

## Task 4.5 – Summary report – Pilot Projects

### 1. General description of the task Task 4.5

Pilot projects: Initiation/ prearrangement/ preparation of pilot projects in the range of biomass and bio energy production. This pilot projects/demonstration projects shall be developed to regional examples for practical energetic use of biomass. The demonstration projects are not only used to investigate biomass production opportunities, but also the opportunities of transport and use (surface productivity, analysis of locations, logistic, cluster, process chains, use of biomass, material circles). Some of these topics are already covered in Task 4.2 – so there will be a close co-operation.

In this very practical oriented task, we have 10 research institutions, 4 administrative bodies and 5 business representatives. It is planned to invest 67.28 man-months by all partners in total within the Task Pilot Projects. The first evaluation of pilot projects was done by 18 project partners with a total of 44 pilot project ideas.

At the WP Meeting in Hadeland from May 18-20, 2009, pilot projects were defined as projects with a main focus on innovation (new technologies). They create the basis for the demonstration projects chosen in each region. The main criterion for the demonstration projects will be the transferability. Within the meeting, a template for the project descriptions was developed to make the proposals comparable. This was sent out in two mailings one in June 2009 and a second mailing after the Mekri-Workshop in November 2009.

### 2. Methodology for the evaluation of the pilot projects

The target figure of pilot projects proposed was an average of 10 per region – ending up in 2 demonstration projects per region (projects which are good enough to transfer within the region and beyond. From these projects the best practices should be chosen by the task group.

3 representative best practices standing for the whole Bioenergy Promotion (BP) Project in total. The general criteria for the best practices are:

novelty (innovation)	- innovative level of the project
sustainability	- it is as defined in the “WCED 1987, Brundtland report” -
transferability	- is it transferable in all countries/Regions of the BSR
marketability	- is it useful for marketing (or is there nothing to see)
accessability	- is it reachable (do we have access to visit/Reach/see it)
coverage	- vertical- value added chain, horizontal – regional spread
implementation status	- what is the state of implementation – it is closed to be established or an idea?
Responsible bodies	- who implement the project – big business 1 point, small companies, regional administrations – 3 points

As the time is advanced and only 1.5 years to implement the project which is far away from the duration of investment decisions or/and from innovation cycles in the energy sector under normal conditions which is even sharpened by the current financial situation, it was agreed on the inclusion of both, completely new and recently finished projects in their regions as well. New projects and their preparation remain in the main focus for the project duration and the template will be also



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used to collect project ideas within the regions, projects which can be accompanied by the partners within Bioenergy Promotion.

For the new projects, the availability of biomass, funds and infrastructures will be essential, so Task 4.5 will build upon the Task 4.2 biomass assessment and 4.4 business and industry analysis.

The (pre-) feasibility studies will be brief rather general studies on the economic and technical feasibility of envisaged projects (problem of confidential information for investors).

The inventory + assessment of projects which is due in Mid-2010 will cover new projects as there will be also a report on existing industries within task 4.2.

The decision tool will be produced separately for each region as a marketing tool for the single business locations. It will contain information on biomass potentials, infrastructures, supporting structures and networks, stakeholders, technologies and incentives. The report on investment opportunities on the contrary is a joint report for all regions with a type of SWOT analysis and conclusions from the implemented projects.

The selection of pilot projects is a dynamic process – the partners will follow the developments in the single regions and add on new projects to our survey. For the best practices, an intensive promotion is planned, also an exchange of the project characteristics between the regions is planned to stimulate trade missions, presentations and exchanges.

During the second project period we have a basis of 44 pilot projects, which were evaluated with the above mentioned criterias.

There was the idea to evaluate also with the Matrix of Task 4.1 (1.1 = biomass from agriculture; 2.1 = biomass from forest; 3.1 = biomass from renewable biomass) and to choose for every subregion one pilot project means 18 subregions = 18 pilot projects.

### 3. 18 Regions- 18 Pilot projects

Partner no.	Partner institution	Man-months	Pilot Projects	Evaluated Pilot Project
2 (SE)	JiLU Tema Skog	2.5	2 projects	“Establishment of a BE demo-site in Bispgarden, Ragunda District”
3 (-)	Nordic Energy Research	0.25	no	
4 (DE)	Chamber of Agriculture Lower Saxony	5.43	3 projects	“Assessment methods for woody bioenergy from slash after thinning or final cuttings”
6 (DE)	Landkreis Nordwestmecklenburg	2	2 projects	“Expansion of the share of bioenergy in district heating and electricity supply network of the city Grevesmühlen (focus on biogas)”
<b>7 (DE)</b>	<b>Potsdam Chamber of Commerce and Industry (Brandenburg)</b>	<b>7.5</b>	<b>3 projects</b>	<b>“Energy independent village Feldheim”</b>
8 (DE)	University of Rostock	4	Cooperation with PP06	See PP 06
9 (DK)	Research Institute of Food and Resource Economics	1	7 projects, cooperation with PP35 and PP36	“Biodiesel- FT-biodiesel in Lolland”
11 (FI)	University of Joensuu	3	3 projects	“PELLETime”
13 (EE)	Foundation Private Forest Centre	6	2 projects	“Bioenergy village Kääpa”
16 (LV)	Latvian State Forestry Research Institute “Silava”	4	1 project	“Decision support for management of naturally afforested farmlands in the pilot region”
<b>18 (LV)</b>	<b>Latvia University of Agriculture</b>	<b>5</b>	<b>4 projects</b>	<b>“Investigations on production and utilization of biogas in Study and Research Farm “Vecauce”</b>
23 (PL)	Technical University of Koszalin	6	1 project	“Energy willow – the new way of energetic and economic development of the region”



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26 (BY)	Volkovisk Forestry Enterprise	2	1 project	"Production of fuel chips from logging residues"
27 (BY)	Grodno PLHO	5	2 projects	"General harvesting trials for gray alder of different ages/dimensions – development of integrated harvesting methods"
<b>28 (NO)</b>	<b>NFLI Norwegian Forest and Landscape Institute</b>	<b>3</b>	<b>9 projects with PP30</b>	<b>"Production of biodiesel from organic waste with focus on 2<sup>nd</sup> generation biofuels"</b>
30 (NO)	The Energy Farm	4		See PP 28
32 (SE)	Naturbrukskansliet, Region Västra Götaland	4	2 projects	"Fossil free Uddetorp" –fossil free school
35 (DK)	Region Zealand	0.3	Cooperation with PP 09 and PP36	See PP 09
36 (DK)	Roskilde University	2.3	Cooperation with PP 09 and PP 35	See PP 09
21 (LT)	Lithuanian Institute of Agriculture	-	1 project /no budget in task 4.5	"Grasses for energy": demonstration of species
22 (PL)	The Szewalski Institute of Fluid – Flow Machinery PASci	-	1 project/no budget in task 4.5	"From sewage sludge to green fuel – enrichment of low-caloric waste in the thermal treatment process in the Pomerania Voivodeship"



### Pilot project within the project Bioenergy Promotion:

**Pilot project 2: "Establishment of a BE demo-site in Bispgården, Ragunda District;**

**Demonstration plant describing regional energy supply at Älggårdsberget- Bispgården**

#### 1. Background

JILU Institute of Forestry is involved in the EU-financed; "Bioenergy Promotion" project which is a part of the "Baltic Sea Region Programme 2007-2013". The comprehensive purpose is increased knowledge and use of bioenergy in the Baltic Sea region. The task for JiLU Institute of Forestry is above all to collect information, create network, exchange of knowledge, and develop silvicultural methods etc concerning bioenergy in the Jämtland and Västernorrland counties. In the region it is very large biomass potential, with capacity to provide BE for other regions and also for export. Appr.



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95% derives from forestry, 4% from agriculture and remaining from other sources. This project will evaluate the possibilities to establish a demonstration plant which should provide information and knowledge about regional energy supply.

The facility Älgårdsberget conference centre in Bispgården is run by Kent Andersson since 1 August 2007 (Picture 1). Ragunda municipality owns the ground as well as the buildings and a lot of forests, ca 4.000 ha. Kent Andersson has a long-term deal with the municipality for the facilities and some of the buildings are rent by the Jämtland County Council, i.e. JiLU Institute of Forestry. During 2006 the old oil heater was converted to a heater using pellets and a silo of a volume of ca 25 m<sup>3</sup> was built. Though, the present energy capacity is not sufficient enough to meet the future demands.

## 2. Purpose and goal

In the last few years new ideas have been growing whether it would be beneficial to change the present energy system. The plan is to do a reconstruction and establish a demonstration plant showing a smaller, wood chip, district power plant, which would provide eco-friendly energy supply as well as being a centre of knowledge.

## 3. Local conditions

Bispgården is centrally situated in between the larger cities of the regions like Östersund, Sundsvall Härnösand and Örnsköldsvik. Älgårdsberget Conference Centre would in this sense function as an appropriate meeting place for people in the bioenergy sector.

During 2009 Ragunda municipality and JiLU Institute of Forestry have cooperated to evaluate alternatives or complement to the existing logistics to provide the energy resources. Some positive coordination effects would be possible between a demonstration plant at Älgårdsberget and the municipality's planned thermal power station in Bispgården, for instance deposition of wood chips and other logistics concerning handling of energy resources from forest into the heater. An increased utilization of the forest ownership to production of energy by the municipality would probably contribute to increased delivery reliability. Furthermore, there is a potential for great resources of wood from the all deciduous forest plantations when thinning at private owned plantations in the surroundings of the facility.

There is also knowledge about installations and equipment in the region.

### Design of demonstration plant

A wood chip heater should be placed in the garage at the centre and a culvert is located to the existing boiler room. To avoid connection of the existing system the culvert should connect to heat exchanger in the boiler room. The wood chip deposition will be built outside the garage. The new energy construction is planned to replace the existing pellets boiler. Investment cost are calculated to ca 110 000 euro without taxes. The energy efficiency should be a least 200-300 kWh. If the plant should provide adjacent buildings the capacity should be about 500 kWh which would increase the costs to 120 000 euro.

### Great supply of wood chips

The Ragunda municipality owned forests provide opportunities to increase the use of local raw material. Especially there are great volumes of potential renewable wood fuel which at the moment are little exploited along the Indal River. One of JiLU Institute of Forest's tasks is to convince forest



owners that the deciduously dominated young forests are resources instead of problem. In these cases silviculture should be planned with the purpose to increased volumes of bioenergy supply. An improved use of natural generated forest land might contribute to a great extent. In this sense it is important to develop improved methods for thinning from the establishment of plants to the felling of biomass and to develop methods to handle raw material for bioenergy where silviculture previously have been neglected. In the latter case the costs of logistics often is too high that it is uncertain whether it would be economically defensible to explore the energy resources from the forests. On the other hand it is in this kind of forest land the greatest unexploited resources of energy supply are available. An increased demand and price for deciduous wood chips would result in severely improved conditions. Furthermore, a more efficient handling in connection to exploitation of biomass from the forests is needed. However, it is of importance that measures in neglected deciduous juvenile plantations is made with a decreased demand for profits Comparisons should be made to the cost for thinning when the wood is left on the ground.

To be able to classify the possibilities to use the local energy resources as an alternative or complement to support system deliveries must be guaranteed. To achieve this, efficient entrepreneurs with knowledge about these circumstances must be engaged.

**Planned activities in the pilot project**

*Design of project; Engaged consult.*

*Visit to Energigården in Norway*

*Financing*

**Project Partner 4: Chamber of Agriculture Lower Saxony**

**Pilot Project No. 2: "Assessment methods for woody bioenergy from slash after thinnings or final cuttings"**

Pilot region                      Rotenburg (W) County

Regional biomass potential                      Woody bioenergy from slash

Description of the pilot project                      Although Woody bioenergy from slash after thinnings or final cuttings is a well-established process, the assessment or estimation of the amount and energy output under various conditions as

- Species
- Age
- Yield class
- Stand density
- Type of operation
- Intensity of operation
- top-cutting diameter

A possible output could be estimated ratios between the solid wood and the energy wood volume, which can be applied to forest inventory data.

Proposed promotion                      • Study of available literature

Target groups/partners to be addressed	<ul style="list-style-type: none"> <li>• Tests with stakeholder participation</li> <li>• Presentations and discussions in the framework of the regional network point at Rotenburg</li> <li>• Publication in regional media</li> <li>• Forest owners and their organisations</li> <li>• foresters</li> <li>• Municipalities</li> <li>• Entrepreneurs</li> <li>• Traders of fuel chips</li> <li>• End consumers of fuel chips</li> </ul>
Co-operation desired	Regions with existing data and experiences in this topic, e.g. SE and FIN
Current bioenergy situation	Slash is already used for bioenergy generation, but the regional data for availability are rather weak, which is an obstacle for investmmnets.
Possible pilot projects	Test harvests, results to be compared/added to already available information

**Project Partner 06: County of Nordwestmecklenburg**

**Project Partner 08: University of Rostock**

**Pilot Project 1: Expansion of the share of bioenergy in district heating and electricity supply network of the city Grevesmühlen (focus on biogas)**

Pilot region	Nordwestmecklenburg
Regional biomass potential	Agricultural biomass (cultivated), waste biomass from households, business, landscape, agriculture, (forest)
Title of the pilot project	I: Expansion of the share of bioenergy in district heating and electricity supply network of the city Grevesmühlen (focus on biogas)
Description of the pilot project	<p>Prerequisites: public utility company (natural gas and biogas plant) and natural gas and district heating network are available</p> <p>working steps:</p> <p>1. Analysis of the surrounding area:</p> <ul style="list-style-type: none"> <li>• cultivation potential NawaRo (silage maize, sugar beet, grass silage ...)</li> <li>• Availability of waste biomass to cofermentation (consequences for remuneration, approval, management)</li> <li>• cultivation potential KUP</li> <li>• HHS from the countryside (and road maintenance?)</li> <li>• wood residues</li> </ul>

	<p>2. Actual state analysis of the system:</p> <ul style="list-style-type: none"> <li>• Construction / technical description of the plant</li> <li>• utilization of the system</li> <li>• Current requirements / needs development</li> <li>• Technical / physical / financial opportunities of enlargement (biogas plant, wood chip facility)</li> </ul>
Proposed promotion	<ul style="list-style-type: none"> <li>• Climate protection guideline of Mecklenburg-Vorpommern (30 % of the planning cost)</li> <li>• EU-Structural Funds in Mecklenburg-Vorpommern</li> <li>• other</li> </ul>
Target groups/partners to be addressed	<p>Heat customers: administration, residents, craft heat-/energy suppliers</p> <p>Biomass suppliers: farmers, landscaping businesses, building yard of the city</p>
Current bioenergy situation	<p>possible (waste) biomass resources are not used (for instance: only approximately 20 % of the liquid farmyard manure are used in biogas plants for energy production), not all of the produced straw is necessary for the humus reproduction (soil fertility), not all of the agricultural area is needed for food and feed production</p>
Possible pilot projects	<p>I: Expansion of the share of bioenergy in district heating and electricity supply network of the city Grevesmühlen (focus on biogas)</p>

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**Project Partner 07: The Potsdam Chamber of Commerce and Industry**  
**Pilot Project 01: "Energy independent village Feldheim"**

Pilot region	Westbrandenburg, County Potsdam-Mittelmark, Village Feldheim belongs to City of Treuenbrietzen
Regional biomass potential (current use)	<ul style="list-style-type: none"> <li>• liquid manure from             <ul style="list-style-type: none"> <li>- pig 2,000 m<sup>3</sup>/a</li> <li>- cattle 1,500 m<sup>3</sup>/a</li> </ul> </li> <li>• energy crops like             <ul style="list-style-type: none"> <li>- maize silage 6125 t/a</li> <li>- rye (rough-ground) 650 t/a</li> <li>- ...</li> </ul> </li> <li>• wood (chips)</li> </ul>
Title of the pilot project	„Energieautarke Gemeinde Feldheim“ Energy independent Village Feldheim
Description of the pilot project	<p>General target: supply of the whole village with electricity and heating from an own system with a local district heating grid</p> <p>Situation:</p> <ul style="list-style-type: none"> <li>• Village Feldheim belongs to City of Treuenbrietzen (since 2002)</li> </ul>



- approx. 150 inhabitants

Actors:

- Local Politicians of City of Treuenbrietzen and Village Feldheim as project coordinator
- People of Feldheim
- Agricultural cooperative “Agrargenossenschaft Fläming” providing biomass
- Energiequelle GmbH for planning and construction

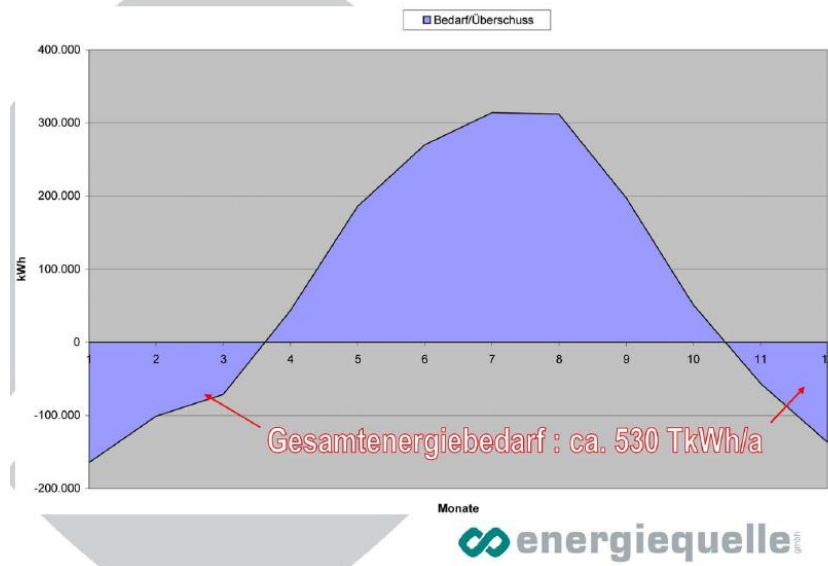
Particular targets:

- Biomass plant with 500 kW<sub>el</sub> and 553 kW<sub>th</sub> providing 3.67 M kWh/a of heat
- 43 Wind mills with an installed power of 74.1 MW approx. 148,000 MWh/a
- Solar park with 40 ha and 3MW<sub>el</sub> peak power
- Wood chip burner to cover gaps in heat supply during winter time

Local district heating:

- 1.6 M € total investment
- 3,000 € connection fee per household
- 45 out of 46 households connected (1 household had already installed a subsurface geothermal heating)

Current problem is the distribution of gaps and surpluses of heat:



Proposed promotion

Will be solved by the installation of a wood chip burner

Role model for small villages

- to become independent from energy providers
- to combine various forms of renewable resources
- to provide heat from bioenergy for domestic use
- to supply renewable heat also during peaks
- to provide renewable electricity for domestic use and for feeding the grid

- Target groups/partners to be addressed
- District and county politicians
  - Federal State of Brandenburg
  - other villages want to become independent
  - other regions want to become independent

**Project partner 09: Reserach Institute of Food and Resource Economics**

**Project partner 35: Region Zealand**

**Project partner 36: Roskilde University**

**Pilot project No. 3: "Biodiesel – FT-biodiesel in Lolland"**

*Technology:* Pyrolysis and Fisher-Tropsch process (Bio-FT). The technology consists as mentioned above of two processes: First a pyrolysis process which produced synthesis gas, and then a process where synthesis gas is converted into biofuels, the so-called Fischer-Tropsch diesel. This technology is rated very high in the EU RES-directive, since it can be produced with very high GHG displacement (95%). Denmark is much behind the requirements of 5.75% biofuels in 2010 and the subsequent requirement of 10% in 2020. The plant will with the large volume contribute relatively much to a Danish production of the required amount of biofuels.

*Biomass:* Expected utilization: 800,000-900,000 tons/year. The biomass is a mixture of the following: Straw from the region, wood waste and leftover from mainly the local forests, waste from wood industries, and as the most important bagasse, leftover from the sugar industry in Lolland-Falster. Around 530,000 tons of the bio resources will be available near by the suggested plant.

*Demonstration:* Three elements: *Firstly*, the bio-FT on biomasse is still on the demonstration level (see f.x. The Bio-FT plant in Güssing, Austria). Larger plants are going to be established Finland (wood) and in Schwedt, Germany (wood waste, short rotation crops and agricultural waste - straw). The idea with this plant is to participate in the European technological development by setting up a demonstration plant based on locally available biomass resources. *Secondly*, the development of local know how about this type of technology that can then be used elsewhere in Denmark and abroad. *Thirdly*, project will have multiple benefits, and among others create local income for the farmers from the bagasse, previously used as cattle feed, but now partly creating a waste problem in the area.

*Production:* Rough estimate 150-170,000 tons biofuel/year and several biproducts, among other biochar and chemicals.

**Project partner 11: University of Joensuu**

**Pilot project: "PELLETime"**

Pilot region                      North Karelia, Finland

Regional biomass                There are about 157 million cubic meters of growing stock in North



## Bioenergy Promotion potential



Title of the pilot project	PELLETime <a href="http://www.pelletime.fi/index.htm">http://www.pelletime.fi/index.htm</a>
Description of the pilot project	<p>PELLETime is a new Northern Periphery 2007-2013 project coordinated by the North Karelia University of Applied Sciences in Finland. Project will develop an accessible package of tools to design sustainable pellet supply chains, thereby promoting the role of local entrepreneurs in utilising local renewable energy resources and supporting the energy self-sufficiency of northern peripheral regions. The small scale production of pellets currently faces both technological limitations, as well as lack of knowledge. The project addresses those challenges by offering a holistic approach for SMEs reaching from identification and estimation of available resources, raw material procurement, and the design of the entire pellet production process to the final product.</p> <p>The duration of the project is 2008-2010</p>
Proposed promotion	PELLETime will encourage sustainable expansion of the raw material resource, and carry out widespread awareness raising and information dissemination to facilitate market development.
Target groups/partners to be addressed	SMEs in small scale pellet production
Co-operation desired	Cooperation will help to promote the concept of the project in other Baltic countries
<b>Project partner No. 13: Foundation Private Forest Centre</b>	
<b>Pilot project no. 1: "Bioenergy village Kääpa"</b>	
Pilot region: Kääpa village	
Regional biomass potential :	9 800 solid cubic meter (fuel wood and wood residues together); plus 36 000 solid cubic meter woody resources on grassland in the region



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Description of the pilot project :



The boiler house in Kääpa uses solid fuel wood. The feed-in is expensive, while the resource is cheap. The houses have no regulators for the supply of heat, which results often in overheating in winter time (especially in the recently isolated houses)

The idea is, that the local forest owner association/an interest group within the FOA in the region would own the boiler house, which should run with wood chips. Wood chips, produced by local entrepreneurs derived from pre-commercial thinning (+nature conservation/electric line maintenance), are used to produce heat (maybe energy) by the forest owner association/an interest group within the FOA. Local inhabitants buy this heat for a cheap price.

The cash flow will be locally, eventually new workplaces are created. The project is favoured by a strong support from the local authority. The local authority currently owns pipes and the boiler house and applies this year for a reconstruction of the pipes (ERDF investment funding). The FOA//an interest group within the FOA will try to apply next year for reconstruction of the boiler house. In the same run houses would receive heat regulator. The local authority agreed to hand over the boiler house to the FOA//an interest group within the FOA within some years.

The project would work towards wood mobilization (using unused wood resources from pre-commercial thinning in private forestry).

### **Project partner 16: Latvian State Forestry Research Institute “Silava”**

**Pilot project: “Decision support for management of naturally afforested farmlands in the pilot region”**

**Pilot region: Tukums region**

Regional biomass potential :

Total harvesting stock in forests – in average 132 thousands m<sup>3</sup> yearly, including 83 thousands m<sup>3</sup> in clear-cuts. Therefore total forest biomass potential in case of „business as usual“ is about 113 thousands t dry, including tops, branches and underground part of trees. Technical and economic availability of these resources isn't estimated yet.

Description of the pilot project :

Aim of the pilot project is to secure efficient utilization of land resources to provide supplies of roundwood and other goods as well as to ensure favourable conditions for carbon sequestration in afforested farmlands.

The scope of the pilot project is elaboration of land owner and forest consulting targeted decision making model for management of naturally afforested agricultural lands. The project consists of three parts:

1. building up of spreadsheet based model and

manual for decision making for management of naturally afforested lands;  
 2. evaluation of the model on the base of information about naturally afforested lands in the Tukums regions;  
 3. dissemination of the results in the pilot region within the scope of the dissemination activities.

Proposed promotion: The model, manual and report on implementation trials will be freely available from the LSFRI Silava website. Different approaches in management of afforested farmlands will be promoted during the workshops in the project region.

Target groups: Land owners, regional planning units, decision makers on distribution of fundings supposed to increase economic value of forests and to support afforestation of abandoned farmlands.

Co-operation desired Regional municipalities, forest owner organization, consulting services and any other intertesents at National level. Organizations working with regional planning issues and management of abandoned farmlands in countries facing with similar problems .

**Project partner No. 18: Latvia University of Agriculture**

**Pilot project: "Investigations on production and utilization of biogas in Study and Research Farm "Vecauce"**

**Pilot region: Auce municipality**

Regional biomass potential Area of Study and Research Farm „Vecauce“ - 2000 ha, number of cattle – 350. Main agricultural crops – cereals, corn, fodder grasses and legumes

Description of the pilot project Aim of the ongoing pilot project is to provide efficient co-utilization of cattle manure and plant biomass (mostly corn) silage for round year biogas production in cattle farm „Līgotņi“, in Study and Research Farm (SRF) „Vecauce“ of Latvia University of Agriculture. Biogas cogeneration plant operation was comissioned in the October 2008 and energy output reaches rated power (360 kW heat and 270 kW electricity in spring 2009. Facility is only biogas plant utilising agricultural plant biomass and manure for biogas production in Latvia at a moment. The project consists of following parts:

1. Realization of biogas production process from manure and biomass silage, and utilization of digestate in Study and Research Farm „Vecauce“ (LLU).

	<ol style="list-style-type: none"> <li>2. Analysis of input substrates in fermenter for maximization of biogas production;</li> <li>3. Analysis of output substrates for utilization of fermented digestate utilization for soil fertilization, that demonstrates the savings of costs on mineral fertilizers;</li> <li>4. Restructuring of sowing areas in Study and Research Farm „Vecauce“ (LLU) to provide both valuable fodder for livestock or raw material for biogas production.</li> <li>5. Investigation of operational parameters of biogas cogeneration plant;</li> <li>6. Assessment of economic and energetic effectiveness of biogas cogeneration plant operation within scope of Study and Research Farm „Vecauce“.</li> </ol>
Proposed promotion	Sustainable and cost effective technology for biogas production from agricultural biomass
Promotional measures:	<ol style="list-style-type: none"> <li>1. Including of acquaintance with biogas cogeneration plant in curriculum of LLU study practices;</li> <li>2. Providing of conferences, seminars and excursions on basis of SRF „Vecauce“ for all interests within scope of pilot region and whole Latvia</li> <li>3. Information will be provided in booklets and websites (LLU website and other)</li> </ol>
Target groups:	Students, authorities in agriculture and in bioenergy, farmers, entrepreneurs in bioenergy business
Co-operation desired:	Help with information on experience of similar biogas plants operation. Cooperation in investigations on advanced anaerobic fermentation processes and in evaluation of full life cycle for bioenergy production from manure and plant biomass
<b>Project partner No. 23: Technical University of Koszalin</b>	
<b>Pilot project: “Energy willow – the new way of energetic and economic development of the region”</b>	
<b>Pilot region:</b>	Commune Polanów and Bobolice The part of zachodniopomorskie voivodeship
<b>Description of the pilot project:</b>	<p>The project concerns the possibility of utilization of marginal soils about low class of quality. The utilization the different levels of organic fertilization - on base of sewer settlings as well as mineral. Within the confines of the Renewable Energy Research and Scientific Centre, research and scientific work is conducted on the Centre’s plantations:</p> <ul style="list-style-type: none"> <li>• No. 1 in Kościernica: area of 31.5 ha (Polanów Commune)</li> <li>• No. 2 in Kościernica: area of 21.5 ha (Polanów Commune)</li> <li>• No. 3 in Kościernica: area of 39.5 ha (Bobolice Commune)</li> </ul> <p>The research regarding the use of willow biomass also comprises the implementation process, i.e. co-combustion of willow chips with fine</p>

coal in the Town Heat Power Plant in Koszalin. Co-combustion commenced in the year 2008. A WR-10 type stoker-fired boiler is used for this purpose. The next step will be using the new method (the process of torification) to change the chips in to pellets. Its helps to improve economic cost of transport in the range of 200 km.

**Proposed promotion:**

- Catalogue of good practices
- Web side
- Local press
- Seminar and conference

**Target groups:**

- Local actors, governments, politics,
- Agricultural farms
- Powers stations
- Teachers, Students

**Co-operation desired:**

- Local governments, local power stations, local agriculture farms

**Project partner No. 26: Volkovisk Forestry Enterprise**

**Pilot project: "Production of fuel chips from logging residues"**

**Pilot region :** Volkovisk

**Regional biomass potential :**

Woody bioenergy from logging residues

**Description of the pilot project:**

Now after harvesting in the forest are still remain the logging residues such as branch, tree tops, wood that has no commercial value. Project envisages the creation of production for the collection and grinding of forest residues, which are currently not used (left in the forest) in the fuel chips. To this end, provides the establishment of the technological process. Steps for achieving this are:

To involve in the production of chips, wood waste that are not currently used;

create a project of the use the logging waste to develop the heat and electrical energy;

To teach professionals new technologies that are not available in the Republic of Belarus

Formulate recommendations for the use of waste timber and to make proposals to change the regulations; Will be developed and implemented the concept of using waste timber as an alternative to traditional sources of fuel;



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Acquaintance with packaging methods of logging residues;  
Compilation a concept of the use of bio fuels;  
Explore the possibility of using alternative energy sources;  
Conducting seminars on bioenergy;  
Creation of the project, promote the interests of bioenergy and expertise;

**Target groups:**

Foresters  
Entrepreneurs  
Nature conservationists

**Project partner 27: Grodno Region Forestry Board**

**Pilot project: "Assessment methods for woody bioenergy from removal of gray alder"**

**Pilot region: Grodno region**

**Regional biomass potential:**

Woody bioenergy from gray alder

**Description of the pilot project :**

Gray alder became a weed in many forest areas. Gray alder grows in inaccessible places, mainly in lowland rivers. Harvesting gray alder is very complex and time-consuming process, but it should be removed completely wherever possible. The use for bioenergy purposes can reduce the financial burden. Steps for achieving this are:  
Assessment of spatial distribution and extension  
Assessment of density, height, breadth.  
Estimate of specific and total energy content  
Planning of harvesting measures in accordance with parallel silvicultural measures.  
Harvesting test

**Proposed promotion:**

Tests with stakeholder participation  
Presentation and discussions  
Publication in regional media

**Target groups:**

Foresters  
Municipalities  
Entrepreneurs  
Nature conservationists  
End consumers of fuel chips



**Project partner 28: NFLI Norwegian Forest and Landscape Institut**

**Project partner 30: The Energy Farm**

**Pilot project No.4: "Production of biodiesel from organic waste with focus on 2nd generation biofuels"**

**Pilot region:** Hedmark and Oppland

**Regional biomass potential :** 200 000 MWh(F9). The amounts presented here represent the total production for both Hedmark and Oppland county.

**Description of the pilot project :** The household waste in the region of Mjøsa is recycled, and sent to Mjøsa processing plant (Mjøsanlegget). The plants have a capacity to process 14 000 tons of waste per year. They transform the waste into biogas and organic fertilizer. The waste is grounded, and boiled up to 138 degrees. After this it is pumped into a 2000m<sup>3</sup> tank that produce biogas. The gas produced in this first stage is mixed with the gas produced at the waste disposal. The gas produced is used to produce damp steam, which again is used to produce electricity and warm water. After the production of biogas, the liquid solution in the tank is filtered and mixed with garden waste. The result of this last step is a high quality organic fertilizer. By adding other types of organic material into this mix a new fertilizer for different purpose made available to the market. The combination of different processes is unique in this kind. The owner of the Mjøsaplant is Glør from Lillehammer (Glør is an inter-county company between Lillehammer County, Gausdal County and Øyer County), Hias iks from Hamar, and GLT-Avfall iks from Gjøvik. Glør is building up a biodiesel plant where the methane gas produce from the waste disposal will be used to produce synthetic biodiesel. This can be the first plant in this type in Norway. However, due to the lack of the external financial support the construction of the plant is delayed.

Glør is confident in the idea of producing biodiesel from biogas is the way to go. The technological aspect of producing biodiesel from biogas is well known but the structure and process back the company makes this project unique. More information about Glør activities is available in Norwegian at [www.glor.no](http://www.glor.no) These commercial plants have a high level of transferability among region and site. However, it is important to consider the cost and distance between the household and the plant. In the region of Hedmark and Oppland there are still areas where a project like that can be beneficial.

**Proposed promotion :** Biodiesel from organic waste  
**Target groups :** Research institutions and energy companies  
**Co-operation desired :** Research and Development



## Bioenergy Promotion



**Project partner No. 32: Region Västra Götaland, Naturbrukskansliet**

**Pilot project: "Fossil free Uddetorp" – fossil free school**

**Pilot region:** Västra Götaland

**Regional biomass potential:**

Calculations of potential shows that agriculture in Västra Götaland can take 5,2 TWh renewable energy without reducing animal production and remaining food production. This energy amount is enough to replace nearly 20% of fossil fuels and electricity within household and service sector. If agriculture due to changed price relations between provisions and energy should focus on energy production are there clearly bigger potentials.

**Description of the pilot project:**

One Second uppendary shool run by the region, Uddetorp, will try to be completely run without fossil fuels no later than 2011. This is done by using different bio energy vehicle fuels and test them on current vehicles. The heating is already fossil free.

The object is to show farmers in the area that it is possible to run tractors and other vehicles fossil free and to try to get tractor manufacturers to optimize the machines to run on bio diesel.

The project will try bio diesel in increasing amounts and the machines used in the study will be inspected at frequent intervals to insure that they do not break.

The results will be spread to farmers in the area in workshops held in autumn 2010.

The project is run in cooperation with the Energy farm.

**Target groups:**

Farmers in the area. Other partners

**Current bioenergy situation:**

The bio energy market I the region is increasing rapidly. The political ambition in Sweden is that by 2020 bio energy prodces 50 % of all energy.

Companies and organisations is beginning to find business opportunities in bio energy and the market is increasing rapidly.

**Project partner No. 21: Lithuanian Institute of Agriculture**

**Pilot project: "Grasses for energy": demonstration of species**

**Pilot region: Kaunas region**

**Regional biomass potential:**

Grass biomass

**Description of the pilot project:**

Aim of the project is to demonstrate potential of different grass species to produce biomass and to promote them as bio-energy feedstock. Demonstration plots with different grass species were established at the LIA' experimental farm. Quality of grass was measured at LIA and biogas production at the Lithuanian Agricultural University under laboratory conditions.

Demonstration plots with grasses were also established aiming biogas production and reduction of nitrate concentration in drainage and ground water. Measurements of biomass, estimations of energetic value, biogas production potential, drainage and ground water quantity and quality are performed.

**Proposed promotion:**

Resource efficient and environmentally friendly production of biomass for energy

**Target groups:**

Farmers, agribusiness, regional authorities, students

**Co-operation desired:**

Information support, especially video material on biogas production from grasses, as well as whole production chain.

From all chosen pilot projects the highest score goes to Project partner 28/30-Norway with 245 points, followed by PP07-Germany with 242 points and 3<sup>rd</sup> to Project partner 18-Latvia with 226 points.

**Project partner No. 22: The Szewalski Institute of Fluid-Flow Machinery – Polish Academy of Sciences/Baltic Eco Energy Cluster**

**Pilot Project: “From sewage sludge to green fuel – enrichment of low caloric waste in the thermal treatment process in the Pomerania Voivodeship”**

**Pilot region: Pomorskie Voivodeship**

**Regional biomass potential:**

Renewable energy sources, biomass in particular, constitute an opportunity for the region to improve its security of energy supply. This source is, so far, largely underutilised.

Among all the renewable energy sources, biomass plays the most important role in the Pomorskie Voivodeship.

There exist a variety of biomass sources, in the region. One of them is sewage sludge.

There exist 215 municipal sewage treatment plants in the Pomorskie Region and they produce sludge in the total amount of 33.6 thousand tonnes of dry mass. The amount of sludge that is gathered/accumulated on the area of the treatment plants, and is not used/applied in any particular way, amounts to 22 thousand tonnes of dry mass. [Environment 2008<sup>1</sup>, Central Statistical Office, Warszawa, Poland]. This definitely is a significant biomass resource, which additionally – needs to be managed and treated, since it cannot be dumped at landfills since 2008 - however the question is how to utilise it in the most efficient way, from environmental and economic point of view.

With the currently available technologies, it is economically justified to produce biogas only in bigger treatment plants, where the effluent rate is around 8 000 – 10 000 m<sup>3</sup>/24h, which is the limiting factor for a number of smaller wastewater treatment plants.

The biogas which is currently produced from sewage sludge in Poland has actually the biggest share in the current biogas production in the country, where the biogas from landfills and from waste (animal waste) are adequately on second and third place. But this ratio will be most probably much different after a couple of upcoming years, since so called agriculture-derived biogas is currently being advocated for and supported by national policy-making.

In principle, the problem is that the technology of production is not yet at the satisfactory level and the import of technologies is very expensive - to be attractive, technologies for energy and resource recovery must be affordable and cost-effective;

There still exist a number of barriers for the development of biogas production sector in Poland.

**Description of the pilot project:**

The utilization of the sewage sludge for biogas could serve as a potential alternative for composting, which is currently the only sewage sludge

management method applied in the Region.

Suggested pilot project assumes the optimization of a thermal treatment process aimed at upgrading of the calorific value of sewage sludge. The objective is to convert organic waste (sewage sludge) into fuel, which can be further utilized: either by direct combustion and as a feed-substrate for biogas producing plant.

Pilot project assumes two stages :

- 1) a laboratory scale installation,
- 2) a real scale investment,

both located in the Wastewater Treatment plant in the Pomorskie Region (*most probably in Przywidz Commune*).

**Proposed promotion:** The pilot project has a potential to become first demo-site of this promising technology not only in the Pomorskie region, but in the whole Poland as well. Needless to say, this creates opportunity to establish a bioenergy promotion educational site.

**Target groups:** Local Wastewater Treatment Plants,  
Biogas Producing Plants  
Energy Company

**Co-operation desired:** Co-operation on different levels would be needed:  
*(Local scale)*

- 1) co-operation with local stakeholders ie. Wastewater treatment plant as well as local authorities
- 2) co-operation with biogas producing plants
- 3) with producers of low-calorific fuel fired boilers

*(International scale)*

- 4) co-operation with partners with experince in the field

From all choosen pilot projects the highest score goes to Project partner 28/30-Norway with 245 points, followed by PP07-Germany with 242 points and 3<sup>rd</sup> to Project partner 18-Latvia with 226 points.