2012-2015 Triennium Work Reports

MARKETING NATURAL GAS BEYOND THE CENTRALISED POWER SECTOR

Study Group 1 of the International Gas Union
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Marketing Natural Gas Beyond the Centralised Power Sector

The scalability and flexibility of natural gas provides a broad range of market development opportunities. This has been accelerated with the growth of distributed power and the acceleration of small-scale LNG development. Distributed power technologies have become more widely available, smaller, more efficient and less expensive, helping to offer an alternative to large centralised power, transmission and distribution

These developments have contributed to a proliferation of opportunities for the marketing of gas and LNG beyond the centralised power sector. Increasingly, these opportunities are characterized by an 'end-user oriented' value chain. In this context, realising the full potential of gas in these emerging segments suggests an increasingly important role for marketing and communications. To succeed the industry will need to demonstrate not only the benefits of gas, but also its application to a broader, often more consumer-oriented audience.

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Introduction

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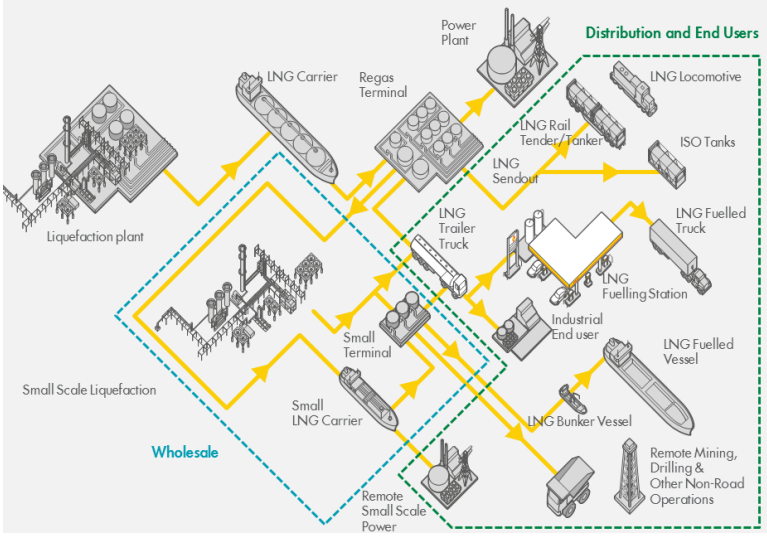


The Emerging Supply Chain (Shell, IGU)

These developments have contributed to a proliferation of opportunities for the marketing of gas and LNG beyond the centralised power sector. Increasingly, these opportunities are characterized by an 'end-user oriented' value chain. In this context, realising the full potential of gas in these emerging segments suggests an increasingly important role for marketing and communications. To succeed the industry will need to demonstrate not only the benefits of gas, but also its application to a broader, often more consumer-oriented audience.

Opportunities for Gas Market Development beyond the Centralised Power Sector

The utilisation of distributed power technology is accelerating rapidly across a range of applications. GE estimates that annual distributed power capacity additions will grow from 142 GW in 2012 to 200 GW in 2020, a 58 GW increase and an average annual growth rate of 4.4%. Gas-fired distributed power offers significant benefits over alternatives, but these

benefits are not always well understood and require consistent communication across the industry.

Distributed power generation

Greater gas abundance creates opportunities for gas-fired distributed power systems. The increasing flexibility, optionality and scale of gas distribution means that gas-fired distributed power technologies should become increasingly prevalent. This offers significant marketing opportunities for gas and LNG, yet the benefits of distributed power generation are not always well understood. It is therefore important that, as an industry, we communicate these benefits to support market development. This requires clear and consistent messaging on the multiple benefits of distributed power as a complement to centralized power development.

Distributed power overcomes a number of the constraints that typically characterise the development of centralised power projects such as cost, transmission and distribution. Distributed power system can also be used to provide base-load, intermittent, peak and back-up power. It can be connected to the grid or off-grid and added in increments to meet increasing demand.

Another benefit of distributed power systems is that they are small, have lower capital requirements and can be built and become operational faster and with less risk than large power plants. This is important in regions where capital is constrained and it is essential to provide critical infrastructure such as electricity without having to raise the level of capital associated with centralised power.

Distributed power systems generate electricity only, or they can produce combined heat and power (CHP). Combined heat and power (CHP) integrates the production of usable heat and power, in one single, highly efficient process. CHP plants can typically run at 60-80% energy efficiency and result in less transmission losses and reduced greenhouse gas emissions.

In advanced economies such as North America and Europe for example, where further transmission and distribution growth is sometimes hindered by planning processes and local resistance distributed power provides a useful alternative. In developing economies without developed transmission and distribution, distributed power provides a realistic route for meeting critical energy needs. In India for example, distributed power in rural areas provides reliable electricity, supporting social and economic needs.

Rapid urbanisation and interconnection also increases the importance of resilience as condensed populations become more vulnerable to a variety of natural disasters. Making the power system more resilient is critical to managing the impact of natural disasters.

According to GE, in 2012, there were 905 natural disasters including earthquakes, severe storms, tornados, droughts and floods, which affected 106 million people and caused economic losses estimated at $160 billion.

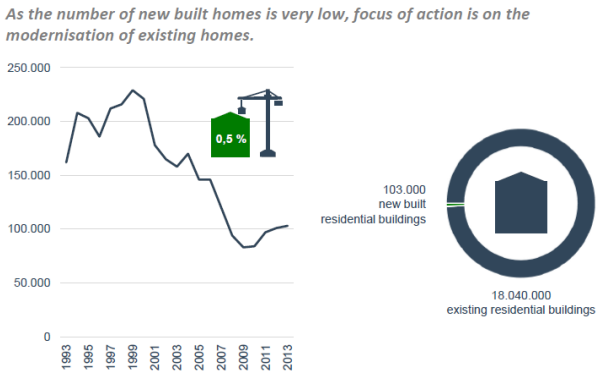
For example, after the Fukushima earthquake damaged transmission lines and impacted several central power plants, gas turbines were used to restore power and prevent black-outs. During Hurricane Sandy in 2012, the gas-fuelled CHP system of the long Island Home was able to generate power for over 15 days. Recognising these benefits, city planners in Tokyo, Seoul and Shanghai have taken steps policy measures to encourage such 'gas by design' in future planning.

The benefits of small, distributed power technologies are unmistakable and often provide both tangible and intangible reasons to support distributed power in lieu of, or in addition to, central power station development. There are many examples of how distributed power has benefited communities around the world. However these benefits are not well understood and require communication to those who will most profit from their use.

Gas in Residential

The role of gas as an efficient, affordable, low-carbon source of power and heating for buildings is not well understood beyond the gas industry and requires a concerted marketing and communications effort.

In Europe, for example, heating accounts for 27% of the (EU's) total energy consumption (including housing, offices and public spaces), with gas accounting for 46% of the market (Eurogas, Sept 2014). Despite the promise of emerging technologies for many European countries, the fastest way to achieve significant energy efficiency gains is by replacing conventional boilers with gas condensing boilers. According to Eurogas, if all all boilers were replaced the EU would achieve a 7% reduction in total EU greenhouse gas emissions from heating (Eurogas).

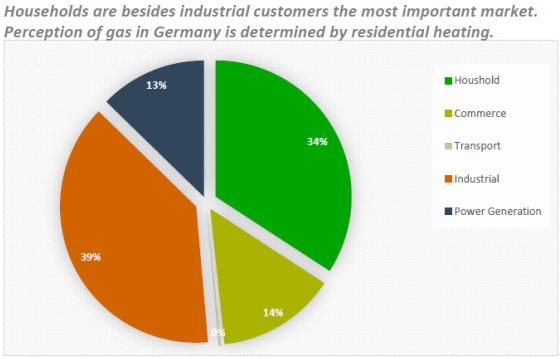


New Homes Built, Germany (Zukunft ERDGAS e.V.)

Gas condensing boilers are more than 20% more efficient than conventional boilers because residual heat is used again (no more unnecessarily warm boiler rooms). Compared to a conventional boiler a 30% reduction in CO2 emission is achieved, at a cost of 2000-7000 EUR (depending on country) with typical return on investment between 5-7 years (Source: German BDH Study, Eurogas, numerous other sources).

Retrofitting heating systems is also 5-10 times cheaper than envelope refurbishment (insulation of roof, floors, windows) and the effects are comparable to the gains of a modern boiler. In all cases it is advised to at least replace the boiler. A German study demonstrates that refurbishment measures require 30+ years of payback time. German example: gas condensing boiler: 7000 EUR, -30% CO2; Full insulation without boiler: 50,000, -36% CO2). A Shell study indicates refurbishment costs at 60,000 Euro (BDH study) (Source: Shell/BDH Study; ERDGAS, Modernisierungskompass 2014).

In many developed markets, after industrial use, households are the most significant market for gas. Perceptions of gas are therefore shaped by use of gas in buildings and it is important that the industry communicates the benefits of gas in terms of supporting emerging innovations such as solar heating, combined heat & power, and heat pumps and can be used for e.g. bio-methane, bio-mass or power-to-gas supply.



Gas Sales by Customer Segment in Germany, (Zukunft ERDGAS e.V.)

For end users micro-Combined Heat and Power (micro-CHP) generates heat and electricity simultaneously, from the same energy source in individual homes or buildings. The main output of a micro-CHP system is heat, with some electricity generation, at a typical ratio of about 6:1 for domestic appliances. A typical domestic system will generate up to 1kW of electricity once warmed up: the amount of electricity generated over a year depends on how long the system is able to run. This electricity can be used or sold back to the grid.

By generating electricity on-site micro-CHP reduces CO2 emissions compared with grid electricity and a standard heating boiler. Micro-CHP is also resilient, providing backup power when the main grid is down. During Hurricane Sandy in October-November 2012,

the gas-fuelled CHP system at the Long Island Home (a member of the North Shore Health System) was able to generate power for over 15 days, providing power to the facility and 400 other homes and allowing for a 24-hour emergency operation for the entire North Shore Health System. During the hurricane, the plant isolated from the grid and was able to generate 224,000 kwh.

LNG for Transport

To meet growing global demand for transport, a range of different vehicles, ships, and fuel options will be required. LNG is emerging as a cost-competitive and cleaner fuel for shipping, and heavy-duty road transport. In the future, it could also become prevalent in rail, mining, and industrial applications.

This development of LNG fuel has the potential to provide economic and environmental benefits for heavy-duty truck, and ship owners. It is cost-competitive, and can reduce sulphur emissions (virtually zero sulphur emissions), particulates and nitrogen oxides compared to diesel, and fuel oil. Its energy density means that ships and trucks can travel longer distances, better suiting the needs of transport operators now, and in the future. It has the potential to provide cost savings compared to today's conventional diesel.

Shell's in-house LNG growth estimates show robust growth of 5% per year. This represents an estimated 430 million tonnes of global LNG demand by 2025. LNG for transport could possibly add 5-10% to our base case global LNG demand estimates by 2025. That is about 25 to 45 million tonnes per year by 2025. (Wood Mackenzie had estimated 40-60 million tonnes by 2030). If all heavy transport switched to LNG, it would consume over 2 times the current global annual supply of LNG. (Details: Marine 218mtpa; Freight Road 410mtpa; rail 30mtpa. Current LNG production is about 280mtpa so the actual ratio is 2.35x).

North America, including most of the US and Canadian coast, and key countries in northwest Europe and the Baltic Sea area have recognised the impact of shipping emissions on air quality. Emission Control Areas (ECAs) and emission reduction requirements for the shipping industry are being implemented gradually and lower sulphur limits for ECAs came into force January 1st 2015. There are currently around 57 LNG fuelled ships in operation worldwide, and more than 79 on order, excluding LNG carriers and IWW vessels (DNV GL). These vessels receive LNG from around 30 to 50 bunker stations globally. LNG will enable the industry to comply with future regulations.

For the heavy-duty truck sector, LNG has the potential to offer significant fuel cost savings compared to conventional diesel. It can also reduce greenhouse gas and sulphur emissions, from production to use, compared to conventional diesel and bio-diesel in new engines. Burning LNG in spark-ignited engines is quieter than burning diesel in combustion

engines. Therefore, LNG-fuelled trucks can operate for longer where noise restrictions apply, for example delivering to supermarkets in residential areas.

China is leading the way with more than 170,000 heavy-duty trucks powered by LNG. These trucks receive the cleaner fuel from approximately 1,500 LNG refuelling stations and more than 60 small scale liquefaction facilities. There are currently about 1,500 heavy-duty trucks running on LNG with over 46 operational LNG refuelling stations in Europe (NGVA Europe). In the US, there are between 5,000 and 6,000 trucks powered by LNG, using the over 100 LNG stations (NGVA America).

LNG's development as a successful fuel option will depend on many areas: it requires infrastructure, the right regulatory framework to foster growth, and a good business case for customers to invest in new vehicle technology, engines and/or modifications to their existing fleets and vessels.

Whilst LNG as a fuel is competitive, the logistics of the total value chain need to be competitive for the customer. The additional costs of cryogenic handling are more expensive than conventional storage. However, when all aspects of the supply chain, including end user equipment, are properly managed, LNG can be a competitive alternative to today's fuels. Furthermore, LNG is cleaner than diesel and heavy fuel oil in terms of sulphur, particulates and nitrogen oxides, and can help reduce greenhouse gas emissions.

There is also a "chicken and egg" dilemma to be addressed. For customers to contemplate a switch to LNG they need to know that infrastructure is in place. This is particularly true for the development of LNG as a transport fuel. However, many infrastructure developers need to see the readiness of the market to receive LNG to invest in LNG infrastructure. Thus, there is a role for International Oil Companies such as Shell to work closely with customers, Original Equipment Manufacturers (OEM), partners, governments, and standardisation bodies to develop the market and the infrastructure.

It will take time and effort to develop a mature LNG for transport market and it is essential that the industry clearly communicates the benefits. This means bespoke marketing to a broad audience and range of stakeholders.

Observations on Successfully Marketing Natural Gas Beyond the Centralised Power Sector

Over the course of the triennium, PGC.E3 has explored a wide range of gas and non-gas examples and considered what constitutes an effective marketing and communication strategy to promote the use of gas in these emerging segments. We have looked at a number of examples across and beyond the gas industry to determine what works well and why some campaigns fail to achieve their objectives. We observe common elements of

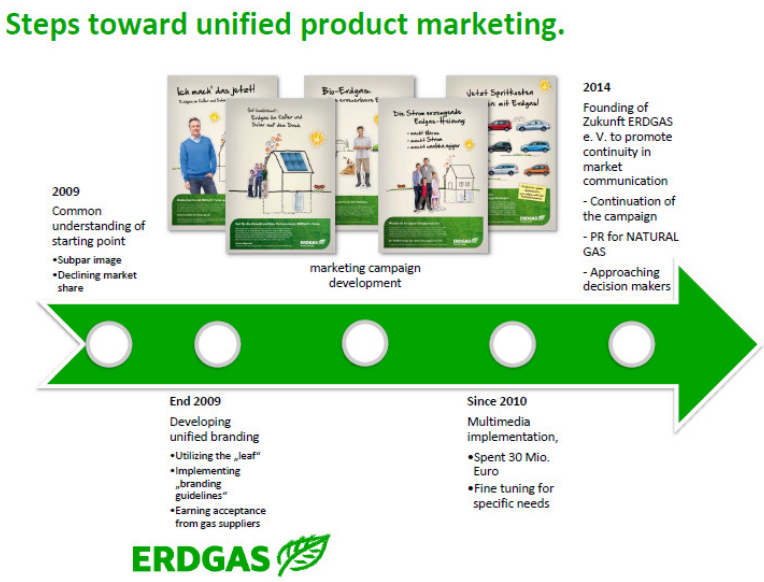
successful integrated marketing and communications strategies, which we have captured in a strategy development model below.

Elements and Process for Developing a Successful Integrated Marketing and Communications Strategy as Observed by PGC.E3

The model is presented as a cycle to reflect the reality that each part of the cycle must be flexible and reflect the impact we are having, changes to the external environment and changes to our own business objectives.

Clearly Defined Objectives

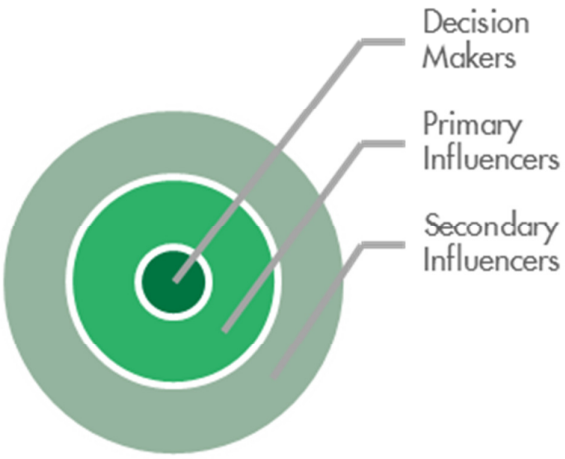
The most successful campaigns were clear on their objectives from the outset. They were clear on objective prioritisation and aligned across their respective organisations. This facilitated targeted resource allocation.



The ERDGAS campaign in Germany offers a good example of each of these elements, starting with a clearly defined strategy

Detailed Audience Identification and Segmentation

The most effective campaigns were clear on who they were trying to reach, whether government, businesses or consumers. Audience segmentation is essential and can be multi-faceted, targeting not just the final decision maker, but also concentric circles of influencers. Understanding your audience helps define your message (what you will say and how you will say it) and what channels you will use to communicate your message. It is essential to ensure that your messaging will resonate and that you are making best use of resources.

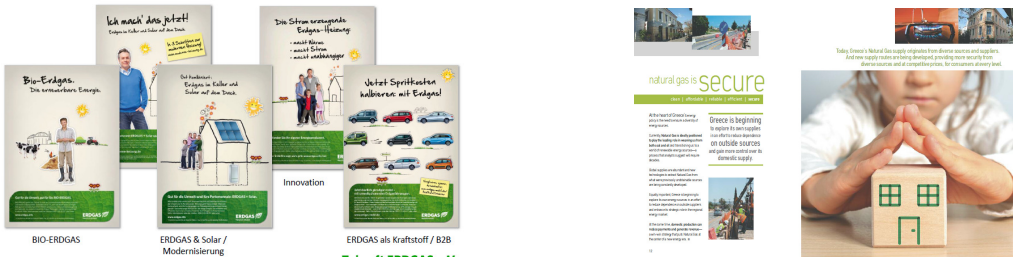


Identifying priority audiences: concentric circles of influence

Aegis Energy Services Inc. CHP campaign with clearly defined (business) audiences

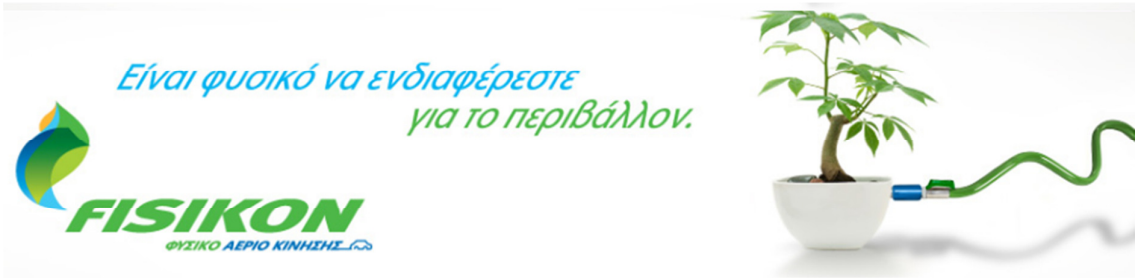
Development of Branding, Advertising and Marketing Materials

The most successful campaigns tailor their messaging towards their defined audiences. The same applies for branding, which should reflect both the message and the audience. We observed that the gas industry is comfortable with 'facts' and data, but sometimes fails to recognise that facts are not messages. While facts should be the foundation of the message, they have to be presented within the context of that which is credible and interests the audience. Often this suggests placing people at the centre of your message; a human face. This supports the development of effective materials that resonate with your audience.



ERDGAS and DEPA put people at the forefront of their marketing and communications materials and gave their offerings a human face

In this context, testing messaging can help ensure that your brand and message resonate and the campaign is making best use of resources and budget. We have seen multiple examples undertaken by companies in-house, through marketing agencies and polling companies.



In Greece, DEPA recognised the benefits of establishing a new brand name for the natural gas for transportation called "fisikon" (in Greek means "natural") with its own logo, its own website (www.fisikon.gr)

Identification of Priority Advertising, Marketing and Communication Channels

Marketing and communications campaigns are faced with an increasing number of delivery channels to reach their audience. We observe that successful campaigns focus and allocate their budget on channels that will carry their message to their identified audience. This can be advertising, events, online, media, social media and direct engagement.

The ERDGAS campaign utilised multiple channels to convey their message: sponsorship, traditional and social media; direct engagement; set-piece events.

In Greece, DEPA has recognised the value of social media for communicating their messages (www.facebook.com/fysikoaerio).

Campaign Execution and Tactics

The study group observed that even the best strategies failed to deliver if due attention was not given to execution. In the distributed gas industry and gas for transport in particular, this increasingly requires a focus on consumer education and acceptance. This is most pertinent in the use of gas for transport because it requires a change in behaviour.

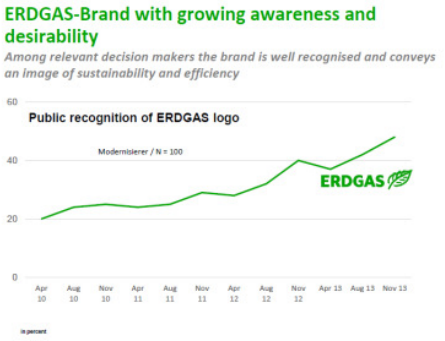
In Greece the Fisikon campaign recognised this challenge in the implementation of their marketing strategy, prioritising:

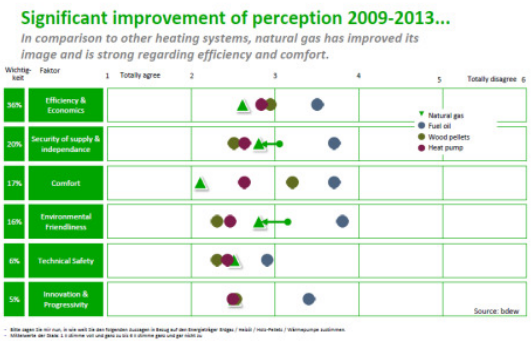
- *Subsidies for ~500 CNG vehicles (Mercedes, Volkswagen, Scoda, Fiat, Opel) for either private or commercial usage (taxi, vans)*
- *Organizing public test-drive events for CNG vehicles,*
- *Training vehicle technicians and vehicle inspection centres*
- *Support for the mechanical conversion of vehicles for using CNG (bi-fuel and dual-fuel)*
- *Establishment of an adequate number of gas stations (CNG sale points) in 5 big cities and on the main transportation system (Athens-Thessaloniki Highway) with some of them already in operation and planning these stations to be also used as "mothers" for the supply of a number of "daughter" stations located in areas where there is no pipe gas.*
- *Participation in consumer-focussed Motor Shows*

Fisikon raised awareness of its customer value proposition through participation in the annual international alternative fuel rally Ecomobility (www.ecomobility.gr/)

Monitoring and Measuring

We also noted that success required monitoring the impact of a campaign, allowing adjustments to the strategy to reflect the impact of the campaign and changes to the external environment.





The ERDGAS campaign monitored its effectiveness and adjusted its strategy accordingly

Conclusion

As we've seen, the scalability and flexibility of natural gas has contributed to a proliferation of opportunities for the marketing of gas and LNG propositions beyond the centralised power sector. Distributed power, use of gas in residential and gas for transport are just three examples. We have observed that to successfully market these opportunities in an increasingly 'end-user oriented' value chain, the industry must: be clear on their objectives from the outset; clear on who they were trying to reach, whether government, businesses or consumers; tailor their messaging towards a defined audiences; focus and allocate their budget and resource on marketing and communications channels that will carry their message to their targeted audiences; and continually monitor impact, adjusting the strategy to reflect the impact of the campaign and changes to the external environment.

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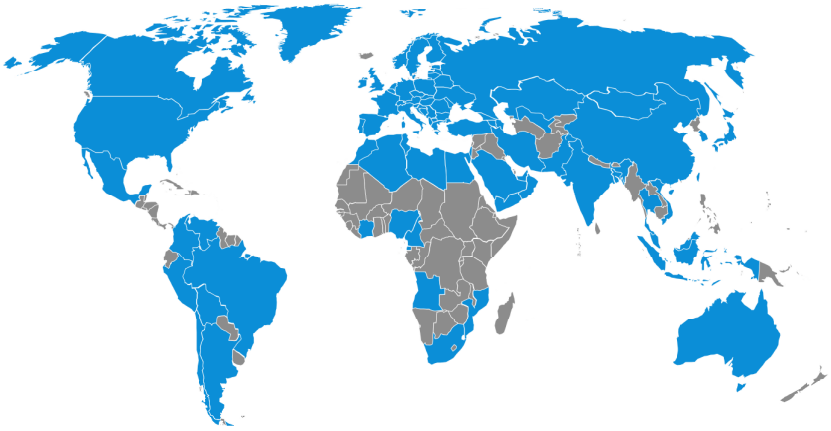

The International Gas Union (IGU) was founded in 1931 and is a worldwide non-profit organisation promoting the political, technical and economic progress of the gas industry with the mission to advocate for gas as an integral part of a sustainable global energy system. The IGU has more than 142 members worldwide and represents more than 97% of the world's gas market. The members are national associations and corporations of the gas industry. The working organisation of IGU covers the complete value chain of the gas industry from upstream to downstream. For more information please visit **www.igu.org**

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