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Regional Networks for the Development of a Sustainable Market for Bioenergy in Europe

Biomass Action Plan for Salacgrīva Region in Latvia

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This report has been produced as part of the project BioRegions. The logos of the partners cooperating in this project are shown below and more information about them and the project is available on www.bioregions.eu.

The work for this report has been performed by Ekodoma Ltd. in collaboration with Salacgrīva municipality and Salacgrīva Tourism information centre.

Development of the regional bioenergy action plan

This document represents one of the five biomass action plans developed within BioRegions project. Action plans set framework for the promotion of renewable energy production and use in five European regions.

The action plan for Salacgrīva region (Latvia) was developed by Ekodoma Ltd. in collaboration with Salacgrīva municipality and Salacgrīva Tourism information centre. The aim of the action plan is to create framework for the support of concrete biomass projects in the target region, as well as to develop a wider strategy for regional energy supply with maximum utilization of the regions' biomass potential.

The content of the action plan is following, in Chapter 2 a general description of the region is given, followed by a description of the biomass situation in Chapter 3 and then followed by SWOT analysis in Chapter 4. This is followed by determination of regional bioenergy targets in Chapter 5. Chapter 6 lists concrete actions that should be undertaken to reach these targets, including short to long term actions. Chapter 7 lists the possible impacts of the actions taken and ends with a proposal of monitoring and evaluation of the progress of the actions in the action plan.

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1. Introduction

The European Union (EU) has committed itself to a binding EU-wide target to source 20% of energy needs from renewable energy sources (RES) by 2020. As a result, all EU Member states have proposed policy measures, such as, e.g., “feed-in” tariffs or green certificates schemes, to promote the development of renewable energy projects. Enabling development of biomass projects will require supporting activities at both local and regional level.

European rural areas concentrate the largest biomass potential but due to number of barriers at local level (e.g., biomass trade and logistics, lack of knowledge) the advantage of this potential is not being properly taken.

The Intelligent Energy Europe project BioRegions contribute to reaching EU renewable energy targets by proposing actions in five European regions, in more specific terms, by supporting the creation of five “bioenergy regions” in five rural areas of Europe. A “bioenergy region” aims to get at least one third of its heating and electricity needs (excluding transportation) from regional and sustainable bioenergy sources, with main focus on solid biomass.

One of the key activities of the Bioregions project is the development of five regional biomass action plans. The action plans show direction towards reaching regions` commitments and their main objectives are to:

- Support the development of efficient and reliable markets and transport chains for solid biomass in the five target regions;
- Increase the knowledge of local stakeholders in establishing biomass projects and all activities related to this development, and;
- Stimulate investments into bioenergy projects and trading businesses of local stakeholders.

Within Bioregions project regional biomass action plans have been developed for the following five European regions:

- Brumov-Bylnice & Slavičín region, a forested mountainous area located in the Eastern part of the Czech Republic at the border with Slovakia;
- County Westmeath, Ireland, an agricultural county located west of Dublin;
- Salacgrīva and Limbaži regions in Latvia, a densely forested areas north of Riga;
- Sredna Gora region, a forested mountainous area in Central Bulgaria, and;
- Le Trièves, France, a forested area at the foot of the Alps near Grenoble.

1.1. Background

Energy is one of the leading development topics for European countries forcing the EU to solve a series of challenges including the climate change and growing dependence on energy imports, energy deficiency and the availability of secure energy at an affordable price.

The EU implements an ambitious energy policy that covers all types of energy resources, ranging from fossil resources (oil, gas and coal) to nuclear energy and renewable energy sources (solar, wind, biomass, geothermal, hydro and wave energy), creating preconditions for new industrial revolution that can build low-energy economy, at the same time ensuring more secure, more competitive and more sustainable use of energy.

The EU has long been one of the leading actors fighting climate change in the international arena. Energy efficiency and renewable energy is an integral part of European energy and

climate policy. The EU leaders have set three key objectives to be attained by the year 2020 (also known as 20-20-20 targets):

- A reduction in EU green house gas emissions of at least 20% below 1990 levels;
- 20% of EU energy consumption to come from renewable resources, and;
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

National renewable energy targets for all EU Member States are described in Figure 1.1 below. Latvia has committed to increase the share of renewables in gross energy consumption by up to 40% in 2020. Achievement of this target will only be possible by implementing concrete actions at national, regional and local levels. Each planning level has its own specificity while energy planning at regional level is recognized as the most proper for promoting renewable energy and energy independence, as well as reducing environmental impacts.

So far energy planning in Latvia has been mainly done at State and at local level. At regional level there have been only few attempts trying to identify and forecast the possible development of the energy sector. No visible results giving positive impulse to other Latvian regions to perform similar research and to move towards sustainable development of the region in the future have been achieved.

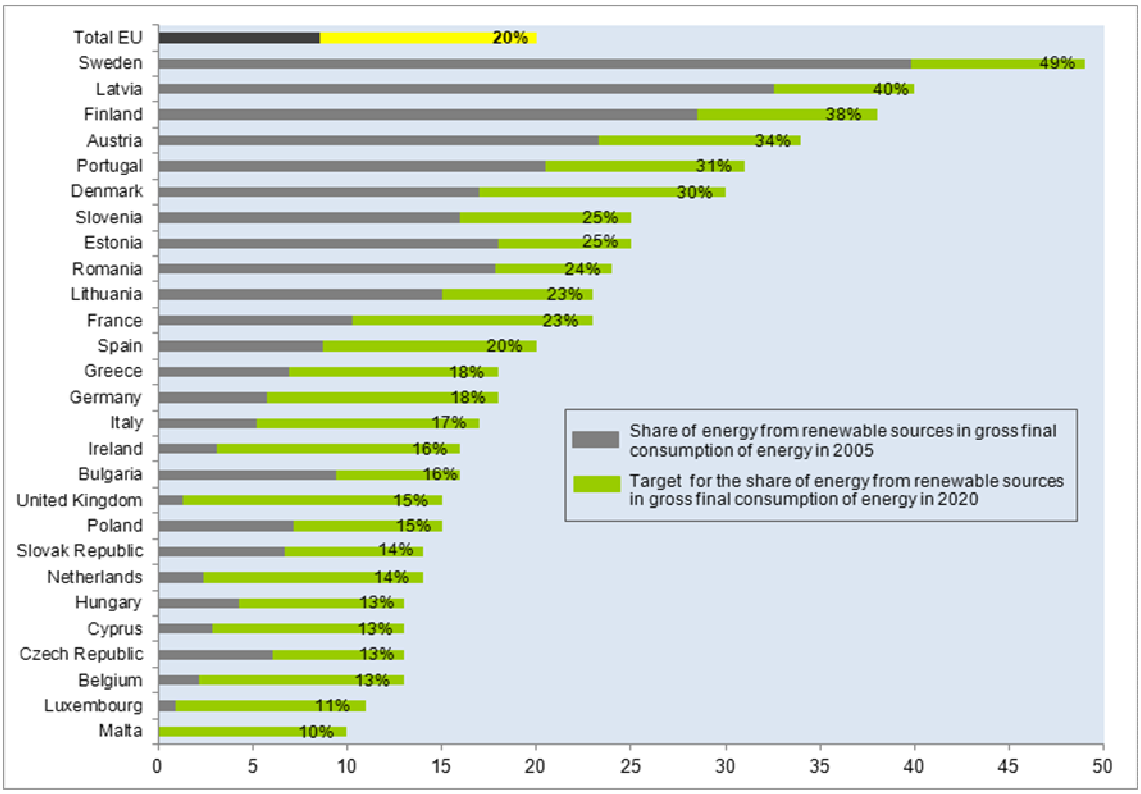

Figure 1.1.EU-27 renewable energy targets

1.2. Aims for the development of the action plan

The aim of the biomass action plan is to support effective and sustainable production and use of biomass resources at regional level in Salacgrīva region.

Biomass action plan for Salacgrīva region was developed by Ekodoma Ltd. in collaboration with interested parties and is available both in Latvian and in English.

The action plan was developed during July-December, 2011, and will be formally adopted by responsible authorities during Spring-Summer, 2012. Afterwards the first steps for the creation of the bioregion will be implemented.

The action plan will be updated periodically to adapt to changing framework conditions in the region.

1.3. Methodology for the development of the action plan

The action plan has been developed as a part of the international BioRegions project based on a model created by partners from experienced bioregions in Achental (Germany) and Jönköping (Sweden).

Data used for the calculation of biomass consumption and potential in the target region were taken from national sources (Central Statistical Bureau of Latvia, the Rural Support Service, the State Land Service, the State Forest Service, the Agricultural Data Centre and the State Employment Agency) and regional sources (Salacgrīva Tourism and Marketing Strategy Action Plan 2008-2017, Salacgrīva Port Development Program until 2013, Salacgrīva Green Declaration, Salacgrīva Climate Change Adaptation Strategy).The analytical section is followed by a strategic section defining objectives of the action plan, activities necessary for their achievement, and evaluation of possible impacts.

Quality control of the action plan is ensured by all partner organizations of the BioRegions project.

Definitions and abbreviations

Bioenergy	–	Electricity and heat produced from renewables energy sources
Bioregion	–	A region in which at least one third of heating and electricity needs is provided from regional and sustainable bioenergy sources
Cogeneration	–	primary energy transformation process where electricity and heat energy are simultaneously produced with facility specific power to heat ratio
Wood fuel	–	Wood materials of variety of size, moisture content, as well as origin used as fuel. E.g., firewood, wood chips, pellets, briquettes and wood residue
CCFI		The Climate Change Financial Instrument
DH		District heating
EE		Energy efficiency
ERAF		The *European Regional Development Fund*
EU		European Union
GMO		Genetically modified organism
LAD		The Rural Support Service
RES		Renewable energy sources

2. Target region portrait

2.1. General characteristics of the region

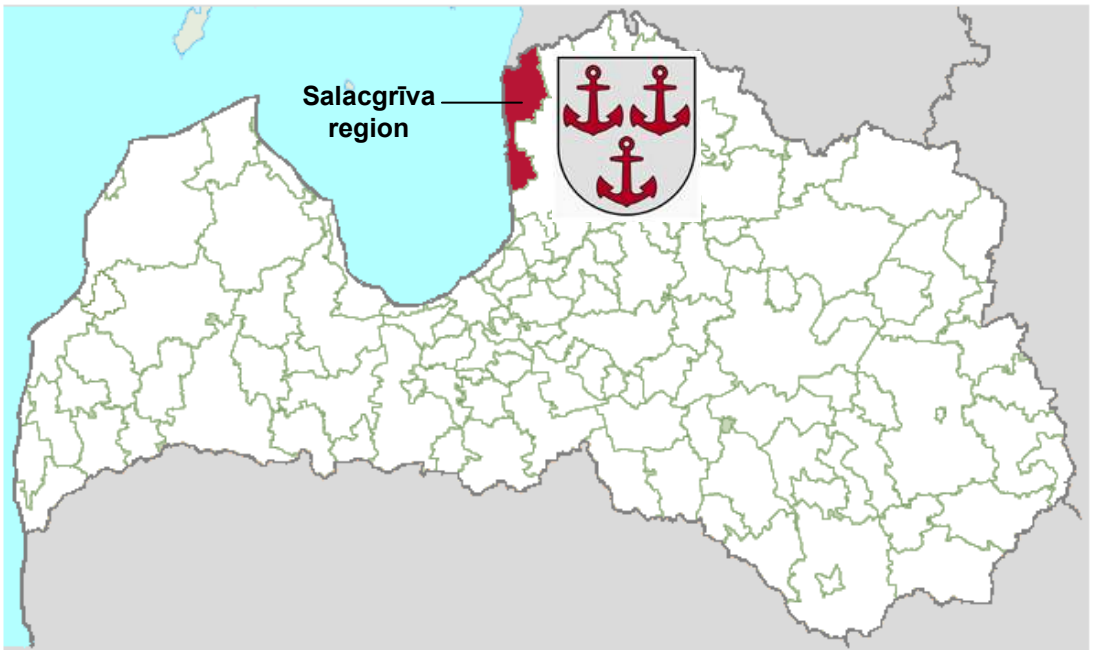

Figure 2.1.Location of the Salacgrīva region

Salacgrīva region is located in the north of Latvia, framed by the Baltic Sea in the west and the Estonian border in the north (see Figure 2.1). Its area comprises 637 km² in total, of which 61.9% are forested, 26.5% are agriculturally used and the rest of the area is subject to different uses. Five communities (two cities, three parishes) are summarized in the region with total number of inhabitants summing up to 9 300. More than a half of population (54.2%) lives in countryside.

As for its climate, Salacgrīva region (similarly like Latvia in general) belongs to the moderate climate zone with warm and moderately humid weather which is affected by the proximity of the Baltic Sea and warm air masses coming from the Atlantic Ocean.

There are two ports located in the territory of Riga planning region. The port in Salacgrīva is used for shipping while the port in Kuiviži is mainly used by fishermen.

The main income in the region is from agriculture and forestry, wood processing and food industry. The unemployment rate is around 10%.

2.2. Current energy situation

2.2.1. Current energy infrastructure

The whole territory of the target region in supplied with electricity by the joint-stock company Latvenergo. The region is located on the costs of the Baltic Sea and there potential for wind

energy production. Currently two wind generators with total installed capacity 1 MW are installed in Ainaži. The produced electricity is supplied for consumers in Salacgrīva and Ainaži cities and rural territories.

The region does not have an access to natural gas networks. For this reason heat energy is manly produced from biomass, leaving a small share for fossil fuels like diesel, heavy fuel oil and coal.

District heating in Salacgrīva region is provided in Salacgrīva and Ainaži cities and Liepupe parish. There are two district heating wood chip boiler houses in Salacgrīva. In 2010 for the first time in Latvia a district heating system with sea heat pump (capacity 1.1 MW) was installed. The new system supplies heating for Salacgrīva secondary school, kindergarten and technical premises. It is planned that the new system will produce 1 736 MWh annually.

2.2.2. Current energy supply and consumption

2.2.2.1. Heat energy

Biomass consumers in Salacgrīva region are grouped into three sectors: households, enterprises, and public institutions.

Households

Data on household fuel consumption in Latvia are collected at national level. The information aggregated by the Central Statistical Bureau of Latvia for the year 2010 shows that the most widely used energy source in Latvian households is wood fuel. Most popular type of wood fuel is firewood (88.0%), which is followed by wood residue (6.1%), briquettes (4.6%), and pellets (0.7%) (see Figure 2.2).

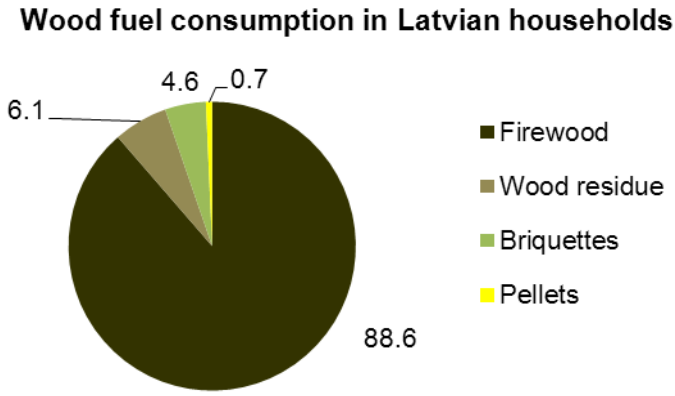

Figure 2.2.Wood fuel consumption in Latvia[1]

Firewood (wood logs) is mainly burned in room stoves and kitchen stoves (65.2%) with average age exceeding 25 years; central heating furnaces are used in 8.2% of all households. Wood residue and briquettes are mainly burned in room stoves and kitchen stoves but pellets are used in room stoves.

Wood fuel consumption in household sector in Salacgrīva region was calculated based on national statistics about average fuel consumption in Latvian households and make 11 774 MWh or 42 TJ (see also Figure 2.3 below).

[1] Data source: Central Statistical Bureau of Latvia, 2010

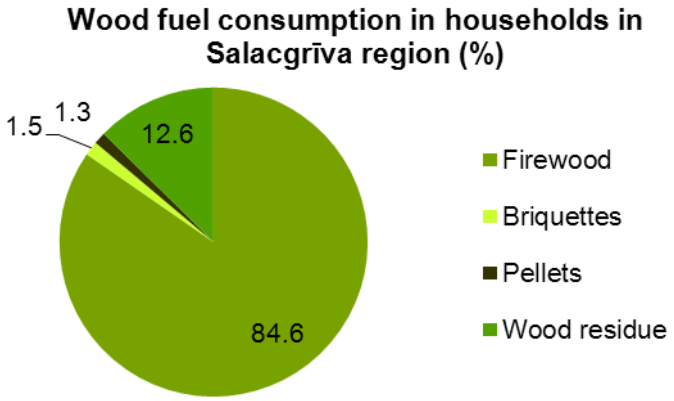

Figure 2.3.Wood fuel consumption in Salacgrīva region households (%)

Industry and services

Total installed capacity in industry and services sector[2] in Salacgrīva region is 12.6 MW. The larger consumer is Brīvais Vilnis JS with the installed capacity 7.1 MW. Total energy consumption in industry and services sector is 20 480 MWh or 74 TJ. The share of wood fuel makes 83% of the total energy consumption and is 16 960 MWh (see Figure 2.4).

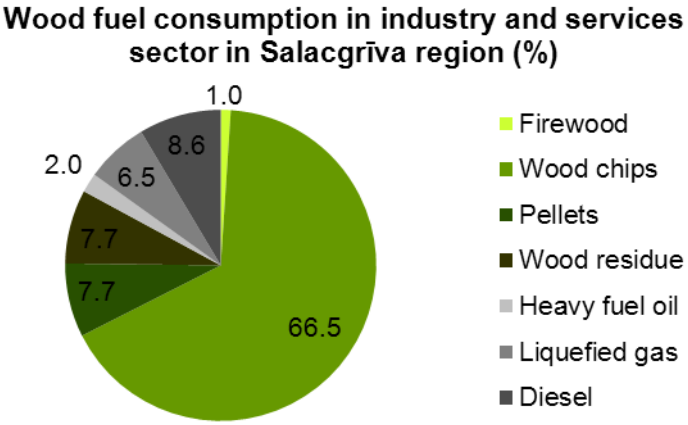

Figure 2.4.Energy consumption in industry and services sector in Salacgrīva region

Local authorities

Local authorities include municipality owned buildings like schools, kindergartens, libraries and other public buildings. Total installed capacity of public consumers is 2.2 MW. Heat energy consumption in public institutions is 1 453 MWh or 5.2 TJ. The share of wood fuel is 57% (831 MWh).
Large part of public buildings is owned by the municipality and in these buildings energy efficiency improvement measures are implemented more often. Energy resource consumption in public institutions is illustrated in Figure 2.5 below.

[2] Calculation of energy consumption in industry and services sector is based on available information about fuel consumption in companies that are obliged to submit data on annual fuel consumption for national statistics

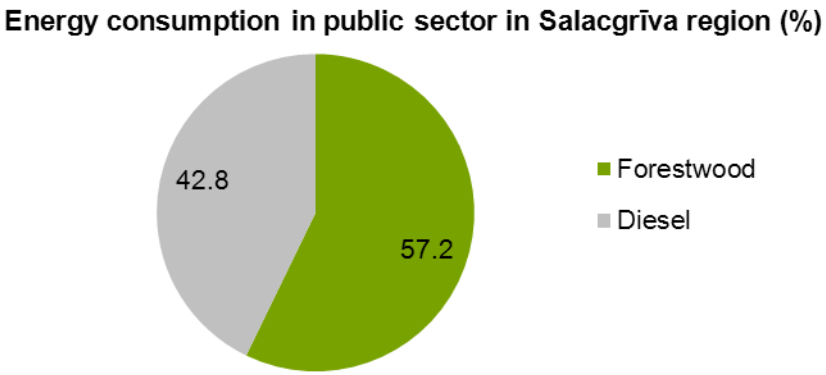

Figure 2.5.Energy consumption in public sector

Figure 2.6 illustrates the structure of wood fuel consumers in Salacgrīva region. Wood fuel consumption is characterized in Figure 2.7.

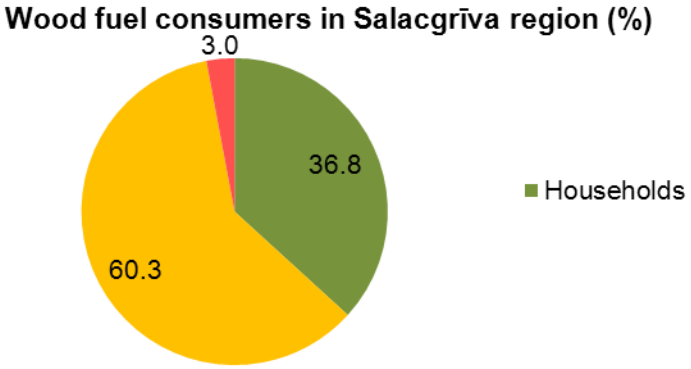

Figure 2.6.Heat energy consumers in Salacgrīva region

In Figure 2.6 it can be seen that the largest heat consumer in Salacgrīva region is the industry and services sector, which is followed by households and public buildings. Figure 2.7 shows that mostly wood chips are used for heat energy production in the region, followed by firewood and wood residue. Wood briquettes are rarely used.

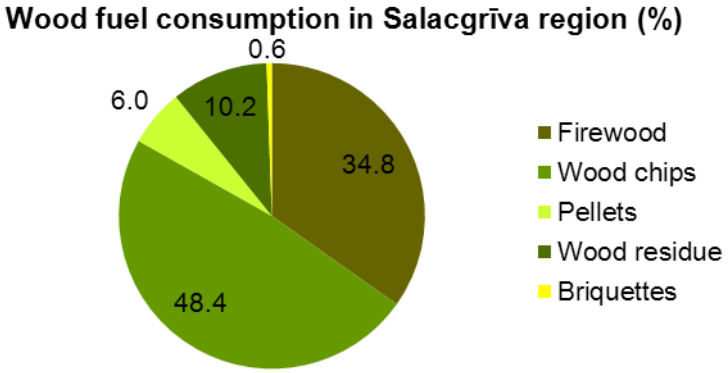

Figure 2.7.Wood fuel consumption in Salacgrīva region

Fuel consumption in industry and services sector, as well as public sector in Salacgrīva region is illustrated in Figure 2.8 below.

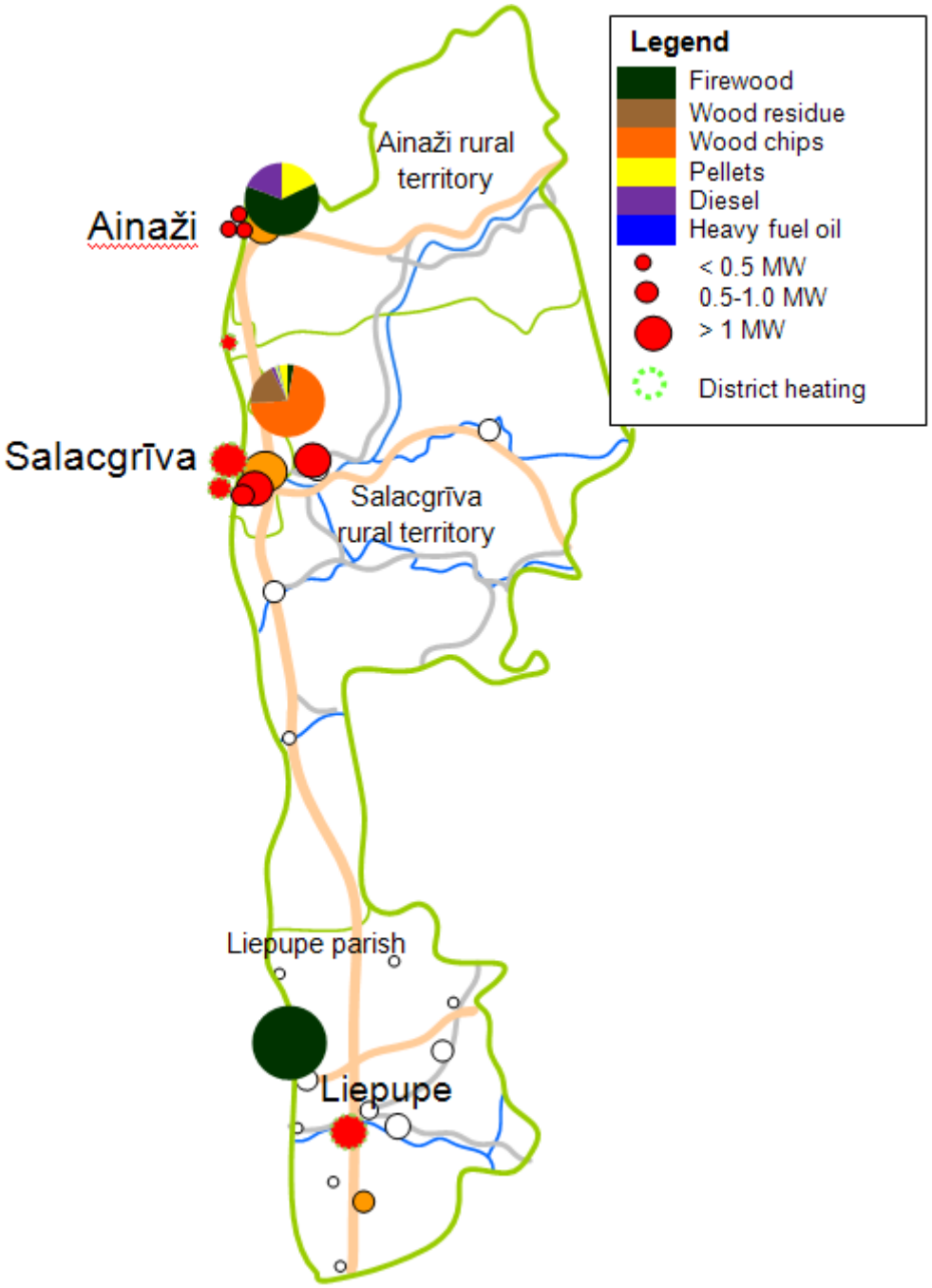

Figure 2.8.Fuel consumption in Salacgrīva region

2.2.2.2. Electricity

According to data on electricity consumption in Salacgrīva region[3] the largest part of electricity consumers are in group with electricity consumption not exceeding 100 kWh per month (see Figures 2.9 and 2.10). Total electricity consumption in Salacgrīva region is around 760 MWh per month.

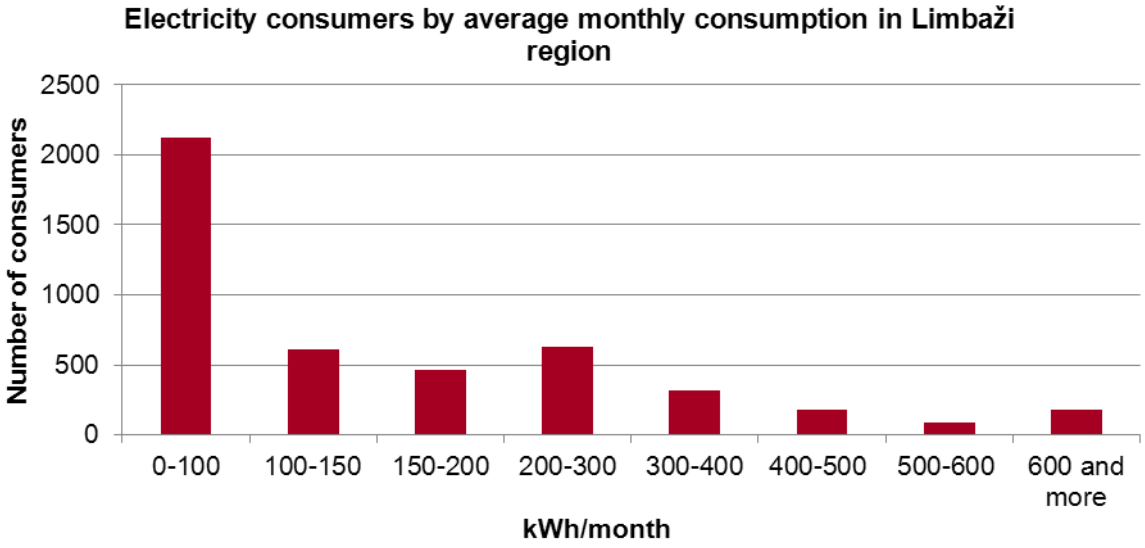

Figure 2.9.Electricity consumers in Salacgrīva region depending on average electricity consumption

Costs for electricity depend on electricity consumption. For the first 1200 kWh (per year) households pay 0.0825 LVL/kWh but for each subsequent kWh higher fare equal to 0.1074 LVL/kWh is applied. Legal entities pay for electricity depending on factors such as the lead-in voltage level, the chosen tariff and electricity consumption.

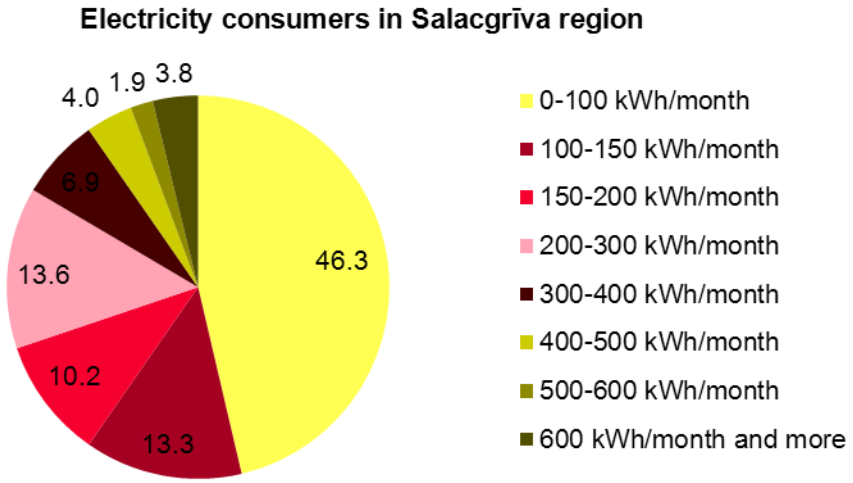

Figure 2.10.The structure of electricity consumers in Salacgrīva region

[3] Data source: Latvenergo JSC.

2.3. Overview of existing action plans and policies related to development of the region

At the regional level there are several planning document related to the development of region:

- **Salacgrīva Tourism and Marketing Strategy Action Plan 2008-2017** aims to promote recognisability of the city among other tourist designation places in the nearest area. Activities are focused on sustainable and qualitative development of the region with an appropriate infrastructure and new tourism products;
- **Salacgrīva Port Development Program unitl 2013** was developed with an aim of improving the competitiveness of Salacgrīva port among other Baltic Sea region ports, as well as creating preconditions for successful development in the future;
- **Salacgriva Green County Declaration (2010)** is an incentive of the municipality to promote healthy, economic, nature and human friendly sustainable lifestyle an economic activity among the inhabitants of the region;
- **Salacgriva Climate Change Adaptation Strategy** was created with an aim of adapting to human caused global climate change impacts, as well as to limit future greenhouse gas emissions as far possible, and;
- **Development Program of Salacgrīva** imposes two essential priorities – (1) development of the VIA Baltica motorway infrastructure and (2) industry development.

2.4. Overview of relevant national plans

Hierarchically the highest long term planning document in Latvia is the Sustainable Development Strategy of Latvia until 2030 **approved on June 2010. According to the strategy** overall goal of Latvian energy policy is to keep at the forefront of the renewable energy in EU and to fully develop the potential of "green economy". Long term priorities are: energy security and independency, the use of renewable energy resources and innovation, energy efficiency improvements and environmentally friendly transportation policy. On a medium term National Development Plan for 2007-2013 sets goal of balanced and sustainable development of the country in line with increased competitiveness among other countries.

Other national level planning documents related to energy, sustainability and environmental issues are following:

- **Renewable energy action plan** defines indicative tasks for renewable energy share in different end user sectors in order to achieve 40% target in 2020, taking into account national renewable energy potential.
- **First renewable energy action plan for 2008-2010** indicates 9% energy savings goal to be reached by 2016. The main energy efficiency improvement is panned to be reached in household sector.
- **Environmental policy guidelines for 2009-2015** is a medium term policy planning document which aims to contribute to global climate change mitigation by ensuring balance between environmental protection and economic interest.
- **Energy development guidelines for 2009-2016** is a medium term planning document with an aim to increase security of national energy supply and to provide citizens with energy availability and sufficiency by improving energy supply infrastructure and by widely implementing energy efficiency measures, as well as by increasing effective use of renewable energy sources and by promoting energy production in cogeneration.
- **Renewable energy guidelines for 2006-2013** is a medium term policy planning document that defines framework for national environmental policy planning. The

main aim of guidelines is to increase the share of renewable energy sources in total energy mix and to contribute to the reduction of green house gas emissions in long term.

- **Climate change mitigation program for 2005-2010** is a medium term policy planning document that defines national policy in the field of climate change mitigation. The aim of the program is to contribute to global climate change prevention by implementing measures focused on coordinated reduction of green house gas emissions and increase of CO_2 attraction by participation in the flexible mechanisms of the Kyoto Protocol and by attraction of investments for GHG reduction projects, etc.

The main State support instrument for initial financing of renewable energy and energy efficiency projects in Latvia is the **Climate Change Financial Instrument (CCFI)** or internationally known as Green Investment Scheme. CCFI is a programme of State Budget and resources are obtained from realizing state owned assigned amount units within the framework of international emissions trading which is one of the Joint Implementation projects under the Kyoto Protocol.

CCFI was first introduced in 2009 and is managed by the Ministry of the Environmental Protection and Regional Development. The main purpose of this instrument is to reduce green house gas emissions, thus contributing to global climate change prevention.

CCFI projects providing support for bioenergy and energy efficiency projects are listed in Table 2.1 below.

Table 2.1

Projects for RES and energy efficiency support under the Climate Change Financial Instrument

Project	Target	Target group	Financing, LVL	Status
Technology transfer from fossil to RES	Reduction of CO_2 emissions, ensuring the transfer from technologies using fossil energy resources to those using RES	City or regional local governments, education institutions; micro-, small- and medium-sized economic operators; research institutions	8 082 346	Application closed 1/12/2011
Development of public awareness as regards the significance of GHG and the options for reducing them	Promote public awareness as regards the significance of GHG emissions and the options for reducing them, fostering informed decision making and actions not harmful to the environment	Associations or foundations	597 384	Project submission deadline 31/12/2011
Complex solutions for the reduction of GHG emissions in State and local government vocational education institution buildings	Reduction of CO_2 emissions, reducing electricity consumption for heating and lighting in Latvia's State and local government vocational education institution buildings	State or local government vocational education institutions	10 225 798	Project implementation till 1/12/2011

Project	Target	Target group	Financing, LVL	Status
Increasing energy performance in local government buildings	Reduction of CO_2 emissions, reducing the consumption of heat energy in Latvia's local government public buildings and in buildings that local governments require to function autonomously	Local governments	26 193 405	Project implementation till 1/12/2011
Development of GHG emission reducing technologies	The funding is provided by means of open tender for use in projects to develop new environmental technologies and products that would reduce heat energy consumption	Latvian direct or indirect administrative bodies, derived public persons or also economic operators registered in Latvia	1 757 010	Project implementation till 1/12/2011
Increasing energy performance in tertiary education institution buildings	Heat energy consumption for heating will not exceed 100 kWh/m^2, and the effectiveness indicator for CO_2 emissions reduction will not be less than 0.35 kg CO_2/LVL per annum.	Tertiary education institution buildings	7 028 040	Project implementation till 1/12/2011
Complex solutions for the reduction of GHG emissions in manufacturing buildings	Reduction of GHG emissions by jointly implementing RES and energy efficiency measures.	Economic operators	8 125 242	Project implementation till 1/12/2011
Support for technology transfer from fossil to RES	Reduction of GHG emissions by replacing fossil fuels with renewables in the production of both electricity and heat (Does not include biogas projects and biomass cogeneration projects)	Micro-, small- and medium-sized economic operators; Latvian city and regional local governments; education institutions	8 082 346	Project implementation till 1/12/2011
RES utilisation in the transport sector	Conversion of vehicles to use biofuel (biogas, vegetable oil, biodiesel, bioethanol)	Economic operators	3 522 621	Project implementation till 1/05/2012
RES utilisation to reduce GHG emissions	Reduction of GHG emissions by increasing RES utilisation in the production of both electricity and heat	Economic operators and local governments. Support for all RES types, particularly in the waste sector	27 716 876	Project implementation till 1/07/2012
RES utilisation in households	Reduction of GHG emissions by implementing microgeneration in households	Natural persons and apartment owner associations	11 399 481	Second round submission deadline 30/11/2011
Low heatconsuming building pilot projects	Reduction of GHG emissions by increasing building energy performance and utilising	Economic operators, natural persons, local governments, State bodies	7 261 722	Project implementation

Project	Target	Target group	Financing, LVL	Status
	RES			
Reduction of GHG emissions in local government lighting	Facilitate the reduction of GHG emissions by installing more efficient lights for street and pedestrian way lighting provided by local governments	Local governments and authorities providing street and pedestrian way lighting and who own the lights to be changed	2 811 216	Application closed
Development of greenhouse gas emission reducing technologies	Projects to develop new environmental technologies and products that would reduce heat energy consumption	Latvian direct or indirect administrative bodies, derived public persons or also economic operators registered in Latvia	2 793 646	Submission deadline 2/01/2012

Other support mechanisms for renewable energy are the **"feed-in" tariff** and **guaranteed payment for the installed electrical capacity**. Electricity producer can choose between the above mentioned support mechanisms[4].

Biofuel production is promoted by annual "quotas" which represent the annual minimum quantity of biofuels, bioethanol and biodiesel that is directly State supported in order to ensure 10% biofuel share in total transport fuel consumption by 2020.

Indirectly biomass is supported in form of excise duty relief. According to the legislation electricity produced from renewable energy sources or electricity produced in cogeneration is exempted from paying electricity tax.

Within the framework of the Rural Support program (the Ministry of Agriculture) activity called "Energy production from agricultural and forestry biomass" is implemented with an aim of promoting biogas production from agricultural and forestry biomass.

Activities financed by the Cohesion Fund include support for the development of renewable energy cogeneration projects and efficiency improvement in district heating systems. The aim of these activities is to increase the share of renewable energy use in electricity and heat energy production and to increase the efficiency of renewable energy systems thus decreasing Latvian dependency on energy imports.

Currently a new renewable energy law is under discussion in the Parliament.

[4] From May 26, 2011, to January 1, 2013 the Ministry of Economics of Republic of Latvia is not organizing new tenders on obtaining the rights to sell renewable energy within mandatory purchase as well as to obtain rights for guaranteed payment for installed electric capacity

3. Bio-energy characteristics

3.1. Analysis of bio-energy potential

For the regional potential three following sectors are analyzed:

- Classic biomass (forest residue);
- Non conventional biomass sources (agricultural residue, sewage sludge, organic municipal waste), and;
- Energy crops.

3.1.1. Classic biomass

Wood fuel is the most popular biomass resource in Latvia and includes wood logs (firewood), wood processing and forestry residues, wood chips, pellets and briquettes. In 2010 the forest cover of the total area of Salacgrīva region was 62% (39 456 ha) and the agricultural land cover – 27% (16 881 ha). The share of other territories (scrub, swamp, water, land beneath the buildings and courtyards) was nearly 12% (please, see Figure 3.1 and Table 3.1 below).

Agricultural land in Salacgrīva region mainly consists of arable land (70.9%); grassland covers 19.1%, meadow – 8.3%, and orchard – 1.6% of agricultural lands in Salacgrīva region.

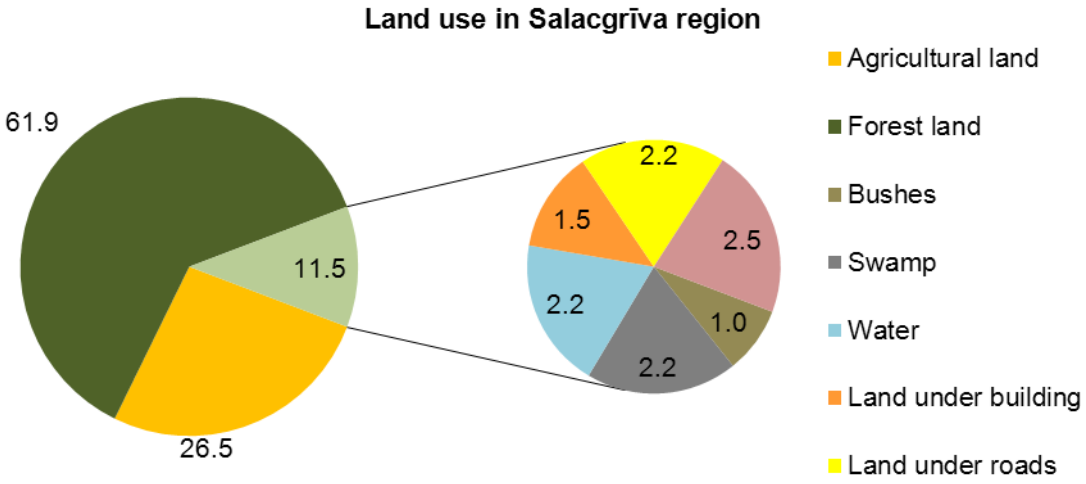

Figure 3.1.Land use in Salacgriva region[5]

Over the past years interest in agricultural land use for production has decreased. As a result areas of waste agricultural land have increased. By form of ownership most land is owned by the State – 56%, 43% of land is the property of private persons while the rest 1% is municipal forest land.

[5] Data source: State Land Service, 01/01/2010

Table 3.1

Land uses by type in Salacgriva region[6]

Land use		Area, ha	% of the total area
Agricultural land		16 880.6	26.5
Including:	arable land	11 971.5	70.9
	orchard	278	1.6
	meadow	1 407.7	8.3
	grassland	3 223.4	19.1
Forest		39 456.2	61.9
Scrub		624	1.0
Swamp		1 422.8	2.2
Water territories:		1 403.4	2.2
Including:	land under water	1 403.4	100.0
	land under fishponds	0.0	0.0
Land under buildings and courtyards		943.1	1.5
Land under roads		1 369.7	2.2
Other lands		1 590.9	2.5
	Total	63 690.7	100.0

The largest area of Salacgrīva region territory is covered with forest land (please see Figure 3.2 a) below). The structure of forest ownership in Salacgriva region is characterized in Figure 3.2 b) Overall in Salacgrīva region 17 238 ha of forest land (43.2%) are privately owned, 22 369 ha (56.0%) – State-owned, and 319 ha of forest land (0.8%) are municipal property.

State owned forests are managed by JSC Latvijas valsts meži Western Vidzeme forestry.

The largest area of Salacgrīva region territory is covered with forest land which indicates the regional wood fuel potential. For the regional wood fuel potential three following sectors are analysed:

- Forest firewood;
- Forest residue;
- Roadside biomass, and;
- Wood processing residue.

3.1.1.1. Forest firewood

According to data from national statistics total forest stock in Latvia is 631 mil.solid-m^3 and forest lands covers 3.4 mil.ha. Current forest processing rate (1.9% of total forest stock) complies with the principles of sustainable forest management and makes 70% of the maximum permissible volumes. Firewood share in forest processing is10% which means that firewood production rate is approximately 0.3 solid-m^3/ha. Forest land cover in Salacgrīva region is 39 456 ha which means that the firewood potential is approximately 11 837 solid-m^3 or 19 030 MWh, or 68.5 TJ per annum.

Firewood price in Latvia is 15-20 LVL/m^3.

[6] Data source: State Land Service, 01/01/2011

Figure 3.2 a) Forest land cover in Salacgrīva region

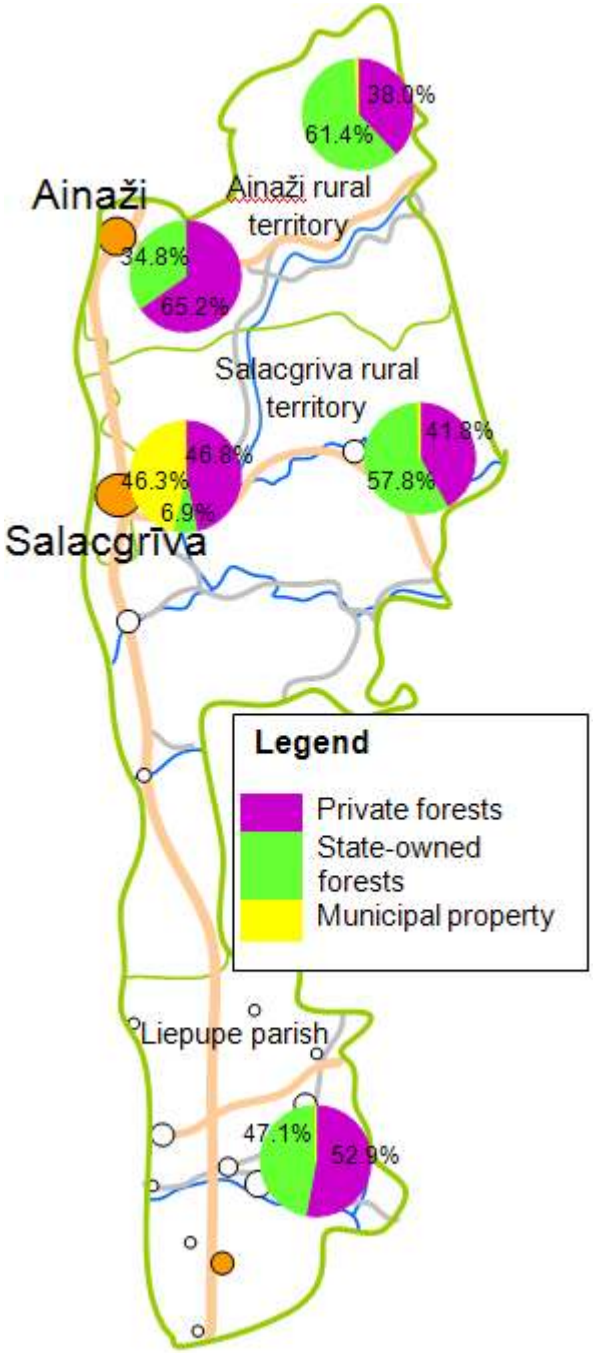

Figure 3.2 b) Forest ownership in Salacgrīva region[7]

3.1.1.2. Forest residue

Forest residue is biomass that is left in the forest after harvesting. This includes tree branches, tops of trunks, stumps, branches, and leaves. Total forest stock in Salacgrīva region is 8.0 mil.solid-m^3 out of which 16% is forest stock with restrictions on economic activities.

[7] Data source: State Land Service, 2011

Estimated[8] annual forest residue potential in Latvia is 1.9-3.1 mil.solid-m^3, which makes 0.3-0.5% of total forest stock in Latvia (631 mil.solid-m^3). Taking into account that the forest stock without restrictions for economic activities in Salacgrīva region is approximately 6.7 mil.solid-m^3, it can be calculated that forest residue potential in Salacgrīva region is approximately 20-33 thousand solid-m^3 which gives 116-190 TJ annually[9].

Table 3.2

National wood fuel potential[7]

Wood fuel	Potential, mil. m^3/a	Potential, PJ
Firewood (low-value round felling assortments)	1.8 – 2.4	12 – 16
Logging residues (tree felling crown part, young forest plantation care)	1.8 – 2.7	12 – 18
Wood from shrubs	0.3 – 0.8	2 – 5
Stumps	0.1 – 0.4	0.7 – 3
Annual natural dying	~ 0.3	~ 1.5
Wood-processing residue	1.6 – 4.5	14 – 37
Recycled timber in landfills	~ 0.3	~ 2
Total	6.2-11.4	44.5-82.5

3.1.1.3. Roadside biomass

Roadside biomass mainly consists of bushes and branches thus the timber content in this kind of biomass is comparatively low while the bark content – high. This decreases energy value of roadside biomass. But still it is proven that chips made from bushes and branches, and other low value wood are competitive with chips made from wood-processing residues in terms of both energetic value and price.

Moisture content in roadside biomass is 45-50%, ash content 1%-3%.

Since in Latvia it is not popular to use forest residue for energy production or other purposes, it can be assumed that there is no competition with other manufacturers regarding the use of roadside biomass.

A survey on roadside biomass prices indicated that average price for chips produced from branches is approximately 8 LVL/loose-m^3 (including VAT).

All roads in Latvia are divided according to their importance:

- State roads;
- Municipal roads;
- Merchant roads, and;
- House roads.

Municipal roads and land belonging to these roads are owned by municipalities. Thus management, maintenance, design, renovation, reconstruction, and construction of roads belonging to territory of municipality are the obligation of particular municipality[10]. Currently

[8] Energy development guidelines for 2007-2016
[9] Assumptions for calculations: ρ= 0.643 t/m_c^3 un Q_z^d= 2.5 MWh/t
[10] Law “On roads” of the Republic of Latvia, in force since 11.03.1992

municipalities negotiate contracts with private persons and utilities for cleaning the ditches and biomass is given to them for free or for a small fee.

Total length of roads in Latvia is 70 000 km. According to the estimates on roadside overgrowth made by the Latvian Association of Biomass „LATbioNRG"[11] one kilometre of roadside is comparable to 6 ha and one hectare gives approximately 65 solid-m^3 of roadside biomass. Total road length in Salacgrīva region is 165 km which theoretically gives 64 350 solid-m^3 of wood. Assuming that 10% of the theoretical potential can be practically used, the potential of roadside biomass in Salacgrīva region is approximately 6 435 solid-m^3 or 10 340 MWh annually[12].

Roadside biomass is usually chipped in autumn when the bushes are without leaves.

3.1.1.4. Wood processing residue

Wood-processing residue is originated in timber companies and includes bark, offcuts, laths, piece of plywood, and sawdust.

Previous research[13] on wood processing residue has indicated that wood-processing residue is mainly used by timber companies them selves, respectively, residue is exported and sold or burned in boiler houses and the heat is used for wood drying. Some of the companies produce wood pellets or briquettes from sawdust.

Chips produced from wood-processing residue contain ash up to 1.5% and the moisture content is 25-55%.

There are 11 different capacity wood processing companies in Salacgrīva region, which produce wooden constructions, sawn timber, furniture, doors and windows, floor boards and skirting, as well as provide harvesting, construction and reconstruction of buildings, etc.

Figure 3.3 shows (red points) location of timber companies operating in Salacgrīva region.

Largest wood-processing companies were interviewed asking to answer some questions about wood-processing residues. The main conclusion from this telephone survey is that wood-processing companies already utilize their waste in different way:

- In most cases sawdust is sold to pellets producers. Since there are quite many pellet factories in Latvia, competition for raw material is high. The price of sawdust is 6.5-7.5 EUR/loose- m^3. One of the companies produces briquettes from sawdust, while another company sells (1.0 LVL/loose-m^3) sawdust to nearby cattle farm to be used for litter.
- Wood cuttings are chipped and burned onsite for heating and drying purposes or sold for approx.3.5 LVL/loose-m^3.

[11] D.Palejs. Availability of wood biomass resources in Latvia
[12] Assumptions for calculations: ρ= 0.643 t/solid-m^3 un Q_z^d= 2.5 MWh/t
[13] Project report "Koksnes pārstrādes blakusproduktu kvalitātes un to izmantošanas alternatīvu izpēte Latvijas uzņēmumos". Forest and Wood Products Research and Development Institute (2005)

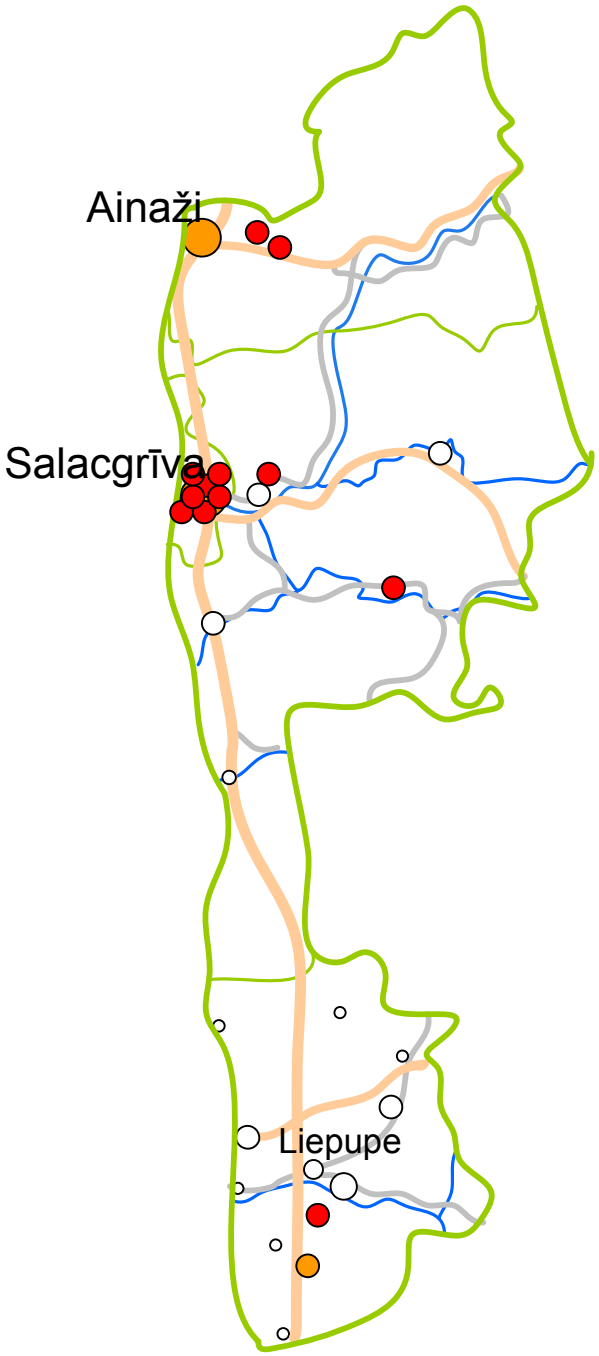

Figure 3.3.Location of timber companies operating in Salacgrīva region

3.1.2. Non-conventional biomass potential

Non-conventional biomass sources include agricultural residue – manure and straw, as well as sewage sludge and organic household waste.

3.1.2.1. Agricultural residue

Agricultural waste is usually grouped based on moisture content in dry (e.g., straw) and wet (e.g., manure) agricultural waste. Dry agricultural waste includes cereals which are not primarily used for food, feed or fibre production, wasted animal litter and feathers. Wet

agricultural residues include waste materials with high moisture content. Because of high moisture content these residues are improper for incineration or gasification, as well as for transporting long distances. It is recommendable to treat these materials closely to their origin and to use treatment methods that allow the use of biomass in moist environment. Typical examples for wet agricultural waste are animal manure and slurry, as well as grass silage.

According to the Rural Support Service data[14] about agricultural land in Salacgrīva region there are up to 68.5% of cultivated agricultural land, 30.3% of uncultivated land, 1.0% of overgrown land and 0.2% of construction land (see Figure 3.4).

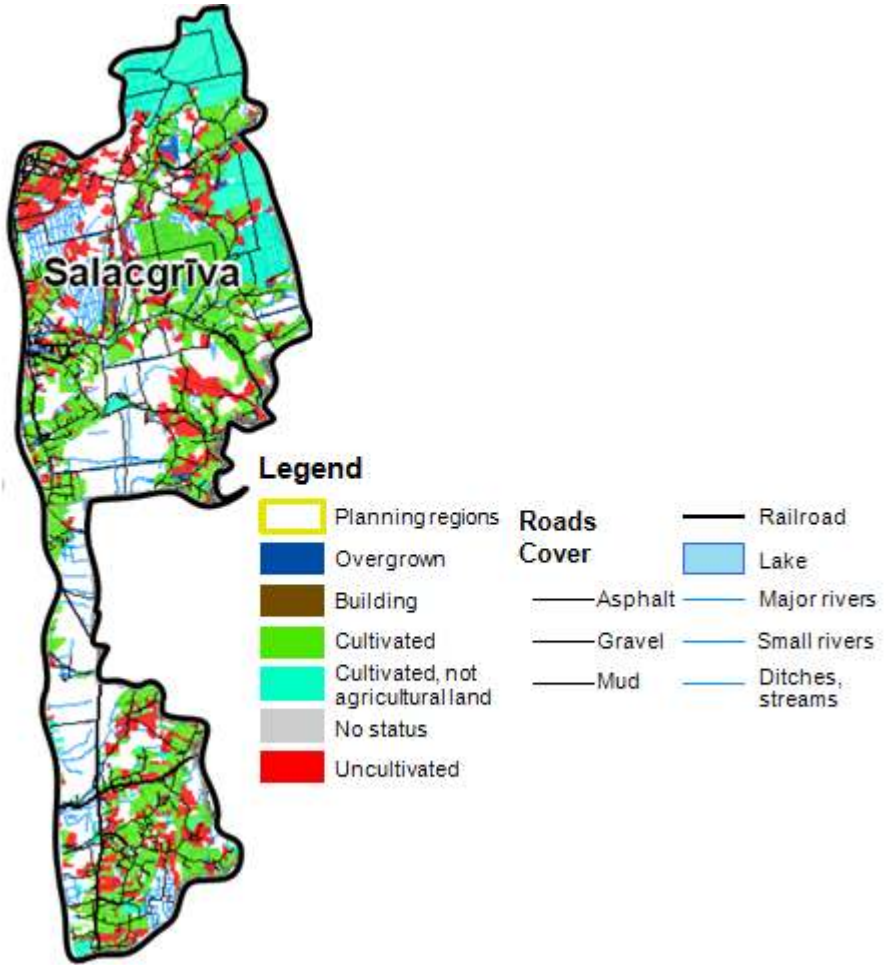

Figure 3.4.Agricultural land in Salacgrīva region

Currently in Latvia there is one district heating plant using straw (in Saulaine) with capacity 1.36 MW. Efficiency of the straw boiler house is 87% but total efficiency of the system is 70%. Energy production in Saulaine boiler house is 20 TJ/year and fuel (wheat straw) consumption – 1 300 t/year. Agricultural land area for straw production is 500 ha and average transportation distance is 6 km[15].

[14] Rural Support Service. Agricultural land survey results. Data prepared for 3/11/2010. Available at: http://www.lad.gov.lv/files/zva_plan_reg_1691c.pdf
[15] Msc. ing. Imants Plūme. Straw use for energy production. University of Agriculture of Latvia

Total straw potential in Latvia is estimated to be 150-570 thousand tonnes per year[16]. Data[17] on previously evaluated regional straw potential is characterizes in Table 3.3.

Table 3.3

Straw potential for energy production[8]

Planning region	Straw potential for energy production, t		
	Crops	Rape	Total
Riga	17 705	2 830	20 535
Vidzeme	19 871	4 125	23 996
Zemgale	42 410	11 489	53 899
Kurzeme	31 977	3 706	35 683
Latgale	20 976	2 830	23 806
Total in Latvia	132 939	24 980	157 919

Straw potential in Riga planning region is estimated to be approximately 20 500 t/a. Limbaži region is situated in the Riga planning region and covers 3.2% of the region territory. Thus it can be assumed that the straw potential in Salacgrīva region is approximately 660 t or 2 640 MWh[18].

Straw are usually harvested and packed in good weather conditions. The main factor influencing the amount of energy produced from straw is the moisture content. For this reason straw should be stored in place where fuel is protected from fall-out.

Operators who utilize straw for energy production face a number of problems:

- Straw contain high content of chlorine and nitrogen which can lead to formation of dioxides and NO_x emissions;
- Operational costs increase because furnace cleaning is required more often, and;
- Utilisation of ashes is necessary.

The experience of Saulaine boiler house which is the largest of two straw boiler houses in Latvia indicates that purchase price of straw (including transportation) is 23.8 EUR/t and the price of heat energy is 15.8 EUR/MWh which is approximately two times less than in case of wood fuel and almost three times less than in case of natural gas.

According to the data of Agricultural data centre, in the beginning of 2011 in Salacgrīva region there were 2 709head of cattle, 288 pigs, 607 sheep, 63 goats, and 67 horses. It can be calculated (please see Table 3.4) that the potential energy production from animal manure in Salacgrīva region is approximately 40 TJ.

Table 3.4

Biogas potential from animal manure in Salacgriva region

Type of animal	Number of animals	Manure/ animal/ day	Dry matter content	CH_4/kg/ organic weight, Nm^3	kWh/nm^3	TJ
Cattle	2 709	60	0.075	0.250	11123831	40
Pigs	288	6	0.08	0.220	111007	0.4
Horses	67	22	0.00	0.165	0	0
					Total	40.4

[16] Renewable energy guidelines 2006-2013
[17] Institute of Physical Energetics. Regional use of renewable energy sources in Latvia and evaluation of environmental economic and social aspects at national and regional level. 2006
[18] Assumed calorific value Q_z^d=4.0MWh/t

3.1.2.2. Sewage sludge

Situation with sewage sludge treatment in Salacgrīva region differs from place to place. In a number of small municipality's wastewater treatment facilities are in catastrophic state, but the situation is slowly improving since Salacgrīva region is involved in water management development projects within EU Cohesion Fund.

Biogas production potential from wastewater treatment in Salacgrīva region is comparatively negligible. This is because of small amounts of wastewaters. In Salacgrīva region there are 10 organizations which have to report their water consumption to national statistics. These organizations include local municipalities, food manufacturers, etc.

According to these reports in 2010 the total amount of sewage sludge created in Salacgrīva region was approximately 5 t, largest part of which was composted.

Biogas yield form one tonne of sewage sludge is 300-500m^3. Assuming that the calorific value for biogas is 6 MWh/1000m^3, it can be calculated that from 5t of sewage sludge theoretically it is possible to produce 9 MWh.

3.1.2.3. Organic waste

Waste management in Salacgrīva region is organized and controlled by the municipality of Salacgrīva region, and managed by a single waste management company ZAAO Ltd. All municipal waste created in the territory of Salacgrīva region is collected and transported for disposal to municipal solid waste landfill „Daibe" which is located outside the territory of Salacgrīva region. All former waste dumping sites in the region are being recovered.

Disposed municipal waste is mostly unsorted. It is difficult to evaluate the share of organic waste in total amount of household waste. Previous research[19] has estimated the share of biodegradable waste to 57% of household and similar waste.

292.5 t[20] of unsorted municipal waste were created in Salacgrīva region in 2011 which means that approximately 167 t (57%) would be usable for biogas production.

Biogas yield from one tonne of organic waste is approximately 200m^3. Assuming that the calorific value of biogas is 6 MWh/1000m^3, it can be calculated that form 167t of organic waste it is possible to produce 200 MWh. Still, it should be taken into account that real amount of biogas production is less than theoretical because without additional sorting the efficiency of biogas production is lesser.

Biogas already is collected in landfill "Daibe" where municipal solid waste from Salacgrīva region is being disposed.

[19] Latvian Waste Management Association report „Priekšlikumi stratēģijai par bioloģiski noārdāmo atkritumu apsaimniekošanu atbilstoši Eiropas Padomes direktīvas 1999/31/EK par atkritumu apglabāšanu un Ministru kabineta 2002.gada 3. janvāra noteikumu Nr. 15 prasībām" (LASA, Riga, 2004)
[20] National waste database „Atkritumi-3"

3.1.3. Energy crops

Growing energy crops is not very popular and widespread in Latvia at the moment although there are lots of unused agricultural areas which are proper for energy crops production.

To calculate energy crops potential in Salacgrīva region it is assumed that 1/3 of lands that are not used in agriculture is used for growing energy crops. Non-agricultural land includes agricultural land which is not used for agricultural production as well as scrubs and other lands (excluding forest land).

According to data on rural areas in Salacgrīva region[21] from the State Support Service, 5 017 ha of all agricultural lands are uncultivated and overgrown lands. Together with scrub and other lands non-agricultural lands make 7 230 ha, of which 1/3 is 2 410 ha.

Average willow yield is 7-14 t/ha and the use of plantations continues 20-25 years. Estimated dry matter content is 40 450 t annually. Assuming that the energy content is 4 MWh/t, the amount of energy one might theoretically produce is 28 570 MWh or 103TJ annually.

The average yield of reed canarygrass is 6-8 tonnes of dry matter per hectare. From one hectare reed canarygrass it is likely to get about 30 MWh of energy. In the case of Salacgrīva region it gives 72 300 MWh per year. In one field reed canarygrass can be produced for at least 12 years, later the area should be restored or used for other purposes. Reed canarygrass is cut once a year, usually in late autumn or winter on frozen soil. Energetic grass is fuel with low moisture content, which can be used in manufacturing briquettes or pellets directly without preliminary drying.

It should be noted that the potential of growing willow plantations and other energy crops is determined not so much by the area of non-agricultural lands, but availability of fertilizers (sewage sludge and wood ash)[22].

3.1.4. Regional biomass potential

Calculation of Salacgrīva regional biomass potential is summarized in Table 3.5. The results are illustrated in Figure 3.5.

Table 3.5

Biomass potential in Salacgrīva region

Biomass	Potential, MWh	Potential, TJ
Forest firewood	19 030	69
Forest residue	20 000	72
Roadside biomass	10 340	37
Wood-processing residue	X	X
Straw	2 460	9
Animal manure	11 111	40
Sewage sludge	9	0
Organic waste	200	1
Energy crops	28 570	103
Total	91 720	331

[21] Results of survey on agricultural areas. Rural Support Service (2011). Available at: http://www.lad.gov.lv/lv/citi-pakalpojumi/lauksaimnieciba-izmantojamas-zemes-apsekosana/

[22] Ilgtspējīgu energoapgādes un energoefektivitātes paaugstināšanas risinājumu atbalsts Savienības līmenī ES jaunajās dalībvalstīs un kandidātvalstīs. STRASA konsultanti (2007)
Available at: http://www.strasa.lv/sec_tools/Newsletter_lv_no_04_08_2007.pdf

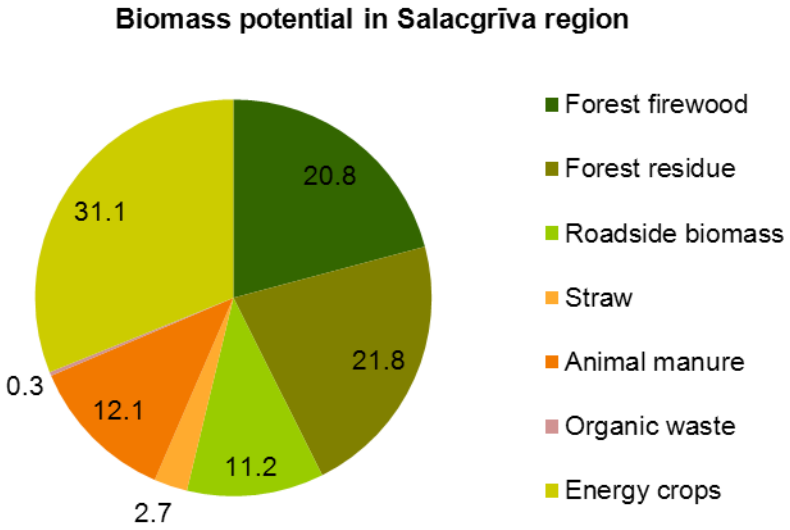

Figure 3.5.Biomass potential Salacgrīva region

Based on calculations it can be concluded that currently wood fuel use in heat production in Salacgrīva region makes nearly 32% of regional biomass potential. It should be borne in mind that part of wood fuel that is consumed in Salacgrīva region is supplied from other regions which means that there exists an important potential to increase the use of local wood fuel. The largest wood fuel potential is related to energy crops production on non-agricultural lands and the use of forest residues and roadside biomass.

3.2. Analysis of biomass supply chains

Biomass supply management in Salacgrīva region mainly depends on consumer requirements and possibilities.

In case of local authorities (that are carrying out public procurement procedure) biomass is supplied by the producer and all costs of fuel preparation and transport are included in the total cost which is agreed in the contract.

National statistics (please see Table 3.6) show that wood fuel in households in most cases is being purchased. Firewood (24.4%) and wood waste (25.2%) are partly self prepared while wood pellets and briquettes are 100% purchased.

Table 3.6

Ways of obtaining wood fuel in households [23]

Type of wood fuel	Share, %
Firewood:	
Total	100.0
Purchased	66.0
Received free of charge	1.0
Self prepared	24.4
Partly purchased, partly received free of charge	2.2
Partially purchased, partially self prepared	6.4

[23] Data source: Central Statistical Bureau of Latvia

Type of wood fuel	Share, %
Wood residue:	
Total	100.0
Purchased	67.4
Received free of charge	2.6
Self prepared	25.2
Partly purchased, partly received free of charge	1.2
Partially purchased, partially self prepared	3.6
Wood briquettes:	
Total	100.0
Purchased	100.0
Received free of charge	-
Self prepared	-
Partly purchased, partly received free of charge	-
Partially purchased, partially self prepared	-
Wood pellets:	
Total	100.0
Purchased	100.0
Received free of charge	-
Self prepared	-
Partly purchased, partly received free of charge	-
Partially purchased, partially self prepared	-

Figure 3.6 and 3.7 show average wood fuel prices for households and for commercial and public sectors in Latvia. Figure 3.8 also represents average wood fuel prices.

Figure 3.6.Wood fuel prices for households (without VAT) [24]

[24] Data source: Central Statistical Bureau of Latvia

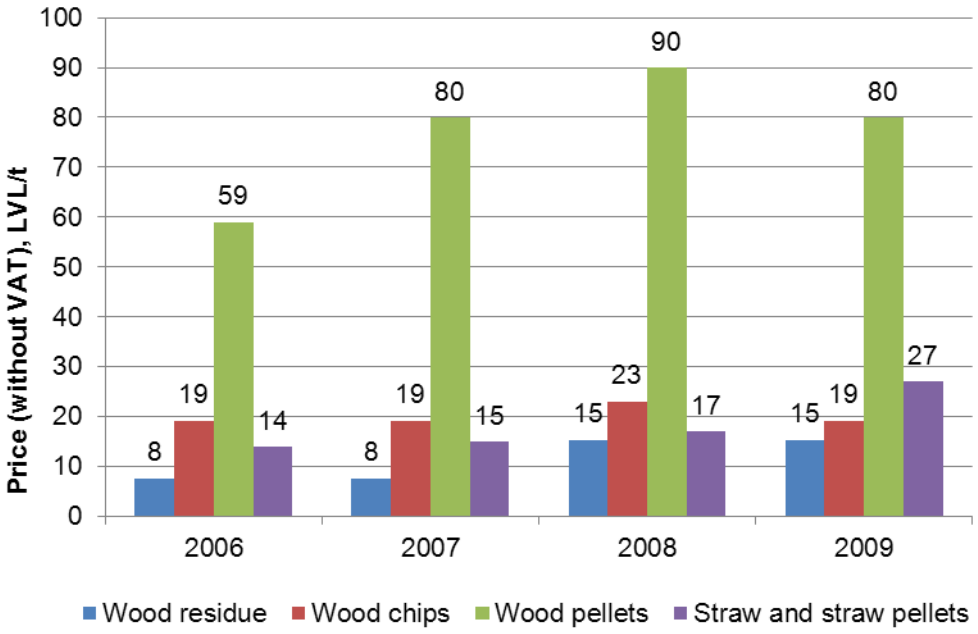

Figure 3.7.Biofuel prices for commercial and public sectors (without VAT)[24]

Market analysis on wood fuel prices in Latvia shows that the average price (excluding VAT) of different wood fuel types is following:

- Firewood: 18-25.0 LVL/t (26-36 EUR/t);
- Wood chips: around 16-22 LVL/t (23-31)
- Wood residue: around 15 LVL/t (21 EUR/t);
- Briquettes: around 90 LVL/t (128 EUR/t), and;
- Pellets: around 95 LVL/t (135 EUR/t).

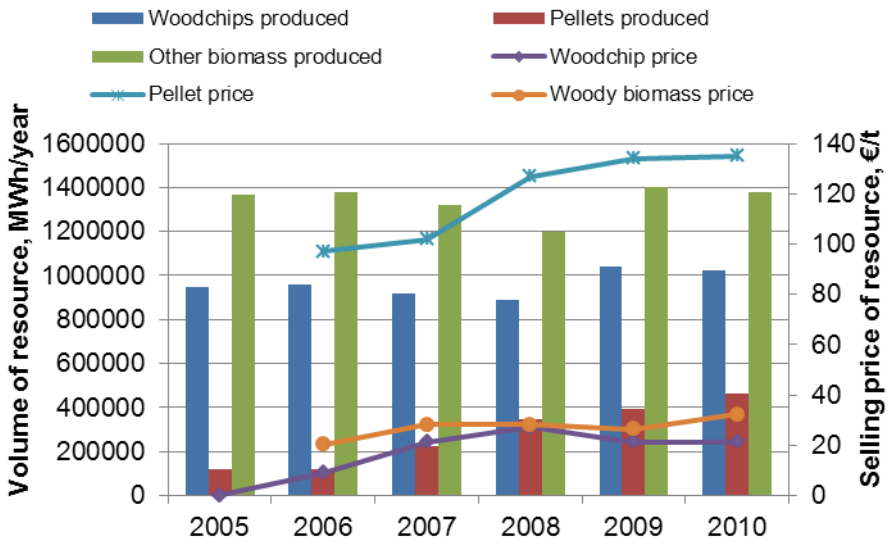

Figure 3.8.Biomass production amounts and selling prices in Latvia 2005-2010

In accordance with the requirements of the Public Procurement Law of the Republic of Latvia authorities must carry out public procurement procedures and inform about the results. From the data base of the Public Procurement Bureau of Republic of Latvia information on public

procurements for fuel purchase in Salacgrīva region were aggregated. Figure 3.9 shows fuel supply flows[25] for local authorities in Salacgrīva region.

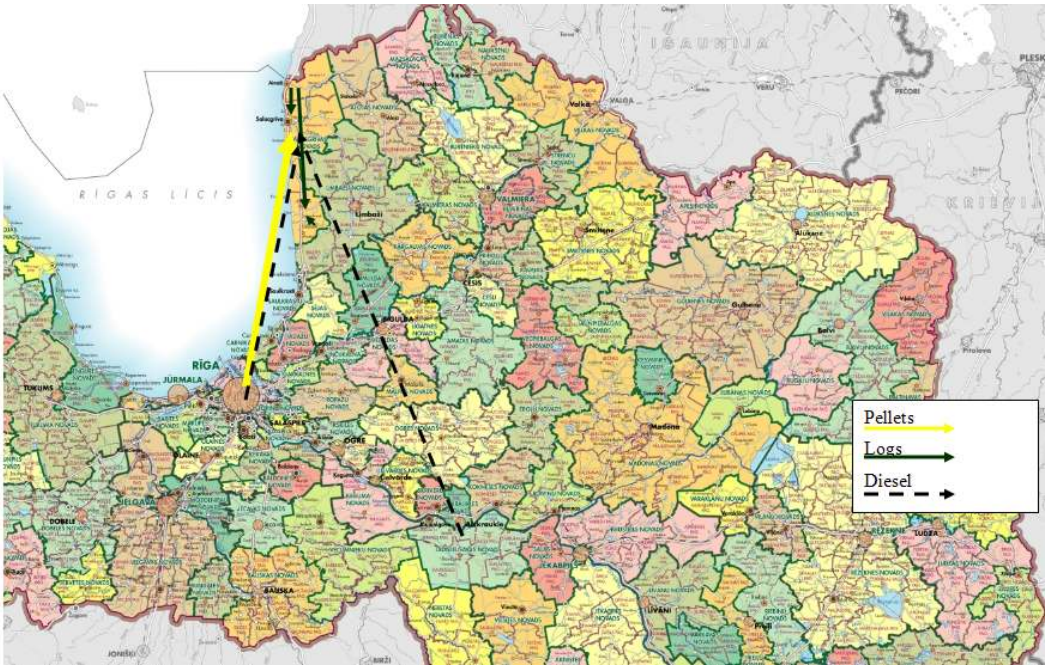

Figure 3.9.Fuel supply for local authorities in Salacgrīva region

3.3. Overview of stakeholders involved in bioenergy development

The main stakeholder groups involved in bioenergy development in Salacgrīva region are:

- Administrative sector (Salacgrīva regional administration and local administration);
- Biomass suppliers (forestry and wood processing companies, farmers, private forest owners, municipality);
- Biofuel producers (producers of wood chips, pellets, briquettes, fire wood as a main product or by-product);
- Energy producers (DH suppliers, industry, municipality, family house owners);
- Energy consumers (public buildings, households, industry), and;
- Regional tourism sector.

Salacgrīva region municipality is a key actor of the proposed bioenergy promotion activities. Municipality is responsible for overall sustainable long-term development of the region territory that includes all – social, economical and environmental aspects. Municipality in some degree is as well potential biomass supplier. Sources of biomass for municipality are forests (municipality owns 0.8% of Salacgrīva region forest territories) and, roadsides and ditches that they are obliged to maintain and keep clean from trees and bushes. Municipality as an actor participates as well in the last two stages of bioenergy supply chain – bioenergy production and use. Municipality operates local heating systems supplying public buildings with heat. Local municipalities are using heat in their administration buildings and other public facilities like schools, kindergartens, libraries, recreation centres, market places, tourism information centres, museums, municipal police offices, etc.

[25] Denser line means that there has been more than one purchase from particular place

The municipality is interested in regional biomass development, do their duties regarding cleaning the roadsides from bushes and providing cheaper and better quality fuel for their facilities reducing expenses for heating.

Biomass suppliers in Salacgrīva region are number of forestry and wood processing companies. Depending on the local bioenergy market situation, these companies potentially may switch from the export orientated approach to internal market orientation approach and facilitate the development of Salacgrīva region bioenergy market activities.

The main interest of bioenergy producers is to have an access to cheaper fuel at decent quality and sufficient amounts.

The main interest of bioenergy consumers is paying less for energy at the same time having stable and reliable energy supply.

4. SWOT analysis

The SWOT analysis examines regional strengths and weaknesses, opportunities and threats of the region (see Table 4.1) both in short and long-term.

Table 4.1

SWOT analysis of the target region

Strength	Weaknesses
Location advantageous for tourism, a diverse range of cultural and natural objects	Lack of a united tourism product. Lack of tourism infrastructure
Ecologically clean environment	Unarranged tourism and business information system
Well developed road network	Lack of enterprises with high added value
Existing bikeway	Deteriorate port infrastructure
Salacgrīva port	Uniform production
Large manufacturing base in fish processing	Concentration of manufacturing objects in one place
Large potential for premises that can be reconstructed for manufacturing needs	Existing manufacturing requires for large quantities of low-qualified labour
Large biomass potential	High degree of depreciation of housing fund
Opportunities	**Threats**
Regional image development	Decrease in local people paying capacity, reduction of work places
Development of qualitative tourism products. Rural household involvement in tourism sector	Increase in environmental pollution
Appropriate use of free municipal lands	Uniform business
Development of the concept for regional symbols and souvenirs	
Development of manufacturing industry	
Development of high level wood processing and exploitation of wood potential	
Electricity production from renewable energy sources	
Energy efficiency measures in energy production and consumption sectors	

5. Setting the bioregion target

Regional energy planning in Latvia is subordinated to national level energy and climate policy objectives. However, currently there is no mandatory requirement for municipalities to carry out local-level measures to support renewable energy. Thus promoting the use of renewable energy at the local level is largely dependent on local initiatives.

5.1. Overall bioenergy vision of the region

Overall vision of Salacgrīva region is to create a competitive area with well developed infrastructure, wide opportunities in all fields of life and sustainable living and working space. An integral part of a sustainable regional development is as well the sustainable development of surrounding environment. Production and use of alternative energy sources and improvement of the surrounding environment through energy efficiency measures are opportunities for Salacgrīva region in its way towards sustainable environmental development.

Based on municipality initiative the region of Salacgrīva has developed and approved so called Green Declaration which serves as a framework for the support of renewable energy.

5.2. Bioenergy targets for the next 10 years

By approving Salacgrīva`s Climate change mitigation strategy, the municipality of Salacgrīva in cooperation with State authorities, State owned companies (Latvijas valsts meži (Latvian State Forests, etc.), enterprises, organizations and local inhabitants has agreed to implement measures necessary to adapt to consequences of global climate change at local level and as far as possible to reduce future greenhouse gas emissions and increase carbon capture. This can be achieved by implementing two fundamental bioenergy targets:

1. Promotion of renewable energy sources (maximum use of local wood fuel resources, promotion of wood fuel use in households, renewable electricity production), and;
2. Energy efficiency improvement (increasing efficiency of wood fuel use, reducing heat losses in district heating networks and at demand side).

Overall target of a bioregion is to produce 33% of energy (heat plus electricity) from biomass. In heat production historically biomass has been the main energy resource in Salacgrīva region since the region does not have an access to natural gas grids. Current biomass share in Salacgrīva regional heat production is estimated to be around 85% which is more than twice the target. For this reason regional bioenergy targets should be focused on more efficient use of bioenergy in terms of wood fuel quality and more efficient technologies and to wider use of local biomass resources.

Current renewable energy share in electricity production in Salacgrīva region is little. Most of the electricity is supplied from general grids. Bioenergy target for the next 10 years is to raise the level of local electricity production from renewable energy sources to ensure that 3% of the total electricity consumption in the region is covered by locally produced renewable electricity.

Wider and more efficient use of renewable energy sources in heat and electricity production should go hand in hand with energy efficiency improvements at demand side. Bioenergy target that goes in line with national energy efficiency targets is to increase energy efficiency in households by 30% in 2030 in regard to heat energy consumption. Decrease in electricity

consumption can be reached with help of active public awareness raising campaigns about energy efficiency measures in households, public buildings and companies.

6. Action Plan

Thanks to its geographical location in the North of Vidzeme, on the coasts of the Baltic Sea, Salacgrīva region is rich in magnificent and biologically diverse rivers and virgin woods. Availability of natural resources has stipulated the development of green tourism as one of regions largest priorities. This includes not only recreation opportunities in clean and unpolluted environment but as well provides an opportunity to meet regions renewable energy and energy efficiency initiatives.

The region of Salacgrīva is the first one in Latvia where green ideas have become top priority. In accordance to municipality`s interest in this topic, BioRegions action plan includes activities directed to integrated development of tourism and environmental questions.

The action plan aims to develop short term, medium term and long term activities in each target group to promote bioenergy production and use, as well as energy efficiency in Salacgrīva region. The action plan was developed with help of VTT Technical Research Centre (Finland) and Achental Bioenergy Centre (BAT, Germany).

6.1. Transferring the targets into actions

Following target groups are considered:

- Administrative sector (Salacgrīva regional administration and local municipalities);
- Energy consumers (households, public buildings, industry and tertiary sectors);
- Energy producers (district heating companies, industry, municipality, family house owners);
- Biomass suppliers and biofuel producers (forestry and wood processing companies, private forest owners etc.), and;
- Tourism sector.

Administrative sector

Salacgrīva regional municipality is the key actor to promote the use and production of bioenergy and energy efficiency in two ways. Firstly, the municipality can implement measures to increase energy efficiency and the use of renewable energy sources in its public buildings (schools, kindergartens, museums etc.). Secondly, the municipality can take the lead action to promote energy efficiency and the use of renewable energy among society.

Energy consumers

Energy consumers should be encouraged to implement energy efficiency measures and effective renewable energy technologies by explaining benefits it can give. Information on support measures and opportunities should be available for each energy consumer.

Heat energy producers

Heat energy in Salacgrīva region is mainly produced in old, low efficiency wood stoves. There is large potential to increase energy efficiency in energy production. A greater attention should be paid to wood fuel quality issues. Fuel purchase for energy generation sources should be organized based on energy content not the volume or mass of the fuel. As far as possible the old, inefficient boilers should be replaced with more modern equipment.

Bioenergy producers

Bioenergy producers and suppliers should be involved in the local biomass trading and encouraged to supply produced biomass to the local bioenergy market. Benefits of participating in the emerging local bioenergy market should be explained for all concerned entities.

Tourism sector

Existing experience has shown that Salacgrīva region with its renewable energy incentives is interesting for public. Development of a qualitative tourism service providing binding information on best experience in the field of renewable energy and energy efficiency can give benefit to both – service providers and consumers.

6.2. Milestones

Constantly	▪ Development and maintenance of regional RES and EE project register ▪ Establishing contacts with local biomass producers and suppliers, RES and EE project developers in household and industry sectors ▪ Encouraging energy producers and consumers to participate in local bioenergy market ▪ Informing the public about current activities ▪ Taking steps towards implementing bioregion targets
Annually	▪ Data collection and evaluation on energy production/consumption in existing RES/EE projects ▪ Review on regions bioenergy balance ▪ Review on the fulfilment of objectives and activities of the action plan ▪ Improvements in objectives and activities of the action plan, if necessary;
Midterm	▪ Defining areas suitable for energy crops growing ▪ Evaluating hitherto cooperation with biomass suppliers/consumers, suggesting possible improvements, if necessary ▪ Updating promotional materials, intensifying awareness activities ▪ Assessing the efficiency of the local biomass market, outlining the possibilities of prospective development in the future

6.3. Concrete actions

In the following two subchapters concrete actions aimed to improve energy efficiency and to promote renewable energy integrated with tourism activities in Salacgrīva region are described.

6.3.1. Energy efficiency improvement and promotion of renewable energy

6.3.1.1. Measures at the demand side

Energy consumer is the most important element of an energy system. Energy consumers in Salacgrīva region can be grouped in three groups: (1) households, (2) industry and services sector and (3) public buildings. Following each of the groups will be characterized. Thinking about energy efficiency measures it is important to bear in mind that decrease in energy consumption should be achieved without compromising the working and living conditions.

Households

An average household in Latvia spends around 250 kWh/m^2 of heat energy annually which indicates huge potential for energy savings. Due to the possibility of attracting ERAF co-financing for apartment house insulation projects the number of renovated apartment buildings is increasing over recent years. Table 6.1 lists apartment buildings in Salacgrīva region which have been approved for co-financing and have either already implemented renovation works or are in the process of renovation.

Table 6.1

Energy efficiency improvement projects in multi-apartment buildings in Salacgrīva region

No.	Project	Energy efficiency measures	Realization	Planned energy savings, %
1	Energy efficiency measures in multi-apartment building in Salacgrīva, Atlantijas Str.1a	Facade insulation, roof replacement, attic ceiling insulation, window and door replacing	Implemented	41
2	Energy efficiency measures in multi-apartment building in Salacgrīva, Vidzemes Str.7	Facade insulation, window and door replacement, attic ceiling insulation, heat and hot water supply system insulation	Implemented	44
3	Energy efficiency measures in multi-apartment building “Liepupe 26” in Liepupe, Salacgrīva region	Facade insulation, window replacement, attic ceiling insulation, renovation of ventilation system, roofing replacement	Implemented	47
4	Energy efficiency measures in multi-apartment building in Pērnavas Str.14, Salacgrīva	Facade and foundation insulation, attic ceiling insulation, roof replacement, window and door replacement, heating system insulation	Active	49
5	Energy efficiency measures in multi-apartment building in Meldru Str.42, Salacgrīva	Wall and socle insulation, attic insulation, window and door replacement, heating system renovation	Active	43
6	Energy efficiency measures in multi-apartment building in Smilšu Str.22, Salacgrīva	Wall insulation, attic ceiling insulation, window and door replacement	Active	36

The average planned energy efficiency saving due to energy efficiency measures (based on energy audits) is around 40%. Energy analysis of renovated buildings in Latvia carried out so far have shown that real heat energy savings are even higher and equals around 50%.

Total public co-financing for apartment house insulation projects is 44.3 mil.LVL (63 mil.EUR). Currently the 9th round of the activity is open for project submission and it will continue until the available financing (27.3 mil.LVL) is spent. It can be foresee that implementation of energy efficiency measures in multi-apartment buildings will continue to rise noticeably while there will be available co-financing. To encourage more renovation projects, there is need for good practice dissemination in society. Experience of other Latvian regions has shown that the opportunity to compare their home energy consumption with similar neighbourhood houses makes people to think about possible ways of reducing energy costs and implementing energy efficiency measures as far as possible. This effect can also be seen in Salacgrīva region where renovation projects are often implemented in neighbouring houses on one street.

In this context, Salacgrīva municipality in its website could upload comparative information about the specific heat consumption and the costs for heating in different multi-apartment buildings in the region, as well as information about existing renovation examples in apartment houses. It is important that this information is followed with advices, how to reduce energy consumption. The web page could also include information (or links to information) about support available for building renovation and contact information of reliable energy auditors and building companies with which the municipality has had positive experience in cooperation so far.

Production and use of renewable energy is, in line with increasing energy efficiency, the other direction and the target of the sustainable development of the region. The CCFI offers a number of project competitions for renewable energy projects in both household and industry sectors, as well as in the administrative sector. Up to now several projects have been approved in Salacgrīva region. Table 6.2 lists the approved projects in Salacgrīva region under the 1st round of CCFI project competition “RES utilization in households”.

Table 6.2

Use of RES in households – results of the 1st round

No	RES, location	Heat/ Electricity H/E	Project implementation	CO_2 reduction, kg CO_2/a
1	Solar collector, Liepupe parish	H	30/06/2012	1 723
2	Wind generator, Salacgrīva	E	01/07/2012	2 501
3	Ground heat pump, Salacgrīva rural territory	H	01/07/2012	3 834
4	Heat pump, Salacgrīva	H	25/06/2012	5 143

Administrative sector

Thanks to the possibilities to attract co-financing from Climate Change Financial Instrument and European funds, a number renewable energy projects have been implemented in municipality owned buildings have been renovated so far in Salacgrīva region (please see Table 6.3).

Salacgrīva regional municipality should take part in building renovation projects by attracting available co-financing. Results of implemented measures should be monitored and shown to public. Like in case of multi-apartment buildings, also information about the specific energy consumption in public buildings should be collected and analysed and should be publicly available to facilitate the exchange of information in society. This incentive could be followed by implementation of local building energy certification scheme. Such scheme allows the resident/buyer/tenant of the building (or apartment) to be informed about the building's

energy consumption.

Table 6.3

Public building renovation projects in Limbaži region

No.	Project	Project activities	Financial instrument	Realization
1	Heat pump demonstration project	Sea heat pump installation for district heating supply	eea grants	Implemented
	Solar-wind lighting system	Solar-wind lighting system installation in children playground in Salacgrīva	Municipal budget	Implemented
	Solar energy for hot water in Salacgrīva municipality	Integration of a solar collector in the system of sea heat pump	CCFI	Active

The municipality has the opportunity to organize various kinds of energy saving initiatives in municipal buildings and public infrastructure, starting with the implementation of green procurement criteria in public procurement and ending with an energy-efficient street lighting.

Ideas for energy efficiency measures in municipality:

- Information campaigns and information dissemination focused on energy efficiency measures in all sectors (including educational programs for schools), involving regional TV and newspaper;
- Awareness rising workshops;
- Competitions on best energy performance in different sectors;
- New technology demonstration projects;
- European Car Free Day activities and promotion of bike riding;
- Public building energy auditing;
- Building managers awareness raising about energy efficiency issues (e.g., thematic one-day training courses), and;
- Green public procurement guidelines for public institutions, private sector and society.

Industry and tertiary sector

Within several project competitions of the Climate Change Financial Instrument also legal persons are offered financial support for energy efficiency measures and installation of renewable energy technologies. So far approved projects in Salacgrīva region are listed in Table 6.4 below.

Table 6.4

RES utilization in enterprises

No	**Project**	**Project implementation**	**CO_2 reduction, tCO_2/a**
1	Greenhouse gas emission reduction in manufactory of JSC Brīvais Vilnis	Active	199
2	Building of a sports centre building in accordance to low energy consumption building principles	Active	n.a
3	Installation of mobile pellet boilers (Granulu Mobilais Siltums Ltd.)	Active	10 520
4	Wind park installation (Jēkabpils enerģija	Active	1 033

Ltd.)

Ideas for energy efficiency measures in industry sector:

- Energy auditing in industrial buildings and advices for energy reduction;
- Consultations on energy efficiency;
- Energy consumption data base about industrial buildings by sectors;
- Technological guidelines;
- Employee awareness rising about energy efficiency;
- Cooperation with ESCO companies;
- Utilization of waste heat energy;
- Promotion of energy consumers management, eco-design, EMAS and ISO environmental management certificates among enterprises.

6.3.1.2. Measures in distribution systems

District heating in Salacgrīva region is available in Salacgrīva and Ainaži cities and Liepupe parish. Data on heat losses in neighbouring regions shows that heat losses in distribution are 20% and higher.

In order to reduce heat losses in heat energy distribution systems a project for reconstruction of heat mines has been developed. The aim of the project is to reduce heat losses in district heating distribution in Salacgrīva city by establishing a common system where both boiler houses on opposite sides of the city are joined in a single distribution system and heat energy is be provided by a single boiler house.

Reconstruction of district heating pipelines should be implemented as far as possible.

6.3.1.3. Measures in heat generation sources

Reduction of energy consumption in energy production is related to several aspects: (1) improving the quality of fuel, and (2) increasing the efficiency of existing equipment or replacing installations.

One of the energy efficiency measures not requiring large investments is the arrangement of the existing system (e.g., adjustment of the boiler operation and other simple technological improvements).

Energy efficiency measures in the longer term should focus on the introduction of fuel quality standards (minimal ash content and moisture content). Biomass quality criteria should be incorporated in public procurement procedures. Regular training (technical assistance) about bioenergy technologies and effective use of these technologies is necessary.

In Salacgrīva region heat is mainly produced in old-fashioned and inefficient wood stoves with an average efficiency 30-40%. It is expected that in future there will be gradual transition to more modern and more efficient biomass technologies. Currently market offers firewood fired boilers with efficiency up to 75%, wood chips boilers with efficiency 80-82% and pellet boilers with efficiency up to 90%.

The idea of biomass gasification is becoming increasingly popular. In gasification process solid biomass is converted to gaseous fuel, thus significantly expanding the range of technologies that can be used for electricity production. Considering installation of new, modern technologies instead of existing ones, also the possible use of biomass gasification

should be considered. At municipality level this could be the task of local energy expert which is being sought.

6.3.2. Tourism activities

Due to large interest about the experience of renewable energy production and utilization in Salacgrīva region, the Salacgrīva Tourism information centre offers a two-hour excursion which includes following objects:

- Administrative building of North Vidzeme Biosphere Reserve (solar collector??);
- Shopping centre „Maxima" (heat pump);
- Children play ground „Nākotnes parks" (solar-wind lighting system);
- Camp site „Rakari" (heat pump);
- Recreation centre „Kapteiņu osta" (heat pump);
- Salacgrīva secondary school and kindergarten (heat pump), and;
- Ainaži wind generators.

The idea of green energy excursion route can be developed further, by providing new objects to visit, detailed information on project implementation and results, as well as interactive maps, factsheets and other promotional activities.

Excursion list could include as well manufacturing companies, households and public buildings that have implemented energy efficiency and renewable energy projects so far. Also the new bike road from Salacgrīva to Kuiviži can be integrated in the excursion.

To popularize Salacgrīva region as an environmentally friendly and sustainable region, also regional souvenirs could be related to renewable energy themes, showing municipalities incentives in this field (e.g., calendars, postcards, printed souvenirs).

6.4. Support measures to fulfil the actions

In Table 6.5 support measures to fulfil the above mentioned actions for the support of renewable energy and energy efficiency in Salacgrīva region are listed.

Table 6.5

Timetable of support measures

No	Action	Activity	Responsible	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Development of RES/EE excursion route	Collecting information on projects	Tourism and information centre, municipality											
		Choosing objects and contacting with project developers												
		Developing informative materials												
		Promotional activities												
		Route operation												
2	Information campaigns on RES and EE	Summarization of EE and RES best practice examples in the region and publication on the Salacgrīva regional municipality web page	Municipality											
		Development of apartment building energy consumption register and publication on the Salacgrīva regional municipality web page												
		Development of municipality owned building energy consumption register and publication on the Salacgrīva regional municipality web page												
		Information on the regional municipality web page on opportunities for obtaining co-financing for RES and EE projects; contact information about reliable energy auditors and building companies												
3	Awareness rising and consultations	Workshop organization about RES and EE topics	Municipality in cooperation with external organizations											
		Best practice visits												
		Consultations about legislation, technologies, economical aspects related to biomass collection, pre-treatment and use, etc.												
4	Promotion of RES and EE in municipality	Keeping up with current events, and project competitions. Writing project proposals as far as possible	Municipality	Constantly										
		Introduction of environmental criteria in public procurement procedures	Municipality											

No	Action	Activity	Responsible	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
5	Development of souvenir concept	Call for applications for ideas												
		Evaluation of ideas												
		Realization of ideas												
		The use of souvenirs for municipality representation purposes, in tourism information centers and elsewhere in the region												
6	Monitoring and corrective activities	Collection and evaluation of statistical data on regional biomass balance	Municipality, consultation company											
		Maintenance of RES and EE project register; analysis of results and information to the public	Municipality											
		Evaluation of action plan targets and activities, introduction of corrective activities	Municipality						Once a year					

6.5. Application of quality/sustainability criteria

Activities of bioenergy production cause impacts which can be categorized in various ways, for instance effects on greenhouse gas (GHG) emissions. Development of the bioregion should comply with the criteria of quality and sustainability. Sustainability standards are following:

- **Environmental**: GHG balance, energy balance, soil protection, water management, natural resource efficiency, ecosystems protection, waste management, adaptation capacity to environmental hazards and climate change, crop diversity, species protection, control of pests and use of chemicals and fertilizer, potentially hazardous atmospheric emissions other than greenhouse gases, land use change, use of GMOs, ecosystems connectivity, exotic species applications.
- **Social**: Participation, compliance with laws, monitoring of criteria performance, food security, working conditions of workers, planning, property rights and rights of use, respect for human rights, cultural acceptability, respecting minorities, `social cohesion, land availability for other human activities than food production, standard of living, noise impacts, visual impacts.
- **Economic**: Microeconomic sustainability, economic stability, employment generation, macroeconomic sustainability.

Considering the development of regional bioenergy and tourism market it must be taken into account that Salacgrīva region territory incorporates a number of areas of conservation that are under certain operational restrictions (see Figure 6.1). Largest part of Salacgrīva region incorporates in the North Vidzeme Biosphere Reserve (please, see Figure 6.2 below) with three functional zones under different management restrictions.

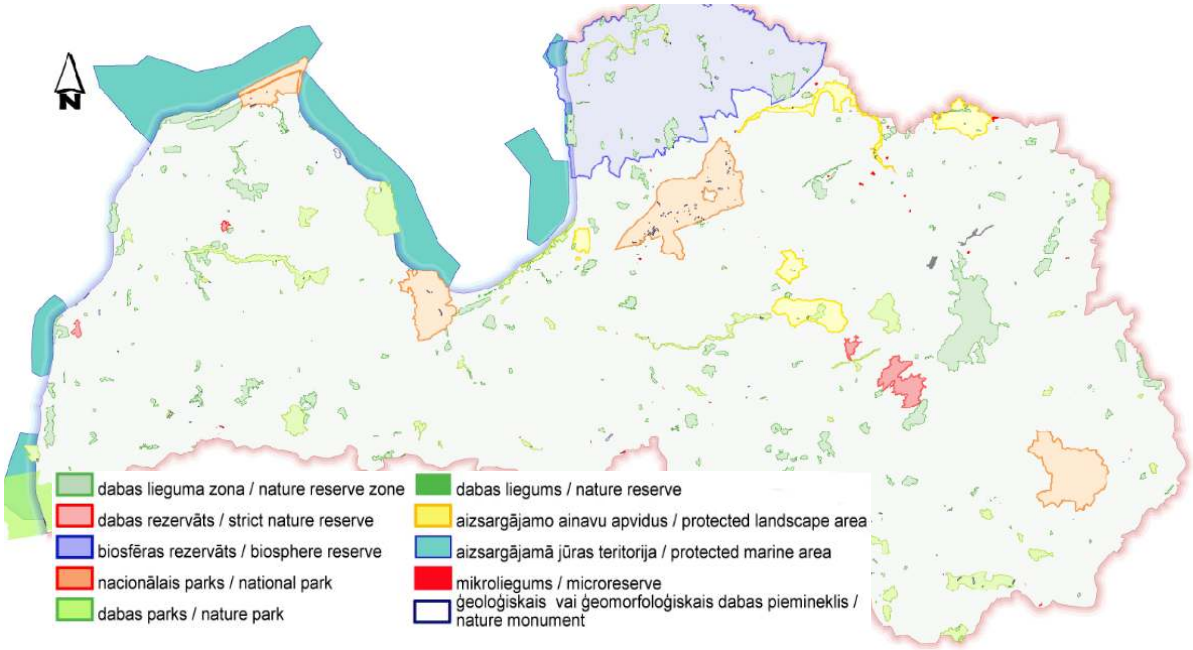

Figure 6.1.Special areas of conservation in Latvia [26]

[26] Picture source: http://www.daba.gov.lv/upload/Image/Ilustracijas/IADT_visa_LV_XXL.jpg

This includes: (1) core areas where economic activities are almost entirely prohibited, (2) buffer zones where economic activities are allowed but no environmentally harmful industrial development can be done, and (3) transition areas which are intensively used areas, residential areas, road networks.

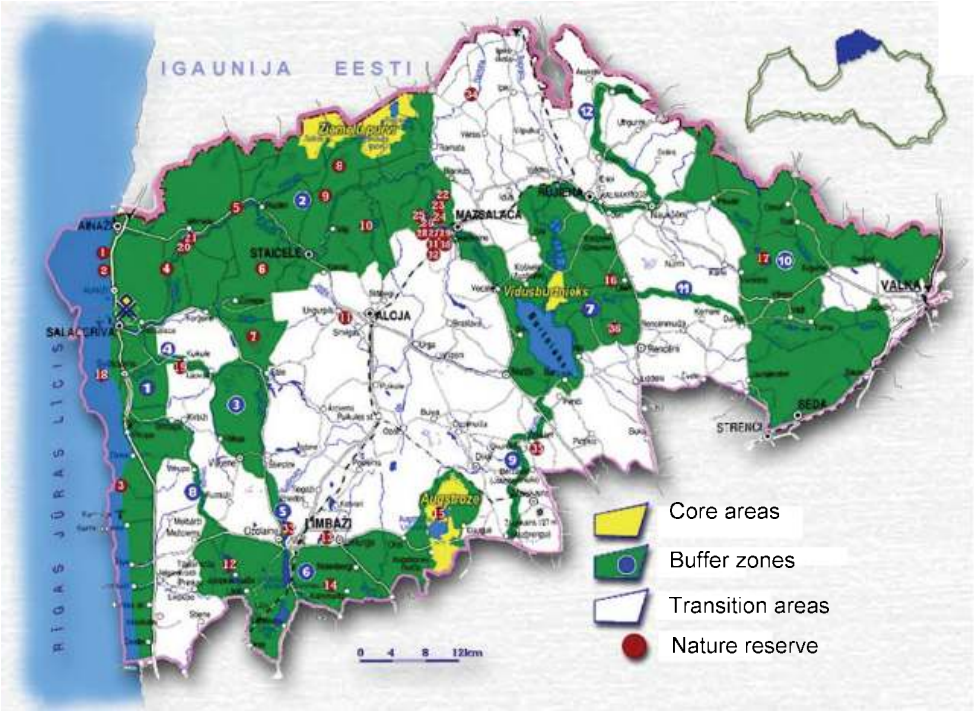

Figure 6.2.North Vidzeme Biosphere Reserve [27]

[27] Picture source: http://www.videsvestis.lv/issues/105/32/karte.htm

7. Impact Assessment

Implementation of the action plan will have a number of positive impacts at regional, national and EU level:

- Contribution to the implementation of national and EU level renewable energy and energy efficiency targets;
- CO_2 reduction and air quality improvement due to fossil fuel replacement with renewable sources;
- Reducing fuel consumption due to energy efficiency measures;
- Income for local forestry and wood processing companies, as well as wood fuel suppliers and tourism sector due to wide use of local wood fuel and tourist attraction, and;
- Public awareness and knowledge rising about renewable energy and energy efficiency topics.

When exploitation of biomass for energy production is considered, also the negative aspects should be considered. This includes food safety in the region, competition between sectors and possible influence on biodiversity. Although there is a little likelihood of possible negative influence on regional food safety because of large areas of unused agricultural lands in the region, still first the waste biomass should be exploited. Energy crops must be grown on a proper manner to prevent soil exhaustion. A proper selection of energy crops and manner of their growing can reduce the risk of biodiversity loss.

8. Progress Monitoring and Evaluation

To ensure the implementation of measures included in the action plan in accordance with the time schedule, a regular monitoring of activities and review of objectives and actions is planned. Responsible parties for the implementation of the action plan supervise the implementation process of the action plan in accordance with the timetable. Once a year, conclusions about the implementation of the action plan are sum up in a report, which, if necessary is followed by a review of action plan targets and actions. The report includes review of regional energy balance based on statistic data and the bioenergy characterization.

Monitoring of the action plan development and implementation of corrective measures, if necessary, is done by the working group once a year. Participants of the working group include Salacgrīva regional municipality representatives, representatives from Salacgrīva Tourism and information centre and other interested parties.