Identifying Investment Projects for Sustainable Forestry and Forest Industry Business in Bosnia and Herzegovina

Sector Study

Final Report
November 07, 2006

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Abbreviations

AAC	Annual Allowable Cut
ADt	Air dry ton
BHF	Business Humanitarian Forum
BiH	Bosnia and Herzegovina
CBBH	Central Bank of Bosnia and Herzegovina
CFMC	Cantonal Forest Management Companies
CHP	Combined Heat and Power
d.o.o.	Limited liability company
EBRD	European Bank for Reconstruction and Development
EU	European Union
EUFOR	European Union Force in Bosnia and Herzegovina
EUPM	European Union Police Mission
EUTDI	European Union Trade Development Initiative
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistics
FBiH	Federation of Bosnia and Herzegovina
FDI	Foreign Direct Investment
FIPA	Foreign Investment Promotion Agency of Bosnia and Herzegovina
FMU	Forest Management Unit
FMC	Forest management Company
FSC	Forest Stewardship Council
FTA	Free Trade Agreements
GDP	Gross Domestic Product
GTZ	German Technical Cooperation
IMF	International Monetary Fund
JPŠ	Joint Stock Company
KM (BAM)	Bosnian Convertible Mark
MDF	Medium Density Fibreboard
MIGA	Multilateral Investment Guarantee Agency
MTDS	Medium term Development Strategy
NTFPs	Non Timber Forest Products
OHR	Office of the High Representative
ŠRS	JPŠ „Šume Republike Srpske"
RCP	Recovered paper (waste paper)
RS	Republika Srpska
t	ton
UNDP	United Nations Development Programme
USAID-CCA	USAID Cluster Competitiveness Activity

EXECUTIVE SUMMARY

EBRD had entrusted Österreichische Bundesforste Consulting in cooperation with Pöyry Energy GmbH to identify investment opportunities in the Forestry and wood industry in Bosnia and Herzegovina (BiH). The funds derived from the Austrian Trust Fund at EBRD, the Client is the Foreign Investment Promotion Agency (FIPA) in BiH.

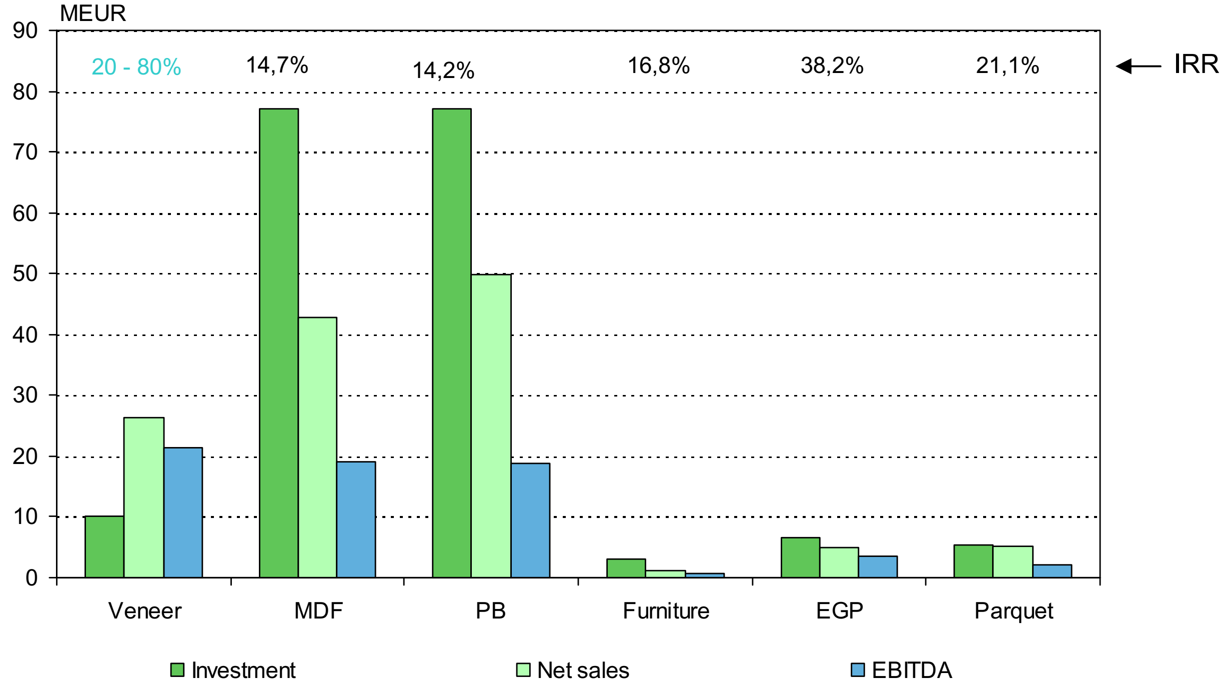
The major objective of the study was to identify a number of prefeasibility cases, which can serve potential investors as support documents for their individual assessment of the local potential. Seven cases have been elaborated, out of which six provide interesting opportunities for investment.

The forestry sector is currently in transformation and still suffers from post war problems like insufficient access to the forest, data insecurity and recent restructuring. Nevertheless the forests (80.7% state owned,) have the sustainable potential to provide nearly 7 million m^3 roundwood per year. Currently this potential is not fully used, but the first companies have received FSC certification and more market tools for auctioning and contracting have been introduced in both entities successfully. With the increasing demand and market prices for roundwood, the economic base for mid term investments in the forestry will be laid.

But the wood processing sector is already now providing opportunities for large and medium investments. There is potential for a new MDF mill and a greenfield particleboard mill of global market competitive size, but investors will have to use the window of opportunity now, because any similar investment in one of the neighbouring countries may jeopardize the market and supply advantages upon which the calculations are based.

The most promising options lie in processing sawn wood to edge glued panels, veneer, parquet and furniture, especially as there are small and medium companies which may be suitable for joint ventures. The calculations, however, are based on greenfield options in order to keep them universally applicable for different potential investors. The prefeasibility cases are summarized in the graph overleaf, where a comparison of investment, sales and EBITDA is made. Please note that the veneer IRR has to be read with caution as there are two extremely volatile and decisive factors to be considered, the supply with high quality logs and the achievable sales prices, where the local prices currently range far below the revenues which can be obtained in Western and Central Europe.

Key financial indicators for profitable investment opportunities



Combined heat and power production from sawmill residues or biomass is the only case of a low IRR (2.3%). Although this is a viable model in central Europe, the low feed in tariffs for electricity and the pending ratification of the Kyoto protocol do not allow an economic justification of this biomass use. The high potential of biomass for energetic purposes is likely to be channelled into existing or recently planned briquette and pellet production facilities which are currently explored by a number of interested local and international investors already.

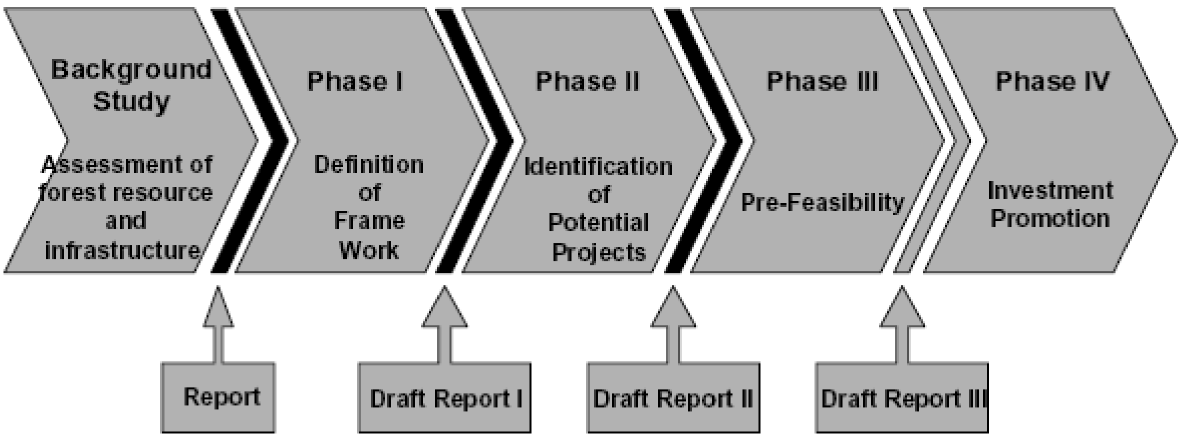
The study was also targeting at the general and specific investment climate and potential deal breakers which could lead to a negative decision of interested investors. The situation has been analysed and it can be stated that within 2006 a significant improvement in the framework conditions has been felt, as new regulations and practices have gained ground and the administrations have learned to be more customer oriented. Nevertheless the administrative and judicial system is not coherent and the performance of institutions varies between the localities, municipalities, cantons and entities. A Foreign Investors Council has established itself recently, with the objective of addressing topics of general interest. The study has elaborated a separate policy paper which is to be discussed with the relevant government and civil society institutions. Its final version will be published separately after round table discussions and shall serve as sector guidance for the local decision makers.

It is recommended that FIPA takes over the investment promotion within its regional and sectoral agenda, using the information compiled and updating it with relevant developments and information provided by other institutions.

1 INTRODUCTION

This document is the final report of the sector study: Identifying Investment Projects for Sustainable Forestry and Forest Industry Businesses in Bosnia and Herzegovina. The study team would like to thank FIPA, EBRD and all cooperating institutions for the professional and personal support that allowed us to concentrate on the study issues. Special thanks go to USAID CCA, which provided much of the background information and also acted as sparring partner for proposals, approaches and presentation.

This final report gives an overview of the findings and results of the project. It consisted of a background study, which was financed form CEI funds and served as basis for this 'genuine' sector study. The sector study itself consisted of four different phases which were concluded in stakeholder meetings where the phase results were discussed and the further procedural steps were determined. The main results are the investment cases which have been mutually selected after Phase II of the study, other investment relevant facts like an overview of the general sector and the fields of action to improve the investment attractivity of the wood processing sectors and to abandon bottlenecks identified by actual investors, interest groups and facilitators. For more detailed information on each of the phases, please refer to the Annex, where the presentations and minutes of the meetings are provided



2 FRAMEWORK OF INVESTMENT OPPORTUNITIES

The framework assessment is based on the information available from secondary sources, and work being undertaken by other organizations including USAID-CCA, as well as findings from the Background Study. Additionally, about two weeks field work was carried out in BIH to identify and evaluate the investment opportunities. The assessment was continued throughout the study in all interviews and roundtable talks with stakeholders in the sector.

The current situation of the forest industry in BIH has been reviewed on regional basis including:

- Existing and future available forest resources/wood volumes
- Analysis of the global and regional situation and trends within the sector
- Markets for round wood and wood products
- Existing manufacturing plants in the sector
- Infrastructure (roads, railways, utilities, esp. energy)
- Investment projects at the existing plants planned and announced by the current management
- Definition of "planning gaps" based on the above analysis
- Scope for greenfield investments

A closer look at the global market situation in the wood industry and the availability of forest resources, the choice of potentials within BiH was narrowed down through defining the "planning gap". Given the current level of industrial activity and anticipated expansion plans of key players within the sector, considering the availability of forest resources a framework for a further in- depth analysis in Phase II was defined. The following determinants were taken into consideration:

2.1 Resource availability

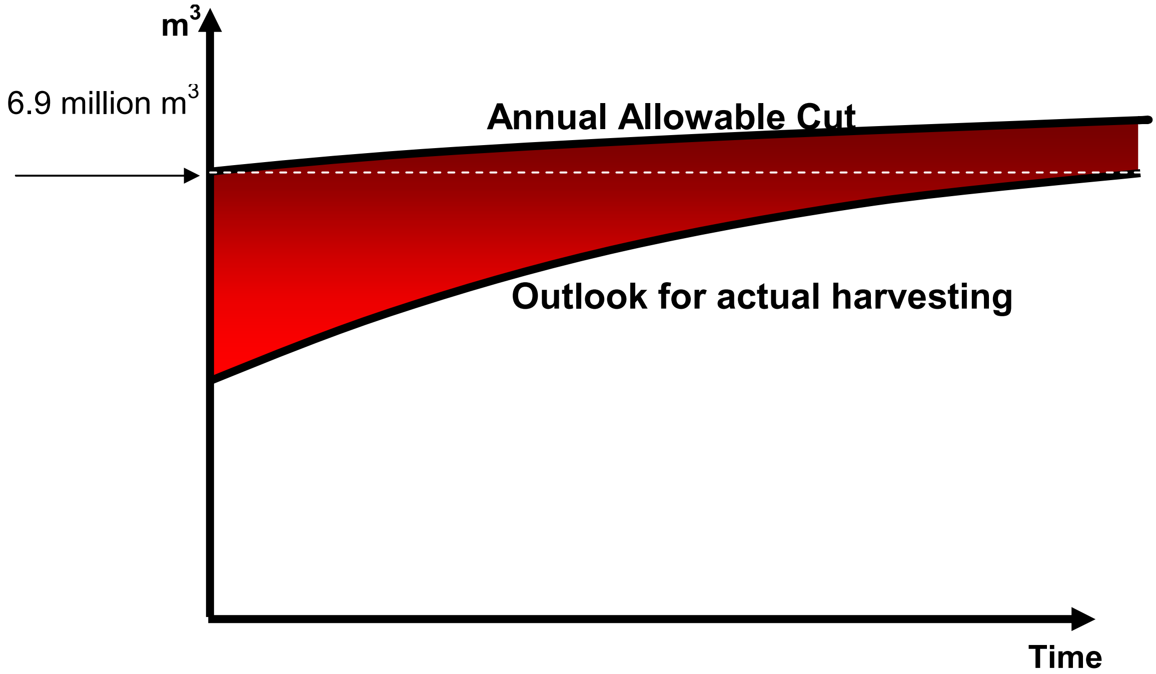
As there is no inventory available and a compilation of the existing individual management plan data would induce a number of methodological and statistical errors, the only reliable information on the raw material available in BiH are educated guesses of sector specialists. Hadžiabdic (2006) estimates the primary state forest product composition at the national as listed in Table 2-1 (State forests account for 80.7 % of total forests in BIH). The private forests predominantly produce fuelwood for self consumption and are no significant market factor yet. The available wood and its potential still has to be fully tapped, as insufficient accessibility and previously inefficient management did not encourage a full use of this undoubted potential. Our estimate of the available resources is illustrated in Figure 2-1.

Table 2-1: Current potential annual removals in state-owned forests in1,000 m^3/a

Conifers	AAC	Broadleaves	AAC
Veneer logs	48	Veneer logs	95
Saw logs I	498	Peeler logs	95
Saw logs II	596	Saw logs I	279
Saw logs III	522	Saw logs II	496
Poles	162	Saw logs III	675
Mine wood	276	Pulp wood	1,117
Pulp wood	282	Fire wood	1,748
Total net mass	2,384	Total net mass	4,505

The national inventory is currently developed and field tested, if investors would require a detail assessment of the actually available resources before end of 2008, an automated satellite imagery interpretation could provide relatively quick and reliable data within short time (3 months) for about 100,000 Euro (depending on intensity, error tolerance and processing depth of the information). It would be worth considering such a rapid assessment if investments for large mills are desired to be attracted immediately.

Figure 2-1: Expected development of annual removals



2.2 Environmental aspects

The legal and institutional framework in environmental management is still under development in Bosnia and Herzegovina. However, it is likely that in the medium term the systems will be rather similar to those in the EU countries.
Development of forest industry does not seem to endanger the rich biodiversity of the country, if the present plans to develop nature conservation and sustainable forest management are realised.
The environmental situation in the country can be described as satisfactory, with lower environmental threats and burden as during the former Yugoslavian times, but with significant local pollution in larger towns and industrial centres. New forest industry using best available techniques in environmental control can be developed without significant environmental impacts except for a state of the art large chemical pulp mill which would require serious scrutiny.

2.3 Pulpwood consumption estimates

Natron Hayat is currently restarting chemical pulp production based on softwood. For this they require about 450,000 m^3/a of pulpwood (softwood). The current availability from State forests is estimated to be 282,000 m^3 (+ some 20 % from private forests), which means that Natron Hayat needs to use also processing residues/chips from sawmills, and most likely import part of their wood requirements.

Hardwood pulp availability is estimated to be 1.1 million m^3. It is unlikely that this will be used for pulp production in BIH, because

- hardwood mix consists of several species, which would have a negative impact on pulp quality
- a state of the art competitive pulp mill would require at least 3 million m^3 of homogeneous pulpwood

For above reasons, hardwood pulpwood is likely to be utilized for wood based panels production or for energy generation.

2.4 Sawnwood

Current sawmill capacity is at least twice the AAC. However, there is no reliable information about the actual production of the sawmills. When comparing the statistics of available raw material and current sawnwood production there seem to be possibilities for higher overall output in BIH. However, when talking with people from the industry, this is not necessary the true situation. Many insiders indicate that there are not enough logs throughout the year due to the micro parcelled politically influenced market. This applies to both softwood and hardwood. Furthermore, veneer and plywood industry have demand for the same logs.
Due to current overcapacity, sawn wood industry appears not to be an interesting alternative for investment or expansion in BIH. However, in the long term restructuring of the industry is likely to take place, which could create investment opportunities in modern plants with niche and high quality products.

2.5 Secondary processing

Particleboard is the most flexible wood-based panel in relation to raw material suitability – applying to both wood species and the form of wood. Spruce and pine are the most commonly used species in Europe, but beech, birch and aspen are accepted as well. Wood can be in a form of roundwood with or without bark, sawmill slabs, chips with or without bark, sawdust and recycled wood.
As there is currently no particleboard industry in BIH, it would be an interesting investment alternative.

Medium Density Fibreboard MDF can use all kinds of fresh wood as raw material since it is stricter than particleboard. The wood source can be sawmill chips, sawdust, plywood waste

or roundwood. When targeting the furniture industry raw material is usually chips without bark. Spruce is the best raw material because of its light colour and long fibre. Other potential wood species are pine, aspen, birch and beech.
As there is no MDF industry in BIH, it is an interesting investment alternative.

Plywood and veneer industries compete about the quality peeler logs with local sawmills. However, the volume required is usually much smaller in comparison to sawmills.
Investment potential of plywood and veneer is to be analysed in the second phase

In Europe all OSB produced is based on softwood. There is some initial use of aspen, yet the potential is limited and does not match with the BiH raw material supply situation.
There is not enough softwood for modern competitive OSB plant.

Solid wood based furniture industry requires a steady raw material flow from the domestic sawmills. Many of the producers have integrated furniture production with sawmilling to guarantee consistent supply of quality raw material. As there is no wood-based panel production in the country at the moment, all companies are totally dependent on imported particleboard and MDF. Thus, there is a clear opportunity for domestic supply. As the panel based furniture is expected to be facing strong competition from the Far East it is important to keep the specific market niches and advantages in mind.
Furniture industry has large potential for expansion in BIH. Low labour costs and the availability of skilled labour in BIH support this option.

As solid wood furniture industry, joinery industry has a good raw material flow from the domestic sawmills. In fact, many of the producers closely cooperate with or integrate sawmilling to guarantee consistent supply of quality raw material.
Joinery industry is a highly potential expansion possibility in BIH. Low labour costs support this option.

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 BIH yet, it is an interesting alternative.

Summary of investment options

	Wood Resources	Market Outlook		Investment Opportunities		Comments
		Export	Domestic	Existing	Greenfield	
Pulp & paper	–	+	+	+	–	Opportunities in downstream converting
Sawn Softwood	–	±	±	+	±	Overcapacity in BIH/Europe, restructuring possibility in BIH
Sawn hardwood	–	–	+	+	±	Overcapacity in BIH, restructuring possibility
Particleboard	+	+	+	–	+	Good potential
MDF	+	+	+	–	+	Good potential
Veneer/Plywood	±	±	–	?	?	To be analysed in phase II
OSB	±	±	–	–	–	Not enough softwood available
Furniture	+	+	+	+	+	Good potential
Joinery	+	+	+	+	+	Good potential
Pellets	+	+	+	–	+	No existing industry, good potential

+ = positive, – = negative, ± = neutral

3 IDENTIFICATION OF POTENTIAL INVESTMENT OPPORTUNITIES

It was agreed that a funnel for the identification of the most promising investment opportunities was developed; the first filter within the sector was the market assessment, as given in detail in Annex 1.1.

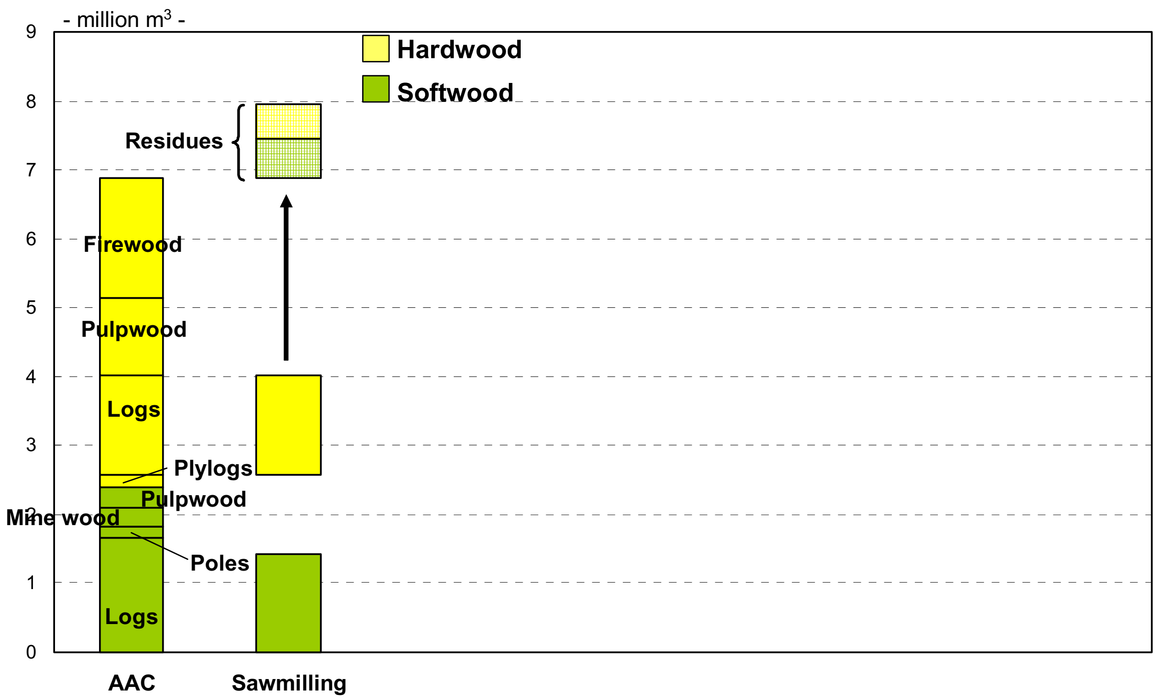
The most attractive products in the view of **market potential** for BiH would be

- Pulp and paper mill (on-going)
- Veneer / hardwood plywood
- Particleboard
- MDF
- Joinery
- Furniture (preferably solid wood furniture)
- Biomass (pellets, heat generation)

Another factor in selecting cases for further in depth analysis for potential investments is physical forest resource potential. It determines expansion plans of current industry players and options that still can be considered for future ventures:
Based on the physical forest resources potential, investment potential was analyzed. The annual allowable cut (AAC) of state owned forests in BiH is almost seven million m^3 of which approximately two thirds consists of hardwood. It is estimated that the overall volume could

increase by about 15-20 per cent when taking also into account the supply from private owned forest areas.
The actual production, and thus also the log usage, of domestic sawnwood industry is unclear but it is estimated that softwood and hardwood sawmills would produce together almost 1.5 million m³ of sawnwood annually. This production volume would require approximately 3 million m³ of logs but would also create about 1.5 million m³ of residues to be utilized as a raw material and a source of energy. About 30 per cent of this residue volume is estimated to be burned at sawmills.

Figure 3-1: Potential for wood processing based on the sustainable potential



For further selection of interesting expansion options and new investment in the sector analysis was conducted based on availability of forest resources for each industry sector:

- Pulp and paper expansions
- MDF expansion
- Particleboard expansion
- Hardwood plywood expansion
- Biofuel expansion

Furthermore, different investment options were selected then upon their attractiveness and positioning in the market place (domestic, regional, international).

Considered were the following:

- Sawn softwood option
- Sawn hardwood option
- Particleboard option
- MDF option
- Hardwood plywood option
- Veneer option
- OSB (oriented strand board) option
- Joinery option
- Furniture – wood based panel based option
- Solid wood furniture option
- Bioenergy option

Based upon the above mentioned criteria, **not attractive** options given the current situation in the market and availability of raw material are:

- Sawnwood
- Fibreboard
- OSB
- Laminated veneer lumber (LVL)
- Gluelam beam
- I-joist
- Mechanical pulping/BCTMP (and consequent paper grades)

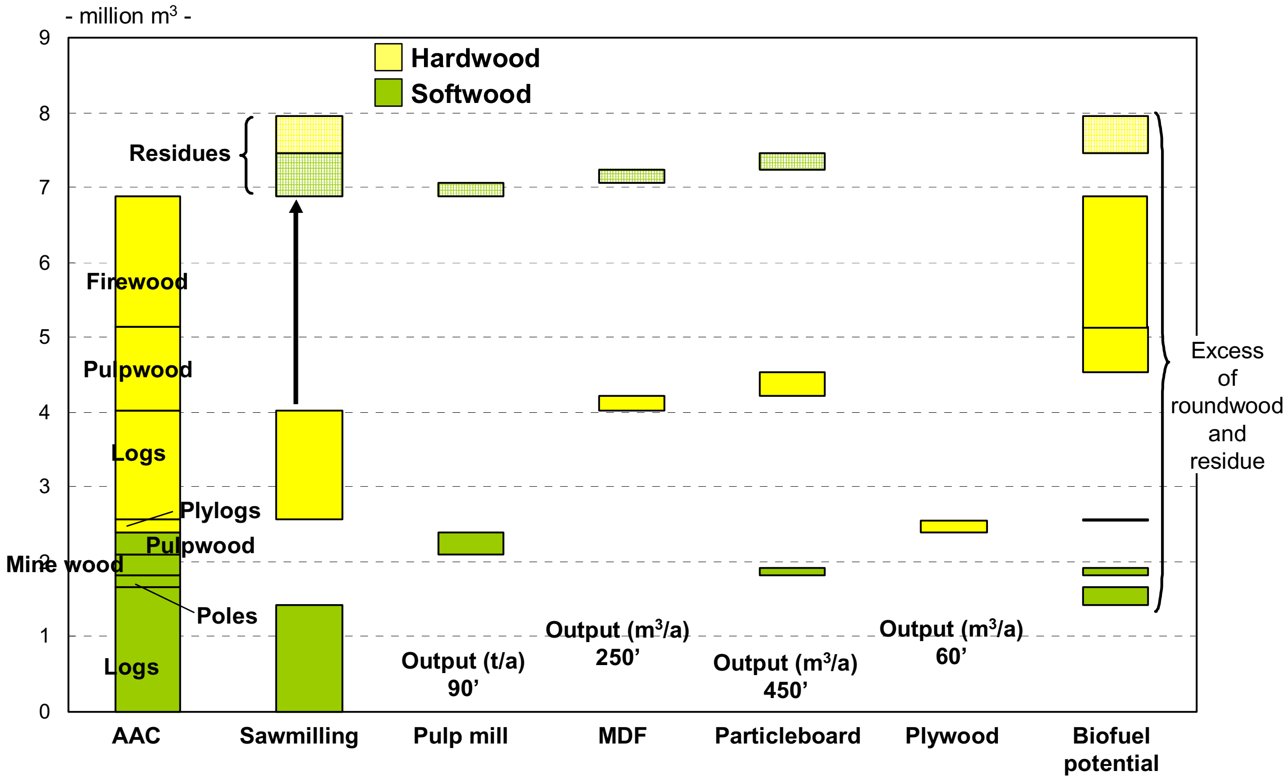
The proposed interesting options selected for further detailed analysis and pre-feasibility studies in the Phase III were:

Table 3-1: Proposed prefeasibility cases after phase II

Investment option	Capacity/year	Fixed investment level Mio. €	No. of possible projects
Pulp and paper (on going Natron)	95 000 t/a	54 (total for mill dev)	1
Veneer/hardwood plywood	60 000 m³ plywood 10 000 m³ veneer	40	1 or 2
Particleboard	450 000 m³	80	1
MDF	250 000 m³	70	1
Joinery	Turnover 1-2 mill. Euro 500-30 000 m³/a	5-15	Several
Furniture (solid wood)	Turnover 1-6 mill Euro 500-5 000 m³/a	5-15	Several
Pellets **Briquettes** **Heat generation**	40-60 000 t/a 5 – 6000 t/a 2 – 100 t steam/h	5 0.5 - 1 0.5 - 30	Several Several Several

The realisation of these potential investment cases would result in the following resource consumption:

Figure 3-2: Resource consumption scenario after investments



After the presentation a discussion concerning the content of the presentation arose and included the following aspects:

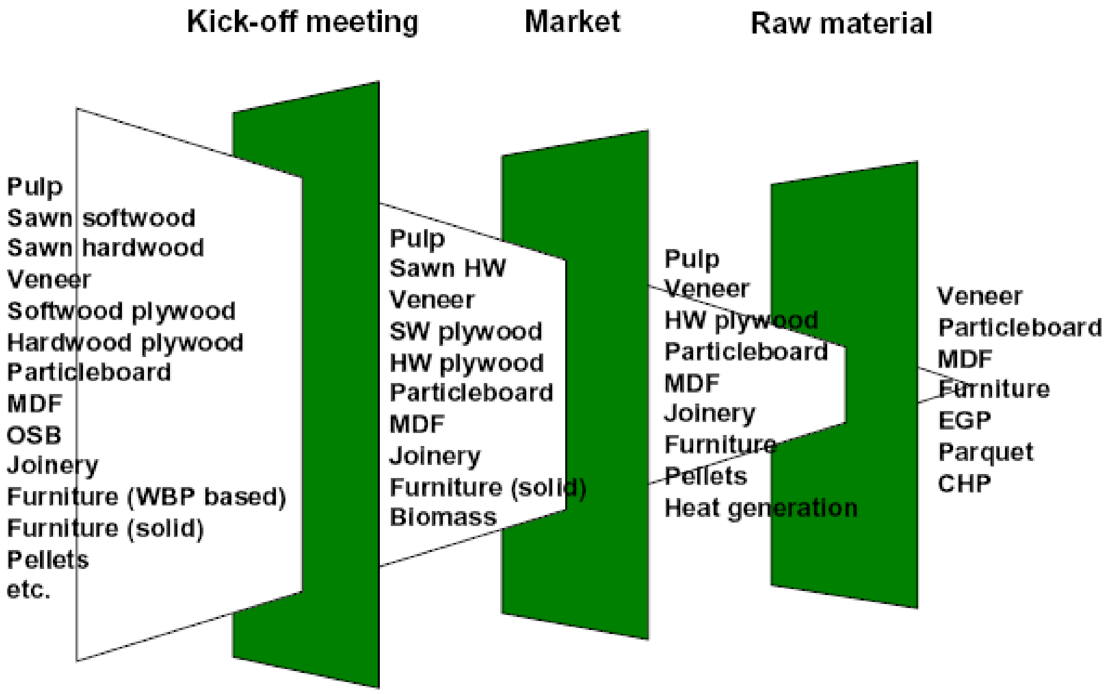
- Consideration of a special category for solid wood boards (edged glued panels) was recommended
- Increased weight of Balkan versus European markets was proposed
- USAID-CCA pointed out that the demand/supply inequality in the sawmilling sector constitutes the core bottleneck of the wood sector development and has to be thoroughly considered
- SBK Canton (Central Bosnia) has reduced AAC from 700,000 to 400,000 m³ per year due to concerns about sustainable yields. It has to be checked whether similar reductions could be made for other FMCs
- USAID reported that Cantons have approached CCA-project for advice in a fail distribution mechanism for raw material to sawmills- this is important as market mechanisms are not considered to be sufficient and functional
- Concerning Particle board:
  - Laminated and veneer particle boards should be included in particleboard option
  - Competition through Balkan producers (for Greenfield particleboard)
  - Import of particleboard higher than UN/FAO figures- will be considered
  - Transport cost advantage 10-15EUR/m³ = 10-15%
  - Present import value 30 mio EUR = 300 m³
  - Study on particleboard with investment value 40mio done in BiH – International Bank standards and experience however consider 80mio EUR
  - Transport costs are element of market requirements/prices

- Assembly houses not included – no detail information were available for the team, **however when selecting the companies with potential for in investments in the joinery sub-sector, companies recommended were also in the assembly houses business.**

- Wood processing sector investment 50 mio EUR in 12 years, 50% for production only
- Big discrepancy between potential and actual investments
- Reforestation/Nature protection is considered, yet the sector development will be monitored

Local participants stresses the strategic preference for import reduction, hence MDF and particleboard would be most interesting for further processing industries The results of Phase II were accepted and the identification of Pre-feasibility cases was generally agreed upon, with the task to the study team to prioritize the elaboration according to the discussion and feasibility. Based on the feed back received from key industry players, government institutions representatives and international interest groups involved in the wood processing sector in BiH after the presentation of Phase II a preliminary list of pre-feasibility cases was compiled. This list contains the new request of EBRD and the participants but is limited due to the scope of the study which cannot deliver more than seven detailed cases for all possible options. The result of this prioritization was consolidated with EBRD and FIPA and is given as follows:

Figure 3-3: Selection process for the prefeasibility cases



4 PRE-FEASIBILITY OF IDENTIFIED INVESTMENT OPPORTUNITIES/ PROJECTS

It is important to point out that the aim of the Consultant was to make a pre-selection of the existing facilities where possible, and base the calculation on these premises. However, due to a relatively short time frame for the delivery of Phase III report all calculations except the Combined Heat and Power (CHP) production from Biomass were based on the "greenfield" investment option. Another factor that led to this decision is the variation of current state of existing sites at different locations, which differ in their size, ownership structure, location e.g. within premises of big state owned combinates that are reluctant to break them apart from other production processes, are only some issues that led to the decision that pre-feasibilities should be calculated on basis of greenfield investment for all cases in order to provide a unique reference point in respect to the scope of the investment necessary for a modern state-of-the art mill. Additionally it was repeatedly asked to consider combined production lines or integrated production. As it is easier to compile the integration from separate cases instead of separating merged cases it was refrained to analyse e.g. sawmill-parquet-veneer-furniture complexes. Hence the cases selected were:

1. Particle Board Mill

One state of the art particle board mill with annual production of 450,000 m^3 and 80 mio Euro investment volume would fit into the market/resource framework, provided no immediate neighbour would initiate such a project at the same time.

2. Medium Density Fibre Board Mill (MDF)

One state of the art MDF mill with annual production of 250,000 m^3 and ~80 mio Euro investment volume would fit into the market/resource framework, provided no immediate neighbour would initiate such a project at the same time.

3. Veneer (Plywood)

The raw material resource requirements for veneer processing are lower. Technology differs from plywood, thus the (sliced) veneer option is more promising and was taken up as case to be calculated. One or two veneer mills with an annual output of 10,000m^3 appeared sensible, an investment volume of 10 mio Euro would be realistic

4. Parquet Production

The availability of hardwood and processing tradition points to the possibility of parquet manufacturing. Several new or improved mills appear likely.

5. Edge Glued Solid Wood Boards

This option as an intermediate between sawmilling and furniture production is an interesting option and has been proven to be viable. It will have to be seen how man new plant would be feasible

6. Solid Wood Based Furniture

This sector includes a wide range of different products. Therefore one case was calculated for the pre-feasibility that was based on Greenfield investment into production of solid wood chairs. This does not mean that only this option is considered promising, yet the variety from joinery to solid wood furniture and prefabricated houses does not allow a generalisation. It has to be stated however, that the quality processing of the valuable resources open cooperation and investment opportunities in a wide range of final and semi-final products.

7. Biomass – Pellets

There is a general shortage of raw wood and the current utilization of wood residues is uneconomic and partly wasteful, use of residual wood for the purpose of energy production was seen as an interesting option for wood processors as well as for energy producers in areas of wood processing industries. In respect to foreign direct investment two main options were screened:

Combined Heat and Power (CHP) Production from Biomass

As favourable legislation for renewable energy production is in place, the feasibility of CHP plants, especially within the wood processing sector was selected for analysis. Two approaches were determined, either to calculate the feasibility on a stand alone solution and/or as integral part of the production process. As during our research work, one of the companies (foreign direct investment Impregnacija-Holz, Vitez) expressed interest and already considered starting CHP plant and was willing to provide the available necessary input figures, the case was based on this example.

Pellets/Briquettes from Biomass

Several potential investors have expressed interest to use wood residues for entering the fuel market. The decision for pellet or briquette production depends extremely on the individual market and raw material access of the investors. This option was left open, to be decided whether a full pre-feasibility shall be elaborated as a public interest case. However, due to the increased activity in this segment in the local market and the awareness of domestic as well as the foreign investors/producers that have recognized the potential of this sector and the global market trends, the final decision was made as not to do the pre-feasibility on this case.

The approach taken in the analysis of each of the identified investment opportunities was to structure each case as follows:

Market analysis
- Target markets and volumes
- Competition & competing materials

Technical description
- Product and production description
- End uses

Location alternatives
- Selection criteria and size of the site

Environmental analysis
Investment costs
Financial profitability
- Production unit costs
- Cumulative cash flow
- Sensitivity

SWOT
Summary

Since the aim of this report is to provide an overview of the project as a whole, only the summary and selected figures for each of the chosen options will be included. For any further details in respect to the pre-feasibility cases please refer to the annexes 3.1.1-3.1.7 included as supporting material.

4.1 Particleboard Mill

Raw material and market analysis
Pulpwood and residues available, 50/50 share used in calculations. Strong sales focus on the Balkans. Several mills in the neighbouring countries with some new mill plans.

Indicative target markets and volumes
- Balkans including BiH about 300,000 m3/a
- Western Europe about 50,000 m3/a
- Middle-East and North Africa together approximately 100 000 m3/a

Competition / Competitors
Geographically closest PB mills
- E-Europe: Serbia, Croatia, Slovenia, Hungary and Romania
- W-Europe: Italy, Austria and Greece

New PB mill plans in Slovenia and Romania.

Technical description
State-of-the-art mill with an annual capacity of 450 000 m^3. No further processing.

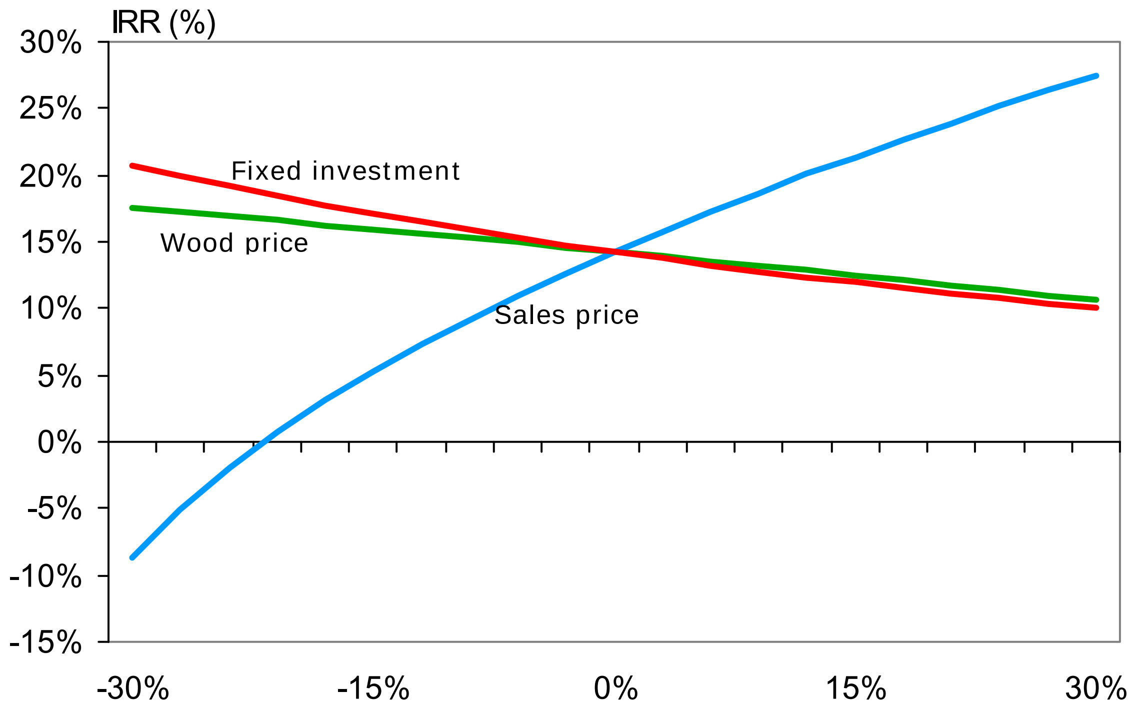
Location alternatives
Requires at least 20 ha site but total area should be up to 50 ha for expansions. Thus existing locations can't be considered. Good transport connections important as well as energy supply.

Environmental analysis
Particleboard mills have potentially environmental impacts, but these can be prevented and mitigated by modern process equipment and specific environmental control measures.

Investment cost
Estimated to EUR 77 million.

Financial profitability
IRR is 14.2%. Payback period amounts to 7.7 years.

Figure 4-1: Sensitivity Analysis Particleboard



SWOT
Due to low added value transport is a critical issue. Low raw material requirements. Competing mill plans with quicker realization might saturate the target market.

4.2 MDF – Summary:

Raw material and market analysis
Pulpwood and residues available, the pulpwood used in calculations. Significant volume to BiH & the Balkans, balance to Italia and M-East & N-Africa. New mill plans also in the neighbouring countries.

Technical description
State-of-the-art mill with an annual capacity of 220,000 m^3. No further processing.

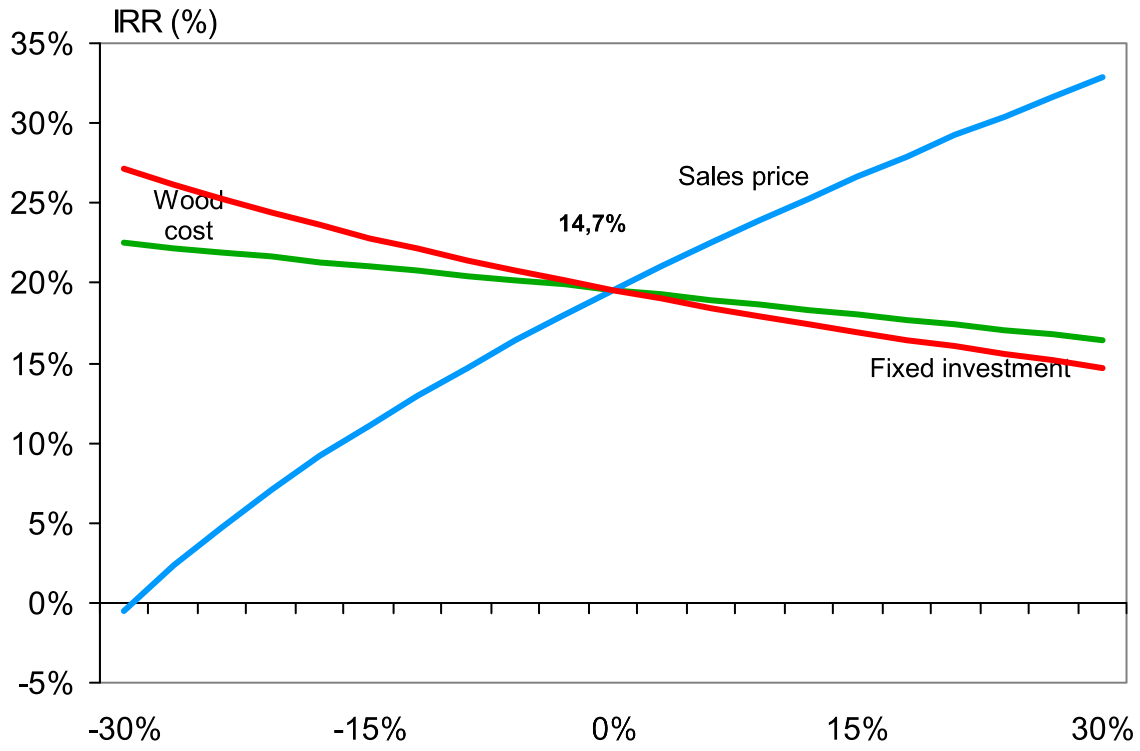
Location alternatives
Requires at least 20 ha site. Thus existing locations can't probably be considered – Mediapan site has to be rechecked for concrete planning Good road and rail connections important as well as high voltage power line.

Environmental analysis
MDF mills have potentially environmental impacts, but these can be prevented and mitigated by modern process equipment and specific environmental control measures.

Investment cost
Estimated to EUR 77 million.

Financial profitability
IRR is 14.7%. Payback period amounts to 7.5 years.

Figure 4-2: Sensitivity Analysis MDF



SWOT
High investment with reasonable profitability. Competing mill plans with quicker realization might saturate the target market.

4.3 Veneer – Summary:

Raw material and market analysis
Quality beech logs available, however, competition with sawmills. Products targeted to W-European market. Domestic suppliers serious competitors.

Technical description
State-of-the-art mill (slicing method) with an annual capacity of 10,000 m³. No further processing.

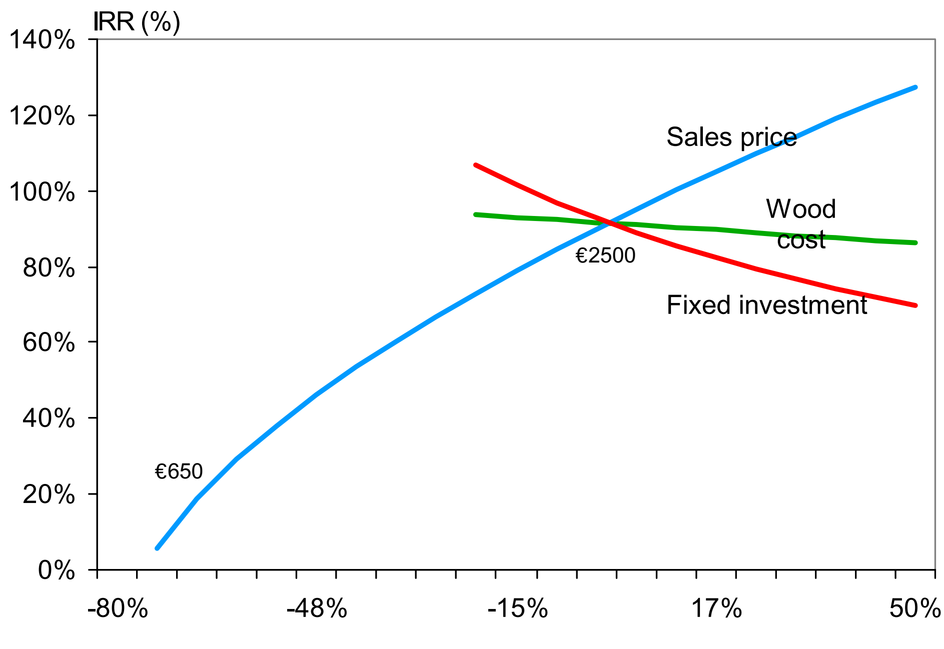
Location alternatives
Requires 5 - 10 ha site. Existing operations could be considered as alternatives.

Environmental analysis
Properly designed and located mills are not expected to have any environmental problems.

Investment cost
Estimated to EUR 10 million.

Financial profitability
The IRR ranges between 20 and 90%, but is extremely sensitive to the European sales price. Sales price has a strong relation to the quality distribution of raw material and to the market position of the vendor. The best opportunity is seen for established veneer producers who want to expand production or replace more expensive production lines with the ones to be erected here.

Figure 4-3: Sensitivity Analysis Veneer



SWOT
There are several strengths and opportunities. Threats and weaknesses related to quality.

4.4 Parquet (solid wood)

Raw material and market analysis
Good hardwood sawnwood availability, beech sawnwood used in calculations. A majority of final products to targeted to Western Europe, but also the Balkans (incl. BiH) offer potential.

Technical description
State-of-the-art mill with annual production capacity being 175,000 m^2/a.

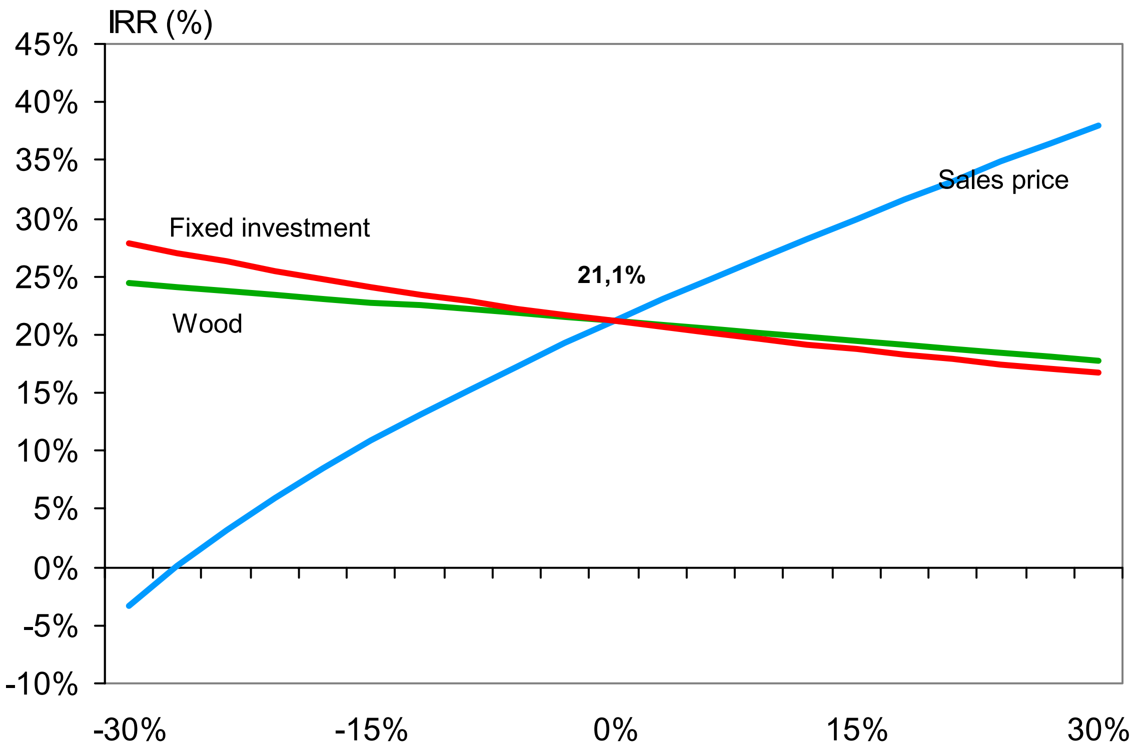
Location alternatives
No specific requirements. Closeness of sawmills can offer synergy / partner possibilities.

Environmental analysis
The small environmental problems of parquet production can be controlled effectively.

Investment cost
Estimated to EUR 5.3 million.

Financial profitability
IRR is 21.1%. Payback period amounts to 6.9 years.

Figure 4-4: Sensitivity Analysis Parquet



SWOT
Strength and opportunities clearly dominate.

4.5 Edged Glued Panels (EGP)

Raw material and market analysis
Good hardwood sawnwood availability, beech sawnwood used in calculations. A majority of final products to furniture industry in Western Europe. Major end use for beech EGP are table tops.

Technical description
State-of-the-art mill with annual production capacity being 5,500 m³/a.

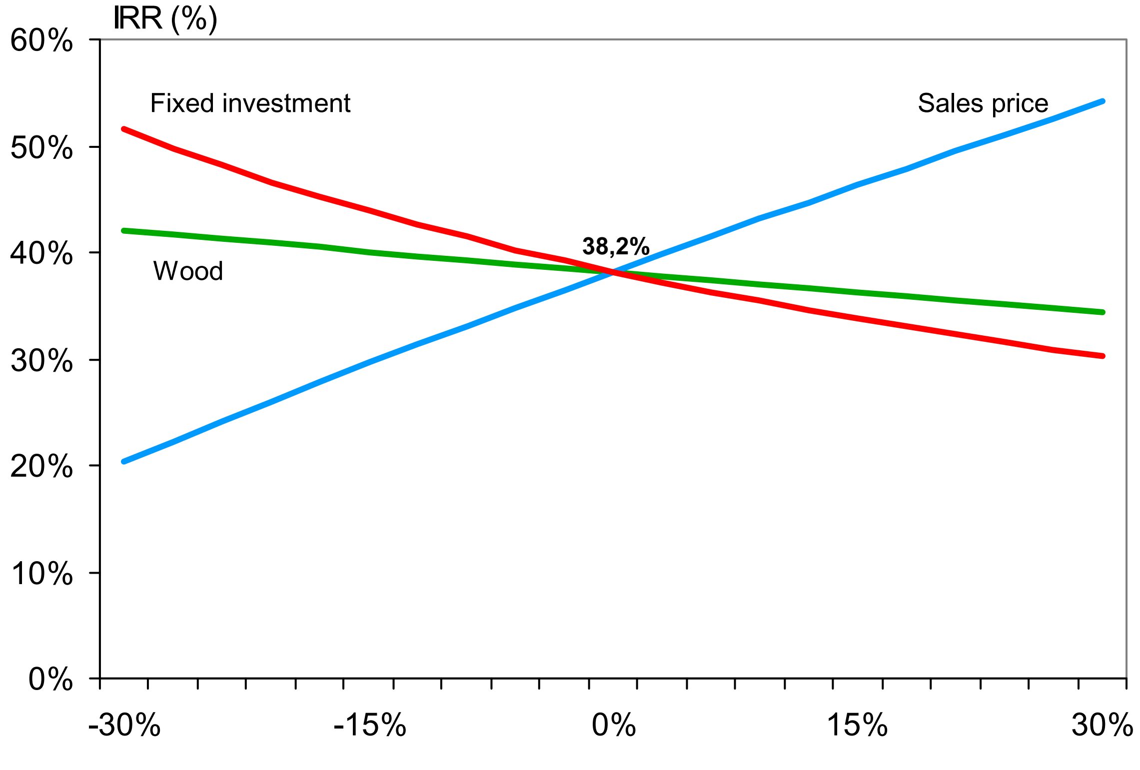
Location alternatives
No specific requirements. Closeness of sawmills and/or furniture makers can offer synergy / partner possibilities.

Environmental analysis
The small environmental problems of EGP production can be controlled effectively.

Investment cost
Estimated to EUR 6.5 million.

Financial profitability
IRR is 38.2%. Payback period amounts to 3.1 years.

Figure 4-5: Sensitivity Analysis EGP



SWOT
Strengths and opportunities clearly dominate.

4.6 Furniture (solid wood chairs)

As mentioned before, the joinery, furniture and prefabricated houses are extremely case dependent as here also the opportunities in investing in existing facilities/companies are heterogeneous. Hence an average calculation would make little sense, therefore a typical case was selected and calculated. The market opportunities

Raw material and market analysis
Good hardwood sawnwood availability, beech sawnwood used in calculations. Most of the final products (high quality chairs) to Western European markets.

Technical description
State-of-the-art machinery with annual production capacity being ~15,000 chairs.

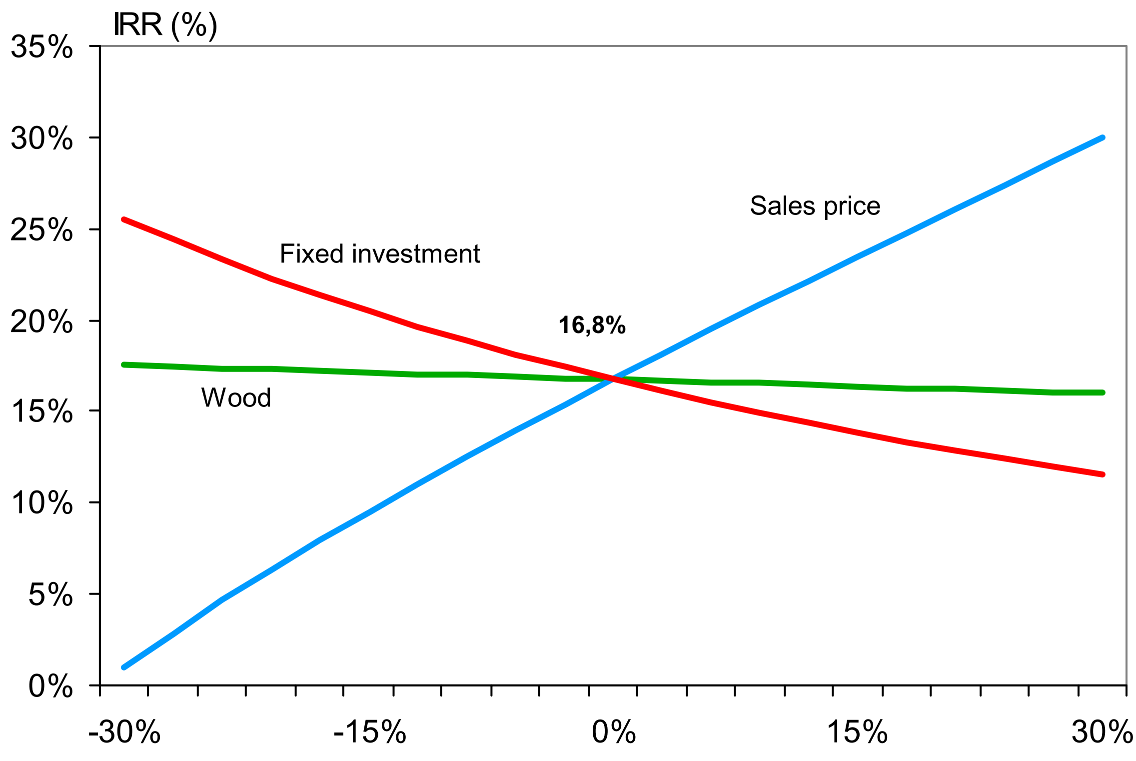
Location alternatives
No specific requirements. Closeness of other furniture makers can offer synergy / partner possibilities.

Environmental analysis
The small environmental problems of furniture production can be controlled effectively.

Investment cost
Estimated to EUR 3.1 million.

Financial profitability
IRR is 16.8%. Payback period amounts to 6.6 years.

Figure 4-6: Sensitivity Analysis Furniture



SWOT
Several strengths and opportunities hindered by threats from competing materials and supply from Asia. The individual factors will have to be weighed against the company positions and opportunities.

4.7 Combined Heat and Power CHP

Market analysis
No competition on electricity due to guaranteed feed-in tariff. Process steam competes with fossil-fuelled steam blocks.

Technical description
State-of-the-art biomass CHP plant (13MWth, 2MWel, 5MW process steam).

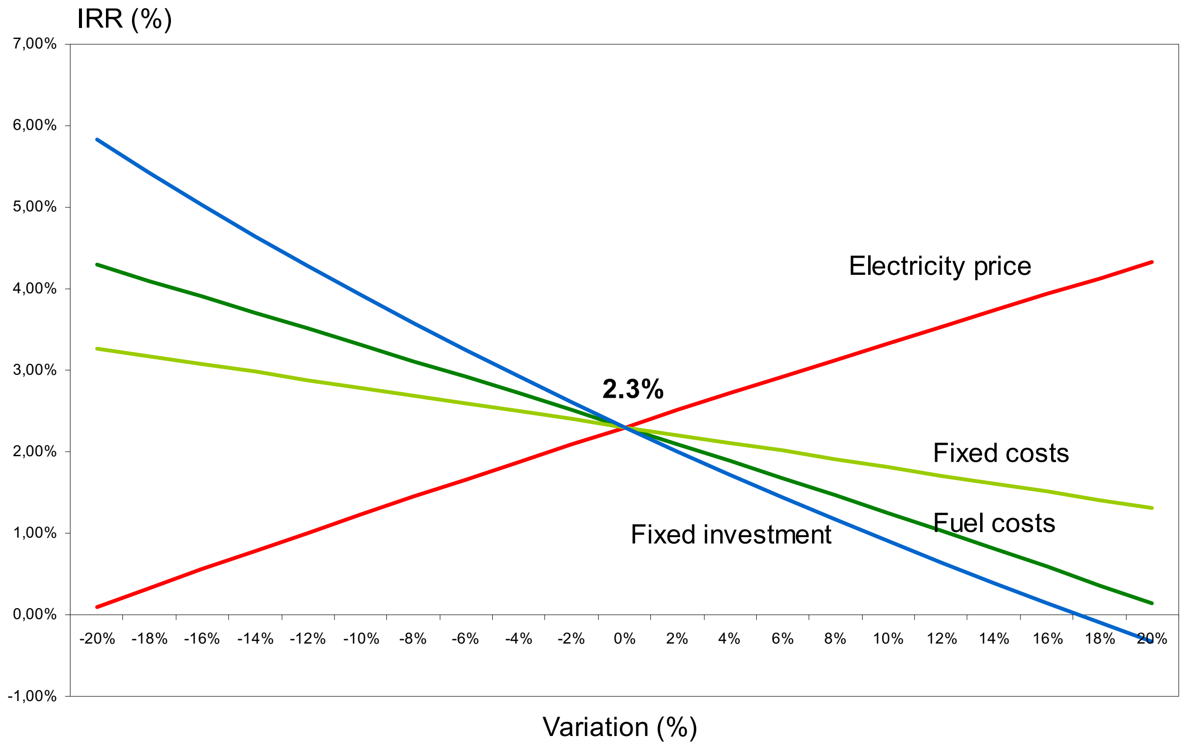
Location alternatives
Existing hardwood panel plant Impregnacija-Holz in Vitez was considered. Similar sites with wood waste and steam demand are available in BiH.

Environmental analysis
Biofuel CHP plants are beneficial to the environment as they utilise wood waste and can replace fossil fuels. Their emissions to the air can be easily controlled.

Investment cost
Estimated to EUR 10.5 million.

Financial profitability
IRR is 2.3%. Payback period amounts to 12 years.

Figure 4-7: Sensitivity Analysis CHP

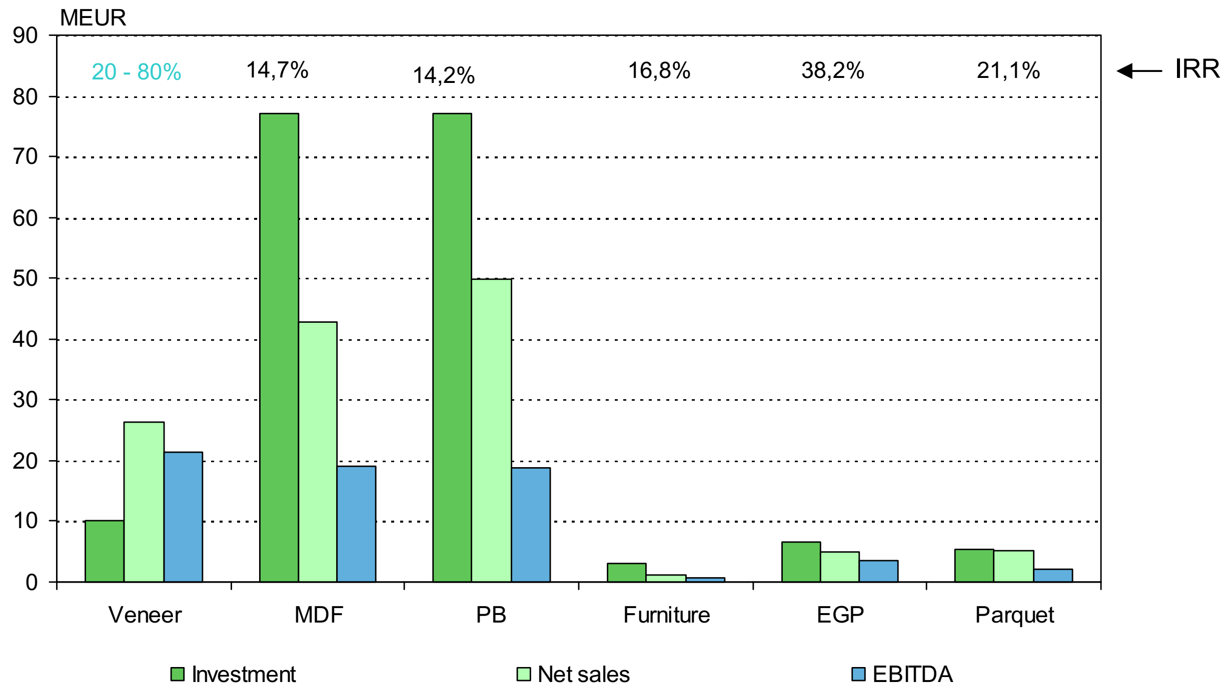


SWOT
Low renewable energy feed-tariff (compared to other European countries) without guarantee for certain duration as well as the uncertainty on Kyoto Protocol ratification lead to an unfavourable investment case. Unless political incentives are set, CHP is financially not feasible.

4.8 Comparison of different cases

The compilation in Figure 4-8 shows that there is a wide variety in feasible investment opportunities in the wood processing sector in BiH. Naturally each investor will have to assess the opportunities with his own business plans and expansion/transfer agendas in order to make a sound investment decision. The general setting appears positive, yet detail questions especially considering the raw material supply will require thorough scrutiny.

Figure 4-8: Key financial indicators for profitable investment opportunities



5 LEGAL / REGULATORY OBSTACLES

According to the Terms of Reference the Consultant was to evaluate which factors in the legal/regulatory environment in the country will make the identified investment opportunities less attractive to foreign investors (e.g. licensing, export regulations etc.). The focus here should be on problems:

- Specific to the forestry and forest industries; however,
- Broader issues should also be considered if they are likely to constitute “deal-breakers” for potential investors.

A closer look at the SWOT analysis of forest management sector provides a general picture of issues at stake:

Table 5-1: SWOT – Forest Management Sector

Strengths	**Weaknesses**
• Forest law exists • Clear decision on sustainable forest management • Strong commitment for changes • Good European level forestry traditions • High level education • Professional forestry experts in all level of forest management	• No written forestry policy • No long-term forestry program • Insufficient information on state of the forests (inventory) • No full understanding and acceptance of present rules (e.g. organisation, position of forest guards) • Market economy in forestry is not on the required level • Poor budget conditions at state level • Inadequate use of public good functions fund and other funds • Poor infrastructure conditions on state level and in the forests • Opinion that forest is resource to solve social problems on local level • Strong and negative local influence (political, economic, social) • Illegal activities • Low level of control
Opportunities	**Threats**
• Good forest resources • Valuable and important ecological resources • Development of public functions of forests • Development of business on non wood benefits of the forests (e.g. hunting tourism) • Market orientation of forestry business • Development of wood processing industry • Prospect on EU integration • Human capacity improvement • Development of international relations and co-operation • Rising resources from more market oriented forestry business	• Unsustainable forest management in some places • Little tendency to remove weaknesses as mentioned above • Strong and exclusive profit demand in private sector • Specifically profit oriented investment and influence on forest management (concessions)

Source: ÖBF/Coillte: Institutional support to state forest management companies, Final Report

5.1 Forest Sector Specific Issues

The forest sector is in a state of change and reform, generally into the right direction, but with some elementary problems:

- No inventory data are available at present, thus an objective control and situation analysis is impossible. Although the ministries and the World Bank strive to remedy this situation it will take at least two to three years, before countrywide inventory data will be readily available.
- Ratification of Forest law amendments still pending, this provides excuses for postponement of agreed but disliked decisions.
- There is no transparent roundwood market in place; this is in combination with strong local political influence on supply decisions.
- Forest Inspection is weak, understaffed and underpaid.
- Advance payments on logs of heterogeneous quality are asked and practised; this does not improve grading and sorting standards. This is paired with a scattered

and unreliable provision of paid lots and disables planning or undermines production security for sawmills and secondary producers
- There were cases of cancelled / corrected auctions if the original winner was not suitable / local
- Privileged dealers distort the market prices
- Reports highlighting illegal logging have raised scepticism of potential clients / investors, especially with final clients in high quality / price sector(see box below)

British timber trades journal on March 20th 2006: *Timber Company Joins Forces with Army to Help in Bosnian Campaign. ..... helping the British Army's Green Howard Regiment prepare for a six-month campaign in Bosnia to tackle illegal forestry and the crime that it supports.*

The Green Howards fly out to Bosnia on March 21 in the first campaign of its kind ever undertaken by the British Army. Timber is Bosnia's largest natural resource, ***yet more than 80% of logging is illegal - starting a chain of events that sees the majority of income from forestry disappear into the black market and organised crime****.)*

Although the figures are nonsense, the image that is transferred will not attract potential investors into such a reputation-risky environment. Unfortunately the counteractions to improve corporate reputation are still in its infancy with only three forest management companies being FSC certified (Livno/Kupres, Han Piesak and Sarajevo, all in Oct. 2006) . So currently export producers do not highlight the origin of their products and keep it as European product or refrain from a declaration of origin.

5.2 General Disincentives

Most investors have reported a general trend of improvement in the investment climate in BiH. This trend can yet be facilitated by the actions of the cantonal and entity governments and administrations. The Foreign Investors Council (FIC) of Bosnia & Herzegovina was established in July 2006 and will take up this task and is currently producing a Whitebook on BiH. Most of the general bottlenecks listed below are in the process of being addressed, yet the consultant has to mention what were the felt difficulties and potential risks for foreign investors. Naturally each company will have to screen their own undertakings and weigh the constraints against the opportunities.

The most frequently encountered difficulties are found in administrative and regulative sector:

- **Import taxes** (6-11%) on investments, components, resin, boards, etc., whereas final products, especially from HR and SCG are free of taxes. This effects the competitiveness of local products with a significant imported part, e.g. diapers.
- **Inconsistent handling** of re-export distorts local market conditions. Some cantons or municipalities have a flexible interpretation on the reimbursement of import taxes in re-export whereas others keep very strict to the letters of regulations.
- Registration delays due to **work overload at courts**. In addition lengthy and not transparent court procedures increase doubts on the rule of law
- **VAT introduction – reimbursement procedures** etc. were not yet harmonically handled and caused additional efforts / costs. This is expected to be settled within early/mid 2007 when all parties will have sufficient familiarity with the system and its applications
- Although new progressive legislation is introduced, old regulations are not always replaced by appropriate instructions; hence complication of procedures with **contradictory / concurrent / parallel regulations** occurs. Enforcement and execution of directives often fails.
- Unfavourable **local financing conditions** of JVs. This was detailed by the requirements for securities at banking side extremely high, the low valuation of physical assets, the poor local bookkeeping tradition (tax avoidance) and high risks in potential payment enforcement / recovery of liabilities.

6 INVESTMENT PROMOTION

The investment promotion initiated under this study was developed in close cooperation with FIPA, ETDI and USAID CCA as well as with the FIC and EBRD. It was agreed that FIPA the major source of information for potential investors and that all materials of the study should be channelled via the FIPA website. This study as well as the supporting Annexes will form the basis for that.

Recent relevant trends in investment in furniture / joinery / wood products and biomass energy / CHP are subject to USAID CCA activities and have hence not been intensified after the initial market assessment which is still valid. The most recent trend in an extreme demand of pellets has to be followed thoroughly and may bear opportunities for existing companies. Initial contacts were made and facilitated; further investors will be directed to FIPA.

A list of the different types of investor organizations and people that may be relevant to the wood / energy sector in BiH has been compiled for the invitations to the workshop in Vienna and for the facilitators also for Sarajevo; this list may be used by FIPA for other venues as well.
As investor information is normally confidential, the list of potential/interesting investors has been provided to FIPA, together with some assistance in contacting target investors. Most of the general information that investors normally require has been compiled in this report, yet the maintenance of databases, investment opportunities and sector descriptions will be a core task for FIPA

Two workshops were held to introduce the study results to investment facilitators and potential investors, one in Sarajevo on 21st September and one in Vienna on 2nd October. Both meetings were evaluated as successful by FIPA and EBRD, yet the number and interest of the participants may have to be increased in individual contacts with facilitators and potential investors. FIPA has got the basic tools to provide the relevant information and access to further expertise whenever it appears required.