Nezavisni operator sistema u Bosni i Hercegovini
Независни оператор система у Босни и Херцеговини
Neovisni operator sustava u Bosni i Hercegovini
Independent System Operator in Bosnia and Herzegovina

REPORT
ON ANCILLARY SERVICES AND BALANCING MARKET OPERATIONS IN BOSNIA AND HERZEGOVINA FOR 2020

Sarajevo, February 2021

Abbreviations:

SERC – State Electricity Regulatory Commission

NOSBiH – Independent System Operator in Bosnia and Herzegovina

BSP – Balancing Service Provider

BRP – Balance Responsible Party

EPBiH – Elektroprivreda Bosne i Hercegovine d.d. Sarajevo

EPHZHB – Elektroprivreda Hrvatske zajednice Herceg Bosne d.d. Mostar

ERS – Elektroprivreda Republike Srpske, matično preduzeće, a.d. Trebinje

EFT Stanari – EFT- Coal mine and Thermal Power Plant d.o.o Stanari

EMS – Elektromreža Srbije

CGES – Electricity Transmission System of Montenegro

HOPS – Croatian Transmission System Operator

ELES – Elektro-Slovenija d.o.o. – Electricity Transmission System Operator in Slovenia

Introduction

Balancing energy market is a part of the wholesale energy market and it comes after the bilateral energy market. Unlike the bilateral energy market whose participants in purchase or sale transactions may be any licenced market participant, in the balancing energy market it is obligatory to have independent system operator as one of the participants in the purchase/sale transaction.

Pursuant to the Law on Establishing Independent System Operator in BiH, NOSBiH is responsible for managing the balancing market in BiH which is defined as 'the central market for electricity purchase and sale managed by NOSBiH with the purpose to maintain continuous balance of demand and supply in real time, as well as additional mechanisms conducted by NOSBiH in order to ensure system services'. In addition, one of NOSBiH's operations is to provide ancillary services which are defined by the Law on Establishing Independent System Operator in BiH as ''all services, with the exception of electricity generation and transmission, which are delivered to NOSBiH with the purpose of providing the system services including, among others, regulation of frequency and reserve, reactive power, voltage regulation and a power plant capability to start up without an external electricity supply''. Therefore, the balancing market and the mechanism of providing ancillary services are the ''tools'' by which NOSBiH maintains the balance between generation, exchange and consumption of electricity in real time, maintains required level of reserve for ancillary services of secondary and tertiary regulation and enables safe operations of the electric power system. Participation in the balancing market is regulated by an agreement which NOSBiH concludes with a power market participant in line with the Market rules.

The main principles of the balancing in 2020

In Bosnia and Herzegovina, the Market rules[1] entered into force on 1st January 2016 thus establishing the market principles in the balancing processes and in allocation of the balancing costs of the power system in BiH.

An organized market of capacity reserve and balance energy was established for secondary and tertiary regulation, while primary regulation was obligatory for the generation units connected to the transmission system, without compensations.

The control capacity market was established for secondary and tertiary regulation and the right to participate belong to those balancing service providers (BSPs) whose capacities satisfy the technical preconditions for providing mentioned ancillary services. The capacity prices in 2020 were limited in line with relevant decisions made by the State Regulatory Electricity Comission (SERC). In case that the required scope of secondary and tertiary control capacity were not provided in the market, there was a possibility to procure the missing quantities. If BSPs had failed to deliver certain amount of secondary and tertiary control capacity, they would incur penalty in amount which was equal to 10% of the price cap for secondary i.e. tertiary control capacity.

[1] Market rules were issued by NOSBiH, adopted by SERC by its Decision no 04-28-9-154-3/15 as of 21 May 2015

The reserved (contracted) capacity had to be offered at the balancing electricity market where power and electricity price were also offered in case of activation. At the daily balancing energy market the right to participate also belonged to the bids without reserved capacity i.e. voluntary bids.

The procurement of secondary control capacity was done symmetrically for positive and negative range of control, and the procurement of tertiary control capacity was done separately for upward and downward control.

SERC's Decision on determination of coefficients and price caps for ancillary services as of 14 September 2017 (hereinafter the 'Decision') determined hourly price caps for control capacity and delivered balance energy. The price of balancing energy for downward tertiary control is not limited.

Table 1: Report on ancillary services in BiH for the year 2020

Reserve capacity and capacity cost					
		Sec. Con. Off-peak load (00.00 - 06.00 hrs)	**Sec. con. Peak load (06.00 - 24.00 hrs)**	**Tert. Con. Upward**	**Tert. con. Downward**
Required capacity	*MW*	31,42	49,09	196,00	68,00
Contracted capacity	*MW*	31,42	49,09	196,00	68,00
Capacity contracted at the market	*MW*	21,21	49,09	196,00	68,00
Price of contracted capacity	*KM/MW/h*	42,98	29,12	3,52	1,74
Contracted cost	*KM*	2.965.568	9.418.503	6.062.670	1.036.951
Delivered capacity	*MW*	6	36	183	50
Delivered capacity	*%*	18%	74%	93%	73%
Capacity cost	*KM*	542.862	9.280.079	5.575.136	762.192
Unprovided capacity	*MW*	26	13	13	18
Penalty for unprovided capacity	*KM*	-242.365	-364.743	-100.889	-33.767

The table shows average capacity values presented in 1 hour.

BSP's share in delivered capacity					
EP BiH	*MW*	4	14	92	0
EP BiH	*%*	62%	40%	50%	0%
ERS	*MW*	1	10	24	30
ERS	*%*	22%	28%	13%	60%
EP HZHB	*MW*	1	12	67	0
EP HZHB	*%*	16%	32%	37%	0%
EFT	*MW*			0	20
EFT	*%*			0%	40%

The table shows average capacity values presented in 1 hour.

These were the limitations[2] at the balancing energy market in 2020:

- Price of energy for upward tertiary control was limited to 414.70 KM/MWh;
- Difference in prices of energy for upward and downward secondary control was limited to 40.00 KM/MWh in the bids for secondary control,
- The price cap for secondary control capacity amounted to 43.00 KM/MW/h
- The price cap for upward tertiary control capacity amounted to 9.00 KM/MW/h
- The price cap for downward tertiary control capacity amounted to 2.10 KM/MW/h

In line with bids activated for balancing energy for secondary and tertiary control there were created imbalance prices which were used in calculation of imbalance costs of balance responsible parties (BRPs) in BiH. Imbalance prices were determined for each hour according to the most expensive bid activated, for realized electricity deficit and surplus respectively.

Ancillary Services in 2020

Table 1 presents specific values related to ancillary services capacity in 2020. Image 1 graphically presents the share that the BSP had in providing specific ancillary services and the share of undelivered capacity on an annual basis. Detailed monthly realization of capacity for some ancillary services is shown in tables 2 - 5.

Low operational availability especially of secondary control capacity in off-peak load periods was still present. Despite this fact, during the year, there were no longer periods of large deviations of BiH Control Area towards the remaining part of the interconnection which would have caused larger disturbances or jeopardized the system's safety.

Secondary regulation

In 2020 NOSBiH had around 6 MW of secondary control capacity in off peak load periods (from midnight until 6:00 am), which makes around 18% of required secondary control capacity and makes significant decrease of 44% in comparison to the year 2019. In peak load periods (from 6:00 am until midnight) there was average amount of 36 MW of secondary control capacity which makes 74% of the capacity required. The cost of secondary control capacity in 2020 amounted to nearly 10 million KMs. In 2020 three companies with their regulation resources were registered to provide ancillary service of secondary control.

Tertiary regulation

In 2020 NOSBiH had around 183 MW of upward tertiary control capacity and 50 MW of downward tertiary control capacity which makes 93% of required upward and 73% of required downward tertiary control capacity. The cost of provided tertiary control capacity in 2020 amounted 5 575 136 KM for upward tertiary control and 762 192 KM for downward tertiary control. Due to a significant increase in the capacity price in 2020, the cost of downward tertiary control also increased by almost 5 times. During the year 4 companies were registered as providers of ancillary service of tertiary control.

[2] Price cap is determined by SERC – Decision on determination of coefficients and price caps for ancillary services

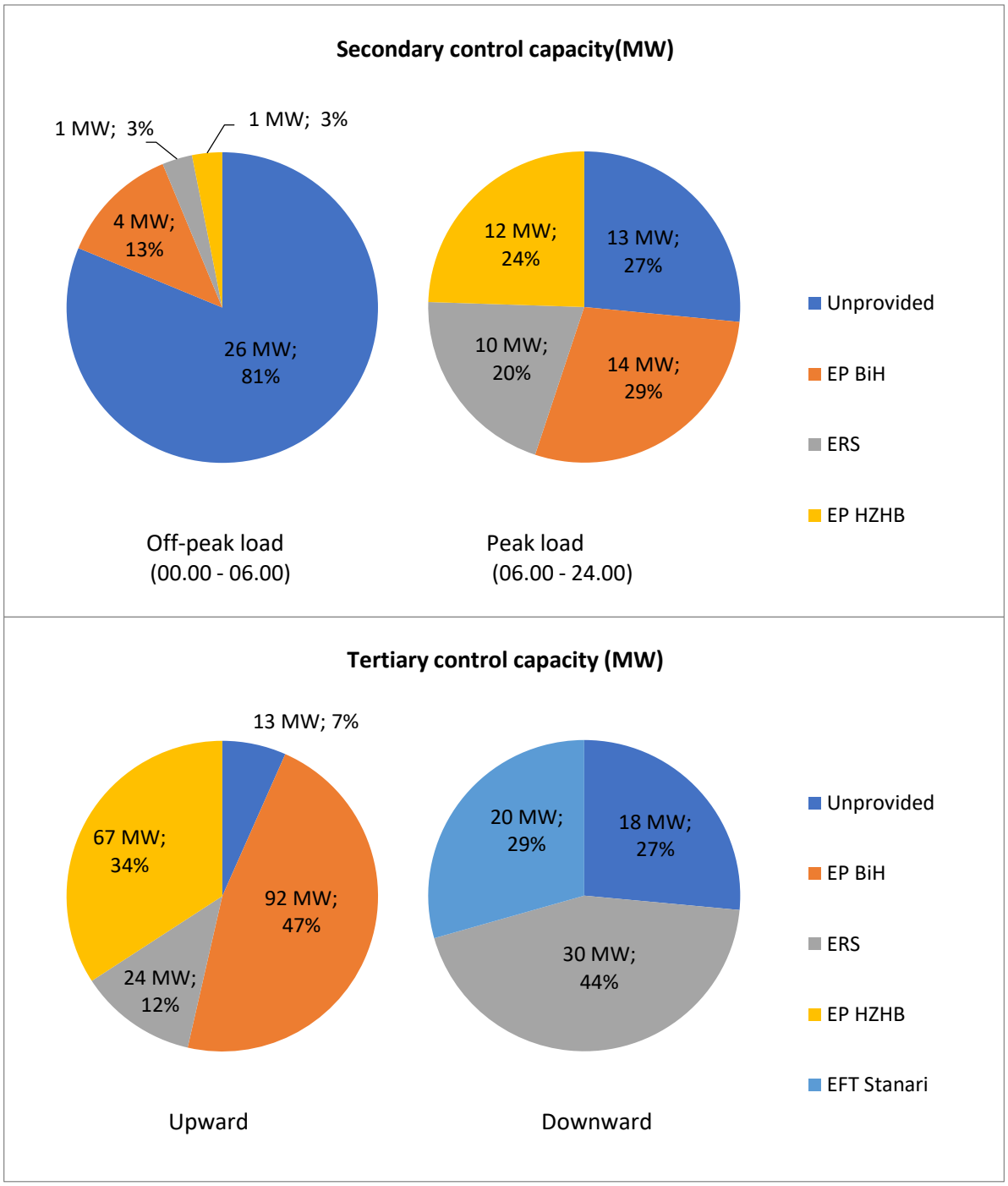

Image 1: Share of BSPs in delivered regulation capacity in BiH in 2020

Table 2: Report on ancillary services in BiH for the year 2020

Secondary control - off-peak load (00.00 - 06.00)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2020	2020/19
Required capacity	MW	36	34	32	31	30	30	30	27	26	32	33	36	31,42	96%
Contracted capacity	MW	36	34	32	31	30	30	30	27	26	32	33	36	31,42	96%
Capacity contracted at the market	MW	24	24	32	31	26	16	0	0	16	24	31	31	21,21	81%
Price of contracted capacity	KM/MW	42,99	42,99	42,97	42,97	42,97	42,99	43,00	43,00	42,99	42,99	42,97	42,98	42,98	100%
Contracted cost	KM	287.839	254.304	254.386	239.774	239.787	232.142	239.940	215.946	201.182	257.222	255.271	287.774	2.965.568	97%
Delivered capacity	MW	17	4	11	1	0	3	2	0	6	8	4	13	5,75	56%
Delivered capacity	%	47%	12%	35%	3%	1%	10%	6%	1%	23%	25%	12%	35%	18,31%	
Capacity cost	KM	134.162	31.381	88.267	8.338	2.579	22.568	13.502	1.161	47.031	63.492	30.292	100.089	542.862	56%
Undelivered capacity	MW	19	30	21	30	30	27	28	27	20	24	29	23	25,67	116%
Penalty for undelivered capacity	KM	-15.373	-22.300	-16.624	-23.160	-23.736	-20.963	-22.644	-21.479	-15.420	-19.380	-22.511	-18.778	-242.365	116%

The table shows average capacity values and prices presented in 1 hour.

BSP's share in delivered capacity															
EP BiH	MW	11	3	9	1	0	2	1	0	3	5	1	7	3,57	48%
EP BiH	%	66%	61%	78%	100%	87%	70%	49%	100%	48%	65%	25%	55%	62%	
ERS	MW	0	0	2	0	0	1	1	0	3	2	3	3	1,27	137%
ERS	%	0%	0%	22%	0%	0%	24%	48%	0%	52%	27%	64%	28%	22%	
EP HZHB	MW	6	2	0	0	0	0	0	0	0	1	0	2	0,91	45%
EP HZHB	%	34%	39%	0%	0%	13%	6%	3%	0%	0%	8%	11%	17%	16%	

Table 3: Report on ancillary services in BiH for the year 2020

Secondary control - peak load (06:00 - 24.00 hrs)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2020	2020/19
Required capacity	MW	55	52	50	48	47	45	47	45	42	50	52	56	49,09	98%
Contracted capacity	MW	55	52	50	48	47	45	47	45	42	50	52	56	49,09	98%
Capacity contracted at the market	MW	55	52	50	48	47	45	47	45	42	50	52	56	49,09	98%
Price of contracted capacity	KM/MW	29,01	28,97	28,96	29,01	29,19	29,27	29,30	29,23	29,13	29,63	28,87	28,96	29,12	72%
Contracted cost	KM	890.463	786.269	807.849	752.065	765.416	711.200	768.387	734.070	660.575	826.556	810.709	904.943	9.418.503	70%
Delivered capacity	MW	51	45	40	31	23	29	33	27	26	42	42	46	36,22	94%
Delivered capacity	%	93%	86%	79%	64%	50%	65%	71%	60%	62%	84%	81%	82%	73,77%	
Capacity cost	KM	1.101.322	901.832	854.649	644.415	505.744	615.378	731.760	591.069	544.007	929.063	872.784	988.056	9.280.079	90%
Undelivered capacity	MW	4	7	10	17	24	16	14	18	16	8	10	10	12,88	111%
Penalty for undelivered capacity	KM	-9.705	-16.383	-25.177	-40.308	-56.945	-36.434	-32.448	-42.703	-37.384	-19.105	-23.366	-24.785	-364.743	112%
The table shows average capacity values and prices presented in 1 hour.															
BSP's share in delivered capacity															
EP BiH	MW	24	20	19	17	13	4	6	4	2	22	18	24	14,40	64%
EP BiH	%	48%	45%	48%	56%	56%	13%	17%	14%	6%	52%	43%	53%	39,76%	
ERS	MW	9	8	9	8	6	12	15	12	14	13	9	9	10,29	116%
ERS	%	18%	17%	22%	26%	28%	39%	45%	43%	55%	31%	22%	19%	28,40%	
EP HZHB	MW	18	17	12	5	4	14	13	12	10	7	15	13	11,53	160%
EP HZHB	%	35%	38%	30%	17%	16%	47%	37%	43%	39%	17%	35%	28%	31,84%	

Table 4: Report on ancillary services in BiH for the year 2020

Upward tertiary control

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2020	2020/19
Required capacity	MW	196	196	196	196	196	196	196	196	196	196	196	196	196,00	100%
Contracted capacity	MW	196	196	196	196	196	196	196	196	196	196	196	196	196,00	100%
Capacity contracted at the market	MW	196	196	196	196	196	196	196	196	196	196	196	196	196,00	100%
Price of contracted capacity	KM/MW	2,82	2,82	2,81	2,81	2,81	5,31	4,38	4,38	5,08	3,38	2,85	2,85	3,52	99%
Contracted cost	KM	410.509	384.025	408.650	396.000	410.361	749.923	638.412	638.412	716.515	492.952	401.760	415.152	6.062.670	100%
Delivered capacity	MW	184	193	190	196	195	175	178	184	147	185	191	182	183,24	111%
Delivered capacity	%	94%	98%	97%	100%	100%	89%	91%	94%	75%	95%	97%	93%	93,49%	
Capacity cost	KM	385.864	377.495	395.268	395.924	409.280	667.120	572.985	594.338	535.645	465.967	390.438	384.812	5.575.136	105%
Undelivered capacity	MW	12	3	6	0	1	21	18	12	49	11	5	14	12,76	41%
Penalty for undelivered capacity	KM	-7.951	-2.090	-4.316	-23	-347	-13.887	-12.298	-8.227	-31.448	-7.222	-3.551	-9.529	-100.889	41%

The table shows average capacity values and prices presented in 1 hour.

BSPs share in delivered capacity															
EP BiH	MW	84	92	90	96	99	59	114	115	82	96	91	86	92,13	111%
EP BiH	%	45%	48%	47%	49%	51%	34%	64%	63%	56%	52%	48%	47%	50,28%	
ERS	MW	0	1	0	0	0	70	63	69	49	33	0	0	23,82	68%
ERS	%	0%	0%	0%	0%	0%	40%	36%	37%	33%	18%	0%	0%	13,00%	
EP HZHB	MW	100	100	100	100	96	46	0	0	16	56	100	96	67,30	144%
EP HZHB	%	54%	52%	53%	51%	49%	26%	0%	0%	11%	30%	52%	53%	36,73%	
EFT Stanari	MW	0	0	0	0	0	0	0	0	0	0	0	0	0,00	
EFT Stanari	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0,00%	

Table 5: Report on ancillary services in BiH for the year 2020

Downward tertiary control

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2020	2020/19
Required capacity	MW	68	68	68	68	68	68	68	68	68	68	68	68	68,00	100%
Contracted capacity	MW	68	68	68	68	68	68	68	68	68	68	68	68	68,00	100%
Capacity contracted at the market	MW	68	68	68	68	68	68	68	68	68	68	68	68	68,00	100%
Price of contracted capacity	KM/MW	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	479%
Contracted cost	KM	87.829	82.163	87.711	84.996	87.829	84.996	87.829	87.829	84.996	87.947	84.996	87.829	1.036.951	481%
Delivered capacity	MW	54	41	56	52	45	34	56	54	54	35	56	58	49,69	100%
Delivered capacity	%	80%	61%	83%	76%	67%	49%	82%	80%	79%	52%	82%	85%	73,08%	
Capacity cost	KM	72.249	49.574	74.186	67.110	59.709	39.767	73.628	72.275	66.634	41.066	70.414	75.580	762.192	493%
Undelivered capacity	MW	14	27	12	16	23	34	12	14	14	33	12	10	18,31	100%
Penalty for undelivered capacity	KM	-2.122	-3.877	-1.842	-2.435	-3.528	-5.204	-1.932	-2.117	-2.174	-5.086	-1.888	-1.563	-33.767	100%

The table shows average capacity values and prices presented in 1 hour.

BSP's share in delivered capacity															
EP BiH	MW	0	0	0	0	0	0	0	0	0	0	0	0	0,00	
EP BiH	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0,00%	
ERS	MW	29	28	31	27	26	27	31	29	34	34	31	33	30,03	104%
ERS	%	54%	67%	56%	52%	57%	80%	55%	54%	63%	95%	57%	57%	60,44%	
EP HZHB	MW	0	0	0	0	0	0	0	0	0	0	0	0	0,00	
EP HZHB	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0,00%	
EFT Stanari	MW	25	14	25	25	19	7	25	25	20	2	24	25	19,66	95%
EFT Stanari	%	46%	33%	44%	48%	43%	20%	45%	46%	37%	5%	43%	43%	39,56%	

Balancing market

In 2020, for the needs of balancing the power system of BiH 32 426 MWh of upward balancing energy was engaged (injected electric energy) with average price of 108.10 KM/MWh. In 2020 around 40% less of upward balancing energy was engaged than it was the case in 2019.

In 2020, engaged downward balancing energy (takeover of electricity from the system) amounted to 57 049 MWh. Average price for this energy was 50.20 KM/MWh taking into account the energy with offered negative price as well. In 2020 around 40% more of downward balancing energy was engaged than it was the case in 2019.

Imbalance

There were 8 balance responsible parties (BRPs) active in BiH in 2020, not counting so called 'trading BRPs' i.e. the BRPs with no imbalance realized within BiH. Average imbalance prices in 2020 were 105.91 KM/MWh for shortage and 33.76 KM/MWh for surplus of electric energy. However, these prices were moving in a wide range from -500.00 KM/MWh up to 414.00 KM/MWh, depending on the energy situation.

Acoording to data on engaged balancing energy and realized imbalances it can be concluded that the year 2020 was characterized by more frequent cases of electricity surplus. Image 2 shows the deviations of the Control Area BiH in last five years.

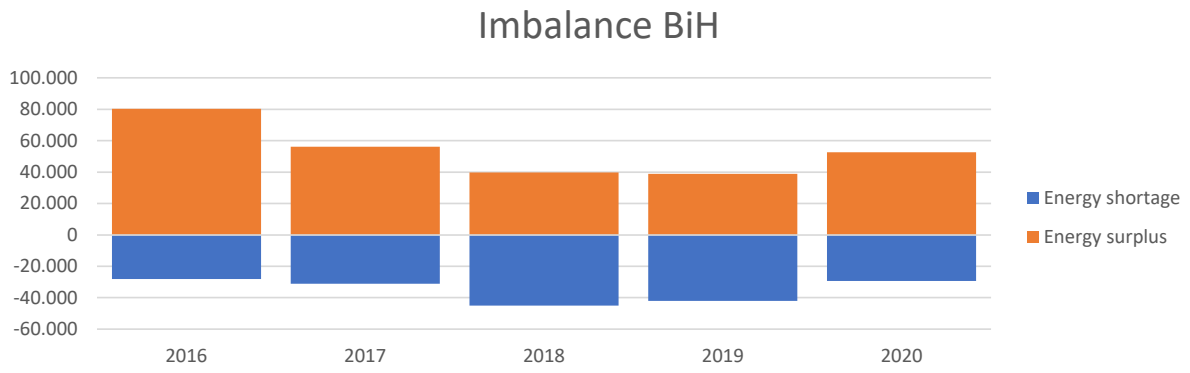

Image 2: Annual deviations of BiH Control Area

Table 6: Indicators of deviation in BiH for last five years

Imbalance BiH		Energy shortage					Energy surplus				
		2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
Total	*MWh*	-28.159	-31.200	-45.062	-42.010	-29.318	80.310	56.105	39.814	38.864	52.587
Max. Hourly	*MW*	-313	-179	-190	-186	-149	239	157	199	171	218

Table 7 presents engaged balancing energy values, energy prices and adequate expenses by taking into consideration cross-border engagements for the needs of BiH Control Area, exempting the energy engaged within BiH for the needs of other system operators.

Table 7: Report on balancing market in BiH for the year 2020

Engaged energy

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2020	2020/19
Energy for upward sec. control	MWh	5.163	2.236	1.524	1.029	754	2.406	3.715	1.522	3.718	2.331	2.592	3.835	30.825	61%
downward sec. control	MWh	4.726	5.898	6.765	5.000	4.254	3.762	3.307	4.175	2.485	6.236	4.609	5.585	56.802	143%
Energy for upward tert. control	MWh	0	548	0	0	399	0	280	0	198	0	0	175	1.600	52%
downward tert. control	MWh	0	0	0	30	191	8	0	0	0	0	18	0	247	40%
Balancing energy upward	MWh	5.163	2.784	1.524	1.029	1.153	2.406	3.995	1.522	3.916	2.331	2.592	4.010	32.426	60%
Balancing energy downward	MWh	4.726	5.898	6.765	5.030	4.445	3.769	3.307	4.175	2.485	6.236	4.628	5.585	57.049	142%

Balancing cost and realized average prices

Upward - cost	KM	611.684	464.489	113.800	79.372	189.956	181.624	394.582	144.480	409.168	212.348	247.783	455.854	3.505.141	54%
Upward - average price	KM/MWh	118,46	166,85	74,66	77,13	164,72	75,49	98,76	94,92	104,48	91,12	95,60	113,69	108,10	89%
Downward - cost (pos. price)	KM	351.222	382.297	276.428	179.596	146.979	137.236	148.909	225.804	152.734	333.491	270.447	305.408	2.910.551	132%
Downward - cost (neg. price)	KM	0	0	-478	-3.141	-33.867	-150	-105	0	0	0	-9.167	0	-46.907	-49%
Downward - average price	KM/MWh	74,31	64,82	40,79	35,08	25,45	36,37	45,00	54,08	61,47	53,48	56,46	54,68	50,20	95%

Imbalance BiH

Shortage - total	MWh	1.543	1.350	1.413	1.458	1.566	2.499	4.484	2.510	5.454	1.989	2.200	2.854	29.318	70%
Shortage - max hourly	MW	31	55	62	67	149	43	106	50	69	58	79	113	149,02	80%
Surplus - total	MWh	3.602	4.815	5.100	6.369	10.042	4.043	2.092	4.453	2.271	3.959	2.943	2.898	52.587	135%
Surplus - max hourly	MW	109	53	48	76	218	55	56	62	45	44	69	55	218,19	127%
Price shortage - average	KM/MWh	125,58	113,88	97,10	90,68	92,97	90,76	102,30	112,57	114,22	104,37	111,64	114,86	105,91	86%
Price shortage - maximum	KM/MWh	240,00	414,00	120,00	160,00	410,00	121,96	250,00	160,00	300,00	150,00	160,00	414,00	414,00	100%
Price surplus - average	KM/MWh	61,76	43,64	22,40	19,56	15,08	24,41	26,89	28,70	43,92	39,14	39,71	40,29	33,76	84%
Price surplus - minimum	KM/MWh	0,00	0,00	-20,00	-100,00	-500,00	-20,00	-15,00	-5,00	0,00	0,00	-500,00	0,00	-500,00	-100%

Transmission losses and compensations

In 2020 electric energy to cover transmission system losses and compensations was purchased through public procurement procedures. Total cost of this service in 2020 was 37 452 069 KM which is around 13% less in comparison to the year 2019. The energy prices obtained in the procurement procedure were in average 8% lower than in the year 2019 (Table 8) while the transmission losses in 2020 were on last year's level.

Cross-border balancing energy exchange

On the basis of the Agreement on the provision of a joint reserve in the Slovenia-Croatia-Bosnia and Herzegovina control block, the capacity of tertiary regulation which was to be provided in 2020 within the BiH control area was 196 MW for upward regulation, and 68 MW for downward regulation. In 2017 Agreement on cross-border exchange of balancing energy was also signed with Serbian Transmission System Operator – EMS, and in 2018 the same Agreement was signed with the Transmission System Operator in Montenegro – CGES.

Table 9 shows the values of exchanged cross-border balancing energy in 2020 with the expenses included. Out of the total amount of 730 MWh of cross-border balancing energy (upward), the amount of 590 MWh was delivered to Serbia and 140 MWh to Montenegro (Image 3). During the year 2020 no balancing energy of other system operators was used for balancing needs in the BiH Control Area.

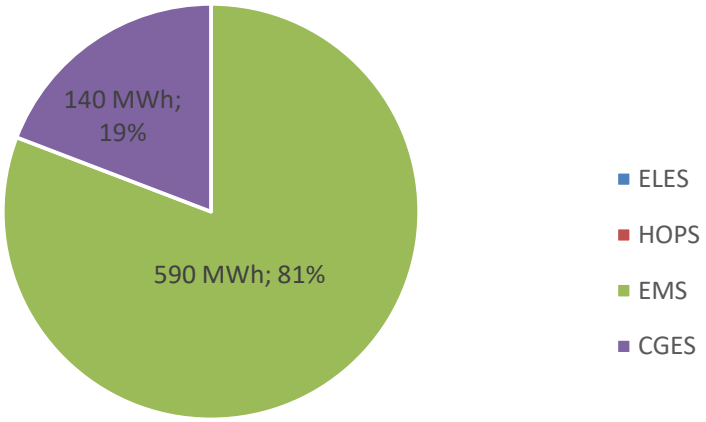

Image 3: Crossborder exchange of balancing energy

Table 8: Report on transmission losses and compensations for 2020

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2020	2020/19
Compensations	MWh	-936	1.894	2.672	-1.974	4.918	6.250	2.854	-1.324	840	3.080	2.116	22	20.412	754%
Losses	MWh	33.220	26.999	26.189	20.476	21.245	21.431	26.891	24.974	25.082	26.214	28.968	35.468	317.157	99%
Reference price	KM/MWh	129,73	133,47	111,56	113,27	117,78	121,96	126,29	131,86	131,17	133,07	133,07	123,98	125,60	92%
Cost	KM	4.431.059	3.350.747	2.623.525	2.542.916	1.923.048	1.851.467	3.035.571	3.467.659	3.179.813	3.078.427	3.573.182	4.394.655	########	87%

Compensations: "-" direction - acceptance, "+" direction - giving.

Table 9 : Report on cross-border balancing energy exchange for 2020

Energy engaged in BiH for other TSOs needs

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2020	2020/19
XB Exchange - Import	MWh														
Price Import Average	KM /MWh														
Cost Import	KM														
Price Export Average	KM /MWh			550			120				60			730	35%
Cost Export	KM			156,69			206,81				318,33			178,22	77%
				86.182			24.817				19100			130.098	27%

Engaged cross-border energy for BiH needs

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2020	2020/19
XB Exchange - Import	MWh														
Price Import Average	KM /MWh														
Cost Import	KM														
XB Exchange - Export	MWh														
Price Export Average	KM /MWh														
Cost Export	KM														

Conclusion

All required ancillary services capacity for 2020, apart from the secondary control capacity in off peak load periods, were procured in public procurement procedures mostly in the annual tender. In comparison to the year 2019 the price of secondary control capacity in peak load periods was 28% lower, and the price of downward tertiary control capacity was almost 5 times higher. The prices of secondary control capacity in peak load periods and of upward tertiary control capacity remained at last year's level. In addition, realized prices of balancing capacities were significantly below the regulated price caps except for the price of secondary control capacity in off peak load periods.

In 2020 only 18% of required secondary control capacity was delivered during the night hours. Other services were delivered in a wider range of 70-95% of required capacity. Prevailing ancillary services providers were three elektroprivreda companies and EFT- Coal mine and Thermal Power Plant l.t.d Stanari for downward tertiary control.

Average imbalance prices were 105.91 KM/MWh for realized electricity deficit and 33.76 KM/MWh for realized electricity surplus and are generally lower than in 2019.

The cost in terms of losses and compensations was around 13% lower than it was in last year, although losses were on last year's level. This total cost for covering losses and compensations is lower due to the energy prices achieved by tendering which is 8% lower than in last year and due to compensations' amounts.

As for cross-border balancing energy exchange, the system operator in Serbia was delivered 590 MWh and the system operator in Montenegro was delivered 140 MWh of electricity. No cross border balancing energy was engaged for needs of BiH in 2020.

Taking into account the actual tariff for system services, on the basis of ancillary services the amount of 6.9 million KM of revenue was realized in 2020.

However, the coronavirus pandemic shaped the year and in certain periods of the year there was a significant decrease of consumption and prices in electricity in the market which also had some effect to energy prices achieved in the balancing market of BiH.