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BioRES- Sustainable Regional Supply Chains for Woody Bioenergy

WORK PACKAGE 3:

Deliverable 3.1 Checklist for the selection of priority locations of new BLTCs in
Bulgaria, Croatia and Serbia



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Work package leader: REGEA

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BioRES project overview

BioRES aims at introducing an innovative concept of Biomass Logistic and Trade Centres (BLTCs) in Serbia, Croatia, and Bulgaria based on cooperation with technology leaders from Austria, Slovenia, Germany, and Finland. This will help increasing the demand for woody bioenergy products (processed fire wood, wood chips, wood pellets, and wood briquettes) in these countries and contribute to the achievement of EU targets set out in the RES Directive (2009/28/EC).

Objective of Work package 3

In Work package 3 BioRES identifies 15 priority locations for new BLTCs, assesses regional potentials for the production and use of woody bioenergy products, and initiates local stakeholder dialogues involving both producers and potential users of woody bioenergy products.

In this task (3.1) 10 operating BLTC/woody energy cooperatives in Austria (4), Finland (4) and Slovenia (2) are analysed. It resulted in the development of criteria (checklist) for the comparative assessment of potential BLTC locations in Bulgaria, Serbia and Croatia.

1. Biomass Logistic and Trade Centers (BLTC)/Wood Energy Cooperatives- Case Studies

1.1. Austria

CASE 1: Biomassehof Feistritz/Hamker

<p>Company (name, address, contacts, web)</p>	<p>Biomassehof Feistritz/Hamker Leithen 30 8262 Ilz</p> <p>Contact: Thomas Hamker Tel.: (+43 664) 300 96 55 Website: www.biomassehof-stmk.at</p>
<p>Why is this BLTC selected as good practise example?</p>	<p>This is a Biomass Trade Center with a special focus on high quality wood chips based on hard wood.</p>
<p>What are the main services of selected BLTC and target customers?</p>	<p>The Biomass Trade Center mainly uses wood from the own forest and from other local farmers. They mainly sell wood chips of high quality to local customers, but also log wood and round timber.</p>
<p>Technical description of BLTC (equipment, machinery, employees, quantity of wood fuels, etc)</p>	<p>The BLTC consists of one depot with a storage quantity of 1.500 m³ of wood chips. The BLTC also uses synergies with already existing facilities like a weighbridge and a dryer. The BLTC has a loader, tractors and tippers.</p> <ul style="list-style-type: none"> • Employees: 1 • Quantities per year: <ul style="list-style-type: none"> ○ 8.000 m³ wood chips ○ 150 m³ log wood (mainly beech for firewood)
<p>Financing and ownership</p>	<p>Owner: Thomas Hamker</p> <p>Investment costs: about 188.000€ for storage hall and storage place</p>
<p>Description of positive criteria for selection of this location</p>	<ul style="list-style-type: none"> • A lot of resources are available at this location • Short distance to the customers • Mr. Hamker is owner of a forest, which is in the radius of 10-15 km and supervises a forest where he gets the wood from. He is spezialiced on round wood (beech with 4m)
<p>Description of negative criteria</p>	<ul style="list-style-type: none"> • No good connection to rail-and motorway

CASE 2: Biomassehof Leoben

<p>Company (name, address, contacts, web)</p>	<p>Biomassehof Leoben Humusweg 4, 8712 Niklasdorf</p> <p>Contact: Martin Gaber Tel.: +43 664 88462548 Mail: martin.gaber@waldverband-stmk.at Website: www.biomassehof-stmk.at</p>
<p>Why is this BLTC selected as good practise example?</p>	<p>It is the Biomass Trade Center in Styria with the highest handling amount per year. They purchase the wood in the ATRO unity (absolute dry wood) and they have a very good transport connection:</p> <p>Short distance to the next Highway. The location is nearby the landroad and for all travelers visible.</p>
<p>What are the main services of selected BLTC and target customers?</p>	<p>The main products are wood logs and wood chips of different quality and kind. They also offer the service of thermal contracting, at the moment with no implemented projects so far. The BLTC provides a delivery service, but the customers can also pick up the products on their own.</p> <p>The customers are industrial businesses, municipalities as well as private households.</p>
<p>Technical description of BLTC (equipment, machinery, employees, quantity of wood fuels, etc)</p>	<p>The BLTC is operating in the buildings of an old saw mill. They have storage depots for their offered products and outdoor they have a huge asphaltic area. Also they have an office container.</p> <p>They own one loader, a weighbridge, a telescopic forklift, a dryer (oven) and a packaging machine (Posch Pack Fix).</p> <p>They also have a full automated system for carriers, where they can weigh the load on their own and get an automated generated bill of delivery.</p> <p>For other tasks like the chipping, they contract an external operator on demand.</p> <ul style="list-style-type: none"> • Employees: 1.5 One employee for the location, who does all the manuell work on this BTC. The other employe (0,5) is the coordinator, who does all the work of sales and marketing with the suppliers, product providers and customers. Also the leadership and the organisation. • Quantities per year: <ul style="list-style-type: none"> ○ 40.000 m³ wood chips ○ 600 m³ log wood
<p>Financing and ownership</p>	<p>Ownership: Forest association/Waldverband Steiermark GmbH 8010 Graz, Hamerlinggasse 3</p> <p>Th Waldverband has 14.000 members, thereof are 6.000 also suppliers to BLTC.</p> <p>Financing: The WVH GmbH is a SME. They invest their own capital.</p>
<p>Description of positive criteria for selection of this location</p>	<ul style="list-style-type: none"> • Good transport connection • Central location • Next to motorway (3-4 km) • Location between two larger towns with the scope of 150000 inhabitants • Cost savings through the acquisition of the old saw mill (hall,

	asphalic area were there)
Description of negative criteria	<ul style="list-style-type: none"> • The BLTC is near a housing area – problems with noise and dust • Authority procedures

CASE 3: Biomassehof Raabtal

Company (name, address, contacts, web)	<p>Biomassehof Raabtal Industriestraße 14 8321 St. Maragrethen an der Raab</p> <p>Contact: Manager: Franz Kien Tel.: (+43 664) 492 92 86 Mail: raabtal@biomassehof-stmk.at Website: www.biomassehof-stmk.at</p>
Why is this BLTC selected as good practise example?	This is a Biomass Trade Center with a special social focus on employment of long-time unemployed people from the region.
What are the main services of selected BLTC and target customers?	<p>The Biomass Trade Center buys round timber and wood chips mainly from local forestry businesses and from the forest association. They process these supplies to wood logs and wood chips of different quality and kind.</p> <p>The supply radius is max. 30km. This is one of the label-criterias to use the label Biomassehof-Stmk.at</p>
Technical description of BLTC (equipment, machinery, employees, quantity of wood fuels, etc)	<p>The BLTC consists of three buildings for processing of sustainable biofuels and to storage these. Also they have an office room. The total area of the BLTC is 18.230 m².</p> <p>The BLTC does not own a weighbridge, but they use synergies with a neighbouring biogas facility and co-use their weighbridge. They also rent a loader, as well as tractors from the biogas facility if needed. Furthermore the use the process heat of the biogas plant for drying the wood chips.</p> <p>The members of the BLTC also make their tractors and tippers available.</p> <p>In future they plan to buy a pelletiser.</p> <ul style="list-style-type: none"> • Employees: 1 + 3-4 long-time unemployed people from the region: <ul style="list-style-type: none"> - One managing director. - The other employees were long-time unemployed people which work for 6-8 months in groups for this BLTC. They work in forstry and on the BLTC. • Quantities per year: <ul style="list-style-type: none"> ○ 10.000 m³ wood chips ○ 500m³ log wood

Financing and ownership	Owner: Maschinenring and forest associatin Weiz Investment costs: about 275.000€ for hall, 2 containers, trailer and a few other small purchases 35.000 € were necessary to built an Ltd.
Description of positive criteria for selection of this location	<ul style="list-style-type: none"> • BLTC is located in an industrial area specialized on biomass • Cooperation with the biogas facility nearby • The biomass boiler producer KWB is nearby • Market co-operation through the local initiative "ZUERST" • Short distance to the customers • Good availability through the nearby motorway
Description of negative criteria	<ul style="list-style-type: none"> • Within the industrial area, the BLTC is a bit hidden • There are a lot of small local competitors (small private biomass suppliers) within the supply radius of the BLTC

CASE 4: Biomassehof Naturwärme St. Lambrecht

Company (name, address, contacts, web)	<p>Biomassehof Naturwärme St. Lambrecht Hauptstraße 62 8813 St. Lambrecht</p> <p>Contact: Manager: Michael Wallner Tel.: (+43 3585) 23 05 12 Mail: info@naturwaerme.at Website: www.biomassehof-stmk.at</p>
Why is this BLTC selected as good practise example?	<p>Because of its special function as Biomass trade centre, heating plant and heat supplier through wood energy contracting. They purchase the wood in the ATRO unity (absolute dry wood).</p>
What are the main services of selected BLTC and target customers?	<p>The main product is wood chips of different quality and kind. Also they offer split logs. They mainly buy local timber from the members of the cooperative and process this.</p> <p>The BLTC also offers the service of thermal contracting and provides a delivery service (i.e. they have a own woodchip blowing container to fill the storage in houses).</p>
Technical description of BLTC (equipment, machinery, employees, quantity of wood fuels, etc)	<p>For the delivery of wood chips they have a pumping dare, with which they can blow the chips into the storage of the customers.</p> <ul style="list-style-type: none"> • Employees: 1.5 • Woodchips: 3 500 m³, • Woodchips from brunches and treetops: 1 500 m³ • Split logs: 300 m³ • Kilowatt hours thermal heat: 8 million
Financing and ownership	<p>Owner: Cooperative Heat delivery cooperative/Wärmeliefergemeinschaft St. Lambrecht</p>

	Members: 14 local farmers and the Benedictine Abbey St. Lambrecht
Description of positive criteria for selection of this location	<ul style="list-style-type: none"> • The district heating is nearby • Short distance to the town St. Lambrecht • Central location • Good transport connection
Description of negative criteria	No negative criteria for this location.

1.2. Finland

CASE 5: Kuittila Farm CHP

Company (name, address, contacts, web)	<p>Farm-Scale Wood Energy Solution: Kuittila Farm CHP Jouni & Eini Korhonen, Salmenkyläntie 6, 75650 Nurmes http://www.efarm.fi/kohteet/e-farm-kuittilan-tila-nurmes/</p>
Why is this BLTC selected as good practise example?	<p>Kuittila Farm is a good example of a successful establishment of a small-scale heat and power production (CHP):</p> <ul style="list-style-type: none"> - CO₂ emissions has been reduced - Savings in energy costs: heat and electricity produced in the farm using wood chips is cheaper and improves the security of energy supply in rural area, where the farm is located. Kuittila farm`s aim is to become self-sufficient in energy - Job creation: Cooperative has created 5 direct jobs. Wood energy production and raw material procurement requires a lot of manpower. In Kuittila farm procurement two employees are needed for harvesting and forwarding of wood, one employee is needed for the transportation of wood chips, one employee is needed for chipping and the whole supply chain needs one manager for taking care of the entirety of supply chain. These five employees are generally enough when designing the supply chains of thinning wood. - Other environmental benefits: Harvesting small-size energy wood has also a positive effect on forest growth and local landscape.
What are the main services of selected BLTC and target customers?	<ul style="list-style-type: none"> - A company, Kuittila Power Ltd., was established to provide energy for the farm, and collocated engineering works. - Raw material procurement has been outsourced to a local company Karjalan Metsä ja Energia Ltd (Karelia Forest and Energy Ltd, http://www.kmeoy.fi/). KME Ltd is a local, knowledgeable and reliable partner that manages the energy supply chain from the forest to a plant.

<p>Technical description of BLTC (equipment, machinery, employees, quantity of wood fuels, etc)</p>	<ul style="list-style-type: none"> - The CHP plant is based on the gasification of wood chips. - The 140 kW (40 kW electricity and 100 kW heat) plant can produce annually up to 1200 MWh of energy. The heat from the gas and engine cooling is utilized in the farm scale micro heating network. - Woodchips are gasified to process gas (incl. CO, H₂, CH₄) that is used in combustion engine (AGCO Sisu Power). - The plant uses annually about 1400 loose cubic of wood chips that are dried by using natural drying and excess heat from the plant. - The plant has been designed and manufactured in Finland by Volter.
<p>Financing and ownership</p>	<ul style="list-style-type: none"> - The CHP-plant is being managed and owned by the 2 private entrepreneurs of the Kuittila farm - Plant finances its operations with the profits of the farm
<p>Description of positive criteria for selection of this location</p>	<ul style="list-style-type: none"> - Lot of unused forest bioenergy potential in region of North Karelia and Kainuu; A lot of resources available at this location - Technical solution available and cooperation with the boiler manufacturer: Kuittila farm wanted to have a simple and easy system to operate which consumed very little of their time. Wood was then the best solution for them. The other option for Kuittila farm may have been to use slurry from cattle and produce energy using Anaerobic Digestion (AD). Gas from the AD could have also been used for farm vehicles but during the investment decision making period, there were no proven AD system available for farm-scale plant. - Reliable wood procurement partner and good quality wood chips available
<p>Description of negative criteria</p>	<p>So far Kuittila farm CHP-plant has run without problems but it may face some challenges in the future:</p> <ul style="list-style-type: none"> - The biggest challenge is the wood energy mobilization and the availability of good quality chips. The plant needs high quality dry woodchips, mainly from thinning wood. - EU-RES directive may effect profitability and byrocracy, if they need to invest in the system on the origin of the raw material in energy production

CASE 6: Tuupovaara Energy Cooperative

<p>Company (name, address, contacts, web)</p>	<p>Tuupovaara Energy Cooperative, Pekka. K. Vatanen, http://www.jns.fi/energiaosuuskunnat/tuupovaara.html</p>
<p>Why is this BLTC selected as good</p>	<p>Tuupovaara Energy cooperative has a lot of positive effects</p>

practise example?	<p>on local community and environment.</p> <ul style="list-style-type: none"> - CO₂ emissions have been reduced in the area. - Savings for municipality: Replacement of heavy heating oil and increased income through cheaper energy and wood harvesting. Heat produced using wood chips is cheaper for consumers compared to oil. This increases wealth and community resilience. - Job creation: Cooperative has increased local employment and also advanced local entrepreneurship. As a result of cooperative's district heat production and increased energy wood harvesting 1-2 new jobs has been created. - Other environmental benefits: Harvesting small-size energy wood has also a positive effect on forest growth and local landscape.
What are the main services of selected BLTC and target customers?	<ul style="list-style-type: none"> - Tuupovaara Energy Cooperative is running both the local municipality-owned district plant and their self-owned district heating plant. - Cooperative members are supplying the energy wood for heating plants from their own forests. - Target customer is the municipality of Tuupovaara, in Eastern Finland.
Technical description of BLTC (equipment, machinery, employees, quantity of wood fuels, etc)	<p>Tuupovaara Energy cooperative has two heating plants:</p> <ul style="list-style-type: none"> - 0,6 MW, annual heat production of 2400 MWh and fuel consumption of 3400 cubic meters (loose) of chips and 500 cubic meters (loose) of sawdust - 0,5 MW, annual heat production of 1300 MWh and fuel consumption of 1900 cubic meters (loose) of chips and 200 cubic meters (loose) of sawdust
Financing and ownership	<ul style="list-style-type: none"> - Cooperative is being managed by a board and a chairman of the board, which also decides about new investments and using the profits. - Cooperative finances its operations with the profits from district heat production - Usually profits are used for running costs, new investments and also renovations of the plants - Surplus is shared between cooperative members. This encourages members to sell energy wood to the cooperative and acts as an incentive.
Description of positive criteria for selection of this location	<ul style="list-style-type: none"> - Potential markets and available forest resources in the area; municipality was willing to change from oil to renewable wood-based energy - Strong support from the municipaly officials: Cooperative was formed from municipality initiative and in got strong support later on from municipality officials and from local bank. Local bank and also local Centre for Economic Development, Transport and the Environment helped the cooperative with funding and investment planning. - Good project planning: Cooperative invested in their own district heating plant in 2001, which could

	<p>be seen as an example of good practice. They got consultation help from the Finnish Forest Centre and thorough project plan. They hired local contractors who they knew. This ensured that construction was kept in schedule.</p>
Description of negative criteria	<ul style="list-style-type: none"> - Community attitudes; Community's attitudes and views of new district heating plant project were very negative before the first district heating plant. This caused some ill-feeling in the community. Once the first plant was operational and people could see the actual results, attitudes changed quite rapidly. - Misevaluation of (storage) capacity; Cooperative first failed to evaluate their chip storage capacity and built too small storage space which made first winter quite difficult.

CASE 7: Eno Energy Cooperative

Company (name, address, contacts, web)	<p>Eno Energy Cooperative Urpo Hassinen http://www.jns.fi/energiaosuuskunnat/eno.html</p>
Why is this BLTC selected as good practise example	<p>Eno Energy Cooperative has a lot of positive effects on local community and environment.</p> <ul style="list-style-type: none"> - CO₂ emissions have been reduced by 5 million kg annually. - Savings for municipality: since the cooperative was established, municipality has saved over 2 000 000 euros and replaced over two million liters of heating oil annually. - Cheaper energy for consumers: heat produced using wood chips is cheaper for consumers compared to oil. This increases wealth and community resilience. - Job creation: Cooperative has created 5 direct jobs and about 7-10 indirect jobs and developed the markets for local energy wood. Most of the cooperative members are selling and also harvesting and chipping energy wood to the cooperative district heating plants. - Other environmental benefits: Harvesting small-size energy wood has also a positive effect on forest growth and local landscape.
What are the main services of selected BLTC and target customers	<ul style="list-style-type: none"> - Eno Energy cooperative produces district heat with local energy sources. Cooperative is also responsible for procurement of the woody biomass to the plant. Cooperative form was selected because it was seen as the best way to ensure steady, good-quality wood supply and sufficient professional skills of the people involved in the project. - Cooperative has three heating plants, built in 2000, 2002, and 2004. - Target customer is the municipality of Eno, in Eastern Finland.
Technical description of BLTC	<p>Eno Energy Cooperative has three heating plants:</p> <ul style="list-style-type: none"> - 0,8 + 1,2 MW, annual heat production of 6 500 MWh and fuel

(equipment, machinery, employees, quantity of wood fuels, etc)	<p>consumption of 11 500 cubic meters (loose) of chips</p> <ul style="list-style-type: none"> - 0,8 MW, annual heat production of 2 700 MWh and fuel consumption of 5 000 cubic meters (loose) of chips - 1 MW+1 MW (+ 1 MW oil boiler), annual heat production of 6 000 MWh and fuel consumption of 10 500 cubic meters (loose) of chips <p>Cooperative has created 5 direct jobs at the cooperative and about 7-10 indirect</p>
Financing and ownership	<ul style="list-style-type: none"> - Eno Energy Cooperative is a 50 members' community and well-known bioenergy cooperative in the region. - Cooperative is being managed by a board and a chairman of the board, which also decides about new investments and using the profits. - Cooperative finances its operations with the profits from district heat production - Usually profits are used for running costs, new investments and also renovations of the plants which are already 13 years old. - Surplus is shared between cooperative members. This encourages members to sell energy wood to the cooperative and acts as an incentive.
Description of positive criteria for selection of this location	<ul style="list-style-type: none"> - From the cooperative point of view, one of the biggest reasons to get involved and start the business in this municipality was to utilize available forest resources and make profits out of harvesting and selling energy wood. This would to increase demand and price competitiveness of energy wood locally. - Strong municipality support throughout the planning and implementation phase - Utilize available district heating markets (municipality was willing to change from oil to renewable wood-based energy)
Description of negative criteria	<ul style="list-style-type: none"> - In the planning phase of the first district heating plant there were delays due to discontinuity in government processes and support decisions. - In actual implementation phase minor delays occurred which caused the budget to exceed. - In the beginning the client base and markets were insufficiently mapped in one municipality where the cooperative invested.

CASE 8: Rajaforest Oy (Ltd)

Company (name, address, contacts, web)	<p>Rajaforest Oy (Ltd)</p> <p>Kiteentie 14 A, 82500 Kitee, Marko Uutela,</p> <p>http://www.rajaforest.fi/</p>
Why is this BLTC selected as good practise example	<ul style="list-style-type: none"> - Rajaforest Ltd has a lot of positive effects on local community and environment. CO₂ emissions have been reduced in the area.

	<ul style="list-style-type: none"> - Savings for municipality: Replacement of heavy heating oil and increased income through cheaper energy and wood harvesting and selling. Heat produced using wood chips is also cheaper for consumers compared to oil. This increases wealth and community resilience. - Job creation: Company that is operating in networking principle has increased local employment and also advanced local entrepreneurship. As a result of Rajaforest`s district heat production 1-2 new jobs has been created. - Operating with a networking principle has divided the company`s management structure and made it more democratic. - Other environmental benefits: Harvesting small-size energy wood has also a positive effect on forest growth and local landscape.
<p>What are the main services of selected BLTC and target customers</p>	<ul style="list-style-type: none"> - Rajaforest Plc is a medium-scale company operating in forest harvesting and small-scale bioenergy energy production. - Rajaforest is buying energy wood from local private forest owners and partners and subcontractors in the company`s network are sup-plying the energy wood for heating plants. - Company`s main goal is to have another area of business alongside wood harvesting and transportation, which would supports them and bring cash flow in bad times. - Company owns four district plants in Eastern Finland and also the district heating network in the area - Target customers are the municipalities of Kesälahti and Tohmajärvi, in Eastern Finland.
<p>Technical description of BLTC (equipment, machinery, employees, quantity of wood fuels, etc)</p>	<p>Rajaforest has four heating plants:</p> <ul style="list-style-type: none"> - 0,5 MW +0,2 MW +1,0 MW, annual heat production of 1700 MWh and fuel consumption of 3500 cubic meters (loose) of chips - 1,0 + 1,5 MW, annual heat production of 5 500 MWh and fuel consumption of 10 000 cubic meters (loose) of wood chips
<p>Financing and ownership</p>	<ul style="list-style-type: none"> - Rajaforest is operating on a corporate network basis, which means that the company is governed by its partners. - Company has one employee who runs the daily work. Management and the decisions makin is being done by a board and a chairman of the board. - Company finances its operations with the profits from wood harvesting operations and district heat production - Part of the finance from the profits of their other business functions. - Surplus is used within the company and are used for running costs, new investments and also renovations of the plants.
<p>Description of positive criteria for selection of this location</p>	<ul style="list-style-type: none"> - Potential markets and available forest resources in the area; municipality was willing to change from oil to renewable wood-based energy - Strong support from the bank throughout the planning and implemention phase; role of the local bank and how important it was that they understood the nature of bioenergy business in general.

	<ul style="list-style-type: none"> - Good planning and cooperation with the boiler manufacturer; The help and expertise received from manufacturer`s side speeded up the process although there was delays in the implementation phase.
Description of negative criteria	<ul style="list-style-type: none"> - Difficulties in communication: Cooperation with the municipality officials was difficult. - Miscalculations: Municipality and consultant failed to evaluate the potential client base and company was wrongly informed about the number of houses that are going to connect to the grid. Also a major industrial client pulled out of the project. These events resulted in relocation of the plant and recalculation of the boiler size. - Community attitudes: Community`s attitudes and views of new district heating plant project were very negative before the first district heating plant. Especially those residents who were directly affected by the district heating network were negative and those who were not, remained neutral. This caused some ill-feeling in the community. Once the first plant was operational and people could see the actual results, attitudes changed quite rapidly. - Delays: Because of unexpected problems on boiler manufacturer`s size and bureaucracy caused by the environmental authorities in the planning phase, the implementation delayed almost two years.

1.3. Slovenia

CASE 9: BLTC BIOMASA Nazarje

Company (name, address, contacts, web)	<p>Biomasa Nazarje d.o.o.,</p> <p>Krnica 52,</p> <p>3334 Luče</p> <p>Mail: info@biomasa.si</p> <p>WEB: http://www.biomasa.si/biomasin-biomasni-center-bbc-nazarje</p>
Why is this BLTC selected as good practise example	<p>This is the only larger center in Savinjska region. They have contracts with local forest owners for wood supply, and use wood remains from local wood processing industry.</p> <p>This is the only larger center in Savinjska region. They have contract with local forest owners for wood supply, and use wood remains from local wood processing industry. The BLTC was developed as a part of the company who sales and maintain heating boiler (devices) for biomass district heating systems and households. Biomasa d.o.o. offers whole spectrum of services, consulting and optimizing heating systems, develop and maintain large biomass district heating system and offer</p>

	<p>boilers for firewood, pellets and wood chips.</p> <p>They have own drying facility for woodchips with capacity of 1,000 kg/h, which take advantage of the heat from the cogeneration process – electricity and heat production.</p>
What are the main services of selected BLTC and target customers	<p>Main service of Biomasa Nazarje BLTC is providing biomass and whole aspect of services for local and regional biomass users. Aside of BLTC they maintain and sale heating systems. Their biggest clients are district heating companies, households represent smaller share of sale.</p>
<p>Technical description of BLTC</p> <p>(equipment, machinery, employees, quantity of wood fuels, etc)</p>	<p>50.000 m2 open areas for storage</p> <p>7000 m2 of covered areas for storage and production</p> <p>170,000 m3 natural dried wood chips per year</p> <p>80,000 m3 technically dried wood chips per year</p> <p>10,000 tons of pellets per year</p> <p>Transmission equipment for dosing and loading</p> <p>Equipment for supplying air</p> <p>Central control system - CNS to monitoring biomass quality and quantity</p> <p>2 flow drier for drying wood chips</p> <p>Flow facilities for the preparation of raw material for pellets</p> <p>Pellet mill, with a capacity of 1500 kg per hour</p> <p>Packaging device for packaging pellets into the bag</p> <p>Front loader Volvo (volume 14 nm 3)</p> <p>Front loader ICB (volume 3 nm3)</p> <p>Trailer Fliegl, with the push wall</p> <p>Trailer Fliegl with blow fan</p> <p>Chipper Bentele BBT 1500 (One of the largest mobile chippers in this part of Europe), Capacity of 400 Nm3 per hour.</p> <p>Chipper Eschlböck Biber 92 (capacity of 130 Nm3 per hour)</p> <p>5-10 employees depending on the season</p>
Financing and ownership	<p>Private owned company by an entrepreneur</p>
Description of positive criteria for selection of this location	<p>Location in forestry area</p> <p>Very cost efficient centre – Heat for drying woodchips, is by-product of cogeneration (electricity generator), Own electricity production from biomass (by wood-gasifier)</p> <p>Private investor</p> <p>Connection with local environment. Supply contract with local and</p>

	<p>smaller forest owners</p> <p>Connected with local wood processing industry</p> <p>The customer base existed before BLTC was opened, so they have secure market and good market position. The owner main activity is selling boilers and other heating equipment, for larger and smaller units - BLTC is connected with costumers of boilers.</p>
Description of negative criteria	Number of smaller users is limited. Location is away from more populated areas.

CASE 10: BIOFT d.o.o.

<p>Company</p> <p>(name, address, contacts, web)</p>	<p>BIOFT d.o.o.</p> <p>Visoko 39</p> <p>4212 Visoko</p> <p>Mail: info@bio-fit.net</p> <p>WEB: http://www.bio-fit.net</p>
<p>Why is this BLTC selected as good practise example</p>	<p>This center is located in central Slovenia. Origin of the company is from agricultural and farming activity. The owners abandoned farming and start investing in forest machinery, mainly for production of woodchip. Now they have own production of woodchip and storage areas in old-farm building.</p>
<p>What are the main services of selected BLTC and target customers</p>	<p>The main service is production and sale of woodchips, they offer whole spectrum of services including delivery, quality control</p> <p>Their main costumers are local district heating companies that have biomass boilers.</p> <p>Main source of biomass are forest companies, agrarian and pasture communities and larger forest owners.</p>
<p>Technical description of BLTC</p> <p>(equipment, machinery, employees, quantity of wood fuels, etc)</p>	<p>30.000 bulk m2 of storage facilities (mainly open)</p> <p>Forestry excavator YUCHAI YC35-8</p> <p>Forestry mulchers AHWI</p> <p>Articulated trailer Novotny LVS 5000</p> <p>Chipper Starchl 86 MK</p> <p>Chipper Silvator 2000</p> <p>Transport trailer with movable base MB Actros</p> <p>Schwarzmüller semi-trailer truck</p> <p>Volvo truck and trailer Hüffermann</p> <p>container trailer KRAMPE</p> <p>nine containers</p>

	trailer FLIEGL ASW 160 8 employees, one person manages the BLTC
Financing and ownership	Private owned company Private owned company by entrepreneur (normal person) who develop and execute business idea.
Description of positive criteria for selection of this location	Location in highly populated area. Most of the customers are from local environment. Self-production of woodchips Direct sale – without storage.
Description of negative criteria	Their main activity is still production of woodchips and cleaning after forestry operations. A lot of material is delivered to customers directly from forest. (green woodchips) They don't have supply contracts. They have limited space for storage.

2. Interpretation of operating BLTCs/woody energy cooperatives cases

The examples of BLTCs or Woody energy cooperatives from Austria, Finland and Slovenia which all are operating competitively highlight important factors which need to be considered for establishing BLTCs as regional hubs for woody energy value chain management. This resulted in the development of a list of essential criteria necessary for the selection process of priority locations for new BLTCs in Croatia, Serbia and Bulgaria.

All 10 case studies stress :

- **Sufficient biomass supply** covering the demands of current and future costumers in the region, keeping in mind the supply needs for material use e.g. plywood, paper industry and similar);
- **Sufficient storage capacity** for wood fuels, with option to install drying facilities
- **good access to transport infrastructure.**

The establishment of a BLTC is a commercial enterprise and thus in order to be competitive the following aspects need to be properly addressed:

- **Market for services/goods offered by the BLTC**, with consideration to competing other fuels
- **Investment/finance options** for the establishment of the BLTC

Additional aspects which are connected with the operation of BLTCs are related to the **social benefits** (new economic activity, ownership structures and job creation at the local level). Increasingly **sustainability** criteria of solid biomass utilisation are discussed for EU-regulations but presently local

consumers hardly ask for certified woody energy products verifying that the wood originates from sustainable forest management (i.e. certified forests and certified products, forest management planning, carbon footprint of energy investment).

3. Criteria Checklist for the selection of priority locations for new BLTCs in Croatia, Bulgaria and Serbia

In the assessment process for prioritising feasible BLTC locations and dialogue with local stakeholders and potential investors for BLTCs all listed criteria below need to be evaluated.

A) **Biomass potential** in the region (30-40 Km as orientation):

- (technically and economically feasible) availability of wooden raw material;
- sources of biomass (forests, plantation, wood processing industry);
- ownership structure of forests (private, state owned, church);
- suppliers and their location;

B) **Consumer market situation for wood:**

- Trade situation (which type of energy wood is mostly sold and used in region (logwood, woodchips, pellets...))
- customer readiness with buying capacity (in volumes) in the region (e.g. biomass heat plants or CHP);
- number and consuming biomass volumes of private consumers: households, business entrepreneurs;
- Existence of wood industry and suppliers? How is the regional wood market organised?
- Potential of market actors getting involved in BLTC development
- Characteristics of current marketing/branding situation for woody products

C) Price and supply structure of **competing energy supply** (natural gas, other renewables);

- Potential for fuel switch from fossil fuels to woody energy products

D) Number and **Composition of farmer cooperatives and forest owners/associations** in region interested in participating in the supply chain management and operating of BLTC; if there are, some of the important information about them are:

- size of the average forest/land plot possible for short rotation plantation;
- potential of annual raw material supply;
- available transport infrastructure;
- available mechanical equipment;

E) **Investment/Finance options** (local, regional, national, private-public)

F) Type of **current wood supply actions** in the region:

- Woody energy production (which products) ?, or only/mainly storage for private consumption,
- Existing trading routes?

G) **Features of possibly feasible location/plot for BLTC set-up:**

- Accessibility to suppliers and consumers – short distances – central location for suppliers and consumers
- Exposed surface (no adjacent residential area: noise/dust)
- As little as possible shading – good through ventilation, rather windy place should be preferred
- The location should be next to a city (visibility, accessibility, marketing)
- No adjacent waters (high air humidity)
- Next to good road network
- Existing Transport possibilities and alternatives in general
- Existing storage and/or processing facilities
- Current characteristics of wood delivery for energy purposes (quality, amount etc.)
- Accessibility option for trucks (e.g. street regulations / weight restrictions on bridges)
- Kind of available technical equipment
- Interested Entrepreneur personalities?
- Kind of legal permissions required for set-up of a BLTC consortia and description of required authority procedures; support by local authorities?
- Complexity of local/regional//national legal procedures relevant for BLTC set-up?
- Local acceptance by key actors?

H) Sustainability:

- Existing certified forests and operators (which certification schemes, figures about certified hectares and certified operators and trade)
- Availability of accredited certification bodies
- Potential of BLTC site for becoming a “flagship-project” with high public outreach for rural development and sustainability in the region

For identifying minimum five priority locations in each of the countries: Croatia, Bulgaria and Serbia the following essential criteria need to be fulfilled:

1. FINANCE OPTIONS: existing interest of private investors/local authorities
2. MARKET DEMAND: existence of consumers
3. KNOWLEDGE: existing awareness of the population
4. SUPPLY: existing potential from private forests (does not apply for Bulgaria) and existing supply chains