Results
WOC 4 Study Group 2 (SG 4.2)

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

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The Team

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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 an other markets would be appreciated)
- 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 conception to illustrate the value added by DNOs into a in 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

  ToDo for the next WOC 4 meeting is to presented the status (Remy Cordier)!
- 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 medium 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 custody transfer issues)
- The dramatically increasing demand of electricity storage capacity is a real challenge (following the increase of renewable injection generation)
  - "Wind-Gas" is for the gas industry a challenge 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 experiences gained in the US)
- **Remark: No operative experiences in the SG 4.2 team! (who could support us? Preferred 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 effective (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 to ensure that our costs are covered

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Other matters:

- Incentivise the best location for decentralised injection (proposal from DSOs: Biogas Map with recommended injection locations for lowest grid investments).
- "Summary" Fact sheet needs to be developed
- Jean Schweitzer? (Study on calorific values WGC 2012)
- What is the calorific value/ impact on Wobbe index of Hydrogen compared to natural gas?
- Position papers already existing?
- Characteristics of Nonconventional
  - Hydrogen 11 MJ/m³
  - NG 36 MJ/m³