

MARKET MONITORING REPORT

Balancing Market

April 2018

Abbrevations

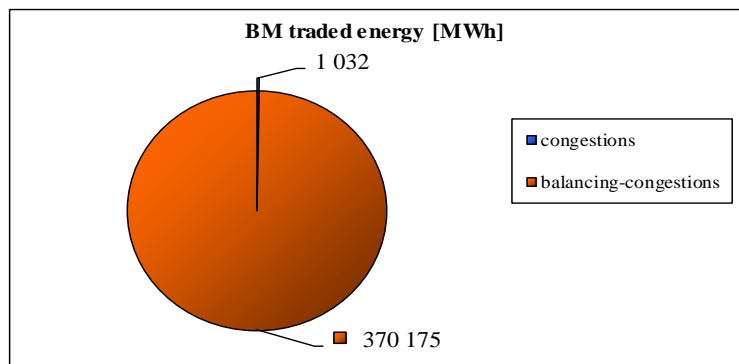
ANRE - Romanian Energy Regulatory Authority
HHI - Herfindahl-Hirschman Index
BRP - Balance Responsible Party
BM - Balancing Market
DAM - Day Ahead Market
TSO - Transmission System Operator
DU – Dispatchable Unit
PN – Physical Notification
NDC - National Dispatching Center
C1 – The market share of the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

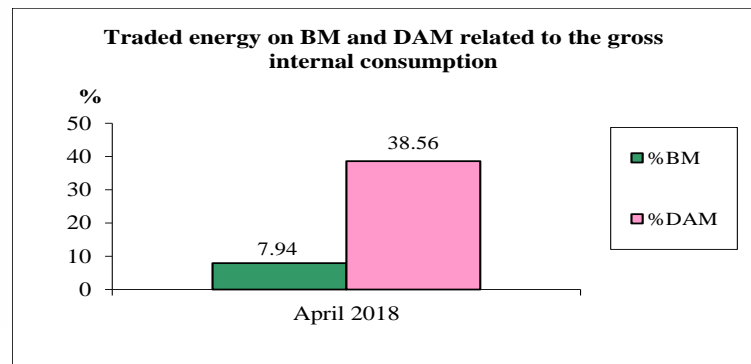
Using the records from the markets data bases, Transelectrica prepares daily, weekly and monthly monitoring reports. A part of the data included in these reports (those data which are not confidential) are published on the website **www.transelectrica.ro** (section Transparency).

The Balance Generation/Consumption

- The average monthly value of generated power was 7 004 MW and the actual internal gross consumption was 6 493 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **2.22%**. 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 **8.24%**. The greatest daily deviation regarding the notifications was registered in **08.04 (25,06%)**.
- The energy used in April 2018 for balancing the power system and congestion management was 371 207 MWh (with an average power of 516 MW, which means 7,94% from the internal gross consumption).
 - the energy used for congestion management was 1 032 MWh (with an average power of 1.43 MW, which means 0.02% from the internal gross consumption).
- The energy traded in April 2018 on Day Ahead Market was 1 802 633 MWh (with an average power of 2 504 MW, which means **38.56 %** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was **17 166 243 lei** (with an average weighted price of 46 lei/MWh).
 - the cost of the energy paid by C.N.T.E.E. Transelectrica S.A. for congestion management was 154 594 lei (with an average weighted price of 150 lei/MWh), which means 0,9 % from the total cost.

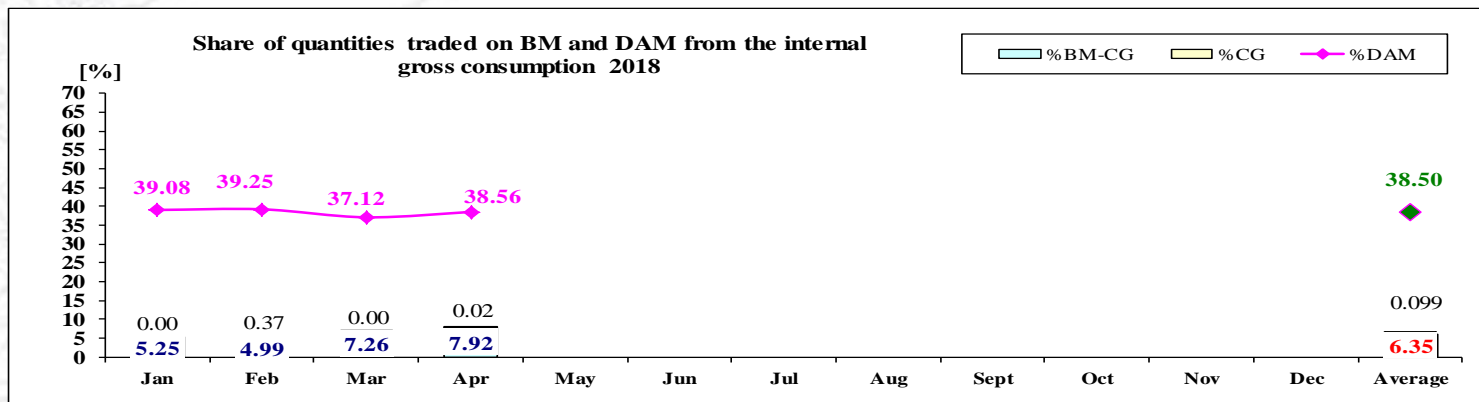
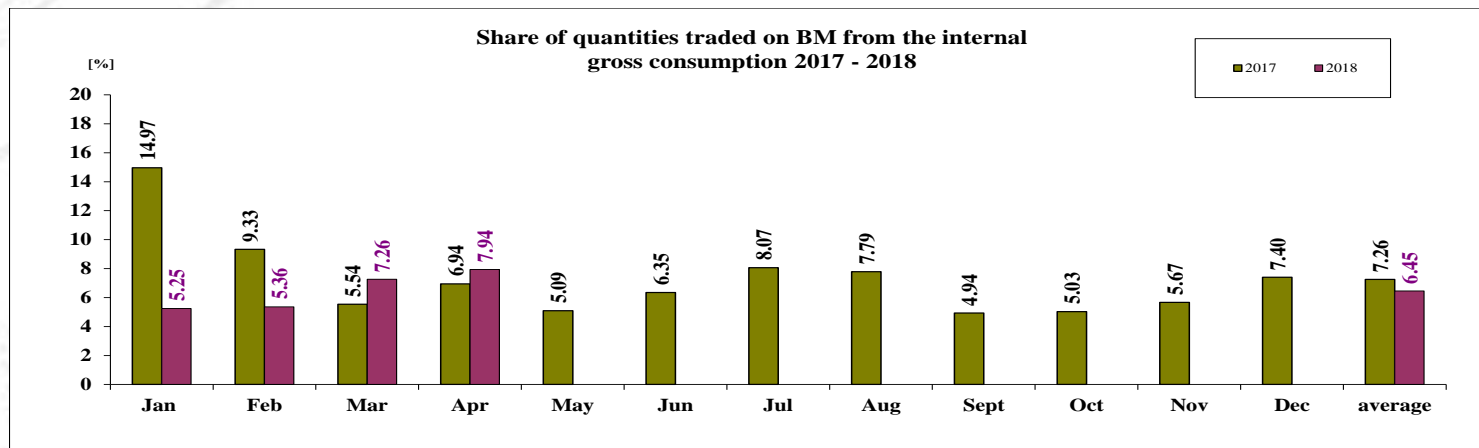


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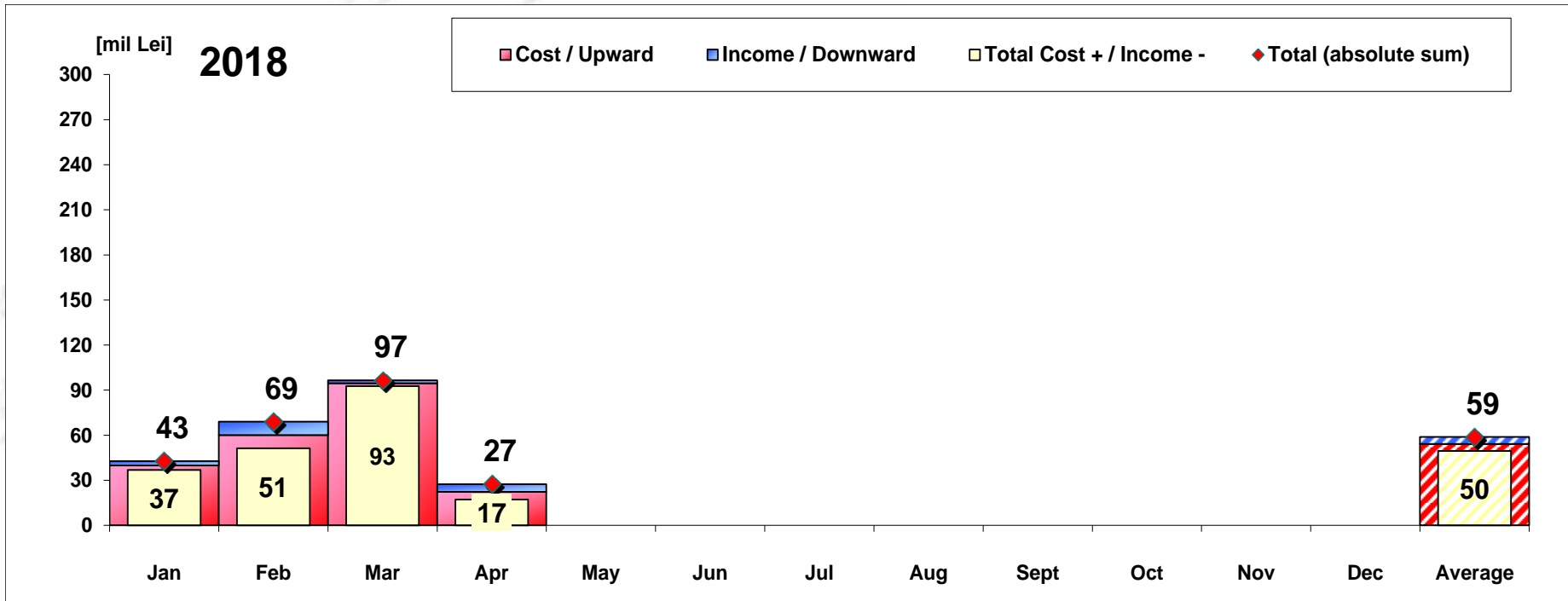


The Balance Generation / Consumption

• 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									6.45
%DAM	39.08	39.25	37.12	38.56									38.50
%CG	0.00	0.37	0.00	0.02									0.099
%BM-CG	5.25	4.99	7.26	7.92									6.35

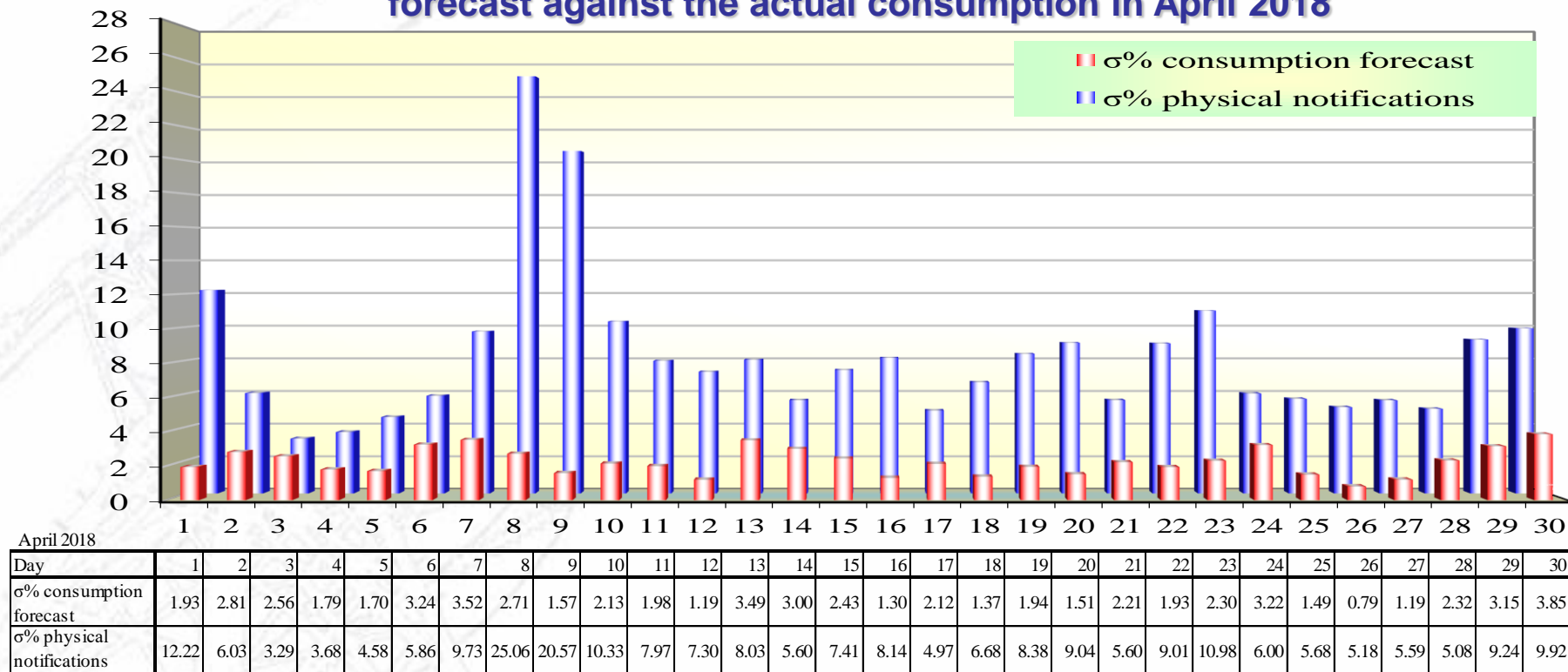


[Lei]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average	Total
Cost / Upward	39 819 143	60 149 383	94 609 129	22 294 472									54 218 032	216 872 127
Income / Downward	2 909 103	8 808 101	1 928 773	5 128 228									4 693 551	18 774 205
CE Cost	0	5 234 582	0	154 594									1 347 294	5 389 177
Total Cost + /	36 910 039	51 341 283	92 680 357	17 166 243									49 524 480	198 097 922
Total (absolute sum)	42 728 246	68 957 484	96 537 902	27 422 700									58 911 583	235 646 331

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 April 2018



σ_{average} % consumption forecast = 2.22

σ_{average} % physical notifications = 8.24

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

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

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 94 BRPs, 121 market participants, holding 240 commercially operating dispatchable units.

April 2018

Downward regulation

	Prices [lei/MWh]		
	Monthly	Maximum	Minimum
average			
Secondary	7.20	100.00	0.10
Fast Tertiary	12.94	350.00	0.10
Slow Tertiary	25.86	299.00	0.10

	Quantities [MWh]		
	Total	Actually	Deviation
selected		delivered	%
	46890.28	46890.28	0.00%
	118391.62	98525.64	16.78%
	144465.15	141170.23	2.28%
	309747.04	286586.15	7.48%

	Participants					
	C1	C3	C1	C3	HHI	HHI
Number	(selected)		(actually delivered)		(selected)	(actually delivered)
2	75.99%	100.00%	75.99%	100.00%	6350	6350
105	49.32%	91.96%	52.11%	91.10%	4114	4095
6	77.52%	99.46%	78.09%	99.99%	6455	6564

Upward regulation

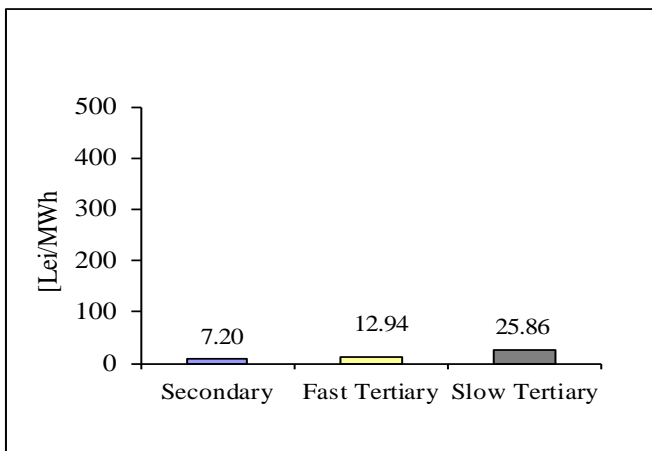
	Monthly	Maximum	Minimum
average			
Secondary	267.44	400.00	250.00
Fast Tertiary	259.97	400.00	0.10
Slow Tertiary	244.21	247.00	235.00

	Total	Actually	Deviation
		delivered	%
selected			
	35076.68	35076.68	0.00%
	51381.93	49278.63	4.09%
	268.30	265.26	1.13%
	86726.91	84620.57	2.43%

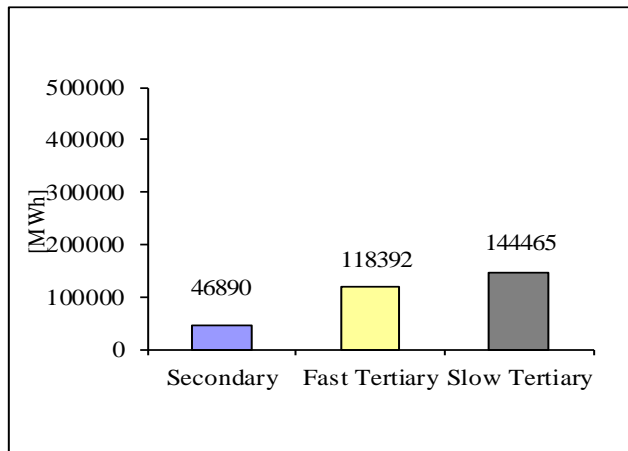
	C1	C3	C1	C3	HHI	HHI
						(actually delivered)
Number	(selected)		(actually delivered)		(selected)	
2	75.08%	100.00%	75.08%	100.00%	6258	6258
9	80.86%	95.19%	82.34%	95.57%	6662	6881
3	92.06%	100.00%	91.97%	100.00%	8519	8503

Balancing energy – Selected prices and quantities in April 2018

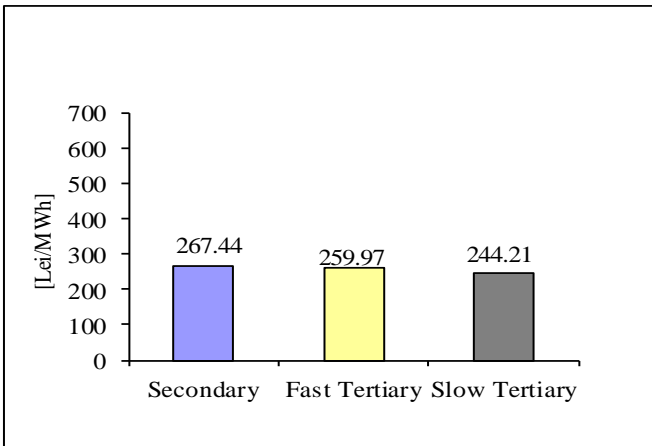
Downward regulation - average price [lei/MWh]



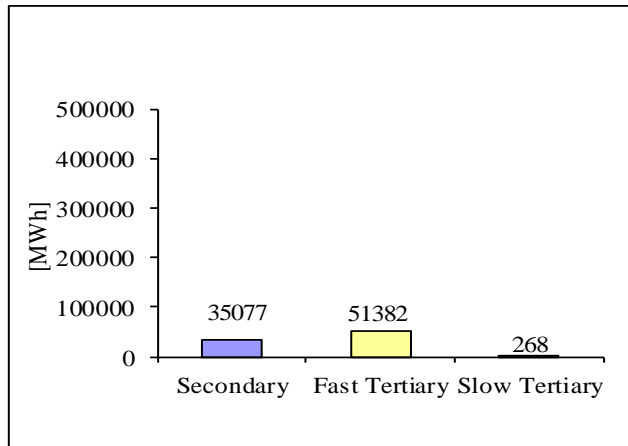
Downward regulation - selected quantities [MWh]



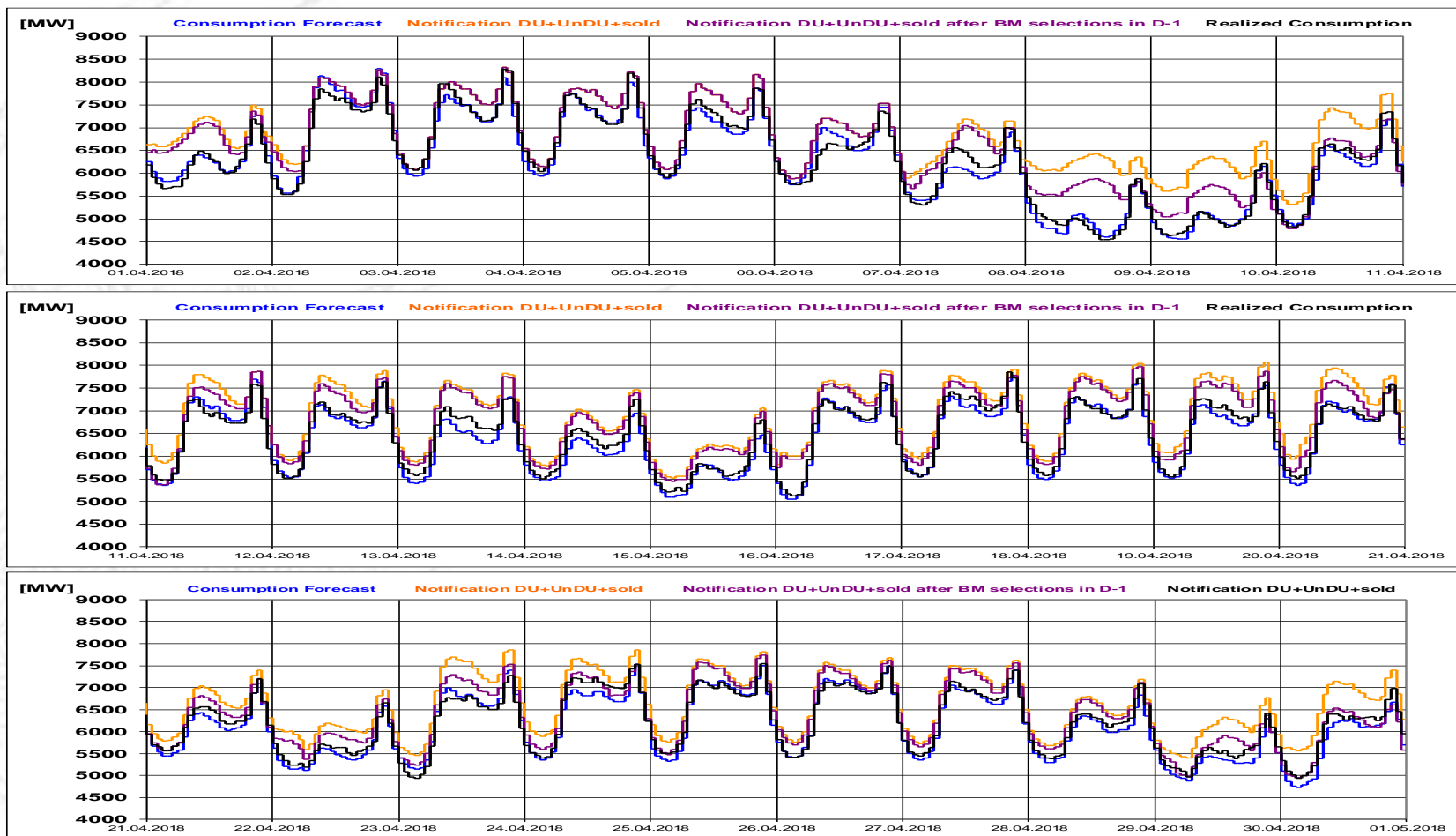
Upward regulation - average price [lei/MWh]



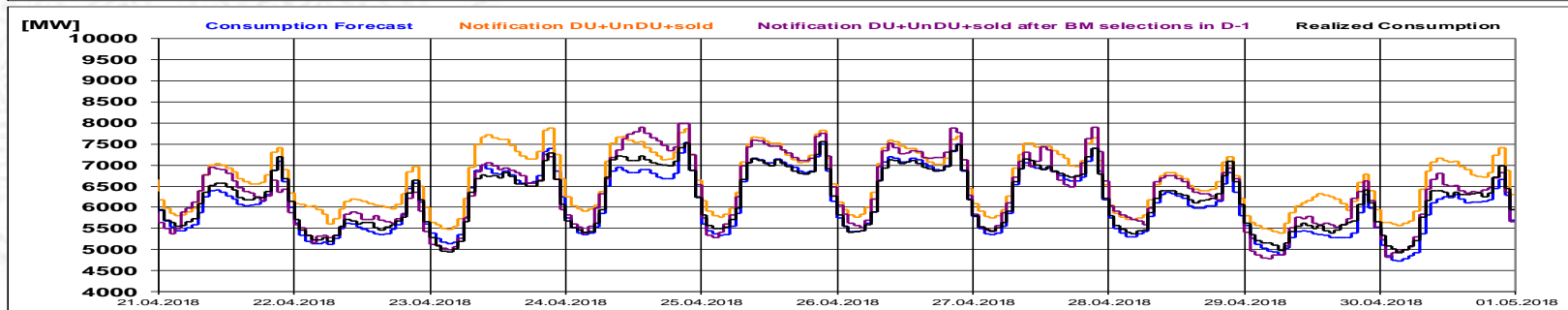
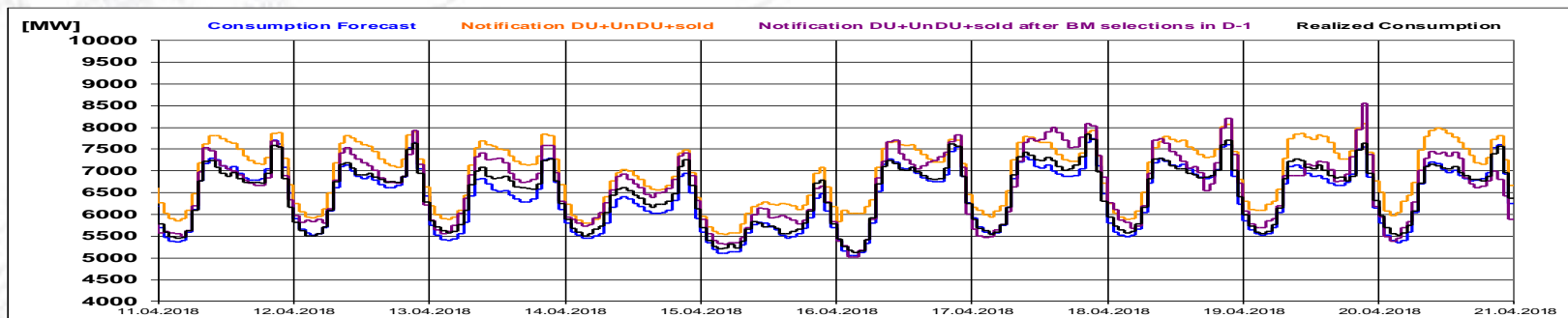
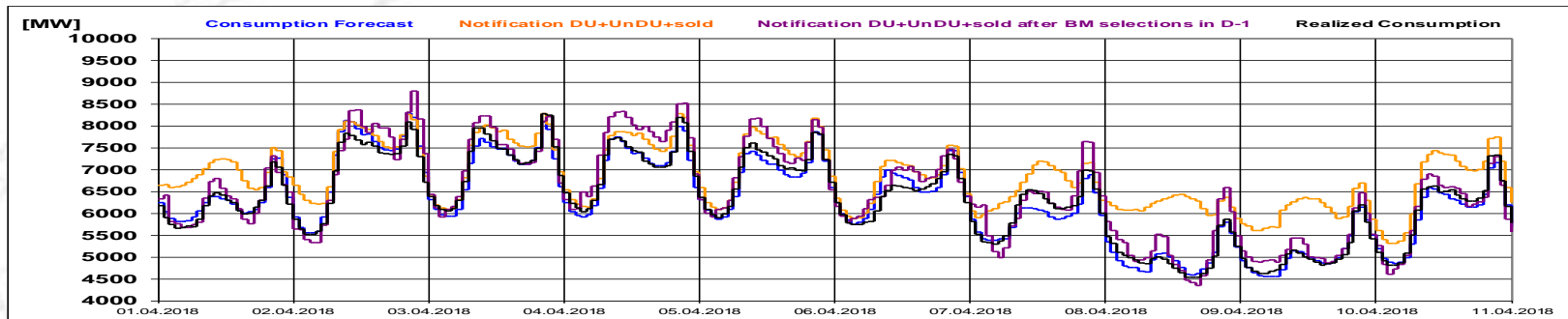
Upward regulation - selected quantities [MWh]



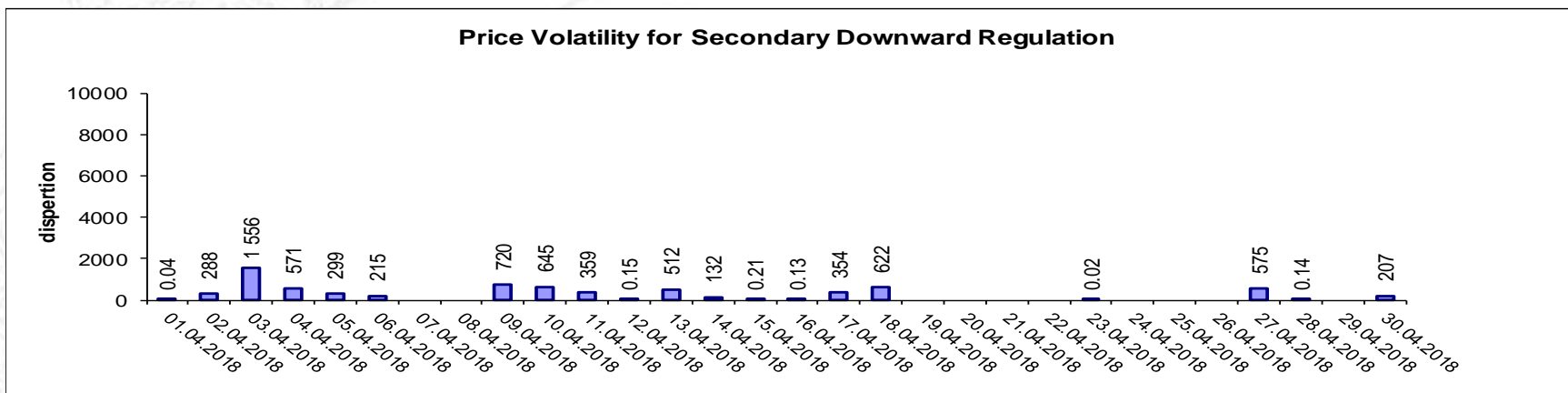
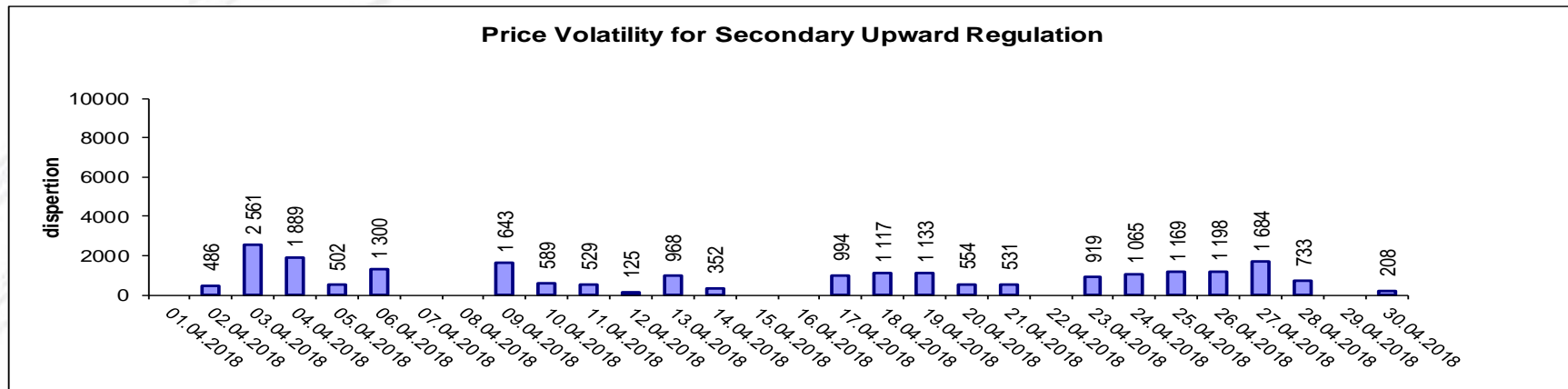
Realized consumption. forecast. notifications. notifications after BM selections in D-1



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



Indicators – Price Volatility for Secondary Regulation



Volatility = price dispersion on studied interval:

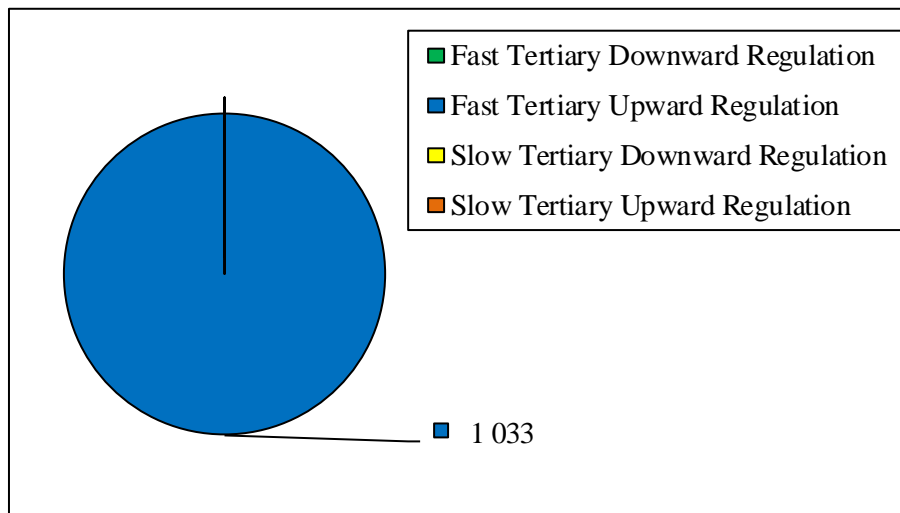
$$\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$

Public

Congestion Management

	Quantities [MWh]			Participants
	<i>Selected</i>	<i>Delivered</i>	<i>Deviation[%]</i>	<i>Number</i>
Fast Tertiary Downward Regulation	-	-	-	-
Fast Tertiary Upward Regulation	1032.92	1031.85	0.10%	1.00
Slow Tertiary Downward Regulation	-	-	-	-
Slow Tertiary Upward Regulation	-	-	-	-
	1032.92	1031.85	0.10%	

Selected energy [MWh]



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

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