

MARKET MONITORING REPORT

Balancing Market

July 2018

Abbrevations

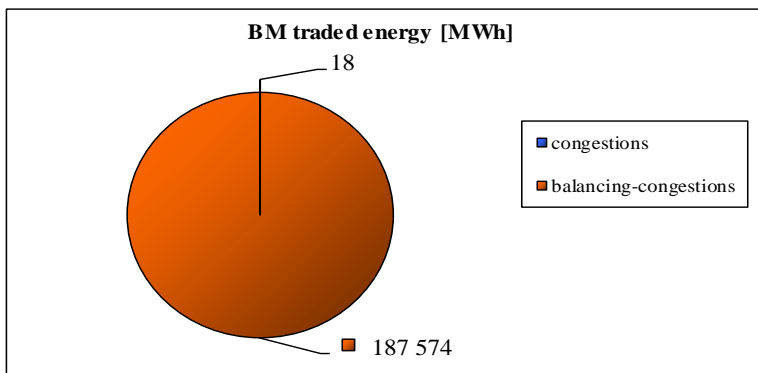
ANRE - Romanian Energy Regulatory Authority
HHI - Herfindahl-Hirschman Index
BRP - Balance Responsible Party
BM - Balancing Market
DAM - Day Ahead Market
TSO - Transmission System Operator
DU – Dispatchable Unit
PN – Physical Notification
NDC - National Dispatching Center
C1 – The market share of the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

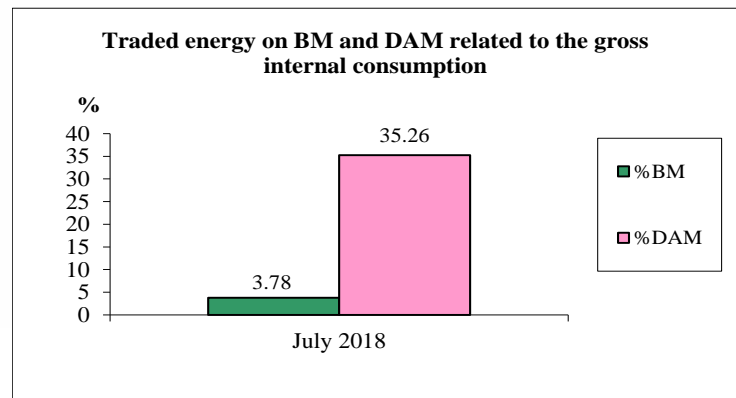
The Balance Generation/Consumption

- The average monthly value of generated power was 7 258 MW and the actual internal gross consumption was 6 679 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **1.52%**. 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 **2.89%**. The greatest daily deviation regarding the notifications was registered in **01.07 (7.71%)**.
- The energy used in July 2018 for balancing the power system and congestion management was 187 593 MWh (with an average power of 252 MW, which means **3.78 %** from the internal gross consumption).
 - the energy used for congestion management was 18 MWh (with an average power of 0.024 MW, which means 0.0004% from the internal gross consumption).
- The energy traded in July 2018 on Day Ahead Market was 1 752 294 MWh (with an average power of 2 355 MW, which means **35.26 %** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was **30 264 672 lei** (with an average weighted price of 161 lei/MWh).
 - the cost of the energy paid by C.N.T.E.E. Transelectrica S.A. for congestion management was 3 449 lei (with an average weighted price of 190 lei/MWh), which means 0.011% from the total cost.



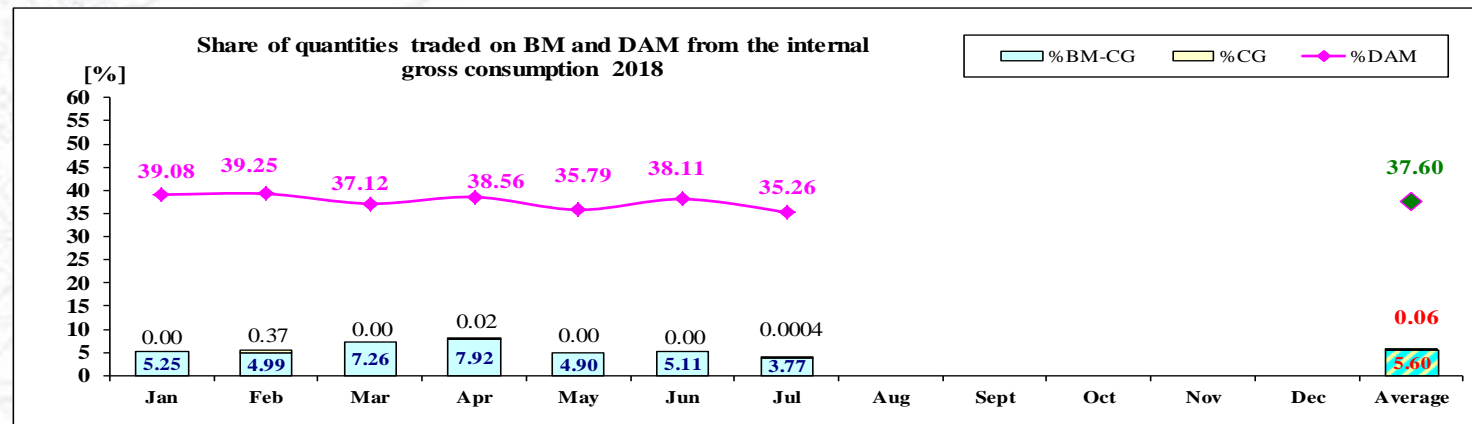
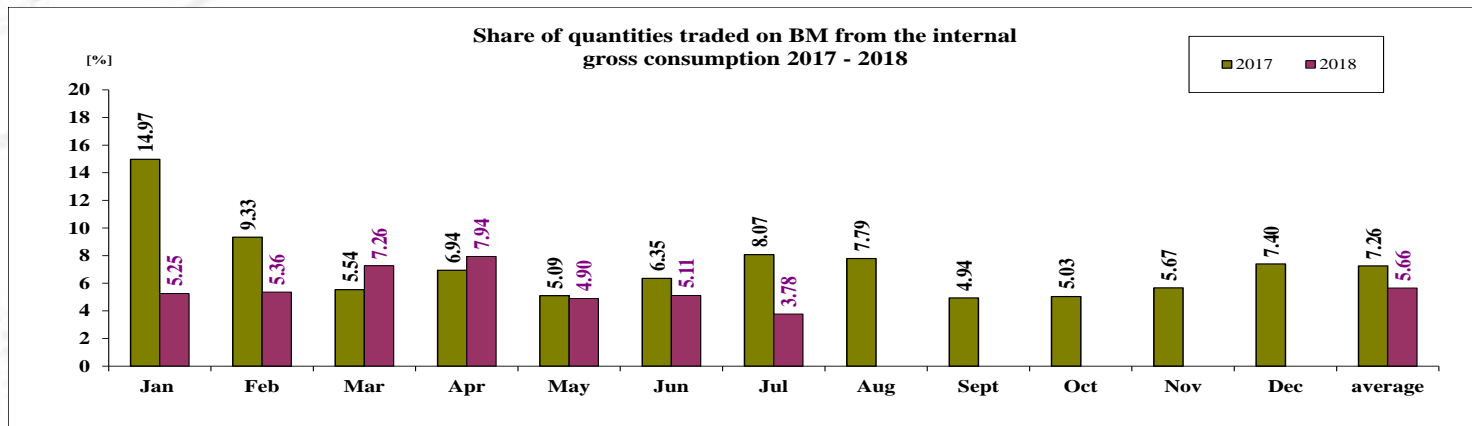
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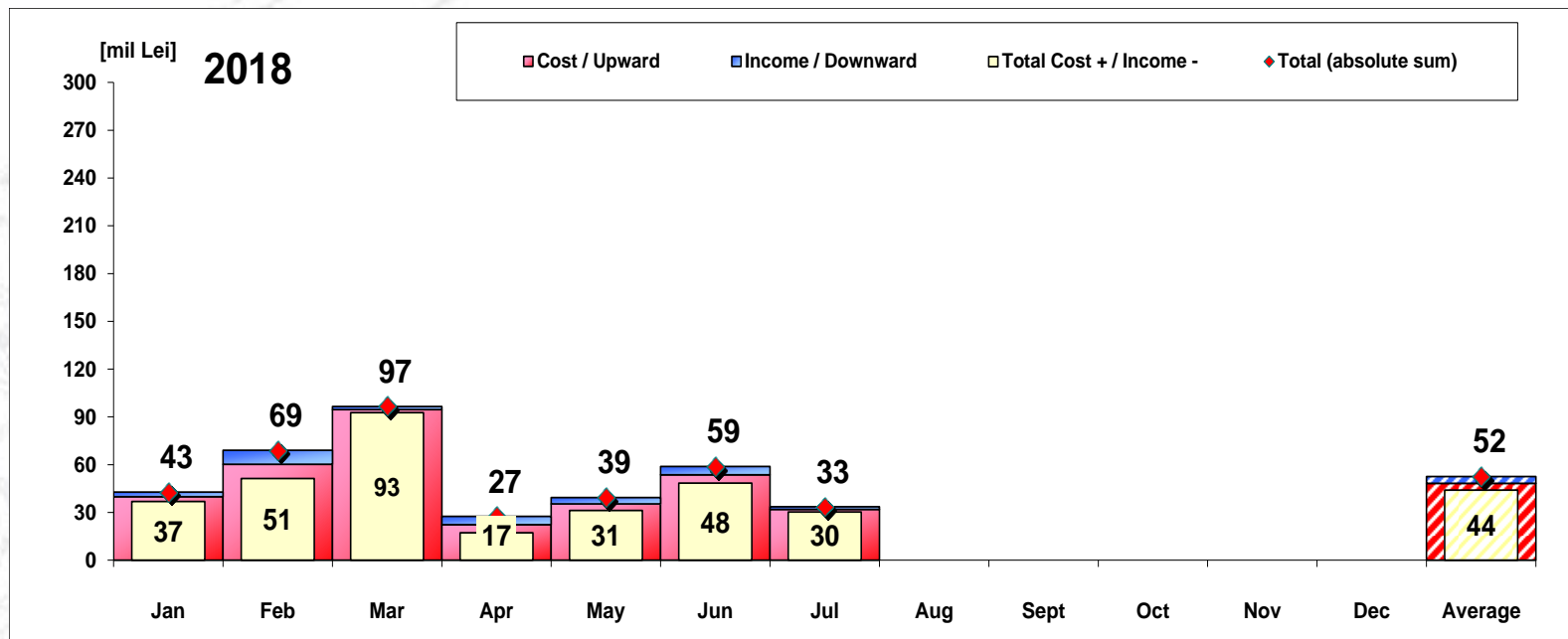


The Balance Generation / Consumption

• 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	4.90	5.11	3.78						5.66
%DAM	39.08	39.25	37.12	38.56	35.79	38.11	35.26						37.60
%CG	0.00	0.37	0.00	0.02	0.00	0.00	0.00						0.056
%BM-CG	5.25	4.99	7.26	7.92	4.90	5.11	3.77						5.60

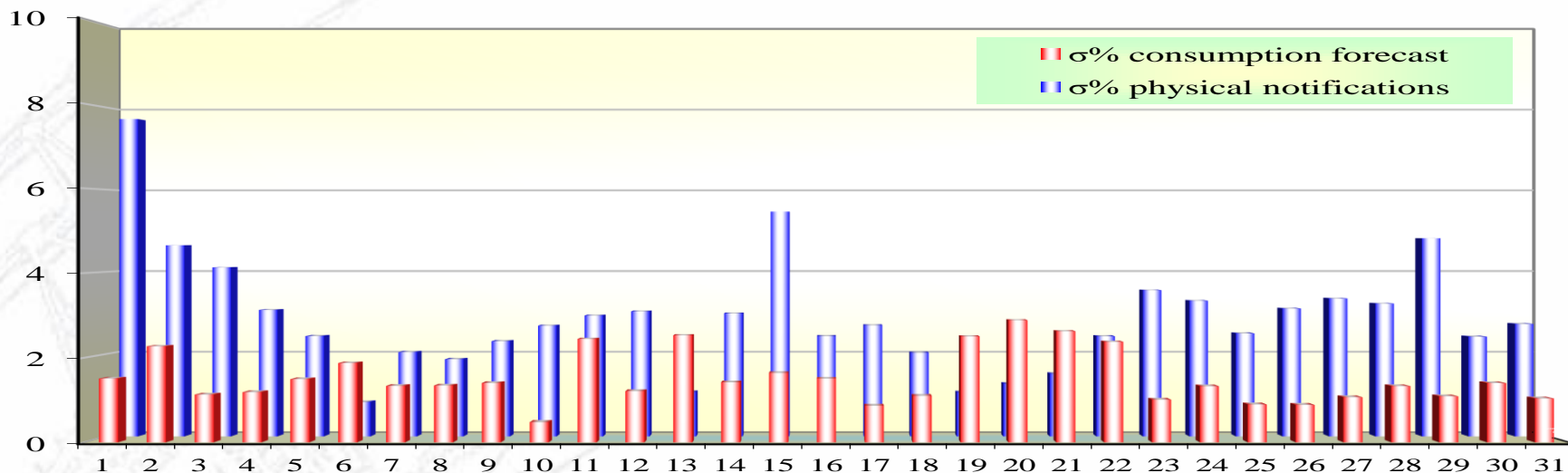


[Lei]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average	Total
Cost / Upward	39 819 143	60 149 383	94 609 129	22 294 472	35 295 644	53 570 278	31 866 958						48 229 287	337 605 006
Income / Downward	2 909 103	8 808 101	1 928 773	5 128 228	4 077 888	5 193 747	1 602 287						4 235 447	29 648 126
CE Cost	0	5 234 582	0	154 594	0	0	3 449						770 375	5 392 625
Total Cost + / Income -	36 910 039	51 341 283	92 680 357	17 166 243	31 217 756	48 376 531	30 264 672						43 993 840	307 956 881
Total (absolute sum)	42 728 246	68 957 484	96 537 902	27 422 700	39 373 531	58 764 024	33 469 245						52 464 733	367 253 132

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 July 2018



July 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	31
σ% consumption forecast	1.51	2.27	1.13	1.18	1.49	1.87	1.33	1.34	1.40	0.48	2.44	1.21	2.53	1.42	1.64	1.50	0.86	1.10	2.50	2.88	2.62	2.37	1.01	1.32	0.89	0.88	1.06	1.33	1.09	1.40	1.04
σ% physical notifications	7.71	4.64	4.11	3.07	2.44	0.83	2.05	1.87	2.31	2.69	2.94	3.04	1.08	2.99	5.46	2.44	2.70	2.03	1.07	1.28	1.52	2.43	3.55	3.30	2.50	3.11	3.35	3.23	4.82	2.42	2.73

σ_{average} % consumption forecast = 1.52

σ_{average} % physical notifications = 2.89

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

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

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 92 BRPs, 113 market participants, holding 226 commercially operating dispatchable units. Starting with 11th of July dispatchable unit VERBUND (30W-VERBUND----7) was registered as a result of aggregation between three dispatchable units: ALPHAWN1 (30W-ALPHAWN1---R), CAS SUD2 (30W-CASSUD2----U) and VENTUS (30W-VENTUSNORD-T).

July 2018

Downward regulation

	Prices [lei/MWh]		
	Monthly	Maximum	Minimum
average			
Secondary	16.29	100.00	0.10
Fast Tertiary	27.45	345.00	0.10
Slow Tertiary	1.00	1.00	1.00

	Quantities [MWh]		
	Total	Actually	Deviation
selected	delivered	%	
39282.48	39282.48	0.00%	
37615.87	34942.44	7.11%	
258.00	251.12	2.67%	
77156.35	74476.04	3.47%	

	Participants					
	C1	C3	C1	C3	HHI	HHI
Number	(selected)	(actually delivered)	(selected)	(actually delivered)		
4	83.03%	97.85%	83.03%	97.85%	7055	7055
7	76.55%	99.61%	75.48%	99.65%	6128	5992
1	100.00%	100.00%	100.00%	100.00%	10000	10000

Upward regulation

	Monthly	Maximum	Minimum
average			
Secondary	292.12	380.00	250.00
Fast Tertiary	274.38	378.00	162.37
Slow Tertiary	241.51	243.00	240.00

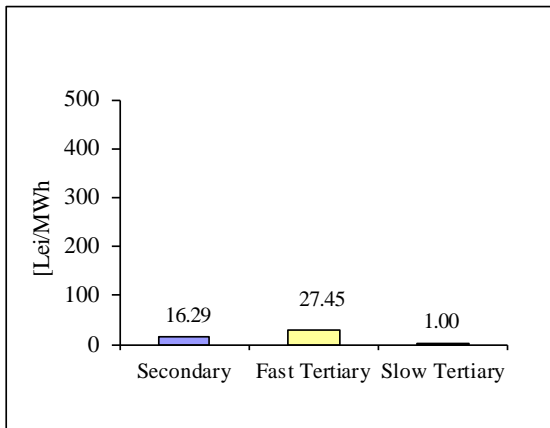
	Total	Actually	Deviation
selected	delivered	%	
46136.09	46136.09	0.00%	
68261.16	66900.76	1.99%	
81.00	79.64	1.68%	
114478.25	113116.49	1.19%	

	C1	C3	C1	C3	HHI	HHI
Number	(selected)	(actually delivered)	(selected)	(actually delivered)		
4	82.67%	97.43%	82.67%	97.43%	6991	6991
7	86.40%	95.72%	87.10%	96.31%	7518	7635
1	100.00%	100.00%	100.00%	100.00%	10000	10000

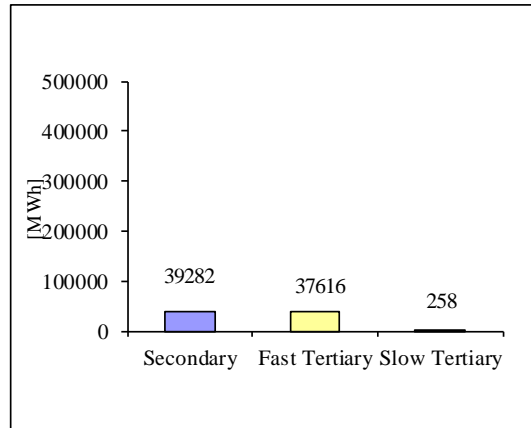
Balancing energy – Selected prices and quantities in July 2018

July 2018

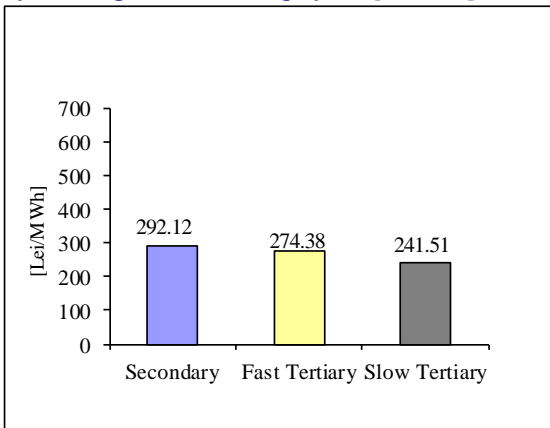
Downward regulation - average price [lei/MWh]



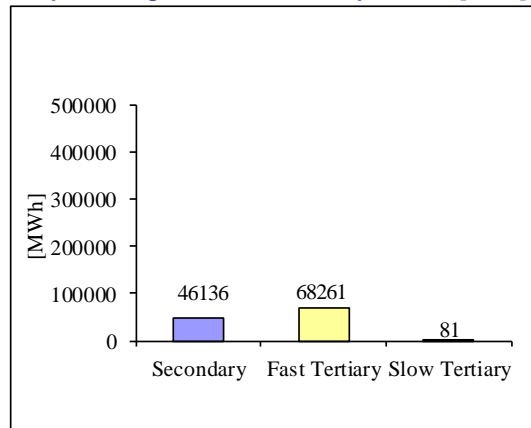
Downward regulation - selected quantities [MWh]



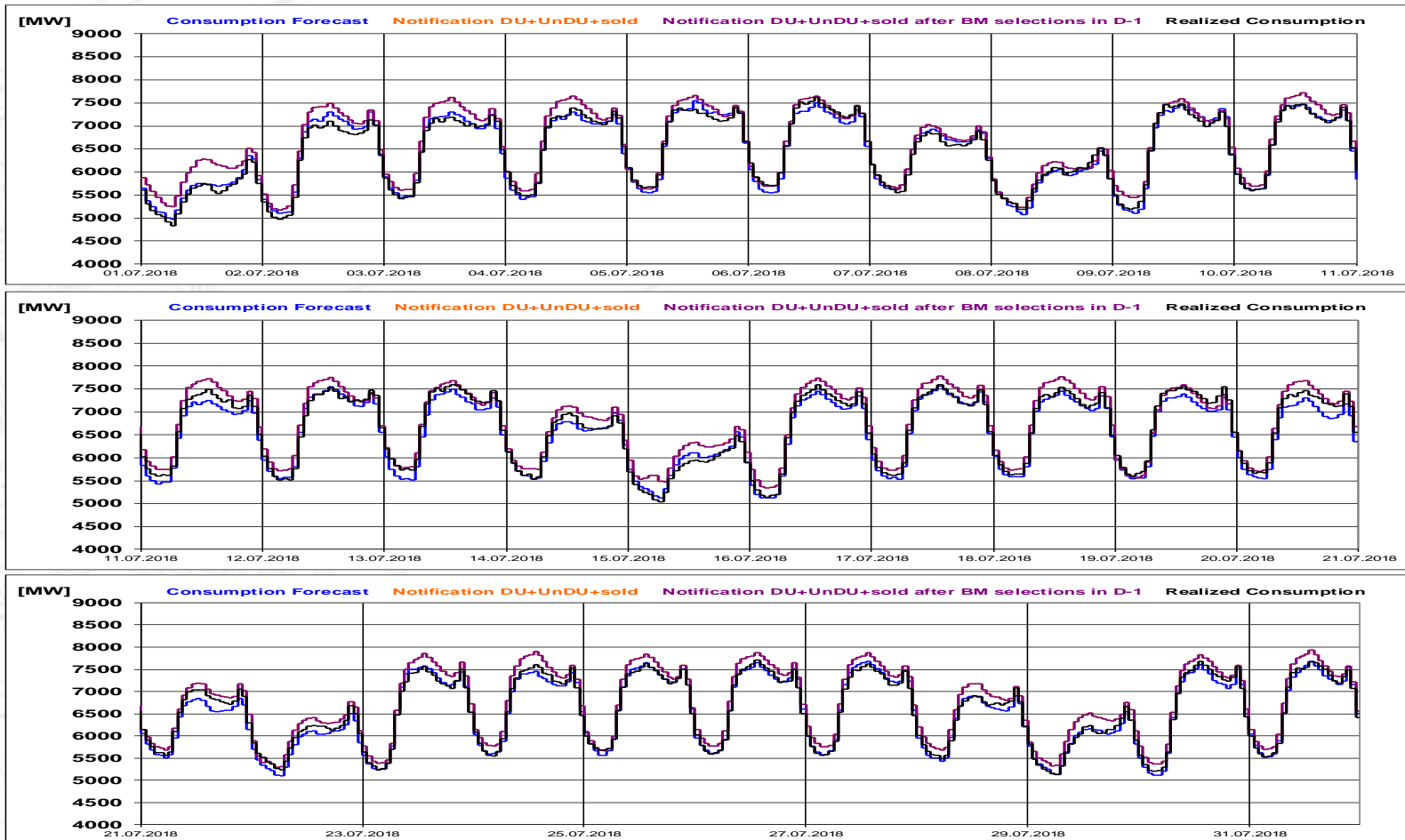
Upward regulation - average price [lei/MWh]



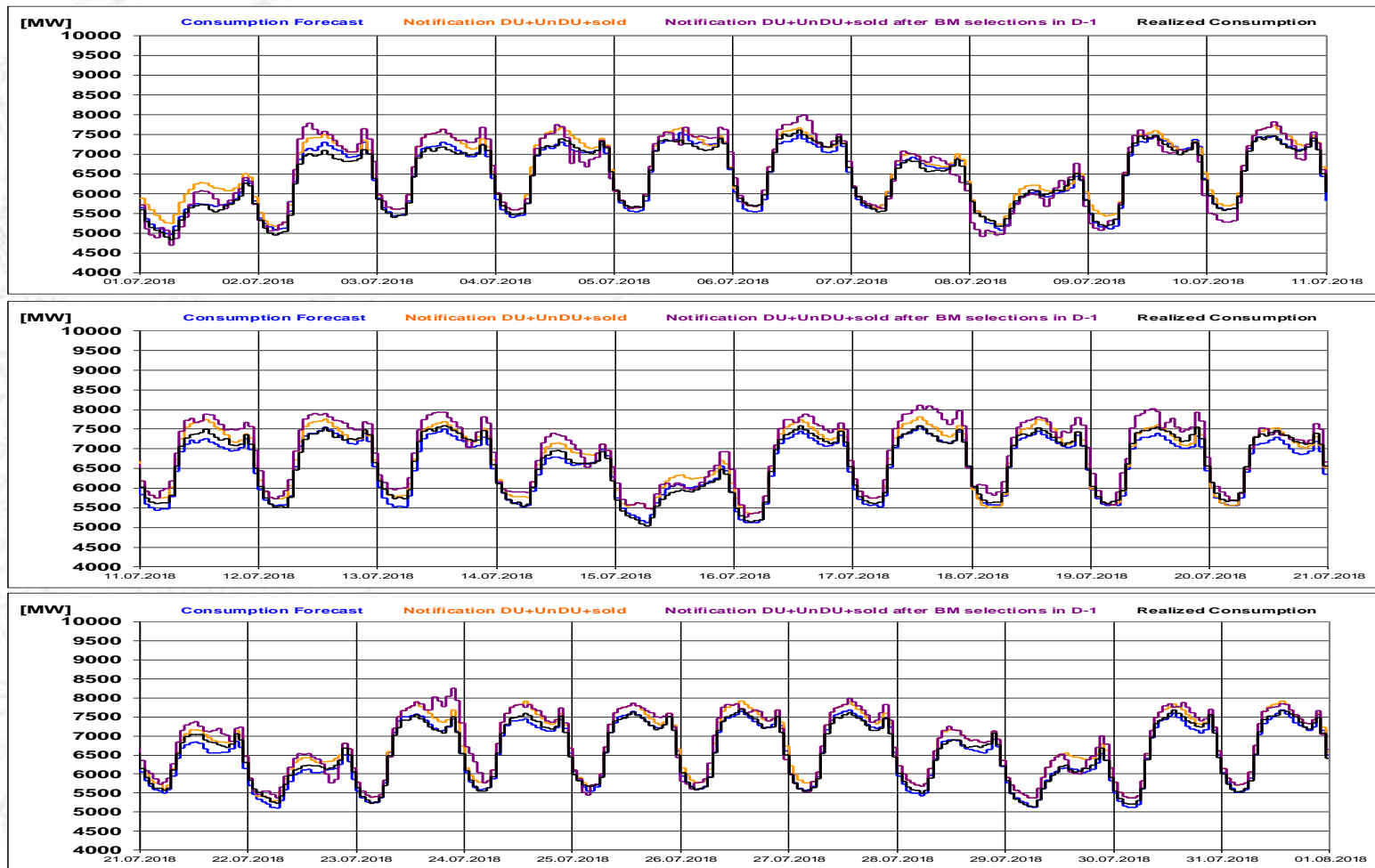
Upward regulation - selected quantities [MWh]



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

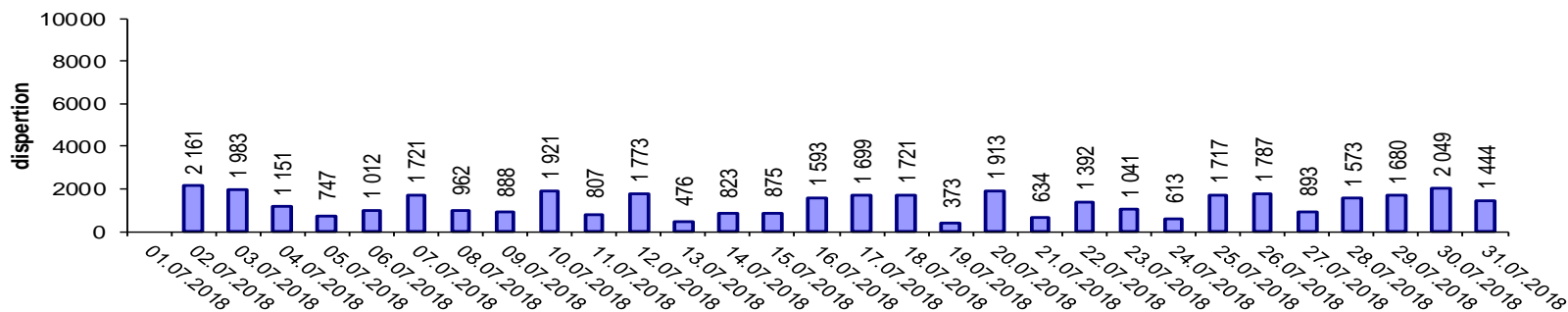


Realized consumption. forecast. notifications. notifications after BM selections in D (end of delivery day)

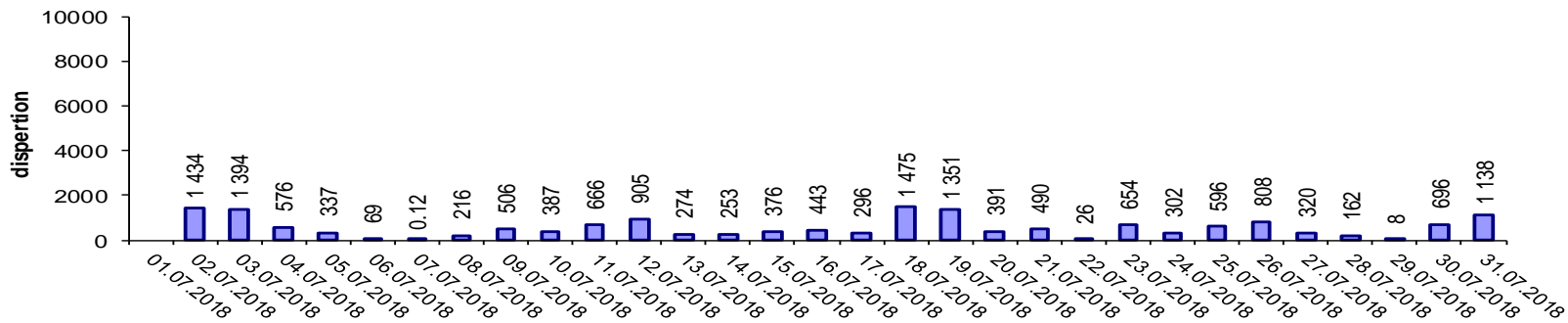


Indicators – Price Volatility for Secondary Regulation

Price Volatility for Secondary Upward Regulation



Price Volatility for Secondary Downward Regulation



Volatility = price dispersion on studied interval:

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

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