Functioning of European Gas Wholesale Markets

Quantitative Study

Vienna, July 2014

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Starting points: Functioning of European gas wholesale markets

Functioning gas wholesale markets

- Outcomes:
  - Ready availability of gas
  - Competitive gas price formation
  - Low transaction cost of gas trading
  - Transparency of gas price

- Effects:
  - Enabling/fertilizing competition for end user business
  - Efficient gas procurement and related risk management
  - Efficient utilization and risk management of gas-related assets (production, supply, storage, pipelines, power stations, ...)
  - Improved security of supply

- Ultimate Benefits*:
  - Lower cost of gas for end users*
  - Lower (cost of) risk in the gas industry
  - Lower cost of power/heat for end users

Article 1 of REGULATION (EC) No 715/2009 (gas transmission) says:

This Regulation aims at: ... facilitating the emergence of a well-functioning and transparent wholesale market ...

* All else being equal
Phase 1: Questionnaire
What do stakeholders require of functioning gas wholesale markets?

Questionnaire was distributed all over Europe via various mailing lists (EFET, Eurogas, ACER, FSR).

Feedback was received from about twenty respondents with a variety of backgrounds (producers, wholesalers, suppliers, traders, large end users …).

Phase 2: Measurement
To what extent are stakeholders’ requirements met by today’s (2013) traded gas wholesale markets in Europe?

Focus on brokered markets (due to their overwhelming importance)

Analysis includes the following gas hubs:
- Austria – VTP
- Belgium – ZEE
- Belgium – ZTP
- Czech Republic – VTP
- France – PEG Nord
- France – PEG Sud
- Germany – Gaspool
- Germany – NCG
- Italy – PSV
- Netherlands – TTF
- United Kingdom – NBP
Results phase 1 – Questionnaire: Stakeholder requirements

**Price relevance threshold**
Minimum number of deals required per product/hub/trading-day so that the price signal can be considered trustworthy.

≥ 15 deals per product/hub/trading-day

**Liquidity threshold**
Minimum amount of gas simultaneously offered/requested (ask/bid) for a product on a hub so that the product is considered “liquid”.

≥ 120 MW each: bid and ask

**Liquid trading horizon**
Minimum time horizon within which trading in gas standard products should be possible with the market being in a liquid state.

≥ 36 months liquid trading horizon

To what extent are stakeholders’ requirements met by today’s (2013) traded gas wholesale markets in Europe?

Source: Responses to ACER questionnaire sent to gas market stakeholders in the beginning of 2014.
Brokered gas trading volumes at European gas markets 2013

<table>
<thead>
<tr>
<th>Country/Location</th>
<th>TWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK NBP</td>
<td>8.239</td>
</tr>
<tr>
<td>NL TTF</td>
<td>7.194</td>
</tr>
<tr>
<td>DE NCG</td>
<td>1.221</td>
</tr>
<tr>
<td>DE GPL</td>
<td>785</td>
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<tr>
<td>BE ZEE</td>
<td>749</td>
</tr>
<tr>
<td>FR PEG Nord</td>
<td>265</td>
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<tr>
<td>AT VTP</td>
<td>208</td>
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<tr>
<td>IT PSV</td>
<td>188</td>
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<tr>
<td>FR PEG Sud</td>
<td>32</td>
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<tr>
<td>BE ZTP</td>
<td>3</td>
</tr>
<tr>
<td>CZ VTP</td>
<td>2</td>
</tr>
</tbody>
</table>

Source and assumptions: See upcoming study by Wagner, Elbling & Company on gas market functioning.
Split of brokered gas trading volumes to delivery months (relative to transaction date)

2013

Spot to 12th month: 90% of total trading volume*

Months 13 – 24: 9% of total trading volume*

Months 25 – 36: 1% of total trading volume*

44% of total brokered trading volume* is concentrated on gas delivered in the current and the immediately following month.

Note 1: “Relative delivery month” means relative to transaction date.
Note 2: Volumes per month are summed up over all products (per hub).
* Unweighted average of all hubs shown in the diagram.
Source and assumptions: See upcoming study by Wagner, Elbling & Company on gas market functioning.
Price discovery:
Deal count per day vs. trading horizon
2013

Less developed hubs:
Relevant prices generated less than 3 months into the future
(far below requirement of 36 months)

Most developed hubs (TTF, NBP):
Relevant prices generated only 14-19 months into the future
(well below requirement of 36 months)

Stakeholder requirement:
Liquid trading horizon:
≥ 36 months into the future

Stakeholder requirement:
Price relevance threshold:
≥ 15 deals per product/hub/trading-day

Source and assumptions: See upcoming study by Wagner, Elbling & Company on gas market functioning.
Availability of gas: Sell-side (offered) volumes vs. trading horizon

2013

Stakeholder requirement:
Liquidity threshold:
≥ 120 MW gas offered per product/hub/trading-day

Stakeholder requirement:
Liquid trading horizon:
≥ 36 months into the future

Less developed hubs:
Offer liquidity only for less than 4 months into the future
(far below requirement of 36 months)

Most developed hubs (TTF, NBP):
Offer liquidity only for 18-19 months into the future
(well below requirement of 36 months)

Source and assumptions: See upcoming study by Wagner, Elbling & Company on gas market functioning.
Sell-side competition: Frequency of only a single offer for the sale of gas visible on brokered gas markets*

* The diagram shows the frequency of only one single offer being available – under the condition that at least one offer was available.

Not available (n.a.) data points: no offer at all available.

Source and assumptions: See upcoming study by Wagner, Elbling & Company on gas market functioning.
Interim conclusions:

- Stakeholders’ requirements regarding
  - price relevance threshold,
  - liquidity threshold and
  - trading horizon

  were not met by any European hub in 2013.

- Dutch TTF and British NBP score far better than all other hubs (but still fall short of stakeholders’ requirements).

What could be gained from increased market liquidity?
The bid-ask-spread is the difference in price between the lowest price for which a seller is willing to sell gas (ask-price) and the highest price that a buyer is willing to pay for it (bid-price) at the same time.

Benefits of improved gas market liquidity

- **Ready availability of gas**
- **Competitive gas price formation**
- **Low transaction cost of gas trading**
- **Transparency of gas price**

- The key element of gas trading transaction cost is the bid-ask-spread.*
- Buyers of gas pay 50% of the bid-ask-spread in addition to the “true” price of gas.
- Hence, the higher the bid-ask-spread, the higher the cost of gas.
- Improved gas market liquidity typically lowers bid-ask-spreads and thus lowers the cost of gas.
Transaction cost:
Bid-ask-spreads on brokered gas forward markets

2013

Savings on gas cost* in the range of 30 to 140 Mio. € p.a. just from saved transaction cost**

Lower bid-ask-spreads

Increased gas market liquidity

* Excl. UK-NBP  ** Estimate based on the difference of bid-ask-spreads of various markets/products to the TTF and current traded forward volume on the continent.
Source and assumptions: See upcoming study by Wagner, Elbling & Company on gas market functioning.
Current discussion:
Alternative market designs for European gas markets

Alternative gas market designs currently discussed for Europe

Option 1: Current (national) gas markets are enlarged as far as required so that each and every European end user is located inside (i.e. same balancing zone) a functioning forward market.

Option 2: Only a certain number of European end-users is located in 2 to 3 functioning (national) forward markets; all other European end users are located in non-functioning forward markets (i.e. “balancing only” markets).

Legend:
FFW = Functioning forward market (where gas is traded liquidly from short-term to well into the future)
BM = Balancing market (where gas is traded liquidly only for spot (and maybe also the current and front month))

5 to 7 functioning gas forward (+ spot) markets (in many cases cross-border) for Europe

2 to 3 functioning gas forward (+ spot) markets (typically national) and 20+ “balancing only” markets (with only short-term products being traded) for Europe
Analysed case: Large end user (or a supplier of small end users) intends to secure fixed price gas for the following year delivered at his home hub.

Scenario 1: End user located in functioning forward market (i.e., in the same balancing zone)

- **1A.** Margin paid to supplier of fixed price gas in functioning (competitive) forward market (€/MWh)

Scenario 2: End user located in a “balancing only” market

- **2A.** Margin paid to supplier of physical gas (spot-indexed) in non-functioning home forward market (€/MWh)
- **2B.** Margin paid for (imperfectly) hedging price risk on distant functioning forward market (€/MWh)
- **2C.** Margin paid for hedging location spread risk between functioning forward market and home balancing market (€/MWh)

Conclusion: Under market conditions, end users located in home markets without a functioning forward market (i.e., “balancing only” markets) permanently have to pay a markup for fixing their price of gas.
The questionnaire asked for the goal to be pursued, not for the means to achieve it. According to the Gas Target Model non-functioning (spot+forward) (national) gas markets can be developed to functioning (spot+forward) gas markets by fully merging them with other markets (i.e. down to end users) or by merging them on the wholesale level only (Trading Region Model).

**Option 1**: Every gas market area should have a liquid spot and forward market*

**Option 2**: Every gas market area should have a liquid spot market, but forward markets should be concentrated to max. 3 of them

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1</td>
<td>67%</td>
</tr>
<tr>
<td>Option 2</td>
<td>33%</td>
</tr>
</tbody>
</table>
Conclusions

1. Stakeholders’ requirements on functioning gas forward markets regarding
   - price relevance threshold,
   - liquidity threshold and
   - trading horizon

   were not met by any European hub in 2013.

2. Improved market liquidity typically leads to lower transaction cost (bid/ask-spreads) allowing for significant savings on gas procurement cost.

3. End users of gas which are located in non functioning forward markets (so called “balancing markets”) face higher cost of fixing their price of gas. (As compared to end users located in functioning forward markets.)

4. The majority of stakeholders prefers a gas market design where every end user of gas is located (same balancing zone) inside a functioning forward (+ spot) market zone.

   → This can be furthered by merging existing market zones to increase market liquidity.