



Transelectrica®
Societate Administrată în Sistem Dualist

MARKET MONITORING REPORT

Balancing Market

April 2017



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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

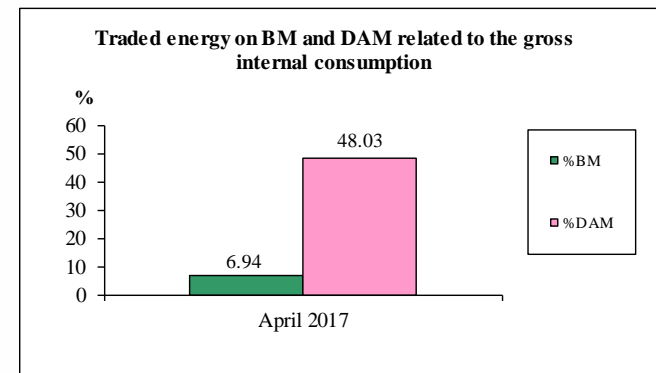
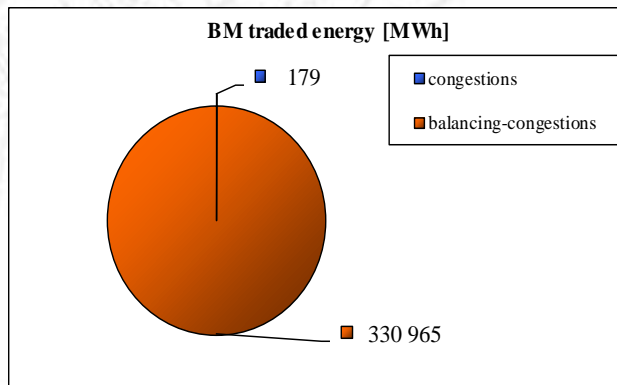


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According to the Commercial Code, Transelectrica, the Romanian Transmission System Operator, operates and monitors the activity of 3 types of markets: Balancing Market, Ancillary Services Market and Market for Allocation of Cross-Border Capacities.

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 average monthly value of generated power was 7 131 MW and the actual internal gross consumption was 6 626 MW.
- The NDC consumption forecast was close to the actual consumption. the standard deviation being 1,82 %. 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 5,19 %. The greatest daily deviation. regarding the notifications. was registered in 17.04 (11,53 %).
- The energy used in April 2017 for balancing the power system and congestion management was 331 143 MWh (with an average power of 460 MW, which means **6,94** % from the internal gross consumption).
 - the energy used for congestion management was 179 MWh (with an average power of 0.25 MW, which means 0,004 % from the internal gross consumption).
- The energy traded in April 2017 on Day Ahead Market was 2 291 302 MWh (with an average power of 3 182 MW, which means **48,03** % from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was 59 697 647 lei (with an average weighted price of 180 lei/MWh).
 - the cost of the energy paid by C.N.T.E.E. Transelectrica S.A. for congestion management was 1 614 lei (with an average weighted price of 9,03 lei/MWh), which means 0,003 % from the total cost.





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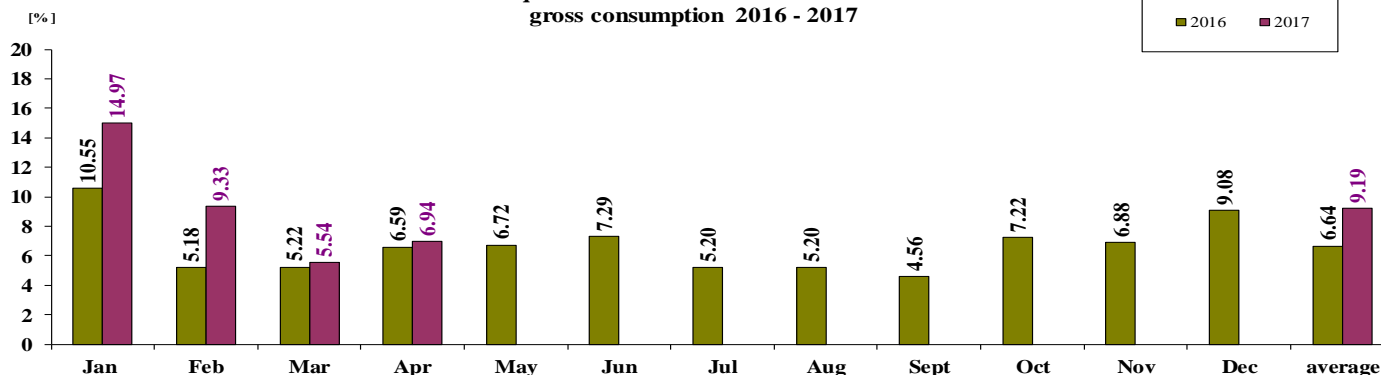
Balancing Market

The Balance Generation / Consumption

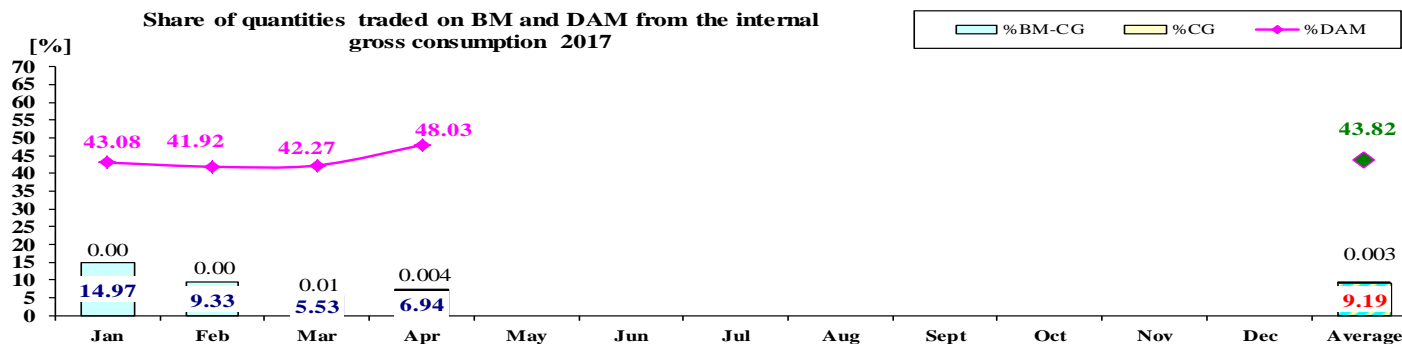
• Monthly percentage values resulted are calculated as ratio between traded volumes on BM and gross internal consumption.

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).

Share of quantities traded on BM from the internal gross consumption 2016 - 2017



Share of quantities traded on BM and DAM from the internal gross consumption 2017



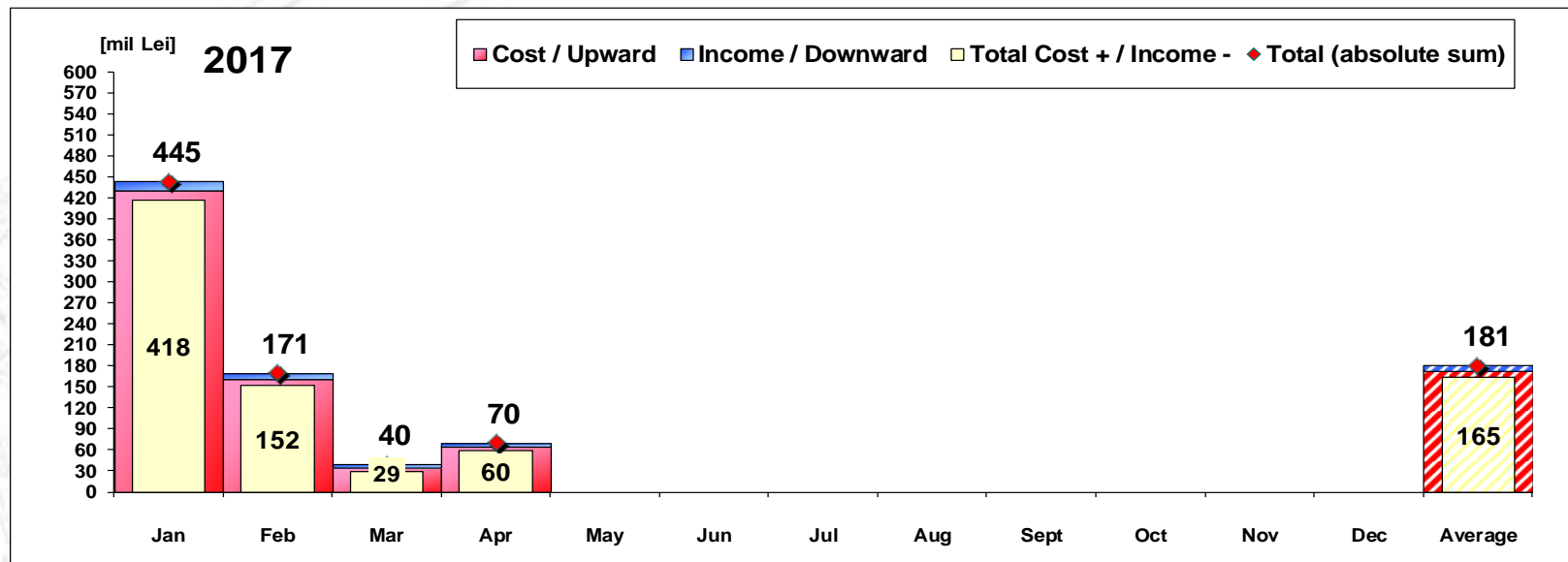
	2017												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
%BM	14.97	9.33	5.54	6.94									9.19
%DAM	43.08	41.92	42.27	48.03									43.82
%CG	0.00	0.00	0.01	0.004									0.003
%BM-CG	14.97	9.33	5.53	6.94									9.19



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Balancing Energy Market Transactions



[Lei]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average	Total
Cost / Upward	431 393 249	161 133 423	34 549 755	65 001 668									173 019 524	692 078 095
Income / Downward	13 186 568	9 389 350	5 081 592	5 304 021									8 240 383	32 961 531
CE Cost	0	0	39 746	1 614									10 340	41 360
Total Cost + / Income -	418 206 681	151 744 073	29 468 163	59 697 647									164 779 141	659 116 564
Total (absolute sum)	444 579 817	170 522 773	39 631 347	70 305 689									181 259 906	725 039 626

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.

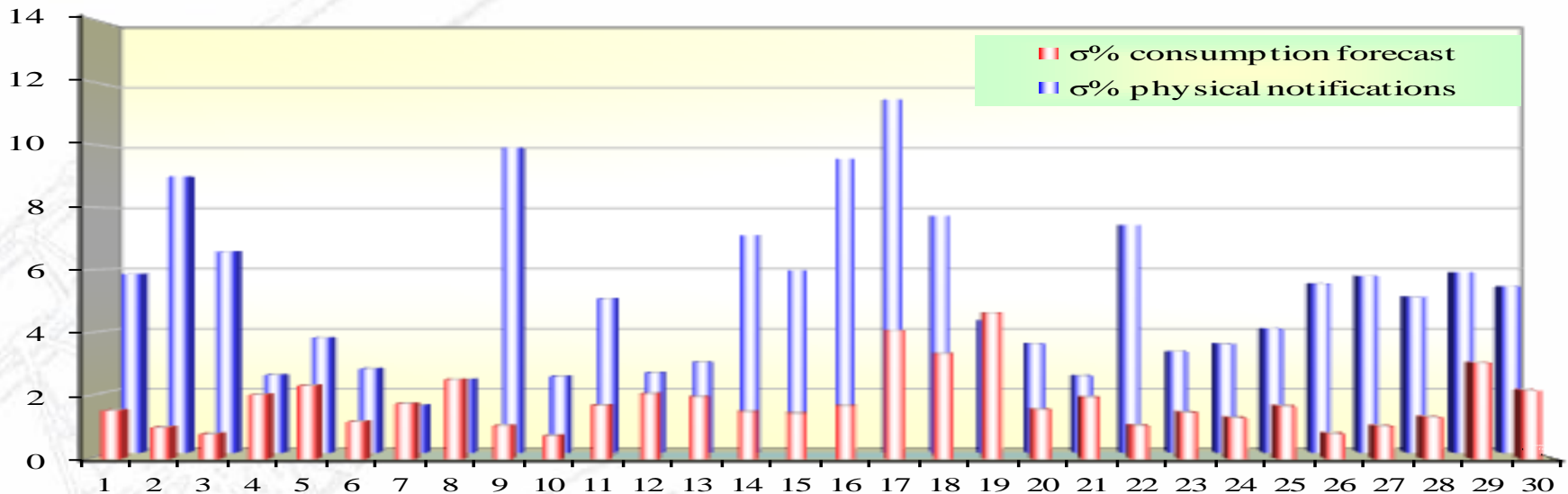


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Standard deviation of physical notifications and consumption forecast against the actual consumption in April 2017



April 2017

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	1.54	1.00	0.79	2.04	2.33	1.18	1.76	2.52	1.05	0.73	1.69	2.06	1.97	1.50	1.44	1.68	4.07	3.34	4.63	1.56	1.96	1.06	1.47	1.30	1.67	0.80	1.05	1.33	3.05	2.18
σ% physical notifications	5.84	9.02	6.58	2.54	3.75	2.74	1.54	2.39	9.96	2.49	5.04	2.61	2.94	7.10	5.95	9.59	11.53	7.74	4.32	3.56	2.51	7.44	3.30	3.55	4.05	5.52	5.77	5.09	5.89	5.43

σ average% consumption forecast = 1.82

σ average % physical notifications = 5.19

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

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

Public

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, 123 market participants, holding 238 commercially operating dispatchable units.

April 2017

Downward regulation

	Prices [lei/MWh]		
	Monthly	Maximum	Minimum
average			
Secondary	16.89	100.00	0.10
Fast Tertiary	59.33	249.00	0.10
Slow Tertiary	55.53	153.48	2.00

	Quantities [MWh]		
	Total	Actually	Deviation
selected	delivered	%	
45657.38	45657.38	0.00%	
54156.29	50368.90	6.99%	
26253.87	26018.97	0.89%	
126067.55	122045.26	3.19%	

Participants						
	C1	C3	C1	C3	HHI	HHI
Number	(selected)	(actually delivered)	(selected)	(actually delivered)	(selected)	(actually delivered)
6	69.76%	97.28%	69.76%	97.28%	5491	5491
17	74.08%	99.48%	74.55%	99.51%	5850	5898
8	60.16%	96.88%	59.98%	96.85%	4405	4389

Upward regulation

	Monthly	Maximum	Minimum
average			
Secondary	324.93	450.00	250.00
Fast Tertiary	311.40	450.00	0.10
Slow Tertiary	233.86	299.00	50.00

	Total	Actually	Deviation
selected	delivered	%	
40342.37	40342.37	0.00%	
160296.60	153850.11	4.02%	
15273.67	14905.72	2.41%	

	C1	C3	C1	C3	HHI	HHI
Number	(selected)	(actually delivered)	(selected)	(actually delivered)	(selected)	(actually delivered)
6	69.55%	97.59%	69.55%	97.59%	5509	5509
14	67.18%	88.29%	69.07%	88.70%	4781	4995
8	46.07%	92.63%	46.48%	92.59%	3549	3543



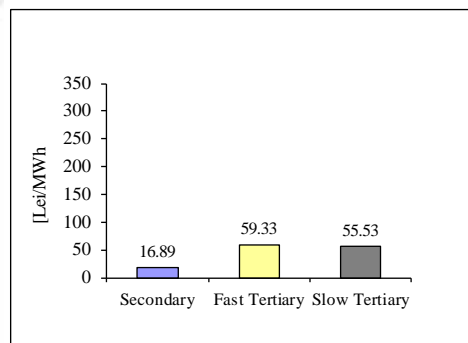
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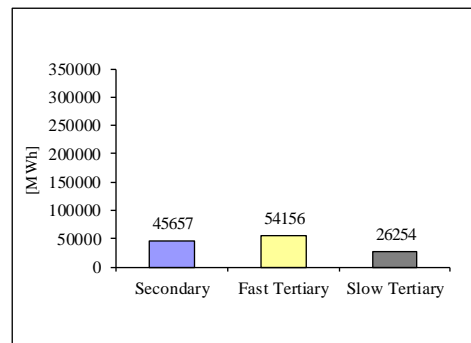
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Balancing energy – Selected prices and quantities in April 2017

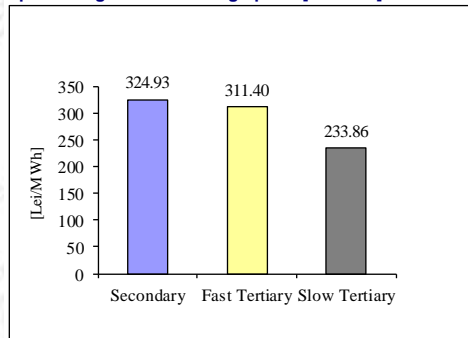
Downward regulation - average price [lei/MWh]



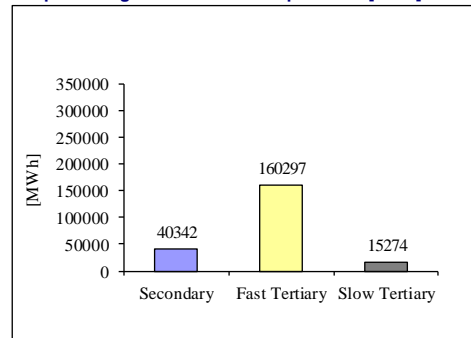
Downward regulation - selected quantities [MWh]



Upward regulation - average price [lei/MWh]



Upward regulation - selected quantities [MWh]



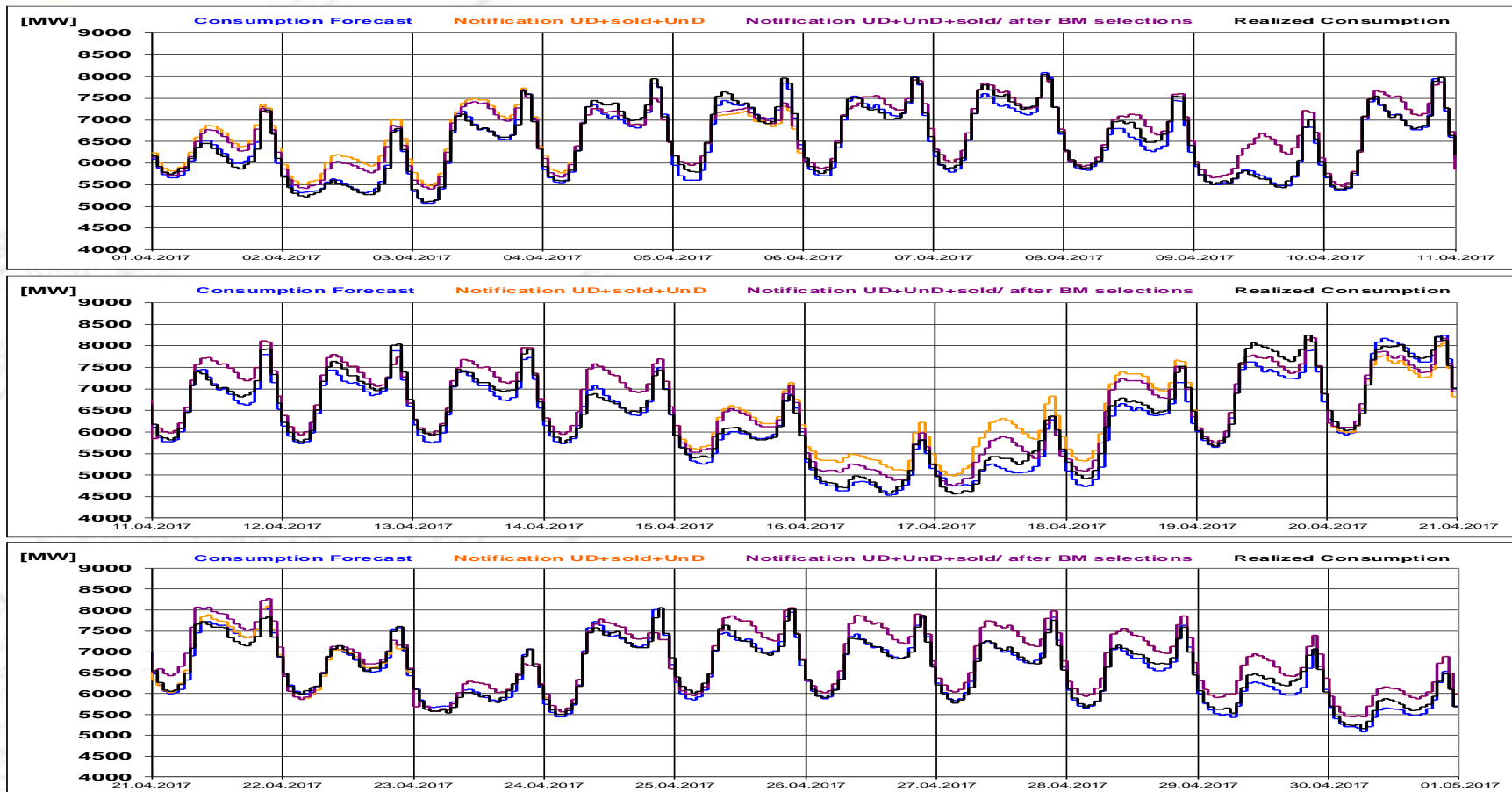


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Realized consumption. forecast. notifications.
notifications after BM selections in D-1



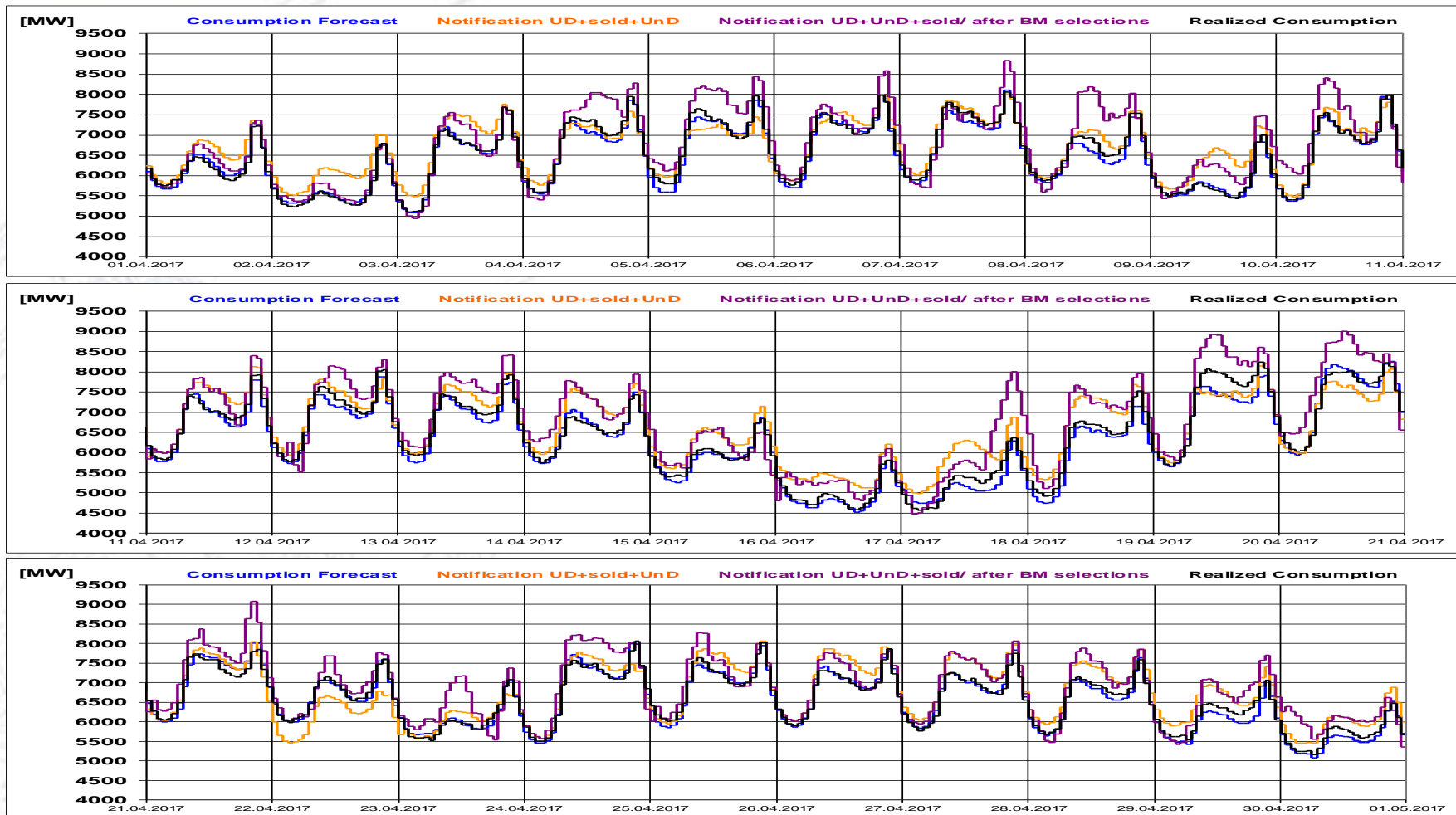


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Balancing Market

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



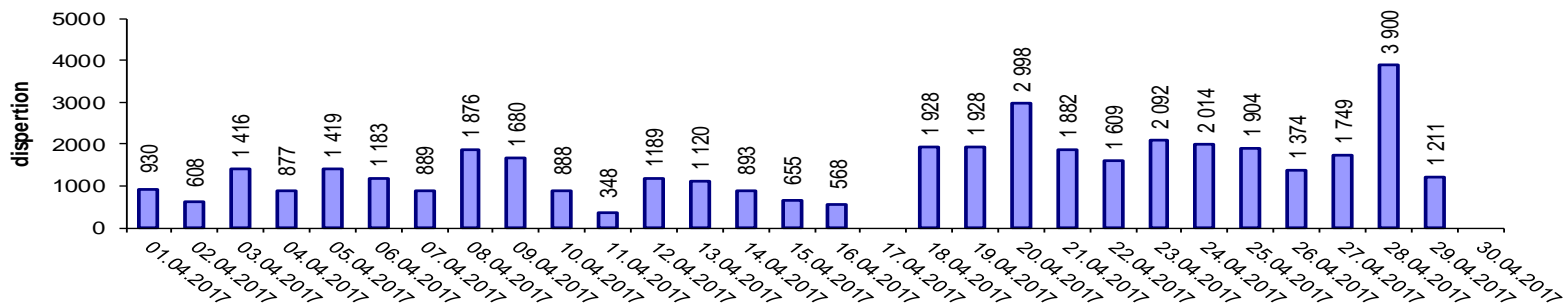


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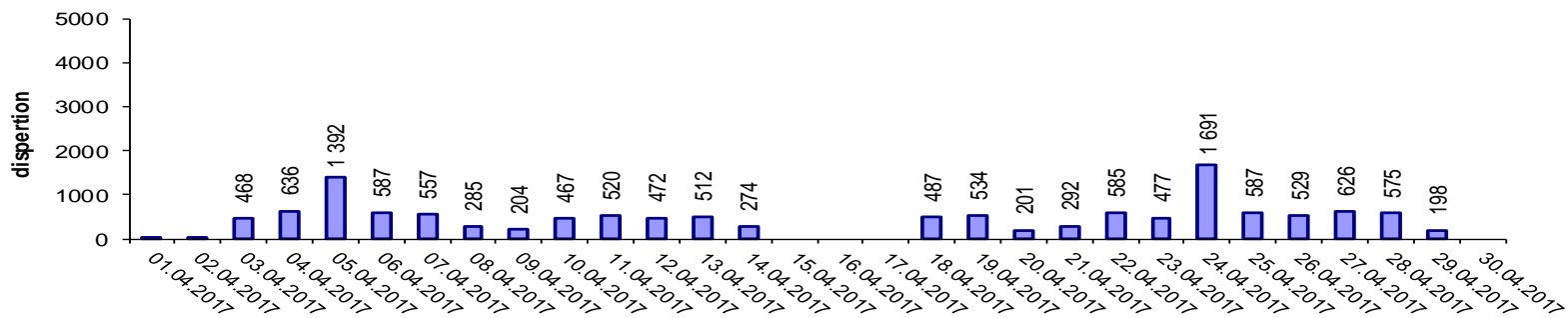
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Indicators – Price Volatility for Secondary Regulation

Price Volatility for Secondary Upward Regulation



Price Volatility for Secondary Downward Regulation

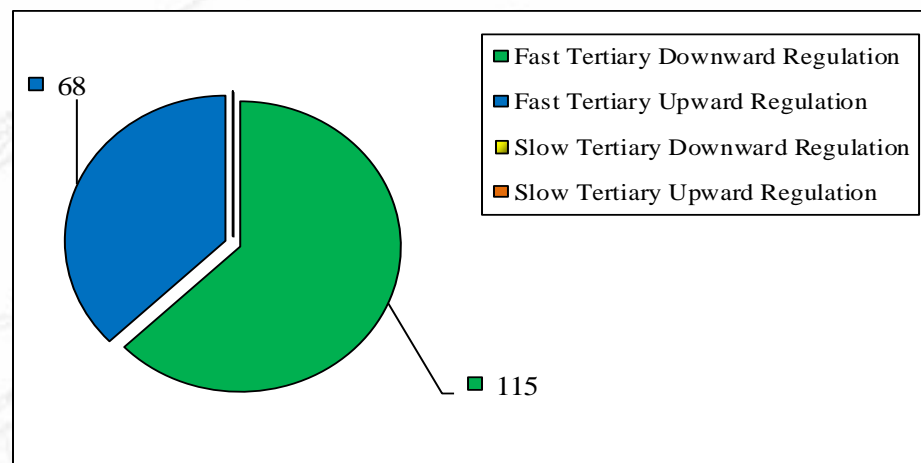


Volatility = price dispersion on studied interval:

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

Public

	Quantities [MWh]			Participant Number
	Selected	Delivered	Deviation[%]	
Fast Tertiary Downward Regulation	115.00	113.70	1.13%	9
Fast Tertiary Upward Regulation	68.00	64.99	4.42%	1
Slow Tertiary Downward Regulation	-	-	-	-
Slow Tertiary Upward Regulation	-	-	-	-
	183.00	178.70	2.35%	10



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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