STORAGE AT THE INTERSECTION OF MAIN PIPELINE SYSTEMS IN THE CENTER OF EUROPE

Michael Kreuz
OMV Gas
Austria
ABSTRACT

This paper will outline how OMV Gas has been able to develop an important and significant storage product portfolio from an economic standpoint. This portfolio has proved to be particularly well adjusted to demands from historical and newly acquired customers. I will discuss how this range of products has shown great flexibility to accommodate clients’ demands.

In 2002, the gas market in Austria was revolutionised after a very important new legislation was introduced in Austria. As a supplement to this, in 2005 the Guidelines of Good Practice for Storage System Operators (GGPSSO) were rigidly enforced. Immediately after, EU regulators instructed all member states to adopt them in their business practices. Against this background, OMV Gas was able to quickly adapt to this new operational context. OMV Gas was facilitated in its adaptation to these new guidelines, thanks to previous legislative decisions which had been adopted much earlier in Austria than elsewhere in the EU.

As Head of OMV Gas Storage Group, I have followed closely the conceptualisation, marketing and testing of a variety of products aimed at traditional OMV Gas clients. I was able to collect and interpret client-feedback data which significantly helped the company to improve these products and so respond in more efficient way to clients’ needs.

The paper also includes an overview of the Austrian gas industry. It provides the main figures related to it.

The paper furthermore outlines the infrastructure concerning transmission pipelines, storage and their location at Baumgarten.

In my conclusion, the paper outlines the significance of these innovative approaches adopted by OMV Gas and how they enhanced the quality of the relationship the company has had with its own old and new clients.
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1. OMV GAS AS A COMPANY

Structure Business Unit OMV Gas

OMV Gas International

OMV Gas

Nabucco

EconGas

Petrom

20 %

50 %

This graph shows the company chart of OMV Gas International. It is a holding company which has four subsidiaries. One of these is OMV Gas. EconGas is the trading arm in this holding. In this chart, Petrom is the gas part of Petrom in Romania. Nabucco represents 20% share of the international legal entity called Nabucco International which is currently being formed with companies in Hungary, Romania, Bulgaria and Turkey.

At the moment there are roughly 270 employees in OMV Gas. The turnover in 2004 amounted to EUR 775 million with an EBIT of EUR 65 million.

2. MAIN FIGURES OF THE AUSTRIAN GAS INDUSTRY

In this table you can find the main figures of Austria’s gas industry (bcm = billion cubic meter = 10^9 m³):

<table>
<thead>
<tr>
<th>Demand in Austria</th>
<th>8.6 bcm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic production</td>
<td>1.2 bcm</td>
</tr>
<tr>
<td>Imports to Austria</td>
<td>7 bcm</td>
</tr>
<tr>
<td>- Russia</td>
<td>5.8 bcm</td>
</tr>
<tr>
<td>- Norway</td>
<td>0.9 bcm</td>
</tr>
<tr>
<td>- Germany</td>
<td>0.3 bcm</td>
</tr>
<tr>
<td>UGS volume</td>
<td>2.8 bcm</td>
</tr>
<tr>
<td>Transmission</td>
<td>42.7 bcm</td>
</tr>
</tbody>
</table>

Table 1: Austrian gas industry (2004)

The significant numbers concern first the national demand. This is 8.6 bcm. This figure is a slight increase compared to the previous year. Current forecast anticipates that this year there will also be a slight increase. The performance of the last five years has also been characterised by a slight increase of about 2% per year on an average.

Following the above information, the import indicated in the lines pertains to the volumes from Russia, Norway and Germany quotes for a total of 7 bcm.

The rest as you can see is produced domestically. The significant figure is clearly the import quota coming from Russia. It has remained stable over the last five years. This reflects the rigidity of the contracts which were negotiated in the 1960s, 1970s and 1980s. The significant voice referring to Germany has to do with the fact that western Austria is supplied from Germany. The imports coming from Norway started in the middle of the 1990s. This gives us the opportunity to diversify our import portfolio.
3. INFRASTRUCTURE AND LOCATION

Baumgarten is the name of OMV Gas import station. This is located 2 km before the border with Slovakia. This station is situated at a very important intersection point: pipelines come to it from the east – namely Russia via the Ukraine and Slovakia. Pipelines then lead south towards Italy, Slovenia and Croatia. Pipelines also lead west towards Germany and France. Lastly, one pipeline leads towards Hungary. In the not so distant future Nabucco pipeline will open a gateway of imports to the centre of Europe coming from the Middle East and the Caspian region.

At present the main stream of the gas is transported to Italy via our largest pipeline system TAG (about 40 bcm/year).

![Pipeline Map]

We shall now focus on the Austrian main pipeline systems. There are five main transmission systems that are operated by OMV Gas. The table below gives you an overview of what they are.

<table>
<thead>
<tr>
<th>Pipeline</th>
<th>Length (km)</th>
<th>Diameter (inch)</th>
<th>Pressure (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAG</td>
<td>380</td>
<td>36 – 42</td>
<td>70</td>
</tr>
<tr>
<td>SOL</td>
<td>26</td>
<td>20</td>
<td>70</td>
</tr>
<tr>
<td>WAG</td>
<td>245</td>
<td>32</td>
<td>70</td>
</tr>
<tr>
<td>HAG</td>
<td>46</td>
<td>28</td>
<td>70</td>
</tr>
<tr>
<td>Penta West</td>
<td>95</td>
<td>28</td>
<td>84</td>
</tr>
</tbody>
</table>

Table 2: Pipelines

- **TAG (Trans-Austria-Gas line)**

This system consists of two parallel pipelines and from 1st January 2007 three lines running from Baumgarten to Arnoldstein at the Austrian-Italian border with a diameter of 42/38/40 inches. It is about 380 km long and has three compressor stations (18 units) with a combined capacity of 286 MW. These three lines ensure a total transport capacity of 41 bcm/year. The pipeline is primarily used as the main import line for Russian gas to Italy.
- **SOL (Süd-Ost-Leitung)**

   This is a branch line from the TAG system to the Slovenian border with a total length of 26 km. It supplies Slovenia and Croatia with Russian import gas, has a diameter of 20 inches and a capacity of 3 bcm/year.

- **WAG (West-Austria-Gas line)**

   The WAG system is about 245 km long with a diameter of 32 inches. At the moment the capacity based on 2 compressor stations is 6.5 bcm/year. The main carriers are Gaz de France and E.ON Ruhrgas. Since 1998 the pipeline has been operated in both directions – to supply Hungary with imports from the west.

   The extension of the WAG system to the east is HAG.

- **HAG (Hungarian-Austrian-Gas line)**

   In 1996, the HAG system started to offer the opportunity to connect the Hungarian high pressure network with the Baumgarten hub and beyond, with the west European network. The HAG system therefore has since then enabled Hungary to diversify its gas imports. On Austrian territory the pipeline has a length of about 46 km and a diameter of 28 inches. For the time being, the flow capacity is, without any compressor station, 4.5 bcm/year.

- **Penta West**

   It leads from Oberkappel (WAG metering station at the German border) along the German/Austrian border to Burghausen in Bavaria. It is about 95 km long, the diameter is 28 inches and the flow capacity without compression is calculated at 4 bcm/year. The pipeline was finished at the end of 1999 to supply the southeast Bavarian region.

- **Storage**

   The UGS facilities in Austria are very well located at the cross roads of these big pipelines.

   Austria imports its gas mainly from Russia. Until the middle of the 1990s, Austria’s imports depended 100% on Russian sources. However, starting in 1993 natural gas from the Troll contract has been delivered to Austria. This gives us the chance/advantage of being more independent away from only one source.

   As you may be aware of, Austria was the first country in Western Europe to sign a gas import contract with the former Soviet Union in 1968. It is important to point out that the supply of gas from Russia or the former Soviet Union was managed without any major problems – and this over a period of nearly 40 years.

   Moreover, a further point is that the long lasting dominant supply situation was the reason for Austria’s abundance of storage capacity. At the moment, there are four UGS in operation in Austria. Three of these belong to OMV Gas. The total working gas volume is 2.8 bcm, i.e. around 35% of all gas consumed. Taking into account the import quantities such a relationship between gas imports and storage volume peaks at some 45%. Because of this, Austria is the number one in Europe.
Technical details for UGS in Austria:

<table>
<thead>
<tr>
<th>UGS</th>
<th>Depth (m)</th>
<th>Pressure (bar)</th>
<th>Number of wells</th>
<th>Working gas (Mm³)</th>
<th>Rate (1000 m³/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schönkirchen/</td>
<td>500 – 1,400</td>
<td>max. 120</td>
<td>124</td>
<td>1,570</td>
<td>770</td>
</tr>
<tr>
<td>Reyersdorf</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tallesbrunn</td>
<td>750</td>
<td>max. 75</td>
<td>24</td>
<td>300</td>
<td>160</td>
</tr>
<tr>
<td>Thann</td>
<td>650</td>
<td>max. 60</td>
<td>17</td>
<td>250</td>
<td>130</td>
</tr>
<tr>
<td>Puchkirchen</td>
<td>1,100</td>
<td>max. 115</td>
<td>6</td>
<td>700</td>
<td>290</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>171</td>
<td>2,820</td>
<td>1,350</td>
</tr>
</tbody>
</table>

Table 3: UGS in Austria

4. NEW AUSTRIAN GAS LAW

In the past, the law which regulated Austria’s gas market was centred around a highly regulated market. With the complete liberalisation of the market the main principle of this law had to be changed. It focused on the total opening of this same market. This change occurred in October 2002 after long discussions which involved all concerned parties. OMV Gas was actively taking part in these consultations and the department Storage was asked for comments and contributions.

With the enforcement of this new law the market model changed overnight to adjust to the new legal framework. The most significant items in this new law are summarised briefly below. The law instructs that the third party access (TPA) to storage should be open to everybody. Furthermore it indicates that tariffs must be cost-based and they must not exceed the EU average tariff by more than 20%.

Lastly all contracts must not be discriminating against any concerned economic actor. To provide evidence for such undiscriminating behaviour gas companies have to produce documents to substantiate their open selection procedure. The body elected to consider such evidence is the regulatory authority in Vienna called E-Control (stands for energy control).

E-Control is a body which is made up of a number of officials who are not political appointees but are directly involved in energy related policies. They have the power to ask details about all procedures or decisions carried out by the companies regulated by this law. The importance of this body’s work lies in the extent to which they can regulate in cases where they deem that a clause in the law has not been respected.

5. GUIDELINES OF GOOD PRACTICE FOR STORAGE SYSTEM OPERATORS (GGPSSO)

These guidelines provide a framework with indications for companies to follow as a model. Various lobbying groups – e.g. Gas Storage Europe (GSE) – recommend now to implement these guidelines as fast as possible to avoid regulation of storage by a European directive. Most of the storage system operators within the EU make best efforts or have already implemented these guidelines.

These guidelines are not compulsory and are only considered voluntarily by various parties. The basis for these guidelines is the Directive 2003/55/EC with respect to storage in particular; the following rules have been defined:

Each member state can choose which procedure to follow to access storage either on a negotiated or on a regulated basis. These procedures shall operate in accordance with objective, transparent and non-discriminatory principles and criteria. On the one hand of negotiated access, storage system operators are required to publish their main commercial conditions for use of storage. On the other hand of regulated access member states (regulators) are obliged to publish tariffs and other terms and obligations for use of storage.
In the paper I will now turn to briefly discuss these principles and their significance.

These guidelines were introduced on 1st April 2005. The response by the major EU member states was of great interest right from the beginning. Austria’s OMV Gas in particular reacted very positively. In fact, the main points of these guidelines had already been practiced by OMV Gas as the national market had “opened up” in 2002. OMV Gas is the major gas company in the EU to have introduced these guidelines.

It follows that OMV Gas had already in 2005 a good experience in managing the principles of these guidelines and could act as a significant referent in the EU towards countries where similar conditions had yet to be created.

On the one hand, OMV Gas leadership in adopting these guidelines provided some international companies with good practices; on the other hand, OMV Gas convinced adherence to these guidelines was seen with scepticism. OMV Gas was de facto creating precedents for the enactment of these guidelines which some other major players in Europe did not wish to encourage.

Some of the principles described in the guidelines are as follows:

- **Third party access (TPA)**

An issue that was clarified by these guidelines concerns the framework for the “third party access” (TPA). Namely anybody operating in this sector must be able to use storage services. This of course was and is fundamental to ensure free and honest competition as well as to guarantee that nobody is blocked or discriminated in doing so.

- **Transparency**

A further essential feature of these guidelines is the “transparency” issue. It is important and basic to good business that anybody should have access to all information about the available capacity. This should apply across time today, but also in the future. This will allow the concerned parties to correctly plan for the future and better serve the interest of the market.

The development of electronic communication greatly facilitated the respect of transparency. It is possible and desirable to have a clear and complete website/platform where all such data are pooled and updated.

Anybody interested, can register for and log in these websites. OMV Gas only needs to know the user details, and does not exclude anybody from access.

- **New products – unbundled services**

Another important aspect considered by these guidelines concerns the offer of unbundled storage services. As a background to such an aspect we must consider first what bundled services were and what impact this had on the market. Bundled services, as the term indicates, were services which were linked together and could not be bought as separate features. The technical development characterising the gas business did not allow an easy split between the storage package (SBU) itself and its components. A comfortable corollary to this was the economic benefit which gas companies could earn from it. When you needed only additional withdrawal rate, because the weather became too cold, you had to book a whole package according to the company’s rigidities. To unbundle such a set of services means now that when it becomes unseasonably cold you can buy only the additional element withdrawal rate and no further feature such as injection rate and/or volume. Of course, the extent of such unbundled services is dependent on the geology of the reservoir and various technical parameters and provisions. It is simple to understand that you can only use unbundled injection or withdrawal rates if you hold a sufficient amount of working gas volume.
As the guidelines were introduced, gas companies could choose to unbundle their services making their business more flexible, customer friendly and generally speaking, more in line with the real need of the market. This unbundling gives the market now the opportunity to require services on a separate basis. To give you another example: in summer when cheap spot gas is available, our clients have now the opportunity to book additional injection rates for storage on a short-time basis for a short term period, assuming the gas price will rise in winter. Consequently we also take advantage of seasonal price variations by supporting our clients' needs of additional injection rate and/or working gas volume.

In the specific case of OMV Gas, this unbundled practice started in 2003. Austrian clients voiced specific needs to have only individual services at any given time. OMV Gas responded to these requests by tentatively adopting this new way promoting services to truly respond to market pressures. These products unbundled services are now available on an annual, monthly, weekly and also daily basis. The provision to implement and to offer unbundled services is to organize the appropriate software for managing the technical aspects for such short term services. But this has already been met by OMV Gas. The earnings resulting from this were highly encouraging and generated more interest in OMV Gas upper management to continue along this direction. OMV Gas correctly anticipated a business practice which would after its introduction in Austria become the recommended model for the trade throughout the EU.

- **Publication of conditions**

A further important issue of these guidelines is the regulation that all gas companies within EU have to publish their conditions for storage on their websites. This gives clients the opportunity to compare the different tariffs and products. It provides the potential buyer/trader the chance to choose the proper product for a specific demand.

OMV Gas already published its conditions for storage two years ago. OMV Gas does not see any disadvantage in publishing our standard tariffs. Special requirements or tailor-made offers have to be negotiated between the parties. It is not feasible to publish all tariffs for all cases which could occur. It was very interesting to learn, that since OMV Gas started to offer unbundled services, the inquiries and requirements of OMV Gas clients have needed to be tailor-made, i.e. negotiated. They all differ more or less from each other - a big advantage for the supply and the entire gas market.

### 6. FUTURE DEVELOPMENTS

OMV Gas plans to do a number of important projects in the near future. First, the extension of a number of pipelines. Second, the development of storage capacity to roughly 2 bcm which will reflect market demand.

A second compressor station on WAG pipeline system (Rainbach) has recently become operational at the beginning of 2006. An additional compressor station is planned for 2007. The pipeline will be partially looped by 2011 in order to increase the transport capacity to 11 bcm.

The second loop of TAG pipeline systems (third line running parallel) will be operational at the beginning of 2007. Two additional compressor stations are considered for development to cover the strongly increasing demand of pipeline capacity to Italy.

The Nabucco pipeline project will open a new gateway for gas imports from the south east of Europe. This will give central European countries the chance to diversify their import portfolio and will make them more independent from a small number of sources. Namely, the Balkans and Hungary, Romania, Bulgaria which are currently dependent on a single source will gain advantage from this pipeline. The capacity of this pipeline is calculated as being 13 bcm at the beginning of transportation and will be extended on demand up to 31 bcm in 2020.
All these pipeline systems are running together at the Baumgarten import station: TAG, WAG, HAG, Slovtransgas-system and in future hopefully Nabucco. Such an intersection of pipelines is the best place for hubs. OMV Gas has already implemented the Central European Gas Hub (CEGH) in Baumgarten as a trading hub. Here we have the chance to offer different storage services - a big advantage for hubs. The product portfolio may comprise basic services like unbundled services, title tracking but also parking and in future perhaps loaning. The exact scope and timing will be determined in due course.

In case the existing storage capacities in Baumgarten will not be sufficient and the demand will increase, OMV Gas has the opportunity to develop and speed up a storage project located directly below Baumgarten. It is a large reservoir (Schönkirchen Tief) in about 2,800 m depths with an excellent permeability, i.e. a very high deliverability. The size of this UGS is up to 2 bcm working gas volume. The advantage of this project is to be able to develop it in steps according to demand.

7. CONCLUSION

The introduction of unbundled services during the last few years was a very positive experience for OMV Gas as a storage system operator and for OMV Gas clients as well. It opened up the market to opportunities for tailor-made products, discussed, organised and negotiated jointly with the clients. It is a response to the requirements of OMV Gas clients and thus covers the real needs of the gas market.

At present OMV Gas proceeds in this way and develops new storage products in close contact with OMV Gas customers, including the Central European Gas Hub (CEGH) in Baumgarten. The extension of the transmission systems through Austria in the next years and particularly the start-up of the Nabucco pipeline in 2011 will bring a lot of opportunities for OMV Gas underground storage located directly below Baumgarten at the intersection of existing pipelines. OMV Gas prepares for this by investigating the large depleted reservoir Schönkirchen Tief. A pre-feasibility study was completed last year with a very encouraging result. The next feasibility study will be finished this year. Further procedures to develop this reservoir and to adapt it as an underground storage will be determined in due time.