Wholesale market functioning: GTM1 criteria

2nd ACER Workshop on Gas Target Model review and update – 19 March 2014
Agenda

- GTM1 criteria
- Results on member state level
- Discussion
• GTM1 criteria
• Results
• Discussion
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Churn rate</td>
<td>≥ 8</td>
</tr>
<tr>
<td>● Volume of gas traded relative to physical volume</td>
<td></td>
</tr>
<tr>
<td>Market zone size</td>
<td>≥ 20 bcm (215 TWh)</td>
</tr>
<tr>
<td>● Consumption of gas by consumers within a market zone</td>
<td></td>
</tr>
<tr>
<td>Number of supply sources</td>
<td>≥ 3</td>
</tr>
<tr>
<td>● We interpret this to be the number of countries imports are originating from</td>
<td></td>
</tr>
<tr>
<td>HHI (Herfindahl Hirschman Index)</td>
<td>≤ 2,000</td>
</tr>
<tr>
<td>● Measure of concentration amongst suppliers based on energy measured by firm</td>
<td></td>
</tr>
<tr>
<td>RSI (Residual Supply Index)</td>
<td>≥ 110 %</td>
</tr>
<tr>
<td>● Share of consumption which can be met without largest supplier based on supply capability, i.e. capacity (again on firm level)</td>
<td></td>
</tr>
</tbody>
</table>
GTM1 criteria assessment depends on market delineation

<table>
<thead>
<tr>
<th>Application of criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Area poses a dilemma</td>
</tr>
<tr>
<td>□ Market zone – clear, but not necessarily a relevant market area</td>
</tr>
<tr>
<td>□ Member state – clear cut, but also not formally useful for competition assessment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relevant economic market</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Neither market zone nor member state always relevant, especially for competition assessments</td>
</tr>
<tr>
<td>● In theory, the competition criteria may need to be applied in the context of the relevant market from an economic perspective</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Computation on member state level</td>
</tr>
</tbody>
</table>

RSI: Concluding that SK has capacity from CZ/AT to replace largest import route not helpful if CZ/AT also depend on the same largest upstream supplier as SK
Conceptual remarks (I)

**Churn rate**
- Not necessarily perfect indicator
  - Hedging opportunities etc. may also exist if a market zone is well integrated (commercially and physically) with adjacent zone which has a highly liquid trading point
- Other aspects also relevant, e.g.
  - Churn rate by product
  - Bid-ask spreads

**Number of supply sources**
- As supply sources are defined on geographic level, it is only a rough measure of level of competition
  - There might be intensive competition between multiple firms from just one or two supply sources (e.g. producers on the UKCS)
  - Some sources (e.g. LNG spot volumes) may only arrive in small quantities and at significant price premiums, but “count” as separate supply source

**HHI**
- Production vs. wholesale level and relevance of long-term contracts
  - Control over volumes may partially be transferred to importers
  - We focus on HHI at upstream level
Background: RSI

Our approach

- Computed based on data on capacities, prevailing flow directions, supply and demand balance in investigated area
  - Pivot analysis
- On an area-by-area basis, qualitative assessment of how to replace largest supplier if that is not yet possible

Issues …

... because of natural gas’ characteristics

Storage (seasonal)

- Gas is storable on a large scale
- In many market areas, significant storage capacities are available – these are part of the supply capacity depending on the time horizon of the analysis

Approach

- Calculation on annual basis (i.e. without storage)

Transits and exports play large role

- Partly subject to contracts and potentially relevant to supply/demand in an area
  - Transits block capacities
  - Exports contribute to demand

- Transits block some capacities
- Exports not part of demand
In the pivot analysis, demand is compared with the total capacity of all other suppliers (apart from supplier A) in a limited period.

A supplier is pivotal in a period in which he is an “inevitable trading partner”:
- Thesis: By holding back supply, a (profitable) shortage of supply can be engineered.
- There would be pivotality if the share of capacity of one stakeholder (e.g. A) is higher than the excess capacity in the market.

A pivotal supplier has at least the theoretical possibility of raising the price above the competitive price.
- Incentives and practicability (of withholding) are, however, not part of this simple analysis.
- Therefore, the analysis does not provide a final proof of market power problem (even if pivotality is found).

**Residual Supply Index (RSI):** Share of demand which can be covered by capacity of suppliers other than A. If RSI > 100%, then no pivotality.

- **Case 1:**
  - Firm A: 20 TWh/a
  - Others: 90 TWh/a
  - Demand: 100 TWh/a

  RSI = 90/100 = 0.9 = 90%

  Firm A would be **pivotal**

- **Case 2:**
  - Firm A: 20 TWh/a
  - Others: 90 TWh/a
  - Demand: 60 TWh/a

  RSI = 90/60 = 1.5 = 150%

  Firm A would **not be pivotal**
Conceptual remarks (II)

- Mechanistic application on capacity level overstates level of competition
  - On capacity level, assuming that CMP works, the largest suppliers in many member states could probably be replaced by all other suppliers.
  - Volumes in gas market as important as capacity – RSI does not check if there are actual volumes on other side of the border to “back up” capacity
  - Also not considered if capacity is related to adjacent “market areas” where same upstream supplier has a dominant role
- Wider market delineation ignores potential bottlenecks within considered area
  - Choosing a wider market delineation may overcome issues of ignoring market dominance issues in adjacent areas, but may overstate substitution possibilities
- Ignores price effect
  - E.g. large LNG capacities may imply that large suppliers can be replaced, but LNG volumes would only be attracted to Europe for significant price premiums

> Conclusion: RSI needs to be interpreted carefully when assessing the level of competition
Trading at wholesale markets

- Only TTF (part of the time) and NBP with Churn rates > 8
- Zeebrugge: 5
- Austrian / German / Italian / French hub: 2-3
- No transparent trading of wholesale gas in most EU member states

Will liquidity drop with ToP volume adjustment?
### Conclusion

- On member state level, only six member states with > 20 bcm gas demand (currently seven market zones > 20 bcm as two German zones)
- Cross-border market zones required if large demand in each market zone required for competition
### Pluralism of supply sources

#### Conclusion

- 10 member states (with gas markets) do not meet target of three supply sources on “country level”
- LNG as significant source of diversity (top 6 member states have LNG import facilities)

> But number of sources does not allow any conclusion on market power of individual suppliers, market structure, and potential competition (one or two sources may dominate in a given country)

---

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of supply countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>7</td>
</tr>
<tr>
<td>Italy</td>
<td>9</td>
</tr>
<tr>
<td>Spain</td>
<td>5</td>
</tr>
<tr>
<td>UK</td>
<td>4</td>
</tr>
<tr>
<td>Greece</td>
<td>3</td>
</tr>
<tr>
<td>Belgium</td>
<td>6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5</td>
</tr>
<tr>
<td>Slovenia</td>
<td>5</td>
</tr>
<tr>
<td>Croatia</td>
<td>5</td>
</tr>
<tr>
<td>Romania</td>
<td>4</td>
</tr>
<tr>
<td>Hungary</td>
<td>4</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>4</td>
</tr>
<tr>
<td>Germany</td>
<td>4</td>
</tr>
<tr>
<td>Poland</td>
<td>3</td>
</tr>
<tr>
<td>Austria</td>
<td>3</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>3</td>
</tr>
<tr>
<td>Slovakia</td>
<td>2</td>
</tr>
<tr>
<td>Portugal</td>
<td>1</td>
</tr>
<tr>
<td>Ireland</td>
<td>2</td>
</tr>
<tr>
<td>Denmark</td>
<td>2</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2</td>
</tr>
<tr>
<td>Sweden</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>1</td>
</tr>
<tr>
<td>Lithuania</td>
<td>1</td>
</tr>
<tr>
<td>Latvia</td>
<td>1</td>
</tr>
<tr>
<td>Estonia</td>
<td>1</td>
</tr>
</tbody>
</table>

We interpret the number of „supply sources“ as the number of countries imports are originating from.

*Not number of entities bringing natural gas into the country*

Source: Frontier based on Eurostat
**Conclusion**

- Six member states with sufficiently diversified supply on a firm level to meet GTM1 target of HHI < 2000 – mainly large markets in Western Europe.
- Single supplier in four member states.
  - But also HHI does not allow full conclusion on level of competition as it ignores potential competition.
  - E.g. Czech gas market may in reality not be less competitive than Bulgarian market because of potential competition from Germany.

Source: Frontier
Conclusion

- Shows reliance on largest supplier
- Indication that, based on RSI, investments in reverse flow for the benefit of, e.g., Austria, Czech Republic, Slovakia, significantly reduced reliance on largest supplier there

- But RSI on itself has limitations: Focus on capacity (ignores competitive situation on other side of an IP)

- RSI may also be helpful in combination with HHI

**RSI**

RSI = 100 * supply capacity (n-largest)/demand

Based on border capacity/domestic production

Source: Frontier
Country specific results: Bulgaria

- Large dependence on one import source and route
- Only domestic production is an alternative
- RSI of 13% → 87% of demand cannot be replaced

Source: Frontier
Country specific results: Hungary

- Large dependence on one import source and route
- Only import route from Austria as an alternative (and domestic production), but cannot replace Russian imports even if capacity can be fully filled with gas
- RSI of 60% → 40% of demand cannot be replaced

![Diagram showing supply capability in TWh/year with the following categories:
- Pipelines via Ukraine
- Pipeline from Austria
- Domestic production
- Demand

The diagram illustrates that all other capacity is not sufficient to meet demand.

Source: Frontier
Country specific results: Poland

- HHI of 4,550
  - Gazprom with about 60 % market share
  - Domestic production as second largest supply

- RSI of 56 %
  - 44 % of demand cannot be replaced, LNG terminal operational as of 2014 already taken into account

Source: Frontier
Country specific results: France

- **HHI of < 1,300**
  - Diversified supply because of LNG and multiple upstream pipeline suppliers

- **RSI of 137 %**
  - Significant pipeline capacities from NO, DE, BE and ES plus LNG import terminals allow replacing each individual supply route
Country specific results: Spain

- HHI of approx. 2,000
  - Diversified supply because of LNG
- RSI of 159%
  - Especially spare LNG import capacity allows replacing pipeline supplies from Algeria, but Spain very exposed to global LNG prices
The few member states where competition is not an issue based on both measures, but these are large MS with many gas consumers.
### Overall results for discussion

#### Member State | Churn Rate | Zone size [TWh/year] | Number of sources | HHI | RSI
---|---|---|---|---|---
Austria | 3 | 105 | 3 | 7.500 | 143%
Belgium | 6 | 197 | 8 | 1.709 | 279%
Bulgaria | 0 | 39 | 2 | 7.587 | 13%
Croatia | 0 | 35 | 5 | 5.987 | 125%
Czech Republic | 0 | 95 | 3 | 9.051 | 159%
Denmark | 0 | 45 | 2 | 2.570 | 22%
Estonia | 0 | 9 | 1 | 10.000 | 0%
Finland | 0 | 36 | 1 | 10.000 | 0%
France | 3 | 165 | 13 | 1.240 | 137%
Germany | 4 | 438 | 4 | 1.982 | 116%
Greece | 0 | 49 | 9 | 5.181 | 131%
Hungary | 0 | 113 | 4 | 3.198 | 60%
Ireland | 0 | 52 | 2 | 1.215 | 8%
Italy | 3 | 799 | 12 | 2.093 | 108%
Latvia | 0 | 21 | 1 | 10.000 | 0%
Lithuania | 0 | 39 | 1 | 10.000 | 0%
Luxembourg | 0 | 12 | 4 | 3.185 | 0%
Netherlands | 7 | 424 | 6 | 2.488 | 189%
Poland | 0 | 193 | 3 | 4.550 | 56%
Portugal | 0 | 55 | 2 | 2.821 | 93%
Romania | 0 | 157 | 4 | 3.270 | 104%
Slovakia | 0 | 70 | 2 | 9.595 | 369%
Slovenia | 0 | 12 | 5 | 5.027 | 74%
Spain | 0 | 365 | 12 | 2.000 | 159%
Sweden | 0 | 13 | 1 | 2.766 | 0%
United Kingdom | 15 | 910 | 11 | 950 | 142%

**GTM1 target**
- ≥ 8
- ≥ 215
- ≥ 3
- < 2,000
- ≥ 110 %

- Only UK meets all GTM1 criteria, Netherlands and Belgium close to meeting all criteria
- Hub liquidity an issue in DE, IT, FR, ES
- French market separated into too many zones
- Italy very dependent on two large sources
- Germany only barely meets HHI and RSI targets → may not meet them if demand picks up again
- Eastern European gas markets usually meet none or only one or two out of 5 criteria

Source: Frontier Economics
Conclusion

**Large western European gas markets**
- Except UK and NL, liquidity below target churn rate and uncertainty regarding further evolution of liquidity
- But existing and transparent gas trading in large market zones
- Pluralism of supply sources, also thanks to LNG, and diverse market structure with imports from multiple firms and production by multiple firms (where applicable)
- But dependence on large suppliers may increase again should gas demand pick up
  - **Many consumers (in largest markets) already benefit from wholesale gas competition**

**Central and Eastern Europe**
- Most gas markets without transparent hub trading and – according to CEER criteria – relatively small to develop into competitive wholesale markets
- Often high concentration on the supply side
- Potential competition in some Central European member states
- But often large reliance on largest supplier, i.e. Gazprom
  - **Lack of competition in smaller member states should not be ignored**
Frontier Economics Limited in Europe is a member of the Frontier Economics network, which consists of separate companies based in Europe (Brussels, Cologne, London and Madrid) and Australia (Melbourne & Sydney). The companies are independently owned, and legal commitments entered into by any one company do not impose any obligations on other companies in the network. All views expressed in this document are the views of Frontier Economics Limited.