

## Description of pilot applications 2:

# Cartographic separation of the regional forest area based on predefined harvesting methods. Suitability for full tree utilization and description of the potential of harvesting slash incurred

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## 1. Pilot factsheet

<b>Pilot title:</b> Cartographic separation of the regional area based on predefined harvesting methods, suitability for full tree utilization and description of the potential of harvesting slash incurred		<b>Acronym:</b>
<b>Lead Partner:</b> TIS innovation park – Cluster wood & technology	<b>Other partners:</b> Slovenian forest institute, Ljubljana, Slovenia Transilvania University of Brasov, Romania Centre for Research & Technology CERTH, Greece	<b>Area of intervention:</b> South Tyrol, Italy Central Slovenia, Slovenia Centru Region, Romania Western Macedonia, Greece
<b>Pilot focus (service, resource etc.):</b> Information on resource	<b>Start of implementation:</b> 02/2014	<b>Pilot duration:</b> 02/2014 – 11/2014
<b>Budget:</b>	<b>Target group:</b> Forest owners, forest departments, forest planning departments, district heating plants, biomass traders, lobbying organizations, harvesting companies	

## 2. Executive summary

The forest and biomass sector has discovered a new, sustainable field of income over the past decades: the production of energy from wood by-products. Since the year 2000 the governments in the European Union have consequently supported the construction of biomass heating plants by public contributions. Due to this economic attractive conditions and the environmentally friendly resource wood, this field has been undergoing a significant boom in some regions like Austria, Germany and also South Tyrol. District heating plants have been built supplying villages or industrial areas with heat, but also private households, public buildings and enterprises have installed heating systems based on biomass.

Nowadays the constant supply of the energy production plants with biomass is a crucial aspect. In some regions the necessary amount of biomass exceeds the local available, so that the biomass has to be transported over far distances. But how much is locally available? And where? This pilot project aims to give answers to this two questions.

In a first step forest areas will be determined, where logging residues accumulate. This is the case when full tree method is applied: cable cranes transport the whole tree from the logging area to the forest road and then a processor is in use. But it also occurs when logging residues are extracted by other means. In a second step information about the soil quality will be gathered to define whether the extraction is possible without affecting the nutrient conditions of the ground or not. Last but not least, the information is displayed in maps and combined. Based on this cartographic information a new way of estimating the amount of sustainably usable biomass will be elaborated.

Key words: modern harvesting method, harvesting slash, harvesting residues, soil degradation



### 3. Objectives

The aim of this pilot project is to segregate the entire area of the project partners regions according to the technically exploitable forest area defined by timber harvesting methods and harvesting systems. As a result, surface statistics for the reference units land and forest administration units and a cartographic illustration will be available.

In addition, by overlapping the information of the forest area defined by harvesting method with location information (forest type map), the forest area suitability on a full tree utilization can be evaluated, quantified per reference unit and displayed cartographic.

In this pilot project, the following main objectives shall be achieved:

- Cartographic excretion of the forest areas according to the main timber harvesting methods or systems
- Development of a model of public support to sustainable forest management and biomass production in forests
- Assessment of the available forest biomass for its utilization for energy production in a social, economic and environmental sustainable way

#### 3.1 Additional objective for South Tyrol, Greece and Slovenia

- Cartographic excretion of the forest areas suitable to the full tree harvesting method

#### 3.2 Additional objectives - Greece

The cartographic excretion will provide an essential control device that guarantees consistency and accuracy of the forest area record. It provides policy makers with the tools needed to design sustainable energy models by means of cartographic excretion of the forest areas and provides support to biomass producers, forest owners and forest based companies and to local and regional authorities for the implementation of strategies for the promotion of forestry biomass and providing information about the suitable forest areas and the main harvesting methods to key stakeholders.

## 4. Description of pilot application

### 4.1 Description of core application and country/region specific extension

The pilot project is divided in the following steps:

#### 1) Definition of the main harvesting methods

The most relevant harvesting methods for the regions of South Tyrol, Western Macedonia and Central Slovenia have been defined as following:

- assortment method: harvester – forwarder
- round wood method: chain saw – hauler
- full tree method: chain saw – cable crane + processor

The Romanian Centru Region has defined the most used harvesting method as following:

- chainsaw + skidder
- chainsaw + animal extraction
- chainsaw + animal & skidding

This harvesting methods cover about 95% of the overall harvesting volume in the named regions.

#### 2) Definition of the forest area

For the definition of the forest area, a common understanding must be defined. It is suggested, that the definition is done according to the FAO criteria. The classification of the areas must be available in digital form. Furthermore, information about the forest communities and soil information must be available. Also in digital form. Ideally, forest site mapping or forest typing would be advantageous.

#### 3) Availability of road information

For the assignment of the different harvesting methods to the respective areas, information about the forest road network must be available in digital form.

#### 4) Digital terrain model (DTM)

Furthermore, for the assignment of the different harvesting methods a digital terrain height model must be available. Ideally, a resolution of 1m x 1m with additional information about coarse block locations should be available. Alternatively, better or poorer resolution can be applied.

#### 5) Definition of criteria

For every harvesting method, specific criteria about accessibility, terrain inclination, distance to forest road and costs need to be defined. An according table will be elaborated by the lead partner.

#### 6) Definition of the minimum required harvesting area

As for the various harvesting methods different transportation and operation costs arise, the minimum harvesting area needs to be defined. A calculation tool will be elaborated by the lead partner of the pilot concept and discussed with all interested partner regions.

#### 7) Segregation of areas where full tree method can be applied

Extracting the whole tree, also all the nutrients in the leaves and needles are extracted. As for several types of soil this might be inappropriate, a clear definition about the nutrient supply of the soil will be elaborated.

Special condition in Romania:

This has been defined as of not relevant for Romania. The application of full tree method as it is defined by specialty literature – extracting the trees after felling without further processing in the felling area – is forbidden by law. However the subsequently extraction of forest residues – branches, small wood etc. – is allowed.

#### 8) Declaration of the forest areas where full tree method is applicable

The declaration will be done by a 3-color-system (for example: red – orange – green). Red areas will display areas where the extraction of the nutrients is not sustainable, orange where the nutrient extraction can be possible but must be evaluated for every harvesting area separately and green where nutrient extraction is possible without negative effects.

Special condition in Romania:

This has been defined as of not relevant for Romania. The application of full tree method as it is defined by specialty literature – extracting the trees after felling without further processing in the felling area – is forbidden by law. However the subsequently extraction of forest residues – branches, small wood etc. – is allowed.

#### 9) Elaboration of the digital maps

Last but not least the digital maps will be elaborated, either with own personal or with a third party.

## 5. Innovative capacity

Elaborated digital maps with full information about the applicability of the most economic harvesting method, the areas where full tree method can be applied and the more specific information about soil characteristics have not been made yet. On the other hand, such information is very important for forest management, especially in the future when the question about potentials for biomass will rise. Based on the information elaborated in this pilot project, crucial decisions about the health of the forest can be made more easily. Regions where forest areas are mountainous and where harvesting is difficult and maybe connected to public contributions might also be very interested in such information, as it can be the groundwork for future planning.

### 5.1 Additional innovative capacity - Greece

Apart from the above, the pilot project utilizes, for the Greek side, an innovative community-based approach to harvesting methods and forest areas through the production of interactive maps. Additionally, this project could be important and helpful for potential bioenergy investors, as it will calculate the potentials for biomass and the most economic harvesting methods for the Region of Western Macedonia. Finally, since there are not enough examples regarding this kind of approach in the region, the project itself constitutes an innovative action that could improve the development of methodologies for reaching the aims proposed.

### 5.2 Additional innovative capacity - Romania

Delivering harvesting slash in accessible locations for further utilization as energy source is a key issue when dealing with the full recovery of wood. In Romania, harvesting slash is left in the forest, where it has to be placed in piles, usually involving (additional) great amounts of time expenditure. Furthermore, when one tries to use this slash for other purposes its extraction is not economically feasible anymore. However, a great interest has been shown lately in finding solutions in order to bring the forest residues in the economy, but little is known in Romania about how efficient is to actually extract the slash as well as if it would not be more efficient to use the full-tree harvesting method. Therefore, this project could be important as a decision making tool, as well as a beginning point in actually using the full tree harvesting method where no environmental burdens are in question. Also, there are no examples regarding this kind of approach in Romania and the project itself constitutes an innovative action.

## 6. Involved parties

### 6.1 South Tyrol

- TIS innovation park - Cluster wood & Technology, Bozen: Planning of Pilot in the Region of South Tyrol
- Local government – department of forestry, Bozen: provision of information on forest areas and harvesting technologies
- WLM, Innsbruck: elaboration of the cartographic material
- Wood harvesting companies: provision of information on harvesting technologies

### 6.2 Greece

- CERTH/CPERI: Planning of Pilot in the Region of Western Macedonia
- Regional Forest Agency of Kozani: provision of information on forest areas and harvesting technologies
- Hellenic Forests G.P.: provision of information regarding the “drawing” of forest management plans
- Forest Cooperatives of Western Macedonia: provision of information on forest areas and harvesting technologies
- Aristotle University of Thessaloniki, Department of Cadastre, Photogrammetry and Cartography, Faculty of Rural and Surveying Engineering: provision and elaboration of digital maps, G.I.S. based information etc.

### 6.3 Slovenia

- Slovenian Forestry Institute (SFI) – Planning of Pilot in the Alpine Region of Slovenia
- Slovenian Forestry Service (SFS) – will provide forest resources data
- Survey and mapping authority of the Republic Slovenia – will provide all cartographic databases for needs of PA
- Forest cooperatives present in mountainous (alpine) space (north-western part of Slovenia)

### 6.4 Romania

- Transylvania University of Brasov: Planning of Pilot in the Region of Western Macedonia, provision of information regarding the potential harvesting technologies, setups and equipment, elaboration of digital maps;
- PRIVATE FOREST DISTRICT PĂDURILE ȘINCII: provision of information on forest areas and forest management plans, provision of G.I.S. data.



## 7. Time schedule

02/2014 – 03/2014	First definition of criteria to be applied in the pilot application
03/2014 – 04/2014	Discussion of the content with the interested partner regions. Adoption of the criteria to the specific regional needs
04/2014 – 06/2014	Collection of the necessary data
05/2014 – 09/2014	Elaboration of drawings
10/2014	Publication of the results, workshops and dissemination activities



## 8. Financial scheme

### 8.1 South Tyrol

Factor	Cost [€]
Personnel	5,000.00
Equipment	
Installation	
External services	6,000.00
<b>Total</b>	<b>11,000.00</b>

### 8.2 Greece

Factor	Cost [€]
Personnel	6,000.00
Equipment	
Installation	10,000.00
External services	
<b>Total</b>	<b>16,000.00</b>

### 8.3 Slovenia

Factor	Cost [€]
Personnel	6,000.00
Equipment	-
Installation	5,000.00
External services	
<b>Total</b>	<b>11,000.00</b>

### 8.4 Romania

Factor	Cost [€]
Personnel	2,500.00
Equipment	
Installation	
External services	
<b>Total</b>	<b>2,500.00</b>

### 8.5 Overall summary

Factor	Cost [€]
Personnel	19,500.00
Equipment	
Installation	15,000.00
External services	6,000.00
<b>Total</b>	<b>40,500.00</b>

## 9. Expected outcomes and impact

The main outcomes of this pilot project are specific maps describing forest areas where harvesting methods based on environmental, economic and technical reasons are applicable as well as where full tree method can be applied. It will be possible to estimate the harvesting residues potential more precisely and give a useful tool to decide whether the extraction is possible, problematic or should not be done.

### 9.1 Additional outcomes - Greece

- Improve the potential of harvesting methods in the Region of Western Macedonia, by offering to stakeholders modern tools that allow for better planning, better updating of databases and better linking with other strategic tools.
- Help develop viable bioenergy investments by calculating the most economic and productive harvesting methods.
- Increase of incomes and productivity of involved parties through the definition of the optimized harvesting areas and methods.

### 9.2 Additional outcomes – Slovenia

- Provide maps for promotion of sustainable biomass extraction in mountainous region, that could be used by forest owners or forest companies working in mountain areas or it could be used as tool for Slovenian forestry service in process of forest management planning.
- Increase competitiveness of mountainous areas where wood extraction is more expensive.
- Give extra knowledge about deficit of nutrients after whole tree extraction in steep terrain where erosion processes are superior.

### 9.3 Additional outcomes - Romania

- Improving of wood recovery in Romania by offering modern tools for planning and estimating the costs involved by full extraction of wood.
- An improved approach in actually setup of a harvesting system and equipment.
- Income and productivity increments for involved parties.

## **10. Communication and dissemination plan**

### **10.1 South Tyrol**

After the pilot project has been finished, the results will be elaborated in a detailed report. If possible and if the project partners agree, the results might be published in some technical / scientific magazines. Workshops with interested groups will be organized. The information will be handed out to the regional forest planning department.

### **10.2 Greece**

The common project after its implementation will be ready to be used in the region of Western Macedonia and available to all stakeholders. The regional Forest Agencies can adopt it and it can be used by stakeholders as a tool. The pilot project will be presented in a workshop in the Region so as all involved parties (forest cooperatives and forest agencies, companies elaborating forest management plans etc.) will be informed about its operation and results.

### **10.3 Slovenia**

The pilot action results will be presented to relevant stakeholders at final workshop and other relevant promotional activities within the work of Slovenian Forestry Institute. Final report of the pilot activity will be spread around on the institute webpage and departments social media network where relevant stakeholders daily gets information's about department research and development work.

### **10.4 Romania**

The common project after its implementation will be ready to be used and available to all stakeholders which can use it as a tool. The pilot project will be presented in a workshop so as all involved parties will be informed about its operation and results. The results may be synthesized and published in a scientific journal.