



Transelectrica®
Societate Administrată în Sistem Dualist

MARKET MONITORING REPORT

Balancing Market

March 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).



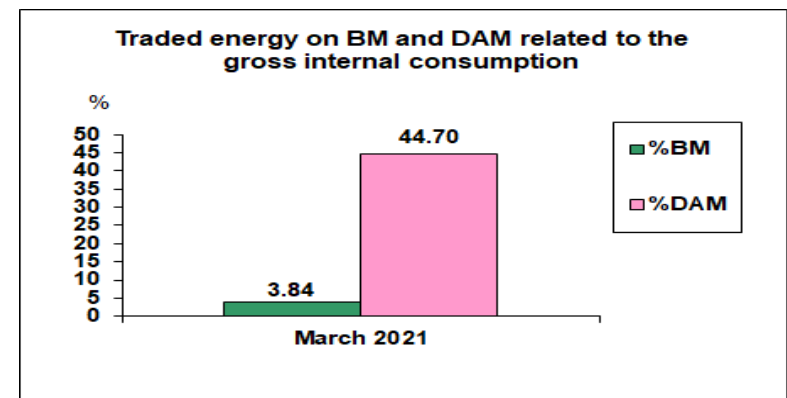
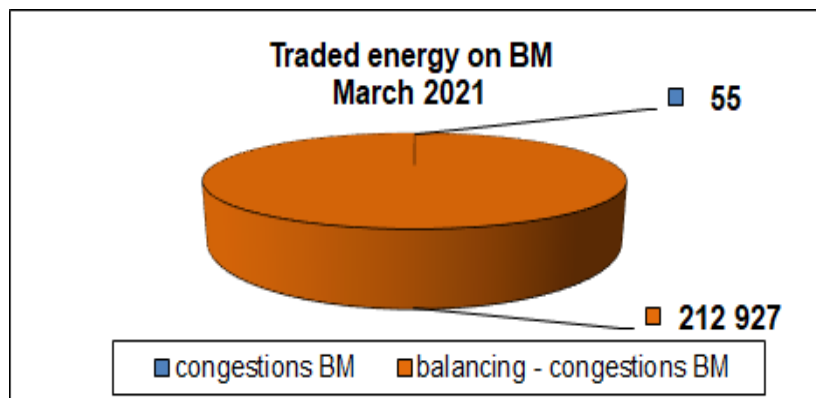
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The Balance Generation/Consumption

- The average monthly value of generated power was 7 315 MW and the actual internal gross consumption was 7 471 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **1.68%**. 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 **2.77%**. The greatest daily deviation regarding the notifications was registered on 30th of March (**5.43%**).
- The energy used in March 2021 for balancing the power system and congestion management was 212 982 MWh (with an average power of 287 MW, which means **3.84%** from the internal gross consumption). The energy used for congestion management was 55.38 MWh (with an average power of 0.07 MW, which means 0.001% from the internal gross consumption).
- There were no transactions outside BM (with financial compensation).
- The energy used in March 2021 on Day Ahead Market was 2 481 384 MWh (with an average power of 3 340 MW, which means **44.7%** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was 65 692 590 lei (with an average weighted price of 308.44 lei/MWh. The cost of the energy paid by C.N.T.E.E. Transelectrica S.A. for congestion management was 121 lei.



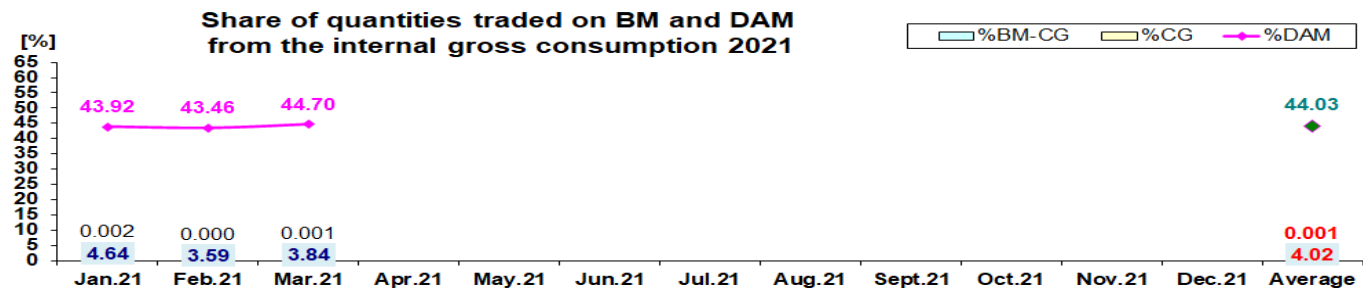
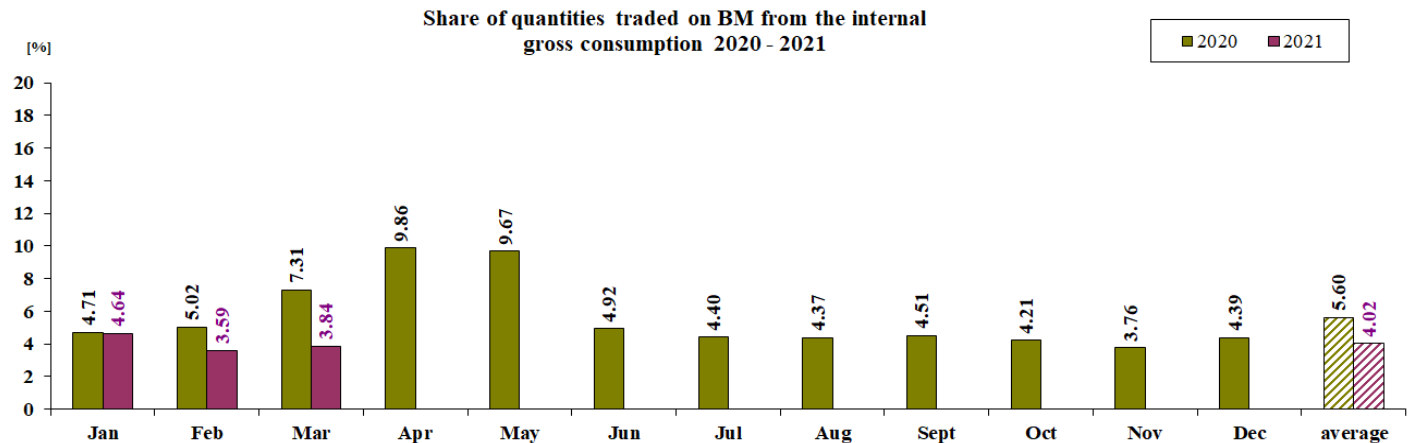


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Balancing Market

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).



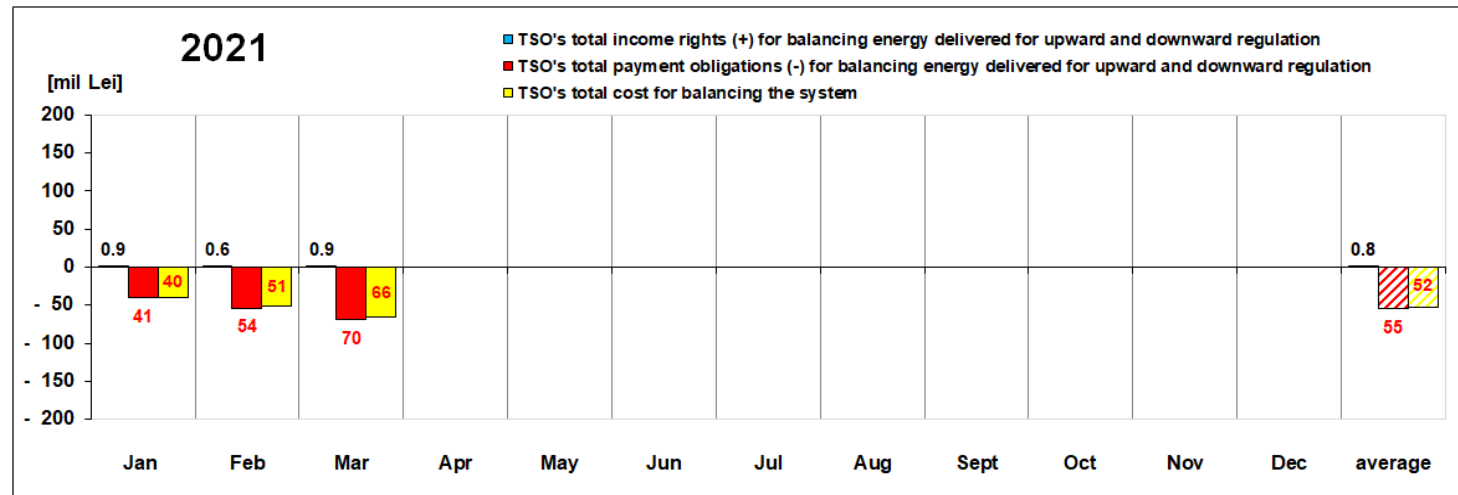
2021													
	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sept.21	Oct.21	Nov.21	Dec.21	Average
%BM	4.64	3.59	3.84										4.02
%DAM	43.92	43.46	44.70										44.03
%CG	0.002	0.000	0.001										0.0009
%BM-CG	4.636	3.592	3.836										4.02
% outside BM	0.02	0.00	0.00										0.006



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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	878 222	633 581	912 692										808 165	2 424 496
incomes (+) prices ≥ 0														
payments (-) prices < 0	- 367 742	- 8 158	- 280 354										- 218 751	- 656 254
TSO's payment obligations / income rights for balancing energy delivered for upward regulation	-40 134 420	-54 045 144	-69 270 145										-54 483 236	- 163 449 709
payments (-) prices ≥ 0														
incomes (+) prices < 0	0	0	0										0	0
TSO's total income rights (+) for balancing energy delivered for upward and downward regulation	878 222	633 581	912 692										808 165	2 424 496
TSO's total payment obligations (-) for balancing energy delivered for upward and downward regulation	-40 502 162	-54 053 301	-69 550 500										-54 701 988	- 164 105 963
TSO's total cost for balancing the system	-39 649 686	-50 861 284	-65 692 590										-52 067 853	- 156 203 560
Value of transactions outside BM (with financial compensation)	- 25 803	0	0										- 8 601	- 25 803
Congestion Cost on BM	- 56	0	- 121										- 59	- 177
Congestion Cost outside BM	0	0	0										0	0

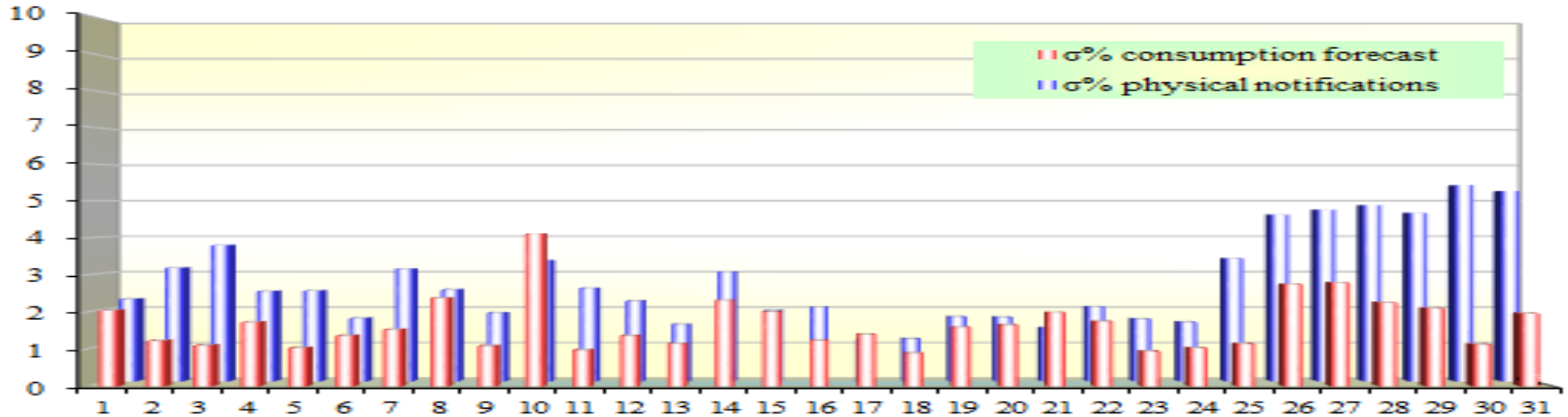
* The annual average value was obtained as arithmetic average of the monthly values.



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Balancing Market

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



mar 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	31
σ% consumption forecast	2.05	1.23	1.10	1.73	1.03	1.36	1.53	2.38	1.09	4.11	0.97	1.36	1.14	2.32	2.01	1.23	1.39	0.89	1.59	1.65	1.99	1.75	0.94	1.03	1.14	2.75	2.80	2.26	2.10	1.13	1.97
σ% physical notifications	2.28	3.14	3.77	2.49	2.50	1.74	3.11	2.53	1.89	3.35	2.57	2.22	1.57	3.03	1.95	2.05	1.15	1.17	1.78	1.77	1.47	2.06	1.72	1.64	3.40	4.62	4.75	4.88	4.66	5.43	5.27

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

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

σ_{average% consumption forecast} = 1.68

σ_{average % physical notifications} = 2.77

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 67 BRPs, 99 market participants, holding 193 commercially operating dispatchable units. Starting with 8th of March 2021, according to ANRE Order no. 59/2015, BRP CET ARAD S.A. (PROBE) (30XROARADPROBE-U) was registered in the BM, having as trial production unit ARADPROBE (motor).

March 2021

Downward Regulation

Downward Regulation	Prices [lei/MWh]			Quantities [MWh]			Participants						
	Weighted Average	Maximum	Minimum	Selected	Actually Delivered	Deviation	Number	C1	C3	C1	C3	HHI	HHI
	[lei/MWh]	[lei/MWh]	[lei/MWh]	[MWh]	[MWh]	[%]	(selected)		(actually delivered)		(selected)		(actually delivered)
Secondary	-0.74	0.10	-10.00	46618.10	46618.10	0.00%	3	52.92%	100%	52.92%	100%	3927	3927
Fast Tertiary	9.02	54.00	-164.00	77925.40	74804.55	4.00%	13	36.58%	94.59%	36.29%	94.51%	3074	3062
Slow Tertiary	-	-	-	0.00	-	-	0	-	-	-	-	-	-
				124543.50	121422.65	2.51%							

Upward Regulation

	Weighted Average	Maximum	Minimum	Selected	Actually Delivered	Deviation	Number	C1	C3	C1	C3	HHI	HHI
	[lei/MWh]	[lei/MWh]	[lei/MWh]	[MWh]	[MWh]	[%]		(selected)		(actually delivered)		(selected)	(actually delivered)
Secondary	824.97	1500.00	577.48	41188.51	41188.51	0.00%	3	53.69%	100%	53.69%	100%	3965	3965
Fast Tertiary	699.75	918.09	17.00	52680.32	50370.88	4.38%	7	56.9%	90.99%	58.22%	90.75%	4063	4127
Slow Tertiary	-	-	-	0.00	-	-	0	-	-	-	-	-	-
				93868.84	91559.40	2.46%							



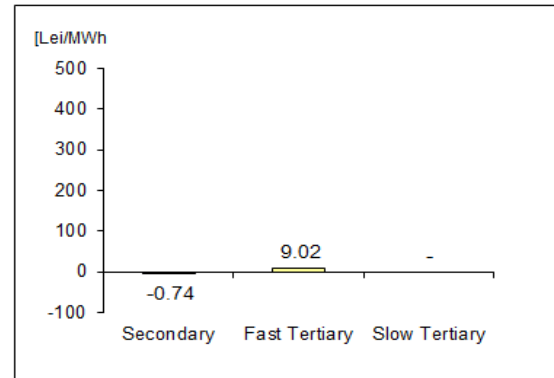
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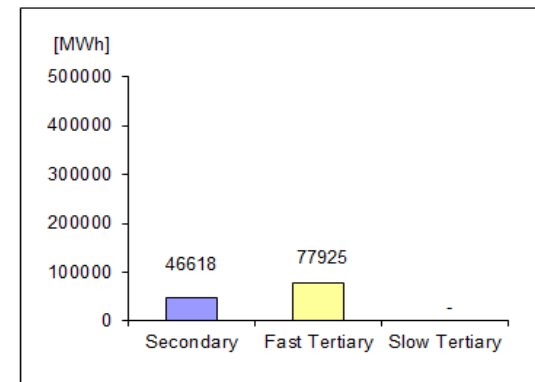
Balancing energy – Selected prices and quantities in March 2021

March 2021

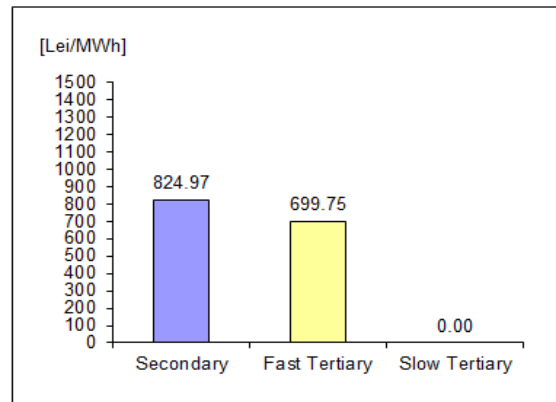
Downward regulation - average price [lei/MWh]



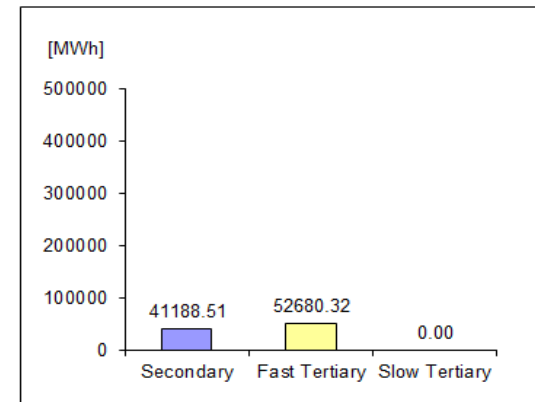
Downward regulation - selected quantities [MWh]



Upward regulation - average price [lei/MWh]



Upward regulation - selected quantities [MWh]



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

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 .

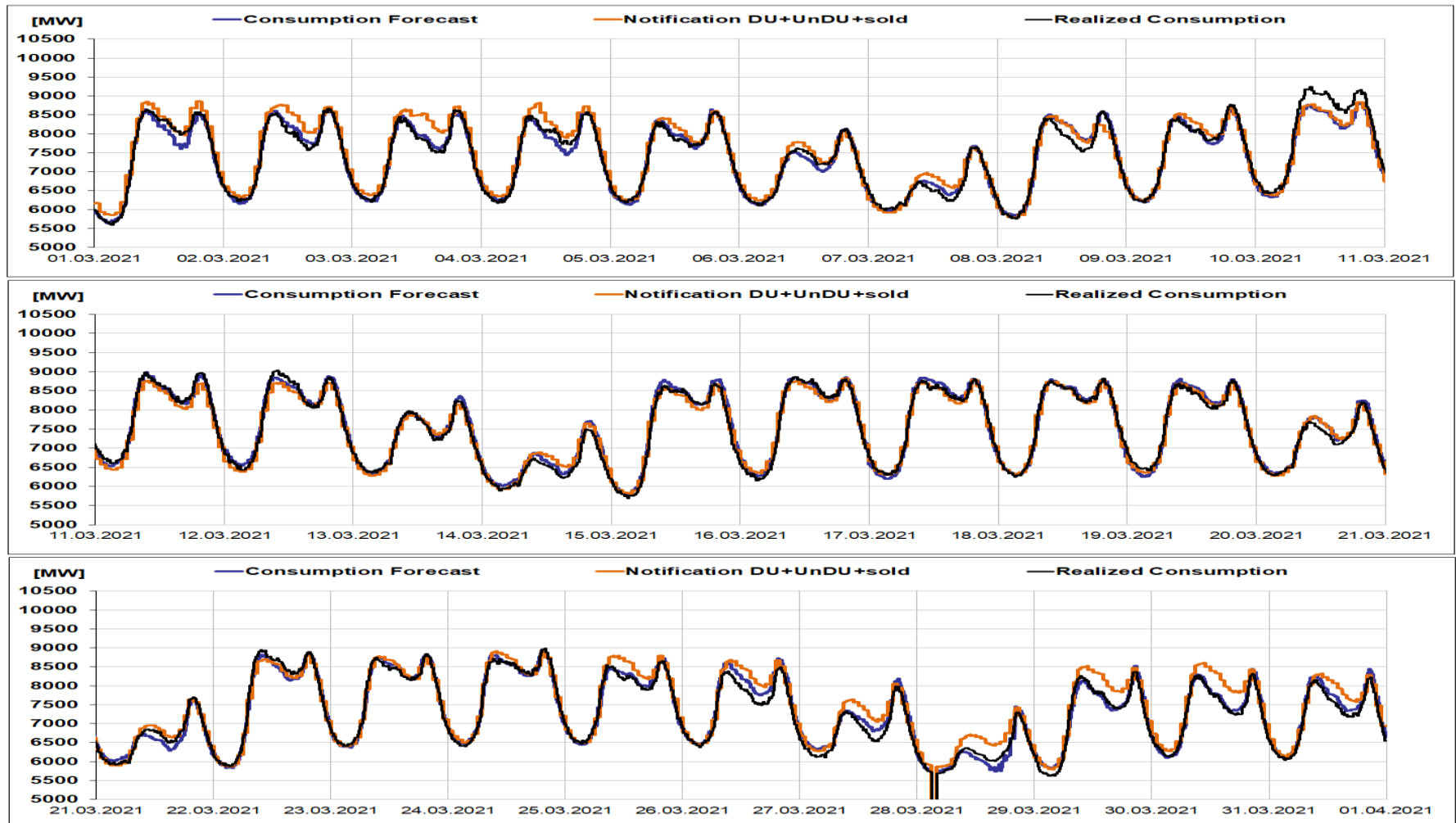


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Balancing Market

Realized consumption, forecast, notifications in D-1



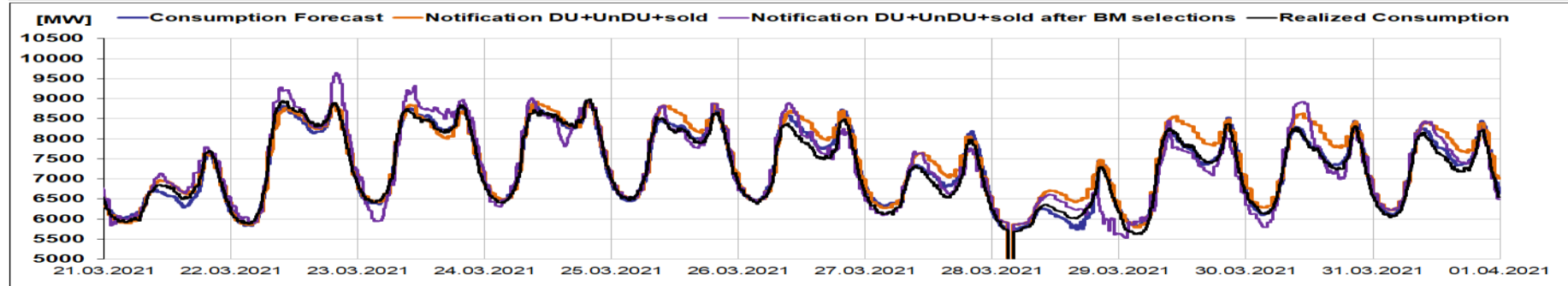
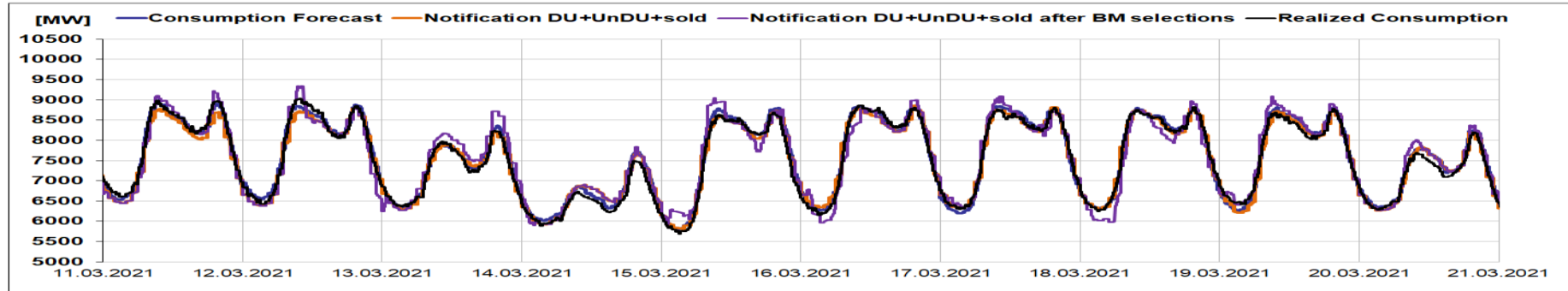
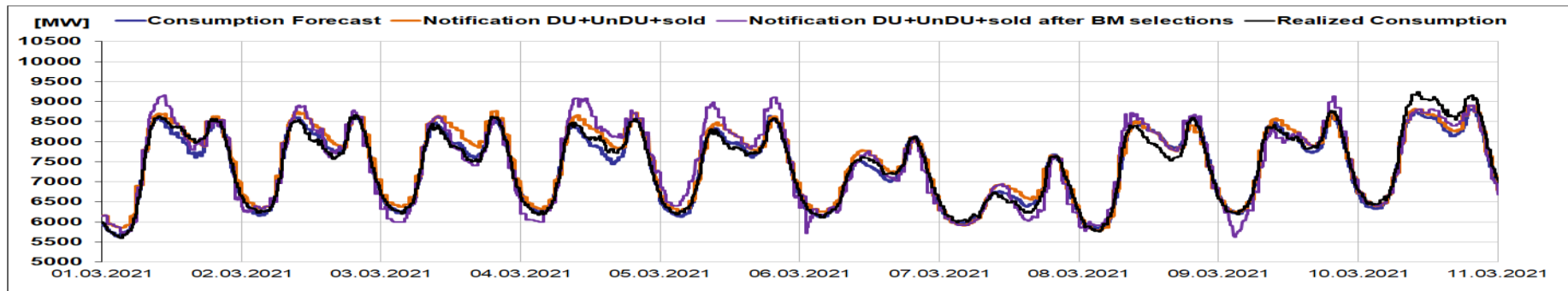


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Balancing Market

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



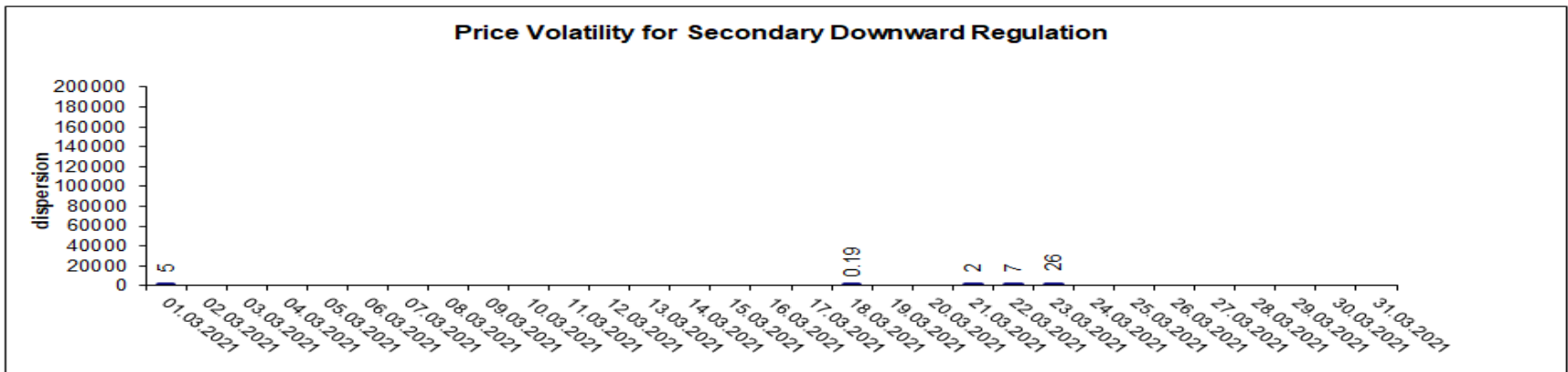
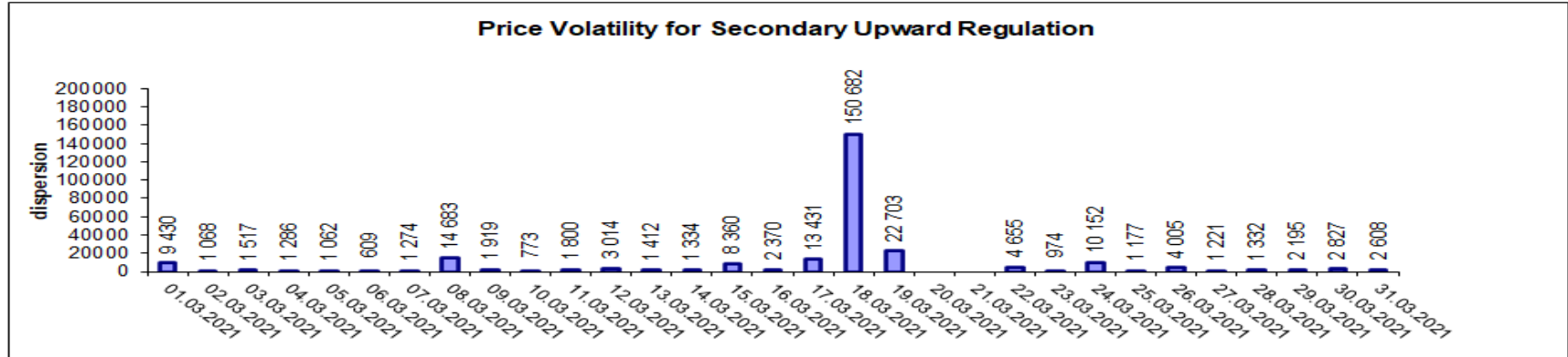


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Balancing Market

Indicators – Price Volatility for Secondary Regulation



Volatility = price dispersion on studied interval:

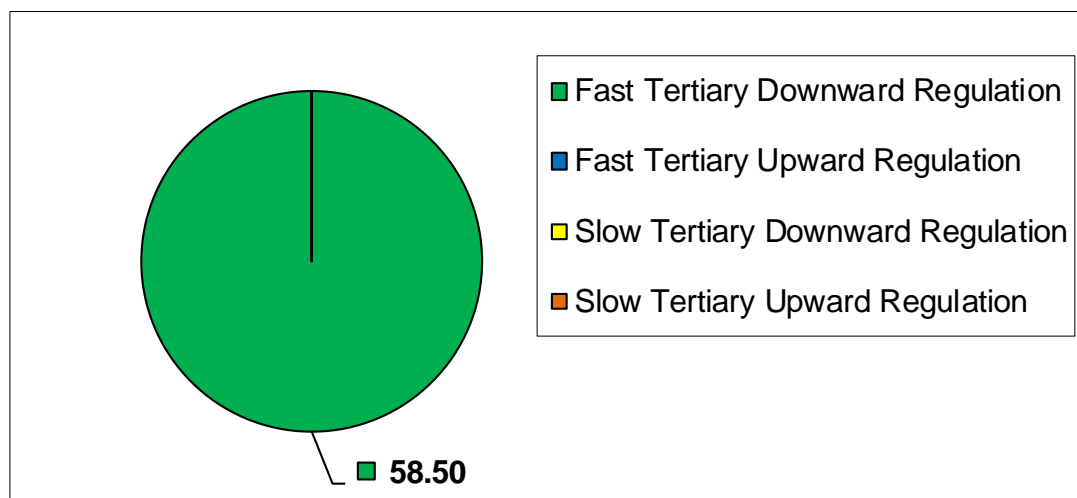
$$\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$

Balancing Market

Congestion Management

	Quantities [MWh]		Participants
	Selected [MWh]	Actually Delivered	Number
Fast Tertiary Downward Regulation	58.50	55.38	1
Fast Tertiary Upward Regulation	0.00	-	0
Slow Tertiary Downward Regulation	0.00	-	0
Slow Tertiary Upward Regulation	0.00	-	0
	58.50	55.38	

Selected energy [MWh]



The value of the delivered energy related to the final transactions for the management of internal congestions is the one resulting from the application of the algorithm for determining the costs for system balancing and for management of internal congestions from the settlement stage on the BM.



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