Low energy prices and the effect on Gas Storage Economics

Dr. Peter Klingenerger
11th Nov 2016, St. Petersburg
Uniper Energy Storage …

Management

Dr. Peter Klingenberger (Chairman)

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Headquarter

Essen, Germany

… the new name for energy storage solutions!
History

- Dec 2007 • Establishment E.ON Gas Storage GmbH
- Aug 2008 • Start of commercial operation
- Oct 2008 • Integration E.ON Gas Storage Ltd. (UK)
- Apr 2011 • Establishment Gas Storage Austria (AT) branch
- Jul 2012 • Commissioning of ESE-Erdgaspeicher Etzel
- Aug 2013 • Commissioning of Power to Gas plant WindGas Falkenhagen
- Oct 2015 • Commissioning of Power to Gas plant WindGas Hamburg
- Jan 2016 • Renaming into Uniper Energy Storage
Our business areas

- Unbundled gas storage system operator in accordance with German and European regulatory law.

- Further development of the storage business both nationally and internationally.

- Innovative products and services for the European storage market.

- Technical and commercial development of storage projects.

- Development of new technologies.

- Construction and operation of underground gas storage facilities and energy storage systems.
Where we operate
Our services

Fixed-price Products
Bundled or non-bundled storage capacities at fixed prices for terms of up to 15 years.

Indexed Products
Variable product pricing depending on market developments.

Additional Capacities
Firm and interruptible storage capacities in addition to storage bundles.

Supplementary Products
Full-service product, financing products, day-ahead optimization, option to transfer capacities between storage facilities, storage of bio-natural gas, …

The Product you want
Bespoke storage solutions tailored to your specific needs.
Power to Gas technology

Conversion of electricity from renewables into hydrogen for use as “green” hydrogen in industry, especially refineries, the heat energy market, the mobility sector and later on possibly also for power generation.

Power to Gas Anlage in Falkenhagen, Start of operation August 2013

Power to Gas Anlage in Hamburg (PEM-Elektrolyse, Start of operation October 2015)
Agenda

• Storage market in gas value chain

• How low energy prices affect the storage market

• Does the current regulatory environment incorporate the full value of gas storage?
Increasing Import dependence in Europe

EU domestic gas production (ENTSOG projections) and EU gas demand (various modelled scenarios, with performance against EU 2030 targets)

- Domestic biogas
- Domestic unconventional production
- Domestic conventional production (non-FID)
- Domestic conventional production (FID)
- PRIMES (2013) reference scenario (32.4% GHG, 24.4% RES, 21.0% EE)
- PRIMES (2013) reference scenario variant “EE27” (40.0% GHG, 27.8% RES, 27.4% EE)
- IEA (2015) Current policies scenario (30% GHG, 23% RES, 19% EE)
- IEA (2015) New policies scenario (40% GHG, 27% RES, 24% EE)
- IEA (2015) 450 scenario (55% GHG, 33% RES, 30% EE)
Gas storage capacities in Europe

- Ukraine: 32 bcm
- Germany: 25 bcm
- Italy: 17 bcm
- Netherlands: 13 bcm
- France: 12 bcm
- Austria: 8 bcm
- Hungary: 6 bcm
- UK: 5 bcm
- Turkey: 4 bcm
- Spain: 4 bcm
- Slovakia: 3 bcm
- Romania: 3 bcm
- Poland: 3 bcm
- Latvia: 2 bcm
- Belarus: 1 bcm
- Denmark: 1 bcm
- Belgium: 1 bcm
- Croatia: 1 bcm
- Bulgaria: 1 bcm
- Serbia: 1 bcm
- Portugal: 0.5 bcm
- Ireland: 0.3 bcm
- Sweden: 0.2 bcm
- Greece: 0.2 bcm
- Lithuania: 0.2 bcm
- Albania: 0.2 bcm

Sources: GSE Storage map, Eurogas, EU reports
Use of UGS in Europe`s supply portfolio - 1

MILD WINTER (13/14)

Source: ENTSOG data

SUMMER
Injection period

WINTER
Withdrawal period
Use of UGS in Europe`s supply portfolio - 2

LONG AND LATE WINTER 12/13
Use of UGS in Europe`s supply portfolio - 3

COLD SPELL 11/12

SUMMER
Injection period

WINTER
Withdrawal period

Source: ENTSOG data
Simulation of supply disruptions in Europe

ENTSOG simulation of an 14 days peak demand (cold spell) and disruption of transit flows via Ukraine
# Actual storage levels in Europe (6th Nov. 2016)

<table>
<thead>
<tr>
<th>Country</th>
<th>Gas in Storage (TWh)</th>
<th>Full (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>938.7177</td>
<td>90.56</td>
</tr>
<tr>
<td>Austria</td>
<td>81.7694</td>
<td>86.43</td>
</tr>
<tr>
<td>Belgium</td>
<td>7.6576</td>
<td>85.07</td>
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<tr>
<td>Bulgaria</td>
<td>5.1226</td>
<td>81.70</td>
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<tr>
<td>Croatia</td>
<td>5.0130</td>
<td>89.44</td>
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<tr>
<td>Czechia</td>
<td>33.8916</td>
<td>97.30</td>
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<tr>
<td>Denmark</td>
<td>11.2953</td>
<td>96.98</td>
</tr>
<tr>
<td>France</td>
<td>121.1337</td>
<td>90.09</td>
</tr>
<tr>
<td>Germany</td>
<td>225.4757</td>
<td>94.23</td>
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<tr>
<td>Hungary</td>
<td>38.4970</td>
<td>57.35</td>
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<tr>
<td>Ireland</td>
<td>1.8609</td>
<td>100.00</td>
</tr>
<tr>
<td>Italy</td>
<td>177.0259</td>
<td>99.70</td>
</tr>
<tr>
<td>Latvia</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Netherlands</td>
<td>131.1931</td>
<td>94.03</td>
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<tr>
<td>Poland</td>
<td>31.7620</td>
<td>97.53</td>
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<tr>
<td>Portugal</td>
<td>1.2739</td>
<td>35.68</td>
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<tr>
<td>Romania</td>
<td>2.4629</td>
<td>88.04</td>
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<td>Slovakia</td>
<td>32.7871</td>
<td>92.28</td>
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<tr>
<td>Spain</td>
<td>21.6413</td>
<td>69.48</td>
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<tr>
<td>Sweden</td>
<td>0.1012</td>
<td>100.00</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>8.7537</td>
<td>95.40</td>
</tr>
<tr>
<td>Non-EU</td>
<td>166.0796</td>
<td>45.60</td>
</tr>
</tbody>
</table>

Source: GSE AGSI+ data
Underground Gas Storage - backbone in Europe`s gas value chain

- Declining swing from European gas production and increasing import dependency requires physical flexibility
- UGS prevents supply disruptions, or technical or geopolitical reasons, extreme weather conditions
- Storage will be needed to support development of global LNG spot trading and arbitrage trades
- Flexibility from UGS supports fluctuations in regional power sector gas demand due to the increased share of intermittent renewable energy sources
Agenda

- Storage Market in gas value chain
- **How low energy prices affect the storage market**
- Does the current regulatory environment incorporate the full value of gas storage?
General assessment: storage value > costs

Value of physical availability (insurance value) ≥ 0 ?

High transport cost decrease the value of UGS at the VTP
Low gas prices and volatility at Trading Hubs

- Gas prices at Trading Hubs in Europe all time low
- Low prices also decrease Day Ahead Volatility of spot prices

- Extrinsic value of UGS is driven by the availability to react on short price movements
- Volatility also influences prices on the balancing energy market
Gas Storage in a challenging market environment

- Low market prices are not reflecting the full value of UGS and do not cover the costs anymore
- Has there ever been an industry sector supporting its overcapacity for 10 years?
- 3 Bcm of storage has already been mothballed / decommissioned since 2010
- Trend will continue when facing re-investment decisions, SSOs could choose to mothball/decommission in coming years

If the current market conditions persist, storage capacities will significantly decrease…
Agenda

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Transport as important element for storage value

Entry/Exit costs 1.5€/MWh

Intrinsic + extrinsic + strategic value 3€/MWh

Total value 1.5€/MWh

→ Value of storage only to be realised at the VP
New deal in the regulatory environment for a competitive gas storage market

• To compete on the flexibility market storage needs
  • Fair transmission tariffs that take the benefits of gas storage to the system into account
  • Predictable access to transportation capacities
  • More flexible regulatory rules for innovative and customized storage products
• To reflect the insurance value of gas storage in the market regime
  • clear responsibilities (national, regional and EU wide)
  • SOS Regulation must take into account the physical availability of sources in a hub based gas market design
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Dr. Peter Klingenberger
Chairman of the Board of Management of
Uniper Energy Storage GmbH
Various Security of Supply regimes in Europe

- SOS Standard
- Strategic Storage
- Supplier Obligation
- TSO Obligation

% withdrawal rate / peak demand per day

% production rate / peak demand per day
Example of supplier obligation: France

Basic principle

• Every customer generates a “storage right” which depends on the level of consumption.
• The equivalent capacity has to be booked by the trader.
• Storage rights are assigned anew every year by the energy ministry / SSO.
• Auctions for remaining capacities are held once a year.

Freely available capacity; “first-come, first-served basis“

Storage right for industrial customers connected directly to the pipeline network (~56 TWh), without obligation to book capacity.

Storage capacity for homes and protected customers (~100 TWh).
For traders serving these customers there is a storage obligation for 85% of the total volume to be delivered, which must be met by 1 November of each year. For withdrawals there is a flat-rate regime.

Storage capacity for TSO and balancing
Example of TSO obligation to take precautions: The Netherlands

**Basic principle**

- Economics ministry has handed over responsibility for security of supply to Gas Transport Services B.V. (GTS).
- GTS has to ensure “peak supply” at temperatures of -9 °C to -17 °C (demand peaks, not volume peaks)
- GTS organises annual tenders (Sept./Oct.) for so-called Flex Peak Tender Call Options.

**Market has access to only 4% of the total storage capacities for free marketing.**

**Gas reserve and peak capacity kept available to support national production and guard against long-terms supply disruptions.**
Example of strategic gas storage: Hungary

Basic principle
- Regulated TPA with regulated tariffs (applies to the whole storage market with one exception: storage facilities holding the strategic reserve)
- Strategic storage facility is operated by a government organisation.
- Costs are borne by gas consumers.

Distorts competition because the capacity of the strategic storage facility can be marketed in competition with other storage facilities.

Strategic storage facility is part of the capacity of a storage facility used commercially (not subject to tariff regulation).
Security of supply needs well-defined rules

- One size does not fit all
- Clear responsibilities
- Standards must take into account the physical availability of sources
- Non-discriminatory rules for storage users in system emergency situations