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Glossary of Abbreviations and Acronyms

BF	**Bag filters**
BiH	**Bosnia and Herzegovina**
CHP	**Combined heat and power**
DeNOx	**Denitrification process**
ELV	**Emission limit value**
EnCS	**Energy Community Secretariat**
ESP	**Electrostatic precipitators**
FBiH	**Federation of Bosnia and Herzegovina**
FGD	**Flue Gas Desulfurization**
HLI	**Hydrated Lime Injection**
ICHPP	**Industrial Combined Heat and Power Plant**
IED	**Industrial Emissions Directive**
IPP	**Industrial Power Plant**
IPPU	**Industrial Power Plant Unit**
LCP	**Large Combustion Plant**
LCPD	**Large Combustion Plants Directive**
LNB	**Low NO_x burner**
MDR	**Minimum desulphurization rate**
NERP	**National Emission Reduction Plan**
NO_x	**Nitrogen oxides**
O&M	**Operation and Maintenance**
OFA	**Over Fire Air**
RS	**Republic of Srpska**
SCR	**Selective Catalitic Reduction**
SD FGD	**Semi-Dry Flue Gas Desulfurization**
SNCR	**Selective Non-Catalitic Reduction**
SO_2	**Sulfur Dioxide**
TPP	**Thermal Power Plant**
TPPU	**Thermal Power Plant Unit**
WLS FGD	**Wet Limestone Flue Gas Desulfurization**

Executive Summary

The **National Emission Reduction Plan (NERP) of Bosnia and Herzegovina (BiH**) has been prepared according to the Policy Guidelines on the preparation of National Emission Reduction Plans, issued by the Energy Community Secretariat (EnCS) on December 19th 2014.[1]

This NERP is related to the emission reductions of sulfur dioxide (SO_2), nitrogen oxides (NO_x) and dust from large combustion plants (LCP) in Bosnia and Herzegovina (BiH), here presented for the Federation of Bosnia and Herzegovina (FBiH) and the Republic of Srpska (RS), as constituent entities of Bosnia and Herzegovina.

Having in mind the requirements of the Energy Community Treaty, as well as the adjusted requirements of the **Directive 2001/80/EC** on the limitation of emissions of certain pollutants into the air from large combustion plants (Large Combustion Plants Directive (LCPD)) and the **Directive 2010/75/EU** on industrial emissions (Industrial Emissions Directive (IED)) and taking into consideration data obtained from the operators of thermal power plants and industrial combined heat and power (CHP) plants, in BiH, there are presently **four thermal power plants, with nine large combustion plant units and one industrial CHP plant with three large combustion plant units that have a rated thermal input equal to or greater than 50 MWth**, which are subject to the LCPD and IED requirements for the reduction of emission of pollutants. For the Energy Community Contracting Parties only large combustion plants (LCPs) that are used for generating electricity that is, at least in part, delivered to the grid are subject to these Directives. The LCPs that are used to produce electricity that is not delivered to the grid are not subject to these Directives.

None of the operators of LCPs selected the option of compliance with the emission limit values (ELVs) (Article 4(3)(a) of LCPD); for ten LCPs the operators selected the option to be included in the National Emission Reduction Plan (NERP) (Article 4(3)(b) and Article 4(6) of LCPD); and for two LCPs the operators selected the option of the Limited Lifetime Derogation Option (Article 4(4) of LCPD).

[1] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3546146/EnC_NERP_guidance_FINAL_jko_signature_merged.pdf

The LCP thermal input varies from 84 MW to 800 MW, which in total amounts to 5,339 MW. All of them use brown coal and/or lignite as fuel, with the exception of an industrial CHP plant at the Natron-Hayat company, which uses black liquor as fuel.

All large combustion plants in Bosnia and Herzegovina in 2014 emitted about 273,577 tons of SO2, about 20,511 tons of NO_x, and around 6,616 tons of dust.

The ultimate objective of the NERP is to reduce emissions from the LCPs included in the NERP by 01/01/2028 to the level of 14,243 tons of SO2, 7,746 tons of NOx and 780 tons of dust.

In the course of drafting and public presentation of this plan, representatives of Elektroprivreda RS (EPRS) argued that the financing costs of this plan represent a burden for TPP Ugljevik (and to a lesser extent for TPP Gacko) causing an increase in overall production costs, primarily for TPP Ugljevik, thus jeopardizing its future market position. Consequently, the representatives of EPRS appealed to competent institutions to help in finding a solution for financing of this Plan. It is believed that some solutions from international practice may be applicable in search of an appropriate solution for financing this Plan.

In the course of drafting and public presentation of this plan, representatives of Elektroprivreda BiH (EPBiH) argued that the financing costs of this Plan represent a large burden for EPBiH, causing an increase in overall production costs at TPP Tuzla and TPP Kakanj, jeopardizing its future market position. Consequently, the financial sustainability of the company is jeopardized, due to such low prices of electricity for households. Due to the above, the representatives of EPBiH appealed to the regulatory bodies, as well as competent institutions, for understanding and support in finding the best way for realization of the Plan.

1. Introduction

The overall aim of the LCPD and the IED is to reduce emissions of SO_2, NO_x and dust from large combustion plants that have a rated thermal input equal to or greater than 50 MWth. For Contracting Parties, only large combustion plants that are used for generating electricity, which is at least in part delivered to the grid are subject to these Directives. The LCPs that are used to produce electricity that is not delivered to the grid are not subject to these Directives.

Taking into account appropriate data collected from the licenses for production of electricity issued by the regulatory commissions of the FBiH and the RS, as well as directly from the operators, a total number of 12 large combustion plants were identified; there are nine thermal power plant units (TPPU) and three industrial plant units (IPU).

The list of 12 plants identified as LCPs in BiH are presented in Table 1, including the plant name, plant identification (ID), address, city, entity, postal code, longitude, latitude and altitude.

Table 1. List of large combustion plants

Plant name	LCP National ID	Address	City	Entity	Postal code	Longitude	Latitude	Altitude
Federation of Bosnia and Herzegovina								
TPP Tuzla - 3	T-3	21 Aprila 4	Tuzla	FBiH	75000	18° 60' N	44° 52' E	210
TPP Tuzla - 4	T-4	21 Aprila 4	Tuzla	FBiH	75000	18° 60' N	44° 52' E	210
TPP Tuzla - 5	T-5	21 Aprila 4	Tuzla	FBiH	75000	18° 60' N	44° 52' E	210
TPP Tuzla - 6	T-5	21 Aprila 4	Tuzla	FBiH	75000	18° 60' N	44° 52' E	210
TPP Kakanj - 5	K-5	Ćatići	Kakanj	FBiH	72240	18° 11 N	44° 09' E	405
TPP Kakanj - 6	K-6	Ćatići	Kakanj	FBiH	72240	18° 11' N	44° 09' E	405
TPP Kakanj - 7	K-7	Ćatići	Kakanj	FBiH	72240	18° 11' N	44°095' E	405
ICHPP Natron Hayat UKO3	UKO-3	Liješnica bb	Maglaj	FBiH	74250	18° 6' N	44° 53' E	183
ICHPP Natron Hayat UKO4	UKO-4	Liješnica bb	Maglaj	FBiH	74250	18° 6' N	44° 53' E	183
ICHPP Natron Hayat LUKO4	LUKO-4	Liješnica bb	Maglaj	FBiH	74250	18° 6' N	44° 53' E	183
Republic of Srpska								
TPP Gacko	G-1	Gračanica bb	Gacko	RS	89240	18° 52 N	43° 17' E	945
TPP Ugljevik	U-1	Ugljevik bb	Ugljevik	RS	76330	18° 96' N	44°680' E	172

The total rated thermal input of large combustion plants in Bosnia and Herzegovina **amounts to 5,339 MWth, where power plants account for 5,075 MWth (95.06 %)** and industrial plants **264 MWth (4.94 %)**. In the power sector the fuels are brown coal and lignite or a mixture of the two, and in the industrial sector the fuels are lignite and black liquor.

In the power sector **the plants are between 29 and 50 years old**, with an average value of 38 years. Up to 31st December 2014 the **total operating hours** in the power sector ranged from

108,234 h in the Kakanj unit 7, up to 322,658 h in the Tuzla unit 3, with an **average value of 199,381 h**.

The options for the existing combustion plants to achieve compliance with the requirements of the Directive 2001/80/EC as adapted by Decision D/2013/05/MC-EnC are set out in Articles 4(3), 4(4) and 4(6) of Directive 2001/80/EC:[2]

- *Option 1: Compliance with the ELVs* ***(Article 4(3)(a))***
- *Option 2: Implementation of a NERP* ***(Article 4(3)(b)*** *and* ***Article 4(6))***
- *Option 3: Limited lifetime derogation* ***(Article 4(4))***

Not a single LCP operator selected the option of Compliance with the emission limit values (ELVs) (Article 4(3)(a) of LCPD); for ten LCPs the operators selected the option of implementation of the National Emission Reduction Plan (NERP) (Article 4(3)(b) and Article 4(6) of LCPD); and for two LCPs the operators selected the Limited lifetime derogation (Article 4(4) of LCPD) (Table 2).

Table 2. Large combustion plant details

Plant name	LCP National ID	Status of the plant	MWth	Date of start of operation	Other sector	Operating Hours up to 2014
Federation of Bosnia and Herzegovina						
TPP Tuzla - 3	T-3	art 4.4	330	31/07/1966	TPP	322,658
TPP Tuzla - 4	T-4	art 4.3(b)	600	01/04/1971	TPP	212,839
TPP Tuzla - 5	T-5	art 4.3(b)	600	02/04/1974	TPP	207,056
TPP Tuzla - 6	T-5	Art 4.3(b)	615	30/09/1978	TPP	201,782
TPP Kakanj - 5	K-5	Art 4.3(b)	330	21/01/1970	TPP	245,446
TPP Kakanj - 6	K-6	art 4.3(b)	330	27/12/1977	TPP	192,394
TPP Kakanj - 7	K-7	art 4.3(b)	670	27/12/1989	TPP	108,234
ICHPP Natron Hayat UKO3	UKO-3	art 4.4	80	1965	IPP	255.364
ICHPP Natron Hayat UKO4	UKO-4	art 4.3(b)	100	1983	IPP	117.713
ICHPP Natron Hayat LUKO4	LUKO-4	art 4.3(b)	84	1983	IPP	114,935
Republic of Srpska						
TPP Gacko - 1	G-1	art 4.3(b)	800	08/02/1983	TPP	159,226
TPP Ugljevik -1	U-1	Art 4.3(b)	800	20/11/1985	TPP	144,798

art_4_3(b) - Plants are subject to the National Emission Reduction Plan
art_4_4 - Plants should not operate more than 20,000 operational hours starting from 1 January 2018 and ending no later than 31 December 2023
TPP – thermal power plant
IPP – industrial power plant

[2] *Ibid.*

Total emissions of SO_2 of LCPs in Bosnia and Herzegovina in 2014 was about 273,577 tons, NO_x emission of 20,511 tons and dust around 6,616 tons.

In Table 3 energy input data and total emissions of SO_2, NO_x and dust are presented.

Table 3. Energy input and total emissions to air (2014)

Plant name	Plant ID	Other solid fuels (TJ)	SO2 (t)	NOx (t)	Dust (t)	Remark
Federation of Bosnia and Herzegovina						
TPP Tuzla - 3	T-3	6,634	5,440.7	820.83	83.74	
TPP Tuzla - 4	T-4	15,239	17,138.7	3021.81	697.71	
TPP Tuzla - 5	T-5	7,856	8,370.45	614.91	301.99	
TPP Tuzla - 6	T-5	11,449	22,063.24	1355.33	120.75	
TPP Kakanj - 5	K-5	6,300	20,688.00	2,493	17	
TPP Kakanj - 6	K-6	6,811	20,241.00	2,350	19	
TPP Kakanj - 7	K-7	11,578	34,418.00	2,542	849	
ICHPP Natron Hayat UKO3	UKO-3	433				Reserve
ICHPP Natron Hayat UKO4	UKO-4	1,625	3,772	694.5	193.4	
ICHPP Natron Hayat LUKO4	LUKO-4	1,116	19	206.6	27	
Republic of Srpska						
TPP Gacko - 1	G-1	17,473	9,688	2,906	1,615	
TPP Ugljevik - 1	U-1	20,303	121,339	3,091	2,748	

2. Present Status of Emission of Pollutants from LCPs in BiH

According to the acquired data from the thermal power plants and the industrial CHP plants, there are presently four thermal power plants with nine large combustion plant units and three industrial large combustion plants in Bosnia and Herzegovina that are subject to the LCPD 2001/80/EC relating to the limitation of emission into the air from large combustion plants[3] and the IED 2010/75/EU on industrial emissions[4] requirements for the reduction of emission of pollutants. The LCP thermal input varies from 80 MW to 800 MW, which in total amounts to 5,339 MWth.

All thermal power plants use either brown coal or lignite, or a mixture of both, as fuel, with the sulfur content varying from 0.7 % to 4.3 %. The industrial CHPs use either coal or black liquor as fuel and produce electricity and heat for the paper mill.

The LCPs have present emissions of sulfur dioxide of 273,577 tons per year, while the NOx emissions are 20,511 tons and dust 6,616 tons (Table 4).

The National Emission Reduction Plan has been prepared according to the Policy Guidelines of the EnCS, using the average fuel consumption of the LCPs in the period from 2008 to 2012. If the plant was temporarily out of operation for at least 60 consecutive days due to investment activities, for those days the average daily fuel consumption, averaged over the five-year period up to and including 2012 (excluding those out-of-operation periods) was used. The basic parameters of fuel input and flue gas parameters, as well as the recent concentrations of pollutants of LCP units, are presented in Table 4. The flue gas data is given for normal conditions (0 °C, 1,013 mb) and for 6 % of O_2.

The average annual total fuel consumption in the period of 2008-2012 was 113,837 TJ and the average annual flue gas flow rate in the same period was 40,932 million Nm^3 per year. The concentration of SO_2 in large combustion plants without FGD equipment varies from 1,245 mg/Nm^3 in IP Natron Hayat UKO-4 to over 16,661 mg/Nm^3 in TPP Ugljevik, while the SO_2 concentration at NH LUKO 4 is only 11 mg/Nm^3, since FGD equipment is installed. The emissions of NO_x vary from 73 up to 3,091 mg/Nm^3, while the dust emission vary from 10 up to 2,748 mg/Nm^3.

[3] OJ L 309, 27.11.2001, p.1
[4] OJ L 334, 17.12.2010, p.17

It is worth mentioning that some of the TPP units have already installed combined electrostatic precipitators and bag filters (TPP Kakanj), resulting in very low dust emission concentrations in flue gas, far below the IED's requirements. In addition, the concentrations of SO_2 in flue gas for LUKO 4 industrial LCP is about 11 mg/Nm^3, in spite of a large content of sulfur (about 1%), as the FGD equipment has been already installed, as a part of paper mill technology.

Table 4. Emission of pollutants from the existing large combustion plants in BiH (2014)

Item	Plant Name	LCP	Fuel Characteristics and Consumption					Emission			Notes
			Type	LHV	Ash	S	Cons.	SO2	NOx	Dust	
				kJ/kg	%	%	000t/a	t/a	t/a	t/a	
LCP BIH TOTAL								**273,577**	**20,511**	**6,616**	
TPP FBIH Total								**141,218**	**14,197**	**2,175**	
TPP Tuzla Total								65,808	6,812	1,290	
1	TPP Tuzla - 3	T-3	95% Lignite/ 5% Brown coal	10,465	18.7	0.9	634	5,441	821	84	Data 2013
2	TPP Tuzla - 4	T-4	75% Lignite/ 25% Brown coal	10,451	18.6	0.9	1,458	17,139	3,022	698	Data 2013
3	TPP Tuzla - 5	T-5	75% Lignite/ 25% Brown coal	10,301	19.5	1.4	1,344	21,166	1,614	388	Data 2014
4	TPP Tuzla - 6	T-6	Brown coal	17,154	21.8	1.9	667	22,063	1,355	121	Data 2013
TPP Kakanj Total								**75,410**	**7,385**	**885**	
5	TPP Kakanj – K5	K-5	Brown coal	12,670	38.3	2.6	497	20,688	2,493	17	Common stack
6	TPP Kakanj - K6	K-6	Brown coal	12,670	38.3	2.6	538	20,241	2,350	19	
7	TPP Kakanj – K7	K-7	Brown coal	12,670	38.3	2.6	914	34,481	2,542	849	
ICHPP Natron Hayat Total								**1,332**	**317**	**77**	
8	ICHPP Natron Hayat	UKO-3	Brown coal	10,500	15.6	0.7	0.5				In reserve
9	ICHPP Natron Hayat	UKO-4	Brown coal	10,500	15.6	0.7	178	1,325	244	68	Common stack
10	ICHPP Natron Hayat.	LUKO-4	Black liquor	9,500		1.0	149	7	73	10	
LCP F BIH Total								**142,550**	**14,514**	**2,253**	
TPP RS Total								**131,027**	**5,997**	**4,363**	
11	TPP Gacko -1	G-1	Lignite	7,732	19	1.0	2,329	9,688	2,906	1,615	
12	TPP Ugljevik -1	U-1	Brown coal	10,686	27.5	4.3	1,900	121,339	3,091	2,748	

Table 5. LCP thermal capacities and pollutant concentrations

Item	Plant Name	Unit	Q_{th}	Average 2008-2012			Emission concentrations in 2014		
				Fuel	Fl. Gas.	S	SO_2	NO_x	Dust
			MW	TJ	M Nm3	t	mg/m3	mg/m3	mg/m3
LCP BiH TOTAL			**5,339**	**113,837**	**40,932**	**192,417**			
LCP FBiH Total			**3,739**	**78,000**	**28,077**	**94,455**			
TPP FBiH Total			**3,475**	**74,898**	**26,866**	**91,866**			
1	TPP Tuzla - 3	T-3	330	5,701	2,045	4,943	2,286	345	35
2	TPP Tuzla - 4	T-4	600	14,706	5,275	12,847	3,135	553	128
3	TPP Tuzla - 5	T-5	600	12,658	4,540	11,010	4,261	325	78
4	TPP Tuzla - 6	T-6	615	12,958	4,648	15,453	5,373	330	29
TPP Tuzla Total			**2,145**	**46,023**	**16,508**	**44,254**			
5	TPP Kakanj - 5	K-5	330	7,459	2,675	12,402	9,155	1,103	8
6	TPP Kakanj - 6	K-6	330	5,518	1,979	9,370	8,285	962	8
7	TPP Kakanj - 7	K-7	670	15,899	5,703	25,840	8,303	612	3[1)]
TPP Kakanj Total			**1,330**	**28,875**	**10,358**	**47,613**			
ICHPP Natron Hayat Total			**264**	**3,102**	**1.211**	**2,589**			
8	ICHPP Natron Hayat	UKO-3	80	433	155	304			
9	ICHPP Natron Hayat	UKO-4	100	1,625	583	1,197	1,245	229	63.8
10	ICHPP Natron Hayat	LUKO-4	84	1,044	473	1,088	11	114	14.9
TPP RS Total			**1,600**	**35,837**	**12,855**	**97,962**			
11	TPP Gacko -1	G-1	800	16,968	6,086	22,217	1,500	450	250
12	TPP Ugljevik - 1	U-1	800	18,869	6,768	75,745	16,661	424	377

[1)] Dust concentration in flue gas was reduced in December 2014 by use of improved ESP+BF

3. List of Large Combustion Plants included in the BiH NERP

Ten LCPs are **subject to the BiH National Emission Reduction Plan**, referred to in **art_4_3(b) (Table 6)**,

Table 6. LCPs selected for implementation of NERP

Plant name	Plant ID	Total rated thermal input on 31/12/2012 (MWt)	Plant included in NERP[5]
Federation of Bosnia and Herzegovina			
TPP Tuzla - 4	T-4	600	true
TPP Tuzla - 5	T-5	600	true
TPP Tuzla - 6	T-6	615	true
TPP Kakanj - 5	K-5	330	true
TPP Kakanj - 6	K-6	330	true
TPP Kakanj - 7	K-7	670	true
ICHPP Natron Hayat UKO4	UKO-4	100	true
ICHPP Natron Hayat LUKO4	LUKO-4	84	true
Republic of Srpska			
TPP Gacko -1	G-1	800	true
TPP Ugljevik - 1	U-1	800	true

Aggregation rules

According to the Policy Guidelines, when the flue gases of two or more separate combustion plants are discharged through a common stack, these plants shall be considered as a single combustion plant, with the thermal input equal to the sum of all fuel inputs. This is the case for the following plants:

- TPP Kakanj 5 + Kakanj 6 + Kakanj 7, with the thermal input of 1,330 MW; and
- CHP Natron Hayat UKO 4 and LUKO 4, with the thermal input of 184 MW.

Determination of ceilings

The emission ceilings are determined for SO_2, NO_x and dust for each of the years from 2018 to 2027. The ceilings are calculated on the national level, according to the contributions of each individual combustion plant, which are included in NERP. The ceilings are expressed in mass per annum.

[5] Art 4.3 - Plants are subject to the National Emission Reduction Plan

The measures for emission reduction have to be undertaken in such a way that the total emission of pollutants, from all combustion plants, is below the ceilings on the national level.

Determination of contributions of individual combustion plants to total emission ceilings

General case

The individual contribution of each combustion plant is calculated in accordance with Article 4(6) of the LCPD for SO_2, NO_x and dust, as a product of flue gas flow rate and the referent ELV.

The flue gas flow rate is calculated according to fuel input, with the use of a coefficient of 0.3587 Nm^3/MJ, as recommended for coal in the EnCS Policy Guidelines[6]. However, for black liquor in LUKO-4 of Natron Hayat CHP, a unit volume rate that is used is 4.305 Nm^3/kg, in accordance with the measurements of an accredited institute,[7] since it is not a standard fuel.

All flue gas volume rates are calculated for dry gas at normal conditions (0 ^{0}C, 1,013 mbar) and for the referent oxygen content of 6%.

Special case for combustion plants using the minimum desulphurization rate option

The option of the implementation of relevant minimum desulphurization rate (MDR) of 94 % was applied in the calculation of individual contributions to the total emission ceiling for unit 7 of TPP Kakanj and TPP Ugljevik in the period 01/01/2018 to 31/12/2023. The relevant MDR of 96% was implemented for TPP Kakanj 5, TPP Kakanj 6, TPP Kakanj 7 and TPP Ugljevik for the period 01/01/2026 to 31/12/2027. A linear decrease was used in the interim period of 01/01/2024 to 31/12/2025.

[6] EN 12952-15 (http://www.vgb.org/vgbmultimedia/rp338_flue_gas.pdf)
[7] Dvokut pro, Laboratory for the Architect Physics and Environmental Protection, Report No: Z-IE-025-B2/15, Dec. 2014

Special case for combustion plants firing multiple fuel types

In the case of CHP Natron Hayat the combustion plants UKO-4 and LUKO-4 are connected to a common stack. As the combustion plants use different fuel types, the contribution to the ceiling is calculated as the sum of the individual products of flue gas flow rates and ELVs. Each ELV is evaluated according to the thermal input capacity, which is the sum of the individual thermal capacities.

4. Total Emission Ceiling for LCPs in BiH

Based on the applied methodology of the EnCS Policy Guidelines and the input data for the LCPs for the NERP, the emission ceilings for SO_2 are calculated for the period 2018 to 2027, according to the average fuel consumption in the period 2008-2012 and the emission limit values shown in Tables 7, 8 and 9. The results are presented in Tables 10, 11 and 12. The total emission of SO_2 from all large combustion plants which are included in the NERP is limited to 27,194 t/year from 01/01/2018 to 31/12/2023 and decreasing gradually to 14,243 t/year in 2026 and 2027.

Similarly, the emission ceiling for NO_x starts from 19,936 in 2018, reduces linearly to 10,031 t/year in 2023, again reduces linearly to 7,746 t/year in the year 2026, and remains the same in the year 2027.

As far as the emission ceiling for dust is concerned, the slope of the ceiling of dust is similar to the one for SO_2, i.e., constant in between 2018 and 2023 and falling down linearly to the year 2026. The total dust emissions are limited to 2,222 t/year in the period 2018 to 2023, and it is further reduced down to 780 t/year in the year 2026 and 2027.

The data about large combustion plants in Bosnia and Herzegovina, as well as calculated emission ceilings and ceilings overview are presented in Appendixes A, and B.

Table 7. Emission limit values for SO_2 in the period 2018-2027

Item	Plant Name	LCP	Qth MW	Emission Limit Values in the year / mg/Nm3/										Notes
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Federation of Bosnia and Herzegovina														
1	TPP Tuzla - 4	T-4	600	**400**	400	400	400	400	**400**	333	267	**200**	200	
2	TPP Tuzla - 5	T-5	600	**400**	400	400	400	400	**400**	333	267	**200**	200	
3	TPP Tuzla -6	T-6	615	**400**	400	400	400	400	**400**	333	267	**200**	200	
4	TPP Kakanj - 5	K-5	330	**1,080**	1,080	1,080	1,080	1,080	**1,080**	844	607	**371**	371	
5	TPP Kakanj - 6	K-6	330	**1,080**	1,080	1,080	1,080	1,080	**1,080**	846	612	**379**	379	Common stack
6	TPP Kakanj - 7	K-7	670	**544**	544	544	544	544	**544**	483	423	**362**	362	
7	ICHPP Natron Hayat	UKO-4	100	**1,664**	1,664	1,664	1,664	1,664	**1,664**	1,193	721	**250**	250	Common stack
8	ICHPP Natron Hayat	LUKO-4	84	**1,664**	1,664	1,664	1,664	1,664	**1,664**	1,193	721	**250**	250	
Republic of Srpska														
9	TPP Gacko -1	G-1	800	**400**	400	400	400	400	**400**	333	267	**200**	200	
10	TPP Ugljevik 1	U-1	800	**1,343**	1,343	1,343	1,343	1,343	**1,343**	1,194	1,044	**895**	895	

Table 8. Emission limit values for NO_x in the period 2018-2027

Item	Plant Name	LCP	Qth MW	Emission Limit Values in the year / mg/Nm3/										Notes
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Federation of Bosnia and Herzegovina														
1	TPP Tuzla - 4	T-4	600	**500**	440	380	320	260	**200**	200	200	**200**	200	
2	TPP Tuzla - 5	T-5	600	**500**	440	380	320	260	**200**	200	200	**200**	200	
3	TPP Tuzla -6	T-6	615	**500**	440	380	320	260	**200**	200	200	**200**	200	
4	TPP Kakanj - 5	K-5	330	**600**	600	600	600	600	**600**	467	333	**200**	200	
5	TPP Kakanj - 6	K-6	330	**600**	600	600	600	600	**600**	467	333	**200**	200	Common stack
6	TPP Kakanj - 7	K-7	670	**500**	440	380	320	260	**200**	200	200	**200**	200	
7	ICHPP Natron Hayat	UKO-4	100	**600**	600	600	600	600	**600**	467	333	**200**	200	Common stack
8	ICHPP Natron Hayat	LUKO-4	84	**600**	600	600	600	600	**600**	467	333	**200**	200	
Republic of Srpska														
9	TPP Gacko -1	G-1	800	**500**	440	380	320	260	**200**	200	200	**200**	200	
10	TPP Ugljevik 1	U-1	800	**500**	440	380	320	260	**200**	200	200	**200**	200	

Table 9. Emission limit values for dust in the period 2018-2027

Item	Plant Name	LCP	Qth MW	Emission Limit Values in the year / mg/Nm3/										Notes
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Federation of Bosnia and Herzegovina														
1	TPP Tuzla - 4	T-4	600	**50**	50	50	50	50	**50**	40	30	**20**	20	
2	TPP Tuzla - 5	T-5	600	**50**	50	50	50	50	**50**	40	30	**20**	20	
3	TPP Tuzla -6	T-6	615	**50**	50	50	50	50	**50**	40	30	**20**	20	
4	TPP Kakanj - 5	K-5	330	**100**	100	100	100	100	**100**	73	47	**20**	20	
5	TPP Kakanj - 6	K-6	330	**100**	100	100	100	100	**100**	73	47	**20**	20	Common stack
6	TPP Kakanj - 7	K-7	670	**50**	50	50	50	50	**50**	40	30	**20**	20	
7	ICHPP Natron Hayat	UKO-4	100	**100**	100	100	100	100	**100**	40	30	**25**	25	Common stack
8	ICHPP Natron Hayat	LUKO-4	84	**100**	100	100	100	100	**100**	40	30	**25**	25	
Republic of Srpska														
9	TPP Gacko -1	G-1	800	**50**	50	50	50	50	**50**	40	30	**20**	20	
10	TPP Ugljevik 1	U-1	800	**50**	50	50	50	50	**50**	40	30	**20**	20	

Table 10. Emission ceiling for SO2 (t/year 2018-2027)

Item	Plant	Unit	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Remark
LCP BiH TOTAL			**27,194**	**2,7194**	**27,194**	**27,194**	**27,194**	**27,194**	**22,877**	**18,560**	**14,243**	**14,243**	
LCP FBiH Total			**15,760**	**15,760**	**15,760**	**15,760**	**15,760**	**15,760**	**12,769**	**9,867**	**6,966**	**15.760**	
TPP FBiH Total			**13,913**	**13,913**	**13,913**	**13,913**	**13,913**	**13,913**	**11,509**	**9,106**	**6,702**	**6,702**	
TPP Tuzla Total			**5,785**	**5,785**	**5,785**	**5,785**	**5,785**	**5,785**	**4,821**	**3,857**	**2,893**	**2,893**	
1	TPP Tuzla - 4	T-4	2,110	2,110	2,110	2,110	2,110	2,110	1,758	1,407	1,055	1,055	
2	TPP Tuzla - 5	T-5	1,816	1,816	1,816	1,816	1,816	1,816	1,513	1,211	908	908	
3	TPP Tuzla - 6	T-6	1,859	1,859	1,859	1,859	1,859	1,859	1,549	1,239	930	930	
TPP Kakanj Total			**8,128**	**8,128**	**8,128**	**8,128**	**8,128**	**8,128**	**6,688**	**5,249**	**3,809**	**3,809**	
4	TPP Kakanj - 5	K-5	2,889	2,889	2,889	2,889	2,889	2,889	2,257	1,625	992	992	
5	TPP Kakanj - 6	K-6	2,138	2,138	2,138	2,138	2,138	2,138	1,675	1,212	750	750	
6	TPP Kakanj - 7	K-7	3,101	3,101	3,101	3,101	3,101	3,101	2,756	2,412	2,067	2,067	
ICHPP Natron Hayat Total			**1,757**	**1,757**	**1,757**	**1,757**	**1,757**	**1,757**	**1,259**	**762**	**264**	**264**	
7	ICHPP Natron Hayat	UKO-4	970	970	970	970	970	970	695	420	146	146	
8	ICHPP Natron Hayat	LUKO-4	787	787	787	787	787	787	564	341	118	118	
TPP RS Total			**11,524**	**11,524**	**11,524**	**11,524**	**11,524**	**11,524**	**10,108**	**8,693**	**7,277**	**7,277**	
9	TPP Gacko - 1	G-1	2,435	2,435	2,435	2,435	2,435	2,435	2,029	1,623	1,217	1,217	
10	TPP Ugljevik - 1	U-1	9,089	9,089	9,089	9,089	9,089	9,089	8,079	7,070	6,060	6,060	

Table 11. Emission ceiling for NO_x (t/year 2018-2027)

Item	Plant	Unit	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Remark
LCP BiH TOTAL			**19,937**	**17,956**	**15,974**	**13,993**	**12,012**	**10,031**	**9,269**	**8,508**	**7,746**	**7,746**	
LCP FBiH Total			**13,510**	**12,300**	**11,090**	**9,880**	**8,670**	**7,460**	**6,698**	**5,937**	**5,175**	**5,175**	
TPP FBiH Total			**12,876**	**11,666**	**10,456**	**9,246**	**8,036**	**6,826**	**6,205**	**5,585**	**4,964**	**4,964**	
TPP Tuzla Total			**7,232**	**6,364**	**5,496**	**4,628**	**3,760**	**2,893**	**2,893**	**2,893**	**2,893**	**2,893**	
1	TPP Tuzla - 4	T-4	2,637	2,321	2,004	1,688	1,371	1,055	1,055	1,055	1,055	1,055	
2	TPP Tuzla - 5	T-5	2,270	1,998	1,725	1,453	1,181	908	908	908	908	908	
3	TPP Tuzla - 6	T-6	2,324	2,045	1,766	1,487	1,208	930	930	930	930	930	
TPP Kakanj Total			**5,644**	**5,302**	**4,960**	**4,618**	**4,276**	**3,933**	**3,313**	**2,692**	**2,072**	**2,072**	
4	TPP Kakanj - 5	K-5	1,605	1,605	1,605	1,605	1,605	1,605	1,249	892	535	535	
5	TPP Kakanj - 6	K-6	1,188	1,188	1,188	1,188	1,188	1,188	924	660	396	396	
6	TPP Kakanj - 7	K-7	2,851	2,509	2,167	1,825	1,483	1,141	1,141	1,141	1,141	1,141	
ICHPP Natron Hayat Total			**634**	**634**	**634**	**634**	**634**	**634**	**493**	**352**	**211**	**211**	
7	ICHPP Natron Hayat	UKO-4	350	350	350	350	350	350	272	194	117	117	
8	ICHPP Natron Hayat	LUKO-4	284	284	284	284	284	284	221	158	95	95	
TPP RS Total			**6,427**	**5,656**	**4,885**	**4,114**	**3,342**	**2,571**	**2,571**	**2,571**	**2,571**	**2,571**	
9	TPP Gacko - 1	G-1	3,043	2,678	2,313	1,948	1,582	1,217	1,217	1,217	1,217	1,217	
10	TPP Ugljevik -1	U-1	3,384	2,978	2,572	2,166	1,760	1,354	1,354	1,354	1,354	1,354	

Table 12. Emission ceiling for dust (t/year 2018-2027)

Item	Plant	Unit	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Remark
LCP BiH TOTAL			**2,222**	**2,222**	**2,222**	**2,222**	**2,222**	**2,222**	**1,704**	**1,239**	**780**	**780**	
LCP FBiH Total			**1,579**	**1,579**	**1,579**	**1,579**	**1,579**	**1,579**	**1,190**	**854**	**523**	**523**	
TPP FBiH Total			**1,474**	**1,474**	**1,474**	**1,474**	**1,474**	**1,474**	**1,148**	**822**	**496**	**496**	
TPP Tuzla Total			**723**	**723**	**723**	**723**	**723**	**723**	**579**	**434**	**289**	**289**	
1	TPP Tuzla - 4	T-4	264	264	264	264	264	264	211	158	105	105	
2	TPP Tuzla - 5	T-5	227	227	227	227	227	227	182	136	91	91	
3	TPP Tuzla - 6	T-6	232	232	232	232	232	232	186	139	93	93	
TPP Kakanj Total			**751**	**751**	**751**	**751**	**751**	**751**	**569**	**388**	**207**	**207**	
4	TPP Kakanj - 5	K-5	268	268	268	268	268	268	196	125	54	54	
5	TPP Kakanj - 6	K-6	198	198	198	198	198	198	145	92	40	40	
6	TPP Kakanj - 7	K-7	285	285	285	285	285	285	228	171	114	114	
ICHPP Natron Hayat Total			**106**	**106**	**106**	**106**	**106**	**106**	**42**	**32**	**26**	**26**	
7	ICHPP Natron Hayat	UKO-4	58	58	58	58	58	58	23	17	15	15	
8	ICHPP Natron Hayat	LUKO-4	47	47	47	47	47	47	19	14	12	12	
TPP RS Total			**643**	**643**	**643**	**643**	**643**	**643**	**514**	**386**	**257**	**257**	
9	TPP Gacko - 1	G-1	304	304	304	304	304	304	243	183	122	122	
10	TPP Ugljevik -1	U-1	338	338	338	338	338	338	271	203	135	135	

5. Measures to Comply with Objectives

The planned emission reduction measures to keep the emissions below the emission ceilings shown in Tables 10-12 are presented in the following tables. Any changes to these measures will be reported to the Energy Community Secretariat as part of the reporting obligation defined under point 13 of the Policy Guidelines.

In BiH it is not necessary to achieve the IED ELV for each pollutant for each plant to keep overall emissions below the emission ceilings for 2026 and 2027. However, according to the Energy Community Ministerial Council's decision D/2015/06/MC-EnC, every existing LCP will have to comply with IED ELVs or MDRs after 1 January 2028.

According to the data given in questionnaires filled out by the LCP operators, not a single large combustion plant in the power sector of Bosnia and Herzegovina has applied any desulphurization measures, since none of them has installed the appropriate equipment (Table 7). However, some TPPs are planning installation of desulphurization equipment, while at the industrial plant Natron Hayat LUKO-4, the appropriate FGD equipment had been installed during the construction of the plant in 1983 as a part of the technological process. In Table 13 measures planned in NERP which will reduce the emissions of SO2 to required levels are presented:

Table 13. Measures for SO_2 emission reduction in LCPS in BiH

Plant name	Plant ID	Applied technology
TPP Tuzla 4	T-4	
TPP Tuzla 5	T-5	WLS FGD
TPP Tuzla 6	T-6	
TPP Kakanj 5	K-5	WLS FGD
TPP Kakanj 6	K-6	
TPP Kakanj 7	K-7	
ICHPP Natron H. UKO4	UKO-4	SD FGD
ICHPP Natron H. LUKO4	LUKO-4	
TPP Gacko U1	G-1	Dry FGD (HLI)
TPP Ugljevik U1	U-1	WLS FGD

According to the data received from questionnaires regarding large combustion plants in the power sector in Bosnia and Herzegovina, some of them have applied denitrification ($DeNO_x$) technologies such as: low NO_x burner (LNB), over fire air (OFA) or both. Equipment for NOx reduction installed in the EPBiH plants gave significant results, especially at TPP Tuzla, which

achieved the requirements of the LCPD. NOx emission reduction is also evident at TPP Kakanj. In the industrial plant Natron Hayat appropriate DeNOx equipment had been installed during the construction of the large combustion facility in 1983. The planned measures in the NERP, which will reduce the emissions of NOx to required levels, are presented in Table 14.

Table 14. Measures for NO_x emission reduction in LCPs in BiH

Plant name	Plant ID	Applied technology
TPP Tuzla 4	T-4	
TPP Tuzla 5	T-5	
TPP Tuzla 6	T-6	SNCR
TPP Kakanj 5	K-5	SNCR
TPP Kakanj 6	K-6	SNCR
TPP Kakanj 7	K-7	SNCR
		SCR
ICHPP Natron H. UKO4	UKO-4	
ICHPP Natron H. LUKO4	LUKO-4	
TPP GackoG1	G-1	LNB+OFA
TPP Ugljevik U1	U-1	SCR

According to the data questionnaires regarding large combustion plants in Bosnia and Herzegovina, some of them applied measures for dust emission reduction by implementing the following technologies: electrostatic precipitators (ESP), bag filters (BF) or both, as well as wet filters with basified water. Some LCPs in Bosnia and Herzegovina installed equipment for dust emission reduction. The results are excellent at the EPBIH plants, especially at the TPP Kakanj. Other LCPs in the power sector did not apply appropriate measures for dust emission reduction. In the industrial plant Natron Hayat appropriate, an ESP was installed during the construction of the large combustion facility in 1983. In Table 15 the measures planned in the NERP, which will reduce the emissions of dust to required levels, are presented:

Table 15. Measures for dust emission reduction in LCPs in BiH

Plant name	Plant ID	Applied technology
TPP Tuzla 4	T-4	
TPP Tuzla 5	T-5	
TPP Tuzla 6	T-6	
TPP Kakanj 5	K-5	
TPP Kakanj 6	K-6	
TPP Kakanj 7	K-7	
ICHPP Natron H. UKO4	UKO-4	
ICHPP Natron H. LUKO3	LUKO-4	
TPP Gacko U1	G-1	ESP + BF
TPP Ugljevik U1	U-1	ESP

Appendix A

Table 16. A.1 List of large combustion plants included in the NERP for BiH

A	B	C	D			E	F
Number	Plant name (operator)	Plant location (address)	Date on which the application for the first permit for the plant was submitted	OR Date on which the first permit for the plant was granted	Date on which the plant was put into operation for the first time	Total rated thermal input on 31 December 2012 (MWt)	Annual number of operating hours (only if Article 5(1) is applied)
SUM BiH						**4,929**	
SUM FBiH						**3,329**	
1	TPP Tuzla 4	Tuzla 21 Aprila 4 75000 BiH			01/04/1971	600	
2	TPP Tuzla 5	Tuzla 21 Aprila 4 75000 BiH			02/04/1974	600	
3	TPP Tuzla6	Tuzla 21 Aprila 4 75000 BiH			30/09/1978	615	
4	TPP Kakanj 5	Kakanj Ćatići 72240 BiH			21/01/1970	330	
5	TPP Kakanj 6	Kakanj Ćatići 72240 BiH			27/12/1977	330	
6	TPP Kakanj 7	Kakanj Ćatići 72240 BiH			27/12/1989	670	
7	ICHPP Natron Hayat UKO4	Maglaj Liješnica bb 74250 BiH			1983	100	
8	ICHPP Natron Hayat LUKO4	Maglaj Liješnica bb 74250 BiH			1983	84	
SUM RS						**1,600**	
9	TPP Gacko	Gacko Gračanica bb 89240 BiH		1983	08/02/1983	800	
10	TPP Ugljevik	Ugljevik Ugljevik bb 76330 BiH			20/11/1985	800	

A	G	H	I	J

Number	Annual amount of fuel used (average 2008-2012) (TJ/year)							Average annual waste gas flow rate[8] (average 2008-2012) (M Nm3/year)	Annual quantity of sulfur input (average 2008-2012) (tons of S per year, expressed as S) (only if desulphurization rate is applied)	Latest available emissions data (2014 or, if data is not yet available by the time of preparation of the plan, 2013 data)		
										SO_2	NO_x	dust
		Hard coal	lignite	biomass	other solid fuels	liquid fuels	gaseous fuels					
SUM BiH			**18,593**		**89,111**			**38,732**	**123,358**	**268,137**	**19,690**	**6,532**
SUM FBiH			**1,625**		**70,242**			**25,877**	**47,613**	**137,109**	**13,693**	**2,169**
1	TPP Tuzla 4				14,706			5,275		17,139	3.022	698
2	TPP Tuzla 5				12,658			4,540		21,166	1.614	388
3	TPP Tuzla6				12,958			4,648		22,063	1.355	121
4	TPP Kakanj 5				7,459			2,675	12,402	20,688	2.493	17
5	TPP Kakanj 6				5,518			1,979	9,370	20,241	2.350	19
6	TPP Kakanj 7				15,899			5,703	25,840	34,481	2.542	849
7	ICHPP Natron Hayat UKO4		1,625					583		1,325	244	68
8	ICHPP Natron Hayat LUKO4				1,044			473		7	73	10
SUM RS			**16,968**		**18,869**			**12,854**	**75,745**	**131,027**	**5,997**	**4,363**
9	TPP Gacko		16,968					6,086		9,688	2,906	1,615
10	TPP Ugljevik				18,869			6,768	75.745	121,339	3,091	2,748

[8]If the waste gas flow rate is calculated based on the fuel input, the following conversion factors are suggested to be used when making the relevant calculations: 0.358 for solid fuels (6% O_2 content), 0.285 for liquid fuels (3% O_2 content) and 0.280 for gaseous fuels (3% O_2 content). For biomass, a typical conversion factor at 6% O_2 content would be 0.344. For further information, please refer to: Graham D P, Salway G, Ray P, Stack Gas Flow Rate Calculation for Emissions Reporting – A Guide to Current Best Practice for the Operators of Coal Fired Boilers, PT/07/LC422/R, May 2007; Graham D., Hamevie H., van Beek R. and Blank F., Validated methods for flue gas flow rate calculation with reference to EN 12952-15 (http://www.vgb.org/vgbmultimedia/rp338_flue_gas.pdf)

Appendix B

Table 17. B.1 Calculated emission ceilings for 2018

A	B	C	D	E	F	G	H	I	J	K
Number	Name	Reference oxygen content (%)	Relevant ELV for SO_2 (mg/Nm3)	Relevant desulphurization rate (where applicable) (%)	Plant's contribution to the 2018 SO_2 ceiling (tpa)	Relevant ELV for NO_x (mg/Nm3)	Plant's contribution to the 2018 NOx ceiling (tpa)	Relevant ELV for dust (mg/Nm3)	Plant's contribution to the 2018 dust ceiling (tpa)	Measures to comply with objectives/ Comments
(individual plant data – one line for each fuel type used[9])										
SUM BiH					**27,194**		**19,936**		**2,222**	
SUM FBiH					**15,670**		**13,509**		**1,579**	
1	TPP Tuzla 4	6	400		2,110	500	2,637	50	264	
2	TPP Tuzla 5	6	400		1,816	500	2,270	50	227	WLS FGD
3	TPP Tuzla 6	6	400		1,859	500	2,324	50	232	WLS FGD
4	TPP Kakanj 5	6	1,080		2,889	600	1,605	100	268	WLS FGD
5	TPP Kakanj 6	6	1,080		2,138	600	1,188	100	198	WLS FGD
6	TPP Kakanj 7	6	544	94	3,101	500	2,851	50	285	WLS FGD, SNCR
7	ICHPP Natron Hayat UKO4	6	1,664		970	600	350	100	58	
8	ICHPP Natron Hayat LUKO4	6	1,664		787	600	284	100	47	
SUM RS					**11,524**		**6,427**		**643**	
9	TPP Gacko	6	400		2,435	500	3,043	50	304	ESP + BF
10	TPP Ugljevik	6	1,343	94	9,089	500	3,384	50	338	WLS FGD, ESP

[9]For plants firing multiple fuels, each row needs to be filled per fuel (multiple rows per plant).

Table 18. B.2 Calculated emission ceilings for 2023

A	B	C	D	E	F	G	H	I	J	K
Number	Name	Reference oxygen content (%)	Relevant ELV for SO_2 (mg/Nm3)	Relevant desulphurization rate (where applicable) (%)	Plant's contribution to the 2023 SO_2 ceiling (tpa)	Relevant ELV for NOx (mg/Nm3)	Plant's contribution to the 2023 NOx ceiling (tpa)	Relevant ELV for dust (mg/Nm3)	Plant's contribution to the 2023 dust ceiling (tpa)	Measures to comply with objectives/ Comments
(individual plant data)										
SUM BiH					**27,194**		**10,031**		**2,222**	
SUM FBiH					**15,670**		**7,460**		**1,579**	
1	TPP Tuzla 4	6	400		2,110	200	1,055	50	264	
2	TPP Tuzla 5	6	400		1,816	200	908	50	227	
3	TPP Tuzla6	6	400		1,859	200	930	50	232	SNCR
4	TPP Kakanj 5	6	1,080		2,889	600	1,605	100	268	SNCR
5	TPP Kakanj 6	6	1,080		2,138	600	1,188	100	198	SNCR
6	TPP Kakanj 7	6	544	94	3,101	200	1,141	50	285	SCR
7	ICHPP Natron Hayat UKO4	6	1,664		970	600	350	100	58	
8	ICHPP Natron Hayat LUKO4	6	1,664		787	600	284	100	47	
SUM RS					**11,524**		**2,571**		**643**	
9	TPP Gacko	6	400		2,435	200	1,217	50	304	LNB+OFA
10	TPP Ugljevik	6	1,343	94	9,089	200	1,354	50	338	SCR

Table 19. B.3 Calculated emission ceilings for 2026 and 2027

A	B	C	D	E	F	G	H	I	J	K
Number	Name	Reference oxygen content (%)	Relevant ELV for SO_2 (mg/Nm^3)	Relevant desulphurization rate (where applicable) (%)	Plant's contribution to the 2026 SO_2 ceiling (tpa)	Relevant ELV for NO_x (mg/Nm3)	Plant's contribution to the 2026 NOx ceiling (tpa)	Relevant ELV for dust (mg/Nm3)	Plant's contribution to the 2026 dust ceiling (tpa)	Measures to comply with objectives/ Comments
(individual plant data)										
SUM BiH					**14,243**		**7,746**		**7,801**	
FBiH					**6,966**		**5,175**		**523**	
1	TPP Tuzla 4	6	200		1,055	200	1,055	20	105	
2	TPP Tuzla 5	6	200		908	200	908	20	91	
3	TPP Tuzla6	6	200		930	200	930	20	93	
4	TPP Kakanj 5	6	371	96	992	200	535	20	54	
5	TPP Kakanj 6	6	379	96	750	200	396	20	40	
6	TPP Kakanj 7	6	362	96	2,067	200	1,141	20	114	
7	ICHPP Natron Hayat UKO4	6	250		146	200	117	25	15	
8	ICHPP Natron Hayat LUKO4	6	250		118	200	95	25	12	
RS					**7,277**		**2,571**		**257**	
9	TPP Gacko	6	200		1,217	200	1,217	20	122	HLI
10	TPP Ugljevik	6	895	96	6,060	200	1,354	20	135	

Table 20. B.4 Emission ceilings overview for BiH 2018 to 2027 (ton/year)

Pollutant	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
SUM BiH										
SO_2	**27,194**	**27,194**	**27,194**	**27,194**	**27,194**	**27,194**	**22,877**	**18,560**	**14,243**	**14,243**
NO_x	**19,937**	**17,956**	**15,974**	**13,993**	**12,012**	**10,031**	**9,269**	**8,508**	**7,746**	**7,746**
Dust	**2,222**	**2,222**	**2,222**	**2,222**	**2,222**	**2,222**	**1,704**	**1,239**	**780**	**780**
SUM FBiH										
SO_2	15,670	15,670	15,670	15,670	15,670	15,670	12,769	9,867	6,966	6,966
NO_x	13,510	12,300	11,090	9,880	8,670	7,460	6,698	5,937	5,175	5,175
Dust	1,579	1,579	1,579	1,579	1,579	1,579	1,190	854	523	523
SUM RS										
SO_2	11,524	11,524	11,524	11,524	11,524	11,524	10,108	8,693	7,277	7,277
NO_x	6,427	5656	4885	4114	3342	2571	2571	2571	2571	2,571
Dust	643	643	643	643	643	643	514	386	257	257