

THE BRČKO DISTRICT BOSNIA AND HERZEGOVINA INTERQUALITY d.o.o. Sarajevo



SUSTAINABLE ENERGY ACTION PLAN (SEAP)



Orderer: GOVERNMENT OF BRCKO DISTRICT BiH

Department of Spatial Planning and Property Affairs

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Abstract

Sustainable Energy Action Plan (SEAP) of The Brcko District BiH is an integral document consisting of a main document and annexes which are an integral part of the Action Plan.

In **The Introduction**, the paper provides a brief overview of **The Covenant of Mayors** initiative, which is the basis for drafting the **Action Plan**. What is the action plan, which targets the development and implementation of the Action Plan and what is the action plan focused will be explained below.

In the chapter **Methodology**, the most important steps that precede the drafting of the Action Plan, description of the development of the plan and the steps and activities to be carried out after the action plan drafted. The Action Plan is a document based on which it is necessary to conduct a series of activities for the successful reduction of CO2 emissions

In **Baseline Emission Inventory - BEI** in accordance with the recommendations of the European Commission, the sectors of energy consumption of The Brcko District BiH are divided into three main sectors, each of which further divided into several sub-sectors:

- Buildings,
- Traffic,
- Public lighting.

The building sector is divided into three sub-sectors:

- Buildings owned by and vested with the Government and Public Administration of Brcko District,
- Housing sector
- Building commercial and service activities,

The transport sector comprises three sub-sectors:

- Vehicle uu property and vested with the Government and Public Administration of Brcko District,
- Public transport in the area of Brcko District,
- Personal and commercial vehicles.

Detailed data on consumed quantities of energy and CO₂ emissions associated with energy consumption can be found later in this document.

Baseline Emission Inventory, contain amounts of CO₂ emissions on the basis of which in each subsequent periodic measurement of the amount of emissions to be seen how reduced (or increased) CO₂ emissions compared to the initial period, and how the Brcko District in successful implementation of measures to reduce emissions. **Reference year for The Baseline Emission Inventory is 2012 years**.

Based on the structure of CO₂ emissions to the emitents, the goal of reducing emissions by 2020. According to the Agreement, specifically the reduction of emissions can not be less than 20% compared to the reference period. Brcko District will decide on a targeted reduction in emissions for the period.

In the strategy to reduce CO₂ emissions by 2020, described the state and local energy environment that is the major framework of action and the basic lines of strategy. Describes the principles on which the strategy is divided into main areas of activity focused on the most important technological units. Description strategy ends with the main priorities and challenges that will emerge in the process of implementation of the defined measures.

The chapter **Action Plan** contains the measures to be taken in order to achieve the goals of reducing emissions. Each area is defined by several measures. For most measures it was possible to define measurable targets to structures responsible for implementing the measures have had the opportunity to monitor the effects of programs that are implemented, however, for some of the measures is not possible within the framework of this document to assess all the parameters (reduction of emission or size of the investments).



To the action specified in the section **Action plan** implemented, Brcko District will face a range of challenges. The biggest challenges in the escorting of the plan are related to changes in the behavior of the citizens and the financing of the proposed measures. Furthermore, the number of measures and issues that individual measures addressed will inevitably require the engagement portion of the Brcko District of BiH which will require the organization of implementation, certain structure adjustment, and finally monitoring the implementation and reporting on the program. All these challenges are addressed in the chapter **Implementation of the Action Plan**.

At the end of the Action Plan are set out in the conclusions where are outlined major challenges in the implementation of measures. Proposed measures to Brcko District should soon be applied to first stop the upward trend in CO₂ emissions, and later turned to the trend towards reduction.



Picture 1. The ceremony of signing the Covenant of Mayors 04th May 2010 at the Great Hall of the European Parliament in Brussels.



1. Introduction

1.1. About The Sustainable Energy Action Plan

The Sustainable Energy Action Plan (hereinafter referred to as the **Action Plan**) is the document that cities, municipalities and regions plan measures and actions to improve the environmental impact, especially in terms of reducing carbon dioxide (CO₂).

In order to create an action plan is needed to prepare for the Brcko District **Baseline Emission Inventory** of CO₂ emissions (hereinafter referred to as the **Emission Inventory**) that lists and describes the key activities to be undertaken in order to achieve the intended objectives.

Creating the Action Plan of the Brcko District BiH (is having to decide the competent authorities) may attach activities of the European Commission and sign the Covenant of Mayors (hereinafter referred to as the Agreement). The Agreement is a key document wich on the basis of the collected data on the existing situation (**Emission Inventory**) recognizes and provides accurate and clear guidelines for the implementation of projects and measures of energy efficiency and renewable energy at the level of a city/region, that will result in the reduction of CO₂ emissions by more than 20% by 2020.

The main objectives of the development and implementation of the Action Plan are:

reduce CO2 emissions

- implementation of energy efficiency measures set out in paragraph 8 of this document. (using renewable energy sources, consumption management, education and other measures;
- as much as possible to contribute to security and diversity of energy supply Brcko District BiH;
- reduce energy consumption in the building sector, traffic and public lighting;
- zoning policies to enable the transformation of urban areas in an environmentally sustainable. The recommended policy of the EU in terms of energy independence of urban complexes means that more energy should be produced locally from renewable energy sources.

The action plan is aimed at long-term changes in cities energy systems and define measurable targets aimed to reducing energy consumption, in line with the emissions of CO₂ and other greenhous gases. The Action Plan refers to the entire administrative area of Brcko District BiH, and includes both public and private sector. The plan defines the measures and projects in the building sector, traffic and street lighting, and does not include the industrial sector, since in industrial sector is difficult to affected. Action Plan in all its aspects should be harmonized with the legal framework of Brcko District BiH and follow as possible EU regulations for the period until 2020.

In the administration of the European Commission is established the Convenant of Mayor Office that should help cities that are involved in this action. In drafting the Action Plan, the Covenant of Mayors Office has prepared a **Guide**¹ to facilitate the implementation of the Action Plan to city governments, and comparing the results achieved among European cities.

In addition to energy savings, the results of this activities and measures outlined in the Action Plan are reflected in the provision of jobs for local industry and services and the creation of new jobs, a healthier environment and an improved quality of life, increase economic competitiveness and greater energy independence. The implementation of the Action Plan opens up a range of opportunities for work and investments to small companies whose working thermo facades of buildings for individual and collective housing and large investors interested in the construction of district heating, gasification of Brcko District BiH and construction of cogeneration and Local production of electricity.

The Action plan is oriented at long-term changes energy systems in cities and define measurable targets aimed at reducing energy consumption, and in line with that emissions of CO₂ and other greenhous gases. The Action Plan refers to the whole administrative area of Brcko District BiH,

¹ (http://www.eumayors.com)



and includes both public and private sector. The Sustainable Energy Action Plan of Brcko District BiH is made according to client requirements and guide "How to Create an Action Plan Sustainable Energy (SEAP)" - guidebook) published by the European Commission through the Publications Office of the The European Union, 2010 Luxembourg

1.2. About "The Covenant of Mayors"

According to the European Statistical Office (EUROSTAT) urban areas in the European Union (EU) are responsible for 80% of energy consumption and CO₂ emissions with the annual trend of increase of 1.9%. For that reason, the objectiv of the European Commission to reduce of greenhouse gas emissions more than 20% can be achieved only if the process involves local government, local investors, citizens and their associations. Together with national governments, local and regional authorities of EU Member States share responsibility and actively take on obligations to combat global warming through the programs of efficient use of energy and renewable energy.

Covenant of Mayors (hereinafter referred to as the Agreement) is one of the most important initiatives of the European Union, which includes local and regional authorities that voluntarily undertake to increase energy efficiency and use of renewable energy in its area.

29 January 2008, and after accepting the package of climate and energy, the European Commission launched an initiative to support and encourage local and regional government in the process of introducing and implementing local energy policy.

Covenant of Mayors is initiating and linking local and regional authorities which have common objectives in line with EU energy and climate goals become a unique initiative in the European institutions has been recognized as an exceptional model. The agreement could be signed by local and regional authorities of all sizes - from small towns to major cities and large metropolitan areas. Local authorities are in the perfect position to change the behavior of citizens and devote themselves to the climate and energy challenges through the harmonization of public and private interests and by integrating sustainable energy development in local development objectives. The signing of an opportunity local and regional governments to step up efforts to reduce CO2 emissions in their area, have opportunities for support from the European Union and exchanges of experience with other European cities.

By signing the **Agreement**, the mayors commit to reduce CO₂ emissions at least 20% until 2020 compared to the initial defined period. This objective has been defined at EU level as a result of **Package on climate and energy** adopted in 2008 The role of local government has been recognized as crucial in the implementation reduce the impact of urban areas to climate change. Reducing greenhouse gas emissions by at least 20% and more than 20% compared to the reference year is taking into account that all indicators show energy consumption growth of energy consumption in all sectors, in line with that growth and emissions of CO₂ and other greenhouse gas emissions, a complex task. Therefore, the achievement of goals is only possible with the active participation of city governments, citizens and all other participants of a larger number of European cities.

The roles city governments defined by the Agreement are the following:

- Increasing energy efficiency in public buildings in the ownership and use of cities;
- Increase the quality and energy-environmental efficiency in the public transport sector;
- Increase energy efficiency sector of street lighting in the city;
- Planning urban development on the principles of energy-environmental sustainability;
- Permanent informational and educational activities and campaigns to raise public awareness about ways to increase energy efficiency and reduce CO₂ emissions and about the necessity of saving energy in all aspects of life and work;
- Support programs and initiatives of various individuals and legal entities in order to increase the use of renewable energy sources;



Promoting and encouraging local production of energy from renewable sources and cogeneration.

The signatories to the Agreement accept the following obligations:

- Creation of Reference inventory of CO₂ emission as the basis for drafting the Action Plan Sustainable Energy town in 2020;
- Development and implementation of the Action Plan;
- Control and monitoring of the implementation of the Action Plan;
- After signing the agreement, reporting on the implementation of the Action Plan of the European Commission (Covenant of Mayors Office) every two years;
- Adjusting the structure of the city government in order to ensure the necessary skilled resources to implement the Action Plan;
- Regularly inform the local media on the results of the implementation of the Action Plan;
- Informing citizens about the opportunities and benefits of using energy in an efficient manner;
- Organise Energy Days or Days of the Agreement cities, in cooperation with the European Commission and other participating cities;
- Participation and contribution to the annual conference of mayors EU Sustainable Energy Europe;
- The exchange of experiences and knowledge with other cities and municipalities.

To the end of October 2013, according to official statistics of the Covenant of Mayors Office, the Agreement was signed by 5034 towns, 13 of which are from Bosnia and Herzegovina.

The first signatories of Bosnia and Herzegovina are Banja Luka, Bijeljina, Sarajevo and Laktaši, and the initiative has overgrown and global so are the cities from Argentina, New Zealand and Kyrgyzstan also recognized its value and signed the Agreement.

2. Methodology

The primary task in the Action Plan is the creation of Reference Inventory of CO₂ emission. Reference Inventory of CO₂ emission requires extensive data collection and analysis of energy consumption in various sectors for a defined reference period (year of which begins monitoring of CO₂ emissions in respect of which the planned reduction of emissions). According to the recommendations of the European Commission, the sectors are divided into buildings, transportation, street lighting and optional industry. Data collection is particularly challenging task, since the data are often either unavailable or scattered in various institutions and enterprises, or the structure and resolution data are insufficient to be able to use the data. The final score of the Reference Inventory of CO₂ emission represent input data for creation of CO₂, local government gets an insight into priority sectors on which to act to reduce emissions. Most of the measures proposed in the Action Plan has time and financial dimension through which local authority can manage during implementation, as well as the estimated energy savings and emitting in order to gain insight into the effectiveness of the measures. For each measure it is possible to use a many sources of funding available to the Brcko District BiH.

Sustainable Energy Action Plan must be approved by the Assembly of Brcko District BiH. Once the action plan is approved, begin implementation of the plan, which runs until 2020. Each measure is defined in the Action Plan may represent a separate project or even program made up of a number of projects. Since the Action Plan contains a relatively large number of measures that is often necessary to carry out at the same time, the implementation of the program represents a financial and organizational challenge for local governments.



The establishment of the working group responsible for implementing the recommendations based on the best practices of other cities. The working group is made up of employees whose profile and position in the hierarchy correspond to the measures to be implemented.

Monitoring and reporting on the implementation of the Action Plan will be carried out periodically. The working group will report to work depending on the level of implementation of measures and achievement of results. These reports will provide insight into actual results or effects of implementing the measures. Overview of emissions, since this is a comprehensive business, will be implemented as necessary in accordance with the level of completion of the measure. For each new review of emissions it is important to apply the methodology of making identical to that used in the preparation of Reference Inventory of CO₂ emission.

2.1 Competencies according the Statute of Brcko District BiH

According to Article 16 of the Law on the Government of Brcko District Bosnia and Herzegovina (Official Gazette of Brcko District BiH, numbers: 19/07, 36 / 07.38 / 07.2 / 08, 17/08, 23/08 and 14/10) Mayor has the following competencies:

a) Represents the District in accordance with the Statute;

b) Chaired by the Government and is responsible for scheduling and conducting sessions;

c) He is responsible for implementing the laws of Bosnia and Herzegovina and the District;

d) be responsible to the Assembly for the orderly management and administration of the District;

e) Declares the appointment, promotion and dismissal of all employees of the Government and the public administration in accordance with the law, except where the Constitution or legislation provides otherwise;

On behalf of the Government Brcko District Bosnia and Herzegovina:

- To submit draft laws and make recommendations to the Assembly;
- Proposed budget of the Brcko District BiH and produce the financial reports of the District

Assembly Brcko District Bosnia and Herzegovina;

- Performs other duties in accordance with the Statute and laws;

g) Has the executive powers given to him in District laws;

h) Organizes the government and brings organizational plan;

i) To submit an annual report on the work of the Government and proposed work program of the Government for the coming year;

j) To report to parliament on the management and disposal of public property of the District;

k) To submit quarterly and annual reports on budget execution;

I) Acts as the principal of all the employees in the government and public administration of the District;

m) Directs and coordinates the work of departments;

n) Declares the state of emergency in the event of danger to life and health of the population, threat to property in the Brcko District, as well as in other cases specified by law. Measures taken during the state of emergency shall be in accordance with the Statute, the laws and regulations of the District;

o) Establich a working body under its jurisdiction;

p) To inform the public and media;

d) Sign the acts of the Government;

s) Perform other duties entrusted to it by the Statute and the District laws

The Mayor of the District can after accepting the "Sustainable Energy Action Plan of Brcko District BiH " of the Assembly of Brcko District BiH and the decision on accession to make the signing of the Covenant of Mayors on behalf of the Brcko District.



3. Urban planning - analysis of the current situation

3.1. General information about the area

The territory of Brcko District is located in the northeastern part of Bosnia and Herzegovina along the Sava River and the border with the Republic of Croatia. The geographical location of Brcko District is defined between 44 $^{\circ}$ 50 24 'and 44 $^{\circ}$ 52 0' north latitude and between 18 $^{\circ}$ 46 53 'and 18 $^{\circ}$ 49 40' east longitude predominantly altitude areas Brcko District BiH is between 96 and 200 m / n stim that over 80% of the territory at an altitude below 200 m / n. The town of Brcko is located at 44 $^{\circ}$ 51 latitude and 18 $^{\circ}$ 47 longitude.

Picture 3.1 Map of the Brcko District



According to internal administrative borders in Bosnia and Herzegovina, Brcko District is bordered by several municipalities of the Republic of Serbian and two of the ten cantons of the Federation of Bosnia and Herzegovina, Tuzla Canton in the south west and the Posavina Canton in the northwest. Area BRCKO DISTRICT BIH is 493.3 km2, which represents 1% of the total area of Bosnia and Herzegovina.

The urban area of the city of Brcko belongs to 4,745 ha, or 16% of the area.

3.2. History and population

Brcko District, established by a decision of the International Court of Arbitration, and established in its present form on 8 March 2000 and includes area of the former municipality of Brcko.

The city of Brcko, which is the administrative, economic and cultural center of the District has a long and turbulent history which goes back to ancient history. There is evidence that people lived here in the Stone Age². The first written evidence of settlements dating back to Brcko from 1548 years when the built border station of the Turkish army. Faster development of the economy and especially the trade Brcko experienced during the Austro-Hungarian occupation (1878-1914.), When formed, and the first educational and medical institutions. Between the two world wars during the Kingdom of Yugoslavia, there was a certain economic stagnation and slowdown in the growth and development of the city. After World War II were built significant economic capacity and there was a large urban development and multiple increase in population. According to the

² Strategy for the Development of the Brcko District BiH for the period 2008-2017 years, Ekonomski institut d.o.o. Bijeljina



first census in 1879 in Brcko, lived in 2901 resident, while in 1971 the municipality of Brcko counted 74,771 residents. This rapid increase in population caused a rapid and unplanned construction of a larger increase in unemployment caused by the departure of a significant number of workers on temporary work abroad makes this municipality was among the first in the former Yugoslavia. Before the start of the war 1991 years Brcko had 87,627 inhabitants in order to preliminary results of the last census 2013 years Brcko District counted 93,028 residents.

From educational institutions in Brcko District now has 16 elementary schools, 4 middle and Faculty of Economics. GDP per capita in 2012 amounted to 8.120 KM.

3.3 Climatic characteristics

In the area of Brcko District there is moderate continental climate with maximum rainfall during the warmer months and a minimum at the end of the cold period. Precipitation is unevenly distributed throughout the year and amount to 700-800 mm. The average temperature is above 10 ° C, the coldest month is January with an average temperature of -1 ° C and the warmest July with an average temperature of about 21 ° C. The dominant wind is northerly low intensity.

3.4 Pedological characteristics of the soil

Soil as a dynamic category and the basis for the development of plant species is variable quality especially when it comes to agricultural land. In the land are, depending on the temperature, water and other factors, accommodated many organisms, including microorganisms that greatly affect the properties of the soil. The land on the territory of Brcko District is predominantly by type pseudogley, although there are areas that belong to other types, namely: semigley, fluvisol, brown sour (distric kombisol) and vertisol. It is believed that the District has the most fertile land in BiH, although it must be to work on solving the problem of flooding. Pseudogley (Planosol) is hydromorphic land to a depth of 30-40 cm has an impermeable layer (clay loam soil), above which the water builds up in layers, usually powdery clay. This land is prone to erosion and the forest circuit, usually the best protection of the land. On it grow sessile oak and hornbeam, the drier parts, while the wet phase of growth oak forests. This type of land in the central and northern part of the District³.

In the southern part of the district is represented by a sour-brown land suitable for growing agricultural crops. These lands are flat and gently sloping terrain. In the valleys of Tinja, Brka and tributaries can be found the land where the process began gleization. Semigley as a land where groundwater leads to process gleization, usually with the terrestrial part of the profile with humus horizon. Fluvisol, or alluvial deposits, formed at the flooded river terraces and the composition of his varied, depending on the application. Most of the geographical area of today's Brcko District BiH (83%) does not exceed 200 meters above sea level and therefore belongs to low Posavina whose structure prevailing clayey and sandy alluvial swamp-land, hard to handle.

3.5 Balance of area

Analysis of the basic forms of land use is presented in the tables below, refers to the area of the District and the urban area of the town of Brcko. Of the total area of the District (49,495 hectares), an urban area belongs to 5,836 hectares, or 11.8%, while 43,659 hectares (88.2%) belongs to a country area. In the structure outside the urban area of agricultural area occupied (62.6% or 30 785 ha). Under the forests in the area of the District is covered by 12,874 ha (26% of the total area of the District).

3.6. Legislative framework and planning documents

Brcko District has adopted the following laws relating to the field of environmental protection:

The Law on Spatial Planning and Construction of the Brcko District BiH ("Official Gazette of the Brcko District BiH ", No. 29/08)

³ Strategy for the Development of the Brcko District BiH for the period 2008-2017 years, Ekonomski institut d.o.o. Bijeljina



The Law on Environmental Protection of the Brcko District BiH ("Official Gazette of the Brcko District BIH BiH", No. 24/04, 1/05, 19/07 and 9/09)

The Nature Protection Act of Brcko District BiH("Official Gazette of the Brcko District BIH ", No. 24/04, 1/05, 19/07 and 9/09)

Air Protection Law of the Brcko District BiH ("Official Gazette of the Brcko District BIH ", No. 25/04, 1/05, 19/07 and 9/09)

Waste Management Law of the Brcko District BiH ("Official Gazette of the Brcko District BIH ", No. 25/04, 1/05, 19/07, 2/08 and 9/09)

Water Protection Law of the Brcko District BiH ("Official Gazette of Brcko District BIH ", no: 25/04, 05/01 and 19/07)

Law on communal activities of the Brcko District BiH ("Official Gazette of Brcko District BIH ", no: 30/04, 24/07 and 9/13)

Forest Law of the Brcko District BiH ("Official Gazette of the Brcko District BIH BiH", No. 14/10)

Law on Tourism of the Brcko District BiH ("Official Gazette of the Brcko District BIH BiH", No. 3/06, 19/07)

The Law on Agricultural Land Brcko District BiH ("Official Gazette of Brcko District BIH ", no: 32/04, 20/06, 10/07 and 19/07)

Rules on conditions for the operation of waste incineration plants ("Official Gazette of the Brcko District BiH ", No. 30/06)

Regulation on conditions for the transfer of waste management obligations with manufacturers and vendors to operators ("Official Gazette of the Brcko District BIH ", No. 32/06)

Regulations on the conditions for the application for the environmental permit ("Official Gazette of the Brcko District BIH ", No. 02/07)

Regulations on contents of the impact on the environment ("Official Gazette of the Brcko District BIH ", No. 02/07)

Regulation on the content of the plan of adjustment of waste management for existing plants ("Official Gazette of the Brcko District BIH ", No. 32/06)

Regulation on the conditions for the application for the environmental permit ("Official Gazette of the Brcko District BIH ", No. 02/07)

Regulation on waste management that is not on the list of hazardous waste or which content is unknown ("Official Gazette of the Brcko District BIH ", No. 32/06)

Regulation on the gradual elimination of substances that deplete the ozone layer ("Official Gazette of Brcko District BIH ", no: 30/06)

Regulation for plants and installations for which the obligation of environmental impact assessment ("Official Gazette of the Brcko District BIH ", No. 30/06)

Regulations on limiting air emissions from incineration plant biomass ("Official Gazette of Brcko District BIH ", no: 30/06)

Regulation on the monitoring of air quality ("Official Gazette of Brcko District BIH ", no: 30/06)

Regulation on monitoring emissions of pollutants into the air ("Official Gazette of Brcko District BIH, no: 30/06)

Regulation on waste categories with lists ("Official Gazette of Brcko District BIH ", no: 32/06)

Regulations on issuing permits for activities of small businesses in waste management ("Official Gazette of Brcko District BIH ", no: 32/06)

Regulation on limit values of pollutant emissions into the air ("Official Gazette of the Brcko District BIH ", No. 30/06)

Regulation on limit values of air emissions from combustion plants ("Official Gazette of Brcko District BIH ", no: 30/06)



Regulation Limited and target values of air quality ("Official Gazette of the Brcko District BIH ", No. 18/11)

Regulation on financial guarantees that can ensure the cross-border movement of waste ("Official Gazette of the Brcko District BIH ", No. 32/06)

Regulations on emissions of volatile organic compounds ("Official Gazette of Brcko District BIH ", no: 30/06)

From strategic planning documents Brcko District BiH has the following:

1. Spatial plan for the Brcko District Bosnia and Herzegovina from 2006 created by Venetoprogetti Ph.D., Vendemiano Italy and Synerghia SpA Milan Italy

2. The decision to implement the plan for the Study Book B ("Official Gazette no. 9/06)

3. Strategy development of Brcko District Bosnia and Herzegovina from 2008 to 2017 year



4. ANALYSIS OF ENERGY CONSUMPTION IN THE BUILDING SECTOR BRCKO DISTRICT BIH IN 2012

For the purposes of this analysis, energy consumption in the building sector Brcko District BIH is classified into the following sub-sectors:

- Buildings owned by and vested with the Government and Public Administration Brcko District BiH,
- Housing sector
- Building for commercial and service activities,;

Buildings owned and under the jurisdiction of the Government and Public Administration of Brcko District Bosnia and Herzegovina, are classified into the following 8 categories:

- 1. Buildings and premises of Government and Public Administration of Brcko District BiH,
- 2. Buildings and premises of local selfgovernment of Brcko District BiH,
- 3. Buildings of public enterprises owned by the Brcko District BiH,
- 4. Buildings institutions in training and education
- 5. Building for health care,
- 6. Buildings for cultural activities,
- 7. Building for sports activities,
- 8. Buildings of public institutions of the police and judiciary

The buildings are privately owned intended for housing are classified into the following two categories:

- 1. Buildings and facilities intended for individual housing,
- 2. Building and objects intended for collective housing,

Building for services and commercial activities in the area of Brcko District BiH:

1. Buildings and facilities for services and commercial activities.

4.1. The methodology of data collection

The relevant data for analysis of energy consumption in buildings is collected from the following sources:

- 1. Department of Spatial Planning and Property Affairs of Brcko District BiH Government,
- 2. The Office of the Public Property of Brcko District BiH Government,
- 3. Directorate of Finance-Tax Administration

4. Department of Economic Development of Sports and Culture of the Government of Brcko District BiH,

- 5. Department of Municipal Affairs of Brcko District BiH Government,
- 6. Department of Administrative Affairs of the Government of Brcko District BiH,
- 7. Department of Agriculture, Forestry and Water Management,
- 8. Department of Public Records
- 9. Department of Displaced Persons, Refugees and Housing Issues
- 10. JP "Komunalno Brcko" d.o.o Brcko District BIH D
- 11. Representatives of local communities Brcko District BIH
- 12. The management of public facilities in Brcko District BiH
- 13. Regional Plan of Brcko District BiH
- 14. Citizens Brcko District BIH landlords

Data were collected on the basis of prepared questionnaires for a preliminary energy audit of public buildings, then the list of questions that are distributed to authorized parties to provide data, also by experts who provided assistance in defining the required data. After collecting a list of questions and a review by experts who are, where necessary, shall re-checking them. Data for



housing facilitie were collected from various documents of professional services and databases Brcko District BIH, via the Tax Administration and in the field through record selected samples. One of the keys sources and Spatial Plan of Brcko District BiH. Data for electricity consumption are tested with JP "Komunalno Brčko" d.o.o which is responsible for the distribution and collection of electricity.

Based on collected data, for all sub-sectors of building construction Brcko District BiH will provide the following parameters:

- general information about the sub-sector;
- total area subsectors (m2);
- number of objects subsectors;
- total electricity consumption subsector (kWh);
- specific consumption of electricity subsector (kWh / m2);
- electricity consumption for heating subsector (kWh);
- specific consumption of electricity for heating subsector (kWh / m²);
- total consumption of fuel wood (m3);
- specific consumption of fuel wood subsector (kWh / m²);
- total consumption of coal (t);
- specific consumption of coal subsector (kWh / m²);
- total fuel consumption (t);
- specific consumption of fuel oil (kWh / m²);
- Total energy consumption subsectors (MWh);
- specific consumption of heat energy sub-sectors (kWh / m2).

Depending on the reliability data were classified into 3 categories:

- fully reliable data data obtained by collecting objects account for individual subcategories and data from two independent sources,
- reliable data, data obtained by collecting data corresponding to the average data subsectors,
- estimated data (in the absence of the necessary data they evaluated various empirical methods and / or derived or calculated from existing data).

4.2 The amount of energy consumption of buildings owned by the Brcko District BiH, public buildings and buildings of public enterprises

Sub-sector administrative buildings owned by Brcko District BIH, public buildings and buildings of public enterprises, depending on the activities which are intended to be divided into eight categories as specified in paragraph 4. General characteristics of this sub-sector are many buildings of different types and period of construction. It is also recognized that data on energy consumption in perpetual cases not collected or at the level of the building and that the resulting data are often inaccurate. This essentially means that in many cases, employees who take care of the buildings do not understand or issues nor importance of controlling energy consumption which resulted in the need to check the data through other data sources. This highlights the very low level of awareness and the lack of an adequate management to monitor energy consumption.

4.2.1 Buildings owned by Brcko District BiH

Category of buildings owned by Brcko District BiH are 21 building belongs to the Government, Parliament and public administration Brcko District BIH surface of 19.182 m2. In 2012, in the category of administrative buildings total was spent 2,427 MWh of heat which gives specific consumption of 126,58 kWh / m2, and 1,876,157 kWh of electricity⁴, which gives the specific consumption of 97.80 kWh / m2

⁴ Information taken from two sources: the JP "Komunalno Brčko" and the Directorate of Finance of Brcko District BiH



Table 4.1 Buildings owned by Brcko District BiH – administrative building

Buildings owned by Brcko District BiH – administrative building							
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumption thermal energy kWh/year	Emission CO ₂ t/year	
1.	Government of Brcko District BiH	UI. Bulevar mira br.1. 76100 Brčko distrikt BiH	heating oil light	3.558,00	403.300	106,34	
2.	City Hall	UI. Trg Robertsa B. Ovena 2 76100 Brčko distrikt BiH	heating oil light	2.160,00	213.720	56,64	
3.	Assembly of Brcko District BiH	UI. Mladena Maglova br.1. 76100 Brčko distrikt BiH	heating oil light	1.148,00	176.570	48,77	
4.	Directorate of FinanceTreasury / Tax Administration	UI. Miroslava Krleže br.1. 76100 Brčko distrikt BiH	heating oil light	2.632,00	296.440	81,95	
5.	The Office for Public Property	UI. Mehmedagića bb 76100 Brčko distrikt BiH	heating oil light	554,00	83.620	22,16	
6.	Subdivision for personal documents	UI. Trg pravde br.20. 76100 Brčko distrikt BiH	electrical energy	954,00	149.370	95,29	
7.	Election Commission	UI. Dr. Abdulaha Bukvice 1 76100 Brčko distrikt BiH	electrical energy	130,00	34.000	21,70	
8.	Department of Agriculture, Forestry and Water Management	UI. Ivana Franje Jukića br. 2 76100 Brčko distrikt BiH	electrical energy	399,00	49.930	31,85	
9.	Department of Displaced Persons, Refugees and Housing Issues	UI. Islahijet br.7. 76100 Brčko distrikt BiH	heating oil light	305,00	39.640	10,94	
10.	Department for fire protection	UI. Bosne srebrne 34 76100 Brčko distrikt BiH	coal and wood	1.396,00	213.000	80,87	
11.	Department of Civil Protection	UI. Mehmeda, Malića i Ibrahima Džindića 76100 Brčko distrikt BiH	electrical energy	565,00	64.000	40,83	
12.	Subdivision roads and parks Sub-department for public facilities	UI. Bosne srebrene br.12. 76100 Brčko distrikt BiH	electrical energy	752,00	86.496	55,18	
13.	Employment Institute of Brcko District BiH	UI. Marka Marulića br.1. 76100 Brčko distrikt BiH	electrical energy	182,00	33.000	21,05	
14.	Department for veteran's	UI. Trg pravde br.4. 76100 Brčko distrikt BiH	electrical energy	93,00	16.420	10,47	



Bui	Buildings owned by Brcko District BiH – administrative building							
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumptio n thermal energy kWh/year	Emission CO ₂ t/year		
14.	Department for veteran's	UI. Trg pravde br.4. 76100 Brčko distrikt BiH	electrical energy	93,00	16.420	10,47		
15.	Department for veteran's	UI. Nadbiskupa J.J.Štrosmajera 76100 Brčko distrikt BiH	electrical energy	110,00	24.000	15,31		
16.	The union Brcko District BIH	UI. Trg pravde br.6. 76100 Brčko distrikt BiH	electrical energy	96,00	17.700	11,29		
17.	Department of Public Records Division for cadastral books -Vijeće For exposure to real estate -Komasacija	Ul. Branislava Nušića br.27. 76100 Brčko distrikt BiH	heating oil light	2.070,00	184.870	48,99		
18.	Center for Social Work	Ul. Klosterska br.18. 76100 Brčko distrikt BiH	heating oil light	618,00	87.910	23,30		
19.	Health Insurance Fund of Brcko District BiH	Ul. Vuka S.Karadžića br.4. 76100 Brčko distrikt BiH	coal and wood	540,00	126.000	56,20		
20.	Office of the Mayor - The Inspectorate	UI. Cvijete Zuzurić br.2. 76100 Brčko distrikt BiH	electrical energy	828,00	116.000	74,00		
21.	Information Technology Sector	UI. Laze Kostića br.4. 76100 Brčko distrikt BiH	electrical energy	92,00	12.000	7,66		
	TOTAL:				2.427.986	920,79		

In Table 4.2 are given parameters of heating energy consumption by fuel in the category of the administrative building of Brcko District BiH Government, and specific consumption of thermal energy.

Table 4.2 The parameters of energy consumption in public buildings

Energent	Total heated	Consumed amount	Consumption of heat	Specific consumption
	(m ²)	annually	energy per year (kWh)	(kWh/ m ²)
Masut (t)	0,00	0,00	0,00	0,00
Heating oil (I)	13.045,00	118.129	1.486.070,00	113,91
Coil (t)	1.936,00	52,15	339.000,00	175,10
El. energy (KWh)	4.201,00	602.916,00	602.916,00	143,51
Pellet (t)	0,00	0,00	0,00	0,00
TOTAL	19.182,00	-	2.427.986,00	126,58

Quantitative shares for heating the types shown in Table 4.1, while the structure of the consumption of heat for heating buildings administrative categories shown in Table 4.2.







Figure 4.2 The structure of consumption of thermal energy for heating fuel from different categories of administrative buildings



4.2.2 The buildings and premises of the local communitiesa

The buildings and premises used by the local community because of dispergovanosti and ways of using the space quite demanding for the calculation of CO₂ emissions. In most cases these buildings are used for a variety of multi-purpose needs of the local population (youth clubs, clinics, etc.), While the Office for representatives of local communities and projecting registries are used occasionally and hence the heat. Energy consumption and CO₂ emissions are calculated on the basis of preliminary energy audits in such a way that the consumption of the entire object proportionally divided to different users depending on the area you use. Category of buildings and premises or local communities i.e. local governments consists of 78 space and facilities of local communities a total area of 13,261.10 m² with an average fuel consumption of 141.49 kWh / m₂ and 1,731,904 kWh of electricity, which gives the specific consumption of 130,60 kWh / m²



Table 4.3 Buildings and	premises owned b	y Brcko District BiH-	The Local Community	1
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Buil	Buildings and premises owned by Brcko District BiH- The Local Community							
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumption thermal energy kWh/year	Emission CO ₂ t/year		
1.	MZ 1.Maj	UI. Vukosavska br.72. 76100 Brčko distrikt BiH	electrical energy	119,00	20.000	12,70		
2.	MZ 4.Juli	UI. Isaka Samokovlije br.1A 76100 Brčko distrikt BiH	electrical energy	126,00	14.000	8,90		
3.	MZ Bijela	UI. Bijela bb 76100 Brčko distrikt BiH	electrical energy	137,50	33.000	21,00		
4.	MZ Bijeljinska cesta	UI. Braće Ribnikar br.8. 76100 Brčko distrikt BiH	electrical energy	534,00	87.000	55,50		
5.	MZ Boće	UI. Boče bb 76100 Brčko distrikt BiH	electrical energy	288,00	49.000	31,20		
6.	MZ Boderište	UI. Boderište bb 76100 Brčko distrikt BiH	electrical energy	93,50	16.000	10,21		
7.	MZ Brezovo polje	UI. Brezovo polje bb 76100 Brčko distrikt BiH	electrical energy	216,00	34.000	21,60		
8.	MZ Brezovo polje-Selo	UI. B.Polje selo bb 76100 Brčko distrikt BiH	electrical energy	45,00	4.000	2,50		
9.	MZ Brka	UI. Brka bb 76100 Brčko distrikt BiH	electrical energy	180,00	33.000	21,00		
10.	MZ Brod	UI. Stari Brod br.38. 76100 Brčko distrikt BiH	electrical energy	113,00	18.000	11,40		
11.	Mz Broduša	UI. Bašeskije br.2A 76100 Brčko distrikt BiH	electrical energy	102,00	16.000	10,20		
12.	MZ Bukovac	UI. Bukovac bb 76100 Brčko distrikt BiH	electrical energy	256,00	25.000	15,90		
13.	MZ Bukvik	UI. Bukvik bb 76100 Brčko distrikt BiH	electrical energy	326,00	36.940	23,55		
14.	MZ Buzekara, Dom kulture, Omladinski	UI. Buzekara bb 76100 Brčko distrikt BiH	electrical energy	276,60	37.000	23,60		
15.	MZ Centar 2	UI. Marka Marulića br.3. 76100 Brčko distrikt BiH	electrical energy	136,50	27.000	17,20		
16.	MZ Centar 3	UI. Mehmeda Mehmedagića br.16. 76100 Brčko distrikt BiH	electrical energy	116,00	25.000	15,90		
17.	MZ Centar 4	UI. Branislava Nušića br.27. 76100 Brčko distrikt BiH	Električna energija	49,00	6.000	3,82		



Buildings and premises owned by Brcko District BiH- The Local Community								
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year		
18.	MZ Centar 5	UI. M.Ef.Sinanagića br.38. 76100 Brčko distrikt BiH	electrical energy	105,00	12.000	7,65		
19.	MZ Cerik	UI. Cerik bb 76100 Brčko distrikt BiH	electrical energy	120,00	15.000	9,50		
20.	Mz Čande	Ul. Čande bb 76100 Brčko distrikt BiH	electrical energy	192,00	22.000	14,00		
21.	MZ Ćoseta	UI. Ćoseti bb 76100 Brčko distrikt BiH	electrical energy	112,00	14.000	8,93		
22.	Mz Dizdaruša	Ul. Dizdaruša bb 76100 Brčko distrikt BiH	electrical energy	180,00	21.200	13,52		
23.	MZ Donja Skakava	UI. D.Skakava bb 76100 Brčko distrikt BiH	electrical energy / wood	134,85	30.000	19,14		
24.	MZ Donje Dubravice	UI. D.Dubravice bb 76100 Brčko distrikt BiH	electrical energy	98,00	11.955	7,63		
25.	MZ Donji Brezik	UI. Josipa Eugena Tomića br.1. 76100 Brčko distrikt BiH	electrical energy	126,00	21.300	13,59		
26.	MZ Donji Rahić	Ul. Donji Rahić bb 76100 Brčko distrikt BiH	electrical energy	96,00	13.000	8,30		
27.	MZ Donji Zovik	UI. D.Zovik bb 76100 Brčko distrikt BiH	electrical energy	414,00	59.000	37,64		
28.	MZ Dubrave	UI. Dubrave bb 76100 Brčko distrikt BiH	electrical energy	244,00	26.000	16,50		
29.	MZ Gluhakovac	Ul. Gluhakovac bb 76100 Brčko distrikt BiH	electrical energy / wood	162,00	28.000	17,80		
30.	MZ Gorice	UI. Gorice bb 76100 Brčko distrikt BiH	wood	45,00	6.195	3,95		
31.	MZ Gornje Dubravice	Ul. G.Dubravice bb 76100 Brčko distrikt BiH	electrical energy	45,00	6.088	3,83		
32.	MZ Gornja Skakava	UI. G.Skakava bb 76100 Brčko distrikt BiH	electrical energy	319,00	53.000	33,80		
33.	MZ Gornji Brezik	UI. G.Brezik bb 76100 Brčko distrikt BiH	electrical energy	198,00	30.000	19,14		
34.	MZ Gornji Rahic, matični ured, Biblioteka, Dom kulture	UI. G.Rahić bb 76100 Brčko distrikt BiH	električna energija	1.320,00	150.000	95,70		



Buil	Buildings and premises owned by Brcko District BiH- The Local Community dnice								
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year			
35.	MZ Gornji Zovik	Ul. G.Zovik bb 76100 Brčko distrikt BiH	electrical energy	216,00	34.000	21,70			
36.	MZ Grbavica	Ul. Grbavica bb 76100 Brčko distrikt BiH	electrical energy / wood	112,00	14,000	3,83			
37.	MZ Grcica	Ul. Prote Mateje Nenadovića br.4. 76100 Brčko distrikt BiH	electrical energy	120,00	13.400	8,55			
38.	MZ Gredice I	Ul. Gredice I bb 76100 Brčko distrikt BiH	electrical energy	112,00	18.000	11,40			
39.	MZ Gredice II	UI. Gredice II bb 76100 Brčko distrikt BiH	electrical energy	45,00	6.000	3,80			
40.	MZ Ilicka	UI. Ilićka bb 76100 Brčko distrikt BiH	electrical energy	63,00	11.000	7,01			
41.	MZ Islamovac z	UI. Islamovac bb 76100 Brčko distrikt BiH	electrical energy	48,00	8.000	5,10			
42.	MZ Ivici	UI. Bakije Selimovića br.73. 76100 Brčko distrikt BiH	electrical energy	82,50	11.000	7,02			
43.	MZ Klanac	UI. Suljo Kahriman br.1. 76100 Brčko distrikt BiH	electrical energy / wood	96,00	12.500	7,97			
44.	MZ Kolobara	Ul. Reisa Dž. Čauševića br.24. 76100 Brčko distrikt BiH	electrical energy	120,00	20.000	12,76			
45.	MZ Krbeta	Ul. Krbeti bb 76100 Brčko distrikt BiH	electrical energy	112,50	24.000	15,30			
46.	MZ Krepšić 1, Matični ured	UI. Krepšić I bb 76100 Brčko distrikt BiH	electrical energy	380,00	37.000	23,60			
47.	MZ Krepšić 2	UI. Krepšić II bb 76100 Brčko distrikt BiH	electrical energy	90,00	17.000	10,85			
48.	MZ Laništa	UI. Laništa bb 76100 Brčko distrikt BiH	electrical energy / wood	96,00	13.000	8,30			
49.	MZ Lipovac	UI. Lipovac bb 76100 Brčko distrikt BiH	electrical energy	39,00	4.490	2,86			
50.	MZ Maoča, Matični ured	UI. Maoča bb 76100 Brčko distrikt BiH	electrical energy	348,00	54.000	34,45			
51.	MZ Marković polje	UI. Marković polje bb 76100 Brčko distrikt BiH	electrical energy	45,00	5.130	3,27			



Buildings and premises owned by Brcko District BiH- The Local Community								
No	NAME	ADDRESS	ENERGENT	Net area m²	Consump tion thermal energy kWh/year	Emission CO ₂ tyear		
52.	MZ Meraje	UI. M.Ibrahimbegovića bb 76100 Brčko distrikt BiH	electrical energy / wood	345,00	49.000	31,26		
53.	MZ Mujkići	UI. Ferhata Mujanovića br.7. 76100 Brčko distrikt BiH	electrical energy / wood	105,00	19.000	11,48		
54.	MZ Ograđenovac	UI. Ograđenovac bb 76100 Brčko distrikt BiH	electrical energy	96,00	12.000	7,65		
55.	MZ Omerbegovača	UI. Omerbegovača bb 76100 Brčko distrikt BiH	electrical energy	216,00	32.000	20,41		
56.	MZ Palanka, Ambulance Palanka	Ul. Palanka bb 76100 Brčko distrikt BiH	electrical energy / wood	87,50	15.000	9,57		
57.	MZ Plazulje	UI. Plazulje bb 76100 Brčko distrikt BiH	electrical energy	45,00	4.700	3,00		
58.	MZ Poljaci- Jagodnjak	UI. Poljaci bb 76100 Brčko distrikt BiH	electrical energy	100,00	13.000	8,30		
59.	MZ Popovo polje	UI. P.polje bb 76100 Brčko distrikt BiH	electrical energy	97,65	21.000	13,30		
60.	MZ Potočari	UI. Potočari bb 76100 Brčko distrikt BiH	electrical energy	221,00	32.000	20,40		
61.	MZ Prijedor	UI. Prijedor bb 76100 Brčko distrikt BiH	electrical energy	84,00	19.000	12,10		
62.	MZ Rašljani	UI. Rašljani bb 76100 Brčko distrikt BiH	electrical energy	300,00	60.000	38,20		
63.	MZ Ražljevo	UI. Ražljevo bb 76100 Brčko distrikt BiH	electrical energy	210,00	28.000	17,80		
64.	MZ Rijeke	UI. Dr.Mehmeda Spahe br.85A 76100 Brčko distrikt BiH	electrical energy	156,00	16.000	10,20		
65.	MZ Sandići	UI. Sandići bb 76100 Brčko distrikt BiH	electrical energy	112,00	13.000	8,20		
66.	MZ Seonjaci, Registry Office, Department of Veterans Affairs disability	Ul. Seonjaci bb 76100 Brčko distrikt BiH	electrical energy	324,00	44.000	28,00		
67.	MZ Slijepčevići	Ul. Slijepčevići bb 76100 Brčko distrikt BiH	electrical energy	45,00	7.000	4,40		
68.	MZ Srpska Varoš	UI. Mladena Maglova br.24. 76100 Brčko distrikt BiH	electrical energy	122,00	19.000	12,10		
69.	MZ Stanovi, Ambulance Stanovi	UI. Stanovi bb 76100 Brčko distrikt BiH	electrical energy	112,00	13.000	8,30		



Buildings and premises owned by Brcko District BiH- The Local Community							
No	NAME	ADDRESS	ENERGEN T	Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year	
70	MZ Stari rasadnik	UI. Stari Rasadnik br.65. 76100 Brčko distrikt BiH	electrical energy	78,00	16.700	10,65	
71	MZ Šatorovići, Matični ured, Ambulance Šatorovići	UI. Šatorovići bb 76100 Brčko distrikt BiH	electrical energy	350,00	40.000	25,52	
72	MZ Štrepci	Ul. Štrepci bb 76100 Brčko distrikt BiH	electrical energy	149,00	17.000	10,85	
73	MZ Trnjaci	Ul. Trnjaci bb 76100 Brčko distrikt BiH	electrical energy	77,00	14.000	8,93	
74	MZ Ulice	UI. Ulice bb 76100 Brčko distrikt BiH	electrical energy	440,00	44.000	28,07	
75	MZ Ulović	Ul. Ulovići bb 76100 Brčko distrikt BiH	electrical energy	39,00	4.800	3,06	
76	MZ Vitanovići	UI. Vitanovići bb 76100 Brčko distrikt BiH	electrical energy	104,00	23.000	14,67	
77	MZ Vučilovac	Ul. Vučilovac bb 76100 Brčko distrikt BiH	electrical energy	96,00	11.840	7,55	
78	MZ Vukšić	UI. Vukšić bb 76100 Brčko distrikt BiH	electrical energy	280,00	51.000	32,54	
TOTAL:			13.261,10	1.876.252	1.198,54		

Table 4.4 The parameters of energy consumption in the category of offices and premises of local communities

Energent	Total heated area (m ²)	Consumed amount annually	Consumption of heat energy per year (kWh)	Specific consumption (kWh/ m ²)
Masut (t)	0,00	0,00	0,00	0,00
Heating oil (I)	0,00	0,00	0,00	0,00
Brown coal (t)	0,00	0,00	0,00	0,00
Lignite coal (t)	0,00	0,00	0,00	0,00
El. energy (KWh)	12.476,60	1.731.904	1.731.904	138,80
Wood m3	784,50	57,74	144.348	184,00
Pelet (t)	0,00	0,00	0,00	0,00
Total	13.261,10		1.876.252	141,49-











4.2.3 Buildings of public companies owned by Brcko District BiH

Brcko District BiH has under its jurisdiction three public companies JP "Komunalno Brčko" d.o.o., JP "Luka Brčko" d.o.o and JP "Radio Brčko" d.o.o.. Public companies have a total of 11 buildings with a total area of 4,699.50 m2. In the category of public companies in 2012 spent a total of 882,368 kWh of electricity, which gives the specific power consumption of 289.49 kWh / m2. Specific energy consumption is 153.85 kWh / m2.



Table 4.5 Buildings and premises owned by Brcko District BiH - Buildings of public companies

Buildings and premises owned by Brcko District BiH - Buildings of public companies									
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year			
		JP	KOMUNALNO BRČKO			·			
1.	JP Komunalno Brčko Administration	UI.Studentska br.13. 76100 Brčko distrikt BiH	electrical energy	960,00	151.000	96,34			
2.	JP Komunalno- Cleaning, Water supply&sewage	UI. Jevrejska, br. 24. 76100 Brčko distrikt BiH	heating oil	358,00	48.000	15,26			
3.	JP Komunalno Brcko - Administration RJ Elektrodistribucija	UI. Bescarinska zona 76100 Brčko distrikt BiH	electrical energy	582,00	72.000	45,94			
4.	JP Komunalno Brcko - Distribution center control	UI. Bijeljinska bb 76100 Brčko distrikt BiH	electrical energy	456,50	86.000	54,86			
5.	JP Komunalno Brcko – Water production	UI. Plazuljska bb 76100 Brčko distrikt BiH	electrical energy	750,00	97.000	61,88			
		1	1	1					
1.	JP Luka Brčko Administration	UI. Lučka bb 76100 Brčko distrikt BiH	electrical energy	740,00	113.000	72,10			
2.	JP Luka Brčko Reception	UI. Lučka bb 76100 Brčko distrikt BiH	electrical energy	200,00	46.000	29,35			
3.	JP Luka Brčko Špedition	UI. Lučka bb 76100 Brčko distrikt BiH	electrical energy	142,00	33.000	21,00			
4.	JP Luka Brčko Customs terminal	UI. Lučka bb 76100 Brčko distrikt BiH	electrical energy	234,00	34.000	21,69			
5.	JP Luka Brčko Restaurant	UI. Lučka bb 76100 Brčko distrikt BiH	electrical energy	130,00	17.000	10,84			
			JP RADIO BRČKO						
1.	JP Radio Brčko	UI. Klosterska br. 20. 76100 Brčko distrikt BiH	electrical energy	147,00	26.000	16,59			
тот	AL			4.699,50	723.000	445,85			



In Table 4.6 are given parameters of heating energy consumption by energy source categories of public companies.

Energent	Total heated area	Consumed amount	Consumption of heat	Specific consumption
	(m ^)	annually	(kWh)	(kWh/ m ²)
Masut (t)	0,00	0,00	0,00	0,00
Heating oil (I)	358,00	3.815	48.000	134,08
Brown coal (t)	0,00	0,00	0,00	0,00
Lignite coal (t)	0,00	0,00	0,00	0,00
El. energy (KWh)	4.341,50	675.000	675.000	155,48
Wood m3	0,00	0,00	0,00	0,00
Pelet (t)	0,00	0,00	0,00	0,00
Total	4.699,50		723.000	153,85

Table 1.6	The narameters	of energy of	consumption	in the ca	teanry of	nublic com	naniae
1 abie 4.0	The parameters	U energy c	Jonsumption		ilegoly of	public com	Janies

Figure 4.5 The structure of energy sources for heating categories of public companies







Figure 4.6 Share of various energy sources for heating categories of public companies

4.2.4 Building institutions in the raising and education of Brcko District BiH

Brcko District BIH has four kindergartens, a total area of 2,640 m2, 15 primary schools with 16 branch schools and one primary musical school a total area of 47,981.50 m2, 4 secondary schools a total area of 13,092 m2 and 1 Faculty of the total area of 2,272 m2. The total number of objects in the category of education and schooling is 40, the total area of 65,985.50 m2. In the field of education and schooling in 2012 spent a total of 1,264,939 kWh of electricity, which gives the specific power consumption of 25.58 kWh / m2. Specific energy consumption is 135.90 kWh / m2.

Note: In this group are exempt Sports Hall Gymnasium, Economic School and the Technical School to be used as a city sports hall. They are covered in this document in the group of sports facilities. These sports facilities are included in the studies of energy within the aforementioned schools.

E	Buildings and premises owned by Brcko District BiH — Institutions in the raising and education								
No	NAME	ADDRESS	ENERGENT		Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year		
	JU OBDANIŠTA "NAŠA DJECA" (Kindergarten)								
1	Kindergarten Nušićeva	UI. Nušićeva br.14. 76100 Brčko distrikt B	BiH	heating oil	881,00	168.000	34,71		
2	Kindergarten Kolobara	UI. Dražena Petrovića b.b. 76100 Brčko distrikt BiH		heating oil	654,00	100.000	26,50		
3	Kindergarten Grčica	UI. Josip Bosnara br.54. 76100 Brčko distrikt BiH		electrical energy	694,00	93.000	59,33		
4	Kindergarten Eš naselje	UI. Bosanskih kraljeva bb 76100 Brčko distrikt BiH		electrical energy	411,00	54.000	34,45		
	υκυρνο					415.000	154,99		

Tabela 4.7 Zgrade i prostorije Brčko distrikta BiH – ustanove u odgoju i obrazovanju



1.	JU Prva osnovna škola Brčko (First Primary school)	UI. Josipa Juraja Štrosmajera br. 2. 76100 Brčko distrikt BiH	heating oil	2.658,00	513.400	136,05
2.	JU Prva osnovna škola Brčko Područna škola Donji Brezik	UI. Donji Brezik 76100 Brčko distrikt BiH	heating oil	2.061,00	203.000	53,80
3.	JU Prva osnovna škola Brčko Područna škola Ražljevo	UI. Ražljevo 76100 Brčko distrikt BiH	heating oil	2.056,00	303.900	80,53
4.	JU Druga osnovna škola	UI. Vase Pelagića br.6. 76100 Brčko distrikt BiH	heating oil	3.164,00	482.130	127,76
5.	JU Druga osnovna škola Brčko Područna škola Potočari	UI. Potočari 76100 Brčko distrikt BiH	electrical energy	411,00	58.100	37,00
6.	JU Druga osnovna škola Brčko Područna škola Omerbegovača	UI. Omerbegovača br. 73 76100 Brčko distrikt BiH	heating oil	500,00	97.400	25,81
7.	JU Treća osnovna škola Brčko	UI. Reisa Dž. ČauŠevića br.60. 76100 Brčko distrikt BiH	heating oil	3.978,00	580.210	153,74
8.	JU Treća osnovna škola Brčko Područna škola Grbavica	UI. Grbavica 76100 Brčko distrikt BiH	heating oil	3.672,00	391.300	103,70
9.	JU Četvrta osnovna škola Brčko	Ul. Bulevar Mira br.14. 76100 Brčko distrikt BiH	heating oil	1.428,00	223.200	59,17
10	JU Peta osnovna škola Brčko	UI. Muderisa N. Begovića bb 76100 Brčko distrikt BiH	Drva- Ugalj	2.193,00	285.150	91,24
11	JU Peta osnovna škola Brčko Područna škola Brod	UI. Brod 76100 Brčko distrikt BiH	electrical energy	390,00	39.000	24,88
12	JU Peta osnovna škola Brčko Područna škola Klanac	UI. Klanac 76100 Brčko distrikt BiH	heating oil	3.014,00	204.900	56,70
13	JU Šesta osnovna škola Brezovo polje	UI. Brezovo polje bb 76100 Brčko distrikt BiH	heating oil	2.629,00	384.870	101,99
14	JU Sedma osnovna škola Gornji Rahić	UI. Gornji Rahić bb 76100 Brčko distrikt BiH	heating oil	3.735,00	443.150	117,43
15	JU Sedma osnovna škola Gornji Rahić Područna škola Palanka	UI. Palanka bb 76100 Brčko distrikt BiH	heating oil	322,00	54.600	14,70

JU OSNOVNE ŠKOLE (Primary School)



16	JU Osma osnovna škola Brka	UI. Brka bb 76100 Brčko distrikt BiH	heating oil	1.788,00	248.000	65,72
17	JU Deveta osnovna škola Maoča	UI. Maoča bb 76100 Brčko distrikt BiH	heating oil	2.205,00	292.000	65,72
18	JU Deveta osnovna škola Područna škola Rašljani	UI. Rašljani bb 76100 Brčko distrikt BiH	heating oil	975,00	107.800	28,57
19	JU Deveta osnovna škola Maoča Područna škola Prutače	UI. Prutače bb 76100 Brčko distrikt BiH	electrical energy	1.078,00	153.720	98,00
20	JU Deseta osnovna škola Bijela	UI. Bijela bb 76100 Brčko distrikt BiH	heating oil	2.365,00	293.710	77,83
21	JU Deseta osnovna škola Bijela Područna škola Gornja Skakava	UI. GornjaSkakava bb 76100 Brčko distrikt BiH	electrical energy	263,50	32.660	20,84
22	JU Deseta osnovna škola Bijela Područna škola Dubrave	UI. Dubrave bb 76100 Brčko distrikt BiH	heating oil	1.022,00	155.680	41,25
23	JU Deseta osnovna škola Bijela Područna škola Donja Skakava	UI. Donja Skakava bb 76100 Brčko distrikt BiH	heating oil	523,00	90.840	24,07
24	JU Deseta osnovna škola Bijela Područna škola Poljaci	UI. Poljaci bb 76100 Brčko distrikt BiH	electrical energy	198,00	31.850	20,32
25	JU Jedanaesta osnovna škola Gornji Zovik	UI. Gornji Zovik bb 76100 Brčko distrikt BiH	heating oil	1.216,00	183.400	48,60
26	JU Jedanaesta osnovna škola Gornji Zovik Područno odjeljenje Boderište	UI. Boderište bb 76100 Brčko distrikt BiH	electrical energy	180,00	24.000	15,30
27	JU Dvanaesta osnovna škola Ulice	UI. Ulice 76100 Brčko distrikt BiH	heating oil	1.080,00	171.000	45,31
28	JU Trinaesta osnovna škola Bukvik	UI. Bukvik bb 76100 Brčko distrikt BiH	heating oil	870,00	159.100	42,16
29	JU Četrnaesta osnovna škola Krepšić	UI. Krepšić 76100 Brčko distrikt BiH	heating oil	224,00	48.400	12,82
30	JU Petnaesta osnovna škola Šatorovići	UI. Šatorovići bb 76100 Brčko distrikt BiH	heating oil	1.302,00	208.850	55,34
31	JU Osnovna muzička škola Brčko (Elementary Music School)	UI. Trg Pravde br.8. 76100 Brčko distrikt BiH	electrical energy	481,00	49.000	31,26
	тс	47.981,50	6.514,320	1.877,61		



1.	Gymnasium "Vaso Pelagić" Brčko	UI. Trg pravde br.3. 76100 Brčko distrikt BiH	heating oil	3.523,00	373.000	98,84
2.	Economic High School Brčko distrikt BiH	UI. Studentska br.9. 76100 Brčko distrikt BiH	heating oil	3.779,00	485.000	128,52
3.	Technical High Schoo Brčko	UI. Musala br.44. 76100 Brčko distrikt BiH	heating oil	3.631,00	490.000	129,85
4.	Agricultural and medical high school Brčko	UI. Vase Pelagića br.2. 76100 Brčko distrikt BiH	heating oil	2.159,00	372.000	98,58
	·	UKUPNO	13.092,00	1.720.000	455,79	

JU SREDNJE ŠKOLE (High School)

FAKULTET (Faculty)

1.	Faculty of Economics Brčko	UI. Studentska br.11. 76100 Brčko distrikt BiH	heating oil	2.272,00	318.000	84,27
	UKUPNO			2.272,00	318.000	84,27
	GRAND TOTAL FOR RAISING AND EDUCATION			65.985,50	8.967.320	2.572,66

In table 4.8 are given parameters of thermal energy consumption according energy source categories upbringing and education

Table 4.8 The	parameters of	f enerav	consumption	in the	category	upbrinaina /	and e	ducation

Energent	Total heated area (m ²)	Consumed amount annually	Consumption of heat energy per year (kWh)	Specific consumption (kWh/ m ²)
Masut (t)	0,00	0,00	0,00	0,00
Heating oil (I)	59.686,00	698.079,50	8.146.840,00	136,50
Brown coal (t)	2.193,00	57	285.150,00	130,03
Lignite coal (t)	0,00	0,00	0,00	0,00
El. energy (KWh)	4.106,50	535.330,00	535.330,00	130,36
Wood m3	0,00	0,00	0,00	0,00
Pelet (t)	0,00	0,00	0,00	0,00
Total	65.985,50		8.967.320,00	135,90

Shares for heating the individual sub-categories are shown in Figure 4.7, while the structure of the energy for heating the category of administrative buildings is shown in Figure 4.8.







Figure 4.8 Share of various energy sources for heating categories upbringing and education



4.2.5 Buildings for health care

In the category Buildings for health care there are 3 the health center the total area of 5,268 m2, 18 ambulances the total area of 2.055 m2, 1 hospital the total area of 9.680 m2 and 1 fund health insurance the total area of 540 m2

Total surface facilities in the category of buildings for health protection amounts to 19033.80 m2.

In 2012, in the category of buildings for health care of the spent 2,442,714 kWh of electricity, which gives the specific power consumption of 139.24 kWh / m2. Specific heat energy consumption amounts to 157.64 kWh / m2.

In the table 4.9 are given parameters consumption thermal energy by energy sources in the category of buildings for health care and of specific consumption thermal energy.



Buildings and premises owned by Brcko District BiH - Buildings for health care

Table 4.9 Buildings and premises owned by Brcko District BiH --- Buildings for health care

В	Buildings and premises owned by Brcko District BiH — Buildings for health care									
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year				
1.	Hospital "Bolnica Brčko"	heating oil	UI. Banjalučka bb 76100 Brčko distrikt BiH	9.680,00	1.382.000	366,23				
2.	Dispensary for lung disease	heating oil	UI. Dr. Sakiba Edhemovića br.4. 76100 Brčko distrikt BiH	1.164,00	201.663	53,44				
3.	Health care center Kolobara –Medical Centre Brčko	heating oil	UI. Dr. Sakiba Edhemovića br.2. 76100 Brčko distrikt BiH	3.744,00	640.000	169,60				
4.	Health care center Maoča	heating oil	UI. Maoča bb 76100 Brčko distrikt BiH	910,00	118.000	31,27				
5.	Medical Centre Bijela	heating oil	UI. Bijela bb 76100 Brčko distrikt BiH	710,00	128.000	33,92				
6.	Veterinary Station Brčko	heating oil	UI. Miroslava Krleže br.56. 76100 Brčko distrikt BiH	455,00	104.000	27,56				
7.	Ambulance Brka	electrical energy	UI. Brka bb 76100 Brčko distrikt BiH	202,80	40.000	25,52				
8.	Ambulance Gornji Rahic	electrical energy	UI. Gornji Rahić bb 76100 Brčko distrikt BiH	240,00	42.000	26,79				
9.	Ambulance Palanka- Local Community Palanka	electrical energy	UI. Palanka bb 76100 Brčko distrikt BiH	87,50	18.000	11,48				
10	Ambulance Grčica	electrical energy	UI. Prote Mateje Nenadića br.4. 76100 Brčko distrikt BiH	190,50	31.000	19,70				
11	Ambulance Dizdarusa	electrical energy	UI. Dizdaruša bb 76100 Brčko distrikt BiH	65,00	10.200	6,50				
12	Ambulance Omerbegovaca	electrical energy	UI. Omerbegovača bb 76100 Brčko distrikt BiH	75,00	14.000	8,90				
13	Ambulance Gornji Zovik	electrical energy	UI. Gornji Zovik bb 76100 Brčko distrikt BiH	140,00	33.600	21,40				
14	Ambulance Ulice	electrical energy	UI. Ulice bb 76100 Brčko distrikt BiH	227,50	40.000	25,50				
15	Ambulance Donji Brezik	electrical energy	Ul. Lj. Krsmanovića br.108. 76100 Brčko distrikt BiH	220,00	41.000	26,16				
16	Ambulance Trnjaci	electrical energy	UI. Trnjaci bb 76100 Brčko distrikt BiH	130,00	25.000	15,95				
17	Ambulance Boće	electrical energy	Ul. Boće bb 76100 Brčko distrikt BiH	144,00	24.000	15,31				
18	Ambulance Brezovo polje	electrical energy	UI. Brezovo polje bb 76100 Brčko distrikt BiH	336,00	66.000	42,10				



19	Ambulance Boderiste	electrical energy	UI. Boderište bb 76100 Brčko distrikt BiH	93,50	16.000	10,21
20	Ambulance Šatorovići	electrical energy	UI.Šatorovići bb 76100 Brčko distrikt BiH	80,00	10.000	6,38
21	Ambulance Bukvik- Registry office-MZ Bukvik	electrical energy	UI. Bukvik bb 76100 Brčko distrikt BiH	27,00	3.060	1,95
22	Ambulance Stanovi- MZ Stanovi	electrical energy	UI. Stanovi bb 76100 Brčko distrikt BiH	112,00	13.000	8,30
TOT	TOTAL			19.033,80	3.000.523	954,17

Table 4.10 The parameters of energy consumption in the category of health care

Energent	Total heated area (m ²)	Consumed amount annually	Consumption of heat energy per year (kWh)	Specific consumption (kWh/ m ²)
Masut (t)	0,00	0,00	0,00	0,00
Heating oil (I)	16.663,00	204.583,70	2.573.663,00	154,45
Brown coal (t)	0,00	0,00	0,00	0,00
Lignite coal (t)	0,00	0,00	0,00	0,00
El. energy (KWh)	2.370,80	426.860,00	426.860,00	180,05
Wood m3	0,00	0,00	0,00	0,00
Pelet (t)	0,00	0,00	0,00	0,00
Total	19.033,80		3.000.523,00	157,64

Shares for heating the individual sub-categories are shown in Figure 4.9, while the structure of the energy for heating the administrative building category is shown in Figure 4.10.







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Figure 4.10 Share of various energy sources for heating category healt care

4.2.6 Buildings for cultural activities

In the area of Brcko District BiH There are 3 House of Culture total area of 3,165 m2, 1 library total area of 1496.5 m2 and 1 Youth Centre total area of 1,331 m2 total area facilities in the category of cultural institutions is 5,992 m2.

In 2012, in the category of cultural institutions in total was spent 148,950 kWh of electricity, which gives the specific power consumption of 34.30 kWh / m2. Specific energy consumption is 155.40 kWh / m2.

In Table 4.11 are given parameters of heating energy consumption by fuel in the category of cultural institutions of Brcko District BiH and the specific consumption of thermal energy.

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Buil	Buildings and premises owned by Brcko District BiH – Cultural activities						
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year	
1.	House of Culture Brcko District BiH	UI. Mladena Maglova br.1. 76100 Brčko distrikt BiH	heating oil	1506,00	250.310	66,33	
2.	Youth centar	UI. Trg Pravde br.18. 76100 Brčko distrikt BiH	heating oil	1331,00	208.000	55,12	
3.	City library	Ul.Bulevar mira br.1. 76100 Brčko distrikt	heating oil	1496,00	225.000	59,62	
4.	House of Culture Palanka	UI. Palanka bb 76100 Brčko distrikt	electrical energy	315,00	39.000	24,88	
5.	House of Culture Maoča (building under construction)	UI. Maoča bb 76100 Brčko distrikt		1.344,00			
	·	TOTAL:			722.310	205,59	



•	0,	•	0,	
Energent	Total heated area	Consumed amount	Consumption of heat Specific consum	Specific consumption
(m ²) annually		energy per year (kWh)	(kWh/ m ²)	
Masut (t)	0,00	0,00	0,00	0,00
Heating oil (I)	5.677,00	54.317,20	683.310,00	120,36
Brown coal (t)	0,00	0,00	0,00	0,00
Lignite coal (t)	0,00	0,00	0,00	0,00
El. energy (KWh)	315,00	39.000,00	39.000,00	123,81
Wood m3	0,00	0,00	0,00	0,00
Pelet (t)	0,00	0,00	0,00	0,00
Total	5.992,00		722.310	120,55

Table 4.12 The parameters c	f energy consumption	in the category of	Cultural activities
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Shares for heating the individual sub-categories are shown in Figure 4.11 and the structure of the energy for heating the building cultural activity category is shown in Figure 4.12.










4.2.7 Buildings for sports activities

In the category of buildings for sports activity has a total of 49 building, the total area of 81,219 m2.

In this category in 2012. year total was spent 121,822 kWh of electricity, which gives the specific consumption of 66.16 kWh / m2. Specific energy consumption is 154.50 kWh / m2.

Table 4.13 Buildings and premises owned by Brcko District BiH – Buildings for sports activities

Bui	Buildings and premises owned by Brcko District BiH – Buildings for sports activities							
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year		
1.	City Stadium	Musala bb	(under reconstruction)	-	-	-		
2.	Football stadiums	12 pc.	No heating	-	-	-		
3.	Playgrounds	32 pc.	No heating	-	-	-		
4.	Sports Hall Gymnasium " Vaso Pelagić"	UI. Trg pravde br.3. 76100 Brčko distrikt BiH	heating oil	1.582,00	262.000,00	69,43		
5.	Sports Hall Economical High School Brčko distrikt BiH	UI. Studentska br.9. 76100 Brčko distrikt BiH	heating oil	1.380,00	160.000,00	42,40		
6.	Sports Hall Technical High School Brcko District BiH	Ul. Musala br.44. 76100 Brčko distrikt BiH	heating oil	1.148,00	213.000,00	56,44		
7.	Blatuša Sport Center	Jevrejska bb	Not in function	-	-	-		
	TOTAL				635.000,00	168,27		

NOTE: In the table are taken into account only sports facilities that are heated. Stadiums and playgrounds have heated rooms. Sports Center Blatuša 2012 years was not in operation.

Table 4.14 are given parameters of heating energy consumption by fuel in the category of buildings of sports activities Brcko District BiH and specific consumption of thermal energy.

Energent	Total heated area (m ²)	Consumed amount annually	Consumption of heat energy per year (kWh)	Specific consumption (kWh/ m ²)
Masut (t)	0,00	0,00	0,00	0,00
Heating oil (I)	4.110,00	50.477,00	635.000,00	154,50
Brown coal (t)	0,00	0,00	0,00	0,00
Lignite coal (t)	0,00	0,00	0,00	0,00
El. energy (KWh)	0,00	0,00	0,00	0,00
Wood m3	0,00	0,00	0,00	0,00
Pelet (t)	0,00	0,00	0,00	0,00
Total	4.110,00		635.000,00	154,50



Shares energy sources for heating the buildings of sports activities are shown in Figure 4.13, while the of various energy sources of the energy for heating the buildings of sports activities category is shown in Figure 4.14.





Figure 4.14 Share of various energy sources for heating for the category sporting activities



4.2.8 The buildings of public institutions, police and judiciary

In the category of public institutions, police and the judiciary has a total of 7 buildings, with a total area of 10,144.50 m2.

In this category in 2012. year total was spent 752,073 kWh of electricity, which gives the specific consumption of 73.90 kWh / m2. Specific energy consumption is 132.29 kWh / m2.

In Table 4.15 are given parameters of heating energy consumption by fuel in the category of building public institutions, police and judiciary Brcko District BiH and specific consumption of thermal energy.



Table 4.15 The buildings of public institutions, police and judiciary

Bui	Buildings of public institutions, police and judiciary								
No	NAME	ADDRESS	ENERGENT	Net area m²	Consumpti on thermal energy kWh/year	Emission CO ₂ t/year			
1.	Public Attorney's Office of Brcko District	UI. Trg pravde br.16 76100 Brčko distrikt BiH	electrical energy	292,50	59.000	37,64			
2.	Basic Court / Prosecutor's Office of Brcko District	UI. Trg pravde br.10 76100 Brčko distrikt BiH	heating oil	3.294,00	393.000	104,14			
3.	Judicial Commission / Judicial Police / Legal Aid	Ul. Trg pravde br.14 76100 Brčko distrikt BiH	heating oil	828,00	106.000	28,09			
4.	Basic Court / Appellate Court of Brcko District	UI. Trg pravde br.12 76100 Brčko distrikt BiH	heating oil	2.907,00	339.000	89,83			
5.	Police Brcko District BiH	Ul. Trg mladih br.10 76100 Brčko distrikt BiH	heating oil	1.762,00	308.000	81,62			
6.	Police Brcko District BiH – Support Crew	UI. Ograđenovac b.b. 76100 Brčko distrikt BiH	heating oil	401,00	47.000	12,45			
7.	Police Brcko District BiH – Detention Unit	UI. Ograđenovac b.b. 76100 Brčko distrikt BiH	heating oil	660,00	90.000	23,85			
ТОТ	AL		10.144,50	1.342.000	377,62				

Table 4.16	The	parameters	of	energy	consumption	in	the	category	of	public	institutions,	police
and judiciar	у											

Energent	Total heated area	Consumed amount	Consumption of heat	Specific consumption	
	(m ²) annually		energy per year (kWh)	(kWh/ m ²)	
Masut (t)	0,00	0,00	0,00	0,00	
Heating oil (I)	9.852,00	101.987,28	1.283.000,00	130,23	
Brown coal (t)	0,00	0,00	0,00	0,00	
Lignite coal (t)	0,00	0,00	0,00	0,00	
El. energy (KWh)	292,50	59.000,00	59.000,00	201,71	
Wood m3	0,00	0,00	0,00	0,00	
Pelet (t)	0,00	0,00	0,00	0,00	
Total	10.144,50		1.342.000,00	132,29	

Shares for heating the individual sub-categories are shown in Figure 4.15, while the structure of the energy for heating the public institutions, police and judiciary is shown in Figure 4.16.







4.16 Share of various energy sources for heating for the category of public institutions, police and judiciary



4.2.9 Analysis of the consumption of electricity and heat in the category of buildings owned by the Brcko District, the building of public enterprises and public buildings

The analysis of electricity and thermal energy for the year 2012 are included in the previous chapters described categories within the sector administrative buildings owned by the Brcko District, the building of public enterprises and public buildings:

- Government buildings, assembly and administration of Brcko District,
- Building public companies owned by the Brcko District BiH,
- Building institutions in the upbringing and education
- Buildings for health care,
- Buildings for cultural activities,
- Buildings for sports activities,



- Building public institutions of the police and judiciary

Table 4.17 Basic parameters of the energy consumption of buildings owned by the Brcko District BiH, the building of public enterprises and public building.

Category	egory Number of facilities (m2)		Electricity consumption (kWh) ⁵	Total energy consumption (kWh)
The buildings of the Government and the Assembly of the Brcko District BIH	21	19.182,00	1.876.157	2.427.986
Premises of local communities	78	13.261,10	209.843	1.876.252
Public companies	11	4.699,50	882.368	723.000
Upbringing and education	40	65.985,50	1.264.939	8.967.320
Health and care	22	19.033,80	2.442.714	3.000.523
Culture	5	5.992,00	148.950	722.310
Sport	3	4.110,00	121.822	635.000
Police, Judiciary and others	7	10.144,50	752.073	1.342.000
TOTAL	233	142.408,40	7.698.866	19.694.391

Electricity consumption by categories within sub-sectors is shown in the graph in Figure 4.17., While the structure of the heating energy consumption by categories within sub-sectors is shown in the graph in Figure 4.18.

Figure 4.17. Electricity consumption by categories within the sub-sector buildings owned by Brcko District BiH



⁵ Sources of Information "JP Komunalno Brčko" d.o.o.



Figure 4.18 The structure of consumption of thermal energy sub-sectors in the property of Brcko District BiH



Figure 4.19 Comparison specific consumption of electricity and heat buildings owned by Brcko District BiH



From the grapf displayed on the structure of electricity and thermal energy, it is evident that the category health is the largest consumer of electricity, while the category of education and schooling is largest consumer of thermal energy in sub-sectors of the building owned and operated by Brcko District BIH. By comparing the specific consumption of heat and electricity, it is evident that the specific energy consumption categories of public companies are significantly higher than in other categories of buildings in the sub-sector buildings owned by Brcko District BIH.



Figure 4.20 The structure of the total energy consumption of buildings owned by Brcko District BiH







As the Figure 4.20 and 4.21 shows, the highest share in the total energy consumption of the building sub-sector property of Brcko District BiH has categories upbringing and education (37.25%), followed by health category (19.82%).

The most important energy source in the sub-sector buildings owned by Brcko District BIH is heating oil with the largest share of consumption (75.43%), followed by electricity (20.67%), heat from coal (3.17%) and wood (0, 73%).

The energy analysis of buildings owned by subsectors of the Brcko District BiH for 2012 shows that all categories of buildings owned by the Brcko District BiH have great potential for cost savings and electricity and heat.



4.3 Analysis of energy consumption in the sub-sector buildings for an Individual housingfamily houses and buildings and collective housing in 2012

Introduction

Brcko District Bosnia and Herzegovina was divided territorially in 78 local communities. Buildings for family housing individually dominate in rural local communities, in the town of Brcko, these housing units are also prevalent. How have not established reliable data on the energy consumption of buildings for individual housing-family houses and buildings for collective housing, approached the methodology of collecting the data through a survey, which has done a number of houses and apartments.

Table 10.18 shows the number of residential house in the publics with demonstrated useful floor space⁶. The houses are divided into those with facade and those without a facade. The heat loss in houses without the facade is far greater and the energy consumption for heating and up to 30% higher. Housing units in collective buildings are uniquely presented.

⁶ Sources of Information the Tax Administration of Brcko District BiH



Table 4.18 Schedule of housing owned by citizens (in the street)

No.	Street name	With façade	Without façade	Total m ²
1	8. MARTA	686,00	242,00	928,00
2	ADILA EFENDIJE ČOKIĆA	2.137,00	2.755,00	4.892,00
3	AHMEDA HANTALAŠEVIĆA AHME	2.503,00	913,00	3.416,00
4	AJANOVIĆA	217,00		217,00
5	ALEKSE ŠANTIĆA	3.926,00	95,00	4.021,00
6	ALIJE ISAKOVIĆA	2.582,00	381,00	2.963,00
7	ALOSMANA TOPČIĆA	1.545,00	496,00	2.041,00
8	ANTONIJA ISAKOVIĆA	676,50	54,00	730,50
9	ANTUNA BRANKA ŠIMIĆA	133,00		133,00
10	ANTUNA GUSTAVA MATOŠA	2.017,00	165,00	2.182,00
11	ARIFA DERVIŠEVIĆA	5.058,00	297,00	5.355,00
12	ASIMA DERVIŠEVIĆA	20,00	1.746,00	1.766,00
13	AUGUSTINA AVGUSTINOVIĆA	1.857,00	2.020,00	3.877,00
14	AVGUSTA ŠENOE	1.316,00		1.316,00
15	BAKIJE SELIMOVIĆA	6.663,00	11.827,50	18.490,50
16	BANJALUČKA	6.133,00	2.862,00	8.995,00
17	BAREŠ	2.992,00	6.423,00	9.415,00
18	BAŠESKIJA	9.067,52	5.154,00	14.221,52
19	BERBEROVIĆA	1.861,00	1.074,00	2.935,00
20	BIJELA	53.963,00	15.481,50	69.444,50
21	BIJELJINSKA	7.672,00	873,00	8.545,00
22	BIRČANSKA	100,00	1.530,00	1.630,00
23	BISKUPA J.J. ŠTADLERA	38,00		38,00
24	BLIZNA	2.610,00	2.136,00	4.746,00
25	BOĆE	28.164,00	7.929,00	36.093,00
26	BODERIŠTE	14.720,00	4.968,00	19.688,00
27	BOLNIČKA	3.171,00	1.526,00	4.697,00
28	BORISLAVA STANKOVIĆA	748,00	92,00	840,00
29	BOSANSKIH KRALJEVA	5.835,00	78,00	5.913,00
30	BOSNE SREBRNE	1.030,00	180,00	1.210,00
31	BRAĆE ĆUSKIĆA	2.093,00	619,00	2.712,00
32	BRAĆE DERVIŠEVIĆA-SKELEDŽIJA	2.924,00	1.994,00	4.918,00
33	BRAĆE FELNER	6.084,00	983,00	7.067,00
34	BRAĆE KAURINOVIĆ	4.254,00	630,00	4.884,00
35	BRAĆE KOBIĆA	3.322,50	1.688,00	5.010,50



No.	Street name	With façade	Without façade	Total m ²
36	BRAĆE RIBNIKARA	492,00	282,00	774,00
37	BRAĆE SULJIĆA	1.701,00	484,00	2.185,00
38	BRANISLAVA NUŠIĆA	2.097,00	134,00	2.231,00
39	BRANKA ĆOPIĆA	3.959,00	338,00	4.297,00
40	BRANKA KISIĆA	3.787,00		3.787,00
41	BRANKA RADIČEVIĆA	2.843,00	605,00	3.448,00
42	BREZIK	10.759,00	4.528,00	15.287,00
43	BREZOVO POLJE	29.643,00	15.619,00	45.262,00
44	BREZOVO POLJE SELO	7.428,00	1.886,00	9.314,00
45	BRKA	53.469,00	22.310,00	75.779,00
46	BROD	908,00	1.214,00	2.122,00
47	BRODUŠA I	1.905,00	498,00	2.403,00
48	BRODUŠA II	2.361,00		2.361,00
49	BUKOVAC	1.068,00	2.365,00	3.433,00
50	BUKVIK	1.675,00	1.692,00	3.367,00
51	BUKVIK DONJI	3.958,00	2.801,00	6.759,00
52	BUKVIK GORNJI	2.451,00	2.662,00	5.113,00
53	BULEVAR MIRA	1.135,00		1.135,00
54	BURIĆA BRDO	995,00		995,00
55	BUZEKARA	7.797,00	2.005,00	9.802,00
56	CERIK	7.149,00	3.536,00	10.685,00
57	CIGLANA	932,00	677,00	1.609,00
58	CVIJETE ZUZORIĆ	346,00		346,00
59	ČAĐAVAC	562,00	1.236,00	1.798,00
60	ČETVRTOG JULA I	2.026,00	1.824,00	3.850,00
61	ČETVRTOG JULA II	888,00	1.362,00	2.250,00
62	ČETVRTOG JULA III	1.481,00	276,00	1.757,00
63	ČETVRTOG JULA IV	1.512,00	2.043,00	3.555,00
64	ČETVRTOG JULA V	1.777,00	1.107,00	2.884,00
65	ČUMUROVIĆA	2.943,00	1.554,00	4.497,00
66	ĆAMILA SIJARIĆA	7.197,00	4.008,00	11.205,00
67	ĆIRILA I METODIJA	3.746,00	648,00	4.394,00
68	ĆOSETA	14.576,00	7.195,00	21.771,00
69	DANILA KIŠA	219,00		219,00
70	DEJTONSKA	21.558,00	7.054,00	28.612,00
71	DERVIŠA SUŠIĆA	1.650,00	910,00	2.560,00



No.	Street name	With façade	Without façade	Total m ²
72	DESANKE MAKSIMOVIĆ	2.342,00	204,00	2.546,00
73	DIZDARUŠA I	984,00	869,00	1.853,00
74	DIZDARUŠA II	501,00	269,00	770,00
75	DIZDARUŠA III	336,00	509,00	845,00
76	DOBRICE CESARIĆ	1.070,00	156,00	1.226,00
77	DONJA BRKA	170,00	548,00	718,00
78	DONJI BREZIK	262,00	168,00	430,00
79	DONJI RAHIĆ	8.108,00	8.869,00	16.977,00
80	DONJI ZOVIK	9.195,00	4.428,00	13.623,00
81	DOSITEJA OBRADOVIĆA	1.002,00	30,00	1.032,00
82	DR. ABDULAHA BUKVICE	6.554,00	832,00	7.386,00
83	DR. FRIDMANA	2.585,00	159,00	2.744,00
84	DR. MEHMEDA SPAHE	6.796,00	5.148,00	11.944,00
85	DR. SAFETA MURATOVIĆA	1.973,00		1.973,00
86	DR. SAKIBA EDHEMOVIĆA	562,00		562,00
87	DRAGICE PRAVICE	1.870,00	619,00	2.489,00
88	DRAŽENA PETROVIĆA	758,40	554,00	1.312,40
89	DUBRAVE	33.562,28	9.563,00	43.125,28
90	DUBRAVICE DONJE	6.908,00	2.094,00	9.002,00
91	DUBRAVICE GORNJE	6.930,00	2.017,00	8.947,00
92	DUŠANA BUDŽENA	1.507,00	1.022,00	2.529,00
93	DUŠANA VASILJEVA	795,00	392,00	1.187,00
94	DUŠKA RADOVIĆA	1.116,00	947,00	2.063,00
95	DŽEMALA BIJEDIĆA	532,00	618,00	1.150,00
96	ÐERMANOVIĆA	1.736,00	430,00	2.166,00
97	ÐORÐA KOJDIĆA	494,00	135,00	629,00
98	ÐURE JAKŠIĆA	6.138,00	1.595,00	7.733,00
99	EDHEMA MULABDIĆA	2.710,00	1.307,00	4.017,00
100	ELDINA HADŽIĆA	2.040,00	31,00	2.071,00
101	EPISKOPA NIKOLAJA VELIMIROVIĆA	760,00		760,00
102	EVLIJE ČELEBIJE	2.915,31	2.328,00	5.243,31
103	FARUKA KUČUKALIĆA MATE	831,00	308,00	1.139,00
104	FERHATA MUJANOVIĆA	3.416,00	1.063,00	4.479,00
105	FILIPA VIŠNJIĆA	6.532,00	1.597,00	8.129,00
106	FRA ILIJE STARČEVIĆA	1.066,00	351,00	1.417,00
107	FRA SERAFIMA ZEČEVIĆA	7.499,00	2.136,00	9.635,00



No.	Street name	With façade	Without façade	Total m ²
108	FRA ŠIMUNA FILIPOVIĆA	6.456,00	2.235,00	8.691,00
109	FRANCA MAŽURANIĆA	1.899,00	1.710,00	3.609,00
110	GAJEVI	917,00	2.158,00	3.075,00
111	GORICE	8.753,00	13.192,00	21.945,00
112	GORNJI RAHIĆ	95.209,02	36.337,40	131.546,42
113	GORNJI ZOVIK	30.089,50	7.610,00	37.699,50
114	GRBAVICA	17.641,00	21.936,50	39.577,50
115	GREDICE	221,00	472,00	693,00
116	GREDICE 1	10.586,40	14.116,80	24.703,20
117	GREDICE 2	668,00	221,00	889,00
118	GUSTAVA KRKLECA	1.720,00	429,00	2.149,00
119	HADŽI HAFIZA OSMANA MEHMEDOVIĆA	760,00	926,00	1.686,00
120	HADŽI MEHMED-EFENDIJE OSMIĆA BROĐE	1.083,00	497,00	1.580,00
121	HADŽI VASVIJE ZEJČIROVIĆ	800,54	172,00	972,54
122	HASANA AGANOVIĆA TAČA	5.168,00	1.696,00	6.864,00
123	HASANA KAFIJA PRUŠČAKA	2.958,78	1.059,00	4.017,78
124	HASANA KIKIĆA	2.594,00	318,00	2.912,00
125	HERCEGOVAČKA	4.389,00	241,00	4.630,00
126	HILANDARSKA	5.834,00	654,00	6.488,00
127	HIVZIJE I HIMLIJE JERKOVIĆA	2.595,00	1.916,00	4.511,00
128	HUSEIN KAPETANA GRADAŠČEVIĆA	3.667,00	1.042,00	4.709,00
129	HUSEINA ŠALAPIĆA	4.317,00	2.967,00	7.284,00
130	HUSEIN-EFENDIJE TREBINJČEVIĆA	887,00	124,00	1.011,00
131	ILIĆKA I	90,00	482,00	572,00
132	ILIĆKA III		132,00	132,00
133	ILIĆKA IV		72,00	72,00
134	ILIĆKA V	69,00	2.663,00	2.732,00
135	ILIĆKA VI	2.103,97	98,00	2.201,97
136	ILIĆKA VII	1.970,00	5.815,00	7.785,00
137	ILIĆKA VIII	69,00	137,00	206,00
138	ILIĆKA X		70,00	70,00
139	ILIĆKA XI	84,00	1.748,00	1.832,00
140	ILIĆKA XII	910,00	2.503,00	3.413,00
141	ILIJE MILOSAVLJEVIĆA KOLARCA	879,00	66,00	945,00
142	INDUSTRIJSKA	116,00	133,00	249,00
143	IRFANA ČOLIĆA ČOLETA	872,00	1.090,00	1.962,00



No.	Street name	With façade	Without façade	Total m ²
144	ISAKA SAMOKOVLIJE	2.526,50	758,00	3.284,50
145	ISIDORE POLJAK	3.658,00	752,00	4.410,00
146	ISLAHIJET	2.222,00	695,00	2.917,00
147	ISLAMOVAC	4.397,00	3.020,00	7.417,00
148	ISMETA MUJEZINOVIĆA	485,00	258,00	743,00
149	IVANA FRANJE JUKIĆA	2.374,00	228,00	2.602,00
150	IVANA GUNDULIĆA	2.222,00	300,00	2.522,00
151	IVANA MAŽURANIĆA	1.393,00	797,00	2.190,00
152	IVANA MEŠTROVIĆA	704,00	891,00	1.595,00
153	IVICI	941,00	261,00	1.202,00
154	IVICI I	1.368,00	1.218,00	2.586,00
155	IVICI II	810,00	1.044,00	1.854,00
156	JAGODNJAK	3.172,00	531,00	3.703,00
157	JAKOVA GOTOVCA	3.952,00	1.331,00	5.283,00
158	JAKOVA IGNJATOVIĆA	1.158,00	939,00	2.097,00
159	JANKA VESELINOVIĆA	2.006,00	619,00	2.625,00
160	JELENKE VOĆKIĆ	573,00	405,00	978,00
161	JEVREJSKA	1.469,00		1.469,00
162	JOAKIMA VUJIĆA	1.261,00	1.980,00	3.241,00
163	JOSIPA BOSNARA	1.359,00	1.663,00	3.022,00
164	JOSIPA EUGENA TOMIĆA	308,00	494,00	802,00
165	JOSIPA KOZARCA	1.092,00	775,00	1.867,00
166	JOSIPA PANČIĆA	2.352,00	542,00	2.894,00
167	JOVANA DUČIĆA	824,78	158,00	982,78
168	JOVANA HADŽIĆA	1.405,00	83,00	1.488,00
169	JOVANA JOVANOVIĆA ZMAJA	5.069,00	959,00	6.028,00
170	JOVANA SKERLIĆA	889,00	295,00	1.184,00
171	JOVANA STERIJE POPOVIĆA	1.827,00	1.029,00	2.856,00
172	JURE KAŠTELANA	4.450,00	7.287,00	11.737,00
173	JUSUFA ČAMPARE		91,00	91,00
174	KALAJDŽIJA	25,00		25,00
175	KANTARDŽIĆA	2.749,00	253,00	3.002,00
176	KLANAC I	1.590,00	2.041,00	3.631,00
177	KLANAC II	639,00	858,00	1.497,00
178	KLEBIĆA	1.736,00	1.728,00	3.464,00
179	KLOSTERSKA	1.323,00	100,00	1.423,00



No.	Street name	With façade	Without façade	Total m ²
180	KOLONIJA	1.893,00	1.777,00	3.670,00
181	KONAČKO BRDO	144,00		144,00
182	KOSTE NEŠKOVIĆA	857,00	70,00	927,00
183	KOŽARA	2.549,00	954,00	3.503,00
184	KRAJINOVIĆI	1.457,00	196,00	1.653,00
185	KRBETI	6.098,00	933,00	7.031,00
186	KREPŠIĆ	18.087,00	15.363,00	33.450,00
187	KREŠIMIRA ĆOSIĆA	390,00	178,00	568,00
188	KRFSKA	6.565,00	826,00	7.391,00
189	KUČUKALIĆA	1.864,00	544,00	2.408,00
190	KULINA BANA	1.122,00	2.984,00	4.106,00
191	LANIŠTE	3.226,00	5.168,00	8.394,00
192	LAZE LAZAREVIĆA	2.088,00	1.945,00	4.033,00
193	LEJLIĆA	11.157,00	9.502,00	20.659,00
194	LIPOVAC	340,00	268,00	608,00
195	LUČKA	428,00	180,00	608,00
196	LUKAVAC	818,00	1.763,00	2.581,00
197	LUKE ĆELOVIĆA	10.091,00	2.538,00	12.629,00
198	LJUBOMIRA KRSMANOVIĆA	18.337,50	5.933,50	24.271,00
199	LJUDEVITA GAJA	883,00	73,00	956,00
200	MAOČA	63.103,00	31.128,00	94.231,00
201	MAOČKI PUT	1.076,00	448,00	1.524,00
202	MARIJE JURIĆ ZAGORKE		507,00	507,00
203	MARINA DRŽIĆA	382,00		382,00
204	MARKA MARULIĆA	1.920,00	788,00	2.708,00
205	MARKOVIĆ POLJE	3.859,00	4.856,00	8.715,00
206	MATIJE GUPCA	3.193,00	1.762,00	4.955,00
207	MEHMED KAPETANOVIĆA LJUBUŠAKA	180,00	230,00	410,00
208	MEHMEDAGIĆA	1.996,00	182,00	2.178,00
209	MEHMEDALIJE MAKA DIZDARA	2.161,00		2.161,00
210	MERAJE I	800,00	496,00	1.296,00
211	MERAJE II	2.319,00	689,00	3.008,00
212	MERAJE III	1.398,00	600,00	1.998,00
213	MEŠE SELIMOVIĆA	264,00	818,00	1.082,00
214	MIHAILA PETROVIĆA-MIKE ALASA	5.940,00	460,00	6.400,00
215	MIHAJLA LALIĆA	1.614,00	240,00	1.854,00



No.	Street name	With façade	Without façade	Total m ²
216	MIHAJLA PUPINA	8.846,00	2.148,00	10.994,00
217	MILANA HADŽI-RISTIĆA	3.363,00	1.055,00	4.418,00
218	MILANA KONJEVIĆA	2.716,00	2.445,00	5.161,00
219	MILANA RAKIĆA	1.048,00		1.048,00
220	MILENE PAVLOVIĆ-BARILI	2.270,00	816,00	3.086,00
221	MILOŠA CRNJANSKOG	1.084,00	49,00	1.133,00
222	MILOVANA GLIŠIĆA	2.534,00	231,00	2.765,00
223	MILUTINA BOJIĆA		1.122,00	1.122,00
224	MIROSLAVA KRLEŽE	4.747,00	245,00	4.992,00
225	MIROSLAVA MIKE ANTIĆA	714,00	156,00	870,00
226	MLADENA MAGLOVA	166,00		166,00
227	MOSTARSKA	14.485,00	11.808,00	26.293,00
228	MUDERISA IBRAHIMBEGOVIĆA	3.262,00	2.659,00	5.921,00
229	MUJAGE M. MEHMEDOVIĆA	2.996,00	318,00	3.314,00
230	MUJDANOVAČA	3.031,40	962,40	3.993,80
231	MUJKIĆI I	3.017,00	120,00	3.137,00
232	MUJKIĆI II	1.240,00	1.008,00	2.248,00
233	MUJKIĆI III	3.026,00	930,00	3.956,00
234	MULA MUSTAFE BAŠESKIJE		140,00	140,00
235	MUSALA	3.691,00	1.061,00	4.752,00
236	MUSE ĆAZIMA ĆATIĆA	5.476,00	3.038,00	8.514,00
237	MUSHVINA RIZVIĆA	1.706,00	1.437,00	3.143,00
238	NADBISKUPA ŠTROSMAJERA	788,00	157,00	945,00
239	NAJFE ŠEHIĆ	1.084,00	945,00	2.029,00
240	NIKOLE PERIĆA	694,00	218,00	912,00
241	NIKOLE ŠOPA	7.295,00	3.592,00	10.887,00
242	NIKOLE TESLE	9.382,00	1.511,00	10.893,00
243	NOVI BROD	1.561,00	1.005,00	2.566,00
244	NOVOBRODSKA	2.313,00	3.345,00	5.658,00
245	NJEGOŠEVA	6.099,50	270,00	6.369,50
246	OGRAĐENOVAC	14.312,20	3.986,00	18.298,20
247	OMERBEGOVAČA	18.861,00	10.622,00	29.483,00
248	OMEROVIĆA	1.019,00	236,00	1.255,00
249	OMLADINSKA	3.956,00	2.807,00	6.763,00
250	OSMANA DERVIŠEVIĆA	4.196,00	2.176,40	6.372,40
251	PAJE JOVANOVIĆA	77,00		77,00



No.	Street name	With façade	Without façade	Total m ²
252	PALANKA	34.977,00	10.861,00	45.838,00
253	PAVLA SAVIĆA	16.422,00	1.833,00	18.255,00
254	PERE MARIJANA	384,00		384,00
255	PERE ZRELCA	4.110,00	2.293,00	6.403,00
256	PETRA KOČIĆA	4.512,00	2.836,00	7.348,00
257	PLAZULJSKA	11.571,00	6.842,00	18.413,00
258	POLJACI	6.231,00	570,00	6.801,00
259	POLJOPRIVREDNIK I	1.187,00	240,00	1.427,00
260	POLJOPRIVREDNIK II	724,00	398,00	1.122,00
261	POLJOPRIVREDNIK III	3.468,00	719,00	4.187,00
262	POPOVO POLJE	5.052,00	2.417,00	7.469,00
263	POSAVSKA	503,00	40,00	543,00
264	POTOČARI	33.154,00	5.459,00	38.613,00
265	PRIJEDOR	12.439,00	2.764,00	15.203,00
266	PRNJAVOR	3.369,00	169,00	3.538,00
267	PROF. ALEKSANDRA NIKOLIĆA	1.736,00	239,00	1.975,00
268	PROF. ESADA PITIĆA	1.814,00	292,00	2.106,00
269	PROF. MURAT-EFENDIJE SINANAGIĆA	6.266,00	1.265,00	7.531,00
270	PROTE MATEJE NENADOVIĆA	3.929,00	1.760,00	5.689,00
271	PROTE RAJKA SOFRENOVIĆA	3.878,40	653,00	4.531,40
272	PRUTAČE	186,00	418,00	604,00
273	PRVOMAJSKA	1.576,00	857,00	2.433,00
274	RADIVOJA KORAĆA	1.882,00	1.465,00	3.347,00
275	RADOJA DOMANOVIĆA	7.411,00	1.289,00	8.700,00
276	RAJFETA AHMETBAŠIĆA	1.454,00	2.975,00	4.429,00
277	RASTKA PETROVIĆA	2.972,00		2.972,00
278	RAŠLJANI	15.658,00	9.430,00	25.088,00
279	RAŽLJEVO	9.634,00	9.388,00	19.022,00
280	REISA DŽEMALUDINA ČAUŠEVIĆA	1.734,00	700,00	2.434,00
281	REPINO BRDO	4.737,00	1.884,00	6.621,00
282	RIJEKE I	1.247,00	2.754,00	4.001,00
283	RIJEKE II	2.730,00	2.478,00	5.208,00
284	RIJEKE III	1.350,00	636,00	1.986,00
285	RIJEKE IV	1.390,00	993,00	2.383,00
286	RINE ČULIĆA	1.138,00		1.138,00
287	RIZAHA ŠTETIĆA	3.651,00	844,00	4.495,00



No.	Street name	With façade	Without façade	Total m ²
288	ROGOZAN - DIZDARUŠA	2.961,00	2.548,00	5.509,00
289	ROGOZAN - ULICE	1.202,00	1.403,00	2.605,00
290	SABITA ALADINA UŽIČANINA	1.849,00	1.043,00	2.892,00
291	SAFETA BEGA BAŠAGIĆA	438,00	70,00	508,00
292	SAFETA PAŠALIĆA	9.743,50	1.270,00	11.013,50
293	SANDIĆI	11.466,00	2.416,00	13.882,00
294	SARAJEVSKA	6.910,00	3.629,00	10.539,00
295	SAVSKA	554,00		554,00
296	SEMBERSKA	15.334,00	3.012,00	18.346,00
297	SEONJACI	919,00	664,00	1.583,00
298	SILVIJA STRAHIMIRA KRANJČEVIĆA	483,00	320,00	803,00
299	SIME MATAVULJA	1.058,00	523,00	1.581,00
300	SKAKAVA DONJA	39.867,00	9.141,00	49.008,00
301	SKAKAVA GORNJA	20.750,00	8.618,00	29.368,00
302	SKENDERA KULENOVIĆA	7.197,00	1.507,00	8.704,00
303	SLAVKA BAŠIĆA	3.196,00	644,00	3.840,00
304	SLIJEPČEVIĆI	8.689,00	2.590,00	11.279,00
305	SMAILA BALIĆA		910,50	910,50
306	SRPKA PETROVIĆA	2.407,00	1.151,00	3.558,00
307	STANOVI	12.944,00	1.669,00	14.613,00
308	STARI BROD	1.963,00	1.654,00	3.617,00
309	STARI RASADNIK	6.733,00	7.463,60	14.196,60
310	STEVANA HRISTIĆA	2.819,00	1.525,00	4.344,00
311	STEVANA MOKRANJCA	6.911,00	1.773,00	8.684,00
312	STEVANA SREMCA	847,00	1.996,00	2.843,00
313	STEVE CVJETKOVIĆA	790,00	4.057,00	4.847,00
314	STJEPKOVICA	5.806,00	1.598,00	7.404,00
315	STUDENTSKA	250,00		250,00
316	SULEJMANA HADŽIALIJAGIĆA	2.918,00	692,40	3.610,40
317	SULJAGIĆA SOKAK	14.977,87	15.746,50	30.724,37
318	SULJE KAHRIMANA	4.360,60	3.440,00	7.800,60
319	SVETOG SAVE	2.780,00	58,00	2.838,00
320	SVETOZARA ĆOROVIĆA	1.569,00	42,00	1.611,00
321	ŠATOROVIĆI	31.738,00	9.260,00	40.998,00
322	ŠEHOVIĆA	712,00	462,00	1.174,00
323	ŠETALIŠTE		37,00	37,00



No.	Street name	With façade	Without façade	Total m ²
324	ŠTREPCI	20.558,00	5.507,00	26.065,00
325	TABAKOVIĆA	2.941,00	1.046,00	3.987,00
326	TINA UJEVIĆA	3.373,00	947,00	4.320,00
327	TOME MAKSIMOVIĆA	1.138,00		1.138,00
328	TRG MLADIH	309,00	33,00	342,00
329	TRNJACI	7.809,00	2.056,00	9.865,00
330	TROBRADOVIĆA SOKAK	1.934,00	1.019,00	2.953,00
331	TURSIĆA	1.968,00	260,00	2.228,00
332	TUZLANSKA	1.493,00	3.092,00	4.585,00
333	ULICE	11.869,00	7.405,00	19.274,00
334	ULICE BUKOVAC	1.787,00	2.019,75	3.806,75
335	ULIČKI PUT	2.589,00	2.567,00	5.156,00
336	ULOVIĆ	18.949,00	8.373,00	27.322,00
337	UZUNOVIĆA	4.317,00	141,50	4.458,50
338	VASE PELAGIĆA	613,00	130,00	743,00
339	VAŠARSKA	876,00		876,00
340	VILIĆA	504,00	330,00	834,00
341	VITANOVIĆI	12.074,36	5.064,00	17.138,36
342	VJEKOSLAVA KLAJIĆA	1.973,00	494,00	2.467,00
343	VLADIMIRA PRELOGA	1.419,00	80,00	1.499,00
344	VOJISLAVA ILIĆA	949,00	417,00	1.366,00
345	VUČILOVAC	5.347,00	6.089,00	11.436,00
346	VUJIČIĆI	1.621,00	2.171,00	3.792,00
347	VUKA STEFANOVIĆA KARADŽIĆA	2.416,60	1.536,00	3.952,60
348	VUKOSAVAČKA	17.546,00	2.434,00	19.980,00
349	VUKŠIĆ DONJI	2.447,00	4.075,50	6.522,50
350	VUKŠIĆ GORNJI	6.466,20	6.317,00	12.783,20
351	ZAIMA MUŠANOVIĆA	11.805,60	6.008,00	17.813,60
352	ZONA VI	132,00		132,00
353	ZONA VII	39,00	106,00	145,00
354	ZONA VIII	98,00	98,00	196,00
355	ŽELJEZNIČKA	700,00	746,00	1.446,00
	UKUPNO	1.725.707,73	781.056,75	2.506.764,48





Figure 4.22 The structure of housing owned by citizens from the basic thermal insulation-facade

When choosing a sample for the collection of data in any inhabited place-town community, were taken into account to be a building which, by their size, construction and age come from the dominant group that reflects the most realistic current situation in 2012.

According to the Tax Administration of Brcko District BiH (completely reliable data) in the housing sub-sector of the Brcko District in 2012 there were a total of 34,871 residential units with a total area of 2,871,746 m2.

Number of individual houses-houses is 28,263 with a total area 2,506,764.48 m2.

The number of housing units in collective housing buildings was 6,608 with a total area 364,981.61 m2.

Electricity consumption in housing sector Brcko District BiH data is based on information provided by the competent services JP "Komunalno Brčko" d.o.o.

In the residential sector of Brcko District in 2012 was spent 130,765,517 kWh electricity, giving a specific power consumption of 45.53 kWh / m2.

In Brcko District there are no exact data on the energy consumption for heating, which refers to the heating of heat from the fuel oil, coal, firewood and parts of electric energy used for heating, so that the following table is drawn up on the basis of the survey and assessment of experiential consumption individual fuel.

Table 4.19 give the parameters of heat consumption in the residential sector of the Brcko District.

Energent	Total heated area (m ²)	Consumption of heat energy per year (kWh)	Percentage share (%)
El. energy (KWh)	861.524	149.043.652	27,00
Heating oil (I)	57.434	10.280.686	1,86
Brown coal (t)	832.806	163.229.976	29,57
Lignite coal (t)	315.892	62.546.616	11,33
Wood m3	717.936	151.484.496	27,44
Pelet (t)	86.152	15.421.208	2,80
Total	2.871.744	552.006.634	100,00

Table 4.19 Parameters of heat consumption in the residential sector of the Brcko District BiH.



The total energy consumption of the sector for individual and collective housing in Brcko was obtained on the basis of average specific heat consumption of 180.45 kWh / m2. In Figure 23.4 shows the representation of individual energy sources for heating uu subsector individual and collective housing.

Figure 4.23 Share of various energy sources for heating uu subsector individual and collective housing



Analysis of energy consumption of residential sub-sectors of Brcko District BiH shows the potential energy savings, especially the savings of electricity and thermal energy for buildings built according to old standards. Almost 30% of individual residential buildings does not have established a façade that is the primary thermal envelope. Most of these buildings are heated with coal and firewood to spend a greater amount of thermal energy for heating due to lack of facades and emit a greater amount of CO₂. The existing housing fund will consume more energy for heating than prescribed by regulation of energy efficiency and will need to undertake a number of energy efficiency measures in order to rationalize consumption and, ultimately, reducing CO₂ emissions by more than 20% by 2020.

4.4 Analysis of energy consumption in the sub-sector, commercial and service activities of the Brcko District in 2012

The sub-sector of commercial and service industries includes about 5,037 buildings with a total area of 385,381 m2.⁷

Data on electricity consumption for this sub-sector buildings in 2012 were obtained from JP "Komunalno Brčko" d.o.o.. In 2012, the Brcko District BiH in the sub-sector commercial and service activities of the spent 37,511,498 kWh of electricity, which gives the specific consumption of 97.33 kWh / m².

In Table 4.12 are given parameters of heat consumption in the sub-sector, commercial and service activities of the Brcko District BiH.

⁷ Information from the Tax Administration of Brcko District of BiH (excluded unheated buildings-warehouses, garages and etc..)



Table 4.20 Parameters of heat consumption in the sub-sector, commercial and service activities of the Brcko District BiH.

Energent	Total heated area (m ²)	Consumption of heat energy per year (kWh)	Percentage share (%)
El. energy (KWh)	250.497	35.400.236	62,60
Heating oil (I)	96.345	14.311.086	25,30
Brown coal (t)	15.415	2.466.400	4,36
Lignite coal (t)	1.926	331.272	0,57
Wood m3	19.269	3.757.455	6,64
Pelet (t)	1.926	286.088	0,53
Total	385.378	56.552.537	100

The total energy consumption in the service and the commercial sub-sector Brcko District BiH is 56,552,537 kWh, which gives the specific consumption of thermal energy of 146.75 kWh / m2. In Figure 24.4 shows the representation of individual energy sources for heating in commercial and service sub-sector.

Figure 4.24 The share of individual energy sources for heating in commercial and service subsector



Analysis of the energy consumption of commercial and service sub-sectors of Brcko District BiH shows the potential energy savings of electricity and heat, and will be required to undertake a number of energy efficiency measures in order to rationalize consumption and, ultimately, reducing CO₂ emissions by more than 20% by 2020.

4.5 Conclusion

According to the results of the analysis of the energy in the building sector of Brcko District BiH, most of the energy consumed in the residential sector, then in commercial and service sectors, and then in the buildings owned by of Brcko District BiH (Figure 4.25).







Figure 4.26 Shares of individual sub-sectors in energy consumption building sector



In Figure 4.27 shows a comparison of specific consumption of electric and thermal energy sector by subsectors.







Housing sub-sector has the largest share in the consumption of both electricity and heat, so the implementation of energy efficiency measures in the sub-sector to be very important for achieving the objective of reducing emissions CO₂ for more than 20% by 2020. By comparing the specific consumption of electricity and heat, it is evident that specific electricity consumption commercial and service sub-sectors is much higher compared to the other two sub-sectors of building construction. Hence the conclusion that the potential for energy savings in the commercial and service sub-sector is very large, and that the measures to reduce electricity consumption, as the building sector and to reduce the overall energy consumption of Brcko District BiH.



In Figure 4.28. shows the structure of the energy consumption of buildings by energy sources sector.



Figure 4.28. The structure of the building sector energy consumption by energy sources

As seen in Figure 4.28, most of the energy consumption in the building sector are electricity (29.79%); followed by district heat from brown coal (26.21%), district heat from wood (24.45%), district heat from lignite (9.88), from fuel oil (7.20%) and pellets (4, 47%).

A general conclusion of energy analysis of the building sector Brcko District BiH to implement a variety of energy efficiency measures can achieve significant energy and environmental savings. Details of the measures whose implementation has resulted in a significant reduction in the consumption of heat and electricity by sub-sector building construction Brcko District BiH are given in Chapters 7 and 8.



5. ANALYSIS OF ENERGY CONSUMPTION IN THE TRANSPORT SECTOR BRCKO DISTRICT BIH IN 2012 YEAR

5.1 General Data

In the area of Brcko District BiH in the year 2012 a total of 25,505 vehicles were registered of which 24,780 vehicles with its own motor drive and the rest of the trailers⁸. The biggest part belongs to the category of passenger cars 21,807 (87.21%), while in the category of trucks 2,329 (9.31%), 77 buses (0.31%), motorcycles 792 (3.17%)⁹.

For the analysis of the energy consumption of the transport sector of Brcko District BiH is divided into the following sub-sectors:

- Vehicle fleet in the ownership and use of Brcko District BiH;
- Public transport in t Brcko District BiH;
- Private and commercial vehicles.

The relevant data for analysis of fuel consumption in the transport sector have been collected from the following sources:

- The Office of Public Property Brcko District BiH, Division of Brcko District BiH Government, institutions and enterprises of Brcko District BiH;
- Police of Brcko District BiH;
- Transport companies concessionaires.

Based on collected data, for all sub-sectors of transport Brcko District BiH determined by the following parameters:

- General information on the sub-sector;
- The structure of the rolling stock by purpose vehicles;
- classification of vehicles according to the type of fuel used;
- consumption of various types of fuel by subsector and vehicle categories in the sector

5.2 Vehicles owned by the Government and other institutions of Brcko District BiH

Vehicle fleet owned by the government and other institutions of the Brcko District BiH includes passenger cars truck, working vehicles, motorcycles, trailers and buses as property of the Government of the Brcko District BiH and other institutions of Brcko District BiH. According to available data provided by the Department of Public Records - Sub-department for personal documents total number of vehicles is 335, of which 264 cars, 34 trucks, 2 working machine, 28 motorcycles, 6 trailer and 1 bus.

The commercial vehicles and trucks are intended primarily for municipal activities.

⁸ Sources of Information the Department of Public Records

⁹ Sources of Information the Agency for identification documents, registers and data exchange IDDEEA



Figure 5.1: Structure of the vehicles owned by the Government and Institutions of Brcko District BiH



5.2.1. Fuel consumption for vehicles owned by the government and other institutions of Brcko District BiH

Total is the subsector of vehicles owned by the Government and Institutions of Brcko District BiH in 2012 consumed 250,976 liters of diesel and 90,899 liters of gasoline¹⁰ which amounts to 12.87 TJ of energy (Table 5.1.), Where diesel fuel accounts for a share of 73.42% and petrol by 26.58%

In Table 5.1 is shown the fuel consumption and CO2¹¹ emissions of vehicles owned by the Government and Institutions of Brcko District BiH

Table 5.1 Fuel consumption in 2012 for vehicles owned by Government and Institutions of Brcko District BiH

Type Fuel	Fuel consumption (I / year)	Energy (TJ)	CO2 emissions (t/a in 2012 years.)
Gasoline	90.899	3,14	220,05
Diesel	250.975	9,73	719,14
TOTAL	341.874	12,87	939,19

Fuel consumption subsectors of vehicles owned by the Government and Institutions of Brcko District BiH is shown in Figure 5.2.¹²

Figure 5.2. Fuel consumption in the year 2012 for vehicles owned by Government and Institutions of Brcko District BiH



5.3. Public transport in the Brcko District BiH

Public transport in the Brcko District of BiH is carried out through the bus transport company performing "Krajnović" d.o.o. and "Laser" d.d. The remainder of this chapter for the purpose of energy analysis will be further analyzed data sub-sectors of public transport.

¹⁰ Sources of Information the Department of Public Records Brcko District BiH

¹¹ CO2 emissions IPCC Guidelines for National Greenhouse Gas Workbook st.1.8

¹² Data taken from the Treasury Brcko District, Trial balance for the year 2012



5.3.1. The public bus transportation

Bus public transportation is organized in the area of Brcko District BiH in 35 regular lines. The bus network covers the urban area of Brcko District BiH and town areas. Buses are older vintages brands MAN and Mercedes types 303, 305 and 405 with engines of Euro II and Euro III and so their exhaust gases do not meet the new European standards for CO₂, HC and NOx emissions.

Transport companies did not give the information on fuel consumption an assessment of fuel consumption on the basis of the timetable and length of bus routes.

Type Fuel	Fuel consumption (I / year)	Energy (TJ)	CO2 emissions (t/a in 2012 years.)
Diesel	1.025.612	39,76	2938,66
Gasoline	0.00	0.00	
TOTAL	1.025.612	39,76	2.938,66

Table 5.2: Types and fuel consumption for the vehicles of public bus transport

Figure 5.3. Fuel consumption in the year 2012 for vehicles of public bus transport



5.3.2. A taxi passenger transp

In the area of Brcko District BiH in 2012 registered 110 licensed taxis carrier. Number of taxidrivers is increasing. In 2010 there were 80. The number of vehicles exceeds the needs of the District, but the impact on CO₂ emissions significantly does not change because now vehicles cross the less kilometers. The largest number of the taxi carrier provides its services in the narrow part of the metropolitan area. Vehicles are mainly with diesel or gasoline or LPG fuel sources. Accurate data on the consumption of taxis do not exist, the budget of their impact on the production of CO₂ conducted the first level of the budget of the IPCC methodology.



Total is in taxi transport in the area of Brcko District BiH in 2012 spent 14.81 TJ of energy (Table 5.3.), In which diesel fuel accounts for a share of 80% and gasoline 20%.

Table 5.3 Types a	and fuel for taxis
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Type Fuel	Fuel consumption (I / year)	Energy (TJ)	CO2 emissions (t/a in 2012 years.)
Diesel	308.120	11,95	883,22
Gasoline	82.510	2,86	200,42
TOTAL	390.630	14,81	1.083,64

21%	
700/	Diesel
79%	Gasoline

Slika 5.4. Potrošnja goriva po vrstama u 2012 godini

5.3.3. Total consumption of fuel for public transport sub-sector

The sub-sector public transport consists of city and suburban buses and taxis. Total energy consumption (TJ) by category sub-sectors of public transport for the year 2012 is shown in Table 5.4. in which bus transportation participates with a share of 72.41%, and taxi services with 27.59%.

 Table 5.4 Total energy consumption of public transport sub-sectors for 2012

Public transport vehicles	Fuel consumption (I / year)		Energy	CO2 emissions	
	Diesel	Gasoline	(TJ)	(t/a in 2012 years.)	
Autobusi	1.025.612	-	39,76	2.938,66	
Taxi vozila	308.120	82.510	14,81	1.083,64	
Ukupno	1.333.732	82.510	54,57	3.821.88	

5.4. Private and commercial vehicles

5.4.1. General Information

In 2012, in the area of Brcko District BiH a total of 25,005 registered vehicles. If the total of registered vehicles subtract the number of vehicles owned by the government and other institutions of the Brcko District BiH, taxis and buses, public transport that had previously been taken into account we get a number of private and commercial vehicles of 24,531. The number of registered vehicles from year to year, which is the pressure on the existing road and traffic impact on the environment is growing.



Table 5.5 Display increase in the number of registered vehicles in the Brcko District BiH 2009-2012.god¹³.

Year	The increase in the number of registered vehicles in Brcko District BiH (%)
2009-2010	5,26
2010-2011	7,53
2011-2012	5,56

Of the total number of registered vehicles in the area of Brcko District BiH most of it are passenger cars 21,433 or (87.37%), followed by trucks 1,993 or (8.12%), other categories of vehicles 300 pc. (tractors, machinery, etc. or (1.22%) and mopeds and motorcycles and 764 or (3.12%) and buses 41 or (0.17%). the structure of registered vehicles in 2012, according to the type of vehicle is shown in Figure 5.5.



Figure 5.5. The structure of registered vehicles in 2012, by type of vehicle

Note: Included here are only registered vehicles with their own engine

5.3.2. Fuel consumption for various types of vehicles

Data on the structure and the total fuel consumption were not available and is for the purpose of this Action Plan, an estimate of fuel consumption for these categories of vehicles.

The calculation was made using the model COPERT IV, developed by the European Environment Agency¹⁴ within the framework of the European thematic center for air and climate change (Europan Topic Centre on Air and Climate Change) and it represents the only recognized tool for this purpose at the European level. Estimated consumption of fuel for private and commercial vehicles is given in Table 5.5.

¹³ Source: <u>www.bihamk.ba</u> statistic

¹⁴ Source www.eea.europa.eu program COPERT



	The average annual mileage	The average speed in	Average fuel consumption			
		the city	Diesel	Gasoline	El.energ.	
Private passenger cars	15.000 km	25 km/h	60 g/km	70 g/km		
Light Truck	20.000 km	20 km/h	80 g/km	100 g/km		
Heavy Truck	125.000 km	20 km/h	240 g/km	-		
Bus	100.000 km	20 km/h	500 g/km	-		
Two-wheel vehicles	4.000 km	25 km/h		35g/km		
Electric car	10.000	25 km/h			0,176kWh/km	

Table 5.5 Estimated consumption of fuel for private and commercial vehicles

Table 5.6: Fuel consumption in 2012 for private and commercial vehicles in the Brcko District BiH

Fuel consumption	Gasoline (I)	Diesel (I)	Electric (kWh)	Consumption (TJ)		Emision CO2 (t/god)	
(t/year)				Benzin	Dizel	Benzin	Dizel
Private passenger cars	12.142.512	15.976.128	5.280	419,94	619,38	28.049,20	42.816,02
Light Truck	132.342	3.631.504		4,58	140,79	305,71	9.732,43
Heavy Truck	-	4.185.960			162,29	-	11.218,37
Bus (other)	-	2.383.699			92,41	-	6.388,31
Mopeds and motorcycles	79.059	-		2.73		182,63	
TOTAL	12.350.913	26.177.291	5.280	427,25	1.014,87	28.537,54	70.155,13
	1.	442,12 (TJ)	98.692	2,67 (t/god)			

The shares of energy from fuel for certain categories of vehicles, in TJ, are shown in Figure 5.6. Figure 5.6: Share of energy consumption of fuel for private and commercial vehicles in the Brcko District BiH



Of the total fuel consumption subsectors private and commercial, private vehicles consumed 72.07%, light trucks make 10.08%, heavy trucks accounted for 11.25% other buses (tourist, private, transport workers and the like.) 6.41% and mopeds and motorcycles 0.19%.



Conclusion

The analysis of fuel consumption of the transport sector in the area of Brcko District BiH shows by far the largest share of spending on the sub-sector of private and commercial vehicles (Figure 5.7).

Accordingly, the proposed measures to reduce greenhouse gas emissions from the transport sector are based in significant part on the purpose of the changes shown interest in favor of public transport, but also to the education and promotion of environmentally friendly modes of travel.



Figure 5.7: Energy share of fuel consumption by sub traffic in Brcko District BiH

The total fuel consumption of the transport sector Brcko District BiH is 40,286.31 tons of fuel, of which 12,524.32 tons of gasoline and 27,761.99 tons of diesel fuel.

The fuel consumption 95.63% is sub-sector of private and commercial vehicles, 3.52% in the sub-sector of public transport, and 0.85% on vehicles owned by the Government and Institutions of Brcko District BiH. The share of gasoline in total fuel consumption amounts to 31.09% and 68.91% of diesel.

Alternative fuels (natural gas, LPG, biofuels, etc.) in traffic is currently used only LPG as a substitute for gasoline, or no data on consumed quantities in 2012. Public transport is a very important part of traffic in relation to the use of private cars has significant advantages. In this sense, one of the main goals to reduce CO₂ emissions from transport should be an increase in the share of public transport in passenger transport. Other measures that may affect the reduction in traffic of passenger cars in the city center is the introduction of a system of charging for parking, construction detours, support the use of bicycles and other activities.



6. ANALYSIS OF ENERGY CONSUMPTION IN THE PUBLIC LIGHTING BRCKO DISTRICT BIH IN 2012

6.1. Introduction

Street lighting network is owned by Brcko District BiH. This is favorable to the implementation of the recommended measures for improving energy efficiency. Data for drafting the Action Plan are obtained from the following sources:

- JPE "Komunalno Brčko" d.o.o.
- The Department of Municipal Affairs of the Government of Brcko District BiH

Based on the data collected for the sector of public lighting Brcko District BiH will be presented the following parameters and characteristics:

- general data of the sector of public lighting;
- the structure of the existing network of public lighting
- electricity consumption for public lighting

6.2. General information on the sector of street lighting

The total number of lights, which formed the street lighting of Brcko District BiH, in 2012 was 14,490. Of the total number of those lamps with mercury bulbs were 8.235 or 56.83%, followed by 5,717 or 39.45% sodium type lamps, while 528 or 3.65% are other types of light bulbs (halogen metal, etc.), While the LED bulbs derived tehnoligija not exist.

Clearly arises strategies to increase energy efficiency - should modernizing entire system of public lighting, following the applicable standards and recommendations for street lighting.

Today manufacturers pay great attention when drafting lamps on its impact on ecology, appearance, maintenance (most lamps were made in IP 66 Sealsafe system), simple installation, with better mechanical, thermal and electrical protection, and a built-in light source. Construction optics lamps and reflectors allow production technology to increase the level of efficiency lamps, thus reducing the required installed power light bulbs, better light-parameters, and compliance with high environmental standards (reduction of light pollution). It is generally installed sodium lamps, with a longer service life, saving more than 50% of electricity compared to mercury lamps and lighting effect is the same and even better. New LED technology with the same lighting effect allows almost three times lower power consumption compared to sodium lamps.

It is necessary to replace the inefficient and environmentally unfriendly mercury bulb of sodium bulbs, and if If financial resources permits and carried torches latest in LED technology.



In Figure 6.1 it is shown how the percentage represented kinds of bulbs in street lighting in Brcko District BiH



Figure 6.1 Structure of street lighting according to the type of light source

6.3. The existing network of public lighting in Brcko District BiH

The network of public lighting Brcko District BiH are: feeder-measurement points of public lighting, devices for programming ON/OFF public lighting, meters for measuring electricity consumption, cam switches, power cables, lighting distribution boards, poles, wall brackets, wires, lamps and bulbs. Measuring places are supplied with low voltage network, the associated transformer areas, based on the electric power consent obtained from the competent public company.

Measurements taken of electricity for public lighting is done in single substations, using special counters, which register only the consumption of public lighting.

Public lighting control (switching on and off of it) is done via the switching clocks and related contactors or via the so-called. photo relays and contactors. Techniques and technology management of public lighting is necessary to modernize which would significantly improve energy efficiency in the sector of public lighting.

Public lighting a year for about 4000 hours

6.4. Consumption of electricity in sector of public lighting

For power supply of public lighting in 2012 was spent 8,959,238 kWh of electricity. The amount of CO₂ emitted indirectly for electricity is 5715.99 t .Trend expansion of public lighting shows a moderate increase in the number of lamps. In the period 2008-2012, the number of lamps is increased by 727 pieces. In the coming period is not expected to increase the spread because they are mainly populated places highlighted.





Figure 6.2 Assessment of consumption el. energy in street lighting in Brcko District BiH

6.5. Conclusion

From the collected data can be concluded that in the sector of public lighting has plenty of point for energy savings and reduction of CO₂ emissions and to increase energy efficiency. It is necessary to change the current approach to the sector of public lighting and adapt it to contemporary perspectives on this issue, as well as the need to follow the European guidelines and standards. The proposed solution will lead to significant energy savings, as well as to the reduction of light pollution.

First of all, it is need to change ineffective bulbs 150W and replace it with a sodium highpressure lamps with control gear and automatic switching to lower power in a period of 24 to 05 hours. These bulbs have a power of 100 / 70W. Depending on the resources, consider installing the most advanced LED light bulbs, leading to additional savings in the required amount of electricity, as well as a reduction in maintenance costs due to longer service life of LED bulbs. Measures to reduce CO2 emissions in the sector of public lighting are found in Chapter 8, and 9.



7. THE BASELINE EMISSION INVENTORY FOR BRCKO DISTRICT BIH

7.1. Introduction

The Baseline Emission Inventory (BEI) of CO₂ emissions for Brcko District BiH made for 2012, which was selected as the reference year. The main criteria when choosing a reference year was the availability of data necessary for the calculation of CO₂ emissions. Unreliable data on energy consumption and the need for assessment of CO₂ emissions provided to a number of uncertainties in reference emissions inventory which is not in accordance with the principles of the methodology prescribed by the European Commission.

The inventory included three sectors of final energy consumption in the Brcko District BiH: buildings, transportation and public lighting, in accordance with the classification of sectors as recommended by the European Commission. Budget includes direct (from fuel combustion) and indirect emissions (from electricity and heat production).

Baseline Emission Inventory of CO₂ emissions Brcko District BiH is made according to the protocol of the Intergovernmental Panel on Climate Change - IPCC as the executive body of the Programme of the United Nations Environment Programme (UNEP)¹⁵ and the World Meteorological Organization (WMO) in the implementation of the United Nations Framework Convention on Climate Change (United Nations Framework Convention on CO₂ Climate Change - UNFCCC)¹⁶. Bosnia and Herzegovina ratification of the Kyoto Protocol in 2007 committed itself to monitoring and reporting on emissions of pollutants into the atmosphere, according to the IPCC protocol, and is on the nationally recognized protocol used for the preparation of Baseline Emission Inventory of CO₂ emissions for the Brcko District BiH. As for the calculation of indirect emissions by the IPCC is not proposed methodology for calculating emissions from the production of district heat using electricity, was taken for indirect emission of an average emission factor for BiH of 638 g CO₂ / kWh (source: US Department of Energy) (Table 7.1.).

Emission factors, t/TJ No ENERGENT Unit CO₂ g CO2/kWhel 1. Electrical energy 638 g CO2/kWht 2. Heat for heating 282 3. t/TJ 56.99 Natural gas 4. Heating oil t/TJ 71,83 t/TJ 5. Liquefied petroleum gas 63.89 6. t/TJ 78.23 Masut t/TJ 7. Brown coal 96.07 t/TJ 8. Lignite 101,20 t/TJ 9. Motor gasoline 70,08 10. Diesel fuel t/TJ 73,91 Firewood t/TJ 0,0 11.

Table 7.1 Emission factors used for the determination of CO₂ emissions from the building sector Brcko District BiH ¹⁷

Baseline Emission Inventory is an instrument that allows local governments to measure the effectiveness of defined and implemented measures. The quantities of emissions in the Review and subsequent measurement, or monitoring the amount of emissions, shows progress in implementing the Action Plan and provides information or early warning signs about the

¹⁵ www.unep.org

¹⁶ https://unfccc.int

¹⁷ www.ipcc.ch



feasibility goals. Viewing can also be used as a motivation for all stakeholders involved in the reduction program and contribute to the achievement of the set goal.

In the Brcko District BiH have been identified following sectors contributing most to CO₂ emissions:

- 1. Buildings
- 2. Transport
- 3. Public lighting

For each sector, an emission calculation on the basis of the methodology defined in the Guidelines and the available data collected in the administrative departments of Brcko District BiH, companies owned by Brcko District BiH, institutions at the level of Brcko District BiH, relevant statistical data available studies and expert assessments.

7.2. Baseline Emission Inventory of CO2 from the building sector Brcko District BiH

CO₂ emissions from the building sector Brcko District BiH include emissions from electricity and fuel combustion (heat energy is mainly derived from the combustion of biomass and electricity consumption). Facilities building sector in Brcko District BiH used as energy: biomass (wood and pellets), coal (brown coal and lignite), fuel oil, and electricity. Emissions from fuel combustion are calculated through the IPCC standard emission factors and biomass as recommended by the IPCC. The calculated CO₂ emissions in the building sector Brcko District BiH are shown in Table 7.2 and Figure 7.1.

No	Category	Electrical energy (t) CO2	Heating oil (t) CO2	Brown coal (t) CO2	Lignite (t) CO2	Biomass (t) CO2	Total from all sources (t/year) CO2
1.	Buildings owned by Brcko District BiH	2.595,42	1.962,53	199,73	-	0	4.757,68
2.	Buildings individual and collective housing	99.184,76	2.746,45	48.089,67	20.776,40	0	170.787,28
3.	Buildings commercial and service activities	18.132,21	6.070,12	1079,26	138,94	0	25.420,53
	UKUPNO	119.912,39	10.779,10	49.368,66	20.905,34		200.965,49

Table 7.2 CO₂ emissions in tons for 2012 from the building sector in Brcko District BiH

In the total CO₂ emissions greatest portion is from building of individual and collective housing, , and the largest part in this subsector come from electrical energy and coal. In the sub-sector buildings which are not in the jurisdiction of the Brcko District BiH the largest emissions come also from coal and electricity.

Note: According to the recommendations of the IPCC CO₂ emission from biomass is not included because it is considered that it was a mass during growth consumes the same amount of CO₂ emitted by combustion.

7.3. Baseline Emission Inventory of CO2 from traffic in Brcko District BiH

Reference inventory of CO₂ emissions from transport in the Brcko District BiH is devided to:

- Vehicles in the Brcko District BiH Government and Institutions Brcko District BiH;
- Public transport vehicle in the area of Brcko District BiH;
- Other passenger cars and commercial vehicles owned by citizens and businesses.

The emission factors are derived according to the spent fuel, which is in accordance with the recommendations of the European Commission.


7.3.1 CO₂ emissions of vehicles owned by the Government and Institutions Brcko District BiH,

This sub-sector has a total of 329 vehicles, which are used as an energy source petrol and diesel, and calculated CO₂ emissions are shown in Table 7.2.

Table 7.3 CO₂ emissions of vehicles owned by Brcko District BiH

No	Ownership of vehicles	Number of	CO2 emissions (t/y) of spent fuel			
		vehicles	Gasoline	Diesel	Total	
1.	Government and Institutions Brcko District BiH	329	220,05	719,14	939,19	

NOTE: From the total number of vehicles are excluded trailers.

7.3.2 CO₂ emissions of public transport vehicles

Tabela 7.4 CO₂ emissions of od licenciranih taksi vozila

RB	Ownership of vehicles	Number		CO2 emissions (t/y) of spent fuel		
		of vehicles	Gasoline	Diesel	Total	
1.	Licensed taxis carrier	110	200,42	883,22	1.083,64	

Tabela 7.5 CO₂ emissions of public transport

RB	Ownership of vehicles	Number	CO2 emissions (t/y) of spent fuel		
		of vehicles	Gasoline	Diesel	Total
1.	Koncesionar javnog gradskog saobraćaja	35	-	2.938,66	2.938,66

7.3.3 CO₂ emissions of passenger and commercial vehicles

Tabela 7.6 CO₂ emissions of passenger and commercial vehicles

RB	Ownership of citizen and Number of		Number of vehicles		CO2 emissions (t/y) of spent fuel				
	bussines				Gasoline	Diesel	Gasoline	Diesel	Total
1.	Passenger a vehicles	ind o	commerc	cial	9.546	14.985	28.537,54	70.155,13	98.692,67

7.4 The total CO2 emissions from the transport sector of Brcko District BiH

Total CO2 emissions from transport depending on enegenta are given in Table 7.7

Table 7.7 CO2 emissions from transport depending on energy source

Subsector	Number of vehicles			
		Gasoline	Diesel	Total
Vehicles owned by Brcko District BiH	329	220,05	719,14	939,19
Public transport vehicles	110+35	200,42	3.821,88	4.022,30
Passenger and commercial vehicles	24.531	28.537,54	70.155,13	98.692,67
TOTAL	25.005	28.958,01	74.696,15	103.654,16







7.5 Baseline Emission Inventory of CO2 from the sector of public lighting Brcko District BiH

These emissions are indirect emissions caused by electricity consumption in the network of public lighting, and are shown in Table 7.8.

Table 7.8 Indirect CO2 emissions from public lighting Brcko District BiH

	Consumed electric. energy in 2012 years (kWh)	The emission factor tons CO2/MWh	t CO2
Consumption of electric energy for public lighting	8.959.238	8.959,238x0,638	5.715,99

7.6. Baseline Emission Inventory of CO2 in Brcko District BiH

The energy consumption of the Brcko District of BiH

Baseline Emission Inventory of CO2 in Brcko District BiH for 2012 year includes CO2 emissions from the building sector, traffic and public lighting based on the consumption of energy in individual sectors, whose overview is given in Table 7.9. and Figure 7.2.

Tables 7.9 Distribution of the energy consumption of individual sectors by energy sources

Energy consumption of fuel (MWh)						
Energy sources	Buildings	Traffic	Public lighting	Total by energy sources	% share by energy sources	
Electrical energy	187.952,40		8.959,24	196.911,64	18,79	
Heating oil	48.125,96	-	-	48.125,96	4,59	
Coal	211.661,13	-	-	211.661,13	20,19	
Biomass	158.594,93	-	-	158.594,93	15,13	
Diesel	-	308.713,42		308.713,42	29,45	
Gasoline	-	124.241,27		124.241,27	11,85	
Total	606.334,42	432.954,69	8.959,24	1.048.248,35		
The share of each sector%	57,84%	41,30%	0,86%	100%	100%	







The figure shows the percentage structure of energy sources in total energy consumption in the Brcko District BiH during 2012. Most of energy consumed comes from diesel fuel 29.45% and the lowest of fuel oil 4.59%.

CO2 emissions in Brcko District BiH

Reference inventory of CO₂ emissions Brcko District BiH during 2012 includes the direct CO₂ emissions due to combustion of fuel and indirect CO₂ emissions from electricity consumption and conversion of electric energy into heat energy, for the sectors of building, transport and public lighting. These emissions are shown in Table 7.10, Figures 7.3 and 7.4

Emission (t CO2)						
Energy sources	Buildings	Traffic	Public lighting	Total by energy	% share by	
				sources	energy sources	
Electrical	119.913,63	-	5.715,99	125.629,62	40,56	
energy						
Heating oil	12.753,38	-	-	12.753,38	4,12	
Coal	67.731,56	-	-	67.731,56	21,86	
Biomass	0	-	-	0		
Diesel	-	74.696,15	-	74.696,15	24,11	
Gasoline	-	28.958,01	-	28.958,01	9,35	
Total	200.398,57	103.654,16	5.715,99	309.768,72		
The share of each sector%	64,69%	33,46%	1,85%		100%	

Table 7.10 CO2 emissions by sector and energy

* **NOTE:** According to the IPCC Directive (96/61 / EC), biomass burning emissions are not calculated, because it is considered that the amount of CO2 the plants absorbed from the atmosphere.







Figure 7.4 Share of CO2 emissions according to sector



The greatest CO₂ emissions come from the building sector even 64.69%, and at least from the public lighting 1.85%, while viewed by energy sources largest emissions come from electricity 40.56% and the lowest of fuel oil 4.12%, disregarding the CO₂ emissions resulting from biomass. According to the IPCC Directive (96/61 / EC) emissions from biomass are not taken into account because it is considered that the plants during growth absorb the same amount of CO₂ emitted during the combustion.

7.7 Conclusion

Even in late 2008 in the annual conference of the UNFCCC (United Nations Framework Convention on Climate Change) stated that "the cities produce 80% of total world emissions of greenhouse gases." That is why the European Union has motivated cities to be actively involved in the implementation of the reduction of these emissions. Brcko District Bosnia and Herzegovina is making an inventory of CO₂ emissions involves the preparation of sustainable energy plan that will lead to emission reduction target. Reference inventory of CO₂ emissions for the Brcko District Bosnia and Herzegovina in the reference year 2012 includes direct and indirect emissions from three sectors: buildings, transportation and public lighting. Heat energy from the source of the Brcko District Bosnia and Herzegovina generated emissions from 184139.10 t CO₂ while of electricity that comes from emissions generated indirectly 125,629.62 tCO₂. The total CO₂ emissions from all sectors in the year 2012 amounted to 309,768.72 tonnes CO₂.



8. GENERAL PLAN OF MEASURES AND ACTIVITIES FOR REDUCING CO2 EMISSIONS UNTIL 2020

8.1 Introduction

According to a developed methodology for the preparation of this Action Plan, in accordance with the recommendations of the European Commission¹⁸ review of general measures and activities to reduce CO₂ emissions by 2020 has identified energy efficiency measures using renewable energy sources for the building sector, traffic and public lighting of the Brcko District Bosnia and Herzegovina.

The measures for the sectors of building and traffic are divided into several sub-categories, depending on the sub-sectors to which they apply, as well as the basic purposes and characteristics. A special sub-category for the sectors of building construction and traffic make the measures resulting from the current BiH legislation.

Measures to improve the energy efficiency of public lighting, in relation to the sectors of building construction and traffic, far fewer and are not divided into sub-categories.

In this chapter will be an overview of all the measures whose implementation would result in a reduction of CO₂ emissions in the Brcko District Bosnia and Herzegovina, regardless of the investment costs, potential energy savings and economic and energy viability of their implementation. For part of the economic and energy-effective and by 2020 feasible measures, in SEAP table is attached to this document will be given descriptions of the measures, the expected savings of energy and related CO₂ emissions with the timetable of implementation, where the estimate of the investment costs and the bodies responsible for their implementation.

8.2 Measures to reduce CO2 emissions in the building sector

In accordance with the recommendation of the European Commission, as well as the specific situation in the Brcko District BiH, priority measures and activities for the building sector are divided into the following five sub-categories:

- general measures to reduce CO₂ emissions from the building sector;
- promotional, informational and educational measures and activities;
- measures for residential and public buildings owned by Brcko District Bosnia and Herzegovina which are listed in clause 9.2 of this document
- measures for the residential sector buildings;
- measures for building commercial and service activities.

8.2.1 General measures to reduce CO2 emissions from the building sector

Category of general measures included are measures relating to building Brcko District BiH as a whole, continues to be divided into two subgroups:

- measures to remove barriers in the monitoring and control of energy consumption in the building sector Brcko District BiH;
- schemes of co-financing the implementation of identified energy efficiency measures in all sub-sectors.

Measures to remove barriers to monitor and control energy consumption in the building sector Brcko District BiH:

1. Acceptance of the methodology for the collection of relevant energy indicators for the building sector Brcko District BiH according to the classification of buildings used in this Action Plan (1.building owned by Brcko District BiH- individually listed in clause 4.2.1 of this document 2. residential buildings; 3. buildings of commercial and service sectors);

¹⁸ <u>http://eumayors.eu</u> Library, Guide book



2. Collection of relevant energy indicators according to the methodology developed on an annual, monthly and daily basis (depending on the indicators), where will be used for collecting systems of automatic remote meter reading and reading by employees for extra safety checks;

3. Development of information system of energy management for Brcko District BiH, which will include all the collected data and indicators, and enable the creation of all the necessary analyzes;

It should be emphasized that this is a very important measure, because without collecting relevant energy indicators to unambigouous methodology impossible to track the actual movement of energy consumption, and thus no corresponding reduction in CO₂ emissions from the building sector, which ultimately means that you will not be able to determine whether the set the aim of this Action Plan by 2020 reached or not.

The following subgroups of general measures which has tremendous impact on the reduction of CO₂ emissions in the Brcko District BiH by 2020 is to establish a scheme co-financing the implementation of identified energy efficiency measures in the building sector as a whole. Experiences of energy conscious and developed European cities show that without the program of co-financing, as well as other incentive programs the city administration can not expect substantial implementation of energy efficiency measures, which by 2020 should result in a reduction of CO₂ emissions by more than 20%.

Proposed general measures of this sub-group are the following:

4. The use of incentive schemes Brcko District BiH (grants, subsidies, etc.) For the construction and renovation of buildings according to the low-energy and passive standards;

5. The use of incentive schemes Brcko District BiH (grants, subsidies, etc.) For the use of renewable energy in buildings (photovoltaic systems, solar panels, biomass boilers, etc.).

Specific measures to be implemented in the building sector are concerned with the thermal insulation of building structures, covering facades and under the roof structure and attics and other non-insulated surfaces, thermal insulation material, the minimum thickness of 10 cm, elimination of heat bridges, replacement of existing windows by highly efficient in terms of thermal insulation. It is need to be gradually replaced fossil fuels with other whose CO₂ emissions are negligible.

For this subgroup of general measures characteristic is very difficult to quantitatively evaluable and their impact on energy savings and the associated reduction in CO₂ emissions but it is certain that without their application will not be possible to meet the set objective of reducing CO₂ emissions by more than 20% by 2020.

8.2.2 Promotional, informational and educational measures and activities

Subcategory of promotional, informational and educational measures and activities to reduce emissions CO₂ with one hand, and improving the quality of life of all citizens of Brcko District BiHon the other hand make the following measures:

1. Opening info desk's on energy efficiency (EE information desk);

2.Setting EE information portals in various parts of the Brcko District BiH;

3.Continuous informing consumers about ways of energy savings and current energy issues on the back of energy bills (in agreement with the companies distributors of energy);

4. The implementation of thematic promotional and information campaigns to raise public awareness about energy efficiency in buildings:

- How to build an energy efficient house ?;
- Reconstruction of the building on the principles of sustainable construction;
- Energy certificates energy consumption as a market category when buying, renting and repair of buildings;



- Energy efficiency measures in households thermostatic valves, solar systems for domestic hot water systems, energy efficient windows, household appliances and the energy class;
- Labels energy efikasnosti- Why only buy appliances energy class A ?;
- And "stand by mode" consumes power! Exclusion of household appliances from the mains after use;
- Energy saving indoor lighting;
- Heating biomass;
- Solar collectors;
- Heat pumps;
- Intelligent building what is it ?;
- What is a low-energy ?;
- What is a Passive House ?;

6.The organization of conferences to promote the rational use of energy and reduction of CO₂ emissions

7.Educational campaign on the design, construction and use of buildings in a sustainable manner for the target groups of citizens:

- The organization of public debates in certain local communities on the topic of energy efficiency;
- How to save energy? For pre-school and school age; (such as eg. in Germany issued picture book "Life in a passive house")
- Implementation of "Kids ISO" ®¹⁹ program in schools; (a program for children of preschool and school-age children very effectively applied in Japan and later in other countries)
- Actions in schools: competition for bands or drawings with the theme of climate change and energy saving, award ceremony and exhibition of the works;
- Preparation and distribution of children's picture books on the subject of energy efficiency and renewable energy;

8.Education:

- The introduction of vocational educational courses on energy efficiency and renewable energy for high school students in the Brcko District BiH;
- The introduction of the elective course on energy efficiency and renewable energy in the curriculum of Faculty of Economics in Brcko;
- Workshops and seminars for employees and users of buildings owned by the Brcko District BiH on ways to save energy;
- Competition staff departments and institutions which operate facilities owned by Brcko District BiH on energy efficiency;
- Organization međurazrednih primary competition on energy efficiency and renewable energy sources with interesting prizes for the winners;
- Financial support for pupils and students work to promote energy efficiency;
- The program of education on ways to save consumption for the educators of kindergarten;

9. Encouraging energy efficient and sustainable building in architectural and Town Planning for submission of artworks in the area of Brcko District BiH:

• Concourse for new buildings;

¹⁹ www.iso.org/iso/kidsiso_home



• Concourse for reconstruction - reconstruction of buildings; In tender programs (terms of reference) Energy efficiency and sustainability introduced as rating class with a percentage up to 20% of the total project appraisal.

For this category of measures, as well as the general measures, it is very difficult to quantitatively assess their impact on energy savings and the accompanying reduction in CO₂ emissions. Based on the experiences of energy-conscious cities of the European Union, it is estimated to be continuous and consistent implementation of the above promotional, educational and information activities by 2020, resulting in total savings of heat the whole building sector Brcko District BiH of about 12% - 15%.

8.2.3 Measures for building in property of Brcko District BiH

Identified energy efficiency measures for buildings owned by the Brcko District BiH, according to the basic characteristics can be divided into three groups:

- Preparatory activities;
- Implementing projects;
- Legislative measures.

The group preparation activities include the following actions:

1. The introduction of the Information system of energy management in buildings owned by the Brcko District BiH which includes:

- centralized collection of data on buildings (building characteristics, year of construction, age and description of the reconstruction, the energy consumption of all types of consumption, monthly bills for energy, etc.);
- system for remote reading of energy consumption;
- creation and continuous updating of the register of buildings;
- energy audits of buildings;

2. The introduction of a **Win-Win** scheme whereby the achieved energy savings and avoided energy costs back to an agreed percentage of an institution that has realized them. The previous practice according to which the users of buildings (schools, kindergartens, etc.) That their conscious behavior achieve energy savings, and that from that ultimately have nothing to get very de-motivating. Many experiences show that the implementation of 50-50% of the scheme as a strong motivating factor results in a change of behavior of the building, which ultimately drastically reduces energy consumption;

3.Engage in projects related to South-Eastern Europe, such as "VISION 2020" (the South East Europe) and Project SELPA (Intelligent Energy in Europe);

4.Using the Internet and a web portal to the wider public information on the efforts of the leaders of districts in relation to the objectives of the SEAP;

Overview of specific projects, the implementation of which has a direct impact on energy consumption and the associated reduction in CO₂ emissions is very long, but here are presented to those whose influence on the reduction of CO₂ emissions largest:

5.Installation of solar systems for hot water preparation in the educational, cultural, sports and administrative buildings owned by Brcko District BiH;

6.Installation of thermostatic valve sets the radiators in buildings owned by Brcko District BiH;

7.Replacement of lighting fixtures in the educational institutions of Brcko District BiH modern and energy-efficient light-technical solutions in accordance with European norms and directives;

8. Thermal insulation of facades and roofs of buildings owned by the Brcko District BiH;

9.Installing saving bulbs in all buildings owned by the Brcko District BiH;



10.Mounting the energy of high-efficiency windows in buildings owned by Brcko District BiH;

11.Placing a thermometer in every room in all buildings owned by Brcko District BiH;

Legislative action at the level of the Brcko District BiH which will result in considerable reduction of CO₂ emissions are the following:

12. The introduction of the Green procurement of all equipment and services in buildings owned by the Brcko District BiH;

13.Decision of the Assembly of Brcko District Bosnia and Herzegovina, according to which all new buildings in the property of the Brcko District BiH should use at least one good source of renewable consumption (photovoltaic systems, solar collectors, heat pumps, etc.);

14.Decision on tax on real estate and municipal taxes with significant discounts for the construction of low energy and passive buildings (at least 30%), as well as tax cuts for existing buildings that have built-in thermal insulation of the facade and which have implemented other measures thermal protection;

15.Establishing a new building planning documentation that will encourage the use of renewable energy sources.

8.2.4 Measures for the housing sector Brcko District BiH

Energy efficiency measures this sub-sector can be divided into measures for new and existing

buildings. Reducing energy consumption in new buildings will most effectively be achieved by adopting legislation that will limit consumption. Successful implementation of the aforementioned regulations will significantly reduce the consumption of new residential buildings.

Energy efficiency measures for existing buildings for residential purposes include two categories:

- Preparatory activities;
- Implementing projects.

Preparatory activities, as in the case of sub-sector buildings owned by the Brcko District BiH, all those measures which will have a direct impact on reducing energy consumption and associated CO₂ emissions but will set the necessary conditions for their successful implementation.

For this category identified the following measures:

1. Provision of funds from projects of support to co-finance the reconstruction of facades and roofs of buildings on the principles of sustainable construction;

2. Provision of funds from projects of support to co-finance the installation of solar systems for hot water.

Implementing energy efficiency projects for existing and future residential building sector, the implementation of which directly affects the energy consumption and the associated reduction in CO₂ emissions are many, but here they are proposed whose influence on the reduction of CO₂ emissions largest:

3.Installation of solar systems for hot water in households by 2020;

4.Reconstruction of the thermal insulation of the outer shell and the repair of the roof on the principles of sustainable building existing housing buildings by 2020;

5.Installation of thermostatic valves on radiators in households with central systems or condominium grijanjana in Brcko District BiH.

For the successful implementation of the identified specific projects, it is important to design and run a program of subvention.

8.2.5 Measures for building commercial and service activities

Energy efficiency measures this sub-sector is, in general, can be divided into measures for new and existing buildings, commercial and service activities in the area of Brcko District BiH.



Proposed measures for existing buildings subsector of commercial and service sector includes the following actions:

1. Requirement obtaining incentives by improving the thermal insulation of the building above the limits prescribed by the regulations;

2. Requirement obtaining incentives by using renewable energy sources:

- a. photovoltaic systems;
- b. heat pumps;
- c. solar collectors;
- 3. Encouraging the purchase of energy-efficient electrical appliances;
- 4. Installation of energy saving light bulbs.

Proposed measures for new buildings sub-sectors of commercial and service sector includes the following measure:

1. Adoption of the system and the implementation of decisions on tax on the property of the Brcko District BiH according to which taxpayers natural and legal persons, generate an additional discount of 20% of the total height of the calculated tax in the case of the construction of low energy and passive buildings;

2. Adoption of the system and the implementation of decisions of the Assembly of Brcko District BiH to a newly constructed building service and commercial activities equipped with heat pumps, photovoltaic and / or solar systems have a discount of an additional 30% of the total height of the calculation of taxes on real estate.

8.3. Measures to reduce CO2 emissions in the transport sector Brcko District BiH

In accordance with the recommendation of the European Commission, as well as the specific situation in the Brcko District BiH, proposed measures and activities for the transport sector are divided into the following subcategories:

- Planned measures;
- Promotion, information and education measures and activities;
- Green public procurement;
- Measures to vehicles owned by Brcko District BiH;
- Measures for public transportation;
- Measures to private and commercial vehicles

8.3.1 The planned measures to reduce CO₂ emissions from the transport sector Brcko District BiH

In the subcategory of planned measures to reduce CO₂ emissions from the transport sector Brcko District BiH was a place for finding all those measures which result in de successful implementation of the general improvement in the quality of public transport on the one hand, and a significant reduction of CO₂ emissions on the other.

Category planned measures to reduce CO₂ emissions from the transport sector includes the following measures:

a) The introduction of an information system for the monitoring of traffic;

The measure involves the introduction of modern transportation traffic light signaling or so. intelligent traffic lights at intersections, which would increase the flow of traffic in Brcko, installation of metering devices to control traffic lights that will allow management depending on the actual (current) traffic load in the transport network, installation of video surveillance systems at intersections that will enable and further improve work operational services with the aim of on time response and prevent potential accidents. In line with the experience of other cities suggests the implementation of measures in phases.



- b) Measures to increase the speed of traffic flow in the area of Brcko District BiH
 - The completion of the bypass around Brcko;
 - The priority right of passage of public transport vehicles;
 - Construction of a roundabout traffic;
 - The establishment of certain restrictions for freight traffic in order to unburden internal city network;
 - c) measures to increase traffic safety;
 - Regulating driving speed by placing the radar showing the speed and specially marked pedestrian crossings;
 - The gradual installation of traffic signs in LED technology at all dangerous places in the Brcko District BiH.
 - d) Measures to encourage the use of bicycles as a means of transport;
 - The construction of biking and pedestrian paths;
 - Construction of the disposal facility bike;
 - Establishing a network of free bike rental;

8.3.2 Promotional, information and education measures and activities

Promotional, information and education measures and activities in order to improve the quality of transport and the reduction of CO2 emissions in the Brcko District BiH are the following:

- Information and training for environmentally sound driving (driving schools);
- Promoting the use of alternative fuels;
- Organization of informative demonstration workshops for citizens about the use of alternative fuel vehicles (electricity, natural gas, biofuels, etc.);
- Organization of forums, workshops and roundtables, conducting surveys and research, distribution of information and promotional materials, etc .;
- Campaign: One day of the week without a car;
- Campaign: Cycling is healthy!

8.3.3 Measures to vehicles owned by Brcko District BiH

Subcategory measures for vehicles owned by Brcko District BiH makes the following measures:

- Purchase of new vehicles with reduced emission of greenhouse gases (alternative fuels) in accordance with the criteria of green public procurement;
- Defining environmentally acceptable quality fuel when fuel supply contract with the supplier, and periodic inspection of fuel quality.

8.3.4 Mjere za javni prijevoz na području Brčko distrikta BiH

Measures for public transport in the area of Brcko District BiH includes all those measures that improving the quality of public transport increases its use in reducing the use of personal vehicles of the citizens.

Measures to improve the quality of bus transport are:

- Regulation of bus stops and bus shelter;
- Decision-making that concession to bus transportation causes vehicles to low-carbon and vehicles driven by alternative fuels;
- Decision-making that concession to bus transportation conditions by introducing an energy management system in bus transport of passengers;



- Optimizing existing bus routes and driving time, and the introduction of new bus routes;
- Encouraging the production of biodiesel from waste cooking oil for public bus transport;

Measures to improve bicycle transportation in the area of Brcko District BiH:

- Establishment of a network of bicycles for rent furnished IT protection against theft, with a secured bike storage and service, and measure km traveled;
- Construction of new and ongoing maintenance of bicycle paths throughout the territory of Brcko District BiH.

8.3.5 Measures for private and commercial vehicles

Proposed measures to rationalize the use of their own and commercial vehicles in the Brcko District BiH includes the following measures:

- The introduction of payment for parking in the city center and the introduction of parking management;
- Time Distribution of entry of vehicles in city core of Brcko;
- Stimulating measures for powered vehicles with alternative fuels;

8.4. The measures for the sector of public lighting

Measures to reduce energy consumption and light pollution in the sector of public lighting of the Brcko District BiH are the following:

- Replacing existing lighting with energy-efficient and environmentally friendly lighting fixtures;
- Management of lighting fixtures by installing modern electronic ballasts.

As already mentioned in the introduction, this chapter gives an overview of all measures and activities in the building sector, traffic and public lighting whose successful implementation resulted in a reduction of CO₂ emissions.

In chapter 9 of the Action Plan for the part identified, economic energy optimal measures for all three sectors of energy consumption in Brcko District BiH will give the main parameters of implementation: the time, the responsible institutions, the potential energy savings and corresponding CO₂ emissions, investment costs and the period return on investment (where possible) and others.

9. TIME AND FINANCIAL FRAMEWORK PLAN IMPLEMENTATION MEASURES AND ACTIVITIES

9.1. Introduction

In the previous chapter gives a comprehensive view of the identified measures and activities of the Action Plan Sustainable Energy Brcko District BiH in the period from 2012 to 2020 for the sectors of building construction, transport and public lighting. For this display measures whose implementation would result in a reduction of CO₂ emissions, were selected energy-economically optimal measures whose application can reduce emissions by 21.38%.

Identified energy efficiency measures are provided in this chapter in a tabular format, with each measure associated following parameters:

- The time frame of implementation;
- The body responsible for implementation;
- Where it is possible to estimate the investment costs of implementation;
- Assessment of energy savings;
- Estimate of the reduction of CO₂ emissions;



- Where possible investment costs per t CO₂ save;
- Possible sources of funding for implementation;
- A brief description of the measures and the manner of implementation.

The measures associated with the parameters are divided into the following categories:

- Measures to reduce CO₂ emissions from the building sector Brcko District BiH;
- Measures to reduce CO₂ emissions from the transport sector;
- Measures to reduce CO₂ emissions from the sector of public lighting.

Possible sources of funds for the implementation of any measures proposed by the main guidelines set out in Chapter 13.

9.2. Measures to reduce CO₂ emissions from the building sector Brcko District BiH

Below is an account of the measures to reduce CO₂ emissions from the building sector Brcko District BiH, divided into four categories:

- Promotion, education and behavior change;
- The substitution of existing energy sources with new greener energy sources
- Residential and public buildings owned by Brcko District BiH;
- Residential buildings;
- Building of commercial and service sectors.



9.2.1 Legislation, education, promotion and behavior change

Creation of an institutional framework for energy management

Measure name	The establishment of legal framework of Brcko District BiH for efficient energy management in accordance with EU directives
Responsible for implementation	The competent departments of the Government, and the Assembly of Brcko District BiH
Start / end of realization (years)	2015 2017.
Estimated costs (unit or total)	25.000 KM
Estimate savings (% or kWh, liters of fuel)	total 3.900 MWh heating energy
	750 MWh electricity for other purposes
Estimation of emission reductions (tCO2)	1.418,4 from both sources
The cost per emission reduction (KM / t CO2)	17,6 KM/t CO2
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment	The measure includes the preparation of the Act and the Regulations relating to power management, primarily in construction and later in other areas. These regulations are based on the regulations of the European Union: -Directive 2012/27/EU on Energy Efficiency -Directive 2002/91/EC on the energy performance of buildings
	-Directive 92/75/EEC on labelling of household appliances,
	Regulations relating to the efficient use of thermal energy in the construction of new and reconstruction of existing buildings to achieve energy savings will be:
	Average consumption 192 KWh/m ² now
	Average consumption <150 KWh/m ² under the new rules:
	According to the experience of European cities after the introduction of savings measures of effective energy use is up to 2% -3.5% per annum.
	The total energy consumption in buildings owned by the Brcko District BiH in 2012 amounted to 1.202.MWh and electrical 5,238.2 MWh.



Measure name	Creating a working group to monitor the efficiency of energy use in the Brcko District BiH
Responsible for implementation	Department of Brcko District BiH Government and the Office of the Public Property
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	35.000 KM year. total 175.000 until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 3.900 MWh heating energy 750 MWh electricity for other purposes
Estimation of emission reductions (tCO2)	1.418,4 from both sources
The cost per emission reduction (KM / t CO2)	123,3
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
Kratak opis/komentar	The measure applies to the formation of permanent departments within existing departments of the Government of Brcko District BiH or agencies for energy management that would lead to an updated database of expendable consumption and implemented energy efficiency measures with the issuance of the energy passport for new buildings in the area of Brcko District BiH. This also includes the establishment of the inspection body to control the implementation of regulations on energy efficiency or expansion of the jurisdiction of the existing inspection bodies. It is understood that this measure can not be changed until the adoption of regulations under Measure No.1. Average consumption 192 KWh/m ² now Average consumption <150 KWh/m ² under the new rules: According to the experience of European cities after the introduction of savings measures of effective energy use is up to 2% -3.5% per annum. The total energy consumption in buildings owned by the Brcko District BiH in 2012 amounted to 1.202.MWh and electrical 5,238.2 MWh.



Measure name	Education and behavior change of employees / users of buildings owned by Brcko District BiH
Responsible for implementation	Department for Professional and Administrative Affairs Sub-Division for human resources
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	6.000 KM year. total 30.000 until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 3.900 MWh heating energy 750 MWh electricity for other purposes
Estimation of emission reductions (tCO2)	1.418,4 from both sources
The cost per emission reduction (KM / t CO2)	21,15
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
Kratak opis/komentar	 The measure includes a full range of educational activities are regularly carried out: Organization Of educational workshops on ways to save energy; Production and distribution of educational materials (flyers, brochures, posters, stickers, etc.) Organization The stands, and the like. In addition to educational activities under this measure is necessary to introduce an incentive scheme for energy saving (for example, schemes 50/50) under which part of the funds from the savings in energy remains available to each institution in which the savings realized. Energy savings by implementing measures aimed at raising awareness and education of employees in the buildings owned by the Brcko District BiH is very difficult to quantify. According to the experience of other European cities, it was assumed that a continuous educational, promotional and informational activities in the next six-year period, resulting in savings of heat and electricity by 9% compared to the reference year 2012 in the buildings owned by the Brcko District BiH. The total energy consumption in buildings owned by the Brcko District BiH.



Measure name	Consumer education in the sub-sector housing and commercial and public service sub-sector with the promotion of the principle of energy eficiency
Responsible for implementation	Department for Professional and Administrative Affairs Subdivision for support to local communities and non- governmental organizations
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	40.000 KM year. total 200.000 until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 4.300 MWh heating energy 950 MWh electricity for other purposes
Estimation of emission reductions (tCO2)	1.642,4
The cost per emission reduction (KM / t CO2)	121,7
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
 A brief description / comment The measure includes a number of activities carried out on a regular basis: 1. Opening of the EE Info desk's in various parts of the Brcko District BiH; 2. Setting EE information panels in various parts of the Brcko District BiH; 3. Continuous informing consumers about ways of energy savings and current energy issues on the back of energy bills; 4. The implementation of thematic promotional and information campaigns to raise public awareness about energy efficiency in buildings: How to build an energy efficient house ?; Reconstruction of the building on the principles of sustainable construction; Energy certificates - energy consumption as a market category when buying, renting and repair of buildings; Energy efficiency measures in households - thermostatic valves, solar systems for domestic hot water systems, energy efficient windows, applicates - energy effic	 According to the experience of other European cities, the continuous implementation of the above measures, in the period from 2014 to 2020 will result in the following savings: The sub-sector buildings for individual family housing and home-building and floors for multifamily housing-apartments - 5% of the heat, 4% electricity, The sub-sector buildings and a commercial and service activities - 7% of the heat, 4% electricity. Sub-building for individual family housing and home-building and floors for multifamily housing-flats in 2012 spent 552,006 MWh of heat and 130,765 MWh of electricity. Sub-building and a commercial and service industry in 2012 spent 56,552 MWh of heat and 37,511 MWh of electricity.



9.2.2 Substitution-replacing existing energy sources with new energy sources

Ordinal number of measures: 5.

Measure name	Gasification of the town of Brcko
Responsible for implementation	Public administration and the relevant administrative bodies of Brcko District BiH
Start / end of realization (years)	2016 2020.
Estimated costs (unit or total)	250.000 KM year until 2020.year (resources for the project documentation)
Estimate savings (% or kWh, liters of fuel)	Substitution of natural gas in total energy 55 .200 MWh of heat
Estimation of emission reductions (tCO2)	13.303,2
The cost per emission reduction (KM / t CO2)	It is not possible to estimate the full amount in this document
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
	A brief description / comment:
	Continue activities envisaged by the Strategy of development of Brcko District BiH 2008-2017 The Strategic goal:
	1 Development of the concent of recification
	Development of the concept of gasilication Design and secondary pipeline gasifikaciiske petwork
	In future the construction of gas pipeline "South Stream" opens serious opportunities for the realization of this project.
	Natural gas as a thermal energy source has a great advantage over other fuels in terms of reducing pollution and CO ₂ emissions as well as convenient and comfortable to use.
	It is anticipated substitution of the current (expensive) forms of energy natural gas in the amount of 50.200 KWh which brings CO ₂ reduction

Note: Financial requirements for the entire investment gasification will be able to evaluate only after the preparation of project documentation.



Measure name	Construction of the district heating (cogeneration plant) with total power of 32 MW heat and 16 MW of electricity that would use environmentally friendly fuel to which it would tap part of the facilities of the public administration and part of the commercial facilities.
Responsible for implementation	Public administration and the relevant administrative bodies of Brcko District BiH
Start / end of realization (years)	2016 2020.
Estimated costs (unit or total)	134.400.000 KM
Estimate savings (% or kWh, liters of fuel)	Saving heat energy will be about 52,7 GWh
Estimation of emission reductions (tCO2)	10.540
The cost per emission reduction (KM / t CO2)	12.751,4
Source of funds for implementation	Public-private partnerships, EU funds (IPA, IEE, NAMAs and others)
A brief description / comment:	The thermal energy will amount to 105.4 GWh Electricity production will amount to 52 GWh / year CHP that the first stage had a 32 MW heat and 16 MW of electricity and thermal energy to the factory would be part of the facilities in the jurisdiction / property of the Brcko District BiH, which are located in the city center and residential buildings . Assessing the value of investments is based on the approximate cost of 2.8 million / MW. Assessment of CO2 emission reduction is 770 t / MWh / year. The plant could meet heating needs of 20% of the consumption of public buildings owned by the Brcko District BiH and 10% of residential buildings, commercial and service activities. Lifetime plant 30 years, paid back up to 5 years.



Ordinal number of measures: 6a. (in conection with number 6.)

Measure name	The establishment of district heating system, which includes heating of 4,000 flats (220,000 m2) and approximately 170,000 m2 of public and commercial buildings
Responsible for implementation	Public administration and the relevant administrative bodies of Brcko District BiH
Start / end of realization (years)	2017 2020.
Estimated costs (unit or total)	35.000.000
Estimate savings (% or kWh, liters of fuel)	Saving heat energy will be about 52,7 GWh, already shown in Measure no. 6
Estimation of emission reductions (tCO2)	10.540 already shown in Measure no. 6
The cost per emission reduction (KM / t CO2) $$	3.320,7
Source of funds for implementation	Public-private partnerships, EU funds (IPA, IEE, NAMAs and others)
A brief description / comment:	Cogeneration plant that in the first stage had a 32 MW heat and 16 MW of electricity and thermal energy to the factory would be part of the facilities in the jurisdiction / property of the Brcko District BiH, which are located in the city center. Reducing energy consumption in relation to the individual combustion chamber (source of energy) that were used in the above approximately 1000 objects, which are according to estimates total amount of electricity used by 50%.

NOTE: When estimate the cost of the investment is calculated to cost the internal installation of central heating borne by owners of facilities



9.2.3 Buildings ii premises owned by Brcko District BiH

Measure name	The establishment of an information system for monitoring energy consumption in public buildings - energy accounting
Responsible for implementation	The Office for Public Property JP "Komunalno Brčko"d.o.o.
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	40.000 KM per year, total 200.000 until 2020.year
Estimate savings (% or kWh, liters of fuel)	2% all public building ukupno 19.694 MWh heating energy 7.772 MWh electricity for other purposes
Estimation of emission reductions (tCO2)	98,25
The cost per emission reduction (KM / t CO2)	2030,5
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	For all objects in the jurisdiction / property Brcko District BiH to establish an information system for monitoring energy consumption-energy accounting. Management Information System is used for energy monitoring and analyzing energy and water consumption in buildings in public sector it is a valuable tool for system power management. Basic functions system:
	 The collection and entry of basic data on buildings and control of energy and water;
	 Easy access to information about the total amount of consumed consumption and water;
	 Calculations and analysis with a view to detecting unwanted, excessive and irrational consumption and identify opportunities for achieving energy and financial savings;
	 Verification of the savings realized;
	 Automatic warning about critical events and the irregularities in the operations.



Measure name	Continuous implementation of energy efficiency measures in public buildings on the basis of the performed energy audits and set priorities.
Responsible for implementation	The Office for Public Property
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	1/4 total space (25 KM/m ²) total 2.122.837 do 2020.year
Estimate savings (% or kWh, liters of fuel)	total 3.062 MWh heating energy 698 MWh electricity for other purposes
Estimation of emission reductions (tCO2)	1183,26 t
The cost per emission reduction (KM / t CO2)	1.794 KM/t
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	For all objects in the jurisdiction / property Brcko District BiH will be established for the implementation of these energy efficiency measures on the basis of the performed energy audits and set priorities. In the area of Brcko District BiH was a total of 113,218 m2 of buildings owned by the Brcko District BiH with approximate area of 339,654 m2 facade which is made of energy capture. Based on the established criteria of energy efficiency all objects above the energy class "A" average building should be in the planning period lead in a class that meets regulations on energy efficiency in buildings.



Measure name	Installation of solar heating systems of public institutions in rural području- 29 facilities
Responsible for implementation	Department of Education, Office for Public Property, Department of Public Health and Other Services and Public Health Center Brcko District BiH
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	59.149 KM year. total 295.749 until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 174 MWh
Estimation of emission reductions (tCO2)	41,93 t
The cost per emission reduction (KM / t CO2)	7.053,4
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	Perform will be the incorporation of solar heating systems in school buildings school district and branch facilities. According to the data of insolation in the area of Brcko District BiH can achieve significant savings by using heat of solar energy in the transitional and winter period. Thanks to the development of technology in recent decades, solar thermal systems today efficient and reliable way of producing thermal energy for domestic hot water space heating. One square meter of solar collector can produce around 800 W of heat for heating hot water or space. There is a device 5 panels per property. Price of the panel surface of 2.1 m ² is 900 KM including PDV, accessories, installation and installation is about 5,700 KM. These systems work in conjunction with other sources of heat and can be used to produce hot water or heating.



Ordinal number of measures: 9a (in conection with number 9)

Measure name	Installation of solar heating systems of public institutions in the metropolitan area of 20 facilities
Responsible for implementation	Department of Education The Office for Public Property
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	40.793 KM year total 203.965 until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 120 MWh
Estimation of emission reductions (tCO2)	28,92 t
The cost per emission reduction (KM / t CO2)	7.052,7
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	Perform will be the incorporation of solar systems for the JU "Bolnica", health centers, indergarten and school facilities. According to the data of insolation in the area of Brcko District BiH can achieve significant savings by using heat of solar energy in the transitional and winter period. Thanks to the development of technology in recent decades, solar thermal systems today are efficient and reliable way of producing thermal energy for domestic hot water and space heating. One square meter of solar collector can produce around 800 W of heat for heating hot water or space. There is a device 5 panels per property. Price of the panel surface of 2.1 m ² is 900 KM including VAT, accessories, installation and installation is about 5,700 KM. These systems work in conjunction with other sources of heat and can be used to produce hot water or heating.



Measure name	Modernization of the boiler in educational institutions (kindergartens, primary schools, secondary schools and faculties) Brcko District BiH - installation of boilers for biomass
Responsible for implementation	Department of Education The Office for Public Property
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	980.000 KM/year.total 4.900.000 KM until 2020.year
Estimate savings (% or kWh, liters of fuel)	Energy consumption remains the same 755.18 MWh or reducing CO ₂ emissions in half lower heating costs
Estimation of emission reductions (tCO2)	182 t
The cost per emission reduction (KM / t CO2)	26.923
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	The measure involves the installation or replacement of existing boiler plants in educational institutions that are heated by fuel oil high- pyrolytic boilers on wood biomass. The new generation of boilers for biomass is automatically controlled and the efficiency coefficient goes up to 95%. These boilers have power and to 1000 KW and can burn different types of wood waste such as wood chips, wood pieces, wood chips, sawdust. In addition to zero emissions of CO ₂ prices this heating is up to two times cheaper than heating oil, which is now used. Source wood chips are covered with thickets and watercourses in the area of Brcko District BiH, which contain a large amount of biomass that otherwise a nuisance. The amount of heat absorbed by these facilities amounts to 5,727 MWh per year and emisja CO ₂ is 182 tons.



Measure name	Modernization of lighting in classrooms that have outdated light bulbs (200 classrooms)
Responsible for implementation	Department of Education
Start / end of realization (years)	2015 2017.
Estimated costs (unit or total)	34.560 KM god. ukupno do 2017.godine
Estimate savings (% or kWh, liters of fuel)	
	792 MWh electricity for lighting
Estimation of emission reductions (tCO2)	190,87
The cost per emission reduction (KM / t CO2)	181,06
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	To acquire and replacement of existing lighting with energy saving lighting fixtures that have better technical features in classrooms that have outdated light bulbs Estimated number of lighting is 4,800. According to the EU regulation stipulates that by 2016 stops producing classic light bulb with a filament and that the same is replaced with energy-saving bulb. To replace incandescent light bulbs with energy saving bulbs in all school buildings. This will be achieved by reducing electricity consumption, CO2 emissions reduction, improved brightness and reduce maintenance costs.



Measure name	Installing thermometers in all buildings owned by Brcko District BiH
Responsible for implementation	The Office for Public Property
Start / end of realization (years)	2015 2016.
Estimated costs (unit or total)	8.750 KM year. for 2500 rooms
Estimate savings (% or kWh, liters of fuel)	According to foreign experience, this measure will result in a 4% reduction in heating energy which amounts to 600 MWh
Estimation of emission reductions (tCO2)	144,6 t
The cost per emission reduction (KM / t CO2)	60,5 KM/t
Source of funds for implementation	Budget Brcko District BiH,
A brief description / comment:	By placing a thermometer on the wall in every room (offices, schools, kindergartens, etc.) Allows an insight into the thermal balance and the ability to control temperature properly ventilated rooms and regulation of heating / cooling the room. Measure other than the setting of the thermometer on the wall in each room includes an initial educational experience: -On the thermometer will be an inscription 1°C saves up to 6% ENERGY. -In Placing a thermometer in the room to explain to the customer premises and the purpose of these measures and ways to successfully implement. -Production And distribution of leaflets and the like. The estimated total investment costs, with the assumed 2,500 rooms in all buildings owned by the Brcko District BiH, is around 8,750 KM (3.5 KM per share). The proposal is that the implementation of these measures go as soon as possible because it is not demanding in terms of finansijskijskom needed are modest investment.



Measure name	Thermal insulation of the outer shell and the roof over the building owned by Brcko District BiH
Responsible for implementation	The Office for Public Property
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	45,00 KM/ m ² total 1.237.500 KM until 2020.godine
Estimate savings (% or kWh, liters of fuel)	total 2.200 MWh heating energy
Estimation of emission reductions (tCO2)	530,2
The cost per emission reduction (KM / t CO2)	2.334
Source of funds for implementation	Funds EU NAMAs projects NAMAs Project, Budget Brcko District BiH
A brief description / comment:	Complete renovation of the thermal insulation of the exterior and roof in several buildings owned by the Brcko District Bosnia and Herzegovina. The total heated area of buildings to be thermally isolated from around 20% of the total area of buildings owned by the Brcko District BiH and that is 27,500 m ² . Estimated savings of thermal energy is about 80 kWh/m ² . The preliminary energy audit stated that the works on buildings should be carried out. The above is the price of the proposed intervention. Buildings that need the most urgent need to renew the insulation outer sheath (facades and windows) and roof are: - Building of Service for fire protection - IV Elementary School - The building of the Election Commission - Building of the Health Insurance



Measure name	Installation of high-efficiency energy windows in several buildings owned by Brcko District BiH
Responsible for implementation	The Office for Public Property
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	55,00 KM/m ² .total 1.512.500 until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 963,5 MWh heating energy
Estimation of emission reductions (tCO2)	2.322,2
The cost per emission reduction (KM / t CO2)	651,3
Source of funds for implementation	Budget Brcko District BiH, NAMAs Project
A brief description / comment:	Installation of high-efficiency energy windows in several buildings owned by the Brcko District Bosnia and Herzegovina. This measure relates to the installation of insulating glass to aluminum windows and cover will cover about 20% of the total area of buildings owned by the Brcko District BiH and that is 27,500 m2. Estimated savings of thermal energy is about 35 kWh / m2 and investment around 55.00 \in / m2. So far, none of the facilities owned by the Brcko District BiH does not meet the thermal regulations for thermal insulation of windows



Measure name	Installation of thermostatic sets in all buildings of Brcko District BiH
Responsible for implementation	The Office for Public Property
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	284.000 KM until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 2.280 MWh heating energy
Estimation of emission reductions (tCO2)	549,48
The cost per emission reduction (KM / t CO2)	516,8
Source of funds for implementation	Budget Brcko District BiH
A brief description / comment:	Installation of thermostatic sets in all buildings of the Brcko District Bosnia and Herzegovina to 2020, the total heated area of 137,332 m2. Based on the results of a number of conducted energy audits in public buildings the average number of radiators is 0.0517 radiator / m2. These measures would include the installation of 7,100 sets of thermostatic radiators. Expected savings of thermal energy is 15% and the price of a thermostat set around 40 KM.



Measure name	The introduction of Green Public Procurement criteria for the purchase of electrical equipment for buildings owned by Brcko District BiH
Responsible for implementation	Department for Professional and Administrative Affairs
Start / end of realization (years)	2015 2017.
Estimated costs (unit or total)	no cost
Estimate savings (% or kWh, liters of fuel)	210
Estimation of emission reductions (tCO2)	50,61
The cost per emission reduction (KM / t CO2)	no additional cost
Source of funds for implementation	Budget Brcko District BiH
A brief description / comment:	Encourage the purchase of energy-efficient electrical equipment for all buildings of the Brcko District Bosnia and Herzegovina through the introduction of Green Public Procurement. The criteria in the purchase of equipment to be pre-defined and governed by special regulations, and all new equipment should meet these criteria. The potential energy savings of these measures for buildings owned by the Brcko District Bosnia and Herzegovina is 210 MWh by 2020.



Measure name	The introduction of energy saving light bulbs in the buildings owned by Brcko District BiH
Responsible for implementation	The Office for Public Property
Start / end of realization (years)	2015 2017.
Estimated costs (unit or total)	no cost (procurement will turn to energy saving light bulbs)
Estimate savings (% or kWh, liters of fuel)	total 240 MWh eletrical energy
Estimation of emission reductions (tCO2)	376,1
The cost per emission reduction (KM / t CO2)	regular cost
Source of funds for implementation	Budget Brcko District BiH,
A brief description / comment:	According to EU regulations on lighting products in households (EC Regulation 244/2009) it is envisaged that by 2016 ceased production of the classic incandescent light bulbs that will eventually lead to the replacement of conventional energy saving bulbs. It is proposed to replace all incandescent bulbs in buildings owned by Brcko District Bosnia and Herzegovina energy saving light bulbs by 2016. This measure will result in a reduction of total electricity consumption of 240 MWh by 2020 in buildings owned by Brcko District Bosnia and Herzegovina.

NOTE: Price saving bulbs has dropped drastically and durability they were so long that the cost of purchasing practically equal in comparison to conventional bulbs.



9.2.4 The buildings for collective housing

Measure name	Reconstruction of the thermal protection of the exterior and repair of the roof of buildings intended for housing
Responsible for implementation	Department for Professional and Administrative Affairs The Office for Public Property
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	40 KM/m ² , total 22.609.800 until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 45.219 MWh heating energy
Estimation of emission reductions (tCO2)	10.897,7
The cost per emission reduction (KM / t CO2)	2074,73
Source of funds for implementation	Financed by citizens, Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	The measure involves the reconstruction of thermal protection exterior and repair roofs on about 10% of residential buildings in the area of Brcko District BiH. Housing Fund of Brcko District Bosnia and Herzegovina in 2012 was 37.683 housing, heating surface 2.826.225 m2. The measure would be implemented by 2020 on an area of about 565,245 m2. The proposal is to choose residential buildings unsatisfactory heat protection and generally poor structural characteristics. Estimated savings of thermal energy is about 80 kWh / m2, and the investment costs around 40 KM / m2. For the successful implementation of these measures will need to create a subsidy model according to which part of the costs borne by the Brcko District Bosnia and Herzegovina, EU funds (IPA, IEE, NAMAs and others) and some of the citizens themselves.



Measure name	Installation of the solar system in about 5% of private dwellings Brcko District BiH total of 1,800 solar systems
Responsible for implementation	Department of Municipal Affairs
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	total 2.400.000 KM until 2020.year
Estimate savings (% or kWh, liters of fuel)	total 1.800 MWh heating energy
Estimation of emission reductions (tCO2)	433,8
The cost per emission reduction (KM / t CO2)	5.532
Source of funds for implementation	Financed by citizens, Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	The measure involves the installation of 300 solar collector systems for houses / flats per year by 2020, making a total installation of 1,800 solar collector systems (12.5 m2 per property). For the successful implementation of these measures will need to create a subsidy model according to which part of the costs borne by the Brcko District Bosnia and Herzegovina, EU funds (IPA, IEE, NAMAs and others) and some of the citizens themselves.



Measure name	Replacing household appliances energy-efficient, energy class A
Responsible for implementation	Subdivision for support to local communities and non- governmental organizations
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	It is not possible to estimate at the time of preparation of this Plan
Estimate savings (% or kWh, liters of fuel)	549,2 MWh electricity for appliances in households Brcko District BiH
Estimation of emission reductions (tCO2)	350,3
The cost per emission reduction (KM / t CO2)	It is not possible to estimate at the time of preparation of this Plan
Source of funds for implementation	Financed by citizens and commercial firms
A brief description / comment:	The households in the Brcko District BiH, most of the major devices in households, on average, changing new models every 10 years. The total number of households in the Brcko District BiH is 27,341, while the total electricity consumption in 2012 was 130,765,517 kWh. Assuming that the average household about 80% of electrical energy waste in the operation of various electrical equipment and about 20% of the lighting, the electrical equipment in 2012 was spent 26,153,103 kWh of electricity. Assuming that the observed six year period at least 60% of households change devices in households on average 35% more efficient overall electricity savings in 2020 will amount to 5,492,151 kWh. It is suggested that in Brcko District BiH promotes the use of energy saving devices in cooperation with trade companies importing equipment for household and that they are promoting.



Measure name	The introduction of energy saving light bulbs in all households Brcko District BiH
Responsible for implementation	Subdivision for support to local communities and non- governmental organizations JP "Komunalno Brčko" d.o.o.
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	no cost
Estimate savings (% or kWh, liters of fuel)	total 20,92 MWh electricity for lighting
Estimation of emission reductions (tCO2)	134,74
The cost per emission reduction (KM / t CO2)	no cost
Source of funds for implementation	Financed by citizens
A brief description / comment:	According to EU regulations on lighting products in private households (EC Regulation 244/2009) envisages that by 2016 to cease production of the classic incandescent bulbs and will replace all incandescent light bulbs saving Assuming that the average household Brcko District BiH about 20% of electricity consumed in lighting, in 2012 for this purpose consumed 26,153,310 kWh of electricity. The average saving bulb consumes up to 80% less electricity than the classic, which will in 27,341 households Brcko District BiH to 2020 a total of 20,922.48 kWh save.


9.2.5 Objects commercial and service activities

Measure name	Getting incentives to improve the thermal insulation of buildings, commercial and service activities in the area of Brcko District BiH
Responsible for implementation	Assembly of Brcko District BiH Department of Economic Development, Sport and Culture
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	nije moguće procjeniti u momentu izrade ovog Plana
Estimate savings (% or kWh, liters of fuel)	ukupno 17.207 MWh toplotne energije
Estimation of emission reductions (tCO2)	4.146,8
The cost per emission reduction (KM / t CO2)	It is not possible to estimate at the time of preparation of this Plan
Source of funds for implementation	Financed by firms, funs EU (IPA, IEE, NAMAs and other)
A brief description / comment:	Conditionality of obtaining incentives for existing buildings / businesses in the commercial and service sub-sector by improving the thermal insulation and the roof of the building in a manner that complies with existing regulations. According to foreign experience, the estimated savings of thermal energy amounted to 10% of the total heat consumption of this sub-sector in 2012 - 17 207 MWh. Before carrying out the measures necessary to carry out a detailed analysis to determine the conditions, possibilities and ways of implementation.



Measure name	Encouraging the use of renewable energy for heat production
Responsible for implementation	Department of Economic Development, Sport and Culture Public and private companies
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	It is not possible to estimate at the time of preparation of this Plan
Estimate savings (% or kWh, liters of fuel)	ukupno 4,007 MWh toplotne energije
Estimation of emission reductions (tCO2)	965,68
The cost per emission reduction (KM / t CO2)	It is not possible to estimate at the time of preparation of this Plan
Source of funds for implementation	Financed by firms, funs EU (IPA, IEE, NAMAs and other)
A brief description / comment:	Conditionality of obtaining incentives for existing buildings / businesses in the commercial and services sector using renewable energy sources for heat generation. According to past experience, the estimated savings of thermal energy amounted to 2% of the total heat consumption of this sub-sector in 2012 - 4,007 MWh. Before carrying out the measures necessary to conduct a detailed analysis to determine the conditions, possibilities and ways of implementation.



Measure name	Encourage the purchase of energy-efficient electrical equipment for commercial and utility sub-sector
Responsible for implementation	Department of Economic Development, Sport and Culture Public and private companies
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	It is not possible to estimate at the time of preparation of this Plan
Estimate savings (% or kWh, liters of fuel)	1.848 MWh električne energije
Estimation of emission reductions (tCO2)	1.179
The cost per emission reduction (KM / t CO2)	It is not possible to estimate at the time of preparation of this Plan
Source of funds for implementation	Financed by firms, funs EU (IPA, IEE, NAMAs and other)
A brief description / comment:	Encourage the purchase of energy-efficient electrical appliances for existing buildings from commercial and service sub-sectors. According to past experience, the estimated electricity savings amount to 7% of total electricity consumption of the sub-sectors in 2012 - 1,848 MWh. Before carrying out the measures necessary to conduct a detailed analysis to determine the conditions, possibilities and ways of implementation.



Measure name	Installing energy saving light bulbs in the buildings and premises of commercial and service sectors
Responsible for implementation	Department of Economic Development, Sport and Culture Public and private companies
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	regular costs
Estimate savings (% or kWh, liters of fuel)	1.584 MWh electrical energy for other purpose
Estimation of emission reductions (tCO2)	1.010,5
The cost per emission reduction (KM / t CO2)	no cost
Source of funds for implementation	Public and private companies
A brief description / comment:	According to EU regulations on lighting products in households (EC Regulation 244/2009) envisages that by 2016 to cease production of the classic incandescent bulbs and will replace all incandescent light bulbs saving. According to past experience, the estimated energy savings equivalent to 6% of total electricity consumption of the sub-sectors in 2012 - 1,584 MWh. Accordingly replacement of incandescent light bulbs energy saving bulbs will be required for the entire commercial and service sectors.



9.2.6 Measures to reduce CO₂ emissions from the sector of public lighting

Device evidence light holds and laws with your
energy-efficient and environmentally friendly
Department of Communal Affairs JP "Komunalno Brčko" d.o.o.
2015 2020.
250 KM per lamp or 2.058.750 KM
About 100 kWh per lamp or 823.5 MWh total
525,39
3.918,5
Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
Modernization includes replacement of mercury vapor amps high pressure of sodium or LEDs, which have electronic ballasts. Newly appointed lighting fixtures have the following characteristics: - They are very efficient (for the same level of brightness to use less consumption) - The possibility of regulation of the intensity of illumination - Considerably longer lifetime (reduced maintenance costs)



Measure name	Management intensity of public lighting
Responsible for implementation	Department of Communal Affairs JP "Komunalno Brčko"d.o.o.
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	49.410 KM plus the costs contained in the measure no 26
Estimate savings (% or kWh, liters of fuel)	1.811 MWh total spent electric energy
Estimation of emission reductions (tCO2)	1.155,4
The cost per emission reduction (KM / t CO2)	42,76
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	This measure application investment with already built- sodium light, while implementing measures 1. on automatically and allows the implementation of measures of the second to all newly attached lamps. The measure is implemented by reducing the intensity of the lighting late at night, when activity level decreases, so it is not necessary the previous level of brightness. In this way it achieves significant savings, as shown by numerous examples of implemented such measures in BiH cities.



9.2.7 Measures to reduce CO2 emissions from the transport sector

Measure name	Construction of the roundabout traffic instead of the existing priority intersections and some that are regulated by traffic lights, as well as building them at intersections of new roads and streets;
Responsible for implementation	JP "Putevi Brčko" d.o.o.
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	unit cost 4.000.000
Estimate savings (% or kWh, liters of fuel)	About 257.250 liter fuel or 8.900 GJ energy
Estimation of emission reductions (tCO2)	640 t annual
The cost per emission reduction (KM / t CO2)	6.250
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	The construction of the roundabout traffic instead of the existing priority intersections and some that are regulated by traffic lights, as well as building them at intersections of new roads and streets, then to increase the level of services the traffic at these junction points.



Measure name	Complete the construction of a bypass around Brcko. The current status of the Brcko District is very unsatisfactory from the standpoint of traffic flows in the direction East-West. The existing road leads right in the urban area of Brcko, where there is a complete mixture of different traffic flows: local, source-target with the point of Brcko and Bijeljina and transit according to the Tuzla / Orašje. For this reason, vehicles are forced to pass through the center, which leads to suffocation traffic and high emissions.
Responsible for implementation	Department of Public Works JP "Putevi Brčko" d.o.o.
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	It is not possible to estimate at the time of preparation of this Plan
Estimate savings (% or kWh, liters of fuel)	About 514.500 liter of fuel or 17800 GJ energy in total
Estimation of emission reductions (tCO2)	1.280
The cost per emission reduction (KM / t CO2) $$	It is not possible to estimate at the time of preparation of this Plan
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	Construction of the bypass solves the problem of the passage of vehicles through the city center and provides: - Reduced traffic congestion; - Part-time driving for road users; - Reduced operating costs of vehicles for road users; - Improved conditions of traffic safety; - Improved connection between the eastern and western parts of the city; - Reduced fuel consumption of road vehicles; - Improved living conditions of residents of Brcko; - Reduction of CO2 emissions



Measure name	The group of measures to encourage the use of bicycles as a means of transportation
Responsible for implementation	Department of Economic Development, Sport and Culture JP "Putevi Brčko" d.o.o.
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	2.500.000 do 2020.year
Estimate savings (% or kWh, liters of fuel)	about 617.500 liter fuel or 21360 GJ energy in total
Estimation of emission reductions (tCO2)	1.540 t per year
The cost per emission reduction (KM / t CO2)	1.623
Source of funds for implementation	Funds EU (IPA, IEE, NAMAs i drugi)
A brief description / comment:	The group of measures to encourage the use of bicycles as a means of transportation include the following activities: -Construction of bike paths in addition to all the newly planned roads and streets; -building disposal facility bike; To establish a network of free bike rental with IT security against theft; The implementation of aforementioned measures would be implemented through the continuous promotion of the use of bicycles as a means of transport, especially in realacijama of 5-10 km



Measure name	Measures to improve public transport
Responsible for implementation	Department of Public Works JP "Putevi Brčko" d.o.o. Concessionaires of public transport
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	It is not possible to estimate at the time of preparation of this Plan
Estimate savings (% or kWh, liters of fuel)	About 3.100.000 liter fuel or 106.800 GJ energy in total
Estimation of emission reductions (tCO2)	7.700 t per year
The cost per emission reduction (KM / t CO2)	It is not possible to estimate at the time of preparation of this Plan
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)

Measures for public passenger transport to cover all those measures which increase its use to the detriment of their own car and the better the transport and measures that favored public transport vehicles with lower CO2 emissions

Promoting the use of alternative fuels in public

- partial financing Bus tickets for certain categories of the

 conditioning Concessions for bus transport possession newer production with EURO 4 and EURO 5 engines.
 Education Bus drivers about fuel savings mode driving and

and those that run on alternative fuels.

switching off the engine when standing

transportation

population

A brief description / comment:



Measure name	Encouraging the use of biodiesel from waste cooking oil for the needs of public transport vehicles and public companies
Responsible for implementation	Department of Public Works Concessionaires of public transport JP "Komunalno Brčko" d.o.o JP "Putevi Brčko" Firm Voćar d.o.o.
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	60.000 do 2020.year
Estimate savings (% or kWh, liters of fuel)	30.000 l
Estimation of emission reductions (tCO2)	95,4
The cost per emission reduction (KM / t CO2)	628,9
Source of funds for implementation	Public-private partnerships, EU funds (IPA, IEE, NAMAs i drugi)
A brief description / comment:	According to the EPA (US Environmental Protection Agency) biodiesel reduces CO ₂ emissions by 76.4% in comparison with the traditional diesel fuel. The benefits of using biodiesel are multiple, because it prevents spillage of waste cooking oil into the sewage system which reduces the pollution of watercourses. The main role of the Brcko District BiH in this measure is to promote and propagate the use of biodiesel and the development of regulations that will govern the distribution and use.



Measure name	Measures to vehicles owned by Brcko District BiH
Responsible for implementation	Department for Professional and Administrative Affairs Subsection public procurement
Start / end of realization (years)	2015 2020.
Estimated costs (unit or total)	450.000 until 2020.year
Estimate savings (% or kWh, liters of fuel)	321 MJ
Estimation of emission reductions (tCO2)	22,7
The cost per emission reduction (KM / t CO2)	19.823
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)
A brief description / comment:	Planning of green public procurement in terms of procurement of vehicles with reduced CO ₂ emissions and all this must be accompanied by an appropriate decision of which will regulate the manner of such purchase. It is estimated that the replacement of existing vehicles that are the property of Brcko District BiH, new vehicles with low CO ₂ emissions by 2020 reduce CO ₂ emissions by 25% compared to the year 2012



Ordinal number of measures: 34						
Measure name	Promotional, informational and educational measures and activities for drivers					
Responsible for implementation	Subdivision for support to local community and non- governmental organizations Department Education Police Brcko District BiH Driving school, NGOs					
Start / end of realization (years)	2015 2020.					
Estimated costs (unit or total)	50.000 KM year. total 250.000 until 2020.godine					
Estimate savings (% or kWh, liters of fuel)	11.850 GJ per year					
Estimation of emission reductions (tCO2)	850 t per year					
The cost per emission reduction (KM / t CO2)	294					
Source of funds for implementation	Budget Brcko District BiH, funds EU (IPA, IEE, NAMAs and others)					
A brief description / comment:	 Promotional, informational and educational measures and activities include the following: Promotion and education of eco-driving; Promoting the use of alternative fuels; Promoting the use of bicycles; Campaign: one day without a car; Continuous continuation of the organization of the European Mobility Week; The organization of various discussions, workshops and roundtables, conducting surveys, research and preparation, blending and distribution of information material. 					



10. ASSESSMENT OF REDUCING CO2 EMISSIONS

The calculated emissions for the reference year 2012 Brcko District BiH from all three sectors amounted to 309,768.72 tonnes CO₂ (see Table 10.1), and the application of the measures outlined in the Action Plan the expected reduction of emissions is of 68,366.63 t of CO₂ expressed in percentages amounts to 22.07%. The analysis of reduction (Table 10.1) in certain sectors is recognition that the biggest quantitative reduction can be achieved in the building sector, which is expressed in t CO₂ is 54,557 t CO₂, and the lowest in the sector of public lighting 1680.79 t CO₂ However, the same table shows the largest percentage reduction of CO₂, compared to the reference year 2012, in the sector of public lighting 29,40%, and lowest in the transport sector 11.70%.

Area	Total in reference 2012.year t CO ₂	Reduction of the applying measures (t) CO ₂	Reduction in relation 2012.year %	Share in reduced emissions %
Buildings	200.398,57	54.557,74	27,22	79,8
Public lighting	5.715,99	1.680,79	29,40	2,46
Traffic	103.654,16	12.128,10	11,70	17,74
Solar energy	0			
Total	309.768,72	68.366,63	22,07	100%

Table 10.1 Comparison of total and reduced CO₂ emissions





The overall activities to reduce CO₂ emissions in 2020 of the measures other than reductions in the building sector, public lighting and traffic, can be applied measures of reforestation and the use of solar energy for electricity generation, which have not yet been taken into account. In consideration of shares in reduced CO₂ emissions in 2020, the largest share belongs to building more than 79.8% and a minimum of public lighting less than 2.46% (Table 10.1).



11. RENEWABLE ENERGY SOURCES

Renewable energy sources as a basis for environmental protection and sustainable development, an increasingly greater importance to the world and in our country. Heat production from fossil fuels leads to emissions of pollutants that adversely affect the environment, and the fact is that conventional sources are limited, so today talking about the so-called. green energy or energy obtained from renewable energy sources, such as geothermal energy, solar energy (solar energy), wind energy, biomass and so on.

11.1. SOLAR ENERGY

Brcko District BiH is located in the continental zone relatively good sunny and without much shading, in this connection it is necessary to encourage the use of solar energy energije. Solarna would be used for heating domestic hot water, to avoid heating with electricity, solar energy would used for space heating as an alternative source of hot and with the main source of the annual period when weather conditions permit, which would lead to savings of primary energy sources such as fossil fuels and electricity.

11.2. ASSESSMENT OF SOLAR RADIATION AND PRODUCTION PHOTOVOLTAIC SYSTEM 10 kWp LOCATION IN BRCKO DISTRICT BIH

Photovoltaic Geographical Information System

Photovoltaic Geographical Information System (PVGIS) provides a list of solar energy resources and the assessment of production of electricity from photovoltaic systems based on the geographical map of Europe, Africa and Southeast Asia. He is part of the "SOLAREC" (Solar Electricity Action) actions contributing to the implementation of renewable energy in the European Union as a sustainable and long-term energy sources. Across Europe there are hundreds of meteorological measuring stations where directly or indirectly measures the solar radiation. The types of data stored in PVGIS database for the European subcontinent contains three groups of layers 1 km x 1 km resolution:

- 1. geographic data: digital elevation models, administrative boundaries, cities
- 2. Second spatially continuous climate data:
 - Daily exposure of horizontal surfaces
 - The ratio of diffuse and global irradiation
 - The optimum angle of inclination of PV modules to maximize the use of energy
- 3. Regional averages for built-up areas:
 - Annual amount of radiation (horizontal, vertical and inclined optimally plots)

- Annual amount provided for the production of electricity (horizontal, vertical and inclined surfaces optimal)

- Optimal tilt angle PV modules for maximum utilization of energy throughout the year

The database for the Mediterranean Basin, Africa and Southwest Asia includes the first two raster layers as well as for the European subcontinent (mentioned above) resolution 2 km x 2 km.



11.3. Data on the intensity of solar radiation in the area of location of Brcko District BiH

Data on the intensity of solar radiation is required for the calculation of electricity production of photovoltaic systems. Latitude and longitude are specified the location of the object on which the photovoltaic system. In particular latitude is an important variable in the solar calculations. It also represents an important variable when calculating the solar radiation surfaces arranged at an angle (PV modules).

Brcko District BiH is located at 44 ° 52 21 'north latitude and 18 ° 48 38' east longitude.

Data on solar radiation in the area of the site for the construction were taken from the PVGIS's database.

(PVGIS Estimates of long-term monthly averages

Location: 44°5221" North, 18°4838" East, Elevation: 96 m a.s.l.,)

Solar radiation database used: PVGIS-CMSAF

Optimal inclination angle is: 34 degrees

Annual irradiation deficit due to shadowing (horizontal): 0.0 %

Tabela 11.1 Podaci o Sunčevom zračenju za lokaciju Brčko distrikt BiH

Month	H_h	Hopt	H(90)	Iopt	T _{24h}	N _{DD}
Jan	1120	1680	1660	61	0.7	495
Feb	1970	2790	2540	56	3.1	368
Mar	3350	4210	3260	45	7.4	291
Apr	4650	5150	3170	30	12.2	95
May	5680	5690	2830	17	17.2	22
Jun	6240	5960	2630	11	20.2	4
Jul	6340	6200	2840	15	22.1	0
Aug	5600	6030	3340	26	21.9	11
Sep	3850	4690	3360	40	17.2	59
Oct	2630	3750	3310	54	13.5	228
Nov	1460	2310	2310	62	7.4	403
Dec	987	1420	1380	60	1.9	537
Year	3670	4170	2720	34	12.1	2513

Where is:

 H_h : daily solar radiation on a horizontal surface (Wh/m2/dan)

Hopt: daily solar radiation at the optimum oblique surface (Wh/m2/dan)

H(90): Solar radiation on the surface 90° (Wh/m2)

lopt: Month optimal angle (°)

 T_{24h} : average monthly temperature (°C)







Figure 11.2. The optimum angle of inclination of the solar modules for location of Brcko Distric BiH









Figure 11.4. Cylindrical Solar diagram for location of Brcko District BiH





Figure 11.5. Annual irradiation on a horizontal surface for Bosnia and Herzegovina



11.4. Estimate of production electricity (for example taken a photovoltaic system 10 kWp)

With PVGIS's assessment will be made of electricity generation for fixed photovoltaic system. Data on the intensity of solar radiation is required for the calculation of electricity production of photovoltaic systems can be found in PVGIS's database. According PVGIS data optimum angle for area location Brcko District BiH ranges from 11 $^{\circ}$ to 62 $^{\circ}$.



It should be noted that the optimal angle changes during the year due to the apparent movement of the sun. For fixed installations to select the optimum angle for maximum annual energy or for maximum energy during the period in which we need greater electricity production.

The angle of inclination of PV modules (Slope) is the angle of the module against the horizontal. Azimut serves as an indicator of rotation of PV systems. In order to obtain the maximum of the PV system that is placed under a fixed angle it must be oriented to the south. For the northern hemisphere Azimuth is usually 0 $^{\circ}$.

Estimate for the location of Brcko District BiH, will be carried out for a fixed power system 10 kWp, orientation 0 $^{\circ}$ and the optimum angle of 34 $^{\circ}$.

Performance of Grid-connected PV

PVGIS estimates of solar electricity generation , Location: 44°5221" North, 18°4838" East, Elevation: 96 m a.s.l.,

Solar radiation database used: PVGIS-CMSAF Nominal power of the PV system: 10.0 kW (crystalline silicon) Estimated losses due to temperature and low irradiance: 9.5% (using local ambient temperature) Estimated loss due to angular reflectance effects: 2.9% Other losses (cables, inverter etc.): 14.0% Combined PV system losses: 24.4%

Fixed system: inclination=34°, orientation=0°					
Month	E _d	E _m	H _d	H _m	
Jan	14.00	433	1.68	52.2	
Feb	22.60	633	2.79	78.3	
Mar	32.90	1020	4.21	131	
Apr	39.00	1170	5.15	154	
May	42.00	1300	5.69	176	
Jun	43.30	1300	5.96	179	
Jul	44.80	1390	6.20	192	
Aug	43.70	1360	6.03	187	
Sep	35.00	1050	4.69	141	
Oct	28.80	892	3.75	116	
Nov	18.60	557	2.31	69.4	
Dec	11.80	365	1.42	44.2	
Yearly average	31.4	955	4.17	127	
Total for year	115	00	1520		

Where is:

Ed - Average daily electricity production from the given system (kWh)

Em- Average monthly electricity production from the given system (kWh)

Hd- Average daily sum of global irradiation per square meter received by the modules of a given system (kWh / m^2)

Hm- The average sum of global irradiation per square meter received by the modules of a given



system (kWh/m²)

Estimated annual production to PVGIS, the location of Brcko District BiH and the system capacity of 10 kWp is **11 500 kWh**

The justification for the installation of solar systems shows that the above presented the solar system could bring annual savings of around 10.5 MWh per year and an annual reduction of 6.7 t CO2.



12. PROMOTIONAL ACTIVITIES ON RAISING AWARENESS OF CITIZENS

In accordance with the recommendations of the European Commission, the sectors of energy consumption of the Brcko District BiH are divided into the following sectors:

- 1. Buildings;
- 2. Traffic;
- 3. Street lighting;

In all these sectors will be carried out a series of actions and measures in order to achieve the set goals.

In order to achieve the set goals of reducing CO₂ emissions by at least 20% by the end of 2020. Among other things, it is necessary to increase the level of awareness of the importance of increasing the energy efficiency of their own community and the importance of these activities for the development of local communities in sustainable development principles in which the role of local communities is crucial.

For all these locals should make better informed about the importance of using renewable energy sources and increasing energy efficiency of the local community, through the following activities:

- Setting the info counter with to information about the advantages of applying the principles of energy efficiency, which would still be available to citizens and where citizens can obtain all the necessary information on energy efficiency;
- The formation of the Service or the Office of Energy Efficiency in the Administrative Service of the Brcko District BiH whose function, among other things, and was advisory. The Service would be employed one person with adequate references, which is one of the European Commission, which would also be responsible for monitoring the implementation of the Action Plan;
- The establishment of a grant to co-finance projects in the areas of energy efficiency, which would help non-governmental organizations, schools, small and medium enterprises that make their projects on energy efficiency contributed to meet targets in the Action Plan;
- By applying the EU funds technical support in the preparation, nomination and realization of projects;
- Brcko District BiH to monitor all published public calls on energy efficiency and distribuisao all the necessary information and providing adequate training to interested parties to participate in the call;
- Organizing Energy Days in the Brcko District BiH;
- One of the activities of the Action Plan is the organization of Energy Days annually in Brcko District BiH. At the Energy Days in addition to the presentation of all committed on the territory of the Brcko District BiH in the field of energy efficiency were invited eminent experts in this field, which would hold a lecture on the topic of energy efficiency and all information would be available to the general public through the media, printed materials and brochures;
- Organizing round tables on the topic of energy efficiency in schools, local communities, associations and citizens of Brcko District BiH where the investors, and interested individuals to a better appreciation of the advantages of rational energy use and the benefits of using alternative energy sources;
- Organization of advertising campaigns and media campaigns aimed at increasing citizens' awareness to energy efficiency;
- Promoting energy saving light bulbs per household, as well as LEDs for public lighting;



- Creation and Distribution of promotional materials (leaflets, brochures, etc.) With the theme of increasing energy efficiency, which should always be available at the information desk in the Brcko District BiH, and also be distributed at public facilities managed by the Brcko District BiH, in libraries, theaters, sports centers, etc., which are due to the large number of visitors, the ideal location to set up promotional materials with information on renewable energy sources;
- By organizing the campaign "One Day without cars" in cooperation with the NGO sector. This campaign is very important to raise awareness among drivers and so far proved to be successful;
- Organizing training in the field of energy efficiency improvements intended various sectors with the aim of presenting different target groups with the benefits of rational use of energy and reduction of carbon dioxide emissions;
- Organizing lectures, meetings and discussions about energy efficiency in primary and secondary schools, where the teaching staff and students to a better appreciation of the hazards of carbon dioxide emissions, a way of reducing carbon dioxide emissions, use of renewable energy as well as the benefits of bicycle transport, especially in short distances;
- Continuous informing consumers about ways of energy savings and current energy issues on the back of utility bills and electricity with the consent of the relevant enterprises;
- The promotion of photovoltaic panels and solar collectors.

Brcko District BiH accession to the Covenant of Mayors initiative became part of the European family of energy-conscious cities. By meeting these objectives through the above promotional, educational and information measures and activities of the Brcko District Bosnia and Herzegovina could by 2020. achieve **total savings of thermal energy of 30.02%** which would reduce carbon dioxide emissions and environmental pollution which would create better living conditions, strengthening the industry and therefore the possibility of creating new jobs, which would all resident satisfaction and environmentally more aware.

In order to achieve the objectives of the implementation of the SEAP is necessary to support the following:

- Held a campaign in which they should be included by all citizens, businesses, public enterprises, administrative services and others. The campaign would aim to present SEAP, inform citizens and other stakeholders about the current situation in the field of energy consumption in the area of Brcko District BiH, behavior change to strengthen awareness of the need and benefits of energy savings,

- Production and dissemination of educational materials (flyers, brochures, posters, etc.),

- Organizing educational workshops on ways to reduce power consumption and heat generation,

- Maintenance of information campaigns to raise public awareness about energy efficiency in buildings,

- Continuous informing consumers about ways of energy savings,

- Production and dissemination of educational and promotional materials on energy efficiency and renewable energy,

- The organization of meetings to encourage rational use of energy and reduce CO2 emissions,

- Promotion of alternative fuels,

- Educational campaign on the design, construction and use of buildings for energy efficiency,

- The establishment of an info office for energy efficiency.



For the implementation of the above measures must be used and the means of communicating with the public, such as TV, radio, print, Internet and others.

13. POTENTIAL SOURCES OF FUNDS FOR ENERGY EFFICIENCY PROJECTS

13.1. The budget of Brcko District BiH

Budget of Brcko District BiH is one of the sources for financing energy efficiency projects in the area of Brcko District BiH. The budget is a document which defines the plan of financial activities of budget users, which includes projected revenues and proceeds and planned expenditures and expenditures of Brcko District BiH for the period of one fiscal year.

The budget consists of revenues and expenditures of the current fiscal year. The budget revenues falling tax revenues (revenues from indirect taxes, income taxes, real estate taxes, property taxes), non-tax revenues and other revenues. A significant part of revenue from the budget allocated for capital projects and construction projects and renovation of municipal infrastructure.). Planned activities for future periods indicate that budget revenues will increase accordingly positive trends mitigate the effects of the global economic crisis.

In addition to the above sources of funds for financing of energy efficiency projects, the Brcko District Bosnia and Herzegovina are able to use the loan funds from available sources on the capital market or through funding programs of existing financial institutions in Bosnia and Herzegovina, amounting to a maximum of 20% of the budget of the current fiscal year.

13.2. ESCO Model

ESCOs are companies that provide services and energy they represent a special form of market intermediation. So, these companies do not perform energy supply, but only the provision of energy. Energy Service Company, or abbreviated ESCO provides a combination of information, training, project identification, financial and technical analysis, financing, services contracting and installation, monitoring arrangements and joint savings ie. Energy-saving measures. All this is achieved by using the ESCO contractual engagement between the ESCO and the client, so-called. contract work.

Energy contract activity represents the financing of projects at the expense of saving energy and ESCOs guarantee that savings are realized in a specific time frame. These activities are cost-favorable, and the ESCOs and users have an interest in cooperation. Net profit of the saved energy is divided between users and ESCOs under the provisions of the contract. There are two essential elements, which ESCOs different than any normal company advisor for energy, namely: (i) the provision of integrated solutions and (ii) linking payments with the effect of the realized project.

13.3. The Fund for Environmental Protection and Energy Efficiency Republic of Serbian

The Fund for Environmental Protection and Energy Efficiency Republic of Serbian, was established as a legal entity with public authorities, whose rights, obligations and responsibilities determined by the Fund and financing of environmental protection of the Republic of Serbian ("Official Gazette of the Republic of Serbian", number 117/11), the Fund and other regulations.

The founder of the Fund's Serbian Republic, the founding rights and duties on behalf of the Republic by the Government of the Republic of Serbian and supervision of the Fund is done by the ministry responsible for environmental protection.

Activities of the Fund include the activities related to the collection of funds, as well as financing the preparation, implementation and development of programs, projects and similar activities in the field of conservation, sustainable use, protection and improvement of the environment, and on energy efficiency and renewable energy determined by the Fund, in particular:



- Professional and other activities in connection with the acquisition, management and use of resources of the Fund,
- Initiating, funding, forwarding and control the execution of projects within the scope of the Fund, brokerage in connection with the financing of environmental protection, energy efficiency and renewable energy, from the funds of international organizations, financial institutions and bodies, as well as foreign legal entities and individuals,
- Continuous monitoring of programs, projects and other activities through the measurable effects of environmental protection, the amount of saved energy and money, and reduce emissions of pollutants,
- Maintaining separate databases on programs, projects and similar activities in the field of environmental protection, energy efficiency and renewable energy, as well as the necessary and available financial resources for their implementation,
- Encouraging, establishing and achieving cooperation with international and domestic financial institutions and other legal entities and individuals to finance environmental protection, energy efficiency, and renewable energy sources in accordance with the interests of environmental protection of the Republic, strategic documents, action and rehabilitation plans and other plans and programs, as well as international agreements signed for the purposes set forth in this Law,
- Perform other tasks in the promotion and financing of environmental protection, energy efficiency and renewable energy sources, as defined by regulations governing this area.

The Fund's financial resources are used to finance environmental protection, energy efficiency and renewable energy sources, in particular for:

- The protection, preservation and improvement of the quality of air, water, land and forests, as well as mitigating climate change and protecting the ozone layer,
- Remediation of landfills, encouraging the reduction of waste generation, reuse and recycling of waste,
- Encouraging the introduction of technological processes that reduce or eliminate negative environmental impacts,
- The protection and conservation of biodiversity and geodiversity,
- Encourage sustainable use of protected areas,
- Encouraging the sustainable development of rural areas,
- Encouraging energy efficiency improvements,
- Encouraging the implementation of energy efficiency and renewable energy in the public sector,
- Promoting the use and research of renewable energy sources and their use in order to increase energy efficiency,
- Encouraging cleaner transport,
- Promotion of educational, research, innovating and development studies, programs and projects in the field of environmental protection,
- Financing of programs of environmental education and raising public awareness on issues of environmental protection and sustainable development.

13.4. Environmental Protection Fund of the Federation of Bosnia and Herzegovina

The Federation of Bosnia and Herzegovina was established in function Environmental Protection Fund of the Federation of Bosnia and Herzegovina. The Federation of Bosnia and Herzegovina there is a special fund for projects related to energy efficiency. In the framework of the existing Environmental Protection Fund of the Federation of Bosnia and Herzegovina, only partly treated area of energy efficiency.

Activities of the Environmental Protection Fund of the Federation of Bosnia and Herzegovina makes the collection and distribution of funds for environmental protection in the territory of the Federation of Bosnia and Herzegovina.



Funds from this fund is used for:

- Support in achieving the tasks arising from the obligations and responsibilities to the international community in the field of environmental protection;
- for combating environmental damage in the event that you can not apply the principle of responsibility for the performance of the damage to a certain person (polluter pays);
- for the costs of preventing or eliminating the environmental damage which requires immediate intervention;
- to support measures to protect the environment, especially in the development and financing of information, education and dissemination of information;
- to promote the development of the economic structure that is favorable to the environment;
- for the conservation of protected natural areas;
- for improvement of environmental awareness and environmental research;
- for the conservation, sustainable use, protection and improvement of the state of the environment.

In this regard, the Fund's activity includes tasks related to:

- pribavljanjem resources, encouraging and financing the preparation, implementation and development of programs, projects and similar activities in the field of conservation, sustainable use, protection and improvement of the state of the environment and renewable energy, in particular professional and other activities in connection with the acquisition, management and use the Fund's assets;
- Mediation in connection with the financing of environmental protection by foreign countries, international financial institutions and bodies, and domestic and foreign legal entities and individuals;
- -Providing professional services in connection with the financing of environmental protection; keeping a database of programs, projects and similar activities in the field of environmental protection, and the necessary and available financial resources for their implementation;
- Promoting, establishing and achieving cooperation with international and domestic financial institutions and other legal entities and individuals to finance environmental protection in accordance with: the Federal Strategy for environmental protection, environmental protection plans adopted on the basis of the Strategy, international agreements whose member Bosnia and Herzegovina, and other programs and documents in the field of environmental protection; Performing other duties related to the promotion and funding for environmental protection, by the Statute of the Fund.

Sredstva za finansiranje, u skladu Zakonom o Fondu za zaštitu okoline FBiH, osiguravaju se iz naknada zagađivača okoline; naknada korisnika okoline; posebne naknade za okolinu koja se plaća pri svakoj registraciji motornih vozila. Prihodi za finansiranje djelatnosti se ostvaruju i iz sredstava ostvarenih s osnova međunarodne bilateralne i multilateralne saradnje, te saradnje u zemlji na zajedničkim programima, projektima i sličnim aktivnostima u području zaštite okoline.

Funds from this fund is used to finance environmental protection, and for the following:

-Protection, conservation and improvement of the quality of air, soil, water and sea, and the mitigation of climate change and protecting the ozone layer;

-Remediation, encouraging avoidance and reduction of waste;

-Make use valuable properties, and waste treatment;

-Protect and conservation of biological and landscape diversity;

-Implement energy programs;

-Implement clearance program;

-A promotion and construction of infrastructure for the protection of the environment;

-Improving, monitoring and assessing the state of the environment and the introduction of environmental management systems;



-Promoting sustainable use of natural resources;

-Promoting sustainable economic activities, ie sustainable economic development;

-Promoting research, development studies, programs, projects and other activities, including demonstration activities.

13.5. Public-Private Partnership

Public-private partnership is a joint, cooperative action of the public sector with the private sector in the production of public goods or the provision of public services.

The aim of public-private partnership is more economical, more efficient and successful production of public goods or services in relation to the traditional way of providing public services.

13.6. Available credit lines for financing energy efficiency projects

Available credit lines for financing energy efficiency projects:

1. A credit line for energy efficiency - EBRD financing sustainable energy program for the Western Balkans is realized through Raiffeisen Bank dd Sarajevo and UniCredit Bank dd Sarajevo and is planning to finance the following projects:

- projects for energy efficiency in industry
- Projects for energy efficiency of buildings
- Projects for renewable energy
- Projects of small hydropower plants (up to 2 MW) or less wind farm.

Second KfW - credit line for energy efficiency-is realized through Raiffeisen Bank dd Sarajevo

The purpose of this credit line is financing energy efficiency projects and projects that generate energy savings and promote efficient use of energy in Bosnia and Herzegovina in a sustainable and efficient manner. The users of credit lines can be public companies and institutions, small and medium enterprises, private individuals and households.

The main conditions of the credit line are: the loan amount to the end user ranges from 3,000 KM to 195,000 KM, with a grace period up to 6 months, repayment period is up to 60 months including grace period.

From this credit line can be financed electrical appliances and air conditioners with the EU energy label, thermal insulation of buildings - walls, ceilings, doors and windows, replacement of direct electrical heaters central heating systems, replacement of old boilers with new condensing boilers (natural gas), installation thermostatic radiator valves, replacement of old pumps for central heating systems with new electronic-operated pumps, replacement of old heating systems by connecting to district heating, the replacement of old boilers with new boilers (on wooden pallets), lighting systems, solar heating systems for domestic hot water, as and all the other projects that provide energy savings of at least 20%.

13.7. Instrument for Pre-Accession Assistance - IPA II valid to 2013 to 2020.

Instrument for Pre-Accession Assistance II introduces the policy areas within which they will be implemented various interventions. Financial assistance can be made available in all areas of policy, regardless of whether the country has the status of a candidate or potential candidate.

Policy areas under Regulation are divided as follows:

- a) the transition process towards membership and capacity building
- b) Regional Development
- c) Employment, Social Policy and Development of Human Resources
- d) Agriculture and Rural Development
- e) regional and territorial cooperation

The IPA II, it was especially emphasized that progress in achieving certain objectives assessed through indicators and, depending on the progress achieved, will be carried out reallocation of financial support from the program as well as between Member States.



The specificity of the CBC is that the proponents of the project must be non-profit legal persons and must belong to the following categories of legal entities: associations, institutions, chambers of commerce, regional and local authorities, regional development agencies, centers for research and development, agricultural cooperatives etc.

Applicants must co-finance the project's own funds (15% should be provided from its own budget), and the have at least one cross-border partner. The cross-border nature of the project must be clearly visible and the must be carried out and have a positive impact on both sides of the border.

EU Delegation in BiH has defined 12 sectors / policy areas Justice

- Home affairs law enforcement
- The reform of the public administration (including public financial management)
- Transport
- Environment
- Energy
- Development of the private sector (competitiveness, SMEs, innovation)
- Development of the private sector (trade, intellectual property rights and infrastructure quality)
- Education and Employment
- Social Development and Human Rights
- Agriculture and rural development
- Public administration reform

13.8. Transnational Cooperation Programme for South Eastern Europe Adriatic-Ionian (SEE) 2014-2020

Transnational Cooperation Programme for South Eastern Europe and the Mediterranean is a program of transnational cooperation, and funded by the European Regional Development Fund, which for the programming period 2014th-2020th year predicted a budget of 206 million Euros. The participation of countries which are not members of the EU will be financed from IPA preaccession program and the European neighborhood program. The program area includes 16 European countries, namely Croatia, Romania, Bulgaria, Slovenia, Hungary, Greece, Albania, Montenegro, Serbia, Bosnia and Herzegovina, Macedonia, Austria, Slovakia, Italy (region of Lombardia, Veneto, Puglia, Friuli-Venezia -Giulia, Trento, Bolzano, Emilia Romagna, Umbria, Marche, Abruzzo and Molise), Ukraine and Moldova.

The priorities of the program are as follows:

- 1) Facilitation of innovation and entrepreneurship
- 2) Protecting and improving the environment
- 3) Improving the accessibility and
- 4) Development of transnational synergies for sustainable growth areas.

The program is intended for non-profit organizations and institutions wishing to work on crossborder project with at least one cross-border partner. The project partnership must include partners from at least three different countries, one of which must be an EU Member State. Also, partners involved in co-financing the project with a 15% share, which is equally distributed among the partners. Participation of non-EU countries in the program is an important element of the Programme. Non-member countries are encouraged to fully participate in the program.

13.9. USAID Fund to finance pilot projects in the field of energy efficiency

USAID project called 3E aims to implement 10 projects in BiH. In the municipalities where they are to projects will be held seminars and training on energy efficiency.



Energy efficiency measures that will implement 3E relating to the following:

- Improvement of the building envelope,
- Improving the efficiency of the heating / cooling distribution system and water heater for households,
- Improving the lighting,
- The use of renewable energy sources,
- The introduction of energy management systems "Smart Building concept." Proposals for pilot project may submit private and public sector.

13.10. Open Regional Fund for South East Europe - GIZ ORF

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH provides support to the region by the Federal Ministry for Economic Cooperation and Development (BMZ), but close to twenty years with its bilateral projects.

It is an instrument to support regional cooperation, which is implemented by GIZ on behalf of the Government of the Federal Republic of Germany. ORF has been active in Bosnia and Herzegovina, Albania, Croatia, Macedonia, Serbia, Montenegro and Kosovo, and is open to projects in the field of foreign trade, modernization of municipal affairs, legal reform and energy efficiency and renewable energy.

The project aims to improve the use of the potential of energy efficiency and renewable energy at the local level throughout the country. The project works primarily on two levels: an important focus of the municipalities have a crucial role especially in the implementation of measures to improve energy efficiency and decentralized use of renewable energy.

At the same time the project supports the competent ministry at the state level (Ministry of Foreign Trade and Economic Relations) on harmonization of laws and regulations including the competent institutions in the entities. It is further concerned about the strengthening of the capacities and engaging other important stakeholders, for example. Cantons, private commercial institutions, universities and NGOs.

In the initial stage is really all about achieving concrete results at the local level that will show that the improvement of energy efficiency and use of renewable energy sources feasible and that makes sense. On the other hand, will be based on cooperation on the concrete issues of energy efficiency and renewable energy sources carefully to build trust among stakeholders, in order to at a later stage facilitate harmonization at the national political level.

The goal of the Open Regional Fund for Energy Efficiency and Renewable Energy of South East Europe is funding for safe energy supply of South Eastern Europe through more efficient energy use and increasing the use of renewable energy sources. Criteria for accessing the Open Regional Fund for Energy Efficiency and Renewable Energy Sources for South Eastern Europe is that the project partners from at least three countries. Partners must participate and equal amounts in the project. Projects usually last two to three years. The Fund is participating financially in the project in the amount of 100,000 to 400,000 euros or providing services (development of studies, konncepata, development targets, development of strategies).

13.11. The program for environment and climate activities (LIFE) 2014-2020 years.

This new "environmental" program covers three main areas:

- Environment and resources and the efficiency of utilization of resources
- Nature and biodiversity conservation
- Natural resource management and information

The part that relates to the "climate action" covers climate change, adaptation to climate change and the management and disclosure.



The program will include new projects covering wide areas and in a wider territory. These projects are aimed at the implementation of environmental and climate policy and strive to integrate this policy with policies in other areas.

The project is only designed to be more detailed information about the project application will soon be facing.

13.12. ESCO model (ENERGY SERVICES COMPANY)

ESCO model is a commercial business (energy services) that develops advanced and complex energy solutions through the creation and implementation of energy saving, energy infrastructure, supply or management. Companies in this model spend analysis, create a service or product, and install and maintain the system. Cost savings are used as return on investment, and after repayment of the investment, the ESCO company out of the project and all the benefits to the client which have been specially adapted projects. In this way, customers are able to modernize equipment without investment risk because the risk of savings being achieved can download ESCO company. Period of return on investment in such projects is usually 5-20 years.

13.13. Revolving Fund

The Revolving fund is a financial mechanism specializing in the financing of clearly defined types of projects established multilateral agreement between the national / international institutions and financial institutions. The reason for the establishment of a revolving fund jenesklad between market supply and demand for financing of energy efficiency projects. Despite the fact that most of the previous experience of using reveloving fund financial mechanism limited to the funds at the national level, this mechanism can be successfully primijenitii to finance projects at the local level. There are two different models of funding.

The first model involves an agreement between the state and commercial banks on the establishment of a revolving fund, with the funds collected from the state budget or by earmarked taxes. End users can be public companies and institutions of local self-government, small and medium-sized enterprises, and ESCO companies.

The second model of the first differs primarily way of financing and the reduced role of the state. Instead of interest-free funds, commercial banks are to use the guarantee, which is usually issued by international institutions such as GEFR. On the basis of guarantees for certain interest rate paid by banks placing commercial loans at interest rates lower than market.

13.14. European Local Energy Assistance (ELENA)

ELENA is a provider of technical assistance launched in cooperation between the European Commission and the European Investment Bank at the end of 2009. The main source of funding ELENA comes from the Intelligent Energy Europe (IEE). Technical assistance will be provided cities and regions in the development of energy efficiency and attract additional investment, and covers all kinds of technical support required for the preparation, implementation and financing of the investment program. The European Commission predicted the funds in the amount of € 15 million intended for the users of the programs that are in line with the overall EU energy objectives. A key criterion in the selection of projects will be their effects on the reduction of CO2 emissions, and eligible projects include the construction of energy-efficient heating and cooling systems, investment in cleaner public transport, sustainable construction and more.

13.15. Program URBACT III 2014-2020 god.

The European Union, which statements since 2002 and is focused on the development of innovative, sustainable and inclusive cities. The program follows the thematic objectives ESI funds. Participants all EU Member States + Norway and Switzerland

It is financed from:

- Funds from the European Regional Development Fund



- The contribution of each country included in the program (the amount is defined in proportion to the share of the population in the total population of the EU)
- The contribution of LGUs that participate in the program

Project partners are found by networking on websites URBACT program www.urbact.eu

Projects are evaluated by a panel of external experts to assess the quality of the already defined criteria and rules. Rating scale is from 0 to 100, with the projects that have less than 70 points are not funded.

Of the total 15 projects selected in the final round of the competition within the URBACT II even 6 was related to the implementation of urban planning and the efficiency of public administration.

13.16. Project NAMAs

In 2012, the Doha negotiations were held on climate change, from which originated the project NAMAs (Nationally Appropriate Mitigation Actions) and primarily funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the construction (German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)) and the Department of Energy and Climate Change of Great Britain (Department of Energy and Climate Change (DECC)). The project supports the activities of the reduction of CO2 emissions and is oriented towards developing countries with a budget of 70 million euros.



14. MONITORING AND CONTROL OF THE ACTION PLAN

When the Mayor of Brcko District BiH signing (Eng. Covenant of Mayors), monitoring, control and reporting on the results of the Action Plan Sustainable Energy Brcko District BiH, should be a continuous process which will include the Assembly of Brcko District BiH, Brcko District BiH Government, mayor, public administration, public companies, in particular formed body for electricity, interest groups, NGOs, citizens and other interested parties. In the case of Brcko District BiH to sign and accede to the Covenant of Mayors will have an obligation to every two years after the adoption of SEAP, prepare and submit to the European Commission, report on the results of the Action Plan.

The report should include a detailed description of the measures implemented, the activities and the results achieved, with control inventory of CO₂ emissions for the reporting period. The action plan specified reference inventory emilie CO₂ for the base year 2012, a comparison of the reference and control inventory of CO₂ emissions will show a real reduction emilie CO₂, and thus the level of success of the implementation of the Action Plan.

Process monitoring and control of implementation of the Action Plan is now based on the recommendations of the European Commission, without the official manual for this area. Joint Research Centre of the European Commission is preparing an official manual of the field and after the enactment of this Act, the methodology for monitoring and control of implementation of the Action Plan will be adjusted to the specified reporting procedures.

The European Commission recommended method of monitoring, control and reporting to the preparation of an inventory control CO₂ every other year. If making inventory control CO₂ is not feasible in these time intervals, then the recommendation is to alternate every two years makes: Report on no inventory CO₂ and Implementation report with the inventory of CO₂

This will be achieved through continuous reporting and analysis of the measures implemented every two years since the adoption of the SEAP. Report on without CO₂ inventory will provide information on the measures carried out, their impact on energy consumption and CO₂ emissions, overall activities, the achieved energy savings, as well as analysis implementacije SEAP, including corrective and preventative measures when necessary. Implementacijoni report will in addition to information provided in the report on the state contain information about the inventory of CO₂ emissions.

Each of these reports will conclude the achieved level of implementation of the Action Plan, and if the level of implementation of measures unsatisfactory, the Report will include corrective action plan.

Each report on the results of the SEAP to the European Commission will be preceded and regular annual report to the Assembly of Brcko District BiH on the implementation of the Action Plan Sustainable Energy.

The report shall contain the following elements:

- - The level of coverage of facilities program of energy efficiency,
- - Number of projects in the field of electricity,
- - The degree of implementation of projects,
- - The achieved level of savings funds,
- - The manner of presentation of results in the field of energy efficiency,
- - Changes in the EE team,
- - Due to the European Commission.

One of the most important elements in the implementation of the corrective action plan is the public attitude towards the activities undertaken. Citizens will regularly through press conferences, round tables, information desk, the official website of the Brcko District BiH to be informed of all measures taken in improving energy efficiency. Through regular surveys will be collect data on the opinions of citizens on the quality of realized projects and seek suggestions for improvement.



In order to reach the projected level entered in the Action Plan is necessary to establish the concept of energy management system, which includes continuous improvement of energy efficiency and sustainable resource management.

This includes:

- Development Of capacity (staff training)
- Define the organizational structure (to establish the organizational chart which clearly specified responsibilities, objectives, analytical procedures, standards of knowledge, the concept of reporting, the concept of intervention and correction)
- Provođenje (Defining the information structure, data analysis, reporting, corrective action).

Figure 14.1. The levels of energy management



If this system is neatly expected outcome would be greater energy efficiency in the whole territory of Brcko District BiH.

What is meant by systemic energy management?

WHERE wasting energy?
HOW wasting energy?
WHAT energy we consume?
HOW MUCH energy and how much that cost?
WHO is in charge of energy management?
HOW TO manage energy (weekly and monthly monitoring, analysis and interpretation)?
PEOPLE
PROCEDURES AND KNOWLEDGE
EQUIPMENT



Figure 14.2. The steps that have been proposed at establishing a system of controlling the implementation of the Action Plan



The objectives of the system power management:

- Reducing costs for energy and water;
- The reduction of harmful effects on the environment as a result of energy consumption;
- Establishing a system of management of real estate owned by the Brcko District BiH through the Information System;
- Establishment of EE team that is knowledgeable and competent to plan and manage energy consumption;
- Establishment of EE info center a center for information and education of citizens on the application of energy efficient technologies in households.

In order to manage the energy system in the Brcko District BiH would be good to establish adequate information systems with the appropriate application-software in the which will be all the necessary information about real estate in its property with the relevant energy indicators.



15. CONCLUSIONS AND RECOMMENDATIONS

By developing this Action Plan, the Brcko District BiH is prepared to sign the Covenant of Mayors and after its adoption by the Assembly will be able, if it wants to join the family of energy osvješćenih cities in Europe who seek energy to sustainable development.

The main objective of the Action Plan is to identify concrete measures for sectors of direct energy consumption District that will be implemented by 2020, result in a reduction of CO₂ emissions by 22.07% compared to the reference year 2012. The methodology of this Action Plan is based on the requirements of the client and the guidelines of the European Commission.

Sectors of final energy consumption of Brcko District BiH, in accordance with the recommendations of the European Commission are: buildings, traffic and street lights, which were conducted detailed energy analysis and drafted the corresponding reference inventory emissions.

For the purpose of detailed energy analysis, the building sector is shared by the following three subsector:

- Buildings and premises of Brcko District BiH,
- Buildings and facilities intended for individual housing and buildings and objects intended for collective housing,
- Buildings and premises of commercial and service sectors.

The transport sector comprises three sub-sectors:

- - Vehicles owned by Brcko District BiH,
- - Public transport in the area of Brcko District BiH,
- Personal and commercial vehicles.

Total energy consumption building sector, traffic and public lighting in the Brcko District BiH in 2012 was approximately 1,048,248.35 MWh of which 606,334.42 (57.84%) is used in building construction, and 432,954.69 MWh (41, 30%) in transport and public lighting 8,959.24 MWh (0.86%) (Table 15.1).

The total CO2 emissions for the Brcko District BiH in 2012 was approximately 309,768.72 tonnes CO2.

The largest source of CO2 emissions is the building sector emissions of 52,438.78 tonnes CO2 (79.15%), followed by the transport sector emissions from 103654.16 t CO2 (18.32%), while emissions from street lighting is relatively low 5715.99 t CO2 (2.53%) (Table 15.2).

Area	Total energy consumption 2012.year MWh	Planned energy consumption MWh	Energy saving MWh	Percentage reduction
Buildings	606.334,42	342.349,92	263.984,5	43,53%
Public lighting	432.954,69	384.808,67	48.146,02	11,12%
Traffic	8.959,24	6.324,74	2.634,5	29,40%
TOTAL	1.048.248,35	733.483,33	314.765,02	30,02%

Table 15.1 Comparison of the energy consumption



Figure 15.1. Comparison of energy consumption in 2012 and energy consumption after the applied measures



Table 15.2 Comparison of CO₂ emissions from 2012 to. and the planned reduction in CO₂ emissions after the implementation of measures

Area	Emission of CO2 in 2012.year. t/a	Emission of CO2 after application of the measures t/a	Reducing emissions CO2 t/a	Percentage reduction
Buildings	200.398,57	145.840,83	54.124,74	27,43%
Public lighting	5.715,99	4.035,20	1.680,79	29,40%
Traffic	103.654,16	91.526,06	12.128,10	11,70%
TOTAL	310.335,64	241.402,09	68.933,55	22,21%

Figure 15.2. Comparison of CO2 emissions in 2012, and CO2 emissions after the applied measures




In order to achieve successful, sustainable energy development Brcko District BiH analyzed and solar potential, which is very interesting resource for future development and whose level of current utilization is almost negligible. In this sector, especially due to the existing incentives the state is expected to the largest increase in investment.

Based on the conducted energy audits and analyzes and concrete situation in Brcko District BiH were identified measures to improve energy efficiency, which are divided into 3 main groups:

- Measures to reduce CO₂ emissions from the building sector;
- Measures to reduce CO₂ emissions from the sector sobraćaj;
- Measures to reduce CO₂ emissions from the sector of public lighting.

In accordance with the results of the energy analysis, most of the measures to reduce CO₂ emissions refers to the building sector.

Taking into account that the set goal of 20% savings in CO₂ emissions, the realization of this Plan set goal can be reached.

The SEAP table data in one place is a recap of all the action, as follows:

- planned time schedule of implementation (beginning and end)
- The proposed activities are carriers,
- where it was possible within the framework of this document are estimated and necessary expenses (unit or total tailor)
- Energy savings (% or kWh, liters of fuel), the potential reduction of CO2 emissions and associated costs per unit (KM / t CO2).

Appendix:

-SEAP table

16. PUBLIC DISCUSSION

A public hearing relating to the Draft Action Plan Sustainable Energy Brcko District BiH, was held as planned on 24.06.2014. in the Youth Center of Brcko District BiH, beginning at 12.00 am.

Participation in the discussion in addition to authorized persons to monitor the execution of services in front of the Department of Regional Planning and Property Affairs of Brcko District BiH Government and representatives Interquality d.o.o.. Sarajevo, by the representatives of local communities, non-governmental organizations and private persons living in the area of Brcko District BiH.

They are present after the completion of the presentation actively participated in the discussion on individual issues. Representatives Interquality d.o.o. Sarajevo gave answers and further explanations on the questions related to the draft document. Concrete proposals and amendments to the draft document of the Action Plan Sustainable Energy Brcko District BiH was not.

Writing to the Association "Centre for Sustainable Development" from Brcko, submitted comments on the draft Action Plan Sustainable Energy Brcko District BiH. Representatives Interquality d.o.o. Sarajevo was given by writing the answers and additional clarification regarding the methodology of drafting the Action Plan Sustainable Energy Brcko District BiH in accordance with the existing terms of reference and adopted strategic documents Brcko District BiH.

At the public hearing presented the draft of the Action Plan Sustainable Energy Brcko District BiH and pointed to the danger of climate change and the basic advantages and obligations that plan brings. The main objective of the Action Plan is to identify concrete measures for sectors of direct energy consumption of Brcko District BiH that will be implemented by 2020, result in a reduction of CO2 emissions by **22.21%** compared to the reference year 2012.



Sectors of final energy consumption of Brcko District BiH, in accordance with the recommendations of the European Commission are: buildings, traffic and street lights, which were conducted detailed energy analysis and drafted the corresponding reference inventory emissions. Results presented at a public hearing.

Presented are located 208 preliminary energy audits of facilities in the area of Brcko District BiH in order to ensure more accurate assessment of the situation in the building and the possibilities offered by modern technology of thermal insulation materials and equipment in the construction industry aimed at warming objects and reducing costs for heating buildings, thereby reducing CO₂ emissions as the primary goal of this project.

In the end, they all agreed that the implementation of the SEAP good opportunity to make use of the possibility of joining the Brcko District BiH Alliance energy conscious cities, opening the possibility of withdrawal of a large number of EU projects for the realization of warming facilities and reduction of CO₂ emissions into the atmosphere. Speakers expressed their gratitude to everyone who responded to a public hearing, in the hope that the authorities will be sensitive to the realization of this very important document and plan.



Sustainable Energy Action Plan Brcko District BiH - SEAP TABLE

SECTORS and areas of activity	KEY actions / measures in the areas of activity	Responsible department, person or company (in the case of a third party)	Implementation (beginning and end)	Predicted price per activity and measure	Expected energy saving per measure (MWh/a)	Expected renewable energy production per measure (MWh/a)	Expected CO2 reduction per measure (t/a)	Energy savings by sector (MWh) u 2020	Local production of renewable energy by sector (MWh) u 2020	CO2 reduction (t) in 2020
HOUSING, PLANTS	/ INSTALLATIONS							156.084,50	294,00	30.714,54
Administrative and other facilities under the jurisdiction of the Government and Public Administration of Brcko District BiH	Measure 1.: Establishing a legal framework BD for efficient energy management in accordance with European directives	1:The competent departments of the Government, and the Assembly of Brcko District BiH	1:2015 2020.	1:25.000	1:4.650		1:1.418,4			
	Measure 2: Creating a working group to monitor the efficiency of energy use in the Brcko District BiH	2:Department of Brcko District Government and the Office of the Public Property	2:2015 2020.	2:35.000	2:4.650		2:1.418,4			
	Measure 3: Education and behavior change of employees / users of buildings owned by Brcko District BiH	3:Department for Professional and Administrative Affairs Sub-Division	3:2015 2020.	3:30.000	3:4.650		3:1.418,4			
	Measure 4: The establishment of an information system for monitoring energy consumption in public buildings - energy accounting	4:The Office for Public Property, JP "Komunalno Br ko"d.o.o.	4:2015 2020.	4:200.000	4:27.466		4; 98,25			
	Measure 5: Continuous implementation of energy efficiency measures in public buildings on the basis of the performed energy audits and set priorities	5:The Office for Public Property,	5:2015 2020.	5:2.122.837	5:3.760		5:1.183,26			

Measure 6: Modernization of the boiler in educational institutions (kindergartens, primary schools, secondary schools and faculties) BD - installation of boilers for biomass	6:Department of Education The Office for Public Property	6:2015 2020.	6:4.900.000	6:0	6:182	
Measure 7: Modernization of lighting in classrooms that have outdated light bulbs (200 classrooms)	7:Department of Education	7:2015 2017.	7:34.560	7:792	7:190,87	
Measure 8: Installing thermometers in svimobjektima property of Brcko District BiH	8:The Office for Public Property	8:2015 2016.	8:8.750	8:600	8:144,6	
Measure 9: Thermal insulation of the outer shell and the roof over the building owned by Brcko District BiH	9:KThe Office for Public Property	9:2015 2020.	9:1.237.500	9:2.200	9:530,2	
Measure 10: Installation of high-efficiency energy windows in several buildings owned by Brcko District BiH	10:The Office for Public Property	10:2015 2020.	10:1.512.500	10:963,5	10:2.322,2	
Measure 11: Installation of thermostatic sets in all buildings of the Brcko District BiH	11:The Office for Public Property	11:2015 2020.	11:284.000	11:2.280	11:549,48	
Measure 12: The introduction of Green Public Procurement criteria for the purchase of electrical equipment for buildings owned by Brcko District BiH	12:Department for Professional and Administrative Affairs	12:2015 2017.	12:0	12:210	12:50,61	
Measure 13: The introduction of energy saving light bulbs in the buildings owned by Brcko District BiH	13:The Office for Public Property	13:2015 2017.	13:0	13:240	13:376,1	
Measure 14: Installation of solar heating systems of public institutions in rural area - 29 facilities	14:Department of Education, Office for Public Property, Department of Public Health and Other Services and Public Health Center Brcko District BiH	14:2015 2020.	14:295.749	14:174	14:41,93	

	Measure 15: Installation of solar heating systems of public institutions in the city area - 20 facilities	14:Department of Education, Office for Public Property	15:2015 2020.	15:203.965	15:120	15:28,92	
Housing objects	Measure 1: Consumer education in the sub- sector housing and commercial and public service sub-sector with the promotion of the principles of energy efficiency	1:Department for Professional and Administrative Affairs Subdivision to support the Ministry of Health and NGOs	1:2015 2020.	1:200.000	1:5.250	1:1.642,4	
	Measure 2: Reconstruction of the thermal protection of the exterior and repair of the roof of buildings intended for housing	2:Department for Professional and Administrative Affairs The Office for Public Property	2:2015 2020.	2:22.609.800	2:45.219	2:10.897,7	
	Measure 3: Replacing household appliances energy-efficient, energy class A	3:Subdivision to support the Ministry of Health and NGOs	3:2015 2020.	3:n/p	3:5.492	3:350,3	
	Measure 4: The introduction of energy saving light bulbs in all households Brcko District BiH	4:Subdivision to support the Ministry of Health and NGOs JP "Komunalno" d.o.o	4:2015 2020.	4:0	4:20.922	4:134,74	
	Measure 5: Installation of the solar system in about 5% of private dwellings BD total of 1,800 solar systems	Department of Communal Affairs	5:2015 2020.	5:2.400.000	5:1.800	5:433,8	
Objects commercial and service activities	Measure 1:Getting incentives by improving the thermal insulation of buildings, commercial and service activities in the area of Brcko District BiH	1:Assembly of Brcko District BiH Department of Economic Development, Sport and Culture	1:2015 2020.	1:n/p	1:17.207	1:4.146,8	
	Measure 2: Encouraging the use of renewable energy for heat production	2:Department of Economic Development, Sport and Culture Public and private companies	2:2015 2020.	2:n/p	2:4.007	2:965,68	

	Measure 3: Encourage the purchase of energy-efficient electrical equipment for commercial and utility sub-sector	3.Department for Economy, Sport and Culture Public and private companies	3:2015 2020.	3:n/p	3:1.848	3:1.179			
	Measure 4: Installing energy saving light bulbs in the buildings and premises of commercial and service sectors	4:Department for Economy, Sport and Culture Public and private companies	4:2015 2020.	4:0	4:1.584	4:1.010,5			
PUBLIC LIGHTING						<u>.</u>	2.634,50		1.680,79
Public Lighting	Measure 1: Replacing outdated light bulbs and lamps with new - energy- efficient and environmentally friendly	1:Department of Communal Affairs JP "Komunalno Brcko" d.o.o.	1:2015 2020.	1:2.058.750	1:823,5	1:525,39			
	Measure 2: Management intensity of public lighting	2:Department of Communal Affairs JP "Komunalno Brcko" d.o.o.	2:2015 2020.	2.49.410	2:1.811	2:1.155,4			
TRANSPORTATIO	N II			1			48.146,02	369.000,00	12.128,10
Vehicles owned by departments and institutions of the Brcko District BiH	Measure 1: Measures to vehicles owned by BD. Planning of green public procurement in terms of procurement of vehicles with reduced CO2 emissions.	1:Department for Professional and Administrative Affairs Subsection procurement	1:2015 2020.	1:450.000	1:0,92	1:22,7			
	Measure 2: Measures to improve public transport	2:Department of Public Works JP "Putevi Brcko" d.o.o. Concessionaires of public transport	2:2015 2020.	2:n/p	2:30.651	2:7.700			
Private and commercial transport	Measure 1: Construction of the roundabout traffic instead of the existing priority intersections and some that are regulated by traffic lights, as well as building them at intersections of new roads	1:Department of Public Works JP "Putevi Brcko" d.o.o.	1:2015 2020.	1:4.000.000	1:2.554,3	1:640			

	Measure 2: Complete the construction of a bypass around Brcko	2:Department of Public Works JP "Putevi Brcko" d.o.o.	2:2015 2020.	2:n/p	2:5.108,6	2:1.280		
	Measure 3: The group of measures to encourage the use of bicycles as a means of transportation	3:Department of Economic Development, Sport and Culture JP"Putevi Br ko"d.o.o.	3:2015 2020.	3:2.500.000	3:6.130,3	3:1.540		
Private and commercial transport	Measure 4: Encouraging the use of biodiesel from waste cooking oil for the needs of public transport vehicles and public companies	4:Depart. of Communal Affairs Concessionaires of public transport JP "Komunalno Brcko" d.o.o. JP "Putevi Brcko" d.o.o. Company Vo ar Ltd.	4:2015 2020.	4:280.000	4:300	4:95,4		
	Measure 5: Promotional, informational and educational measures and activities for drivers	5:Subdivision for support to local community and non-governmental organizations Department Education Police Brcko District BiH Driving school, NGOs	5:2015 2020.	5:250.000	5:3.400,9	5:850		
DISTRICT HEA	TING III						107.900,00	23.843,20
Combined Heat and Powera	Measure 1: Gasification of the town of Brckc	1:Public administration and the relevant administrative bodies of Brcko District BiH	1:2015 2020.	1:250.000	1:55.200	1:13.303,2		
	Measure 2: Construction of the district heating (cogeneration plant) with total power of 32 MW heat and 16 MW electricity	2:Public administration and the relevant administrative bodies of Brcko District BiH	2:2015 2020.	2:134.400.000	2:52.700	2:10.540		
	Measure 3: The establishment of district heating system, which includes heating of 4,000 flats (220,000 m2) and approximately 170,000 m2 of public and commercial buildings	3:Public administration and the relevant administrative bodies of Brcko District BiH	3:2017 2020.	3:35.000.000	3:0	3:0		