IGCC – Participation Elia
On 01/10/2012 Elia started with IGCC for a trial period of 1 year.

Presently: Energinet (DK-W), TenneT TSO (NL), SwissGrid (CH), Ceps (Czech Republic) and Elia

What: IGCC aims to prevent counteracting deployment of secondary reserves in separate control blocks, by exchanging opposing imbalances between TSOs

IGCC adjusts the imbalances of the control areas by netting all imbalances

- Dynamic, real time
- Limited to remaining ATC after Intra-Day Closure
- Within the limits made available to the market $\rightarrow$ no extra risk
- After closure of the market $\rightarrow$ no impact on the market
- Limited to contracted volume R2 (140MW)
- Exchange can be suspended at any moment for technical reasons
**IGCC – Participation Elia:**

**Introduction to IGCC concept - example**

**Control Area A**

- Imbalance = +150 MW
- SCR deployment = 0 MW

**Control Area B**

- Imbalance = -200 MW
- SCR deployment = +100 MW

**Control Area C**

- Imbalance = -100 MW
- SCR deployment = +50 MW

**IGCC Optimization (TransnetBW)**

- 150 MW
- 100 MW
- 50 MW

Example without exchange limits
IGCC – Participation Elia: IGCC: Expected effects

- Minimal impact on the Imbalance Tariff
- Better control quality
• **Imbalance Tariff:**

<table>
<thead>
<tr>
<th>ARP Imbalance</th>
<th>Net Regulation Volume (NRV)</th>
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<tbody>
<tr>
<td>Positive</td>
<td>Negative (Net downward regulation)</td>
</tr>
<tr>
<td>MDP - α1</td>
<td>MIP - β1</td>
</tr>
<tr>
<td>MDP + β2</td>
<td>MIP + α2</td>
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• **No Impact NRV**
  → IGCC exchanged volumes are considered as a part of the NRV

• **Minimal Impact Marginal Prices**
  → Instead of activating Secondary reserves, the imbalance will be exchanged via IGCC
  → IGCC exchanges are considered at R2 price in the imbalance tariff

• **Calculation of alpha is based on the system imbalance, no changes**

• **Conclusion: IGCC will not impact the imbalance**
IGCC – Participation Elia: IGCC information on website Elia

- Volumes exchanged via IGCC
  
  Non validated data for 20/11/2012

20/11/2012

- Value IGCC exchanges in the imbalance tariff
• **IGCC-volumes**: Quickly and automatically activated (140 MW – non guaranteed)

• **Secondary reserve - R2**: Quickly and automatically activated (140 MW – guaranteed)

  - When secondary reserves are not sufficient to resolve system imbalances, other resources are manually activated.
  - Reason; consider that suddenly only “guaranteed fast reserves” (R2) might be available to resolve imbalances

• **Tertiary reserve**: manually activated, less quick that R2

  - **CIPU- & Free bids**:
    - power that can be activated upwards and/or downwards within 15 min
    - depending on the margin available in the production units
    - @ free price: positive for I-Bids and positive/negative for D-Bids

  - **Contracted R3**:
    - Upwards reserve
    - activation price is fuel cost based on technical parameters of power plants

• **Load Shedding of Grid Users**:
  - upwards reserve
  - activation price is fixed
  - Limited number of activations & fixed duration of each activation

• **Call for extra volumes/Activation of LC-units**:
  - Activation of LC-units if price is between -3000 €/MWh & +3000 €/MWh
  - Call for extra volumes to ARPs

• **inter-TSO assistance**:
  - agreements made with RTE and TenneT operators about electricity imports or exports
  - emergency reserve with no guarantee
### IGCC – Participation Elia:
#### Balancing management Elia: example

<table>
<thead>
<tr>
<th>Quarter</th>
<th>NRV (MW)</th>
<th>GUV (MW)</th>
<th>IGCC+ (MW)</th>
<th>R2+ (MW)</th>
<th>Bids+ (MW)</th>
<th>R3+ (MW)</th>
<th>GDV (MW)</th>
<th>IGCC- (MW)</th>
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<td>119,7</td>
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Questions?
Monthly IGCC settlement price determination: Two Step Approach

– Estimating Opportunity Prices of each IGCC Participant for each 1/4h
  • The opportunity price is the price a TSO would pay for upwards/downwards regulation without IGCC.

– Calculating a Settlement Price as the weighted average of these Opportunity Prices for each 1/4h

– The Energy Imports and Exports of each IGCC Participant will be valued with that Settlement Price (which is valid for both) and then charged to each other.
Imbalance tariffs

- New imbalance tariffs: single marginal pricing

<table>
<thead>
<tr>
<th>NRV</th>
<th>Positif</th>
<th>MDP - α₁</th>
<th>MIP - β₁</th>
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<tbody>
<tr>
<td>Déséquilibre du Responsable d'Accès Positif</td>
<td>MDP - α₁</td>
<td>MIP - β₁</td>
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<tr>
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<td>MDP + β₂</td>
<td>MIP + α₂</td>
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</table>

- Level of tariffs driven by:
  - NRV: MDP or MIP? Consider iGCC-volumes for NRV calculation?
  - Highest/lowest activation price Consider IGCC-settlement price for MIP/MDP?

- Principal goals
  - Give incentives to ARP’s to restore/keep their balance
  - Should be transparent: real time publication
  - Activations requested by Elia resolve imbalances should be done in merit order => imbalance tariffs should increase in function of system imbalance
IGCC – Calculation of the NRV

• **Compare simulations Consentec:**
  No IGCC Mean positive/negative SCR Activation (MW)
  with IGCC Limited Cap Mean positive/negative SCR Activation (MW)

• **Results:**
  – 20% of the time “NRV without IGCC” isn’t reflecting the situation of the Belgian control area.
  – Example:

<table>
<thead>
<tr>
<th>NRV+GCC</th>
<th>GCC</th>
<th>NRV</th>
<th>Imbalance tariff delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>147,7</td>
<td>149,7544</td>
<td>-2,05437</td>
<td>-11,69</td>
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</table>

  • “NRV Without IGCC”: **WRONG** signal imbalance tariff => MDP: zone is long
  • “NRV With IGCC”: **CORRECT** signal imbalance tariff => MIP: zone is short

• **Conclusion:**
  – Imbalance tariffs should reflect the situation of the Belgian control area.
  – Therefore IGCC-volumes should be considered in the calculation of the NRV
IGCC – marginal activation price

- **Compare:**
  - Settlement price Consentec with marginal activation price

- **Transparency (real time publication)**
  - Settlement price is only available at very earliest W+1

- **Analysis merit-order activation:**
  - +/-27% of the time the settlement price of IGCC is influencing the imbalance tariffs.
  - The settlement price of IGCC is reflecting the situation of other control areas.
  - Imbalance tariffs should reflect only the situation of the Belgian control area.

- **Conclusion:**
  - Do not consider IGCC settlement price in imbalance tariffs
  - For the imbalance tariffs IGCC volumes will be valued at R2-prices
IGCC – Calculation of $\alpha$

- In tariff proposal additional component “$\alpha$” is foreseen:

  \[ \alpha_2 (\text{€/MWh}) = \begin{cases} 0 & \text{if } \text{ABS(System imbalance)} \leq 140 \text{ MW} \\ \text{average } \left( \frac{(\text{System Imbalance}^\text{QH})^2}{15.000} \right) & \text{if } \text{ABS(System imbalance)} > 140 \text{ MW} \end{cases} \]

  System imbalance = ACE - NRV

- IGCC-volumes are necessary to calculate the system imbalance:
  
  - As the “$\alpha$” should reflect the situation of the Belgian control area “NRV incl IGCC” will be used to determine the real time system imbalance

  System imbalance = ACE - NRV

  Where NRV = NRV_{Elia} + IGCC

- Conclusion:
  
  - IGCC-volumes need to be considered in the calculation of the $\alpha$