



Transelectrica®
Societate Administrată în Sistem Dualist

MARKET MONITORING REPORT

Balancing Market

April 2022

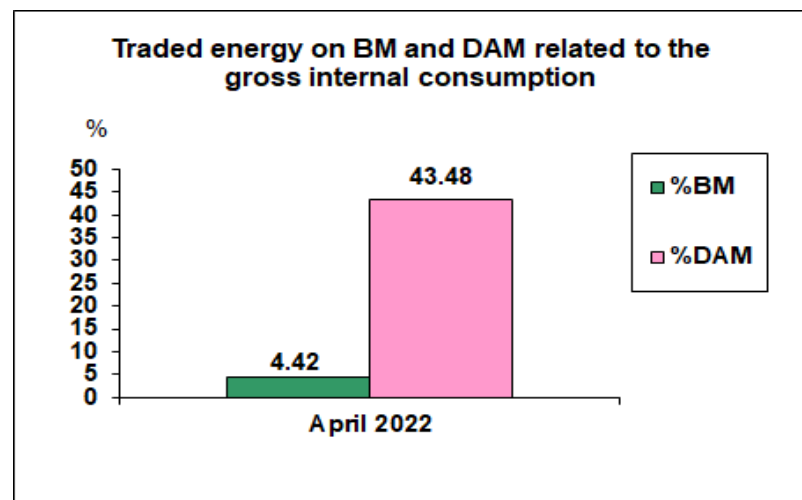
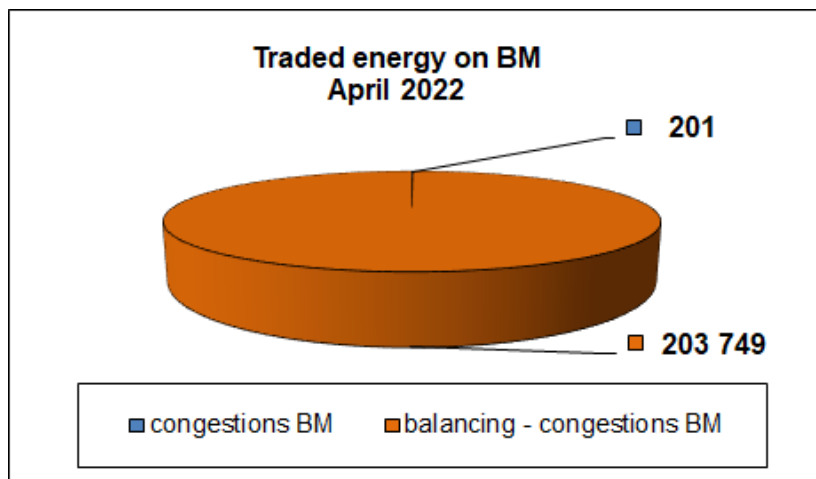
ANRE - Romanian Energy Regulatory Authority
HHI - Herfindahl-Hirschman Index
BRP - Balance Responsible Party
BM - Balancing Market
DAM - Day Ahead Market
TSO - Transmission System Operator
DU – Dispatchable Unit
PN – Physical Notification
NDC - National Dispatching Center
C1 – The market share of the 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 6 465 MW and the actual internal gross consumption was 6 414 MW.
- The NDC consumption forecast was close to the actual consumption, the standard deviation being **2.01%**. 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 **5.67%**. The greatest daily deviation regarding the notifications was registered on the 24^h of April (**14.35%**).
- The energy used in April 2022 for balancing the power system and congestion management was 203 950 MWh (with an average power of 283 MW, which means **4.42%** from the internal gross consumption). The energy used for congestion management was 201.08 MWh (with an average power of 0.28 MW, which means 0.0044% from the internal gross consumption).
- There were no transactions outside BM (with financial compensation).
- The energy used in April 2022 on Day Ahead Market was 2 007 717 MWh (with an average power of 2 788 MW, which means **43,48%** from the internal gross consumption). Data are shown in EET hours.
- The total cost of the energy traded on the Balancing Market was 74 719 809 lei (with an average weighted price of 366.36 lei/MWh. The cost of the energy paid by C.N.T.E.E. Transelectrica S.A. for congestion management was 30 924 lei.



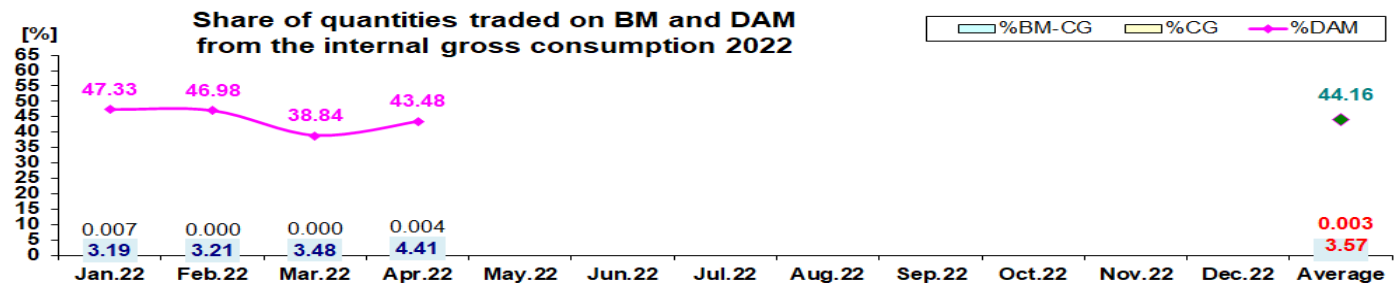
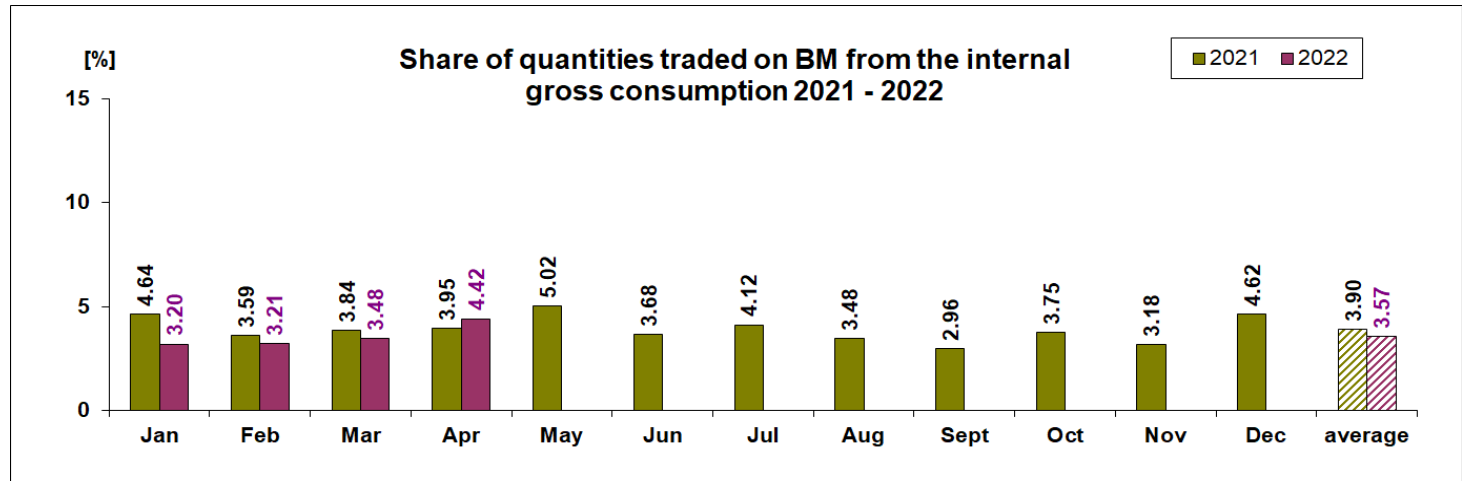


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Balancing Market

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).



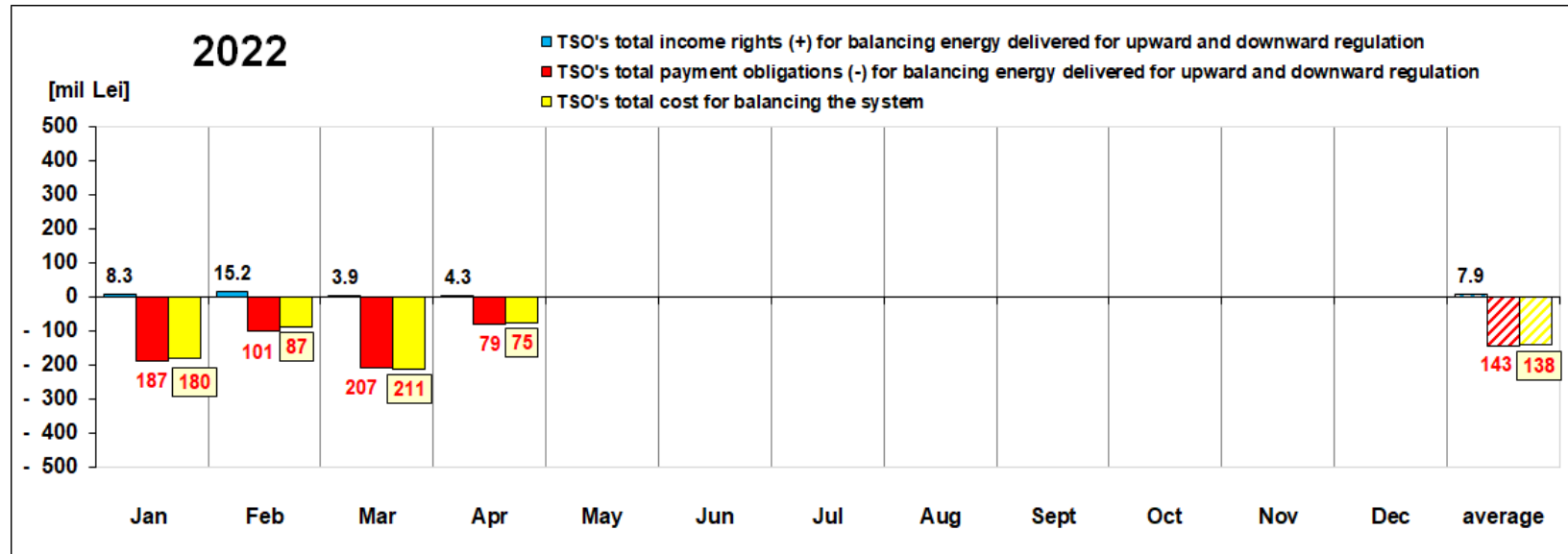
2022													
	Jan.22	Feb.22	Mar.22	Apr.22	May.22	Jun.22	Jul.22	Aug.22	Sep.22	Oct.22	Nov.22	Dec.22	Average
%BM	3.20	3.21	3.48	4.42									3.57
%DAM	47.33	46.98	38.84	43.48									44.16
%CG	0.01	0.00	0.00	0.00									0.0029
%BM-CG	3.191	3.206	3.479	4.412									3.572
% outside BM	0.00	0.00	0.00	0.00									0.00



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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	8 344 244	15 164 350	3 932 020	4 322 327									7 940 735	31 762 941
	payments (-) prices < 0	- 40 999	- 12 132	- 96 136	- 131 045									- 70 078	- 280 312
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									-143 315 902	-573 263 609
	incomes (+) prices < 0	0	0	0	0									0	0
TSO's total income rights (+) for balancing		8 344 244	15 164 350	3 932 020	4 322 327									7 940 735	31 762 941
TSO's total payment obligations (-) for		-186 639 443	-100 715 635	-207 088 333	-79 100 510									-143 385 980	-573 543 921
TSO's total cost for balancing the system		-180 209 876	-86 965 620	-211 125 690	-74 719 809									-138 255 249	-553 020 995
Value of transactions outside BM (with		0	0	0	0									0	0
Congestion Cost on BM		- 157 055	0	- 3 224	- 30 924									- 47 801	- 191 202
Congestion Cost outside BM		0	0	0	0									0	0

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

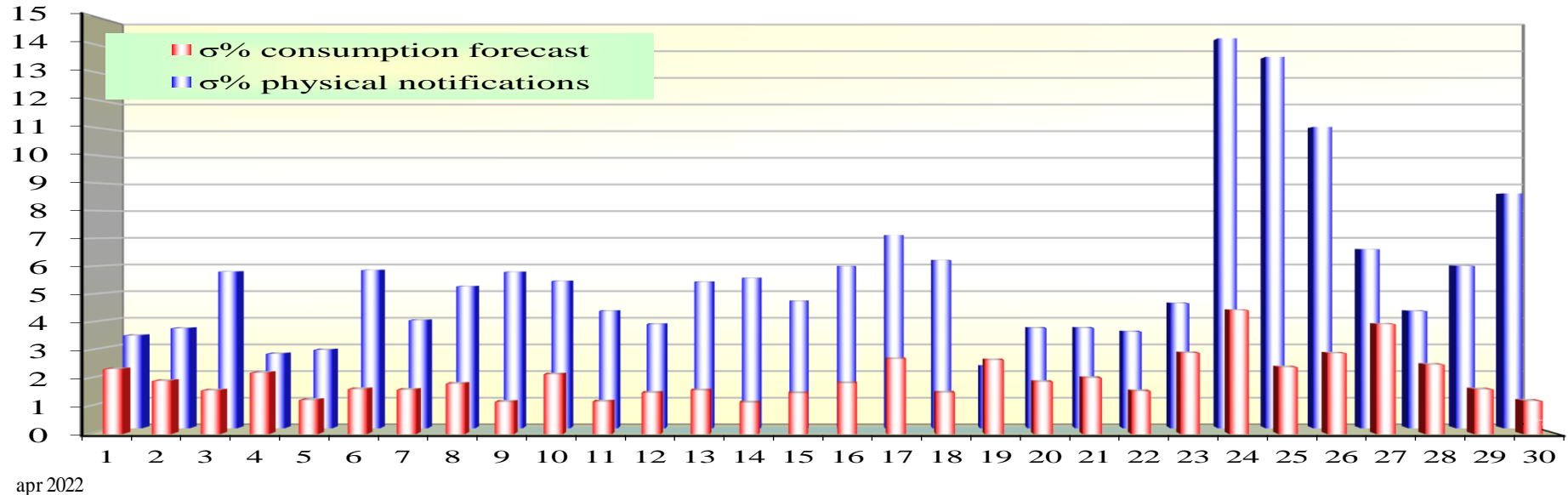


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Balancing Market

Standard deviation of physical notifications and consumption forecast against the actual consumption in April 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
σ% consumption forecast	2.33	1.90	1.56	2.19	1.22	1.61	1.58	1.80	1.15	2.14	1.16	1.48	1.56	1.13	1.46	1.82	2.69	1.48	2.65	1.87	2.01	1.53	2.90	4.43	2.39	2.89	3.93	2.48	1.60	1.19
σ% physical notifications	3.41	3.68	5.76	2.74	2.88	5.82	3.97	5.22	5.75	5.41	4.31	3.82	5.38	5.52	4.67	5.96	7.11	6.18	2.27	3.68	3.69	3.55	4.60	14.35	13.67	11.09	6.59	4.31	5.98	8.64

σ_{average% consumption forecast} = 2.01

σ_{average % physical notifications} = 5.67

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

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

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 67 BRPs, 94 market participants, holding 186 commercially operating dispatchable units.

April 2022

Downward 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)	(actually delivered)
Secondary	-0.19	0.10	-10.00	33578.83	33578.83	0.00%	3	68.31%	100%	68.31%	5457	5457
Fast Tertiary	31.80	250.00	-165.00	137547.77	133106.83	3.23%	9	45.56%	99.45%	45.1%	3697	3688
Slow Tertiary	-	-	-	0.00	-	-	0	-	-	-	-	-
				171126.60	166685.66	2.60%						

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)	(actually delivered)
Secondary	3469.75	3500.00	1000.00	12867.39	12867.39	0.00%	3	69.76%	100%	69.76%	5670	5670
Fast Tertiary	1405.93	2675.70	470.00	24662.31	24397.08	1.08%	6	96.94%	99.48%	96.97%	9401	9407
Slow Tertiary	-	-	-	0.00	-	-	0	-	-	-	-	-
				37529.70	37264.47	0.71%						



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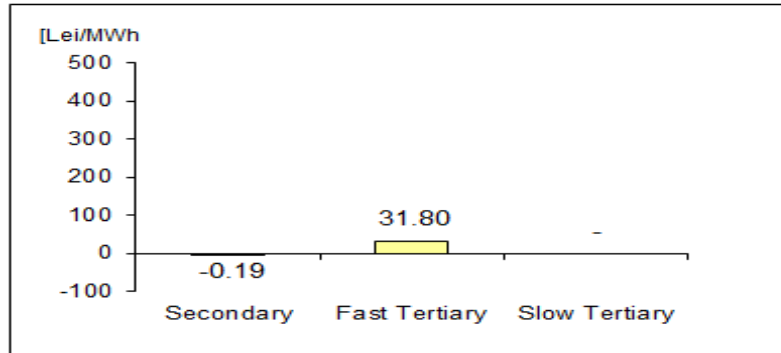
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Balancing Market

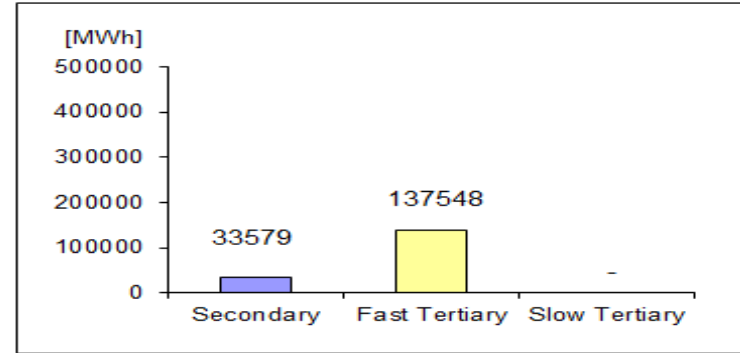
Balancing energy – Selected prices and quantities in April 2022

April 2022

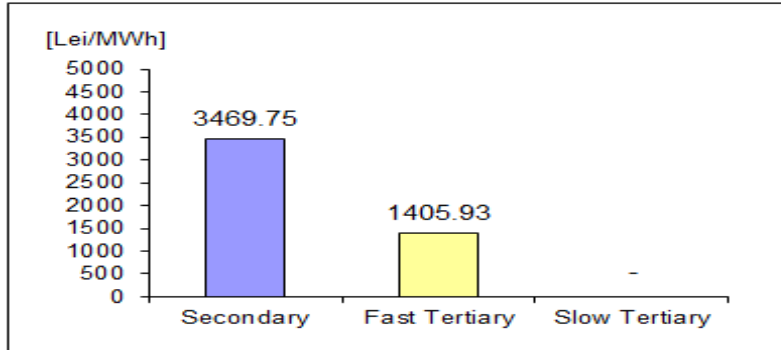
Downward regulation - average price [lei/MWh]



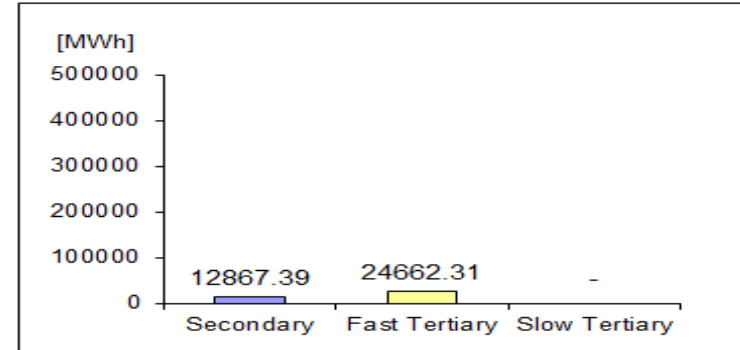
Downward regulation - selected quantities



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 .

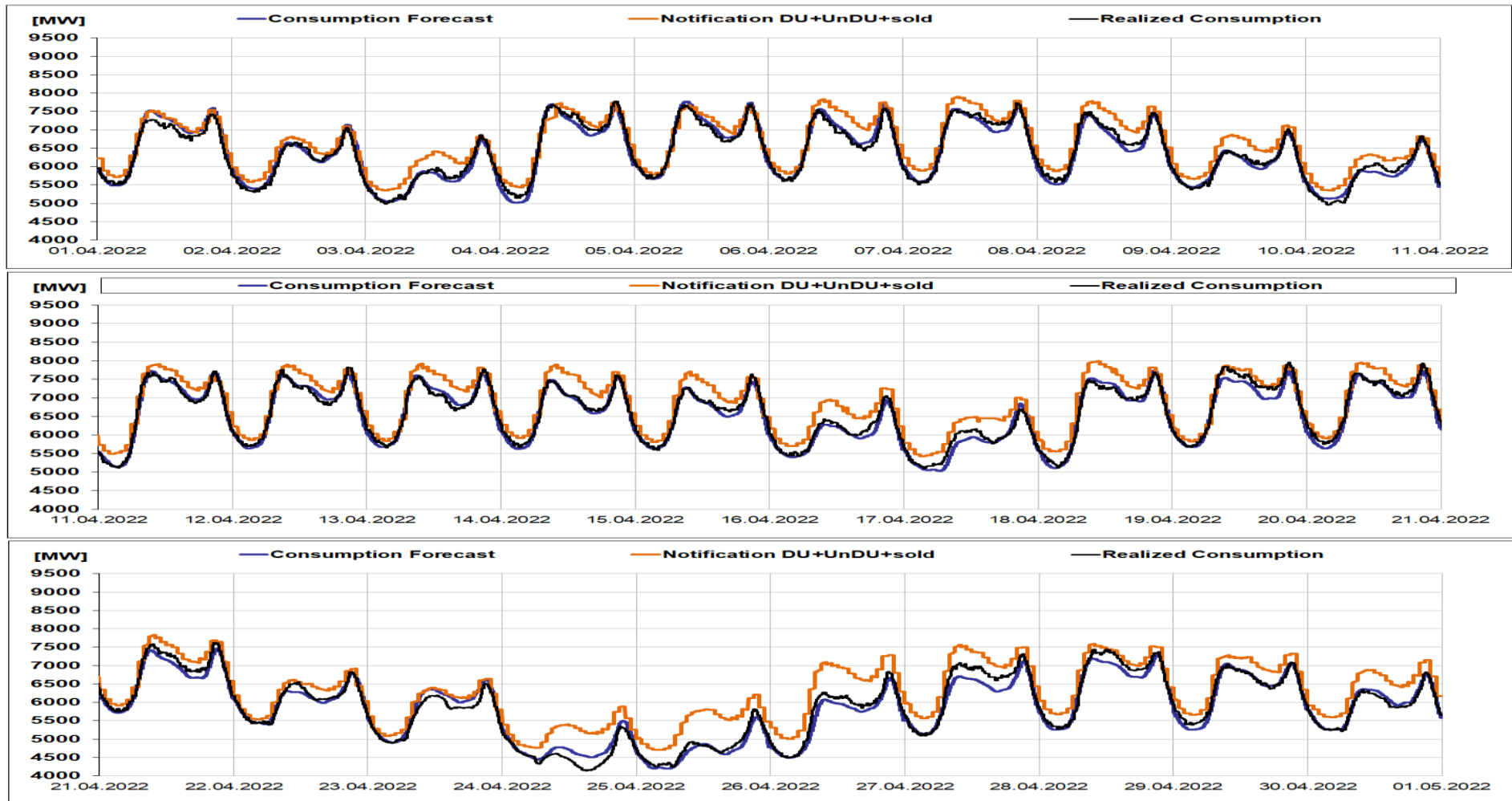


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Balancing Market

Realized consumption, forecast, notifications in D-1



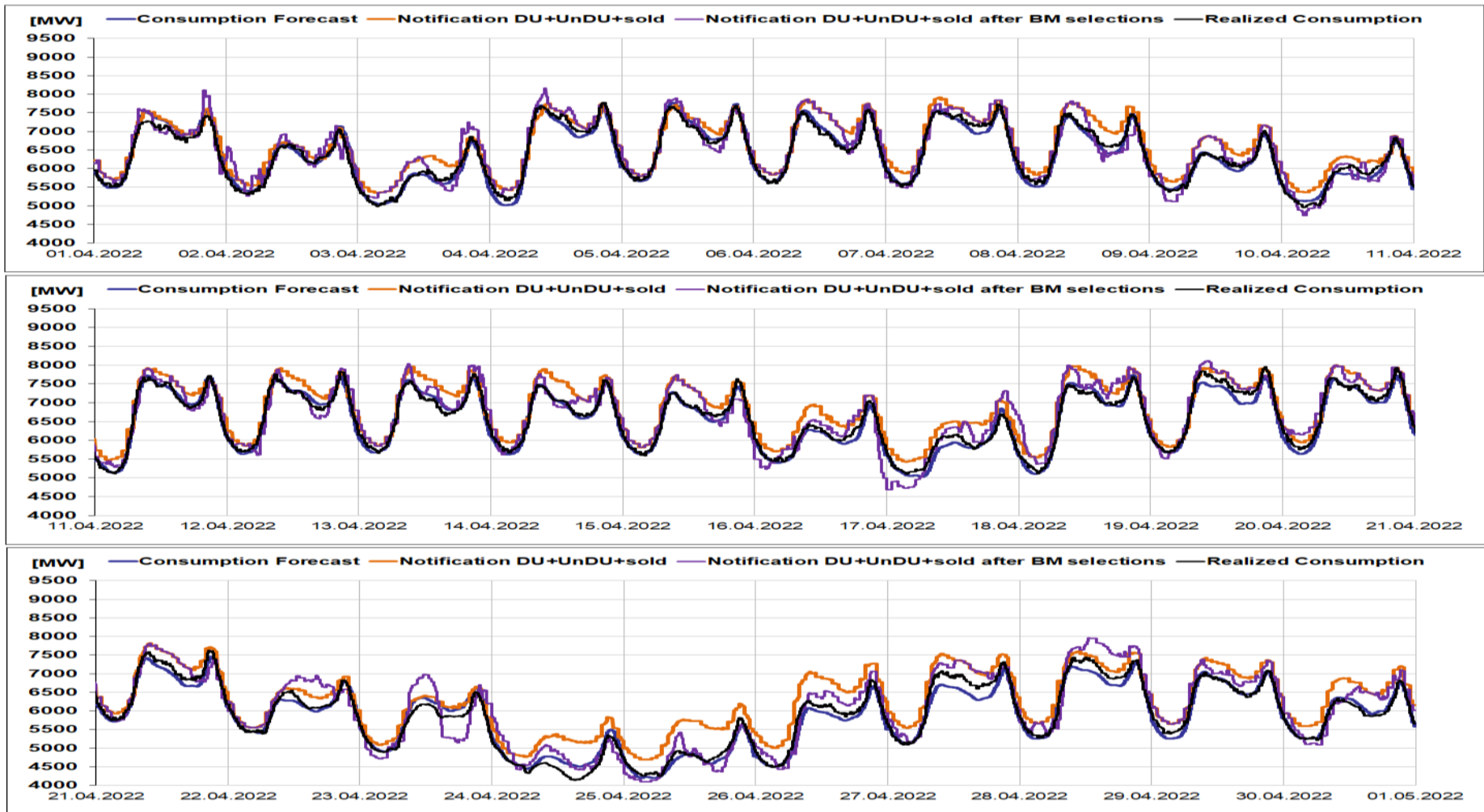


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Balancing Market

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



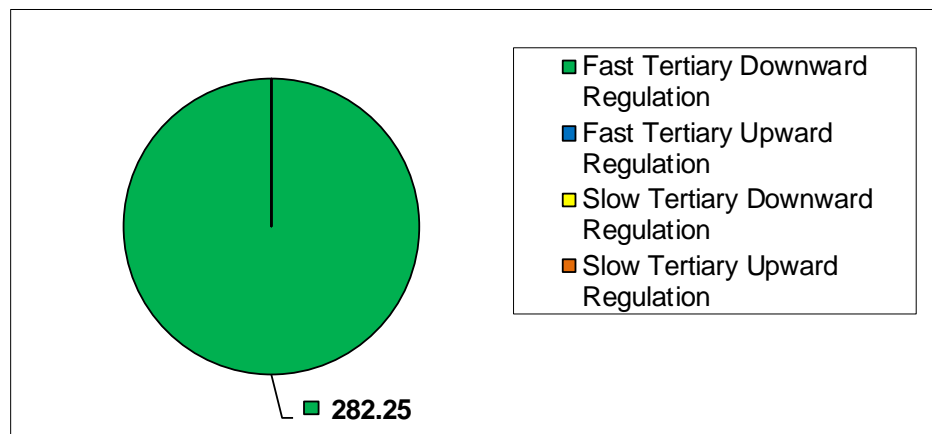
Balancing Market

Congestion Management

April 2022

	Quantities [MWh]		Participants
	Selected [MWh]	Actually Delivered	Number
Fast Tertiary Downward Regulation	282.25	201.08	3
Fast Tertiary Upward Regulation	0.00	-	0
Slow Tertiary Downward Regulation	0.00	-	0
Slow Tertiary Upward Regulation	0.00	-	0
	282.25	201.08	

Selected energy [MWh]

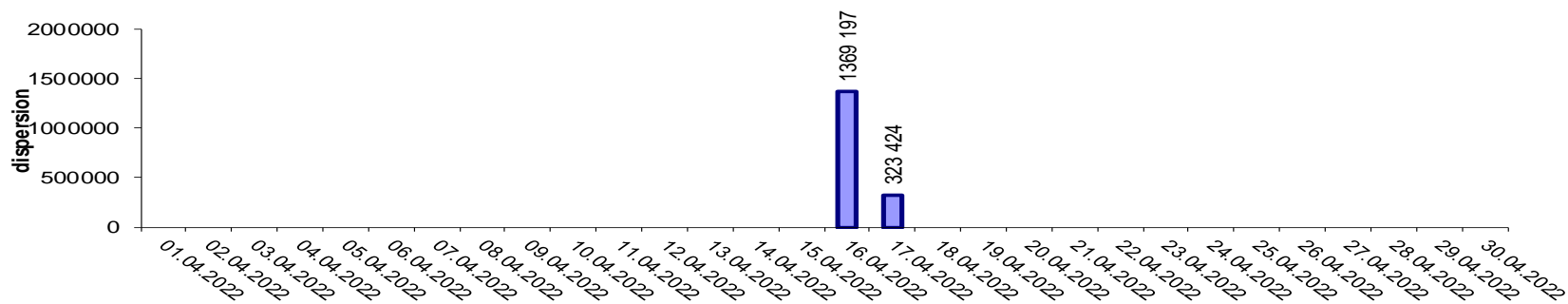


The value of the delivered energy related to the final transactions for the management of internal congestions is the one resulting from the application of the algorithm for determining the costs for system balancing and for management of internal congestions from the settlement stage on the BM.

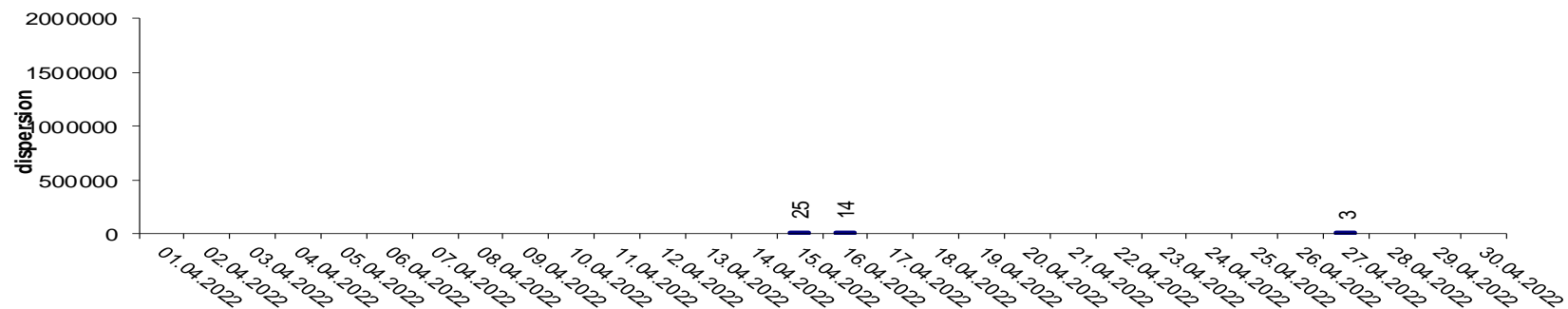
Balancing Market

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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