



Transelectrica

Compania Națională
de Transport
al Energiei Electrice

WE LEAD THE POWER

MARKET MONITORING REPORT

Balancing Market

January 2012

Abbreviations

ANRE - Romanian Energy Regulatory Authority
HHI - Herfindahl-Hirschman Index
BRP - Balance Responsible Party
BM - Balancing Market
DAM - Day Ahead Market
TSO - Transmission System Operator
DU – Dispatchable Unit
PN – Physical Notification
NDC - National Dispatching Center
C1 – The market share of the largest market participant
C3 – Total market share of top 3 market participants
NPS – Minimum number of residual generators
TTC – Total Transfer Capacity
NTC – Net Transfer Capacity
ATC – Available Transfer Capacity

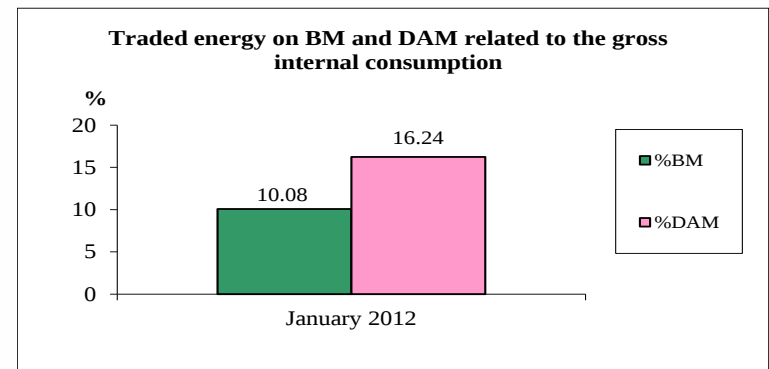
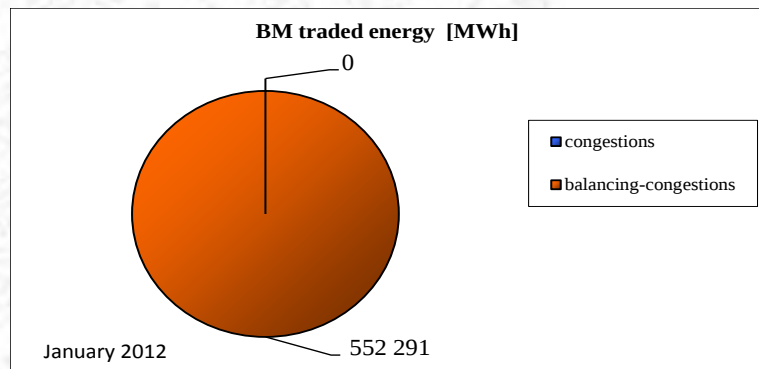
According to the Commercial Code, Transelectrica, the Romanian Transmission System Operator, operates and monitors the activity of 3 types of markets: Balancing Market, Ancillary Services Market and Market for Allocation of Cross-Border Capacities.

Using the records from the markets data bases, Transelectrica prepares daily, weekly and monthly monitoring reports. A part of the data included in these reports (those data which are not confidential) are published on the website **www.transelectrica.ro** (section Transparency).

Balancing Market

The Balance Generation/Consumption

- The average monthly values of generated power was 7 307 MW and the actual internal gross consumption was 7 363 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being 1.36 %. Bigger differences were registered in the case of consumption values, resulted as the sum between notified production and total scheduled exchanges with the neighbouring power systems. In this case the standard deviation value was of 8.80 %. The greatest daily deviation, regarding the notifications, was registered in 24.01 (18.68 %).
- The sum between notified production and total scheduled exchanges with the neighbouring power systems was smaller than the actual consumption with a monthly average of **681** MW.
- The energy used in January 2012 for balancing the power system and was 552 291 MWh (with an average power of 742 MW, which means **10.08** % from the internal gross consumption).
- The energy traded in January 2012 on Day Ahead Market was 889 417 MWh (with an average power of 1 195 MW, which means **16,24** % from the internal gross consumption).
- The total cost of the energy traded on the Balancing Market was **152 146 124** lei (with an average weighted price of 275 lei/MWh).



Balancing Market

The Balance Generation/Consumption

	Generation units commissioned or rehabilitated in 2011	Generation units shut down in 2011
Annual share of P_i */**	8.00%	0.49%
Annual share of C_i */***	10.40%	0.32%

Installed power (P_i) - the sum of nominal active powers indicated by the manufacturer and marked on the equipment plate or in the technical documentation, for all the installed generators in operation and were not removed from records. There are also included the units under rehabilitation or which have been out of use for more than 1 year.

Installed capacity (C_i) – equal to installed power of generator, for generators in operation. For generators in conservation installed capacity is equal to 0 MW. At observations it will be specified if the generator in conservation can be started and the time interval in which it can be available. If the generator cannot be started it will be specified the reason (technical, administrative, removed from records, etc.)

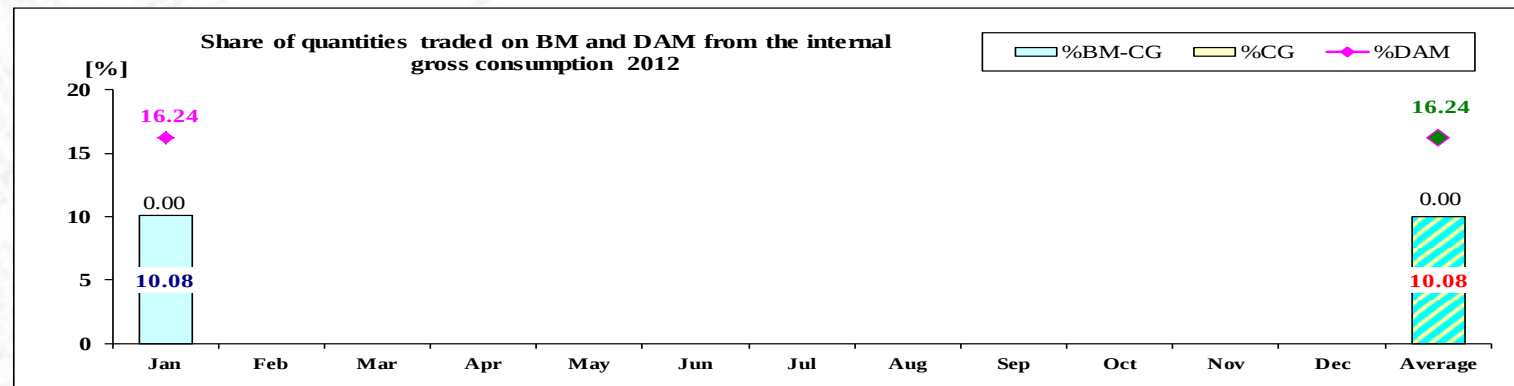
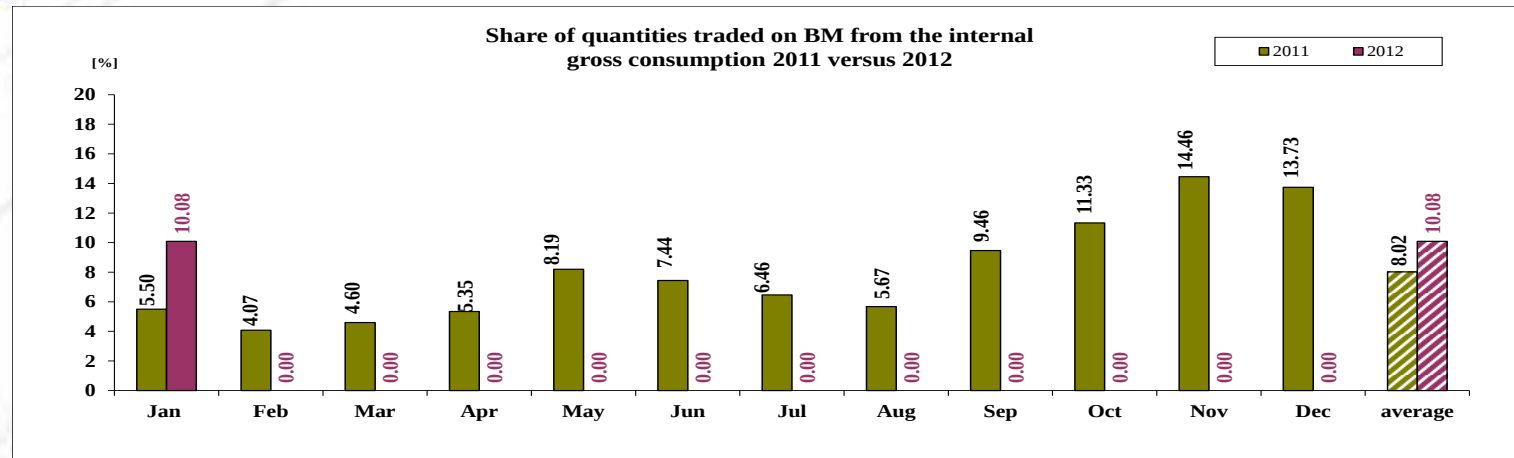
* Observations:

- percentage values were calculated based on installed capacity reported at 01.01.2011;
- unjustified notification differences from one year to another were not taken into account;

Balancing Market

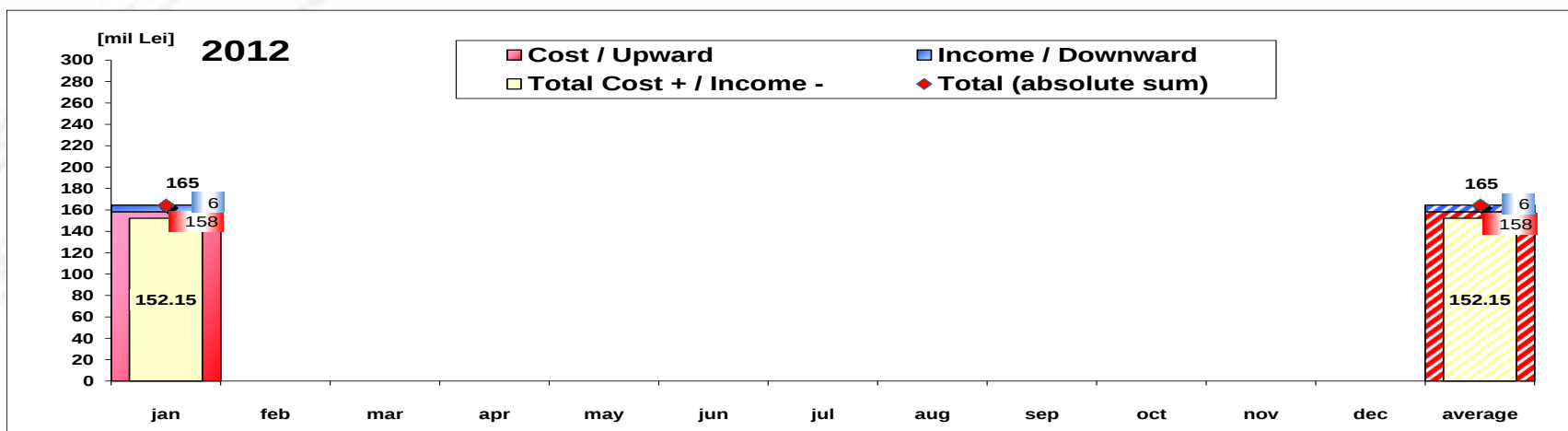
The Balance Generation/Consumption

• Monthly percentage values resulted are calculated as ratio between traded volumes on BM and gross internal consumption. The annual average value was calculated as average of monthly values.
(BM – Balancing Market, DAM – Day Ahead Market, BM-CG – difference between Balancing Market and traded volume on congestion).



	2012												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
%BM	10.08												10.08
%DAM	16.24												16.24
%CG	0.00												0.00
%BM-CG	10.08												10.08

Balancing Energy Market Transactions



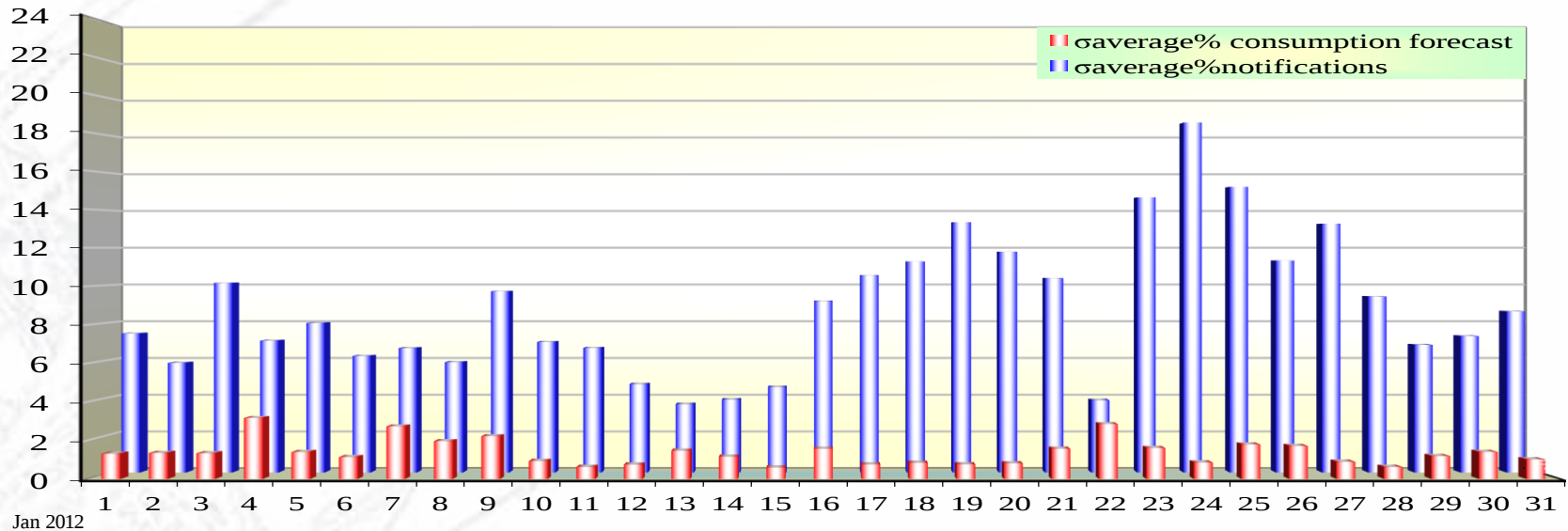
[Lei]	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	average	Total
Cost / Upward	158 348 346	0	0	0	0	0	0	0	0	0	0	0	158 348 346	158 348 346
Income /	6 202 222	0	0	0	0	0	0	0	0	0	0	0	6 202 222	6 202 222
CE Cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Cost + /														
Income -	152 146 124	0	0	0	0	0	0	0	0	0	0	0	152 146 124	152 146 124
Total (absolute sum)	164 550 569	0	0	0	0	0	0	0	0	0	0	0	164 550 569	164 550 569

CE – Congestion Energy

* The average annual value of BM transactions (the absolute sum of upward and downward transactions) was calculated as average of monthly values.

Balancing Market

Standard deviation of physical notifications and consumption forecast against the actual consumption in January 2012



Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
σ average% consumption forecast	1.31	1.35	1.33	3.17	1.39	1.13	2.73	1.96	2.21	0.93	0.62	0.74	1.46	1.15	0.59	1.57	0.75	0.84	0.75	0.80	1.57	2.85	1.60	0.85	1.79	1.71	0.89	0.62	1.18	1.40	1.01
σ average% notifications	7.42	5.85	10.12	7.04	7.98	6.22	6.64	5.89	9.68	6.97	6.65	4.71	3.64	3.89	4.56	9.15	10.52	11.26	13.36	11.79	10.37	3.85	14.69	18.68	15.25	11.32	13.29	9.40	6.81	7.28	8.60

$$\sigma \text{ average\% consumption forecast} = \sqrt{\frac{\frac{1}{n} \sum_{i=1}^n (R - P)^2}{\bar{R}}} \cdot 100$$

$$\sigma \text{ average\% notifications} = \sqrt{\frac{\frac{1}{n} \sum_{i=1}^n (R - N)^2}{\bar{R}}} \cdot 100$$

Public

R = Realized Consumption;
N = Physical Notifications;
P = Consumption Forecast.

average% consumption forecast **1.36**
σ average% notifications **8.80**

Balancing Market

Balancing energy – Selected prices and quantities

- At the beginning of the month on the Balancing Market operated 121 BRPs and 18 market participants, holding 134 commercially operating dispatchable units.

January 2012

Downward regulation

Downward regulation	Prices [lei/MWh]			Quantities [MWh]			Participants						
	Monthly	Maximum	Minimum	Total	Actually	Deviation	C1	C3	C1	C3	HHI	HHI	
	average			selected	delivered	%	Number	(selected)	(actually delivered)	(selected)	(actually delivered)		
Secondary	24.34	129.99	1.00	45614.14	45614.14	0.00%	7	48.16%	84.39%	48.16%	84.39%	3073	3073
Fast Tertiary	76.77	400.00	1.00	19411.78	16356.15	15.74%	8	39.67%	78.34%	42.74%	80.42%	2537	2726
Slow Tertiary	72.44	300.00	1.00	61577.52	55323.99	10.16%	9	41.74%	76.40%	44.74%	76.93%	2553	2723
				126603.45	117294.28	7.35%	24						

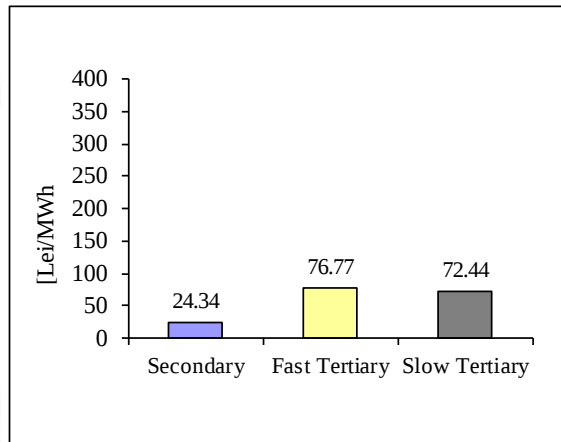
Upward regulation

	Monthly	Maximum	Minimum	Total	Actually	Deviation	C1	C3	C1	C3	HHI	HHI	
	average			selected	delivered	%	Number	(selected)	(actually delivered)	(selected)	(actually delivered)		
Secondary	305.60	400.00	225.00	41925.71	41925.71	0.00%	7	52.47%	86.79%	52.47%	86.79%	3398	3398
Fast Tertiary	372.67	400.00	80.00	40599.83	39600.93	2.46%	9	90.28%	94.46%	90.98%	95.05%	8166	8291
Slow Tertiary	361.51	400.00	4.00	365972.89	353470.46	3.42%	13	34.41%	85.25%	34.56%	85.60%	2561	2580
				448498.43	434997.10	3.01%							

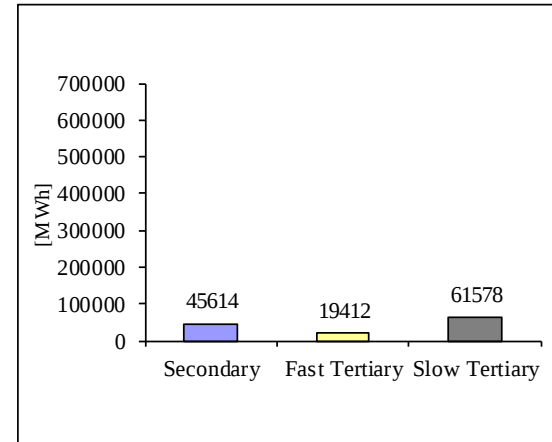
Balancing Market

Balancing energy – Selected prices and quantities

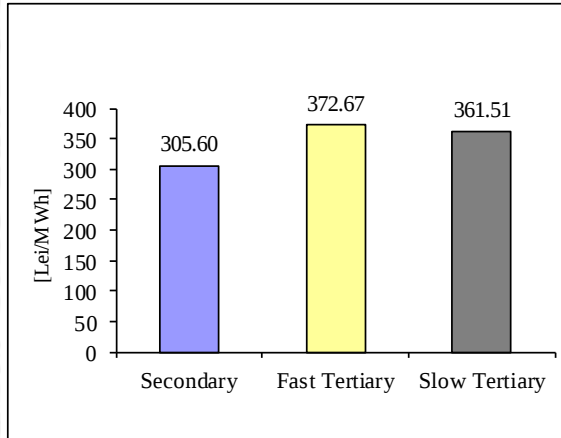
Downward regulation - average price [lei/MWh]



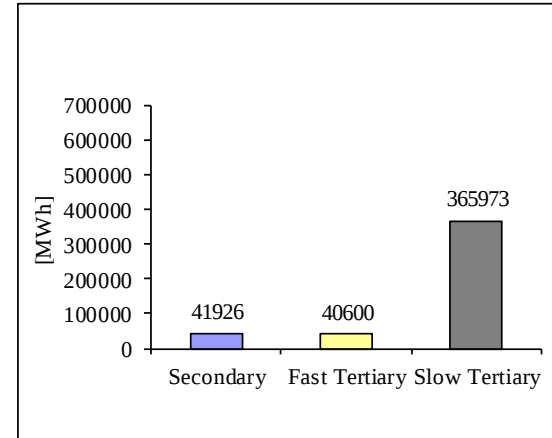
Downward regulation - selected quantities [MWh]



Upward regulation - average price [lei/MWh]

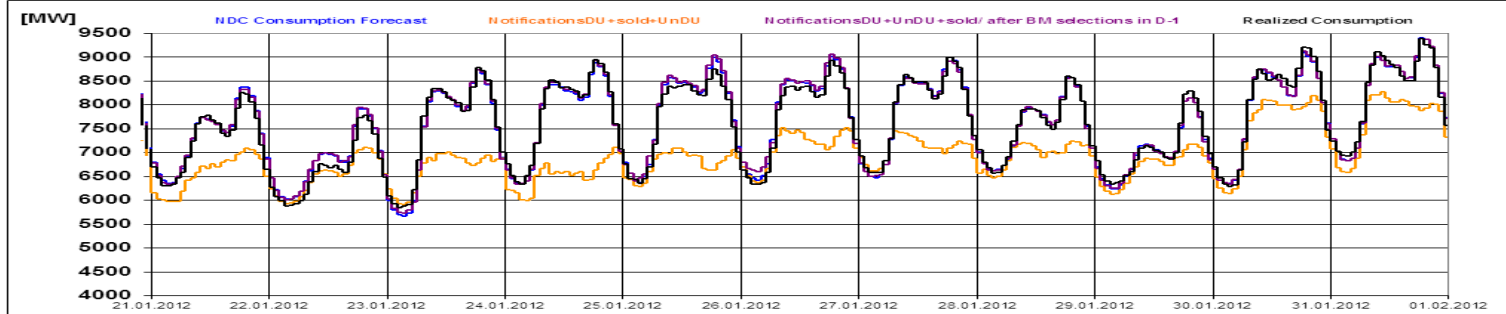
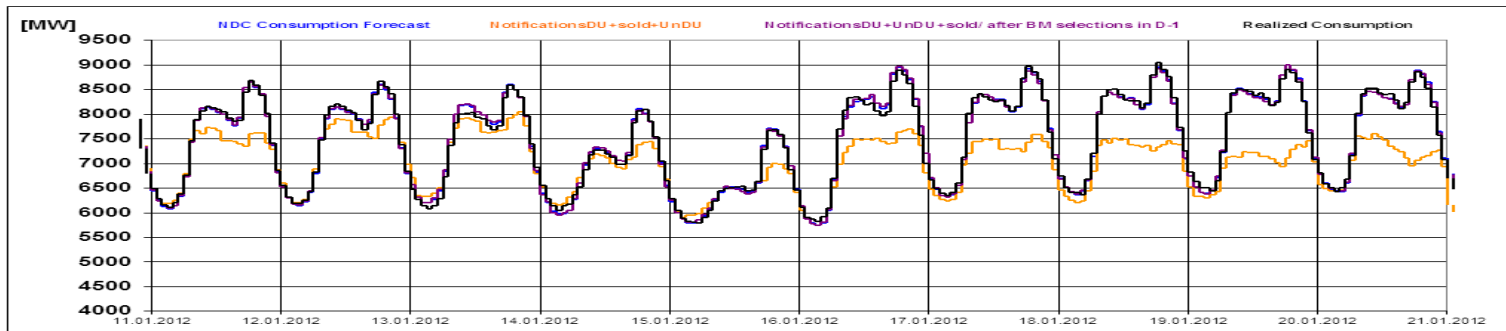
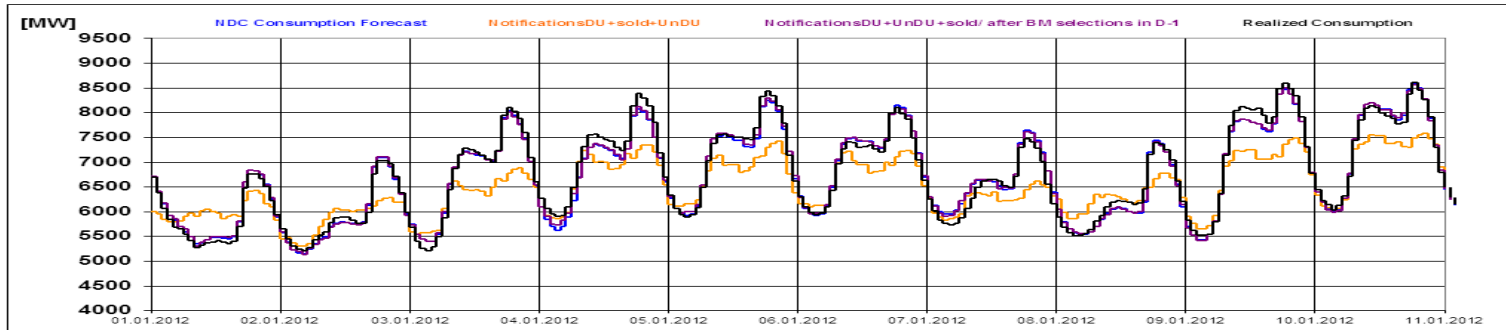


Upward regulation - selected quantities [MWh]



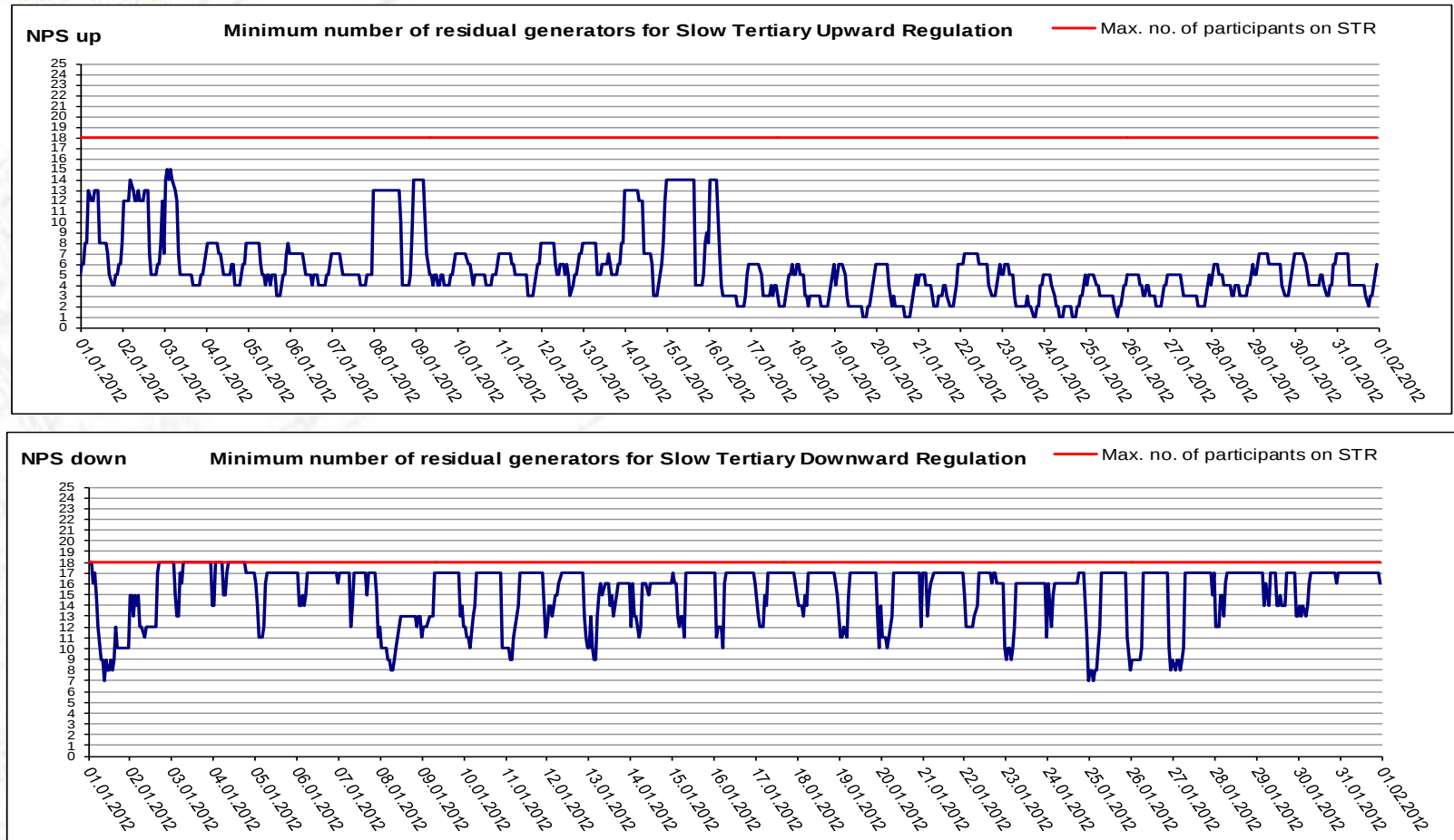
Balancing Market

Realized consumption, forecast, notifications,
notifications after BM selections in D-1



Balancing Market

Indicators – NPS Slow Tertiary Regulation



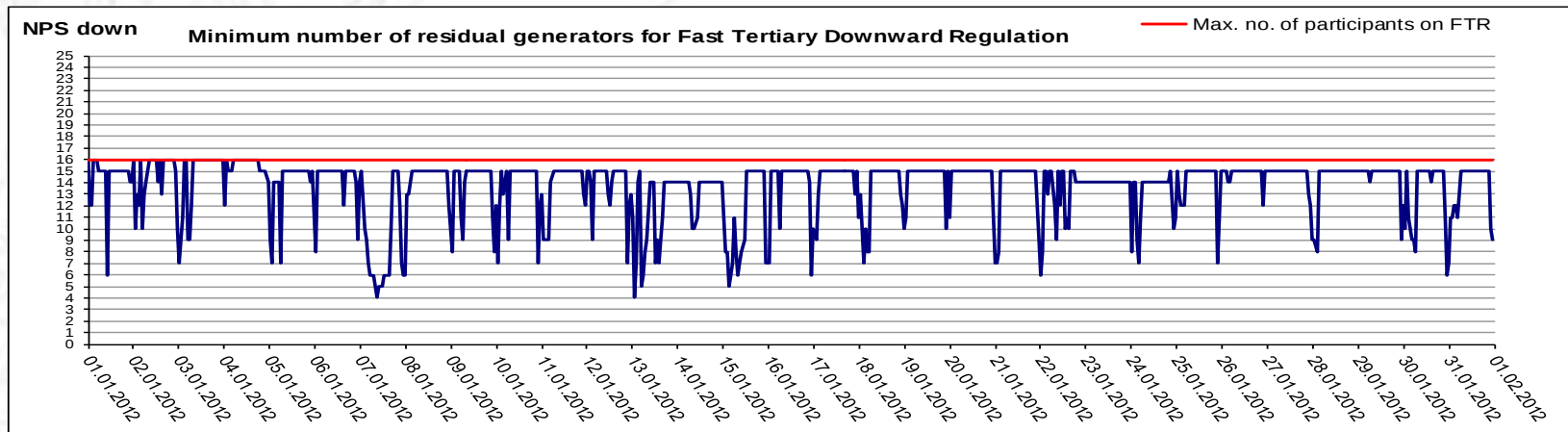
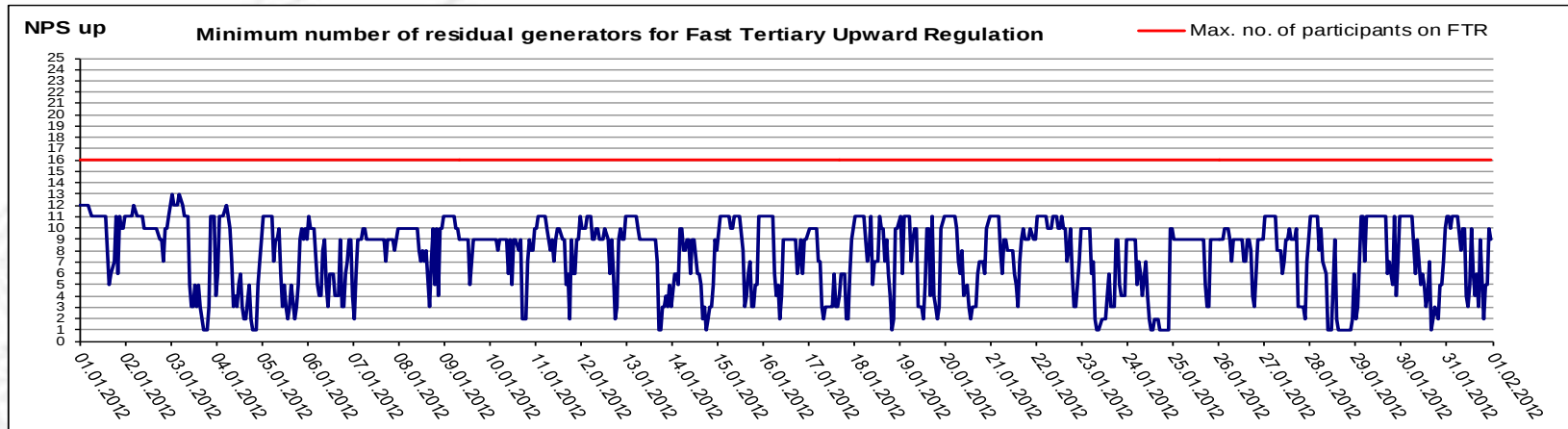
$$Total_Offer(i) - \sum_{j=1}^{NPS} Offer_j(i) = Actually_delivered(i)$$

i = hourly interval;

j = participants market index (ordered by size, $j=1$ is the biggest)

Balancing Market

Indicators – NPS Fast Tertiary Regulation



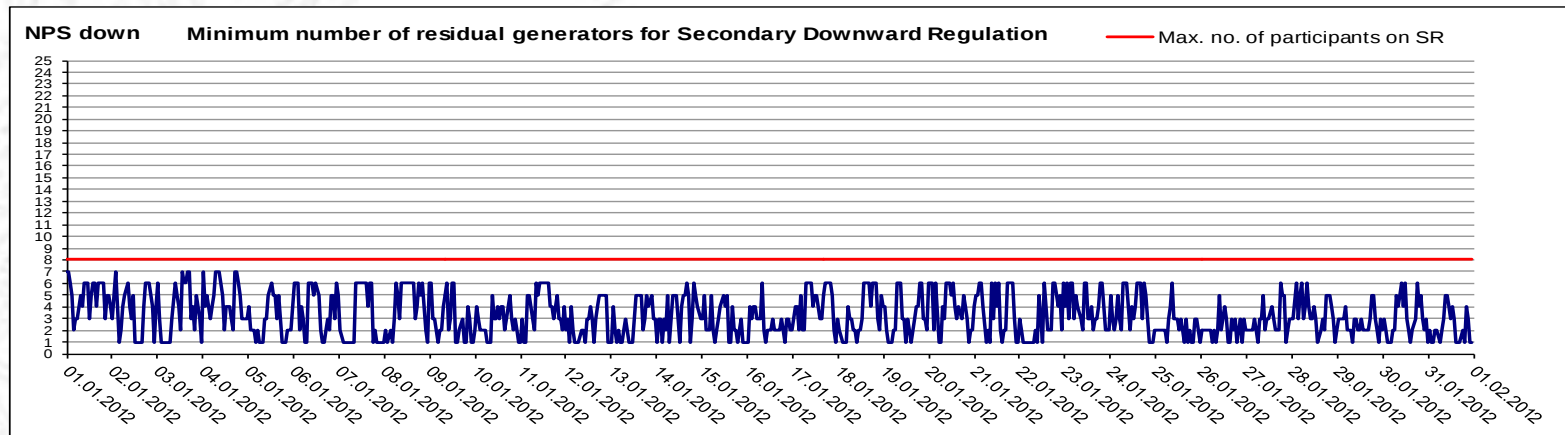
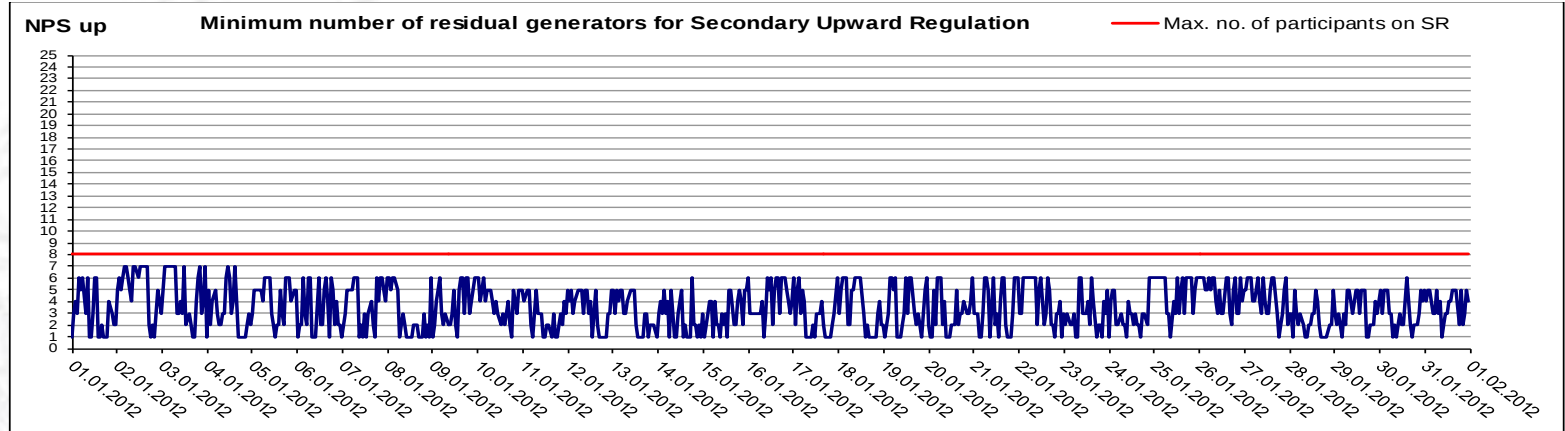
$$Total_Offer(i) - \sum_{j=1}^{NPS} Offer_j(i) = Actually_delivered(i)$$

i = hourly interval;

j = participants market index (ordered by size, $j=1$ is the biggest)

Balancing Market

Indicators – NPS Secondary Regulation



$$\text{Total_Offer}(i) - \sum_{j=1}^{NPS} \text{Offer}_j(i) = \text{Actually_delivered}(i)$$

i = hourly interval;

j = participants market index (ordered by size, $j=1$ is the biggest)

Balancing Market

Indicators – NPS results synthesis

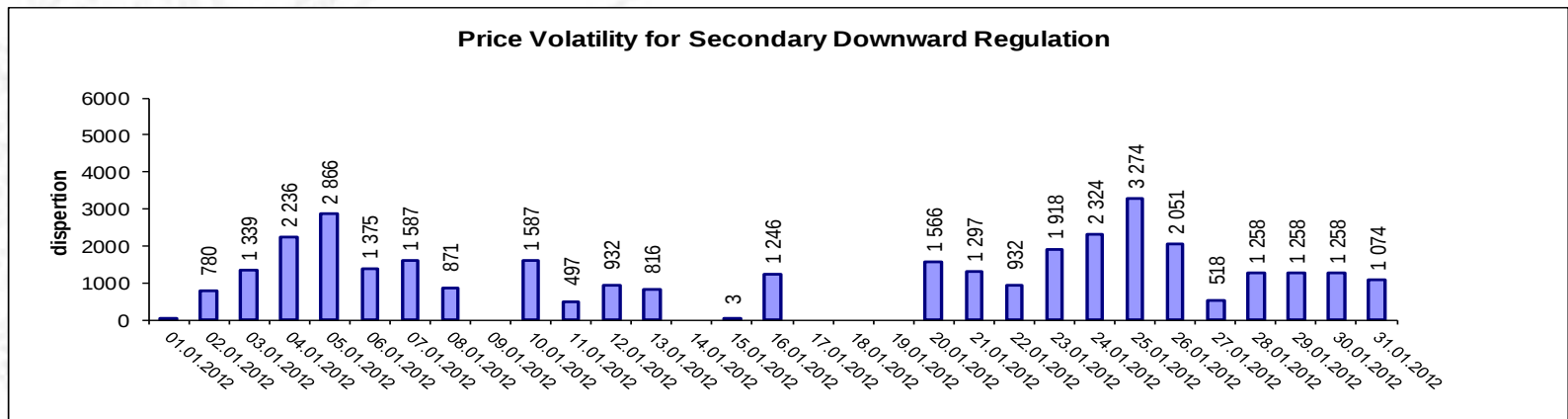
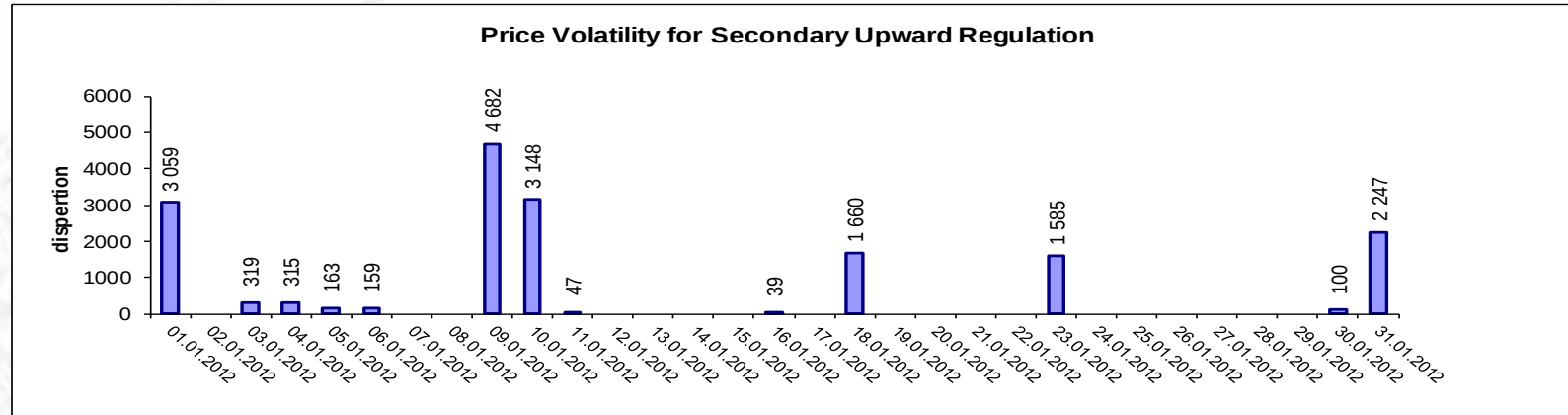
Centralized NPS

Jan. 12

	up				down			
	NPS=1	NPS=2	NPS=3	NPS=4	NPS=1	NPS=2	NPS=3	NPS=4
Slow Tertiary								
% hours on month	1.75	9.14	12.90	14.92	0.00	0.00	0.00	0.00
% offered volumes on month	0.89	5.76	9.20	12.81	0.00	0.00	0.00	0.00
Fast Tertiary								
% hours on month	4.03	4.84	7.93	3.63	0.00	0.00	0.00	0.27
% offered volumes on month	33.89	4.16	7.14	3.37	0.00	0.00	0.00	0.16
Secondary								
% hours on month	17.07	17.07	20.70	9.68	19.09	20.56	20.16	11.02
% offered volumes on month	10.60	12.51	18.01	8.78	9.65	13.87	17.48	9.80

Balancing Market

Indicators – Price Volatility for Secondary Regulation



Volatility = price dispersion on studied interval:

$$\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$



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