

**AGREEMENT
REGARDING
GASNATURALLY 2015**

BETWEEN

The European Union of the Natural Gas Industry AISBL (hereinafter referred to as "Eurogas"), having its registered address at Avenue de Cortenbergh, 172, 1000 Brussels, Belgium, represented by Beate RAABE, Secretary General,

AND

Gas Infrastructure Europe AISBL (hereinafter referred to as "GIE"), having its registered address at Avenue de Cortenbergh, 100, 1000 Brussels, Belgium, represented by Thierry DESCHUYTENEER, Executive Secretary,

AND

The European Gas Research Group / Groupe Européen de Recherches Gazières AISBL (hereinafter referred to as "GERG"), having its registered address at Avenue Palmerston, 4, 1000 Brussels, Belgium, represented by Robert JUDD, Secretary General,

AND

The International Gas Union, International Non-profit organisation registered in Vevey, Switzerland (hereinafter referred to as "IGU"), having its registered address at Avenue du Général-Guisan, 28, 1800 Vevey, Switzerland, represented by Pål RASMUSSEN, Secretary General,

AND

The Technical Association of the European Natural Gas Industry AISBL (hereinafter referred to as "Marcogaz"), having its registered address at Avenue Palmerston, 4, 1000 Brussels, Belgium, represented by Daniel HEC, Secretary General,

AND

The International Association of Oil & Gas Producers, Non-profit private Company limited by guarantee (hereinafter referred to as "IOGP"), a company duly organized and existing under the Law of the State of UK, having its registered address at 209-215 Blackfriars Road, London SE1 8NL, United Kingdom and registered in Belgium under number 448554031, represented by Michael ENGELL-JENSEN, Executive Director,

Referred to together as the "Associations", or individually as the "Association",

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WHEREAS

The Associations have entered into a "Memorandum of Understanding regarding a Joint Gas Advocacy Programme" between 1 September 2011 and 31 July 2012 aiming at pooling resources for a Joint Gas Advocacy Programme. This programme led to the creation of the GasNaturally initiative, brand and tagline. Several advocacy activities and events were undertaken under this name and continued and expanded under the "Memorandum of Understanding regarding GasNaturally" between 1 September 2012 and 31 December 2013 and an "Agreement regarding GasNaturally" between 1 January and 31 December 2014.

The successful outcome of the GasNaturally initiative led the Associations to agree to continue common activities aimed at the promotion of natural gas in the framework of the development of European energy policy – in particular towards the European Commission, the European Parliament and the Council of the European Union.

The Associations agree to enter into this Agreement to set out the core elements on the working of GasNaturally and its financing by the Associations, as well as the supporting activities by a communication agency, for the period starting on 1 January 2015 and ending on 31 December 2015.

THE ASSOCIATIONS HAVE AGREED THE FOLLOWING:

ARTICLE 1 – Objective and Scope

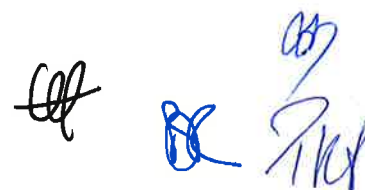
The objectives of GasNaturally are (hereafter "Objectives"):

- To improve the image and reputation of gas towards policymakers, by:
 - Emphasising benefits of gas across end-use sectors (power generation, heating, transport);
 - Emphasising the benefits of investment in domestic gas exploration and production and of the diversification of EU supplies;
 - Looking for 'gas champions' in the EU institutions to ensure greater political support;
 - Continuing dialogue with possible partners, such as Renewables, in order to find common ground for proposals and recommendations.

- To be a reference point for the Associations' internal and external stakeholders for the provision of factual information and data on all parts of the gas value chain, and to be a forum to exchange information between Associations on their communication and advocacy activities;

These activities aim to enhance the activities of the Associations in the EU advocating European Union policies that support the use of natural gas.

In seeking to achieve the above-mentioned objectives and where it is appropriate to demonstrate how gas and the combination of gas and renewable energy sources within the EU energy and climate policy debate can best be realised through policy measures, GasNaturally may set out common



policy messages. Such communication by GasNaturally is undertaken within the framework set by the GasNaturally "Messaging Document" and "Policy Priorities" appended to this Agreement. Day-to-day interactions on legislative dossiers with policy makers shall be conducted by member Associations. In the event of a contradiction between this Agreement and the Addendum, the provisions of this Agreement shall prevail.

The Objectives shall be primarily achieved through the delivery of a 2015 Work Programme appended to this Agreement.

GasNaturally shall seek to ensure that its activities are complementary to the activities of the Associations and shall endeavour that its activities do not conflict with the activities or interests of individual Associations. The scope of the cooperation of Associations under this Agreement is strictly and exclusively limited to GasNaturally. Nothing contained in this Agreement shall be construed as establishing a partnership, joint venture, association, trust or any joint obligation between the Parties.

The Associations and their members agree to comply fully with applicable national or international competition laws. In all GasNaturally activities, the Associations and their members shall avoid any discussion or conduct that might violate competition laws.

The Associations and their members shall comply with relevant European and national energy laws and regulations that are applicable to them when conducting GasNaturally activities.

ARTICLE 2 – Duration and Term

The present Agreement shall be effective as of 1 January 2015 and shall continue for duration of one (1) year.


This Agreement may be terminated by decision of the Steering Committee.

ARTICLE 3 – GasNaturally membership: Admission, Termination, Withdrawal, and Exclusion

3.1. Admission

The criteria for an Association to be a member of GasNaturally are:

- Recognised European or international professional association;
- Association having members that directly or indirectly (through their own members):
 - Are active in certain parts of the gas value chain; and/or
 - Have assets in the gas business;
- Common interest in further promotion of the use of gas in the European energy mix today and in the future;
- Full support of GasNaturally messages and actions (website, newsletter, brochure, Member States Forum, Gas Week, etc.) as communicated in 2014 and developed in 2015 or later;



- Capacity to support financially the gas advocacy work of GasNaturally with a minimum budget approved by the Steering Committee and through active contribution to the advocacy work;
- Association having already their own publications or, brochures, or website relating to the promotion of the benefits of natural gas.
- Signature of this Agreement by the Association;
- Signature of the "Agreement on Intellectual Property rights of GasNaturally" according to Article 9.

Associations meeting the above-mentioned criteria may join GasNaturally upon formal request and unanimous approval by the Steering Committee. This Agreement and the "Agreement on Intellectual Property rights of GasNaturally" shall be amended accordingly to include the joining Association. The joining Association shall be a member of GasNaturally from the date of such Amendment.

3.2. Withdrawal

An Association that no longer wishes to participate in GasNaturally activities may give notice to the other Associations by registered letter sent to the Chair of the Steering Committee that it intends to cease to be a Party to this Agreement.

The said notice shall be sent no later than three months prior to the date at which the Association wishes to cease being a party to this Agreement. Such Association shall duly comply with all its obligations (including, but not limited to, financial obligations) under this Agreement and the "Agreement on Intellectual Property rights of GasNaturally", which have arisen prior to the date of ceasing to be a party to these Agreements. This Association shall not be entitled to any refunds or deductions on the amounts due according to this Agreement.

The Agreement shall remain in force and effect between the remaining Parties.

3.3. Exclusion

At any time before the expiry of this Agreement, any Association in breach of this Agreement or the "Agreement on Intellectual Property rights of GasNaturally" as referred in article 9 below, shall be excluded by decision of the Steering Committee. In this case, the Association to be excluded shall not have a voting right. This exclusion shall be notified by registered letter, signed by the Chair and Vice-Chairs. If the exclusion concerns the Association of the Chair or one of the Vice-Chairs representing the Association to be excluded, their signature shall not be required.

Such Association shall duly comply with all its obligations (including, but not limited to, financial obligations) under this Agreement and the "Agreement on Intellectual Property rights of GasNaturally", which have arisen prior to the date of exclusion to these Agreements.

The Agreement shall remain in force and effect between the remaining Parties.

ARTICLE 4 – Participation of EGaF in GasNaturally

The representative of the European Gas Forum (EGaF) is invited to attend the Steering Committee meetings as an observer.



ARTICLE 5 – Chair and Vice-Chairs of GasNaturally

The Steering Committee will choose a Chair and two Vice-Chairs of GasNaturally from among its members.

As of 1 January 2015, François-Régis Mouton (IOGP) has been elected as Chair of GasNaturally, Noel Regan (Eurogas) and Thierry Deschuyteneer (GIE) have been elected as Vice-Chairs. The duration of the Chairmanship and Vice-Chairmanships is in principle for a period of one year, with a review of the internal GasNaturally governance structure being foreseen by 1 July 2015.

In the case where the Associations agree that GasNaturally is to be continued after 2015, at the latest by 1 December 2015, the Steering Committee shall choose a new Chair and two Vice-Chairs for the next calendar-year mandate starting on 1 January 2016 taking into account the willingness of the Associations to rotate the chairmanship.

If one of the above-mentioned Chair or Vice-Chairs resigns, the Steering Committee shall choose a replacement of the resigned person, for the rest of the original term.

The Chair and the Vice-Chairs shall oversee the day-to-day management of GasNaturally and report to the Steering Committee.

The Chair shall be responsible for:

- Chairing the Steering Committee meetings;
- Chairing the Chair/Vice-Chairs meetings;
- Facilitating discussion and agreement amongst the Associations in full compliance with the provisions of this Agreement;
- External representation of GasNaturally, acting as a spokesperson of GasNaturally subject to agreement by the Steering Committee or in urgent case, subject to agreement by the Chair and Vice-Chairs.

The Vice-Chairs shall be responsible for:

- Acting as Chair in the absence of the Chair;
- Chairing the Steering Committee meetings at the Chair's request;
- External representation of GasNaturally, acting as a spokesperson of GasNaturally in coordination with the Chair.

When representing GasNaturally externally, the Chair and Vice-Chairs express themselves within the framework set by the GasNaturally 'Messaging Document' and 'Policy Priorities' appended to this Agreement. If questioned about details which are not covered in the 'Messaging Document' and 'Policy Priorities', the Chair or Vice-Chairs point out that these details are not covered by GasNaturally.

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ARTICLE 6 – Steering Committee

A Steering Committee shall be set up with a maximum of two representatives appointed by each Association except that the Chair and the Vice-Chairs shall not be considered representatives of the Associations they belong to.

Where a representative of an Association is unable to attend a Steering Committee meeting the Association may nominate an alternate member for the meeting.

Subject to prior agreement received from the Chair and the Vice-Chairs, an inviting Association may also invite representatives or guests to attend a Steering Committee as observer.

The Steering Committee shall exercise overall direction, supervision and control of all matters pertaining to GasNaturally.

The Steering Committee shall be responsible for:

- Taking strategic decisions regarding the actions to be taken by GasNaturally according to Article 1;
- Taking decisions about requests for new membership according to Article 3;
- Setting the yearly budget for the financial contribution of all Associations;
- Endorsing the day-to-day management of GasNaturally as reported by the Chair and Vice-Chairs;
- Allocation of potential contingency budget and modification of provisional budget;
- The creation, mandating and oversight of ad-hoc taskforces in order to achieve the objectives set out in Article 1 and for the appointment of taskforce leaders.
- Coordinating the Associations in providing participants from their secretariats and membership to actively support the work of taskforces;
- Appointing a representative of the Steering Committee to act as financial controller;
- Approval of potential additional ad-hoc projects organised under the GasNaturally umbrella and financed by an individual Association or group of Associations or companies or members of Associations, particularly in their areas of expertise;
- Lending support if an international, European or national association, or a national initiative within Europe similar to that of GasNaturally, requests the support of GasNaturally for activities that help achieve the Objectives set out this Agreement and if this support is in full compliance with this Agreement, and agreed by the Steering Committee.

In accordance with Article 1, Steering Committee members shall endeavour to respect the differences in the interests, focus, activities and capacities of each Association and shall seek, to enable the involvement of all Associations, and to avoid conflict with the activities or interests of individual Associations.



The Steering Committee shall take all decisions unanimously – with each Association having one vote – and shall allow each Association due time for consultation of his/her Association’s membership, if deemed necessary by a Steering Committee member.

Steering Committee Members shall be provided with the agenda, minutes of previous meeting and working documents for each Steering Committee meeting at least 5 working days before the meeting.

ARTICLE 7 – Taskforces

Taskforces are created to support the Steering Committee in content development and operational tasks (as mentioned in the GasNaturally 2015 work programme), according to the mandates received from the Steering Committee and as mentioned in Article 6. Taskforces report regularly to the Steering Committee and request the approval of the Steering Committee, or, if urgent, the Chair and Vice-Chairs for any action beyond their mandate.

Taskforces are led by representatives of the Associations or their members.

ARTICLE 8 - Budget 2015

The budget for the activities of GasNaturally between 1 January 2015 and 31 December 2015 will be divided among the Associations as follows, subject to the internal approval procedure of each Association:

| | | |
|----------------|--------------------|------------------------|
| Eurogas : | 75 000 EUR | |
| GERG : | 15 000 EUR | |
| GIE : | 65 000 EUR | |
| IGU : | 30 000 EUR | |
| Marcogaz : | 15 000 EUR | |
| <u>IOGP :</u> | <u>130 000 EUR</u> | |
| Total : | 330 000 EUR | (excluding VAT) |

The Steering Committee may propose amendments to this budget. In the event that the Steering Committee proposes such amendment, it must take due account of the time required for each Association to undergo budgetary revisions and approvals.

In the case where another Association wishes to join the GasNaturally initiative, its contribution shall be agreed by the Steering Committee but cannot be lower than 15 000 euros. Such additional contribution by a new Association shall be added to the budget such that it is increased by the new Association’s contribution.

In the case where at the end of 2015, the overall costs incurred would be lower than the initial budget – including additional budget raised from Associations joining GasNaturally according to article 3 – the difference shall be allocated to the budget 2016 if GasNaturally is to be continued after 2015; otherwise each Association shall be reimbursed pro rata its contribution to the budget 2015.

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In addition, individual Associations or a group of Associations can decide to provide additional budget to finance specific ad hoc projects under the umbrella of GasNaturally subject to the unanimous approval of the Steering Committee.

On certain occasions, as part of GasNaturally events, companies or associations that are members of the Associations participating in GasNaturally may be given an opportunity to organise and finance specific events under the umbrella of GasNaturally, upon unanimous decision by the Steering Committee.

ARTICLE 9 – Intellectual Property rights

The Intellectual Property rights associated with GasNaturally under the “Memorandum of Understanding regarding a Joint Gas Advocacy Programme” between 1 September 2011 and 31 July 2012 have been transferred from WEBER SHANDWICK to IOGP, subject to the “Agreement on Intellectual Property Rights of GasNaturally” signed between the Associations in 2014 and regarding the management and use of such the management and use of such Intellectual Property Rights. This agreement shall ensure that the Intellectual Property rights shall be managed by IOGP for the benefit of all the Associations.

New Intellectual Property rights arising from the execution of this 2015 related Agreement shall be held by this same Association for the benefit of all the Associations.

ARTICLE 10 – Communication Agency for 2015

Each Association shall enter into a bilateral consultancy contract with FLEISHMANHILLARD S.A. regarding the implementation of GasNaturally from 1 January 2015 until 31 December 2015. Each Association shall commit to the amount of its share of the total cost and remain liable only for payment of its share, according to Article 7. Each Association may agree on payment terms with FLEISHMANHILLARD S.A.

ARTICLE 11 – Applicable law

This Agreement shall be governed by, construed and enforced in accordance with the laws of Belgium and any dispute shall be settled by the courts in Brussels.

Done in Brussels, 26 January 2015,

For Eurogas:

Beate RAABE
Secretary General

For GERG:

Robert JUDD
Secretary General

For GIE:

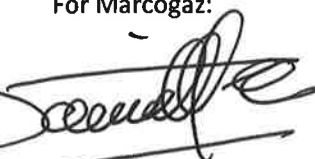
Thierry DESCHUYTENEER
Executive Secretary

For IGU:



Pål RASMUSSEN
Secretary General

For Marcogaz:



Daniel HEC
Secretary General

For IOGP:



Michael ENGELL-JENSEN
Executive Director

Addendum:

- GasNaturally 'Messaging Document'
- GasNaturally 'Policy Priorities'
- GasNaturally '2015 Work Programme'
- GasNaturally '2015 Budget'



GasNaturally 2015 Programme

Version 16 January 2015



| ACTIVITIES | Total hours per activity | Total fee per activity | Third Party Costs (incl. VAT) | Third Party Costs - Description |
|---|--------------------------|------------------------|-------------------------------|---|
| Power Generation | | | | |
| Gas and IIS collaboration | 36,000 | € 9,700,000 | | N/A |
| Meeting | | | | |
| Workshop | 78,000 | € 19,475,000 | € 5,000,000 | renting venue + catering |
| Transport | | | | |
| Workshop | 78,000 | € 14,475,000 | € 5,000,000 | renting venue + catering |
| Concussion activities | | | | |
| MIF Survey | 6,000 | € 1,830,000 | € 5,000,000 | For two rounds of questions |
| Visual materials, incl. infographic on gas and innovation (incl. biomethane) and animation on the uses of gas | 115,000 | € 22,125,000 | € 325,000 | 500 copies of the infographic (development and delivery of assets by FH creative studio) Transport from Pau to Brussels (2900) + storage in Brussels for 1 year (3000) |
| Balcony exhibition to Brussels and storage | | | | |
| Gas Week: Exhibition | 27,000 | € 3,885,000 | € 5,500,000 | Transport from Pau to Brussels (2900) + storage in Brussels for 1 year (3000) |
| Gas Week: Public Hearing (2 panels) | 177,000 | € 31,185,000 | € 7,200,000 | Exhibition costs (M&C) - no exhibition update, fees cover 2-day exhibition, liaison with MIF sponsor and with M&C etc |
| Member States Gas Forum | 175,000 | € 30,275,000 | € 2,200,000 | 64 Sponsorship: Catering (3000), photographer (500), packs (500), give aways (gens: 1000), moderator (1000) |
| Update messaging and Policy Priorities | 55,000 | € 10,250,000 | | Dr Warande and audio system covered. SF Sponsorship could cover cocktail (3780), photographer (700), furniture (500) |
| Website Update | 53,000 | € 9,075,000 | € 3,900,000 | Morris & Chapman costs (3000) + 900 (domain name renewal) |
| Campaign Heartbeat | | | | |
| Speaking opportunities (4x) | 45,000 | € 9,675,000 | € 7,000,000 | Travel costs for speakers |
| World Gas Conference 2015 | 8,000 | € 1,900,000 | € 5,000,000 | Speaker's registration fee and collateral promotion |
| Twitter engagement | 180,000 | € 21,000,000 | | Includes daily management + influencers' mapping and targeting |
| Web promotion | | | | |
| Campaign Management | | | | |
| Steering Committee meetings (6x) | 130,000 | € 36,500,000 | | Google adswords to drive traffic to website, to events page, infographics, videos |
| Bi-weekly Campaign Meeting: Chair/Vice Chairs and FH | 72,000 | € 17,100,000 | | N/A |
| Campaign coordination & support | 95,000 | € 21,225,000 | | N/A |
| Total fees | 1,812,000 | € 255,675,000 | € 51,125,000 | |
| Contingency | | € 10,000,000 | | |
| Administrative charge (5% total fees) | | € 12,783,750 | | |
| Total fees & admin charge (without VAT) | | € 278,458,750 | | |
| | | € 139,229,375 | | |

Activities open to sponsorships in 2015 (estimates)

| ACTIVITIES | Total hours per activity | Total fee per activity | Third Party Costs (incl. VAT) | Comments |
|-------------------------------------|--------------------------|------------------------|-------------------------------|--|
| ESSENTIAL ADD-ON ACTIVITIES | | | | |
| Public Hearing External Costs | | | € 6,000,000 | |
| Site visits (3x) | | | € 5,000,000 | To be organised by associations like in 2014 |
| Workshop on power generation | | | € 15,000,000 | The topic will be covered in Gas Week. If there is no sponsorship for this activity. |
| ADDITIONAL ACTIVITIES | | | | |
| Mentoring, selection and reimburse | | | € 60,000,000 | |
| Member State Forum Dinner | | | € 10,000,000 | |
| COP 21 activities | | | € 15,000,000 | |
| Market design info gathering | | | € 15,000,000 | |
| MIF assistant event during Gas Week | | | € 5,000,000 | |
| Additional Gas Week events | | | | |

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2015 Programme of Activities

19 January 2015

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A new context, a shift in focus

Policy

People



GN focus

2014

2030
Framework

Institutional
reshuffle



General 2030
activities & intro to
new policymakers

2015

Legislative
proposals

Policymakers
settle in



More specific
focus areas per
sector & finding
champions

MEJ
FV
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2015: Position gas as a solution to make 2030 goals possible



2014
2030 Council
Conclusions



2015
Legislative
proposals tackling
different sectors



Emphasise the
benefits of gas across
individual sectors

« Making a Clean
Future Real » is still a
valid campaign motto

Communications is
about repetition

BR PH HEJ

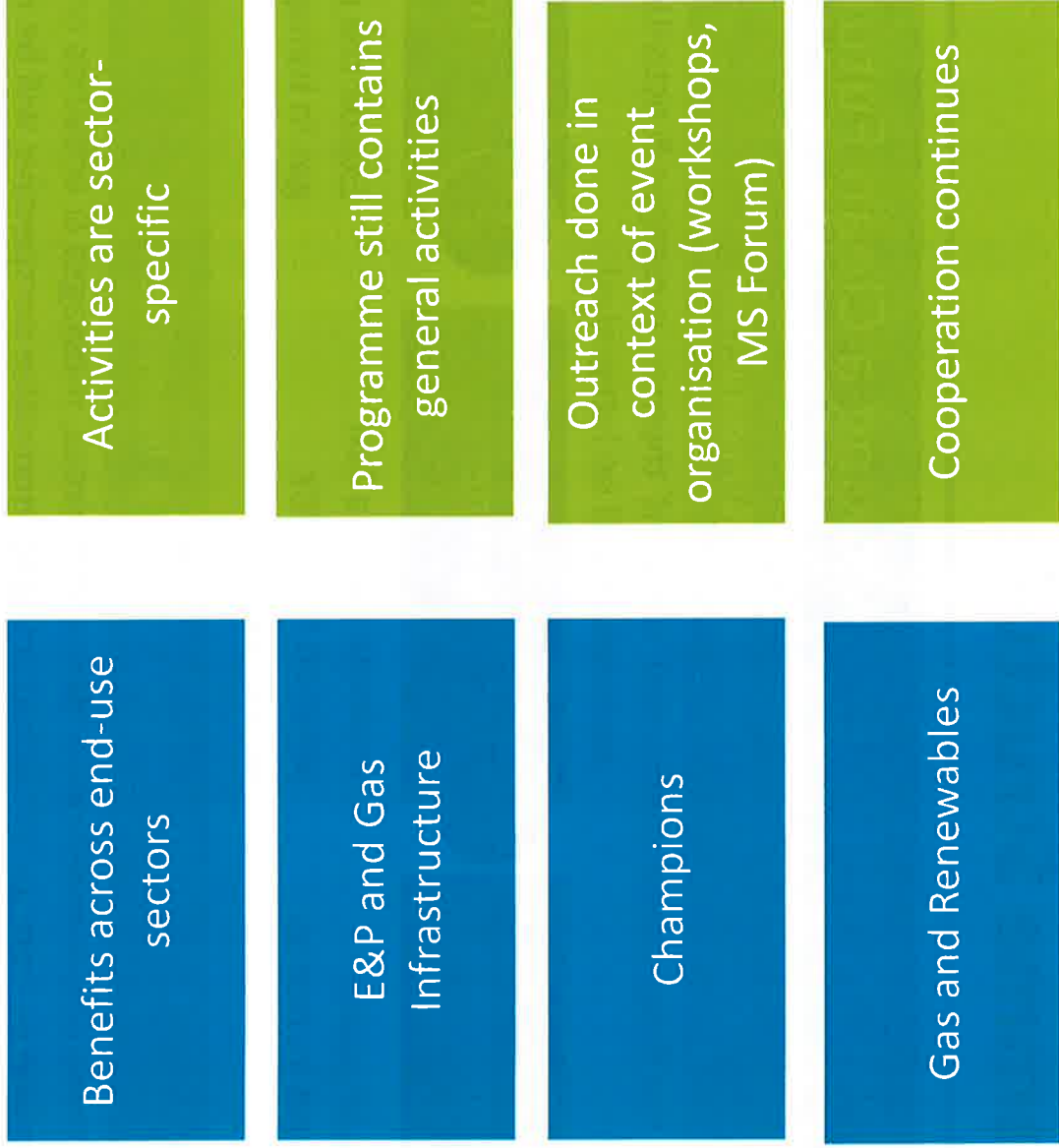
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BR
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Agreed objectives for GN in 2015

• Improve the image and reputation of gas towards policymakers by:

- Emphasising benefits of gas across end-use sectors (power generation, heating, transport);
- Emphasising the benefits of investment in domestic gas exploration and production and of the diversification of EU supplies
- Look for ‘gas champions’ in the EU institutions to ensure greater political support (Member States, MEPs)
- Continuing dialogue with possible partners, such as Renewables, in order to find common ground for proposals and recommendations

Objectives & Activities



BP # BR 7A HEJ

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Programme Structure



CAMPAIGN THEME: « Making a Clean Future Real »

Exploration & Production

Across the three below-mentioned 'demand' themes, messages & activities relating to exploration will be integrated

1

Power Generation

Promote gas in power generation and its role as RES partner

2

Heating

Promote gas as a fast solution to energy efficiency

3

Transport

Exploit the positive image of gas in transport

Infrastructure & Innovation

Across the three above-mentioned 'demand' themes, messages & activities on the 'supply' side as well as from an infrastructural and innovative perspective will be included

4

Campaign Heartbeat

General-focus activities to:

- Emphasise benefits of gas, and address horizontal issues such as innovation
- Help profile gas in ongoing EU policy discussions (Energy Union, COP21 preparation, etc)

1

Power Generation

Substance

- Outreach activities with RES

Tools

- ‘High-level orientations and guidelines on the power system design’ developed with wind and solar, possibly followed by joint public declaration

Activation

- Debate on power generation as part of Gas Week (rather than separate workshop)
- Site visit to gas power plant*

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* Not covered by 2015 budget

MEJ

FR
BR
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Heating



Substance

- Policy Point of View on Energy Efficiency

Tools

- Infographics on gas & innovation (incl. Biomethane)

Activation

- Workshop on Heating sponsored by an MEP
- Site visit*

* Not covered by 2015 budget

Substance

- Refresh policy point of view when Commission issues Communication on Transport emissions for 2030

Tools

- Gas in transport section on the website

Activation

- 1 workshop on LNG in shipping, road transport and inland waterways & on CNG in fleets sponsored by an MEP
- 1 site visit* (e.g. to a LNG refuelling point like Zeebrugge, Dunkerque)

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* Not covered by 2015 budget

HEJ

PM BR

SA

ASD

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Campaign Heartbeat



Substance

- MEP survey with ComRes (2 rounds)
- Refresh Policy Point of View
- Refresh messaging

Tools

- Website update
- Animation on the uses of gas across sectors

Activation

- Signature events: Member States' Gas Forum; Gas Week remains flagship event for the industry (with exhibition and public hearing as basis for the programme)
- Re-use GasVisually exhibition at events (GN events or third-party, such as EGATEC)
- Twitter
- Speaking opportunities, including World Gas Conference and EGATEC

2015 : Timeline of GN Activities



ACTIVATION | TOOLS | SUBSTANCE

Start PoV & Messages update



MEP Survey

Animation on gas uses

Website Update on complete innovation
Infographics on complete innovation

Heating workshop

MS Forum
Site Visit*
WGC

GN at EGATEC

Transport workshop
Site Visit*

Site Visit*

Gas Week

JAN

FEB

MAR

APR

MAY

JUNE

JULY

AUG

SEPT

OCT

NOV

DEC

2015

In blue: sector-specific
In grey: general

* Not covered by 2015 budget

Campaign Heartbeat (speaking opps, Twitter)
Gas & RES Collaboration

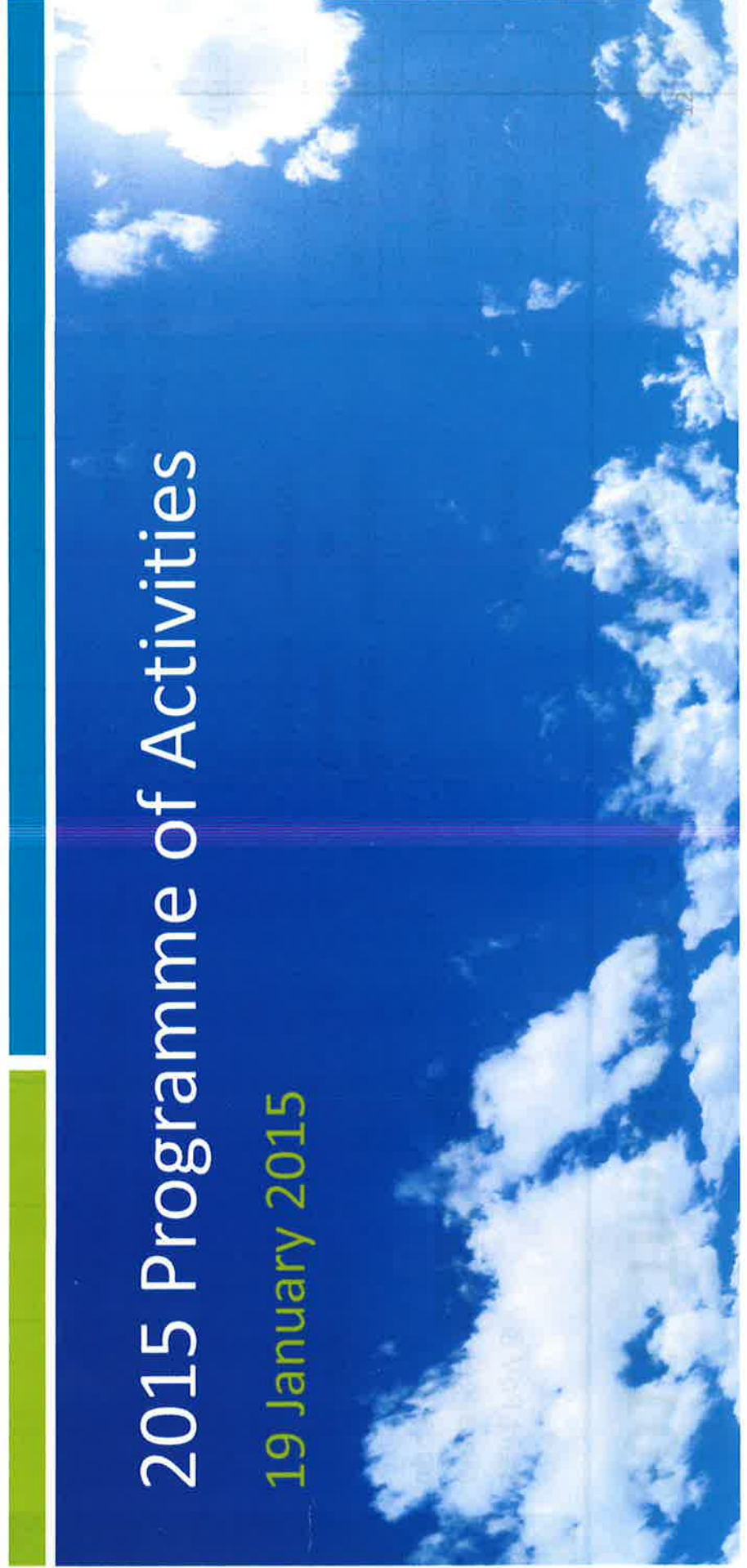
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2015 Programme of Activities

19 January 2015



Messaging Document

Table of Contents

| | |
|---|-----------|
| Key Message 1: Europe has a diversified and secure supply of gas | 2 |
| Key Message 2: Natural gas operates in a competitive market | 4 |
| Key Message 3: Switching to gas in the power sector is the fastest and cheapest way to meet CO₂ reduction targets..... | 6 |
| Key Message 4: Natural gas allows Europe to keep its options open, because of flexibility and short investment cycles. There is not risk of 'lock in' with gas | 8 |
| Key Message 5: Natural gas brings value to the European economy | 9 |
| Key Message 6: CCS works, but it is not yet economically viable | 10 |
| Key Message 7: Gas is part of Europe's long-term options. There are enough resources for many decades to come. | 12 |
| Key Message 8: Natural gas is safe as its industry is experienced and committed to the highest standards..... | 13 |
| Key Message 9: Methane emissions are limited and being mitigated | 14 |
| Key Message 10: Flaring is continuously addressed..... | 15 |
| Key Message 11: Europe has a diverse supply of gas | 16 |
| Key Message 12: Natural gas contributes to sustainable transport in Europe | 19 |
| Key Message 13: Natural gas contributes to a cleaner, cheaper and more efficient heating system | 21 |

Key Message 1: Europe has a diversified and secure supply of gas

Arguments

- Europe has a varied supply of gas from about 30 different countries. The majority (52%) of European natural gas supplies come from EU-based production and Norway.
- New sources of reliable supply continue to be developed including Azerbaijan, the US, and in the longer term, East Africa, Eastern Mediterranean, Kazakhstan and Turkmenistan. The rapid growth in global trade in Liquefied Natural Gas will continue to open up further new sources of reliable and diverse supply for Europe, in addition to new pipeline gas from, for example, Azerbaijan.
- By starting to explore its untapped domestic resource base, Europe has the potential to further increase its supply security.
- Factual dependence on one external supplier is actually limited to a few Eastern European countries, where fewer than **three per cent** of Europe's gas customers live. Gas supply to **97 per cent** of Europe's customers is highly diversified.
- The relationship between Europe and its main external suppliers Russia, Norway and Algeria can be best categorised as one of interdependence, rather than asymmetric dependence.
- Europe has a resilient supply system and flexible infrastructure that limit disruption from a single source.

Proof points

- In 2011, indigenous production was still the largest source of gas for EU customers, making up **33% of total net supplies**. The main external sources of pipeline supply came from **Russia at 24% and Norway at 19%**. **Algeria, with 9%**, supplied both pipeline gas and LNG. Qatar, Nigeria, Trinidad Tobago and Egypt are also important gas suppliers. More than ten countries supplied gas by LNG, which accounted for 15% of supplies in 2011. ([Eurogas annual report](#))
- On **peak winter days**, when gas is most needed, secure storage on EU territory and indigenous production supply **more than half** of Europe's gas, with **Russia accounting for only 16%, Norway 14%** and the balance from other suppliers. (GIE/ENTSOG 2011 System Development Map)
- Over more than four decades of gas imports to Europe there have been very few supply disruptions. Factually there have been just **five**; three from Russia (1993, 2006, and 2009), one from Norway (1990) and one from Libya (2010). Only one had a major impact on European customers.
- Europe's potential to diversify its natural gas supplies is enabled by:
 - Several thousands of km of pipelines, interconnections and extensions being built or planned, to ensure reliability and security of supply. (Source: [GIE](#))
 - A large-capacity transportation network that reaches neighbouring supply regions and that can receive liquefied natural gas (LNG) by tanker from all over the world. In 2011 Europe had a regasification capacity of **186 bcm/year** a figure which is predicted to rise to **259 bcm/year by 2015**. This capacity is currently underutilized. (Source [GLE](#) - presentation to CEER LNG Workshop: 'LNG Terminals in Europe' September 06, 2011)
 - The current implementation of the Security of Supply Regulation, the Internal Energy Market and the Infrastructure Package.

Quote

“The system has become much more resilient following the 2009 crisis and the market is able to react. In case of a crisis, gas can flow where it is needed”.

Stories

- The 2009 disruption was the only major incident and affected customers in eastern and central Europe and had no impact (not even on prices) for the vast majority of customers in other parts of Europe. When Central Europe and former Yugoslavia started to be short of gas, the market delivered (through French and German storage and extra production from The Netherlands). Reverse flow capacity was developed after the crisis, improving the situation in the longer term.
- “The benefits of an increasingly flexible, integrated EU gas market were evident during the cold snap [in March 2013] with EU spot prices being effective in attracting the flow of gas to where it was needed most and quickly re-establishing the balance between supply and demand under unforeseen circumstances. Price differentials between the hubs in the UK, the Netherlands and Germany encouraged strong pipeline flows to the UK, attracting gas from Germany’s storage facilities into the Dutch and Belgian markets, and then from those markets into the UK via the BBL pipeline and Interconnector Pipelines.” ([Quarterly Report on European Gas Markets](#), DG Energy, vol. 6, issue 1, 2013)

Key Stats

- Relatively few—about **3% of EU consumers, spread across 7 Member States**—live in areas that buy their gas from a single source. A large number of consumers—over 100 million households—benefit from the security of diverse supplies.
- **200,000 km of transmission pipelines** extend across the continent.
- In 2011, **52% of European natural gas supplies came from EU-based production and Norway.**
- Russia’s share of EU-27 imports of natural gas declined **from 45.1 % to 31.8 %** between 2003 and 2010, while Qatar’s share rose from **less than 1 % to 8.6 %**. ([Eurostat](#))

Comments/questions:

- See also Key Message 11 developed around the Ukraine/Russia crisis in March 2014.

Key Message 2: Natural gas operates in a competitive market

Arguments:

- **Competitive upstream international and European markets** ensure that natural gas can be supplied to the European wholesale markets at lowest cost. The strong regional and global competition is expected to grow as more diverse resources are identified for indigenous development within Europe or as new sources of production available for export to Europe.
- A well-interconnected, well-functioning **internal gas market** with diverse supply sources and routes ensures that prices are competitive.
- Fluctuation in prices is common. The competitiveness of gas in Europe depends on the relative competitiveness of alternative energy sources (renewables, coal, nuclear, etc.). The competitiveness of gas vs. coal is also influenced by the price of carbon dioxide allowances.
- Prices are a function of supply and demand and are **increasingly formed in the wholesale market hubs of Europe** whilst long-term contracts indexed to alternative fuels such as oil products are expected to continue their decline.
- Gas offers the clean flexibility needed for the successful roll-out of renewables as gas generation units can be flexed up and down. Flexible gas for back-up can be provided through short-term gas storage in a cost-efficient way.

Proof points

- For a given demand, a more liquid market, with more gas-to-gas competition and diversity of supply will tend to **bring gas prices down**. A comparison of EU wholesale gas prices reveals that the prices for gas in **Belgium, Germany or the Netherlands averaged 23€/MWh** in January 2013, whereas **Lithuania**, who is largely dependent on one supplier, faced a price of **38€/MWh**. (European Commission, [briefing for 22 May 2013 European Council](#), p. 23)
- The dramatic reduction in US gas prices following the shale gas boom demonstrates **what can happen to prices where supply potential in a competitive market far exceeds demand**. Over 2005-2012, the gas price index for industry has gone **down by 66% in the US** and **increased by 35% in the EU**. (Energy priorities for Europe, [presentation by J-M Barroso](#), European Council, 22 May 2013)
- In some Member States, a large part of the final gas price is **made up of taxes and levies**. This is particularly the case in Denmark (more than 50%), Sweden and Italy. ([Eurostat](#)) As noted by the European Commission itself in a response to a written MEP question, "in Portugal the biggest share of the gas price increase was due to the VAT increase in October 2011 (from 6% to 23%)" ([European Parliament](#), July 2013).
- Between 2010 and 2012, the share of oil-indexation went down **by 8%**, **applying to contracts that account for about 51% of gas consumption in Europe**. In contrast, over the past 5 years spot-priced volumes have doubled, reaching 44% of gas consumption in 2012. ([Quarterly Report on European Gas Markets](#), DG Energy, vol. 6, issue 1, 2013)
- In 2012-2013, Norway moved more gas to the spot market, gaining market share. This has led to Norway overtaking Russia as the leading gas provider to Europe in 2012. (BP Statistical Review, 2013)
- Virtually all of the European long-term gas supply contracts include price review clauses that allow

either the buyer or seller to request an adjustment to the sales price if it is clear that market conditions have changed. With spot gas prices remaining below contract prices, many buyers have successfully argued in the last few years, for a reduction in the latter. Such discussions exert a downward pressure on natural gas prices.

- The cost of transporting natural gas through Europe's network of high pressure pipelines is **at least 10 times lower** than the cost of transporting the equivalent energy as electrical power.

Q&A:

- **Question:** Can we provide a solid **reason why the current gas price is high**? It seems counter-intuitive that we have a wide variety of supplies and still high prices.

Response: Mostly it is due to high demand for gas elsewhere in the world (Far East, Latin America) and disruption of a number of LNG sources because of various local problems (Egypt, Indonesia, Nigeria ...). This has tightened the supply of LNG available to Europe. Global LNG prices are holding up European prices. The US and Canada, where supply is surplus to demand, are a market that is isolated from the rest of the world by lack of LNG export facilities (so far).

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Key Message 3: Switching to gas in the power sector is the fastest and cheapest way to meet CO₂ reduction targets

Arguments

- Emissions reductions can take place **more quickly**. Gas-fired power plants are built rapidly and in most cases expenditures are spread over **two to three years**. As a point of comparison, it takes on average **7 to 10 years** to build a nuclear power plant (Projected Costs of Generating Electricity - 2010 edition, [IEA & NEA](#)).
- It is **more cost-effective**. The capital expenditure of gas-fired power plants is lower than for nuclear or coal.
- Reductions of GHG emissions can be **significant**, as the power sector is the largest source of GHG in the EU.
- Gas is the **cleanest fossil fuel available**; both in terms of CO₂ and air quality. Harmful emissions of SO_x, NO_x, particulate matter and mercury will be significantly reduced by burning gas instead of coal.

Proof points

- Switching from coal- and oil-fired power generation to best performance CCGT plants would result in **58% CO₂ emissions reductions** relative to 1990 levels ([IHS CERA, 2011](#))
- The CAPEX required for gas-fired power plants is relatively low compared with other energy sources: the capital cost of electricity is **10€/MWh for CCGTs, 21.8€/MWh for coal super-critical, 44.4€/MWh for a nuclear EPR and 97.5€/MWh for offshore wind** (source: Total, 2012).
- CCGTs together with additional heat recovery can reach efficiencies of up to 90%.
- Heat and electricity production remains the largest contributor to GHG emissions in the EU, accounting for **26.6 % of total GHG emissions** in 2011. (source: [EEA, 2013](#))
- Natural gas emits **up to 60% less CO₂** (at 350g per kWh) than coal when burned for power generation (850 g of CO₂/kWh for hard coal and 1,200g of CO₂/kWh for lignite-fired power). (Mott MacDonald Update on UK Electricity Generation Costs 2010)
- Therefore switching one kWh of generated electricity from coal to gas **reduces CO₂ emissions by 500g/kWh**. The average kWh of electricity generated in Europe in 2012 emitted **378g per kWh** (source Eurelectric). Switching from this level to zero-carbon wind, solar, or nuclear reduces emissions by less than switching from coal to gas.
- When zero-carbon renewables force a change in the merit order so that gas is displaced and coal brought in, the *increase* in CO₂ emissions (500g/kWh) more than offsets the decrease from the zero-carbon source. This is why today EU power generation emissions of CO₂ are increasing, as gas plants are less used.
- Coal-to-Gas switch reduces more than 'just' CO₂: **100% less SO_x, 100% less particulate matter and 80% less NO_x per kWh** (source: Exhibit 27 in [DBCCA report, Oct. 2011](#))
- Gas is now the new **fuel of choice for the US power sector**: In 2012, **37%** of the US electricity was generated from coal, versus **30%** from natural gas ([US Energy Information Administration](#)). In January 2009, the coal share (on an annual basis) was **50%**, whereas the share of natural gas was just **under 20%** ([EIA](#)). These gas-fired power plants have helped the US to greatly reduce its emissions. From

2010 to 2011, CO₂ emissions from fossil fuel combustion decreased by **2.4%** in the United States. The EPA notes: "This decrease is a result of multiple factors including a decrease in the carbon intensity of fuels consumed to generate electricity due to a decrease in coal consumption, **with increased natural gas consumption**". (US [Environmental Protection Agency](#), Inventory Of U.S. Greenhouse Gas Emissions And Sinks: 1990-2011, April 2013).

- In the US, studies published in the last six months show that coal retirements projected between 2010 and 2020 range **between 35 GW on the low side to 101 GW on the high side** (Deutsche Bank Climate Change Advisors, [Natural Gas and Renewables report](#), October 2011).

Key Message 4: Natural gas allows Europe to keep its options open, because of flexibility and short investment cycles. There is not risk of 'lock in' with gas

Arguments

- When it comes to investments in gas CCGTs, between now and 2050 there are actually **2 investment cycles** which leave ample opportunities to take different investment decisions at a later stage. A programme of natural gas-fired power plants built before 2030 could transition into backing up renewables post-2030.
- Building new, high-efficiency gas powered plants now is a **'no regrets' decision** that gives immediate carbon reductions *and* allows time for the development of more economic technology for both carbon capture and storage and renewable energy to make them competitive without government subsidies.
- Gas-fired power capacity will play an increasingly important role in providing **flexible backup to growing supplies of variable renewable energy**, in the absence of a breakthrough that provides affordable utility-scale electricity storage. (Source: [MIT](#)) Gas demand volatility is likely to increase which may require additional flexibility from gas infrastructure. This could be achieved efficiently with new fast-cycle storage facilities, LNG terminals or transmission system flexibility such as linepack. (Pöyry Management Consulting, 2011)
- Gas infrastructure investment is generally done through private money, whereas certain renewable energy sources require public funds, therefore they do not mutually exclude each other. Where gas and renewables compete, the choice should be the most cost-efficient way of reducing emissions, which could include hybrid solutions.

Proof points

- The life-time of a CCGT is in the order of **20+ years**.
- Once permission is granted, a natural gas-fired power plant can typically be built and come on line faster than other power generation sources. Construction of a gas-fired power plant takes **about 3 years** (Source [IEA](#)). In addition, the permitting process for gas powered plants is typically **shorter** than for other energy sources. (Source: [NRECA](#))
- Gas-fired power generation is the best suited to provide flexible generation to complement renewables as it is capable of rapid response to changes in demand. A **CCGT (400 MW)** can ramp from **zero to 100% output in 30 to 60 minutes** (coal: 1 to 10 hours; nuclear: 2 hours to 2 days). The maximum ramp-up rate will be 5-10%/minute (coal and nuclear: 1-5%/minute). (source: Nuclear Energy and Renewables, [OECD](#) and NEA, 2012).
- The state-of-the-art FlexEfficiency 50 CCGT can even reach full load (510MW) from start-up in less than 30 minutes ([GE Energy](#), 2011)
- Gas and renewables are complementary. In the US, the EIA forecasts that natural gas and renewables will grow together in the electricity mix by 2040, **from 25% to 30% for natural gas and from 13% to 16% for renewables** according to the Reference Scenario. (source: [EIA Annual Energy Outlook 2013](#))

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Key Message 5: Natural gas brings value to the European economy

Arguments

- The gas sector provides jobs and could deliver even more if there was more room/ incentive for innovative technology developments in connection with gas. Hybrid solutions (gas & renewables) offer a great potential.
- The argument is put forward that renewable technology is produced in Europe whilst gas will increasingly have to be imported. There is no guarantee that a large part of the renewables supply chain will be located within the EU. Given the EU's commitment to free trade and that many of its trading partners will have cheaper energy and employment costs it is highly likely that much of the equipment required for renewables will have to be imported. This isn't a one-off activity as parts wear out, for example wind turbines need to be replaced every 20 years or so.
- The renewables sector is only able to create jobs because of the large subsidies it receives. It is very likely that more jobs would be created if these subsidies were abolished, leaving more disposable income in consumers' pockets, or even if they reallocated to support more efficient industries.

Proof points

- The natural gas industry greatly contributes to the economy. About **280,000 people work directly for the natural gas sector in Europe**, along the gas supply chain. (Eurogas Statistical Report, 2012) This figure does not include indirect jobs generated by the natural gas sector, notably in small and medium-sized enterprises at local level (equipment suppliers, installers, maintenance engineers).
- On average, the industry demonstrates an **employment multiplier greater than three**, meaning that for every direct job created in the oil, natural gas and related industries, three or more indirect and induced jobs are also created across the economy. ([World Economic Forum and IHS CERA](#), 2012). For comparison purposes, "for every job created in manufacturing, 2.5 jobs are created in other sectors." The figure is 1.63 for the business services sector and 1.66 for transportation ([ITIF](#), 2011, p. 12).
- A recent report by RWI has shown that, in the case of photovoltaics, Germany's support scheme regime has reached a level that by far exceeds average annual wages, with per-worker subsidies as high as €175,000 ("Economic impacts from the promotion of renewable energies: The German experience", Rheinisch-Westfälisches Institut für Wirtschaftsforschung, 2009).

Key Message 6: CCS works, but it is not yet economically viable

Arguments

- CCS works from a technical point of view, as has been demonstrated, for example in Norway, the U.S. and Algeria in the case of high CO₂ concentrations in the natural gas produced.
- Larger scale deployment, in particular for flue gases from fossil-fuel power stations, urgently needs to be demonstrated in the EU since the EU's decarbonisation plans rely on CCS.
- CCS is not economically viable for the moment, as the price of CO₂ is too low and is affecting the economics of investment choice.
- Public-private partnerships are required in terms of finance for R&D programmes and public acceptance.
- **Choosing gas now gives Europe time to develop CCS**, as unabated natural gas makes an immediate reduction in CO₂ emissions and therefore does not need CCS now. On the other hand, coal would need CCS right away to reduce its environmental footprint.
- In the longer term, **gas with CCS should be favoured over coal with CCS** on economic grounds for new build power generation, as well as on environmental grounds because the amount of CO₂ to store is a little less than half per kWh of electricity produced.

Proof points

- **Natural gas CCS is likely to have two significant cost advantages over coal CCS:**
 - The **capex cost for gas will be lower**. The capex cost of a gas-fired power station with carbon capture is estimated at between \$2,500-\$3,000 per kW compared with \$5,000-\$6,000 per kW for a similar coal plant - about the double.
 - The cost of CO₂ transportation and storage (T&S) will be lower. For each kWh of electricity generated, natural gas produces a little less than half as much CO₂ as a coal plant. Therefore the costs of CO₂ T&S per MWh generated by a gas plant are also expected to be approximately half or less. Should there be a constraint on storage capacity, natural gas also presents an advantage over coal: it requires only half as much pore space for the same amount of electricity produced. (IGU, [Global Vision for Gas -The Pathway towards a Sustainable Energy Future](#), 2012, p.21)

Stories

- **The Carbon Capture & Storage facility at Sleipner (Norway)** demonstrates that safe, long term storage of CO₂ is possible. Natural gas in the Sleipner reservoir on the Norwegian Continental Shelf originally contains around 9% CO₂. Before natural gas can be sold on the market, a majority of CO₂ is removed and stored in geological layers. Every year since 1996, approximately one million tonnes of CO₂ have been captured from natural gas production at Sleipner and stored in an aquifer more than 800 metres below the seabed. To date, approximately **13 million tonnes of CO₂** have been stored and as of 2014 the storage will also be injected with CO₂ captured from the Gudrun field located nearby.
- Another gas CCS project in operation in Europe is the **Snohvit CO₂ Injection project in the Barents Sea**. CO₂ is removed from the gas stream and piped 152 km back to the field for injection into an offshore deep saline formation through a dedicated well. Around 0.7 million tonnes per annum

(Mtpa) of CO₂ have been safely injected and stored in the Tubåen sandstone (some 2,600 metres beneath the seabed and about 45-75 metres thick) since April 2008. 1.2 Mt have been injected to date. (source: [Global CCS Institute](#) database)

Key Message 7: Gas is part of Europe's long-term options. There are enough resources for many decades to come.

Arguments

- Europe has increasingly **more supply options** due to new discoveries and the gas industry's record of continuously improving resource extraction techniques.
- New technology has enabled European natural gas producers to tap into reservoirs that were considered beyond reach 20 years ago. Advances in technology will continue to make more and more supplies available. (Source: OGP)
- Natural gas may be of mineral and biological as well as of fossil origin. Supplies can also be enhanced with locally-produced biogas.
- **Power-to-gas** opens up yet another option and combination of renewables and gas.

Proof points

- Worldwide **proven gas reserves**, i.e. volumes that have been discovered and can be produced economically with existing technology at current gas prices, are estimated at around **190 trillion cubic metres (tcm)** or about 60 times the current annual global gas production. (IEA website, [FAQ](#))
- **Recoverable gas resources**, i.e. volumes that analysts are confident will be discovered or technology developed to produce them, are much larger, with recoverable conventional resources estimated at around **400 tcm**. Recoverable unconventional resources are **of a similar size**. Altogether, this would last **around 250 years**, based on current rates of gas consumption. (IEA website, [FAQ](#))
- Europe is in an enviable geographic position as nearly **80% of conventional gas reserves** are within economic distance from its borders.

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Key Message 8: Natural gas is safe as its industry is experienced and committed to the highest standards

Arguments

- In gas production, the natural gas industry is strictly regulated and has a wide range of recommended best-practices, which are fully adhered to. Gas-producing companies rely on exceptional technology, rigorous standards and an unwavering commitment to best-practice safety procedures.
- In transport and use, gas is also extremely safe. Pipeline and household incidents are relatively rare compared with the production of other fuels.

Proof points

- Much equipment and material used by the natural gas industry, as well as the associated operating practices, are regulated and, in addition, are addressed by recommended Practices and Specifications outlined by OGP who are considered to set the recommended practices and industry standards. (Source OGP)
- The natural gas industry has also adopted local, national or regional standards for non-specific equipment such as pressure vessels, lifting equipment, materials, electrical gear, etc. These include the standards developed by organisations such as the American Society of Mechanical Engineers (ASME), the American Society for Testing and Materials (ASTM) and the National Association of Corrosion Engineers (NACE). Some of these have proved so useful to the industry that they have been adopted for international use (ISO, CEN) along the same lines as OGP standards. (Source OGP)
- The number of fatalities on gas installations is low with an average frequency of **1.42 per 1 million gas customers** and **0.93 per 10,000 km of length of gas distribution mains** for the years 1995 – 2011; a decrease is to note since 2008; equally each accident causes few fatalities in comparison to the number of accidents. (MARCOGAZ, EGAS C Report – Statistics 1995 – 2011).
- The frequency of incidents on pipelines operated by TSOs over the period 1970-2010 has been **0.35 incidents per 1,000 km of pipelines**. In 2010, the figure was 0.16 incidents, marking a stable decrease over time (8th report of the European Gas Pipeline Incident Data Group, EGIG, 2011).

Key Message 9: Methane emissions are limited and being mitigated

Arguments

- The natural gas industry is a relatively small emitter of methane.
- Switching from coal to gas in any end use (power generation, industrial use, or heating) *reduces* emissions of methane, as the coal supply chain (mining, transport, storage) emits much more methane than the gas supply chain.
- Nonetheless, the industry takes this issue very seriously and adopts numerous measures to address it.

Proof points

- Natural sources (fires, geologic processes, and bacteria that produce CH₄ in a variety of settings, most notably wetlands) contribute 208 Tg CH₄/yr to the atmosphere, or 37 percent of total global methane emissions. (Methane and Nitrous Oxide Emissions from Natural Sources, [EPA](#), 2010)
- Amongst **anthropogenic sources**, 29% comes from enteric fermentation (sheep and cattle), 11% from landfills, 11% from landfills, 10% from rice cultivation, 6% from coal mining. **Oil and gas production accounts for 20%**. ([Global Methane Initiative](#), EPA data)
- **Methane emissions from natural gas production have dropped by 36% from 2007-2011** (Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2011, 2013, EPA), even though gross natural gas production increased by 15.5% over the same period (EIA)
- Every time a customer switches from coal to natural gas the fugitive methane emissions go down as there is less coal to be mined, and fewer methane-leaking stocks of coal.
- "Emissions from shale gas generation are significantly lower (41% to 49%) than emissions from electricity generated from coal. This is on the basis of methane having a 100 year GWP [Global Warming Potential] of 25. This finding is consistent most other studies into the GHG emissions arising from shale gas". ([AEA report](#), Climate impact of potential shale gas production in the EU, July 2012)

Stories

- The natural gas industry has begun to use laser airborne methane leak detection (helicopters), such as the CHARM system for CH₄ Airborne Monitoring System ([Open Grid Europe website](#)).
- Operational rules are adapted, for example:
 - TSOs can recompress gas during interventions that require to empty a pipeline, therefore avoiding releasing methane emissions into the atmosphere;
 - For gas pressure control systems: actuator of some throttling valves can be controlled by 'external pilot systems', which continuously emit small quantities of gas to regulate the pressure but 'auto-piloted' valves can also be used, regulating pressure without any gas emissions.

To-do/comments:

- **Are we sure that the coal supply chain emits more methane than the gas supply chain? Figures from the Global Methane Initiative seem to indicate the contrary. Data gathered in the US in the context of shale gas exploration also shows the contrary (Methane Emissions from Natural Gas Systems, R. Howarth, [Cornell University](#), 2012). Do we have other data? Ecofys studies were mentioned in comments - which Ecofys studies?**
- **FH to monitor findings of EDF UT Texas study announced for 2014 [here](#).**