Sustainable Networks for the Energetic Use of Lignocellulosic Biomass in South East Europe

Description of Joint Pilot application 3:

Biomass Trade Center

to be implemented in
Styria, Austria,
Banska Bystrica, Slovakia and
Serbia

Content

1. Pilot factsheet

Pilot title: Biomass Trade Center		**Acronym:** BTC
Lead Partner: NFC/Slovakia	**Other partners:** PE Srbijasume /Serbia, HCS/Austria, WVS/Austria	**Area of intervention:** Timok area/Serbia, Banska Bystica/Slovakia, Styria/Austria
Pilot focus: process oriented, ICT, feasibility	**Start of implementation:** 4/2014	**Pilot duration:** 8 months
Budget:	**Target group:** Biomass traders, forest enterprises, forest owners	

2. Executive summary

A main problem in the forest sector in most SEE countries is the fragmented structure of privately owned small-scale forests. Although there is a large potential for timber utilisation in these small-scale forests, wood mobilization is generally low. One reason for the low mobilization rate are structural disadvantages such as a weak marketing position, low timber volumes per owner/woodlot, lack of forest management knowledge or difficulties in promotion. This leads to higher harvesting costs for individual owners which, together with lack of time for wood harvesting as well as aging forest owners, lead to low timber mobilization rates.

The aim of this pilot is the establishment of a Biomass Trade Center (BTC) resp. distribution center in Serbia and Slovakia. Styria will act as a distributor of knowledge and lessons learned, since BTCs are already a well-established concept in Styria. The idea behind biomass trading centers is the local marketing and distribution of forest biomass from small-scale forests owned by farmers/families to small private customers as well as to medium and large commercial end users. Biomass trade centres are business entities driven and owned by local stakeholders. The BTCs act as a coordination and distribution hub for the whole biomass supply chain from harvesting and transport to the centre, processing and storage of biomass to distribution to the end users.

In this pilot, the Austrian partners will provide knowledge on standardized procedures for acceptance of raw material and selling of biomass fuels as well as knowledge on quality management and control. Additionally, a use case for the automatic acceptance of round wood will be developed and tested at the BTC Leoben/Styria. Haulers will be able to deliver, weigh and unload the wood on their own independently from the center´s opening hours.

Key words: Biomass trade center, logistics, round wood, automatic acceptance, small –scale forests

3. Objectives

The aim of this pilot project is to connect small private forest owners to the buyers of biomass, in such a way that small owners generate additional income by delivering their wood to the Biomass Trade Centre as the intermediary in the sales to households and larger consumers. As no BTCs exist in Serbia and Slovakia, the joint implementation of the pilot will focus on comparative regional feasibility studies taking advantage of the experience and knowledge on BTCs of the Austrian partners Waldverband Steiermark, Holzcluster Steiermark GmbH and University of Natural Resources and Life Sciences Vienna (BOKU).

The feasibility studies will focus on the outline of expected improvements of the supply chain for woody biomass including production, transport, storage and distribution to the end user and will investigate the Potentials for an early inclusion and introduction of available ICT technology in the planning of BTCs in SEE. The Austrian partners will not only provide existing knowledge to the pilot, but also implement a small test case for the electronic acceptance of biomass at the BTC Leoben/Styria.

The introduction of automatized and standardized methods for all main processes at the new established biomass centers is another important aspect pf the pilot. Therefore the experience of Austrian partners will provide the necessary input on how to implement standards for handling and quality management of biomass. Transfer of knowledge obtained by Styrian BTCs as well as existing biomass logistics centers in Slovakia play an important role as well.

The proposed pilot concept consequently follows the knowledge obtained within WPs 3 and 4, through the selected SCORPs, SWOT analysis and knowledge of experts and stakeholders working in different areas of, biomass supply chains such as harvesting and processing of biomass, transport, energy production or research.

3.1 Additional Serbian objectives

The main objective is to connect small private forest owners to the buyers of biomass. The study should show how much financial resource, people and equipment are needed to build a Biomass Trade Center. It will be established whether there is an interest of forest owners and processors, as far as the quantity of biomass can engage in this way annually. Potential carriers of initiatives and development center for biomass will be identified.

The assumption is that PE Srbijašume with their financial, professional and other facilities will be interested in the development of this activity in the selected region. This is definitely a project needed to confirm and identify other potential stakeholders and partners in the business, such as local governments, forest owners associations and others. One of the goals of the project will be related to the motivation of potentially interested parties to establish a center for biomass, primarily by providing information about its importance and positive experiences that exist in other countries.

3.2 Additional Slovakian objectives

Pilot project specific objectives are following:

- Mobilization of usable regional wood biomass sources from the forests, non-forest lands and wood-processing industry, suitable for energy utilization
- Costs optimization for the biomass transport to the biomass trade centre
- Improvement of quality parameters of fuel biomass (granularity, moisture, heat value)
- Increase of the supply security for end users of fuel biomass
- Employment in rural areas through advanced, sustainable utilization of biomass
- Decrease of greenhouse gases by the fossil fuels compensation by biomass
- Costs optimization for the storage and distribution of fuel biomass

3.3 Additional Austrian objectives

The main objective for Styria, besides the distribution of knowledge, is to enable the delivery of round wood to the biomass trade center independently from the opening hours of the center. Therefore, fixed opening hours which are a main cost driver can be reduced, while at the same time a 24/7 service for the delivery of round wood is offered to forest owners and haulers.

The workers at the BTC are only employed part-time and therefore the BTC is not manned every day of the week. Those limited opening hours currently limit round wood deliveries to the short time windows when an employee actually is present at the center. By implementing this pilot concept, there won´t be fixed delivery times anymore. This will allow for forest owners and haulers to deliver wood any day and time of the week. Suppliers of biomass will get more flexibility in route planning, time management, and transport capacities.

4. Description of pilot application

4.1 Description of core application

The core application focusses on the establishment of a Biomass Trade Center in Serbia and Slovakia with all corresponding activities including comparative feasibility studies, analysis, cost assessments as well as planning and construction of the centers.

Another important part is the knowledge transfer from already existing trade centers or similar institutions in Styria and Slovakia. Austrian partners will provide knowledge for the implementation of such a concept while a few significant additional technical and ICT measures will be implemented in a Styrian BTC as well.

4.2 Description of country-specific extensions in Serbia

An important problem that arises in the biomass market in Serbia is the lack of interest of large producers to purchase firewood and biomass from private forest owners. The cause of this problem is found in the ownership situation of private forests in Serbia which is characterized by highly fragmented property. According to available data, in Serbia there are 0.5 – 0.8 million private forest owners, whose average lot size is only 0.34 ha. This fact clearly indicates the problems that discourage customers to establish a business relationship with such a large number of private owners. Associations of private forest owners, although noticeable in some areas, are not yet in a position to assume the role of sales intermediaries between producers and private forest owners.

Stakeholder connections between private forest owners and buyers for industrial purposes, as well as the establishing of a sales intermediary may create favorable conditions for better placement of wood that comes from private forests. In this direction, analyses should be carried out and a viability assessment of establishing a regional center for biomass - Biomass Trade Centre should be created. The aim of this pilot project is to connect small private forest owners to the buyers of biomass, in such a way that small owners would deliver their wood to the Biomass Trade Centre as the intermediary in the sales to larger consumers.

The result of the project would be a study of the potential for establishing a regional Biomass Trade Centre. This study would be done according to the expressed interest of private forest owners and buyers of biomass. The analysis would include the costs assessment of establishing the centre, the

necessary equipment, location and other elements that may be important in the decision-making by the investor. The study will be carried in the Timok region and in Eastern Serbia.

4.3 Description of country-specific extensions in Slovakia

In Slovakia, the concept focuses more on a distribution center for the delivery of a heating plant. The pilot project consists of the following component parts:

- Identification of available biomass sources in selected region
- Organization of the biomass harvesting and transport to the biomass trade centre
- Logistics centre technical solution
- Organization of the logistics centre performance
- Techno-economic and environmental assessment of the project implementation

The concept is based on obtained scientific and practical knowledge of supply chains, tested within existing logistics centres in Zvolen, Žarnovica, Hriňová and Ružomberok.

The supply area from which the biomass will be transported to the centre is defined by maximum transport distance of 80 km.

The planned annual capacity of the logistics centre is 170 000 tons of woody biomass. Biomass will be obtained from Forest (100 000 t) and non-forest land (20.000 t) Other lands (3000 tons), wood-processing industry: (90 000 t) as well as from energetically stands (30 000 t)

Technologies of biomass exploitation and transport will be proposed not to exceed the production costs 35 €/t. The price of the raw material purchase from the producers or owners is not involved in the costs. Total planned costs of purchase, exploitation and biomass transport to logistics centre range from 30 to 50 €/t. Capacity of the centres is proposed for creation of sufficient fuel stock for the supplies lapse compensation and increased consumption of end users during the winter heating period.

Technical solution is based on these basic requirements:

- Minimization of the fuel contamination by the mineral admixtures
- Utilization of natural drying effect for fuel moisture decrease
- Minimization of noise and dust formation
- Optimal space solution of the centre (biomass loading and unloading, handling, transport in the storage, chipping, biomass crushing)

Planned structure of input biomass will be mainly consisting of wood chips (70 %), the rest will consist of trunks, piece waste and sawdust (10% each). The total handled annual volume of biomass should amount to 230 000 m3 (85 000 t), total monthly volume of the fuel biomass: to19 000 m3 (7500 t) on average.

The maximum planned storage capacity of the centre will sum up to 11 000 t on 40 000 m².
Planned number of truck arrivals: 4200
The biomass will be stored in covered (Sawdust, slices and chips) and uncovered (trunks) storage areas in layers up to 4 m high.

Chipping:
Planned annual production capacity of the chippers in the centre: 30 000 tons (2 chippers with the minimum annual capacity 15 000 tons)

Biomass transport in the logistics:
Unload of the trucks conveying the biomass to the particular storages
Trunks and slices waste transport to the chippers and chips transport to the chips storage
Biomass expedition to the end users

Besides the logistics centre construction pilot project includes also biomass supplies of logistics centre and performance start within the first two years. Possible modifications and changes of the project may be influenced by the changes of biomass offer and demand, investor financial situation and end users requirements. Selected parts of the pilot project are alreaty tested in Bučina and Intech companies during 2014.

4.4 Description of country-specific extensions in Austria

Besides the role of knowledge distributer due its role as a forerunner in the field of BTCs, Styria will also implement an automatized roundwood takeover. This will be realized through some additions to the existing infrastructure at the Biomass Trade Center Leoben. The existing weigh bridge has to be expanded by an external computer terminal and video cameras for registration, along with the necessary software interfaces. The hauler will drive on the weighbridge when he enters the center, register at the terminal, unload the wood and drive over the weighbridge again, where the weighing note is automatically generated and a copy is printed through the terminal as a conformation for the driver.

The video camera will automatically take photo of the truck while it resides on the weigh bridge and the driver registers in order to identify the vehicle without doubt and to have a rough overview of the delivery. The wood will be unloaded in a special area for the automatic acceptance. The driver has to mark the delivery so it can be doubtlessly identified by the employees of the BTC. The next day an employee is present at the BTC, he takes a sample of the delivery for determination of the moisture content, which provides the basis for invoicing. Moisture content is determined by drying the sample in a drying kiln and weighing it before and after drying. Together with the automatically generated weighing note, the dry matter and respectively the moisture content of the whole delivery can be determined and the invoice can be created and sent to the supplier.

4.5 Innovative capacity

4.5.1 Serbia

The project implementation is based on two practical innovative activities. One refers to very modern production and use of biomass for energy purposes, while the second refers to the center of biomass that in such organizational and economic aspects did not exist in forestry of Serbia. Therefore, the project involves the transfer of knowledge and experience from other countries, who have significant experience in this field. Examples of good practice can be identified within the Foropa project and used in the process of knowledge transfer, which the project gains importance.

4.5.2 Slovakia

At the present state of biomass supply chains in Slovakia, the pilot project includes following innovative components:

- Communication system for employees at the distribution centre with producers and biomass suppliers
- Efficient solution for regional biomass mobilization
- Technical solution of the distribution centre and proposed organization of its performance
- Creation of new jobs in rural areas
- Efficiency increase within the stakeholders cooperation on regional level
- Flexible approach of public authorities (Government, relevant ministries)

4.5.3 Austria

The automatic round wood acceptance is a new approach in the biomass sector in Styria and therefore provides an innovative solution under the use of up-to date information and communication technologies.

4.6 Involved parties

4.6.1 Serbia

PE Srbijašume: Planning of pilot and coordination of activities and future holder of Biomass Trade Center
Bioenergy Point: potential greatest purchaser of wood biomass in the Timok forest area
Small forest owners: All private small-scale forest owners in the region will be interviewed to capture their interest in the pilot and as future suppliers of woody biomass and will therefore participate indirectly in the pilot.
External experts: Experts in the field of forestry and biomass utilization will be engaged for preparation of a study of the potential for establishing a Regional Biomass Trade Centre

4.6.2 Slovakia

Hornonitrianske Bane a.s. Prievidza: Biomass Logistics Centre future investor and lands owner , will provide employees for the Logistics Centre operation, is owner of 2 boilers for woody biomass

Forests of the Slovak Republic Banská Bystrica: Future principal supplier of fuel chips from the forest, able to supply 35 % of fuel biomass from the total planned capacity of logistics centre, will provide know-how for the chips supply

Bučina Zvolen: Knowledge transfer related to the biomass supplies from the wood-processing industry and non-forest lands. Cooperation in the biomass business is supposed. Company is testing selected innovation procedures, applied for the internal centre operation

Intech s.r.o Bratislava: Knowledge transfer related to the biomass supplies from non-state forests and other sources. Company is testing selected innovation procedures applied in the whole biomass supply chain ensured by the daughter company of end user. Long term cooperation is supposed.

CREST Banská Bystrica: Future project leader of Biomass Logistics Centre, will provide the support to future operator with the communication with commercial partners

National Forest Centre Zvolen: Authof of the feasibility study, responsible for the professional side of the project, construction and initial phase of the Biomass Logistics Centre operation

4.6.3 Austria

Holzcluster Steiermark GmbH: Planning of pilot and coordination of partner activities
Waldverband Steiermark: Planning of pilot and coordination of partner activities
Biomass Trade Center Leoben: implementation of pilot
Technology provider, Software company: provision of hardware and software components

4.7 Time schedule

4.7.1 Serbia

03/2014 – 05/2014 Planning and coordination
05/2014 – 10/2014 Study of the potential for establishing a regional Biomass Trade Centre
10/2014 - Consideration of the results

4.7.2 Slovakia

03/2014-04/2014	Planning and coordination
07/2014-10/2014	Assessment of wood fuel quality
09/2014	Test run

The establishment of the center will be carried out in 3 phases, depending on the financial possibilities of investor.

Planned activities during the 1st phase:

- Reinforcement of the area
- Construction of the access driveway
- Construction of covered sawdust storage
- Purchase of front loaders

Planned activities during the 2nd phase:

- Construction of covered storage of piece waste
- Chips production technology establishment
- Establishment of the system of inside storage conveyors
- Purchase of front loader

Planned activities during the 3rd phase:

- Construction of covered storage of chips
- Construction of covered storage of trunks
- Construction of socio-administrative building
- Reinforcement further area

4.7.3 Austria

03/2014-04/2014	Planning and coordination
04/2014-09/2014	Installation
09/2014	Test run

4.8 Financial scheme

	Cost [€]			
Factor	**HCS**	**WVS**	**PE Srbijasume**	**NFC**
FOROPA staff	3.800	3.000	15.000	
Equipment	2.000	6.000	5.000	
External expertise and services	9.900	-	15.000	
Total	**15.700**	**9.000**	**35.000**	
Grand total	**59.700**			

4.8.1 Slovakia

Investment plan of the logistics centre establishment has been approved by the Slovakian government in 2013, as one of the projects for employment retention in the region with planned attenuation of the brown coal mining.

Factor	**Cost [€]**
1st phase:	
Equipment and installation (construction works)	1 500 000
Equipment and installation (technologies)	500 000
Personnel (performance of the biomass centre)	320 000
Service, Experts	30 000
Totally 1st phase:	**2 350 000**
2nd phase:	
Equipment and installation (construction works)	500 000
Equipment and installation (technologies)	1 100 000
Personnel (performance of the biomass centre)	410 000
Service, experts	30 000
Totally 2nd phase:	**1 940 000**
3rd phase:	
Equipment and installation (construction works)	2 100 000
Personnel (performance of the biomass centre)	550 000
Service, experts	15 000
Totally 3rd phase:	**2 665 000**
TOTALLY investment costs (Equipment and installation)	**5 700 000**
TOTALLY personnel costs	**1 280 000**
TOTALLY Services, experts	75 000

Total	**7 055 000**

5. Expected outcomes and impact

5.1 Serbia

The main output will be a study of the needs, possibilities and justification of erecting a local Biomass Logistics and Trade Center (BLTC) that indicates how many financial, human and other resources are necessary for the establishment of such a center. Reports of the study will be published in Serbian and English language. The local population will be mobilized in order to take the initiative in the establishment of the local BLTC. This Biomass Logistics and Trade Center is expected to result in increased use of biomass, creating new jobs and economic prosperity of the region.

5.2 Slovakia

In the case of the planned construction of a biomass logistics centre, the following outcomes and impacts supposed:

- Mobilization (increase) of the regional biomass sources by 170 000 tons annually, in amount of 7 500 000 €
- Creation of 80 new permanent jobs
- Increase of the quantity and safety of fuel biomass supplies for end users in the region
- Decrease of the emissions production as consequence of the coal compensation by biomass
- Decrease of the production costs for the heat and electricity production, comparing to the present status
- Decrease of the energetic demand of the biomass production as impact of the production activities concentration (compensation of the liquid fuels by electricity, increase of the time utilization of the machines and equipment)
- Increase of the energetic value of the fuel biomass by natural drying within the Logistics centre storages

5.3 Austria

Since it will no longer be necessary that an employee has to be present at the BTC, deliveries are practically possible 24 hours a day, 7 days a week. The application of the pilot will broaden the delivery time for round wood and will allow suppliers to coordinate and manage their deliveries more freely and enables them to make more deliveries.

On the other hand, opening hours of the center which are one of the main cost drivers could be reduced and the manager of the BTC could focus on more important tasks.

6. Communication and dissemination plan

6.1 Serbia

Shortly before the launch of the pilot project, all potential stakeholders of the Biomass Logistics and Trade Center (BLTC) will be informed on the pilot project concept. Later on, in the course of developing a study plan on the needs, possibilities and justification of the existence of the BLTC, the

public will be duly informed in the following ways: through press conferences, web sites, workshops and the like. The primary target audience of communication and dissemination activities will be small private forest owners, potential buyers of biomass as well as the local government.

6.2 Slovakia

Pilot foresees two kinds of communication and dissemination activities:

"Standard" activities (press releases, press conferences, website, brochures, newsletters, conferences,…) and "smart dissemination" and knowledge management activities.

These tools will target both relevant stakeholders and any interested stakeholders of other regions. Pilot communication process objectives will be SMART: specific, measurable, achievable, relevant and timed.

Direct/primary target groups are:

- Relevant stakeholders
- Ministries, Public officials
- Other regional intermediary organizations: Chambers of Commerce, incubators

Pilot indirect/secondary target groups are:

- Consultants
- Research centres
- Entrepreneurs
- Employers organizations
- Trade unions

The knowledge produced and exchanged during the pilot project will be codified and made easily available via a Knowledge Base. The Knowledge Base will be systematically developed during the project, it will use the results and the experts' feedback to the topics discussed. Codification of this knowledge and making it attractive (e.g. short and understandable, no-nonsense articles) will still require a substantial effort.

The initial concept of the Knowledge Base IT solution will be prepared by selected company. Library of good practice inventory, existing reports and manuals related to the project's themes will be involved. NFC with CREST will take the responsibility of regular updates and relevant reports. Photos and Videos made during all phases of pilot will be uploaded in the Knowledge Base.

A list should be kept of all local, regional, national and European media coverage on the pilot project.

For press conferences, a complete attendance list (name journalist, type of media, volume of coverage) should be kept. The communication plan will be closely related to Schedule of planned activities of pilot, used communication tools will be meetings, written communication and ICT.

6.3 Austria

Before the implementation, current suppliers and haulers of BTC Leoben will be informed of the concept. Once the system is installed and working, suppliers will be instructed on the functions of the system, how it works and how to use it.

Once the pilot is implemented at BTC Leoben, a demonstration workshop will be held for operators of the other Styrian BTCs as well as other interested parties to inform on the advantages of the concept. Since the pilot might be of interest for operators of similar applications as well such as sawmills, pulp and paper mills or biomass heating plants, representatives of such entities will be invited to the workshop as well.