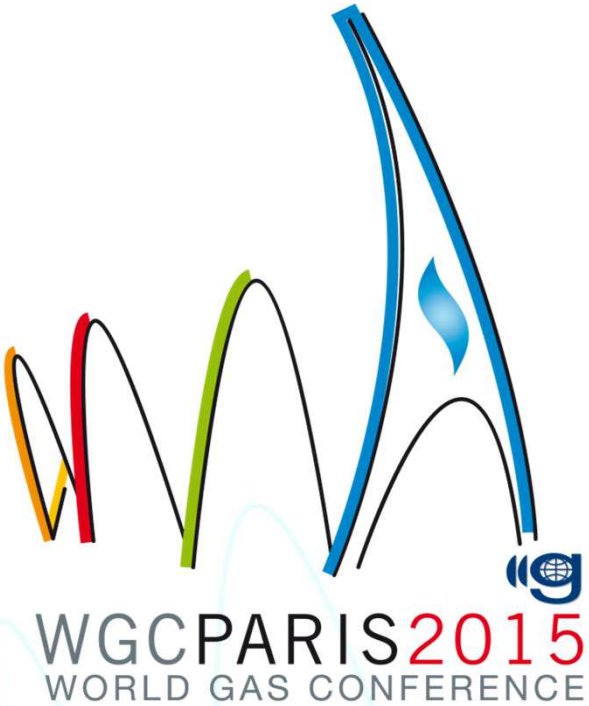

New Transmission Projects, Public Acceptance and New Technologies

Progress Report

PRAGUE, CZECH REPUBLIC
OCTOBER 6 - 9, 2014

Peter Tóth
Alessandro Moretti

CURRENT STATE OF THE OVERAL PROGRESS - as of 6th October 2014

1 | OPTIMIZED SUBJECTS / DONE

2 | GATHERING INFORMATION FROM THE PRIMARY SOURCES / DONE

3 | FINAL REPORT CONTENT / DONE

4 | FINAL REPORT CONTRIBUTIONS / ALMOST DONE

5 | FINAL REPORT: ABSTRACT, CONCLUSIONS AND RECOMMENDATIONS (five sentences) / IN PROGRESS

1 | OPTIMIZED SUBJECTS - as of 6th October 2014

A	TRANSMISSION PROJECTS	Ansgar BRAUER
B	COMPRESSION PROCESS	Peter TÓTH
C	TARIFFS AND REGULATIONS	Mark RAND
D	PUBLIC ACCEPTANCE	François CROCOMBETTE
E	NEW TECHNOLOGIES	Alessandro MORETTI
S	SPECIAL CHAPTERS	Peter TÓTH

2 | QUESTIONNAIRES - as of 6th October 2014

Compressor stations
Compressor units
Compressor drive
Backup philosophy
Power distribution

Table
COMPRESSOR STATION

Strategic projects 2012
Strategic projects 2015
HPD projects 2015
Communication plan
Communication strategy
Risk management
Pipe materials

Template
PROJECT PLAN

Costs comparison
Availability of el. power
Environmental issues

Questionnaire
EL. DRIVE (6Q)

NOx and CO emission limits
Legislation
Technology
Operational range

Questionnaire
EMISSIONS (6Q)

Relation between the Information to Public and the Authorization processes.

Questionnaire
AUTHORIZATION PROCESS(9Q)

IGU WOC3 members
Technology suppliers

Presentations
NEW TECHNOLOGIES

Access to new sources
Promotion
Incentives
Regulations

Questionnaire
NEW SOURCES (7Q)

Rules for distances to habitations
Acceptance criterions
Regulations

Questionnaire
SAFETY DISTANCES (11Q)

Communication
Interaction with the community
Partnership

Questionnaire
PUBLIC ACCEPTANCE (6Q)

DONE
IN PROGRESS
SUPPORT

2 | PROJECT PLANS - as of 6th October 2014

1. Trans Adriatic Pipeline (TAP)
2. Capacity Expansion Ellund-Egtved
3. SK-HU Interconnector DN800
4. GAZELLE project
5. Connection to Oberkappel
6. Poland-Czech Republic Interconnection within the North-South Corridor (STORK II)
7. Moravia
8. Bidirectional Austrian Czech Interconnection (BACI)
9. Eastern Transmission Pipeline
10. Eridan
11. Nord Stream
12. South Stream
13. SP AusNet
14. Power of Siberia

4 | FINAL REPORT - as of 6th October 2014

Chap. 2 Strategic Transmission Infrastructure projects (Ansgar Brauer)

2.1 Overview of main gas supply corridors

- ✓ Europe (Ansgar Brauer)
- ✓ Russia (Vita Bystrova)
- ✓ Middle East (Algeria)
- ✓ North America (Mark Rand)
- • South America (Carlos Sergio Mazzei, Yenitza Malavé)
- • Australia (Deepank Gupta)
- • Africa (Vladimir Bychkov)
- ✓ Asia / China (Takafumi Aoki)

Structure:

Main gas corridors (to include the impact of new conventional and unconventional sources on gas the transmission infrastructure development)

Detailed description of the selected projects (to include the promotion plans and the incentives for specific projects if applicable)

2.1 Conclusions and Recommendations (five sentences)

Chap. 3 Improvements of the Gas Compression Technology and the Performance Optimization (Peter Toth)

3.1 Efficiency of the gas compressors (Peter Toth)
3.2 Increasing of the operational flexibility of the compressor units (Peter Toth)
- ✓ Tandem compressor with variable inlet guide vanes (Peter Toth)

3.3 Compressor drives (Peter Toth)
- Gas turbine drive (Peter Toth)
  - Legislation requirements (Peter Toth)
  - ✓ Technologies used to reduce CO and NOx emission (Technology suppliers)
  - Efficiency of the gas turbines (Peter Toth)
- ✓ Electric drive (Henrik Rosenberg)
  - ✓ Smart Grid conditions / restrictions (Henrik Rosenberg)
  - ✓ Comparison of the electric drive vs. gas turbine drive (Henrik Rosenberg)

✓ 3.4 Distribution of the total power to the particular units in CS (Peter Toth)
✓ 3.5 Optimum distance between compressor station (Ansgar Brauer)
✓ 3.6 Optimization of the required compressor fleet (Peter Toth)
✓ 3.7 Hydraulics simulations of the gas transmission as a reliable tool for the performance optimization (Peter Toth)

3.8 Conclusions and Recommendations (in progress)

4 | FINAL REPORT - as of 6th October 2014

Chap. 4 Tariffs and regulations; a comparison & update (Mark Rand)

Chap. 5 Public Acceptance of Technology and Technical Constructions (François CROCOMBETTE)

- ✓ 5.1 Who are the key public actors? (François CROCOMBETTE)
- ✓ 5.2 Main impacts of gas transmission infrastructure (François CROCOMBETTE)
  - ✓ Construction phase (François CROCOMBETTE)
  - ✓ Operation (François CROCOMBETTE)
  - ✓ Reduction of the environmental impacts (François CROCOMBETTE)
  - ✓ Public perception by the different stakeholders (François CROCOMBETTE)
  - ✓ Environmental and social impact assessment (Ansgar Brauer)
  - ✓ Social and environmental investment (Ansgar Brauer)
- ✓ 5.3 Stakeholder management (Carlos Sergio Mazzei)
- ✓ 5.4 Effective communication with the public (Peter Toth)
- ✓ 5.5 Internal processes of companies for the communication with the public (Peter Toth)
  - ✓ Regulations on communication with the public
  - ✓ Interaction with the community around technological facilities
- ✓ 5.6 Mitigation during and after technology construction (Martin Slabý)

5.7 Conclusions and Recommendations (in progress)

Chap. 6 New technologies (Alessandro MORETTI)

6.1 Technologies in the area of Safety and Reliability:

- In line inspection (Oľga Cherkashina, Jury Dergausov)
- Inspection for deep-water pipelines (Oľga Cherkashina, Jury Dergausov)
- Welding inspection technologies (Oľga Cherkashina, Jury Dergausov)
- Leak detection (Oľga Cherkashina, Jury Dergausov)
- ✓ Flow meters (Takafumi Aoki)
- ✓ Gas treatment plants (Kristin Kinn Kaste)

6.2 Technologies in the area of Environmental Footprint Reduction:

- ✓ Technologies used to reduce CO and NOx emission (Technology suppliers)
- ✓ Reduction of the methane emissions (Vladimír Potočný)

6.3 Technologies in the area of Pipelines / Compression process:

- Subsea applications of the compressor stations (Vladimír Bychkov)
- ✓ Pipe materials (Sinobu Kawaguchi, Technology suppliers)
- ✓ Welding technologies (Woosik Kim)
- ✓ Hot taps (Ian Fordyce)
- ✓ Cold shells (Vladimír Potočný)
- ✓ Coatings (current state Ian Fordyce + Ansgar Brauer+ Vladimír Potočný)

6.4 Conclusions and Recommendations

4 | FINAL REPORT - as of 6th October 2014

Chap. 7 Construction of Pipelines in Areas of High Population Density

- ✓ Case study: *Korea (Sung Baek Hong)*
- ✓ Case study: Japan (*Shinobu Kawaguchi)*

Chap. 8 Alternative Utilization of Pipelines

- ✓ Hydraulic simulations of the CO2 transportation (Andrzej Osiadacz)
- ✓ Technical challenges of the CO2 pipeline transportation (Carlo Spinelli / ENI)

Chap. 9 Conclusions and Recommendations (All SG members)

Chap. 10 Appendices – Application of the New Technologies (Authors)
Summary of the technical presentations in the area of new technologies presented during our meetings by our members and technology suppliers.

Chap. 11 Appendices – Project plans
List of the Project plans.

ACTION POINTS - as of 6th October 2014

1. Appointed SG1&3 members will send their contributions by **end of October 2014 at the latest.**
2. All SG1&3 members will prepare five (at least) sentences for the **ABSTRACT, CONCLUSION AND RECOMMENDATIONS as soon as possible.**
3. **Updated report will be send to** SG1&3 members by the **15th November 2014** for final comments.
4. **Target: To finalize the Report by the end of December**

Thank you for your attention.