

26th World Gas Conference

1 – 5 June 2015, Paris, France



WOC 4 SG 4.2. Report

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Diversification of Gas Quality and Nonconventional Sources

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

SG 4.2 - Study Group Questions

- Why should the gas industry promote new technologies and new gases?
- How will we achieve Government and climate protection targets that reduce CO₂ emissions?
- How do we create a market for substituting gas for coal and oil and make investment sustainable for gas-fired power generation?

SG 4.2 Topics of the Study Group Report

1. Historical experiences & Review
2. Strategy & Global Market effects
3. Developing a Marketing concept
4. Regulation, Tariffs, Incentives & Third Party Access
5. Future Paradigm and Challenges

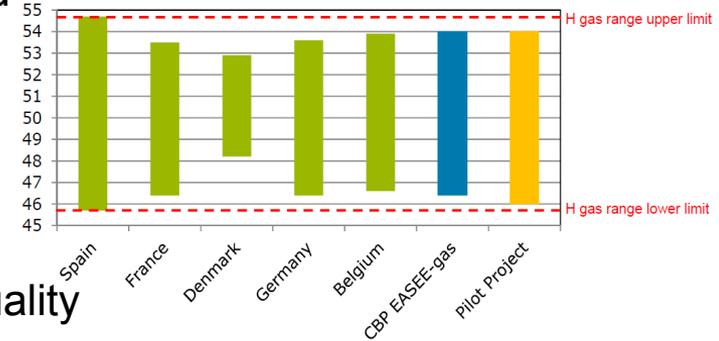
SG 4.2 Study Group Report

Study Group Members:

- Chairman: Peter Flosbach, Dortmunder Energie- und Wasserversorgung GmbH (DEW 21), Westnetz – RWE Group, Germany
- Vice Chairman: Rory Somers, Gas Networks Ireland, Ireland
- Jose Maria Almacellas Gonzalez, Gas Natural Fenosa, SDG, S.A., Spain;
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- Remy Cordier, GDF SUEZ / CRIGEN, France;
- Flemming Jensen, DONG Energy, Denmark;
- Tohru Takahashi, TOKYO Gas CO., LTD., Japan;
- Uwe Klaas, DVGW, Germany;
- Vladimir Klimenko, JSC Gazprom promgaz, Russian Federation;
- Christian Schicketmüller, OÖ. Ferngas Netz GmbH, Austria;
- Dragan Vucur, JP Srbijagas, Serbia;
- Paul D. Wehnert, Heath Consultants, USA – Texas.

Historical experiences & Review

- Wide experience in gas quality diversity across the world
 - H-gas, L-gas, changes from L to H and vice versa
 - variations in Wobbe Index (WI)
- Fluctuations in WI more problematic than fluctuations quality
 - Higher Carbon Monoxide (CO)
 - Poor performance
 - Limit fluctuations to <10%
 - Process sensitivities (e.g. glass, ceramics, steel)
- Bio-gas has been widely employed for many decades
 - usage leads to inefficient heat utilisation from CHP
 - This drives interest in Bio-Methane to Grid

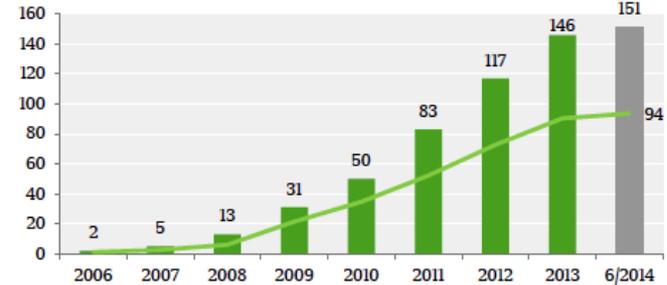


Strategy & Global Market effects

- Fukushima effects
- Shale gas effects
- Security of Supply & Pipeline “trouble spots”
- Increasing LNG
 - LNG & Bio-methane, with suitable storage, can bring sustainable energy diversity to remote locations

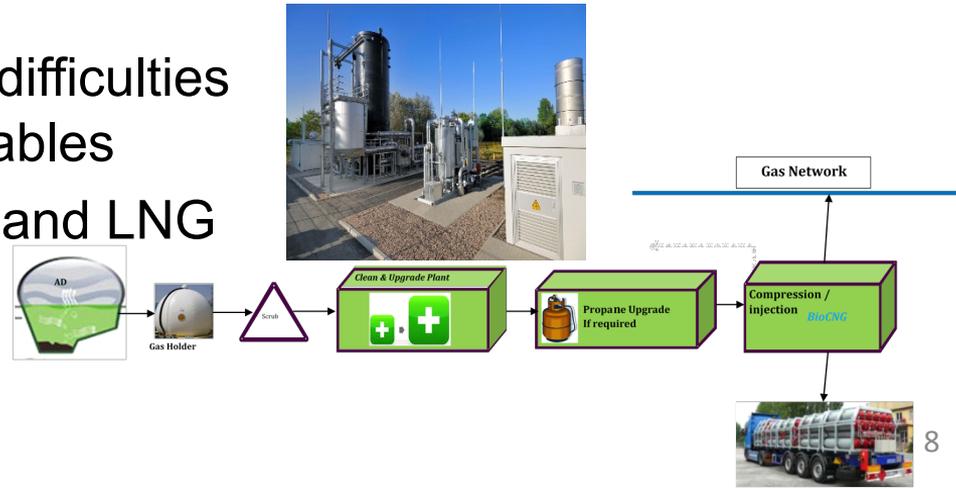
Developing a Marketing concept

- Increased Advocacy from the Gas Industry
- End-users want green energy
- “Greening the gas” is aligned with strategic interests of nations, industry and end-users
- Wind energy has led to market difficulties – Natural Gas supports Renewables
- Expanding the market for CNG and LNG in transport



(Source: dena)

Figure 6.1: Number of injecting biogas plants and development of injection capacity in Germany

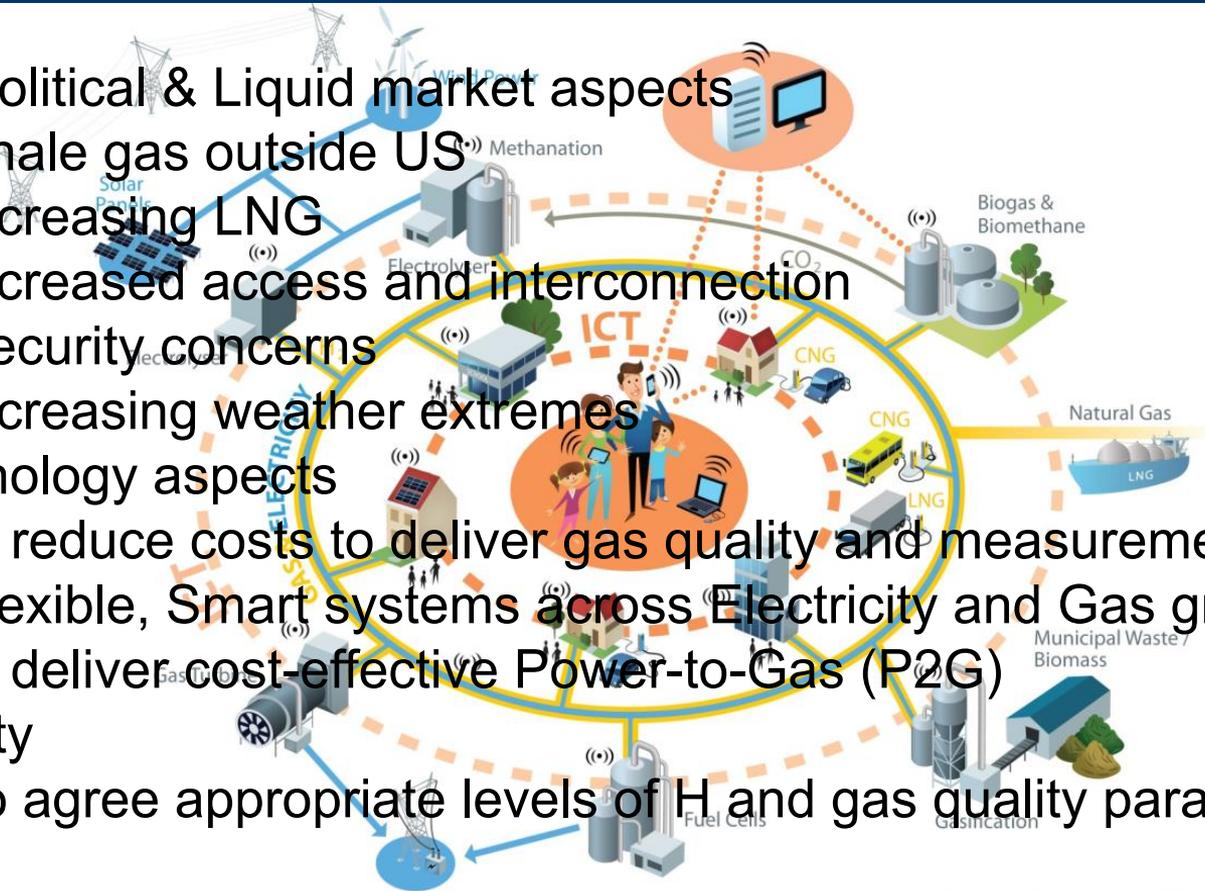


Regulation, Tariffs, Incentives & Third Party Access

- Market regulation required to determine interface points between Producers and System operators
 - This will influence costs to the consumer
- Bio-Methane costs are higher and it must compete with Bio-Gas for Energy incentives
- Bio-Certification is an increasing issue and needs regulation
- Standardisation of the new systems and gas qualities need to be developed to provide a framework for safe, reliable and stable supplies of renewable gas to the end user
 - Historically work was done by industry participants on a national basis
 - Work is increasing to harmonize standards across ISO and CEN
 - % Hydrogen levels in the gas network subject to debate
 - Metal CNG storage tank
 - Turbines
 - Gas storage facilities
 - Process sensitivities (e.g. chemical industry)

Future Paradigm and Challenges

- Geopolitical & Liquid market aspects
 - Shale gas outside US
 - Increasing LNG
 - Increased access and interconnection
 - Security concerns
 - Increasing weather extremes
- Technology aspects
 - to reduce costs to deliver gas quality and measurement
 - Flexible, Smart systems across Electricity and Gas grids
 - to deliver cost-effective Power-to-Gas (P2G)
- Quality
 - To agree appropriate levels of H and gas quality parameters



SG 4.2 Conclusion:

- Far away from a master plan for a global strategy into a carbon-low gas future and the Kyoto targets in 2050
- A common global understanding of the regional gas market mechanisms and gas quality standards was built and shown in the WOC4 report
- The research on gas infrastructures including acceptable gas quality compositions, possible technological and regulatory measures will provide us with a good basis for the development of the master plan for the future
- The "lower carbon gas future" will be classified as a "green gas evolution" instead of a "revolution"
 - ➔ No doubt that gas and our infrastructures will be the key success factor to promote the green energy future



THANK YOU