
Development of a Sustainable Bioenergy Market in Serbia

Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Dag-Hammerskjöld Weg 1-5
Postfach/ P.O.Box 5180
65760 Eschborn

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INTRODUCTION

More than 20 years of practical experience of the public-private model exists in European Union (EU) countries. One of the many purposes of this model is to ensure that public services are more efficiently provided.

Broadly speaking, PPP covers all known types of cooperation between public and private partners, usually leading to the establishment of joint investments.

More specifically, it is essentially about joint ventures where the public and private sectors merge resources and professional knowledge to fulfil a public need.

By selecting the appropriate PPP model and scheme for its implementation, together with sound risk management, and by adhering to the principles of public interest, efficiency, transparency, equal and just treatment, free market competition, proportionality, environmental protection, autonomous will and the equality of contracting parties, government administration becomes more efficient in providing public services and at the same time significantly reduces the use of its own capital (budget appropriations) by obtaining capital from the private sector, thus minimizing operational risk.

Through a variety of methods, private partners can create opportunities to make use of their own resources and skills in order to deliver services which that traditionally been provided by public companies or public utilities.

Private partners are introduced in PPP arrangements for several basic reasons: to obtain additional fresh capital, managerial skills, implementation and maintenance, thereby securing added value to beneficiaries and the general public by enabling better identification of needs and efficient use of resources.

Local governments have been financing the procurement of fossil and other fuels used for heating public buildings for decades. Out of its budget, a municipality also invests in procuring necessary new equipment and pays for spare parts, maintenance, and inspections and interventions related to boiler units located either in central facilities (a boiler house for several buildings) or in individual public buildings (boiler rooms).

It is clear that municipalities, through a modern approach and socially responsible behavior, must contribute to providing greater comfort for users of public buildings, and the highest standards in operation, maintenance and environmental protection.

Since the price of fossil fuels has steadily increased over many years and that the price of maintaining aging boiler units (both central and individual) has also increased, municipalities are facing numerous issues and risks that are often, not addressed properly.

On the other hand, the delivery of public services obliges a municipality to provide these services at a constant level of quality, which is more and more financially demanding. At the same time, the municipality is not able to collect all the money billed for heat energy supplied to users.

So as to achieve an expected and satisfactory quality level of these services and to go one step further by supplying superior and permanent value for money and minimizing the present risks, many Serbian municipalities are currently (due to legal possibilities) exploring their options of partnering with the private sector for heating public buildings, replacing existing fossil fuel boilers with biomass fired boilers that supply the same amount of heat energy over the PPP contract duration.

This Manual for Implementation of Bioenergy Heating Systems in Public Buildings within a Public-Private Partnership Model provides an overview of development and a framework and guidelines for applying PPP models in financing the replacement of boilers, including converting the fuel and heat energy supply used in public buildings. The aim is to increase effectiveness and efficiency in providing public services to create benefits for the public entity and share the risks with a private partner.
I INSTITUTIONAL SUMMARY FOR POTENTIAL INVESTORS
1. Description of Current Situation in Serbian Municipalities

1.1. Heating Systems and Heat Energy Costs in Municipalities

The first district heating system (DH) in Serbia was built in 1961 to efficiently heat a newly built city quarter called New Belgrade.

In the decades that followed, numerous DH facilities have been installed in cities and towns across Serbia and public companies were established to manage them. Today there are 59 DH systems supplying heat energy to residential and commercial buildings.

DH Companies (in Serbian: ‘Toplane’) have been organized under the “Toplane Srbije” Business Association since 4 April, 1997, with 59 members and total installed capacity of approx. 6 thousand MW.

DH facilities mainly burn coal, heavy fuel oil and natural gas. The cost of heat energy, when paid according to consumption, is divided into two parts: 25% - 35% is fixed and the rest is variable. More than 600,000 households use heating services.

Serbian DH Companies are at present in debt for gas and other fuels purchased from suppliers and state reserves (in total EUR 75 million for gas and EUR 5 million for other fuels). Consumer debt owed to DH companies is about EUR 170 million (official data from the Energy Agency of the Republic of Serbia).

Light oil is the most expensive fuel, yet widely used especially in heating of public buildings not connected to district heating. Price ranges from 116 to 155 RSD/l without VAT (20%) and deduction that municipalities get on the amount with VAT -39.5 RSD. Heavy oil prices ranged from 60-85 RSD/kg. LPG was paid 88 RSD/l. Price of fossil fuels, similarly to 2008 was constantly increasing, had a sharp drop and then recovery is expected in the future by the most market analysts. Price of coal depends on the quality and non-imported coal price is most often around 12,000 RSD/t while it ranges from 7,000 to 20,000 RSD/t. Exchange rate was 115-120 RSD/€. Prices of wood pellets range from 140-190 €/t, wood chips 45- 65 €/t and firewood 30-50 €/m³. Prices usually paid per fuel in 2014 in Serbia are presented in table below.

Table 1: Current fuel prices for heating in Serbia excl. VAT

<table>
<thead>
<tr>
<th>FUELS</th>
<th>Heatvalues</th>
<th>Price per Unit (net)</th>
<th>Calorific Price</th>
<th>Boiler Efficiency</th>
<th>Heat Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agro-Biomass Briquetts</td>
<td>4 kWh/kg</td>
<td>110,00 €/t</td>
<td>28 €/MWh</td>
<td>75%</td>
<td>36,7 €/MWh</td>
</tr>
<tr>
<td>Brown coal</td>
<td>4,5 kWh/kg</td>
<td>100,00 €/t</td>
<td>22 €/MWh</td>
<td>75%</td>
<td>29,6 €/MWh</td>
</tr>
<tr>
<td>Electricity</td>
<td>1 kWh/kWh</td>
<td>60,00 €/MWhel</td>
<td>60 €/MWh</td>
<td>85%</td>
<td>70,6 €/MWh</td>
</tr>
<tr>
<td>Light Oil</td>
<td>12,60 kWh/kg</td>
<td>1,05 €/l</td>
<td>98 €/MWh</td>
<td>85%</td>
<td>115,4 €/MWh</td>
</tr>
<tr>
<td>LPG</td>
<td>12,87 kWh/kg</td>
<td>0,92 €/kg</td>
<td>72 €/MWh</td>
<td>90%</td>
<td>79,8 €/MWh</td>
</tr>
<tr>
<td>Heavy Fuel</td>
<td>11,21 kWh/kg</td>
<td>519,58 €/t</td>
<td>46 €/MWh</td>
<td>80%</td>
<td>58,0 €/MWh</td>
</tr>
<tr>
<td>Natural gas</td>
<td>10 kWh/m³</td>
<td>0,41 €/m³</td>
<td>41 €/MWh</td>
<td>95%</td>
<td>43,2 €/MWh</td>
</tr>
<tr>
<td>Wood Pellets</td>
<td>4,7 kWh/kg</td>
<td>160,00 €/t</td>
<td>34 €/MWh</td>
<td>90%</td>
<td>37,8 €/MWh</td>
</tr>
<tr>
<td>Woodchips (Humidity 35%)</td>
<td>3,1 kWh/Kg</td>
<td>60,00 €/t</td>
<td>19 €/MWh</td>
<td>85%</td>
<td>22,8 €/MWh</td>
</tr>
<tr>
<td>Straw in Bales</td>
<td>3,9 kWh/kg</td>
<td>50,00 €/t</td>
<td>13 €/MWh</td>
<td>80%</td>
<td>16,0 €/MWh</td>
</tr>
<tr>
<td>Firewood (Humidity 45%)</td>
<td>2,5 kWh/kg</td>
<td>62,00 €/t</td>
<td>25 €/MWh</td>
<td>65%</td>
<td>38,2 €/MWh</td>
</tr>
</tbody>
</table>

Source: GIZ research and calculation 2014

1 Note: Prices will differ depending on region, quality and quantity of fuel negotiation strenghts
Members of the Association believe that this debt does not affect the stability of their energy supply systems and that DH Companies will be ready for the 2014/2015 heating season. Regarding the possibilities for fuel switch as well as installing of new heating systems, there is proven significant potential attractive for investors. Chart below shows fuel switch capacity distributed per type of currently used fuel for public buildings not connected to district heating and owned or operated by 110 municipalities that were included in GIZ DKTI research. Spatial distribution of total fuel switch capacity per municipality as well as of capacity per type of fuel is presented in the Chapter 13: Maps – Individual heating - capacity in public buildings.

Chart 1: Total installed capacity in fuel switch – worthy public buildings not connected to district heating – 316, 33 MW$^2$

Source: GIZ DKTI research 2014

To sustain energy supply stability, it is important that consumers pay their bills regularly, enabling DH Companies to pay their suppliers on time. DH Companies overall debt is 40% less than in 2013 because of loans borrowed from development banks.

1.2. Biomass Potential in Serbian Regions

Biomass potential in Serbia is three times greater than hydro potential. Renewable energy sources (RES) are a growing business, thanks to the recent gas crises, and investments in RES have increased fivefold since 2004.

Serbia has huge potential to use biomass that can substitute energy produced from crude oil, its derivations and other expensive sources. In recent years, interest in using biomass has grown

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$^2$ Installed heating capacity in public buildings with individual heating, reported as fuel-switch worthy by 110 municipalities from Central Serbia
extensively. Using biomass would mean that significant amounts of energy produced from oil and gas could be substituted and so far, Serbia's province of Vojvodina has made the most progress in this direction. Using biomass and RES as an appropriate solution would successfully resolve two issues: the need for additional fuel and the need to protect the environment.

60% of the total RES potential is biomass. Despite having achieved some results, the use of biomass potential is still very low.

The estimated unused available technical biomass potential of Serbia is 2.351 million toe/a (tons of oil equivalent per annum) (Source: Draft Development Strategy for the Energy Sector of the Republic of Serbia until 2025 with Projections until 2030):

- Agricultural biomass 1.637 million toe/a (agricultural waste 0.99, fruit processing waste, viticulture and growing fruit crops 0.605, liquid manure 0.042);
- Wood (forestry) biomass 0.509 million toe/a
- Energy plantings not available
- Biodegradable municipal waste 0.205 million toe/a

Today, energy shortage is a reality, producing energy is costly, the rate of pollution is increasing and employment rates are decreasing, which is why finding alternative solutions like RES are imperative.

**Focusing on increasing the amount of biomass used**

At the start of each new heating season, many public debates are held (including the participation of experts) concerning the necessity of increasing the use of biomass in heat and electricity production and combined heat and electricity production (CHP). By using just one third of the total biomass potential it would be possible to substitute one million tons of imported heavy fuel oil. After agricultural land is harvested, there is approx. 20 million tons of agricultural waste (known as residuals) produced. This waste is a precious organic resource.

Some of the agricultural waste is used for land fertilizer, some of it for cattle farming, and an extremely small amount, approx. 2%, is used as fuel for producing heat and electricity. Unfortunately, the practice of burning biomass at the spot on the field is still widespread.

This agricultural biomass can be used in bulk form, in specialized boilers that can accommodate large volumes of biomass fuel. Another option is to pack agricultural biomass into small bricks. The latest and most common use of biomass in energy production is in the form of pellets.

In Europe, (including Serbia) the use of biomass fuel in the form of pellets, has spread drastically over the last decade because they are easy to use and can be automatically fed into boilers.

Despite all of the above, there are only a handful of agricultural pellet producers in Vojvodina. One example is “Vojvodinapelet” in Novi Sad, which has been producing this kind of fuel for several years, using wheat, soya straw and sunflower residuals and sawmill waste left over from the production of hardwood flooring.

Current prices vary from EUR 130 to EUR 160 per ton and have had a tendency to rise. The buyers are mostly natural persons.

In 2009 the Government of Serbia passed a Decree on Incentives Measures (Feed-in tariffs) on the use of biomass fuel in electricity production, where EUR 0.16 was paid for every kWh of electricity produced from this type of fuel. Later, in 2013 feed-in tariffs were increased to amounts shown in the following table. Amount of feed-in-tariff depends on a facility’s production capacity. The prices shown in the table are about double the price of EUR 0.06 - including VAT per kWh of electricity produced in Serbian thermal power stations. It is clear that there are significant profits to be made here, especially in regions of the country that produce larger amounts of agricultural waste.
Table 2: Feed – in Tariffs

<table>
<thead>
<tr>
<th>Type of Electrical Generation</th>
<th>Feed-in-Tariff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass power plant up to 1 MWel</td>
<td>13,26 €/kWh</td>
</tr>
<tr>
<td>Biomass power plant 1 - 10 MWel</td>
<td>13,82 – 0,56 x Pel €/kWh</td>
</tr>
<tr>
<td>Biomass power plant more than 10 MWel</td>
<td>8,22 €/kWh</td>
</tr>
<tr>
<td>Biomass power plant up to 0.2 MWel</td>
<td>15,66 €/kWh</td>
</tr>
<tr>
<td>Biogas power plant 0.2 – 1 MWel</td>
<td>16,498 – 4,188 x Pel €/kWh</td>
</tr>
<tr>
<td>Biogas power plant more than 1 MWel</td>
<td>12,31 €/kWh</td>
</tr>
<tr>
<td>Plan fired by biogas from animal origin waste</td>
<td>12,31 €/kWh</td>
</tr>
</tbody>
</table>

Source: DECREE ON INCENTIVE MEASURES FOR PRIVILEGED POWER PRODUCERS Pursuant to the Article 59, paragraph 6 of the Energy Law (“RS Official Gazette”, No. 57/11, 80/11 – corrigendum, 93/12 and 124/12)

How to promote biomass fuel?

First of all, penalties need to be introduced for burning waste materials in open fields. Next, funding for the encouragement of biomass use should exist on all levels and the government should offer financial aid regarding taxation and customs duty fees, and/or it should grant a tax exemption on all biomass equipment (and its installation) used for the production of energy.

And finally, forming a supply chain market for biomass fuels (pellets and other), as was done in the European Union several years ago, is a necessity.

What is the situation with Serbian wood production and trade?

In Serbia, the average volume of wood assortment produced in April 2014 had decreased by 16.3% in comparison to the previous year average monthly production and decreased by 34.2% in comparison to data from April 2013.

In April 2014 the production of wood assortment in all of Serbia amounted to 138,417 m³. In the Belgrade area, the total amount was 6,686 m³, in Vojvodina it was 35,345 m³, in Šumadija and western Serbia it was 57,260 m³, and in southern and eastern Serbia it amounted to 39,126 m³. A total of 121,715 m³ was sold from publicly owned woodland in that same month in all of Serbia (official data from Srbijašume, a publicly-owned company).
### Table 3: Wood produced in Serbia, in publicly-owned forests by region and assortment from April 2013 - April 2014

<table>
<thead>
<tr>
<th>REPUBLIC OF SERBIA</th>
<th>PRODUCTION ASSORTMENT (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>Belgrade area</td>
</tr>
<tr>
<td>2013</td>
<td></td>
</tr>
<tr>
<td><strong>IV</strong></td>
<td>20464</td>
</tr>
<tr>
<td><strong>V</strong></td>
<td>14493</td>
</tr>
<tr>
<td><strong>VI</strong></td>
<td>18407</td>
</tr>
<tr>
<td><strong>VII</strong></td>
<td>20880</td>
</tr>
<tr>
<td><strong>IX</strong></td>
<td>21352</td>
</tr>
<tr>
<td><strong>X</strong></td>
<td>22323</td>
</tr>
<tr>
<td><strong>XI</strong></td>
<td>14522</td>
</tr>
<tr>
<td><strong>XII</strong></td>
<td>10537</td>
</tr>
<tr>
<td><strong>2014</strong></td>
<td></td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>13693</td>
</tr>
<tr>
<td><strong>II</strong></td>
<td>18992</td>
</tr>
<tr>
<td><strong>III</strong></td>
<td>19301</td>
</tr>
<tr>
<td><strong>IV</strong></td>
<td>13841</td>
</tr>
<tr>
<td><strong>Ratio I-IV 2014</strong></td>
<td></td>
</tr>
<tr>
<td><strong>I-IV 2013</strong></td>
<td>106.3</td>
</tr>
</tbody>
</table>

Municipal Institutional Framework

Energy efficiency is one of the most effective ways of achieving sustainable development. Local governments play a crucial role in achieving EE objectives. Although Serbia’s EE legal framework is still being developed, every General Act and Law recognizes that EE is important to the country’s energy policy; however, there are by-laws yet to be passed which would regulate the implementation of concrete and obligatory EE measures that must be adhered to by companies and public entities.

The institutional framework for the implementation of EE measures is in place but it is questionable as to whether or not these institutions have the capacity to fulfil their responsibilities. An approach to energy management at the local level has shown that the procedures, practices and capacities of those employed are not yet developed enough to achieve the required objectives.

Local governments play an important role in the energy sector that ties in closely with achieving EE standards. This role is evident through the following:

- Indirectly through the public companies they own, local governments are energy producers and owners of district heating systems.
- Local governments are one of the largest energy consumers through public buildings, public services, and street lighting.
- Local governments make decisions on energy issues within the local community; they influence energy management and are responsible for all energy issues.

Lastly, local governments are more closely tied to the general public than any other branch of government which is why they are obliged to motivate other entities to act responsibly and rationally when it comes to energy consumption.

The institutional framework in Serbia for energy, energy efficiency, and energy management is made up of numerous institutions at all three levels of government, national, provincial and local. They are, firstly, the Ministry of Mining and Energy and the Ministry of Agriculture and Environmental Protection, the Province of Vojvodina Secretariat for Energy and Mineral Resources, the Energy Agency, the Agency for Environmental Protection, the Regional Centres for Energy, as well as associations like the Serbian Chamber of Commerce, the Association for Energy and Mining, the Committee for Energy Efficiency of Standing Conference of Cities and Municipalities of Serbia, the Business Association of Serbian DH Companies, and the Serbian Chamber of Engineers, as well as publicly-owned companies at national and local levels and local governments.

The setting and implementation of the Serbian energy policy is under the jurisdiction of the Ministry of Mining and Energy (MoME) through the realization of the Energy Sector Development Strategy, an implementation programme for Strategy and Energy Balance. MoME carries out all tasks related to energy, energy balance, oil and gas, as well as taking measures to secure the necessary conditions needed for public companies to function, as well as other responsibilities delegated by law, such as the rational use of energy. Additionally, the Ministry prepares draft regulations and other legal acts such as draft laws, by-laws and planning document drafts at the national level. As well, MoME provides expert and technical staff, gathers and analyses data needed to formulate and steer energy policy. Generally speaking, MoME has the highest jurisdiction and responsibility regarding the country’s entire energy state.

In Serbia, there are five EE Regional Centres: Belgrade, Novi Sad, Niš, Kragujevac and Kraljevo. The main objective of these centres is to implement EE programmes and the use of renewable energy sources, either independently or in cooperation with other institutions.

In addition to the above mentioned institutions, other publicly-owned companies (at the national and local levels) have been established in order to deal with energy issues, either exclusively or
partially. First of all the Electricity Power Company of Serbia (EPS) and various companies responsible for street lighting, DH companies, etc.

**Conditions of local governments (cities and municipalities) are as follows:**

1. Energy planning has not been developed or is in its infancy, therefore EE development planning is extremely poor.

2. Administrative and technical capacities in the energy sector are not equally dispersed throughout Serbia. In cities, these capacities are significantly larger than in smaller towns and municipalities because of a discrepancy in EE know-how. Consistent training/education regarding new technological solutions is either non-existent or provided in small doses.

3. In the local governments, the methods used to gather energy data are outdated or extremely basic. The most common method used is budget planning and spending control. Clearly, follow up from the energy market is missing entirely and that is because it is considered to be under the jurisdiction of public procurement procedure.

4. 60 local governments have publicly-owned companies that deal with either the production and distribution of heat energy or street lighting. These local governments have total jurisdiction over heat energy and street lighting services. Also, publicly-owned companies that deal with the distribution of gas are present in cities/towns with a developed gas network.

5. Because of the requirement to draft an energy balance, almost every local government in Serbia has a record of energy consumption (public facilities which consume energy and therefore energy infrastructure).

6. However, the systems used to monitor energy consumption in the above mentioned facilities are underdeveloped.

7. The most frequent methods used to monitor energy consumption in public facilities are budget planning and spending as well as public procurement procedure for obtaining various fuels or energy. The procurement procedure itself is not standardized, but rather depends on whether the municipality consists of a single institution (building) or a collective group of buildings.

8. Investments in the energy consumption of public facilities and energy infrastructure are quite often a consequence of maintenance activities, mainly financed out of local budgets with government participation.

**Defined are three groups of the most frequent investments in the energy sector and energy consumption:**

1. A number of local governments invested in the following: energy-saving street lighting, reconstructing and extending existing DH systems, installing block boiler houses and installing piping networks;

2. Some have invested in public building maintenance by replacing old windows and renovating flat and pitched roofs to increase thermal insulation of the entire structure;

3. Very small investments were made in switching over from LFO or crude oil fuels to a heating fuel which is more environmentally friendly, mainly through the introduction of a gas network or district heating system in the given area or public facility. This included minor boiler replacement in individual boiler houses;

4. Activities which promote EE improvements in companies and residential areas are rare and for the most part neglected;

5. If we exclude hydro power stations, there are very few energy production units which use renewable energy sources in use.
What is the EE institutional framework at the local level?

1. Local entities whose sole responsibilities revolve around energy issues are only present in Serbia’s three largest cities: Belgrade, Novi Sad and Niš.

   At the municipal level of government, a department dealing exclusively with energy efficiency does not exist; instead individuals working in other departments have been delegated to deal with EE issues as they arise, in addition to their regular work.

   This situation exists in all local governments except the above mentioned cities of Belgrade, Novi Sad and Niš.

2. Local governments neglect certain responsibilities defined by the Law on Energy. This situation is especially confusing because, according to law, local governments and their legislature hold exclusive rights over the heat energy market.

3. This situation emphasizes the need for external, mostly financial support from financial sources other than the government’s budget in order for energy efficiency to be represented at the local level.

4. Finally, in order for local governments to move in the right direction and improve the current state, an EE regulatory framework must be built. This appears to be the most influential method for local governments to implement energy efficiency in broader terms.

What is the situation regarding planning documents at the local level?

1. Local spatial and urbanization planning, quite often is not prepared as well as development planning. The same goes for general and detailed regulation planning. These poorly developed plans are usually used as a legal control mechanism regarding construction works and do not take energy issues into consideration except in relation to infrastructure and equipping construction land;

2. There is only one planning document relevant to energy efficiency which must be submitted. It is called the energy balance document, and it is for the most part approached without any comprehension;

3. EE is normally seen as a part of sustainable development or environmental protection and is rarely considered in connection with the energy sector;

4. Generally speaking, energy efficiency is insufficiently recognized and represented in municipal planning documents. Basically, EE is considered separate from the energy sector and is not clearly positioned in municipal development planning.


2. DESCRIPTION OF LEGAL FRAMEWORK FOR PUBLIC-PRIVATE TENDER-PROCUREMENT

2.1. Legal Background and Issues

Quite often in literature the Concession and BOT (Build-Operate-Transfer) investing models are considered to be very similar and in many legal systems the BOT model is ruled within regulations which are defined by concession agreements.

This approach may not be the correct one as there is a clear difference between these model types. Despite the fact that both models have the same contract subject in regards to the development and building of public assets, there is a significant difference when it comes to understanding, as the BOT model represents combined legal business, which involves more contracts.

In one legal system, BOT businesses must be separately regulated because in Concession contracts, the government is always one of the contractual parties, while a BOT contract may also be concluded between private sector entities.

This means that in the BOT contract model, the subject of the contract may be transferred to private property, while with Concessions this cannot be the case.

In the Republic of Serbia Concession agreements are defined by the Law on Public-Private Partnership and Concessions, while other contracts, which could potentially form the BOT model, are regulated by the Law on Obligation Relationships.

It should be emphasized that the Law on PPP and Concessions, which was adopted in late 2011, is a huge step forward because it now stipulates the possibility of concluding a direct contract between public and private partners, with the aim of securing a better investment for the financier. The Law on PPP and Concessions is the first one of its kind which soundly introduces the idea of a "direct contract" in Serbian legislation, a model largely used in the Anglo-Saxon legal system.

Also, and with the aim of securing payback of invested resources in the most appropriate way, for the first time, the PPP Law allows a private partner (with prior consent of the public partner) to designate, mortgage or pledge any of their rights or obligations from the public contract, or other property to secure payment of any debt or future debt in connection with the building and financing or refinancing of a PPP project.

Two of the abovementioned regulatory improvements offer the private partner a significantly higher degree of protection as the dominant financier of the project. This is one of the key conditions necessary to attract foreign investors as it is obvious that the value of PPP projects greatly overshadow the financial potential of public budgets.

2.2. Advantages and Opportunities for BOT Projects for Biomass-based Heating Systems in Public Buildings

The BOT model (Build-Operate-Transfer) is the most commonly used model in infrastructure financing (highways, bridges, tunnels, and heat energy supply) in which a certain fee is incurred to public beneficiaries by representatives of private capital.

This term is broadly defined and includes other financial models, for example:

- BOOT (Build-Own-Operate-Transfer),
- ROT (Reconstruct-Operate-Transfer),
- LRO (Lease-Reconstruct-Operate),
- BLT (Build-Lease-Transfer),
as well as other models used in building new or restructuring existing infrastructure.

It is common practice that the private partner fulfills the following criteria:
- Construction of public good or facility, or installation of all equipment,
- Secure financial means,
- Maintenance and billing of contracted fees,

while the government retains ownership over the public good.

Project implementation and production of necessary documentation is usually split between representatives of private capital and the public authority. This authority has a leading role in defining the basic elements of the project (terms of references), while the private sector develops the project documentation based on these elements, to be approved by the public authority.

The aim of the private partner is to generate sufficient income during the development period, income that will be used to cover credit debt, as banks or funds are most often the leading investor of these kinds of projects with 70% to 90% participation of the total project value, depending on the risk assessment. Income generated from the project, in this case income that is generated from supplied and measured heat energy, should be enough to cover operating costs and maintenance of the public good (newly-built or reconstructed buildings, installed boiler equipment and facilities, equipment used for measuring and controlling). This income should also cover the financier’s investment and planned profits.

2.2.1. Phases of the BOT Financing Model

Identification (definition) of the Project

In the BOT model, project identification is the first phase in project implementation where the public partner defines the plan of activities.

In accordance with Article 19 of the Law on PPP and Concessions, identification of the project can also be done by interested entities (potential private partners) under condition that the project proposal does not relate to a project for which a contract award or a public call announcement has already been initiated.

Preparation of Public Body for Tender

In Serbia, a public call for tender in open procurement procedure is made to potential bidders, while criteria for a contract award are based on the selection of the economically best bid (using a points-based meriting system) or the lowest qualified bidder (the lowest price).

Project Implementation

The project implementation phase begins with the signing of the contract. This phase should be conducted in accordance with a signed public contract and an understanding of how the project is to be executed, its maintenance and use.

Managing and Maintenance Phase

After the facility has been built, and the building is open for use, the Operator (the company which has taken over managing and maintenance of the facility) takes over the facility in order to conduct testing and inspections. Key issues during this phase are concerns about the number of potential users of the heating network and the possibility of connecting extensions to support new users in future.

Contractual parties must agree on the minimum number of heat energy users which is crucial in order to calculate the profitability of the investment. There are methods by which the minimum number of estimated users is defined in advance, where the public partner is obliged to reimburse the private partner if there are fewer users than was originally estimated, for income that would
have been generated if the heat energy infrastructure had been used by the estimated minimum number of users.

**Transfer**

The final phase of a BOT project is called the transfer phase, where the company operating the project transfers all rights over the facility back to the public partner. It is in the interest of the public partner to assure that the construction of the facility was properly conducted and maintained and that the necessary transfer of knowledge and technology occurred, which will enable the public partner to use and maintain the facility properly in future.

**Analysis of Project Profitability**

Infrastructure projects have large financial values and their implementation is often possible only through project financing, which means that the assessment of project profitability is based on (i) projections of cash flow and incomes (estimated monetary incomes) which are generated through project use, and (ii) projections of expenditures (estimated monetary spending) which, together with operating costs, includes the cost of project financing.

The most precise project investment profitability indicators are net present value (NPV) and internal rate of return (IRR), which is calculated, based on the total value of the project or invested capital. NPV calculations are based on the discount of future cash flow using a discount rate which is usually equivalent to costs of landed capital. If the NPV is greater than zero, the project is profitable.

This indicator is usually used to select the most profitable project among a number of proposed ones, or when one project has more than one option, in order to select the best solution. The NPV method is also used by Law to calculate the total value of the project as a means of discounting the total cost of the project in the contracted period, not including VAT. Calculating the cost of the project in this way represents one of the criteria for selecting the best bid. The internal rate of return (IRR) shows how much income the project generates over its life cycle. This is the value of the discount rate used when the project’s NPV is equal to zero.

For projects usually funded through project financing, the share of borrowed capital is high, meaning that investors are interested in the determination of project payback capacity by calculating a series of ratio indicators such as the following:

- Annual debt service cover ratio (ADSCR), and
- Payback period.

ADSCR is usually calculated annually, using the projected operational cash flow ratio against the total principal amount and corresponding interest rate paid in a given year. This way, payback capacity is estimated and its ability to secure regular credit payments out of generated incomes.

The payback period shows which project development period will generate operational cash flow equal to the total amount of invested capital. It is calculated in such a way that the total investment amount is divided by the average annual operational cash flow. More precisely, the period where project cash flow is projected (monthly, semi-annually or annually) will determine the speed at which the investment is paid back, i.e. how many months or years. When evaluating the project, it is imperative for investors to know the speed of investment payback, although this indicator is never used independent of other indicators.

**2.3. Methodology and Process Steps of Public-Private Tender Procurement**

How to arrive at a requested public contract, how to approach the private partner selection procedure and, of course, how to fulfil all the legal requirements?

A chronological overview of PPP project implementation Acts, excluding concession agreement elements (See Chart 2):
1. The public body adopts the Decision to initiate the PPP project implementation process (City/Municipal Assembly i.e. Municipality). This decision may have been adopted based on a Self-initiative Project Proposal submitted to the public body by an interested party responsible for conducting or implementing PPP projects. In the latter case, the public body considers the proposal and thereby decides whether or not to initiate the proposed project, within a period of 90 days (see Chart 2 step A).

2. The public body then develops the PPP project proposal and submits it to the relevant authorities for approval. In this period, the project proposal is also submitted to the Commission for PPP and Concessions of the Republic of Serbia for opinion and assessment, if implementation of the project can be achieved through the PPP model; (see Chart 2 step B).

3. The opinion and assessment of the Commission for PPP and Concessions of the Republic of Serbia is given; (see Chart 2 step C).

4. The Decision and consent to adopt the PPP project proposal is given by the relevant authority (municipal Assembly); (see Chart 2 step D).

5. Once the PPP proposal has received clearance from the relevant authority, the public body decides to initiate a public procurement procedure for the selection of a private partner (an open procedure defined by the Law on Public Procurement); (see Chart 2 step E).

6. With the initiation of public procurement, the public body forms a Commission responsible for the public procurement procedure; (see Chart 2 step E).

7. Once the public procurement procedure is initiated, the public body prepares tender documents which enable bidders to prepare their bids properly; (see Chart 2 step F).

8. The public body announces the call for public procurement (tender) of the PPP public contract, first in the local language, i.e. in the Serbian language and subsequently in the language most commonly used in international trade; (see Chart 2 step G).

9. Advertising and submission of the tender dossier to interested bidders; (see Chart 2 step G).

10. Submission of bids; (see Chart 2 step G).

11. Opening of the bids and drafting the Minutes of Bid Opening by the public procurement procedure Commission; (see Chart 2 step G).

12. The public body is obliged to submit the Minutes of the Bid Opening to all bidders within three (3) days of bid opening day; (see Chart 2 step G).


14. Before selecting a private partner and signing a contract, the public body is obliged to submit a final draft of the contract to the relevant authority (municipal Assembly) for approval, including all appendices which are integral part of the contract; (see Chart 2 step H).

15. The relevant authority (municipal Assembly) must approve the final draft of the contract within a 30-day period from the date of submission. Approval of the contract is based on an assessment of how well the draft contract conforms to the law and tender dossier. The public contract is complete only after it has been approved by the relevant authority; (see Chart 2 step H).

16. Based on the Bid Evaluation Report, drafted by the Municipal Public Procurement Procedure Commission and once approval of the draft contract has been granted, the public body then decides which private partner has been awarded the contract, within the period stipulated in the public call for bids. This decision must be clearly justified in black and white and contain data from the Bid Evaluation Report; (see Chart 2 step I).

17. The decision regarding the selected bid must be submitted within a three-day period from the day the decision was reached; (see Chart 2 step I).

18. The public body concludes the PPP contract with the chosen bidder; (see Chart 2 step J).
19. The public body is obliged to submit an information notice announcing the concluded PPP contract for advertising to the "Official Gazette of the Republic of Serbia" within three (3) days of signing the contract and this same notice must be posted on the public procurement web portal in the same timeframe; (see Chart 2 step J)

20. The public body is also obliged to submit the signed contract including all appendices and annexes (if any) and all attachments to the relevant ministry, responsible for financial affairs to be filed in the appropriate Register. Chart1 Activities and chronology for acquiring the necessary documents for the implementation of the PPP project see Chart 2 step J)
### Chart 2: Activities and chronology of acquiring necessary documents for a PPP project in accordance with the Law on PPP and Concessions

<table>
<thead>
<tr>
<th><strong>A. PUBLIC BODY / MUNICIPALITY ADOPTS A DECISION ABOUT INITIATION OF THE PPP</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SELF-INITIATIVE PROPOSAL (Article 19)</strong></td>
</tr>
<tr>
<td>• Domestic or foreign legal entity submits</td>
</tr>
<tr>
<td>• 90 days to accept the Proposal</td>
</tr>
<tr>
<td>• Form of Presentation or Pre-feasibility study</td>
</tr>
<tr>
<td>• List of Expenditures provided</td>
</tr>
<tr>
<td>• Contractual PPP</td>
</tr>
<tr>
<td>• SPV owned by private partner</td>
</tr>
<tr>
<td><strong>INITIATION AND PREPARATION OF PPP PROJECT SOLELY BY PUBLIC BODY (Article 12)</strong></td>
</tr>
<tr>
<td>• Requires Project team or Consultant</td>
</tr>
<tr>
<td>• Institutional PPP</td>
</tr>
<tr>
<td>• SPV jointly owned by partners</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>B. PREPARATION OF PPP PROJECT PROPOSAL (Article 27)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C. REPUBLIC COMMISSION FOR PPP &amp; CONCESSIONS (Article 27) – positive decision</strong></td>
</tr>
<tr>
<td><strong>D. DECISION OF MUNICIPALITY ASSEMBLY on consent on PPP proposal (Article 26)</strong></td>
</tr>
<tr>
<td>• 3 months to make a decision</td>
</tr>
<tr>
<td><strong>E. DECISION ON INITIATION OF PUBLIC PROCUREMENT (Law on Public Procurement Article 28)</strong></td>
</tr>
<tr>
<td><strong>ACT ON COMPOSITION OF PUBLIC PROCUREMENT COMMISSION</strong></td>
</tr>
<tr>
<td><strong>F. PREPARATION OF BIDDING DOCUMENTS AND MODEL OF PUBLIC CONTRACT (Law on Public Procurement Article 30)</strong></td>
</tr>
<tr>
<td>• Open Procedure (Minimum 52 Days)</td>
</tr>
<tr>
<td>• Bid Evaluation Report &amp; Contract Award</td>
</tr>
<tr>
<td><strong>H. MUNICIPAL ASSEMBLY consent on PUBLIC CONTRACT (Article 47, paragraphs 1 and 2)</strong></td>
</tr>
</tbody>
</table>

| **I. DECISION OF PUBLIC BODY ON CONTRACT AWARD NOTIFICATION ON CONTRACT AWARD TO ALL THE BIDDERS CONCLUSION OF PUBLIC CONTRACT (Article 47, paragraph 3 of PPP Law)** |

| **J. SIGNING OF PUBLIC CONTRACT (Article 48 of PPP Law)** |
| Notification on concluded PPP public contract: 1) ”Official Gazette of the Republic of Serbia”, 2) Public procurement portal |
| Registration of the Contract: Public Contracts Register to Ministry of Finance of the Republic of Serbia |

| **J. INTRODUCTION OF PRIVATE PARTNER (CONSTRUCTION WORKS / PROVISION OF SERVICES)** |
3. DESCRIPTION OF PUBLIC-PRIVATE PARTNERSHIP CONCEPT

3.1. Legal Background and Issues

Public-private partnership is one possible model that Serbia can use to build better quality infrastructure and facilities of public interest in future, as well as to provide beneficiaries, first and foremost, the general public, new services that are better quality or to improve on existing services.

It has already been made public that Serbian government will do its best to attract new investments through the PPP model, in the near future. This especially applies to energy projects like the building of hydro power plants and combined heat and electricity producing facilities.

For the government, the most cost-effective approach is to borrow from international banks or funds in order to build roads or bridges. Local governments, however, cannot borrow money in this way and PPP opportunities that correspond with the respective law, could very well be the key for future cooperation with private investors.

This issue has brought to light the necessity of creating a legal and institutional framework which will attract investors. This is why the Law on PPP and Concessions adopted in late 2011 has given local governments with extremely limited budgets hope.

Local governments will have the opportunity to engage private capital in order to build schools and kindergartens, water supply facilities, waste landfills, to convert fuel used in central and individual heating facilities in order to create savings. In other words, PPP will really enhance the possibility of financing projects which support public services, and for which funds are lacking in local budgets.

This is the true essence of introducing the private sector, which has strong know-how (sometimes more than the public sector) of business management models, how to decrease fiscal pressure on local budgets, how to speed up infrastructure investments, and how to improve services while at the same time, cutting costs.

3.2. Structures and Responsibilities within an ESCO Project as a PPP Concept

ESCO (Energy Service Company) is the generic name given to a novel concept in Serbia’s energy sector service market. In addition to innovative EE projects that reduce energy consumption, ESCO offers its clients financial solutions for project implementation. Users of ESCO services are industrial facilities, publicly-owned companies, public institutions and the residential sector i.e. the general public.

Basic features of the ESCO concept include:

- Integrated “one-stop-shop” solutions,
- Linking payments with project implementation.

The most attractive aspect of the ESCO model, from the client’s point of view is that the client collaborates with only one legal entity, in all phases of project implementation (and avoids having to deal with design consultants, energy suppliers, producers and suppliers of equipment, government and financial institutions).

Additionally, the “all-in-one-place” feature largely reduces the overall cost of EE project implementation.

ESCOs method represents a new approach to energy management which offers clients the following services when implementing energy efficiency projects:

- Resumes entire responsibility for design, implementation, supervision, control and financing of the project;
Guarantees investment payback through energy savings during contracted duration of the project.
- Its profit is closely tied to the amount of achieved energy savings in relation to percentages which are defined in advance by a contract signed with the client.

ESCO generates profit from the energy savings it achieves for its clients and therefore resumes the risk of billing its services until the first project results i.e. energy savings are achieved and verified. The profit level is directly connected to the amount of achieved savings in percentages, defined in advance in the contract. The contract also guarantees the client payback of investment through energy savings.

This type of contract, known as Performance Contracting involves the realization of measures which lead to verifiable and measurable or estimable energy savings and is used by ESCO.

In practice, there are three typical Performance Contract models:
- “Sharing of Savings” – ESCO finances project implementation and receives payback of its investment through 80% of the generated savings, while 20% of the savings remain with the client;
- “Guaranteed Savings” – the client resumes project implementation financing, and the cost of ESCO’s services are included in the cost of the project and are billed at the start of project implementation. In this type of contract, the entire achieved savings remain with the client;
- “Chauffage” - is a contract where ESCO resumes all responsibility in providing the client with a particular energy service, (for example: supplying steam to a specific technological process, heating buildings, street lighting, etc.). The client is guaranteed savings in comparison with existing costs. In this arrangement ESCO bills its fee in the amount of existing energy costs minus a savings percentage that range from 5% to 10%.

3.3. Municipal Guarantee Potential

For long-term contracts such as PPPs, it is very important for all parties involved to consider guarantees, to protect project partners from various risks that may occur in the long-term.

Partner Guarantees are foreseen by public contract as obligatory for both parties and define a higher level of responsibility.

Private Partner Collateral:
- Before signing the contract, the private partner is required to submit an unconditional bank guarantee issued by a first class bank, which is valid for at least one year in the amount of 10% of the contract value of each subject of the contract.
- The private partner is required to submit a new or extended bank guarantee before the existing guarantee expires, under the same conditions, no later than 30 June of the current year.
- If the private partner does not submit a new or extended guarantee before the expiration of the original bank guarantee, and fails to do so in the extended 15-day period left by the public partner, the public partner has grounds to terminate the contract in accordance with relevant articles.

Public Partner Collateral:
- As collateral for fulfilling its financial obligations in a timely manner, (fees to be paid to the private partner in accordance with and within deadlines defined by the PPP contract) the public partner is required to issue a void cheque to the private partner, on the day of signing, with authorization enabling the private partner to fill in the cheque in the amount covering non-payment of any indisputable debt for fees foreseen by the PPP contract.
• The private partner shall have the right to cash this certified cheque only after a prior 15-day notice has been issued to the public partner, enabling the public partner to fulfil its financial obligation, according to the PPP contract.

• If the cheque is cashed by the private partner, the public partner must issue a new certified cheque within 8 days and under the same contractual conditions.

• If the cheque cashed by the private partner does not cover the total amount owed by the public partner, the private partner has grounds to terminate the contract, in accordance with respective contract clauses.

3.4. Advantages and Opportunities for ESCO projects for Biomass based Heating Systems in Public Buildings

The main feature of performance contracting is that the company providing energy services must finance EE measures in public facilities using their own resources or funds borrowed on the financial market.

The ESCO Company bears all technical and financial risk (or the majority of risks) for measures implemented in public facilities within the scope of the contract, both in energy consumption and any future maintenance costs. If contracted EE improvements and maintenance cost savings are achieved, ESCO then receives the expected profit, and if this does not occur, the public sector has the right to collect the contracted fee. When the achieved savings are greater than the contracted savings, both parties share the benefits, as defined in the contract.

The public sector, as owner of the public facility, stand to gain many benefits. For example, it is not required to use its own resources, nor does it have to borrow funds to invest in EE measures.

Basically, the burden of investing in a public facility is shifted to the private sector, and repayment is performed out of savings achieved in current expenditures, normally planned in the annual budget for such purposes. Energy systems found in public facilities are extremely complex and the EE measures taken to upgrade/replace these systems are also extremely multifaceted.

As a rule, the public sector lacks both human resources and the equipment necessary to prepare and implement projects of this kind. However, by using this model, procurement of the above is transferred entirely to the private partner.

Services offered by various companies in the private sector range from project preparation and development, design, execution of works, equipment supply, energy services and maintenance, to complete reconstruction of energy systems in buildings and its financing.

Furthermore, newly installed measures and systems become the property of the public sector immediately after instalment, regardless of the contract term, whereby the private company then takes over responsibility of maintaining the measures implemented and installed equipment for the entire term of the contract.

From the client's point of view, i.e. the public sector, one of the most attractive aspects of performance contracting is that during project implementation, the client cooperates with a single contractor (company) throughout every phase of the project.

By receiving a package service arrangement, the public partner can significantly reduce transaction costs as well as human resources costs, which are very often the biggest obstacle in implementing EE projects in the public sector.
3.5. Legal Requirements, Methodology, Process Steps and Milestones for ESCO projects for Biomass based Heating Systems in Public Buildings within the PPP Model

In order to attract private capital to finance projects such as these, they have to be significantly profitable and the responsibilities and rights of all parties need to be clearly defined in the contract. Parties including those involved in financing, construction and end-users, defined, first and foremost, by the following terms:

- A level of economic stability in the host country,
- The method by which legal regulations define projects and investments,
- Risk sharing between both sectors, i.e. to what degree do existing legal regulations protect the public partner’s interests, as well as private capital,
- Project investor credibility,
- How the project is structured,
- Quality of the project’s financial structure, and
- Degree of financial market development in the host country.

Two crucial factors in attracting private capital to invest in infrastructure projects are: (i) a favorable economic environment and (ii) a legal structure which protects the interests of private capital (both foreign and domestic).

The risks involved in construction works are allocated to representatives of private capital, who then transfer this responsibility over to a Special Purpose Entity or Vehicle (SPE or SPV), a so-called "project company", which can belong to the private capital representatives or can be jointly-owned by a public-private entity (called an Institutional PPP). A SPV is the best solution here because the shared risks are then clearly defined between private capital representatives and local government.

Private capital representatives are better able to cope with a project’s commercial risk i.e. more efficient construction management and financing, however, in order for them to gain the trust of investors (funds, associations and banks), they must have the support of the public sector, especially regarding construction permits, land expropriation to be used to construct DH facilities, and guaranteeing the minimum income amount, when there is a risk of insufficient demand.

The investor’s level of credibility, which is represented by its ability to build and manage the project implementation both successfully and on-time, is very important in order to obtain external financing. In developing countries, where financial market development is low, long-term bank loans are available exclusively from external financial sources.

Economic and political stability are key factors in attracting potential investors. Evaluation of these factors is based on macroeconomic stability (GDP, inflation, national currency), the country’s risk level is assessed by an international auditor, and public and external debt is taken into consideration.

Exchange rate stability is extremely important because a decrease in the national currency rate can significantly decrease (investor) profits, leading to more money being spent on credit instalments (which are tied to foreign currency), regardless of whether the investor is domestic or foreign.

Representatives of private capital are responsible for project construction works and service billing, while the public sector retains ownership over infrastructure after the contract has reached term. The responsibility of project implementation is shared between both sectors.
The main project risks are:
- Construction works risk,
- Required services for project completion are not available in the market,
- National currency rate risk,
- Political risk,
- Lack of legal experience in municipalities concerning implementation of PPP legal procedure accompanied with legal structure that lacks bylaws to reduce legal gaps and improve interaction between Laws and
- Force majeure (natural disasters).

Before the project financing process begins, the obligations of all parties involved must be clearly defined.

The private partner’s credibility is measured by experience, i.e. the number of already executed projects of a similar nature. At the very start of the project, i.e. its conceptual design, the private partner must be qualified to execute the project, not only in technical terms but also in financial and legal terms as well. Many projects of this kind are executed through project financing, where an investor leans towards designed profitability more than on creditworthiness and the payback capacity of the project.

And finally, the main advantages of this financing model are:
- There is no negative influence on the macroeconomic stability of the country, i.e. no fiscal or inflationary pressures are placed on the economy,
- The construction phase is implemented more efficiently due to the fact that the previously defined project budget has not been exceeded. Also, moderate operational costs (especially in terms of the number of employees) during the exploitation phase, all positively influence the pricing policy.
4. OVERVIEW OF FINANCING PROGRAMS, CONDITIONS AND INSTITUTIONS

In the plans of the Serbian business community, investments in EE projects and projects promoting renewable energy sources (RES) are more often being considered.

Financing EE and RES projects can be obtained through the KfW Development Bank and the European Bank for Reconstruction and Development - EBRD through the WEBSEDFF programme – Western Balkans Sustainable Energy Direct Financing Facility.

**KfW**

KfW Development Bank (KfW Entwicklungsbank), acting on behalf of the German Federal Government, finances investments and consultancy services in developing countries and countries in transition through financial cooperation with the Ministry for Economic Cooperation and Development (BMZ) of the Federal Republic of Germany.

**Loan Terms:**

<table>
<thead>
<tr>
<th>Individual loan amount:</th>
<th>Agricultural</th>
<th>No limits</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>EE and RES</td>
<td>Up to EUR 1,000,000</td>
</tr>
<tr>
<td></td>
<td>General infrastructure</td>
<td>Up to EUR 1,200,000 with a maximum of EUR 2,500,000 per individual project</td>
</tr>
<tr>
<td>Maturity:</td>
<td>Up to 7 years</td>
<td></td>
</tr>
<tr>
<td>Grace period:</td>
<td>Up to 2 years</td>
<td></td>
</tr>
<tr>
<td>Interest rate:</td>
<td>Dependent on the intermediate bank’s interest rate for loans from other sources and for the same purpose</td>
<td></td>
</tr>
</tbody>
</table>

KfW loans are available for small and medium enterprises, local governments, farms and natural persons through correspondent or intermediary banks:

<table>
<thead>
<tr>
<th>Bank</th>
<th>Loan Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>ČAČANSKA BANK</td>
<td>EUR 5,000,000 for EE and RES</td>
</tr>
<tr>
<td>KOMERCIJALNA BANK</td>
<td>EUR 30,000,000 for farming and EUR 25 million for general infrastructure</td>
</tr>
<tr>
<td>PROCREDIT BANK</td>
<td>EUR 40,000,000 for farming</td>
</tr>
</tbody>
</table>

In Serbia, KfW activities are focused on construction and infrastructure expansion, creating efficient financial institutions, securing resources and a healthy economic environment. KfW, in cooperation with international consultancy firms, also supports its partners in the project preparation and implementation.

**Purpose of Loans:**

- Agriculture – financing agricultural production and the food industry (purchasing farm land, buildings, machinery and equipment, breeding cattle, investments in developing organic produce and fruit cultivation and investments in operational capital of up to 10% of the total loan amount);
- EE and RES – reconstruction financing, renovating or equipping small and medium enterprises and residences which shall decrease the specific energy consumption and CO₂ emissions by at least 20%;
- Local government infrastructure – financing construction and reconstruction of water supply and sewage systems, purchasing vehicles and machinery to provide communal services...
and public transportation, street repairs, construction and reconstruction of electric power grids, street lighting and heating systems, construction and reconstruction of social infrastructure (i.e. schools, kindergartens, health care institutions, etc.).

**KfW-MEGLIP**

KfW has launched in Summer 2014 the Municipal Environment Grant–Loan Investment Programme (MEGLIP) for the financing of infrastructure in Serbian municipalities in the area of energy efficiency, renewable energy and environment.

The MEGLIP programme offers to Local Governments and Public Utility Companies (PUC):
- Low–interest Loans for energy and environment projects
- EU–financed Grants of up to 20 % of the project cost
- Technical Assistance for project development

Bioenergy Heating Projects in Serbian Municipalities currently can be financed with a 100 % credit line without equity requirements up to 1.2 million EUR of overall investment, providing low-interest loans through private banks, up to 20 % of EU-financed grant after project implementation.

The programme is a continuation of the previous KfW credit line for municipal infrastructure, which since 2009 has disbursed close to 100 m € in loans for the financing of more than 300 projects in more than 60 locations all over Serbia.

⇒ find more under: [www.meglip.org](http://www.meglip.org)

**EBRD**

The WEBSEDFF project began in Serbia in May 2009 and has successfully implemented several projects amounting to approx. EUR 50 million from EBRD funds.

In May 2012, the second phase of the WEBSEDFF project started with an additional EUR 50 million, to finance various other projects, and in addition to the new funding, free technical support was made available to clients, as well as non-refundable incentives, that make up 10% of the total amount of the loan. It is important to note that companies that are under private ownership can also apply for WEBSEDFF funding, giving these companies the opportunity to potentially become a private partner in a PPP project. EBRD approves the loan terms of each project individually.

The average expected loan payback period is 6 to 8 years for EE projects and 12 to 15 years for RES projects, including a grace period and flexible payoff plans.

**What is WEBSEDFF?**

- EBRD direct project credit line;
- Intended for small industrial EE and RES projects;
- Available in western Balkan countries (Albania, Bosnia and Herzegovina, FYR Macedonia, Croatia, Montenegro and Serbia including Kosovo according to UN Resolution no. 1244);
- Credit line amount: up to EUR 100 million plus EUR 21.5 million in funds for technical cooperation and incentives.

**Conditions of financing through WEBSEDFF credit line**

- Senior loans (with collateral) and project financing;
- Amount of individual loan: from EUR 2 to 6 million for EBRD financing (in some countries from EUR 1 million);
- Average expected payback period: 6 to 8 years for EE projects and 12 to 15 years for RES projects including a grace period and flexible payment plans;
- Market interest rates;
- The credit line is supported by (i) funds for technical cooperation that finance project proposal identification and preparation, and (ii) funds for incentives based on estimated CO$_2$ emission reduction as the result of an individual project.

**WEBSEDDF’s Position**

WEBSEDDF is a part of the broader EBRD initiative for sustainable energy development in the western Balkan region which also includes:

- a WEBSEDDF credit line of up to EUR 60 million for financing industrial EE projects and RES projects through commercial banks (in B&H, FYR Macedonia, Montenegro and Serbia) with individual loans starting from EUR 100,000 to EUR 2 million, including the support of technical consultant and incentives;
- an institutional support development component in the amount of EUR 3.5 million which deals with improvements to existing laws and bylaws and other constrains which curb sustainable energy project development.
Selection criteria:
In order to fulfil conditions for financing and incentives, projects have to meet specific criteria:

1. **Technical criteria defined as:**
   - Minimum 20% energy savings in industrial EE projects;
   - Minimum efficiency factor in RES projects.

2. **Financial criteria:**
   - A financially and economically sound structure, including sufficient participation of the investor’s own capital in the investment.

3. **Other criteria:**
   - For projects requiring concessions, permits and licenses, all documentation must be issued in accordance with EBRD requirements (transparent through publicly disclosed competition, among other criteria).

   Examples of projects that have the potential of being financed through WEBSEDF credit line:

**Energy efficiency (EE):**

1. Cogeneration – combined production of heat and electricity;
2. Three-generation – combined heating, cooling and electricity production;
3. Rehabilitation of existing boilers (modernizing control devices, the installation of economizers, insulation improvement, installation of regenerative burners, automatic drainage, etc.);
4. Replacement of old boilers with condensation boilers;
5. Switching from electrical heating systems to other means of heating;
6. Rehabilitation of steam distribution systems, installation of condensate traps, improvement of condensate return pipelines, etc.;
7. Installation of recuperation systems – use of waste heat from technological processes (installation of economizers for preheating purposes, heat recovery for space heating, heat recovery for drying and/or from ventilation systems);
8. Rehabilitation of compressed air systems (decentralization and/or new dimensioning of compressor, replacement of old compressors with new, more efficient ones);
9. Rehabilitation of electrical distribution systems (replacement of old and oversized transformers, installation of condensers to reduce consumption of reactive electric energy, etc.);
10. Installation of more efficient chillers, frequency variation devices, more efficient street lighting;
11. Improvements in process of production, monitoring and control;
12. EE measures in buildings could also be financed, but only as a part of a whole package of EE measures which include the above mentioned measures;
   - Improvement of heating system efficiency including heat source, distribution system with heating devices, hydraulic balancing;
   - Installation of heat meters and controls;
   - Installation of new windows and doors with low U values;
- Systems with renewable energy sources (solar panels, biomass boilers, geothermal systems with or without heat pumps);
- Thermo insulation of external walls, roofs and floors;
- Thermo insulation of heating/cooling distribution systems;
- Use of waste heat (from processes and ventilation systems);

Renewable energy sources:
1. Free flow hydro power stations under 10 MW;
2. Wind power stations up to 20 MW;
3. Solar systems for heating hot water and sanitary water, drying systems;
4. Solar power stations for electricity production;
5. Biomass systems for producing heat and electricity only or the combined production of heat, electricity and cooling;
6. Biogas facilities;
7. Geothermal heat pumps;
8. Production of fuels such as pellets or other bio fuels (incentives are not provided for these kinds of projects);

Energy efficiency projects in the public sector:
These kinds of projects are under an ESCO contract implemented by a private ESCO company together with publicly-owned companies, responsible for equipment, systems and processes that enable the reduced consumption of primary energy and/or the final consumption of electrical energy and/or other fuels (fossil or renewable) and/or other means of energy.
EBRD consultants offer support in the load approval process to potential loan users, as well as to EBRD itself.
In Serbia, EBRD funds are distributed through Komercijalna and Intesa banks.
Local governments have other options when it comes to financing, for example, UniCredit Bank’s credit line offers loans to newly formed small and medium enterprises which finance and follow ESCO companies’ projects.
5. Overview of Possible Biomass Project Opportunities

5.1. District Heating Companies

Table 4: DH Companies service costs and billing by consumers (listed prices excluding VAT)

<table>
<thead>
<tr>
<th>No.</th>
<th>DH Company (TOPLANA)</th>
<th>PRICE OF HEATING</th>
<th>Way of billing</th>
<th>Office spaces</th>
<th>Way of billing</th>
<th>In use from</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BELGRADE</td>
<td>103.64 RSD/m²</td>
<td>12 months</td>
<td></td>
<td></td>
<td>01.02.2013</td>
</tr>
<tr>
<td>2.</td>
<td>NOVI SAD</td>
<td>9.81 RSD/m²</td>
<td>12 months</td>
<td>7.58 RSD/kWh</td>
<td>01.11.2012</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Kragujevac</td>
<td>4,133.61 RSD/kWh</td>
<td>12 months</td>
<td>241.70 RSD/kWh</td>
<td>16.11.2012</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>BOR</td>
<td>74.26 RSD/m²</td>
<td>12 months</td>
<td>9.75 RSD/m³</td>
<td>04.12.2012</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Nis</td>
<td>83.60 RSD/m²</td>
<td>heat season</td>
<td>25.10 RSD/m²</td>
<td>01.07.2013</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Pancevo</td>
<td>101.85 RSD/m²</td>
<td>12 months</td>
<td>10.98 RSD/m²</td>
<td>01.02.2013</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Kraljevo</td>
<td>83.50 RSD/m²</td>
<td>12 months</td>
<td>25.10 RSD/m²</td>
<td>20.10.2012</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Uzice</td>
<td>86.78 RSD/m²</td>
<td>12 months</td>
<td>25.10 RSD/m²</td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Smederevo</td>
<td>92.40 RSD/m²</td>
<td>12 months</td>
<td>25.10 RSD/m²</td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Sabac</td>
<td>4.00 RSD/kWh</td>
<td>variable part</td>
<td>91.20 RSD/m²</td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Priboj</td>
<td>83.35 RSD/m²</td>
<td>12 months</td>
<td>25.10 RSD/m²</td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Leskovac</td>
<td>101.52 RSD/m²</td>
<td>12 months</td>
<td>25.10 RSD/m²</td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Pirot</td>
<td>83.19 RSD/m²</td>
<td>12 months</td>
<td>25.10 RSD/m²</td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Majdanpek</td>
<td>101.85 RSD/m²</td>
<td>12 months</td>
<td>25.10 RSD/m²</td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>RSD/kWh</td>
<td>RSD/m² fixed part</td>
<td>RSD/m² heat season</td>
<td>Installed power</td>
<td>Monthly</td>
<td>Date</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>-----------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Cacak</td>
<td>5.32</td>
<td>24.91</td>
<td>7.99</td>
<td></td>
<td>01.03.2013</td>
<td></td>
</tr>
<tr>
<td>18. S. Mitrovica</td>
<td>64.56</td>
<td>167.72</td>
<td>203.63</td>
<td></td>
<td>24.09.2012</td>
<td></td>
</tr>
<tr>
<td>19. Jagodina</td>
<td>92.40</td>
<td>277.20</td>
<td>277.20</td>
<td></td>
<td>01.02.2013</td>
<td></td>
</tr>
<tr>
<td>20. Valjevo</td>
<td>85.92</td>
<td>128.88</td>
<td>128.88</td>
<td></td>
<td>01.11.2012</td>
<td></td>
</tr>
<tr>
<td>23. Ruma</td>
<td>97.95</td>
<td>146.92</td>
<td>146.92</td>
<td></td>
<td>01.11.2012</td>
<td></td>
</tr>
<tr>
<td>24. Vrbas</td>
<td>90.00</td>
<td>135.00</td>
<td>135.00</td>
<td></td>
<td>01.11.2012</td>
<td></td>
</tr>
<tr>
<td>25. Kikinda</td>
<td>37.96</td>
<td>45.55</td>
<td>56.93</td>
<td></td>
<td>08.02.2013</td>
<td></td>
</tr>
<tr>
<td>27. Trstenik</td>
<td>30.00</td>
<td>147.00</td>
<td>147.00</td>
<td></td>
<td>01.05.2013</td>
<td></td>
</tr>
<tr>
<td>28. Sombor</td>
<td>5.61</td>
<td>31.66</td>
<td>31.66</td>
<td></td>
<td>01.03.2013</td>
<td></td>
</tr>
<tr>
<td>29. Novi Pazar</td>
<td>71.00</td>
<td>255.00</td>
<td>370.00</td>
<td></td>
<td>01.11.2012</td>
<td></td>
</tr>
<tr>
<td>30. Vranje</td>
<td>89.48</td>
<td>107.60</td>
<td>184.61</td>
<td></td>
<td>01.03.2013</td>
<td></td>
</tr>
<tr>
<td>31. G. Milanovac</td>
<td>105.00</td>
<td>252.02</td>
<td>333.02</td>
<td></td>
<td>16.11.2012</td>
<td></td>
</tr>
<tr>
<td>32. Nova Varos</td>
<td>96.80</td>
<td>125.02</td>
<td>125.02</td>
<td></td>
<td>01.11.2013</td>
<td></td>
</tr>
<tr>
<td>33. Bajina Basta</td>
<td>83.35</td>
<td>298.92</td>
<td>298.92</td>
<td></td>
<td>01.10.2012</td>
<td></td>
</tr>
<tr>
<td>34. Kosjerić</td>
<td>99.64</td>
<td>113.91</td>
<td>113.91</td>
<td></td>
<td>15.02.2012</td>
<td></td>
</tr>
<tr>
<td>35. Knjaževac</td>
<td>83.31</td>
<td>119.51</td>
<td>119.51</td>
<td></td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>36. Batocina</td>
<td>84.31</td>
<td>60.91</td>
<td>60.91</td>
<td></td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>37. BEOcin</td>
<td>87.36</td>
<td>131.04</td>
<td>131.04</td>
<td></td>
<td>01.05.2013</td>
<td></td>
</tr>
<tr>
<td>38. Pecinci</td>
<td>73.71</td>
<td>110.56</td>
<td>110.56</td>
<td></td>
<td>01.11.2012</td>
<td></td>
</tr>
<tr>
<td>40. Kovin</td>
<td>87.60</td>
<td>60.91</td>
<td>60.91</td>
<td></td>
<td>01.12.2012</td>
<td></td>
</tr>
<tr>
<td>41. Pozarevac</td>
<td>2.31</td>
<td>3.39</td>
<td>3.39</td>
<td></td>
<td>01.05.2013</td>
<td></td>
</tr>
<tr>
<td>42. Lazarevac</td>
<td>52.45</td>
<td>38.74</td>
<td>38.74</td>
<td></td>
<td>01.01.2013</td>
<td></td>
</tr>
<tr>
<td>43. Obrenovac</td>
<td>38.74</td>
<td>38.74</td>
<td>38.74</td>
<td></td>
<td>01.01.2013</td>
<td></td>
</tr>
</tbody>
</table>
Census from 2011 has shown that 48.9% of flats in Serbia are connected to publicly-owned heating production plants (DH companies) or to individual boiler houses. In cities 66.3% of flats have centralized heating installations; in other parts of Serbia 25.9% of houses have centralized heating systems. Compared to previous census there is a visible increase in the number of flats with heating installations. Over the past 10 years, heating installations have been introduced into 461,837 occupied flats. In Serbia, there are 3,231,931 flats.

Table 5: Debts of some DH companies which are members of the “Serbian DH Companies” Business Association - June 2013

<table>
<thead>
<tr>
<th>No.</th>
<th>DH Company (Public Utility)</th>
<th>Debt owed to suppliers (data from 2013) (RSD)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CAČAK</td>
<td>RSD 248 million</td>
<td>Debt owed to the gas supplier “Srbijagas” 4,200 tons of crude oil</td>
</tr>
<tr>
<td>2.</td>
<td>SMEDEREVO</td>
<td>RSD 75 million</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>JAGODINA</td>
<td>RSD 2.5 billion</td>
<td>Blocked by “Srbijagas” 25.03.2013 In blockade 5-6 days</td>
</tr>
<tr>
<td>4.</td>
<td>NOVI SAD</td>
<td>RSD 270 million</td>
<td>Blockade RSD 22 million</td>
</tr>
<tr>
<td>5.</td>
<td>NOVI PAZAR</td>
<td>RSD 120 million</td>
<td>Crude oil debt</td>
</tr>
<tr>
<td>6.</td>
<td>NIS</td>
<td>RSD 2.3 million</td>
<td>Debt owed to the gas supplier “Novi Sad gas”</td>
</tr>
<tr>
<td>7.</td>
<td>PRIBOJ</td>
<td>RSD 318 million</td>
<td>Debt in the form of 4,700 tons of crude oil borrowed from State Reserves in the previous period</td>
</tr>
</tbody>
</table>

Source: Business Association of District Heating Companies in Serbia, June 2013
DH companies are now facing the following substantial and chronic issues:

- Overdue debt to gas, crude oil, fuel oil or coal suppliers,
- Insufficient collection from consumers of heating energy, both residential and non-residential,
- Uncertain gas supply from Russian partner because of the crisis in the Ukraine.

The main activity of municipal DH companies is the production of heat energy and its distribution throughout DH networks to end users in urban areas.

Boilers operate during the heating season, approx. 184 heating days or 3,128 heating hours. The average number of heating hours in a day is 17. Between the hours of 21:00 to 06:00, boiler houses operate on standby.

As construction/reconstruction of biomass boiler houses is planned mainly in city centres or within city limits, it is very important to consider potential environmental risks, and to undertake the necessary technical and organizational precautions in order to mitigate risks, for the health of the general public. Therefore it is necessary to prepare an assessment study on the operation of biomass boilers and their influence on the environment.

Environmental impact assessment is a preventive environmental protection measure based on the preparation of a study, the conducting of public consultations and the analysis of presented options, for the purpose of collecting data and estimating any potential harmful impacts that certain projects may have on human life, vegetation, soil, water, air, climate, cultural heritage, or combinations of any of the above. Also, this assessment is carried out to confirm and suggest any mitigation measures which can diminish or remedy harmful effects related to project implementation.

An Environmental Impact Assessment Study is a document that analysis and assesses the quality of environmental components and their sensitivity in a given area as well as the influences of existing and planned activities. It forecasts any direct and/or indirect harmful impacts that the project may have on the environmental components as well as providing solutions or conditions which can prevent, diminish or remediate harmful impacts on the environment and human health.

An Environmental Impact Assessment Study contains following:

- Data re the body responsible for carrying (carrier) the project,
- Description of the planned location of project implementation,
- Project overview,
- Presentation of main alternatives which have been considered by the project carrier,
- Presentation of the environmental situation on the location and nearby surroundings (micro and macro location),
- Description of possible significant harmful impacts the project may have on the environment,
- Environmental impacts assessment in case of accidents,
- Description of forecasted measures aimed at preventing, diminishing, and where possible, remediing any significantly harmful environmental impacts,
- Programme designed to monitor environmental impacts,
- Brief, non-technical presentation of data,
- Technical failures data or lack of adequate professional know-how, or incapability of acquiring adequate biomass data.
This study should determine, at the preliminary design level, the concept for building a new boiler house and verify the viability of the design concept, based on technical and economic analysis. It is necessary to present basic technical and economic indicators of facility management for the proposed design concept as well as to analyses the new technical and economic situation of the heat production facility.

**General technical requirements for building a boiler facility**

When reconstructing an existing facility, the future reconstructed boiler house (a combined facility using biomass and crude oil) should meet the following basic technical, economic and environmental requirements:

- To prepare for the construction of a new facility and to reconstruct the existing one, aimed at improving energy efficiency,
- To enable use of renewable energy sources i.e. biomass,
- To use existing equipment and infrastructure optimally, at the same time, enabling an extension to the new boiler house, to supply existing and future consumers with heat energy,
- Doing so will achieve highly economic, competitive heat energy production prices, compared to heat produced using crude oil (fossil fuel) only,
- Environmental pollution remains within European emission standards,
- To secure reliability and availability of the facility in all operational procedures,
- To secure a modern management system and control of existing and newly built facility operation,
- To enable a modern maintenance system at minimum (optimal) cost.

Construction of a new boiler facility must not affect the supply of heat energy to consumers during heating season.

**Particular technical requirements for boiler facilities**

The biomass facility should maintain the base-load source of heat energy in accordance with economic indicators, while the crude oil facility should cover peak loads and enable heat energy supply in sufficient volume when the biomass facility is not in operation.

The biomass facility should have a biomass boiler, with a possible capacity variation ratio of 1:2, a fuel feeding device, and adequate storage space for biomass, communications, ash disposal and flue stack.

The existing light fuel oil/crude oil facility should be reconstructed in order to increase operational security and efficiency.

When choosing a base fuel for a biomass boiler, a fuel that will provide easier operational control, better quality combustion, easy transport of biomass, safe storage, a secure supply, and be cost-effective.

The EE rate must not be less than the EE criteria set by respective EU directives.

**Environmental requirements**

A biomass boiler facility must be designed in accordance with modern requirements for environmental protection. NO\textsubscript{x} and CO\textsubscript{2} emissions in the atmosphere and water treatment must be in accordance with European and Serbian standards and legislations. Adequate solutions must be forecasted in order to secure low noise levels, in accordance with EU standards.
Expected situation upon completion of the study draft

The expected situation at Project completion should be as follows:

- The total installed heat capacity of the heat production facility should enable future extensions, accommodating new consumers, while at the same time reducing prices,
- Municipal DH companies would receive new biomass facilities, thus contributing to the development plans of Serbia’s energy sector in terms of the use of renewable energy sources,
- From the environmental protection aspect, a clean energy technology facility would be acquired, whose operations do not have a negative impact on the environment, and operates in accordance with the Kyoto protocol.
- Reliability and security of the heat energy supply would increase, and this would allow the facility to expand the area it operates in, reaching more consumers.

These kinds of projects are attractive and for that reason the investment possibilities are high, i.e. grants, donations and favorable loans are available.

While creating the study draft, it is necessary to use the following data:

- The municipal DH Company’s existing technical documentation,
- Equipment manufacturer’s materials and documentation,
- International experience in construction, reconstruction and modernization of similar systems
- General Urban Development Plan
- Serbian and international legislation and regulations.

5.2. Biomass Boiler Producers

Selecting the right boiler facility and fuel is of key importance for energy savings, which are the basics of any successful heat energy delivery business.

If a boiler facility which fires wood biomass is selected, then the situation is quite specific when compared to the selection of a standard boiler facility. One reason to construct a new (or reconstruct an existing) boiler facility is to have a facility which will produce heat energy at lower prices in comparison with the current facility. Another reason is to have a facility that will use local renewable fuels and therefore will not be dependent on external factors such as shortages of crude oil and its products, coal mining or the gas supply as well as avoiding potentially inflated prices).

The standard procedure for selecting a boiler facility’s heating system capacity includes calculations based on consumer heat demand and climate data (which are proportionally related).

In practical terms, this means that if just one boiler unit is selected according to the pick load for a particular time of year (season), that boiler will work at 60% of the nominal load most of the time. Therefore, nominal loads greater than 700 KW should be split into combinations of smaller boiler units (200+500, 300+500, 300+700 KW) if this is possible and space allows for it, so that the heating system functions optimally and utilize bio-fuel rationally during the heating season.

Boilers fired by wood pellets are completely automated systems, as are boilers that fire using light fuel oil, crude oil or gas. Today, these boilers are equipped with system controls that have microprocessors that regulate and adjust the volume and flow of pellets and fresh air for efficient combustion. This ensures high combustion efficiency (over 90%) and low air pollutant emissions.
Wood pellet boilers have the following primary features:

- Simple and easy to feed pellets into the unit. Pellets come in 15 kilo, PVC bags or in special tanks if larger quantities are requested (usually 1, 2 or 5 tons) depending on storage space capacity,
- Automated combustion control,
- Very easy to clean and maintain,
- Extremely reliable and safe to use,
- High performance regarding environmental pollution reduction,
- Simple handling,
- Average CO₂ emissions under 12%,
- Automatic start and restart in case of loss of electricity.

In Serbia there are several domestic producers of quality biomass boilers as well as numerous representative offices and dealers of international producers:

- Toptherm LLC – Bečej
- Tehnoserv LLC – Subotica
- ATI Terming Kula
- Tipo Korlogradnja, Belgrade
- Radijator LLC - Kraljevo
- Kirka SURI LLC – Krnjača, Belgrade
- Sukom - Knjaževac
- UNIKO – Kovačica, Pančevo
- Termico LLC – Šimanovci, Belgrade
- Igumanov - Belgrade
- Termomont LLC – Šimanovci, Belgrade
- Representatives of international producers: Centrometal, Bosch, Ferroli, Heizomat, Viessmann

5.3. Pellet Producers and Supply Chain


"Knowing how much biomass is available is crucial when deciding on how to utilize it. It is also necessary to obtain a steady and long-term supply of biomass at reasonable and competitive prices.

Presently, the available potential is not being utilized to its full capacity because organized collecting of biomass for energy purposes does not exist, nor does the corresponding infrastructure. Another reason is the underdeveloped consciousness surrounding the different possibilities of biomass utilization. The use of biomass originated in the farming, forestry and wood processing industries, and depended on agreements made between many farm land woodland and sawmill owners which only served to decrease reliability of the supply chain and create problems in the supply of biomass."
Most often, biomass is used to heat residences. There have been some positive experiences in using biomass in large plants, but the main obstacles are security of purchase and the costs. Some companies use their own biomass, for example, wood residuals are used in the forestry and wood processing industries, and agricultural residuals are used on farms to produce heat energy. Examples of biomass trading exist, but without long-term supply contracts. Biomass prices are not clearly defined and therefore can significantly vary at different locations and at different times of the year. At the same time, pellet producers mainly export their goods to foreign markets because devices for pellet combustion are rarely used in Serbia.

Production and storage of wood chips

Wood chips are the cheapest woody biomass fuel per produced heat kWh. Depending on initial source material, wood chips are mainly produced on-location or in the vicinity of where the material can be found. The main reason for this approach is of an economic and technical nature.

The production of wood chips from forest residuals usually require the use of mobile machinery with their own power supply, or powered by another machine, most often a device which attaches to a tractor that has strong aggregates.

After being loaded onto conveyor belts, wood chips produced in this way, are transported mainly by truck or in tractor trailers to storage units, then they are hauled in containers to large heat production facilities and to other consumers, such as wood based plate factories. If the wood chips were produced from a material that had a humidity level of less than 25%, than it is stored in closed storage units (with occasional shifting and ventilation), and if the chips were produced from material with a humidity level above 25% it is then stored in partly-closed units.

Experience from Austria has shown that economically-speaking, a supply of wood chips can be up to 80 kilometers away from the heat production facility. Numerous agricultural households, private woodland owners and publicly-owned companies participate as wood chips producers in the supply of public and private heat production facilities in two ways: selling wood chips as a final product or, in most cases, participating in the kWh price, which is billed to the end users. The kWh price share depends on the wood chips quality.

The price of wood chips depends on several factors, and one of the most important is the transport distance between the storage facility and the heat production facility where the wood chips are utilized as fuel.

When drafting project documentation for a heat production facility that will use wood chips, it is necessary to consider the availability of wood chips in the requested quantities, transport distances and the purchase price.

Advantages of using wood pellets

Comparing to other, less refined wood fuels such as logs, chips or bricks, pellets have numerous advantages, of which following are most prominent:

- Less space volume is needed for transport and storage because of dimensions and larger specific density,
- Fewer shipments (one or two) to consumers during the heating season,
- Consistent and constant dimensions and humidity content,
- Possibility of multipurpose use, in one-room stoves or boilers,
- Unload in storage without damages or losses,
- Fully automated and simple transportation from storage to boilers,

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• Easy handling, and
• Easy ignition.

Pellet production is either the main activity performed by a business or a secondary activity when producing other wood products.

The initial raw material for producing wood pellets is usually used sawdust, chips and small and large wood residuals. Regardless of what kind of wood residual is used, all impurities must be removed including any metal particulates, sand and small stones.

Central heating systems which use wood pellet boilers are as comfortable as heating with liquid fuels. It is not necessary to constantly monitor and control these boilers because this function is done by a microprocessor, and feeding the boiler with pellets from a stockpile is automated.

It is very important to producers and consumers of wood pellets that the quality and origin of the raw material used for pellet production are constantly controlled. In this regard, producers of wood pellets are obliged to have corresponding quality control certificates, issued by authorized laboratories in which wood pellets are tested.

Additionally, in the EU there is a defined, separate system for certifying wood pellet production, called Enplus Certification.

With certification, the entire supply chain is known, from the suppliers of raw wood materials through to producers and distributors of wood pellets, thus controlling the entire origin and quality of the pellets.

5.4. Forest Management Companies and Legal Framework for Biomass Acquisition

Serbia is considered to have an average amount of woodland area. 29.1% of Serbia’s land is covered in forests (7% in Vojvodina and 37.6% in Central Serbia) according to data from the National Inventory of Forests in the Republic of Serbia for 2009.

Compared with 30% globally, and 46% in Europe (data from 2000), Serbia’s percentage of woodland is rather low. However, a 5.2% increase in forested areas compared to 1979, has had a positive influence on the environmental state and quality, as a whole. In relation to number of inhabitants, Serbia has 0.3 ha per capita (for example, Russia has 11.11, Norway 6.3, Finland 5.91, Bosnia 1.38 and Croatia 1.38 ha per capita).

The total woodland area in Serbia is 2,252,000 ha. The state owns 1,194,000 ha or 53%, and 1,058,387 ha or 47 % is privately-owned.

The publicly-owned company "Srbijašume", from Belgrade, governs over and manages 899,612.75 ha of publicly-owned woodland. They also provide expert/professional services to 1,058,387.00 ha of privately-owned woodland (data from 31 December, 2010).

Over the past twenty years, interest in growing forests for the production of biomass has steadily increased as the demand on European and world markets is ever-rising.

For the entire territory of Serbia, two publicly-owned companies are responsible for woodland management. They are: "Vojvodinašume" for the province of Vojvodina, and "Srbijašume" for the rest of the country.

A forest is considered as any area larger than 500 m² which is covered in trees, serves to protect or is used for the production of forest assortments or has some other special purpose.

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4 Public Utility Company “SRBIJASUME” - Belgrade
Tree alleys, city parks, forest nurseries and groups of trees less than 500 m² are not considered to be forests.

Owners of private woodland are private individuals.

Serbia’s total area is 77,474 km², approx. 24,000 km² is covered by woodland, while approx. 45,000 km² is farm land. Based on this data, we can conclude that there is relatively large potential for biomass. It is estimated that each year in Serbia, 12.5 million tons of biomass is produced, and that a very large amount is not used reasonably or rationally. Energy which could be received by using biomass is estimated to be equivalent to 2.66 million tons of oil (1.66 million toe from farmland or 62% and about 1 million toe from forest biomass or 38%).

Based on an analysis of potential for oil substitution, forest biomass gives 13% more toe per unit area of 1 km² than biomass from farmland.

More serious participation of wood biomass in energy production in Serbia can be expected in the years to come due to ratification of the Kyoto protocol, by which Serbia is required to reduce CO₂ emissions, mainly from fossil fuels.

There are several ways to get energy from biomass. One is to use forest biomass (residuals and waste from regular woodland management) and biomass from the wood processing industry (residuals and waste from sawing, grinding, and planning). During wood processing 35% to 40% of the initial raw material is lost in producing the final product.

The combustion process is defined through the following 4 steps:

1. Heating and drying,
2. Distillation of volatile ingredients – pyrolysis,
3. Combustion of volatile ingredients,

Basic functions in using forest or wood biomass as a fuel are the same as for any other fuel type:

- Chemical composition,
- Heat value
- Temperature of self-ignition,
- Temperature of combustion,
- Physical properties which have an influence on heat value (density, humidity, etc.).

The fundamental value in calculating energy amounts which can be produced from certain quantities of wood is its heat value. Humidity has the biggest influence on this value, and can be 50% to 55% of the chemical composition, density and health of the wood (2.2kg to 2.5kg of wood used for heating, with 20% moisture, contains the energy equivalent of 1 liter of light fuel oil).

Heat value is found by using calorimeters. Air and wood fuel must enter a combustion chamber at the same temperature, and the combustion products have to be cooled down to the same temperature. There are two values: lower heat value and upper heat value.

Upper heat value is a heat amount which is a result of the complete combustion of the unit quantity of fuel when fuel gases are cooled down to a temperature of 25°C and moisture from these gases is separated as condensate.

Lower heat value is a heat amount which is a result of the complete combustion of the unit quantity of fuel when fuel gases are cooled down to a temperature of 25°C and moisture remains in these
gases as vapour so that the condensation heat remains unused. When defining the efficiency of the heating system, a lower heat value is considered because it takes into account any realistic potential losses, while the upper heat value is used theoretical.

Because of the larger amount of moisture and volatile parts (up to 80%), the energy value of wood biomass is significantly lower than fossil fuels and can vary from 8.2 to 18.7 MJ/kg (hard coal 24 to 37.7 MJ/kg, dark coal 12.7 to 23.9 MJ/kg, lignite up to 12.6 MJ/kg), and therefore combustion chamber design has to be different from boilers which use coal:

- Combustion on the grid (smaller systems – smaller costs, but combustion of wet wood is unequal and produces higher emissions),
- Combustion in the fluidized layer (bigger systems – good for fuels with low heat value and higher moisture content).

Concerning the climate and type of trees found in Serbia, it is important to know whether or not the tree is deciduous or conifers and if it is hard or soft, because the amount of particular ingredients depends on these factors and whether or not it can be used as fuel. By reducing moisture, the biomass heat value increases significantly, this is why it is useful to dry the biomass.

**Table 6: State of woodland (structure of forested area)**

<table>
<thead>
<tr>
<th>STRUCTURE OF TOTAL WOODLAND AREA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest, forest cultures and forest land</td>
<td>849,323.47 ha</td>
</tr>
<tr>
<td>Other land</td>
<td>48,532.13 ha</td>
</tr>
<tr>
<td>Acquisitions</td>
<td>1,757.15 ha</td>
</tr>
<tr>
<td><strong>Total area</strong></td>
<td>899,612.75 ha</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STRUCTURE OF PLANTED AND NON-PLANTED LAND</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Planted (forests and forest cultures)</td>
<td>765,953.56 ha</td>
</tr>
<tr>
<td>Non-planted (forest land + other land + acquisitions)</td>
<td>133,659.19 ha</td>
</tr>
<tr>
<td><strong>Total area</strong></td>
<td>899,612.75 ha</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WOODLAND CONDITIONS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest and forest cultures</td>
<td>766,013.55 ha</td>
</tr>
<tr>
<td>Total volume</td>
<td>125,332,471 m³</td>
</tr>
<tr>
<td>Average (specific) volume</td>
<td>163.6 m³/ha</td>
</tr>
<tr>
<td>Total growth increment</td>
<td>3,322,059 m³</td>
</tr>
<tr>
<td>Average growth increment</td>
<td>4.3 m³/ha</td>
</tr>
<tr>
<td>Planned annual yield</td>
<td>1,841,179 m³</td>
</tr>
</tbody>
</table>

*Source: JP Srbijasume, April 2014*

The condition of the woodland and the possibility of purchasing and contracting a supply with the publicly-owned company, “Srbijašume”, can be done through a one-year supply contract only of requested biomass quantities, regardless of who the buyer is or what their needs are. This will be an additional issue for potential heat energy suppliers in future.
II OVERVIEW OF PUBLIC-PRIVATE PARTNERSHIP LEGAL FRAMEWORK
1. Introduction to the Public-Private Partnership (PPP) Model

1.1. Definition of the Public-Private Partnership

A standardized definition of the term ‘public-private partnership’ (PPP) does not exist, but in practice there are various definitions that are used to define PPP agreements. The PPP concept itself is based on the idea of lasting improvements and the discovery of more efficient solutions for the development of public infrastructure and providing services. For these reasons it is necessary that the legal framework be flexible enough to support the content and nature of various agreements.

Broadly-speaking the term PPP is defined as the implementation of all known types of collaboration between public and private partners, which in many cases lead to the establishment of joint investments. However, more specifically, the term PPP is understood as joint activities where the public and private sectors unite resources and professional know-how in order to satisfy a public need, through adequate allocation of resources, risks and benefits. Thus, by applying various methods, the private sector can engage its resources and skills in providing goods and services which traditionally are provided by public/government bodies.5

A partnership between public and private entities simply put is, the joint and cooperative interaction of the public and private sectors in providing public services, construction works or the production of goods. Defining this partnership precisely is difficult because the main objective of this kind of partnership is the more economic, effective and successful building of facilities, production of goods or providing services in comparison to the traditional approach. These partnerships transpire in different locations, in different forms and with different timeframes. One of the PPP definitions is: “PPP can be described as the collaboration between the public and private sectors in planning, production, providing services, financing, business or billing of public affairs”.6

This definition clearly shows the public sector as provider and producer or as the partner who defines the contract type and scope of business or services transferred to the private sector. Here, the public sector offers the private sector the opportunity to take over operations of these businesses as a partner seeking this model-type of cooperation, provided that they (the private partner) is able to make a profit, and can guarantee quality performance as stipulated in the contract.

PPP creates an atmosphere of synergy between both partners because of the joint collaboration.6 PPP are gaining an ever-expanding role in the implementation of large-scale projects within the sphere of satisfying public needs, mostly due to the shortcomings of budget investment funds, as well as inefficient labour and low quality public sector services. In these kinds of partnerships, the public sector must ensure that the respective project, completed in partnership with a private body achieves “value for money”; i.e. provides cost effective, reliable and timely services, at agreed prices and in accordance with quality standards defined by the contract, and that the project is more cost effective in comparison with traditional public procurement or investment.7

1.2 Public-Private Partnership and Concessions in Serbia

The present legal framework enables various kinds of cooperation between the public and private sectors, ranging from contracts which entrust the provision of public services or construction works to founding institutional partnerships, when a new legal entity is established.

The Republic of Serbia, its provinces and municipalities can entrust the provision of public services to private entities (entities which perform commercial operations – i.e. companies), other legal entities (non-profit organizations such as NGOs) as well as natural persons. For the above listed entities to perform requested services or works, the public body must entrust them to perform

services or works by means of a contract (PPP Contact) that clearly defines the rights and obligations related to providing works and services to a public good.

With the aim of improving legal and economic mechanisms, and to maintain precision in relation to other laws (such as the Law on Public Procurement, the Law on Public Companies and Performance of Services of Common Interest, the Law on Communal Services, the Law on Energy, the Law on Mining and Geological Explorations, and so on), a need to regulate PPP and Concessions arose.

The Law on Public-Private Partnership and Concessions “regulates the following: conditions and preparation method, proposing and approving of PPP projects; determination of entities in charge or authorized to propose and implement PPP projects; the rights and obligations of the public and private partners; form and content of the PPP contract, with or without concessions and legal protection in public contract award procedures; conditions and method of awarding concessions, subject of concession, entities in charge or authorized to carry out the concession award procedure, termination of concession; protection of the rights of the participants in public contract award procedures; the establishment and the competences of the PPP Commission; and other issues relevant to PPP with or without elements of concession.”

According to Article 7 of the Law on Public-Private Partnership, PPP represents long-term collaboration between public and private partners for the sake of providing financing, construction, reconstruction, management or maintenance of infrastructure and other facilities of public interest, and providing services of public interest, which can be contractual or institutional.

The Law specifies the key elements of PPP which, inter alia, relate to:

1. The subject of PPP, which may not be an exclusive commercial use of the asset in general use or other asset;

2. PPP forms:

   a) Contractual: mutual rights and obligations in the PPP project implementation, with or without elements of concession, are regulated by the contractual parties by the public contract (contents of which are prescribed in Article 46). A public contract granting concession regulates the rights and obligations of the party granting concession and of the concessionaire in compliance with the provisions of this law and provisions of separate regulations regulating the area to which the subject of concession belongs. Any issues related to public contracts which are not regulated specifically by this law are governed by the provisions of the law regulating contractual obligations;

   b) Institutional: An Institutional PPP is based on membership relation of the public and private partner in a joint undertaking which is in charge of implementing the PPP project, where this relation between the public and the private partner may be based on founders' shares in a newly established joint undertaking or on the acquisition of the equity share in or capital increase of the existing undertaking. The founding and management rights are regulated freely between the members of the SPV in compliance with the law regulating the status of companies. The public body initiates the private partner selection procedure in the manner prescribed by the provision of Article 26 of this law and prescribed by the provisions of this law regulating the concession granting procedure, by applying the criteria referred to in Article 21 of this law. After the private partner selection procedure is completed, the public body and the selected private partner sign a contract on the establishment of a joint company, for the purpose of implementing the PPP project. The content of the contract is subject to paragraphs of the law which regulate obligations between parties and law which regulates the status of companies (establishment and operations). The joint company is governed by provisions of the law relevant to the establishment and management of companies, and the provisions of the contract on establishment. The law regulating privatization (put and call options) is not applicable to
the disposal of shares or stocks in the joint undertaking in the manner defined in its foundation documents. The provisions of this law regulating the registration of public contracts and supervision over their implementation apply also to public contracts on Institutional PPP.

c) Concession: is a PPP with the elements of concession in which a public contract regulates the commercial use of natural resources or assets in general use which are publicly owned or the performance of an activity of public interest which the competent authority transfers to a national or foreign person, for a specific period of time, under specially prescribed conditions, against the payment of a concession fee by the private or the public partner, with the private partner bearing the risk associated with the commercial use of the subject of concession. A concession may be granted for the purpose of commercial use of publicly owned natural assets, or goods in general use which are publicly owned, or for the purpose of performing an activity of general interest, especially for exploitation of mineral resources and other geological resources and for specific activities within protected areas of nature, as well as for the use of other protected natural resources.

Existing Public-Private Partnerships in Serbia are either contractual PPPs where performance of public services is entrusted to a private investor, or in the form of a joint public-private enterprise (Institutionalized PPP) for performance of public services.8

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8Pavlović-Križanić T., Brdarević Lj, Partnership of Public and Private Sector in Serbia: Orientation to Fair Share of Risks and Profitable Investments, Palgo Center, Belgrade, 2010
2. Municipality as Public Body

2.1. Public Body Data

According to Article 7, paragraph 4, item 7 of the Law on PPP and Concessions, the Public Body is:

1. Government body, organization, institution and other direct or indirect users of the state budget funds according to the law which regulates the budget system and the budget, as well as the organization for mandatory social insurance;

2. Public company;

3. Legal entity which performs other activities of common interest, if it fulfils some of following conditions:
   - more than half of the entity’s managing board members are representatives of the public body;
   - more than half of the voters on the entity’s managing board are representatives of public body;
   - the legal entities operations are supervised by the public body;
   - the public body owns more than 50% of the entity’s shares or stocks;
   - more than 50% of the entity’s financing comes from funds of the public body.

4. A legal entity established by a public body that also performs services of public interest and fulfils at least one of the conditions from item 7, sub-item 3 of this Article.

Insight into public partner competencies and the manner in which it presents itself to potential and interested partners is very important at very beginning of a PPP project, for various reasons, and certainly because of the following:

- Geostrategic position of the region,
- Transport interconnections,
- Industry development,
- Agricultural development,
- Demographic data,
- Organizational structure of the municipality,
- Budget situation,
- Labour structure, and the like.
- Presence of institutions and organizations such as universities, clinical centres, government bodies, professional associations, agencies, and so on.

2.2. Public Body Organizational Model

Management of the urban/local government is conducted by the Chief of Staff (načelnik opštine), who represents local government, organizes and secures the legitimate, efficient and professional performance of duties.

The organizational structure of the municipal government, depending on the municipality’s needs and structure, mainly consists of:
The municipal government departments under authorization represent places where the general public, legal entities, individual entrepreneurs, and institutions can complete all activities and exercise their legal rights in accordance with the municipality’s existing laws, bylaws and adopted legal acts, in a quick and efficient manner.

2.3. Geographical Area of a Municipality

While drafting the appropriate documentation needed for preparation and development of a PPP project, in Article 27, paragraph 1, item 1 of the Law it is stipulated that sound geographical determination of the municipality is obligatory, as follows:

“1) The subject of the proposed PPP, a designation of the geographical area in which the activity of the PPP is performed and the objectives within the scope of public tasks that are to be achieved through the project”

The description of the geographical area must contain:

- Geographical coordinates,
- Description of landscape (mountainous land, other land, soil, terrain),
- Woodland,
- Urban and rural environments (number of communities),
- Position of the largest community (city) within a given area,
- Description and quality of farm land, rock massive, vegetative structure, annual rainfall,
- Altitude,
- Number of square meters.

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3. Importance and Actuality of Biomass based Heating Projects

3.1. Comfort of End-users of Public Buildings

Public buildings maintenance and the installed equipment and facilities found in them ensure the safety a desired level of comfort and operation, as well as protection of public interests in accordance with the law.

Public buildings are used in accordance with their purpose. Business and other transactions are performed in them, in a manner that does not have a negative effect on the safety of the building, its users or the general public, and which does not harm the building itself or disturb other users during regular use of the facility.

The proper maintenance of these buildings and the heating systems is of public interest. The owners of these buildings (local governments, institutions, and public enterprises) provide additional maintenance such as painting, washing and cleaning staircases, entrance halls and more frequently used areas, repair and replacement of lighting, and other jobs that ensure that the building’s maintenance is at the appropriate level.

The owner of the public building specifies what kinds of maintenance jobs are required, how they will be organized, as well as other issues of importance in ensuring use of the structure and use adjacent areas does not pose a health risk to the people or environment.

3.2. Maintenance of Public Buildings and Individual Boiler Facilities

Public building maintenance consists of two kinds: routine and investment maintenance on frequently used areas, devices, installations and equipment, damage repair and replacement of obsolete parts, thereby obtaining new, long-lasting functionality, usefulness and safety.

*Investment maintenance is the repair or replacement of:*

- Roof and other building construction;
- Roof coverings and other roof elements;
- Lifts and their corresponding parts;
- Rainwater pipes and other elements used to evacuate water from roofs and protect the building from water leakage;
- Horizontal and vertical hydro insulation;
- Plumbing and sewage networks;
- Ventilation pipes and ducts, including rooftops and sewerage network;
- Electrical installations in building up to connection/distribution board;
- **Installations for central heating, heating devices, parts of primary heat supply facilities including filling in with water and drainage, as well as fixing and replacing parts of gas installations;**
- Pumping stations for water drainage with corresponding parts;
- Hydrostatic pumps or other pump stations for water supply or for reducing pressure with corresponding parts and installations;
- Obsolete metal, glass and other railings on roof, stairs, terraces, and other frequently used areas of the building;
- Obsolete flooring, ceiling and wall furnishings in frequently used areas of the building;
- Wooden and metal parts on windows and doors in frequently used areas;
• Damaged and obsolete facades (coverings and other elements), and other external areas surrounding the building with priority on protection of the façade against water and moisture leakage;
• Installations and devices used to alert building occupants;
• Lightning installations, interphones, cable TV and phone installations, antenna devices and its parts in building;
• Water hydrants, hydrant pipes and other hydrant parts in building;
• Installations and devices for central sanitary water heating in frequently used areas frequently used areas;
• Fire exits, staircases and installations and devices for fire protection;
• Boilers using solid fuels in frequently used areas of the building;
• Sanitary devices used in frequently used areas of the building;
• Devices for emergency lighting and devices for backup electrical energy of aggregates.

Routine maintenance on frequently used areas of public buildings includes:

• Routine lift servicing;
• Repair and replacement of automats for common lighting, switches, bulbs, etc.;
• Extermination of rats and insects and disinfection of frequently used areas;
• Regular inspections and servicing of hydrostatic pumping devices in building, installations of central heating (boiler rooms, heat substation, heating networks with radiators, valves, flue stacks) and other, fire extinguishing installations and devices, lightning installations, plumbing and sewage installations, electrical installations, emergency lighting devices, air conditioning and ventilation equipment;
• Cleaning of rainwater pipes;
• Fixing or replacement of iron fittings, locks and other devices used to keep electric meter, water meter, TV and phone installation lockers closed;
• Painting the interior of the building;
• Painting piping network, radiators and other devices;
• Maintaining hygiene in frequently used areas of the building (cleaning and washing staircases, hallways, glass, etc.);
• Cleaning and maintaining pavements surrounding the building, galleys, drainage covers, etc.;
• Other maintenance jobs which fall under the category of routine maintenance that allow the building to function to a satisfactory level.

Maintenance of these kinds of public buildings is more often than not, partially delegated to publicly-owned communal (utility) companies, or entrusted to (in accordance with the Law on Public Procurement) a selected legal entity or entrepreneur. Monitoring is carefully regulated: conditions and methods used to complete maintenance, relationship in cases where the maintenance job has been poorly executed, payment method and reporting conditions. From its limited budget funds, local government finances maintenance programmes for public buildings, it defines the conditions and methods to be used in order to complete maintenance jobs and adopts the programme implementation annual report.
3.3. Features of Individual Boiler Houses/Control Rooms and their Management

When looking at the ownership structure of individual boiler rooms, which are located in public buildings, it is a fact that local governments manage these public buildings even if a certain number of them are under ownership of the state.

Making things even more complex, is the fact that local government is obliged to maintain the entire public building, including its systems (boiler rooms, heating systems, facades, roofs, and so on), and that these governments are not ready to invest in the maintenance costs of these buildings because of their limited budgets and the fact that they have other, more important priorities. In addition, the society itself does not have a mechanism put into place which stimulates private capital to invest in public building maintenance which would improve comfort for end users.

From the perspective of management and maintenance, a common element found in public buildings in Serbia is the accumulation of a maintenance deficit or simply put, a lack of maintenance altogether. The deficit can be either visible or invisible. A visible deficit can be described and quantified by systematic inspection. Invisible faults exist in practically the whole public building stock due to a lack of awareness that must be expected, and this general lack of maintenance is a commonplace.

A general lack of adherence to maintenance standards is notable in the use of public buildings. The structures and purpose of the buildings were not changed adequately, waste material was stockpiled and the explanation given was “it may be needed”, old and discarded equipment and devices, office equipment and obsolete items were stored visibly (boiler rooms, hallways, cellars, basements, attics). This all resulted in workspace remaining clean but frequently used areas became untidy, cluttered and neglected. Additionally, satellite dishes and air conditioner units were installed on facades, instead of on rooftops, as there were no plans made to utilize rooftop space, and so on.

Furthermore, it has been noticed that the general public does not feel empowered and energized enough to participate more in public utility issues.

3.4. Issues with Boiler Facilities in Public Buildings

Issues which relate to boilers using light fuel oil, heavy fuel oil or coal:

- Inefficiency rate (about 60-65%),
- Damaged thermal insulation,
- Damaged, unusable drainage,
- Damaged or disregarded drainage channels,
- Damaged and blocked valves,
- Damaged piping infrastructure,
- Problems with flue stacks,
- Problems with ventilation ducts,
- Dirtiness

In Serbia, public buildings maintained by the local governments are mostly +30 years old. Because of their age, poor maintenance and a lack of sufficient investments, the boilers located in these buildings are practically obsolete.

Due to poor and inappropriate maintenance investments in public buildings, its equipment, facilities and devices, it is also clear that when a system fails or damages ensue the costs are significant in order to restore the building so that it may serve its purpose appropriately.
3.5. Energy Efficiency in Public Buildings

Under the term “Improvement of Energy Efficiency in Buildings” continuous and a wide scope of activities is understood, all aimed at reducing the consumption of all kinds of energy while ensuring the same or a greater level of comfort for end users of buildings.

The term ‘Energy Efficiency’ most frequently has two possible meanings; one is related to devices and appliances and the other to measures and behaviour. An EE device is one which is highly productive or loses small amounts of energy when converting one kind of energy into another. For example, common incandescent light bulbs convert a high amount of electrical energy into heat and only a small amount into light, thus the light bulb is not an energy efficient device.

When speaking of EE measures, we are speaking about performing certain actions that are aimed at the direct reduction of energy consumption. Whether or not these measures are technical or non-technical, or whether they alter behaviour or not is irrelevant.

The most common measures undertaken with the aim of reducing energy losses and increasing energy efficiency are:

- Replacing non-renewable with renewable fuels with clearly visible savings,
- Replacing inefficient energy consumers with efficient ones,
- Thermal insulation of heated spaces,
- Replacement of obsolete windows in heated spaces,
- Installing measuring and controlling devices for energy consumers,
- Introducing tariff systems to energy distributors to motivate energy savings, and so on.

Potential to save energy is huge because energy savings are achieved on both sides; energy producers (coal, crude oil and gas processing and production, transport and distribution of electricity) and end user (residences, transportation and manufacturing). EE practices are not widely-used therefore, their potential, for the most part remains untapped.10

Public buildings can be seen as relatively large energy consumers. The reduction of energy consumption is possible by building new energy efficiency buildings or finding retrofit solutions for the existing building stock. Energy efficiency in buildings means efficient use of energy by implementing optimal measures which aim at: reducing energy consumption with financial savings to end users, more comfortable and better quality living in buildings, reducing maintenance costs and extending the life cycle of buildings, contributing to environment protection and reducing harmful gas emissions, as well as global climate change.11

When energy efficiency and sustainability of buildings are in question, the past decade has seen EE improvements in buildings through the implementation of new technologies, renewable energy sources (RES) and distributed electricity production integrated within the buildings themselves. Another factor which has contributed to this is the simulation of building property methods to optimize EE measures and approaches towards energy sustainable buildings.12

EE assessment in construction and the production of energy passports have the objective to permanently reduce the energy needs in the design, construction and use processes use of new buildings, and to find retrofit solutions for the reconstruction of existing buildings.13

11“Law on Planning and Construction,” (Official Gazette of the Republic of Serbia” no. 72/09, 81/09, 64/10 and 24/11)
40% to 60% of the total energy consumption in many countries (in Serbia it is 40%) is energy spent in various buildings therefore, much attention is paid to EE in these structures. In the national EE action plans of most countries today, the focus is on the inclusion of steps towards the reduction of energy consumption in buildings and is the subject of numerous research, development, strategic, regulatory, financial, incentive and other programmes and measures, policy making, respective standards and other regulations.

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4. Public-Private Partnership

4.1. PPP and Concessions in Serbia

The present legal framework enables various kinds of cooperation between the public and private sectors, ranging from contracts which entrust the provision of public services or construction works to founding institutional partnerships, when a new legal entity is established. The Republic of Serbia, its provinces and municipalities can entrust the provision of public services to private entities (entities which perform commercial operations – i.e. companies), other legal entities (non-profit organizations such as NGOs) as well as natural persons. For the above listed entities to perform requested services or works, the public body must entrust them to perform services or works by means of a contract (PPP Contact) that clearly defines the rights and obligations related to providing works and services to a public good.

With the aim of improving legal and economic mechanisms, and to maintain precision in relation to other laws (such as the Law on Public Procurement, the Law on Public Companies and Performance of Services of Common Interest, the Law on Communal Services, the Law on Energy, the Law on Mining and Geological Explorations, and so on), a need to regulate PPP and Concessions arose.

The Law on Public-Private Partnership and Concessions "regulates the following: conditions and preparation method, proposing and approving of PPP projects; determination of entities in charge or authorized to propose and implement PPP projects; the rights and obligations of the public and private partners; form and content of the PPP contract, with or without concessions and legal protection in public contract award procedures; conditions and method of awarding concessions, subject of concession, entities in charge or authorized to carry out the concession award procedure, termination of concession; protection of the rights of the participants in public contract award procedures; the establishment and the competences of the PPP Commission; and other issues relevant to PPP with or without elements of concession."

According to Article 7 of the Law on Public-Private Partnership, PPP represents long-term collaboration between public and private partners for the sake of providing financing, construction, reconstruction, management or maintenance of infrastructure and other facilities of public interest, and providing services of public interest, which can be contractual or institutional.

The Law specifies the key elements of PPP which, inter alia, relate to:

1. The subject of PPP, which may not be an exclusive commercial use of the asset in general use or other asset;
2. PPP forms:
   a) Contractual: mutual rights and obligations in PPP project implementation, with or without elements of concession, are regulated by the contractual parties by the public contract (contents of which are prescribed in Article 46). A public contract granting concession regulates the rights and obligations of the party granting concession and of the concessionaire in compliance with the provisions of this law and provisions of separate regulations regulating the area to which the subject of concession belongs.

   Any issues related to public contracts which are not regulated specifically by this law shall be governed by the provisions of the law regulating contractual obligations;

   b) Institutional: An Institutional PPP is based on membership relation of the public and private partner in a joint undertaking which is in charge of implementing the PPP project, where this relation between the public and the private partner may be based on founders' shares in a newly established joint undertaking or on the acquisition of the equity share in or capital increase of the existing undertaking. The founding and management rights are
regulated freely between the members of the SPV in compliance with the law regulating the status of companies.

The public body initiates the private partner selection procedure in the manner prescribed by the provision of Article 26 of this law and prescribed by the provisions of this law regulating the concession granting procedure, by applying the criteria referred to in Article 21 of this law. After the private partner selection procedure is completed, the public body and the selected private partner sign a contract on the establishment of a joint company for the purpose of implementing the PPP project. The content of the contract is subject to paragraphs of the law which regulate obligations between parties and law which regulates the status of companies. The joint company is governed by provisions of the law relevant to the establishment and management of companies, and the provisions of the contract on establishment. The law regulating privatization (put and call options) is not applicable to the disposal of shares or stocks in the joint undertaking in the manner defined in its foundation documents. The provisions of this law regulating the registration of public contracts and supervision over their implementation apply also to public contracts on Institutional PPP.

c) A concession: is a PPP with the elements of concession in which a public contract regulates the commercial use of natural resources or assets in general use which are publicly owned or the performance of an activity of public interest which the competent authority transfers to a national or foreign person, for a specific period of time, under specially prescribed conditions, against the payment of a concession fee by the private or the public partner, with the private partner bearing the risk associated with the commercial use of the subject of concession. For the purpose of the law a concession may be granted for the purpose of commercial use of publicly owned natural assets, or goods in general use which are publicly owned, or for the purpose of performing an activity of general interest, especially for exploitation of mineral resources and other geological resources, for the use of water, energy and other resources.

Existing Public-Private Partnerships in Serbia are either contractual PPPs where performance of public services is entrusted to a private investor, or in the form of a joint public-private enterprise (Institutionalized PPP) for performance of public services.16

4.2. Principles of PPP and Concessions

The regulation of conditions, manner and procedures for the conclusion of public contracts is based on the following principles: the protection of public interest, efficiency, transparency, equal and just treatment, free market competition, proportionality, environmental protection and autonomous will and equality of parties to the contract.

When implementing a concession granting procedure, the concession granting authority is obliged, apart from the abovementioned, in view of all participants in the procedure, to implement the principle of free movement of goods, the principle of free provision of services, the principle of prohibition of discrimination and the principle of mutual recognition. These principles are used in the interpretation of provisions of the PPP law.

The principle of protection of public interest includes the obligation of the public body to ensure in the exercise of the rights of private persons that the exercise of these rights is not contrary to the public interest defined by the law.

The principle of efficiency includes the obligation to conduct the procedure of public contract conclusion and private partner selection within the periods and in the manner prescribed by the PPP law and the law regulating public procurement, with the lowest possible procedure-related costs.

The principle of transparency includes the obligation of announcing the intention of concluding a public contract with or without elements of concession, the possibility for the bidder to have access to the data on the conducted public contract award procedure and similar.

The principle of equal and just treatment includes the prohibition of discrimination on any basis among participants in the procedure of public contract award and selection of the private partner, as well as the obligation for participants in the procedure for the selection of the public partner to have full and accurate information regarding the procedure, standards and criteria for the selection of the private partner.

No party participating in the procedure of selection of the private partner will have any advantage over others in terms of time, information or access to authorities and persons in charge of public contract award procedure. All decisions must be made on the basis of published and objective criteria and forwarded to participants in the procedure with justification.

The principle of free market competition includes the prohibition of limitations of competition among participants and an obligation to accept participants with adequate technical, financial and other professional qualifications.

The principle of proportionality implies that every measure undertaken by a public authority or another person must be the minimum necessary measure and proportional to the public interest which is thereby protected.

The principle of environmental protection includes the principles defined by the law regulating environmental protection, such as: the principle of integrity, the principle of prevention and precaution, the principle of preservation of natural values, sustainable development, the polluter-pays principle and other.

The principle of the autonomy of will includes the freedom of parties to the contract, in accordance with this law, the law on contractual obligations, other laws and good management practice, to regulate their mutual rights and obligations according to their will.

The principle of equality of parties to the contract implies that mutual relations between the parties to a public contract are based on their equality and the equality of their wills.
5. PPP Project Description

5.1. Key Elements of PPP Project

Pursuant to the Law on PPP and Concessions important elements of public-private partnership refer to the following:

1. The subject of PPP, which may not be an exclusive commercial use of the asset in general use or other asset;
2. The form of PPP, which may be an institutional PPP or a contractual PPP, or as a concession that presents a special form of PPP in accordance with this law;
3. The obligation of the private partner to take over from the public partner the design, construction or reconstruction of public infrastructure or a facility of public interest, as well as the maintenance of public infrastructure or provision of services of public interest, including one or more of the following obligations: financing, management and maintenance, for the purpose of providing services of public interest to final beneficiaries from within the competences of the public partner, or for the purpose of ensuring the necessary preconditions for the public partner for the provision of services of public interest within their competences, or provision of services of public interest from within the competences of the public partner to the final beneficiaries;
4. Partial or full PPP project financing by the private partner;
5. That the public partner may, in view of obligations undertaken by the private partner, transfer to the private partner certain real rights, or grant a concession to the private partner, or pay moneys to the private partner for the obligations undertaken;
6. Each partner undertakes responsibility for the risk which it can better manage or which it can affect, or risks are divided in a balanced manner, all for the purpose or ensuring optimal risk management for the duration of the PPP project, with the use of management, technical, financial and innovative capacities of the private partner, and by improved exchange of skills and knowledge between the public and the private partners;
7. The public partner may allow the private partner to perform commercial activities within the execution of the Public-Private Partnership project, only if it is not possible in another manner to ensure the necessary level of cost-effectiveness in the implementation of the PPP project and the return on investment.

5.2. Subject of PPP

The Public-Private Partnership without concession, for the project for which this manual has been produced, is comprised of a strategic relationship for the completion of specified services at the highest maintenance investment level which correspond with EE postulates:

Energy retrofit of boiler houses/rooms which use light fuel oil, heavy fuel oil or coal with fuel conversion to wood biomass and with corresponding construction works on replacement of obsolete parts and installations within the facility.

The duration of Public-Private Partnerships is from 5 to 50 years, while in this case, the project duration is 10 to 15 years.

Considering PPP in this particular project, the PPP subject would be: organizing and managing the implementation of construction works in replacing boilers in public buildings, which supply final heat energy as a benefit to the building owners and the general public, which are of interest to the project (user safety, environmental protection, improving the culture of usage, increasing the market value of public buildings).
5.3. PPP Options

As already stipulated, the Law on PPP and Concessions, as possible forms of PPP enables Institutional Public-Private Partnership or Contractual PPP, or Concession, which is a separate form of PPP in accordance with this law.

The form of PPP, as stated in the above subject example would lead to the achievement of most of the benefits for the general public and users, and without investments from the local government, but with optimal use of other municipal resources (human resources, time resources), the Public Body suggests a Contractual Public-Private Partnership without elements of concession.

According to the Law on PPP and Concessions, part 2.1. – Contractual Public-Private Partnership, Article 9, contractual PPP is based on public contract which regulates the mutual rights and obligations during implementation of the PPP project with or without elements of concession, and which content is prescribed by article 46 of this law.

In this contract and its contents, paragraphs of the law which regulate obligation relationships are applied\(^\text{17}\) as well as the law which regulates the status of companies.\(^\text{18}\) In practice, the applicable law, by which obligation relationships are regulated, is the Law on Obligation Relationships. This law regulates obligation relationships which have derived from the contract, when damages have ensued, when benefits have been obtained without grounds, actions taken without a work order, one-sided expression of will, and other facts determined by law.

Paragraphs of the Law on PPP and Concessions which regulate public contract registration and supervision over their implementation also apply to a public contract concluded within Institutional PPP.

5.4. Project Objectives

The General objective of this PPP project is resolving the issues of obsolete and unsafe boilers in public buildings in a particular municipality, both in a rational and viable way in order to fulfil the concept of affordable, comfortable and quality operation.

Specific objectives of this particular PPP project are presented in the following table:

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>OBJECTIVE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBJECTIVE 1</td>
<td>To achieve saving in heating costs, and to allocate less funds in municipal budget for financing heating of public buildings</td>
</tr>
<tr>
<td>OBJECTIVE 2</td>
<td>To obtain a secure fuel supply, considering pellet producers are from Serbia and surrounding countries</td>
</tr>
<tr>
<td>OBJECTIVE 3</td>
<td>To use a renewable (cleaner) energy source</td>
</tr>
<tr>
<td>OBJECTIVE 4</td>
<td>To produce less air pollution and less pollution of the micro-location, and to reduce CO(_2) emission</td>
</tr>
<tr>
<td>OBJECTIVE 5</td>
<td>That the energy services provider accepts investments in facility conversion and maintenance of heating system, and guarantees quality of the heat energy supply to buildings as well as all risks for period defined by energy service contract</td>
</tr>
</tbody>
</table>

5.5. Critical Factors for Project Success

Key parameters of project performance relate to the following:

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\(^{17}\)Law on Obligation Relationships ("Official Gazette SFRJ", no. 29/78, 39/85, 45/89 and 57/89 and "Official Gazette SRJ", no. 31/93)

\(^{18}\)Law on Companies ("Official Gazette RS", no. 36/2011)
1. Parameters which represent indicators of objectives of quality, environment, health and safety of users;
2. Parameters of efficiency and effectiveness of project activities development (deadlines in accordance with projected activities, achieved results);
3. Assessment of satisfaction of all external and internal stakeholders;
4. Assessment of satisfaction of the users with works performed.

Project Manager and representatives of the partners would be responsible for follow-up and measuring project performance.

5.6. Stakeholders

*Stakeholders* are individuals or organizations actively engaged in the PPP project and whose interests may positively or negatively influence the results of project performance or the successful completion of the project.

The key *stakeholders* in the "Application of PPP for Replacement of Boilers and Fuels in Public Buildings Project" are:

**Table 8: Project stakeholders**

<table>
<thead>
<tr>
<th>No.</th>
<th>Interested Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Public buildings (building managers)</td>
</tr>
<tr>
<td>2</td>
<td>City Assembly (municipal government)</td>
</tr>
<tr>
<td>3</td>
<td>Users (beneficiaries)</td>
</tr>
<tr>
<td>4</td>
<td>Interested companies (private partners)</td>
</tr>
<tr>
<td>5</td>
<td>State agencies and institutions</td>
</tr>
</tbody>
</table>
Chart 3: Basic benefits to external stakeholders and investor

PUBLIC-PRIVATE PARTNERSHIP

PUBLIC BUILDINGS

BENEFITS:
1. Investment maintenance at the highest level
2. Rational investment
3. Significant decrease of energy consumption
4. Resolving requirements in the best quality way possible
5. Increase of quality in providing public services
6. Use of innovations and expertise from private sector

CITY/MUNICIPALITY, GOVERNMENT

BENEFITS:
1. Support of public sector and society/community to improve use quality
2. “One less problem”
3. Ecological requirements fulfilled

BENEFICIARIES – USERS

BENEFITS:
1. Directly affected by poor or insufficient heating quality
2. Resolved issue of public buildings heating without investments from the local government and without credit indebtedness
3. Extension of the building life cycle and decreased risks of use

COMPANIES – PRIVATE PARTNERS

BENEFITS:
1. Installation of modern materials and equipment
2. Promotion of new products and high-tech, domestic types of material
3. Obtaining references
4. Rational investment which provides long-term incomes
5. Long-term contract for system maintenance after works are completed (and beyond warrantee period)

AGENCIES AND INSTITUTIONS

OVERVIEW:
1. Agency for Energy of the Republic of Serbia
2. Energy department in municipal government
3. Municipality budget
4. Local government agencies
5. Ministry of Finance of the Republic of Serbia (Tax Department)
5.7. OBS – Organization breakdown structure

Chart 4: Organizational breakdown structure (OBS)
### Table 9: Project activities (work out)

<table>
<thead>
<tr>
<th>I. PREPARATION OF PPP SELF-INITIATIVE PROPOSAL (POSSIBLE PRIVATE PARTNER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1. Assigning duties to members of Project Team</td>
</tr>
<tr>
<td>1.2. Analysis of market conditions</td>
</tr>
<tr>
<td>1.3. Analysis of future operation of the company – Special Purpose Company (SPC = SPV)</td>
</tr>
<tr>
<td>1.4. Analysis of legal regulations (public procurement, long-term contracting, etc.)</td>
</tr>
<tr>
<td>1.5. Preparation and draft of the PPP project</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II DESIGN OF PPP PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1. Assignation of duties to designers</td>
</tr>
<tr>
<td>2.2. Preparation and project design on the basis of accepted PPP self-initiative proposal</td>
</tr>
<tr>
<td>2.3. Needed consultations with City/Municipality Assembly’s representative(s)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III SUBMISSION AND ADOPTION OF PPP PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1. Submission of self-initiative proposal to City/Municipality Assembly for approval</td>
</tr>
<tr>
<td>3.2. Submission of Request to give opinion and assessment of the project to the Commission for PPP and Concessions of the Republic of Serbia</td>
</tr>
<tr>
<td>3.3. Receiving approval from City/Municipal Assembly</td>
</tr>
<tr>
<td>3.4. Receiving positive opinion and assessment from Commission for PPP and Concessions</td>
</tr>
</tbody>
</table>
### IV SELECTION OF PRIVATE PARTNER

4.1. Consideration of self-initiative proposal (if exists) by parties interested in PPP project implementation

4.2. Issuing of document for constitution of Commission for public procurement by municipal government

4.3. Announcement of public call in open procedure (with previous announcement if in accordance with the Law on Public Procurement) and advertising said in accordance with the Law on Public Procurement

4.4. Preparation and submission of tender documentation

4.5. Opening of bids

4.6. Report on expert bid evaluation

4.7. Decision on selection of the best bid

4.8. Notification of bidders on decision made about selection of the best bid

4.9. Expiry of deadline for submission of requests for protection of rights of the bidders

4.10. Report on conducted public procurement procedure in accordance with the Law on Public Procurement

### V CONSENT ON CONCLUSION OF CONTRACT

5.1. Preparation of contract in accordance with adopted model of contract which was part of the tender documentation

5.2. Submission of contract to City/Municipality Assembly for approval

5.3. Adoption of the contract by City/Municipality Assembly

### VI CONCLUSION OF PUBLIC CONTRACT WITH PRIVATE PARTNER

6.1. Conclusion of the contract with the private partner

6.2. Submission of requested guarantees (mutually by public body and private partner)

### VII IMPLEMENTATION OF PPP PROJECT

7.1. Notification of beneficiaries/users and project promotion

7.2. Conducting of activities in accordance with the contract and design

### VIII CLOSING OF THE PROJECT

8.1. Closing of the project after expiration of contracted period, or earlier, pursuant to relevant contract clauses, or in accordance with the Law on PPP and Concessions
### Table 10: Structure of the Project Team

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>NAME&amp;SURNAME</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 RESPONSIBLE PERSON</td>
<td></td>
<td>Responsible on behalf of private partner</td>
</tr>
<tr>
<td>2 PROJECT MANAGER</td>
<td></td>
<td>Coordinator of the project</td>
</tr>
<tr>
<td>3 MEMBER 1</td>
<td></td>
<td>International funds and financing lines</td>
</tr>
<tr>
<td>4 MEMBER 2</td>
<td></td>
<td>Specifications – Bill of Quantities</td>
</tr>
<tr>
<td>5 MEMBER 3</td>
<td></td>
<td>Design of boiler rooms/houses (facilities)</td>
</tr>
<tr>
<td>6 MEMBER 4</td>
<td></td>
<td>Technical calculations</td>
</tr>
<tr>
<td>7 MEMBER 5</td>
<td></td>
<td>Technical coordinator</td>
</tr>
<tr>
<td>8 MEMBER 6</td>
<td></td>
<td>Financing</td>
</tr>
<tr>
<td>9 MEMBER 7</td>
<td></td>
<td>QA – Quality Assurance</td>
</tr>
<tr>
<td>10 MEMBER 8</td>
<td></td>
<td>Logistics</td>
</tr>
</tbody>
</table>

### 5.8. Timetable

The following table shows the list of PPP project activities from the very beginning of actual implementation with respective duration periods and start/end dates as well as interconnections between activities and the timeframe of project activities.

#### Table 11: Main project activities

<table>
<thead>
<tr>
<th>No.</th>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preparation of the study</td>
</tr>
<tr>
<td>2</td>
<td>Preparation of PPP project</td>
</tr>
<tr>
<td>3</td>
<td>Initiation of procedure for project implementation</td>
</tr>
<tr>
<td>4</td>
<td>Submission of the project to public body (city/municipality) for consent and approval</td>
</tr>
<tr>
<td>5</td>
<td>Submission of the project proposal to the Commission for PPP and Concessions of the Republic of Serbia for opinion and assessment</td>
</tr>
<tr>
<td>6</td>
<td>Acquiring consent of public body (city/municipal Assembly)</td>
</tr>
<tr>
<td>7</td>
<td>Acquiring consent of Commission for PPP and Concessions</td>
</tr>
</tbody>
</table>
Planning of time consists of: defining the project activities timeframe, assessment of time period needed for execution of each activity and calculation of time needed for the completion of the entire project. In this procedure, more than one timeframe is drafted, using network planning techniques, both global and detailed timeframes.

With the aim of quality planning, a master project plan, network plan (diagram) and timeframe of key activities are produced.

<table>
<thead>
<tr>
<th></th>
<th>Conducting selection procedure of private partner and contractor (Law on Public Procurement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Submission of draft Contract to public body for approval</td>
</tr>
<tr>
<td>10</td>
<td>Receiving approval of public body on final draft Contract</td>
</tr>
<tr>
<td>11</td>
<td>Contract award to selected private partner</td>
</tr>
</tbody>
</table>
Chart 5: Timetable (Concept: preparation of PPP project during winter season, construction works in summer and after heating season)

**ACTIVITY** (months – calendar year)
1. Decision of City Council for Project start
2. Preparation of PPP proposal for Assembly
3. Preparation of PPP project study
4. Decision process of City Assembly
5. Decision of City Assembly
6. Request for opinion of Commission for PPP
7. Decision process of Commission for PPP
8. Positive opinion of Commission for PPP
9. Preparation of technical documentation
10. Preparation of tender documentation
11. Preparation of Public Call according to Law
12. Selection process of private partner
13. Selection of private partner
14. Period for complaints according to Law
15. Consent of City Assembly to contract
16. Signing of contract for PPP
17. Construction works
18. Technical acceptance of the works
19. Testing and trial operation
5.9. Life Cycle of PPP Project Implementation

1. Project idea (preparation of the study, preparation of the project, obtaining of necessary approvals, public procurement procedure, partner selection, contract signing),
2. Planning of activities for project implementation,
3. Realization of project activities,
4. Implementation/assessment of the project (completed within 1 year).

5.10 Public Body

The public body is a term which also refers to public enterprise. Public enterprise is any enterprise or undertaking which is either directly or indirectly dominantly influenced by other public body on the basis of ownership over it, or on the basis of financial share in it or on the basis of the rules governing it (in accordance with the Law on PPP and Concessions\textsuperscript{19}, Article 4, paragraph 1, item 8). It is considered that a dominant influence exists when such parties, directly or indirectly, with respect to any enterprise or undertaking:

(1) Own the majority of the subscribed capital, or
(2) Control the majority of votes based on shares issued by such an enterprise or undertaking, or
(3) may nominate more than one half of the executive, management, and the supervisory boards of such an enterprise or undertaking.

Activities of the public body are as follows:
- Activities in preparatory phase of the study (\textit{desk-research}, acquiring data relevant to the project, communication with founder, suppliers market research)
- Mandatory preparation of the study entitled \textit{“Application of PPP Project of Energy Retrofit of Individual Boiler Rooms and Conversion of Fuels in Public Buildings”}
- Preparation of the PPP project: According to the Law on PPP and Concessions,\textsuperscript{20} Article 4, paragraph 1, item 1, " is a project which is prepared, proposed, approved and implemented based on one of the public-private partnership models and consists of a series of interconnected activities taking place in a specific sequence for the purpose of achieving the identified objectives within a specified time period and within a specified financial framework which, in compliance with this law, has been approved as a public-private partnership project, with or without elements of concession."
- Initiation of procedure for project implementation
- The submission of the project to the authorized public entity for approval and adoption: Pursuant to the Law on PPP and Concessions, Article 26: The public body shall submit a proposal of the PPP project for the purpose of acquiring an approval and adoption to the following bodies for project approval:
  - To the Government, when the public partner is the Republic of Serbia or another public body of the Republic of Serbia;

\textsuperscript{19}Law on PPP and Concessions, ("Official Gazette of the Republic of Serbia", no. 88/11)
\textsuperscript{20}Law on PPP and Concessions, ("Official Gazette of the Republic of Serbia", no. 88/11)
To the government of the autonomous province of Vojvodina, when the public partner is the autonomous province or another public body of this autonomous province;

To the Assembly of the local self-government unit when the public partner is the local self-government unit or another public body of such a local self-government unit. Assembly

- The submission of the procedure proposal to the Commission for PPP and Concessions for opinion and assessment: Pursuant to the Law on PPP and Concessions, Article 26: the project proposal is submitted to the Commission for PPP and Concessions for its opinion and assessment as to whether the specific project can be implemented in the form of a PPP.

- Obtaining consent: If the approving authority referred to in Article 26 of this law fails to approve the project proposal within three months and does not request amendments to it, it shall be considered not approved.

- Obtaining consent from the Commission for PPP and Concessions of the Republic of Serbia.

Pursuant to Article 12 of the PPP Law, Public bodies can initiate the procedure to implement a PPP project from within their competences. In addition, Public bodies can enter into public contracts with any legal entity or natural person and to sign auxiliary or related agreements.

- Conduction of public procurement procedure for the private partner selection;
- Consent of the Municipality and the Commission on draft Contract;
- Conclusion of public contract.

5.11 Private Partner

A private partner, in accordance with the Law on PPP and Concessions,\textsuperscript{21} Article 4, paragraph 1, item 10, is a natural or legal person, national or foreign, with local or foreign share or without it, or a consortium of one or more such natural and legal persons which have been selected in a public procurement procedure or concession granting procedure and which have signed with the public partner a public contract, or which is establishing for that purpose an SPV, or which is establishing with the public partner a joint enterprise.

For participants from the private sector profit is the first condition of gaining a PPP project contract. Besides that, and before engaging its own capital for project development, the private sector will be required to have a sound legal and regulatory structure wishing to see potential for future economic growth.

Private partners have four basic roles in PPP arrangements:\textsuperscript{22}

1. To obtain additional capital,

2. To provide alternative management and implementation know-how,

3. To secure added value to users and the general public,

4. To provide better identification of needs and optimal use of resources.

\textsuperscript{21} Law on PPP and Concessions, ("Official Gazette of RS", no. 88/11)
In accordance with Article 14 of the PPP Law, any national or foreign natural person or legal entity may participate in the procedure for the award of public contract.

Groups of companies may submit their bids or act as participants in the procedure. Public bodies do not have to ask from these groups of persons to have a specific legal form in order to participate in the procedure.

Of all the participants in the procedure whose bid has been evaluated as the most favorable one, a certain legal form shall be required after the award of public contract.

When a specific project is in question, the public body can decide on partial or entire financing of the PPP project by public partner. It is recommended that the private partner finances the entire project and submits a required bank guarantees for seriousness of bid and good performance of works.

5.12. Project Risk Management Plan

Table 12: Project Risk Management Plan

<table>
<thead>
<tr>
<th>Section of plan</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope of the project</td>
<td>Contractual PPP between 10 to 15 years on energy retrofit of boilers in public buildings</td>
</tr>
<tr>
<td>Project risk management process</td>
<td>Comprehended are all key steps of project risk management, from identification, through analysis, prioritizing, response to risk, and to follow up and risk control during project implementation. Standard model or risk management will be used (RM)</td>
</tr>
<tr>
<td>Organization structure, responsibilities and functions for project risk management</td>
<td>Decentralized approach to risk management structure will be used which means that each representative of particular organizational part is included in project risk management of its sector, and that in the risk management process the private partner (contractors and subcontractors, if any) are also included</td>
</tr>
<tr>
<td>Critical factors of success</td>
<td>Critical factor of success in risk management is timely identification and creation of response to selected risks, as well as continuous follow up of project risks during project implementation because of earlier emphasized influences which may occur when this kind of project is implemented for the first time.</td>
</tr>
<tr>
<td>RBS</td>
<td>Basic groups of risk are: technical, organizational, project, financial and external risks</td>
</tr>
<tr>
<td>Register of project risks</td>
<td>For conducting register of risks, the project manager and the person responsible for risk management) are assigned to this task. However, in accordance with a decentralized approach which applies here, other members of the team are also included in this process</td>
</tr>
<tr>
<td>Response to risks</td>
<td>Preventive and reactive strategies for project risk management will be used</td>
</tr>
<tr>
<td>Connections with other project processes</td>
<td>As a decentralized approach to risk management has been selected, project risk management is connected to all the activities being implemented by a particular participant in project implementation</td>
</tr>
<tr>
<td>Follow up, control and</td>
<td>Reporting on project risk management on project team meetings and &quot;ad hoc&quot; reports</td>
</tr>
</tbody>
</table>
Revision of project risk management is conducted periodically or on occurrence of a high risk event, with a potentially large impact on project results.

Procedures available to all project team members from beginning of project implementation are applied.

Team members will go through training for project risk management, and for project specifics all members of project team will also attend PPP training. The aim is to broaden their knowledge and enable possible identification of any new, specific risks for this type of project.

### 5.13. Project Preconditions

The main preconditions of the "Application of PPP Model in Project of Energy Retrofit of Boiler Rooms and Conversion of Fuels in Public Buildings Project", are the following:

**Table 13: Project Preconditions**

<table>
<thead>
<tr>
<th>No.</th>
<th>Preconditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Existence of justification for selection of PPP model and determination of public interest</td>
</tr>
<tr>
<td>2</td>
<td>Acceptance of the project by local government (city/municipality)</td>
</tr>
<tr>
<td>3</td>
<td>Acceptance of the project by Commission for PPP and Concessions of the Republic of Serbia</td>
</tr>
<tr>
<td>4</td>
<td>Successful procedure for selection of the best bid in accordance with the Law on Public Procurement</td>
</tr>
<tr>
<td>5</td>
<td>Positive outcome in case of request for protection of rights (if any) pursuant to the Law on Public Procurement</td>
</tr>
<tr>
<td>6</td>
<td>Acceptance of draft public contract by local government</td>
</tr>
<tr>
<td>7</td>
<td>Existence of necessary financial means for project implementation within planned timeframe</td>
</tr>
<tr>
<td>8</td>
<td>Existence of responsive profile of work contractors and equipment suppliers</td>
</tr>
<tr>
<td>9</td>
<td>Positive assessment of economic profitability of the PPP project</td>
</tr>
<tr>
<td>10</td>
<td>Existence of legal conditions for PPP project implementation</td>
</tr>
<tr>
<td>11</td>
<td>Existence of continuous demand for the services which are the subject of PPP project</td>
</tr>
<tr>
<td>12</td>
<td>Obtaining support of the local government</td>
</tr>
<tr>
<td>No.</td>
<td>Preconditions</td>
</tr>
<tr>
<td>-----</td>
<td>---------------</td>
</tr>
<tr>
<td>13</td>
<td>Acceptance of project idea by broader social community (general public)</td>
</tr>
<tr>
<td>14</td>
<td>Acceptance of the project by end users of the services</td>
</tr>
</tbody>
</table>

5.14. Environmental Protection

Measures for decreasing negative and increasing positive influences to the environment:

Environmental protection of the administrative (territorial) area of the city/municipality is based on the concept of sustainable development, adjustment of the use of space with the possibilities and restraints caused by natural and man-made resources (established routines and protection measures) and with the economic development needs, taking into consideration the principles of prevention and impeding environmental pollutions and the principle of integrity.

This means the mandatory inclusion of environmental protection requirements in all plans and programmes, and all planned activities in the area.

The environmental protection system consists of measures, conditions and instruments for:

1) Sustainable management, preservation of the natural balance, wholeness, diversity and quality of natural values/resources and survival conditions of all living things;

2) Preventing, controlling, and decreasing all forms of environmental pollution.

By applying environmental protection measures the effects of negative tendencies identified in the area will be corrected in regard to quality improvements of particular environmental elements, and by applying all available instruments, they will be blocked from spreading beyond the determined planned framework.

Measures for decreasing negative and increasing positive influences in the Spatial Plan in the administrative city/municipal, environment must be prepared in advance in the form of perceived and analyzed results of the impact assessment and objectives of strategic assessment.

Air Protection

Protection of this element means limiting or decreasing emissions of pollutants, primarily by the following:

- Strictly limiting emissions of pollutants from industrial facilities, transportation and residential areas, further development of gas and district heating systems, adjustment of the economy to environmental protection criteria, more frequent control of boiler room management, encouraging EE, in terms of rational use of energy;

- By taking certain measures to stimulate the general public, who manage individual boilers, to switch to alternative heating sources;

- Instalment of devices for decreasing emissions in places where emissions have exceeded limits prescribed by law, i.e. industrial plants, heat production facilities, boiler houses and so on;

- Decreasing and limiting emissions by redirecting transit traffic away from urban areas, applying essential protection measures on highways and other roadways, applying regulations and obtaining mandatory permits for existing and new industrial facilities, changing the way existing facilities function, and applying the best available technologies and solutions in accordance with laws and regulations in new facilities;
Use of alternative energy sources like solar and geothermal energy, energy from biomass and waste;

Harmonizing the basic functions of local government with the aim of improving environment status;

Public area planned by building new parks and sport and recreation facilities, playgrounds, and planting new trees along streets and boulevards where possible;

Creating a cadastre of air polluters located in a particular area (city/municipal territory) with data on all stationary sources of air pollution;

Obtaining automatic follow up of air quality indicators for adequate reaction in case of accidental pollutions;

Conducting long-term epidemic research in order to discover consequences of bad quality of air on the health of the population.

The project will fulfill all necessary requirements in regard to environment protection, working conditions, and the occupational health and safety of employees engaged by the private partner. The nature of the project itself insists on energy efficiency, and is conditioned by its connection with elements proposed by environmental protection and sustainable development.

5.14.1. General Issues

Using wood as a fuel for heating means using energy from natural circles, because CO₂ that is a by-product of wood combustion is used in combination with solar energy, for the creation of new biomass. Wood is a constant renewable energy source in long-term woodland management and represents a neutral CO₂ energy carrier. Therefore, raw wood is, through the growth process, a part of the ecosystem which offers us protection and wellbeing, and can be exploited without any long-term harm to woodland areas. Using wood for energy purposes creates a positive vibe between consumers and nature, more specifically with their immediate surroundings and the environment in general.

5.14.2. Utilization of Biomass

Energy utilization (especially of wood pellets) is also very high at over 90%, while coal and logs have at maximum efficiency level of 70%.

CO₂ emissions from wood based fuels and other available fuels are:

<table>
<thead>
<tr>
<th>Type of fuel</th>
<th>Emission of CO₂ in kg/kWh of energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas</td>
<td>0.19</td>
</tr>
<tr>
<td>Crude oil</td>
<td>0.27</td>
</tr>
<tr>
<td>Coal</td>
<td>0.29</td>
</tr>
<tr>
<td>Wood pellet</td>
<td>0.03</td>
</tr>
<tr>
<td>Wood chips</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Comparison of heat value of wood biomass and fossil fuels:

- Natural gas: ~ 10 kWh/m³
- Light fuel oil: ~ 10 kWh/l
- Pellet: ~ 5 kWh/kg
Chips: ~ 3.5 kWh/kg

From the aspect of energy, this means:

1 m³ of gas ~ 1 l of light fuel oil ~ 2-2.2 kg of pellets ~ about 2.5 kg of chips

Advantages of using biomass:

1. Political benefits (relaxed budget, substitution of imported fuels);
2. New jobs;
3. Environmental protection due to reduction of greenhouse gases emission and acid rains, and better quality of soil;
4. CO₂ neutral;
5. Domestic fuel.

It has been proved by thorough analysis that heat production facilities that use gas or crude oil, which supplies heat to towns with a population of approx. 10,000, must have 9 workers employed, and in the case of biomass, approx. 135 jobs are secured in the supply chain, which is of great importance for uniform regional development and employment of the local population.

Based on the analysis and findings of a Study financed by the Government of Serbia, through the authorized ministry, entitled “ENERGY POTENTIAL AND CHARACTERISTICS OF BIOMASS RESIDUALS AND TECHNOLOGIES FOR ITS PREPARATION AND USE AS ENERGY FUEL IN SERBIA” it was concluded that:

Serbia is amongst the European countries with the largest potential/amounts of biomass that can be used to generate energy;

Energy potential of wood is about 43,000 TJ per year in the forestry and wood processing industries.

These do not include the possibility of (for the purpose of) cultivating fast-growing forests with energy potential of about 16,000 TJ per year.

5.15. Expected Results of the Project

Table 14: Expected main results of the project

<table>
<thead>
<tr>
<th>No.</th>
<th>Expected results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>More efficient and better quality public services</td>
</tr>
<tr>
<td>2</td>
<td>Shortening the service providing process</td>
</tr>
<tr>
<td>3</td>
<td>Satisfaction of users of the services with works performed and new technologies</td>
</tr>
<tr>
<td>4</td>
<td>Increasing quality of life in public buildings</td>
</tr>
<tr>
<td>5</td>
<td>Better engagement of resources than current situation</td>
</tr>
<tr>
<td>7</td>
<td>Savings and better business results for public body and private partner</td>
</tr>
<tr>
<td>No.</td>
<td>Expected results</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>8</td>
<td>Positive reactions of the general public to promotion EE</td>
</tr>
<tr>
<td>9</td>
<td>Positive reactions of the general public to PPP concept</td>
</tr>
</tbody>
</table>
6. PPP Model for Financing Fuel Conversion and Boiler Replacement Projects

6.1. PPP Model without Elements of Concession

The recommendation is a PPP in the form of contractual partnership through PPP model without elements of concession, in which the private sector is engaged in financing and management of services.

If the objective of the PPP is to provide quality and cost-effective public services to consumers and the state, an appropriate transfer of risk from the state to the private sector has to exist. The private partner is expected to bear all organizational risks and the risks involved in conducting of works and demand and availability risks.

At the center of the service, is the private partner entity. The private entity’s starting capital is owners/shareholders capital who, in turn, expect dividends in the form of cash or subsidized services. The private entity can gather funds on the financial market by means of borrowing from banks, and in that case, it services its debt to banks.

When the financing structure is in question, it is important to emphasize that in this case there is no financing from the public body but the project leans on the partner’s resources entirely, and its internal and external financing sources.

Chart 6: Scheme of payments of contracted services by the users
6.2. Initiating Procedure for Implementation of PPP without Concession

The PPP project proposal must contain following:

1. Subject of the proposed PPP project, notification of the geographic location where PPP activities will be performed, and objectives of the public tasks which have to be achieved by the project;

2. Business plan, including conditions for PPP, assessment of costs and value-for-money analysis in accordance with Methodology defined by the Commission for PPP and Concessions of the Republic of Serbia, specifications on financing viability of PPP for public body, specifications on financing of the project (out of the budget, financing by international financial institutions, private financing and the costs of financing), availability of funds, and planned risk distribution;

3. Analysis of economic efficiency of proposed project;

4. Kinds and amounts of collateral that are to be obtained by project partners;

5. Short overview of conditions, requirements and methods of securing infrastructure and services to users by private partner, such as project quality, specifications of results for services provided or price levels, etc.;

6. Information on contract award procedure, especially regarding selection and award criteria, selected contract award procedure, overview of public contract contents in accordance with Article 46 of the PPP law;

7. Requirements of environment protection, working conditions, occupational health and safety of employees hired by private partner;

8. Planned dynamics of project development beginning from contract award procedure and up to the commencement of service providing or putting the facility or other infrastructure into operation;

9. The public body project team who will follow up on the entire project and perform the function of tender commission which selects bidders or selection of the best bid, including external advisors.

The proposer of the project must, either independently or through the authorized public body, gather approval for material used in the concrete PPP Project proposed from the entity authorized to give approvals. In the process of gathering approvals project proposal is also submitted to the Commission for PPP and Concessions for opinion and assessment if concrete project may be realized in form of PPP.

If the approving authority fails to approve the project proposal within three months and does not request amendments to it, it shall be considered not approved. After receiving approval of project proposal by the approving authority, the public body commences with the public procurement procedure to select a private partner in accordance with the law which regulates public procurement issues.

6.3. Proposal of Procedure for Selection of Private Partner

Pursuant to the Law on PPP, Article 8, paragraph 1, item 10, a private partner is a natural person or legal entity, national or foreign, with local or foreign share or without it, or a consortium of one or more such natural and legal persons which have been selected in a public procurement procedure or concession granting procedure and which have signed with the public partner a public contract, or which is establishing for that purpose an SPV, or which is establishing with the public partner a joint enterprise. Additionally, item 11 states that:
The procedure for selection of private partner is public procurement procedure in compliance with the law regulating public procurement or granting of concessions in accordance with this law.

If the proposed form of PPP is a contractual PPP, after the private partner selection procedure, the public contract will regulate mutual rights and obligations of the contract signees, public body and private partner representatives.

Pursuant to Article 14 of the PPP Law, a national or foreign natural person or legal entity may participate in the procedure for the award of public contract.

Groups of companies may submit their bids or act as participants in the procedure. Public bodies do not have to ask from these groups of persons to have a specific legal form in order to participate in the procedure.

Of all the participants in the procedure whose bid has been evaluated as the most favourable one, a certain legal form shall be required after the award of public contract.

6.3.1. Consortia/Joint Venture/Association

The formation of a consortium, in order to participate in the public contract award procedure is permitted, unless the public body that conducts the procedure clearly foresees otherwise, for objective reasons. If objective reasons exist, the public body can install certain restrictions related to the number of consortium members, the structure of the consortium, and replacement of the subcontractor, etc.

The public body can include consortiums in the public procurement procedure and in the public call, but to protect user interests, the following restrictions (that have legal ground) should be put into place, (to be stipulated in the public call and tender dossier):

1. A restricted number of consortium members or other restrictions in terms of consortium structure and responsibilities of its members;
2. Restrict changes in consortium structure after pre-qualification phase, such as replacing members, merging of bidder to consortium or merging and resolving of consortiums;
3. Restrict subcontractor changes which capacities are needed for bidder or consortium to fulfil selection criteria.

6.3.2. Subcontracting

In the tender dossier and draft public contract, the public body can request bidders to stipulate in their bids the contract value percentage intended for subcontracting. In this case the bidder is responsible to fulfil the contract. If subcontracting is not stipulated in the bid in this way, the subcontract cannot be concluded without the previous consent of the public partner. Therefore in the tender dossier and draft public contract it is necessary to include any potential subcontracting and the percentage of it, as well as requesting necessary qualifications and technical and financial capacities of bidders, both single bidders and those in a consortium or with subcontractors, because contracting and subcontracting is possible only if the proposed subcontractor fulfils the conditions for conducting professional activities in terms of economic and financial status and technical or/and professional skills in completing all contractual obligations.

6.3.3. Proposal of Interested Parties

Pursuant to the Law on PPP, part 6 of the Proposal of Interested Entities for the Implementation of PPP Projects, Article 19, it is stipulated that a public body may consider and accept a self-initiated
proposals do not refer to a project for which the public contract award procedure has been initiated or for which a public invitation to tender has been published.

When submitting a self-initiated proposal, the proposer shall inform the public body of the value of the documents prepared, which the public body or the private partner shall be obliged to compensate in the case of awarding the contract to a person other than the person submitting the self-initiated proposal.

Within 90 days of the receipt of the specific self-initiative proposal, the public body shall determine whether it considers the project to be in public interest and shall notify the proposing party accordingly. A public body may discuss any aspect of the project thus proposed by the proposing entity, including the justification of the costs of preparing the documentation.

If it is considered that the self-initiated proposal is in public interest and if the public body decides to initiate such a project, this body shall act according to the procedure provided for in Article 26 of this law and provisions of this law regulating the concession granting procedure. If a procedure for public contract award for the proposed PPP with or without elements of concession is initiated, the public body shall state in its invitation that the project was proposed by private proposing entities.

The proposing entity shall be entitled to participate in the contract award procedure if its participation in the preparation of project proposal does not violate competition.

If the proposer has a competitive advantage, the public body shall provide to all other interested persons or bidders all the information necessary to neutralize such advantage.

If the competitive advantage cannot be neutralized, the entity must be excluded from public contract award procedure.

Pursuant to Article 21 of the PPP Law, the selection of the private partner is made according to the selection criteria prescribed by the law governing public procurement, except for provisions regulating the advantage of national bidders over foreign ones.

In implementing these criteria, the price shall mean the net present value relevant to total costs over the contract period without VAT.

The calculation of the assessed value of the public contract is based on the total value, as assessed by the public body taking into account the assessed total value, including possible options and possible renewal of the public contract.

6.3.4. Advertising of Public Call

The procedure of awarding a PPP public contract with or without elements of concession is launched by means of a public invitation in the Serbian language and in a foreign language commonly used in international trade.

The identical text of the public invitation shall be published in the “Official Gazette of the Republic of Serbia”, as well as in a daily paper widely distributed in the whole territory of the Republic of Serbia, on the web page of the public body and on the public procurement portal, stating the date when the invitation is to be published in the “Official Gazette of the Republic of Serbia”.

The public notice will, if necessary, be published on one international newspaper and electronically on the internet pages of the Tenders Electronic Daily, the Internet publication attached to the Official Journal of the European Union. This is mandatory for projects whose value exceeds EUR 5 million.
The costs associated with the publishing of the public invitation are borne by the public body implementing the procedure.

6.3.5. Deadlines for Submission of Applications and Bids

When determining the deadlines for the receipt of bids and applications for participation, the purchasing entities shall especially take into consideration the complexity of the public contract and the time needed to compile the bid in order to set the adequate deadlines.

In an open procedure, the shortest deadline for the receipt of bids is 52 days of the date of publication of the public notice. In case of procedures conducted by a holder of exclusive rights within the meaning of the law regulating public procurement.

The Law on public procurement applies to all public contracts which are not exempt and whose assessed value not including value-added tax (VAT) is equal to or exceeds the minimum thresholds below which public bodies are not obliged to apply the law which regulates public procurement and which are determined in the law regulating the annual budget of the Republic of Serbia.

6.4. Conclusion of Public Contract

Pursuant to the Law on PPP, part 5.5. – The Period for which the Public Contract is Concluded, Article 18, paragraph 1, it is stipulated: “The period for which the public contract is concluded is determined in the manner which does not limit market competition more than necessary in order to ensure appreciation of the investment of the private partner and a reasonable return on invested capital, at the same time taking into consideration the risk related to the commercial use of the subject of the contract.” The period referred to in the same article cannot be shorter than 5 years or longer than 50 years, with a possibility that after the expiry of the contracted period a new contract may be signed along with the selection of a private partner in manner and according to procedure prescribed by this law.

The public body, bearing in mind the subject of the PPP and enabling amortization for the private partner by obtaining reasonable payback of invested capital, and pertaining to risks in connection with a project to switch over to biomass from fossil fuel, may suggest a period between 10 and 15 years for public contract conclusion.

The mutual rights and obligations of contractual parties in the PPP project implementation is regulated by the public contract which content is prescribed by Article 46 of this law.

In chapter II – the Procedure and Manner of Public Contract Award, section – Types of Procedures, Article 20, states that the procedure for the selection of the private partner is either the public procurement procedure prescribed by the law regulating public procurement or the concession granting procedure regulated by this law. A public contract is signed as a public procurement contract or a concession granting contract. The subject of the PPP is already proposed under the model of PPP without elements of concession, therefore no concession; the public contract will be concluded as a public procurement contract. If the public body for the purposes of implementing a PPP project engages advisors, their selection will be according to the law regulating public procurements.

6.4.1. Content of the Public Contract

The public contract contains all clauses, conditions and other terms that the public body considers of use for the scope of tasks that are to be fulfilled by the project by the private partner and for regulating relationships between the private partner and other participants that play a significant
role in implementation of the PPP project without elements of concession. While determining clauses and conditions of public contract, the public body should regulate the following issues:

- The nature and the scope of works to be performed and/or services to be delivered by the private partner and the conditions for their provision, provided that they are stated in the tender documents;

- Risk distribution between the public and private partner;

- Provisions regarding the minimum required quality and standard of services and works in the public interest or in the interest of service beneficiaries or beneficiaries of public facilities, and the consequences in case of failure to fulfil such quality requirements, provided that they do not represent an increase or decrease in the fee payable to the private partner;

- The scope of exclusive rights of the private partner, if any;

- Any assistance that the public partner may extend to the private partner in acquiring permits and approvals necessary for the implementation of the PPP or of the concession;

- The requirements related to the SPV (if there are plans to establish thereto) in terms of: the legal form, the establishment, the minimum capital and minimum other assets or human resources; the structure of shareholders, organizational structure and business premises as well as the business activity of the SPV;

- Ownership over the assets relevant to the project and, if necessary, the obligations of other contract parties in terms of acquiring project assets and possibly any necessary authorization;

- The fee payable to the private partner, irrespective whether it consists of tariffs or fees for the provision of facilities or services, the manner and the formula for the calculation, periodic correction and adjustments of such tariffs or fees, possible payments that the public partner should make to the private partner;

- The mechanism for increasing or reducing the fee (irrespective of the legal form) to the private partner depending on the good or poor quality of their services or works;

- The procedure that the public partner uses to consider and approve designs, construction plans or specifications, and procedures for testing and final inspection, approval and taking-over of the infrastructure facility and services delivered, if necessary;

- The procedures for the amendment of designs, construction plans or specifications if unilaterally determined by the public partner and procedures for consent on possible extension of deadlines and/or increase of fees (including the costs of financing);

- The scope of obligations of the private partner, depending on the case, to ensure the changes in the facility or services within the period of duration of the contract in order to meet the changed actual demand for services, its continuity and its provision under substantially same conditions to all beneficiaries, as well as the consequences this may have on the fee (and the costs of financing) for the private partner;

- The possible scope of changes in the public contract after it is signed, the persons who have the right to request this and the mechanisms for the harmonization of such changes;

- The possible right of the public partner to approve to the private partner to sign the key subcontracts or contracts with subsidiaries of the private partner or with other related persons;
- The guarantees to be provided by the private partner or the public partner (including the guarantees by the public partners to financiers);
- Insurance coverage to be provided by the private partner;
- the available legal remedies in case that any party to the contract fails to perform its obligations;
- The measure in which either party to the contract may be exempt from liability for non-execution of obligations under the contract due to circumstances objectively beyond its control (force majeure, changes in legislation, etc.);
- The period of duration of the public contract and the rights and obligations of parties to the contract after its expiration (including the state in which the assets shall be handed over to the public partner); the procedure for the extension of the contracted period of the contract and consequences thereof on the project financing;
- Compensation and debt equalization;
- Consequences detrimental changes in legislation;
- Grounds for and consequences of premature termination (including the minimum amount to be paid to the public or the private partner), penalties, and other relevant provisions;
- The possible limitations of liability of the parties to the contract;
- All auxiliary and related contracts that should be signed including those intended to facilitating financing of project related expenditures, and the effects of such contracts on the public contract. This especially includes special provisions whereby the public partner is allowed to sign contracts for the financing of the private partner and provide the rights for the transfer of the public contract to the person designated by the financiers under certain circumstances;
- The applicable law and the dispute settlement mechanisms;
- The circumstances under which the public partner or a designated third party may (temporarily or otherwise) take over the management of the facility or other functions of the private partner in order to ensure effective and continuous provision of services and/or of the facility which are the subject of the contract in case of serious failures of the private partner in the execution of its obligations;
- Taxation and fiscal issues, if any.

6.4.2. Consent on/Approval of Public Contract

Pursuant to the Law on PPP and Concessions, Article 47, prior to making the decision on the selection of the private partner and the signing of the public contract, the public body must submit to the authority, i.e. the City/Municipal Assembly, the final draft of the public contract including all appendices which are integral parts thereto, for approval.

The City/Municipal Assembly, on the basis of the assessment of compliance of the draft contract with this law and compliance with the tender dossier, give its approval of the final draft contract within 30 days of submission.

The public contract may be signed after approval has been given by the City/Municipal Assembly.
Any amendments and additions to the signed public contracts amending the rights and obligations of the contracting parties, are subject to the procedure according to the clauses of the PPP Law. Unless otherwise agreed in writing, the public body which is the public partner in the public contract is always responsible for the implementation of the PPP project and its possible consequences.

6.4.3. Signing of Public Contract

Pursuant to Article 48 of the PPP Law the public partner must invite the selected best bidder to sign the public contract within the timeframe determined in the decision on the selection of the best bid, after the acquired approval of the City/Municipal Assembly.

The public contract in writing is signed by the authorized representatives of the public partner and the selected best bidder, and in cases when the contract provides for the disposal of shares in a joint undertaking, the contract shall be certified.

By signing the public contract the private partner acquires the right and undertakes the obligation to perform the activity for which the public contract is awarded.

The public contract must be composed in accordance with the tender dossier, all the information from the public invitation notice, the selected bid and the decision on the selection of the best bid.

6.4.4. Amendments to the Public Contract and Termination

The PPP with or without elements of concession will be terminated upon fulfilment of the legal conditions, will be terminated for reasons of public interest, with the agreed termination of the public contract, with the unilateral termination of the public contract, with the effectiveness of a court decision whereby the public contract is pronounced null and void and is cancelled.

The PPP with or without elements of concession shall be terminated with the fulfilment of legal conditions for it: with the expiration of the period of time for which the public contract was signed, with the death of the private partner, or with the liquidation or bankruptcy of the private partner. PPP with or without elements of concession need not be terminated with the liquidation of a consortium member if at least one consortium member, with prior consent of the public partner, assumes the unlimited joint and several liability to fulfil the part of the public contract of the consortium member that was liquidated.

The public partner may unilaterally terminate the public contract in following cases:

- If the private partner is not performing the public works or is not providing the public services according to quality standards for such works or services in a manner agreed in the public contract;
- If the private partner does not implement measures and actions necessary to protect the assets in general use or the public asset in order to ensure protection of nature and cultural values;
- If the private partner provided false and inaccurate data which were decisive in the evaluation of his qualification during the selection of the best bid;
- If the private partner through its fault does not begin to perform the public contract in the agreed time;
- If the private partner performs also other acts or fails to perform the necessary acts which is contrary to the public contract;
If the private partner assigns their rights from the public contract without prior approval of the public partner;

- In other cases in accordance with the provisions of the public contract and general rules of law on contractual obligations and the generally accepted rules for the specific type of contract.

The criteria based on which the public partner determines the existence of reasons for termination of contract are defined by public contract. Prior to unilateral termination of the public contract, the public partner must first in writing notify the private partner of his intention and assign an appropriate period of time for the private partner to remedy the reasons for termination of the public contract and make its statements regarding the reasons.

If the private partner does not remedy the reasons for termination within the deadline stipulated by law, the public partner shall terminate the public contract.

In case of unilateral termination of the public contract by the public partner, the public partner has the right to compensation for damages caused by the private partner according to the general rules of regulations on contractual obligations.

The private partner may unilaterally terminate the public contract in accordance with paragraphs of the PPP Law, the public contract and the general legislation on contracts and torts, if the public partner acts in a manner which makes their contractual relations untenable or fully disrupts the capacity of the private partner to perform the public contract.

6.4.5. Possible Omissions of Public Partner

Possible omissions of Public partner include:

1. Expropriation, or seizure of property or of the share of the private partner by the public partner;
2. Failure of the public partner in terms of payment of accrued payments in favor of the private partner;
3. Any breach of obligations from the public contract by the public partner which significantly disrupts or makes impossible for the private partner to perform the obligations from the contract.

The consequences of premature termination of the public contract due to default of the public partner are regulated by specific rules defined by the public contract, as well as the general rules of the applicable law.

6.4.6. Elements of Securities (Guarantees)

In accordance with the Law on Public Procurement, the public body can stipulate in the public call and tender dossier that the entity granting concession is obliged to ask bidders to submit a **bank guarantee to demonstrate the seriousness of their bids**.

The Commission for public procurement, formed by the public body, can suggest kind and amount of particular guarantees.

The bid guarantee must be returned immediately to a bidder whose bid has not been considered in the course of the selection process.

On all issues related to bid guarantee, the relevant paragraphs of the law which regulates public procurement are applied.

The public body is obliged to obtain necessary guarantees or collateral for payment of contracted fees, and fees for possible damages prior to public contract signing because of failures in fulfilment.
of obligations from public contract (pledge declarations, bank guarantees, personal guarantees, checks, etc.), and in accordance with estimate of expected value coming from rights given by public contract.

Guarantees and collateral are stored in an appropriate place at the public partner’s premises, which is obliged to keep them during the timeframe of the public contract, and in accordance with the PPP law.
7. Justification of the Project & Justification of Project Implementation through PPP

7.1. Project Justification

There are numerous advantages of a PPP that may be useful to the public sector. These advantages include the possibility of approaching additional funds and using the operational efficiency of the private sector in reducing costs, and improving the quality level of services to the satisfaction of the public services users.

The main reason to establish a PPP is the possibility of generating benefits for service users and local governments as a result of the participation of a private partner in providing public services and the management of public services.

In this case, it is all about the existence of a public interest need or public service provisions, as well as the existence of the legal possibilities for implementing the proposed project.

It is expected that the PPP will improve the economy because the existence of contractual obligations means that the project will be completed on time and costs rarely increase during project realization.

7.2. Justification of Project Implementation through PPP

The main criteria used to assess and to receive approval for the justification of using the PPP model in implementing the proposed project are defined in the following table:

Table 15: Criteria for justification of Project implementation through PPP

<table>
<thead>
<tr>
<th>No.</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Legislation which allows for the implementation of the PPP model (laws and bylaws)</td>
</tr>
<tr>
<td>2</td>
<td>Request from local government that have had the need for conducting of works to be done for a long period of time, that are not the subject of a basic boiler facility maintenance contract, but are regulated by separate works contracts, or there are no such contracts at all</td>
</tr>
<tr>
<td>3</td>
<td>The use of the “know-how”, research and development results of private partners by public partner (technologies, materials, management, quality systems, and so on )</td>
</tr>
<tr>
<td>4</td>
<td>The public partner does not change the ownership structure and is not the subject of sale or privatization</td>
</tr>
<tr>
<td>5</td>
<td>Public body does not spend its own resources nor its own capital for performance of works which would be the subject of the PPP</td>
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<td>6</td>
<td>Public partner/body does not have credit debt and mortgage obligations</td>
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<tr>
<td>7</td>
<td>Favourable payment conditions and security (long-term payments, guarantees on works performed and services provided, payments according to known/contracted model of billing). Crediting is done by private partner.</td>
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<tr>
<td>8</td>
<td>Fuel savings and energy efficiency of public buildings</td>
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<tr>
<td>No.</td>
<td>Criteria</td>
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<tr>
<td>9</td>
<td>Enabling heat energy billing according to real consumption, and not per unit of heated area</td>
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<tr>
<td>10</td>
<td>Construction permit is not requested</td>
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<tr>
<td>11</td>
<td>Distribution of risks (main project risks resumes private partner)</td>
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<tr>
<td>12</td>
<td>Improvement of services quality level</td>
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<tr>
<td>13</td>
<td>Widening assortment of services by introducing new services</td>
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<tr>
<td>14</td>
<td>Using private sector resources and engaging public partner resources on other services and activities</td>
</tr>
<tr>
<td>15</td>
<td>Shortening deadlines for service delivery</td>
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<tr>
<td>16</td>
<td>Lower costs for services provided to users (private partner is producer of heat energy, and in comparing with the current model and the purchase of fuel, there is no intermediary)</td>
</tr>
<tr>
<td>17</td>
<td>Increase in public buildings value</td>
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<tr>
<td>18</td>
<td>Improvement of public body image</td>
</tr>
</tbody>
</table>

The Distribution of duties between public and private partners would be conducted in the following manner: the private partner, in addition to the responsibility of design and reconstruction of the boiler facility, resumes more responsibilities such as financing, management and maintenance within and beyond the guarantee period.

In this manner, the private partner, by resuming the responsibility of conducting works and providing the heat energy supply, together with this risk, will also resume the market risk for the existence of sufficient demand for services provided and the positive value-for-money risk for the entire contract period (10 to 15 years). This entails comparing all the planned costs of the public sector when the PPP model of implementation is used, with planned costs in the case of traditional budget financing of those costs in the same period, including, and apart from the costs of conducting works, as well as all other costs which are in the PPP model borne by the private partner, such as facility maintenance costs within and beyond the guarantee period or any costs which may arise in the event of a problem.

Through innovations and applying new technologies, materials and expertise of the private partner, the quality of services provided to beneficiaries improves, and the level of satisfaction of beneficiaries increases.
8. Feasibility Study of the Project

8.1. Analysis of Project Feasibility

Taking into account financial resources and the possibility of investing funds into the energy retrofit of boiler facilities (both district heating boiler houses and individual boiler rooms), and based on experiences and projections to date, it is clear that, at this time, in Serbian municipalities there is no possibility (or it is significantly diminished) to prepare a disbursement plan for project implementation where the local government finances the project on its own or borrows from another public body. Special attention, in addition to financial issues, has to be paid to areas of the building (boiler rooms) that need retrofitting, bearing in mind the fact that the private partner must pay for the all costs of materials used to complete works to a selected subcontractor, as well as the costs of the needed supplies at commercial prices (and not at production prices).

8.2. Costs Estimate and Value for Money Analysis

The definition of achieved value when compared to invested funds (value for money, \( VfM \)) is the application of an analytical procedure in order to determine if it is more beneficial for tax payers for a traditional investment model to be applied (in which the public body is the investor, resuming all or the major risks of public investment), or it is more beneficent to purchase services from a private sector bidder thus allocating most of the risks to the private partner, as in the case of the Public-Private Partnership (PPP).

Therefore, the idea to maximize the achieved value for public money (funds) is for the purpose of allocating certain risks of public investment to the private partner.

In this regard, the EU Commission defines the PPP as a partnership between the public and the private sector aimed at providing services which are traditionally provided by the public sector. The public sector plays the role of Employer who wants to obtain the provision of public service to the end users, while the private partner plays the role of Contractor who wants to provide services as defined by the public contract.

In order to complete the value for money analysis within the PPP and Concessions it is of great importance to know the limits, as defined by law, of how much the local government units (Municipalities) may borrow, which is prescribed by fiscal and budget laws.

However, committing to the long-term obligations up to limits allowed by law will have a different effect on the financial stability of each municipality. Therefore, it is of the utmost importance to determine economic (real) capacity for assuming long-term commitments by the public sector. These limitations, for the needs of the light fuel and crude oil replacement of coal boilers with wood biomass (pellet) boilers in public buildings project, and for the aim of implementing measures for energy efficiency improvements, a Special Purpose Company is established, so further value for money analysis is assigned to that company.

8.2.1. Special Purpose Company (SPC = SPV)

An SPV is a business entity – a company which will be established by the private partner for the purpose of concluding a public contract and implementing a PPP project.

Founding and managerial rights are regulated freely between the SPV members in accordance with the law which regulates the status of companies. An SPV is established in accordance with paragraphs of the Law on Companies and it is 100% in the ownership of the private partner.

The act of establishing an SPV defines the following minimum rights of the public partner:
- The SPV has a Supervisory Board with three members, of which two are members directly nominated by the private partner and one by the public partner;
- The representative of the public partner has the same rights as the private partner representatives, in accordance with Serbian regulations and laws;
- The Supervisory Board must compose the Report on business results and savings achieved, each year no later than 30 May (after the heating season has finished), and submit it in writing to the City/Municipal Assembly (the public body) as an informative report.

During project implementation the value for money analysis is transferred to the SPV.

8.2.2. Comparator of Public Partner Expenses

Public Sector Comparator (PSC), hereinafter referred to as Comparator, is an instrument by which the public sector investor compares the overall life cycle costs of the project with the PPP and the traditional method used by the public sector.

Comparator gives merits for assessment of value for money by comparing alternative models.

The Comparator plays a large role with regards to the correct analysis of overall life cycle costs and risk distribution between the public and the private sector.

Comparator of costs compares:

A. The traditional method used by the public sector [Heating with light fuel oil, crude oil or coal boilers]

and

B. The Establishment of the SPV [Switch to biomass heating boilers]

If own, public sector investment is possible, this solution should be compared to PPP/ESCO solution in order to see how the public money could be the best utilized.

Project Overview

The purpose of the project is to reduce the amounts spent by the local government budget on heating public buildings by changing the type of fuel used in the respective boiler rooms.

At present, public buildings have the largest heating expenses. They use light fuel oil, liquid petroleum gas and electricity in boiler rooms and individual furnaces.

The cost of purchasing fuel needed to heat an average flat during the heating season is about RSD 174,000 for light fuel oil, RSD 131,000 for liquid petroleum gas and RSD 106,000 for electricity. When natural gas is used, heating costs are several times lower and amount to approx. RSD 54,000.

Light Fuel Oil (the most expensive fuel)

It is well-known that there was a significant increase in the cost of LFO as of May 2012 when the Government of the Republic of Serbia introduced a tax on LFO of European quality in order to prevent misuse and disable the sale of LFO instead of euro-diesel fuel.

In future, further increases in the cost of LFO are expected. The Law on taxation of fuels defined increments of taxes as follows:
Until 31 December, 2013: 42 RSD/l
- From 1 January to 31 December, 2014: 46 RSD/l
- From 1 January, 2015: 50 RSD/l

**Chart 7: Fluctuation in LFO prices**

**Investments in fuel change in existing heating system**

When changing the type of fuel used in various heating systems, apart from fuel input prices, the whole system including different mechanical, electro and construction parts requires a considerable investment which needs to be carefully calculated in order to find out the savings resulting from the fuels switch during life span of the newly installed heating system.

**Net Present Value (NPV)**

The net present value is the sum of net positive effects of the project coming from its economic flow, and discounted to actual value, plus interest rate stipulated in the Public Call conditions. It is an integral and absolute indicator for the assessment of economic viability and acceptability of the project. In order for the project to be acceptable, the NPV must be more than zero which means that positive effects of the project are greater than the investment costs.

Of great importance to the assessment of the overall life cycle costs is the analysis of discounted cash flow as well as the defining discount rate. The discount rate should present a real possibility of capital expenses and opportunity cost of capital discounted for inflation (and subsidies if any), and for projects of public interest.

For the period between 2007 and 2013, the EU Commission recommended the use of a discount rate for non-coherent countries at 5.5%, and for coherent countries at 3.5%. For further calculations of NPV, a discount rate of 5.5% is used.

**Capital Expenses of SPV**

The following Chart gives an assessment of the average investment costs for fully automated biomass boilers for individually designed heating systems. As it can be noted, costs per produced thermic kWh depend primarily on the size of the boiler and type of used fuel.

All capital expenses needed in the first year of the project are maximal. All the capital expenses (CAPEX) are borne exclusively by the private partner.
Chart 8: Average Investment Costs- Individual design

**Specific Investment Costs for fully automated biomass boilers**

<table>
<thead>
<tr>
<th>Range</th>
<th>HR costs</th>
<th>Fuel costs</th>
<th>Maintenance costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-500 kW</td>
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<tr>
<td>501-1,000 kW</td>
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<tr>
<td>1,001-5,000 kW</td>
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</tbody>
</table>

Source: Leitladen Feste Biobrennstoffe 2014, FNR

**SPV Operational expenses** Operation expenses of the SPV are presented in the following table:

Table 13. Operation expenses (OPEX)

<table>
<thead>
<tr>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR costs</td>
</tr>
<tr>
<td>Fuel costs</td>
</tr>
<tr>
<td>Maintenance costs</td>
</tr>
</tbody>
</table>

**Public Partner Operation Expenses (without PPP project)**

Assessment of existing Public Partner OPEX is shown in the following table:

Table 14. Public Partner OPEX (without fuel costs)

<table>
<thead>
<tr>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance costs</td>
</tr>
<tr>
<td>HR costs</td>
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</tbody>
</table>

**8.3. Financial Viability of PPP Project for the Public Partner**

Specification of financial viability, based on the prior decision made by the city/municipal Assembly, the where minimal guaranteed monetary savings of 30% is defined, compared to the current price of fuel, and 10% savings based on lower fuel consumption due to better increased operational efficiency of the new boilers. The final maximum price of heat energy takes into consideration other savings that the public partner will enjoy as part of the PPP project implementation. There are also lower CAPEX and OPEX for the public partner.
8.3.1. Defining Heat Energy Price re Fuel Costs
The heat energy price is calculated using the following formula:

\[ C_{T0} = C_{LU} \times k \times 0.70 \]

\[ C_{T0} = 90.51 \text{€/MWh} \]

In the formula presented above, the meaning of each symbol is as follows:
- \( C_{T0} \) - Price of heat energy which is 30% lower than heat energy produced from LFO
- \( C_{LU} \) - Current LFO price [€1.29 /lit]
- \( K \) - Calorific value of LFO [10.000 MWh/lit]

8.3.2. Energy Savings due to Improved Energy Efficiency
In selected public buildings during heating season, and after project implementation, 10% less resources will be spent due to the better operational efficiency of the new boilers.

8.3.3. Defining Heat Energy Price Capital and Operation Expenditures
Savings calculated in the Value for money section are based on the calculation of:
- Capital expenditures during PPP Contract period;
- Operational expenditures on a yearly basis for labour costs and maintenance investment costs of boiler rooms/houses.

Taking into account the energy savings and OPEX and CAPEX, the maximum heat energy price is determined and defined per unit of delivered of heat energy (EUR/MWh without VAT).

Based on simulation and determination of all the monetary savings the maximum heat price is calculated per unit of supplied heat energy (EUR/MWh without VAT).

This is the price of heat energy which guarantees expected monetary savings for the public partner.
9. Analysis of Economic Efficiency of the Project

Table 16: Model table of PPP economic analysis for a 15-year period

<table>
<thead>
<tr>
<th>BUSINESS ACTIVITY OF THE PROJECT</th>
<th>Project’s years</th>
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<td>Incomes from sale</td>
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<td>Gross incomes from sale</td>
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<td>Business expenditures</td>
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<td>Costs of fuel purchase</td>
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<td>Costs of operation and maintenance</td>
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<td>Costs of labour</td>
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<td>Amortisation</td>
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<td>Financial incomes</td>
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<td>Financial expenditures</td>
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<td>Gross profit/loss</td>
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<td>Tax on profit</td>
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<td>Net profit/loss</td>
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<table>
<thead>
<tr>
<th>ECONOMIC FLOW OF THE PROJECT</th>
<th>Project’s years</th>
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<td>INCOMES</td>
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<tr>
<td>1. Incomes + subsidies</td>
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<td>2. Reminder of project value</td>
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<td>4. Tax on profit</td>
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<td>PROFIT OF INVESTMENT</td>
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<td>Projection of investment payback</td>
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## FINANCIAL FLOW OF THE PROJECT

<table>
<thead>
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<th>Project’s years</th>
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<td>Net incomes from sale</td>
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<tr>
<td>Financing sources/credits</td>
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<tr>
<td>Financing sources/own assets</td>
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<td>Reminder of project value</td>
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<tr>
<td><strong>EXPENDITURES</strong></td>
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<td>Investment</td>
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<td>Costs of fuel purchase</td>
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<td>Costs of operation and maintenance</td>
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<td>Costs of labour</td>
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<td>Tax on profit</td>
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<td>Principal debt and interest rates</td>
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<td><strong>NET INCOMES</strong></td>
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<tr>
<td>Cumulative financial flow</td>
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</table>

This table should clearly present SPV business projection for the period of 10 to 15 years of the PPP project duration.
Presumptions for preparation of SPV results projection:

**A. INCOMES FROM SALES**
- Sales incomes are based exclusively on price and sold amount of energy. The SPV has no other income source, not from public nor other sources.
- The heat energy prices increase by 2% per annum (average inflation rate in EU) over entire project period.

**B. EXPENDITURES**
- Costs of energy are costs of pellet purchase and increase by 2% per annum.
- Operational and maintenance costs include insurance, electricity for boiler room operation, servicing of equipment, rectifying failures, etc.
- The cost of labour includes the calculation of the employment of 2 persons on maintenance (boiler operators). In agreement with the public partner, those already employed by the public sector may remain so.
- For calculating yearly amortization, a linear average rate of 6.66% is used. The life cycle of the facility is estimated at a minimum of 15 years.

**C. FINANCIAL FLOW OF THE PROJECT**
Financial flow marks structure of financial flows and columns in individual periods in the life cycle of the project or in the dynamics of financial flows in time. Financial flow is outlined based on constant market prices and official exchange rates. The structure of financial flows is composed of three basic groups of items:

- Incomes;
- Expenditures;
- Net incomes.

Incomes in financial flow are all incomes of financial sources in the project and include following categories:

- Gross income;
- Sources of financing (own and external);
- Project value remainder (includes remained value of basic assets, operation capital and reserves).

Expenditures in financial flow are those business events which decrease the financial potential of the project or all drains of financial resources out of investment regardless of the payment type and ownership over these resources.

Part of the expenditures is the result of investing with the aim of production (investments and costs related to investments) which simultaneously influence a decrease of the economic and financial potential of the project. This includes the costs of basic assets (without amortization), operational capital, material costs, gross salaries, and other such costs.
Part of the expenditures is the consequence of using financial potential that is not produced as a result of the project, so it shows a return of previously received financial resources, which means it decreases the financial but not economic potential of the project, as in the following:

- Repayment of credit (annuity = principal + interest);
- Other expenditures;
- Tax obligations (tax on profit and other);
- Reserves;
- Other

Net incomes in financial flow of the investment project are difference between its incomes and expenditures.

Cumulative financial flow shows the periods in which negative flow emerges which will be covered by credit taken by the private partner.

D. ECONOMIC FLOW OF THE PROJECT

Economic flow represents the structure of economical flows which is composed of three basic groups of items:

- Incomes;
- Expenditures;
- Net incomes.

Economic flow is different from financial flow because in incomes, financial resources are not included, and in expenditures, repayment of credit and loans are not included.

9.1. Sensitivity Analysis

Sensitivity analysis is performed in relation to an increase and a decrease of the following:

1. Investment;
2. Heat energy price;
3. Fuel price (pellet), and
4. Subsidies

Investment is more sensible to change than the price of heat energy. A decrease in the price of energy by more than 15% would push the NPV under the minimum 10%. The project is less sensitive to the price of pellets and the investment itself and even lesser to the subsidy amount. It is important to emphasize that even though the subsidy amount does not influence the NPV by much, the subsidy is very important in regards to the financial flow of the project.

9.2. Financing Structure

Pursuant to the Law on PPP and Concessions, the public contract may be financed by the private partner through a combination of direct investments in capital or by borrowing, including without
limitation structured or project financing and other similar instruments provided by international financial institutions, banks, or other third parties (hereafter: financiers).

With the prior consent of the public partner, the private partner is authorized to assign, put under mortgage, or pledge, for a time period and scope that is in accordance with the PPP Law and Concessions, or the law regulating public property, any of its rights, or obligations from the public contract or other project related property in favor of the Financier and for the purpose of securing payment of any existing or future claims related to construction and financing, or re-financing of the PPP project.

At the request of the Financier and the private partner, the public partner may accept to give certain reasonably requested collateral and accept to undertake certain liabilities necessary to the private partner with respect to any obligation from the public contract.

Said collateral may imply the signing of a separate direct contract between the public partner, the private partner, and the Financier, according to which, inter alia, the public partner may agree with the following:

1. That the Financier is authorized, instead of the private partner, to exercise temporarily all rights from the public contract and to remedy any failure of the private partner, and that the public partner will accept all such actions as if undertaken by the private partner;

2. That the private partner, without the prior consent of the Financier, will not accept cancelation or termination of the public contract at the request of the public partner;

3. That the public partner will not, on the basis of the public contract, file requests with respect to the failures of the private partner without the prior notification in writing to the Financiers regarding such failures, allowing the Financiers and the private partner an opportunity to rectify such failures;

4. That the public partner will, in advance give its consent to temporary or permanent assignment of the contract position or any rights of the private partner under the public contract and that it will grant the requested permits to strengthen the collateral given to Financiers by the private partner;

5. Any other usual provisions which are justified in order to adequately secure the interests of the public partner and the Financiers.

The public body, before concluding the direct contract, is obliged to obtain approval from the City/Municipal Assembly in accordance with law. This approval will imply the right of the Financier to take action and protect their rights in the manner provided for by the direct contract without any separate subsequent approval.

When the financing structure is in question, it is important to note that in this case there are no investments made by the public body but the project leans entirely on the resources of the private partner and its internal and external sources of financing.
10. Risk Distribution Framework

10.1. Project Risks

Although PPP can provide numerous advantages, it must not be forgotten that these arrangements have certain risks, and it is necessary to prepare a framework of risk distribution between the public and the private partners, at least in regards to the following risks: risk of financing, design, construction works, management, maintenance and sufficient demand, as well as the quantification framework of these risks, assessment of probability of their occurrence and costs which may incur.

Regarding financing, it is important to take into account that by the public call, the tender dossier and the public contract itself is going to be précised that the private partner will perform project financing in the planned amount (from initial to maximum designed amounts), the risks of financing are significantly lowered and are limited to a selection of financiers that, in accordance to the Law on PPP can be chosen by the public partner, but considering that for all decisions made in regard to financing in the form of collateral, approval of the public partner is needed, and therefore the risk is minimal.

10.2. Project Risk Management

This project carries certain risks, directly related to construction works, due to which project realization is not necessarily equal when viewed from the aspect of the final results of the project and from the view of the project management plan. It is mainly about the risks that arise from the long-term nature of the project (10 to 15 years) and the high number of participants involved.

The PPP projects teams must make lists of risks in the same way that a list of risks is compiled by any construction works project team.

These risks are determined after any potential sources of risks related to the project are assessed, and the events that carry risks and the unfavorable results that may happen if one of these scenarios were to occur.

The PPP project risk management process begins with the identification of risks and an understanding that this is the most important phase of the risk management process. Listed as one of the most important risks is (in addition to other), the achievement of quality assessment of risks. A register of risks with a short description of each risk has been prepared.

10.2.1. Risk Identification

Risk management must pay special attention to the project subject, in order to prevent risks.

When considering the risks involved in the PPP project, three phases are evident: identification, analysis, and response to risks. The project risk management views project risk distribution in accordance to the following items:

- Technological risks;
- Organizational risks;
- Management risks;
- Financial risks;
- External risks.
Identification of risks is performed based on expert analysis of the project and documented previous experiences. With respect to the characteristics of the project as:

- The project has specific characteristics regarding the obligation of the public body to conduct the public procurement procedure pursuant to paragraphs of Law on Public Procurement;
- Scope and duration of project;
- Specificity of public service,

The conclusion is that the main risks come from the project environment itself, while a significant number of risks come from possible failures in project management. The scope of the PPP project is significantly large and its duration is extremely lengthy, which is why so many potential risks will be detected in the course of project implementation.

10.2.2. Risk Analysis

Some basic risks which have been analyzed are also influences of environmental conditions, failures on behalf of the construction works contractor (bad planning, failures in procurement of equipment and materials) and additional requests for changes to be made to project.

Table 17: Risk categories, Initiators and probability of risk event

<table>
<thead>
<tr>
<th>Risk description</th>
<th>Initiator of risk</th>
<th>Probability</th>
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</thead>
<tbody>
<tr>
<td>1 Risks of private partner selection</td>
<td>Mistake of Commission for public procurement</td>
<td>S (small)</td>
</tr>
<tr>
<td>2 Risk of public procurement procedure</td>
<td>Mistake of Commission for public procurement</td>
<td>M (medium)</td>
</tr>
<tr>
<td>3 Contract clauses not precise or not adjusted to project needs</td>
<td>Contract draft beyond standards of contracting</td>
<td>M</td>
</tr>
<tr>
<td>4 Documentation for preparation of bid not correct</td>
<td>Team for preparation of bidding documents overloaded</td>
<td>M</td>
</tr>
<tr>
<td>5 Errors in calculations of estimated project value</td>
<td>Team for preparation of bidding documents overloaded</td>
<td>L (large)</td>
</tr>
<tr>
<td>6 Incapability of obtaining necessary approvals</td>
<td>Team for preparation of documentation overloaded</td>
<td>S</td>
</tr>
<tr>
<td>7 Inefficiency in receiving conditions and approvals from institutions</td>
<td>Complex and slow administration</td>
<td>M</td>
</tr>
<tr>
<td>8 Errors in selection of technology</td>
<td>Incompetence of engineer in charge</td>
<td>S</td>
</tr>
<tr>
<td>No</td>
<td>Risk description</td>
<td>Initiator of risk</td>
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<tr>
<td>9</td>
<td>Insufficient number of professional labourers according to established criteria and needs</td>
<td>Undeveloped labour market in respect to work with special technologies and materials</td>
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<td>10</td>
<td>Late delivery of equipment and materials</td>
<td>Remote location from suppliers of materials</td>
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<td>11</td>
<td>Possible unsolved ownership or legal issues on construction site (buildings, land)</td>
<td>Inadequate ownership documentation</td>
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<td>12</td>
<td>Incompetent members of project team or personal on key executive positions (no knowledge on technical aspects of the project)</td>
<td>Poor selection of executive team members</td>
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<td>13</td>
<td>Poor communication within organization</td>
<td>Absence of clear distribution of duties</td>
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<td>14</td>
<td>Interruption of works for more than 5 days due to climate conditions (high or low temperatures, falls)</td>
<td>Atmospheric influences</td>
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<tr>
<td>15</td>
<td>Productivity below average</td>
<td>Extreme working conditions for people and equipment</td>
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<tr>
<td>16</td>
<td>Problems with financing</td>
<td>Insolvency of private partner</td>
</tr>
</tbody>
</table>

**Table 18: Initiators and probability of impacts**

<table>
<thead>
<tr>
<th>No</th>
<th>Risk description</th>
<th>Initiator of risk</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Risks of private partner selection</td>
<td>Insufficient number of bidders or bids not good enough</td>
<td>S (small)</td>
</tr>
<tr>
<td>2</td>
<td>Risk of public procurement procedure</td>
<td>Inadequately prepared tender dossier</td>
<td>M (medium)</td>
</tr>
<tr>
<td>3</td>
<td>Contract clauses not precise or not adjusted to project needs</td>
<td>Impossible to get approvals</td>
<td>M</td>
</tr>
<tr>
<td>4</td>
<td>Documentation for preparation of bid not correct</td>
<td>Inadequate base for bid preparation</td>
<td>M</td>
</tr>
<tr>
<td>No</td>
<td>Risk description</td>
<td>Initiator of risk</td>
<td>Probability</td>
</tr>
<tr>
<td>----</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>5</td>
<td>Errors in calculations of estimated project value</td>
<td>Inadequate base for calculations</td>
<td>B (big)</td>
</tr>
<tr>
<td>6</td>
<td>Incapability of obtaining of necessary approvals</td>
<td>Insufficient information to legal team</td>
<td>S</td>
</tr>
<tr>
<td>7</td>
<td>Inefficiency in receiving conditions and approvals from institutions</td>
<td>Inability for getting approvals</td>
<td>M</td>
</tr>
<tr>
<td>8</td>
<td>Errors in selection of technology</td>
<td>Poorly prepared bill of quantities</td>
<td>S</td>
</tr>
<tr>
<td>9</td>
<td>Insufficient number of professional labourers according to established criteria and needs</td>
<td>Impossible to get permit for commencement of works</td>
<td>M</td>
</tr>
<tr>
<td>10</td>
<td>Late delivery of equipment and materials</td>
<td>Inadequate base for calculation of costs</td>
<td>S</td>
</tr>
<tr>
<td>11</td>
<td>Possible unsolved ownership or legal issues on construction site (buildings, land)</td>
<td>Undefined responsibilities of contractual parties</td>
<td>M</td>
</tr>
<tr>
<td>12</td>
<td>Incompetent members of project team or personnel on key executive positions (no knowledge on technical aspects of the project)</td>
<td>Undeveloped labour market in respect to working with special technologies and materials</td>
<td>S</td>
</tr>
<tr>
<td>13</td>
<td>Poor communication within organization</td>
<td>Unavailability of resources according to determined plan</td>
<td>S</td>
</tr>
<tr>
<td>14</td>
<td>Interruption of works for more than 5 days due to climate conditions (high or low temperature, rain/snow falls)</td>
<td>Lack of permits for commencement of works</td>
<td>M</td>
</tr>
<tr>
<td>15</td>
<td>Productivity below average</td>
<td>Impossible to solve technical problems</td>
<td>S</td>
</tr>
<tr>
<td>16</td>
<td>Problems with financing</td>
<td>Unavailability of necessary data</td>
<td>S</td>
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</table>
### 10.2.3. Risk Ownership

#### Table 19: Risk Ownership

<table>
<thead>
<tr>
<th>No.</th>
<th>RISK DESCRIPTION</th>
<th>RISK OWNER</th>
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<tbody>
<tr>
<td>1</td>
<td>Risks of private partner selection</td>
<td>Commission for public procurement</td>
</tr>
<tr>
<td>2</td>
<td>Risks of public procurement procedure</td>
<td>Commission for public procurement</td>
</tr>
<tr>
<td>3</td>
<td>Faulty documentation for preparation of bids</td>
<td>Private partner</td>
</tr>
<tr>
<td>4</td>
<td>Errors in calculating estimated project value</td>
<td>Private partner</td>
</tr>
<tr>
<td>5</td>
<td>Urban conditions not met</td>
<td>Private partner</td>
</tr>
<tr>
<td>6</td>
<td>Issues with rights for obtaining construction permit</td>
<td>Private partner</td>
</tr>
<tr>
<td>7</td>
<td>Inefficiency in resolving conditions and approvals from public utility companies</td>
<td>Private partner</td>
</tr>
<tr>
<td>8</td>
<td>Inefficiency in resolving conditions and approvals from institutions</td>
<td>Private partner</td>
</tr>
<tr>
<td>9</td>
<td>Inadequate stability of subject and adjacent buildings/facilities</td>
<td>Private partner</td>
</tr>
<tr>
<td>10</td>
<td>Mistake in selection of technology</td>
<td>Private partner</td>
</tr>
<tr>
<td>11</td>
<td>Contract clauses incomplete or not adjusted to project needs</td>
<td>Private partner</td>
</tr>
<tr>
<td>12</td>
<td>Insufficient professional labour according to established criteria and needs</td>
<td>Private partner</td>
</tr>
<tr>
<td>13</td>
<td>Late delivery of equipment and materials</td>
<td>Private partner</td>
</tr>
<tr>
<td>14</td>
<td>Unresolved ownership and legal issues on construction site</td>
<td>Public partner</td>
</tr>
<tr>
<td>15</td>
<td>Incompetent project team members or personnel on key executive positions (no knowledge of technical aspects)</td>
<td>Public/private partner</td>
</tr>
<tr>
<td>16</td>
<td>As built, design does not follow works implementation</td>
<td>Private partner</td>
</tr>
</tbody>
</table>
10.2.4. Risk Monitoring and Control

When the analyzed project is in question, it can be concluded that the project is strategic, because it is the highest level of investment:

- Long-term (10 to 15 years);
- Highly organized (project portfolio);
- New approach (permanent investment);
- New technologies (new equipment, materials and modern technologies);
- Unique on market (new concept, original);
- Financing method (no investments by public bodies, entirely leaning to private partner resources and its financiers).

S - Specific: unique on the market in concept and investor
M - Measurable – determined and entirely defined
A – Accessible – technologically and materially viable
R - Real – all resources needed for its accomplishment exist
T – Time bound

The follow up of conducting adopted responses to risks will be performed based on the adopted risk management plan and adopted risk respond strategies. Data on tactical measurements will be prepared within the authorized departments and owners of the risks themselves. All data will then be presented in the form of a report.

Follow up and control of timeframe for project implementation will also be performed to determine if the project implementation on site is developing in accordance with the planned schedule, and to constantly assess whether or not the entire project will be implemented within the planned timeframe.

11. Concluding Project Evaluation

Although the PPP model is already an available model in Serbia’s private sector, it has yet to be fully exploited, and its importance and potential in times to come is large.

Bearing in mind the fact that the PPP process of project implementation is extremely dynamic, and that the details surrounding most of the arrangements within it are adjusted to the specific circumstances of particular cases, this manual presented a model (in accordance with all known basic PPP models) that would mostly comply with concrete users’ needs for energy retrofit services in individual boiler units in public buildings, and therefore it complies to the needs of the public
body, taking into consideration all internal and external factors which influence how this model operates.

By analyzing available materials and the financial resources of the public body, the types of services it provides, its restrictions and potentials, the PPP model suggested brings the greatest number of benefits to all internal and external stakeholders and contains a high number of justified reasons for its implementation, together with the legislative framework needed as well as the existence of the presumptive interest of the private sector to take part in this kind of strategic partnership project.

Considering that the private partner selection procedure is a public procurement procedure in accordance with the law which regulates public procurement, and complying with principles of public procurement, public bodies in cases of PPP without elements of concession provide for themselves a good strategic partner, in the long run for activities defined by the subject of the PPP.

In this situation all interested parties win, the public body, the private partner and the users of public services whose satisfaction level increases as the quality of service provided improves and with the increase of delivered value.
12. List of Ruling Laws and Legislations

- **Law on Planning and Construction** (“Official Gazette of the Republic of Serbia” no. 72/09, 81/09, 64/10 and 24/11)
- **Law on Public-private Partnership and Concessions** (“Official Gazette of RS” no. 88/11)
- **Law on Public Companies** (“Official Gazette of RS” no. 119/2012)
- **Law on Companies** (“Official Gazette of RS” no. 36/2011)
- **Law on Obligation Relationships** (“Official Gazette of SERJ” No. 29/78, 39/85, 45/89 and 57/89, and “Official Gazette of SRJ” no. 31/93)
- **Law on Efficient Use of Energy** (“Official Gazette of RS” no. 25/2013)
- **Decisions of Cities/Municipalities (Local governments)**
13. Maps – Individual heating - capacity in public buildings

Chart 9: Total installed heating capacity per municipality

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23 Installed heating capacity in public buildings with individual heating, reported as fuel-switch worthy by 110 municipalities from Central Serbia
Chart 10: Gas boilers – installed capacity
Chart 11: Heavy Oil-Mazut boilers – installed capacity

Belgrade municipalities
1. Stari grad
2. Savski Venac
3. Vladi
4. Crnogorski
5. Zvezdara
6. Zemun
7. Lazarevac
8. Mladenovac
9. Novi Beograd
10. Obrenovac
11. Palilula
12. Pilotin
13. Valjevac
14. Sopot
15. Dorcol
16. Bistrik
17. Cukarica

Other municipalities
16. Petlovac (Novi Sad)
15. Brza Palanka (Kragujevac)
21. Aerodrom (Kragujevac)
22. Bazovac (Kragujevac)
23. Pivara (Kragujevac)
26. Stanice (Kragujevac)
26. Crveni Krst (Kragujevac)
27. Postolje (Nis)
28. Medicska (Nis)
29. Palilula (Nis)

Total capacity (MWh) – Legend

- 0 - 0,99
- 1 - 2,99
- 3 - 4,99
- 5+
Chart 12: Light Oil - Diesel boilers – installed capacity
Chart 13: LPG boilers – installed capacity
Chart 14: Coal boilers – installed capacity
Chart 15: Coal and firewood boilers – installed capacity
Chart 16: Firewood boilers – installed capacity

Belgrade municipalities
1. Stari grad
2. Savski Venac
3. Vračar
4. Grocka
5. Zvezdara
6. Zemun
7. Lazarevac
8. Mladenovac
9. Novi Beograd
10. Obrenovac
11. Palilula
12. Rakovica
13. Zemunovac
14. Sopocani
15. Barajević
16. Bistrica
17. Ćukarica

Other municipalities
18. Petrovaradin (Novi Sad)
19. Brezinci Karlovci
20. Štrugarik (Kragujevac)
21. Aerodrom (Kragujevac)
22. Stari Grad (Kragujevac)
23. Pivac (Kragujevac)
24. Stanovo (Kragujevac)
25. Crveni Krst (Niš)
26. Pančevo (Niš)
27. Niška Banja (Niš)
28. Medina (Niš)
29. Palilula (Niš)

Total capacity (MW) - Legend
- 0 - 0,99
- 1 - 2,99
- 3 - 4,99
- 5+
- Out of research area
- Data not available
Chart 17: Electricity boilers – installed capacity

Belgrade municipalities
1. Stari Grad
2. Savski Venac
3. Wotar
4. Grocka
5. Zvezdara
6. Zemun
7. Lazarevac
8. Miladrovac
9. Novi Beograd
10. Obrenovac
11. Palilula
12. Rakovica
13. V Ivanovac
14. Sopocani
15. Barajevo
16. Morinj
17. Ćukarica

Other municipalities
18. Petrovaradin (Novi Sad)
19. Brezovci (Kragujevac)
20. Stari Grad (Kragujevac)
21. Aerodrom (Kragujevac)
22. Piperc (Kragujevac)
23. Stanovo (Kragujevac)
24. Crveni Krs (Niš)
25. Pančevo (Niš)
27. Niška Banja (Niš)
28. Medina (Niš)
29. Palilula (Niš)

Total capacity (MW) - Legend
- 0 - 0,99
- 1 - 2,99
- 3 - 4,99
- 5+
- Out of research area
- Data not available
14. Other Sources

- Commission Interpretative Communication on Concessions under Community Law; Official Journal of the European Communities; C 121/2; 29. 4. 2000.
- Republic of Serbia, National Assembly, Library of the National Assembly, Public-private Partnership and Concessions, 2011. (Research)
- Pavlovic-Krizanic T., Brdarevic Lj, Partnership of Public and Private Sector in Serbia: Orientation to Rightful Distribution of Risks and Investment’s Profitability, Palgo Centre, Belgrade, 2010
- Public Company “Srbijašume”
- Business Association "District Heating Companies of Serbia"
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