

# MARKET MONITORING REPORT

## Balancing Market

September 2018

## Abbrevations

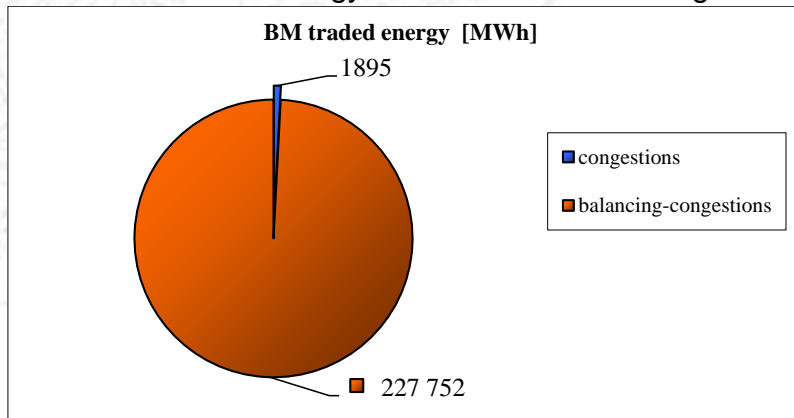
ANRE - Romanian Energy Regulatory Authority  
HHI - Herfindahl-Hirschman Index  
BRP - Balance Responsible Party  
BM - Balancing Market  
DAM - Day Ahead Market  
TSO - Transmission System Operator  
DU – Dispatchable Unit  
PN – Physical Notification  
NDC - National Dispatching Center  
C1 – The market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

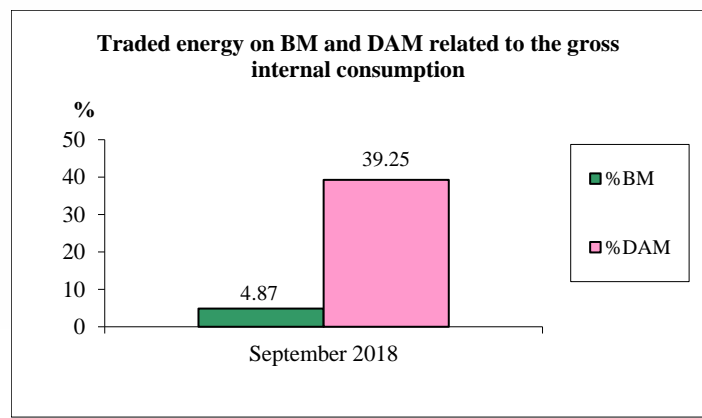
Using the records from the markets data bases, Transelectrica prepares daily, weekly and monthly monitoring reports. A part of the data included in these reports (those data which are not confidential) are published on the website **[www.transelectrica.ro](http://www.transelectrica.ro)** (section Transparency).

## The Balance Generation/Consumption

- The average monthly value of generated power was 6 750 MW and the actual internal gross consumption was 6 554 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **1.41%**. 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 **2.37%**. The greatest daily deviation regarding the notifications was registered in **08.09 (6.05%)**.
- The energy used in September 2018 for balancing the power system and congestion management was 229 647 MWh (with an average power of 319MW, which means **4.87%** from the internal gross consumption).
  - the energy used for congestion management was 1 895 MWh (with an average power of 2.63 MW, which means 0.04% from the internal gross consumption).
- The energy traded in September 2018 on Day Ahead Market was 1 852 320 MWh (with an average power of 2 573 MW, which means **39.25%** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was 47 581 685 lei (with an average weighted price of 207 lei/MWh).
  - the cost of the energy paid by C.N.T.E.E. Transelectrica S.A. for congestion management was 581 517 lei (with an average weighted price of 307 lei/MWh), which means 1.22% from the total cost;
  - the cost for energy traded on the Balancing Market was 47 000 168 lei.

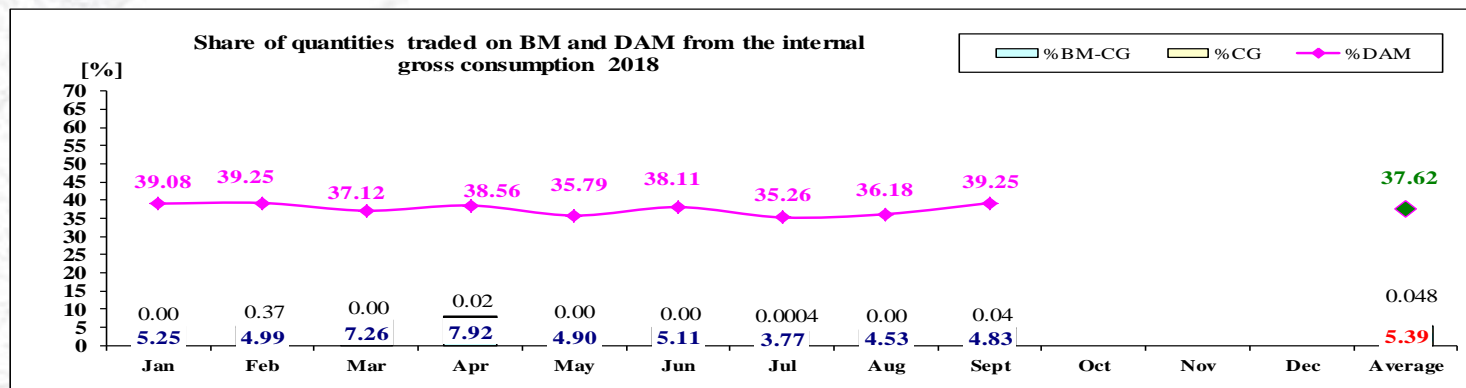
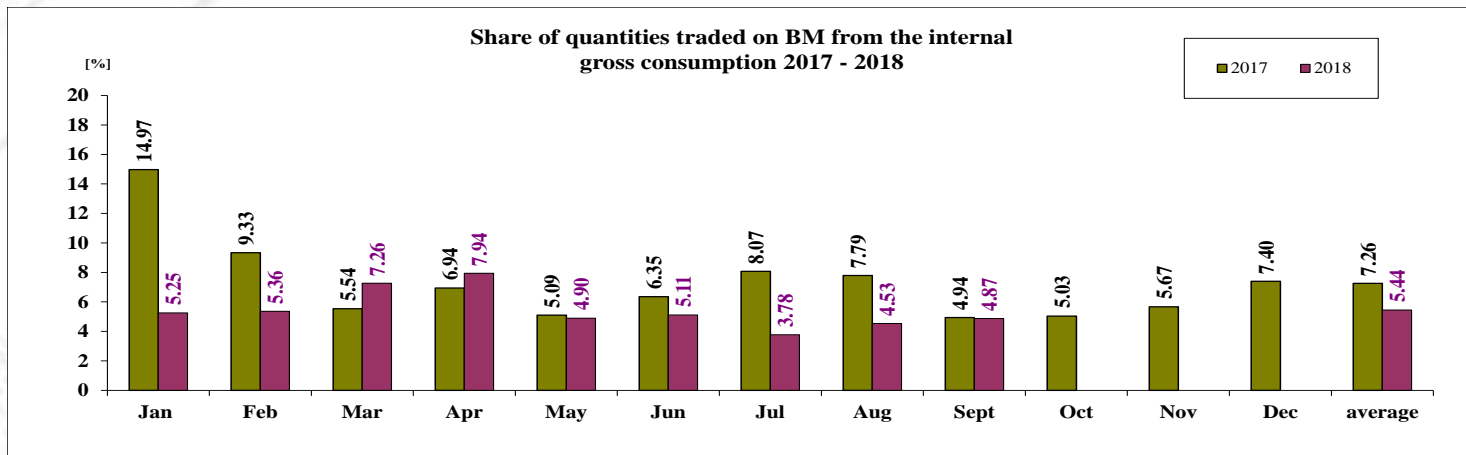


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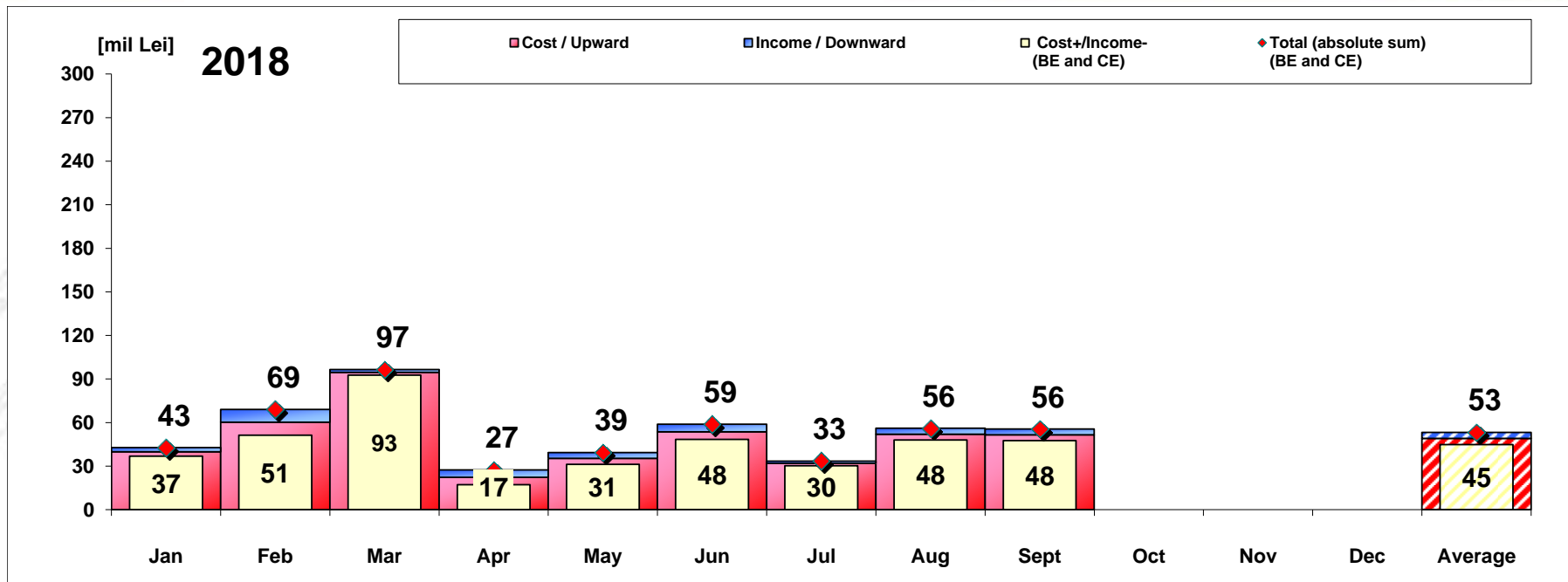


## The Balance Generation / Consumption

• 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	4.53	4.87				5.4
%DAM	39.08	39.25	37.12	38.56	35.79	38.11	35.26	36.18	39.25				37.6
%CG	0.00	0.37	0.00	0.02	0.00	0.00	0.0004	0.00	0.04				0.04
%BM-CG	5.25	4.99	7.26	7.92	4.90	5.11	3.77	4.53	4.83				5.3



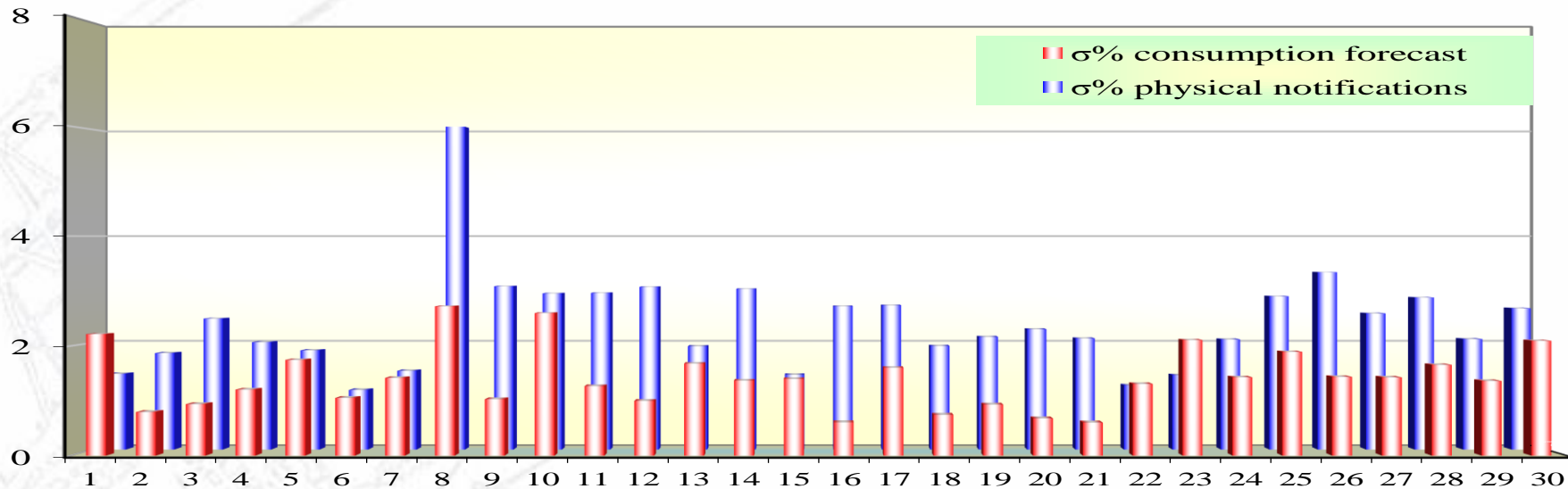
[Lei]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average	Total
Cost / Upward	39 819 143	60 149 383	94 609 129	22 294 472	35 295 644	53 570 278	31 866 958	52 018 823	51 549 623				49 019 272	441 173 452
Income / Downward	2 909 103	8 808 101	1 928 773	5 128 228	4 077 888	5 193 747	1 602 287	4 064 789	3 967 938				4 186 761	37 680 853
CE Cost	0	5 234 582	0	154 594	0	0	3 449	0	581 517				663 794	5 974 142
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				44 168 717	397 518 457
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				44 832 511	403 492 599
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				53 206 034	478 854 305

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 September 2018



September 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	2.21	0.79	0.94	1.20	1.74	1.05	1.42	2.72	1.03	2.60	1.27	1.00	1.68	1.37	1.40	0.61	1.60	0.74	0.93	0.68	0.60	1.31	2.11	1.43	1.89	1.44	1.43	1.65	1.36	2.09
σ% physical notifications	1.42	1.81	2.45	2.01	1.86	1.11	1.47	6.05	3.06	2.93	2.93	3.05	1.93	3.01	1.40	2.68	2.70	1.94	2.11	2.25	2.08	1.20	1.39	2.06	2.87	3.32	2.55	2.85	2.07	2.65

**σ<sub>average</sub>% consumption forecast = 1.41**

**σ<sub>average</sub> % physical notifications = 2.37**

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

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

**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 66 BRPs, 113 market participants, holding 225 commercially operating dispatchable units.

### September 2018

#### 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	0.33	1.00	0.10	40110.68	40110.68	0.00%	5	79.09%	95.68%	79.09%	95.68%	6437
Fast Tertiary	53.62	750.00	0.10	77648.80	74096.53	4.57%	10	48.17%	97.48%	49.31%	97.78%	3630
Slow Tertiary	-	-	-	-	-	-	-	-	-	-	-	-
				117759.48	114207.21	3.02%						

#### Upward regulation

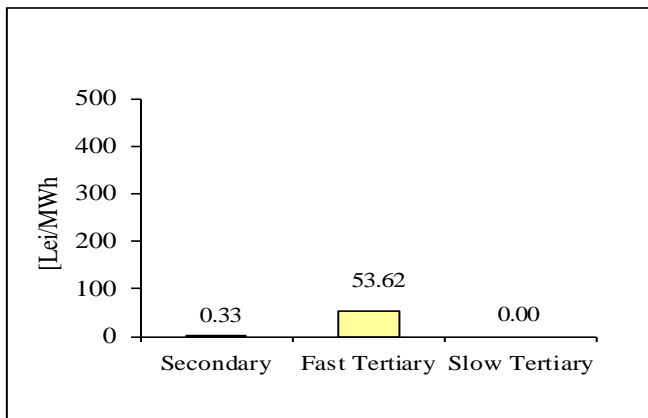
	Monthly	Maximum	Minimum	Total	Actually	Deviation	C1	C3	C1	C3	HHI	HHI
	average			selected	delivered	%	Number	(selected)	(actually delivered)	(selected)	(actually delivered)	(actually delivered)
Secondary	525.89	996.18	300.00	35536.30	35536.30	0.00%	5	78.95%	95.56%	78.95%	95.56%	6422
Fast Tertiary	413.94	750.00	0.10	79332.85	77444.05	2.38%	8	89.74%	95.44%	90.56%	95.81%	8077
Slow Tertiary	320.00	320.00	320.00	2460.00	2459.73	0.01%	1	100.00%	100.00%	100.00%	100.00%	10000
				117329.15	115440.08	1.61%						



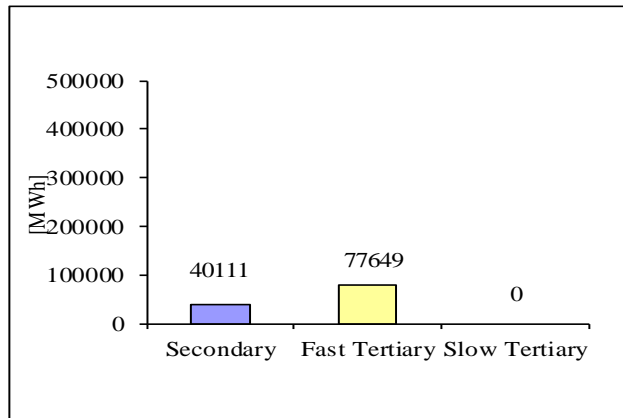
## Balancing energy – Selected prices and quantities in September 2018

September 2018

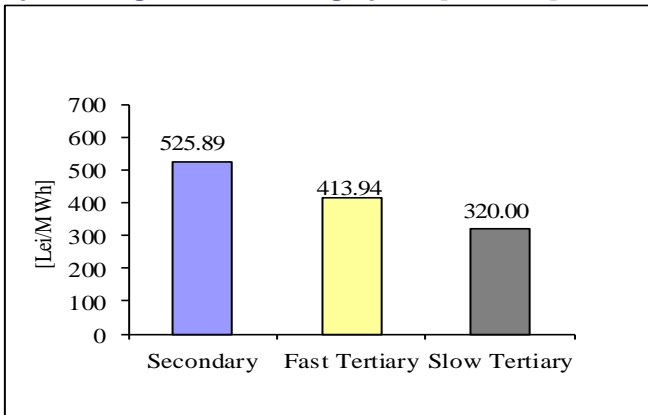
**Downward regulation - average price [lei/MWh]**



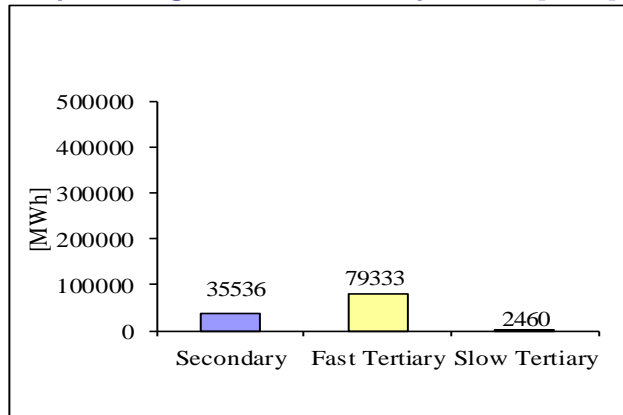
**Downward regulation - selected quantities [MWh]**



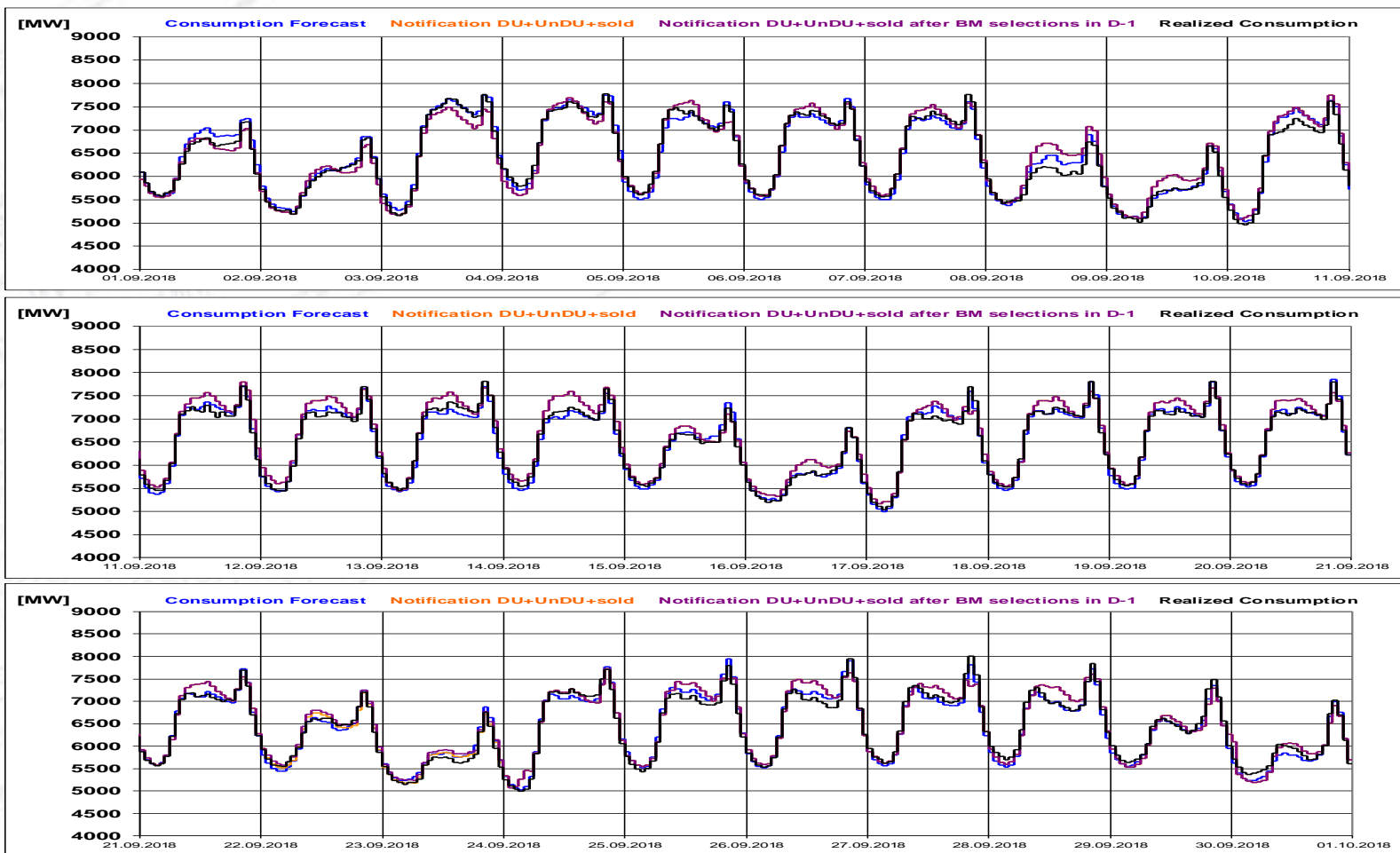
**Upward regulation - average price [lei/MWh]**



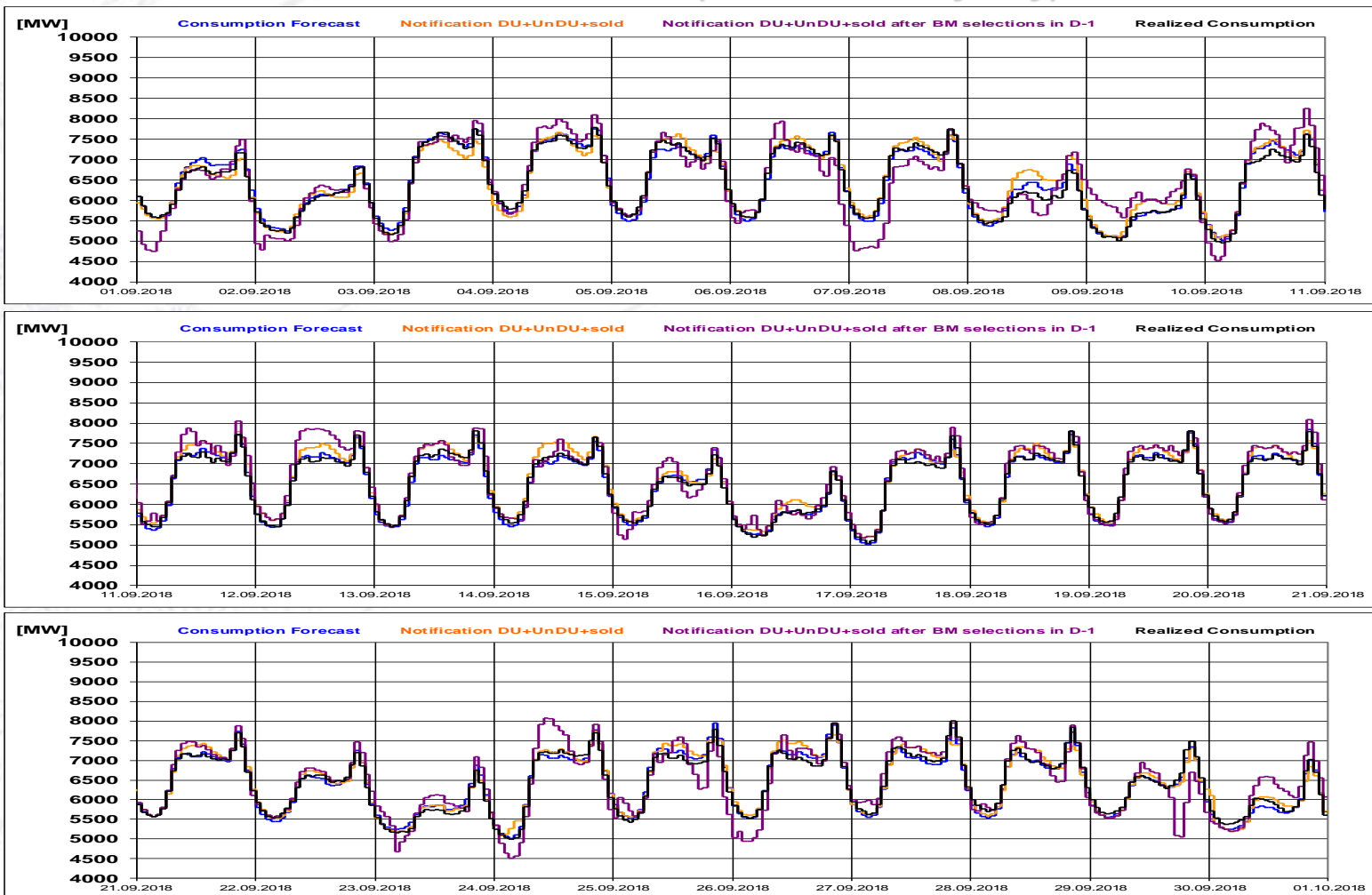
**Upward regulation - selected quantities [MWh]**



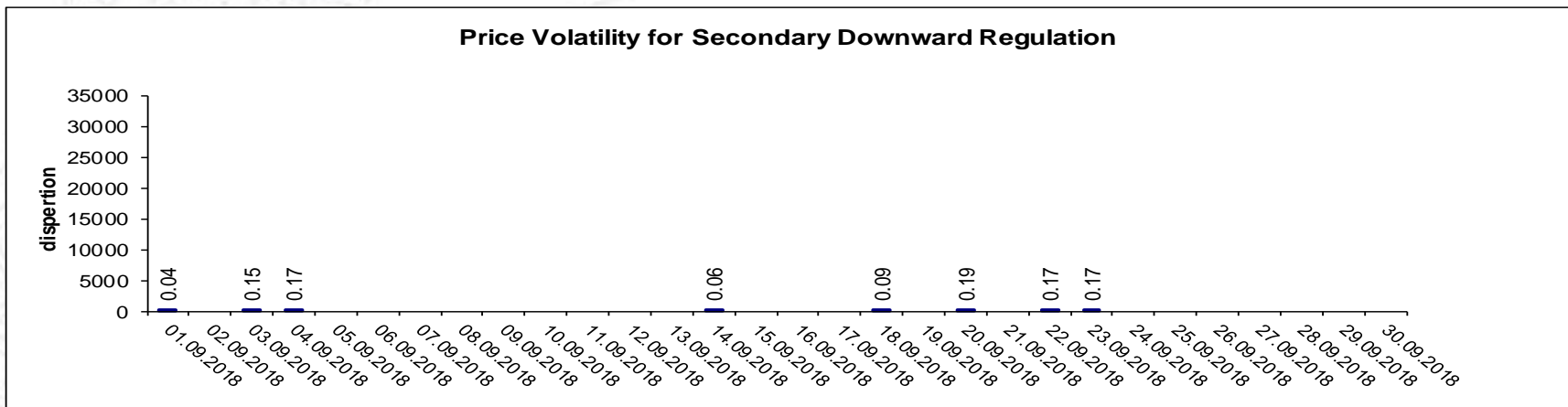
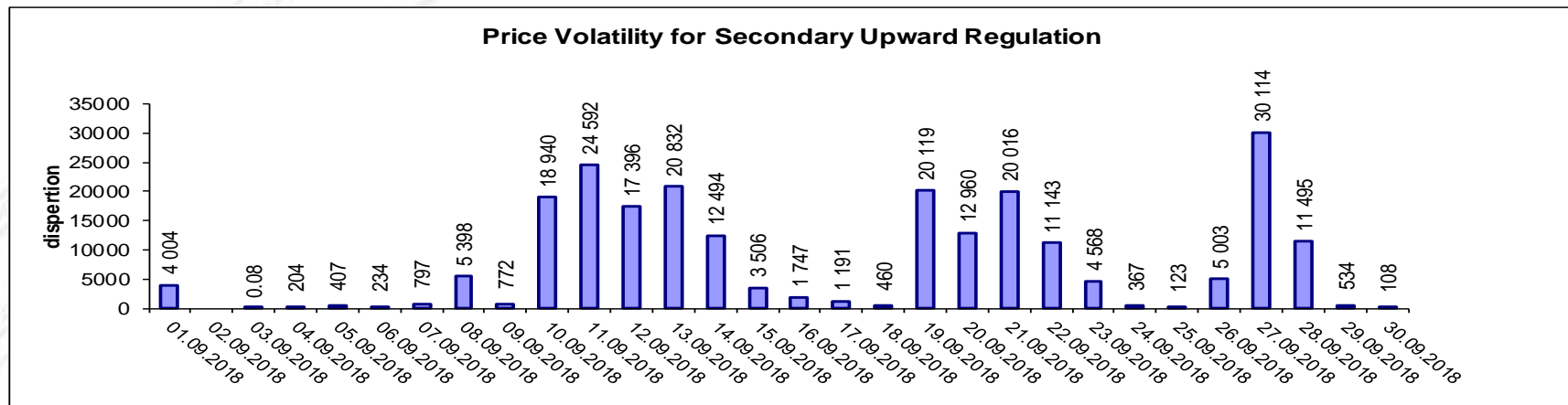
## Realized consumption, forecast, notifications, notifications after BM selections in D-1



## 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:**

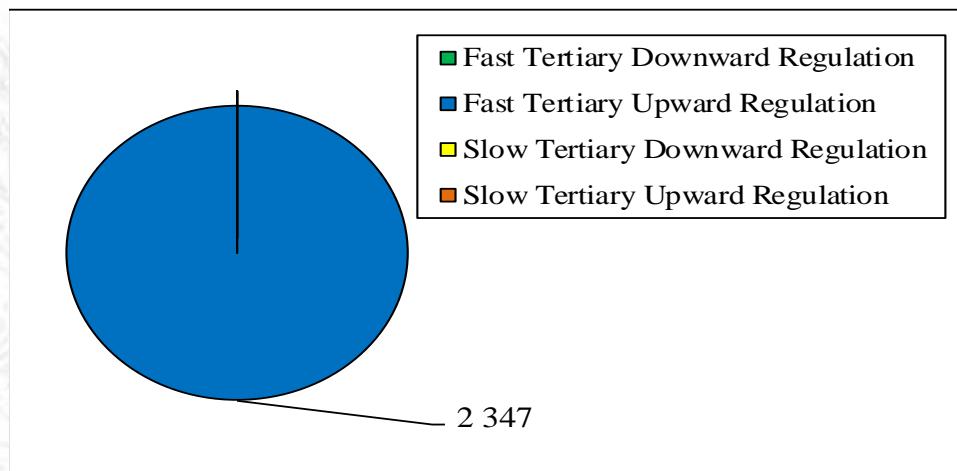
$$\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$

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## Congestion Management

	Quantities [MWh]		Participants
	<i>Selected</i>	<i>Delivered</i>	<i>Number</i>
Fast Tertiary Downward Regulation	-	-	-
Fast Tertiary Upward Regulation	2347.00	1895.49	1
Slow Tertiary Downward Regulation	-	-	-
Slow Tertiary Upward Regulation	-	-	-
	2347.00	1895.49	

### 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.

**Email: [Monitorizare.Piata@transelectrica.ro](mailto:Monitorizare.Piata@transelectrica.ro)**

**Fax: 021 3035630**