Market Code

Market Division

21.12.2012.

ЈАВНО ПРЕДУЗЕЋЕ
ЕЛЕКТРОМРЕЖА СРБИЈЕ

Market Code

AERS

Approves the Market Code

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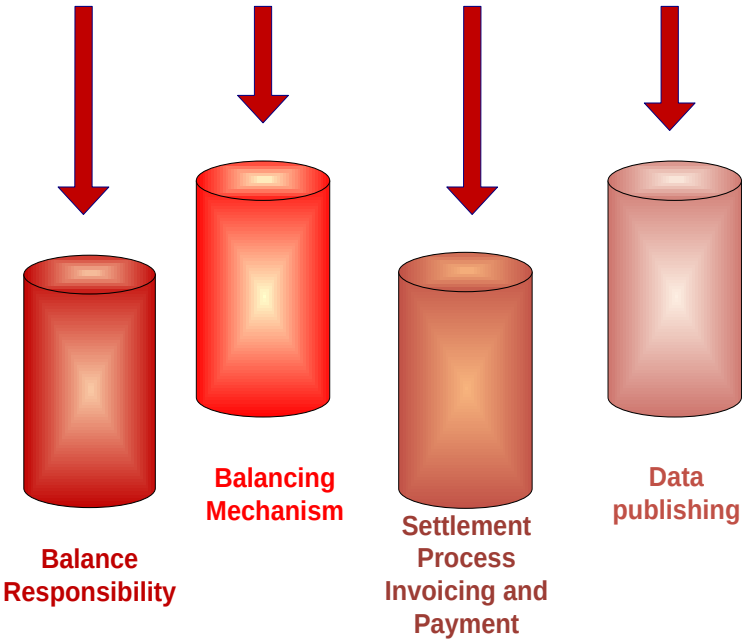
ЕЛЕКТРОМРЕЖА СРБИЈЕ

Market Code



Market Participants on Energy Market in Serbia

- TSO
- MO

Regulatory Agency

- Producer
- Public Supplier
- Supplier
- DSO

Spot Market

- Privileged Producers (Feed-in)

- Independent Producers

Final Consumers

- Households

- Small Consumers

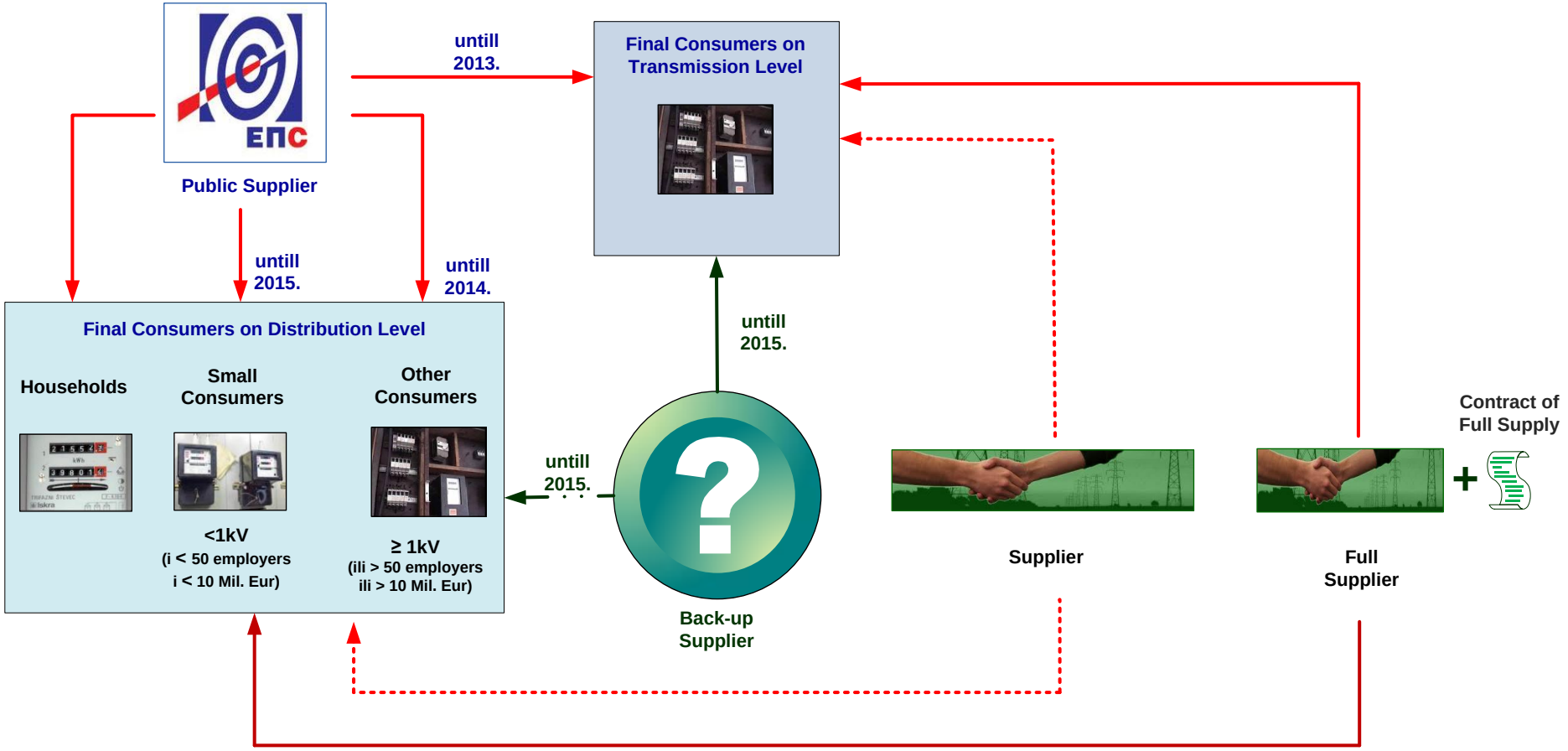
- Consumers

Suppliers

Last Resort Supplier

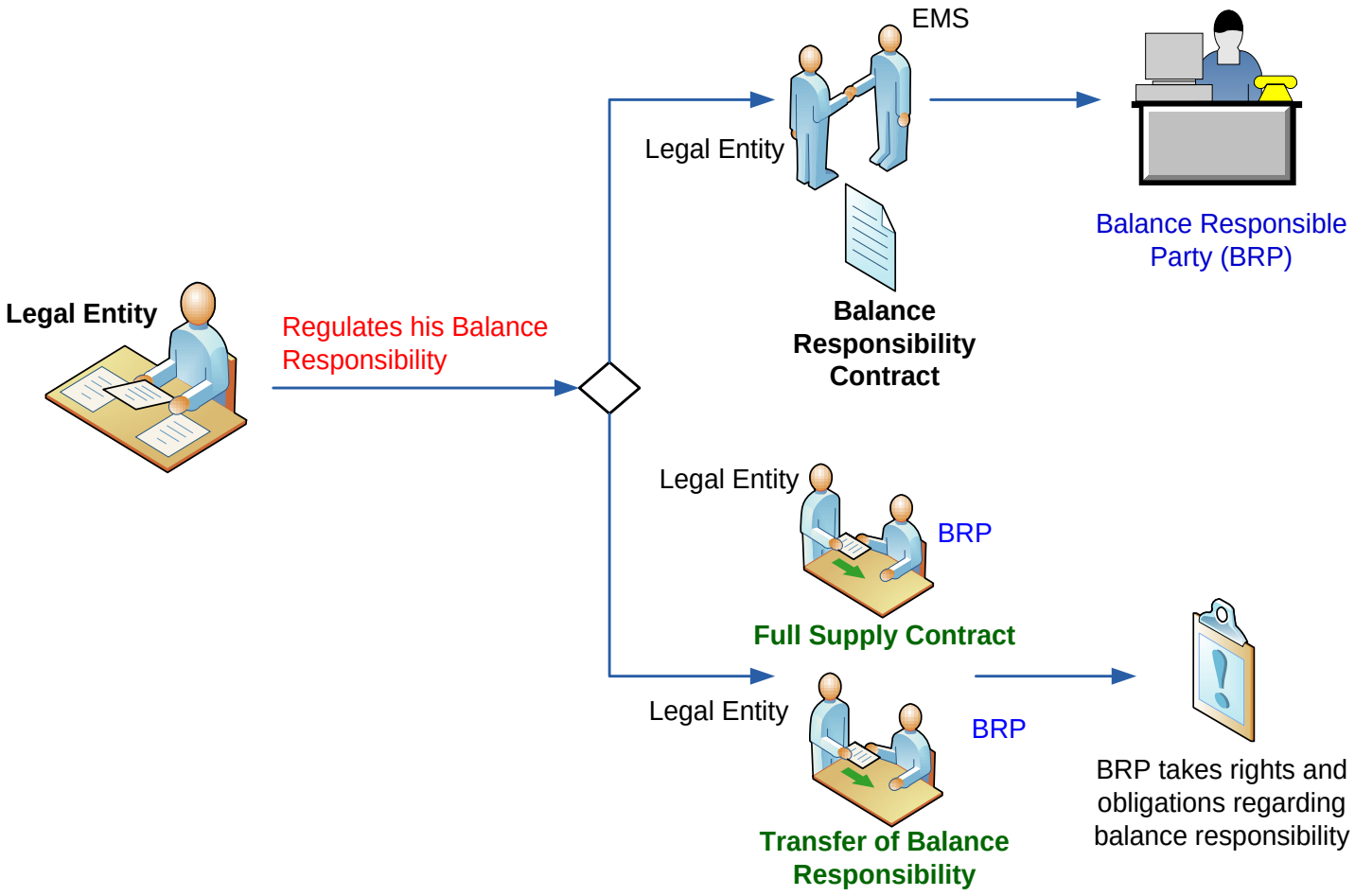
Electricity Supply of Consumers

- Public supply: sale of electricity to households and small customers at regulated prices
- Full supply contract : electricity sale where amount of electricity is not determined in advance by the contract ; it is based on the consumption measured at the metering point
- Back-up (Reserve) supply: final consumer that is not entitled to public supply and has no supplier; The back up supply may last for a maximum of 60 days; provided by law until 2015.

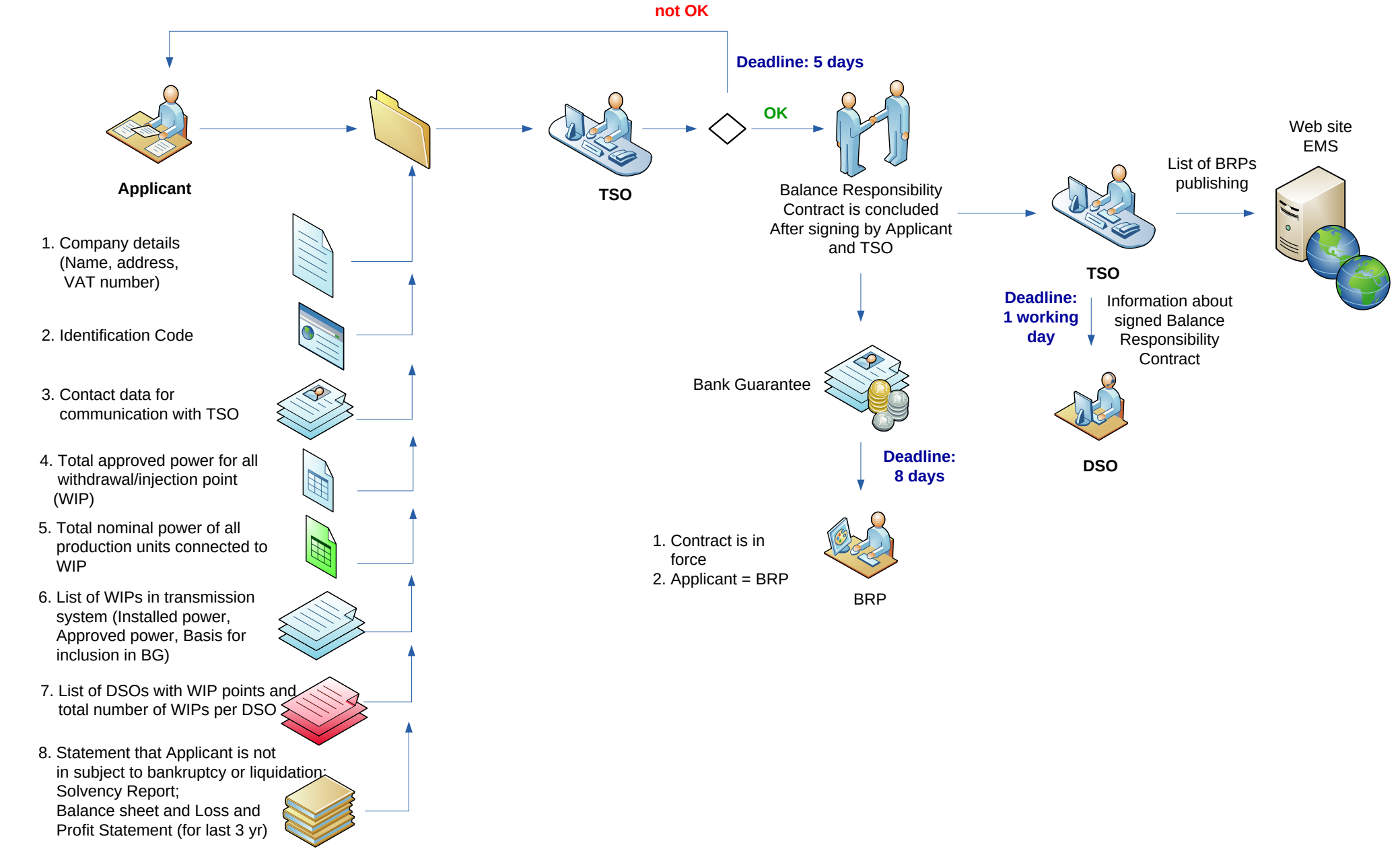


Balance Responsibility Concept

- Balance responsibility means the obligation of market participants to balance generation, consumption and internal and external transactions for purchase and sale of electricity.
- Balance responsibility is obligation for taking over financial responsibility for imbalance caused by difference between realized production, realized consumption, and confirmed internal and external transactions for purchase and sale of electricity



BRP Registering



Balance Group (BG)

- Includes all withdrawal/injection points in transmission and distribution system, as well as scheduled transactions of market participants.

- One BRP can be responsible only for one balance group
- All withdrawal/injection points must be associated to BGs
- One withdrawal/injection point can be associated only to one BG

Advantage of forming the balance group:
- economic stability
- effectively achieve business goals (easier connecting of market participants) (producer - supplier, supplier – customer)
- association of individual participant imbalances in a unique BG imbalance
- cost reduction
- simplified administration

Risk Value, Bank Guarantee and Deposits

$$R = \max(P_1, P_2, P_3) \times D \times C$$

- Where:
  - R – Risk Value
  - P_1 – Average Daily Consumption of Balance Group for last 12 months
  - P_2 – Average Daily Production of Balance Group for last 12 months
  - P_3 – Average value of Daily internal and external transactions for purchase of electricity
  - D – number of days (D=3)
  - C – estimated prices (mean value of peak product on EPEXSPOT Germany from 1st October in Year Y-2 till 30th September in Year Y-1)
- **Limitation of Risk Value**:
  - minimum value: 50 000 €,
  - maximum value: 1 000 000 €
- TSO can change value of the Risk every 3 month if it is necessary
- **Collaterals:** Revolving Bank Guarantee; Deposit
- **Bank Guarantee:** covered one calendar year; revolving, irrevocable, unconditional, payable on the first call
- **Deposit:** BRP deposited money on special bank account; accounting interval of Risk value is one month;

Balancing mechanism (BM)

- **The balancing mechanism resources:**
  - Resources whose capacity is purchased in advance, as a System service;
  - Resources whose capacity is not purchased in advance, but is available in real time.
- **Balancing energy**: secondary and tertiary, contractual
- **Participants in balancing mechanism:** Balancing Entities (BE), Suppliers, Neighboring TSO
- **Explicit Offers**:
  - **Balancing entities (Dominant Participant) – Agreement for Participating in BM**
  - **Offer**: pair energy – price; engaged according to Merit Order list;
  - **Limitation**: price for BE engaging from (-100MWh to +100MWh) must be in 30€/MWh range
  - **Limitation 2:** minimum price 0.1 €/MWh, maximum price: 500 €/MWh
- **Implicit Offers**:
  - **Balancing entities (other participants) – Agreement for participating in BM**
  - **Offer**: pair power – price;
  - **Limitation**: minimal price: 0.1 €/MW, maximum price: 500 €/MW
- **Contractual Reserve:**
  - **Suppliers – System Services Contract**
  - **Neighboring TSO – Agreement between TSO regulating the purchase and sale of emergency energy**
  - **List for engagement of contractual reserve:**
    - Following minimal cost principles, according on price from above Contracts

The calculation of fees for the engaged Balance Energy

- **Pay direction:**
  - "Upward" regulation of balancing entities – JP EMS is paying

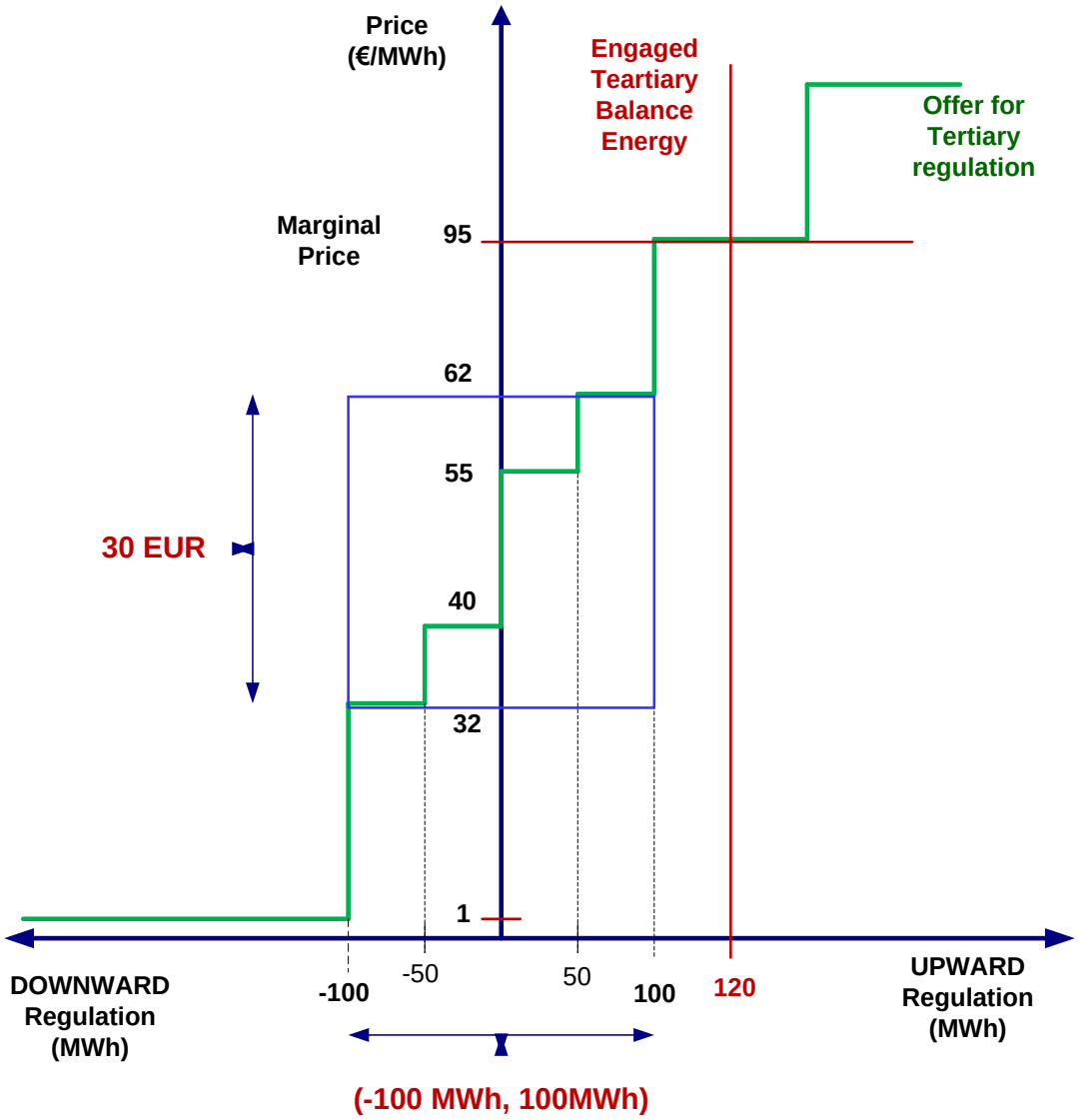
  - "Downward" regulation of balancing entities – Participant in BM is paying

- **Calculation of Fees for Tertiary regulation engagement:**
  - paid by offered price (pay as bid)

- **Calculation of fee for Secondary regulation engagement:**

  based on prices delivered in tertiary regulation offers:
  - Secondary regulation direction = Tertiary regulation direction:
    - SR price = marginal price for engaged TR
  - Secondary regulation direction ≠ Tertiary regulation direction :
    - SR price = boundary price from range (-100MWh, +100MWh), in SR direction
  - Only SR engaged; tertiary regulation = 0
    - SR price = boundary price from range (-100MWh, +100MWh), in SR direction

Example of Fee Calculation For Engaged Balancing Energy



- **Tertiary regulation:**

$$TR = 120\,MWh$$

$$NTR = 50\times 55\frac{€}{MWh} + 50\times 62\frac{€}{MWh} + 20\times 95\frac{€}{MWh}$$

- **Secondary regulation:**
  - ***EX.1 : SR Dir. = TR Direction:***

$$NSR = SR\times 95\frac{€}{MWh}$$

  - ***EX.2: SR Dir. ≠ TR Direction :***

$$NSR = SR\times 32\frac{€}{MWh}$$

  - ***EX.3:*** SR Dir. Upward; TR = 0

$$NSR = SR\times 62\frac{€}{MWh}$$

  - ***EX.4:*** SR Dir. Downward; TR = 0

$$NSR = SR\times 32\frac{€}{MWh}$$

Balancing Group Imbalance

- Balancing group imbalance is determined on basis of overall scheduled position, overall metered position and engaged balancing energy in that BG

$$O = UPP + UOP - BEN$$

$$O = \left[\left(\sum BRP_{BOS,OI} - \sum BRI_{BOS,OI}\right) + \left(\sum EU_{BOS,OI} - \sum EI_{BOS,OI}\right)\right] + \left[\sum UPR_{BOS,OI} - \sum UPO_{BOS,OI}\right] - \left[BES_{BOS,OI} + BET_{BOS,OI} + BETS_{BOS,OI}\right]$$

- Acceptable Imbalance of Balance Group (POB):
  - **MAX(1 MWh; 2.5% of scheduled hourly consumption),** if there is at least one withdrawal/injection (WIP) in BG and if BRP has a role of Consumption Responsible Party.
  - **MAX(1 MWh; 2% of scheduled hourly production)**, if there is at least one WIP point in BG and BRP has role of Production Responsible Party.
  - **0 MWh** in case when BRP has role of Trade Responsible Party

Imbalance Settlement Price

- Imbalance Settlement Price (ISP) is determined from Balancing Mechanism, based on engaged secondary regulation, engaged tertiary regulation and engaged contractual reserves.

- Imbalance Settlement Price is determined from the following formula:

$$ISP = \frac{BET \times CTR + BES \times CSR + UR \times CUR}{BET + BES + UR}$$

  - Where:
    - BET - Total engaged tertiary regulation
    - BES - Total engaged secondary regulation
    - UR - Total contractual reserve engaged
    - CTR - weighted price for tertiary regulation
    - CSR – price for secondary regulation
    - CUR - the price of engaged contractual reserve

  - The sign in front of balancing energy depends on the direction of engagement:
    - („+“ for regulation „upward“ and „–“ for regulation „downward“)
  - In case of negative Imbalance Settlement Price, it is taken **ISP = 0**
  - Imbalance Settlement Price can be maximum **1.5 times higher** than maximal price for engaged balancing energy in that accounting interval.

Fee for Balance Group Imbalance

- **Pay direction:**
  - In case of positive imbalance of Balance group: JP EMS is paying to BRP

  - In case of negative imbalance of Balance group: BRP is paying to JP EMS

- In case when imbalance is not higher than normal deviation (POB), Fee is calculated:

$$N = O \times ISP$$

  - Where:
    - N – fee in case of BG imbalance
    - O – BG imbalance
    - ISP – imbalance settlement price

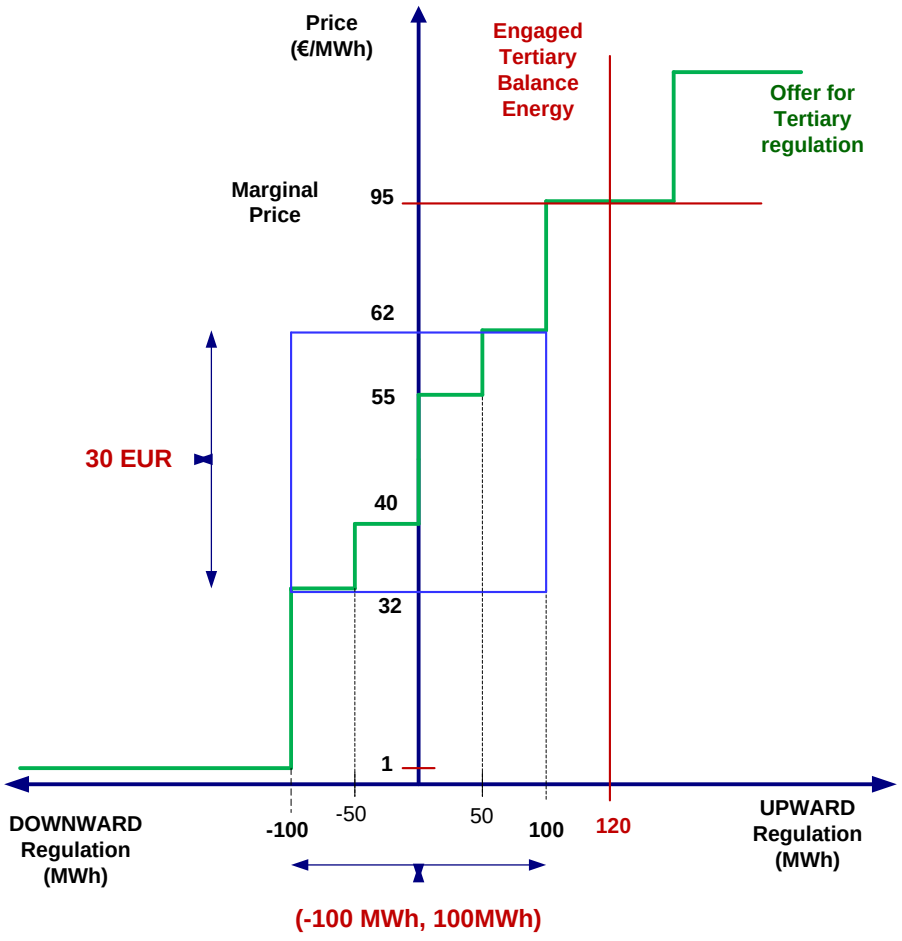
- In case when Imbalance is higher than Acceptable Imbalance :
  - **Negative Imbalance of balance group:**
    - Fee for share above Acceptable Imbalance is multiplied with coefficient **K1= 1.5**

$$N = POB \times ISP + (O - POB) \times ISP \times 1.5$$

  - **Positive Imbalance of balance group:**
    - Fee for share above Acceptable Imbalance is multiplied with coefficient **K2= 0.5**

$$N = POB \times ISP + (O - POB) \times ISP \times 0.5$$

Example of fee calculation for Imbalance



- **EX. 1**:
  - BG Imbalance: **- 110 MWh**
  - Tertiary regulation: **+ 120 MWh**
  - Secondary regulation: **- 10 MWh**
  - POB (2.5%) : **100 MWh**

- **Weighted tertiary regulation price**:

$$CTR = \frac{50 \times 55 \frac{€}{MWh} + 50 \times 62 \frac{€}{MWh} + 20 \times 95 \frac{€}{MWh}}{120} = 64.58 \frac{€}{MWh}$$

- **Price for secondary regulation:**

$$CSR = 32 \frac{€}{MWh}$$

- **Imbalance Settlement price (ISP)**:

$$ISP = \frac{120 \times 64.58 \frac{€}{MWh} - 10 \times 32 \frac{€}{MWh}}{120 - 10} = 67.54 \frac{€}{MWh}$$

- **Fee in case of balance group imbalance:**

$$N = 100 \times 67.54 + (110 - 100) \times 67.54 \times 1.5 = 7767.10€$$

Relations (financial) between market participants

Final consumer (FC) Type of Contract	Balance Responsibility who is paying?	Access to the system who is paying?	Electricity who is paying?
1 contract on full supply (FS)	- **Full Supplier is BRP:** (FC is paying BRP for balancing; BRP is paying EMS for balancing)	BRP	Final consumer based on full supply contract
1 FS contract + 1 or more supply contract	- **Full supplier is BRP:** (FC is paying BRP for balancing; BRP is paying EMS for balancing)	BRP	- Final consumer based on full supply contract - Final consumer to other suppliers
1 or more supply contract (**no full supply contract**)	1. **Final consumer is BRP** (FC is paying for balancing to EMS) 2. **Final consumer transferred balance responsibility on BRP** (FC is paying BRP for balancing; BRP is paying EMS for balancing)	Final consumer	- Final consumer to suppliers according to signed contracts

Publishing of Market Data

- Publishing of Data of engaged balancing energy
  - **Public Data Access:**
    - Engaged tertiary balancing energy (for system balancing)
    - Engaged secondary balancing energy
    - Engaged tertiary balancing energy (for congestion management)

- Publishing of Data in Imbalance Settlement Process
  - **Public Data Access:**
    - Imbalance Settlement Price (deadline: 8 working days, EMS web site)
  - **Data Access Restricted to BRP:**
    - Confirmed schedules – D+1
    - Engaged balance energy (tertiary, secondary, contractual) – D+3
    - Metered position – D+20
    - Balance group Imbalance – D+20
    - Monthly fee for BG imbalance – 21st day in month M+1