



# Turkish Power Balancing Market

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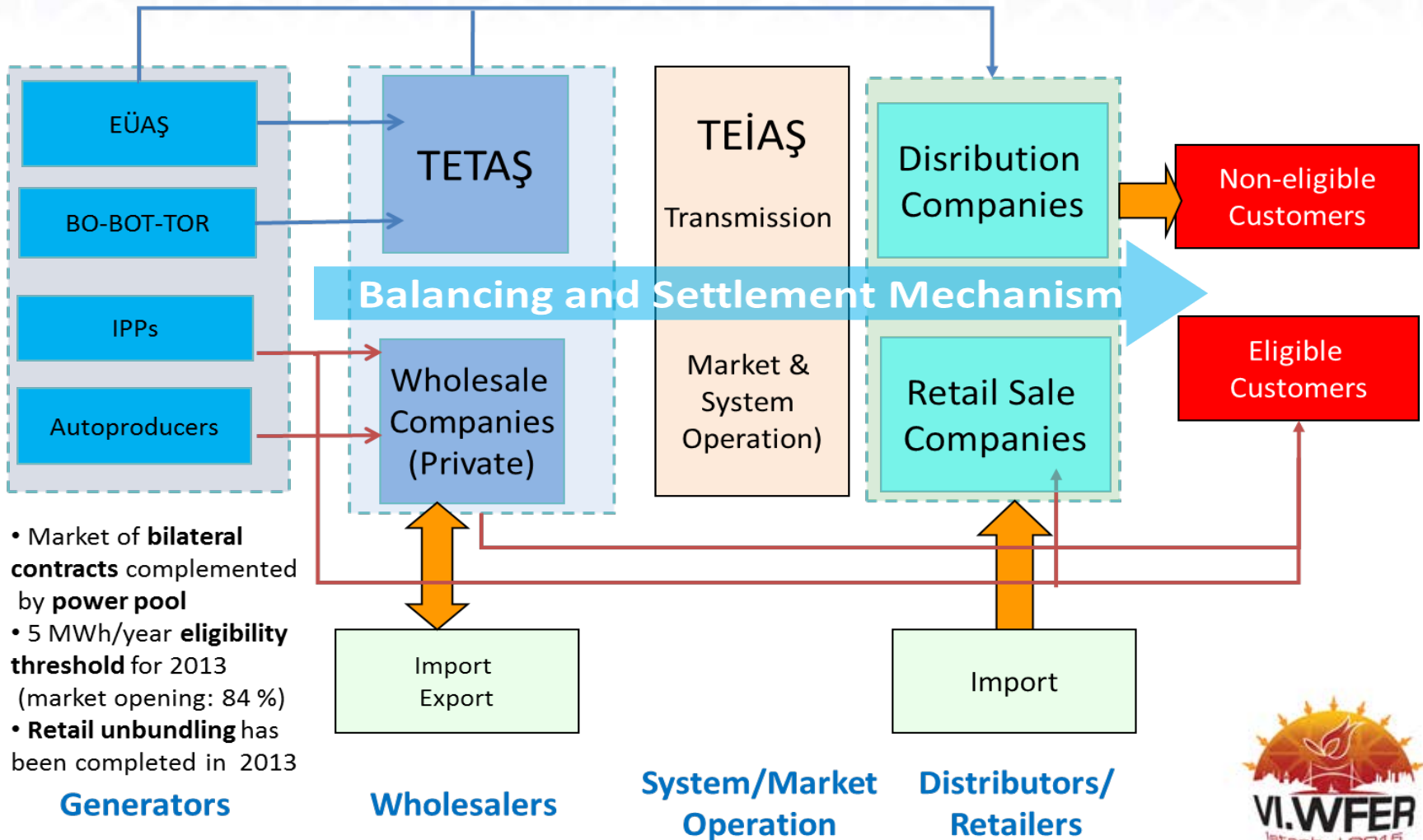
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**27/01/2014 – Tbilisi, Georgia**



# Electricity Market Structure

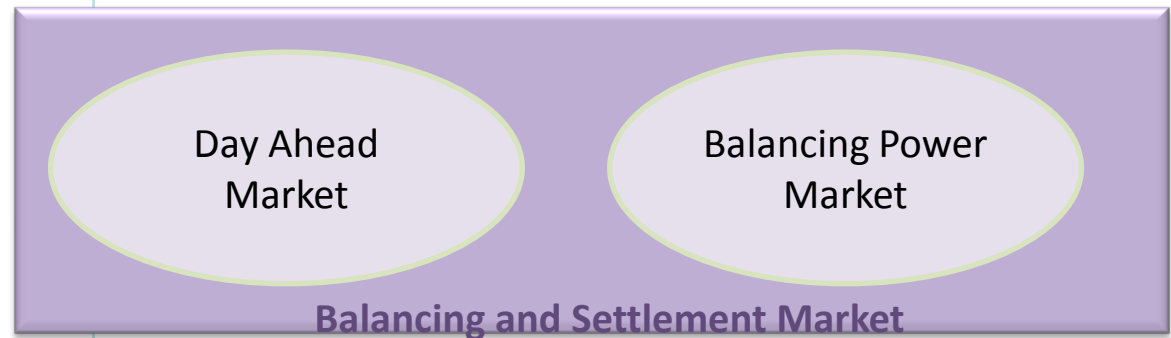


# Balancing & Settlement Mechanism

## Features

- Day Ahead Market
- Balancing Power Market
- Hourly Settlement
- Demand side participation
- Enables market splitting
- Base-load futures offered
- Intra-day market underway

**Since Dec 2011 – present**



# History of Balancing & Settlement Market

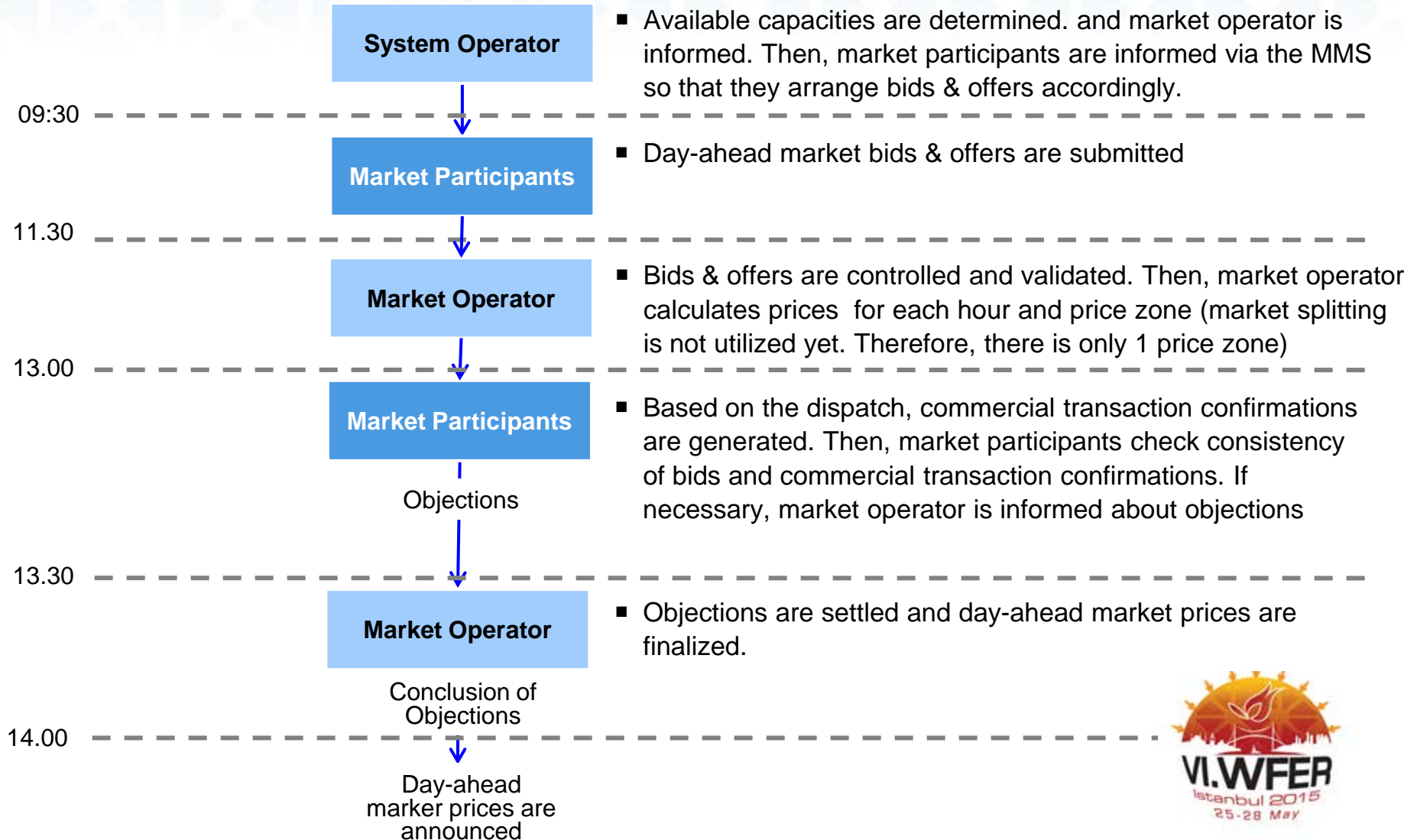


➤ Day Ahead Market provides;

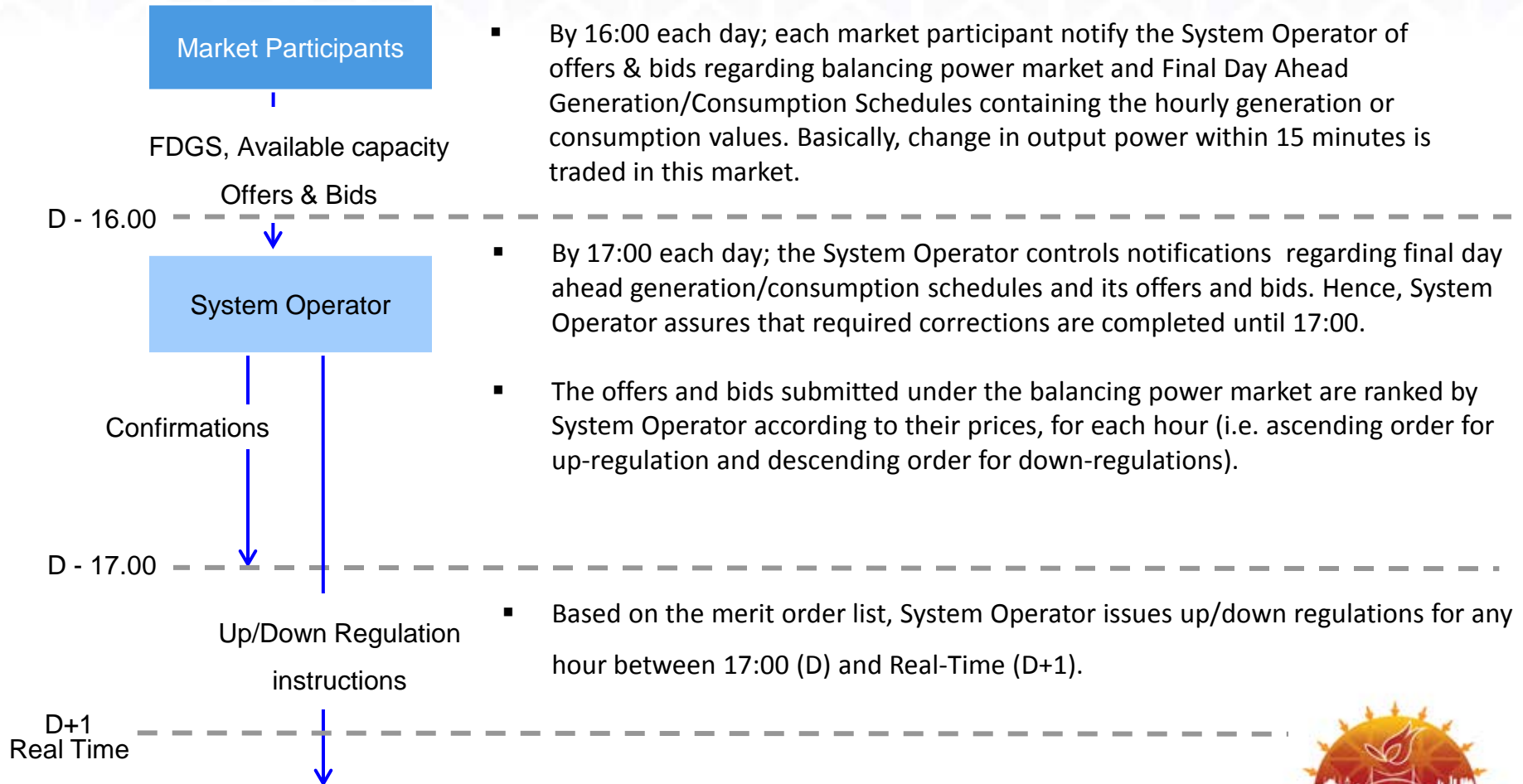
- Opportunity for the market participants to purchase/sell energy for the following day in addition to their bilateral agreements
- Balanced system to the system operator for the following day

➤ Balancing Power Market is used for real-time balancing of demand & supply

# Day – Ahead Market Process



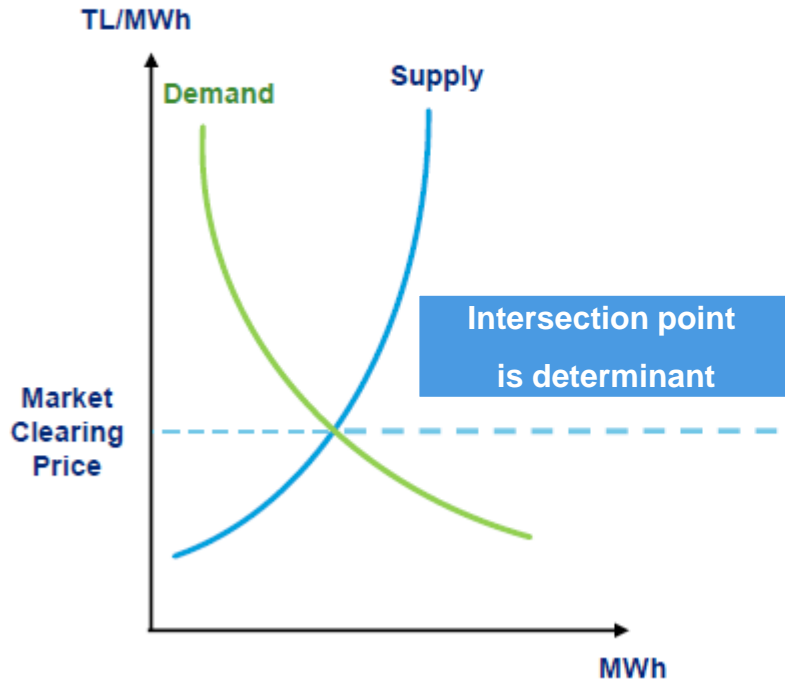
# Real - Time Market Process



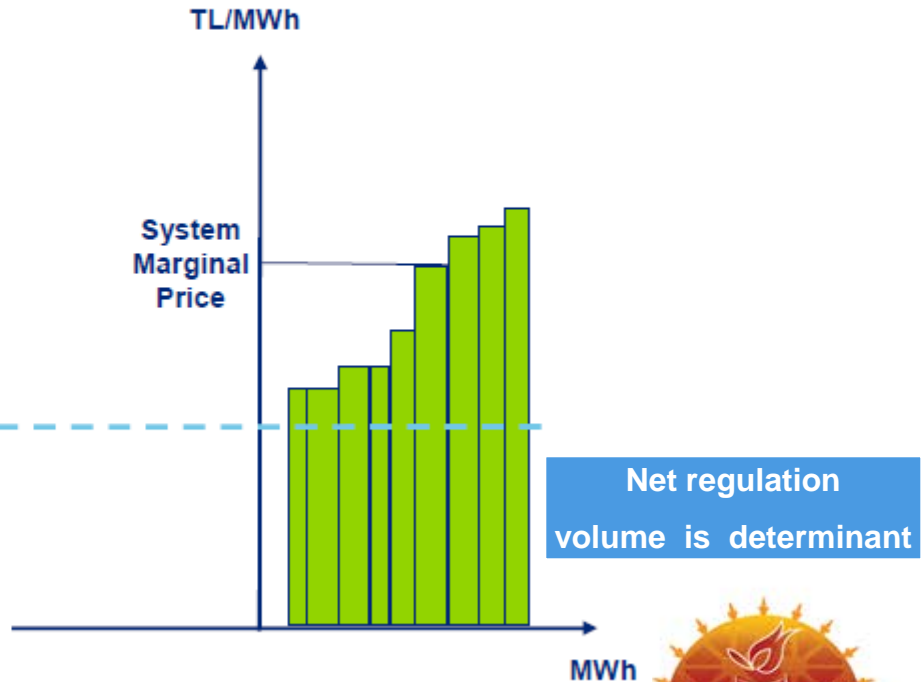


# Market Clearing Price

Price Determination in  
Day Ahead Market



Price Determination in  
Balancing Power Market



## Day – Ahead Market

- (sold/purchased volume) X (clearing price)  $\longrightarrow$  **Marginal**

## Real – Time Market

- (sold/purchased volume) X (clearing price)  $\longrightarrow$  **Marginal**
- (sold/purchased volume due to congestion) X (bid price)  $\longrightarrow$  **Pay-as-bid**

## Imbalances

- (+ imbalance volume) X min {day-ahead price, real-time price}
  - (- imbalance volume) X max {day-ahead price, real-time price}
- } **Dual**

## Collateral Mechanism

- Financial settlements in monthly invoices are secured via a collateral mechanism operated on a daily basis through Takasbank (Settlement & Custody Bank)



# Financial Settlement (+ Imbalance)



Production

110  
MWh

Day-Ahead  
Balanced  
Volume

100  
MWh

Imbalance  
Volume (IV)

+10  
MWh

IV = +10 MWh

System is in deficit

Day-ahead price (DAP) = 100 TL/ MWh

Real-time price (RTP) = 150 TL/ MWh

Revenue = IV x min (DAP, RTP)

+10

100

Revenue = +1000 TL

System is in surplus

Day-ahead price (DAP) = 100 TL/ MWh

Real-time price (RTP) = 50 TL/ MWh

Revenue = IV x min (DAP, RTP)

+10

50

Revenue = +500 TL

Up Regulation

Down Regulation

# Financial Settlement (- Imbalance)



Production

90  
MWh

Day-Ahead  
Balanced  
Volume

100  
MWh

Imbalance  
Volume (IV)

- 10  
MWh

IV = - 10 MWh

Sistem is in deficit

Day-ahead price (DAP) = 100 TL/ MWh

Real-time price (RTP) = 150 TL/ MWh

Cost = IV x max (DAP, RTP)

- 10

150

Cost = - 1.500 TL

System is in surplus

Day-ahead price (DAP) = 100 TL/ MWh

Real-time price (RTP) = 50 TL/ MWh

Cost = IV x max (DAP, RTP)

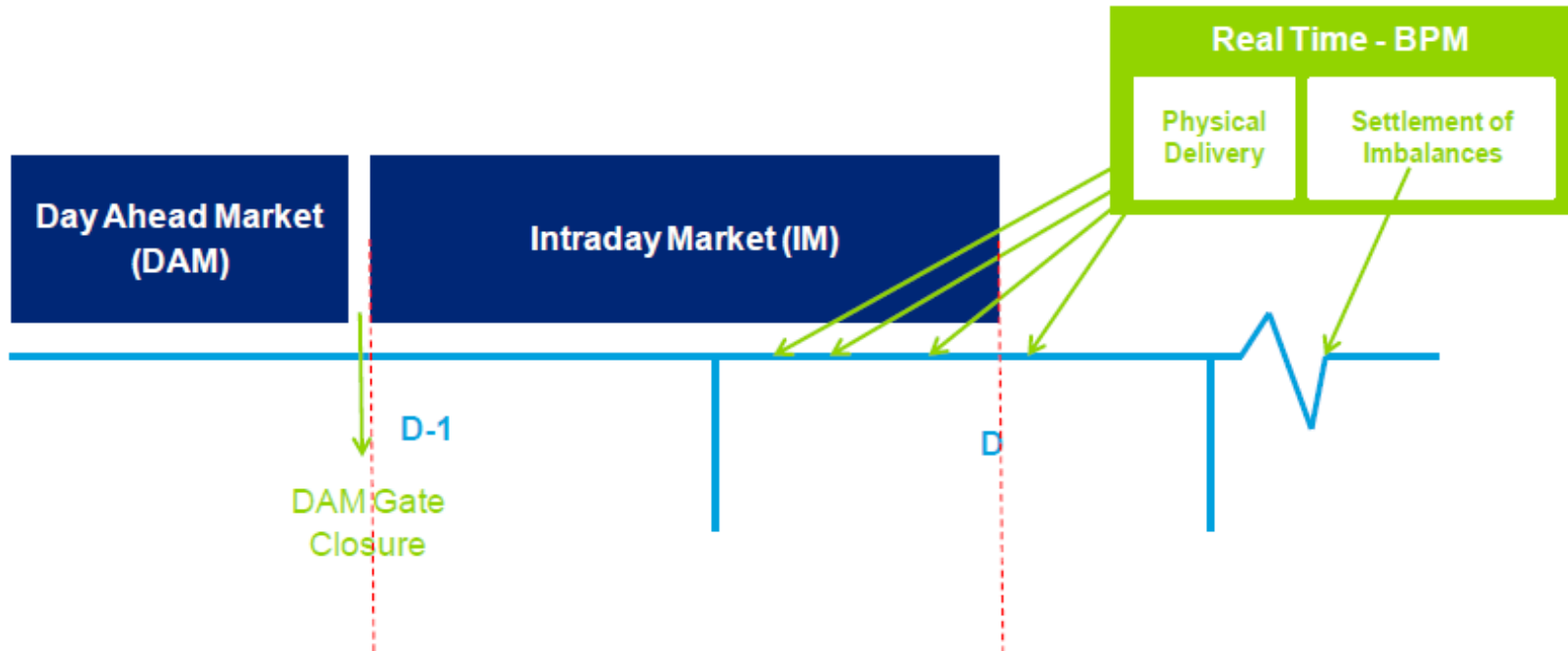
- 10

100

Cost = - 1.000 TL

Down Regulation

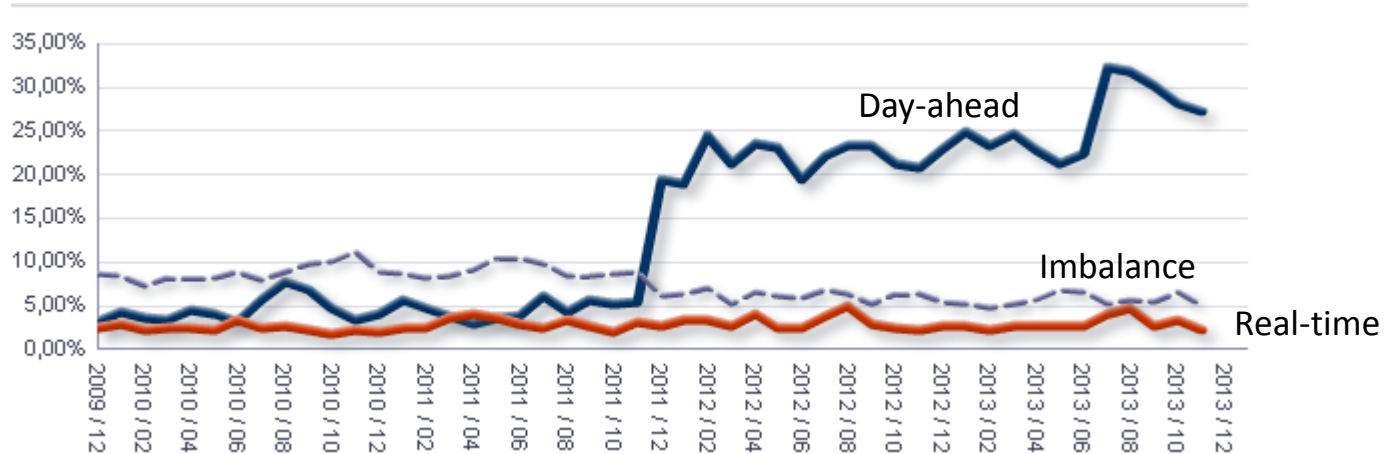
# Intra – Day Market (exp. 2014)



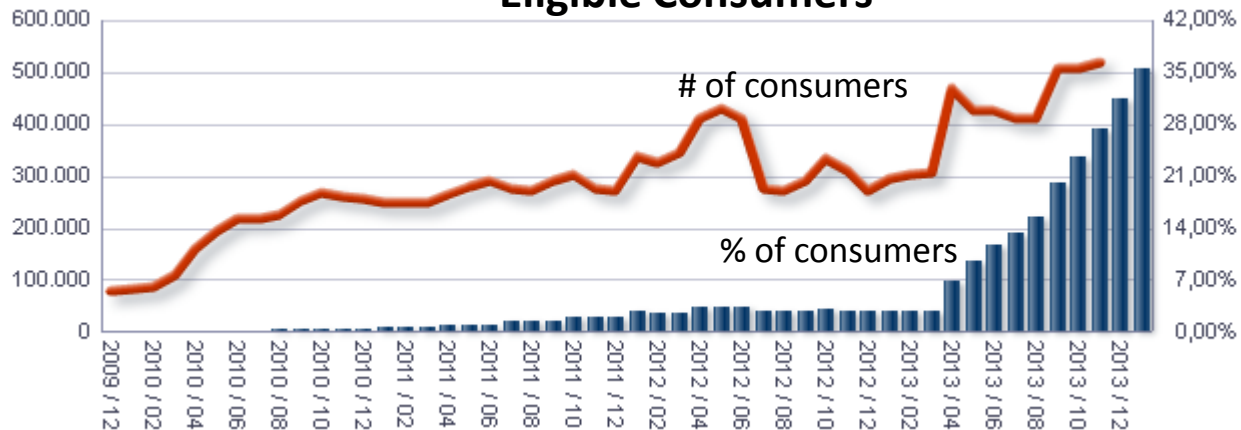
- Trades becoming closer to real-time
- Trade expected to concentrate in day-ahead and intra-day
- Alternative platform for imbalance management, especially for renewables
- Arbitrage opportunity for cross-border trade

# Settlement Indicators - I

## Market Volume Shares



## Eligible Consumers



# Settlement Indicators - II

**Residual Balance Adjustment Amount (TL)**



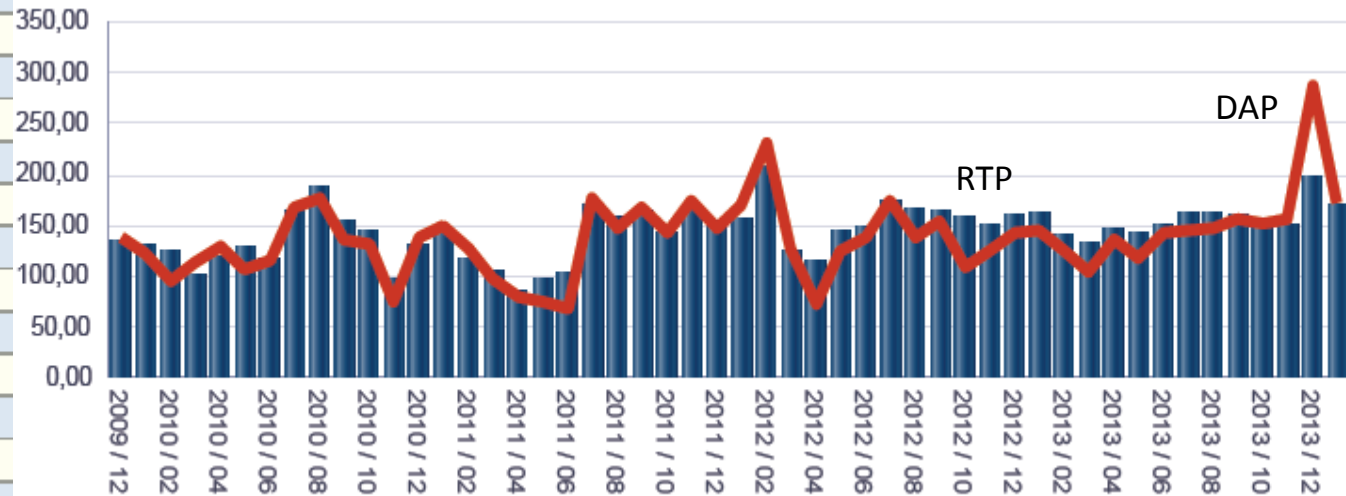
- Market clearing is done on a «zero-balance» basis
- "Cost – payments" are settled via residual balance adjustment (reflected to consumers)
- Real – time balancing via «pay-as-bid» leads «higher adjustments»



# Settlement Indicators - III

| Month     | DAP    | RTP    |
|-----------|--------|--------|
| 2014 / 01 | 168,94 | 172,30 |
| 2013 / 12 | 197,65 | 286,52 |
| 2013 / 11 | 152,23 | 156,59 |
| 2013 / 10 | 147,06 | 152,08 |
| 2013 / 09 | 160,77 | 155,84 |
| 2013 / 08 | 162,07 | 148,02 |
| 2013 / 07 | 162,82 | 144,53 |
| 2013 / 06 | 152,11 | 142,81 |
| 2013 / 05 | 141,62 | 118,10 |
| 2013 / 04 | 147,19 | 134,92 |
| 2013 / 03 | 133,49 | 105,19 |
| 2013 / 02 | 140,07 | 125,52 |
| 2013 / 01 | 163,02 | 145,33 |
| 2012 / 12 | 159,31 | 142,10 |
| 2012 / 11 | 151,50 | 124,34 |
| 2012 / 10 | 158,42 | 108,93 |
| 2012 / 09 | 163,54 | 153,53 |
| 2012 / 08 | 166,13 | 137,37 |
| 2012 / 07 | 174,17 | 173,26 |
| 2012 / 06 | 148,53 | 138,54 |
| 2012 / 05 | 143,51 | 125,66 |
| 2012 / 04 | 114,68 | 72,45  |
| 2012 / 03 | 125,02 | 126,22 |
| 2012 / 02 | 206,26 | 229,73 |
| 2012 / 01 | 154,79 | 168,73 |

|            | Peak DAP<br>(TL/MWh) |          | Peak RTP<br>(TL/MWh) |          | Peak Load<br>(MWh) |        |
|------------|----------------------|----------|----------------------|----------|--------------------|--------|
|            | Date                 | Value    | Date                 | Value    | Date               | Value  |
| Historical | 13/12/2012           | 2.000,00 | 13/12/2012           | 2.000,20 | 27/07/2012         | 38.431 |
| Yearly     | 13/01/2014           | 197,00   | 10/01/2014           | 217,04   | 08/01/2014         | 36.009 |
| Monthly    | 13/01/2014           | 197,00   | 10/01/2014           | 217,04   | 08/01/2014         | 36.009 |



- Peak prices likely to occur in the winter
- Power generation heavily reliant on natural gas
- Impact of import or network problems in the gas market



# Thank you for your attention!

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