



FOREIGN INVESTMENT PROMOTION AGENCY  
OF BOSNIA AND HERZEGOVINA

# INVESTMENT PROJECTS



## WOOD PROCESSING INDUSTRY

# WOOD SECTOR

## I. INTRODUCTION

Bosnia and Herzegovina has a long tradition in forestry and wood processing, going back to the second half of the 19th century. The abundance of both hard and softwood, as well as the competitive and skilled workforce, make this sector attractive for investment, particularly in export-oriented production programs. Over 60% of B & H wood sector production is exported, where the finished furniture is becoming more and more important export product. Currently, the largest markets for these producers are Germany, Croatia, Serbia, Italy, and the UK, but the potential to export to other countries is enormous.

Nevertheless, the wood processing sector is characterized by a large gap between its current performances and its real potential.

Targeted investments have the potential to bridge the mentioned gap and improve the substantial value-added outcome, starting new companies or modernizing existing ones, with some capital investments or introduction of the new technologies and equipment.

### 1. Forest resources – raw materials

B & H forestry provides reliable resource base (volume, species, quality) related to the supply of various high quality raw materials (beech, oak, ash, pine and fir, as well as walnut, apple, cherry etc.), to the wood processing industry, on long term basis.

Around 53% of B & H territory is covered by forests, where deciduous trees (hardwood) are predominant (over 60 %, mainly beech and oak). „Bosnian beech” is particularly famous worldwide, due to its high quality.

The B & H forests (80.7% state owned,) have the sustainable potential to provide nearly 7 million m<sup>3</sup> round-wood per year.

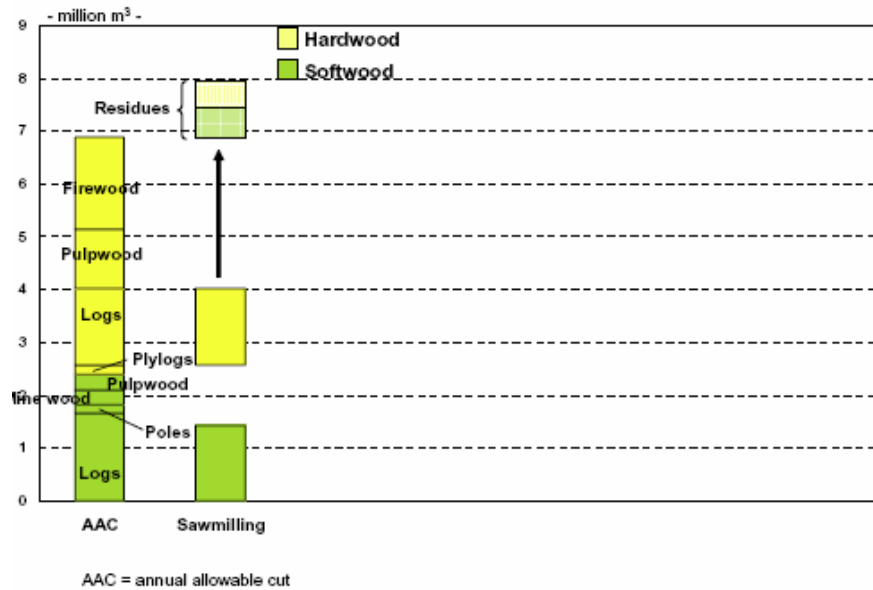
#### Estimated forest cover (ha) in B & H

1000 ha	State	Private	Total forest and forest land
High forest	1 235	132	1 368
Coppice	455	332	787
Karsts (shrub land)	504	80	584
<b>Total of all forest land</b>	<b>2 194</b>	<b>544</b>	<b>2 739</b>

#### Annual Allowable Cut (AAC) in state-owned forests in B & H

Entities	Tree species	Gross volume 1000 m <sup>3</sup>	Net volume 1000 m <sup>3</sup>
Fed BiH	Conifers	1 402	1 173
	Broadleaves	2 026	1 789
	Total	3 428	2 962
RS	Conifers	1 447	1 211
	Broadleaves	3 075	2 715
	Total	4 522	3 926
Total in BiH	Conifers	2 849	2 384
	Broadleaves	5 101	4 504
	Total	7 950	6 888

## Investment potential based on forest resources



## 2. Infrastructure & Energy

### 2.1 Infrastructure

Existing infrastructure, including railway and road network, as well as respective transportation costs can satisfy entirely all requirements for successful development of B & H wood sector. B & H disposes with 4 international airports, 2 river ports, and 1 sea port too. B & H distribution network brings most of Europe within 24-48 hours by truck, under acceptable prices. B & H possesses a developed telecommunications infrastructures (close to European standards).

### 2.2 Transport costs

Transport costs on railway are based on official tariffs (approximately 0.05 €/ton/km). Discounts up to 25% are however applied, depending on the number of wagons that are being moved. Using a wood density of 0.65 tons / m<sup>3</sup>, railway transport cost about 0.023 €/m<sup>3</sup>/Km.

### 2.3 Energy

B & H market provides electrical power, water, gas & oil products supply under competitive prices

### 2.4 Electrical energy cost

The electrical energy cost varies from € 0.038 to 0.08 €/KWh for residential use (depending on time of day) and it is about € 0.026/KWh for industrial uses. In case of wood processing industry, these costs can be alleviated with contained investments in combined heat and power plants.

## 3. Workforce

Bosnia and Herzegovina has favorable demographics and consistent investment in education provide sustainable supply of flexible, adaptable, innovative, foreign language spoken and productive young workforce. There is well-developed university education system, providing sufficient qualifications for entry to professions with high skilled requirements.

In addition there is abundance of labor of all categories, under competitive prices, being app. 20% of West Europe and USA wages

## 4. Market potentials

The most attractive products in the view of market potential for B & H would be:

- MDF
- EGP
- Veneer / hardwood plywood
- Parquet
- Furniture (preferably solid wood)
- Particleboard
- Joinery
- Biomass (briquette, pellets, heat generation)

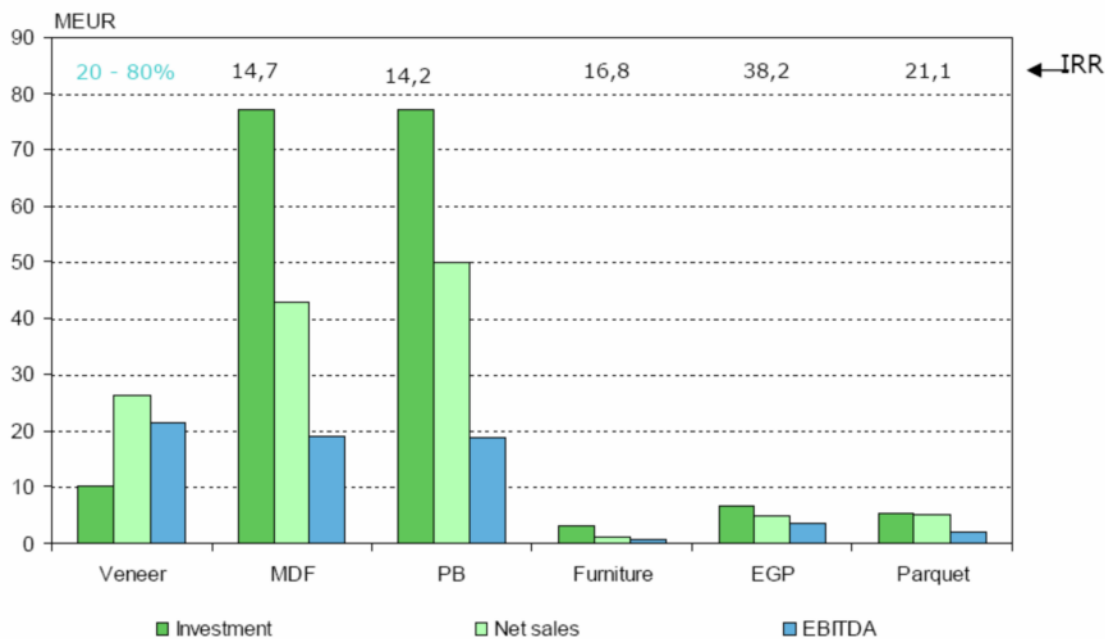
## 5. Most promising options

The most promising options for potential investors in B & H forestry / wood industry lie in processing of sawn wood to edge glued panels (EGP), veneer, parquet and furniture, especially as there are small and medium companies which may be suitable for joint ventures. In addition, there is potential for investment in one MDF and one particleboard mill of global market competitive size

## 6. Profitability

Below presented Figure shows most promising options and feasible investment opportunities in the wood processing sector in B & H, as well as expected IRR, enabling each investor to assess the opportunities with his own business plans and expansion/transfer agendas in order to make a sound investment decision.

*Key financial indicators for profitable investment opportunities*



# WOOD - BASED PANELS

## MDF AND PARTICLEBOARD

As there is no particleboard and MDF industry in B & H, and local furniture industry imports the raw material needed in their production processes, this sub-sector is an interesting investment opportunity.

B & H used to have one of Europe's first MDF mills, Medipan in Busovaca, but due to the lack of the investments for modernization of the obsolete production technology and machinery, what caused poor cost competitiveness of the factory, it stopped a production in 2002.

## MDF - MEDIUM DENSITY FIBERBOARD MILL

### 1. Forest resources – MDF expansion

Modern MDF mill with an annual capacity of 220 000 m<sup>3</sup> would require about 340 000 m<sup>3</sup> of fresh raw material. In optimal case this would consist of both softwood and hardwood but production based on pure hardwood is also possible – which was the case with Mediapan in the past times.

Consequently, new MDF mill could use approximately 1750 000 m<sup>3</sup> of hardwood pulpwood and about 165 000 m<sup>3</sup> of softwood residues. As said, instead of softwood residues MDF mill could utilize hardwood residues available.

### 2. Strengths & Opportunities

- Availability of raw material
- No major users for sawmill residues at the moment
- Wood waste can be utilized as raw material
- Low labor cost
- Expansion to laminate flooring business
- Local furniture industry which currently completely dependent on imports
- Local market will grow faster than expected due to e.g. product substitution

### 3. Markets

Overall consumption in the neighboring countries in the Balkans is over 100 000 m<sup>3</sup> at the moment. Development of the furniture industry is a key factor in the domestic and Balkan markets in the future. European and global markets are growing, and Italia might offer the best opportunities.

Initially, products from a new greenfield MDF mill with an annual capacity of 220 000 m<sup>3</sup> could be targeted to: Balkans including B & H about 90 000 m<sup>3</sup>, Italy about 40 000 m<sup>3</sup> and Middle-East and North Africa together approximately 90 000 m<sup>3</sup>.

### 4. MDF PRE-FEASIBILITY CALCULATIONS

#### 4.1. Main Inputs for the Pre-Feasibility Calculations

MAIN UNIT PRICES		
Description	Unit	Price
Wood raw material	EUR / m <sup>3</sup> (sub)	25,0
Electricity	EUR / kWh	0,04
Resin	EUR / kg	0,39
Personnel (blue collars)	EUR / a	4 800
Personnel (white collars)	EUR / a	10 800

CONSUMPTION FIGURES		
Description	Unit	Consumption
Wood	m <sup>3</sup> (sub) / m <sup>3</sup> / pcs / m <sup>2</sup>	1,67
Electricity	kWh / m <sup>3</sup>	350
Heat energy	GJ / m <sup>3</sup>	4,3
Resin	kg / m <sup>3</sup> / pcs	90
PERSONNEL		
Description	Unit	Number
Personnel (blue collars)	Persons	130
Personnel (white collars)	Persons	35

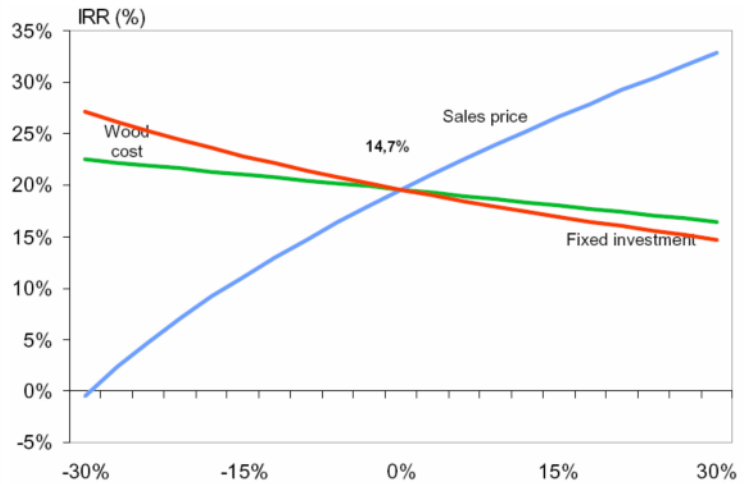
#### 4.2. Investment cost estimate for 220 000 m<sup>3</sup>/a MDF mill

Estimated cost of greenfield MDF mill with production capacity of 220 000 m<sup>3</sup>/a, with state-of-the-art Western machinery is about € 77 million.

#### Production unit costs

	EUR/m <sup>3</sup>
<b>VARIABLE COST</b>	
Wood	42
Energy	18
Chemicals	37
Other variable	9
<b>Total variable costs</b>	<b>106</b>
<b>FIXED COST</b>	
Personnel	5
Other	9
<b>Total fixed costs</b>	<b>14</b>
<b>TOTAL MANUFACTURING COSTS</b>	<b>120</b>

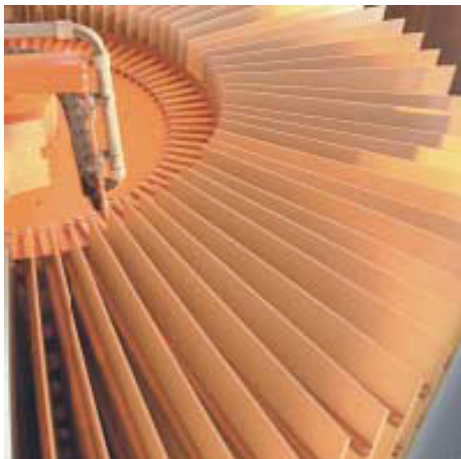
#### MDF Sensitivity Analysis



### 5. MDF – FINANCIAL PROFITABILITY

MDF project presents a high investment one with reasonable profitability.

- Expected IRR is 14.7%.
- Payback period amounts to 7.5 years.



# PARTICLEBOARD MILL

## 1. Forest resources

Modern particleboard mill with an annual capacity of 450 000 m<sup>3</sup> would require approximately 630 000 m<sup>3</sup> of wood raw material. This volume could be found utilizing for example some 100 000 m<sup>3</sup> of softwood mine wood and 220 000 m<sup>3</sup> of softwood residues as well as about 315 000 m<sup>3</sup> of hardwood pulpwood.

## 2. Strengths & Opportunities

- Availability of raw material
- Wood waste can be used as raw material
- No major users for (sawmill) residues at the moment
- Low labor costs
- Local furniture industry which is currently completely dependent on imports
- Wider use in local construction
- Faster than expected consumption growth

## 3. Markets

Domestic market has permanent trends of increasing actual consumption of some 50.000 m<sup>3</sup>. Development of the local furniture industry, but also in the neighboring countries, is the key demand driver in the future.

Total particleboard demand in the Balkan is over 800 000 m<sup>3</sup>. The size of Western European market is about 27 mill. m<sup>3</sup> at the moment, and is expected to grow annually by over 300 000 m<sup>3</sup> towards 2015.

There are no modern world scale particleboard mills in the Balkan at the moment.

Initially, products from a new greenfield particleboard mill with an annual capacity of 450.000 m<sup>3</sup> could be targeted to: Balkans including B & H about 300 000 m<sup>3</sup>, Western Europe about 50 000 m<sup>3</sup> and Middle-East and North Africa together approximately 100.000 m<sup>3</sup>.

## 4. PARTICLEBOARD PRE-FEASIBILITY CALCULATIONS

### 4.1. Main Inputs for the Pre-Feasibility Calculations

MAIN UNIT PRICES		
Description	Unit	Price
Wood raw material	EUR / m <sup>3</sup> (sub)	17,5
Electricity	EUR / kWh	0,04
Resin	EUR / kg	0,39
Personnel (blue collars)	EUR / a	4 800
Personnel (white collars)	EUR / a	10 800
CONSUMPTION FIGURES		
Description	Unit	Consumption
Wood	m <sup>3</sup> (sub) / m <sup>3</sup> / pcs / m <sup>2</sup>	1,55
Electricity	kWh / m <sup>3</sup>	140
Heat energy	GJ / m <sup>3</sup>	2,9
Resin	kg / m <sup>3</sup> / pcs	58
PERSONNEL		
Description	Unit	Number
Personnel (blue collars)	Persons	149
Personnel (white collars)	Persons	35

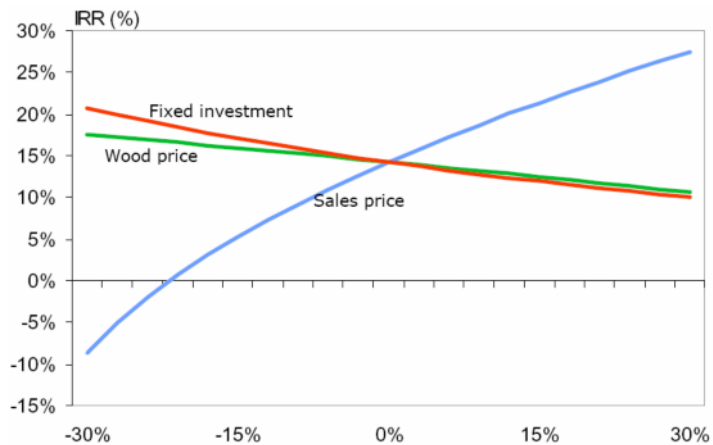
## 4.2. Investment Cost Estimate for 450 000 m<sup>3</sup>/a Particleboard mill

Estimated cost of greenfield particleboard investment in B & H with state-of-the-art Western machinery is about € 77 million, production capacity being. Additional costs of adding short cycle press lines for particleboard overlaying would be around EUR 7 million with annual overlaying capacity of 150 000 m<sup>3</sup>/a.

### Production unit costs

	EUR/m <sup>3</sup>
<b>VARIABLE COST</b>	
Wood	27
Energy	9
Chemicals	25
Other variable	8
<b>Total variable costs</b>	<b>69</b>
<b>FIXED COST</b>	
Personnel	3
Other	4
<b>Total fixed costs</b>	<b>7</b>
<b>TOTAL MANUFACTURING COSTS</b>	<b>76</b>

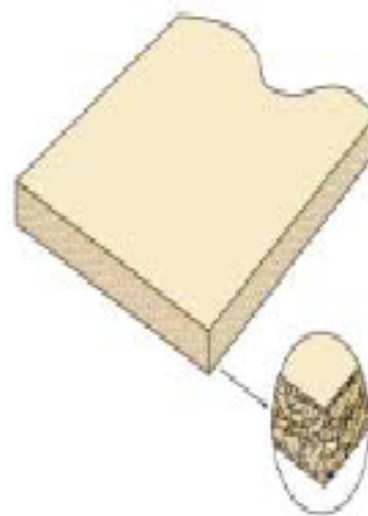
### Particleboard Sensitivity Analysis



## 5. FINANCIAL PROFITABILITY

Particleboard project is high investment one with reasonable profitability.

- IRR is 14,2%.
- Payback period is 7,7 years





# VENEER MILL

## 1. Forest resources

The raw material resource requirements for veneer processing are sustainable, because quality beech logs are widely available.

## 2. Strengths & Opportunities

- Raw material availability
- Low labor cost
- Closeness to markets
- Long tradition and know-how in veneer production
- Growing local furniture industry
- Export opportunities
- Optimal utilization of local raw material resources

## 3. Markets

Veneer markets in B & H and surrounding countries offer a good growth potential. Again, local furniture industry is the key driving force in the development. As production of wood-based panel furniture increases the demand for quality veneers expected to follow growth path.

Western Europe accounts for almost 80% of overall veneer consumption in Europe. Italy is by far the largest market followed by Germany, France and Spain and consequently these are the main target markets for a veneer mill in B & H.

Denmark and Austria are also significant importers and could be among the target markets.

Based on above mentioned data and analysis related to the raw material availability, as well as export and local markets demand, construction of two veneer mills in B & H, with an annual output of 10,000 m<sup>3</sup> is economically feasible.

Small quantities of bark and other wood waste can be used as fuel at the plant and/or in other bio fuel plants

## 4. VENEER PRE-FEASIBILITY CALCULATIONS

### 4.1. Main Inputs for the Pre-Feasibility Calculations

MAIN UNIT PRICES		
Description	Unit	Price
Wood raw material	EUR / m <sup>3</sup> (sub)	150
Electricity	EUR / kWh	0,04
Personnel (blue collars)	EUR / a	4 800
Personnel (white collars)	EUR / a	10 800
CONSUMPTION FIGURES		
Description	Unit	Consumption
Wood	m <sup>3</sup> (sub) / m <sup>3</sup> / pcs / m <sup>2</sup>	2,30
Electricity	kWh / m <sup>3</sup>	221
Heat energy	GJ / m <sup>3</sup>	4
PERSONNEL		
Description	Unit	Number
Personnel (blue collars)	Persons	95
Personnel (white collars)	Persons	25

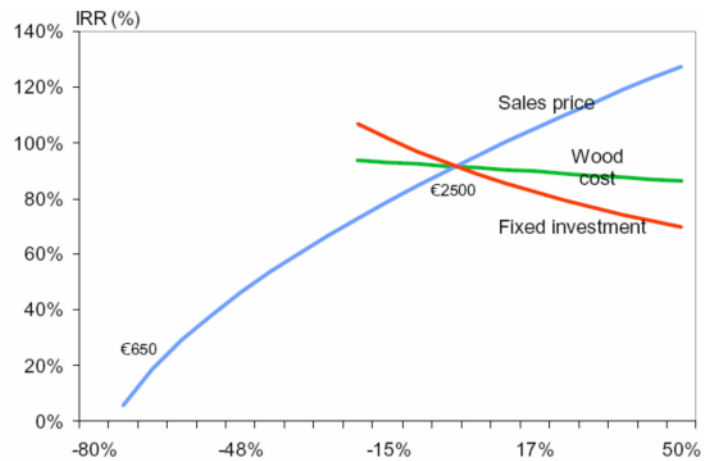
## 4.2. Investment cost estimate for 10 000 m<sup>3</sup>/a Veneer mill

Estimated cost of greenfield veneer mill with production capacity of 10 000 m<sup>3</sup>/a, with state-of-the-art Western machinery and equipment is about € 10 million.

### Production unit costs

	EUR/m <sup>3</sup>
<b>VARIABLE COST</b>	
Wood	345
Energy	9
Chemicals	0
Other variable	11
<b>Total variable costs</b>	<b>365</b>
<b>FIXED COST</b>	
Personnel	73
Other	40
<b>Total fixed costs</b>	<b>113</b>
<b>TOTAL MANUFACTURING COSTS</b>	<b>478</b>

### Veneer Sensitivity Analysis



## 5. FINANCIAL PROFITABILITY

IRR is really high (from to 80%), but extremely sensitive to sales price. Sales price has strong relation to the quality distribution of raw material.



# EGP - EDGE GLUED PANELS - MILL

## 1. Forest resources – EGP

The raw material resource requirements for EGP processing are sustainable, due to good hardwood sawnwood availability, particularly beech sawnwood, which is a basis for further calculations.

## 2. Strengths & Opportunities

Analysis demonstrated that strengths and opportunities clearly dominate in case of EGP investment project, assuming as follows:

- Availability of raw material - A large number of potential sawmills to supply required raw material
- Low labor costs
- Closeness to markets
- Declining production in Western Europe
- Large export opportunity

## 3. EGP – Market Analysis

EGP markets are typically characterized by domestic supply. Leading sawmills have often integrated forwards and furniture industry backwards. However, there are also companies who are specialized only in EGP production. Major end users of beech based EGP products are furniture producer, using these products as beech EGP table tops.

EGP products would be targeted mainly to furniture industry (table tops) in Western Europe (Germany, the UK, Italy and Austria), as well as to B & H and the neighboring countries.

## 4. EGP - PRE-FEASIBILITY CALCULATIONS

### 4.1. Main Inputs for the Pre-Feasibility Calculations

MAIN UNIT PRICES		
Description	Unit	Price
Wood raw material	EUR / m <sup>3</sup> (sub)	115
Electricity	EUR / kWh	0,04
Resin	EUR / kg	1.75
Personnel (blue collars)	EUR / a	4 800
Personnel (white collars)	EUR / a	10 800
CONSUMPTION FIGURES		
Description	Unit	Consumption
Wood	m <sup>3</sup> (sub) / m <sup>3</sup> / pcs / m <sup>2</sup>	1,65
Electricity	kWh / m <sup>3</sup>	27
Heat energy	GJ / m <sup>3</sup>	2.1
Resin	kg / m <sup>3</sup> / pcs	3
PERSONNEL		
Description	Unit	Number
Personnel (blue collars)	Persons	46
Personnel (white collars)	Persons	8

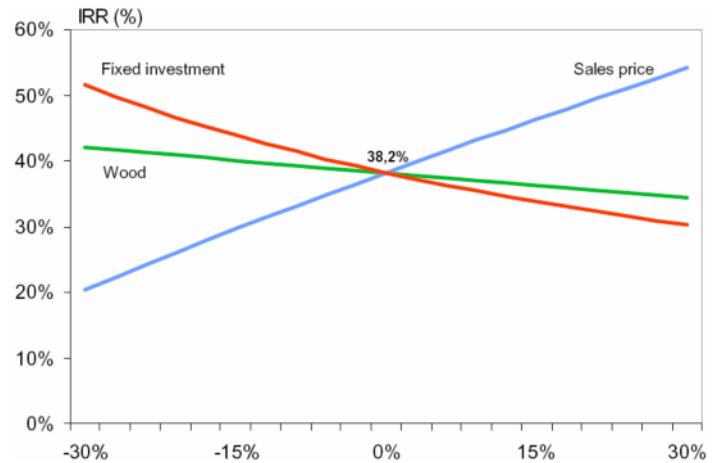
## 4.2. Investment cost estimate for 5 500 m<sup>3</sup>/a EGP mill

Estimated cost of greenfield EGP mill with production capacity of 5 500 m<sup>3</sup>/a, with state-of-the-art Western machinery is about € 6,5 million, assuming as follows:

### Production unit costs

	EUR/m <sup>3</sup>
<b>VARIABLE COST</b>	
Wood	190
Energy	1
Chemicals	5
Other variable	11
<b>Total variable costs</b>	<b>207</b>
<b>FIXED COST</b>	
Personnel	56
Other	23
<b>Total fixed costs</b>	<b>79</b>
<b>TOTAL MANUFACTURING COSTS</b>	<b>286</b>

### Sensitivity Analysis



## 5. FINANCIAL PROFITABILITY

- IRR is 38,2%.
- Payback period amounts to 3,1 years.



# PARQUET (SOLID) MILL

## 1. Forest resources – parquet (solid)

The raw material resource requirements for parquet (solid) production are sustainable, due to good hardwood sawnwood availability, particularly beech sawnwood, which is a basis for further calculations.

## 2. Strengths & Opportunities

Analysis demonstrated that strengths and opportunities clearly dominate in case of parquet (solid) investment project, assuming as follows:

- Raw material availability
- Long tradition and know-how in production
- Low labor costs
- Growing local market
- Large export opportunity

## 3. Parquet (solid) – Market Analysis

Parquet (solid) products would be targeted mainly to Western European countries (Germany, Italy, France, Spain, the UK), but also the Balkans, including. B & H offer reliable potentials.

## 4. PARQUET (SOLID) - PRE-FEASIBILITY CALCULATIONS

### 4.1. Main Inputs for the Pre-Feasibility Calculations

MAIN UNIT PRICES		
Description	Unit	Price
Wood raw material	EUR / m <sup>3</sup> (sub)	115
Electricity	EUR / kWh	0,04
Personnel (blue collars)	EUR / a	4 800
Personnel (white collars)	EUR / a	10 800
CONSUMPTION FIGURES		
Description	Unit	Consumption
Wood	m <sup>3</sup> (sub) / m <sup>3</sup> / pcs / m <sup>2</sup>	0.4
Electricity	kWh / m <sup>3</sup>	18,0
Heat energy	GJ / m <sup>3</sup>	2.1
PERSONNEL		
Description	Unit	Number
Personnel (blue collars)	Persons	58
Personnel (white collars)	Persons	8

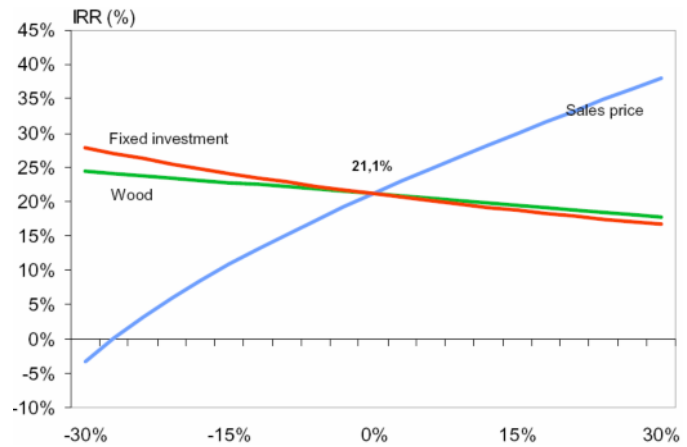
### 4.2. Investment cost estimate for 175 000 m<sup>2</sup>/a parquet (solid)mill

Estimated cost of greenfield parquet (solid) investment project in B & H with state-of-the-art Western machinery is about € 5,3 million for production capacity of 175 000 m<sup>2</sup>/a, assuming as follows:

## Production unit costs

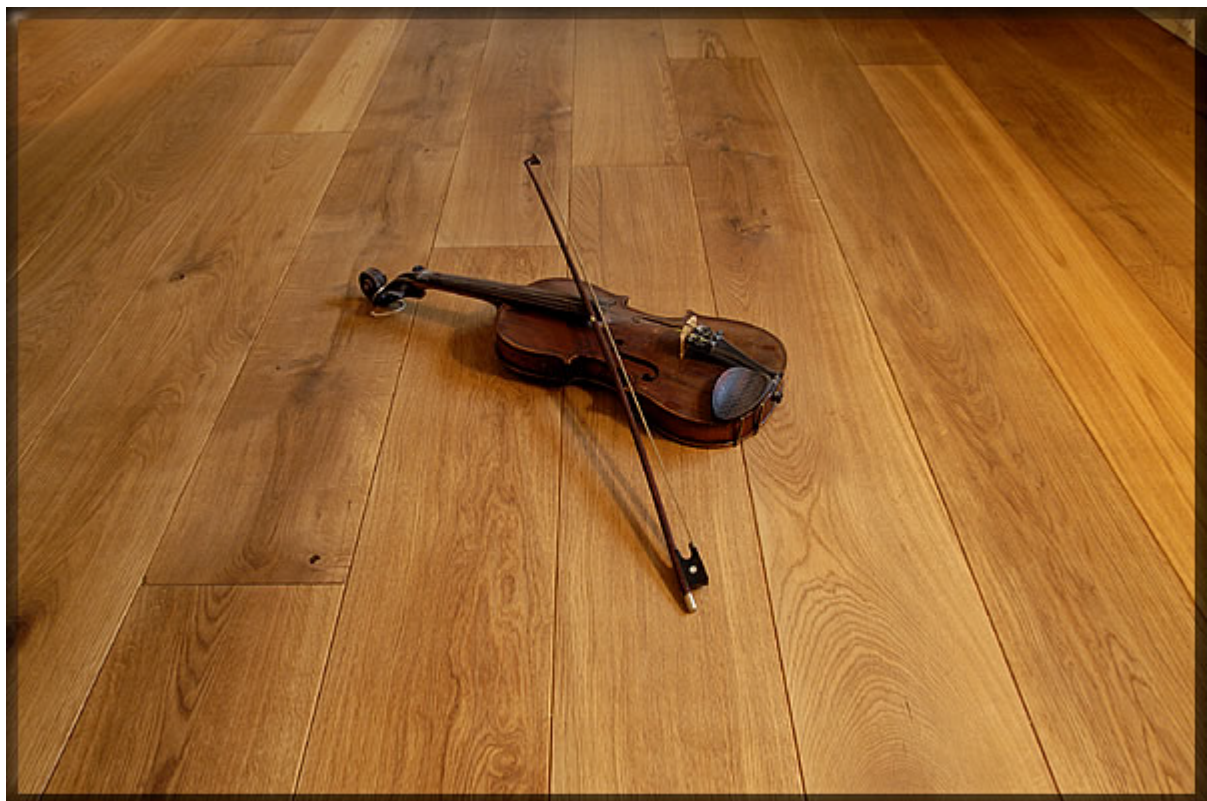
	EUR/m <sup>2</sup>
VARIABLE COST	
Wood	5
Energy	1
Chemicals	0
Other variable	9
<b>Total variable costs</b>	<b>15</b>
FIXED COST	
Personnel	2
Other	1
<b>Total fixed costs</b>	<b>3</b>
<b>TOTAL MANUFACTURING COSTS</b>	<b>18</b>

## Parquet (solid) Sensitivity Analysis



## 5. FINANCIAL PROFITABILITY

- IRR is 21.1%.
- Payback period amounts to 6.9 years.



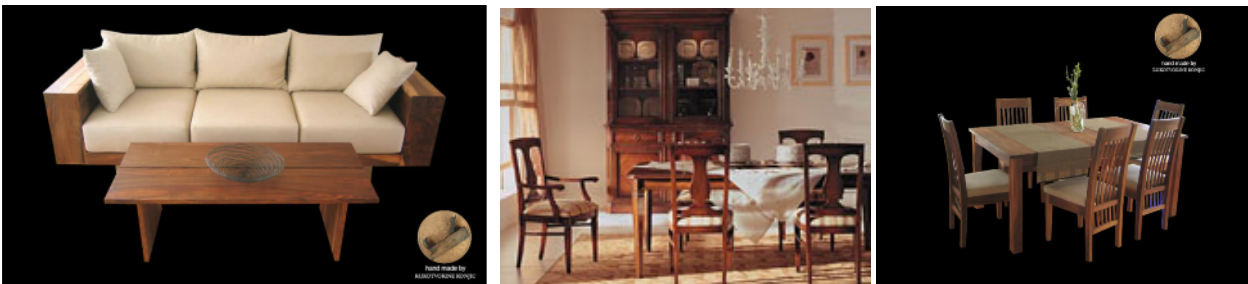
# FURNITURE INDUSTRY

Furniture industry has large potential for expansion in B & H. Low labor, raw material and energy costs, as well as the availability of skilled labor in B & H support investments in this sub sector.

This sub sector includes a wide range of different products. The variety of the option is considered promising, from joinery, to solid wood furniture and prefabricated houses.

Following before mentioned facts, the quality processing of the valuable resources open numerous cooperation and investment opportunities in a wide range of final and semi-final products.

In this document, among various promising options, one specific case was selected as example, for the pre-feasibility calculations. That was a greenfield investment in the production of the solid wood high quality chairs, from the beech sawnwood as raw material.



## SOLID WOOD FURNITURE - SOLID WOOD CHAIRS

### 1. Forest resources – solid wood furniture

B & H has a strong raw material resource basis for furniture industry development using, solid softwood and hardwood (beech, oak), as well as exotic solid woods (walnut, cheery, peer, etc.) as raw material.

### 2. Strengths & Opportunities

- Export opportunity
- Growing local market
- High quality of solid wood furniture
- Raw material availability
- Long tradition and know-how in production
- Low labor costs
- Relatively low investment requirements

### 3. Markets

The market for wooden furniture in B & H and neighboring countries in the Balkans is estimated to be worth over 800,000 million Euros. The overall market in Eastern European countries, excluding Russia, is estimated to be approximately 2.5 billion Euros which is still rather small when comparing it to Western Europe's almost 50 billion Euros.

The UK, France, Netherlands, Germany, Switzerland and Austria are the largest net importers of wooden furniture.

Initially, products from a new greenfield solidwood furniture mill could be targeted mainly to Western Europe but some also the neighboring countries around B & H, as well as some other markets, including Russia.

## SOLID WOOD CHAIRS - PRE-FEASIBILITY CALCULATIONS

### 1. Main Inputs for the Pre-Feasibility Calculations

MAIN UNIT PRICES		
Description	Unit	Price
Wood raw material	EUR / m <sup>3</sup> (sub)	115
Electricity	EUR / kWh	0,04
Resin	EUR / kg	1.75
Personnel (blue collars)	EUR / a	4 800
Personnel (white collars)	EUR / a	10 800
CONSUMPTION FIGURES		
Description	Unit	Consumption
Wood	m <sup>3</sup> (sub) / m <sup>3</sup> / pcs / m <sup>2</sup>	0.04
Electricity	kWh / m <sup>3</sup>	15,0
Heat energy	GJ / m <sup>3</sup>	2.1
Resin	kg / m <sup>3</sup> / pcs	0.12
PERSONNEL		
Description	Unit	Number
Personnel (blue collars)	Persons	27
Personnel (white collars)	Persons	6

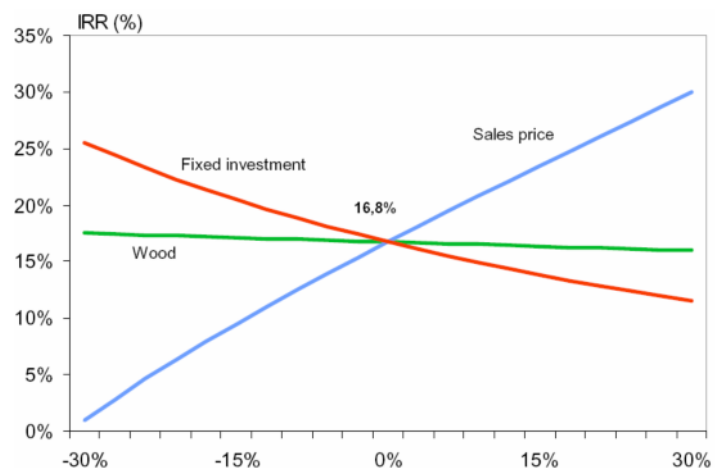
### 2. Investment cost estimate for 14 700 solid wood chairs / a mill

Estimated cost of greenfield solid wood chairs investment project in B & H with state-of-the-art Western machinery is about € 3.1 million for production capacity of 14 700 chairs/a, assuming as follows:

#### Production unit costs

	EUR/pcs
<b>VARIABLE COST</b>	
Wood	4
Energy	1
Chemicals	5
Other variable	11
<b>Total variable costs</b>	22
<b>FIXED COST</b>	
Personnel	13
Other	4
<b>Total fixed costs</b>	17
<b>TOTAL MANUFACTURING COSTS</b>	39

#### Sensitivity Analysis Furniture



### 6. FINANCIAL PROFITABILITY

- IRR is 16.8%.
- Payback period is 6.6 years.



## FURNITURE – WOOD PANEL BASED OPTION

Comparing with Solid wood furniture option, this option is less attractive. But in case B & H would have own particleboard and/or MDF production, attractiveness of this option will be increased.

### UPHOLSTERY FURNITURE

#### I – MARKET

##### 1. Production and service program

Production program, considered to have most chances at the local market in a near surrounding. This is about starting production assortment structure, towards which all the calculations have been prepared hereafter. Program is going to be changed – accommodated in accordance to market requests - greater buyer's orders. Reparation of the old furniture is recommendable

##### 2. Target market segments and top buyers

Target market groups are lower level standard citizens within the region (middle and lower cost). A part of sales would be performed through direct deliveries, or long-term cooperation with retailers.

##### 3. Concurrence

Competition is becoming higher, related to the supplier number, more favorable sale conditions, larger dispersion of selling units of great furniture producers, etc. Beside that, Investor is able to find its own market place, orientated towards specialization, productivity, low prices, out standard measurements production – as ordered, etc...Investor has to apply more aggressive appearance at the local, regional and market of B & H, while investing in to distribution capacities (vehicle), promotional material, advertising campaigns and in to own visit of the potential buyers.

##### 4. Volume, structure and sale value calculations

Estimated investment effects, production scope, structure, services and sales have been planned in accordance with current demands and possible changes of the gravitating markets. Production scope and structure) have to be adjusted with changes on the market.

##### *Planned volume, structure and sale value*

No.	Products	Unit	Quantities			Prices	Sale value KM		
			1.Year	2.Year	3 and +		1.Year	2.Year.	3. and +
1	SET PN1	Pack	500	550	600	552	276.000	303.600	331.200
2	SET K05, S 09	Pack	700	770	850	520	364.000	400.400	442.000
3	Three seats sofa	Pack	650	720	800	312	202.800	224.640	249.600
4	Three seats sofa TM13	Pack	200	230	250	392	78.400	90.160	98.000
5	Two seats sofa PN 03	Pack	250	300	330	224	56.000	67.200	73.900
6	Two seats sofa K 07, S 11	Pack	160	180	200	200	32.000	36.000	40.000
7	Two seats sofa DM 15	Pack	160	180	200	312	49.920	56.160	62.400
8	Two seats sofa DL 16	Pack	240	260	290	240	57.600	62.400	69.600
9	Armchair PN 04, F 17	Pack	300	330	370	128	38.400	42.240	47.360
10	Armchair K 08, S 12	Pack	300	330	370	120	36.000	39.600	44.400
11	Couch K 18	Pack	450	490	540	192	86.400	94.080	103.680
12	One seat sofa SO 19	Pack	300	330	370	160	48.000	52.800	59.200
13	One seat sofa SS 20	Pack	180	200	220	200	36.000	40.000	44.000
14	French sofa LO 21	Pack	150	160	180	240	36.000	38.400	43.200
15	French sofa u 20	Pack	70	80	100	304	21.280	24.320	30.400
16	Bed click - clack	Pack	150	160	180	224	33.600	35.840	40.320
	IN Total production:						1,452.200	1,607.840	1,779.200
	Services:						47.800	62.160	70.800
	<b>Total</b>						<b>1,500.000</b>	<b>1,670.000</b>	<b>1,850.000</b>

## 6. Resources and supply conditions

There is pretty high number of linen and sponge suppliers, so direct supply should be considered as well as supply through the compensation in order to reduce problem of lack of own return capital. Regular supply and continuous availability of the required quantities of board, due to the natural drying process, is the phase where investor immediately needs to establish rigorous system.

## II – PRODUCTION AND TECHNICAL ASPECTS

### 1. Production space

According to the whole investment concept, whole production and technical process is going to be done at single location, one building, with the total space of 1000m<sup>2</sup>, including the following units:

- Raw material and utilities storage
- Carpenter machinery and rims montage
- Tailor store and upholstery
- Showroom room
- Finished products storage
- Offices
- Auxiliary premises

Business and production site has to be flexibly organized, in order satisfy all production standards (workshop, infrastructure, loading facilities, storages), and business and marketing requirements (offices, showroom) etc. Investment in building and infrastructure is about 480.000 KM.

### 2. Equipment

		Quantity	Price	Value
1.	Combine machine	2	20.000	40.000
2.	Cutting machine	1	25.000	25.000
3.	DIHT ABRIHTER	2	15.000	30.000
4.	Pistol for upholsters and carpenters	30	1.000	30.000
5.	Knife fro cutting	2	5.000	10.000
6.	Sewing machine	8	2.000	16.000
7.	Air stapler	1	2.800	2.800
8.	AKU drilling machine	1	3.200	3.200
9.	Crane	1	3.600	3.600
10.	Compressor	1	6.700	6.700
11.	Air compressor	1	3.800	3.800
12.	Other equipment	1	11.850	11.850
13.	Track «Mercedes»	1	32.500	32.500
	<b>Total:</b>			<b>215.450</b>

State-of-the-art machinery will allow the orientation towards attractive, stylistic massive furniture, in compliance with recognized quality and design at the market.

### 3. Number and employee structure

- University education 1
- Two year post secondary school education 2
- Secondary school education 3
- Highly skilled workers 3
- Skilled workers 18
- Semi-skilled workers 7
- Unskilled workers 1
- TOTAL 35**

#### 4. Consumption norms and requested material inputs

Raw material and utilities consumption norms are based on the general standards and experience from similar production processes. According to the consumption norms, projected sales volume of product and services, the review of required inputs is presented in the table below:

Raw material and utilities	Unit	Annual product quantities									
		Set	Couch	One seat sofa	Three seats sofa	Two seats sofa	Armchair	French bed	Total annual quantities	Buying prices	Annual values
Board	m3	300	72	60	212,5	105,3	48	39,6	837,4	200	167.480
Chipboard	sheet	1.500	225	76,8	595	405	240	154	3.195,8	32	102.266
Plywood	sheet	1.200	360	240	136	405	240	-	2.581	20	25.810
Sponge	kg	15.600	2.250	1.680	5.100	4.050	1.800	1.100	31.580	3	94.740
Mechanism	packs	1.200		-	850	-	-	-		37 60	44.400 51.000
Linen	m	13.200	450	2.160	5.950	4.860	2.400	1.100	30.120	5	150.600
Glue	kg	480	67,5	48	212,5	162	60	22	1.052	6	6.312
Sponge glue	kg	480	67,5	48	212,5	162	60	22	1.052	6	6.312
Material	total	36.000	8.100	4.800	12.750	9.720	6.000	3.300			80.670
Total:											729.590
Other for prod.											21.510
Total – prod.											751.100
Raw material Services - 50%											23.900
<b>TOTAL:</b>											<b>77.500</b>

### III– ECONOMIC AND FINANCIAL ASPECTS

In compliance with the goals of Study, main quantitative elements and indicators are synthesized in this part for the period of 7 years of operations and development.

#### 1. Investment plan

##### 1.1. Investments in fixed assets

Following production and technical analyses, investments in fixed assets are as follows:

No:	Investments (description)	Total investments (KM)
1.	Land	120.000
2.	Construction building	480.000
3.	Equipment	182.950
4.	Transportation means	32.500
5.	Share holders equity (staffs education, projects, etc.)	46.000
	<b>Total investments in fixed assets</b>	<b>861.450</b>

##### 1.2. Investments in to return assets

Return capital is to be invested (minimum 80.000 KM) particularly for board stocks, in order to enable its natural drying.

#### 2. Resources and financing conditions

Financing construction, based on extern and own financing funds is propose as follows:

- in KM -

No	Evaluated investment intention	Sources of founding			
		Own means	Banks loan	Total	Participation %
I	Fixed assets	461.450	400.000	861.450	91,5
II	Return assets	-	80.000	80.000	8,5
	TOTAL :	461.450	480.000	941.450	100,0
	Participation %:	49%	51%	100.000	

Loans and recapitulation commitments financing conditions are mentioned in to the repayment plan, by years, as follows:

#### Loans conditions:

• Credit amount (KM)	480.000
• Repayment (years)	5
• Grace period (years)	1
• Annuities number	48
• Annual interest rate (%)	5
• Equal monthly repayment	10.000

#### Recapitulation of loan commitments

Years	Interest Rate	Repayment	Annuity
1.	24.000	-	24.000
2.	21.250	120.000	141.250
3.	15.250	120.000	135.250
4.	9.250	120.000	129.250
5.	3.250	120.000	123.250
<b>Total:</b>	<b>73.000</b>	<b>480.000</b>	<b>553.000</b>

### 3. Business cost calculations

Costs calculations have been presented according to the basic – usual groups. Calculations have been prepared analytically for the first business year. All cost amounts, calculated for the coming years and after investment, are presented in a table of balance success projection.

### 4. Total revenue, revenue allocation and income state projection

Based on the markets and sales conditions, as well as production and business costs, total revenue projection for 7 years is presented at the following table.

## INCOME STATE PROJECTION

- in KM -

		1.	2.	3.	4.	5.	6.	7.
I -	TOTAL REVENUE	1,500.000	1,670.000	1,850.000	1,850.000	1,850.000	1,850.000	1,850.000
1.	Raw material costs, package and utilities.	775.500	863.390	956.450	956.450	956.450	956.450	956.450
2.	Energy costs	37.500	41.750	46.250	46.250	46.250	46.250	46.250
3.	Depreciation costs	44.143	44.143	44.143	44.143	44.143	44.143	44.143
4.	Gross wages	272.506	299.756	329.732	329.732	329.732	329.732	329.732
5.	Investment servicing costs	4.500	13.250	13.250	13.250	13.250	13.250	13.250
6.	Other expenses	107.100	109.900	112.000	112.000	112.000	112.000	112.000
7.	Interest rates costs	24.000	21.250	15.250	9.250	3.250	-	-
8.	Value Added Tax	98.000	110.000	120.000	120.000	120.000	120.000	120.000
II-	TOTAL EXPENSES	1,363.249	1,503.439	1,637.075	1,631.075	1,625.075	1,621.825	1,621.825
III-	GROSS INCOME	136.751	166.561	212.925	218.925	224.925	228.175	228.175
	Income tax	13.675	16.656	21.293	21.893	22.493	22.818	22.818
IV-	NET INCOME	123.076	149.905	191.632	197.033	202.432	205.358	205.358
	Reproduction capability	167.219	194.048	235.776	241.176	246.575	249.501	244.501
	Loan Repayments (new)	-	120.000	120.000	120.000	120.000	-	-
	Rest for reproduction	167.219	74.048	115.776	121.176	126.575	249.501	249.501

## 5. Indicators of investment efficiency

Static and dynamic indicators of the project efficiency, including the indicators of project liquidity, are presented on the basis of data on the amount of total revenues, the structure of expenses with regard to types and extent of reaction to modifications in using capacities (fixed and variable expenses), the number of employees, as well as the analysis of the economic course of the project, as follows

### 5.1. Static indicators of project efficiency

The following table presents the basics static indicators of investment efficiency, for the first three years of operating business:

No.	Indicators	Years		
		1.	2.	3.
1.	Gross profit per one employee (KM)	3.907	4.759	6.084
2.	Economics(Total revenue / Total expenses) coefficient	1,100	1,111	1,130
3.	Accumulation (Net profit/Total revenue (%))	8,21	8,976	10,36
4.	Profitability (Net profit / Total means employed) (%)	13,07	15,92	20,35
5.	Reproductive capability + amortization/ Total means employed (%)	17,76	20,61	25,04

### 5.2. Dynamic indicators

#### 5.2.1. Efficiency analyses

In order to overview investment project efficiency, listed hereafter, following indicators have been presented: net current value, internal rate of cost - effectiveness, and period of investment return.

- a) net current value 790.000 KM
- b) internal rate of cost - effectiveness, 22,0%
- c) period of investment return in the fifth year

#### 5.2.2. Liquidity analyses

In order to consider the liquidity, the cash flow is prepared for the investment period and for the first three years of loans repayment. It is evident that the investor would operate with the high liquidity during all years and could invest his own means in a significant amount in the implementation of the project in addition to cost servicing.



## JOINERY OPTION

Joinery industry has a long-lasting tradition and presents B & H highly potential expansion possibility.

Low labor costs support this option.

### Markets

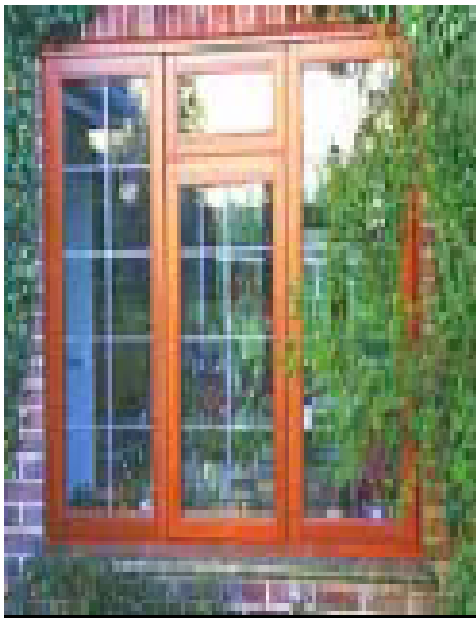
The market for wooden joinery products in B & H and the neighboring markets is estimated to be approximately 250 000 million Euros. The whole Eastern Europe, excluding Russia, amounts to less than one billion Euros whereas Western European market is estimated to exceed 12 billion Euros.

Initially, products from a new greenfield joinery mill could be targeted mainly to Balkans but also Western European countries like Austria, Germany and France.

## ADDITIONAL OPTION - Assembly houses

Bosnia and Herzegovina has a good recourse and human base, as well as a long-lasting tradition in assembly houses business, which could preset an additional, particularly export oriented investment possibility.

Numerous existing B & H companies with potentials in the joinery sub-sector are already involved in the assembly houses business, but with limited capacities.



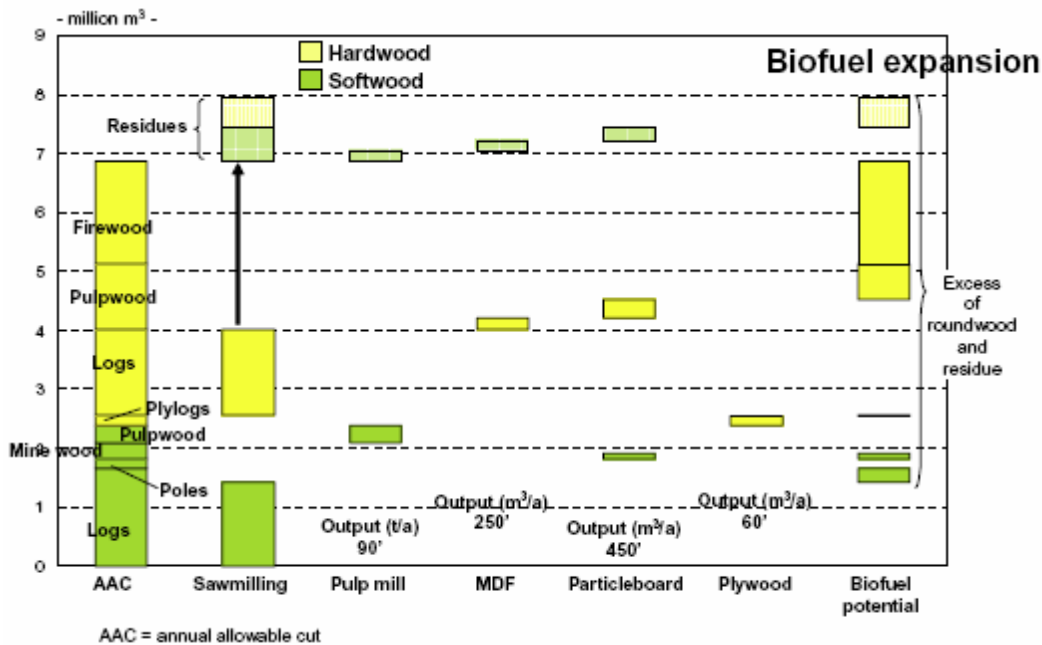
# BIOENERGY

## Forest resources – Bio- fuel expansion

The use of sawmill residues is currently completely underdeveloped. Plenty of suitable raw materials are available; partly it is dumped or stored in abandoned industrial facilities. Hence the sawmilling residues are a largely untapped resource which is worth considering. As there is no bio-energy industry in B & H yet, it is an interesting alternative.

After all the above mentioned raw material requirements / options among the primary processing industries, there should be plenty of resources left for bio-fuel opportunities. This volume would mostly consist of hardwood firewood but there should also be a significant amount of hardwood pulpwood and hardwood residues available. However, the latter two could, and actually might be needed, in supplying the primary processing.

Investment potential based on forest resources



## Markets

There is limited market for bioenergy in B & H, in this moment. However, there are already aims to increase the share of energy from renewable sources in B & H and several neighboring countries as is the case in Western Europe. Price level of fossil fuels, e.g. natural gas, is the key driver in the future development.

Western European markets for pellets is approximately three million tones at the moment and initially products from a new pellet mill could be targeted particularly to Italy (annual imports 150 000 – 200 000 t) but also other countries like Spain, etc.

## Forest resource potential and raw material balance

Introduction of bioenergy plants would help considerably in resolving the huge problem with raw material balance by utilizing the residues from the primary and secondary industries.



## CHP – COMBINED HEAT AND POWER OPTION

For developing this Combined Heat and Power (CHP) project case study, the characteristic wood processing plant with wood waste and steam demand were chosen, assuming an overall processing capacity of app. 60 000 cubic meters of beech timber per year. Numerous similar sites are available in B & H. These production facilities generate substantial amounts of waste wood (biomass), as presented below:

Description	*) Moisture content	*) Heating value	Daily Amount	Currently achievable price
Dry wood chips	10%	16 MJ/kg	24 t	37 EUR/t
Wet wood chips	65%	10 MJ/kg	40 t	20 EUR/t
Wet sawdust	65%	10 MJ/kg	25 t	10 EUR/t
Bark	65%	10 MJ/kg	15 t	

\*) estimated values

### CHP – Technical Description

Plant Main Components:

- Biomass boiler (app. 13MW, 15t/h steam, 30bar/450°C)
- Steam turbine (Extraction of 7.4t/h process steam, 3.5bar/180°C)
- Generator (app. 2MW net power)
- Electrical and control & instrumentation systems.

#### Output parameters

Average annual el. output	MWh	16,000	Based on 8,000 operating hours p.a.
Average annual steam output	MWh	40,000	Based on 8,000 operating hours p.a.
Potential annual generation of CO2 Certificates	t CO2	15,000	Based on carbon emission factor of 0.977 t CO2 / MWh in B & H

### Location criteria and size of the site

- Availability of waste wood
- Easy access to high voltage power line
- Process steam demand on site. Or heat demand in vicinity of the plant (e.g. district heating)
- Adequate fresh water and sewage facilities
- A modern CHP plant requires a space of about 2.000 m<sup>2</sup> (including biomass storage area).

### CHP – Environmental Analysis

The proposed combined heat and power production is environmentally friendly for three reasons (1) it utilizes waste from industrial plants, (2) replace use of fossil fuels, and (3) has good energy efficiency.

With proper technology the dust emissions from the plant is less than 50 mg/m<sup>3</sup> (B & H requirement for biomass boilers with a capacity more than 5 MW; smaller boilers are allowed 150 mg/m<sup>3</sup>).

A CHP with a capacity over 10 MW needs a specific environmental permit from the Ministry of Environment. Smaller units require a permit from the local authorities. Emissions to the air can be controlled effectively:

- Use of wood waste for energy production means:
- Very small emissions of sulfur dioxide
- Relatively small emissions of nitrogen oxides

- Use of modern burner technology minimizes the emissions
- Dust control measures (e.g. cyclones, electrostatic precipitators) secure that the tight international and local requirements are fulfilled

### CHP – Investment Cost

Estimated cost of greenfield CHP Biomass investment in B & H with state-of-the-art western technology is about € 10.5 million. The design thermal capacity is app. 13MW, heating steam output is app. 5MW and net electrical capacity is app. 2MW. A high pressure reducing station (HP-reducing) is planned to supply the steam consumers in case of a turbine trip. In case of trip of the CHP boiler the stored energy in the CHP-boiler can be used for a short time till one of the existing (hot stand by) biomass boilers is ready to supply the necessary steam.

#### Investment and O & M cost estimate for 2MW el. Biomass CHP plant in B & H

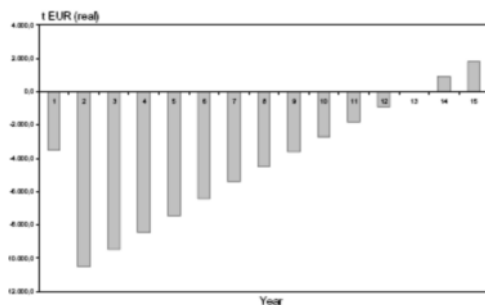
Investment estimate	Mio €	10.5	Turn key basis
Maintenance costs	Mio €	0.21	Annual figure
Operation costs	Mio €	0.1	Annual figure (1 – 2 persons)

### CHP – Financial Profitability

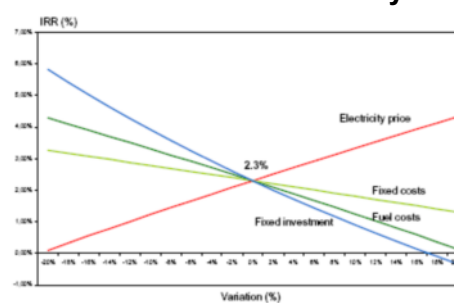
#### Production revenues

Electricity	41.66 EUR/MWh
Steam	30.00 EUR/MWh
CO2 Certificates	8.0 EUR/t CO2

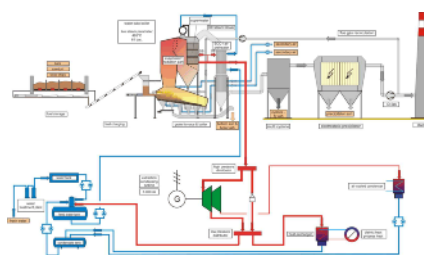
#### Cumulative cash flow



#### Sensitivity



IRR is 2,3%. Payback period amounts to 12 years. Actual (positively temporary) low renewable energy feed-tariff (compared to other European countries) leads to a less favorable investment case, but with certain perspective to be changed.



## PELLETS OPTION

The decision for pellet or briquette production depends extremely on the individual market and raw material access of the investors.

There is opportunity for construction of several pellet plants, with capacities form 10 to 60 000 t/a. Most suitable would be a plant of 60 000 t/a.

### Pellets overview

Mill size	60 000 t/a, several size alternatives
Wood raw material	All wood waste, sawdust, chips, chipped technical wood 2.4 m <sup>3</sup> of wood per one ton of pellets
Residues	-
Investment	About EUR 5 million
Chemicals	-
Key processes	Chipping, crushing, drying, pressing, cooling, packing
Personnel	15 -20 prs. (process experts, mechanics)
Power	1.5 MW
Site	About 2 ha
End-uses	Fuel to compensate oil typically. Subsidised fuel in EU

## OTHER BIOENERGY OPTIONS

Investment option	Capacity/yea	Fixed investment level Million €
Brickets	5 – 6000 t/a	0.5 - 1
Heat generation	2 – 100 t steam/h	0.5 - 30



## PELLET PLANT (small size)

### I - PROJECT DESCRIPTION

Wood pellets are made of waste biomass materials that remain in wood industry after the wood processing. The principal of production is the following – they have to be pulled through the small section hole without connecting material or other additives. Wood pellets present fire resource and they are also called as biomass pellets..

- Caloric value is high and suitable to the following extent: 24pellets same as 1 liter of distillate oil.
- Pellets production process is consisted of the following fazes: breaking of the rough wood wastes, drying on 12% of humidity, conditioning, mixing, pellets processing, cooling and storage – packing.
- Facilities have the different capacities: from 500 – 3500 kg of pellets/h.
- Comparing to the fossil fuels, wood pellets present clean fuel, without increasing of CO2 pollution.
- For biomass pellet process, less energy is spent (2.7% from own caloric value), than for natural gas (10%) or distillate oil (even 12%), what presents a huge advantage.

### II- MARKET ASPECTS

#### 1. Targeted market segments and top buyers

Consumption of the pellets of biomass (sawdust, finely wood and wood waste) in Bosnia and Herzegovina is just in initial phase, and total production output is to be export oriented.

Western European markets for pellets is approximately three million tones at the moment and initially products from a new pellet mill could be targeted particularly to Italy (annual imports 150 000 – 200 000 t) but also other countries like Spain, etc.

The huge market's potentials based on the possibilities of the long-term export contracting is main investment motive for this project.

#### 2. Concurrence

Since the product is meter of stock exchange, its prices need to be absolutely adjusted. For now, the product is explicitly exporting, so future investor – producer, may provide concurrent advantages, based on the higher capacity and achieved production (3 to 3, 5 t per hour), higher level of the technical equipment, long-term agreed deliveries and reduce of fixed expenses based on used capacities. Special advantage to the future producer could be a possession of appropriate certificate about product's quality.

#### 3. Expected size estimate and sale revenue

Based on the concluded long-term arrangements for products export with foreign (Italian) exporters and local producers, as well as on the recognized market's chances and restrictions at the other exporter markets, following value and sail structure could be realized during the mentioned period:

No.	Products	Annual quantities (t)			Prices	Sail Revenue (KM)		
		1. Year	2. Year	3. and + years		1. Year	2. Year	3. and + years
1.	Pellets 15 kg packing	4.500	6.500	8.500	300	1,250.000	1,950.000	2,550.000
2.	Pellets 1250 kg	1.000	1.500	2.000	270	270.000	405.000	540.000
3.	Massive solid briquette		300	500	200	-	60.000	100.000
	<b>TOTAL:</b>	<b>5.500</b>	<b>8.300</b>	<b>11.000</b>		<b>1,620.000</b>	<b>2,415.000</b>	<b>3,190.000</b>

#### **4. Resources and conditions of raw materials supply**

Main advantages related to the raw material supply are as follows:

- Use of one type of material, which is softwood or hardwood residues (sawdust, wood chips, etc.)
- Raw material favorable prices (sawdust 4 KM/m<sup>3</sup>; 5 KM/m<sup>3</sup> dry sawdust, in 2007), from more sources

Due to the ecological requests numerous wood processing companies are interested to sale sawdust, which is residuum form their production.

### **III – TECHNICAL – TECHNOLOGICAL PART**

#### **1. Pellet technology**

Pellet's processing encompasses following steps:

- Rough shattering (Huge pieces of the waste materials should be reduced at the tiny parts with the band saw or similar device.)
- Drying
- Grinding
- Conditioning & Mixing
- Pelletizing
- Cooling
- Storage & Packing

#### **2. Pellet production standards**

Most common is Austrian standard ONORM M 7135. In accordance to its rules, it technically transfers pellet's producers, device's producers and end users, in order to reduce air pollution.

There are two main types of products:

- Wooden pellets: produced from woods with addition of small quantity of bark
- Bark pellets, produced from bark with addition of small quantity of wood

According to the standard, amended 1998, wooden pellets need to fulfill the following standards:

- Dimension: caliber 6-8 mm, length 10-25 mm
- Weight: 650kg/m<sup>3</sup>
- Moisture: 8-12%
- Caloric value: ≥18,0 MJ/kg
- Sulfur volume: ≤0,04%
- Azoth volume: ≤0,30%
- Chlorine volume: ≤0,02%

Producer is obliged to control its products once per week. Firstly, thickness and moisture of pellets are controlled, all results should be registered.

### 3. Material inputs and pellet production unit costs

Applying standards of European Union, pellets production costs are from 60 to 100 EUR/t, depending on capacity and production size. For example, production of 2t/h, working in one shift during 225 days a year, cost price is 93,75 EUR/t. Mentioned price is calculated according to the following consumption standards and standards of certain expenses participation.

No.	Description	Consumption 1/t	Expenses EUR /t
1.	Matrix costs	5 packs	4,80
2.	Pressing wheels	18 packs	2,05
3.	Energy	280 kWh	8,85
4.	Lubricants and waste parts	mark	0,22
5.	Sawdust costs	2/m3	6,00
6.	Warm water	0,2/t	10,00
7.	Industrial water	0,01/t	0,08
8.	Sawdust transportation	2,5/t	3,75
9.	Workforce costs	5,00	6,60
	Investment costs		51,14
	<b>TOTAL COST PRICE</b>		<b>93,75 EUR/t (183,36 KM/t)</b>

### 4. Capacity

Pellet production capacity depends on presses performances Installation of 4 presses with individual capacity of 2t/h of pellets (total 8t/h) is foreseen.

Projected sales – production is based on the capacity use between 35% and 79%.

### 5. Work Force

10 permanent and 5 part-time workers will be employed in the first year and 17 permanent and 5 part-time workers in subsequent years.

### 6. Investments

	Description	-KM-
1.	Land Purchase	30.000
2.	Substation	100.000
3.	Land restructuring and infrastructure	40.000
4.	Hall 21x25x8 m (525 m2)	100.000
5.	Room for computer managing with air condition	7.000
6.	Second hand facility (presses and other) included customs and transport package)	485.000
7.	Canopy and communications	20.000
8.	Forklift – used one till 3,5 t	20.000
9.	Track kipper – second hand	20.000
	<b>TOTAL :</b>	<b>822.000</b>

## V – DYNAMIC OF INVESTMENT PROJECT

No.	PROJECT ACTIVITIES	MONTH							
		1.	2.	3.	4.	5.	6.	7.	8.
1.	Land purchase and location organization	■							
2.	Tender collection								
3.	Equipment supply (facilities)	■	■	■	■	■	■		
4.	Construction and object outfit	■	■	■	■	■			
5.	Equipment and machinery montage			■	■	■	■		
6.	Raw material supply and raw material				■	■	■	■	
7.	Test production and capacities						■	■	■
8.	Beginning of the regular production							■	■

## IV – ECOLOGICAL ASPECTS

Production processes is without negative ecologic consequences. This project is a huge contribution to the upgrading of environment, presenting the best solution for the residues removal and providing ecologically suitable energy recourse. Certainly, one of the biggest ecological effects of this project is contribution to the local natural resources protection.

## VI – ECONOMIC – FINANCIAL PART

### 1. Investments

#### *Total investment recapitulation*

Ordinal	Investment items	TOTAL INVESTMENTS
1.	Land and organization	30.000
2.	Construction buildings and infrastructure	267.000
3.	Facilities and equipment	485.000
4.	Transportation means	40.000
	<b>TOTAL INVESTMENTS:</b>	<b>822.000</b>

The fixed assets investments are excluded.

### 2. Investment resources and conditions

Respecting current conditions at the financial market, financing construction assumes engagement of 2/3 of credit assets and 1/3 of Investor's own assets. Credit conditions and recapitulation of annual obligations are the following:

**Credit conditions:**

- Credit amount 550.000 KM
- Repayment period (year) 7 years
- Grace period (year) 12 months
- Annuities number 72
- Interest rate 5%yearly (0,41667% monthly)
- Repayment starts 1.5.2008.
- Monthly equal repayment (KM) 7.640

Years	Interest rate	Repayment	Annuity
1.	27.500		27.500
2.	25.404	91.680	117.084
3.	20.820	91.680	112.500
4.	16.208	91.680	107.888
5.	11.651	91.680	103.331
6.	7.068	91.680	98.748
7.	2.488	91.600	94.088
<b>Total:</b>	<b>111.139</b>	<b>550.000</b>	<b>661.139</b>

**3. Business calculation estimate****3.1. Raw materials, packing and spare parts expenses**

These expenditures are calculated on the basis of the consumption norms in developed countries, own local empiric norms, actual market prices of inputs, as well as projected scope and production structure. These expenses participate in total sale value with approximately 31%, and include costs of sawdust, transportation, matrix, pressing wheels, spare parts, and packing, distributed per years as follows:

	1. Year	2. Year	3. Year
Raw materials, packing and spare parts expenses:	502.200	748.650	988.900

**3.2. Energy advertising expenses**

According to the empiric standards, energy, fuel and water costs are estimated approximately at 30% of the total sale value, and would amount:

- First year 486.000 KM
- Second year 724.500 KM
- Third and subsequent years 957.000 KM

**3.3. Depreciation**

No.	Description	Base (KM)	Rate	Amount	Assets value remains
1.	Land	30.000	-		30.000
2.	Construction building and infrastructure	267.000	2,50	6.6	213.600
3.	Equipment and machinery	485.000	12,50	60.6	-
4.	Transport facilities	40.000	14,30	5.7	-
	<b>Total:</b>			<b>73.0</b>	<b>243.600</b>



### 3.4. Gross wages

Wage's calculations were made on the following base:

- First year – 10 permanent workers and 5 seasonal workers
- Second and coming years – 17 permanent workers and 5 seasonal workers
- Average net wage of 600 KM per employee
- Taxes and contributions of 52% for net wages (permanent workers) and 40% for seasonal workers
- Planned average gross wage growth during the first two years by 10%

According to the mentioned, gross wages by years are:

<b>- First year</b>	<b>130.440</b>
10x600x12x1,52	109.440
5x500x6x1,40	21.000
<b>- Second year</b>	<b>227.752</b>
17x600x12x1,52x1,10	204.652
5x500x6x1,40x1,10	23.100
<b>- Third and subsequent years</b>	<b>250.527</b>
227.752x1,10	250.527

### 3.5. Maintenance expenses

Planned maintenance expenses per years are:

- First year 15.000 KM
- Second and coming years 44.000 KM

### 3.6. Other costs

No.	COSTS	Value in KM	
		In the 1.Year	In the 2.Year
1.	Material for hygiene keeping	1.000	3.000
2.	Small toolkit, inventory and car tires	16.000	28.000
3.	Expenses of PPE	6.000	12.000
4.	Lubricant's and waste material's costs	4.000	7.000
5.	Forwarding costs	12.000	25.000
6.	Banking services costs and fee	3.000	5.000
7.	Art's services	5.000	9.000
8.	PTT costs	2.400	4.000
9.	Transport services of other materials	18.000	30.000
10.	Utility services	4.000	6.000
11.	Itinerary costs	10.000	18.000
12.	Economic propaganda and promotion costs	4.000	10.000
13.	Transportation to and from work	5.500	9.300
14.	Representation expenses	2.000	3.000
15.	Expenses for worker's food	26.000	42.000
16.	Insurance premium	8.000	15.000
17.	Other costs	5.000	10.000
	<b>Total:</b>	<b>121.900</b>	<b>236.300</b>

In the third year, growth of expences is estimated to be 10 % higher than in the previous years.

#### 4. Projection of income statement

	1.	2.	3.	4.	5.	6.	7.	8.
<b>TOTAL INCOME</b>	<b>1,620.000</b>	<b>2,415.000</b>	<b>3,190.00</b>	<b>3,190.00</b>	<b>3,190.00</b>	<b>3,190.00</b>	<b>3,190.00</b>	<b>3,190.00</b>
Raw material costs.	502.200	748.650	988.900	988.900	988.900	988.900	988.900	988.900
Energy media costs	486.000	724.500	957.000	957.000	957.000	957.000	957.000	957.000
Depreciation costs	73.020	73.020	73.020	73.020	73.020	73.020	73.020	73.020
Gross wages	130.440	227.752	250.527	250.527	250.527	250.527	250.527	250.527
Investment maintenance	15.000	44.000	44.000	44.000	44.000	44.000	44.000	44.000
Other costs	121.900	236.300	259.930	259.930	259.930	259.930	259.930	1
Interest rates costs	27.500	25.404	20.820	16.268	11.651	7.068	2.488	-
<b>TOTAL EXPENSES</b>	<b>1.356.060</b>	<b>2.079.626</b>	<b>2.594.19</b>	<b>2.589.58</b>	<b>2.586.00</b>	<b>2.581.42</b>	<b>2.576.84</b>	<b>2.674.35</b>
<b>GROSS EARNING</b>	<b>263.940</b>	<b>335.374</b>	<b>595.803</b>	<b>600.415</b>	<b>603.992</b>	<b>608.575</b>	<b>613.155</b>	<b>615.649</b>
Profit tax	79.182	100.612	178.741	180.125	181.198	182.573	183.947	184.693
<b>NET EARNING</b>	<b>184.758</b>	<b>234.762</b>	<b>417.062</b>	<b>420.291</b>	<b>422.794</b>	<b>426.003</b>	<b>429.209</b>	<b>430.950</b>
Reproduction capability	257.778	307.781	490.082	493.311	495.814	499.023	502.229	503.970
Loan's repayment	-	91.680	91.680	91.680	91.680	91.680	91.600	-
Remain for reproduction	257.778	216.102	398.402	401.631	404.134	407.343	410.629	503.970

#### 5. Indicators of investment efficiency

Static and dynamic indicators of the project efficiency, including indicators of project liquidity are presented on the basis of data on the amount and structure of investment, sources and terms of financing, the amount of total revenues, the structure of expenses with regard to reaction to modifications in using capacities (fixed & variable expenses), the number of employees, as well as the analysis of the economic course of the project, as follows:

##### 5.1. Static indicators of project efficiency

No.	Indicators	Years		
		1.	2.	3.
1.	Gross profit per one employee (KM)	21.115	17.199	30.554
2.	Economics (Total revenue / Total expenses) coefficient	1,195	1,161	1,223
3.	Accumulation (Net profit/Total revenue) (%)	11,41	9,72	13,07
4.	Profitability (Net profit / Total means employed) (%)	22,45	28,56	50,73
5.	Reproductive capability (accumulation + amortization/ Total means employed) (%)	31,36	37,44	59,62

##### 5.2. Dynamic indicators

###### 5.2.1. Efficiency analysis

In order to consider the investment project efficiency, the economic course is presented below: assuming as follows.

- Net actual value 1.556.000 KM
- Internal ratability rate 33,2%
- Repayment of investments third year

###### 5.2.2. Liquidity analysis

The cash flow for the period of investment and for the three years upon project completion, demonstrate a high level of the operations liquidity, enabling servicing of all expenses, as well as significant investment in further expansion of this project. This project generates 1.247.000 KM, within tree year of operations.