

## "IS THERE POTENTIAL FOR WASTE WOOD COMMERCIAL UTILISATION IN CENTRAL BOSNIA AND HERZEGOVINA"

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### **ABSTRACT**

*At the time when the European Union implements measures to achieve the 2010 target of 22% of electricity consumption from renewable energy sources and the overall target of a 12% share of renewable energy use for all purposes, Bosnia and Herzegovina is still completely neglecting one of its potential resources, the biomass from wood waste. Biomass is available in Bosnia and Herzegovina in abundant quantities. Having this as a initial input REZ-RDA have commenced the activities on more detailed and more scientific approach to given subject in order to explore the possibilities of bio-fuel production in Central BiH region.*

*Quantitative field research was performed through surveying, using prepared questionnaire of 84 enterprises in wood processing sector in the region of Central BiH. The primary research sample included 298 companies from the territory of the region of Central BiH for which, based on registration of their activities, it was assumed that they dispose with wood waste. While performing field visits it was established that 206 companies do not carry out the registered activities or dispose with insignificant quantity of wood waste. Out of 92 companies for which it was established that they have wood waste 84 of them gave the required data and the other 8 companies refused to give data on their activities.*

*This article presents possible methods of disposal and use of waste generated by exploitation forests, primary and final wood processing thus directly influencing environmental protection. Development of production of bio-renewable fuels and its use as replacement for organic fuels will directly influence decrease of pollution and hazardous gas emissions.*

*The article gives short description of results of production profitability and use of these fuels as well on environmental protection.*

**Key words:** Waste wood, commercial utilisation, bio-fuel, Central BiH

### **1. INTRODUCTION**

Biomass is available in Bosnia and Herzegovina in abundant quantities. Waste wood is "produced" in places from forestry companies to saw mills; to furniture and joinery production plants; to construction companies. Having this as a initial input REZ RDA have commenced the activities on more detailed and more scientific approach to given subject in order to explore the possibilities of bio-fuel production in Central BiH region. These efforts were recognized by Sida and it resulted with awarding the project on development of "Feasibility study on waste wood commercial utilisation in central Bosnia and Herzegovina as a resource recovery and economic development project".

### **2. PROJECT OBJECTIVE AND TASKS**

The objective of the feasibility study was to analyse the demand and supply factors that impact the potential development of this industry within Central BiH as a viable commercial activity and its anticipated socio-economic and environmental consequences by considering Environmental Protection, Unemployment Reduction and Commercial Sustainability.

Main focus during the survey development was on the following:

- Determination of the type and potential of wood waste;
- Determination of the current method of use and quantity of the remaining available waste;
- Offer and demand analysis;
- Market analysis;
- Identification of technologies required for adequate use of wood waste;
- Presentation of economically justified production methods and;
- Presentation of funding methods.

In order to establish a commercial justification of available wood waste utilization, as well as to determine the effects in terms of unemployment reduction and improvement of environmental protection in the region of the Central Bosnia, it is necessary to conduct the following tasks:

A) to make analysis of supply/demand

a.) to make analysis of the present market

- to review of the products present at the European market in the field of fuels made of the wood waste;
- to estimate domestic needs in BiH and current prices for products of solid bio fuels;
- to determine the European market and the existing market prices of the analyzed types of products;
- to make analysis the competitive environment in Europe for fuel products made of wood waste in the context of the renewed alternative energy sources;
- to make analysis of regulations on environment in BiH relevant for the fuel products made of wood waste; to review the existing and potential orientation of beneficiaries to the products from the field of bio fuels);

b.) to make analysis of primary sources of supplying

- to make a general overview of wood processing and forestry in BiH given through analyses of raw material base, chain of supplying, existing demand, export activities, and legislation;
- to determine the sustainability of this activity through forest management in BiH and recommend the impact of the fuels produced from wood waste on sustainability of forest resources in BiH;

B) to review capability/feasibility of competitiveness of products from wood waste in BiH

a.) to define waste management

- to review potential supplying with non-processed wood waste from saw-mills on the territory of BiH, as well as the necessary activities, costs and agreements for reliable, continuous and sustainable supplying with wood waste from saw;
- to propose the most effective system of wood waste collection from saw-mills through complete procedure);

b.) to define the process of logistics prior to production

- to identify necessary logistics for transport of non-processed wood waste to the defined micro-location with warehouse/production points;
- to locate and position the micro-locations in BiH for production/storage in the vicinity of the saw-mills or markets;
- to recommend the most effective system of logistics in transport and storing of the non-processed wood waste primarily intended for production of fuel made of wood;

c.) to define the production process

- to recommend the most efficient technology to be applied in production of fuel products made of wood;
- to identify the costs of all other resources necessary throughout the process of producing fuel made of wood waste;

d.) to define logistics from post-production to market

- to identify logistical and other resources necessary for transport of fuel products made of wood waste to domestic or European market;
- to recommend the most efficient system of logistics in transport of fuel products made of wood waste to domestic or European market.

### 3. METHODOLOGY

REZ RDA has engaged Consulting Company to perform field research and to collect the relevant data. Mentioned company has vast experience in related field. It has used a couple of different methods or sources of data for the Feasibility Study preparation like: Quantitative field research, Qualitative field research, Secondary data from relevant institutions, Knowledge of Experts with long-standing practical experience.

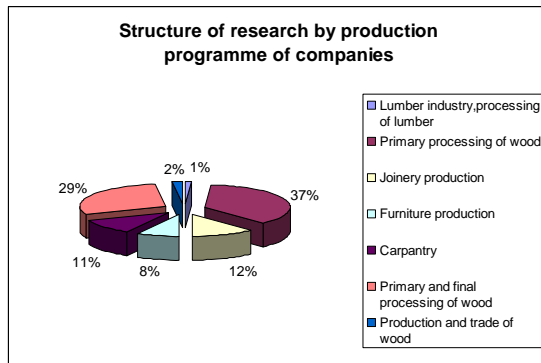


Figure 1. Structure of research by production programme

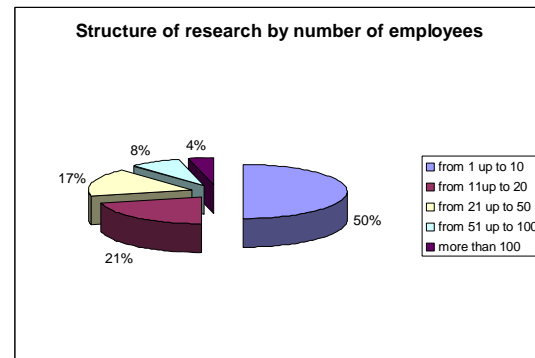


Figure 2. Structure of research by number of employees

Quantitative field research was performed through surveying, using prepared questionnaire of 84 enterprises in wood processing sector in the region of Central BiH. The primary research sample included 298 companies from the territory of the region of Central BiH for which, based on registration of their activities, it was assumed that they dispose with wood waste. While performing field visits it was established that 206 companies do not carry out the registered activities or dispose with insignificant quantity of wood waste. Out of 92 companies for which it was established that they have wood waste 84 of them gave the required data and the other 8 companies refused to give data on their activities. Qualitative field research was performed through the interviews on the sample of 9 enterprises of the wood processing sector in the region along with secondary information sourcing. Secondary data were collected based on the reports of Chamber of Commerce, Bureau of Statistics, Association of Businessmen, Forest Administration, international agencies and associations.

### 4. PROJECT OUTPUTS

Based on the results of this study the assessment of potentials in BiH was made with a special focus on the region of the Central Bosnia aiming at start up of a sustainable production of solid bio fuels from the wood waste as a renewed energy source.

**Commercial Sustainability:** The general conclusion which initiated this Study was that in the territory of the Region there are huge quantities of wood waste as well as that its commercial utilization in production of bio-fuel can assist revitalization of economic activities in the region primarily in relation to small and medium size enterprises. The quantities of wood waste and recommendations referring to possible methods of utilization are analysed in details and can give credible evidence for profitable commercial use.

**Unemployment Reduction:** Development of a new industry in wood processing sector shall open employment possibilities as one of the competitive advantages of the Region. Development of a new industry shall have a great impact on different types of economic activities that will show the need for additional employment.

**Environmental Protection:** The Study presents possible methods of disposal and use of waste generated by exploitation forests, primary and final wood processing thus directly influencing environmental protection. Development of production of bio-renewable fuels and its use as replacement for organic fuels will directly influence decrease of pollution and hazardous gas emissions. The Study gives detailed analysis of production profitability and use of these fuels as well on environmental protection.

## 5. CONCLUSION

The most important findings of Feasibility Study were as follows [1] :

- The indicators for wood waste distribution in the Central BiH region were established in the following proportions applicable for the whole BiH: 53.4% wood waste from forests after exploitation, 46.6% wood waste from mechanical wood processing.
- The existing production of solid bio fuels (briquette and pellets) in the territory of BiH does not exceed the amount of 15,000 t/ year. About 50% of this production is located in the Central BiH region. According to the primary survey data (potential of wood waste that remains unused after exploitation is not included) the potential of the Central BiH region in bio fuels production amounts about 22,000 t briquette/year or 16,000 t pellets/year.
- At the territory of BiH it is possible to apply the following technologies in wood waste utilization, depending on the place of their occurrence: production of briquette, pellet, thermal energy, electrical and thermal energy (co-generation) and ethereal oils. Strategic orientation in wood waste processing should be directed to briquette production in comparison to pellet production. Proposed technologies for production of briquette, pellets and ethereal oils are economically justified according to study results, as well as their introduction for the needs of both domestic market and markets of Slovenia, Austria and Italy. Optimal positioning of one production capacity is necessary in the each of the following municipalities: Busovača, Žepče, Vitez, Travnik, Bugojno and Olovo. Interest for purchasing equipment for wood waste utilization has been expressed by 30 companies in the Central BiH region. The most optimal installed press capacity for briquette is 2,000 kg/h and for pellet 1,200 kg/h. Total number of plants for ethereal oil production in the Central BiH is 16. In considering economic justification of the investment in bio fuels production, three options have been considered: 100% own raw material, 50% own raw material and 100% raw material purchasing from external subjects. Each of stated options provides the economic justification for bio fuels production start-up.
- If we take into account the omitted forest potential of the forests in the Central BiH region, economic profitability for briquette production would be under 3 years, and for pellet production under 5 years counting from the production start-up.
- Strategic market for briquette is to the lower extent domestic, and to the greater extent it is foreign market of Austria, Italy and Slovenia. Strategic markets for pellet are solely foreign ones, identical to those mentioned in the case of briquette. Production price of briquette in BiH, as well as pellet, enables qualitative and competitive market price for these products at foreign markets.
- Utilization of wood waste from forests is a huge potential in BiH since it is not utilized in any way now. Organizational form of Wood Excellence Centar in the Central BiH region and promotion of Woodprocessing and forestry cluster approach in organization of professionally related companies is a necessary factor for quality establishment of bio fuel production in the region, and even in wider area.

## 6. REFERENCES

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