4 December 2008

Original: ENGLISH

ECONOMIC COMMISSION FOR EUROPE

COMMITTEE ON SUSTAINABLE ENERGY

Working Party on Gas

Third expert meeting on the update of the
UNECE Study on Underground Gas Storage in
Europe and Central Asia

Geneva, 29 October 2008

REPORT OF THE MEETING

I. INTRODUCTION AND ELECTION OF OFFICERS (Agenda item 1)

1. The third expert meeting on the update of the UNECE study on "Underground Gas Storage in Europe and Central Asia" was held on 29 October 2008. It was attended by representatives from the following UNECE member countries: France, Germany, Hungary and Netherlands. Representatives of Gas Infrastructure Europe and International Gas Union were present as well.

2. Mr. G-H. Joffre, Chairman of the Bureau of the Study, was elected to serve as Chairman of the meeting.

II ADOPTION OF THE AGENDA (Agenda item 2)

2. The agenda was adopted.

III TERMS OF REFERENCE FOR THE LAUNCH OF UPDATE OF THE UNECE STUDY ON UNDERGROUND GAS STORAGE IN EUROPE AND CENTRAL ASIA (Agenda item 3)

3. As a follow-up to the valuable contributions provided by the representatives of France, Germany, Hungary and Netherlands and in particular by the representatives of Gas Infrastructure Europe and International Gas Union, the participants further refined and approved an updated version of the Terms of Reference for the Study, which is given in the annex of this report. While

structure of the project, its chapters and focus from the previous version were maintained, numerous modifications related to the structure of individual chapters and clear demarcation of tasks among those chapters.

4. Heads of Chapters were asked to further develop contents of the chapters as well as to identify their contacts for every UNECE country in close cooperation with International Gas Union and Gas Infrastructure Europe.

5. A new definition of market areas or market influence was adopted. It is given in Annex One of this report. Participants underlined that the market areas would be subject to continuous review as the Study advances.

6. The current version of the Terms of Reference for the Study, given in Annex One of this report, might be further revised at the fourth expert meeting on the update of the UNECE Study on Underground Gas Storage in Europe and Central Asia, scheduled to take place in Geneva, on 7 January 2009 before being submitted for approval to the nineteenth session of the Working Party on Gas on 20-21 January 2009.

Item IV ELECTION OF OFFICERS OF THE STUDY (Agenda item 4)

7. The participants decided to modify Bureau of the Study. Mr. Keneth McKellar (Deloitte&Touche LLP, United Kingdom) was removed from the position of Vice-Chairman.

8. While numerous suggestions were made on filling-in the positions of Heads of Chapters, and the UNECE secretariat asked to get in contact with suggested companies and executives, the previous structure remained unchanged:[1]

Chapter One: Representatives of Germany (Mr. Hermann Spreckels, E.ON Gas Storage GmbH, Germany, participation) and United Kingdom (some suggestions made, including Centrica)
Chapter Two: Mr. Mircea Sandu, (Romgaz, Romania) and Mr. Joachim Wallbrecht (BEB Erdgas und Erdöl GmbH, Germany) as representative of IGU with Ms. Petra Grigelova (RWE Trangas Net, Czech Republic) as alternate to Mr. Wallbrecht when he is absent
Chapter Three: Mr. Gilles-Henri Joffre (GdF-Suez, France) and Mr. Ulrich Duda (E.ON Gas Storage GmbH, Germany - participation)
Chapter Four: Representative of Italy (selected suggestions made, including Stogit), Mr. Joachim Wallbrecht (BEB Erdgas und Erdöl GmbH, Germany) as representative of IGU with Ms. Petra

[1] Mr. Alexander Ramm (RWE Energy Aktiengesellschaft Storage System Operator, Germany) also joined the expert team of the study and will decide on suitable chapters for his contribution during the Expert Group meeting on 7 January 2009 in Geneva.

Grigelova (RWE Trangas Net, Czech Republic) as alternate to Mr. Wallbrecht when he is absent and Mr. Ulrich Duda (E.ON Gas Storage GmbH, Germany - participation).
Chapter Five: Mr. Tamas Korosi (Hungarian Energy Office, Hungary)
Chapter Six: Mr. Gerard H. Martinus (GasTerra, Netherlands) and a representative of Germany (selected suggestions made), and possibly a representative of Denmark (preferably DONG), or of Austria or Slovakia, with a selected input from the US gas industry
Chapter Seven: Mr. Gerard H. Martinus (GasTerra, Netherlands), Mr. Joachim Wallbrecht (BEB Erdgas und Erdöl GmbH, Germany) as representative of IGU with Ms. Petra Grigelova (RWE Trangas Net, Czech Republic) as alternate to Mr. Wallbrecht when he is absent, Mr. Sergei Khan (Gazprom, Russian Federation) and Mr. Ulrich Duda (E.ON Gas Storage GmbH, Germany-participation).

9. Representatives of International Gas Union and Gas Infrastructure Europe fully supported the work on the Study and pledged to cooperate in its execution and on filling-in the positions of Heads of Chapters. International Gas Union identified in particular the following areas of cooperation with the UNECE on this Study: technology assessment, completion of database in particular with regard to Central Asia and Caucasus, trends in storage business and current demand and demand forecast. Gas Infrastructure Europe (GIE) would be ready to assist where possible by providing available information and position papers elaborated by its storage column Gas Storage Europe (GSE). GSE will also keep updating its members about the progress of the study thus facilitating UNECE liaison with some companies.

Item V ADOPTION OF THE CALENDAR OF WORK (Agenda item 5)

10. The next meeting of the Bureau and Heads of Chapters and other interested delegates will take place on 7 January 2009, Palais des Nations, Geneva. The main purpose of this meeting would be to complete the appointment of Heads of Chapters and to approve the final draft of Terms of Reference, with a more detailed description of chapters. Those Terms of Reference will be submitted to the UNECE Working Party on Gas on 20-21 January 2009 for the adoption.

11. The participants agreed that the Study should be completed in the course of 2010, with a definitive detailed 2009/2010 calendar to be developed and discussed at the next meeting in January 2009.

VI OTHER BUSINESS (Agenda item 6)

12. Meeting participants decided that Mr. G-H. Joffre (Gdf-Suez, France), Mr. G. Martinus (GasTerra, the Netherlands), Mr. T. Korosi (Hungarian Energy Office, Hungary), Mr. G. Radu (Romgaz, Romania), Mr. Wallbrecht (BEB, Germany and IGU) and Ms. M. Kamola (Gas Infrastructure Europe, Belgium) would serve as panellists at the Round Table on Underground Gas Storage in the UNECE Region , which will take place in the morning of 20 January 2009 at the occasion of the annual session of the UNECE Working Party on Gas on 20-21 January 2009.

Equally, it was accepted that the UNECE secretariat would invite a number of other gas industry executives in the UNECE region to join the Round Table.

13. Participants reiterated that it would be important to include maps of showing the market influence of each UGS and availability of transmission network into the study. While International Gas Union and Gas Infrastructure Europe kindly offered their cooperation in this respect, the meeting delegates felt that the reliance on additional secondary sources such as selected websites and on primary data from Central and Eastern Europe and Central Asia would be the most appropriate approach.

14. Representatives of GdF-Suez and Hungarian Energy Office offered to assist the UNECE secretariat in finding solution to cover the cost of hosting a lunch and a reception during the annual session of the UNECE Working Party on Gas in January 2009, which would promote further the work on the Study on Underground Gas Storage in Europe and Central Asia.

15. As a follow-up to the detailed presentation of the UNECE secretariat on the progress on the UNECE Study on "Current Status and Prospects for Liquefied Natural Gas (LNG) in the UNECE region", the meeting participants requested the secretariat to circulate its Terms of Reference among delegates taking part in the UNECE Underground Gas Storage Study.

VII ADOPTION OF THE REPORT (Agenda item 7)

16. The expert group adopted the report of its third meeting on 29 October 2008.

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Annex One

STUDY ON UNDERGROUND GAS STORAGE IN EUROPE AND CENTRAL ASIA

OR

STUDY ON UNDERGROUND GAS STORAGE IN THE UNECE REGION 2010

DRAFT OUTLINE – TERMS OF REFERENCE

Introduction

The current and expected increase in natural gas demand in the UNECE region, coupled with the greater complexity of natural gas market operations and change in sources of supply, requires all natural gas market players to optimize flows of natural gas in order to ensure uninterrupted supply of the fuel, its delivery at competitive prices and flexibility in meeting demand peaks as well as various other consumer needs. While efficient operation of the natural gas industry is certainly a prerequisite for the vast majority of companies for maintaining desirable profitability and meeting prescribed technical standards and safety requirements, it is also considered to be a condition for improving security of supply.

The expected rise in demand for natural gas in the UNECE region over the next 15 to 25 years, in the framework of the sharp increase in import dependency for most of the countries, has further accentuated the pressure on the natural gas industry to guarantee reliable delivery from ever increasing distances at a competitive cost. Underground gas storage within the whole industry chain plays an important role in securing a reliable and efficient supply of natural gas to industrial, residential and other consumers in the region.

Considerable recent and ongoing changes in the functioning of the natural gas market in the UNECE region have also affected the underground natural gas storage sector. New legislation has been introduced, including at the European Union level, which opened the sector to competition together with third-party access provisions. Unlike the past experience, where the key national natural gas industry players had a long investment horizon and little uncertainty with regard to the use of their underground natural gas storage facilities, in the current and expected market and regulatory framework, investment decision-making becomes more difficult. Potential new requirements regarding security of supply, unhindered access to third parties and ever higher standards for transparency of operations and clarity of price mechanisms also make it difficult for the key operators to make timely decisions on the investment needed in this major part of the natural gas value chain.

Underground gas storage services as the backbone of flexible and reliable natural gas infrastructure

With the deregulation and liberalization of the natural gas industry in the UNECE region, the natural gas industry has to rely more on the increasing role of underground natural gas storage facilities. In addition, new services have been developed and new roles designed, such as underground gas storage swaps and transforming the storage facilities into the backbone of hub operations. In turn, they have contributed considerably to the integration of the gas markets in the UNECE region with the development of facilities which serve regional needs and convert a set of national markets into a truly regional or even, as in the case of the European Union, into a European industry. In addition, considerable decline in transport tariffs in Europe also reinforced trend of an increasing reach of underground gas storage facilities.

To ensure the continuing efficient functioning of underground gas storage facilities in the UNECE region, a good understanding of the current and expected industry trends is essential. Also, the consequences of the regulation of the natural gas market and gas storage must be anticipated and their financial consequences estimated in a timely manner. It is therefore of vital importance both for governments and corporations to undertake a continuous assessment of the key trends in the underground gas storage sector and accordingly adjust their strategic, operational and investment decisions.

The purpose of the UNECE study on underground gas storage is to review the main trends in the sector with a view to increasing the visibility of future capacity and investment needs as well as the regulatory, cost and operational challenges. It should also identify potential problem areas which might inhibit the sector's ability to continue providing the desired services in a timely and affordable manner. Finally, it should assist gas companies in making informed investment decisions in underground gas storage facilities with obvious benefits for natural gas end-user.

Structure of the UNECE study on underground gas storage

Introduction

Executive summary

Methodology employed and sources

-Information gathering
-Structure of update
-Confidentiality

Chapter One: New and emerging technologies and technological improvements in underground gas storage
Heads: Representatives of Germany - Mr. Hermann Spreckels (E.ON Gas Storage GmbH, Germany, participation) and United Kingdom (some suggestions made, including Centrica)

- Subsurface and surface technological trends and improvements
- Intelligent UGS (operational optimization)
- Commercial optimization software
- Technical developments (delta pressure, horizontal drilling, …)
- Monitoring
- Reducing environment impacts
- Offshore technology for storage
- Surface and subsurface infrastructure
- Competition with CO_2 storage
- Storage in combination with regasification of LNG

Chapter Two: Current UGS status in Europe and Central Asia
(Chapter could be brief as it is an update of the existing study)
Heads: Mr. Mircea Sandu, (Romgaz, Romania) and Mr. J. Wallbrecht (BEB, Germany) as representative of IGU with Ms. Petra Grigelova (RWE Trangas Net, Czech Republic) as alternate to Mr. Wallbrecht when he is absent

- Existing UGS by country – Technical analysis
- Minimum data:
  - working volume,
  - total volume,
  - maximal send-out capacity,
  - maximal send-in capacity
  - annual cycles
- impact of declining capacities as in caverns - capacity outlook
- focus on a synthesis by market area
- Role for production of crude oil and natural gas (brown fields) – requires clarification
- Cooperation with IGU including use of their data base mandatory

Chapter Three: Market structure and legal framework analysis

Head: Mr. Gilles-Henri Joffre (GdF-Suez, France) and Mr.Ulrich Duda (E.ON Gas Storage GmbH, Germany - participation)

- Status of existing market structure, incl. access to storage capacities, and regulation by country
- Legal Framework
    - Regulatory documentation : list of references to regulatory texts that govern gas storage activity
        - philosophy / goals
        - current discussions and initiatives on the regulatory framework and possible evolutions in the coming years
    - Regulatory context :
        - philosophy / goals
        - current discussions and initiatives on the regulatory framework and possible evolutions in the coming years – requires differentiation from previous bullet point or deletion
    - Type of regulation : negotiated, regulated, hybrid, exemption
    - Frameworks for the storage allocation rules : priority order, in addition to the public service obligation defined by the law
    - Regulatory framework or guidelines for the storage service offers :
        - Marketing processes (opens season , auctions, …)
        - Contract durations
        - Injection, withdrawal and working capacities offering (bundle and not bundle)
        - Max notice schedule before starting a storage service contract
        - Max amount of maintenance days
        - Obligation to resell non sold storage capacities
        - Authorisation for a secondary market of storage capacities
    - Regulatory Frameworks for storage service pricing[2]
        - Price structure
        - Pricing of service options
- Storage market / offer[3]
    - Storage position / companies
    - Short term and long term offers (current position)
- Relation UGS versus LNG

[2] To be conducted in the way compatible with open competition and price transparency principles of the UNECE countries and steer clear of any work which could lead to the price-fixing possibilities in any way

[3] Originally proposed to be in this chapter, the following elements are in fact integral part of Chapter Seven: Gas demand (Historical gas demand, Demand projections, Gas demand seasonality and volatility), Gas supply (Imports / exports / home production (current status and projection) and Storage demand: need of modulation (need of WGV and withdrawal capacity).

- Access to the transmission network and transportability (Description of procedures as requested by regulator proposed by gas companies including the evaluation on possible trend towards a prevailing mechanism)

Chapter Four: UGS projects and criteria for the selection of potential UGS facilities
(Chapter could be brief as it is an update of the existing study)
Heads: Representative of Italy (selected suggestions made, including Stogit), Mr. Joachim Wallbrecht (BEB Erdgas und Erdöl GmbH, Germany) as representative of IGU with Ms. Petra Grigelova (RWE Trangas Net, Czech Republic) as alternate to Mr. Wallbrecht when he is absent and Ulrich Duda (E.ON Gas Storage GmbH, Germany - participation).

- Planned projects by country and type, and focus on a synthesis by market area
- Estimated working volume and capacities
- Overview of potential sites by country
- Can be rather brief, as it is an update of the existing study
- Cooperation with IGU including use of their data base mandatory

Chapter Five: Legal framework for development and operation of storage (incl. Permitting process)
Head: Mr. Tamas Korosi (Hungarian Energy Office, Hungary)

- Information by country about the legislation and procedures for granting consent/ authorization to Storage Systems Operators (SSO) to implement UGS projects.
- European Union countries with a common regulatory background (directives and Guidelines for Good TPA Practice for Storage Systems Operators (GGPSSO)) - to be transferred to Chapter 3 as directly linked to Regulatory aspects ?
- Non-European Union countries
- Mining laws per country and storage
- Fiscal framework
- Authorization for existing assets (renewal and extension) and for new projects
- (*incl. Above*)
- Landownership (expropriation,.easements,…)
- Legal framework for use of UGS for brown fields
- Safety
- Legal and fiscal aspects of cushion gas
- Comparison European Union countries versus Non-EU countries

Chapter Six: Cost of storage

(The scope of this chapter should be carefully defined. It is important to be not too ambitious because of confidentiality issues, especially for investment expenses (second part hereunder).
Heads: Mr. Gerard H. Martinus (GasTerra, Netherlands) and possibly a representative of Denmark (preferably DONG), or of Austria or Slovakia, with a selected input from the US gas industry

- Regulated versus unregulated storage facilities to be specified: Comparison of regulated and unregulated costs on a country by country basis ?
- Cost of service of existing storage facilities in Europe
    - TPA tariff overview
    - Impact of regulatory framework on costs (qualitative)
    - Other, including cushion gas
- Cost of greenfield construction, preferably in Europe (use of public information only), but United States might serve as proxy
    - Cost specification by storage type (cavern, aquifer, depleted field)
    - Influence of reservoir characteristics on cost range
    - Impact of regulation and /or legislation (environment for example) on costs
- If possible: comparison of cost of storage in EU versus the US: commercial outlook for new storage facilities
- Value and viability of UGS as independent asset for companies (valuation and potential for mergers and acquisitions)

Chapter Seven: Outlook and main expected trends of gas markets and UGS developments (by country and regions)
Heads: Mr. Gerard H. Martinus (GasTerra, Netherlands), Mr. Joachim Wallbrecht (BEB Erdgas und Erdöl GmbH, Germany) as representative of IGU with Ms. Petra Grigelova (RWE Trangas Net, Czech Republic) as alternate to Mr. Wallbrecht when he is absent, Mr. Sergei Khan (Gazprom, Russian Federation) and Mr. Ulrich Duda (E.ON Gas Storage GmbH, Germany-participation).

- Gas supply (imports/exports, origin)
- Demand forecast (to use available data of International Energy Agency)
- Demand structure (households, commercial sector, power, industry, other)
- (*See above*)
- Gas demand seasonality and volatility - need for modulation
- Storage demand (need for WGV and withdrawal capacity)

- Ownership distribution in the UNECE region – requires clarification if it will be covered in the market structure in Chapter 3 or the Expert Group intends to give an outlook of further developments in ownership structure in the region
- Periods: 2015, 2020
- Baseline projection, plus impact of renewable target (EU 20% in 2020) on storage demand
- Implications of regulation on strategic storage for the development of new UGS's
- Use of IGU outlook desirable

Conclusion and recommendations, comparison with the first UNECE study

Annexes: Glossary, contact details, maps, database, units, bibliography.

Definition of market areas

Following the discussion during several months of the UNECE experts and their written proposals on definition of market areas, the UNECE Task Force decided on the matter as follows:.

- Area A. Western Europe (Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Norway, Sweden, Switzerland, United Kingdom)
- Area B. Central Europe (Czech Republic, Hungary, Poland, Slovak Republic)
- Area C. West Mediterranean (Italy, Spain, Portugal)
- Area D. East Mediterranean (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Greece, Malta, Montenegro, Former Yugoslav Republic of Macedonia, Romania, Serbia, Slovenia, Turkey)
- Area E. North-East Europe (Belarus, Estonia, Finland, Latvia, Lithuania, Russian Federation, Ukraine)
- Area F. Central Asian and Caucasus (Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Uzbekistan)

Method and organization of work

The UNECE Task Force is under way to nominate heads for each chapter. Heads of chapters could also establish their own teams. The depth of each chapter will be discussed and related details agreed.

Particular attention will be devoted to the sources of primary information (focal points in individual countries and relevant corporations) as well as to secondary information, to avoid duplication of

effort and make efficient use of already available data (the ongoing work within the International Gas Union, Gas Infrastructure Europe as well as the Study on Natural Gas Storage in the EU).

The inclusion of all relevant countries in the Task Force is of paramount importance for the success of the Study. All Task Force members will provide suggestions and recommendations in this regard.

Work progress will be assessed regularly, at three-month intervals with meetings taking place in various UNECE member countries, primarily hosted by the members of the UNECE Task Force.

Time framework

The definitive outline/terms of reference should be presented to the annual session of the UNECE Working Party on Gas, to be held on 20-21 January 2009, in Geneva, Switzerland.

The Study should be completed in the course of 2010.

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