

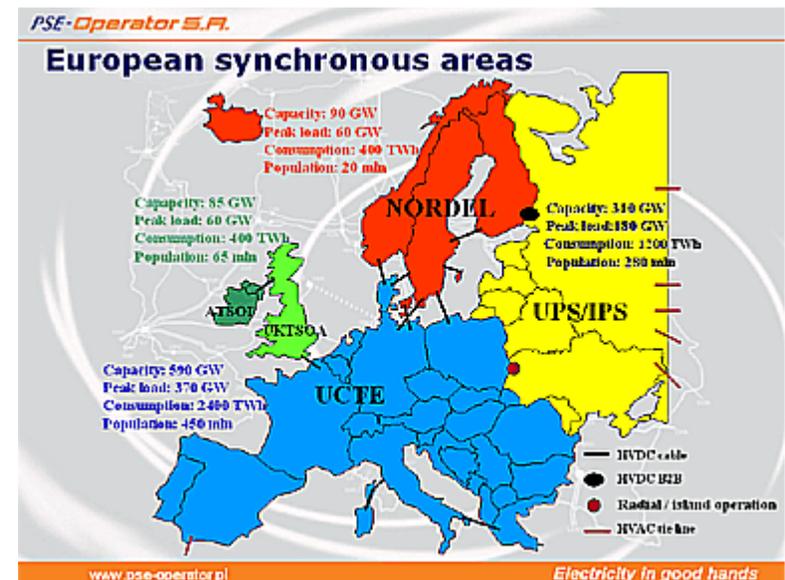
Electricity Cross-Border Balancing Arrangements

Workshop on Gas Balancing

12 October 2010

Introduction

- **Electricity can't be stored!**
 - Production must always be equal to consumption
- Every imbalance between production and consumption results in a **frequency variation**
 - The frequency is measured permanently by TSOs
- In **UCTE area**, 50 Hertz frequency must be maintained at all time to avoid major black out
 - Interconnected balancing areas are synchronized



Introduction

- Since electricity can't be stored, a part of **generation capacity** must be **reserved** to correct imbalances
 - **Generation units have certain margins** above their minimum capacity and below their maximum capacity in order to be able to **increase or decrease** their production in case of imbalance
 - **Two kind of reserves** are activated in case of imbalance
 - ***Reserves triggered automatically***: Obeying to a signal sent by TSOs, generation units automatically increase or decrease their production in a few seconds to correct the imbalance (primary reserve) and restore the frequency at its nominal value (secondary reserve)
 - ***Reserve triggered manually (tertiary reserve)***: It relays primary and secondary reserves to restore reserves (in a few minutes or hours)
 - A part of this reserve is **contracted** (tendering process)
 - A part of this reserve consists in **offers submitted by producers in day-ahead or within-day**
- In France, the “**Balancing Market**” organizes the selection of these offers

Outlook

- Focus on the French Balancing Mechanism
- The need for Cross-Border Balancing Arrangements
- Actor-TSO and TSO-TSO models
- A concrete example: BALIT

Focus on the French Balancing Mechanism

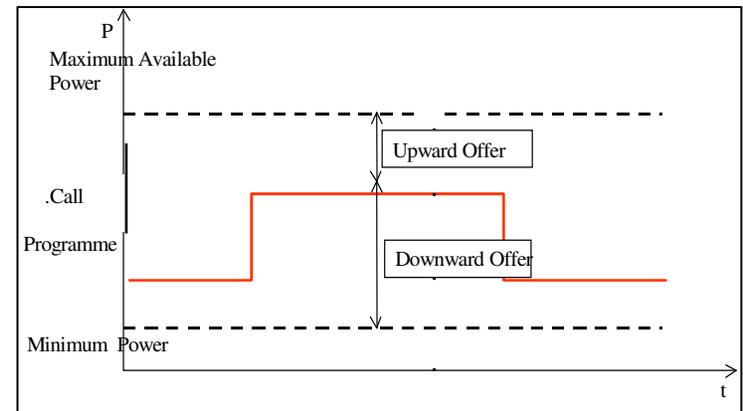
Functioning of the Balancing Market (1/2)

- In France the Balancing Market has a **double role** :

- **Frequency control**
- **Network constraints**

- Offers include:

- Contracted Tertiary reserves
- Offers from generators: in France, all generators have to **bid their available capacities** at the same time than their production program (security of supply)
- Offers from consumers
- Offers from **foreign systems**

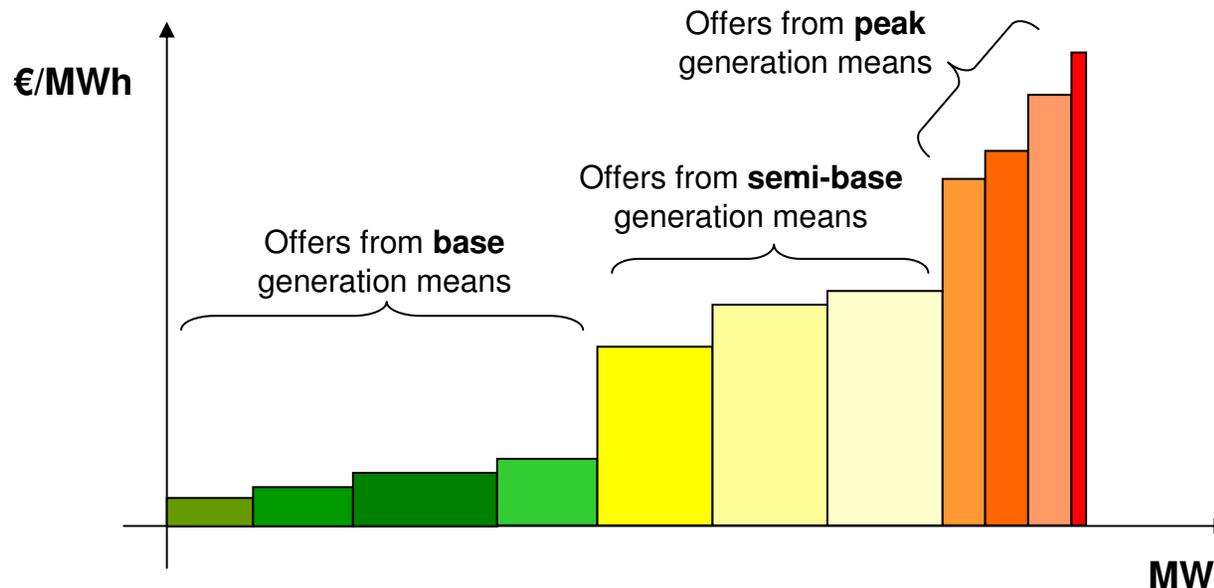


- Balancing offers are remunerated « **pay-as-bid** »

Focus on the French Balancing Mechanism

Functioning of the Balancing Market (2/2)

- Offers are ranked according to **merit order** (from low-price offers to high-price offers)



- The **lowest price offers** are selected
 - If needed by the TSO, more expansive offers may be selected if they have a better geographic position to solve a network constraint or a shorter activation time

The outcome of this selection is a reference for the **imbalance settlement**₆

Focus on the French Balancing Mechanism

Imbalance settlement

- The imbalance settlement price is a **dual price** which varies according to
 - the net position of the Balancing Responsible Party (positive or negative imbalances)
 - the total imbalance of the system (upward or downward balancing needed)

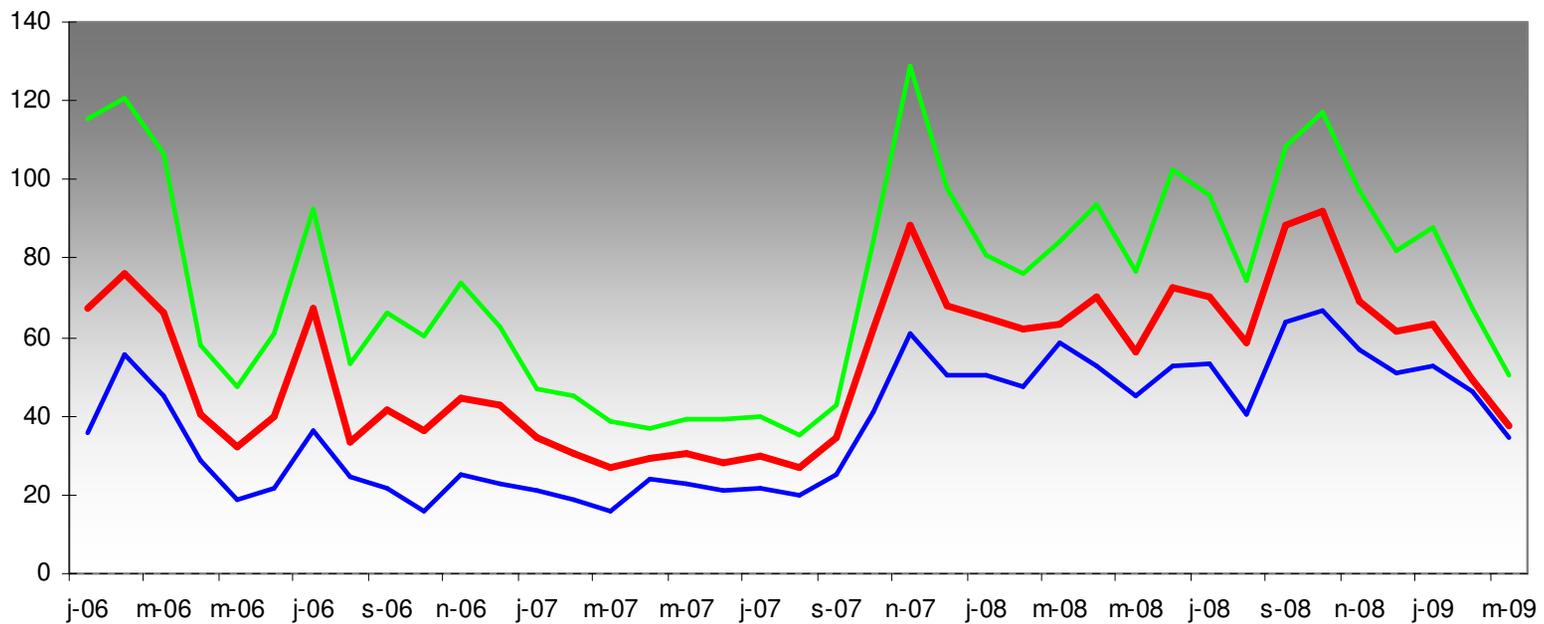
- The imbalance price is based on the **Average Weighted Price (AWP)** of activated balancing offers
 - The « K factor » impedes arbitrages between day-ahead and balancing markets

	Upward trend	Downward trend
Positive Imbalances (P>C)	BRP receives Powernext D-A price	BRP receives Min (AWP _{down} / (1+K) ; Powernext D-A price)
Negative Imbalances (P<C)	BRP pays Max (AWP _{up} * (1+K) ; Powernext D-A price)	BRP pays Powernext D-A price

Focus on the French Balancing Mechanism

Balancing prices

Upward weighted average price Downward weighted average price Average spot price (Powernext)



Monthly average prices (€/MWh) in the French balancing mechanism compared to the average spot price (Powernext)

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The need for Cross-Border Balancing Arrangements

- Why to develop Cross-Border Balancing exchanges?
 - Provide TSOs with access both to a **more diversified generation technology mix** and further opportunities to offset deficit and surplus net generation positions
 - Achieve **more efficient utilisation** of balancing resources
 - Reduction of costs
 - **Increase competition**
 - Reduction of market power in the balancing markets
 - **Reduce the risk** of supply interruption
 - Increase in security of supply

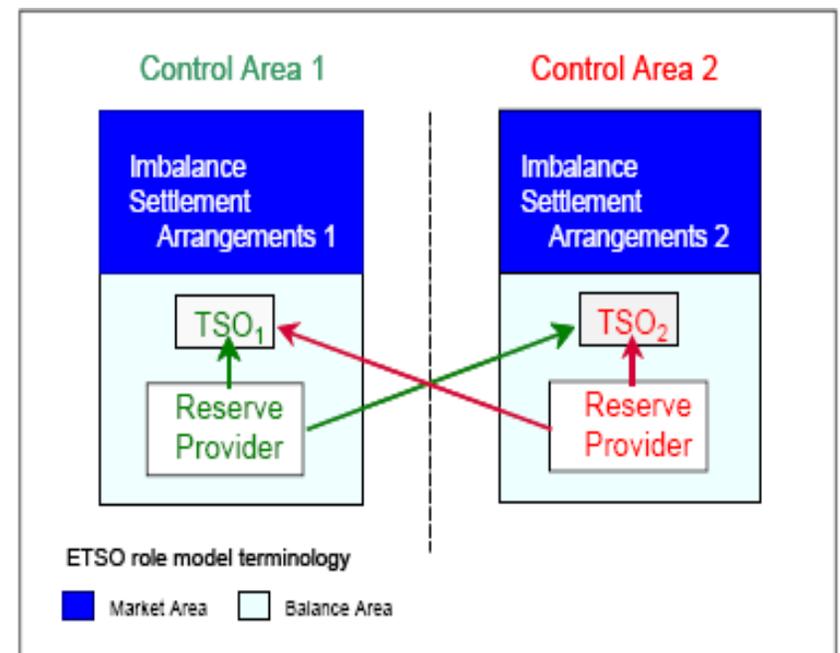
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BSP-TSO model

A first step toward integration

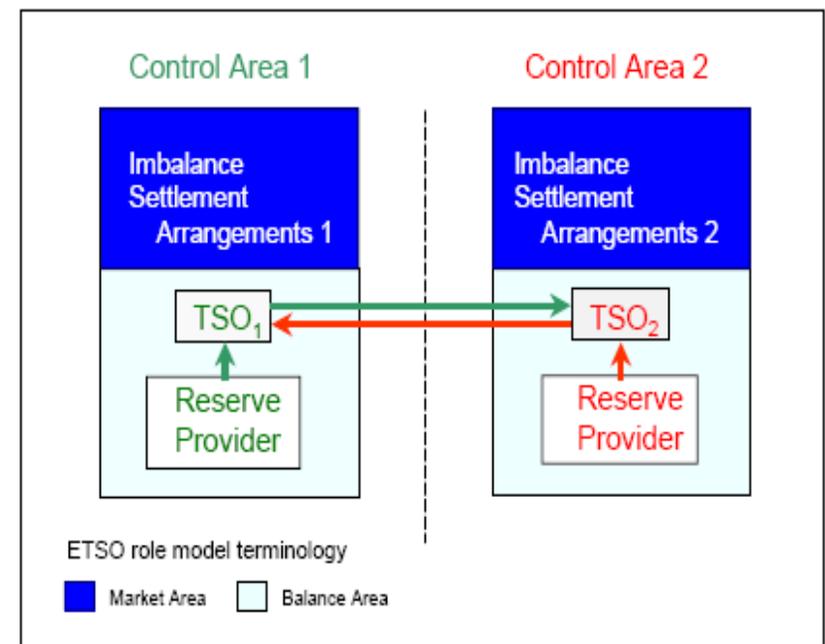
- Swiss and German market players participate directly in the French BM
 - They submit upward and downward offers to RTE through the interconnection intraday gates
- In theory, Spanish and Italian market players can also participate
 - But incompatibility of market designs impedes their effective participation
- This is the so-called “**Actor – TSO model**” which presents several drawbacks:
 - It is **not reciprocal**: French market players can't participate to adjacent balancing markets
 - It only allows exchanges **from the more flexible country** (scheduling process)



TSO-TSO model

Reciprocal benefits

- In the “**TSO-TSO model**”, each actor provides balancing offers to its own TSO, and adjacent TSOs manage themselves cross-border balancing exchanges
- The TSO-TSO model brings **reciprocal benefits**:
 - The opportunity for market participants to provide balancing bids/offers should increase
 - The balancing capacities available in both markets should be better used
 - The competition in both markets should be enhanced
 - As a consequence, the balancing costs should be reduced in both markets
 - The security of supply in both systems is preserved



TSO-TSO model

Two options

- Two options are under consideration:
 - “**TSO-TSO model with a common merit order**”: The lowest price offer is selected in case of no-congestion within and between control areas

→ This is the **European target model** identified by all stakeholders

- “**TSO-TSO model without a common merit order**”: TSOs exchange bid-offer curves that reflect the resources available in their control area (ensuring enough reserves remain available in their control area and taking into account network constraints)

→ This is considered as a pragmatic **interim solution** towards market integration

TSO-TSO model

Degree of harmonisation needed

- **Full harmonisation** of balancing markets **is not a prerequisite** for cross-border balancing (in particular for “TSO-TSO model without common merit order”)
 - However, **compatibility of key characteristics** of balancing market design is needed :
 - Scheduling gate closure time
 - Technical characteristics of balancing services. (e.g. activation time, time to full activation, manual/automatic activation)
 - Balancing services procurement (e.g. contracts or bid)

- More information in the **ERGEG Guidelines of Good Practice for Electricity Balancing Markets Integration**
 - http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Guidelines%20of%20Good%20Practice/Electricity/E09-ENM-14-04_RevGGP-EBMI_2009-09-09.pdf

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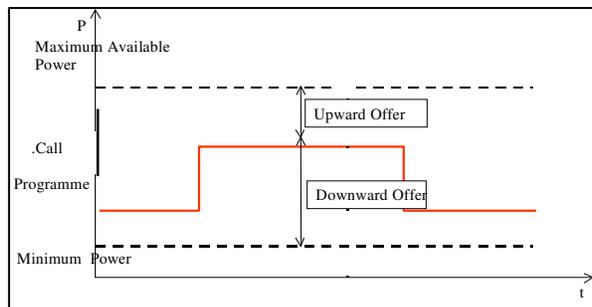
Background

- The **BALIT** project (**BAL**ancing **I**nter **T**SO) had been under study by RTE (France) and NGET (GB) as soon as 2007
 - This project is based on the TSO-TSO model without common merit order
- The project was submitted for **public consultation** in November 2007
- After reviewing the proposal and the results of the public consultation, **CRE and Ofgem approved the proposal** in April 2008, considering that it would allow **reciprocal access** to the national Balancing Markets and promote **economic efficiency** and **competition** on each market.
- **BALIT interim solution** was implemented in March 2009
- The **enduring phase** is going to be launched in December 2010

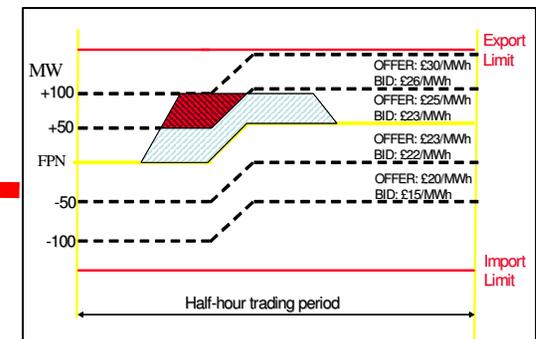
A concrete example: BALIT Functioning

- **One hour before real time** RTE and NGET exchange balancing offers based on 50 MW blocks of 1 hour duration
 - **Interim solution:** possibility of **6 prices** per day exchanged in D-1
 - **Enduring solution:** possibility **24 prices** per day exchanged in H-1

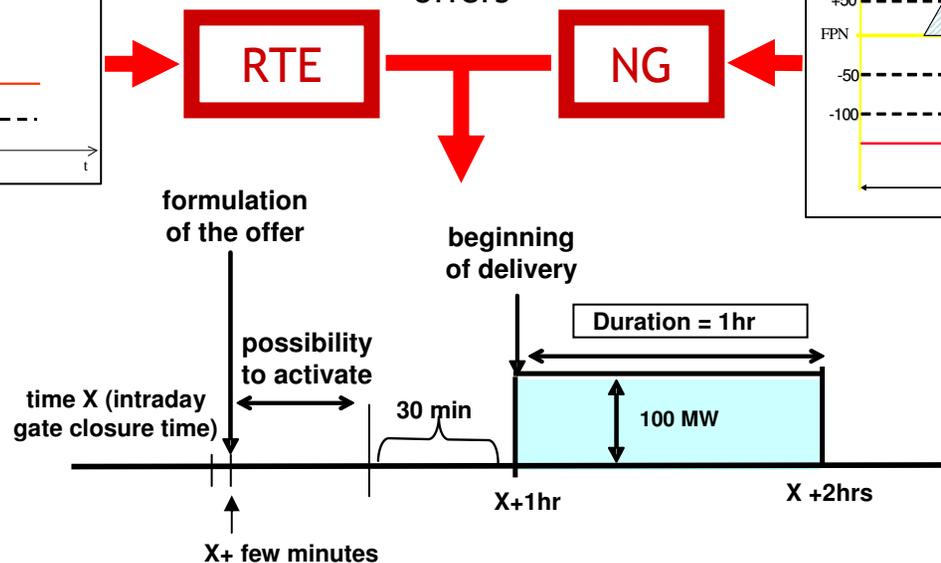
French participants' offers



GB participants' offers



Standart format of offers



A concrete example: BALIT

Review of experience

- **Review of experience** of the first year is **positive**:
 - 1,3 TWh activated in total
 - As a comparison, the volume activated on the French Balancing market varies between 6 and 8 TWh
 - BALIT has been activated 60% by NGET and 40% by RTE
 - Power flow has been 86% of the time from France to GB
 - Activation of BALIT has a **positive impact** on balancing price settlement
 - during 63% of the time for France
 - during 74% of the time for GB
 - RTE has activated 5% of the French total downward volume through BALIT



Thank you for your attention!

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More information in
**ERGEG Guidelines of Good Practice for Electricity Balancing
Markets Integration**
available on ERGEG website