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International Gas Union Working Committee 4 Distribution

Second Meeting

19th – 22nd March 2013

São Paulo, Brazil

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IGU WOC 4 – Agenda of the 2nd meeting

	Tuesday	Wednesday	Thursday	Friday
Morning		**09.00 – 13.00** Committee Meeting	**09.00 – 12.00** Study Groups	**08.15 – 13.30** Football Tour and Farewell Lunch
Afternoon		**14.00 – 17.00** Study Groups	**13.30 – 17.00** Study groups & Plenary Meeting	
Evening	**19.30 – 21.30** Welcome Cocktail	**18.30 – 22.15** Gala Dinner	**19.00 – 22.45** Brazilian Dinner & Samba Show	

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IGU WOC 4 – Committee Meeting (Wednesday)

09:00 – 09:15 Welcome and Opening: *Dietmar Spohn* (WOC 4 Chair), *José Carlos Broisler Oliver* (Safety information)

09:15 – 09:35 Presentation “Brazilian Gas Association” - Abegás

09:35 – 10:15 Presentation Petrobrás – Brazilian Oil and Gas Company

10:15 – 11:00 Presentation Comgás – São Paulo Gas Distribution Company

11:00 – 11:15 Coffee break

11:15 – 11:20 Adoption of agenda: *Dietmar Spohn* (WOC 4 Chair)

11:20 – 11:35 Brief introduction of Members

11:35 – 11:40 Follow-up Time Schedule of WOC4 for the 2012 – 2015 Triennium: *Uwe Klaas* (WOC 4 Secretary)

11:40 – 11:45 Information on the third meeting (*Pascal Vercamer*)

11:45 – 12:00 Introduction of SG 4.1: Regulation of Third Party Access to Gas Distribution Networks – A Standard Approach: *José Carlos Broisler Oliver* (Leader SG 4.1)

12:00 – 12:15 Introduction of SG 4.2: Diversification of Gas Quality and Nonconventional Sources in a Carbon-free future: *Peter Flosbach* (Leader SG 4.2)

12:15 – 12:30 Introduction of SG 4.3: Smart Grids in Gas Distribution: *Pascal Vercamer* (Leader SG 4.3)

12.30 – 13.00 Member’s presentation (*D. Hec*, MARCOGAZ)

13.00 – 14.00 Lunch

14-00 – 17.00 Meeting of study groups

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IGU WOC 4 – Plenary Meeting (Thursday)

09.00 – 12.00	Meeting of study groups
12.00 – 13.30	Lunch
13.30 – 15.00	Continuation Work in study groups
15.00 – 15.30	Coffee break
15.30 – 15.45	Plenary: Presentation of results SG 4.1 *José Carlos Broisler Oliver*
15.45 – 16.00	Presentation of results SG 4.2 *Peter Flosbach*
16.00 – 16.15	Presentation of results SG 4.3 *Steven Vallender*
16.15 – 16.30	Wrap-Up of today's results including keywords for Call for Papers *(Secretary and Study leaders)*
16.30 – 16.40	Preparation of the Next Meeting; *Uwe Klaas (WOC 4 Secretary)*
16.40 – 16.50	Any Other Business;
▪	*Contributions for IGU Newsletter etc.*
▪	*Presentations from members for IGU WOC 4 meetings*
16.50 – 17.00	End of Meeting; *Dietmar Spohn (WOC 4 Chair)*

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IGU WOC 4 – Introduction of members

The management team:

Chairman: Dietmar Spohn

Managing Director, Stadtwerke Bochum, Germany

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Vice Chairman: José Maria Almacellas

Gas Distribution Technical Director,
Gas Natural Fenosa, Spain

E-Mail: jmalmacellas@gasnatural.com

Secretary: Uwe Klaas

Senior Technical Manager,
DVGW Deutscher Verein des Gas- und Wasserfaches,
Germany

E-Mail: klaas@dvgw.de

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IGU WOC 4 – Introduction of members

The study group leaders:

SG 4.1: José Carlos Broisler Oliver

COMGAS, Brazil

E-Mail: joliver@comgas.com.br

SG 4.2: Peter Flosbach

Westnetz, Germany

E-Mail: peter.flosbach@westnetz.de

SG 4.3: Pascal Vercamer

GDF SUEZ, France

E-Mail: pascal.vercamer@gdfsuez.com

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IGU WOC 4 – Introduction of members

Who's new here?

Please introduce yourself briefly.

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IGU WOC 4 – Reminder of Work Programme

Gas distribution companies in many countries are subject to a changing economical environment. After the unbundling of the large gas companies into transport service operators and gas sales companies, the distribution companies are targeted now by the regulation authorities. In addition to that, third party access is becoming an growing issue, with the number of suppliers increasing, and not only with natural gas to enter. Biomethane and hydrogen are ecological sound entries, but to manage a stable gas quality also for sensible clients does not become easier. One solution could be smart grids and their possibilities in dispatching and quick response. Which in turn needs operating staff just as smart, and up-to-date with the fast development of electronic aides.

WOC 4 Study Groups in the 2012 – 2015 Triennium

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

IGU WOC 4 – Provisional Meeting Schedule

Meeting	Proposed date	Meeting topics	Corresponding meeting of IGU-CC
1	9 – 12 Oct. 2012 Cologne / Germany	- Analyse study group topics - Define areas of study - Questionnaire framework - Intermediate deliverables framework	15 Oct. 2012 Ottawa, Canada
2	19 – 22 Mar. 2013 Sao Paulo / Brazil	- Final questionnaire, if any ➔ Release date: April 2013 - Work on intermediate deliverables (e.g. keywords, articles IGU newsletter)	9 – 11 Apr. 2013 Seville, Spain
3	8 – 11 Oct. 2013 Paris/France (New date!)	- Analyse input for study group reports - First draft intermediate deliverables	23 Oct. 2013 Beijing, China
4	3 – 7 Mar. 2014 Madrid / Spain	- First draft WOC 4 report - Final draft intermediate deliverables	25 – 27 Mar. 2014 Brisbane, Australia
5	30 Sept. – 03 Oct. 2014 Vienna/Austria (New date!)	- Final draft WOC 4 report - Final intermediate deliverables - WGC preparation: Papers selection	15 Oct. 2014 Berlin, Germany
6	2 – 6 Mar. 2015 Location tba	- Presentation final WOC 4 report - WGC preparation	24 – 26 Mar. 2015 Cairo, Egypt

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Information on the third meeting

Information about the meeting in France by Pascal Vercamer

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WOC 4 Study Group 1: Regulation on Third Party Access to Gas Distribution Networks – A Standard Approach

- Examination of the development of regulation over the last decade in different countries
  - Access of gases other than natural gas
  - Development of marketing/charging areas
  - Change of energy balancing and transfer options for costs
  - Unbundling of distribution companies
  - Training and qualification of personnel
  - …
- Preparation of an “IGU Network Code”

SG 4.1 work progress 1st meeting

SG 4.1: Regulation of Third Party Access to Gas Distribution Networks – A Standard Approach

- **Leader: Jose Carlos Broisler Oliver, COMGÁS, Brazil**
- **Progress detail:**
  - Discussion of initial views on third party access
  - Development of an action plan for the next meeting
    - Definition of third party access
    - Definition of key aspects of the regulatory framework of third party access to be studied by SG 4.1
    - Regulatory overview across regions & countries – “initial draft”
      - Key aspects of the legislation & regulation
      - Comparison of the different regulation
      - EU, Non EU countries (e.g. Russia), Asia (Japan, Korea, China, India), North America (US and Canada), Australia, New Zealand, etc.
    - Definition of the basic content of the “IGU Network Code Guideline”
    - Analysis of real cases (e.g. Injection and off take: actual process, issues, benefits)

WOC 4 Study Group 2: Diversification of Gas Quality and Non-conventional Sources in a Carbon-free Future

- Increasing diversification of gas quality
  - Different sources of supply due to short term contracts
  - Change between pipeline-based and LNG-based supply
  - Development of local gas fields (e.g. shale gas)
- Increasing injection of gases from non-conventional sources in a carbon-free future
  - Biomethane
  - Hydrogen
  - SNG
- Examination of options to secure a stable gas quality

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Results
WOC 4 Study Group 2 (SG 4.2)

Diversification of Gas Quality and Nonconventional Sources in a Carbon-free Future

Peter Flosbach

March 2013, Sao Paulo

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WOC 4 Study Group 2 (SG 4.2)
The Team

Chairman:
Peter Flosbach, Westnetz GmbH (RWE), Germany

Vice Chairman:
Rory Somers, Bord Gais Networks, Ireland

Study Group Members:

- Jose Maria Almacellas Gonzalez, Gas Natural Fenosa, SDG, S.A., Spain
- Danijela Busetincan, Gradska plinara Zagreb d.o.o., Croatia
- Maciej Chaczykowski, Warsaw University of Technology, Poland
- Remy Cordier, GDF SUEZ / CRIGEN, France
- Flemming Jensen, DONG Energy, Denmark (new member)
- Uwe Klaas, DVGW, Germany (new member)
- Vladimir Klimenko, JSC Gazprom promgaz, Russian Federation
- Christian Schicketmüller, OÖ. Ferngas Netz GmbH, Austria
- Dragan Vucur, JP Srbijagas, Serbia

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Study Group 4.2 Work progress

Progress details:

- Analysis of the initial status of the diversification of Gas Quality in selected countries
  (Europe, Russia, US and other markets would be desirable)
- Opportunities to exploit the gas composition ranges more efficiently incl. recommended measures (hardware, software & system intelligence)
- Development of supra-regional standards to promote the implementation of new & innovative technologies
- Analyses of the individual renewable gases and evaluation of the impact on DNO infrastructures and consumer applications
- Determination of acceptable concentrations of renewable gases for the injection in distribution grids
- Development of a roadmap for the preferred evolutionary steps towards a carbon-free future from the DNO perspective
- Development of marketing concept to illustrate the added value by DNOs into a Carbon-free Future

Initial situation

- Initial situations in the individual countries are very different
  - Markets with LNG + Pipeline Gas :
    Traditionally a very diverse gas supply with wide range of gas composition
  - Eastern European Markets:
    Natural gas supplies to given location remained stable

Recommendation is to exploit the allowed gas composition ranges

Possible Measures:

- Hardware – investment in gas chromatographs or correlative analytical methods (e.g. speed of sound) which are mostly much cheaper
  - Real data input is needed
  - Existing technologies are designed for the transmission grids and therefore are very expensive
  - What gas quality technologies are available in other industries such as chemical industry?
  - Meter the process heat for certain customer groups (Austria)
- Improvement of system intelligence:
  - Implementation of software programme for gas quality simulation and calculation
  - Software based online tracking functionalities
- Gas Mixing: LNG, Nitrogen or Air

Finding supra-regional standards to allow a European wide implementation of new & innovative technologies?

- Could be conflicting as the initial situations in the individual countries are currently very heterogeneous
- Change in gas quality standards always demand a previous inventory and evaluations of the consequences on the application side
- The procedure for adopting standards should be recommended as “evolution” instead of “revolution”
- CEN initiated a process to harmonise gas quality standards in Europe
  - CEN/TC 234/WG 11 working on the standardization of natural gas H
  - CEN/TC 408 working on a standard for biomethane as vehicle fuel and for natural gas grid injection
  - ENTSOG is developing a grid code also for natural gas quality
- Different pipeline materials demand dry gas quality
- Management of gas quality at the production side or at the consumer side (should we have smart grids or more tolerant applications)?
  - Assessment: In mid-term we will need both

Challenges of Gas Quality Diversification

- Determination of acceptable concentrations for the injection of renewable gases (e.g. hydrogen)
  - Hydrogen:
    - Germany: 2% is seen as uncritical ; up to 5 % should be realistic in future
    - France: 6 % (to be checked)
    - Austria: less than 4 % is seen as uncritical
- Evaluation of possible impact of hydrogen and/or other components in natural gas mixtures on compressibility factor calculation results (due to ownership transfer issues)
- The dramatically increasing demand of electricity storage capacity is a real challenge (following the increase of renewable injection generation)
  - "Wind-Gas" is a challenge for the gas industry and a chance as well to promote reputation!
- Biggest challenge is to manage the increasing complexity and to guarantee the competitiveness of natural gas versus other fuels!

Development of local gas fields - e.g. shale gas

Characteristics of shale gas and its potential impact on gas distribution grid infrastructures:

- Additional shale gas penetration offers the opportunity to substitute other primary energy fuels with higher CO_2 emissions such as oil and coal
- After initial treatment shale gas composition should be uncritical (because its basically Methane)
- Quality management: Improvement of monitoring and dispatching requirements seem to be necessary
- Quality of E&P companies must be secured to ensure security of supply in the distribution grid (concerns about bad experience gained in the US)
- Remark: No operative experience in the SG 4.2 team!
  (Who could support us - preferably from the US)

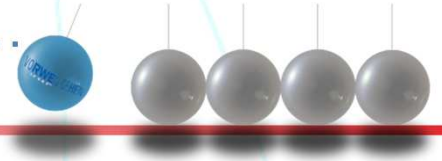
Development of local gas fields

- Preferred evolutionary steps towards a carbon-free future from a distribution system operator standpoint
  - Technological development
    - evaluation of technological maturity
    - impact on security of supply
  - Economically most cost effective procedure
  - What kind of gases support the aimed CO_2 reduction targets most effectively (Bio-methane, Hydrogen, SNG, etc.)?
  - **Roadmap needs to be developed!**

Ways distribution companies can address the growing challenge to secure stable gas supplies for their customers

- First make the challenges transparent
- Promote the positive image effect as gas is already green and will get greener
- Emphasise our contribution to solve the increasing problems on the electricity side following wind and PV generation
- We have a combination of “supply quality” and “quantity” issue
- Gas market issues (long term contract stability) are not under our control
- We as the industry need to ensure in reconciliations with politicians, decision makers and the consumers that our costs are covered

SG 4.2 Working Group: How we proceed …



phase 1: Analysis

- problem definition
- expert survey individual markets
- change of perspective
- problem scenario
- …

phase 2: Findung new solutions

- Biogas
- Bio methane
- Hydrogen
- Synthetic gas
- Shale gas impact
- …

phase 3: Assessment & evalutaion

- Preferred scenario
- …

phase 4: Plan for implementation

- Development of action Plan
- ToDo list
- convince decision makers
- Marketing concept
- ….

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Study Group 4.2
Open issues & topics to be discussed

Studies and other relating activities:

- DENA - Biogas injection map in the EU — Peter Flosbach, Uwe Klaas
- Power to Gas projects in Germany — Peter Flosbach
- Introduction to Marcogaz activities — Uwe Klaas
- Experiences following the adoption of gas quality in the individual markets — All
- "Summary" Fact sheet needs to be developed
- CEN initiated a process to harmonise gas quality standards in Europe — Remy Cordier, Uwe Klaas
  - CEN/TC 234/WG 11 working on the standardization of natural gas H
  - CEN/TC 408 working on a standard for biomethane as vehicle fuel and for natural gas grid injection
  - ENTSOG is developing a grid code also for natural gas quality

WOC 4 Study Group 3: Smart Grids in Gas Distribution

- Increasing application of smart grids in gas transport systems
- Examination of smart meters in the current triennium
- Open questions to discuss:
  - Are smart grids feasible for a distribution grid at a reasonable cost?
  - How likely is a coherent development with the electric power grid?
  - Are the clients ready for smart grids?
  - Is the personnel appropriately trained?

Brief report

WOC 4 Study Group 3 (SG 4.3)

Smart Grids in Gas Distribution

Pascal Vercamer

March 2013, Sao Paulo

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WOC 4 Study Group 3 (SG 4.3)
The Team

- ***Leader :*** *Pascal VERCAMER (Fra)*
- ***Vice chair****: Steven VALLENDER (UK)*
- ***Members:*** *Akiharu ASADA (Jap); Libor CAGALA (CZE); Mohammed HAKKOUM (Alg); Roch DROZDOWSKI (Fra); Birgitte HERSKIND (DK); Ben LAMBREGTS (NL); Kees PULLES (NL);; Ryoichi TORIUMI (Jap); Peter VERBEEK (NL); Kim VRANCKEN (Bel) …*

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Study Group 4.3 Work progress

Progress detail:

- Definition of high level functionalities of the Smart Gas Grids
- First set of assessment criteria / scoring matrix for functionnalities
- Exchanges about national or continental approaches about smart gas grids – first set of examples
- No questionnaire is needed
- SG4.3 will ask IGU members for national or continental position papers on smart gas grid concepts and examples of smart gas grids projects

10/10/12 output : functionalities & criteria

High level functionalities

- **Remote operation of gas network**
  - Monitoring, enhanced automation and protection
- **Quality control of gas in the network**
  - Different gas qualities
  - Acceptance of NCG
- **Ability to interact with other energy systems**
  - Storage in gas networks, Smart gas utilization
  - Energy measurement
  - Capacities and gas flow real time monitoring.
- **Integrity / security management**
  - Leakage detection, integrity control, failure detection
  - Automatic shut-off / healing
  - Components check

Criteria for analyzing functionalities

- Economy (savings of costs, investments, value of new services, commercial opportunities) – for what stakeholder?
- Technology availability and applicability on the field
- Compatibility with Regulation
- New responsibilities and duties for DNO
- Image and Social acceptance
- New risks of failure
- Safety and security improvement
- Tarrification aspects
- …

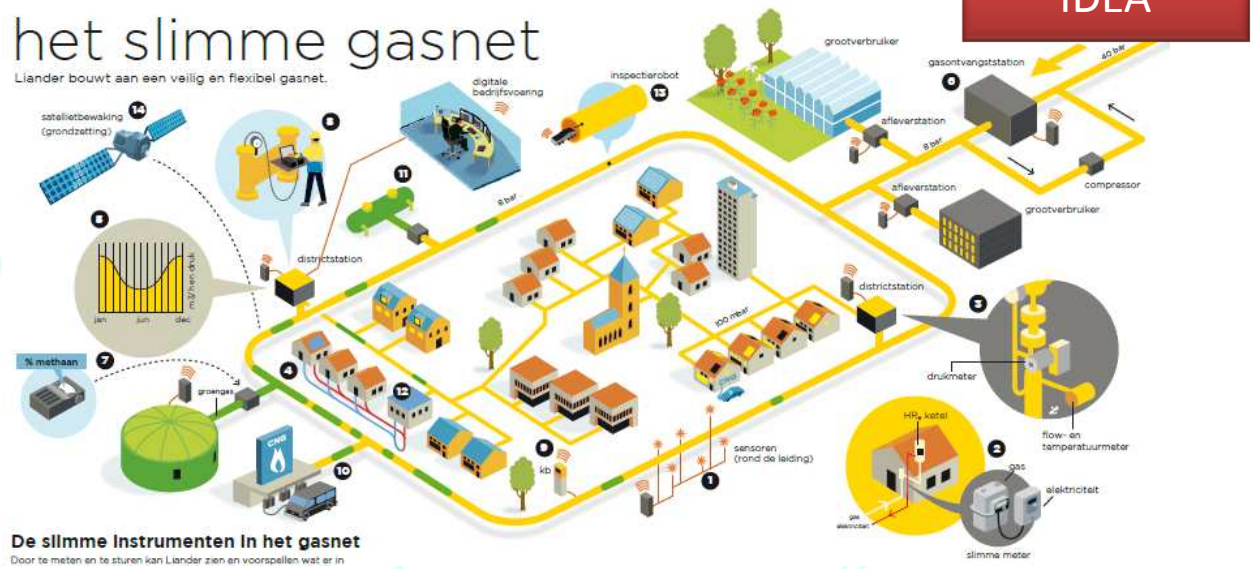
Quality control of gas in the network

Criteria	Score	Remarks
Economy (savings of costs, investments, value of new services, commercial opportunities) – for what stakeholder?		(cash out, PNL) Cost / benefit relation for the different stakeholders
DNO	-	
Supplier	+	(gas producer) increased competition intensity
Customer	-	
Society	-	
Shipers	+	Energy vs volume (intermediate)
…		
Technology availability and applicability on the field	-	Expensive solutions on the market.
Compatibility with regulation	neutral	
New responsabilities and duties for DNO	-	increase in responsibility
Image of the gas industry and Social acceptance	+	
New risks of disfunctioning		Dedicated risk assessment to be carried out
Safety and security improvement	+	society expectation to inject NCG
Tarrification aspects	+	Energy vs volume billing, transparent billing of green gas consumers / producers
Commercial opportunity for DNO	+	
Impact on DNO organization	-	new tools, new technologies, new expertise, training, new equipements
Impact on the environment and sustainability	+	

Next steps (1)

- Ask for position papers and examples of smart gas grids projects
  - Other feedback and pilote projects
  - Collecting position papers about Smart Gas Grids & Smart Energy Grids
- Drafting analysis of each functionnality
- Illustration of the features Smart Gas Grids

IDEA



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Next steps (2)

Three main directions of discussion:

- Smart Gas Grids for the energy provider: a useful tool for facilitating Power to Gas (P2G)?
- Smart Gas Grids for the DNO : what economical, social (ex: safety), and technical benefits for Gas Network Operators in having a much more automated and interactive Gas grid?
- Smart Gas Grids for the image of Gas industry: how to communicate about smart gas grids (is it the good name?) regarding what is done in electricity

  Apply Sao Paulo's motto: *Non ducor, duco*

  (I am not behind a leader, I am the leader)

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Thank you for your attention!

Source:Wikipedia

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SG 4.3 work progress 1st meeting

SG 4.3: Smart Grids in Gas Distribution

- **Leader: Pascal Vercamer, GDF SUEZ, France**
- **Progress detail:**
  - Definition of high level functionalities of the smart gas grids
  - First set of assessment criteria / scoring matrix for functionalities
  - Exchanges about national or continental approaches about smart gas grids – first set of examples
  - No questionnaire is needed; SG 4.3 will ask IGU members for national or continental position papers on smart gas grid concepts and examples of smart gas grids projects

Actual Information on the Brazilian Gas Industry

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PGC-A Study Group 3
Life Cycle Assessment

Anne Prieur-Vernat, GDF SUEZ,
Chair, PGCA-SG3

February 2013

Supporting presentation

Study Group LCA within PGC-A

Objectives

- LCA internationally recognised as the relevant tool to assess the potential environmental impacts
- But available LCA databases lack of technical reliability
- An international LCA Study Group would thus be relevant in 3 ways :

1. Data collection

- Framework to collect **industry data** (instead of generic public data)
- Better representativeness
- **Set up an international database** for LCA of the NG chain within IGU

2. LCA of the natural gas chain

- At regional levels
- Applied to specific NG pathways (e.g. LNG, non conventional resources)

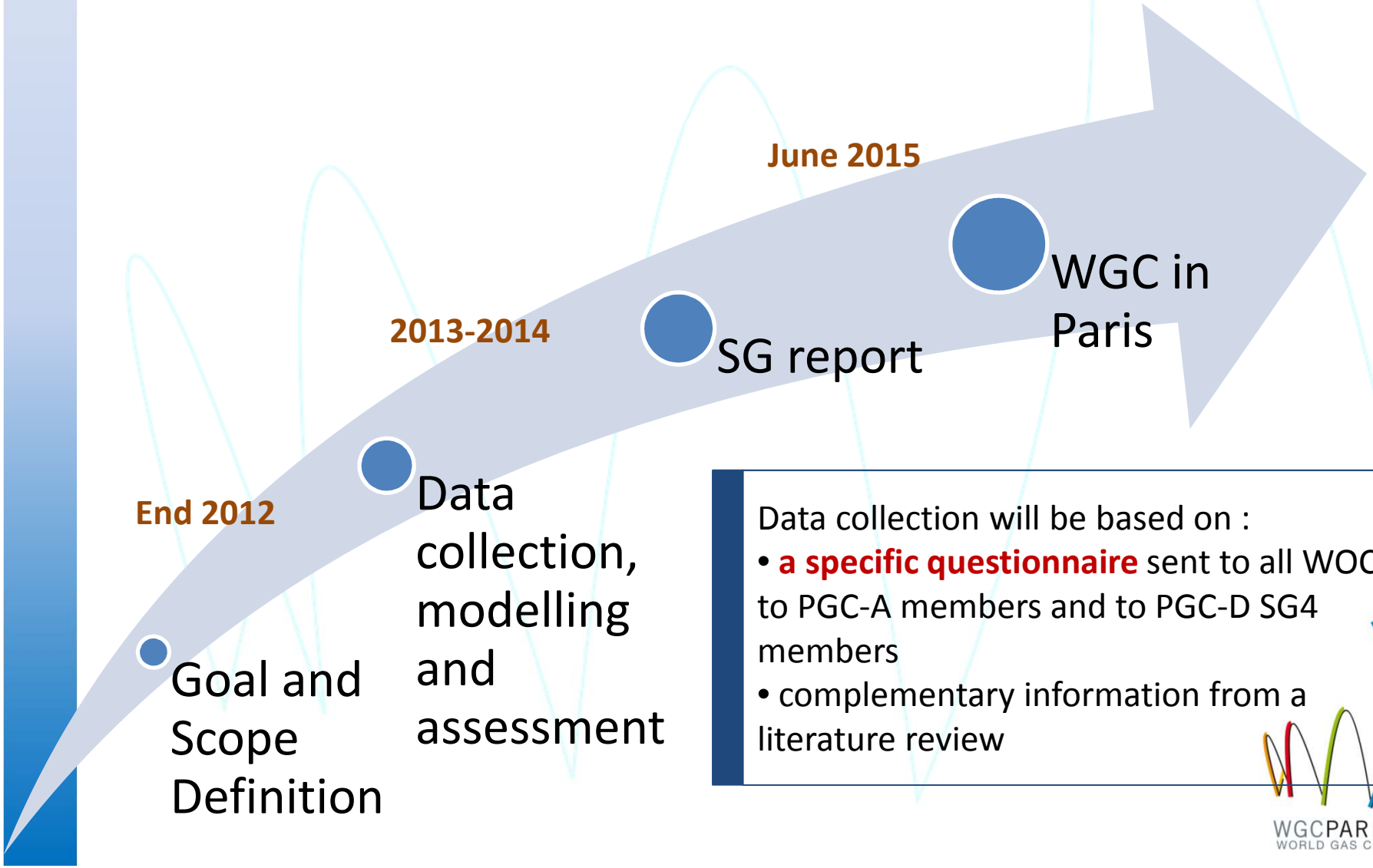
3. Support to decision making

- **Continuous improvement** of the environmental performance of natural gas
- **Strategic decisions**, such as to **promote the environmental performances of the natural gas**

IGU is relevant to coordinate such actions at the international level

Work plan for the Study Group « LCA »

Planning for the triennum



Data collection will be based on :

- **a specific questionnaire** sent to all WOCs, to PGC-A members and to PGC-D SG4 members
- complementary information from a literature review

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Study Group LCA within PGC-A

Goal & Scope

- Focus on the upstream chains
  (« by unit of gas distributed »)
  - Detailed steps from exploration and production to low pressure distribution
- Methodology chosen for the assessment
  - Life Cycle Assessment, as described by ISO 14040 & 44

Link between data collection and SG3 work

What kind of data are asked for ?

- Data available directly
- No additionnal calculation is needed
- Data will be agregated to ensure confidentiality

How data are used for SG3 work ?

- Data gathered in an Excel file
- Additionnal data will be deduced from data collected (e.g. atmospheric emissions)
- Environmental impacts will be calculated by SG3 for typical NG supply chains

Time schedule for data collection in 2013

2013

- February – PGCA Meeting (Rio)

Launch of data collection

- April/May 2013 - Presentation of the SG3 study to the Coordination Committee and relevant WOCs and PGCs

- 27th of May 2013

SG3 Webmeeting

- **End of June 2013**

Data to be sent to PGCA-SG3

- *Data will be reviewed by SG3 before next PGCA meeting*

- September – PGCA Meeting (Kota Kinabalu)

End of data collection

- Beginning of 2014

Feedback to data providers

2014

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For any question regarding the questionnaire…

- Please contact :

Anne Prieur-Vernat

anne.prieur-vernat@gdfsuez.com

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Thank you very much for your contribution !

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IGU WOC 4 – Plenary Meeting (Thursday)

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12.00 – 13.30	Lunch
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16.00 – 16.15	Presentation of results SG 4.3 *Steven Vallender*
16.15 – 16.30	Wrap-Up of today's results *(Secretary and Study leaders)*
16.30 – 16.40	Preparation of the Next Meeting; *Uwe Klaas (WOC 4 Secretary)*
16.40 – 16.50	Any Other Business;

- *Contributions for IGU Newsletter etc.*
- *Presentations from members for IGU WOC 4 meetings*

16.50 – 17.00 End of Meeting; *Dietmar Spohn (WOC 4 Chair)*

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IGU WOC 4 – Today's results of the study groups

- SG 4.1: see slides from next on
- SG 4.2:
- SG 4.3:

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WOC 4 Study Group 1 (SG 4.1)

Regulation on Third Party Access to gas Distribution Networks – A Standard Approach

- ***Leader :*** *Jose Carlos Broisler Oliver, COMGÁS, Brazil*
- ***Vice Leader****: Gabriel de Sousa, GALP Energia, Portugal*

March 2013, Sao Paulo

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WOC 4 Study Group 1: Regulation on Third Party Access to Gas Distribution Networks – A Standard Approach

- Examination of the development of regulation over the last decade in different countries
  - Access of gases other than natural gas
  - Development of marketing/charging areas
  - Change of energy balancing and transfer options for costs
  - Unbundling of distribution companies
  - Training and qualification of personnel
  - …
- Preparation of an “IGU Network Code”

IGU WOC 4 SG 4.1: Participants

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IGU WOC 4 SG 4.1: Participants

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Study Group 4.1 Work progress

From Cologne to SP:

- Preparation of “raw material” to be evaluated by the sub group
  - Introduction – historical evolution of TPA
  - Legal regimes
  - Key aspects of TPA
  - Regulatory overview
  - Country Case Studies:
    - US
    - Brazil
    - Europe overview
    - France
    - Japan
    - Slovakia

Study Group 4.1 Work progress

SP Meeting:

- VERY GOOD discussions about TPA and its applicability, law and regulation, real benefits, terminology, etc.
- Evaluation of the “raw material” produced until now
- Discussion of “Case Studies” from:
  - France
  - Japan
  - US
  - Russia – Transmission
  - Brazil
- “Provisional” Definition of TPA
- Defining the next steps & homework
- Clarification of the “Final Product”

IGU WOC4 SG4.1: TPA provisional definition

- Third party access can be described:
  - Customers being able to use a system to deliver gas for their own use or for resale from a source of gas of their choice
  - Suppliers or producers being able to use a system to deliver gas for sale to customers

Study Group 4.1 Next Steps

- Homework by the end of May/13
  - Detailed Case Studies
    - Portugal – Gabriel
    - Thailand – Wijuck Krisnakri
    - Russia – Anna Zhur
    - France supplementary - Benoit
    - UK – Rosemary
    - US / Canada – Nick
    - Brasil – Piazza
    - Japan - Makoto Hiranuma
    - South Korea - Seong-Kyeong Hong
    - Germany / Netherland / Denmark / Ireland
    - China, India, South Africa, North Africa, Far East, Australia???
  - Capture the main aspects of the law & regulation, identifying impacts, common practices, technical issues, definition of the system participants, etc..
  - Evaluate the level of the implementation of these legal & regulatory aspects

Study Group 4.1 Next Steps

- Prepare a TPA overview applicable to Transmission and Distribution – JSC Gazprom
  - Capture the main aspects to show the big picture, identifying impacts, common practices, technical issues, etc.
  - Prepare a diagram showing the definition of TPA with regard to the system components

Study Group 4.1 Deliverables

Final Objectives:

- Present different experiences around the world regarding TPA legislation and regulation, stage of implementation and evolution
- Indicate impacts of the cases analyzed
- Indentify trends of the TPA around the world
- Prepare a “World Map of TPA”
- Prepare “IGU guidelines” – to be referenced - instead of a “IGU network code” (prescriptive)

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International Gas Union Working Committee 4 Distribution

Second Meeting

19th – 22nd March 2013

São Paulo, Brazil

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SG 4.2 Working Group: How we proceed …

phase 1: Analysis

- Decreasing public- & governmental acceptance of NG as fossil fuel
- “Greening” promotes new image of natural gas
- Chance to contribute to Kyoto target
- Chance to develop additional gas demand

phase 2: Finding new solutions

“New Gases”

- Biogas (only in combination with CHP)
- Bio methane to grid
- Hydrogen
- Synthetic (SNG)
- Shale gas

“New technologies”
SG 4.3

- smart appliances
- smart grids

phase 3: Assessment & evalutaion

- Scenario assessment for the introduction of renewable gases

phase 4: Plan for implementation

- Development of action Plan
- Marketing concept
- ToDo list
- ….

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SG 4.2 Phase 1: Analysis & Challenges
Why should we promote new technologies and gases?

Environmental Protection:

- Decreasing public-& governmental acceptance of natural gas as fossil fuel:
- "Greening" promotes new image of natural gas
  - NG compared to oil or coal much CO_2 lower (substitution allows CO_2 savings)
  - Excellent "bridging" technology into a carbon low future
- Example of Denmark: Forbidden to connect new build houses with natural gas; district heating preferred to substitute NG

Economical aspects to be considered

- NG is for existing buildings cheapest option if gas grid is available
- Electricity & gas convergence (optimization can only be done on an integrated basis)
- Stagnation and demand destruction in some mature markets requires new marketing concepts
- NG is most competitive fuel for heating (if infrastructure is available)

SG 4.2 Phase 1: Analysis & Challenges
Challenges of Gas Quality Diversification

- Biggest challenge is to manage the increasing complexity and to guarantee the competitiveness of natural gas versus other fuels!
- The increasing demand of electricity storage capacity is a real challenge
- Evaluation of possible impact of new gas mixtures on gas grid infrastructure
- Determination of acceptable concentrations for the injection of renewable gases
- Gas composition ranges, within specifications, have to be exploited

Phase 3: Progressive scenario assessment & evaluation as a global approach

Renewable gases will have a clear impact on our distribution infrastructures!

European assessment	Today	2020	2025	2040
NG	100 %	98 %	92 %	83 %
Biogas/ Biomethane	-	2 %	5 %	10 %
Hydrogen	-	-	2 %	5 %
SNG	-	-	1 %	2 %

Determination of the introduction of renewable gases in the individual markets
ToDo for all members of WOC 4!

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Phase 4: Action Plan for implementation

- Standardization of specifications for gas quality in the individual markets (e.g. CEN TC 234 for Europe)
- Global strategy for research on gas infrastructures need to be implemented (incl. acceptable levels, measures, timeline, etc.)
- Standardization of application technologies in co-operation with the appliance industry in order to develop efficient but flexible applications
- Develop projects (e.g. P2G) to support mature technology implementation
- Co-operation with new market participants (e.g. biogas producers, hydrogen industry, etc.) to ensure gas quality compliance
- Develop an adequate regulatory framework
  - costs need to be included in the regulatory tariff
  - stable investment conditions for producers and DSOs

Phase 4: Our contribution as gas industry to promote the “green gas evolution”

- Development of a marketing concept (PGC-E to be proven)
- Convince decision makers & customers
- Guarantee stable gas quality in line with the specification
- Sharing experiences with new technologies (e.g. P2G)
- Reduction of the overall CO_2 balance
- Promote new appliances in cooperation with industry partners
- Develop gas infrastructures to support renewable gases
- Develop “green” commodity products (consultancy to retail industry)
- Security of supply
  - long term together with shale gas
  - proven reserves exceeding 100 years

Agenda SG 4.2 – Autumn meeting in Paris

- Key words for call of papers — Uwe Klaas
- Shale gas status report — Maciej Chaczykowski
- Update of results following P2G initiative in Germany — Peter Flosbach
- Gas quality tracking on distribution level — Maciej Chaczykowski
- Danish experience (cost evaluation) for the switch of L-Gas installations to H-Gas — Flemming Jensen
- Scenario assessment & evaluation: Determination of the introduction of renewable gases in the individual markets — all members of WOC 4

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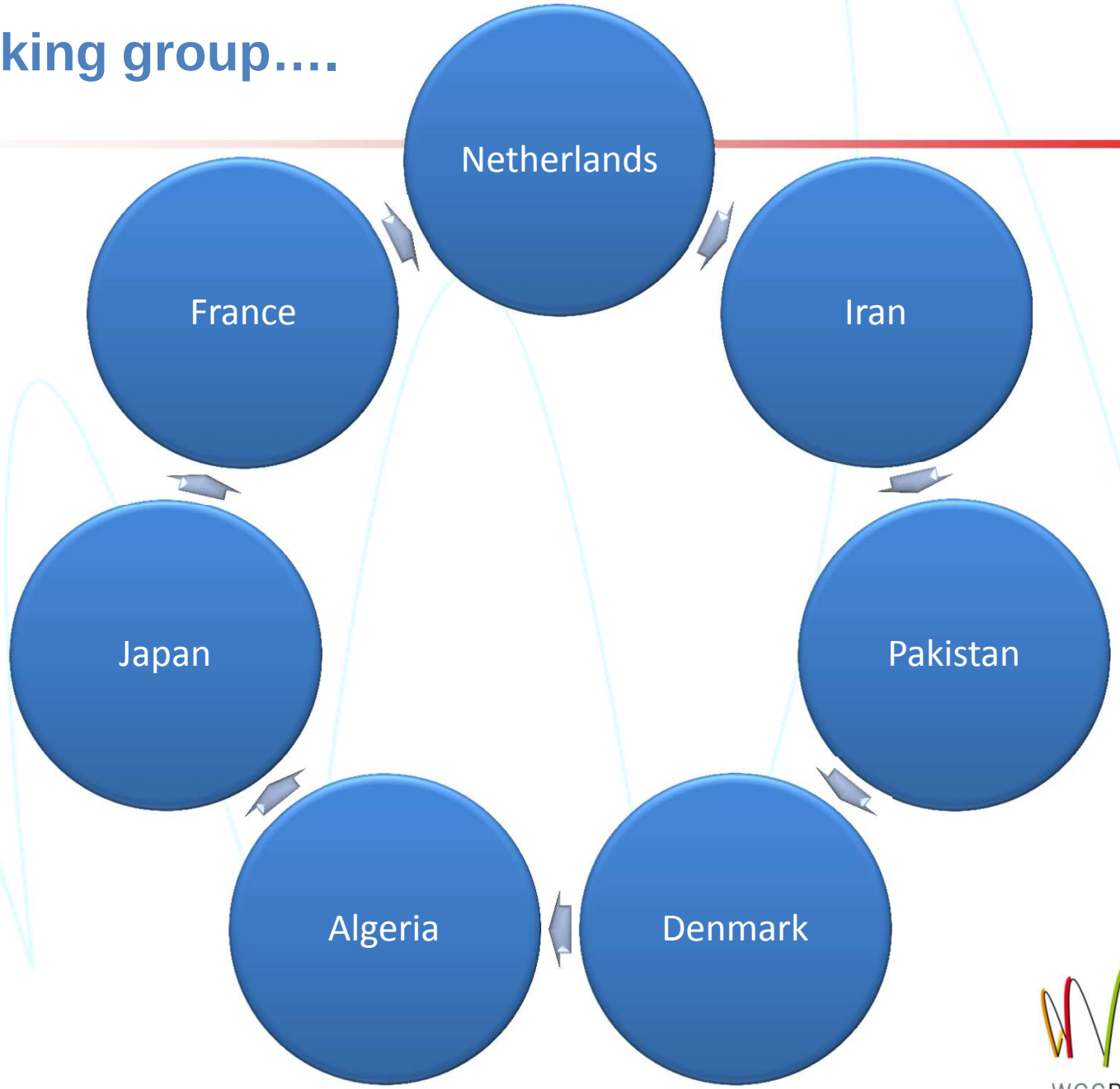
SG 4.3 Working Group

Smart Gas Grids

- N+1 effect
- What are the Smart Grids: drivers and technological buidling blocks
- Best Practices sharing through a questionnaire

Our working group….



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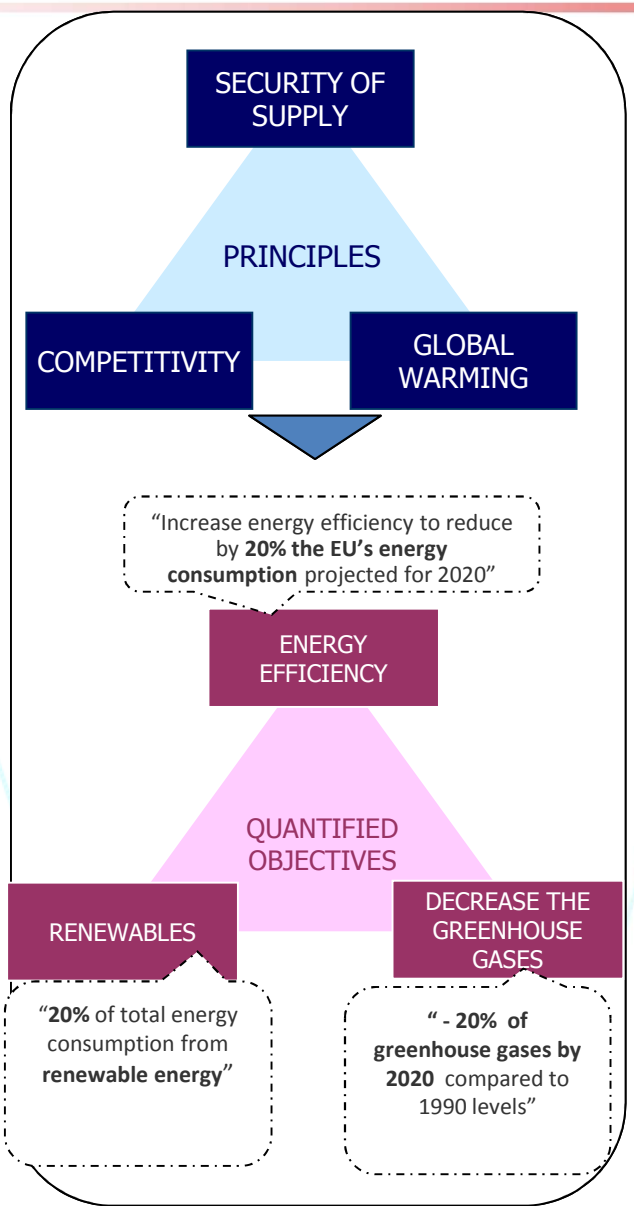
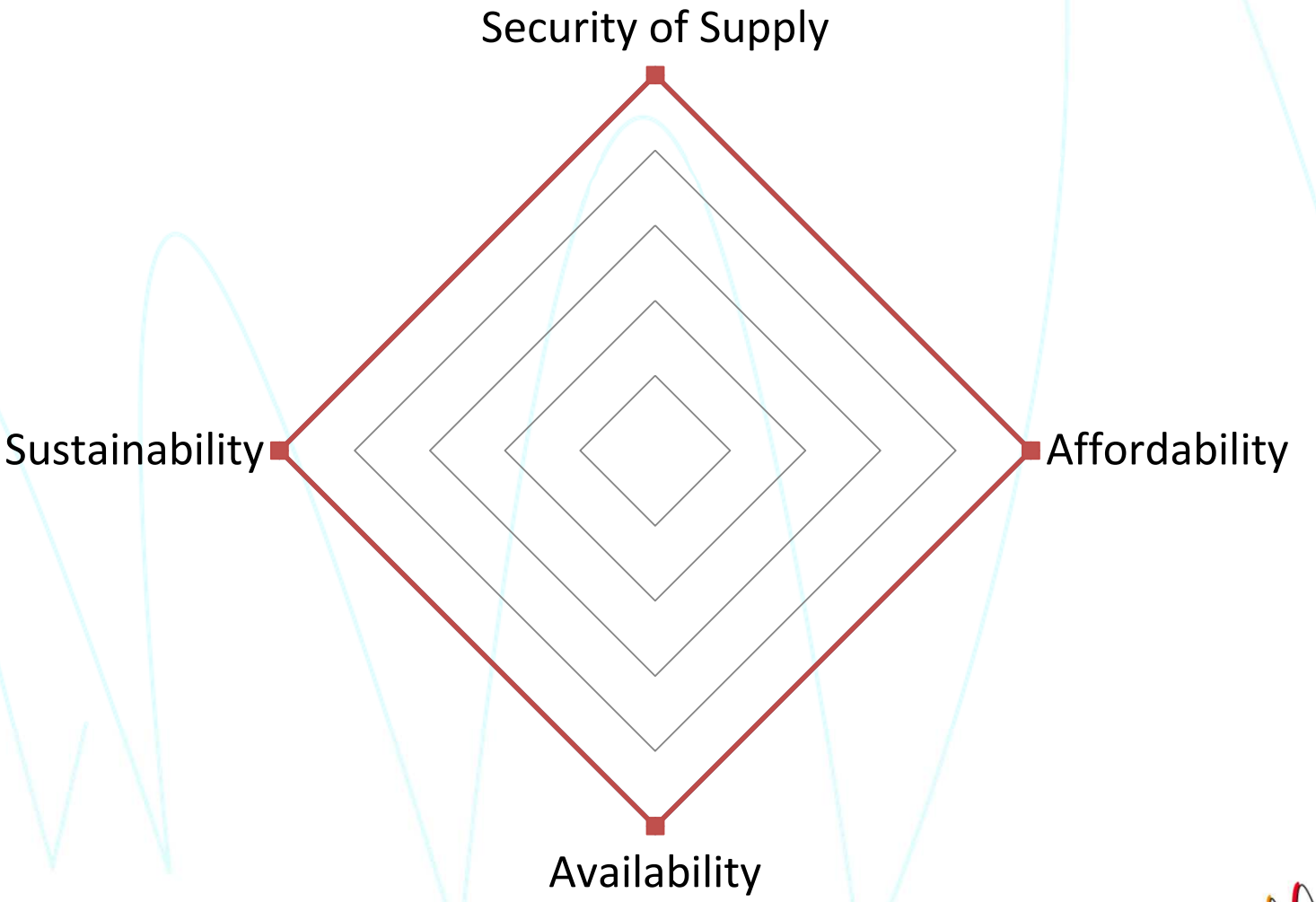
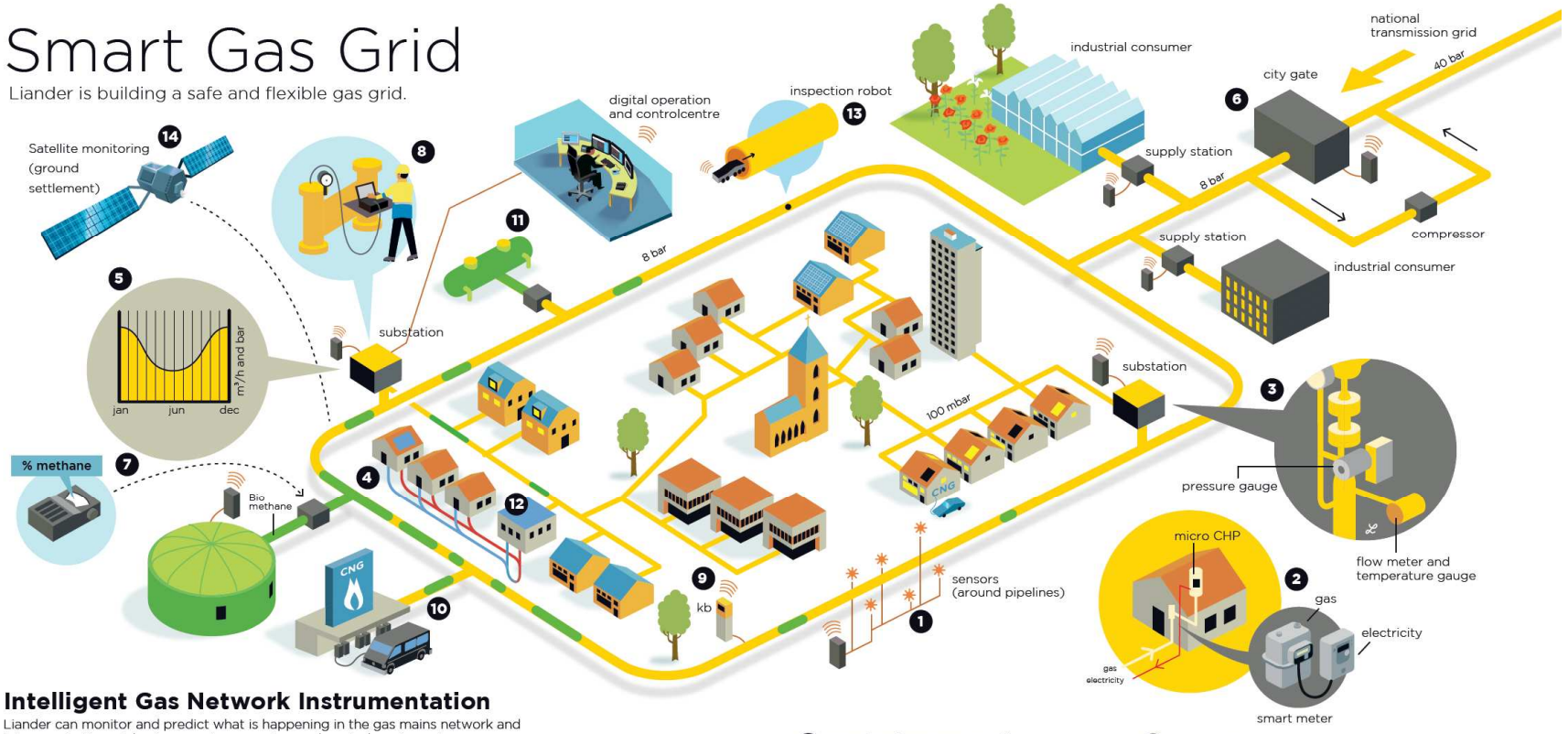
Where does the “Smart” come from ?



Drivers for a smart grid….



Definition of a Smart Grids



Intelligent Gas Network Instrumentation

Liander can monitor and predict what is happening in the gas mains network and intervene in timegrid using remote measuring and control equipment.

1. **Gas Grid Monitoring**
   Sensors measure ground vibrations, traffic loads, ground settlement, gas leakages, etc, around gas mains 24/7.
2. **Smart Metering**
   Gas meters record gas consumption profile and make this data available in digital format.
3. **Measurements in stations**
   Remote monitoring of gas inlet and outlet pressures, volumes and temperatures.
4. **Gas Diffusion**
   Sensors and computer models measure and predict gas flow diffusion and mixing.
5. **Dynamic Pressure Management**
   Varging the gas pressure depending on demand and supply.
6. **City Gate**
   Real-time GTS (Gasunie) data for gas outlet pressures, volumes, temperatures and quality.
7. **Monitoring Gas Quality**
   The quality of bio methane added to the grid is monitored 24/7.
8. **Station Diagnostics**
   Periodical diagnostics are run to ensure control systems are working properly.
9. **Cathodic Protection**
   Remote diagnostics and monitoring of the polymer coating around steel pipelines.
10. **Gas for mobility**
    Filling stations for gas used as vehicle fuel on the road and on the water.
11. **Local Storage**
    Storage of overcapicity of bio methane.
12. **Energyhub in residential area**
    CHP analog gas driven heat pump for district heating and electricity.
13. **Inspection Robots**
    Internal pipeline inspection.
14. **Satellite Monitoring**
    Monitoring ground settlement at a street and neighbourhood level.

Definition of the Smart Gas Grids

- **Smart Gas Grids**: **gas distribution** and **ICT** sector cooperation..

- To answer society needs improve **efficiency** of DNO core business
- To develop ability of the gas distribution network to **interact** with other networks

- Towards **Smart Energy Networks**
- Security of supply, Sustainability, Affordability, Availability

Buidling blocks of the Smart Gas Grid

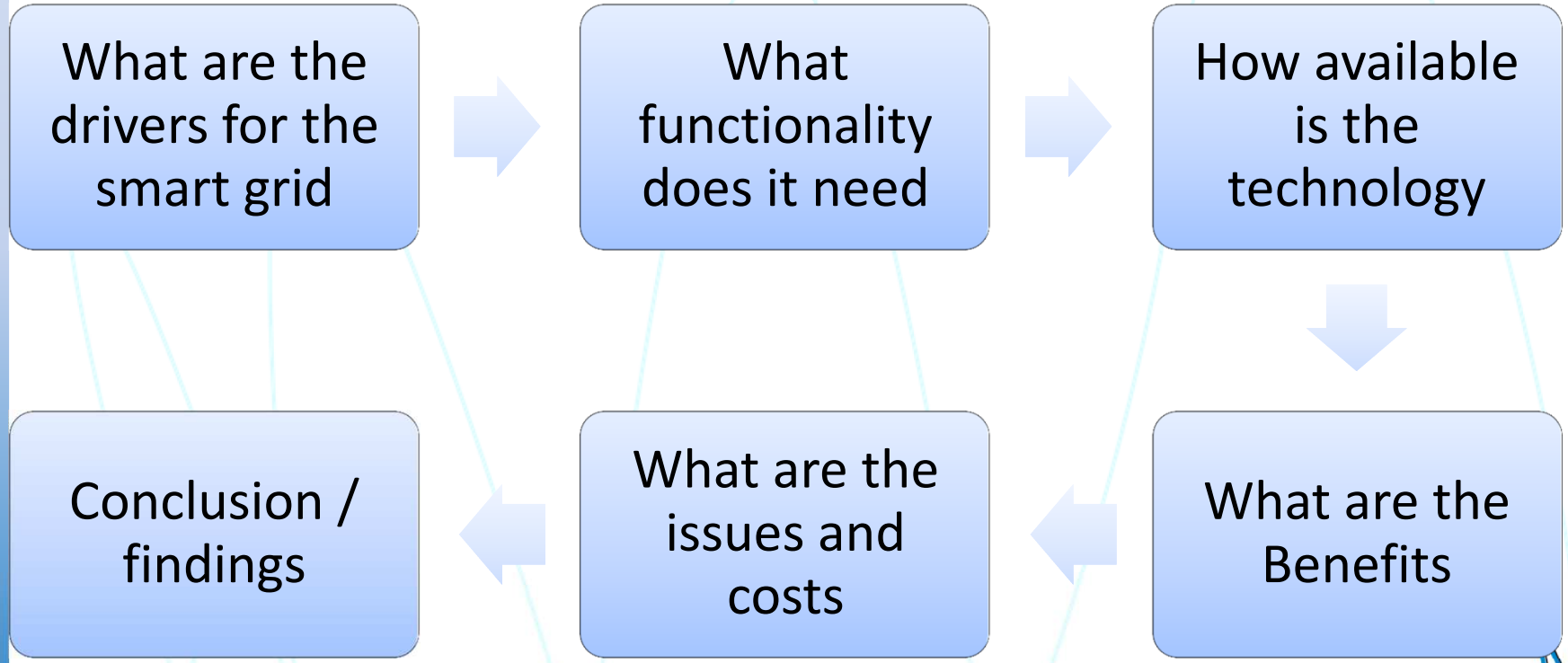
1. Biogas, unconventional gas
2. Hydrogen and SNG
3. LPG
4. LNG
5. Storage
6. Fuel cells and micro-generation
7. Hardware evolution: regulation station, remote monitoring
8. IS evolution
9. Smart metering
10. Information management
11. Innovative maintenance
12. Natural Gas Vehicles

Best Practices sharing

INNOVATIVE MAINTENANCE	NETHERLANDS	ROBOTS	How well do they perform, impact on safety ? CBA ?
		SATELLITES	How well do they perform, impact on safety ? CBA ? What is the possible use outside of greycast pipelines?
		SENSORS	How well do they perform, impact on safety ? CBA ?
		GPS Technology	How well do they perform, impact on safety ? CBA ?
	France, Pakistan, Iran	LEAKAGE Detection car and hand	What technology, how well do they perform?
	Germany, Denmark	LEAKAGE Detection helicopter / drone	What technology, how well do they perform?
	JAPAN	SENSORS	How well do they perform, impact on safety ? CBA ?
	IRAN	SENSORS	How well do they perform, impact on safety ? CBA ?
	PAKISTAN	Tracebility of maintenance operations or theft alarm	(already operational)
	EUROPE		How smart energy networks support safety improvement ?

Smart Gas Grids for the image of Gas industry: how to communicate about smart gas grids (is it the good name?), regarding in particular what is done in electricity ? Smart Gas Grids → Smart Energy Networks → Smart Energy Solution (Smart Cities)		
Who	Why	Position
Regulators / end user	Economics: reduce customers bill. Safety. Environment. Market fluidification.	Support
DNO	**Improving energy networks efficiency. Optimizing use of the gas system. Image +**	**Support**
TNO	Positive spin-off	Support
Governments	Energy transition enabler. Energy mix of the future.	Support
Suppliers	Services development linked with the smart system.	Support
Producers	Business development (biogas)	Support
End user	Improved QoS, sustainable energy mix, economic optimization (bill reduced), safety	Support

Content of Report…



Next steps: “no ducor, duco” …

1. Defined the strategy
2. Building block identification
3. Dig into the details / best practices sharing through the dedicated questionnaire
4. Build a technological roadmap

R: Forge a world vision of future of gas distribution networks

IGU WOC 4 – Provisional Meeting Schedule

Meeting	Proposed date	Meeting topics	Corresponding meeting of IGU-CC
1	9 – 12 Oct. 2012 Cologne / Germany	- Analyse study group topics - Define areas of study - Questionnaire framework - Intermediate deliverables framework	15 Oct. 2012 Ottawa, Canada
2	19 – 22 Mar. 2013 Sao Paulo / Brazil	- Work on intermediate deliverables (e.g. keywords, articles IGU newsletter)	9 – 11 Apr. 2013 Seville, Spain
3	8 – 11 Oct. 2013 Paris/France **New date!**	- Analyse input for study group reports - First draft intermediate deliverables	23 Oct. 2013 Beijing, China
4	3 – 7 Mar. 2014 Madrid / Spain	- First draft WOC 4 report - Final draft intermediate deliverables	25 – 27 Mar. 2014 Brisbane, Australia
5	30 Sept. – 03 Oct. 2014 Vienna/Austria **New date!**	- Final draft WOC 4 report - Final intermediate deliverables - WGC preparation: Papers selection	15 Oct. 2014 Berlin, Germany
6	2 – 6 Mar. 2015 Location tba	- Presentation final WOC 4 report - WGC preparation	24 – 26 Mar. 2015 Cairo, Egypt

Articles for the IGU Newsletter/Magazine

Delivery date:

- June 2013: Flosbach/Klaas on SG 4.2 issues
- June 2014: Vercamer/Vallender on SG 4.3 issues
- December 2014: Broisler Oliver on SG 4.1 issues
- Anyone else who wants to contribute?

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IGU WOC 4 – Any Other Business

- Liaison with PGC F „R & D“?
- EGATEC Conference, May 2013, Paris
- Information IGU-CC

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IGU WOC 4 – End of Meeting

Thank you for your attention!

See you at 19.00 in the hotel lobby, fit for Samba!

Et au revoir à

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Quintessence of 2nd meeting IGU WOC 4 Sao Paulo, Brasil, 20/21 March 2013

- Attendance: 38 members
- Current membership: 79 members
- Good progress in study groups
- No questionnaires for all IGU members
- SG 4.1 started to develop IGU Guidelines
- SG 4.2 taking into account biogas, SNG, hydrogen and shale gases for injection and the consequences thereof on distribution grids
- SG 4.3 covering smart grid development for distribution
- 3 articles for IGU magazine to be developed until December 2014 (06/2013; 06/2014; 12/2014)

IGU SG 4.1 Regulation on Third Party Access to Gas Distribution Networks – A Standard Approach : Deliverables

Objectives:

- Present different experiences around the world regarding TPA legislation and regulation, stage of implementation and evolution
- Indicate impacts of the cases analyzed
- Indentify trends of the TPA around the world
- Prepare a “World Map of TPA”
- Prepare “IGU guidelines” – to be referenced - instead of an “IGU network code” (prescriptive)

IGU SG 4.2 Diversification of Gas Quality and Nonconventional Sources in a Carbon-free Future : How we proceed …

phase 1: Analysis

- Decreasing public- & governmental acceptance of NG as fossil fuel
- “Greening” promotes new image of natural gas
- Chance to contribute to Kyoto target
- Chance to develop additional gas demand

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IGU SG 4.3 Smart Gas Grids in Distribution: Work scheme