

REPORT
ON ANCILLARY SERVICES AND BALANCING MARKET
OPERATIONS IN BOSNIA AND HERZEGOVINA FOR 2019

Sarajevo, February 2020

Abbreviations:

SERC – State Electricity Regulatory Commission

NOSBiH – Independent System Operator in Bosnia and Herzegovina

ASP – Ancillary 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

EAL – Aluminij d.d. Mostar

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 rules¹.

The main principles of the balancing in 2019

In Bosnia and Herzegovina, the Market rules 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 ancillary service providers whose capacities satisfy the technical preconditions for providing mentioned ancillary services. The capacity prices in 2019 were limited in line with relevant SERC's decisions. 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 ancillary service providers 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.

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.

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

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 2019

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	<i>MW</i>	32,57	50,13	196,00	68,00
Contracted capacity	<i>MW</i>	32,57	50,13	196,00	68,00
Capacity contracted at the market	<i>MW</i>	26,20	50,13	196,00	68,00
Price of contracted capacity	<i>KM/MW/h</i>	42,99	40,71	3,55	0,36
Contracted cost	<i>KM</i>	3.065.869	13.406.999	6.089.128	215.759
Delivered capacity	<i>MW</i>	10	39	165	50
Delivered capacity	<i>%</i>	32%	77%	84%	73%
Capacity cost	<i>KM</i>	975.370	10.281.978	5.313.652	154.734
Unprovided capacity	<i>MW</i>	22	12	31	18
Penalty for unprovided capacity	<i>KM</i>	-209.096	-326.306	-248.094	-33.740

The table shows average capacity values presented in 1 hour.

ASP's share in delivered capacity					
EP BiH	<i>MW</i>	7	23	83	0
EP BiH	<i>%</i>	71%	58%	50%	0%
ERS	<i>MW</i>	1	9	35	29
ERS	<i>%</i>	9%	23%	21%	58%
EP HZHB	<i>MW</i>	2	7	47	0
EP HZHB	<i>%</i>	20%	19%	28%	0%
EAL	<i>MW</i>			0	
EAL	<i>%</i>			0%	
EFT	<i>MW</i>			0	21
EFT	<i>%</i>			0%	42%

The table shows average capacity values presented in 1 hour.

These were the limitations² at the balancing energy market in 2019:

- 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 2019

Table 1 presents specific values related to ancillary services capacity in 2019. Image 1 graphically presents the share that the ASP 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 e the system's safety.

Secondary regulation

In 2019 NOSBiH had around 10 MW of secondary control capacity in off peak load periods (from midnight until 6:00 am), which makes around 32% of required secondary control capacity and makes significant decrease of 28% in comparison to the year 2018. In peak load periods (from 6:00 am until midnight) there was average amount of 39 MW of secondary control capacity which makes 77% of the capacity required. The cost of secondary control capacity in 2019 amounted to 11 257 348 KM. In 2019 three companies with their regulation resources were registered to provide ancillary service of secondary control.

Tertiary regulation

In 2019 NOSBiH had around 165 MW of upward tertiary control capacity and 50 MW of downward tertiary control capacity which makes 84% of required upward and 73% of required downward tertiary control capacity. The cost of provided tertiary control capacity in 2019 amounted 5 313 652 KM for upward tertiary control and 154 734 KM for downward tertiary control. In 2019 5 companies were registered as providers of ancillary service of upward tertiary control, and 4 companies as providers of ancillary service of downward tertiary control.

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

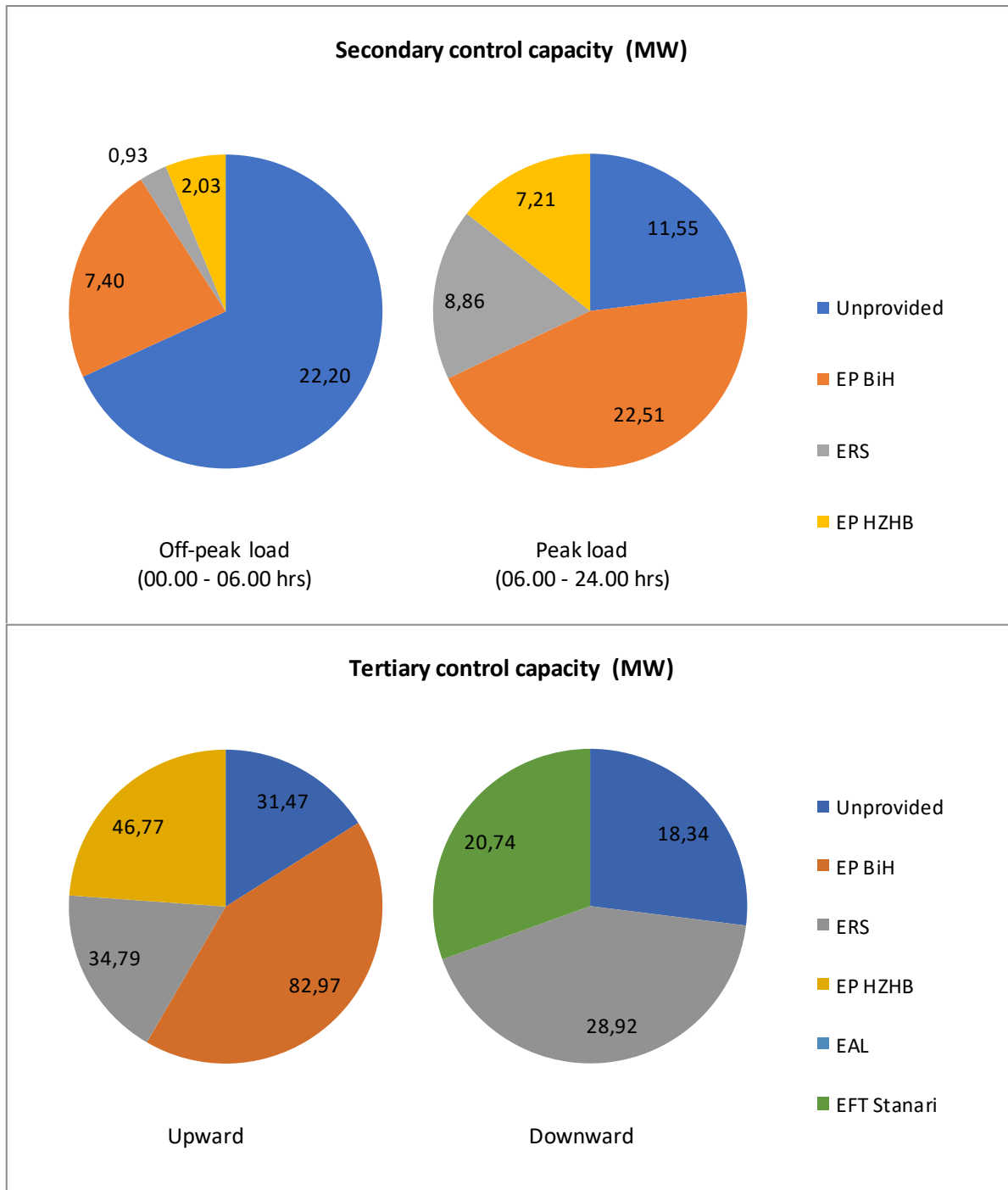


Image 1: Share of ASPs in delivered control capacity in BiH in 2019

Table 2: Report on ancillary services in BiH for the year 2019
Secondary control - off-peak load (00.00 - 06.00)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2019	2019/18			
Required capacity	MW	34	36	36	31	29	30	31	31	32	31	31	32	34	35	32,57	99,96%
Contracted capacity	MW	34	36	36	31	29	30	31	31	32	31	31	32	34	35	32,57	99,96%
Capacity contracted at the market	MW	34	34	34	31	26	26	18	10	8	26	34	34	34	34	26,20	104,78%
Price of contracted capacity	KM/MW	42,99	42,99	42,99	42,98	42,99	42,99	42,99	43,00	42,99	42,99	42,99	42,99	42,99	42,99	42,99	100,00%
Contracted cost	KM	271.843	259.983	286.291	239.854	231.882	232.142	247.860	255.936	239.911	257.252	263.074	279.841	3.065.869	99.96%		
Delivered capacity	MW	4	15	12	13	14	13	8	6	6	3	9	21	10,36	71,61%		
Delivered capacity	%	12%	41%	33%	43%	49%	44%	26%	19%	18%	10%	28%	60%	31,82%			
Capacity cost	KM	33.268	105.992	93.965	102.208	112.794	102.824	64.472	49.751	43.558	25.970	72.340	168.228	975.370	71,61%		
Undelivered capacity	MW	30	21	24	18	15	17	23	26	25	29	25	14	22,20	122,61%		
Undelivered capacity	KM	-23.865	-15.403	-19.238	-13.769	-11.911	-12.934	-18.344	-20.619	-19.638	-23.134	-19.079	-11.163	-209.096	122,61%		
The table shows average capacity values and prices presented in 1 hour.																	
Aspi's share in delivered capacity																	
EP BiH	MW	4	14	9	13	10	9	1	1	0	1	8	20	7,40	88,10%		
EP BiH	%	92%	93%	75%	96%	72%	68%	13%	20%	4%	20%	87%	94%	71%			
ERS	MW	0	1	2	1	2	3	1	1	0	0	1	1	0,93	17,57%		
ERS	%	8%	4%	15%	4%	11%	23%	8%	9%	0%	1%	13%	4%	9%			
EP HZHB	MW	0	0	1	0	2	1	6	4	5	3	0	0	2,03	261,93%		
EP HZHB	%	0%	2%	10%	0%	17%	10%	79%	71%	96%	79%	0%	1%	20%			

The table shows average capacity values presented in 1 hour

Table 3: Report on ancillary services in BiH for the year 2019
Secondary control - peak load (06:00 - 24.00 hrs)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2019	2019/18	
Required capacity	MW	53	56	55	48	44	46	47	49	47	49	54	54	50,13	99,27%
Contracted capacity	MW	53	56	55	48	44	46	47	49	47	49	54	54	50,13	99,27%
Capacity contracted at the market	MW	53	56	55	48	44	46	47	49	47	49	54	54	50,13	99,27%
Price of contracted capacity	KM/MW	40,54	40,56	39,71	39,67	39,63	41,95	41,97	42,01	42,33	41,10	39,70	39,70	40,71	97,84%
Contracted cost	KM	1.198.891	1.144.861	1.218.655	1.028.273	972.979	1.042.022	1.100.733	1.148.688	1.074.298	1.123.882	1.157.566	1.196.451	13.406.999	97,12%
Delivered capacity	MW	44	46	49	43	33	29	28	29	33	37	44	49	38,58	101,21%
Delivered capacity	%	83%	83%	89%	90%	75%	63%	59%	58%	70%	76%	81%	91%	76,96%	∞
Capacity cost	KM	998.440	949.322	1.089.279	927.261	727.148	650.330	644.857	668.287	754.210	850.654	938.374	1.083.817	10.281.978	99,05%
Undelivered capacity	MW	9	10	6	5	11	17	19	20	14	12	10	5	11,55	93,28%
Penalty for undelivered capacity	KM	-21.337	-20.915	-14.014	-10.956	-26.690	-40.042	-46.264	-48.818	-32.525	-28.797	-23.762	-12.186	-326.306	93,27%
The table shows average capacity values and prices presented in 1 hour.															
ASPs share in delivered capacity															
EP BiH	MW	25	29	33	32	25	6	6	8	18	27	29	33	22,51	109,46%
EP BiH	%	57%	62%	67%	74%	77%	20%	22%	28%	55%	73%	66%	67%	58,36%	
ERS	MW	7	8	8	7	3	18	14	13	7	7	7	8	8,86	57,95%
ERS	%	15%	17%	16%	15%	9%	64%	49%	45%	22%	19%	16%	16%	22,96%	
EP HZHB	MW	12	9	8	5	5	5	8	8	7	3	8	8	7,21	318,49%
EP HZHB	%	28%	20%	17%	11%	14%	16%	29%	27%	23%	8%	18%	17%	18,68%	
The table shows average capacity values presented in 1 hour.															

Table 4: Report on ancillary services in BiH for the year 2019
Upward tertiary control

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2019	2019/18	
Required capacity	MW	196	196	196	196	196	196	196	196	196	196	196	196,00	100,00%	
Contracted capacity	MW	196	196	196	196	196	196	196	196	196	196	196	196,00	100,00%	
Capacity contracted at the market	MW	196	196	196	196	196	196	196	196	196	196	196	196,00	100,00%	
Price of contracted capacity	kWh/MW	3,24	3,24	3,18	3,01	3,18	3,35	4,40	4,70	4,41	3,34	3,24	3,55	88,97%	
Contracted cost	kWh	472.261	426.559	462.711	424.627	463.333	472.291	641.760	685.819	622.339	488.139	457.027	472.261	6.089,128	88,97%
Delivered capacity	MW	165	172	181	174	151	168	171	170	158	143	169	151	164,53	107,75%
Delivered capacity	%	84%	88%	92%	89%	77%	86%	87%	87%	81%	73%	86%	77%	83,94%	
Capacity cost	kWh	401.683	376.971	503.899	434.823	411.800	410.401	562.155	603.495	502.162	339.384	397.490	369.390	5.313,652	89,31%
Undelivered capacity	MW	31	24	15	22	45	28	25	26	38	53	27	45	31,47	72,68%
Penalty for undelivered capacity	kWh	-20.510	-14.756	-9.855	-14.189	-30.092	-17.883	-16.434	-17.308	-24.569	-35.224	-17.420	-29.856	-248,094	61,97%
The table shows average capacity values and prices presented in 1 hour.															
ASPs share in delivered capacity															
EP BiH	MW	101	98	109	100	79	80	30	30	71	112	101	87	82,97	143,39%
EP BiH	%	61%	57%	60%	57%	52%	48%	17%	18%	45%	78%	60%	57%	50,43%	
FRS	MW	19	28	26	28	26	22	65	65	62	31	22	22	34,79	77,78%
FRS	%	11%	16%	15%	16%	17%	13%	38%	38%	39%	22%	13%	14%	21,14%	
EP HZHB	MW	46	46	46	46	46	66	76	75	25	0	46	43	46,77	93%
EP HZHB	%	28%	27%	25%	26%	30%	39%	44%	44%	16%	0%	27%	28%	28,43%	
EAL	MW	0	0	0	0	0	0	0	0	0	0	0	0	0,00	
EAL	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0,00%	
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%	
The table shows average capacity values presented in 1 hour.															

Table 5: Report on ancillary services in BiH for the year 2019
Downward tertiary control

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2019	2019/18	
Required capacity	MW	68	68	68	68	68	68	68	68	68	68	68	68,00	100,00%	
Contracted capacity	MW	68	68	68	68	68	68	68	68	68	68	68	68,00	100,00%	
Capacity contracted at the market	MW	68	68	68	68	68	68	68	68	68	68	68	68,00	100,00%	
Price of contracted capacity	€/MW	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	71,77%	
Contracted cost	€/M	18.325	16.551	18.300	17.734	18.325	17.734	18.325	17.734	18.349	17.734	18.325	215.759	71,77%	
Delivered capacity	MW	45	53	51	33	60	53	52	52	51	37	52	49,66	93,76%	
Delivered capacity	%	66%	78%	75%	49%	88%	78%	76%	76%	75%	55%	77%	73,03%		
Capacity cost	€/M	11.993	12.472	13.645	9.794	15.768	13.489	13.371	13.315	12.784	10.031	13.096	154.734	65,59%	
Undelivered capacity	MW	23	15	17	35	8	15	16	16	17	31	16	18,34	121,98%	
Penalty for undelivered capacity	€/M	-3.571	-2.089	-2.702	-5.225	-1.309	-2.214	-2.537	-2.566	-2.615	-4.820	-2.375	-1.716	-33,740	121,98%
The table shows average capacity values and prices presented in 1 hour:															
ASP's share in delivered capacity															
EP BiH	MW	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%	0,00%		
ERS	MW	27	28	32	33	35	29	27	27	27	23	27	28,92	81,93%	
ERS	%	59%	53%	63%	98%	58%	55%	52%	52%	54%	63%	52%	58,23%		
EP HZHB	MW	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%	0,00%		
EFT Stanari	MW	18	25	19	1	25	24	25	25	23	14	25	20,74		
EFT Stanari	%	41%	47%	37%	2%	42%	45%	48%	48%	46%	37%	48%	41,77%	117,40%	

The table shows average capacity values presented in 1 hour.

Balancing market

In 2019, for the needs of balancing the power system of BiH 53 820 MWh of upward balancing energy was engaged (injected electric energy) with average price of 121.00 KM/MWh.

In 2019, engaged downward balancing energy (takeover of electricity from the system) amounted to 40 238 MWh. Average price for this energy was 52.60 KM/MWh taking into account the energy with offered negative price also.

Imbalance

There were 8 balance responsible parties (BRPs) active in BiH in 2019, not counting so called 'trading BRPs' i.e. the BRPs with no imbalance realized within BiH. Average imbalance prices in 2019 were 122.77 KM/MWh for shortage and 40.10 KM/MWh for surplus of electric energy. However, these prices were moving in a wide range from -500.00 KM/MWh up to 414.70 KM/MWh, depending on the energy situation.

In comparison to previous years when the Market rules were applied, it can be concluded that the year 2019 was specific for quite equal electricity surplus and deficit appearing in the system. Image 2 shows the deviations of the Control Area BiH in last five years.

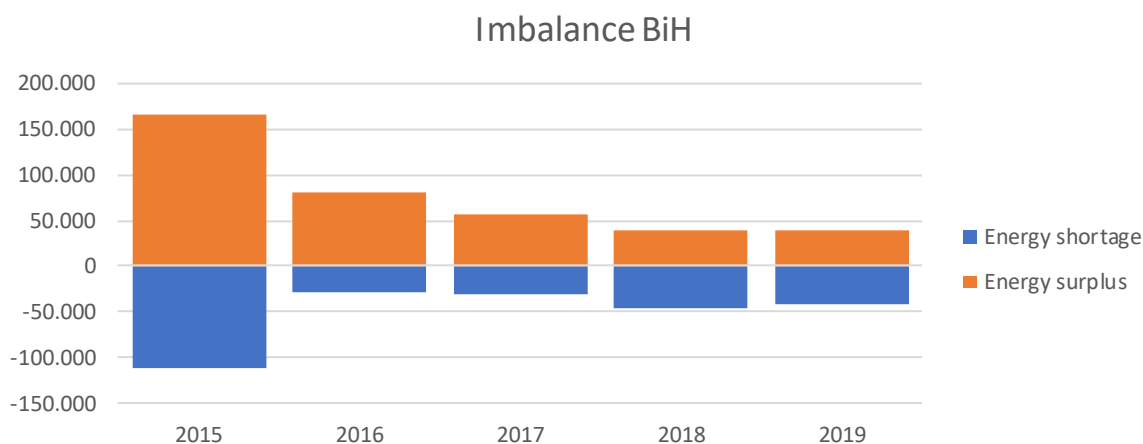


Image 2: Annual deviation of BiH Control Area

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

Imbalance BiH	Energy shortage					Energy surplus				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Total <i>MWh</i>	-110.950	-28.159	-31.200	-45.062	-42.010	166.863	80.310	56.105	39.814	38.864
Max. Hourly <i>MW</i>	-188	-313	-179	-190	-186	233	239	157	199	171

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 2019

Engaged energy		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2019	2019/18
Energy for upward sec. control	MWh	5.722	2.059	2.822	6.945	3.602	4.003	3.479	3.926	3.737	3.639	4.064	6.766	50.764	136,43%
Energy for downward sec. control	MWh	1.993	6.749	6.298	2.058	2.880	3.012	2.547	2.594	2.160	2.829	3.186	3.307	39.613	66,57%
Energy for upward tert. control	MWh	10	0	90	107	310	521	0	168	40	904	50	855	3.056	45,96%
Energy for downward tert. control	MWh	0	83	113	0	0	0	0	37	361	0	31	0	625	45,43%
Balancing energy upward	MWh	5.732	2.059	2.912	7.052	3.912	4.524	3.479	4.095	3.777	4.543	4.114	7.621	53.820	122,72%
Balancing energy downward	MWh	1.993	6.833	6.410	2.058	2.880	3.012	2.547	2.631	2.521	2.829	3.217	3.307	40.238	66,09%
Balancing cost and realized average prices															
Upward - cost	KM	859.968	205.092	268.974	709.612	474.000	523.109	359.330	489.365	416.865	725.925	452.065	1.027.970	6.512.274	110,76%
Upward - average price	KM/MWh	150,04	99,62	92,36	100,63	121,16	115,62	103,30	119,51	110,36	159,80	109,87	134,88	121,00	90,26%
Downward - cost (pos. price)	KM	223.697	405.876	205.011	75.366	132.802	112.377	154.592	173.753	89.772	207.815	211.965	218.755	2.211.781	64,27%
Downward - cost (neg. price)	KM	0	-3.970	-26.195	-1.309	-3.715	0	0	-4.440	-40.625	-210	-14.833	0	-95.297	-51,29%
Downward - average price	KM/MWh	112,26	58,82	27,89	35,99	44,82	37,31	60,70	64,34	19,49	73,40	61,28	66,15	52,60	98,37%
Imbalance BiH															
Shortage - total	MWh	4.068	2.261	4.165	2.836	3.128	2.485	2.395	3.253	4.390	5.902	3.119	4.007	42.010	93,23%
Shortage - max hourly	MW	60	63	65	186	44	98	53	85	71	87	56	111	185,67	97,88%
Surplus - total	MWh	2.785	4.115	3.334	3.253	3.300	4.844	4.401	3.266	2.338	1.834	3.321	2.073	38.864	97,61%
Surplus - max hourly	MW	68	84	51	52	61	84	74	64	171	44	61	39	171,32	85,88%
Price shortage - average	KM/MWh	164,70	120,75	104,19	106,56	105,40	97,50	124,55	140,85	126,41	138,07	118,26	124,36	122,77	110,33%
Price shortage - maximum	KM/MWh	300,00	143,38	414,00	414,00	414,00	414,70	160,00	360,00	395,00	414,70	410,00	414,70	414,70	100,00%
Price surplus - average	KM/MWh	63,86	40,44	22,08	34,57	39,69	23,50	45,46	42,46	40,93	43,00	36,46	47,96	40,10	96,87%
Price surplus - minimum	KM/MWh	0,00	-150,00	-500,00	-40,00	-20,00	0,00	0,00	-120,00	-500,00	-20,00	-500,00	0,00	-500,00	-100,00%

Table 8: Report on transmission losses and compensations for 2019

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2019	2019/18
Compensations	1.576	48	1.822	-659	-190	988	2.633	1.157	617	-1.355	-3.422	-508	2.707	-69,93%
Losses	35.150	25.529	30.043	24.549	24.263	22.569	23.818	25.167	22.975	25.003	27.179	33.389	319.633	80,16%
Reference price	141,86	143,38	115,24	113,11	127,20	130,16	147,70	142,03	144,92	150,41	146,11	135,54	136,47	135,96%
Cost	4.762.818	3.653.485	3.252.202	2.851.257	3.110.375	2.808.958	3.129.097	3.410.132	3.240.062	3.964.471	4.471.149	4.594.355	43.248.360	107,05%

Compensations: "-" direction - acceptance, "+" direction - g/wing.

Table 9: Report on crossborder balancing energy exchange (XB) for the year 2019 godinu

Energy engaged in BiH for other TSOs' needs	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2019	2019/18	
XB exchange - Import															
Average price Import															
Import cost															
XB exchange - export		325	1.240			365					50	80	2060	62%	
Average price export		276,93	227,39			194,27					350,00	195,99	231,09	119%	
Export cost		90.002	281.960			70.910					17.500	15.679	476.051	74%	
Crossborder energy engaged for BiH needs															
XB exchange - Import													285	415	41%
Average cost Import													139,20	207,47	101%
Import cost													68.005	86.101	42%
XB exchange - export										280				280	
Average price export										-183,89				-183,89	
Export price										-51.489				-51.489	

Transmission losses and compensations

In 2019 electric energy to cover transmission system losses and compensations was purchased through public procurement procedures. Total cost of this service in 2019 was 43 248 360 KM which presents an increase of 7% in comparison to the year 2018. The energy prices obtained in the procurement procedure were in average 36% higher in comparison to the year 2018 (Table 8). In addition, losses on an annual level were reduced by 20% in comparison to last year, mostly due to the significant increase of transmission losses in February and March 2019.

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 2019 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 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 2019 with the expenses included. Out of the total amount of 2 755 MWh of cross-border balancing energy, the amount of 2070 MWh was exchanged with Serbia, 413 MWh with Croatia, 130 MWh with Montenegro, and 142 MWh with Slovenia.

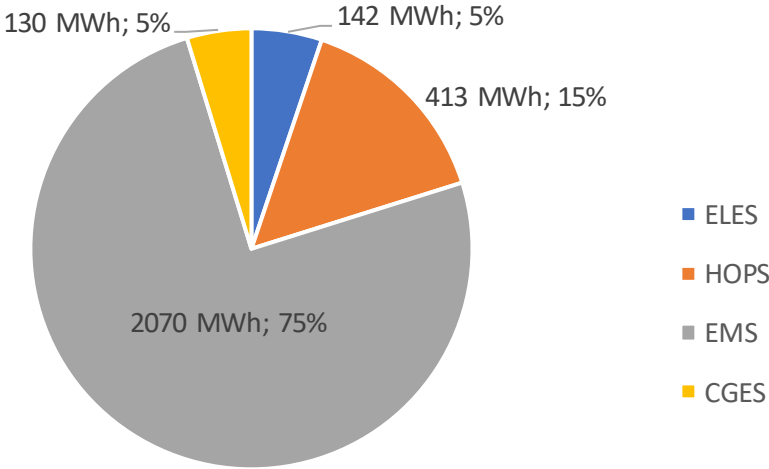


Image 3: Exchange of cross border balancing energy

Conclusion

All required ancillary services capacity for 2019, apart from the secondary control capacity in off peak load periods, were procured in public procurement procedures mostly in the annual tender. In addition, in comparison to earlier period there was additional price reduction on tertiary control capacity. Therefore, in comparison to the year 2018 the price of upward tertiary control was reduced by 11%, and the price of downward tertiary control was reduced by 28%. Prices of tertiary control capacity were significantly below the regulated price caps while prices of secondary control capacity were close to price caps.

In 2019 32% of required secondary control capacity was delivered during the night hours. Other services were delivered in the range of 75-80% of required capacity. Prevailing ancillary services providers were three elektroprivreda companies and EFT- Coal mine and Thermal Power Plant I.t.d Stanari for downward tertiary control.

In July 2019 Aluminij Mostar shut down its operations which affected the revenue in ancillary service system in line with the tariff for ancillary services. Apart from this, Aluminij, as a consumer, was a registered balancing services provider.

In hydrologic terms, the year 2019 was specific for relatively low precipitation in its second half.

Average imbalance prices were 122.77 KM/MWh for realized electricity deficit and 40.10 KM/MWh for realized electricity surplus.

The cost in terms of losses and compensations was around 7% higher than it was in last year, although losses were much lower than in 2018. The total cost of losses and compensations was higher due to rather high prices of energy achieved in the tender procedure which were 36% higher than last year.

As for cross-border balancing energy exchange the most dominant were arrangements with EMS, reaching 75% of totally exchanged energy. Exchange with HOPS amounted to 15% and arrangements with CGES and ELES made 5% of totally exchanged balancing energy. The total of 2 755 MWh of balancing energy was exchanged, and this amount is much lower than in 2018.

Taking into account the actual tariff for system services, there was a shortfall of over 774 000 KM in the BiH balancing market in 2019 (in 2018 this shortfall reached over 9 million KM).