years after commercial LNG trading started the first LNG conference was held in Chicago.

LNG 6 was held in Kyoto. Japan started LNG imports in November 1969 and is the world's largest LNG importer.

- Peak-shaving Systems;
- New Developments in LNG Technology;
- Transportation of LNG; and
- Utilisation of LNG.

The meeting lasted six days and attracted 760 delegates, far exceeding the organisers' expectations. Around 600 people came from the US, while 16 other countries sent 150 delegates. English and French were the official languages and simultaneous interpretation was provided.

The tradition of organising field trips was established at this conference by visits to a peak-shaving plant and a storage field. The proceedings were pre-printed in a 750-page volume weighing nearly 2kg!



Luigi Meanti, IGU Vice President at the time and President 1991-94 (*second from left*), Bernie Lee, IGT President (*third from left*) and colleagues tour the exhibition at LNG 9.

It was obvious that such a successful event should be continued, so plans were discussed to hold such a meeting every two years. The second conference, LNG 2, was held in Paris, France in October 1970 and IIR and IGU came on board as co-owners with IGT. Georges Robert represented IGU as SC Chair. Paris was an appropriate place since France was the second country in the world to import LNG (after the UK). By now, the USA was exporting LNG from Alaska to Japan and Libya was exporting to Italy and Spain. More than 1,200 delegates from 37 countries attended.

A special dinner speaker was the great pioneer of the LNG industry, William Wood Prince, former head of Chicago's Union Stockyards and Transit Company, who in the 1950s first conceived the idea of liquefying gas and shipping it as LNG by barge. Field trips were to receiving terminals at La Spezia, Italy; Barcelona, Spain; and Le Havre, France; and to St Nazaire where the LNG carrier *Descartes* was under construction.

LNG 3 was held in 1972, at the Hilton Hotel in Washington DC, a year after the USA received its first cargo of LNG from Algeria. Georges Robert chaired both the conference and the SC, while Aman Khan headed the PC. The conference attracted 1,700 delegates, not including spouses or visitors to the exhibition. Many US government officials, including then-president Richard Nixon, discussed the important role LNG could play in the US energy future.

Two years later, in 1974, the conference moved to Algeria where LNG 4 was held in the Palace of Nations 25km from Algiers on the Mediterranean shore. Leslie Clark was Conference Chair, Aman Khan chaired the SC and Geoffrey Haselden (representing IIR) chaired the PC. Algerian President Houari Boumedienne and US Federal Power Commission Chairman John Nassikas gave keynote addresses at the opening ceremony,

underscoring the importance of the growing trade between the two countries. Optimism was high about the future of the industry, with Brunei having started LNG exports to Japan at the end of 1972 and Indonesia and Abu Dhabi in the UAE planning projects. One expert predicted that world LNG demand could go as high as 260 bcm by the late 1990s. (In fact, it was not until 2010 that LNG trade surpassed this level).

As attendance increased, the conference switched from a two-year cycle to the three-year cycle common among major international energy conferences. LNG 5 was held in 1977 in Düsseldorf, West Germany. James Kerr and Christoph Brecht were the Conference Chairs, Christoph Brecht chaired the SC and Geoffrey Haselden again chaired the PC. Although Germany was not an LNG importer, at the time there were plans to build a receiving terminal. They did not come to fruition but more recently three projects have been launched and a terminal could open by the mid-2020s.

LNG 6 in Kyoto, Japan in 1980 drew a record 2,200 attendees (including spouses), half of whom came from 41 countries outside Japan. Eric Giorgis and Hiroshi Anzai were Conference Chairs; Aman Khan and Geoffrey Haselden chaired the SC and PC, respectively. At the opening session, the heads of Pertamina and Tokyo Gas expressed rather different opinions about LNG prices – plus ça change!

◄ HH Sheikh Hamad bin Khalifa Al-Thani, Emir of Qatar, opens LNG 14.

▼◄ Myung-Kyu Kim, CEO of KOGAS and Chairman of the Korea Gas Union, addresses LNG 9.

LNG 7 took place in 1983 in Jakarta, Indonesia, which by 1980 had become the world's leading exporting country. Christoph Brecht and Joedo Sumbono were Conference Chairs, IGT President Bernard (Bernie) Lee was Chair of the SC and Maurice Grenier became PC Chair.

In 1986, the conference returned to the USA, this time to Los Angeles, where a receiving terminal was planned and imports were expected to begin in the near future. John Kean and Joseph Rensch were Conference Chairs of LNG 8. Christoph Brecht chaired the SC and Maurice Grenier again led the PC.

In 1989, France hosted the conference for a second time with LNG 9 being held in Nice. A highlight was the opportunity for delegates to tour the first commercial dual-fuel jet that used LNG, a Tupolev Tu-155 brought by the then Soviet Union especially for the conference. Pierre Gaussens and Luigi Meanti were Conference Chairs. Bernie Lee chaired the SC and Jean-Pierre Dufresne the PC.

Malaysia, by now a major exporting country, hosted LNG 10 in Kuala Lumpur in 1992. The SC Chair was Luigi Meanti and the PC Chair was again Jean-Pierre Dufresne. Tan Sri Datuk Azizan Zainul Abidin and Bernie Lee were Conference Chairs.

Birmingham was the venue for LNG 11 in 1995, although the UK had discontinued its LNG imports in 1990 (they were to restart in 2005). Messrs. Lee and Dufresne chaired the SC and PC.

In 1998, Perth, Australia was the venue for LNG 12. The SC Chair was Claude Détourné and Nirmal Chatterjee chaired the PC for the first time. Delegates visited the North West Shelf project which had begun operations in 1989.

In 2001, Korea, now the world's second largest LNG importing nation after Japan, hosted LNG 13 in Seoul. Bernie Lee headed the SC and Nirmal Chatterjee the PC.

LNG 14 was held in Doha in 2004 with Khalifa Al-Sewaidi chairing the NOC, Hiroshi Urano the SC and Nirmal Chaterjee the PC. Having started LNG exports in 1996, Qatar was rapidly expanding its capacity and a focus of LNG 14 was on the use of larger capacity

HE Abdullah bin Hamad Al-Attiyah, Qatar's Minister of Energy & Industry, opens the LNG 14 exhibition.

liquefaction trains to achieve economies of scale. Other developments covered included Darwin LNG, which was under construction and would be the first liquefaction plant to use aero-derivative gas turbines, and the Snøhvit project in Norway, which was also going to use aero-derivative gas turbines and had the added innovation of a CO_2 capture and storage facility.

A late addition to the programme was a presentation on the initial lessons to be learned following an explosion at Skikda LNG in Algeria in January 2004.

Spain hosted LNG 15 in Barcelona in 2007 and Juan Pons chaired the NOC, Michael Duggan the SC and Nirmal Chaterjee the PC. A key concern was how rising raw material prices and competition from other industries for engineering and contracting services were forcing up the cost of building liquefaction plants. Delegates looked at ways of countering these cost pressures through modularisation to allow off-site fabrication, building even larger trains than Qatar's 7.8-mtpa supertrains, where feedstocks made that feasible, and improving the efficiency of smaller trains. On the transportation front, they debated the pros and cons of larger ships and different propulsion systems.

María Teresa Costa, President of Spain's National Energy Commission, opens the LNG 15 exhibition flanked by Antoni Peris, President of the IGU Charter Member for Spain, Sedigas, (*left*) and Antoni Llardén Honorary LNG 15 Chair (*right*).

There are many eventualities to plan for when mounting a large international conference, but the eruption of a volcano 4,000km from the venue which had been dormant for nearly two centuries was not something the organisers of LNG 16 in Oran could have imagined in their wildest dreams – or nightmares. When Eyjafjallajökull spewed a cloud of volcanic ash into the atmosphere which paralysed air traffic in northern Europe from April 15 to 20, 2010, the travel plans of LNG 16 delegates from or routeing through Europe were badly affected. Some were delayed and many were not able to attend at all. However, a swift response by the Algerian NOC chaired by Abdelhafid Feghouli, the SC chaired by Ernesto López Anadón and the PC chaired by Nirmal Chatterjee mitigated the impact.

While the exhibition opened as planned on April 18, the conference start was delayed and the programme condensed from three and a half to two days. Some stranded speakers nominated substitutes to give their papers while two recorded podcasts. And for those who registered but were unable to travel, all the presentations were videoed and made available for download from the LNG 16 FTP site. At the forefront of delegates' minds were demand-side issues such as the impact of growing supplies of unconventional gas, particularly in the USA.

Indeed, the USA hosted the next conference with Houston as the venue for LNG 17 in 2013. Heading up the organising committees were

◀ The opening ceremony of LNG 16.

▼ Dr Abdelhafid Feghouli, NOC Chair (*left*) hands over the conference banner at the closing ceremony of LNG 16 to Jay Copan, Executive Director of LNG 17 (*right*), while Dr Chakib Khelil, Algeria's Minister of Energy & Mines (centre) and Ernesto López Anadón, IGU President 2006-09 (*far right*) look on.

John Somerhalder as NOC Chair, David Carroll as SC Chair and Nirmal Chatterjee as PC Chair. The LNG 17 programme was broader in scope than previous conferences with innovations such as the Global Strategy Forum, and the working day was extended to accommodate more than 300 speakers. There was a major focus on floating LNG, both liquefaction and regasification, and on the expansion of end-use markets, particularly transportation. Developments in small-scale liquefaction were also covered, while there was much debate about pricing models and the impact of rising costs. The event attracted a record 5,000 participants from 80 countries and part of the proceeds went towards an American Gas Association scholarship fund for students interested in pursuing a career in the gas industry.

The conference returned to Perth, Australia in 2016 when Grant King was NOC Chair, Jérôme Ferrier was SC Chair and Nirmal Chatterjee again headed the PC. The message

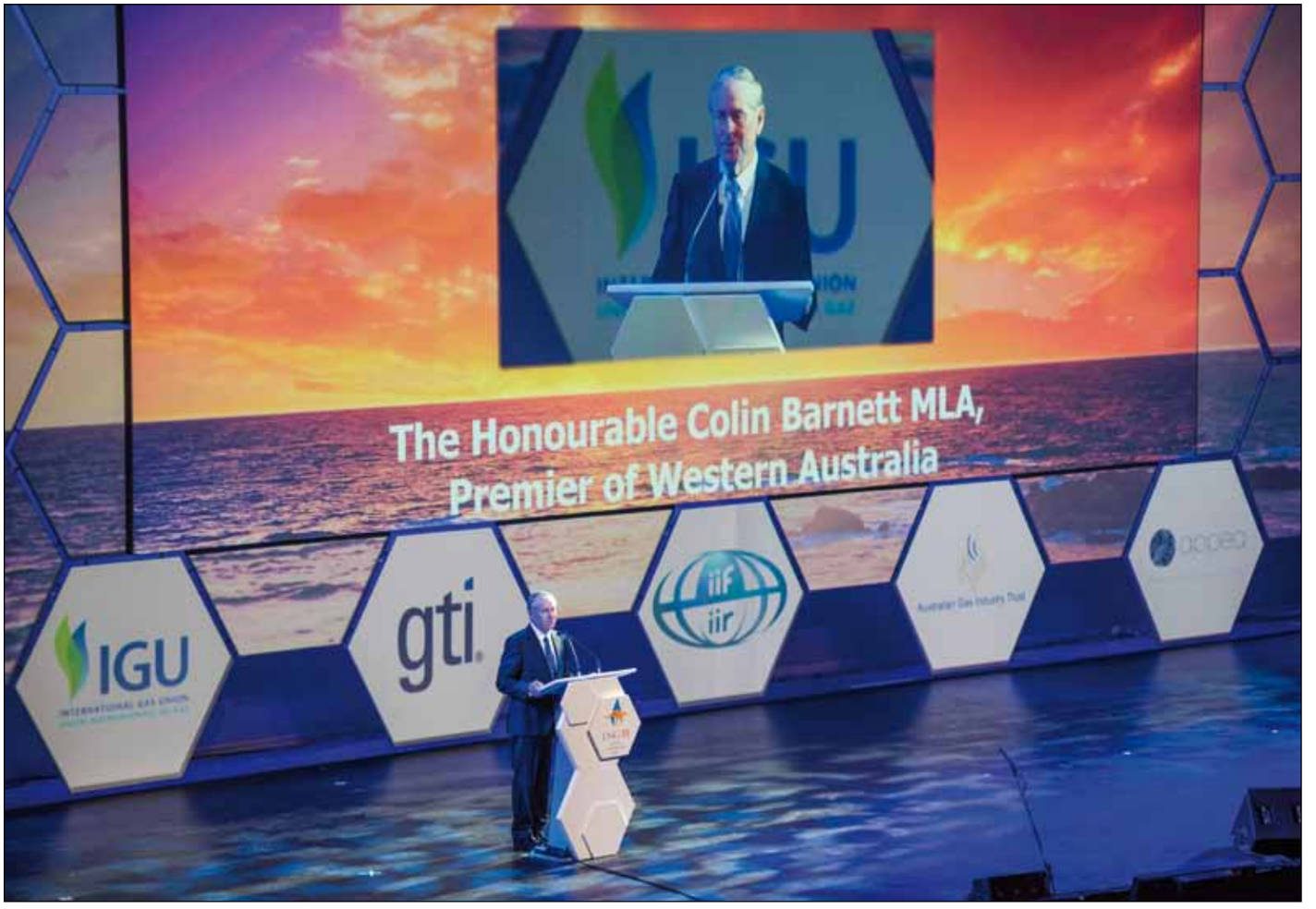
▶
Dr Nirmal Chatterjee, seen here addressing LNG 17, chaired the PC for eight conferences.

▶▶
David Carroll, President & CEO of GTI (and later IGU President 2015-18), welcomes participants at the LNG 17 opening ceremony.

from LNG 18 was that the globalising LNG industry can look forward to a bright future so long as all market players successfully navigate several big challenges over the medium term. Speakers in Perth forecast that LNG production could reach 500 bcm in 2020 (which it did), up from around 330 bcm in 2015. However, faltering demand growth in key Asian markets means the industry is facing a medium-term glut, prices are under pressure from the oversupply and the collapse in oil prices and buyers are showing an ever greater appetite for flexibility and diversity. For the industry to thrive over the long term, LNG will need to be perceived as an affordable fuel so that it is able to compete with coal, especially in electricity generation. So along with cuts in capital costs, there was much discussion about how LNG should be priced in the future, with a growing feeling, even amongst buyers, that oil indexation is not the best way forward. Not only are oil prices no longer relevant to gas markets but also their volatility is bad for both suppliers and sellers.

If the challenges can be addressed, many delegates saw the current era of oversupply and low prices as an ideal time to encourage the development of new markets – both in new countries and new applications such as transportation – and to expand the reach of natural gas in existing markets, especially in China and India. They highlighted the growing role of floating regasification in opening up new markets.

▶
From left to right at the LNG 17 Global Strategy Forum are: José Alcides Santoro Martins, Chief Gas and Energy Officer of Petrobras; Marcelino Oreja Arburua, CEO of Enagás; Shigeru Muraki, CEO of the Energy Solution Division of Tokyo Gas; Pat Roberts, moderator; Hamad Rashid Al Mohannadi, CEO of RasGas; Joseph Geagea, President of Chevron Gas and Midstream; and Richard Guerrant, Vice President of ExxonMobil Gas & Power Marketing.



◀ Colin Barnett, Premier of Western Australia, speaking at the LNG 18 opening ceremony.

◀ *From left to right* at the LNG 18 Plenary "Investing for Growth" are: Ron Snedic, Vice President Corporate Development of GTI; Josh Frydenberg, Minister for Resources, Energy and Northern Australia; Patrick Pouyanné, CEO of Total; Datuk Wan Zulkiflee Wan Ariffin, President and Group CEO of Petronas; and Simon Redmond, Director, Corporate Ratings Commodities, Standard & Poor's.

Wang Zehong, LNG2019 NOC Chair (*left*) hands over to Sergey Kalityuk, Director General of the LNG2023 NOC.

New branding

China hosted the next conference in Shanghai, April 1-5, 2019, and a new logo branding was introduced with the aim of creating consistency from one event to the next while still allowing individual content based on each new location. The branding combines LNG with the year of the event and the consistent element is a gas flame within a blue drop. Wang Zhehong chaired the NOC, Ron Snedic the SC and, for the last time, Nirmal Chatterjee the PC. After chairing the PC since LNG 12, he retired at the end of LNG2019.

Li Yalan, Chair of Beijing Gas Group and IGU's Vice President addressing LNG2019.

In the run-up to LNG2019 there were important developments in the shipping sector. The Panama Canal expansion project, inaugurated in June 2016, accommodated larger ships including LNG carriers with a capacity of up to 210,000m^3 and was particularly beneficial for the US export trade from the Gulf of Mexico to Asia. The following year the first LNG carrier traversed Russia's Northern Sea Route without the use of icebreakers halving the time for shipments from the Yamal plant to Asia between May and November.

There were just over 2,000 conference delegates and the issue of cost-cutting continued to dominate the agenda with the Chinese hosts leading calls for cost-competitive, flexible LNG and more investment in infrastructure, while the major producers acknowledged the need to tackle costs, improve efficiency and reduce methane emissions.

Delegates noted that the increasing use of modularisation, allowing construction in the controlled environment of a factory or fabrication yard before installation on site, and standardisation rather than bespoke project designs, were helping to cut costs. Supplies were increasing from a geographically diverse resource base, customer requirements were being met by new pricing options and new markets being developed. It was predicted that the LNG trade would reach 800 bcm by 2040 with half of the import growth coming from greenfield markets. All in all, 40 plenary speakers addressed the conference along with 200 industry experts covering the entire LNG value chain, while the accompanying exhibition featured

◄ Representatives of the owners and hosts at the LNG2019 opening ceremony.

▲ Philip Hagyard is the new PC Chair.

200 exhibitors presenting their latest technology and services.

Due to the rescheduling of the 28th World Gas Conference from 2021 to 2022, the next in the LNG Event Series has been pushed back a year to become LNG2023, which will be hosted by Russia in St Petersburg. Sergey Kalityuk heads the NOC, Joo-Myung Kang the SC and the new chair of the PC is Philip Hagyard.

The key to the success of the LNG Event Series has been the clear assignment of responsibilities to the committees and the close coordination and productive teamwork between IGU, IIR and GTI and the national organising committees. From its very inception, the LNG Event Series has provided a sterling example of international cooperation in a spirit of friendship and mutual good will.

This is an updated history of the LNG Event Series based on an article originally written by Colleen Taylor Sen of the Gas Technology Institute to whom grateful acknowledgement is made.

The dates and venues of the LNG conferences

Conference	*Date*	*Location*
LNG 1	April 7-12, 1968	Chicago, USA
LNG 2	October 19-23, 1970	Paris, France
LNG 3	September 24-28, 1972	Washington DC, USA
LNG 4	June 24-27, 1974	Algiers, Algeria
LNG 5	August 29-September 1, 1977	Düsseldorf, West Germany
LNG 6	April 6-10, 1980	Kyoto, Japan
LNG 7	May 15-19, 1983	Jakarta, Indonesia
LNG 8	June 15-19, 1986	Los Angeles, USA
LNG 9	October 17-20, 1989	Nice, France
LNG 10	May 25-28, 1992	Kuala Lumpur, Malaysia
LNG 11	July 3-6, 1995	Birmingham, UK
LNG 12	May 4-7, 1998	Perth, Australia
LNG 13	May 14-17, 2001	Seoul, Korea
LNG 14	March 21-24, 2004	Doha, Qatar
LNG 15	April 24-27, 2007	Barcelona, Spain
LNG 16	April 18-21, 2010	Oran, Algeria
LNG 17	April 16-19, 2013	Houston, USA
LNG 18	April 11-15, 2016	Perth, Australia
LNG2019	April 1-5, 2019	Shanghai, China
LNG2023	July 3-7, 2023	St Petersburg, Russia
LNG2026	April 12-16, 2026	Doha, Qatar

▲ Marketing for the LNG conferences now features consistent branding – the logos for the 2019 and 2023 events.

The History of the IGRCs

The IGU Research Conference (IGRC) is the premier global forum devoted to presentation and discussion of gas R&D. Originally known as the International Gas Research Conference, the event was launched in 1980 and the next one will be held in Banff, Canada in 2024.

The IGRC was conceived by the Gas Research Institute (GRI) with IGU, the American Gas Association (AGA) and the US Department of Energy (DOE) as co-sponsors. Initially there was a difference of opinion between GRI and IGU about the event's frequency. IGU felt that it would be best to have a conference once every three years, while GRI favoured a higher frequency. As a result the second and fourth IGRCs were organised without formal IGU involvement. But from 1986 the three-yearly cycle was introduced with IGU as a permanent co-sponsor and GRI hosting the IGRC secretariat.

In 2000, GRI merged with the Institute of Gas Technology to form the Gas Technology Institute, which assumed the responsibility as secretariat host for the 2001 and 2004 conferences but indicated that it could not do so in the longer term. Following negotiations the IGRC was brought into the IGU fold in 2005, when it was decided to hold the event in the year before each World Gas Conference, rather than the year after, so that the highlights could be presented during the WGC. This meant that there was an interval of four years between the 11th IGRC in 2004 and the 12th in 2008, whereupon the three-yearly cycle resumed.

With effect from the 2012-15 Triennium the IGRC was fully integrated into IGU's structure by the creation of a permanent committee for R&D activities.

The IGRCs from 1980 to 2004

The first IGRC was held in Chicago, June 9-12, 1980 at a time of energy crisis. The Iranian Revolution of 1979 had led to a surge in the oil price (which would increase even more when Iraq invaded Iran later that year) and importing countries were looking for ways to reduce their oil dependence. Could the gas industry help? The 500 delegates from 17 countries believed it could, and the conference's key message was that policymakers were underestimating the potential for gas.

The conference was structured so that gas R&D issues were presented during morning plenary sessions, with specific research results given in afternoon technical sessions. The latter were devoted to coal gasification, unconventional natural gas, improved efficiency in natural gas utilisation, solar, biomass and R&D planning. The plenary sessions addressed issues of gas supply and conservation.

GRI President Henry Linden chaired the Steering Committee and 56 papers were presented in addition to the opening and closing addresses, one of which was given by the then IEA Director Ulf Lantzke.

GRI went on to organise a second conference in Los Angeles, September 28-October 1, 1981, with the AGA and DOE as co-sponsors. There were 557 delegates from 18 countries and 166 papers were presented.

IGU was back on board for the next IGRC in London, June 13-16, 1983, when the President, Christoph Brecht declared, "R&D is indispensable for the very existence and growth of the gas industry".

The third IGRC was attended by 535 delegates from 25 countries and 100 papers were

presented in six groups: distribution & transmission; substitute natural gas; residential & commercial utilisation; industrial utilisation; thermophysical properties & processes; and general technical. To aid discussions preprints of all papers were made available to registered delegates before the conference. Christoph Brecht chaired the Policy Committee (PC) and GRI's William Staats chaired the Programme & Papers Committee.

IGU passed on the fourth IGRC which was held in Washington DC, September 10-13, 1984. This was attended by 454 delegates and included a poster session for the first time. In total, 70 papers and 33 posters were presented.

From the fifth IGRC in Toronto, September 8-11, 1986, IGU was on board permanently, with the President, John Kean declaring in his opening address, "I have seen the advantages of the interchange of technical and scientific information and what that exchange can do to benefit the rest of the world".

For this event, which was attended by 472 delegates from 24 countries, the Canadian Ministry of Energy, Mines & Resources and the Ontario Ministry of Energy joined GRI, IGU, AGA and DOE as co-sponsors. John Kean chaired the PC and Dr John Laurmann took the helm of what was now known as the Technical Programme Committee (TPC). The environment made its first appearance as a subject area and six papers looked at indoor air quality and emission controls. Overall, there were 76 oral and 52 poster presentations grouped into nine subject areas: gas distribution; gas transmission; thermophysical properties; residential & commercial utilisation; industrial utilisation; gas supply; gas properties & combustion; environment; and general studies.

The sixth IGRC was held in Tokyo, November 6-9, 1989, with the Japan Gas Association joining GRI, IGU, AGA and DOE as a co-sponsor. A record 902 delegates from 32 countries attended and there were 72 oral and 120 poster presentations in nine groups: gas distribution; gas transmission; gas storage; residential & commercial utilisation; industrial utilisation; gas supply & treatment; environment; gas properties; and general studies. The PC was chaired by IGU's Herbert Richter and the TPC by Jörg Becker of Ruhrgas.

The conference was marked by a focus on environmental issues related to global warming. Stephen Schneider of the US National Center for Atmospheric Research set the scene with a presentation to the opening plenary session on the state of the science regarding the greenhouse effect.

The next IGRC was held five months after the Rio Earth Summit and IGU's President, Luigi Meanti continued the environmental

◄ The CEOs' roundtable was introduced for IGRC2008. *From left to right:* Gérard Mestrallet, Chairman & CEO of GDF Suez; Tadaaki Maeda, Executive Vice President of Tokyo Gas; Mark Dodson, CEO of Northwest Natural; Bob Catell, then Chairman of National Grid (US); and Bernhard Reutersberg, Chairman of the Board of Management E.ON Ruhrgas.

▶▼
George Verberg, IGU President 2003-06 (RIGHT) at the opening ceremony of IGRC2004 which was held in Vancouver (BELOW RIGHT).

theme when he addressed delegates. "To guarantee sustainable development," he declared, "ever greater emphasis is needed on the efficient use of energy and compatibility with the environment."

IGRC 7 was held in Orlando, November 16-19, 1992. While attendance fell to 678 delegates from 31 countries, the programme was bigger. It was also rationalised under five headings: exploration & production; transmission & storage; distribution; residential & commercial utilisation; and industrial utilisation. There were 90 oral and 171 poster presentations, and 18 (compared to three in 1989) were the work of authors from more than one country illustrating the increasing importance of international cooperation in R&D. The PC was chaired by Luigi Meanti and the TPC by Tsunenori Tokumoto.

The programme structure was maintained for the eighth IGRC, which was held in Cannes, November 6-9, 1995. There were 675 delegates from 31 countries and 90 oral and 205 poster presentations. Noting the accelerating trends of privatisation and deregulation of energy markets, IGU's President Hans Jørgen Rasmusen told delegates, "It will be a challenge to find ways to share the cost of R&D … IGU is in a very good position to help the gas industry meet these challenges". He chaired the PC and Bernard Lee chaired the TPC.

The move to market liberalisation or full deregulation in many countries involved the break-up of former monopoly gas enterprises with their traditional strength in R&D into several companies and an increased focus on cutting overheads. This put pressure on R&D budgets and in turn affected IGRC participation for a number of years. However, the unbundling of gas companies would create new demands for R&D, particularly in terms of measuring, metering and interoperability, while focusing on the bottom line created a new driver for R&D into more effective maintenance and the upgrading of installations.

The ninth IGRC was held in San Diego, November 8-11, 1998. IGU's Claude Détourné chaired the PC and Francis Dewerdt chaired the TPC. Attendance was similar to the previous conference, with 672 delegates from 34 countries, and there were 97 oral and 230 poster presentations. The programme structure was maintained with a slight revision by renaming the fifth category industrial utilisation & power generation.

Innovations for the 10th IGRC included a reduced fee for students and the publishing of the conference proceedings on CD-Rom supplemented by an abstract book. The conference was held in Amsterdam, November 5-8, 2001, just two months after the tragic

events of September 11 when some companies had business travel restrictions in place. There were 492 delegates. The programme structure was maintained with 291 papers and posters presented. IGU's Hiroshi Urano chaired the PC and Dr Robert Harris of Advantica Technologies chaired the TPC.

An associated exhibition was organised for the first time at the 11th IGRC, which was held in Vancouver, November 1-4, 2004, and attended by 372 delegates from 34 countries. A best paper award worth €10,000 was also inaugurated in honour of the late Dan A. Dolenc of GRI who had helped organise the conferences for some years and headed the IGRC secretariat for the 1998 conference. The winners were Vinod Chauhan of Advantica and co-author Wytze Sloterdijk of NV Nederlandse Gasunie, for their paper "Advances in Interaction Rules for Corrosion Defects in Pipelines". The award was presented by Mrs Jean-Marie Dolenc during the closing ceremony of the conference.

The programme structure was amended with the five categories entitled: gas resources, production & processing; transmission; distribution; residential & commercial utilisation; and industrial utilisation. In total, 76 oral papers and 152 posters were presented. The PC was chaired by IGU's George Verberg and the TPC by Peter Hinstrup of the Danish Gas Technology Centre.

The IGRCs in 2008 and 2011

For the next two conferences secretarial support was provided to the PC by the IGU Secretariat and to the TPC by the Foundation IGRC, which was established by the Dutch gas industry on the basis of a foundation created to help organise the 2001 event.

Participation in the 12th IGRC bounced back with an impressive 811 delegates from 41 countries leading George Verberg to conclude that, "the involvement of companies in research and development has made a U-turn compared to previous years". The event was held in Paris, October 8-10, 2008.

One of the exhibitors at IGRC2008 briefs a delegate.

George Verberg chaired the PC for the second time and Christian Beckervordersandforth chaired the TPC. There were 42 oral papers, three keynotes and 270 poster presentations, while innovations included a roundtable with five CEOs and four workshops.

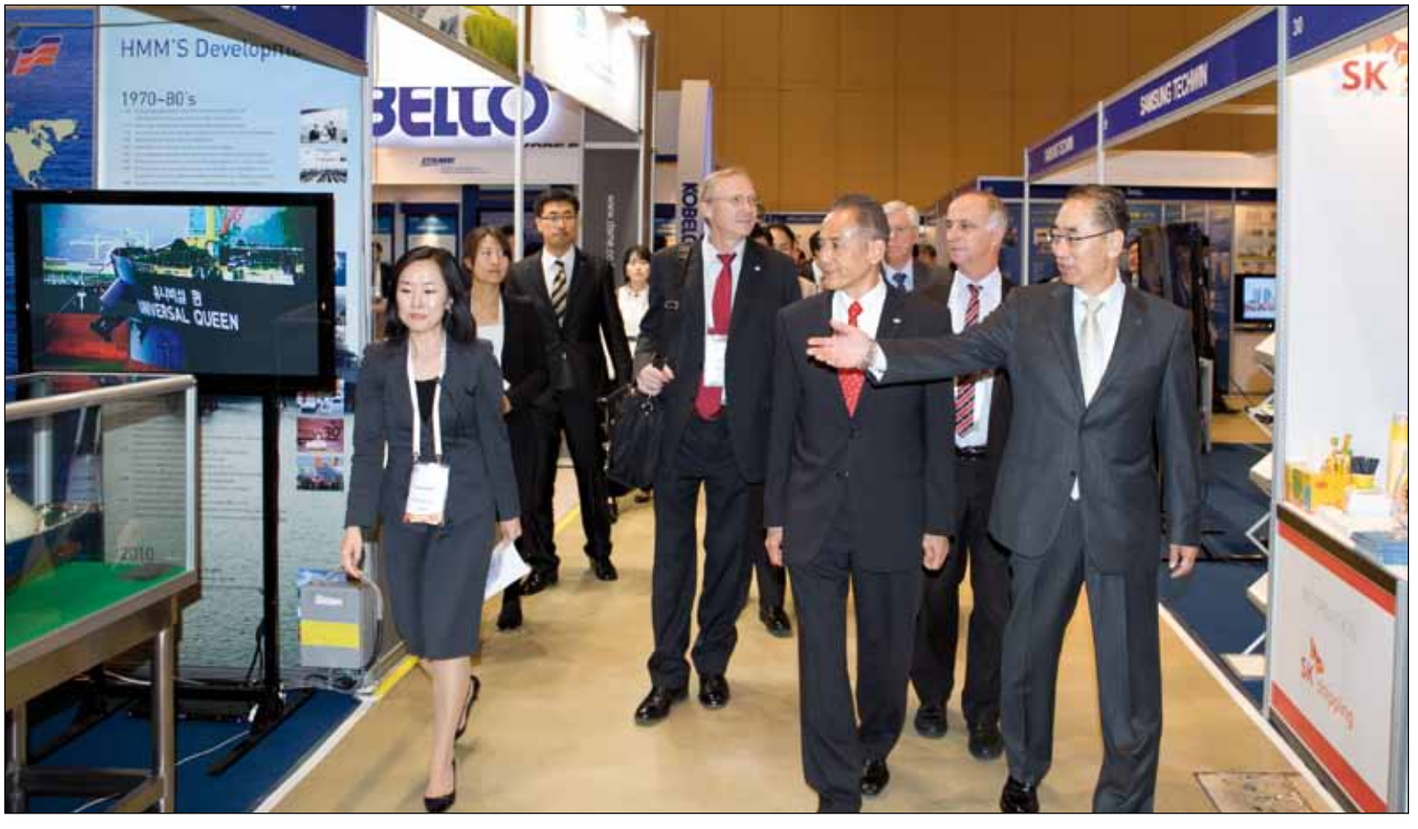
The Dan A. Dolenc Award was given to two papers with the winners sharing the prize: Dominique Gueugnaut from GDF Suez did fundamental work on the permeability of methane hydrogen mixtures in polyethylene gas pipes used in gas distribution networks; Takahide Haneda from Tokyo Gas developed a gasification system for sewage sludge and proved in practice with a full-scale plant that the expected contribution to a reduction in greenhouse gases was realistic.

Although participation in the 13th IGRC, which was held in Seoul, October 19-21, 2011, dropped back, there were more than 500 delegates from 39 countries. Some 200 papers and posters were presented and there were 40 exhibitors. IGU's Ernesto López Anadón chaired the PC and Marc Florette of GDF Suez chaired the TPC.

A new €3,000 prize was launched for a paper presented by a young researcher (under 30) and Cyril Vuillecard of GDF Suez won for his work on a bottom-up model for local gas and electricity interactions with hybrid technologies. The Dan A. Dolenc Award for the best paper overall went to Dr Marius Adelt of E.ON Ruhrgas for "The Life Cycle Assessment of Biomethane". The CEOs' roundtable was moderated by Bob Catell, Chairman of Advanced Energy, and brought together: Thijs Aarten, CEO of Kema GCS;

Kang Soo Choo, President & CEO of KOGAS and Chairman of the Korea Gas Union addresses delegates during the opening ceremony of IGRC 2011 in Seoul.

The ceremonial opening of the exhibition at IGRC2011.



Kang Soo Choo escorts Datuk Abdul Rahim Hashim, IGU President 2009-12, and other members of the PC around the exhibition at IGRC2011.

Seongho Hong, Chief Researcher of Kogas; Matthias Bichsel, Projects & Technology Director of Shell; J. Wason, Executive Director Marketing of GAIL; and Dr Colin Wong, Vice President, Technology & Engineering of Petronas.

The new IGRC structure

In April 2011, the IGU Executive Committee approved the creation of a permanent technical committee covering R&D and innovation. With effect from the 2012-15 Triennium, this took over the tasks of the TPC, while those of the PC were divided between the new technical committee and the Executive Committee. The Dutch Foundation IGRC was then wound up.

Chaired by Jack Lewnard, the R&D and innovation committee worked with the Danish NOC to organise the 14th IGRC, which was held in Copenhagen, September 17-19, 2014. The event was attended by 750 delegates from 46 countries and the programme included more than 400 papers which were presented in 20 oral sessions, eight workshop sessions and 10 poster sessions. For the first time there was a royalty on the delegate income and the NOC was responsible for paying this into IGU central funds.

The Dan A. Dolenc Award was given to a paper by Julien Duclos, Dominique Gosselin and Philippe Buchet of GDF Suez entitled "High-temperature gas heat pumps to recover industrial waste heat". The young researchers' prize (increased to €3,500 and with a new age limit of under 35) was given to a paper by Andreas Hielscher, Christian Fiebig, Roland Span, Peter Schley and Joachim Schenk of Ruhr University Bochum entitled "Gas quality tracking in distribution grids with Smartsim – a new kernel for flow calculation".

Also taking place during IGRC2014 was the NRG (Energy) Battle – World Edition. Teams of talented young professionals were brought together to solve real energy challenges from GDF Suez, DNV GL, Gasunie and Energinet.dk. Teams presented their ideas before a jury of experts, and the winners received tickets for a trip around the world.

Ulco Vermeulen, Managing Director Business Development & Participations at Gasunie moderates a debate during IGRC2014 between Michael Weinhold, Chief Technology Officer of Siemens Energy and Seok-hyo Jang, President & CEO of KOGAS.

For the 15th IGRC a steering committee supported by the IGU Events Director (a new position established in 2016) was set up to strengthen the governance of the event, which was held in Rio de Janeiro, May 24-26, 2017. Chaired by Gerald Linke, the R&D and innovation committee worked with the Brazilian NOC on the programme with five plenary, 24 oral and four poster sessions. In total, 274 papers were

David Carroll, IGU President 2015-18, addressing IGRC2017.

The chairs of the R&D and innovation committee, Gerald Linke (2015-18) and Jack Lewnard (2012-15) during the closing plenary of IGRC2014.

▶ Milton Costa Filho, Secretary General of IBP, the host of IGRC2017.

▶ ▶ IGU President Joo-Myung (Joe) Kang speaking during the IGRC2020 opening ceremony.

presented and there were 360 delegates from 27 countries.

This time no awards were made during the event but the R&D and innovation committee did establish new non-monetary innovation awards for the 27th World Gas Conference the following year. These were made for innovation in 10 categories and there was an 11th for the overall winning presentation, which was given by Wim van Grunderbeek of Gasunie and Gerben Roseboom of MapXact for a new system using ground-radar technology to produce a 3D display of underground infrastructure.

The 16th IGRC was held in Muscat, February 24-26, 2020, following a last-minute reorganisation of the programme to ensure the success of the event in the face of the growing Covid-19 crisis (the World Health Organisation would declare a global pandemic in March 2020). This impacted international participation although support from Omani companies and institutions brought total attendance to 548. In all, 32 countries were represented.

Hisataka Yakabe chaired the R&D and innovation committee and the programme included a new "Deep Dive Session" during one of the lunch breaks. This invitation-only session was designed to develop side discussions as an extension of Q&A on a particular topic, in this case LNG Blockchain. During the conference 72 oral presentations and 220 poster presentations were made. An award for the best presentation was reinstated with a prize of $1,500 and the winner was Sander Gerson of DNV GL, whose presentation was on hydrogen as a fuel for heating processes. There were three non-monetary awards for posters presented by young researchers.

In the upstream category, Ali Al Siyabi and Ahmed Ibrahim Albalushi of the Muscat Higher College of Technology were recognised for their experimental investigation of a solar biogas digester to optimise performance.

In the downstream category, Naoyuki Kato of Toho Gas was recognised for his development of the trenchless Stream method to replace cast-iron pipes with polyethylene pipes.

In the cross-cutting technologies category, a team led by Amélie Louvat of the Research and Innovation Centre for Energy (RICE) at GRTgaz was recognised for the development of standardised methods for the analysis of ammonia, terpenes and amines in biomethane.

The next IGRC will be held in May 2024, one year later than originally scheduled due to the impact of the pandemic on IGU's programme of activities. It will be held in Banff in the Canadian province of Alberta.

▼ Wim van Grunderbeek (*left*) and Gerben Roseboom were the overall winners of IGU's innovation awards in 2018.

The dates and venues of the IGRCs

Date	*Location*
June 9-12, 1980	Chicago, USA
September 28-October 1, 1981	Los Angeles, USA
June 13-16, 1983	London, UK
September 10-13, 1984	Washington DC, USA
September 8-11, 1986	Toronto, Canada
November 6-9, 1989	Tokyo, Japan
November 16-19, 1992	Orlando, USA
November 6-9, 1995	Cannes, France
November 8-11, 1998	San Diego, USA
November 5-8, 2001	Amsterdam, The Netherlands
November 1-4, 2004	Vancouver, Canada
October 8-10, 2008	Paris, France
October 19-21, 2011	Seoul, Korea
September 17-19, 2014	Copenhagen, Denmark
May 24-26, 2017	Rio de Janeiro, Brazil
February 24-26, 2020	Muscat, Oman
May 13-15, 2024	Banff, Canada

Luis Bertrán Rafecas, IGU Secretary General, with HE Salim Al Aufi, Undersecretary in Oman's Ministry of Oil and Gas, during IGRC2020.

Ali Al Siyabi (*left*) and Ahmed Ibrahim Albalushi are presented with their Young Researchers' Award at IGRC2020 by Khalid bin Abdullah Al Massan, CEO of Oman LNG Development Foundation.


ASIA EXCELLENCE

Today and Tomorrow

This section starts with chapters looking at important initiatives of IGU to step up involvement in the annual UN Climate Change Conferences, set up a Ministerial Gas Forum jointly with the International Energy Forum (IEF), establish relations with the G20 forum of major economies, set up Diplomatic Gas Forums and launch a gas advocacy programme. Then there is a chapter looking at the future prospects of the global gas industry. The section rounds off with details of the publications available from IGU and the acknowledgements.

IGU Engages with International Policymakers

An important finding of the task force reviewing IGU's future at the start of the new millennium was that the Union needed to broaden its work and move from a focus on technical issues to get more involved in economic, regulatory and social policy issues. Apart from the internal impact on IGU's work programme, this entailed much greater external engagement with stakeholders and policymakers. Four important outreach initiatives have been stepping up IGU's involvement in the annual United Nations Climate Change Conferences, launching the Ministerial Gas Forum in conjunction with the International Energy Forum (IEF), establishing a relationship with the G20 forum of major economies and setting up the Diplomatic Gas Forums.

UN Climate Change Conferences

The first Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) took place in 1995. IGU has held NGO status from COP1, and was initially represented by the chairman of the task force on gas and the environment, Frank Shephard.

For COP5 in 1999, IGU joined forces with Eurogas to have a stand and organise a seminar themed "Natural gas – part of the solution to global climate change". IGU also participated in meetings with subsidiary bodies at COP5, which prepared the plenary studies and discussed technical issues.

It was at COP6 that IGU took its involvement to another level, achieving the rare honour of addressing the official plenary of environment ministers. Only four slots were available to NGOs and IGU was granted one to give a brief presentation. As COP6 was being held in The Hague, it was considered most appropriate for the Dutch Vice President, George Verberg to speak.

In addition, IGU hosted a special event at COP6, looking at "Natural gas perspectives and transfer of technology". The main speaker was Professor Nebojša Nakićenović, from the International Institute for Applied Systems Analysis and a lead author in the Intergovernmental Panel for Climate Change (IPCC). A panel discussion was held which included the President of IGU, Hiroshi Urano, the Secretary General, Peter Storm, and IGU colleagues from Argentina, Australia and Canada.

IGU also joined forces with six other gas-related organisations, accredited to the UNFCCC, to present an information stand on the benefits of gas. This was outside the plenary hall of the conference; there was another stand in an adjoining technology exhibition with some of the gas organisations.

From COP7 to 14

In 2001, COP7 was held in Marrakech. Here, IGU had an information stand and held a special event where IGU representatives gave presentations on issues related to the natural gas industry and sustainable development.

COP8 was held in New Delhi in 2002. This time, IGU had a stand in the exhibition to promote its views on sustainable development and climate change. IGU also collaborated with the Indian Charter Member, Gas Authority of India (GAIL), and the Federation of Indian Chambers of Commerce and Industry (FICCI) to organise a special event. This promoted gas with special emphasis on a project on sus-

George Verberg, IGU Vice President 2000-03, addressed the official plenary of Environment Ministers at COP6 – the sack contained coal, the dirty fuel he was urging should be supplanted by clean-burning natural gas (LEFT). COP6 was held in The Hague in November 2000 (BELOW).

tainable urban system design being coordinated by the Japanese Charter Member, the Japan Gas Association.

In addition to its usual exhibition stand at COP9 in Milan in 2003, IGU organised two special events with the theme of "Natural gas, also the better choice in transport". Speakers were brought in from Argentina, India and Italy to promote gas, with the events reflecting the special transport theme chosen by the UNFCCC Secretariat for COP9.

At its special event during COP10 in Buenos Aires in 2004, IGU presented the first draft of a vision paper themed "The future role of natural gas and the strategic impact for IGU". (The final version would be presented at the 23rd World Gas Conference in 2006.) Transport was again a topic of discussion with IGU bringing in speakers from The Netherlands and the

President of the International Association for Natural Gas Vehicles (NGV Global) to promote NGVs as a sustainable future transport solution.

The Kyoto Protocol entered into force in 2005, setting binding targets for 37 industrialised countries and the European Union for reducing greenhouse gas emissions .These amounted to an average of 5% against 1990 levels over the five-year period 2008-12. The major distinction between the Protocol and the UNFCCC was that while the Convention encouraged industrialised countries to stabilise emissions, the Protocol committed them to do so.

The parties to the Kyoto Protocol met for the first time at COP11 in Montreal to agree on tools to facilitate the work towards mitigating climate change and what should be done after 2012 when the first commitment period was due to end. IGU had its usual stand at COP11 but did

▲ The parties to the Kyoto Protocol met for the first time at COP11 in Montreal.

not organise a special event and followed this policy for the next three COPs.

Members of the committee on sustainable development joined the team representing IGU for COP12 in Nairobi and again for COP13 in Bali. At COP14 in Poznan, IGU joined forces with NGV Global to promote natural gas vehicles. IGU also distributed material focusing on sustainability and gas as the fuel of choice during the conference. Representatives of IGU at COP14 included the Secretary General Torstein Indrebø, his advisor Erik Gonder and assistant Florijana Dedović, as well as Hyo-Sun Kim from Korea, a member of the committee on sustainable development.

New gas event launched at COP15

Agreement to extend the Kyoto Protocol beyond 2012 was expected to be reached at COP15 in Copenhagen in 2009. This gave the conference a particularly high public profile so IGU decided to launch a new gas event under the banner of "The role of natural gas in a sustainable energy future". The aim was to inform COP15 delegates, civil servants, NGOs, press and industry about the environmental benefits of natural gas. More than 110 people attended the event, which was sponsored by DONG Energy, Statoil, BG Group and Petoro. It was organised as a symposium with speakers

▼ COP13 took place in Bali, Indonesia, in 2007. IGU was represented by the Secretary General and members of the committee on sustainable development.

addressing several topics related to natural gas and climate change. Speakers came from IGU and the sponsors as well as IEA, the American Gas Association, European Commission, Total, E.ON Ruhrgas and Indraprastha Gas.

In the event, agreement was not reached in Copenhagen and IGU continued the symposium as a side event during the next four COPs. For COP16 in Cancun in 2010, the theme was "The role of natural gas in a low-carbon economy". IGU joined forces with the Worldwatch Institute to organise the symposium, which was sponsored by E.ON Ruhrgas and Statoil. A wide range of speakers included representatives of UNIDO, IEA, the UN Foundation, European Commission, the US Departments of State and Energy, China's Energy Research Institute, the American Council on Renewable Energy, E.ON Ruhrgas, Statoil, Shell, Total, NGV Global and Det Norske Veritas.

For COP17, which was held in Durban in 2011, the theme was "Natural gas: Powering the low-carbon economy and facilitating access to

▲◄ Seen at the IGU stand at COP14 are *(from left to right)*: Torstein Indrebø, Florijana Dedović and Erik Gonder from the Secretariat.

▲ Torstein Indrebø, IGU Secretary General 2007-14 (*left*), Datuk Abdul Rahim Hashim, IGU President 2009-12 (*centre*), and Ho Sook Wah, Chairman of the Coordination Committee 2009-12 at COP15

◄ Panellists at the IGU gas event during COP15.

Statoil's Senior Vice President for Climate, Hege Marie Norheim was one of the speakers at the IGU-Worldwatch gas symposium during COP16.

IGU President 2009-12 Datuk Abdul Rahim Hashim (*left*) talks to Nobuo Tanaka, IEA's Executive Director (*centre*) and UNIDO's Director General, Dr Kandeh Yumkella, during the COP16 symposium.

energy". The symposium was supported by the South African Department of Energy and sponsored by E.ON Ruhrgas and Statoil. In addition to the IGU team, there were speakers from UNIDO, IEA, the Worldwatch Institute, the South African Department of Energy, the Energy Research Institute of China's National Development and Reform Commission, E.ON Ruhrgas, Statoil and Total. The symposium concluded with an address by Elizabeth Dipuo Peters, South Africa's Minister of Energy.

The Kyoto Protocol was finally amended to extend into a second commitment period running to 2020 at COP18 in Doha in 2012. Here IGU organised a symposium with the theme "Natural gas for a global sustainable energy future". Joining the IGU speakers were representatives of IEA, the CO_2 Technology Centre Mongstad, Qatargas and Statoil.

For COP19 in Warsaw in 2013, IGU worked with the Charter Member for Poland, the Polish Oil and Gas Company (PGNiG), to organise a symposium with the theme "Development of clean energies: Need for unprecedented scale of innovation". Piotr Woźniak, Poland's Deputy Environment Minister and Chief National Geologist, addressed the opening session. He was followed by speakers from PGNiG, the CO_2 Technology Centre Mongstad, IEA, Shell, Statoil and Total, as well as the IGU team.

IGU did not mount a side event during COP20 in Lima in 2014, preferring to concentrate resources on preparing for COP21 which was tasked with agreeing a long-term global climate deal.

COP17 was held in Durban in 2011 under the presidency of South Africa's Foreign Minister, Maite Nkoana-Mashabane (*centre*).

Dr Pradeep Monga, Director of Energy and Climate Change Branch, UNIDO opened the first part of IGU's symposium at COP17.

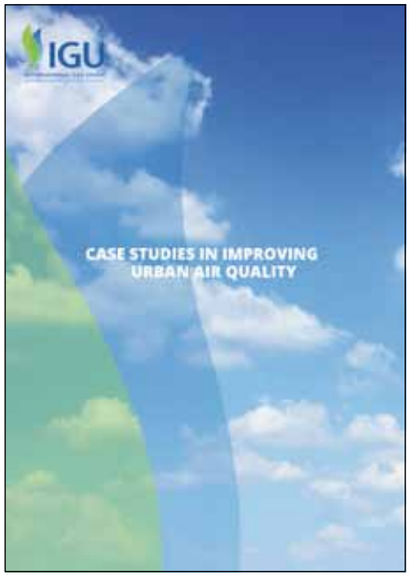
COP21

IGU's approach for COP21 in Paris was to develop an advocacy campaign focusing on the immediate importance of improving air quality in urban areas while working towards the longer-term goal of combating climate change. IGU's message was that the enhanced use of natural gas in energy generation, heating and industry could drastically reduce emissions, mercury and particulate matter, thereby providing enhanced quality of life for virtually everyone in urban society.

A special report *Case Studies in Improving Urban Air Quality* was prepared highlighting the interconnection that exists between reducing greenhouse gas emissions and reducing emissions of other air pollutants. It presented case

Carolin Oebel, at the time Senior Advisor in the Secretariat, moderated IGU's COP18 gas event.

Piotr Woźniak, Poland's Deputy Environment Minister and Chief National Geologist, addressed the opening session of IGU's symposium during COP19.



▶ IGU's special report on improving urban air quality (FAR RIGHT) was launched during COP21 which culminated in the Paris Agreement (RIGHT).

studies of efforts in four cities – Beijing, Istanbul, New York and Toronto – that had tackled or were tackling the issue of improving urban air quality and where gas featured as the main contributor to their efforts. These cities can provide lessons for other cities seeking to reduce the potentially severe health consequences of urban air pollution. The report's release during the conference was backed up by a media campaign which resulted in a featured story in the *Financial Times* web and print editions that stressed the gas industry's commitment to cleaning the air.

The Paris Agreement reached at COP21 reaffirmed the goal of limiting the global temperature increase well below 2°C, while urging efforts to limit the increase to 1.5°C above pre-industrial levels. It established a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This included, for the first time, requirements that all parties report regularly on their emissions and implementation efforts, and undergo international review.

▼ IGU President Joo-Myung Kang addresses IGU's urban air quality event at COP24.

From COP22 to 26

For COP22, which was held in Marrakech in November 2016, IGU did not organise a side event but IGU President, David Carroll, did address one organised by the OPEC Fund for International Development on "Energy Access and Climate Change through the Food-Water-Energy Nexus".

The following November for COP23 in Bonn, IGU worked with Charter Member the German Association for Gas and Water (DVGW) to organise a side event and associated press conference to showcase the benefits that natural and renewable gases and the gas infrastructure offer. David Carroll opened proceedings and there were speakers from DVGW, Germany's Environment Agency, the Port of Rotterdam and Southwestern Energy.

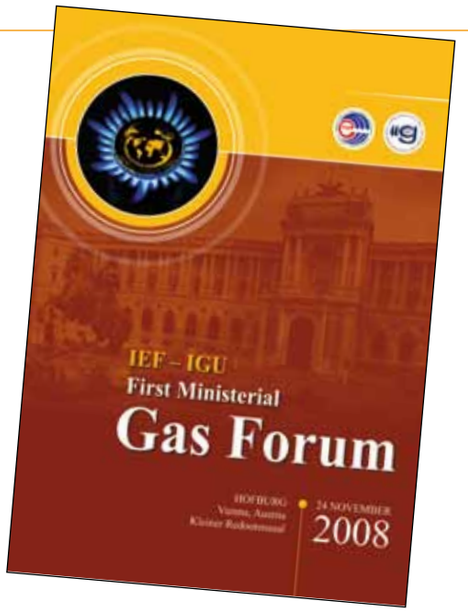
Activities were stepped up for COP24 in Katowice in December 2018 where IGU hosted an urban air quality event at the Korean Pavilion and participated in a similar panel at the Polish Pavilion. IGU also collaborated with Ecofys and the New Energy Coalition on a side event at the EU Pavilion on global developments in renewable gas, synthetic gas and hydrogen.

IGU was out in force for COP25, which was held in Madrid in December 2019. The IGU team included the President, Secretary General, Public Affairs Director, Public Affairs Manager and Regional Coordinator for Latin America and the Caribbean. Two panel discussions were organised at, respectively, the Korean and Chilean pavilions on the important contribution of natural gas to clean mobility and to improving urban air quality, and the fourth edition of IGU's Urban Air Quality report was released.

IGU will continue its advocacy at the UN Climate Change Conferences and is planning to participate actively in COP26 in Glasgow in November 2021.

IEF-IGU Ministerial Gas Forums

In 2008, IEF and IGU joined forces to establish a Ministerial Gas Forum (MGF) which is held on a biennial basis. The event is a platform for ministers and senior decision-makers to investigate how energy policies, long-term partnerships and enhanced cooperation can help to address the core challenges of energy security and sustainable economic development within a holistic energy framework. It is held under the Chatham House Rule and is by invitation only.



◄ The 1st IEF-IGU Ministerial Gas Forum was held in Vienna in 2008 (FAR LEFT). Austria's Federal Minister of Economics & Labour, HE Dr Martin Bartenstein gave a welcome address (LEFT).

1st MGF

Held in Vienna on November 24, 2008, the 1st IEF-IGU Ministerial Gas Forum was, according to IGU President Ernesto López Anadón, an opportunity "to enhance dialogue among all parties on matters relating to natural gas".

The participants included ministers and delegates from gas producing and consuming countries, top industry executives and senior officials from international organisations.

The theme of the first forum was "The World Gas Market Going from Regional to Global" and it was organised as two roundtable discussions. The morning session discussed gas market globalisation; while the afternoon session looked at partnership and cooperation in a global gas market. Each roundtable had nine eminent panellists and was moderated by Tim Eggar, a member of IGU's Wise Persons Group.

During the roundtables, participants focused on the changing dynamics of gas markets, principally driven by the growth of LNG trading, and the major challenges that faced the natural gas industry at the time. The global financial crisis was in its early stages and the main challenge discussed was funding investment to meet future demand in a period of economic turmoil.

In particular, participants noted the growing interdependence of exporting and importing countries and considered the balance between security of supply and security of demand. They stressed that, subject to adequate and timely investment, natural gas reserves would be sufficient to meet future demand in the coming decades. Participants also discussed the role for natural gas in a low-carbon emissions energy-mix scenario and noted that they expected natural gas demand to continue growing in the future, mainly driven by power generation.

▼◄ HE Dr Chakib Khelil, then Algeria's Minister of Energy & Mines and OPEC President (*left*) and moderator Tim Eggar (*centre*) listen as Helge Lund, CEO of StatoilHydro (now Statoil) makes a point.

▼ Ernesto López Anadón, IGU President 2006-09, addresses participants.

▲ The 2nd IEF-IGU Ministerial Gas Forum was held in Doha in 2010.

It was noted that while natural gas reserves were amply available, timely and accurate investments would be needed to deliver gas to the markets, despite the economic situation and volatile oil prices of 2008. The importance of investment was emphasised as a means of preventing bottlenecks, particularly in capital-intensive LNG projects.

LNG was cited as the major growth area and it was noted that it had evolved from a straight-line-chain model to a multiple-destination or flexible network model. The impact of LNG trade increasingly linking the regional gas markets was discussed with a focus on the possibility of increased convergence of prices between regions.

Globalisation of the gas markets was another topic that attracted wide-ranging discussion. It was observed that interregional gas trade would most likely increase significantly with the Middle East emerging as a major exporting region alongside Russia and Central Asia.

Growing interdependence between producing and consuming countries was noted and the participants agreed that all stakeholders should find ways to translate this higher interdependence into cooperation and action-oriented dialogue through IEF. It was envisaged that this cooperation include cross-investment. Examples were given of gas exporters entering ventures in consuming countries, such as receiving terminals and distribution networks, and of gas importers getting involved in upstream gas field development, natural gas transportation and liquefaction plants.

On the issue of gas transport and the role of transit countries, participants noted that the development of transport and transit infrastructures would enhance interdependence between producing, transit and consuming countries, and called for regional agreements and a better coordination between governments and companies to reduce uncertainties and thus encourage investment.

Participants affirmed that human resources and technology were the main drivers for energy security, and encouraged national and international oil companies to cooperate in the improvement of human resources, R&D and cost savings through technological advances.

The need to improve energy efficiency and energy conservation across the board in gas consuming and producing countries to curb global CO_2 emissions and increase export potential of gas producing countries was also emphasised.

Improving the transparency of oil and gas markets was discussed with participants recognising that investment decisions can be facilitated by transparent economic, fiscal, legal and regulatory frameworks. Practical ways to improve transparency were advocated. One such example was the Joint Oil Data Initiative (JODI) and the idea of adding natural gas data to JODI was flagged at the forum. This was subsequently achieved with JODI renamed as the Joint Organisations Data Initiative to cover natural gas data.

The importance of a sustained and enhanced global dialogue was affirmed by the ministers and industry leaders; and the 1st MGF was seen an important step forward in promoting and strengthening a global dialogue between natural gas producing and consuming countries.

2nd MGF

The 2nd IEF-IGU Ministerial Gas Forum was held in Doha on November 30, 2010. This time, the theme was "The Role of Natural Gas in a Sustainable Energy Future".

HE Abdulla Bin Hamad Al-Attiyah, Qatar's Deputy Prime Minister, who was also Minister of Energy & Industry at the time, hosted the forum. Once again there were two panel sessions, each followed by roundtable discussions involving all participants. The morning session discussed developments in global gas markets and the role of natural gas in a sustainable energy future, while the afternoon session looked at the industry's response to new opportunities for natural gas. Both sessions were moderated by Tim Eggar.

Addressing the forum, Datuk Abdul Rahim Hashim, IGU President, underlined the necessity of enhanced dialogue among all gas stakeholders, while Torstein Indrebø, IGU Secretary General, highlighted the role of natural gas in a sustainable energy future as an "enabling" or "dual" fuel to back up intermittent renewable

energy sources. For his part, Noé van Hulst, IEF Secretary General, called on the industry to take a long-term view and continue to invest in the gas value chain despite uncertainties surrounding the global economic downturn, a gas glut and relatively low prices.

IEF and IGU noted that projected expansion and lengthening of gas supply chains gave impetus to a growing need for focus on global energy dialogue to help ensure robust, secure markets to benefit all stakeholders. The important role to be played by the evolving cooperative relationship between national and international oil companies (NOCs and IOCs) was also emphasised.

Climate change was high on the agenda at the second forum. Government representatives and industry leaders discussed the major challenges facing the natural gas industry and how it could help develop a sustainable response to climate change. They stressed the need to create predictable rules and regulations in order for the industry to act efficiently in terms of operations and investments, for a sustainable use of resources and a sound use of available human capital.

Participants examined how the market had changed with demand levelling off in many traditional markets but increased demand expected in emerging markets, especially in Asia and the Middle East, which is emerging as a supplier and consumer of gas. However, they also agreed that demand would increase in all markets in the future.

Uncertainty over how shale gas could be developed outside of the USA was also discussed, along with how the development of unconventional gas resources in the USA had changed the global market.

Ramping up energy efficiency, particularly in developing countries and tackling the issue of phasing out unsustainable fossil fuel subsidies, was discussed along with the widening gap between gas prices in long-term oil-indexed contracts and spot gas prices. It was agreed that long-term oil-indexed contracts would remain predominant as they underpin large upstream and infrastructure investments.

The forum emphasised the role of natural gas as part of a sustainable future energy mix, especially in the power generation sector and in emerging and developing countries. It was agreed that the role of natural gas as a positive contributor to climate change mitigation and CO_2 emissions reduction should be highlighted more vigorously in international forums and debates.

The importance of communication and cooperation between policymakers and the gas industry to reach the common goal of a sustainable energy future was highlighted. Reduction of gas flaring was also underlined as an issue for the industry to address.

It was acknowledged that, worldwide, gas resources were more than sufficient to meet projected demand for the next decades, as long as adequate investments were made. The forum also acknowledged that the industry needed to take a long-term view and continue to invest in the gas value chain despite economic uncertainties.

Improved dialogue, with a view towards boosting long-term cooperation between gas producers, gas consumers and transit countries, was highlighted at the forum. Multilateral agreements and intergovernmental solutions were put forward as ways to support or bring forward new infrastructure, to jointly explore and exploit new gas reserves, and to help establish robust, secure markets for the benefit of all stakeholders.

3rd MGF

The 3rd IEF-IGU Ministerial Gas Forum was held in Paris on November 16, 2012 with the theme "Call for Sustainable Energy Policies and Improved Cooperation – Enhancing the Role of Natural Gas". The sessions were moderated by Tim Eggar in his last service to IGU before standing down as a member of the Wise Persons Group.

In her opening address, the French Minister of Ecology, Sustainable Development & Energy, Delphine Batho underlined the importance of diversifying energy sources and mitigating climate change. Natural gas was a good low-CO_2 substitute for other fuels, contributed

HE Abdullah bin Hamad Al-Attiyah, Qatar's Deputy Prime Minister (*left*) greets Datuk Abdul Rahim Hashim, IGU President 2009-12 (*centre*) and Torstein Indrebø, IGU Secretary General 2007-14 at the 2nd IEF-IGU Ministerial Gas Forum.

HE Delphine Batho, French Minister of Ecology, Sustainable Development & Energy, Jérôme Ferrier, IGU President 2012-15, and Torstein Indrebø, IGU Secretary General 2007-14, at the 3rd IEF-IGU Ministerial Gas Forum which was held in Paris in 2012.

to energy efficiency and met the power generation sector's need for flexibility, she said.

In his opening remarks, IGU President, Jérôme Ferrier stressed the importance of the forum as an opportunity to formulate proposals for the development of energy policies involving long-term partnerships and new models of cooperation between stakeholders.

IGU Secretary General, Torstein Indrebø noted that energy policies needed to address three complex and often contradictory objectives at the same time: energy security – both for suppliers and consumers, economic development and environmental sustainability. An alignment between the policies and market forces was vital, he stated. This required partnerships between governments and businesses, and a global framework of policies that supported and facilitated investments with a long-term perspective.

IEF Secretary General, Aldo Flores-Quiroga noted the importance of transparency for market stability and confirmed that IEF and its partners in the Joint Organisations Data Initiative had committed to create a JODI-Gas database modelled on the same concept as the existing JODI-Oil model.

Maria van der Hoeven, IEA Executive Director making a point to HE Youcef Yousfi, Algeria's Minister of Energy & Mines (*left*) and moderator Tim Eggar (*far left*) during the 3rd IEF-IGU Ministerial Gas Forum.

In the panel and roundtable sessions, government representatives and industry leaders reviewed recent developments in the gas sector and discussed the increased importance of sustained energy policies, long-term partnerships and enhanced cooperation in helping to address the complex challenges facing the natural gas industry.

They noted that the Fukushima accident in 2011 had given cause for many countries to review their nuclear power policies with potential significant implications for gas demand. They also noted that while gas was displacing coal in US power generation – thanks to the rapid growth of unconventional gas production – the reverse was happening in Europe despite EU climate policies. There was discussion about the interplay between gas, coal, renewables and nuclear, and participants were concerned that many stakeholders and market players did not grasp the degree to which renewables needed gas as a backup.

Overall, participants agreed that the outlook for gas was good. Global demand was projected to grow significantly from 3,233 bcm in 2011 to 4,750 bcm in 2035 with more than 80% of the increase expected to come from non-OECD countries, mainly in Asia. The potential for increased use of gas as a transportation fuel was highlighted. Participants also stressed that natural gas was well positioned to play a more important role in mitigating global energy poverty and supporting the UN's Sustainable Energy for All initiative.

Estimates of the cumulative investment needed to meet projected gas demand from 2011 to 2035 amounted to around $9.5 trillion or an annual average of $380 billion, and there was much discussion of how to raise this investment. Participants pointed out that

sustained energy policies and stable fiscal regimes contributed toward reducing uncertainties in the investment framework, and enabled the gas industry to plan and invest in new capacity.

Participants discussed markets and pricing mechanisms and noted that the prospect of a global gas market had not yet materialised. Significant variations in regional market structures remained, they observed, with gas prices still determined by their respective regional dynamics. Indeed, the difference between the US Henry Hub, European and Asian LNG contract prices had never been so wide.

Participants called for improved communication and cooperation within the industry and with other stakeholders, including governments, and the general public to help ensure the continuing development of natural gas and global energy security. They noted that gas-based partnerships between NOCs and IOCs were expected to grow, as their respective interests were more likely to converge in the natural gas business.

◄ Jérôme Ferrier, IGU President 2012-15, addressing the 4th IEF-IGU Ministerial Gas Forum which was held in Acapulco in 2014.

▼ Other speakers at the 4th IEF-IGU Ministerial Gas Forum included (*from left to right*): HE Ali bin Ibrahim Al-Naimi, Minister of Petroleum & Mineral Resources of Saudi Arabia; HE Pedro Joaquín Coldwell, Secretary of Energy of Mexico; Aldo Flores-Quiroga, IEF Secretary General; and Luis Vásquez, President of the Mexican Natural Gas Association.

4th MGF

The 4th IEF-IGU Ministerial Gas Forum took place in Acapulco, November 11-12, 2014 with the theme "The Role of Gas in Energy Security and Sustainable Economic Development". The fact that the forum took place in Mexico was of particular interest as it had just enacted sweeping reforms that fundamentally changed the legal framework of its energy sector.

Proceedings began with a welcome address and opening remarks from Aldo Flores-Quiroga, IEF Secretary General. He was followed by Jérôme Ferrier, IGU President, Luis Vásquez, President of the Mexican Natural Gas Association and HE Pedro Joaquín Coldwell, Secretary of Energy of Mexico.

In the opening remarks the IEF and IGU speakers highlighted the increasing demand for gas, especially in power generation, its growing share of the primary energy mix and its reliable partnership with renewables. The Mexican speakers looked at the significant potential for development of Mexico's gas sector and the reform of its energy market which was then underway with the aim of attracting investment, improving productivity and reducing prices. They said the target was to increase production from 56.6 bcm in 2013 to 106 bcm by 2025 and noted that the generating sector in Mexico was transitioning from diesel plants to new combined-cycle gas plants.

After the opening remarks, HE Ali bin Ibrahim Al-Naimi, Minister of Petroleum & Mineral Resources of Saudi Arabia, gave a keynote speech entitled "Natural Gas: A view from Saudi Arabia".

The forum then continued with three panel discussions. The first panel considered the role of gas in sustainable economic development and was moderated by Aldo Flores-Quiroga. Discussion focused on the extent to which natural gas is a partner of renewable energy sources as opposed to a competitor; its future role in Asia as the region with the highest forecast growth; and the expected increase in the fleet of gas-fuelled vehicles.

The second panel looked at long-term investment and the LNG trade in competitive but unsettled gas markets and was moderated by Jérôme Ferrier. The main points raised concerned the current level of investment in the gas sector, constraints faced and how investment in pipeline and LNG infrastructure can facilitate regional integration. In addition, geopolitical risks as a result of the increase in international gas trading were discussed, as well as the likely impact of international trade, investment and climate agreements on LNG trade and investment.

The final panel was dedicated to discussion of Mexico's energy market reform and its development within a global context, and was moderated by Pedro Joaquín Coldwell. Participants tackled the short-, medium- and long-term implications of the reformed Mexican natural gas model on domestic and international markets. They also discussed the possibility of Mexico becoming a key global player in natural gas through regional energy integration and international trade.

5th MGF

The 5th IEF-IGU Ministerial Gas Forum took place in New Delhi on December 6, 2016 with the theme "Gas for Growth: Improving economic prosperity and living standards". Coinciding with the Forum, IGU published a report entitled *Global Gas Markets Supporting Growth and Sustainability*.

India's Minister of Petroleum & Natural Gas, HE Shri Dharmendra Pradhan gave the inaugural address and HE Dr Mohammed bin Saleh Al-Sada, Qatar's Minister of Energy & Industry, followed him with a keynote speech giving his perspective on gas markets and economic growth. While noting strong gas demand, notably in Asia and particularly in fast-growing China and India, he highlighted the impact falling LNG prices had had on investment to meet future demand. Discussions during the forum considered this as well as how gas resources and technologies could stimulate sustainable growth, diversify economies, improve air quality, keep global warming within agreed thresholds and achieve energy access goals.

There were three panel sessions. The first looked at gas for growth and sustainability and was moderated by IGU Wise Person Daniel Yergin. The second examined regional gas markets and was moderated by Fereidun Fesharaki, Chairman of energy consultants FGE. The third covered at policy trends for investment and was moderated by IGU Wise Person Nobuo Tanaka.

Participants acknowledged that increasing supplies on a more competitive global gas market had created new opportunities for gas importing countries to lock in supplies on more favourable terms. On the other hand enduring gas market supply abundance had reduced investment incentives in the development of upstream gas resources. Participants felt that growing gas trade volumes and opportunities could expose global gas markets to new risks and price fluctuations, as shifts in regional markets could propagate with greater ease across a better interconnected system. They noted the importance of strengthening dialogue on a rolling basis, and that bilateral producer-consumer relations built up over the past decades remained critical for longer-term gas market security.

Furthermore, participants recognised that a denser global midstream sector with more diverse pipeline and flexible LNG trade capacity should encourage governments to consider market reforms that reduce price, regulatory, infra-

structure and other hurdles, and industry to consider more cost-efficient operations and innovate on business models. For all stakeholders they considered that it would be important to seize the opportunity of more abundant gas supplies and trade in shaping healthier energy matrices that increase economic prosperity and living standards in both consuming and producing countries while delivering on globally agreed goals.

Noting that gas can be a driving force to help achieve an orderly energy transition, participants acknowledged that an enhanced dialogue between producers and consumers on the evolution of gas markets was necessary for both governments and industry to seize on these opportunities arising on the medium term, and maintain longer-term gas market security.

6th MGF

The 6th IEF-IGU Ministerial Gas Forum was held in Barcelona, November 21-22, 2018, with the theme "Inclusive Growth Towards a Sustainable Energy Future: The role of gas technologies and innovation" and panel session discussions focused on: the role of gas technologies in resilient low-carbon energy systems; gas demand growth beyond power generation; and enhancing gas supply security and diversification.

Participants noted that the importance of natural gas in achieving inclusive sustainable growth and successful energy sector transformations was more widely acknowledged. They highlighted that natural gas is critical to help keep global warming within tolerable limits and improve air quality in major cities, noting that in comparison to other fossil fuels, natural gas produces less greenhouse gas emissions, negligible sulphur dioxide and airborne particulate matter and very low nitrogen dioxide emissions, while supporting the greater deployment of renewable energies and integration of other sources.

Participants called on government and industry leaders to build confidence by overcoming obstacles to gas market trade and cross-border interconnections and by fostering stable and predictable conditions to accelerate the deployment of gas sector technologies such as carbon capture use and storage (CCUS), the use of hydrogen and modern gas sector infrastructure, including flexible and small-scale LNG.

Participants noted the main trends in gas consumption that made gas the fastest growing fossil fuel. They expected gas to increase its share in the global energy mix substantially in the forthcoming decade with growth shifting towards the non-OECD region beyond the power sector alone, and likely to be strongest in the maritime and road transportation, industrial and petrochemical sectors. To boost stable and resilient gas markets, they urged, long-term investment had to accelerate over the next decade.

However, achieving cost advantages through economies of scale in the new growth sectors was considered impossible without strong government support to leverage the

▼ Delegates to the 5th IEF-IGU Ministerial Gas Forum in New Delhi in 2016 pose for a group photograph.

IGU President Joo-Myung Kang (*far right*) addressing the 6th IEF-IGU Ministerial Gas Forum. On the top table with him are (*from left to right*) Luis Bertrán Rafecas, IGU Secretary General; Francisco Reynés Massanet, Executive Chairman, Naturgy; and Dr Sun Xiansheng, IEF Secretary General.

required private sector investments. At the regulatory level, participants agreed, gas market reforms and regional integration could further help overcome hurdles such as market access constraints, inefficient price formation and rigid contract terms. They saw predictable and transparent market conditions including reliable price signals and regulation as vital to gas market security and trade flows in a more diverse and rapidly changing environment.

To realise gas market resilience participants also saw a need to focus on pricing and to reduce costs by enhancing supply chain efficiency and improving communication with stakeholders.

Finally, participants noted the progress made by the Joint Organisations Data Initiative (JODI) on gas data transparency since JODI-Gas was launched in 2014. With increasing LNG trade, they recognised the need for improved granularity of LNG data available in the marketplace and called on JODI partner organisations to help achieve this goal.

7th MGF

Due to the Covid-19 pandemic, the 7th IEF-IGU Ministerial Gas Forum was held as a virtual event on December 3, 2020. It was coordinated by the Malaysian Gas Association from Kuala Lumpur with the theme "Towards Recovery and Shared Prosperity: Natural gas opportunities for a sustainable world". There were two panel sessions: opportunities in growing gas markets: producer-consumer perspectives on new realities; and market signals and policy pathways: investment and innovation on the road to recovery.

Participants discussed the impact of the pandemic on natural gas markets and the steps needed to ensure market stability and facilitate a swift, sustainable and inclusive recovery. They agreed that dialogue on the neutral IEF platform in partnership with IGU and gas market stakeholders would play a vital role.

They also agreed that LNG would be the main driver of international gas trade. Greater contract flexibility and new natural gas marketing opportunities offered by innovation and evolving business models could help access new growth markets, they considered, while a more competitive gas market environment would create more room to cater to individual producer and consumer needs and thus enhance flexibility across gas value chains globally.

Participants said that producers require predictable market rules and enduring partnerships to mobilise the investments

Dato' Sri Mustapa bin Mohamed, Minister in the Prime Minister's Department for Economic Affairs (centre) opened the 7th IEF-IGU Ministerial Gas Forum as a virtual event from Kuala Lumpur. He is flanked by Tengku Muhammad Taufik, President & Group CEO of Petronas (*left*) and Hazli Sham Kassim, President of the Malaysian Gas Association (*right*).

needed, while simultaneously they need to reduce costs to access liberalising growth markets. Producer-consumer dialogue on policy, technology and innovation agendas as well as advocacy to increase awareness of the role of natural gas and new technologies are key to capitalising on new opportunities and overcoming hurdles emerging in the new and evolving risk environment, they stressed.

As emission reductions in developed economies demonstrate, participants noted, gas technologies accelerate fuel-switching and deeper penetration of renewables. This will enable affordable and resilient energy systems integration, coupled with hydrogen technologies that are essential for sustainable growth. Natural gas continues to contribute to emission reductions and affordable access in the OECD region and remains the transition fuel of choice in non-OECD growth economies where switching from coal is essential to reduce greenhouse gas emissions.

There was agreement that a more sustainable and secure future requires greater solidarity, and holistic solutions to energy and climate policy challenges. To safeguard robust and predictable trade and investment conditions across densely interconnected regional markets and jurisdictions, participants noted that there is an urgent need to deepen understanding of evolving policy and market signals to stimulate gas sector trade and investment.

G20

IGU established a relationship with the G20 forum of major economies in 2013 during the Russian G20 Presidency as one of the few NGOs invited to join the Energy Sustainability Working Group (ESWG). This enabled the Union to contribute to the drafting of the G20 leaders' communiqué and a statement on enhancing investments in the power sector. Secretary General Torstein Indrebø and Senior Advisor Ksenia Gladkova were IGU's first representatives on the ESWG.

The G20 Presidency rotates each year and in 2014, under the Australian Presidency, the ESWG met in February, May and August. The group made considerable progress on issues relating to global energy architecture, gas markets and energy efficiency; advanced its ongoing work on inefficient fossil fuel subsidies, transparency, investment and regulation; and began discussing how the G20 could help improve energy access.

IGU also participated in the G20-IEF Gas Market Dialogue in November 2014 (just before the 4th IEF-IGU Ministerial Gas Forum) during which IGU President Jérôme Ferrier gave a presentation on North American developments and chaired the second session.

Under the Turkish G20 Presidency, the focus areas for the ESWG were access to energy for all with special attention paid to sub-Saharan Africa, energy efficiency, market transparency, inefficient fossil fuel subsidies and renewable energy.

The group met in February, May and September 2015 and IGU's contributions included the presentation of a report on natural gas as a partner for renewable energy. IGU Secretary General, Pål Rasmussen also attended the G20 Energy Ministers' meeting and Conference on Energy Access in sub-Saharan Africa in October.

During the Chinese G20 Presidency, IGU focused on two areas. Firstly, support was

Torstein Indrebø, IGU Secretary General 2007-14, addressing an ESWG meeting in Melbourne in February 2014.

provided for the ESWG agenda item "Clean Energy", in which the role of natural gas in energy transition was highlighted as a key issue. As a contribution to this work the report *Case Studies, Enabling Clean Energies* was presented to the ESWG meeting in April 2016.

IGU also joined forces with China's National Energy Administration to co-host a Natural Gas Day on June 29, 2016 in Beijing as part of the official G20 working programme. Held one day before the G20 Energy Ministers' meeting and a day after the third meeting of the ESWG under the Chinese Presidency, the event brought together G20 ministers, policymakers and representatives of the international gas business to explore the different ways that natural gas can contribute to a sustainable energy future. It was organised by the Beijing Gas Group, China Gas Society and China Gas Association.

Li Yalan, Chair of Beijing Gas Group, addressing the G20 Natural Gas Day in June 2016. She is now also IGU's Vice President.

IGU was represented by the President, David Carroll, Secretary General, Pål Rasmussen and Mel Ydreos, Public Affairs Director. Two of IGU's Regional Coordinators also participated: Li Yalan, Chair of Beijing Gas Group (Asia and Asia-Pacific) and Khaled AbuBakr, Executive Director of TAQA Arabia (Africa and the Middle East).

The three panel sessions of the event emphasised the role of natural gas as an economic, secure and clean source of energy, and the role it could and should play as a facilitator and catalyst of energy transition, as well as providing a key pathway towards a sustainable development. Debates encouraged delegates to enact policies to support further development of natural gas industry in order to make this happen.

Following the Natural Gas Day, David Carroll addressed the G20 Energy Ministers' meeting.

On the energy and climate front, the German G20 Presidency addressed the implementation of the Paris Agreement together with the long-term transition towards the decarbonisation of energy systems. During the ESWG meeting in Berlin in March 2017, IGU tabled a report and gave a presentation on the role of gas in enabling clean marine transport. In total, the ESWG met three times and IGU participated actively in all agenda items including input to the G20 leaders' communiqué.

Under the Argentine G20 Presidency, the ESWG became the Energy Transitions Working Group and IGU Secretary General Luis Bertrán Rafecas participated in the three meetings which were held in Buenos Aires, contributing to the discussions of how switching from more polluting fuels to gas could improve urban air quality, gas as a transportation fuel and how gas could support the intermittency of renewables.

A Natural Gas Day was back on the G20 agenda for 2018 and IGU worked with Instituto Argentino del Petróleo y del Gas (IAPG) to co-host the event on June 12 in Bariloche, shortly before the meeting of the G20 Energy Ministers. The theme was "Natural Gas: Facilitating growth and cleaner energy systems".

The Natural Gas Day was organised with three panels exploring the economic, technical and policy challenges and opportunities facing the global natural gas industry. Panel 1 identified gas as an abundant, accessible and flexible energy source. Panel 2 looked at gas as a contributor to climate change mitigation and clean air. Panel 3 considered gas as part of the pathway to achieving a sustainable energy future. IGU President David Carroll gave a presentation during the first panel, while IGU Secretary General Luis Bertrán Rafecas moderated the second. IGU Vice President Joo-Myung (Joe) Kang also participated in the event.

Issued at the end of the Argentine Presidency, the G20 leaders' communiqué included

a clear statement on the contribution of gas as part of the sustainable future energy mix.

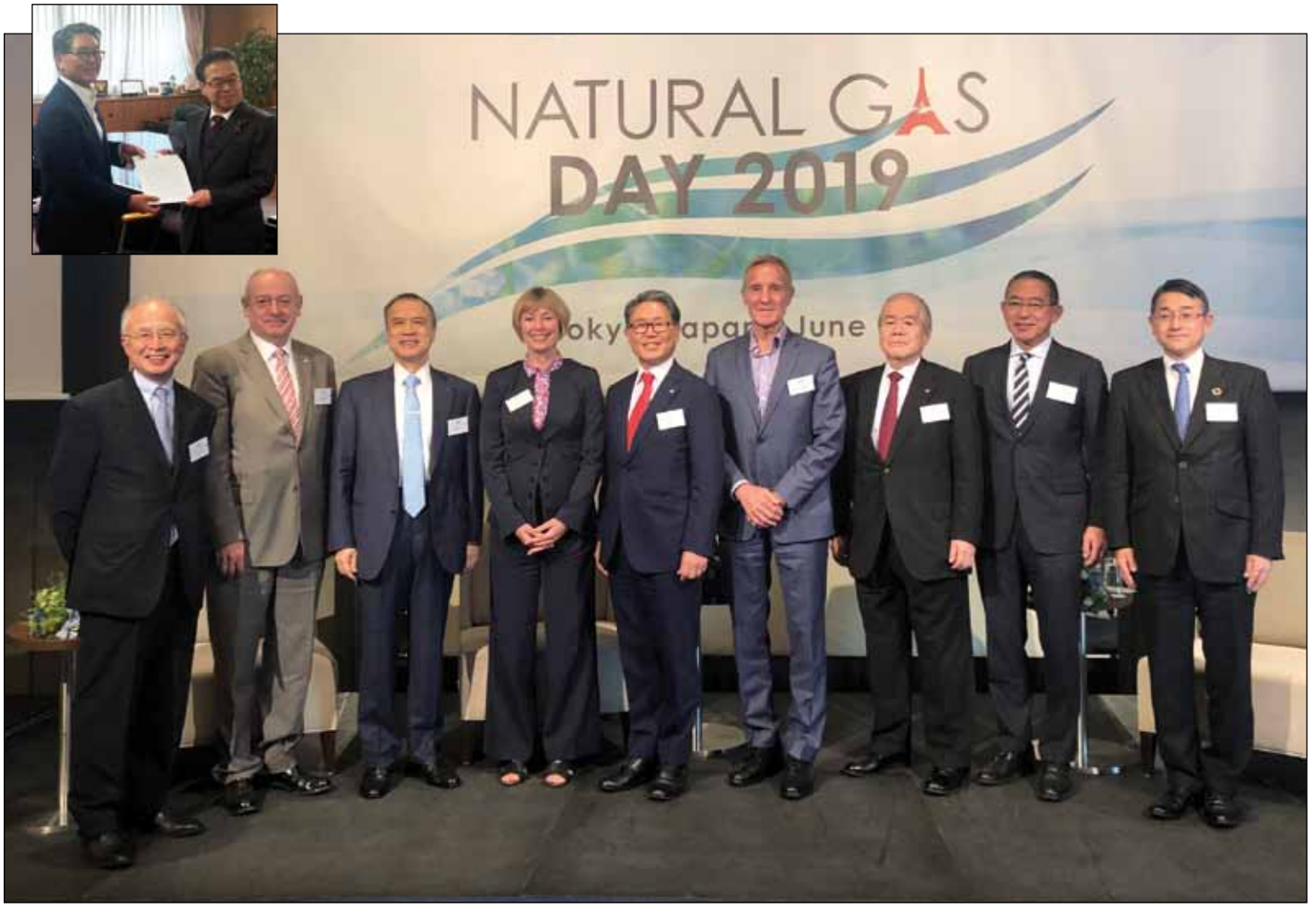
There was also a Natural Gas Day in 2019 under the Japanese G20 Presidency. IGU and the Japan Gas Association (JGA) held the event on June 12 in Tokyo with the theme "Securing Transparency and Competitiveness and Enhancing Security of Gas Markets in Asia". From IGU there were presentations and contributions by President Joo-Myung (Joe) Kang, Secretary General Luis Bertrán Rafecas and Public Affairs Director Mel Ydreos. Key Asian stakeholders from the energy sector and G20 representatives from 18 countries participated in the Natural Gas Day, which was held shortly before the G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth.

Under the Saudi G20 Presidency, the working group returned to the ESWG name and met in Riyadh in March 2020 with subsequent meetings being virtual ones due to the Covid-19 pandemic. The Riyadh meeting was preceded by workshops on enhancing energy market stability and security and on the circular carbon economy. IGU was represented by Public Affairs Director Mel Ydreos and Public Affairs Manager Tatiana Khanberg and they gave two presentations. One was on energy security, when they tabled a special case study on the role of gas in ensuring security of supply for electricity systems. The other was on the role of gas technologies in enabling the sustainable energy future in the circular carbon economy. In the latter they shared pre-release findings from IGU's report *Gas Technology and Innovation for a Sustainable Future*.

For the Italian G20 Presidency, the ESWG has been renamed the Energy Transitions and Climate Sustainability Working Group.

Diplomatic Gas Forums

In 2013, the IGU Secretariat invited all the diplomatic missions in Oslo to a forum addressing the role of gas in the future sustainable energy mix. Reaching out to local diplomatic representatives proved to be a great success and, in 2015, the USA Presidency organised a similar event in Washington DC. Diplomatic Gas Forums have since been organised in Amsterdam, Kuala Lumpur, Madrid and Seoul, and repeated in Oslo and Washington DC. In order to facilitate the organisation of such forums, IGU has prepared a template that members can use at national or regional level.



IGU and JGA held the Natural Gas Day 2019 on June 12 in Tokyo. INSET IGU President, Joo-Myung Kang (*left*) delivering the IGU-JGA Natural Gas Day communiqué to HE Hiroshige Seko, Minister of Economy, Trade & Industry of Japan.

IGU – Advocating for Gas

Making gas advocacy an integral part of IGU's Vision and Mission has been a key strategic development for the Union. Natural gas now has a more effective and consistent voice; and communications with stakeholders outside the industry – including policymakers and regulators, NGOs and the general public – have been improved.

IGU works to ensure that the benefits of natural gas, particularly its role in meeting the challenge of providing additional energy supplies and at the same time reducing emissions by replacing more polluting fuels, are widely appreciated. Moreover, gas is ideally suited to complement intermittent power generation from renewable sources and has an important role to play in a sustainable energy future.

Various initiatives have been developed to ensure IGU's messages reach targeted audiences around the world. Attention was first focused on engaging with policymakers as detailed in the previous chapter. Then work began to reach out to institutional stakeholders and the general public with an advocacy campaign launched in 2010 during the Malaysian Presidency.

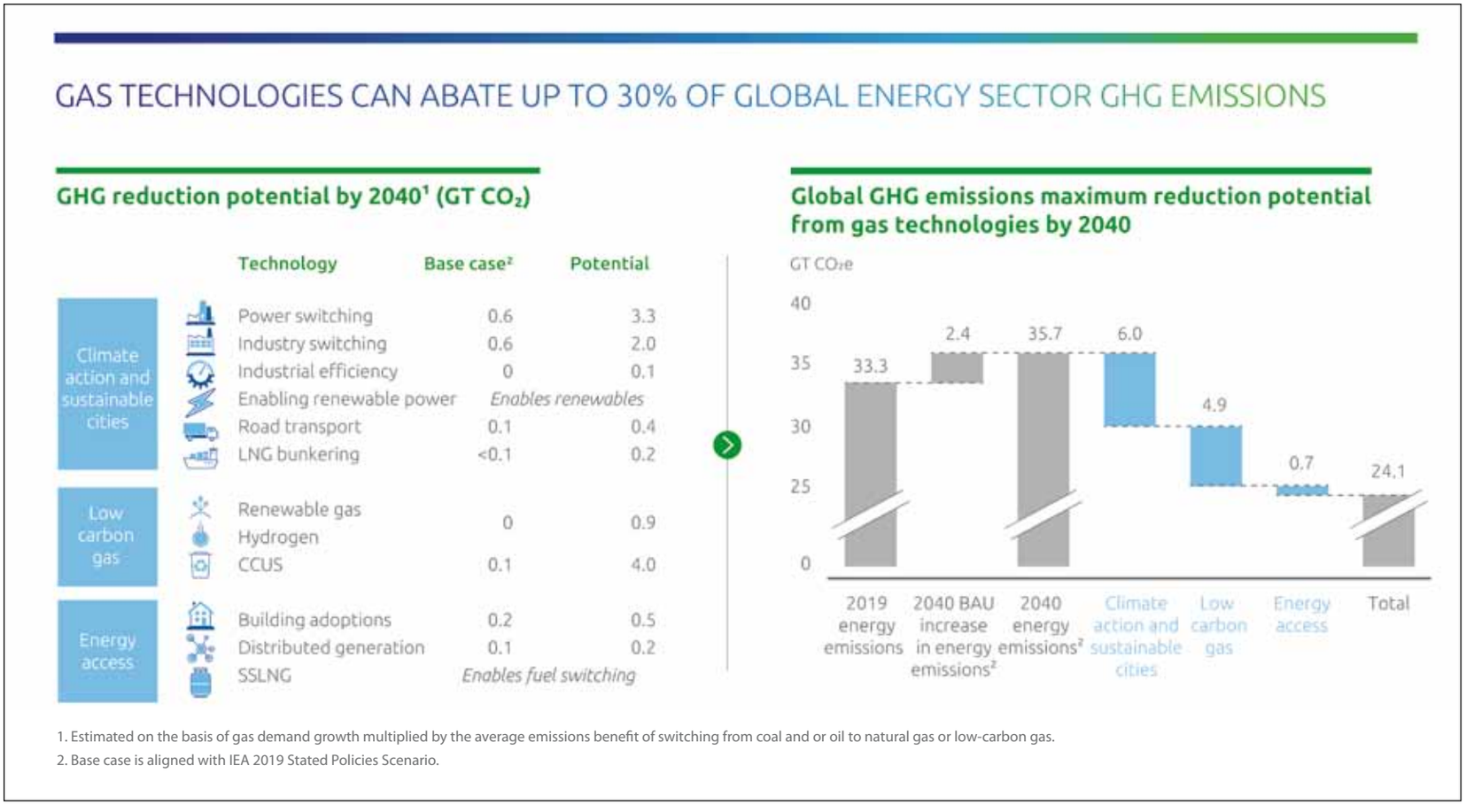
The first phase was to provide online resources to help members promote understanding and awareness about natural gas to stakeholders, and to join forces with other organisations to raise the profile of gas. The second phase developed a global vision and roadmap for natural gas which clearly defines the pathway natural gas can take as part of the world's low-carbon energy future.

After revision of the Union's Vision by the Council in Paris in 2015, work started to position IGU as the Global Voice of Gas and establish a sustainable means of funding strategic projects supporting gas advocacy. Now the focus is on stronger engagement and further development of an integrated and comprehensive outreach strategy.

Gas advocacy toolkit and GasNaturally

The centrepiece of phase one of the gas advocacy initiative was an online toolkit. Available free of charge via the IGU website, this allowed IGU members to be more effective advocates for the natural gas industry on a global level. There were five different presentations on the website which could be downloaded and tailored to suit different audiences and circumstances. They included advocacy messages, facts and figures, a report on gas and climate change mitigation, a report on the environmental issues associated with shale gas development and an overview of the shale gas sector. In each presentation, the theme of "CARES" (that of natural gas being a Clean, Affordable, Reliable, Efficient and Secure energy source) was predominant.

IGU also teamed up with six gas associations based in Europe to launch a joint advocacy programme called GasNaturally. This targeted the European Commission and Parliament with the aim of ensuring that natural gas was well represented in discussion of the future energy mix in Europe. The GasNaturally programme kicked off in 2012 and today has eight members (IGU plus Eurogas, GERG, GIE, the International Association of Oil and Gas Producers, Liquid Gas Europe, Marcogaz and NGVA Europe).



1. Estimated on the basis of gas demand growth multiplied by the average emissions benefit of switching from coal and or oil to natural gas or low-carbon gas.
2. Base case is aligned with IEA 2019 Stated Policies Scenario.

▲ Technologies and innovation in the gas sector have a transformative potential impact on global energy systems.

Global Vision for Gas

With the advocacy initiative underway, IGU started work on a global vision and pathway for natural gas development. The goal was to reaffirm and consolidate the role of natural gas – at times mistakenly perceived as a "transitional fuel" – as an integral part of the global energy system for the long term, and to build confidence in the future demand for gas across a variety of sectors.

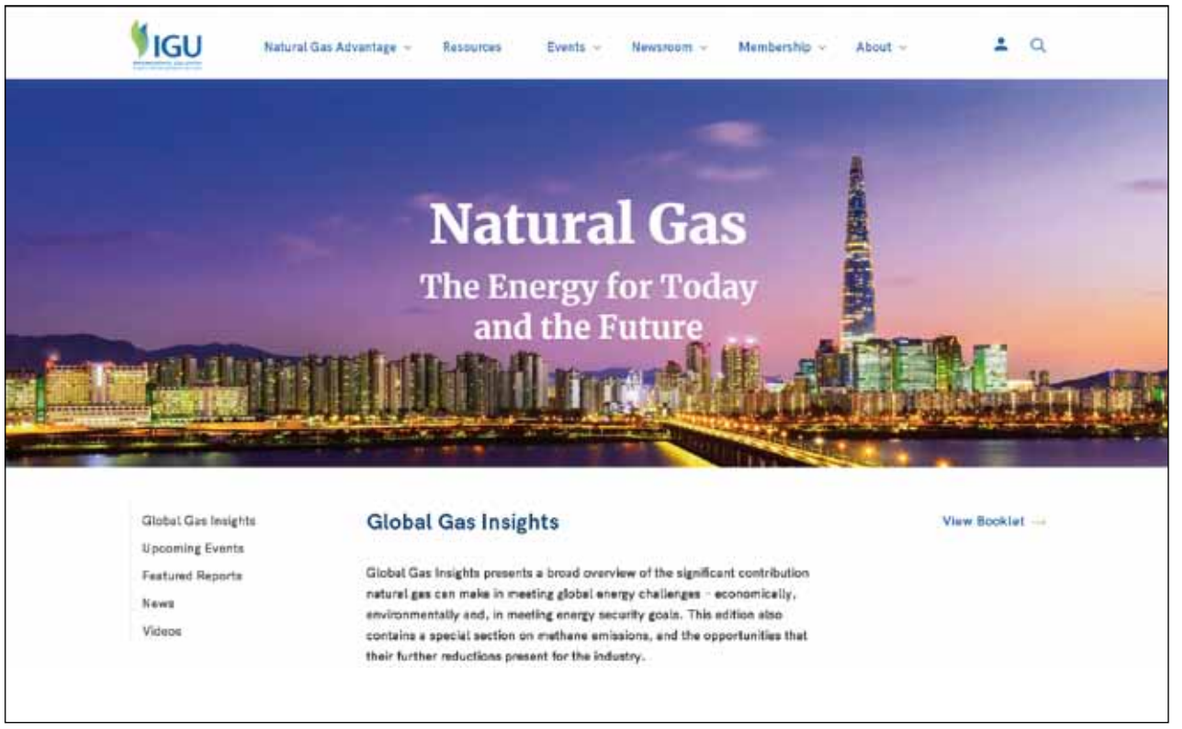
A special report "Global Vision for Gas – The Pathway towards a Sustainable Energy Future" was prepared for presentation during the 25th World Gas Conference in Kuala Lumpur in 2012. This covered the merits of gas as a fuel, and provided a quantified and sustainable pathway of global energy use through to 2050. The pivotal role of natural gas, alongside other energy sources, was highlighted in terms of its affordability, reliability and role in economic development as well as its contribution to reducing greenhouse gas emissions. Key policy enablers to help realise the vision for gas were also enumerated across the different continents.

An important message of the report was and remains that natural gas is not just part of the long-term energy solution; its immediate wider deployment based on proven technologies can have a significant near-term impact on emissions and the quality of life.

Global Voice of Gas

IGU's gas advocacy work was stepped up in the 2012-15 Triennium under the French Presidency by increasing cooperation with other international organisations through the development of strategic partnerships and the launch of the Global Voice of Gas project. The value members placed on this work was highlighted in a survey that was conducted in 2014 by the USA Vice Presidency, in which three-quarters of members said that IGU's growing role in advocacy was of particular importance to them, but at the same time the message was clear that IGU needed to engage more and to dedicate more resources to the work.

Under the Global Voice of Gas project every aspect of IGU's external communications was reviewed and a new strategic approach developed with the aim of raising the Union's profile and generating greater media coverage of the benefits of natural gas. A framework of key global messages was established to better focus efforts, media training was introduced for the IGU leadership, the website was upgraded and a new format for publications was



IGU has steadily developed its digital presence and the website has been redesigned with additional interactivity.

designed. In parallel, IGU worked closely with an international communications agency to develop good relationships with journalists of global media outlets and to establish the Union as the Global Voice of Gas.

In the first phase of the project a Global Gas Portal accessed via the IGU home page was developed with the aim of making IGU the first point of call for people looking for information about gas, making it easy to find that information and allowing IGU to target specific audiences with compelling, engaging content. The Portal's launch in May 2014 was supported by a six-month digital and social media outreach campaign, which was successful in generating new traffic.

Moving into the 2015-18 Triennium under the USA Presidency, when the Strategic Communications and Outreach Task Force was set up to provide strategic direction to IGU's advocacy and outreach work, the next phase of the Global Voice of Gas project was to develop a campaign around the issue of clean air and tie this into an integrated public affairs and government relations strategy.

It was decided to build on IGU's long-standing involvement in the UN Climate Change Conferences and focus the campaign on COP21 in Paris at the end of 2015. Work started on preparing the report *Case Studies in Improving Urban Air Quality* looking at Beijing, Istanbul, New York and Toronto.

Prior to the launch of the IGU report, the International Energy Agency published its *World Energy Outlook 2015*, which recognised that greater use of gas in power generation and transport helps reduce emissions and improve urban air quality. IGU's response to the IEA report, welcoming its positive outlook for gas, was widely distributed and received excellent coverage.

Meanwhile, the COP21 media campaign was being developed around the release of *Case Studies in Improving Urban Air Quality* in a webcast to which both media and the industry were invited. A page for the report was created on the IGU website showing the highlights of the research into switching to gas from more polluting fuels. Sponsored links to the report were placed near contextually relevant media content on leading business, news and finance sites. A special edition of the IGU Newsletter was also distributed.

A significant result of the campaign was an exclusive interview with the *Financial Times* on improving urban air quality. An article was published on FT.com on December 3, 2015 and in the Asian, European, UK, Middle Eastern and North American printed editions the following day. The report was also covered in key international energy trade publications, while its main messages were covered in Chinese media focusing on energy and the environment.

IGU has since published three more urban air quality reports – in 2016, 2018 and 2019 – each backed up with a media

campaign coordinated by the public affairs team.

IGU has steadily developed its website and social media channels such as the Twitter account (@IGU_News) and YouTube channel. Initiatives have included a webcast series organised by the Marketing and Communications Committee to give a voice to players and discuss issues that matter to the gas industry, and a series of professionally-produced short interviews with leading energy experts such as Fatih Birol, IEA's Executive Director, on YouTube.

Increasing discussion of the role of natural gas in the energy mix has moved the issue of fugitive methane emissions up the agenda. IGU has addressed this head-on, striving to ensure that the facts and premises of the debate are accurate and properly understood with a series of reports and by joining the Methane Guiding Principles partnership as a supporting organisation.

At the beginning of the Korean Presidency, IGU unveiled a Strategic Communications and Outreach Plan setting out an overall strategy for the Union's advocacy and outreach. The plan is regularly updated and is an important step in further enhancing IGU's advocacy work, to solidify the Union's recognition and credibility as the Global Voice of Gas. As part of the plan, IGU's public affairs team has developed a comprehensive key messaging document, which contains approved messages on the most critical subjects.

In 2018, the *Global Gas Report* was introduced showing a broader global gas development covering the full gas value chain including LNG. The report was expanded in 2019 with a special chapter dedicated to technology and the work of the gas industry in reducing greenhouse gas emissions and coupling the electricity and gas systems. The year after, the GGR 2020 also covered the introduction of gases like biomethane, biogas, synthetic gas and hydrogen into the current infrastructure, which provides a new way to continue the decarbonisation of gas industry.

In 2019, a more flexible and customised public web portal was launched using the WordPress publishing platform, which facilitated links with social media campaigns and improved traffic to the IGU website. Visitor numbers and the downloading of reports increased, while the number of followers of the YouTube and Twitter media channels grew. The project continued with the integration of the Members Portal on the same host and tool, providing new services to IGU members. The Members Portal was launched in April 2021.

In 2020, the Covid-19 pandemic meant that all face-to-face meetings were suspended and virtual meetings using Zoom and Teams were adopted, which allowed IGU to continue its operations in tele-working mode. As public events were cancelled or postponed, IGU responded to the challenge by developing a webinar tool personalised with the IGU brand and logo. This allowed IGU to continue advocacy activities and present reports.

Starting in June 2020, the IGU Magazine was transformed from a printed publication twice a year to a quarterly digital magazine called *Global Voice of Gas*. For the third quarter of the year, and aligned with the IGU Council meeting, there is also a printed version distributed to members.

IGU's international communications agency was also changed. Ketchum served IGU well with strategic advocacy plans and counsel between 2016 and 2020, when Natural Gas World (NGW) took over the role. NGW also took over the magazine production after a long and productive relationship with ISC in London.

By the end of 2020, with Matthew Doman as interim Public Affairs Director, the Public Affairs function was reintegrated into the responsibilities of the Secretariat as part of preparations for the setting up of the new permanent Secretariat in London.

The world was changing rapidly with the pandemic and in 2021 the economic recovery plan for resuming activities put much more accent on the climate change fight than ever. Fulfilling the Paris Agreement and 2050 climate goals was driving new investments and IGU adopted a new policy position during its May Executive Committee meeting adopting the renewable gases as part of IGU's scope in its Vision and acknowledging that energy supply needs to be available, secure and reliable while climate change presents significant risks and that gas (now gases) are and will be a major contributor to the solution to face these challenges.

Going forward

The new IGU policy position on climate change and the role of gas in the future sustainable energy mix will align IGU with the new requirement from society, maintain gas capacity and advance gas as a key contributor to improving quality of life.

The next few years will be vital in determining the energy mix for decades to come. The aim of IGU's advocacy work is to improve perceptions, influence opinion leaders and ultimately drive legislation and investment decisions. The new scope now includes broader communications with reports and social media amplifications, outreach activities with partners and advocacy to policymakers in different events.

Challenges and Opportunities for Gas

As the International Gas Union celebrates its 90th anniversary, the energy landscape and the debates that inform it are shifting at an unprecedented pace

By Matthew Doman

Rapid change is nothing new to the gas industry. It is important to remember that when IGU was established in 1931, the bulk of the world's primary energy needs were met by coal or traditional biomass (wood fuels, agricultural by-products and dung). Oil played a relatively small role and natural gas a smaller one. The so-called town gas that was used in many cities was produced from coal; hence the more appropriate term manufactured gas.

Today, natural gas supplies almost a quarter of global primary energy demand (*see the graph over*). It is exported by pipelines by more than 20 exporting countries to more than 30 importing ones. And, as liquefied natural gas, it is shipped from 20 countries to customers in 43 importing countries and territories.

▼ China is the biggest importer of natural gas both via pipeline and as LNG through terminals such as Guangdong Dapeng in Guangdong Province.

Gas helps meet the energy needs of over 100 countries and has played a significant role in giving millions of people around the world access to safe, sustainable and affordable energy for the first time. Gas is the source of 23% of the world's electricity, and is enabling the integration of intermittent renewable energy sources like wind and solar in many countries.

Natural gas does more than generate electricity. It is an essential feedstock in the production of a wide range of products such as glass, plastics, building materials, electrical appliances, clothing, health and sporting equipment.

The global gas industry has also been an investor and innovator in the development of renewable gases (including hydrogen), decarbonised gases and low-carbon gas.

This capacity for innovation and change will be critical to the industry in the years ahead.

▲ Russia is the world's largest exporter of natural gas. The Amur plant processes gas for delivery to China via the Power of Siberia pipeline.

The climate debate

With a sharpening focus on climate change and attempts to reduce the carbon emissions from energy production, the gas industry finds itself at the centre of political discussion right around the world.

Natural gas is of course a fossil fuel. Its production and consumption release about 7 gigatonnes of CO_2 into the atmosphere every year. But gas is a much cleaner, less carbon-intense fuel than coal or oil, which together still meet 60% of the world's primary energy demand.

Indeed, switching from coal-fired power generation to gas has been the major factor enabling lower carbon emissions in countries like the United States and the United Kingdom, and is reducing urban air pollution in China, India and other countries.

Governments, communities, business organisations, media and commentators are increasingly focused on slowing global warming, which many see as the greatest challenge of our times.

Some see no role for gas in meeting that challenge.

Echoing a view common in Brussels, European Commission Vice President Frans Timmermans said recently "fossil fuels have no viable future". In an interview with *The Guardian* newspaper, he said: "If we get this wrong, our children will be fighting wars over food and water."

Signalling the UK government's ambition for more urgent action on climate change as it prepares to host the next UN Climate Change Conference, COP26 President Alok Sharma said the world was on course for global temperature rises of over three degrees Celsius – double the most ambitious Paris climate target of 1.5 degrees set at COP21 in 2015.

"That will cause devastation … in many cases that will be the catalyst for an apocalyptic future," Sharma said in the opening speech at

the International Energy Agency-COP26 Net Zero Summit in March 2021.

The US Government, changing tack after the departure of former President Donald Trump, also sees the need for an urgent policy shift.

"Mother Earth, the planet, is screaming at us in feedback loops that are telling us every single day, 'get this done,'" US special climate envoy John Kerry told the same IEA-COP26 Summit.

India's Prime Minister Narendra Modi has called for balance. Delivering the keynote address at the CERAWeek 2021 virtual conference he said: "Now is the time to think logically and ecologically. After all, this is not about me, or you. It is about our planet's future. We owe this to our coming generations."

In this environment it is easy to conclude that the natural gas industry is facing an existential crisis. But the industry is confident it will be an enabler of change not a barrier.

In a statement in March 2021, IGU President Joe Kang signalled the organisation would take a public stance to position natural gas as a core part of the solution to the climate crisis and as a vital component of the future energy mix.

"The global debate about climate change and the role of energy is at a critical juncture," Professor Kang said. "That debate in recent years has been intense and loud, but we have not come far in aligning on an approach that enables us to meet the enormous challenges of decarbonisation, energy access and energy security."

This year – with events like President Biden's Climate Summit, the G20 meeting under Italy's Presidency and COP26 under UK leadership – the world appears to have a real opportunity to do so.

Professor Kang said it would require a clarity of purpose and approach that has been lacking to date. "This is not the time for politics and self-interest. We have to settle on an approach that delivers clean, secure and affordable energy," he said.

The pathway to Paris

The heads of state, ministers and senior government officials, academics, NGO representatives, energy industry leaders and thought leaders who virtually connected at CERAWeek 2021 shared their views and discussed the many complex issues relating to "Energy, Climate and Charting the Future".

A concern that emerged throughout the discussions was that the world is not on a path to meet the core Paris Accord ambition of limiting global warming to below 2 degrees – let alone the stretch target of 1.5 degrees. This has prompted calls from many for "aggressive and achievable" plans to be developed and implemented.

According to a recent UN report on National Determined Contributions, covering submissions from 75 countries accounting for about a third of the world's total emissions, the combined impact of the new actions on emissions would result in a less than 1% reduction by 2030. To get to the 1.5ºC pathway that reduction must amount to 45%.

There is recognition that different nations face different challenges and have different means to achieve a pathway toward Paris. For billions of people in the developing world – with low CO_2 emissions per capita and low access to energy – there is no greater challenge than achieving an affordable, secure and clean supply of energy. In richer nations – with high CO_2 emissions per capita – resources and infrastructure are in place to accelerate decarbonisation.

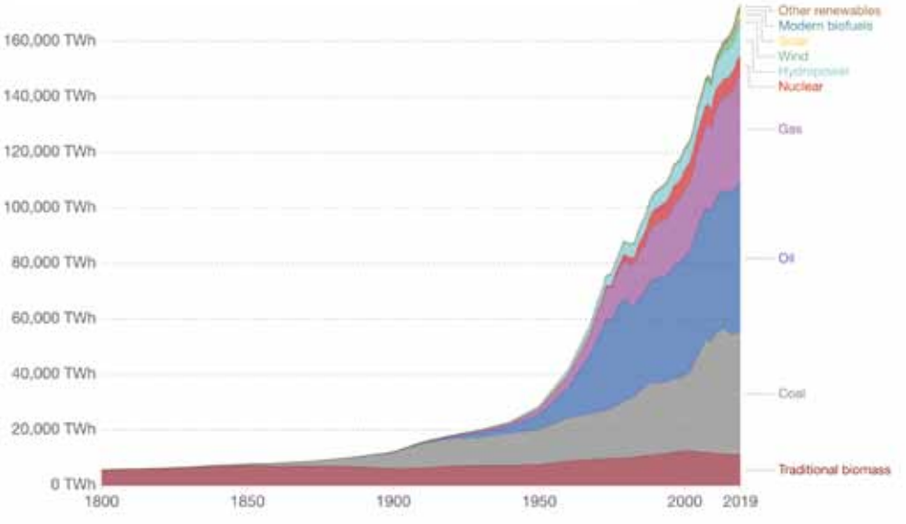
IGU argues an achievable transition is one that delivers clean, secure and affordable energy, using electrons and natural gas and hydrogen molecules, and the necessary infrastructure to help individual countries meet the UN Sustainable Development and Paris Goals.

In his March statement, Professor Kang said continued calls for only electrical pathways to Paris targets is a setup for failure on both Paris and the Sustainable Development Goals.

He said the aim of the Paris Accord is to reduce emissions, not target particular fuels, technologies, or pathways.

▶ Natural gas supplies almost a quarter of global primary energy demand.

Global primary energy consumption by source



Note: Primary energy is calculated based on the substitution method which takes account of the inefficiencies in fossil fuel production by converting non-fossil energy into the energy inputs required if they had the same conversion losses as fossil fuels.

Source: Vaclav Smil (2017) and BP Statistical Review of World Energy (2020) via OurWorldinData.org/energy.

"No justice will be served if achieving the Paris targets involves actions that stymie economic growth and prosperity, or that deny billions of people access to much-needed affordable energy and clean cooking fuels. Picking only electrical pathways will lead to lost opportunities, higher costs and a slower transition for millions of people."

Many examples came forward through presentations at CERAWeek 2021 demonstrating technology and innovation that is being deployed to reduce the carbon intensity of fuels, to increase efficiency in energy use, to remove emissions and to improve measurement and quantification technologies to facilitate the identification and reduction of methane emissions.

The gas industry supplies natural gas to energise all six continents, to enable the scale-up of intermittent renewables and to produce hydrogen.

This puts the industry at the forefront of environmental innovation to reduce emissions. IGU members on three continents are involved in producing hydrogen and renewables gases and the pipelines the industry uses offer the pathway for renewable natural gas and hydrogen.

"The International Gas Union calls on decision-makers to accept that a clean, secure and affordable energy future requires electrons, molecules and infrastructure. Let the energy industry innovators compete to see how best this can be achieved by a variety of means, and in so doing ensure the greatest opportunities for citizens around the world – the opportunities a just transition should provide," Professor Kang said.

Importantly, as IGU represents and advocates for renewable gases, including hydrogen, decarbonised gases and low-carbon gas, it should have a voice in the energy transition discussion for decades to come.

Growing role of gas

Amidst the policy debate and the disruption of the Covid-19 pandemic, the data and credible projections continue to highlight the significant role of gas in meeting our energy needs.

After growing by more than 2% in 2019, global gas use fell by 2.5% in 2020, as the Covid-19 pandemic reduced energy consumption across the global economies. However, the resulting low gas prices, as well as clean air and

◀ Natural gas has a growing role as a transportation fuel in the marine (LEFT) and road sectors. INSET This Opel GT was converted to run on natural gas by Holdigaz, the parent company of the gas distributor for Vevey, Switzerland, where IGU is registered.

climate policies, did promote further switching to gas from other more polluting energy sources, such as oil and coal.

This trend was already underway before the pandemic, thanks to cost-competitive gas in key sectors including power, industry and transport, and major regions including Asia, Europe and North America.

IGU's *Global Gas Report 2020* showed that medium-term growth will come from increasing cost-competitiveness and increased global access to gas – with a particular growth opportunity existing in liquefied natural gas.

LNG imports reached 482 billion cubic metres in 2019, up 13% from 2018, and despite the disruption of the pandemic still rose by 1% in 2020. The rebound appears certain to accelerate this year, depending on the persistence and longevity of the pandemic. IEA is forecasting a return to modest overall natural gas demand growth of 3.2% this year.

There is no doubt the pandemic has had a dramatic impact. It has truly shaken up the world, taking lives and crippling livelihoods.

And it has not been kind to the most vulnerable. The World Bank has highlighted that over 100 million people could be pushed into extreme poverty. Budget deficits have reached levels not seen since World War II, and the global economy will likely be almost one-tenth smaller in 2030 than it would have been otherwise.

It has also had a dramatic impact on the energy sector – a 20% decline in investments, something the industry had not previously experienced.

Over the short term, the pace of demand recovery will be influenced by a range of factors, not the least the continued disruption of the pandemic.

Energy of course underpins all economic activity, and gas has a role to play in the economic recovery from the pandemic. Gas and the gas industry, both through ensuring continued energy supply and resuming investment in major projects, will support the healthy economic recovery.

Longer term, gas – be it natural gas, renewable gases or hydrogen – will play a vital role in delivering reliable, affordable and sustainable energy to billions of people around the world for decades to come.

The *Global Gas Report 2020* said ample natural gas resources exist to support a return to demand growth, but greater gas infrastructure development is needed to support growth in the medium term. For example, India is planning to almost double the length of its gas transmission grid, while China will grow its gas network about 60% by 2025.

"There are a number of factors driving increased natural gas demand – and clearly some limiting that growth. But overall, we see gas playing a critical role in the global energy system for decades to come," Professor Kang said.

▼ Energy systems of the future will be characterised by a higher share of renewables but back-up is needed.

As highlighted in the report, it is expected that gas demand in China will almost double by 2040 and, through infrastructure build out, that 63% of the Chinese population will have access to gas, up from today's 33%.

India also sees significant potential increased gas demand – double that of today's – as the country moves to a gas economy and builds out the necessary infrastructure that will be needed. It is expected that the number of households with access to gas will increase seven times from now until 2040.

Gas will also play a major role in improving energy access in Africa, Southeast Asia and other regions.

Over the last 50 years, the industry has seen the contribution of LNG grow dramatically, mainly in Asia. With supply continuing to grow, increased use of LNG is expected in regions like Europe and Latin America that traditionally relied on pipeline supply.

Africa also has a remarkable new domestic natural gas supply opportunity – new natural gas infrastructure and increased gas usage can propel economies across the continent, reducing monetary and energy poverty, and improving the lives of millions in tangible, measurable ways.

An example is the start-up of sub-Saharan Africa's first LNG import project at Tema in Ghana – something likely to be repeated in other coastal African countries.

LNG and pipeline gas exports from Algeria, Angola, Egypt, Equatorial Guinea, Mozambique and Nigeria bring foreign exchange to those economies and will continue to do so. New gas export sources in Mozambique, Senegal/ Mauritania and Tanzania are likely to be developed and they can bring valuable development to these economies and valuable energy supply to the region.

▲ Mozambique started gas exports via pipeline and is now developing LNG projects such as Coral-Sul using a floating liquefaction vessel which is set to start up in 2022.

◀ Ghana's new LNG import terminal will comprise this floating regasification unit (pictured en-route to Tema) and a floating storage unit.

Methane mitigation critical

One of the global gas industry's major ongoing challenges is to reduce methane emissions from

Many countries are working on hydrogen projects such as the Magnum power plant in Eemshaven, The Netherlands, where one of the three natural gas-fired units is being converted to run on hydrogen.

its operations. The issue lies at the heart of proving gas can play an important part in meeting global greenhouse gas (GHG) reduction efforts and contributing to meeting the Paris commitments.

Methane is the second most important GHG after carbon dioxide. Its greenhouse effect is significantly stronger in the short term. Even though it also has a much shorter atmospheric than CO_2 it remains the focus of international efforts combat climate change.

The UN says cutting methane emissions quickly and dramatically is the world's best hope to slow and limit the worst of global warming.

According to a report by the UN Environment Programme released in May 2021, if human-caused methane emissions are cut by nearly in half by 2030, a 0.3ºC-amount of warming can be prevented by mid-century.

The industry continues to prioritise management and mitigation of any methane losses along its production and delivery value chain. This is a key factor to support the part gas plays in the energy transition.

There is a long history of industry efforts to minimise methane emissions across its value chains, originating in routine safety requirements and operational efficiency improvements.

IGU began addressing the topic in 2016 when it instituted its Global Group of Experts on Methane Emissions consisting of international industry experts, across the entire value chain. The purpose is to enhance the level of knowledge and communication within and outside the industry, supporting informed discussions about this critically important and technically complex topic.

As a supporting organisation to the Methane Guiding Principles partnership, and a dedicated advocate for accelerating the global reduction of methane emissions, IGU encourages the industry to continue to act through consistent assessment, reporting and mitigation.

Importantly, there has been significant innovation activity, with a variety of promising technologies under development to aid in these efforts and bring down the cost of reduction efforts.

Resilient energy

A significant opportunity for the gas industry has been positioning natural gas as a key

component of a resilient energy system for the future.

The recent debate about the power system failure in Texas in February 2021 saw a lot of finger pointing after extreme cold weather set in motion a perfect storm of separate, but interconnected energy sector events that brought most of the state's power down. As a result, 4 million people lost electricity for days, the main source of heating in the state, in the midst of record frigid weather.

While the debate featured a lot of blame shifting, it did highlight the importance of resilient energy supply.

The energy transition needs to deliver an affordable, resilient, secure and sustainable energy system, reducing GHG and air pollutant emissions. In this process, it also needs to expand access to clean and modern energy to those who do not have it.

This challenge can only be met with a well-rounded combination of policy measures and sustained investment in cleantech. Renewable energy and natural gas are critical pieces of that combination.

Electricity, natural gas, hydrogen and the necessary infrastructure will all be needed to help individual countries secure their energy supply and meet the Sustainable Development and Paris Goals.

The gas industry is working hard to position itself at the forefront of environmental innovation, with natural gas as the reliable, affordable and safe energy that enables intermittent renewables and the gas industry as an innovator and enabler of new gas-based energy from hydrogen to decarbonised gases.

As the global energy debate continues, the industry will need to align on an approach that enables it to meet the enormous challenges of decarbonisation, energy access and energy security.

The industry must do more to inject balance into that debate. The fact is the sector will be a greater enabler of the energy transition, both through switching from coal to gas in power generation, greater use of gas as a transport fuel and gas supporting the integration of intermittent renewables into the energy mix.

Low-carbon gas technologies, such as biomethane, hydrogen and gas with carbon capture, could play a major role in the low-carbon transition. Hydrogen in particular has captured attention in recent years and, with enough investment and policy support, could abate up to 37% of energy-related GHG emissions, according to BloombergNEF estimates.

There is much to be done, but confidence is growing that gas and the gas industry will continue to play a vital economic and environmental role for decades to come.

Matthew Doman was the International Gas Union's interim Public Affairs Director from August 2020 to May 2021.

This hydrogen refuelling station in Vancouver, Canada is part of a network supporting the rollout of hydrogen fuel cell electric vehicles.

Biomethane has a role to play in the low-carbon transition. This CNG refuelling station in Hatfield, UK supplies blended biomethane to delivery trucks.

IGU Publications

As the global voice of gas, IGU seeks to improve the quality of life by advancing gas as a key contributor to a sustainable energy future. IGU's official publications are an important means to accomplish this. These publications, consisting of various position papers, recommendations and results of IGU-organised or joint studies, serve to enhance the image, authority and global reach of the Union in a local and global gas context. They are available online and/or in printed form free of charge.

You are invited to download the publications currently available from the IGU website www.igu.org or order hard copies (if in stock) from the Secretariat.

Recent IGU reports

- Transitions toward Clean and Reliable Power Systems – A Case Study of Ontario, Canada
- World LNG Report 2021 Edition
- Gas Technology and Innovation for a Sustainable Future
- Wholesale Gas Price Survey 2020 Edition – A global review of price formation mechanisms 2005 to 2019
- Global Gas Report 2020
- Case Studies in Improving Urban Air Quality
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General IGU publications

- Articles of Association
- Global Natural Gas Insights
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- IGU Natural Gas Conversion Guide
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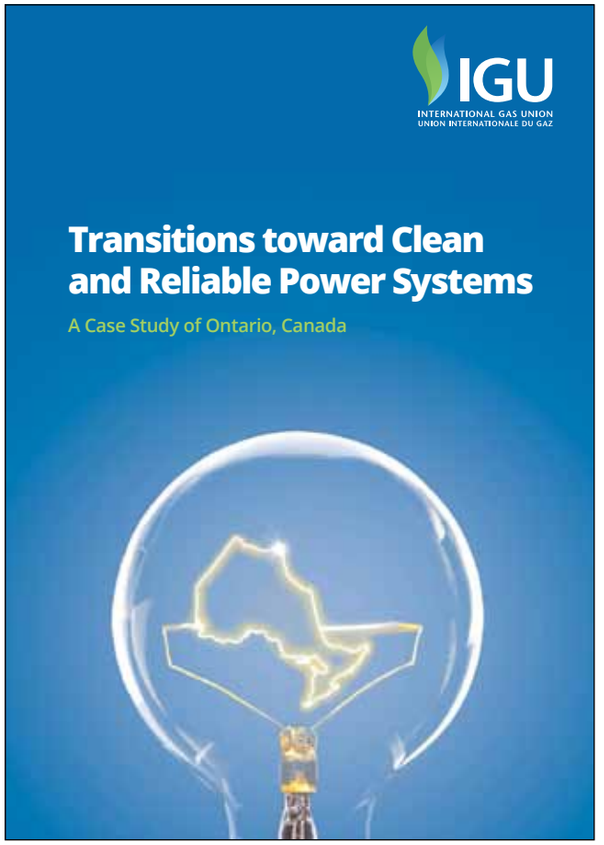


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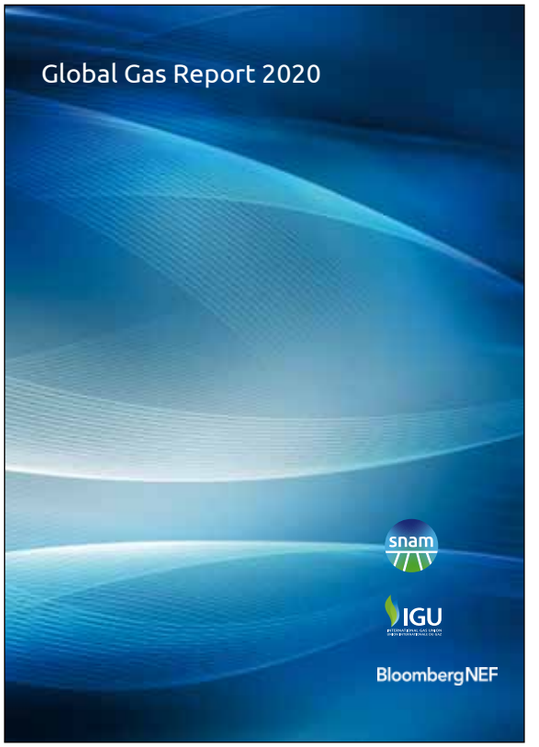
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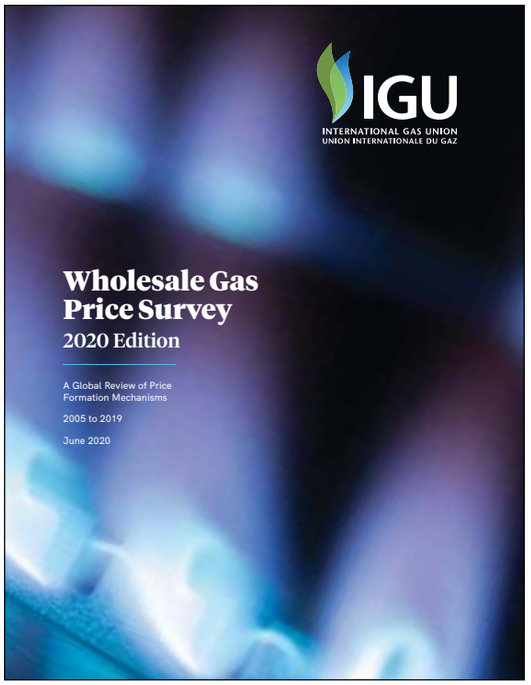
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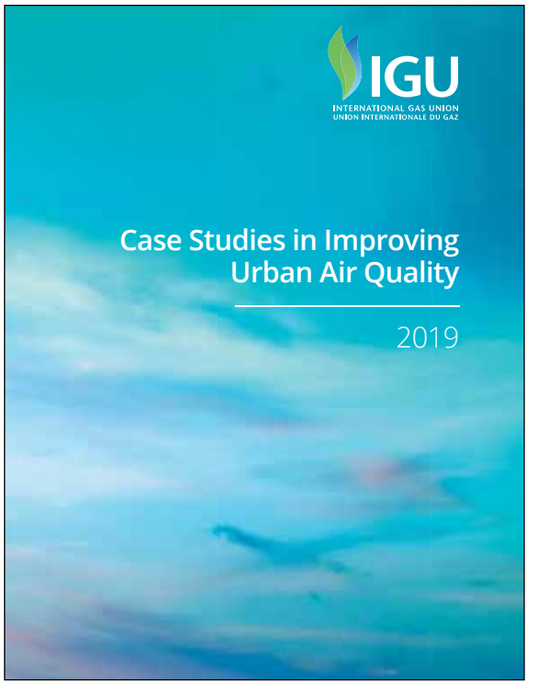
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Acknowledgements

For IGU
Secretary General: Luis Bertrán Rafecas
Deputy Secretary General: Andy Calitz
Director Advisor: Luis Calvo Lema
Events Director: Rodney Cox
Public Affairs Director: Matthew Doman
Public Affairs Manager: Tatiana Khanberg
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Consulting Editor: Mark Blacklock
Copy & Picture Editor: Adrian Giddings
Publications Director: Robert Miskin
Finance Director: Yvonne O'Donnell
Finance Assistant: Maria Picardo

Art and Design Director: Michael Morey

Printed by: Buxton Press Ltd

IGU and ISC would like to express their thanks to all those who helped in the preparation of this publication and in particular to the following people.

- In Belgium, Henri Van Speybroeck of the Association Royale des Gaziers Belges (ARGB).
- In Canada, Timothy Egan and Nathalie Bousquet of the Canadian Gas Association (CGA).
- In China, Tang Xuan of Beijing Gas Group.
- In the Czech Republic, Miloš Kebrdle and Jana Kymplová of the Czech Gas Association.
- In Denmark, Peter Storm, Honorary Secretary General; Hanne Thomsen of the Danish Gas Museum; Lotta Hållén-Kragh of DONG Energy; Jean Schweitzer of the Danish Gas Technology Centre.
- In France, Daniel Paccoud, Amélie Herrault, Sébastien Courleux and Jean-Luc Gadeau of the Association Française du Gaz (AFG); Michel Roux of AFEGAZ (Association la flamme Européenne du gaz); Claude Mahuzier of COPAGAZ (Conservation du patrimoine gazier); Michael Batard and Nathalie Le Marec of Engie.
- In Germany, Uwe Klaas and Elisabeth Hörning of the Deutscher Verein des Gas- und Wasserfaches (DVGW); Rolf Beyer, Honorary Member.
- In Indonesia, Yenni Andayani, formerly of Pertamina; Rakhmad Dewanto of the Indonesian Gas Society (IGS).
- In Italy, Andrea Stegher of Snam and the team at Eni Archives.
- In Japan, Satoshi Yoshida of the Japan Gas Association.
- In Korea, Seyoung Ha and Seong Soo Kang of the Korea Gas Union (KGU).
- In Malaysia, Rosman Hamzah and Nabilah Zulkefli of the Malaysian Gas Association (MGA).
- In Morocco, Farid Berrahou of Sonatrach.
- In The Netherlands, Robert Doets, Honorary Member; John Meeder, Honorary Member; George Verberg, Honorary President.
- In Peru, Jesús Santeliz of Transportadora de Gas del Perú (TGP).
- In Russia, Alexander Bespalov, Andrey Sapozhnikov and Oleg Voynov of Gazprom.
- In Sweden, Anders Mathiasson, Maria Pohjonen and Sara Nilsson of Energigas Sverige.
- In Switzerland, Jean-Pierre Lauper, Honorary Member; Philippe Petitpierre of Holdigaz; Ursula Wittwer of SSIGE/SVGW.
- In the UK, Kristina Parkin, Barry Wilkinson and Sukhi Johal of the Institution of Gas Engineers and Managers (IGEM).
- In the USA, Tracy Burleson and Jennifer O'Shea of the American Gas Association (AGA); Colleen Taylor Sen formerly of the Gas Technology Institute (GTI).

Thanks are also due to the following companies, people and organisations for opening up their archives and providing pictures.

Cover: The globe with a collage of historical and contemporary pictures on the front cover was designed by the graphics team of Equinor for IGU. On the back cover are pictures from the 1st International Gas Conference in 1931 (courtesy of IGEM) and of Daegu, venue of the 28th World Gas Conference in 2022 (courtesy of EXCO Exhibition & Conference Center).

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Post-War Recovery: ARGB (27, 28 lower & inset, 35 lower), IGEM (28/9 upper, 32 upper, 35 upper), IGU (29 lower, 34, 36 upper left & lower, 37 upper), Italgas Archive Museum (30, 31), National Gas Archive, National Grid (32 lower, 38), Energigas Sverige (33), DVGW (36 upper left), Gazprom (37 lower), Sonatrach (39 upper), Engie (39 lower).

Development and Expansion: Engie (40, 41 lower, 42 upper left & right), ADNOC (41 upper), IGU (42 middle left, 50 lower left & right, 51, 55 lower, 58 lower), AFG (42 lower, 60 upper left & right, 61), Eni Archives (43 upper, 53 upper left & right, 55 upper left),OMV (43 lower), DVGW (44 lower, 45 upper & lower right, 46 upper left & upper right, 47, 52), CGA (44 upper & inset), Philippe Petitpierre/Holdigaz (45 lower left), ARGB (46 inset, 46 lower, 60 lower), ConocoPhillips Corporate Archives (48 upper), Kawasaki (48 lower), Pertamina (49), Ronald Reagan Library (50 upper left & right), collection of John Meeder (53 lower, 54, 55 upper centre & right, 58 upper), collection of Peter Storm (56, 57), GTI (59 upper left), Colter Henderson/Devon Energy (59 upper right), Halliburton (59 lower).

Speaking for the Gas Industry Worldwide: Tokyo Big Sight Inc. (63 upper), JGA (63 lower, 64 all except Peter Storm, 65, 68 upper left), Søren Svendsen (64 Peter Storm, 70 Lisbeth Koefoed), TGP (66, 67), KGU (68 upper right, 92 Jeongwook Khang & Dong-Hoon Kim, 94 Bong-Kyu Park), IGU (68 lower, 69 lower three, 70 lower left, 72 lower right, 72 all except Eduardo Ojea Quintana, 75 lower seven, 78, 79 upper right, 80 Carolin Oebel, Ksenia Gladkova, Silje Storsul & Sjur Bøyum, 81 Mats Fredriksson, 82 upper centre & lower right, 83 upper right, Anette Sørum Nordal, Khadija Omar Al-Siyabi, Taeksang Kwon & Kristin Sande, 86 lower right, 87 all except Rod Rinholm & Terence Thorn, 88, 89 except Union Station, 90 Luis Calvo Lema & Flavia Malet de Hvidbo, 92 Marcela Martínez Serret, 93 upper, 94 all except upper main, 96, 97 Andy Calitz, 99 all except lower), Guus Pauka/23rd WGC NOC (69 upper left & right, 70 upper & lower right, 71), WGC2018/DChFoto (74, 90 except Luis Calvo Lema & Flavia Malet de Hvidbo, 91 lower left), WGC2015 (69 Coby van der Linde, 83 lower left, 84, 85, 86 upper), OECD/IEA (69 Nobuo Tanaka), Jon Chomitz/IHS Markit (69 Daniel Yergin), Lotta Hållén-Kragh (70 Lotta Hållén-Kragh), Global Gas Historical Network (72 upper), IAPG (72 Ernesto López Anadón & Roberto Brandt, 73 Eduardo Ojea Quintana), Roberto Eduardo Decurnex/24th WGC NOC (75 upper, 76, 77 except upper right), Jean Schweitzer (77 upper right), WGC2012 (79 upper left & lower three, 80 three main pictures, 81 except Mats Fredriksson), GasNaturally (82 upper left), UNESCO/P. Chiang-Joo (82 upper right), Marc-André Boisvert (82 lower left), UNESCO/Emilien Urbano (83 upper left), Vienna Energy Forum (86 lower left), GTI (87 Rod Rinholm), AGA (87 Terence Thorn, 91 Dave McCurdy & Jay Copan), WGC2018/Bokeh Lane Photography (89 Union Station, 91 lower right), WGC2018/Julia Zhogina (91 upper), EnergyNet (92 lower & 94 upper main), IGS (93 lower), EXCO Exhibition & Conference Center (95 upper). CMA CGM Group (98 upper main), Chevron Australia Pty Ltd (98 lower), Mingyang Zhou (99 lower).

The History of the International Conference and Exhibition on LNG: Grain LNG (101 upper), GTI (101 lower, 102), Qatar Petroleum (103 upper, 104 upper), KGU (103 lower), Sedigas (104 lower), LNG 16 (105), LNG 17/Gary Fountain (106), LNG 18/Oneill Photographics (107), LNG2019 (108, 109 except Philip Hagyard), Technip Energies (109 Philip Hagyard).

The History of the IGRCs: Cédric Faimali via Engie (111, 113 upper), Jean Schweitzer (102, 115 except IGRC2017), KGU (113 lower, 114), IBP/Marcos Queiroz (115 IGRC2017, 116 upper left), Uwe Klaas/DVGW (116lower left), Ubar Conference & Events (116 upper right, 117).

IGU Engages with International Policymakers: Joop van Reeken, The Netherlands (121), International Institute for Sustainable Development (IISD) Reporting Services (122, 123 lower), IGU (123 upper left & right, 124 upper left & right, 125 centre, 126 all except upper left, 127, 128, 129, 130, 132/3, 134, 136, 137), Hild Bjelland Vik/Statoil (123 lower), Lisa Stayt/Stayt Photography (125 upper), PGNiG (125 lower), Arnaud Bouissou/MEDDE/SG COP21 (126 upper left), IEF (131), MGA (135).

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Challenges and Opportunities for Gas: Guangdong Dapeng LNG Company Ltd (142), Gazprom (143), ESL Shipping (145 main), Holdigaz SA (145 inset), Torresol Energy Investments S.A. (146), Eni (147 upper), maasmondmaritime.com (147 lower), Koos Boertjens/Vattenfall (148), Brian Buchsdruecker/Photographic Services, Shell International Ltd (149 upper), Gasrec (149 lower).

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