UK-Continent Market Integration

EPRG Winter Research Seminar
University of Cambridge, 12th December 2008

Martin Thomas, Operations Director, APX

apXGroup
MAKING MARKETS WORK
APX Group

- Power NL (Dutch spot market) + Market Coupling NL-Be-Fr + Belpex: services + 10% equity + NorNed cable
- Power UK (spot, prompt, OTC, fwd)
- Gas UK (NBP, OCM) + gas storage trading
- Gas ZEE (Zeebrugge hub)
- Gas NL TTF (transfer facility) + gas transport capacity

Announced: APX (spot) integrating with Endex (futures): Dutch/Belgian Power, TTF gas futures
What does the UK need from integration with continental Europe?

1. Better access to (continental) gas

2. A more liquid wholesale electricity market

3. A speedy and secure implementation of improvements
1. Better access to (continental) gas
Solution: international Gas Market integration

Transportation capacity:
- To be utilized to the maximum
- Promote flow in right direction
- Netting and reverse flow
- Full access to TTF and Zeebrugge
- Pathway to German gas, Russia
Trading products

Current products: Balancing, Spot, Storage, Transport capacity, TTF futures. To come:
- More storage / transport
- More curve products
- Spreads / Swaps
- Spark spreads
What characteristics make gas hubs successful?

- Features that support trading at the hub
  - clarity of arrangements
  - firmness of trades
  - low delivery risk (cash out volume and price)
  - standardised trading opportunities
  - low cost
  - simplicity of delivery mechanism
  - existing trading!
What characteristics make gas hubs successful?

- Common features with other local hubs to enable trading between them
  - currency
  - gas units
  - delivery day
  - balancing periods
APX gas markets

GBP
Therms
0600 day GMT/BST
Daily balance

Euro
MWh
0600 day CET
Hourly balance

NBP
TTF
ZEE
GBP
Therms
0600 day CET
Hourly balance
2. A more liquid wholesale electricity market
Solution: Market coupling

2006 Market Coupling
NL-BE-FR

2008: NorNed cable 700 MW
Nordic imports to NL

2009: CWE (NL-B-F-D-Lux)
- TLC+Germany

2010 BritNed cable:
- Capacity 1000MW
- Development agreement APX-NG-TenneT
- Trading design
- 300 MW market coupling
- Intention to operate coupling+markets

[Map showing APX, BritNed, NorNed, and other European power exchanges and TSOs]
Example: Netherlands/France price convergence after market coupling

Daily average prices for TLC countries

- Powernext
- Belpex
- APX
Example: Netherlands/France price convergence after market coupling

Hourly price difference, €/MWh

Before Market Coupling
Winter 2006

After Market Coupling
Winter 2007

<table>
<thead>
<tr>
<th>Price Range</th>
<th>Before Market Coupling</th>
<th>After Market Coupling</th>
</tr>
</thead>
<tbody>
<tr>
<td>P &gt; 10 €</td>
<td>40%</td>
<td>9%</td>
</tr>
<tr>
<td>P 1..10€</td>
<td>51%</td>
<td>19%</td>
</tr>
<tr>
<td>P &lt; 1 €</td>
<td>8%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Transportation capacity:
- Allocated together with the day-ahead power
- Utilized to the maximum
- Cannot be hoarded
- 100% utilization
- Flows in right direction

A market with:
- Lower risks
- Better access smaller parties, end users
- Better liquidity, lower volatility, robust index
- Price convergence

“copper plate”
Trilateral market coupling (TLC) results

2007 full price convergence between TLC spot markets

- Single price zone over 60% of time
- Belpex and APX prices identical over 70% of time
- Powernext and Belpex prices identical over 85% of time

Spot price difference between NL & FR:
- 2007: 1.04 Euro/MWh
- 2006: 8.81 Euro/MWh
CWE perspective: simulation* of market coupling price convergence**: hourly price difference, €/MWh

### Results Historically

<table>
<thead>
<tr>
<th></th>
<th>Fr-Nl</th>
<th>Fr-Ge</th>
<th>Nl-Ge</th>
</tr>
</thead>
<tbody>
<tr>
<td>P &gt;10€</td>
<td>35%</td>
<td>38%</td>
<td>33%</td>
</tr>
<tr>
<td>P 1-10€</td>
<td>56%</td>
<td>52%</td>
<td>58%</td>
</tr>
<tr>
<td>P &lt;1€</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
</tr>
</tbody>
</table>

### Simulated coupling

<table>
<thead>
<tr>
<th></th>
<th>Fr-Nl</th>
<th>Fr-Ge</th>
<th>Nl-Ge</th>
</tr>
</thead>
<tbody>
<tr>
<td>P &gt;10€</td>
<td>15%</td>
<td>14%</td>
<td>3%</td>
</tr>
<tr>
<td>P 1-10€</td>
<td>68%</td>
<td>54%</td>
<td>66%</td>
</tr>
<tr>
<td>P &lt;1€</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Equal price “copper plate”</td>
<td>19%</td>
<td>19%</td>
<td>12%</td>
</tr>
</tbody>
</table>

* Early work by APX  
* ATC capacities as used in the explicit auctions (not flow-based)
BritNed cable market coupling perspective: UK and NL day-ahead prices

<table>
<thead>
<tr>
<th>Date</th>
<th>GB (LEBA)</th>
<th>NL (APX)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/03/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/04/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/05/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/06/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/07/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/08/08</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average GB: 72.20
Average NL: 54.28
Difference: 17.92
Market coupling needs a day-ahead auction at both sides of interconnector

Transportation capacity:
- Allocated together with the day-ahead power
- Utilized to the maximum
- Cannot be hoarded
- 100% utilisation
- Flows in right direction

A market with:
- Lower risks
- Better access for smaller parties, end users
- Better liquidity, lower volatility, robust index
- Price convergence
European electricity market

Regional market coupling
Functioning:
- Nord Pool
- TLC (Fr-B-NL) → CWE (Fr-B-NL-G)
- Mibel (Iberia), GRE
Other regions: EU scheme of regional development
Projects:
- NorNed (No-NL cable)
- German-Danish coupling
- BritNed (NL-UK) cable

Inter-regional possible “Dome” coupling:
- “Loose” (volume-based) coupling between regions
- Price-based coupling within regions
3. A secure and speedy implementation: Sequential or Parallel implementation?

The sequential solution:

- “First create an index”
  - There are several roads to an index: some want it from continuous trading, some want a daily auction
  - If you try both, you fragment….and probably fail
- “Then build up index trustworthiness”
  - This normally takes several years
  - This normally takes a large(r) number of players
- “Launch a derivative on the index”
  - This makes the derivative sensitive to index quality
  - So you need a really good index (see above)

This may be best in ideal circumstances, but it is slow and, in our non-ideal world, it is also risky
3. A secure and speedy implementation: Sequential or Parallel implementation?

The parallel solution:

- “First create sufficient daily market, accessible to all”
  - Daily auction creates single price, low trading cost
  - Single market clearing price as market reference
- “Right after, start a futures contract, physically delivered”
  - Start right away, don’t wait for the index to mature
  - Hedging instrument is needed for investments now
- “Start market integration across North Sea”
  - Price convergence, reduced volatility, stabilised index
  - Import/export through daily market guarantee of liquidity
- Finally, start an index based wholesale power derivative when all the conditions are satisfied

This hedges the approach, and is more likely to work in the non-ideal world – eventually, it leads to the ideal as well
MAKING MARKETS WORK

Martin Thomas
m.thomas@apxgroup.com

Energy Exchange of the Year 2008

www.apxgroup.com