

AREEP 2018

Annual Report on Environmental Protection

Public Enterprise Elektroprivreda Bosne i Hercegovine d.d. - Sarajevo

CONTENTS

1.	Power and Thermal Energy Generation	0001
2.	Basic Indicators of Environmental Impact and Environmental Protection Measures	0003
3.	Trend of Environmental Impact Indicators 2014 – 2018	0007
4.	Realization of Conditions of Environmental and Water Permits	0013
5.	Environmental Management System	0015
6.	Capital investments	0016
7.	Preparation of Planning and Study Documents	0018
8.	Costs in Environmental Protection	0019

1.

Power and Thermal Energy Generation

In 2018, JP Elektroprivreda BiH in its production facilities achieved total electricity production amounting to 7.256 GWh, of which thermal power plants produced 5.659 GWh (TPP Tuzla 3,207 GWh and TPP Kakanj 2,452 GWh), and hydro power plants 1,597 GWh (HPP on r. Neretva 1,534 GWh and sHPPs 63 GWh) (Diagram 1).

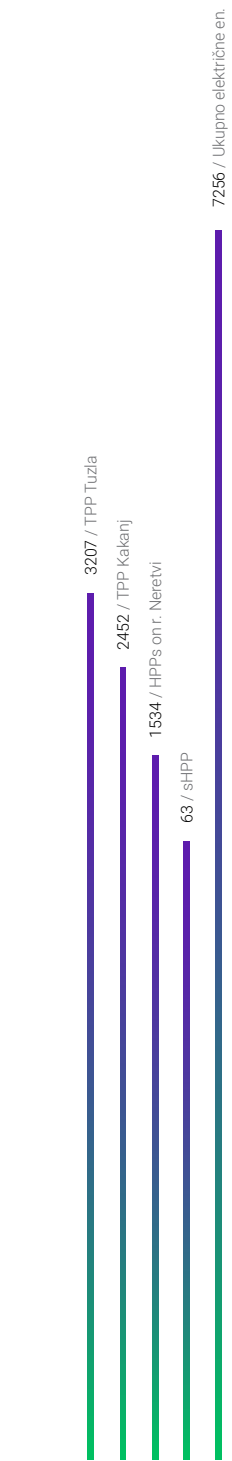


Diagram 1.

Electric power production in 2018 (GWh)

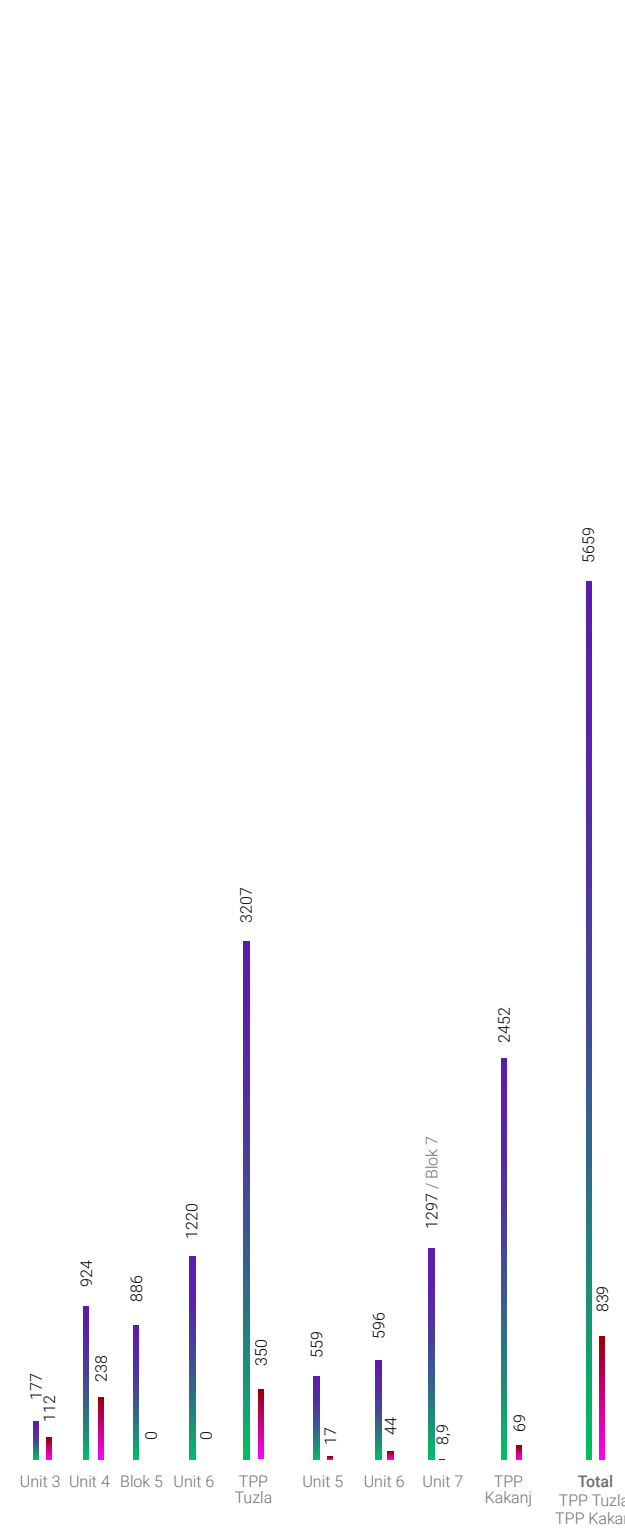


Diagram 2.

Balance of the production of electricity and heat by Units in TPP Tuzla and TPP Kakanj (GWh)

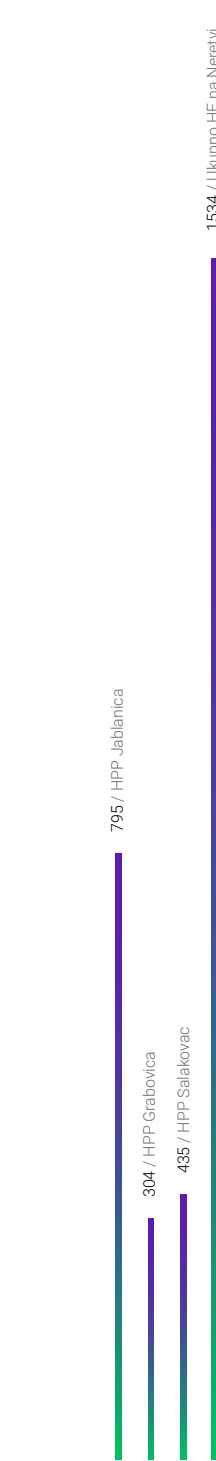


Diagram 3.

Balance of the production of electricity in HPPs on river Neretva (GWh)

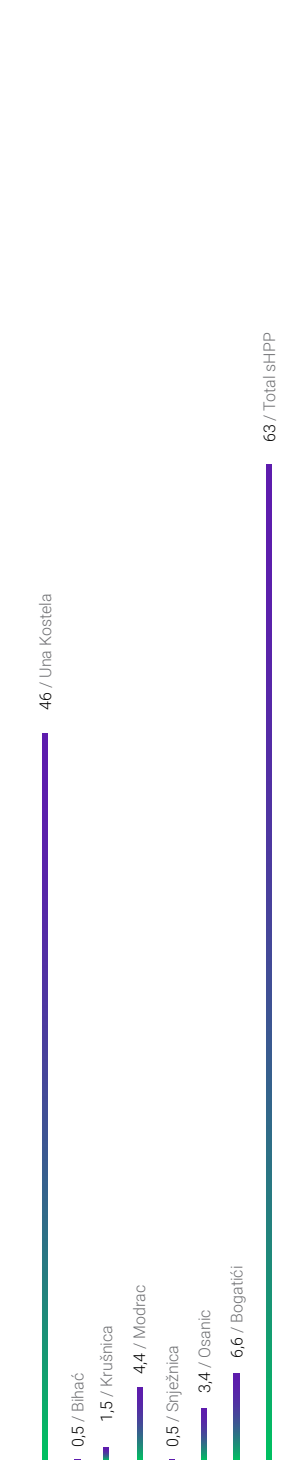


Diagram 4.

Balance of the production of electricity in sHPPs (GWh)

Operation of the electric power system of JP Elektroprivreda BiH in 2018 was characterized by:

- the total realized natural water inflows were by 838 GWh or 53.0% higher than the realized inflows in hydrologically more disadvantageous year of 2017, with the note that the dynamics of changes in natural water inflows observed quarterly was very unfavourable given that the favourable hydrological conditions were concentrated exclusively in the first quarter and the month of April.
- total coal procurement by 224,143 t or by 3.7% less than in 2017;
- total electricity production increased by 236 GWh or by 3.4% higher than the realized production in 2017;

Table 1.

Total annual coal consumption in 2018

Power Plant	Consumed coal (t)
TPP Tuzla	3,456,881
TPP Kakanj	2,254,264
Total	5,711,145

Table 2.

Water used in Hydro Power Plants on river Neretva in 2018

Hydro Power Plant	Used water, m ³
HPP Jablanica	3,228
HPP Grabovica	3,945
HPP Salakovac	4,301
Total	11,474

Energy

2.

Basic indicators of environmental impact and environmental protection measures

JP Elektroprivreda BiH, as part of its activities, continually monitors and analyses the impact of its business processes on the environment, in accordance with the current legislation in the field of environmental protection.

Air pollutants emissions from thermal power plants

In accordance with the legislation in the field of air protection of JP Elektroprivreda BiH, during 2018, continued monitoring the air pollutant emissions from thermal power facilities – sulphur dioxide (SO₂), nitrogen oxides (NO_x), solid particles, and carbon dioxide (CO₂) emissions.

Total annual emissions of pollutants into air and CO₂ emissions from thermal power plants are given in Table 3.

Power plant	NO _x t/yr	SO ₂ t/yr	solid particles t/yr	CO ₂ t/yr
TPP Tuzla	4,891	47,499	777	3,054,202
TPP Kakanj	9,270	90,153	72	2,573,715
Ukupno	14,161	137,652	849	5,627,917

Table 3.
Emissions of pollutants into air and CO₂ emissions from TPP Tuzla and TPP Kakanj

Consumption of water and emissions into water in thermal power plan

Data on the amount of water used for the production of electricity, heat and process steam in thermal power plants, and data on total wastewater pollution burden expressed population equivalent (PE), are given in Table 4.

Power plant	Utrošena voda m ³	Ispuštena voda m ³	Population equivalent (PE)
TPP Tuzla	10,243,860	1,275,269	27,360 ES Established PE valid until 31/11/2018.
TPP Kakanj	11,731,750	4,163,788	23,332.60 ES Established PE that applies from 1/12/2018 20,312.85 ES

Table 4.
Balance of water used and discharged for generation of electricity, thermal power and process steam in TPP Tuzla and TPP Kakanj

Waste Management in JP Elektroprivreda BiH

Within the framework of the waste management system in the JP Elektroprivreda BiH, all laws and by-laws related to the area of waste management are applied. In 2018, our company continued improving waste management system, by investment in the existing temporary waste storages at production subsidiaries, as well as by continuing the Project for construction of temporary waste storages in all power distribution subsidiaries, until its final disposal.

In 2018, a total of 1,592 t of non-hazardous waste was produced in JP Elektroprivreda BiH. TPP Kakanj produced 651.2 t, TPP Tuzla 477 t, HPPs on r. Neretva 98.3 t.

A total of 365.7 tonnes was produced in the power distribution subsidiaries (power distributions: Sarajevo, Tuzla, Zenica, Bihać and Mostar).

The total amount of hazardous waste, produced in JP Elektroprivreda BiH in 2018 is 55.7 tons. TPP Kakanj produced 9.5 tons, TPP Tuzla 2.2 t, HPPs on r. Neretva 41.1 t.

The power distribution subsidiaries (power distribution: Sarajevo, Tuzla, Zenica, Bihać and Mostar) produced a total of 2.9 t.

Total quantity of slag and ash produced in TPP Tuzla and TE Kakanj is 1,656 tons.

Entire collected waste from JP Elektroprivreda BiH was handed over to authorized operators for collection, transport, treatment and export of the same, until its final disposal.

Waste Management of Elektrodistribucija Sarajevo

In the Subsidiary „Elektrodistribucija“ Sarajevo, a temporary waste storage was constructed in the location Azići. In July 2018 a Certificate of occupancy was issued by the Municipality of Ilidža. Also, in 2018 a Water Permit was issued by the Ministry of Economy of Canton Sarajevo as well as a waste management license obtained from the Ministry of Physical Planning, Construction and Environmental Protection of Canton Sarajevo. The storage is equipped with pallet racks, for better use of space. The missing bins and containers for hazardous waste were purchased, and the storage was put into operation in November 2018.

In 2018, a contract was concluded for the Main Design for the Reconstruction of the Temporary Waste Storage Facility at the site of TS Azot 1 Vitkovići, Municipality of Goražde.

The Preliminary Design was completed. The Decision on urban planning approval was issued in July 2018. The process of making and revision of the Main Design of the Storage is ongoing.

In sHPP Osanica 1, regular cleaning of the Osanica river bed and maintenance of water intake were conducted. Approximately 62 kg of floating waste was collected and disposed of in an environment-friendly way. Also, about 606 m³ of the alluvial deposit was collected and disposed of.

Waste Management in Elektrodistribucija Tuzla

- Revised Main Design of Central Storage for Hazardous and Non-Hazardous Waste.
- The Filter for mineral oil purification in the transformer overhaul process is regularly maintained, and usable oil cleansed and returned to the process, while unusable oil is handed over to authorized waste operators. In this way the volume of hazardous waste is reduced.
- A contract was concluded with the waste operator for intervention in emergency situations of uncontrolled environmental pollution by mineral oil.

Waste Management of Elektrodistribucija Zenica

In 2018, an Elaboration of Hazardous Waste Disposal was developed with the assessment of environmental impact on the construction of a warehouse for temporary storage of waste in the area around the Subsidiary Elektrodistribucija Zenica in Radakovo - Zenica settlement. Urban Planning Approval was issued for the construction of a new warehouse for temporary storage of waste, at the site of an existing open warehouse, within the area of the Subsidiary.

Waste Management in Elektrodistribucija Bihać

In 2018, activities were carried out in accordance with the regulations in the field of waste management, and in line with them, the Subsidiary Elektrodistribucija Bihać, realized

the process of selling secondary raw materials and waste materials collected in the Subsidiary. In November 2018, the process was initiated for selling waste - non-chlorinated oils for engines, propulsion systems and lubrication based on minerals collected in the Subsidiary.

Unlike in the previous years, in 2018, there was no transfer, free of charge, of decommissioned and written-off computer equipment, to public institutions, associations of citizens and other interested persons, with the obligation of the recipients of the equipment to dispose the same in an environmentally friendly manner, after they stop using it.

Waste Management of Elektrodistribucija Mostar

In 2018, the contract was signed with a licensed company on final disposal of collected categories of waste.

FISH STOCKING

Hydro Power Plants on River Neretva

The Subsidiary Hydro Power Plants on River Neretva was planning to acquire fingerlings/ fish in 2018 under the "Program for Revitalization of Fish Community for the purposes of Hydro Power Plants on River Neretva", "Jablanica".

The watercourses in the fishing zone "Konjic" were planned to be restocked yearly with the following indigenous fish species:

- brown trout (110,000 pieces)
- marble trout (20,000 pieces)
- soft-mouth Neretva trout (55,000 pieces).

The watercourses in the fishing zone "Jablanica" were planned to be restocked yearly with the following indigenous fish species:

- brown trout (31,000 pieces)
- marble trout (1,000 pieces)
- soft-mouth trout (1,000 pieces).

Procurement Review Body of BiH, resolving as per complaint of the bidder PD "Riba Neretva" d.d. Konjic declared against the tender documentation in the procedure of public procurement of indigenous fish species of fingerlings/fish for the Neretva River basin, on two occasions issued a decision on the acceptance of the bidder's complaint to the

tender documentation. Accordingly, there was no restocking of the Neretva River basin in 2018.

Power distribution subsidiaries

In Elektrodistribucija Tuzla, restocking of the hydro reservoir Snježnica was carried out with the required quantity and type of fingerlings from the Fishing Basis of the Associations of the mentioned area.

In Elektrodistribucija Bihać, the annual restocking of the rivers Una and Krušnica is regularly carried out. In 2018, restocking of the river Krušnica, the municipality of Bosanska Krupa, was carried out with 20,487 pieces of brown trout (6-10 cm).

The obligation under the Contract is a 60% participation in the annual restocking of the Krušnica river basin, i.e. the acquisition of the fingerlings for restocking of the Krušnica river in 2018, which is proportional to the estimated damage caused to the natural equilibrium of this ecosystem and to the fish stock by the operation and maintenance of the sHPP Krušnica Bosanska Krupa.

Also, in cooperation with USR Una Bihać, on the basis of the 2018 Restocking Plan and the Fishing Basis of the Fishing Area on the territory of the City of Bihać, the restocking of Una river was carried out with 94,300 pieces of brown trout (10-15 cm).

The obligation of JP Elektroprivreda BiH on the basis of the Agreement on the Promotion of the Fish Stock is to participate in the restocking of

the Una river with 15% of the total number of fingerlings, which is defined Annual plan for restocking the fishing areas by sports fishing association USR UNA, by the right to manage the Una river basin (which is proportional to the estimated damage caused to the equilibrium of the ecosystem and the fish stock is implemented by the operation of the sHPP Una Kostela and sHPP Bihać).

In Elektrodistribucija Sarajevo, annual restocking of the Osanica River in Goražde (the facility of sHPP Osanica 1) is carried out. Because of the free water flow and fish migration, on the River Željeznica, on the profile of Bogatići dam for the purpose of remediation of landslides, there was no restocking in 2018.



USE OF TRANSFORMER OIL IN POWER DISTRIBUTION SUBSIDIARIES (EDs)

Elektrodistribucija Sarajevo

In the normal course of the process of repair and maintenance of substations and transformers, in the area of Sarajevo Canton and Bosnian-Podrinje Canton Goražde, in 2018, 4,495 kg of non-chlorated insulating oil and heat transfer oil based on mineral oil was spent (14.68% less oil in 2018 compared to 2017).

Elektrodistribucija Bihać

The Subsidiary Elektrodistribucija Bihać, does not have a transformer repair workshop. In the course of the regular process, i.e. carrying out the maintenance of the transformers and the low-voltage switches, the electro-isolating transformer oil was supplemented (approx. 860 kg). In the activity of electricity production, within the process of production and maintenance of power facilities in hydro power plants, biodegradable hydraulic oils and grease were used. Used oil is temporarily deposited and also prepared for final disposal by authorized operators. No cases of uncontrolled oil spillage have been recorded.



3.

Trend of Environmental Impact Indicators 2014 – 2018

Tuzla
Kakanj

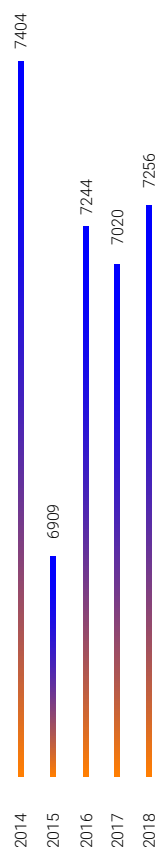


Diagram 5.

Total electric power generation in
JP Elektroprivreda BiH d.d. for the
period 2014 - 2018
(GWh)

THERMAL POWER



THERMAL POWER

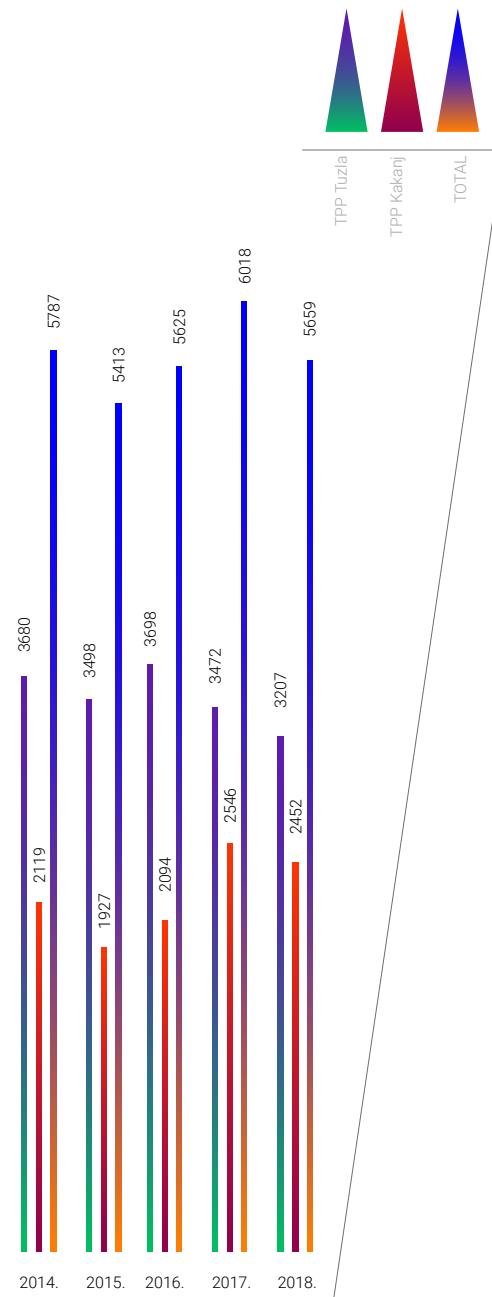


Diagram 6.

Electric power generation in thermal power plants for the period 2014 - 2018 (GWh)

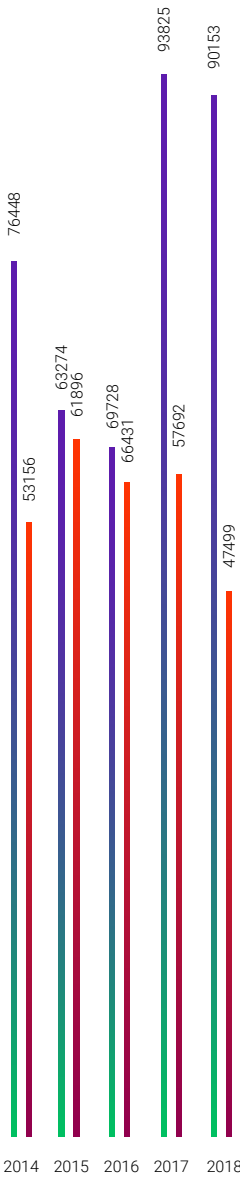


Diagram 7.

Emission of SO₂ from thermal power plants for the period 2014 - 2018 (t)

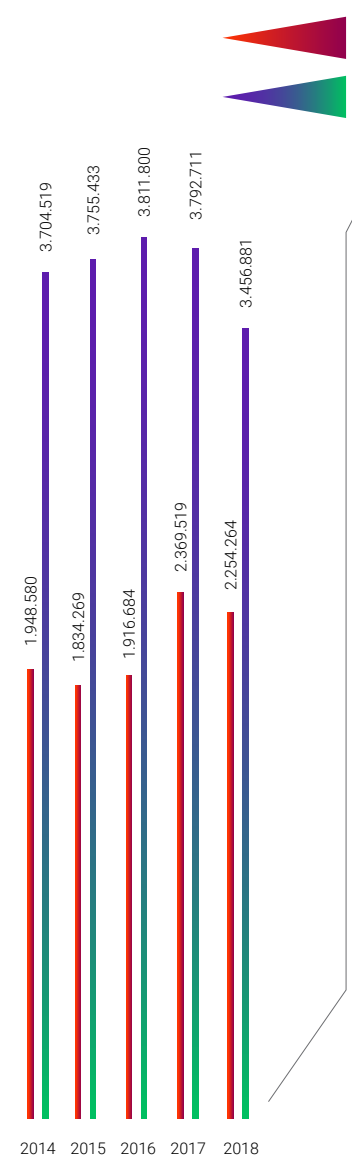


Diagram 8.

Coal consumption in thermal power plants for the period 2014 - 2018 (t)

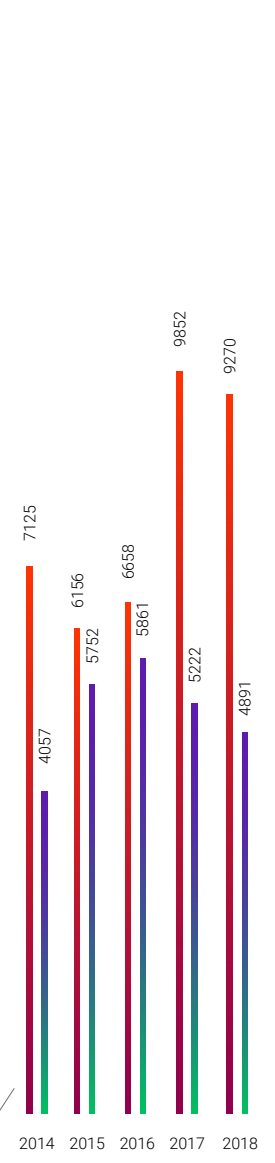


Diagram 9.

Emission of NO_x from thermal power plants for the period 2014 - 2018 (t)

TPP Tuzla
TPP Kakanj

TPP Kakanj
TPP Tuzla

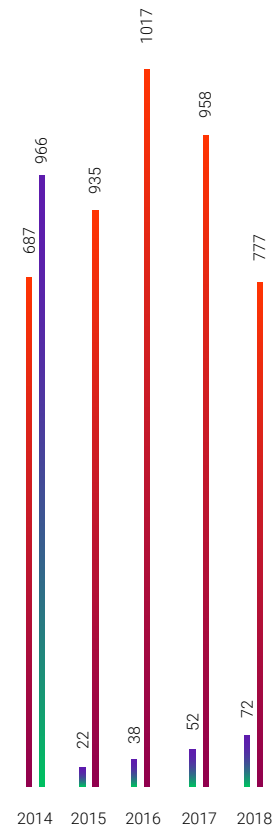


Diagram 10.

Emission of solid particles from thermal power plants for the period 2014 - 2018 (t)

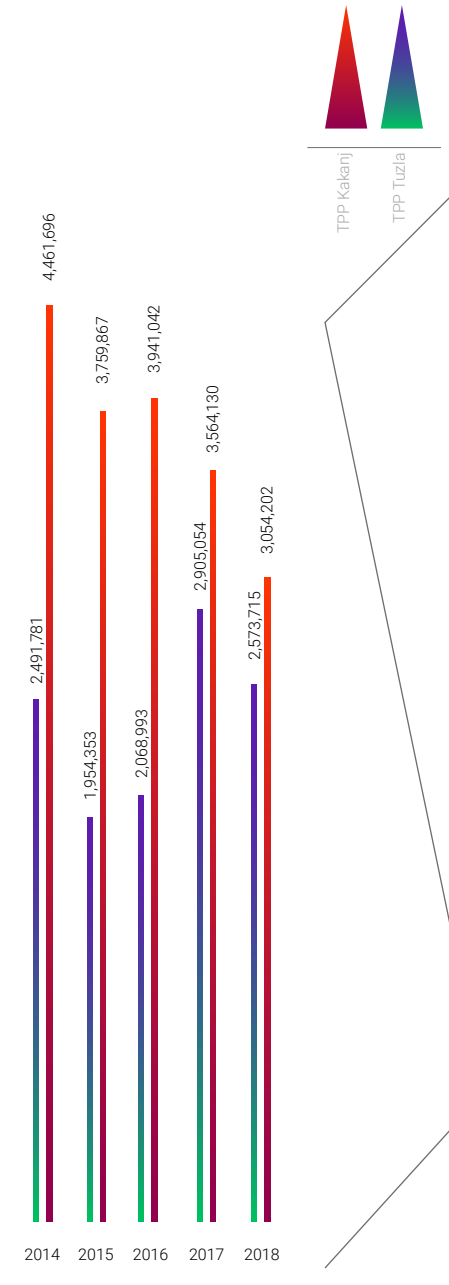


Diagram 11.

Emission of CO₂ from thermal power plants for the period 2014 - 2018 (t)

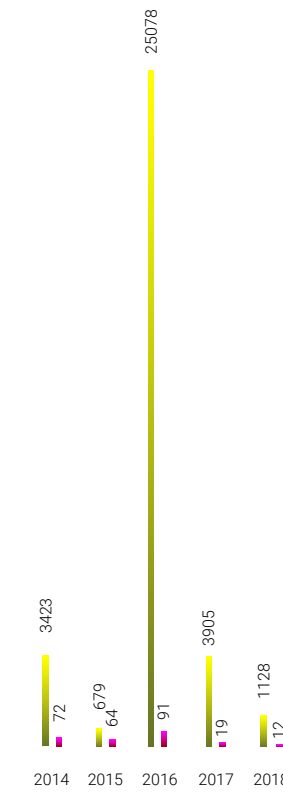
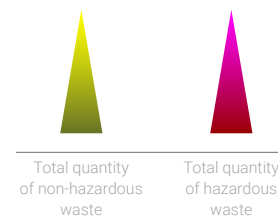
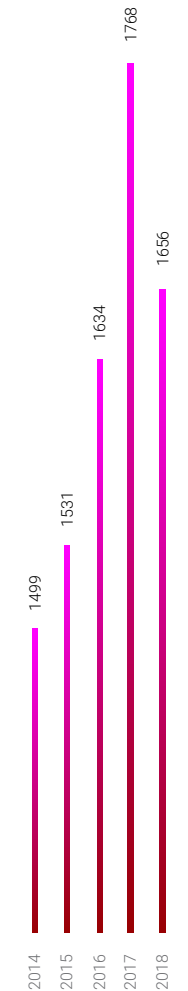


Diagram 12.

Total quantity of non-hazardous waste and hazardous waste* in thermal power plants for the period 2014 - 2018 (t)



Dijagram 13.

Total quantity of slag and ash in thermal power plants for the period 2014 - 2018 (t)

HYDRO POWER PLANTS

on River Neretva

3.



HYDRO POWER PLANTS

on River Neretva

3.

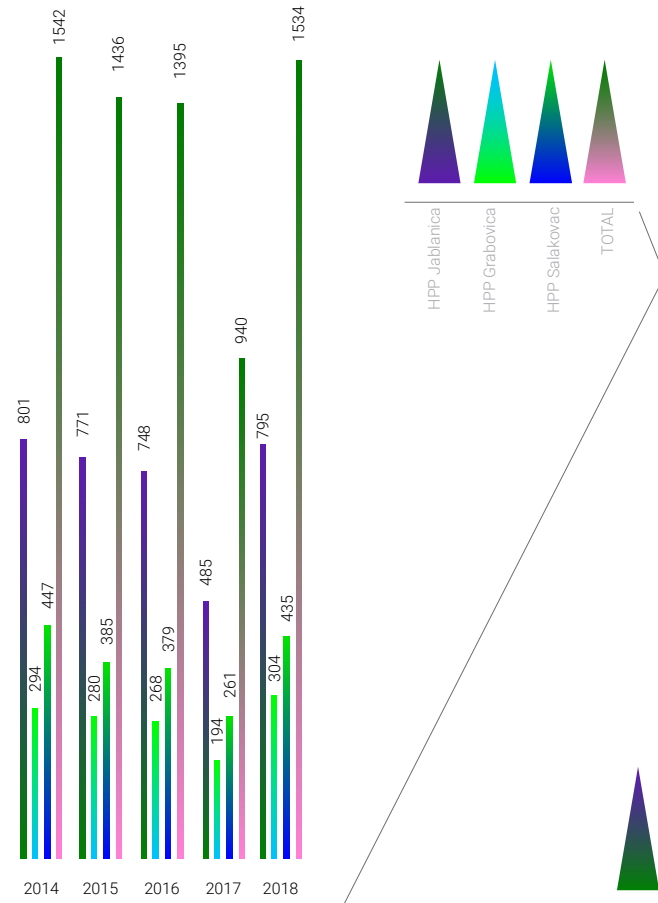


Diagram 14.

Electricity generation in hydro power plants for the period 2014 – 2018 (GWh)

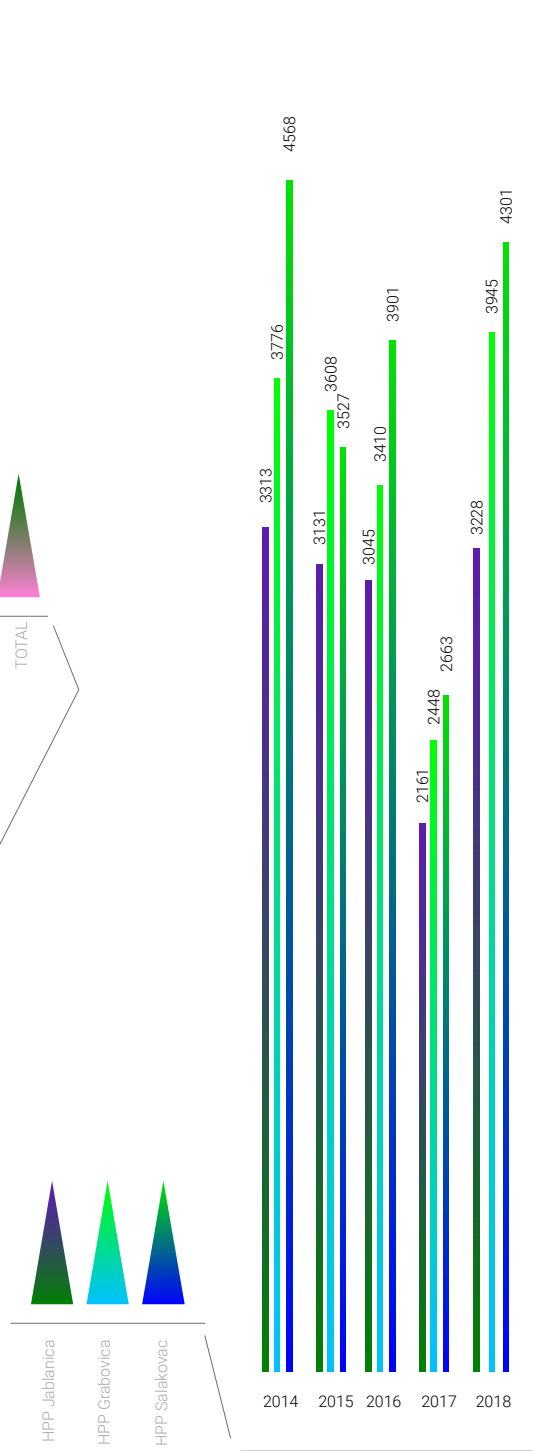


Diagram 15.

The amount of water used for the production of electricity in hydro power plants for the period 2014 – 2018 (million m³)

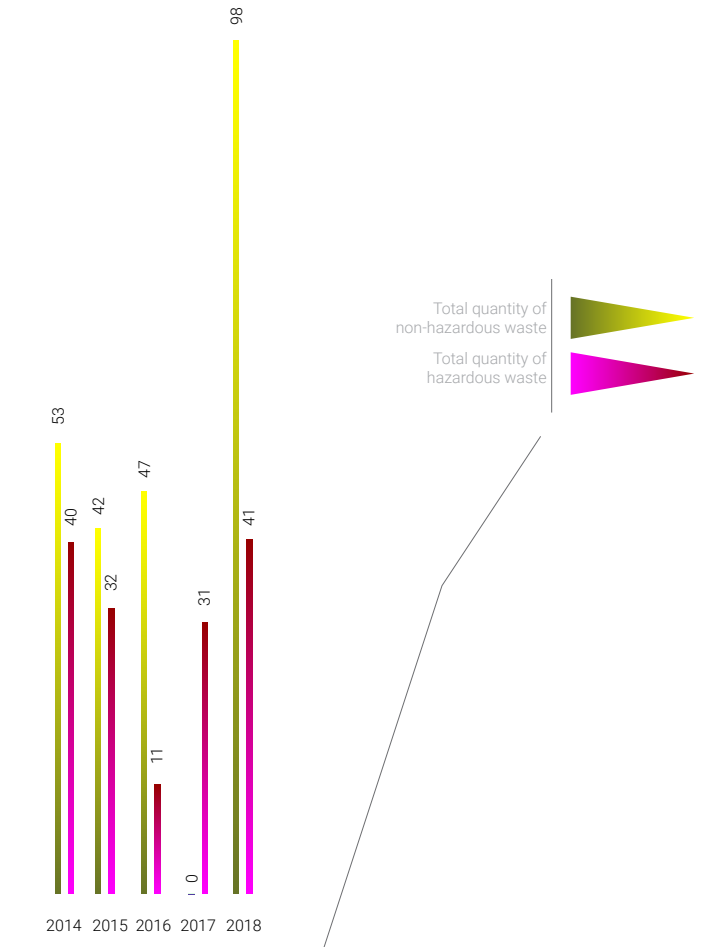


Diagram 16.

Total quantity of non-hazardous waste and hazardous waste* in hydro power plants for the period 2014 – 2018 (t)

POWER DISTRIBUTION SUBSIDIARIES

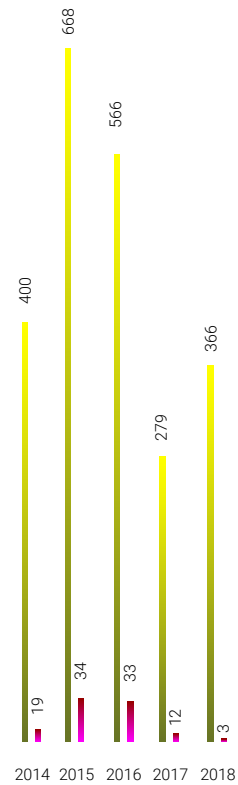


Diagram 17.

Total quantity of non-hazardous waste and hazardous waste* in distribution subsidiaries: Sarajevo, Tuzla, Bihać, Zenica and Mostar, for the period 2014 - 2018

Total quantity of non-hazardous waste
Total quantity of hazardous waste



4.

Realization of conditions of environmental and water permits



THERMAL POWER PLANTS

Thermal Power Plant Tuzla

In April 2018, a Request for Extension/ Renewal of the Environmental Permit for the Ash and Slag Landfill Jezero II/ Jezero last phase, was submitted to the Federal Ministry of Environment and Tourism. In June 2018, the Federal Inspectorate carried out an inspection and found that the Environmental Permit for the Jezero Landfill expires on 20/08/2018 and that TPP Tuzla has submitted a request for extension of the Environmental Permit in a timely manner.

The Federal Ministry of Environment and Tourism did not issue the Environmental Permit in due time, but on 23/08/2018 issued an Instruction for Procedures until Issuance an Environmental Permit stating that Thermal Power Plant Tuzla fulfils the prescribed measures, conditions and monitoring from the renewed Environmental Permit for the Jezero Landfill until the issuance of the new Environmental Permit.

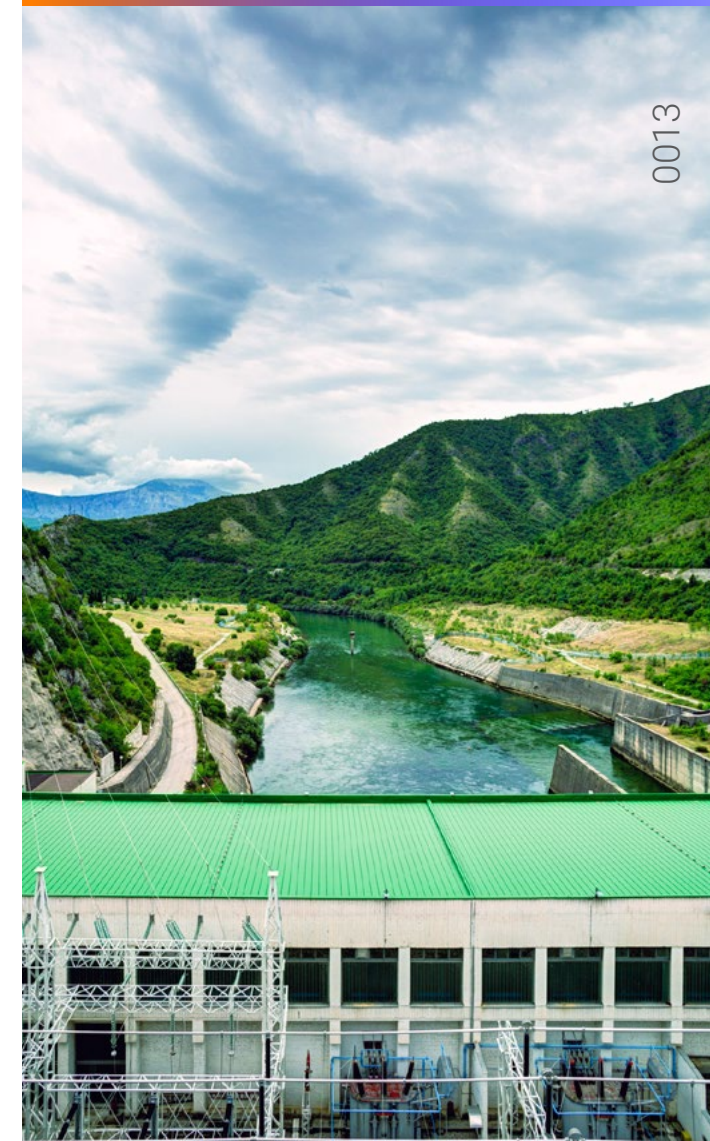
Thermal Power Plant Kakanj

- An Elaboration of the justification for the construction of the flue gas desulphurization plant.
- The activities prescribed by the Environmental and Water Permits are regularly carried out, such as: continuous monitoring of SO₂, CO, NO_x, CO₂, solid particles emissions into air and flue gas flow, continuous monitoring of the quantitative and qualitative characteristics of process wastewater prior to discharge into the river Bosna, measurement of thermal power consumption in order to rationalize power consumption in power units; continuous control of input energy sources in order to prevent outflow to the river Bosna, regular cleaning of the sludge treatment plant from the condenser where the overflow water is returned into the flocculation pool (coagulator).

Hydro Power Plants on River Neretva

According to the valid environmental permits for HPP Jablanica, HPP Grabovica and HPP Salakovac, the following activities are regularly conducted:

- Protection of water quality
- Protection of air quality
- Waste management
- Minimizing negative impacts of noise
- Minimizing negative impacts on fauna
- Minimizing other negative impacts on the environment.





POWER DISTRIBUTION SUBSIDIARIES

Elektrodistribucija Sarajevo

The requirements from the Environmental Permit for sHPP Osanica are observed (environmentally acceptable flow) and environmental protection measures are implemented.

Elektrodistribucija Tuzla

The conditions from the valid environmental and water permits for the sHPP Modrac in Lukavac and the sHPP Snježnica with hydro reservoir in Teočak are observed. Accordingly, the following is performed:

- regular observation of dams and reservoir, control of working parameters, visual control of erosive processes,
- technical, geodetic and physical observation of the dam,
- selective separation of waste and keeping records of produced waste quantities and
- restocking of hydro reservoir Sniježnica, once a year.

Elektrodistribucija Bihać

According to the valid environmental and water permits for sHPP "Una Kostela" Bihać, sHPP "Bihać" Bihać, and sHPP "Krušnica" Bosanska Krupa, the ordered activities are carried out regularly.

5.

Environmental Management System

Elektrodistribucija Tuzla

The Supervisory Audit of Environmental Management System BAS EN ISO 14001 was completed in June 2018, with the audit of Quality Management System according to ISO 9001, which together form an Integrated Management System. The Subsidiary is continuously working to improve the relationship with the environment, through a systematic approach to waste management, control of environmental aspects, identification and application of legal regulations, fulfilment of the set environmental objectives, and corrective actions.

In the course of 2018 preparations were made for the Supervisory Audit, in particular by reviewing procedures and documents related to the new ISO standard requirements according to 2015 edition. The environmental management that is recognized as a separate process is evaluated in terms of determining the context of organization and potential risks, and measures for identified risks and opportunities were considered.

Thermal Power Plant Tuzla

In 2018, internal audits of Integrated Management Systems were conducted, which showed a slight need for corrective actions and improvements in individual processes.

The revision of the integrated management system by management for 2017 was carried out in July 2018.

Also, the Decision on the completion of transition and transition to new standards EN ISO 9001:2015 and EN ISO 14001:2015 was adopted. The recertification audit of the Integrated Quality Management and Environment Management System was carried out according to the requirements of ISO 9001:2015 and ISO 14001:2015.

The recertification audit has been successfully completed and the certificate has been extended until October 2021.

Thermal Power Plant Kakanj

Thermal Power Plant Kakanj has a valid certificate of compliance of the Environmental Management System with the requirements of the EN ISO 14001:2004 standard. By December 2018, this system complies with the requirements of BAS EN ISO 14001:2017. Harmonization of the existing Environmental Management System with the requirements of the new standards implied the modification of existing documents of the Environmental Management System, maintenance and achievement of the following principles:

- that employees are constantly familiarized with the importance of meeting the environmental legal requirements,
- that the environmental policy is defined and published and
- that the environmental goals are defined and published.

Hydro Power Plants on River Neretva

The program to improve the Integrated Management System (IMS) was developed in 2018, on the basis of which the following activities were carried out:

- a Report on the Implementation of the Integrated Management System Improvement Program,
- a review of the documents of the Integrated Management System was carried out,
- Internal audit was carried out in all plants/sectors,
- an analysis of environmental aspects, that relate to the process of power generation in facilities/sectors was carried out.
- assessment of compliance of work with legal and other environmental requirements was carried out;
- environmental goals and quality goals have been achieved,
- the Report on the Assessment of the Readiness of the Integrated Management System was completed
- a Report on Audit of (Transitional) Integrated Management System was produced, according to the requirements of ISO standard 9001:2015 and ISO 14001:2015.

6.

Capital investments



Small Hydro Power Plant Una Kostela -

- the project for the continuation of reconstruction and expansion

Reconstruction and expansion are actions to optimize the use of Una River water to increase the overall utilization rate and increase production. Planned interventions, with set limitations of environmental requirements, can be implemented within a period of 40 months including the implementation of preparatory actions. For preparatory works, reconstruction of the supply bodies and reconstruction of the pond in the river Una 20 months is foreseen. Expansion of the plant requires additional 20 months after reconstruction works have been completed.

Realized activities during 2018:

The water acts have been updated for the existing facility and the planned project for the continuation of reconstruction and expansion:

- The Decision on the water permit for the facility of sHPP Una Kostela,
- The Decision on the preliminary water approval for continuation of reconstruction and expansion,
- The Federal Ministry of Spatial Planning was sent a request for the issuance of urban planning approval for the project of the continuation of the reconstruction and expansion of the sHPP Una Kostel. For the purpose of preparing and submitting the application, the following were collected: approvals, permits and consents.

Hydro Power Plant Babino Selo

A part of the Environmental Impact Assessment Study for HPP Babino selo was prepared - Assessment of critical habitats in the project area of the Vrbas River planned for construction HPP Babino Selo. Continuous monitoring of groundwater levels on installed piezometers continued.

Hydro Power Plant Janjići and Hydro Power Plant Kovanići

Continuous monitoring of groundwater levels on installed piezometers continued.



Wind Farm Podveležje 1

Organized by JP Elektroprivreda BiH and consulting company Fichtner, a public presentation of the WF Podveležje 1 Project was held in Mostar on 13/03/2018. In accordance with Annex 2 and Annex 4 to the Consultancy Contract EP BiH-IC-WPP Podveležje-Cons-2/13-KfW, concluded between the Consultant FICHTNER GmbH & Co. KG, Germany and JP Elektroprivreda BiH d.d. - Sarajevo, that are financed from the GRANT funds of KfW Bank (the framework of Annex 2 includes the engagement of Consultant referred to in item 1), the Consultant in 2018 prepared the following documentation:

- Report on GAP Analysis and Environmental Impact Assessment (in accordance with IFC Performance Standards) - Initial Document
- Additional requirements for environmental impact assessment (in accordance with IFC Performance Standards), and finalization and delivery of the Environmental Impact Study

In 2018, the Environmental Impact Study was also submitted to the Export Credit Agency (EKF - Denmark), as part of the procedure for securing the ECA guarantee for the WF Podveležje 1 Project.

8.

Costs in Environmental Protection

In the JP Elektroprivreda BiH, for the time being, no special records are kept on investments and costs for implementation of plans and programs in the domain of environmental protection and natural resources. Funds are planned and realized in the framework of investments and regular maintenance of plants and facilities. There is no harmonized procedure for presenting objective indicators of total costs in realized activities, which includes the fees for the use of natural resources. It is therefore difficult to provide safe and complete information about total spent resources JP Elektroprivreda BiH d.d. – Sarajevo, in that context. According to the data available for the preparation of this document, the total amount is 36,068,393 KM. This indicator is a confirmation that environmental protection is an important part of the total business of our company also in financial aspect.

The Table 5, according to available data, provides costs of environmental protection by subsidiaries, at the level of the Company Directorate, and the total for JP Elektroprivreda BiH d.d. – Sarajevo.

Table 5.

Environmental Protection Costs in the Domain of Environmental Management

Subsidiaries	(BAM)
TPP Tuzla	597,400
TPP Kakanj	1,288,700
HPPs na Neretvi	1,592,615
ED Sarajevo	320,737
ED Tuzla	656,616
ED Zenica	1,144,028
ED Bihać	691,131
ED Mostar	163,963
Fee for air pollution of TPP Tuzla	2,113,191
Fee pursuant to the Law on the allocation of part of the revenues generated by work of TPP Tuzla	4,811,133
Fee for water protection of TPP Tuzla	157,193
Fee for air pollution of TPP Kakanj	3,925,892
Fee pursuant to the Law on the allocation of part of the revenues generated by work of TPP Kakanj	4,139,309
Fee for water protection of TPP Kakanj	351,953
Contributions for hydro reservoir (HPP on river Neretva)	13,667,235
Fee for water protection HPP on river Neretva	5,567
Company Directorate	
Sector for strategic development	60,000
Capital investments	269,765
Water charges and communal utilities Water charges and utilities services	111,965
TOTAL:	36,068,393