Organizational set-up of EU ETS-auctions

Stefan Teis – EEX AG

University of Cambridge
January 12th 2007, Cambridge, UK
158 participants from 19 countries

- 136 spot market participants
- 76 derivatives market participants
- 165 OTC clearing participants
- 13 general clearing member
- 9 broker
- 7 market maker
- 6 transmission system operators

updated: 8 January 2006
### Product Portfolio

<table>
<thead>
<tr>
<th>Spot Market</th>
<th>Derivatives Market</th>
<th>OTC Market</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td><strong>Power</strong></td>
<td><strong>Power</strong></td>
</tr>
<tr>
<td>- continuous trading</td>
<td>- financial futures</td>
<td>- corresponding products</td>
</tr>
<tr>
<td>- auction</td>
<td>- physical futures</td>
<td>- financial futures</td>
</tr>
<tr>
<td>- intraday</td>
<td>- options</td>
<td>- corresponding products</td>
</tr>
<tr>
<td><strong>CO₂</strong></td>
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<tr>
<td>- continuous trading</td>
<td>- physical futures</td>
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</tr>
<tr>
<td>- auction</td>
<td></td>
<td>- auction</td>
</tr>
</tbody>
</table>

- **Fully integrated clearing with cross-margining**
European Energy Exchange
High level processes

Trading Participant X

Trade

Clearing

Clearing Member 1

Clearing

Clearing House (ECC AG)

STP

Clearing

Clearing Member 2

Trade

Clearing

Trading Participant Y
Auctions at the EEX

Power Spot (day-ahead)-Market
- Auction for each hour of the year (8759 / 8783) per year per market area (Germany/Austria and Switzerland)

Opening Auctions – for all products in continuous trading
- Block contracts for day-ahead power
- EUA Spot
- Derivatives markets

Intra-Day Auction
- EUA-Spot

EOD Auctions
- Block contracts for day-ahead power
## Hourly contracts on power

**Auction principle**

<table>
<thead>
<tr>
<th>Hour/Price</th>
<th>0</th>
<th>6.9</th>
<th>7</th>
<th>16.9</th>
<th>17</th>
<th>17.1</th>
<th>17.2</th>
<th>149.9</th>
<th>150</th>
<th>3000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200.0</td>
<td>200.0</td>
<td>100.0</td>
<td>100.0</td>
<td>0.0</td>
<td>-75.0</td>
<td>-75.0</td>
<td>-75.0</td>
<td>-275.0</td>
<td>-275.0</td>
</tr>
<tr>
<td>1</td>
<td>154.9</td>
<td>154.9</td>
<td>42.6</td>
<td>42.6</td>
<td>6.3</td>
<td>6.3</td>
<td>0.0</td>
<td>0.0</td>
<td>-20.0</td>
<td>-20.0</td>
</tr>
<tr>
<td>2</td>
<td>-57.0</td>
<td>-57.0</td>
<td>-100.0</td>
<td>-100.0</td>
<td>-175.0</td>
<td>-175.0</td>
<td>-175.0</td>
<td>-325.0</td>
<td>-325.0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>200.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>4</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200.0</td>
</tr>
</tbody>
</table>

**Graphs:**

- **MCP:** Aggregated purchases (red) and Aggregated sales (gray)
- **Volume (MWh):**
- **Price (€/MWh):**
Bid & Ask Curves Hour 5, 23rd of November 2006

Aggregated price curves are distributed daily via EEX information products
German power

- 14th to 2nd day before delivery

Entering, deleting, changing, retrieving of orders
7:30 am – 8:00 pm

Day of auction

<table>
<thead>
<tr>
<th>Entering, deleting, changing, retrieving of orders</th>
<th>Price establishment</th>
<th>Result distribution, participants objections</th>
<th>Trade administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30 am – 12:00 pm</td>
<td>12:00 pm – 12:15 pm</td>
<td>12:15 pm – 12:45 pm</td>
<td>12:45 pm – 08:00 pm</td>
</tr>
</tbody>
</table>

Swiss power

- Same timeline; price establishment 10:30 am

- 24/23 auctions in parallel — hrs. of a day

- Time shifts on trading days prior to weekends or holidays due to the fact that several auctions are conducted (on Fridays auctions are performed for Sat., Sun. and Mon., if Mon. is not a holiday)
Information moves the market

Publication of data on emissions
Information moves the market
Auctions provide price signals …

… rumours as well

„turn-around“ time of auction should be in line with the „speed“ of the secondary EUA market
- time from closing of order book to publishing of results << 1 day

High reliability and transparency
- Processes
- Technical infrastructure
- Result / information distribution

Goal: Avoid disturbing the ongoing EUA trading scheme possible through delays, operational errors or missing transparency of/in the auction process(es)
Set-up of EU ETS auction(s)

Who is allowed to participate?
Participant and auctioning organisation are technically able to handle data required for auction / clearing process

Knowledge building: process, timing, etc.

Auction process: frequency, algorithm, timing, etc.

Credit risk mitigation, settlement

Result distribution to individual participants and the market
Auction-office and participants are technically and operationally ready to pursue the auction and the clearing process (depending on the clearing process chosen)

Contracts required are in place and verified e.g.
- Debit orders
- Bank guarantees, collateral agreements – depending on the credit risk mitigation mechanism chosen

Participants master data available and verified
- General data, communication data etc.
- Participation criteria
- National registry
- Bank / payment data

Participants have proper access to the auction system
- technical access
- security measures for the interaction with the system are in place
- participants are able to operate the system
Provide participants with knowledge about the auction and processes

Distribution
- Web-infrastructure (content, downloads, podcasts, FAQ threads etc.)
- Interactive sessions, hotlines, support

Information about (examples)
- Auction process (timelines, deadlines)
- Auction methodology
- IT-Infrastructure

Simulations
**Alignment of auctions**
- Schedule for auctions within each country
- Throughout Europe

**Auction algorithm (not discussed in this presentation)**

**Auction Schedule (for each auction)**
- Pre-auction phase – x days prior to auction

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entering, deleting, changing, retrieving</td>
<td>hh:00 – hh:00'</td>
</tr>
<tr>
<td>of orders</td>
<td></td>
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</table>

**Day of auction**

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<th>Event</th>
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<tr>
<td>Entering, deleting, changing, retrieving</td>
<td>hh:mm – aa:00</td>
</tr>
<tr>
<td>of orders</td>
<td></td>
</tr>
<tr>
<td>Price establishment</td>
<td>aa:00 – aa:xx</td>
</tr>
<tr>
<td>Result distribution, participants objections</td>
<td>aa:xx – aa:yy</td>
</tr>
<tr>
<td>Begin of clearing</td>
<td></td>
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</table>
Credit risk in EU ETS auctions in one-sided – governments bear the risk of defaulting auction participants

Questions

- How can the government be protected against these monetary credit losses?
- What is the non-monetary impact of high number of (credit) defaults in the auctions?
- Which question is more important for establishing an auction process?
Non-monetary credit risk mitigation

- Careful participant qualification process
- Setting of price limits
- Limiting the amount of certificates a participant can bid for
  - In general?
  - According to the financial strength?
  - According to the need of certificates in the production process?
  - Other
- Decrease of number of certificates auctioned at any one given time
  - Increase of number of auctions
- Require „monetary“ credit risk mitigation
Current Liquidating Margin
Mitigation of potential losses if open net positions (EUA and cash) have to be liquidated at current market conditions, in case of a counterparty’s failure.

Additional Margin
Mitigation of potential losses (close-out costs) due to changes in market conditions (volatility), in case of a counterparty’s failure. Calculation base: quantile of loss distribution.

Initial Margin/clearing fund – upfront

Daily processes, highly automated margining and settlement processes
### Example - Margin calculation

<table>
<thead>
<tr>
<th>Purchase of 1,000 EUA at a price of 9.50 €/EUA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long 1,000 EUA</strong></td>
</tr>
<tr>
<td><strong>Short 1,805 € Cash (VAT)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation of the position* at the current market value of 10 €/EUA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long 1,000 EUA:</strong></td>
</tr>
<tr>
<td>- 9,997.30 € *</td>
</tr>
<tr>
<td><strong>CLM = 1,305.20 €</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation of the change in the market price of the position based on the assumption of a maximum price fluctuation of 3.3 € (AM parameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long 1,000 EUA:</strong></td>
</tr>
<tr>
<td>1,000 x 3.3 € = 3,300 €</td>
</tr>
<tr>
<td><strong>AM = 3,300 €</strong></td>
</tr>
</tbody>
</table>

**Total margin = 4,605.20 €**

* Evaluation of positions discounted to the current trading day and rounded to one digit
Monetary credit risk mitigation

- **No mitigation**
  - No credit risk mitigation is performed.
  - EUAs are delivered after the receipt of the owed amount by auction office.
  - EUAs auctioned by defaulted participants are given out for free are sold in the secondary market or auctioned in subsequent auctions.

- **Collateral / guarantees upfront**
  - Participants pledge collateral / bank guarantees prior to auction.
  - Collateral is returned after payment of EUAs.
  - In order to guarantee full mitigation the bids might have to be adjusted according to the mitigants pledged.

- **Exchange process**
  - Credit risk mitigation according to exchange process.
  - Pledge of collateral upfront.
  - Adjustment of pledged amount during settlement period.

Possibility: Improvement of the credit risk mitigation processes related to the EU ETS auctions over time.
Credit lines
- If participant has to borrow the collateral the cost of the collateral will scale with the credit rating
- Cost of bank guarantees also depends on the participant’s credit rating and type of company

Opportunity cost
- Difference between the interest received for the margins and the interest that could have been earned in the market / through investments

Process cost
- Increasing implementation cost for the different mitigation procedures
Basics
- Thousand - few thousand participants
- Participants: small companies -> large financial institutions
- Heterogeneous and various levels of sophistication of IT-infrastructures at participants sites
- Low cost IT-infrastructure

Auction infrastructure
- „Real“-time
- Light-weight web-application
- High security measures (banking standard)
- Emergency procedures (manual)
Clearing infrastructure

- Settlement and credit risk mitigation through „standard“ banking infrastructures
- „Near time“
- Collateral balancing possibly daily – depending on the credit risk mitigation process implemented
- High security measures (banking standard)
Possible EU ETS auction / mitigation / settlement processes

- **Auction Org./Setup**
  - Government
  - CO₂ Allowances amount to be auctioned
  - Cash – proceeds of auctions

- **Settlement Org./Setup**
  - Accounts
    - EUA Cash
    - Mitigants Cash EUA
  - SO’s account at ntl. reg.

- **Buyer**
  - Bid
  - Mitigants
  - Cash

- **Ntl. Reg.**
  - Account of Buyer
  - CO₂ Allowances
Thank you very much for your attention

Dr. Stefan Teis
Director Market Development

E-mail: stefan.teis@eex.de
Internet: www.eex.de
Phone: +49 (0) 341 / 21 56 200
Fax: +49 (0) 341 / 21 56 109