



Transelectrica®
Societate Administrată în Sistem Dualist

MARKET MONITORING REPORT

Balancing Market

September 2021

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).



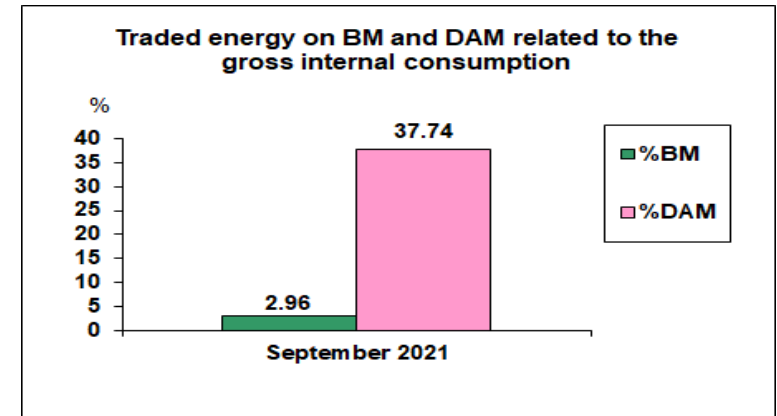
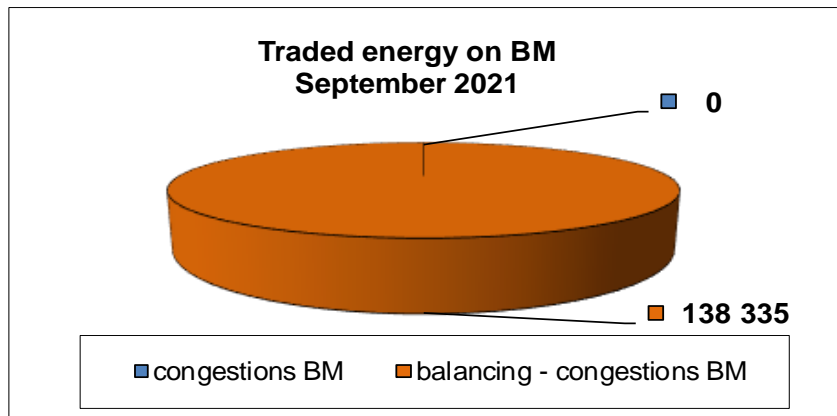
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Balancing Market

The Balance Generation/Consumption

- The average monthly value of generated power was 5 962 MW and the actual internal gross consumption was 6 489 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **1.48%**. 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 **3.69%**. The greatest daily deviation regarding the notifications was registered on 8th of September 2021 (**6.36%**).
- The energy used in September 2021 for balancing the power system and congestion management was 138 335 MWh (with an average power of 192MW, which means **2.96%** from the internal gross consumption).
- There were no transactions for congestion management.
- There were no transactions outside BM (with financial compensation).
- The energy used in September 2021 on Day Ahead Market was 1 763 266 MWh (with an average power of 2 449 MW, which means **37.74%** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was 55 923 148 lei (with an average weighted price of 404.26 lei/MWh).





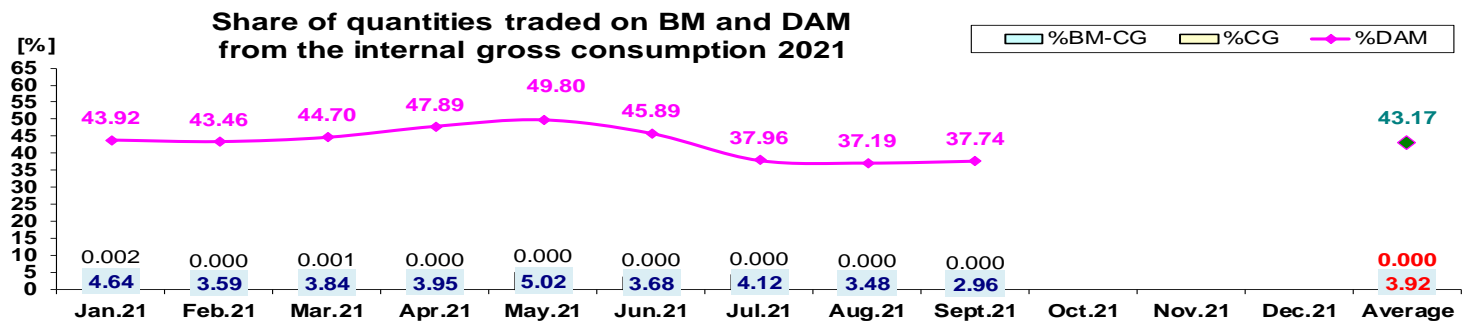
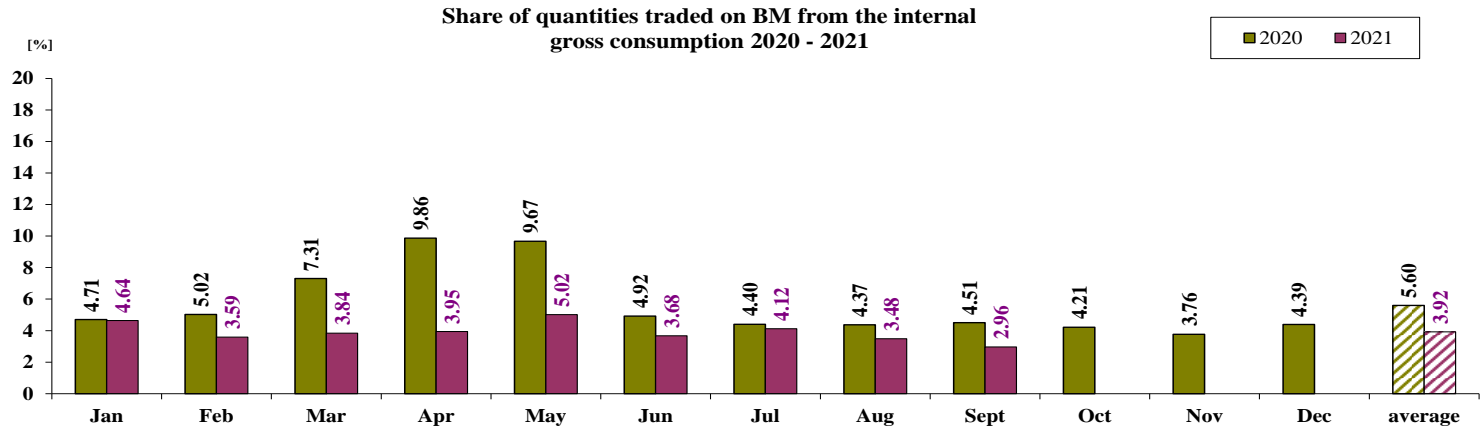
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Balancing Market

The Balance Generation / Consumption

- Monthly percentage values resulted are calculated as ratio between traded volumes on BM / outside BM with financial compensation 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).



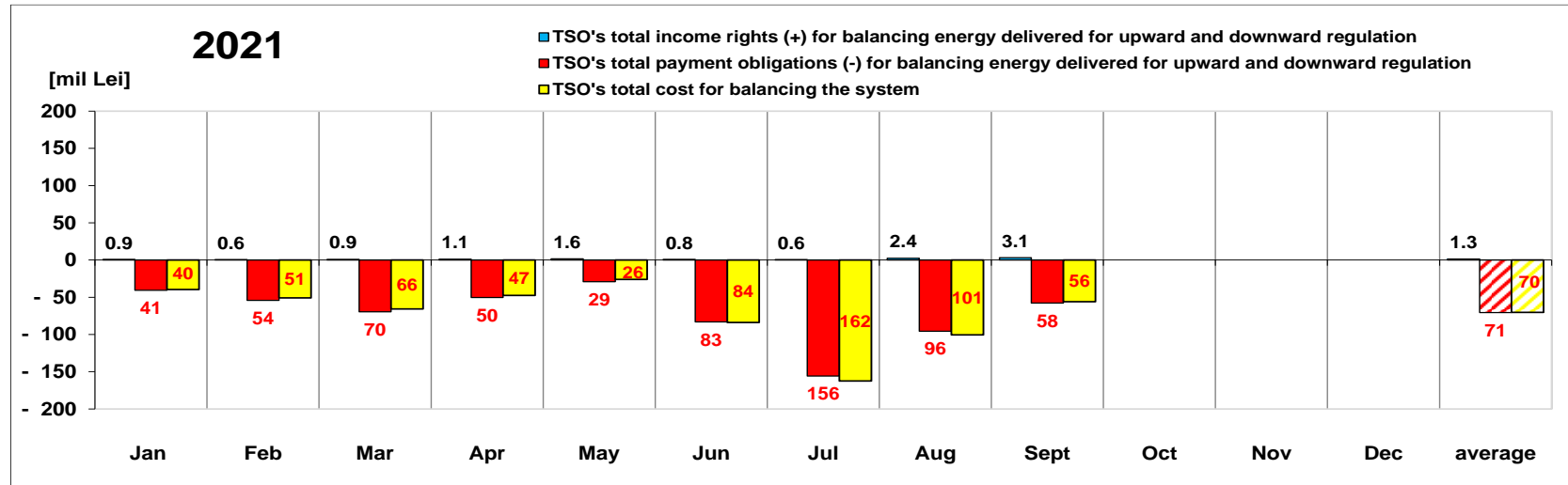
	2021												
	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sept.21	Oct.21	Nov.21	Dec.21	Average
%BM	4.64	3.59	3.84	3.95	5.02	3.68	4.12	3.48	2.96				3.92
%DAM	43.92	43.46	44.70	47.89	49.80	45.89	37.96	37.19	37.74				43.17
%CG	0.002	0.000	0.001	0.000	0.000	0.000	0.000	0.0003	0.0000				0.0003
%BM-CG	4.636	3.592	3.836	3.947	5.019	3.675	4.122	3.485	2.961				3.919
% outside BM	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.002



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Balancing Energy Market Transactions



[Lei]		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	average	Sum
TSO's income rights / payment obligations for balancing energy delivered for downward regulation	incomes (+) prices ≥ 0	878 222	633 581	912 692	1 127 724	1 558 592	805 841	648 010	2 432 702	3 133 558				1 347 880	12 130 923
	payments (-) prices < 0	- 367 742	- 8 158	- 280 354	- 849 859	0	- 295 584	- 340 681	- 65 874	- 7 763				- 246 224	- 2 216 015
TSO's payment obligations / income rights for balancing energy delivered for upward regulation	payments (-) prices ≥ 0	-40 134 420	-54 045 144	-69 270 145	-49 547 577	-29 085 259	-82 840 786	-155 567 405	-95 476 521	-57 690 962				-70 406 469	- 633 658 220
	incomes (+) prices < 0	0	0	0	0	0	0	0	0	0				0	0
TSO's total income rights (+) for balancing		878 222	633 581	912 692	1 127 724	1 558 592	805 841	648 010	2 432 702	3 133 558				1 347 880	12 130 923
TSO's total payment obligations (-) for		-40 502 162	-54 053 301	-69 550 500	-50 397 436	-29 085 259	-83 136 370	-155 908 086	-95 542 395	-57 698 725				-70 652 693	- 635 874 234
TSO's total cost for balancing the system		-39 649 686	-50 861 284	-65 692 590	-47 412 381	-26 133 778	-83 889 171	-162 448 175	-100 539 890	-55 923 174				-70 283 348	- 632 550 128
Value of transactions outside BM (with financial compensation)		- 25 803	0	0	0	0	0	0	0	0				- 2 867	- 25 803
Congestion Cost on BM		- 56	0	- 121	0	0	0	0	- 178	0				- 39	- 355
Congestion Cost outside BM		0	0	0	0	0	0	0	0	0				0	0

* The annual average value was obtained as arithmetic average of the monthly values.

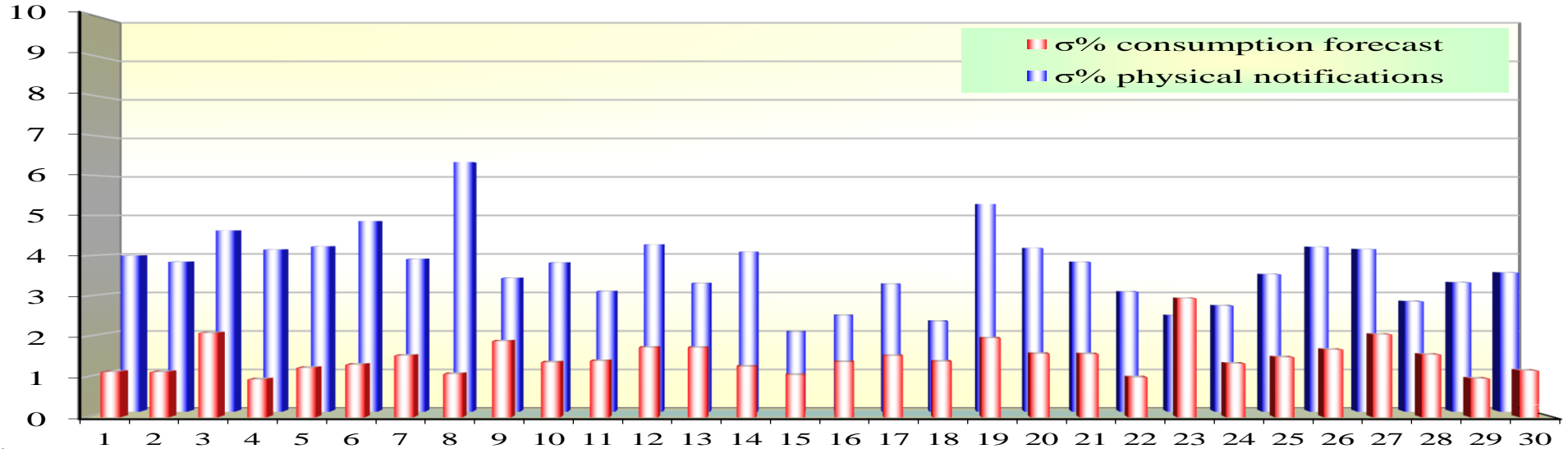
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Standard deviation of physical notifications and consumption forecast against the actual consumption in September 2021



Sept 2021

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	1.12	1.12	2.09	0.94	1.22	1.30	1.53	1.07	1.89	1.36	1.39	1.73	1.72	1.26	1.05	1.37	1.52	1.38	1.96	1.57	1.56	0.99	2.94	1.33	1.48	1.67	2.05	1.55	0.96	1.15
σ% physical notifications	3.97	3.81	4.62	4.13	4.21	4.86	3.89	6.36	3.40	3.79	3.06	4.26	3.27	4.07	2.03	2.45	3.25	2.30	5.29	4.16	3.81	3.05	2.45	2.70	3.50	4.20	4.14	2.81	3.29	3.54

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

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

R = Realized Consumption;

N = Physical Notifications;

P = Consumption Forecast.

σ_{average % consumption forecast} = 1.48

σ_{average % physical notifications} = 3.69

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Balancing Market

Balancing energy – Selected prices and quantities

At the beginning of the month on the Balancing Market operated 72 BRPs, 98 market participants, holding 190 commercially operating dispatchable units.

September 2021 Downward Regulation

Downward Regulation	Prices			Quantities			Participants						
	Weighted Average	Maximum	Minimum	Selected	Actually Delivered	Deviation	C1		C3		HHI	HHI	
	[lei/MWh]	[lei/MWh]	[lei/MWh]	[MWh]	[MWh]	[%]	Number	(selected)	(actually delivered)	(selected)	(actually delivered)		
Secondary	-0.06	0.10	-10.00	50739.40	50739.40	0.00%	3	59.75%	100%	59.75%	100%	4418	4418
Fast Tertiary	80.57	120.00	0.10	41747.37	38812.30	7.03%	5	48.04%	96.94%	48.64%	97.13%	4151	4163
Slow Tertiary	-	-	-	0.00	-	-	0	-	-	-	-	-	-
				92486.77	89551.70	3.17%							

Upward Regulation

	Weighted Average	Maximum	Minimum	Selected	Actually Delivered	Deviation							
	[lei/MWh]	[lei/MWh]	[lei/MWh]	[MWh]	[MWh]	[%]	C1	C3	C1	C3	HHI	HHI (actually delivered)	
							Number	(selected)	(actually delivered)		(selected)	(actually delivered)	
Secondary	1163.42	1652.00	700.00	28793.02	28793.02	0.00%	3	60.04%	100%	60.04%	100%	4436	4436
Fast Tertiary	1210.51	1650.00	560.00	20759.53	19990.54	3.70%	8	59.86%	85.71%	60.75%	85.64%	3985	4072
Slow Tertiary	-	-	-	0.00	-	-	0	-	-	-	-	-	-
				49552.55	48783.55	1.55%							



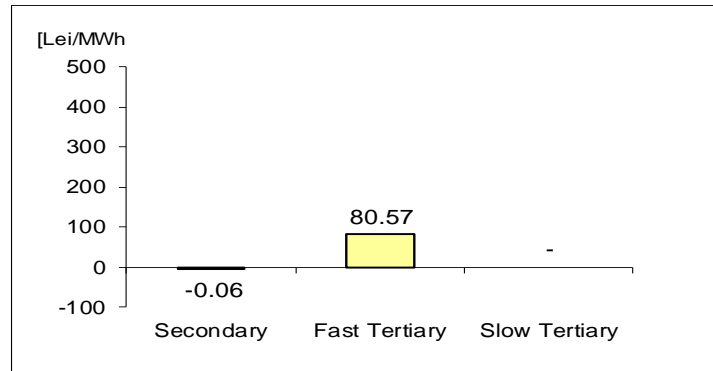
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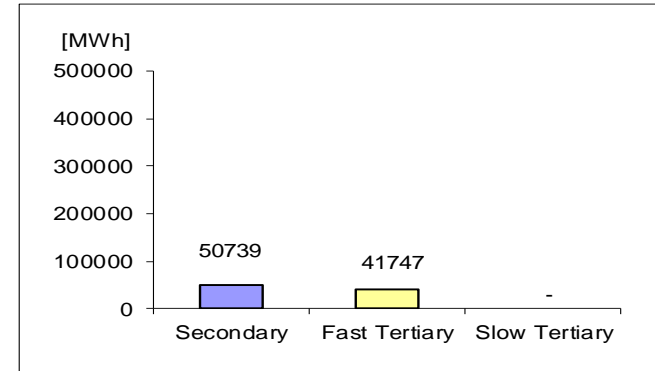
Balancing energy – Selected prices and quantities in September 2021

September 2021

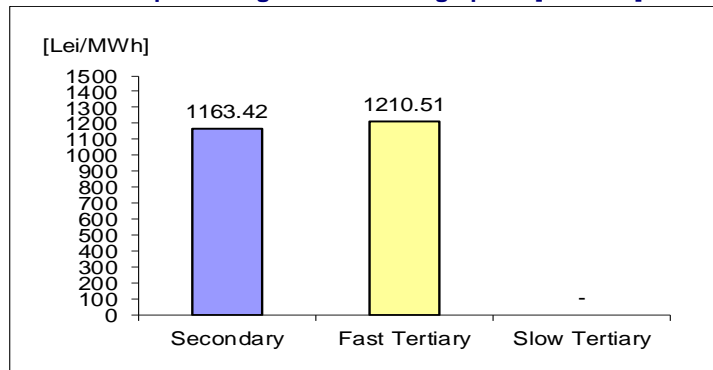
Downward regulation - average price [lei/MWh]



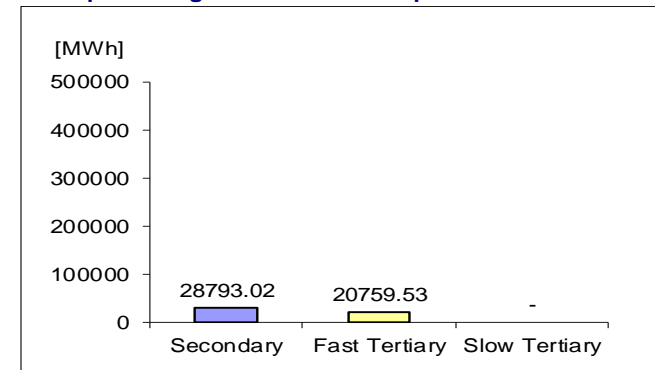
Downward regulation - selected quantities



Upward regulation - average price [lei/MWh]



Upward regulation - selected quantities



$$\text{Price}_{\text{average weighted, regulation type, direction}} = \frac{\sum (Q_{i,j} * P_{i,j})}{\sum Q_{i,j}}$$

where $Q_{i,j}$, $P_{i,j}$ represents the quantity, respectively the price of the energy selected, corresponding to the selected transaction j in the dispatching interval i .

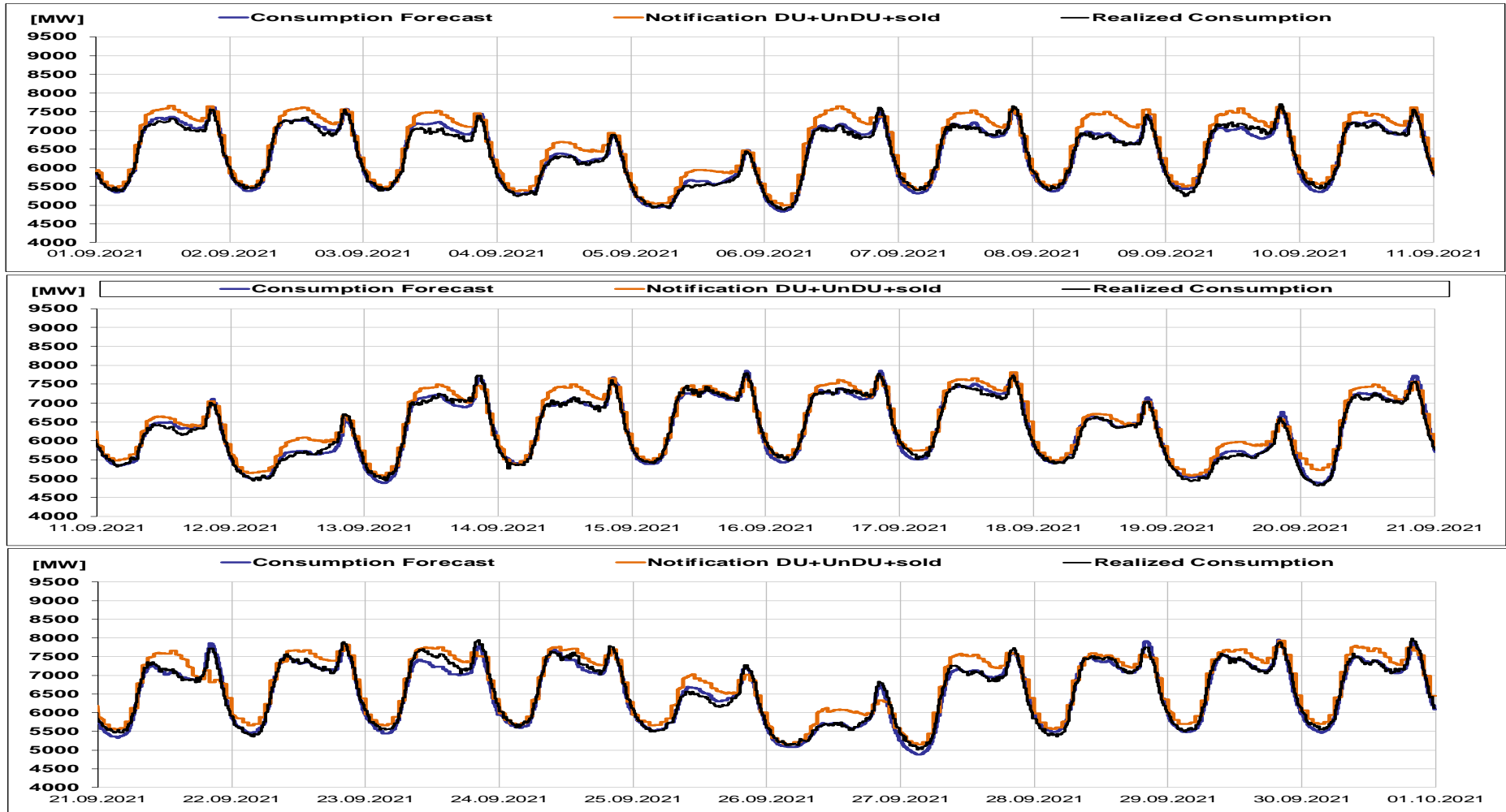


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Realized consumption, forecast, notifications in D-1



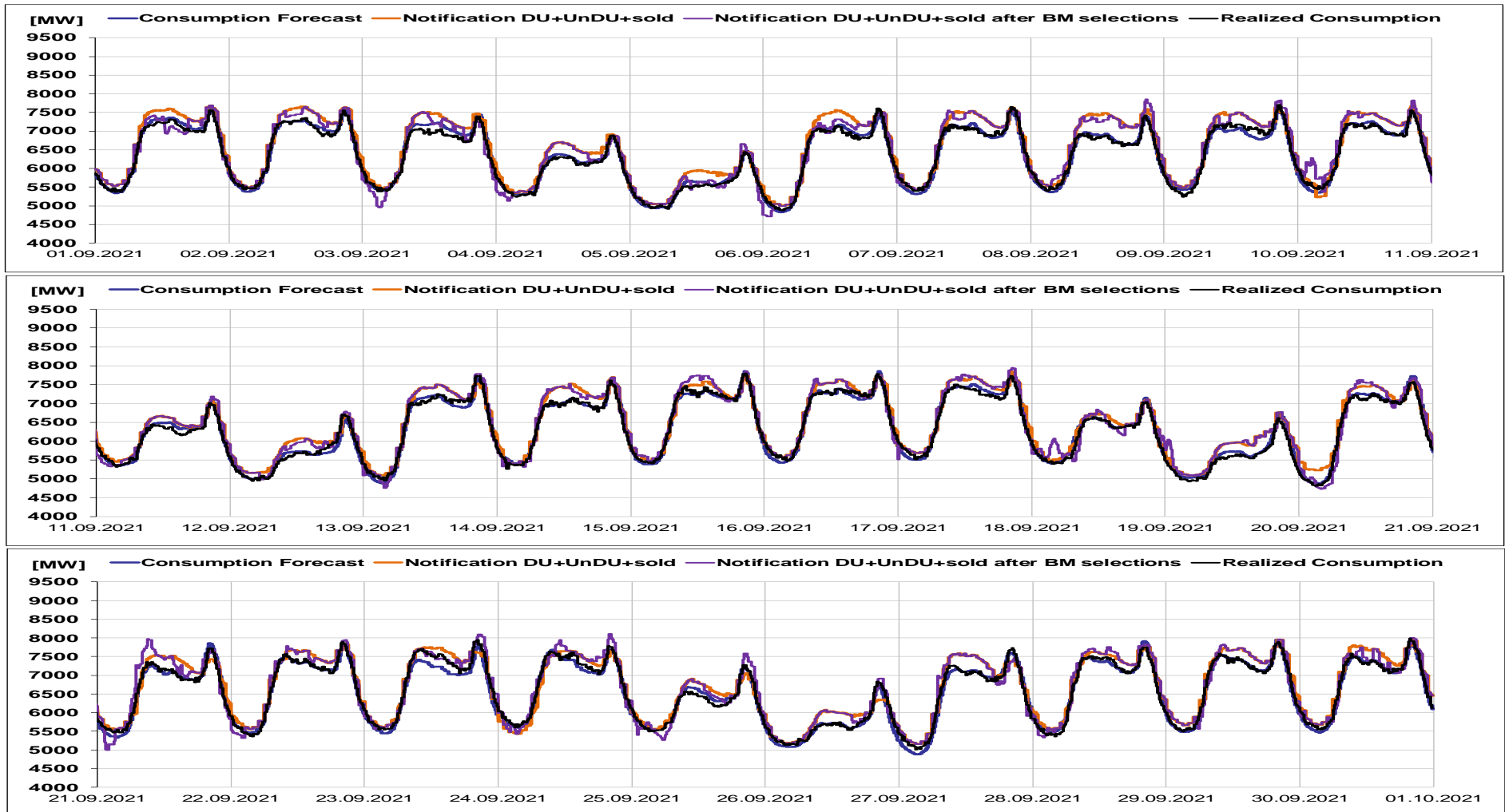


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Balancing Market

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





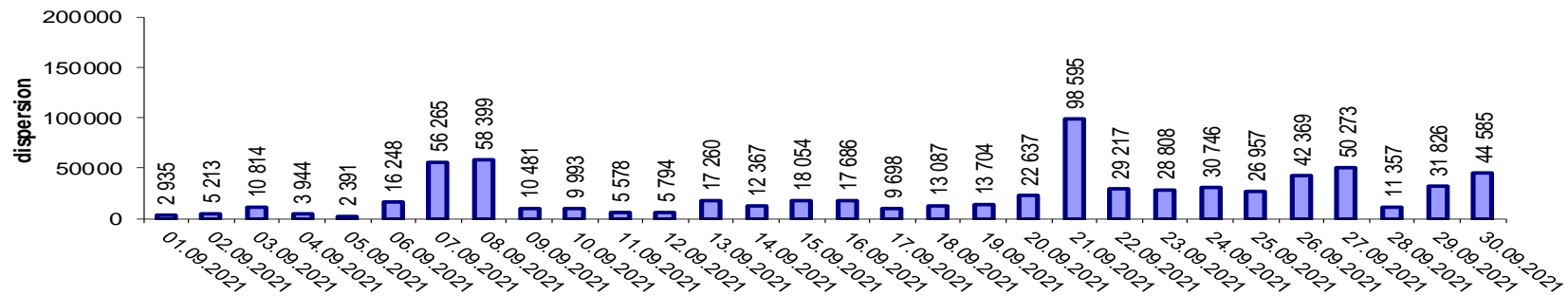
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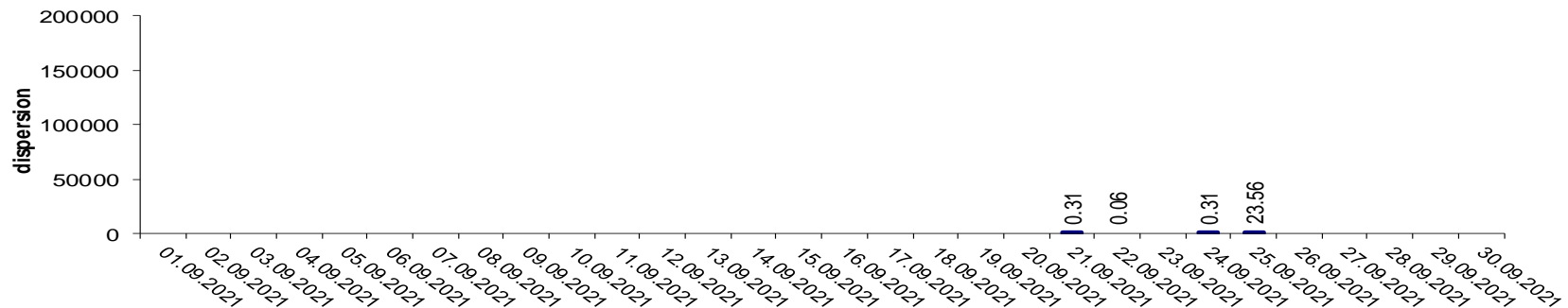
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Indicators – Price Volatility for Secondary Regulation

Price Volatility for Secondary Upward Regulation



Price Volatility for Secondary Downward Regulation



Volatility = price dispersion on studied interval:

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



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