

MARKET MONITORING REPORT

Balancing Market

November 2018

Abbrevations

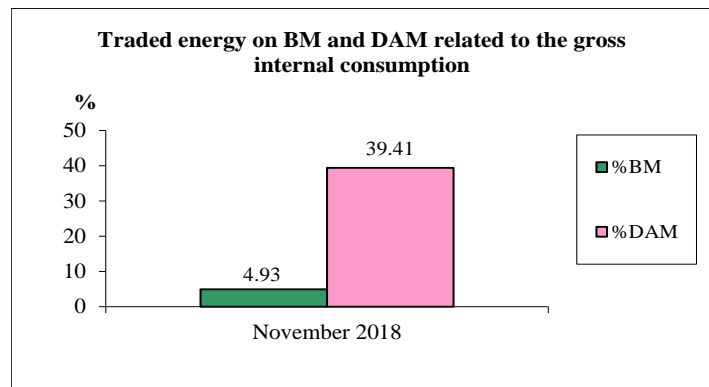
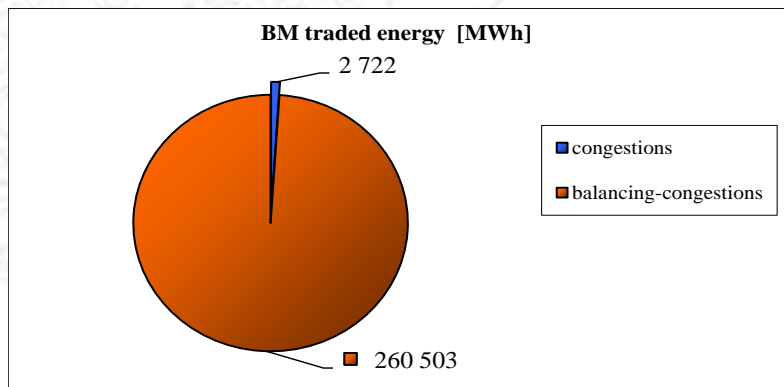
ANRE - Romanian Energy Regulatory Authority
HHI - Herfindahl-Hirschman Index
BRP - Balance Responsible Party
BM - Balancing Market
DAM - Day Ahead Market
TSO - Transmission System Operator
DU – Dispatchable Unit
PN – Physical Notification
NDC - National Dispatching Center
C1 – The market share of the 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).

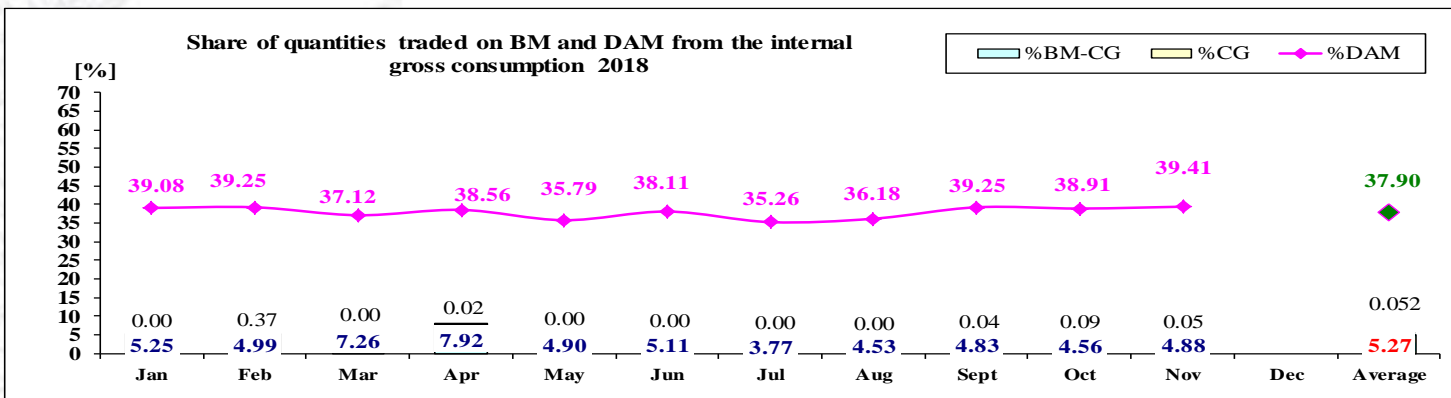
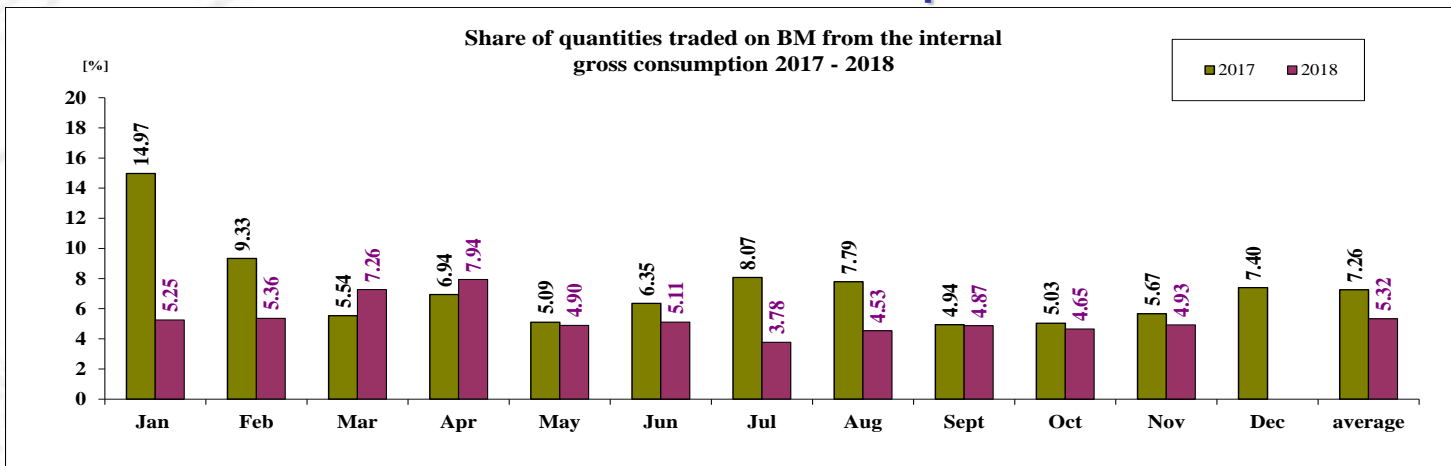
The Balance Generation/Consumption

- The average monthly value of generated power was 7 456 MW and the actual internal gross consumption was 7 417 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **1.30%**. Bigger differences were registered in 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 monthly deviation value was **3.00%**. The greatest daily deviation regarding the notifications was registered in **22.11 (5.84%)**.
- The energy used in November 2018 for balancing the power system and congestion management was 263 225 MWh (with an average power of 366 MW, which means **4.93%** from the internal gross consumption).
 - the energy used for congestion management was 2 722 MWh (with an average power of 3.78MW, which means 0.05% from the internal gross consumption).
- The energy traded in November 2018 on Day Ahead Market was 2 104 851 MWh (with an average power of 2 923 MW, which means **39.41%** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was **132 761 084** lei (with an average weighted price of 504lei/MWh):
 - the cost of the energy paid by C.N.T.E.E. Transelectrica S.A. for congestion management was 909 721 lei (with an average weighted price of 334 lei/MWh), which means 0.69% from the total cost;
 - the cost for energy traded on the Balancing Market was 131 851 363 lei (from which 487 200 lei startup cost).

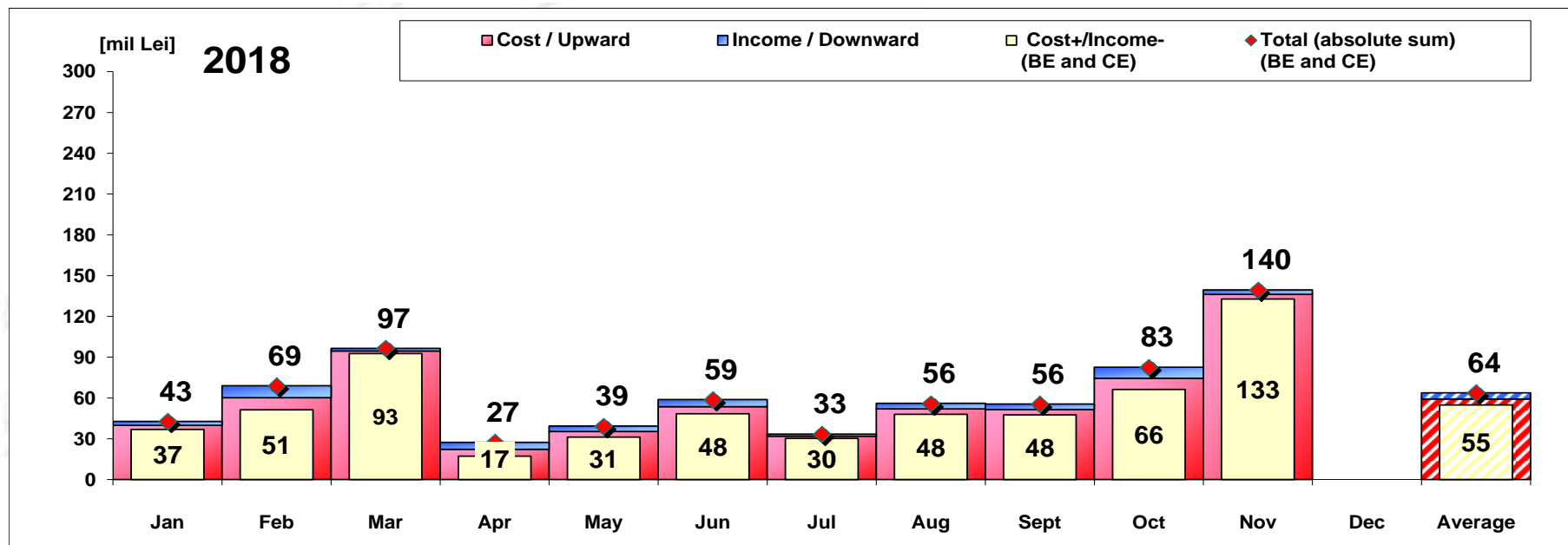


The Balance Generation / Consumption

• 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).



2018													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
%BM	5.25	5.36	7.26	7.94	4.90	5.11	3.78	4.53	4.87	4.65	4.93		5.32
%DAM	39.08	39.25	37.12	38.56	35.79	38.11	35.26	36.18	39.25	38.91	39.41		37.90
%CG	0.00	0.37	0.00	0.02	0.00	0.00	0.00	0.00	0.04	0.09	0.05		0.052
%BM-CG	5.25	4.99	7.26	7.92	4.90	5.11	3.77	4.53	4.83	4.56	4.88		5.27



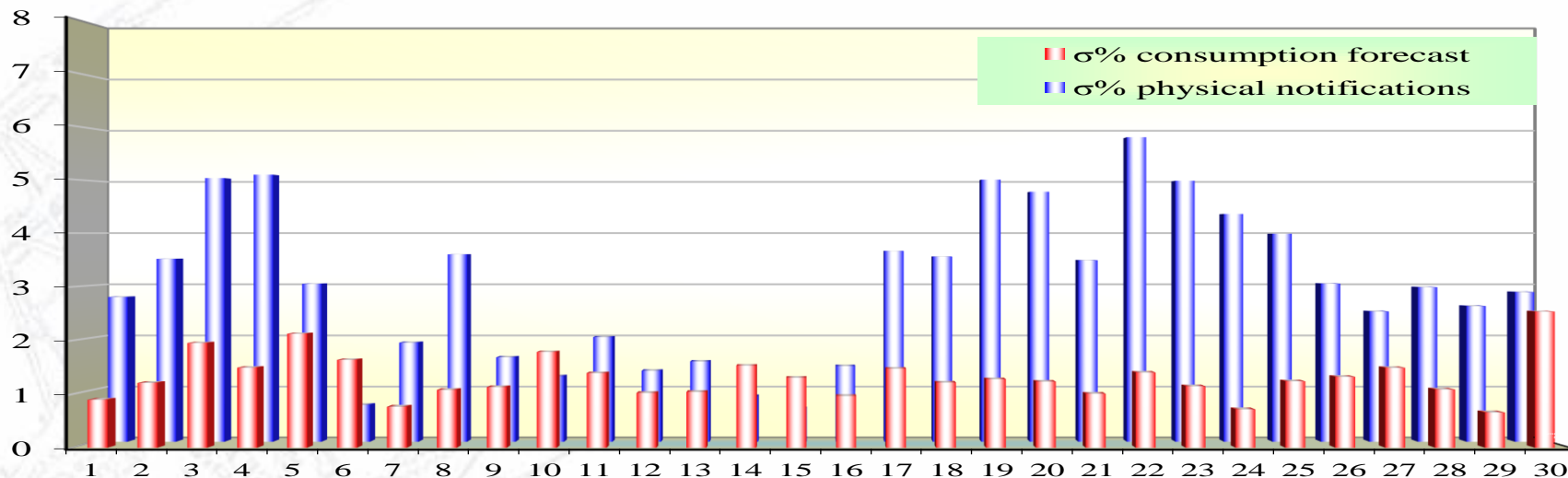
[Lei]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average	Total
Cost / Upward	39 819 143	60 149 383	94 609 129	22 294 472	35 295 644	53 570 278	31 866 958	52 018 823	51 549 623	74 477 715	136 154 942		59 255 101	651 806 109
Income / Downward	2 909 103	8 808 101	1 928 773	5 128 228	4 077 888	5 193 747	1 602 287	4 064 789	3 967 938	8 178 488	3 393 858		4 477 564	49 253 199
CE Cost	0	5 234 582	0	154 594	0	0	3 449	0	581 517	1 333 814	909 721		747 062	8 217 678
Cost for energy traded on the Balancing Market (includes startup cost)	36 910 039	46 106 700	92 680 357	17 011 649	31 217 756	48 376 531	30 261 223	47 954 034	47 000 168	64 965 413	131 851 363		54 030 476	594 335 233
Cost+/Income- (BE and CE)	36 910 039	51 341 283	92 680 357	17 166 243	31 217 756	48 376 531	30 264 672	47 954 034	47 581 685	66 299 227	132 761 084		54 777 537	602 552 911
Total (absolute sum) (BE and CE)	42 728 246	68 957 484	96 537 902	27 422 700	39 373 531	58 764 024	33 469 245	56 083 612	55 517 561	82 656 203	139 548 800		63 732 664	701 059 308

BE – Balancing Energy

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.

Standard deviation of physical notifications and consumption forecast against the actual consumption in November 2018



November 2018

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
σ% consumption forecast	0.89	1.21	1.95	1.49	2.12	1.64	0.76	1.08	1.13	1.78	1.39	1.02	1.04	1.53	1.30	0.96	1.47	1.21	1.28	1.23	1.01	1.40	1.15	0.71	1.24	1.32	1.49	1.09	0.66	2.54
σ% physical notifications	2.77	3.51	5.05	5.12	3.03	0.70	1.90	3.59	1.62	1.26	2.01	1.36	1.54	0.87	0.64	1.45	3.66	3.55	5.03	4.79	3.48	5.84	5.00	4.37	3.99	3.03	2.50	2.96	2.60	2.87

σ_{average % consumption forecast} = 1.30

σ_{average % physical notifications} = 3.00

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

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

R = Realized Consumption;

N = Physical Notifications;

P = Consumption Forecast.

Balancing energy – Selected prices and quantities

- At the beginning of the month on the Balancing Market operated 66 BRPs, 113 market participants, holding 225 commercially operating dispatchable units.

November 2018

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)	(actually delivered)	
Secondary	1.65	30.00	0.10	41331.65	41331.65	0.00%	5	80.23%	98.92%	80.23%	98.92%	6649	6649
Fast Tertiary	99.41	798.05	0.10	34884.90	32528.44	6.75%	16	59.95%	94.68%	62.21%	94.62%	4510	4652
Slow Tertiary	-	-	-	-	-	-	-	-	-	-	-	-	-
				76216.55	73860.09	3.09%							

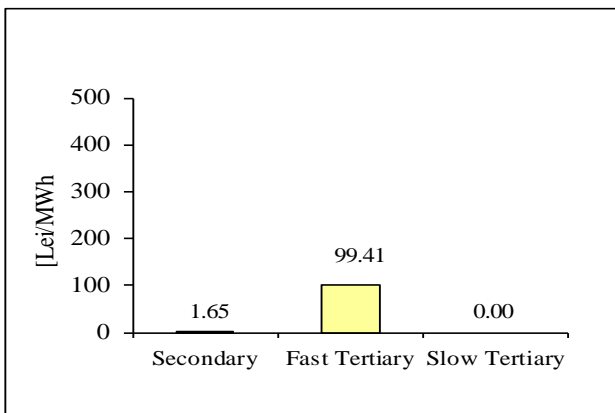
Upward regulation

	Monthly	Maximum	Minimum	Total	Actually	Deviation	C1	C3	C1	C3	HHI	HHI	
	average			selected	delivered	%	Number	(selected)	(actually delivered)	(selected)	(selected)	(actually delivered)	
Secondary	730.77	1033.00	453.00	38149.16	38149.16	0.00%	5	79.44%	97.95%	79.44%	97.95%	6530	6530
Fast Tertiary	728.30	1033.00	0.20	114024.04	111440.93	2.27%	11	61.26%	81.69%	61.83%	81.97%	4022	4087
Slow Tertiary	661.64	1008.00	240.00	40574.48	39774.57	1.97%	8	56.79%	97.35%	56.32%	97.32%	4405	4385
				192747.68	189364.67	1.76%							

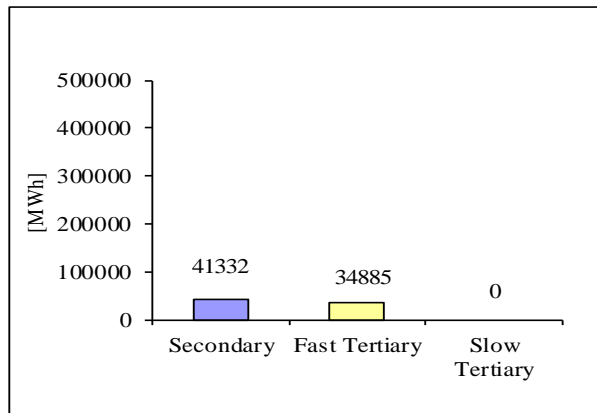
Balancing energy – Selected prices and quantities in November 2018

November 2018

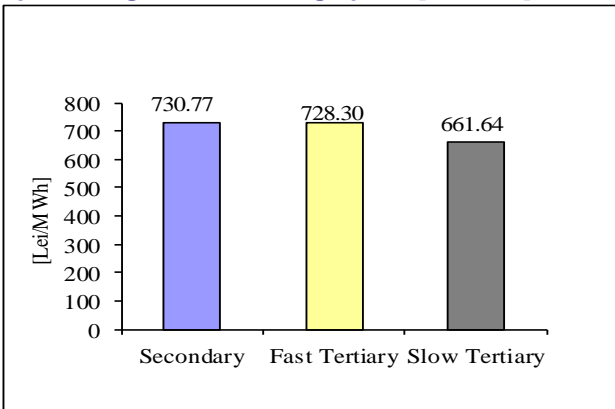
Downward regulation - average price [lei/MWh]



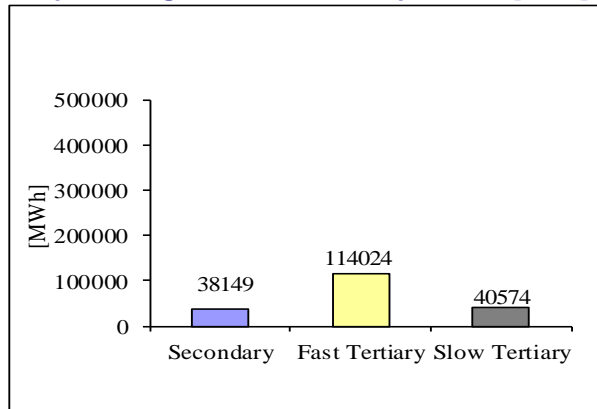
Downward regulation - selected quantities [MWh]



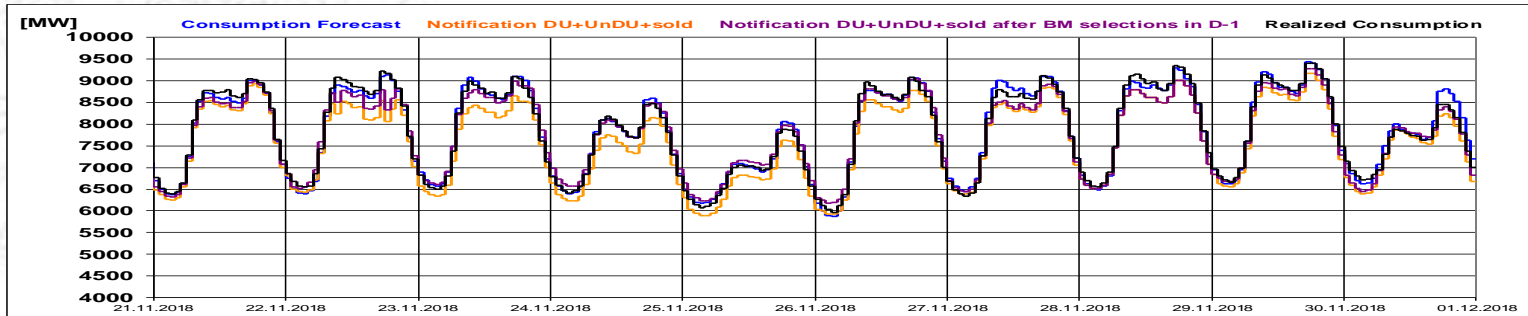
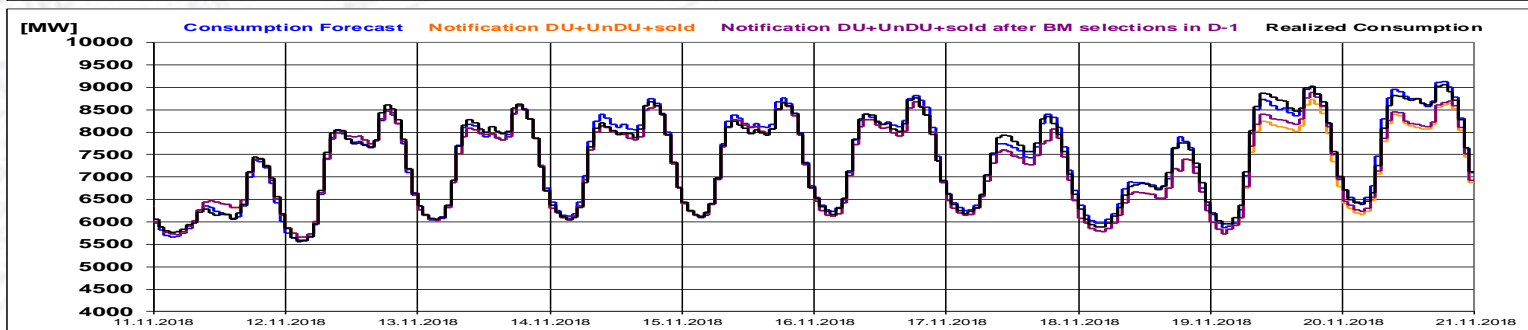
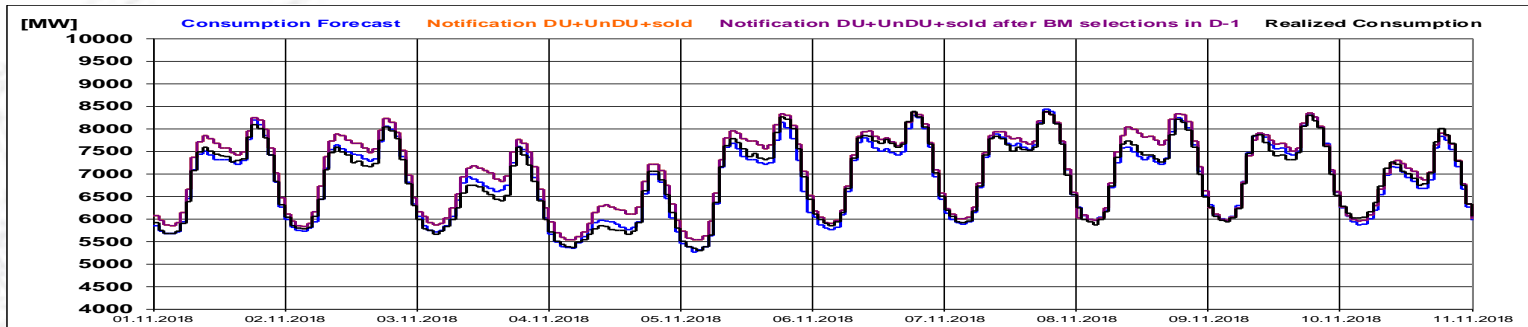
Upward regulation - average price [lei/MWh]



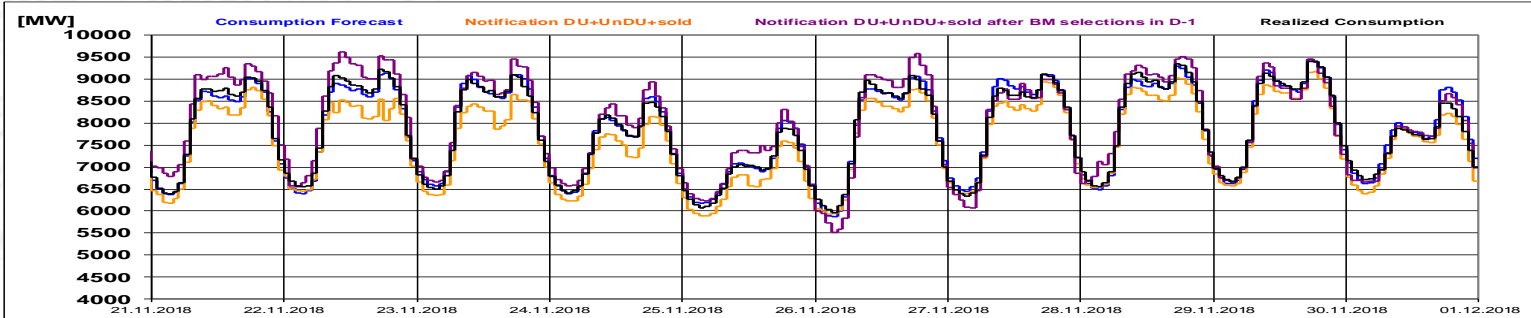
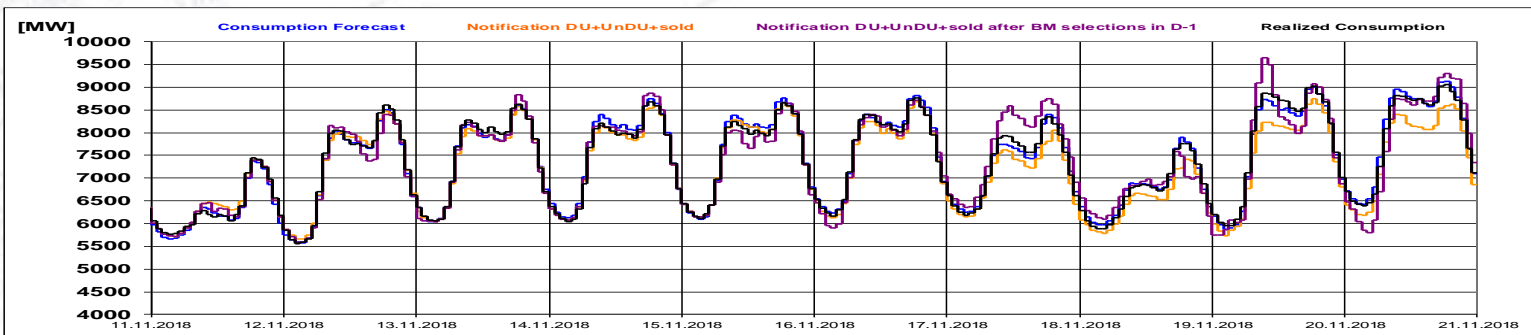
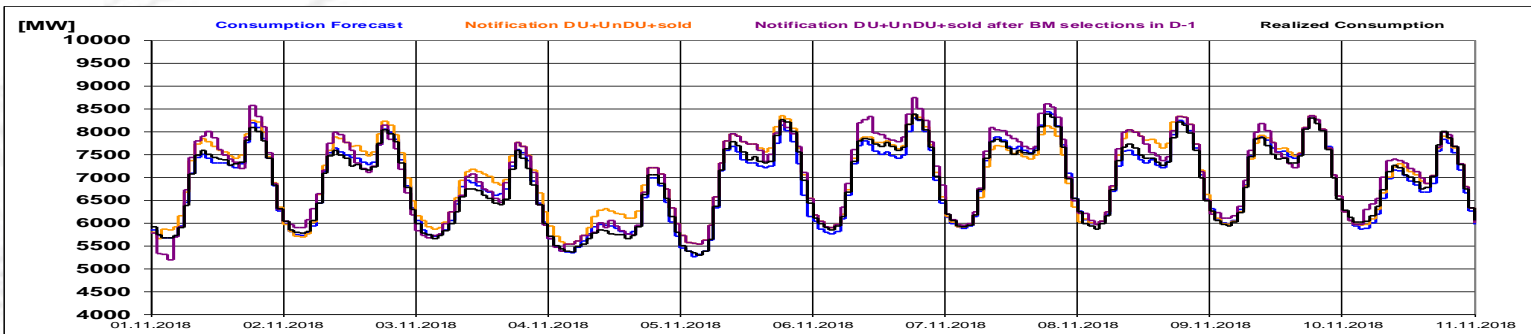
Upward regulation - selected quantities [MWh]



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

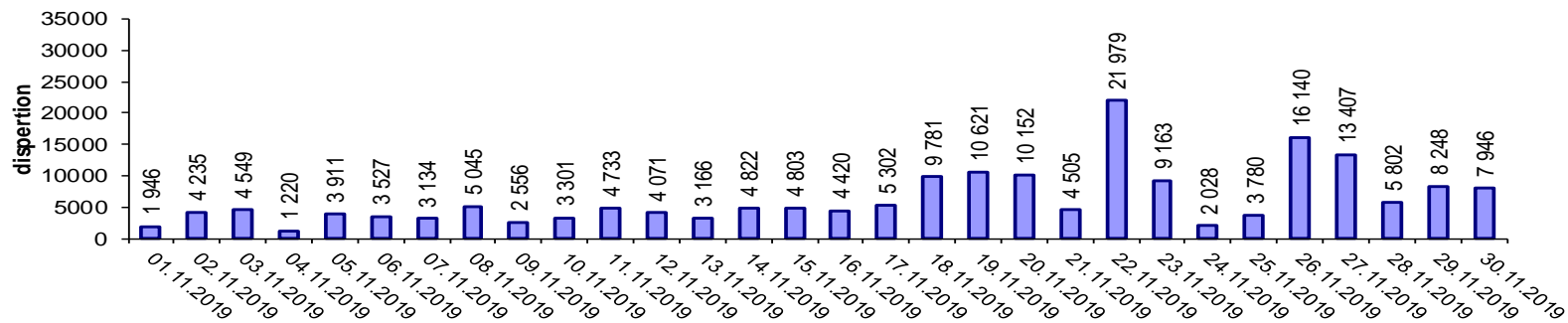


Realized consumption, forecast, notifications, notifications after BM selections in D (end of delivery day)

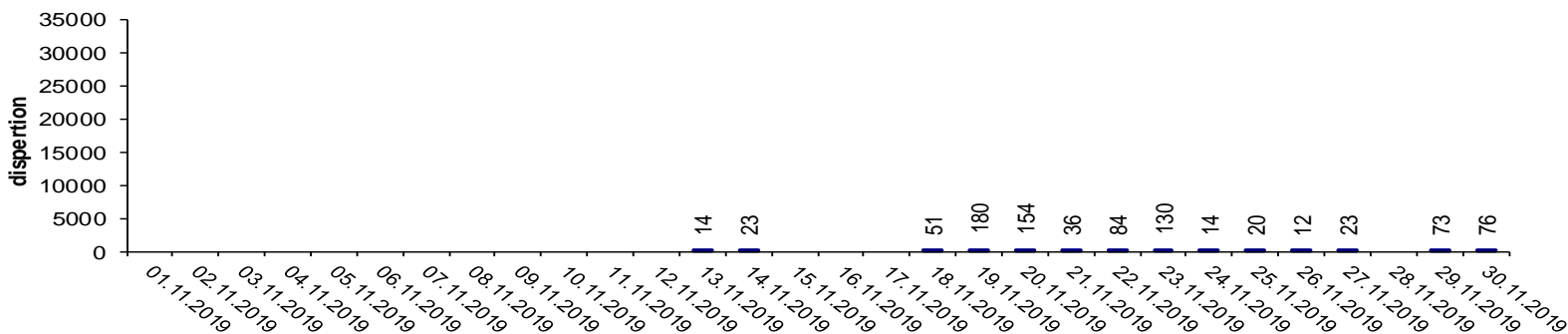


Indicators – Price Volatility for Secondary Regulation

Price Volatility for Secondary Upward Regulation



Price Volatility for Secondary Downward Regulation



Volatility = price dispersion on studied interval:

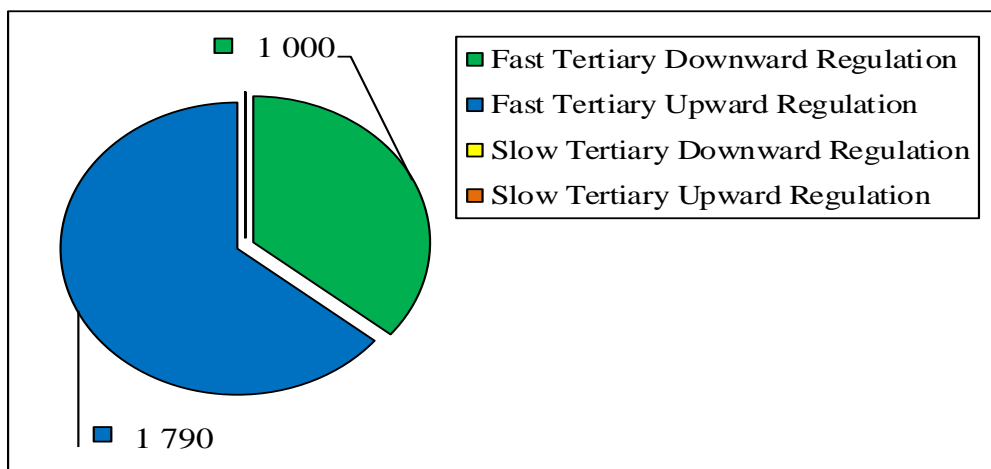
$$\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$

Public

Congestion Management

	Quantities [MWh]		Participants
	<i>Selected</i>	<i>Delivered</i>	<i>Number</i>
Fast Tertiary Downward Regulation	1000.25	982.92	9
Fast Tertiary Upward Regulation	1789.92	1739.11	2
Slow Tertiary Downward Regulation	-	-	-
Slow Tertiary Upward Regulation	-	-	-
	2790.17	2722.03	

Selected energy [MWh]



Note: The value of delivered energy for congestion management (which induces costs for internal management congestion) is the result of the algorithm used to determine the costs for balancing the power system and internal congestion management.

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