



Transelectrica®
Societate Administrată în Sistem Dualist

MARKET MONITORING REPORT

Balancing Market

January 2021

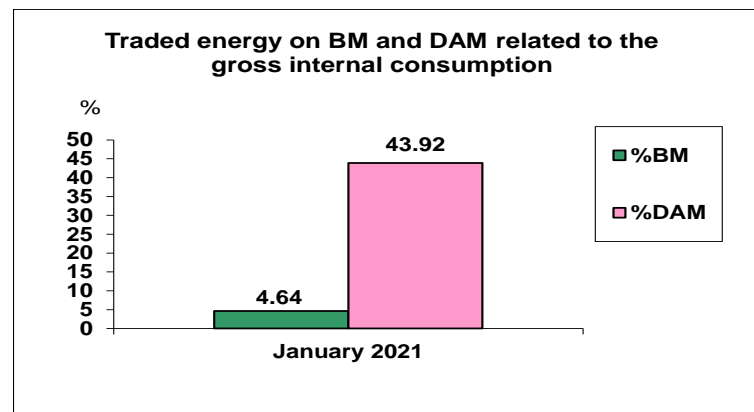
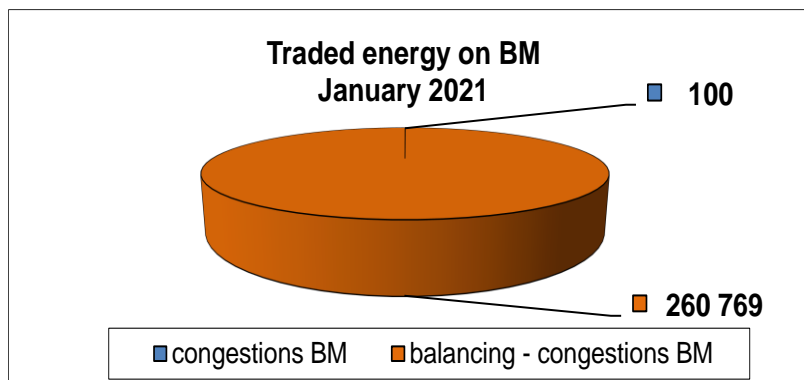
ANRE - Romanian Energy Regulatory Authority
HHI - Herfindahl-Hirschman Index
BRP - Balance Responsible Party
BM - Balancing Market
DAM - Day Ahead Market
TSO - Transmission System Operator
DU – Dispatchable Unit
PN – Physical Notification
NDC - National Dispatching Center
C1 – The market share of the 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
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 7 453 MW and the actual internal gross consumption was 7 561 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **1.83%**. 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 **3.66%**. The greatest daily deviation regarding the notifications was registered on 1st of January (**9,72%**).
- The energy used in January 2021 for balancing the power system and congestion management was 260 869 MWh (with an average power of 351 MW, which means **4.64%** from the internal gross consumption). The energy used for congestion management was 100.47 MWh (with an average power of 0.14 MW, which means 0.0018% from the internal gross consumption).
- The energy used in January 2021 for transactions outside BM (with financial compensation) was 945 MWh (with an average power of 1 MW, which means **0.02%** from the internal gross consumption), from which the energy used for congestion management was 552.08 MWh ((with an average power of 0.74 MW, which means 0.0098% from the internal gross consumption).
- The energy used in January 2021 on Day Ahead Market was 2 470 720 MWh (with an average power of 3 321 MW, which means **43,92%** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was 39 649 686 lei (with an average weighted price of 151.99 lei/MWh. The value of transactions outside BM (with financial compensation) was 25 803 lei (with an average weighted price of 27.3 lei/hMW). The cost of the energy paid by C.N.T.E.E. Transelectrica S.A. for congestion management was 56 lei.



The Balance Generation/Consumption

	Generation units commissioned in 2020	Generation units shut down in 2020
Pi [MW]	12.14	126.36

Pi NRA license = Installed power specified in the technical documentation from NRA license.

Notes:

- for the newly installed production units in 2020, both the new units and the positive power differences between the installed power according to the NRA licenses from 1st of January 2021 compared to those from 1st of January 2020 were taken into account;
- for the production units released in 2020, the units withdrawn from operation, those without an NRA production license and the negative power differences between the installed power according to the NRA licenses from 1st of January 2021 compared to those from 1st of January 2020 were taken into account.



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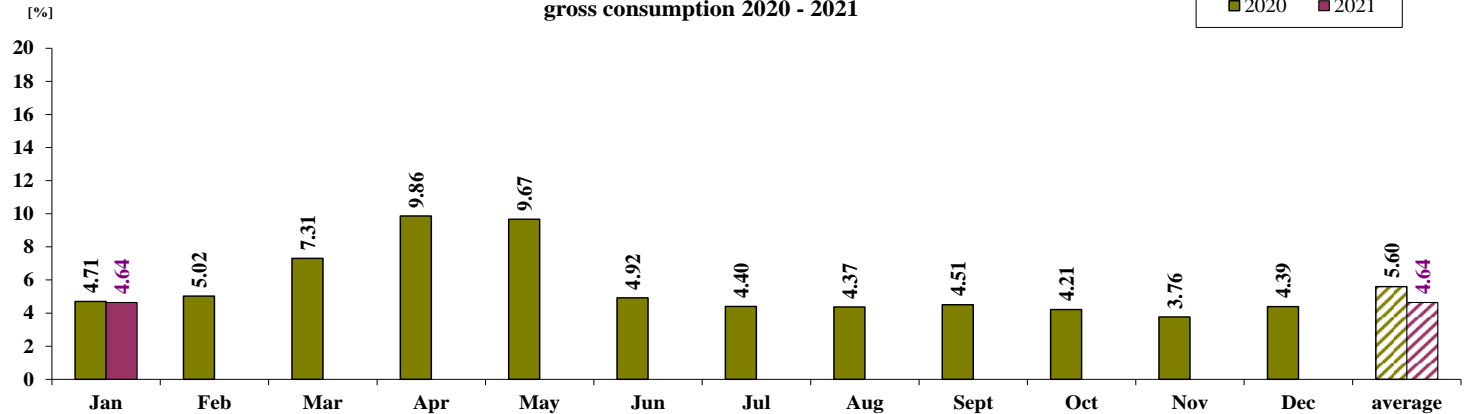
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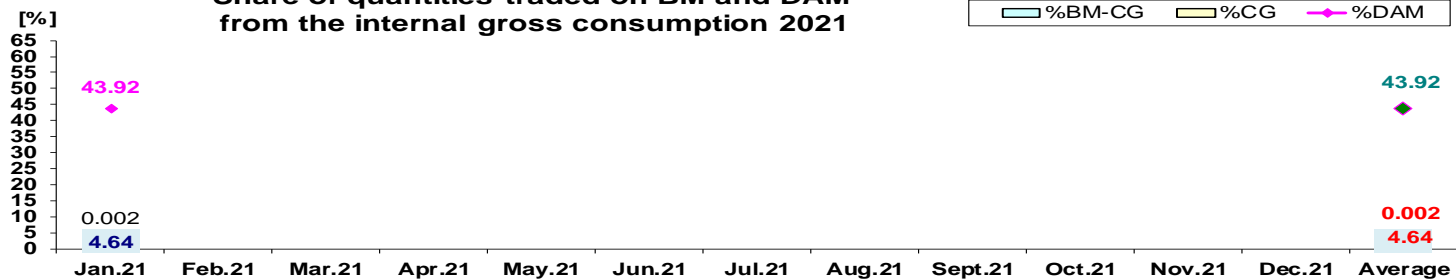
The Balance Generation / Consumption

• 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).

Share of quantities traded on BM from the internal gross consumption 2020 - 2021



Share of quantities traded on BM and DAM from the internal gross consumption 2021



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												4.64
%DAM	43.92												43.92
%CG	0.002												0.0018
%BM-CG	4.636												4.64
% outside BM	0.02												0.017



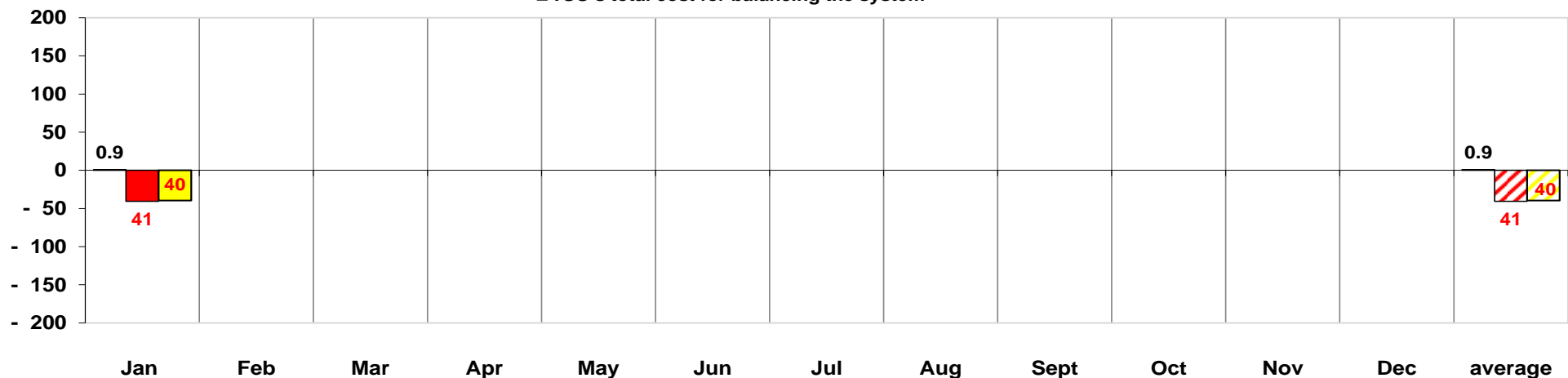
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Balancing Energy Market Transactions

2021

[mil Lei]



[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												878 222	878 222
	payments (-) prices <0	- 367 742												- 367 742	- 367 742
TSO's payment obligations / income rights for balancing energy delivered for upward regulation	payments (-) prices ≥0	-40 134 420												-40 134 420	- 40 134 420
	incomes (+) prices <0	0												0	0
TSO's total income rights (+) for balancing energy delivered for upward and downward regulation		878 222												878 222	878 222
TSO's total payment obligations (-) for balancing energy delivered for upward and downward regulation		-40 502 162												-40 502 162	- 40 502 162
TSO's total cost for balancing the system		-39 649 686												-39 649 686	- 39 649 686
Value of transactions outside BM (with financial compensation)		- 25 803												- 25 803	- 25 803
Congestion Cost on BM		- 56												- 56	- 56
Congestion Cost outside BM		0												0	0

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

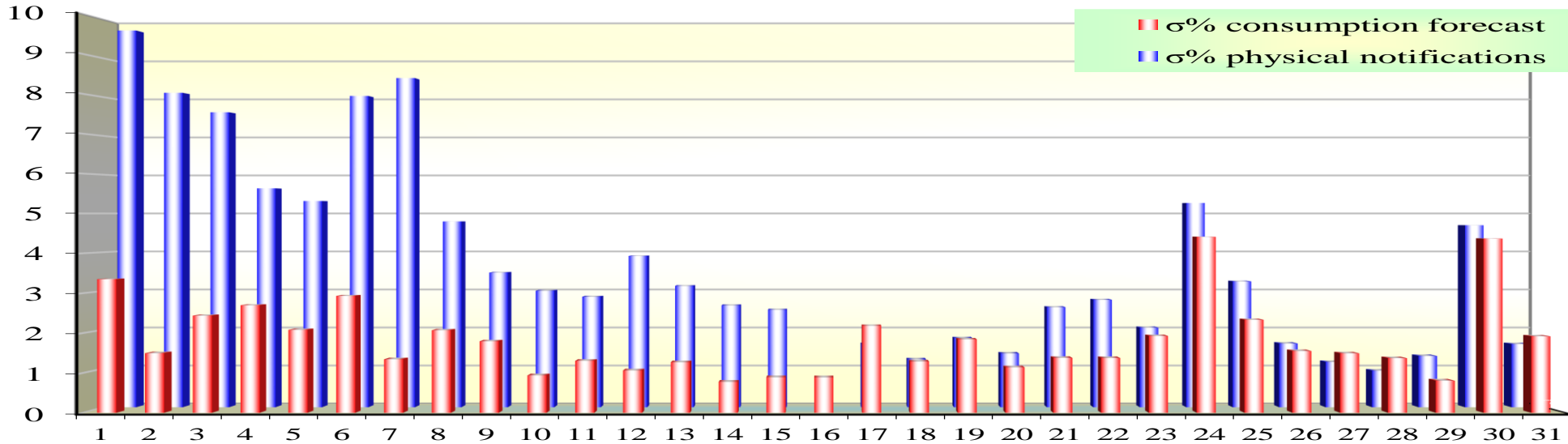
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Balancing Market

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



Jan 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	3.35	1.50	2.44	2.70	2.08	2.93	1.34	2.07	1.79	0.94	1.30	1.06	1.27	0.78	0.89	0.89	2.18	1.29	1.84	1.14	1.38	1.37	1.93	4.41	2.33	1.55	1.49	1.37	0.81	4.37	1.92
σ% physical notifications	9.72	8.11	7.61	5.65	5.32	8.03	8.49	4.79	3.47	3.01	2.85	3.90	3.13	2.63	2.51	0.75	1.63	1.23	1.78	1.39	2.58	2.77	2.05	5.27	3.25	1.64	1.17	0.94	1.32	4.69	1.63

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

σ_{average % consumption forecast} = 1.83

σ_{average % physical notifications} = 3.66

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

R = Realized Consumption;

N = Physical Notifications;

P = Consumption Forecast.

Balancing Market

Balancing energy – Selected prices and quantities

- At the beginning of the month on the Balancing Market operated 65 BRPs, 99 market participants, holding 193 commercially operating dispatchable units.

January 2021

Downward Regulation

Downward Regulation	Prices [lei/MWh]			Quantities [MWh]			Participants						
	Weighted	Maximum	Minimum	Selected	Actually	Deviation	Number	C1	C3	C1	C3	HHI	HHI
	Average				Delivered								
	[lei/MWh]	[lei/MWh]	[lei/MWh]	[MWh]	[MWh]	[%]	(selected)			(actually delivered)		(selected)	(actually
Secondary	-0.03	15.00	-10.00	61268.52	61268.53	0.00%	4	56.06%	98.62%	56.06%	98.62%	4059	4059
Fast Tertiary	3.25	200.00	-129.70	152227.01	146932.31	3.48%	16	36.11%	94.14%	36.42%	94.35%	3054	3072
Slow Tertiary	-	-	-	0.00	-	-	0	-	-	-	-	-	-
				213495.53	208200.84	2.48%							

Upward Regulation

	Average [lei/MWh]	Maximum [lei/MWh]	Minimum [lei/MWh]	Selected [MWh]	Actually [MWh]	Deviation [%]	Number	C1 (selected)	C3 (selected)	C1 (actually delivered)	C3 (actually delivered)	HHI (selected)	HHI (actually delivered)
Secondary	814.14	1500.00	523.12	26782.14	26782.14	0.00%	4	54.75%	98.61%	54.75%	98.61%	3970	3970
Fast Tertiary	708.44	1050.98	15.00	26958.22	25783.47	4.36%	8	60.79%	88.85%	62.34%	88.69%	4284	4402
Slow Tertiary	789.98	904.46	674.21	105.41	102.86	2.42%	1	100%	100%	100%	100%	10000	10000
				53845.76	52668.46	2.19%							



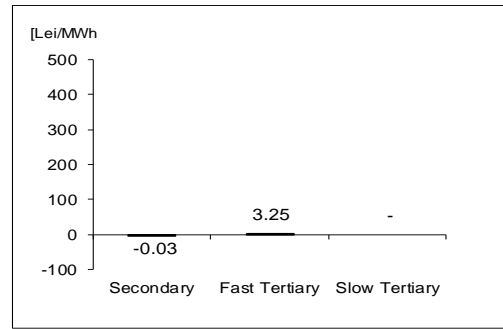
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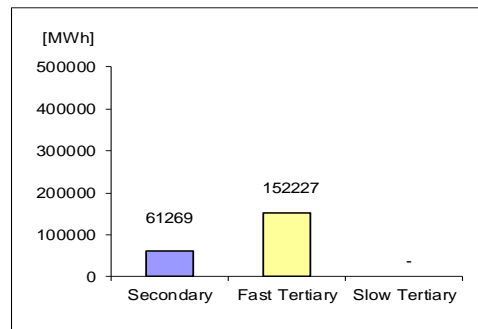
Balancing energy – Selected prices and quantities in January 2021

January 2021

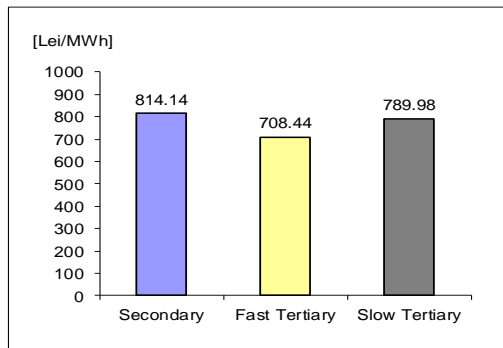
Downward regulation - average price [lei/MWh]



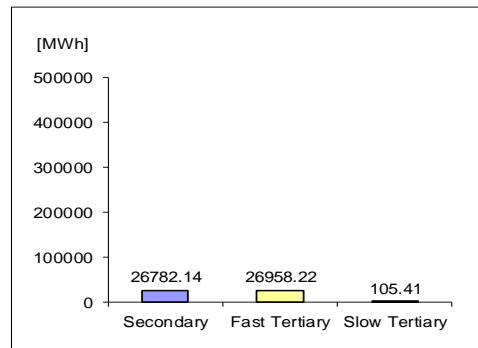
Downward regulation - selected quantities [MWh]



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 .

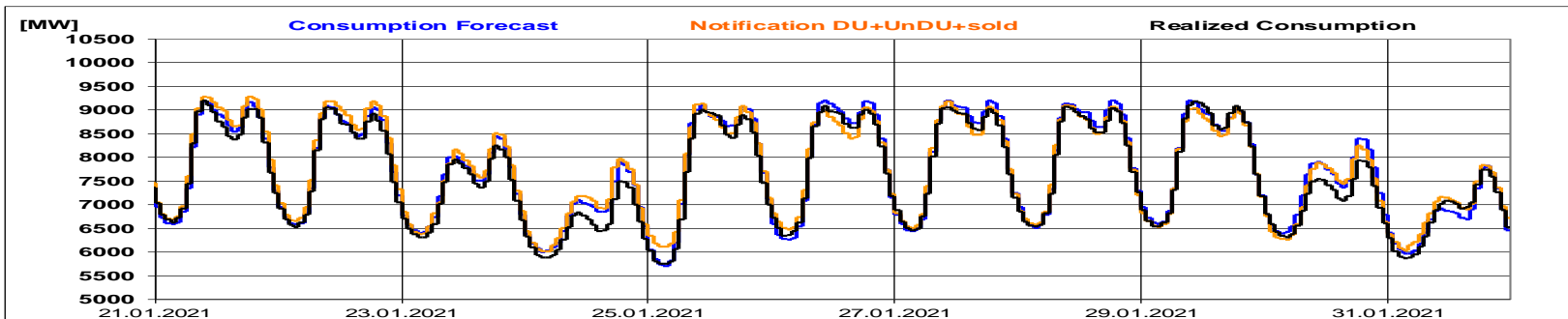
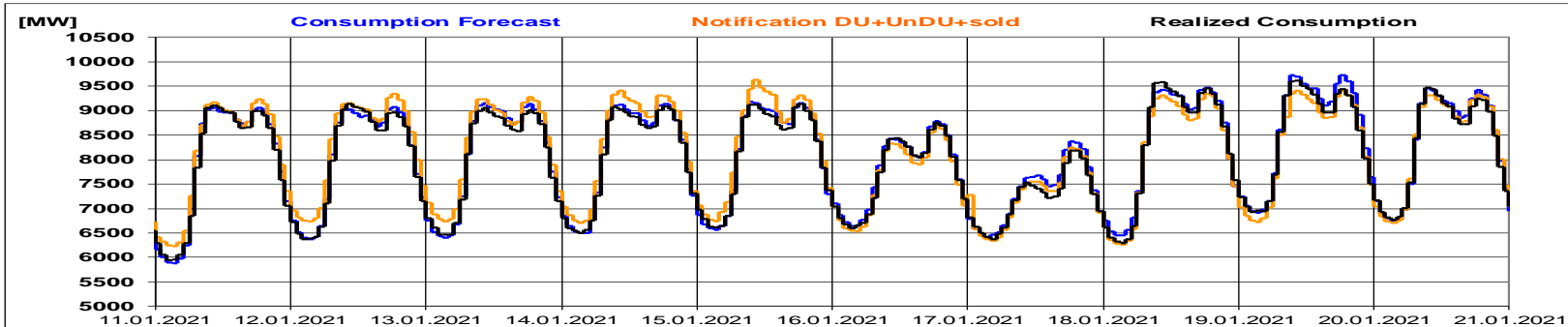
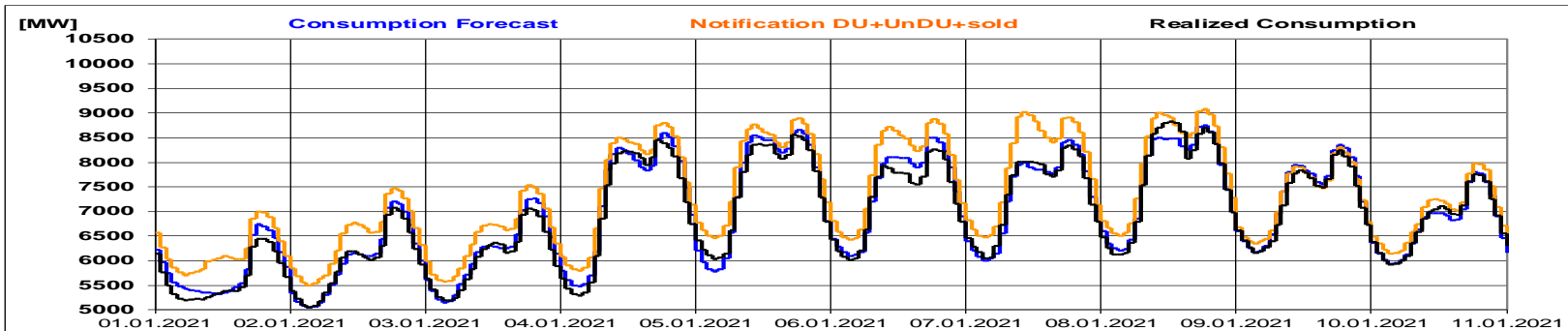


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Balancing Market

Realized consumption, forecast, notifications in D-1



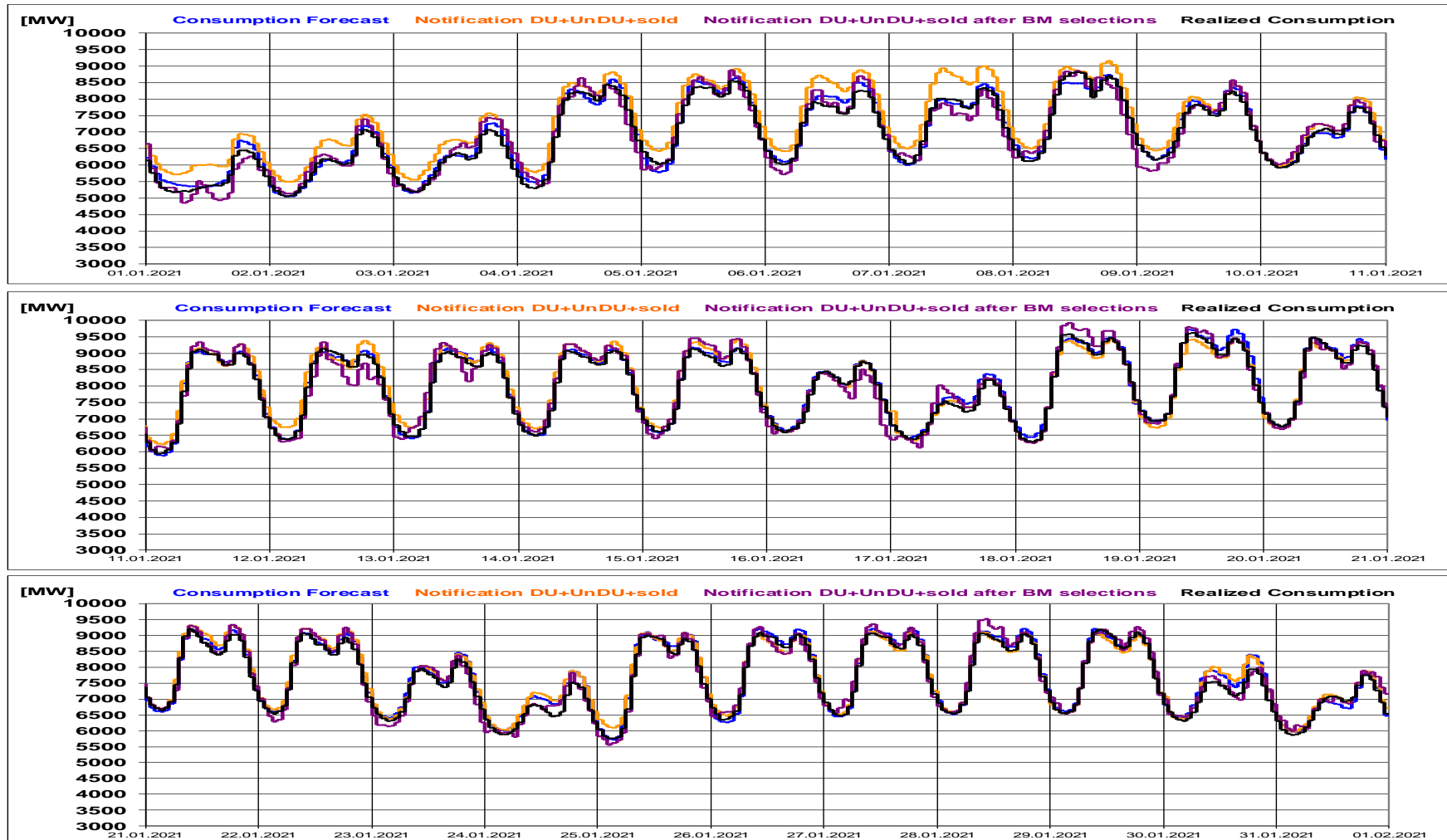


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Balancing Market

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





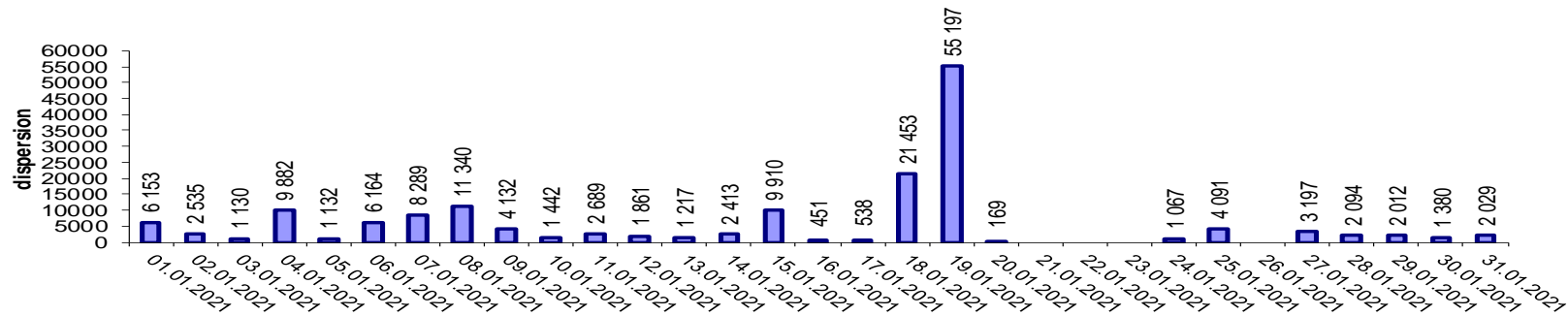
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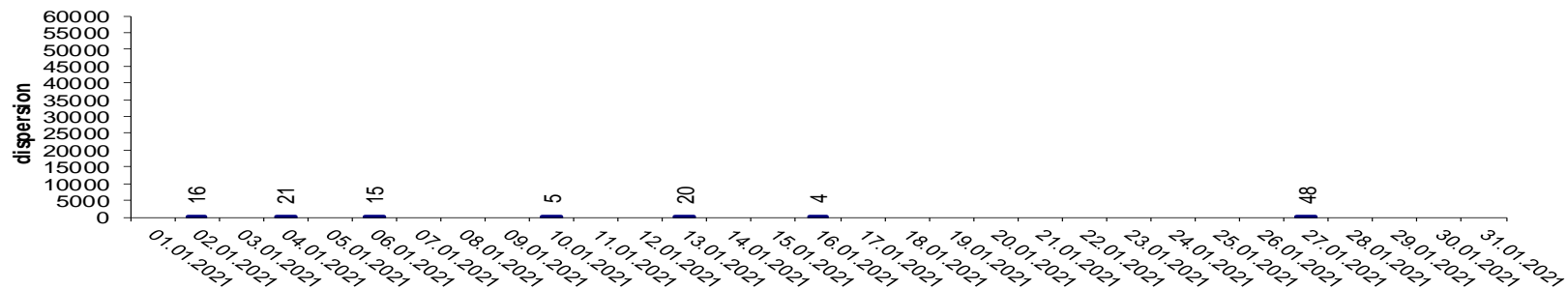
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Indicators – Price Volatility for Secondary Regulation

Price Volatility for Secondary Upward Regulation



Price Volatility for Secondary Downward Regulation



Volatility = price dispersion on studied interval:

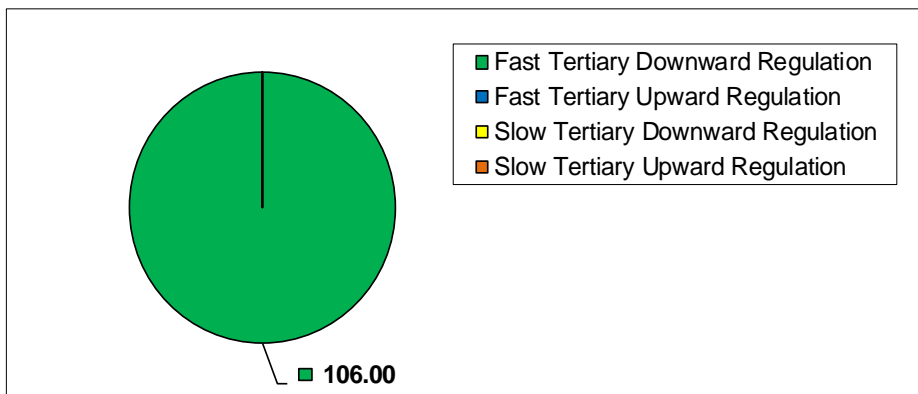
$$\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$

Balancing Market

Congestion Management

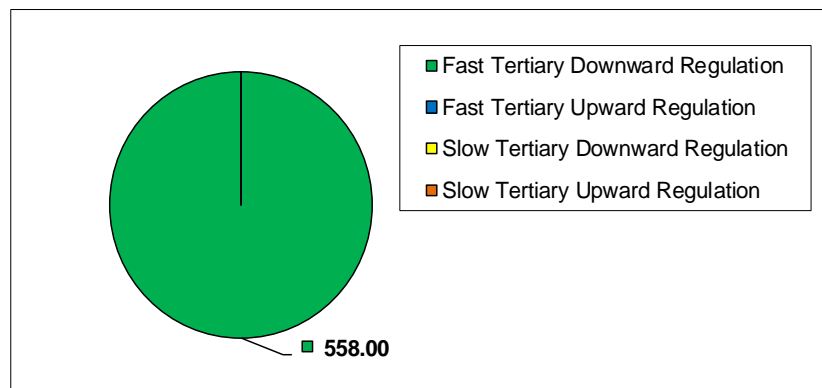
	Quantities [MWh]		Participants
	Selected [MWh]	Actually Delivered	Number
Fast Tertiary Downward Regulation	106.00	100.47	1
Fast Tertiary Upward Regulation	0.00	-	0
Slow Tertiary Downward Regulation	0.00	-	0
Slow Tertiary Upward Regulation	0.00	-	0
	106.00	100.47	

Selected energy [MWh]



	Transactions outside BM (financial compensation)		Participant
	Selected [MWh]	Delivered [MWh]	Number
Fast Tertiary Downward Regulation	558.00	552.08	1
Fast Tertiary Upward Regulation	0.00	-	0
Slow Tertiary Downward Regulation	0.00	-	0
Slow Tertiary Upward Regulation	0.00	-	0
	558.00	552.08	

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; the incident on the European interconnected electricity transmission network on 8th of January 2021 also resulted in transactions outside the BM with compensation in order to resolve network restrictions



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