



Transelectrica®
Societate Administrată în Sistem Dualist

MARKET MONITORING REPORT

Balancing Market

September 2022

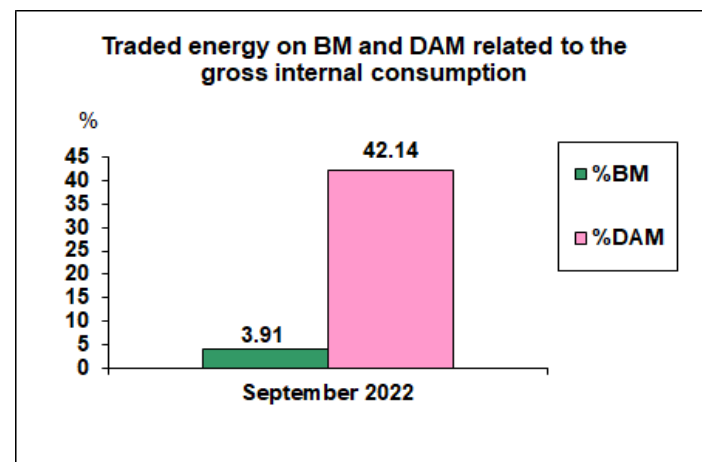
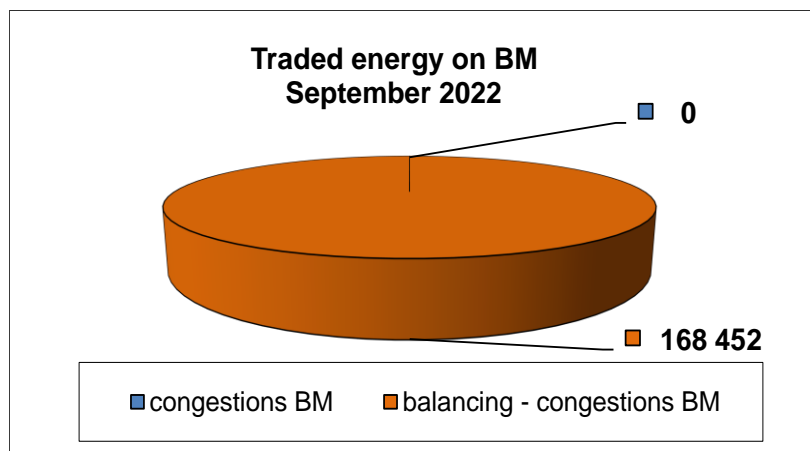
ANRE - Romanian Energy Regulatory Authority
HHI - Herfindahl-Hirschman Index
BRP - Balance Responsible Party
BM - Balancing Market
BMP – Balancing Market Participant
DAM - Day Ahead Market
TSO - Transmission System Operator
DU – Dispatchable Unit
PN – Physical Notification
NDC - National Dispatching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

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 6 055 MW and the actual internal gross consumption was 5 980 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **2.07%**. 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%**. The greatest daily deviation regarding the notifications was registered on the 4th of September (**7.68%**).
- The energy used in September 2022 for balancing the power system and congestion management was 168 452 MWh (with an average power of 234 MW, which means **3.91%** from the internal gross consumption).
- There were no transactions on congestion management nor outside BM (with financial compensation).
- The energy used in September 2022 on Day Ahead Market was de 1 814 462 MWh (with an average power of 2 520 MW, which means **42.14%** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was 115 809 867 lei (with an average weighted price of 687.49 lei/MWh).





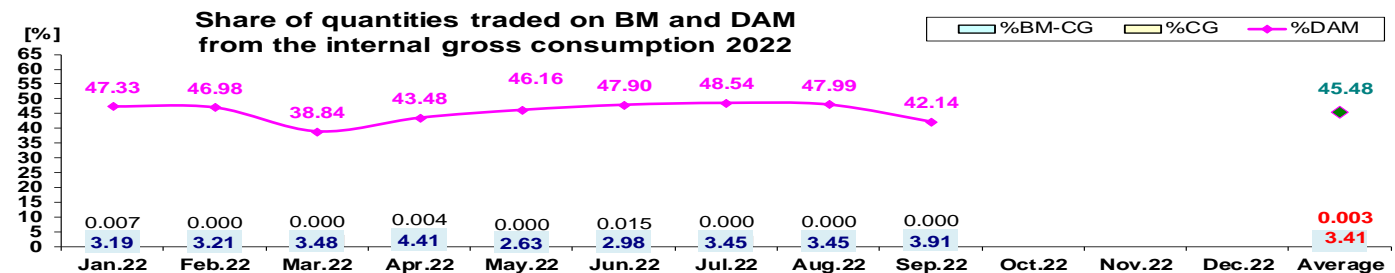
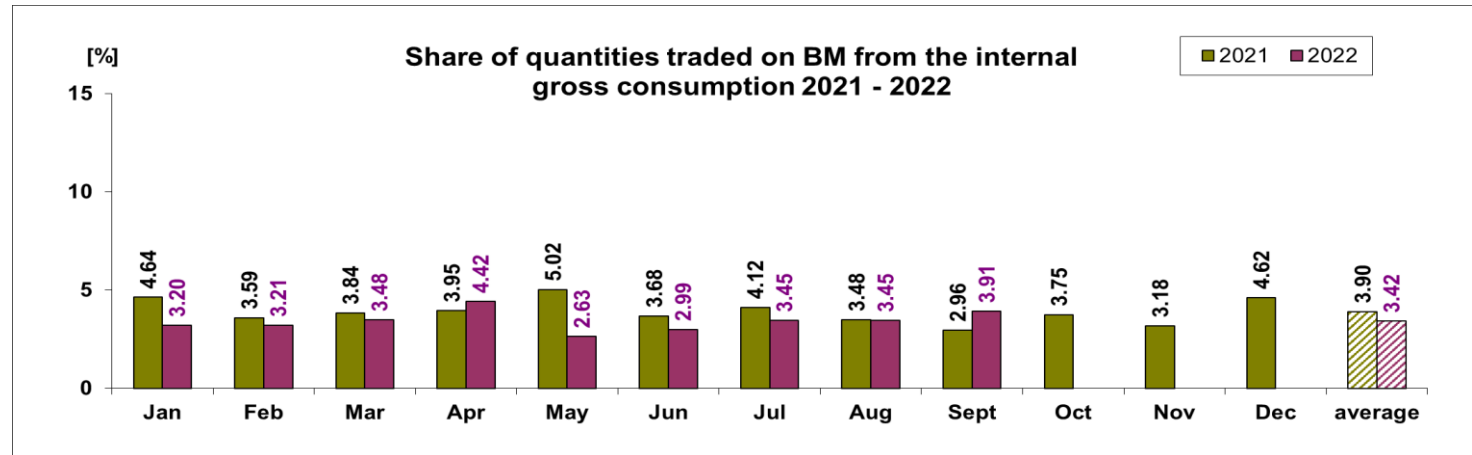
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Balancing Market

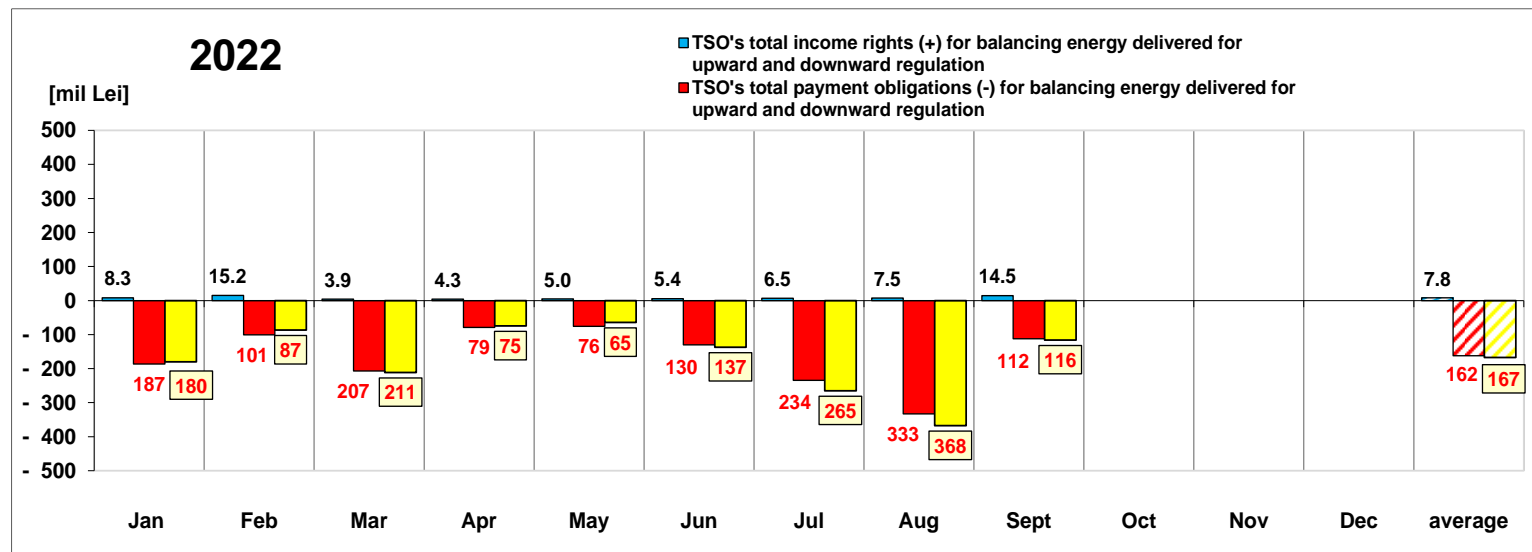
The Balance Generation / Consumption

• 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).



	2022												
	Jan.22	Feb.22	Mar.22	Apr.22	May.22	Jun.22	Jul.22	Aug.22	Sep.22	Oct.22	Nov.22	Dec.22	Average
%BM	3.20	3.21	3.48	4.42	2.63	2.99	3.45	3.45	3.91				3.42
%DAM	47.33	46.98	38.84	43.48	46.16	47.90	48.54	47.99	42.14				45.48
%CG	0.007	0.000	0.000	0.004	0.000	0.015	0.000	0.000	0.000				0.0029
%BM-CG	3.191	3.206	3.479	4.412	2.631	2.979	3.452	3.448	3.912				3.412
% outside BM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00

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	8 344 244	15 164 350	3 932 020	4 322 327	4 990 345	5 393 527	6 457 040	7 512 705	14 481 440				7 844 222	70 597 997
	payments (-) prices < 0	- 40 999	- 12 132	- 96 136	- 131 045	- 1 648	- 22 991	- 374	- 15 549	- 3 839				- 36 079	- 324 713
TSO's payment obligations / income rights for balancing energy delivered for upward regulation	payments (-) prices ≥ 0	-186 598 444	-100 703 503	-206 992 197	-78 969 465	-75 510 505	-130 258 379	-234 452 122	-333 300 725	-112 433 467				-162 135 423	-1459 218 808
	incomes (+) prices < 0	0	0	0	0	0	0	0	0	0				0	0
TSO's total income rights (+) for balancing energy delivered for upward and downward regulation		8 344 244	15 164 350	3 932 020	4 322 327	4 990 345	5 393 527	6 457 040	7 512 705	14 481 440				7 844 222	70 597 997
TSO's total payment obligations (-) for balancing energy delivered for upward and downward regulation		-186 639 443	-100 715 635	-207 088 333	-79 100 510	-75 512 153	-130 281 369	-234 452 496	-333 316 275	-112 437 306				-162 171 502	-1459 543 521
TSO's total cost for balancing the system		-180 209 876	-86 965 620	-211 125 690	-74 719 809	-64 511 950	-136 923 991	-265 197 031	-367 812 338	-115 809 867				-167 030 686	-1503 276 172
Value of transactions outside BM (with financial compensation)		0	0	0	0	0	0	0	0	0				0	0
Congestion Cost on BM		- 157 055	0	- 3 224	- 30 924	0	- 29 640	0	0	0				- 24 538	- 220 843
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.

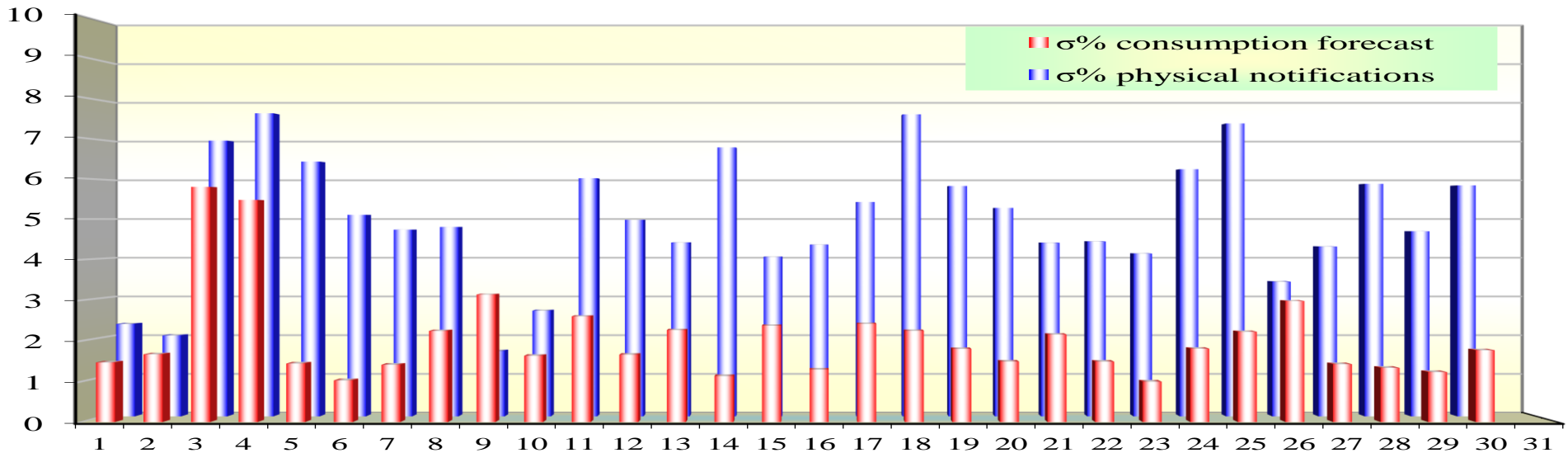


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Balancing Market

Standard deviation of physical notifications and consumption forecast against the actual consumption in September 2022



September 2022

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
$\sigma\%$ consumption forecast	1.47	1.67	5.79	5.47	1.44	1.03	1.41	2.24	3.14	1.63	2.60	1.66	2.27	1.13	2.37	1.29	2.42	2.25	1.80	1.49	2.16	1.49	0.99	1.81	2.22	2.98	1.43	1.34	1.23	1.77
$\sigma\%$ physical notifications	2.34	2.05	6.99	7.68	6.46	5.11	4.73	4.80	1.65	2.68	6.03	4.98	4.40	6.81	4.04	4.35	5.43	7.65	5.84	5.28	4.40	4.43	4.12	6.26	7.42	3.41	4.30	5.89	4.69	5.85

$\sigma_{\text{average\% consumption forecast}} = 2.07$

$\sigma_{\text{average \% physical notifications}} = 5.00$

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

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

R = Realized Consumption;

N = Physical Notifications;

P = Consumption Forecast.

Public

Balancing Market

Balancing energy – Selected prices and quantities

• At the beginning of the month on the Balancing Market operated 73 BRPs, 90 market participants, holding 180 commercially operating dispatchable units. Starting with 10th of September according to NRA Order no. 213/2020, amended and supplemented by NRA Order no. 33/2021 BMP CTPARK PHI (PROBE) (30XROCTPARKPHI-C) was registered having as a production unit during the trial period CTPARK_P. Starting with 24th of September 2022, BRP GENESIS BIOTECH (PROBE) (30XRO-GBTPROBE-D) was withdrawn, following the end of the trial period of the GENESIS2 production unit.

September 2022

Downward Regulation

Downward Regulation	Prices			Quantities			Participants						
	Weighted				Actually								
	Average	Maximum	Minimum	Selected	Delivered	Deviation		C1	C3	C1	C3	HHI	HHI
	[lei/MWh]	[lei/MWh]	[lei/MWh]	[MWh]	[MWh]	[%]	Number	(selected)	(actually delivered)	(selected)	(selected)	(actually delivered)	
Secondary	-0.01	0.10	-10.00	33965.37	33965.37	0.00%	3	67.26%	100%	67.26%	100%	5471	5471
Fast Tertiary	153.51	300.00	0.10	98078.46	94542.77	3.60%	6	42.03%	96.37%	42.63%	96.42%	3429	3429
Slow Tertiary	-	-	-	0.00	-	-	0	-	-	-	-	-	-
				132043.83	128508.14	2.68%							

Upward Regulation

	Prices			Quantities			Participants						
	Weighted Average	Maximum	Minimum	Selected	Actually Delivered	Deviation		C1	C3	C1	C3	HHI	HHI (actually delivered)
	[lei/MWh]	[lei/MWh]	[lei/MWh]	[MWh]	[MWh]	[%]	Number	(selected)	(actually delivered)	(selected)	(selected)	(selected)	(actually delivered)
Secondary	3222.02	4063.49	1500.00	16415.35	16415.35	0.00%	3	70.22%	100%	70.22%	100%	5741	5741
Fast Tertiary	2548.75	4000.00	0.10	23438.87	22976.75	1.97%	4	94.2%	99.69%	94.41%	99.69%	8895	8932
Slow Tertiary	1904.66	2128.98	1682.20	555.50	552.17	0.60%	1	100%	100%	100%	100%	10000	10000
				40409.72	39944.27	1.15%							



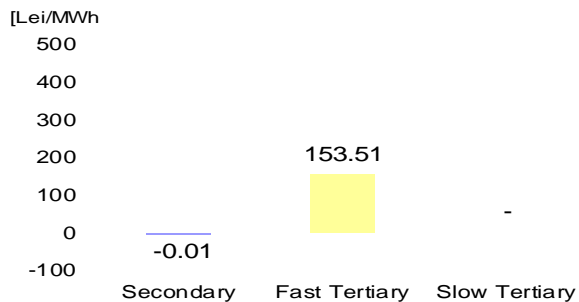
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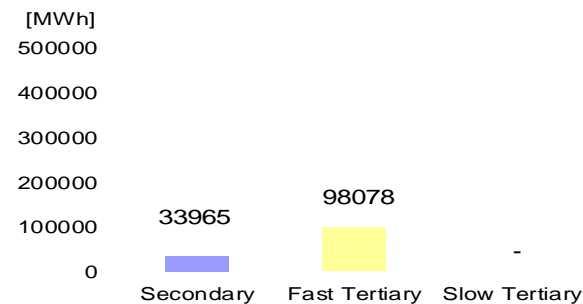
Balancing energy – Selected prices and quantities

September 2022

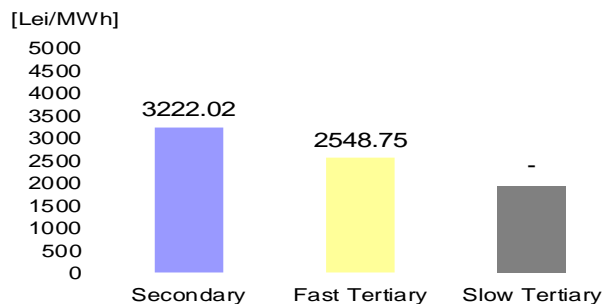
Downward regulation - average price [lei/MWh]



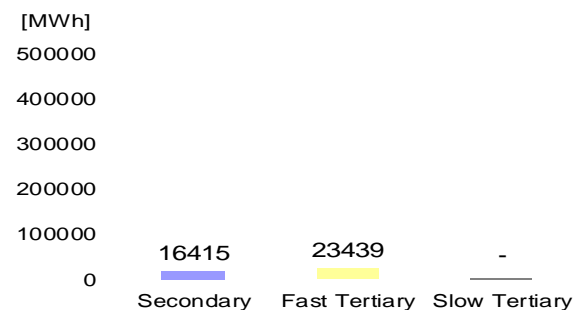
Downward regulation - selected quantities



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 .

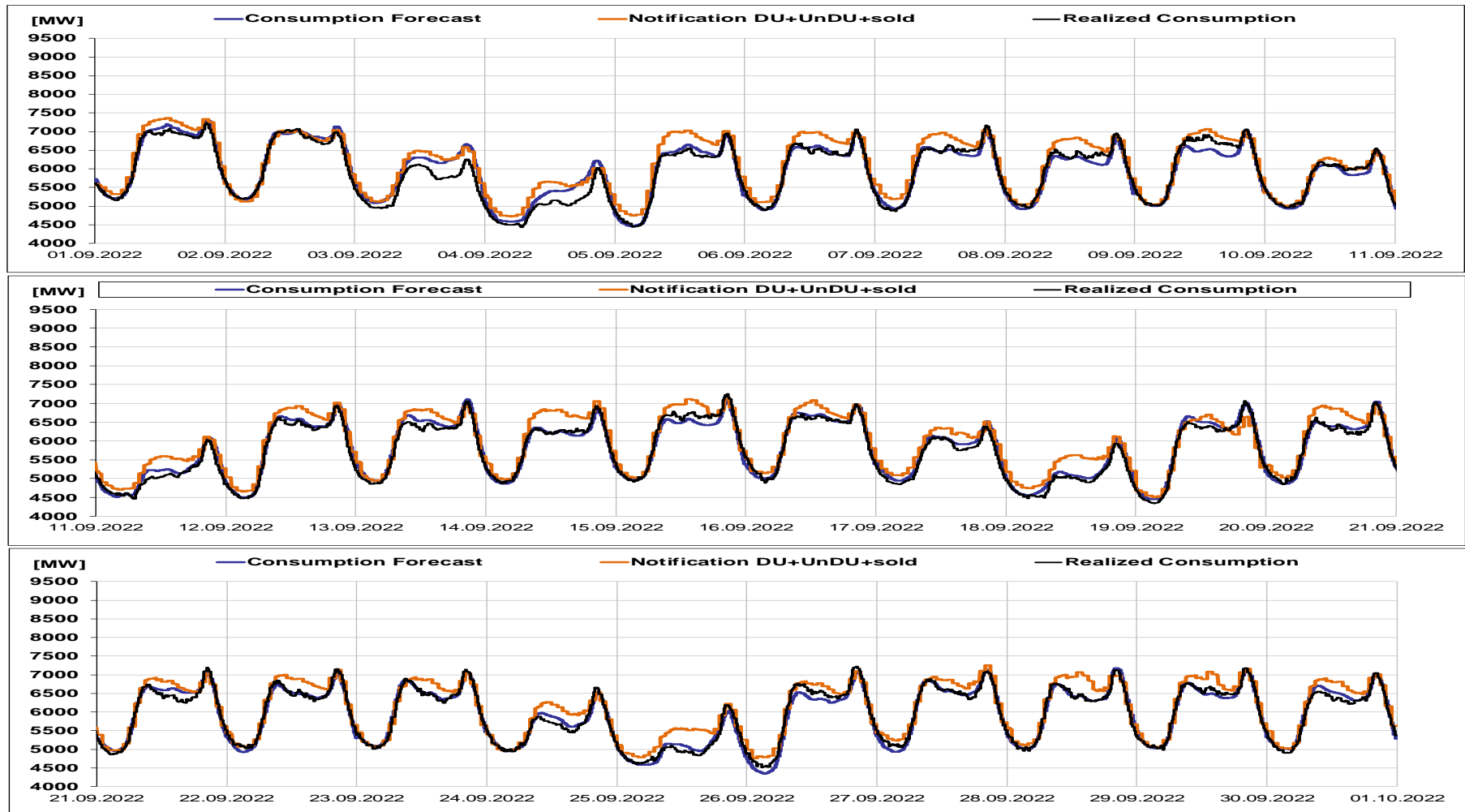


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Balancing Market

Realized consumption, forecast, notifications in D-1



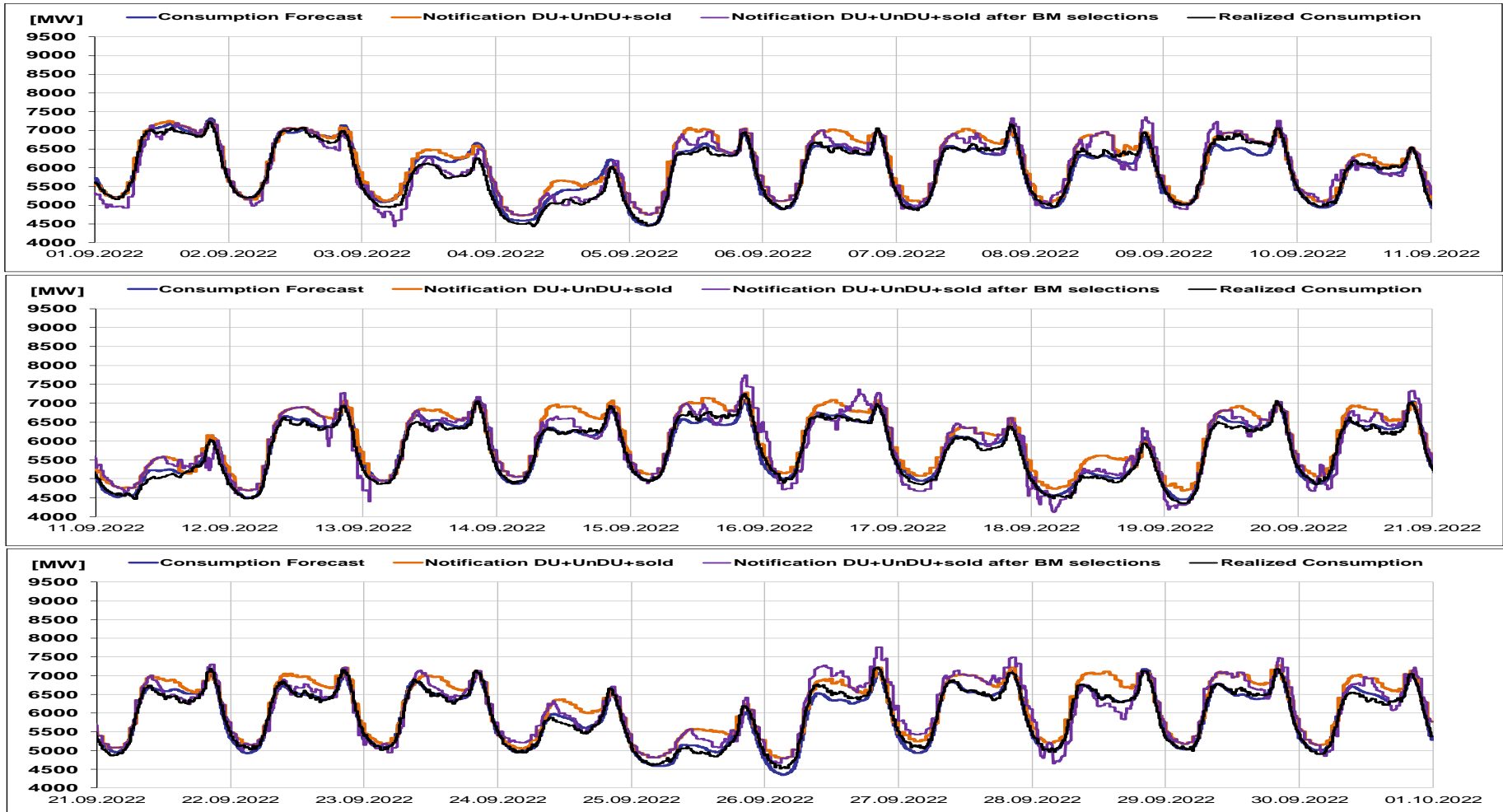


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Balancing Market

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





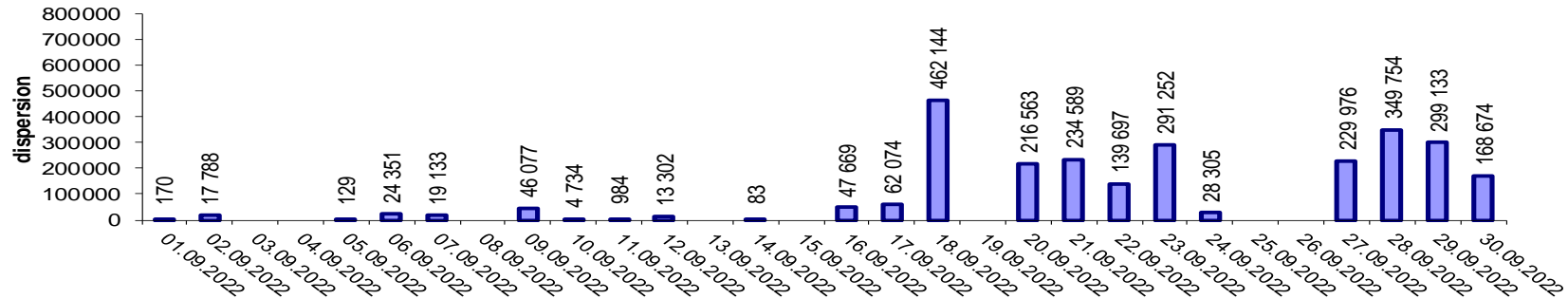
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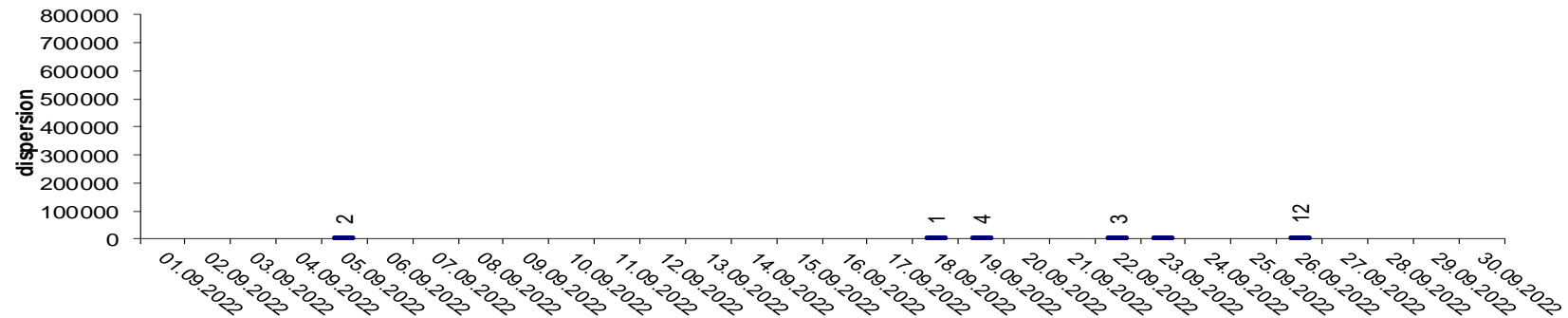
Balancing Market

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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