Bioenergy Promotion

A Baltic Sea Region project

WP3 Policy

Task 3.3

Country policy assessment report on bioenergy

LATVIA

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Contents

1. Purpose of the document

The following report has been prepared in the framework of the Interreg IVB project *Bioenergy Promotion* which is coordinated by the *Swedish Energy Agency* involving 33 partners from the Baltic Sea Region (BSR) including Norway. The document has been prepared in the framework of Work Package 3 (Policy). The main rationale of this work package is to support the development of coherent national and (sub)regional policies promoting the *sustainable* production and consumption of bioenergy.

The purpose of the *country policy assessment report* is to describe the main promotional policies and support schemes for bioenergy and to assess to what extent national policy frameworks including the National Renewable Energy Action Plans (NREAPs) contribute to *Sustainable Development* and integrate related sustainability principles and criteria. This assessment takes into account the

a) binding sustainability criteria for biofuels/bioliquids contained in the Renewable Energy Directive (RED),
b) the non-binding criteria/recommendations contained in the European Commission's report COM (2010)11 regarding sustainability requirements for solid and gaseous biomass used in electricity, heating and cooling,
c) the sustainability principles and criteria developed for the BSR in the framework of *Bioenergy Promotion*, particularly those which are not covered by the RED (e.g. resource efficiency, energy efficiency).

The report concludes with a brief summary of policy needs and recommendations.

2. Status quo of bioenergy use and biomass potentials

Latvia's energy demand is secured by local energy resources and the import of primary resources from the Russian Federation, the CIS countries, the Baltic countries, EU and other countries. Currently, three types of energy resources dominate in Latvia's primary energy balance contributing with fairly equal shares – oil products (mainly petrol and diesel), natural gas and wood fuel. Like many other European Union (hereinafter – EU) countries, Latvia is dependent on imports of primary energy resources. Taking into account the reduced economic activity in Latvia as a consequence of the financial crisis, renewable energy sources (RES) maintained a significant share in Latvia's primary energy balance although final energy consumption fell during 2008 and 2009 and started to increase in 2010.

According to data available in Information Report Republic of Latvia National Renewable Energy Action Plan (further NREAP) the share of RES has traditionally been significant in Latvia's energy supply and in 2008 it amounted to 29.9% of total final energy consumption. The rapid growth of final energy consumption and the slow development of RES projects reduced the RES proportion by 2.6% compared to 2005. In 2008, RES made up 39.6% of total final consumption of electricity, the largest part (slightly over 97%), covered by large hydropower plants, with the remainder coming from wind power plants, biomass cogeneration plants and small hydropower plants. RES make up the largest proportion in final heat consumption, including district heating, amounting to 42.7 % in year 2008.

Taking into account the potential of economically usable RES available in Latvia, the main types of RES will continue to be solid biomass, mainly wood, as well as biogas, wind power and hydro power. Imports of fossil energy resources are characterised by large price fluctuations, which hampers the sustained development of the economy. Taking into account that natural gas is imported from only one country –the Russian Federation –, and having regard to the domestic potential of RES in Latvia and the significant share of RES in Latvia's primary energy resource balance, also compared to other EU Member States, the Latvian government should seek to achieve national energy independence both through promotional measures aiming to increase energy efficiency, to increase the share of local RES in energy supply, to diversify energy resources and to reduce energy imports.

Biomass is the most important local fuel in Latvia, where forests cover approximately 50% of the national territory. Therefore, in order to achieve the mandatory national renewable energy targets imposed upon Latvia, the use of wood, wood residues and other biomass sources has to increase, particularly in the heating sector. Taking into account existing heat loads and operating fossil fuel boilers, it can be expected that the replacement of existing technologies and conversion to biomass will happen gradually, through the implementation of highly efficient cogeneration projects.[1]

Total final energy consumption in 2008 was 178.7 PJ. The structure of final consumption in 2008 was as follows - households 34%, transport 30,6%, services and construction 17,1 %, industry 15,2% and agriculture, forestry, hunting, fisheries 3,1%.

The share of bioenergy in total energy consumption in 2008 was **21.8%** consisting of fuel wood. The share of bioenergy in electricity production was 0.5% consisting of fuel wood, landfill and sewage sludge gas in CHP plants. The share of bioenergy in the heating/ccoling sector was 16% (14.5% fuel wood used in boiler houses, 1.4% fuel wood used in CHP plants and 0.1% sewage sludge gas).The share of biofuels in the transport sector was 0.2% in 2008.

In 2010, the total consumption of primary energy resources in Latvia amounted to 200.5 PJ and self-sufficiency amounted to 33.5%. In the total consumption of primary energy sources, fuelwood with its total consumption forming 51.4 PJ was the most widely used local energy resource, electricity generated in hydropower stations and wind power stations constituted 12.8 PJ.[2]

[1] Ministry of Economics (2011): Explanatory statement on National Renewable Energy Action Plan. [14].
[2] Ministry of Economics internet resources: www.em.gov.lv

Table 1. Biomass supply in 2006 (corrected Table 7 from the National Renewable Energy Action Plan)

Sector of origin		Amount of domestic resource	Imported		Exported		Net amount	Primary energy production (ktoe)
			EU	Non-EU	EU	Non-EU		
A. Biomass from forestry (m^3)								
1. Direct supply of wood biomass from forests and other wooded land for energy generation		**1,380**	**90**		**2,568.6**		**4,038.6**	**2,827.02**
2. Wood biomass for energy generation from wood processing by-products (timber waste and wood chips)		**678**	**26.4**		**756.8**		**1,461.2**	**1,022.84**
B. Biomass from agriculture and fisheries (ktoe)								
Of which: 1. Agricultural crops and fishery products directly provided for energy generation		**48.222**		**0.824**			**49.046**	**17,164,968 (thousand litres)**
2. Agricultural by- products/processed residues and fishery by-products for energy generation								
2.1. Liquid manure		*1,619.9*						
2.2. Manure		*3,503.2*						
2.3. Crop production waste		*418.9*						
C. Biomass from waste (ktoe)								
1.Biodegradable fraction of municipal solid waste including biowaste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants		**79.6**	**17.64**				**1,420.4**	
2. Biodegradable fraction of industrial waste (including paper, cardboard, pellets)		**14.6**	**6.3**		**5.94**			
3. Sewage sludge		**23.9**						

Source: Ministry of Economy (2011) [14].

Table 2. Estimated biomass domestic supply in 2015 and 2020 (corrected Table 7a from the National Renewable Energy Action Plan)

		2015		2020	
		Expected amount of domestic resource	**Primary energy production (ktoe)**	**Expected amount of domestic resource**	**Primary energy production (ktoe)**
A. Biomass from forestry	1. Direct supply of wood biomass from forests and other wooded land for energy generation				
	2. Indirect supply of wood biomass for energy generation				
B. Biomass from agriculture and fisheries	1. Agricultural crops and fishery products directly provided for energy generation	87,247		90,737	
	2. Agricultural by-products/processed residues and fishery by- products for energy generation				
C Biomass from waste	1. Biodegradable fraction of municipal solid waste including biowaste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) and landfill gas				
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)				
	3. sewage sludge				

Source: Ministry of Economy (2011) [14].

The wood felling volume from forestry, in the time period from 2006 – 2008 was ~15.8 mln.m^3 per year, the total amount from forest cuttings ~ 14.3 milj.m^3 per year, from non-forestry lands ~ 0.8 million m^3 per year[3]. In the NREAP it is stated that potentially available wood resources total to 5.5 – 6.9 mln.m^3, including the potentially available amount of wood from forestry and non-forestry land of 1.9 – 3.3 mln.m^3.

If the felling conditions will not change, the availability of domestic wood biomass in 2015 and 2020 will be the same as in the period 2006 – 2008. Research on wood fuel availability shows that if the felling conditions remain the same as in 2007, in 2010 and 2015 it will be possible to produce in total 1,05 ktoe of energy (Figure 1) from fuel wood of which[4]

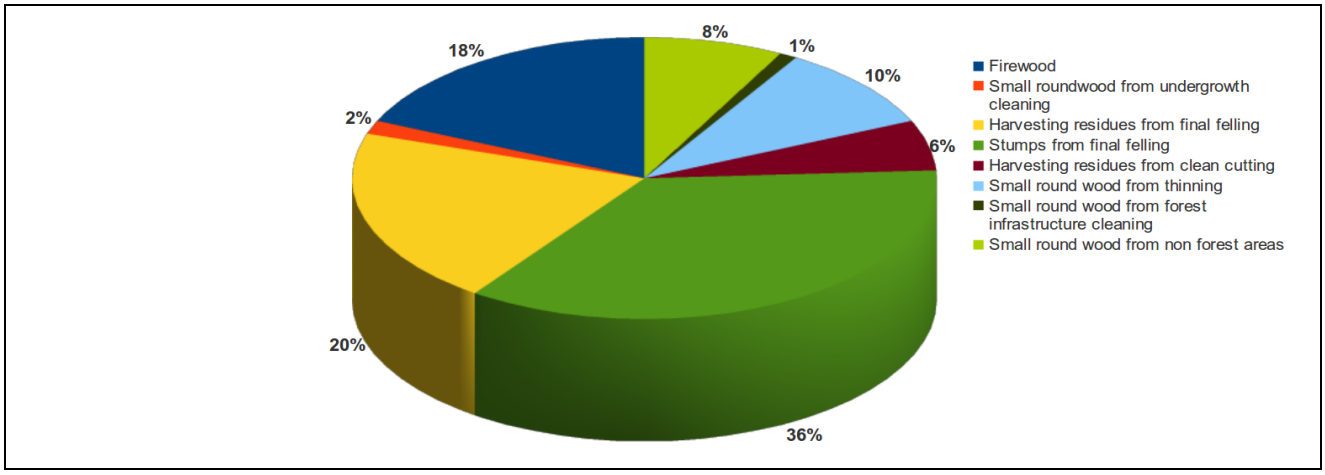
- from firewood - 0.19 ktoe,
- small roundwood from undergrowth cleaning – 0.016 ktoe,
- harvesting residues from final felling – 0.21 ktoe,
- stumps from final felling – 0.37 ktoe,
- harvesting residues from clean cutting – 0.06 ktoe,
- small round wood from thinning – 0.10 ktoe,

[3] www.vmd.gov.lv

[4] Biomasas izmantošanas ilgtspējības kritēriju pielietošana un pasākumu izstrāde, Valsts SIA Vides projekti, 2009

- small round wood from forest infrastructure cleaning – 0.01 ktoe,
- small round wood from non forested areas – 0.08 ktoe, in total 1.05 ktoe.

Figure 1: Potential fuel wood from forest operations in 2015 and 2020[5]



During 2006-2008, the changes in Latvia's annual total amount of utilizable wood were not large and comprised ~15.882 million m^3, where the total amount of harvested wood from forestry was ~14.3 million m^3 and from non-forestry sources ~0.5 million m^3. In addition, the potential total amount of available wood is around 5.5-6.9 million m^3. Since 2007, the amount of sawn-wood production has decreased, which has changed the nature of wood-processing by-products while not affecting the total amount of wood-processing by-products. The total amount of wood-fuel exported in the last seven years is within the range of 2-3 million tons annually and it is estimated that such volumes could be maintained up to 2015, unless there are unforeseen circumstances. The total amount of wood-fuel imported in the last seven years has not exceeded 1/10 of the exported amount.

Short-rotation wood-fuel plantations in Latvia cover around 200 ha. Providing that local consumption remains unchanged, the amount of wood-fuel exported in 2015 and 2020 might be in the range 2-3 million t.

[5] Summary prepared according to the research report on application of sustainability criteria to solid biofuel - http://www.varam.gov.lv/lat/print/files/text/Darb_jomas/atjaun//Finaldraft_Biomasa27012009.doc

Table 3. Agricultural land use for production of crops dedicated to energy in 2006energy crop cultivation in 2006

Agricultural land use for production of dedicated energy crops	Surface (ha)
1. Land used for short rotation trees (willows, poplars)	200
2. Land used for other energy crops such as grasses (reed canary grass, switch grass, Miscanthus), sorghum	> 200*

Source: National Renewable Energy Action Plan, Table 8.
*The Ministry of Agriculture does not have any precise information available.

3. Bioenergy strategies, targets and action plans

3.1 National Renewable Energy Action Plan (NREAP) (2010)

Latvia's medium-term energy policy planning documents consolidate the objective of increasing the share of renewable energy sources in electricity, heating and cooling, and transport, however, Latvia needs to establish a unified strategy so that it is possible to fulfil the requirements provided for by the renewable Energy Directive Directive (2009/28/EC)[6]

The National Renewable Energy Action Plan (NREAP) was elaborated as an information report thus excluding the need to apply several procedures, for example environmental impact assessment as well as public consultations.

Under the provisions of Annex I(A) to Directive 2009/28/EC, Latvia's overall objective, provided for by the NREAP, is to increase the share of energy produced from renewable energy sources (hereinafter – RES) **in gross final energy consumption** from 32.6% in 2005 **to 40% in 2020.** The expected total amount of RES to be utilized in 2020 equals to 1,918 ktoe.

The NREAP contains indicative targets for the share of RES in each sub-sector of final energy consumption (heating and cooling, electricity, transport), to foster the fulfilment of the overall objective pursuant to Directive 2009/28/EC, taking into account the potential RES available and usable in Latvia.

Table 4. The national 2020 targets for energy from renewable energy sources in heating and cooling, electricity and transport

	2005 (%)	**2020 (%)**
RE-heating and cooling	42.7	53.4
RE-electricity	44.9	59.8
RE-transport	0.9	10
Total RE share	32.6	40

Source: National Renewable Energy Action Plan.

The *National Renewable Energy Action Plan* stipulates that Latvia's main RES sources are concentrated in agriculture and forestry, which could make up 60-80% of all the economically utilizable RES potential in Latvia. The remaining sources are provided by solar radiation, wind and geothermal heat. However no quantitative policy targets for bio-electricity, bioheat or biofuels have been set. Neither is there any overall target for the share of bioenergy in final energy consumption 2020.

[6] Information Report Republic of Latvia National Renewable Energy Action Plan for implementing Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources.

Regarding the assesment of biomass supply/consumption as well as import and export needs, only the forestry sector has been analysed in more detail. In the NREAP it is stated that the potential total amount of available wood is around 5.5-6.9 million m^3. The total amount of wood fuel exported during the last seven years is within the range of 2-3 million tons annually and it is estimated that such volumes could be maintained up to 2015, unless there are unforeseen circumstances.

The total amount of wood-fuel imported in the last seven years has not exceeded 1/10 of the exported volumes. In its *Explanatory statement* referring to the NREAP the Latvian Ministry of Economics argued that Latvia will achieve the target for 2020 by using local renewable energy sources, and that therefore it is not possible to forecast the amount of biomass to be imported or to specify countries supplying raw material to Latvia (Latvian Ministry of Economy 2011).

The NREAP describes existing and planned measures for the promotion of renewable energy sources. Below we provide a brief summary of the most important measures:

Current measures to promote the use of RES in the **electricity sector**:

A. Mandatory electricity purchase schemes:

- Within the framework of mandatory procurement, there is a tariff and guaranteed payment for installed electrical capacity for electricity generated from RES. Price formulas are applied to the determination of mandatory procurement prices for electricity generated from biomass, biogas, solar or wind power plants, as well as hydropower plants with an installed electrical capacity of less than 5 MW;
- For electricity produced in cogeneration process no quantitative restrictions exist in mandatory procurement;
- Currently until 1st of January 2013 no competition for new rights to sell electricity produced from RES will be organized, except for the electricity produced in cogeneration process from RES.

B. Support for investments:

- The Operational Programme 'Infrastructure and Services', complementary Activity 3.5.2.2 'Development of cogeneration power plants using renewable energy sources'' financed from the Cohesion Fund (CF) provides aid up to 50% of eligible expenses for the construction of new cogeneration power plants using RES and for the re-construction of existing boiler houses to cogeneration power plants using RES.
- Latvia's Rural Development Programme 2007-2013 (hereinafter – RDP), Measure 'Support for the creation and development of undertakings (considering diversification of activities not connected with agriculture)' Submeasure 'Energy generation from biomass of agricultural and forestry origin'. provides support to promote the production of biogas by means of anaerobic fermentation to generate electricity.

Current measures to promote the use of RES in the **heating /cooling** sector:

- The Government encourages the use of combined heat and power (CHP) production from renewable energy sources. Generators producing electricity in a cogeneration process utilizing biomass and biogas can claim mandatory procurement rights or receive guaranteed payment for the installed capacity.
- The Government encourages the use of district heating and cooling using renewable energy sources by help of different fiscal measures. Projects are funded from the European Union Structural Funds 2007-2013 by way of direct investment grants which cover at least 25% of all eligible expenditure. Under this scheme, support can be received for investments in the installation of new cogeneration plants and the conversion of existing boilers into cogeneration plants using RES. Furthermore, support will be received for the use of biomass and biogas.
- The Government encourages the use of small-scale heating and cooling from renewable energy sources by help of investment support for RES utilizing Cohesion Fund resources and the climate

change financial instrument established by the Law on the Participation of the Republic of Latvia in the Kyoto Protocol Flexible Mechanisms.

- The Government encourages the use of heating and cooling from renewable energy sources in industrial applications. Support to promote the use of RES in industry sector heating and cooling is available through Cohesion Fund - Measures to improve heating system efficiency for enterprises.

Current measures to promote the use of RES in the **transport** sector:

- A mandatory admixture of 5% of biofuel in fossil fuel was enacted on 1 October 2009.
- In order to promote **biofuel production**, the Ministry of Agriculture has drawn up and implemented the State aid programme 'Support for biofuel production' (N 540/2005; with amendments N 254/2007) under which direct State aid was provided until 2010.
- The use of biofuels is supported by reduced rates of excise duty.

The development scenario envisages that in the electricity sector the share of RES in gross final energy consumption increases from 44.9% in 2005 to 59.8% in 2020, in the heating and cooling sector from 42.7% to 53.4%, and in the transport sector from 0.9% to 10%.

It should be noted that the development of RES and the nominated interim targets for each sub-sector are subject to various uncertainty factors, for example changes in the relationship between fossil fuel and RES prices, the procedure of auctioning the GHG emissions allowances under the EU Emissions Trading System and the expected emissions allowance price, as well as the impact of planned support measures for RES utilization.

Table 5. Calculation table for the contribution of renewable energy in each sector to final energy consumption (ktoe)

	2005 (ktoe)	2020 (ktoe)
Expected gross final consumption of RE in heating and cooling	1,114	1,395
Expected gross final consumption of electricity generated from RES	261	446
Expected final energy consumption generated from RES for transport	7	83
Expected total consumption of RES	1,377	1,918

Source: National Renewable Energy Action Plan.

The NREAP chapter on *Specific measures for the promotion of the use of energy from biomass* assesses the current amount of available biomass from fisheries, agriculture (crop acreage with high energy values) and forest biomass. There are no measures planned to encourage unused arable land, degraded land, etc. to be used for energy purposes. Regarding production of biogas it is planned to use biogas obtained from manure for energy generation. Specific measures for promoting the use of energy of biomass are not mentioned.

3.2 Guidelines for Energy Sector Development 2007-2016 (2006)

In 2006 the Government published its Guidelines for Energy Sector Development, with an aim to increase energy supply security; ensure energy availability and sufficiency, improve the energy supply infrastructure, to increase energy efficiency, the effective use of renewable energy sources and the production of energy in cogeneration processes.

In the Guidelines it is stated that the use of renewable energy sources should be corrected according to the sustainability of forestry and agriculture development.

Compared to the targets which have been set later in the NREAP in 2010, the Guidelines formulated a more ambitious target for biofuels in the transport sector (RES-T). According to the guidelines, in 2016 the share of biofuels should reach 10% and in 2020 15%. As we mentioned already, the NREAP envisages a target of

10% of renewable energy in transport in 2020.

The policy document envisages the promotion of bioenergy use mainly in electricity and heat production in cogeneration process co-firing biomass with fossil fuels.

3.3 The Strategy for the Utilization of Renewable Energy Sources 2006-2013 (2006)

This policy document was launched in 2006 with the purpose to increase the share of renewable energy resources in the national energy balance. It sets out the following priorities:

- Enhancing the competitiveness of renewable energy sources;
- Biomass use for heat and power generation;
- New renewable energy technologies in pilot projects;
- Scientific research

3.4 Energy Strategy 2030 (Draft)

The new Energy Strategy 2030 is under development in Latvia, and the first version of this document was released on 14.12.2011 [16]. The following three main aims are defined in Energy Strategy:

- **Balanced, effective and market based energy system**, providing competitiveness in region and in world;
- **Sustainable energy**, by reducing dependence from imports, by development of new effective technologies for utilization of renewable resources and by energy-efficiency improvement;
- **Security of energy supply**, providing stable supplies affordable for energy consumers by development of infrastructure.

According to the proposed Energy Strategy 2030 the main energy policy directions are the following:

- Security of energy supply and foreign energy policy (e.g. reduction of electricity and natural gas imports by 50%);
- Increase of energy efficiency (e.g. reduction of average specific annual heat consumption for buildings from 289 kWh/m^2 to 100 kWh/m^2);
- Promoting the use of renewable energy sources (e.g. the share of renewable energy in gross final energy consumption should achieve 50% in 2030);
- Promoting the extraction and utilization of other domestic energy sources, particularly peat.
- Development of the infrastructure for the national energy system (e.g. new electricity connection line 'Circle Kurzeme' should be commissioned in 2018);
- Promoting the development of effectively functioning electricity and gas markets (e.g. realization of Baltic Energy Market Interconnection Plan for ensuring uniform electricity market conditions for all market participants in three Baltic states);
- Tax policy and emissions trading policy;
- Promoting the competitiveness of the energy sector;
- Scientific developments and innovations in energy.

The following biomass to energy directions should be supported according to Energy Strategy 2030:

1. Introduction of 2nd generation biofuels production technology aid by additional payments and/or grants, involvement of researchers from chemical and biotechnology areas in a project, aiming to introduce BTL biodiesel technologies in the Latvian market and to provide competitivness of export of such a technologies.

2. Elaboration of effective technology for electricity production from biomass in form of experimental or demonstration project, by appreciation of development of forest and wood-processing sectors and metal working technologies.

An Action Plan for Implementation of Energy Strategy in the period 2011-2015 should be elaborated, both to comply with binding international goals and short-term goals contained in planning documents in Latvia. The next Action Plan for Implementation of Energy Strategy will cover the period after 2015.

4. Policies promoting sustainable production and use of bioenergy

4.1 Binding EU minimum sustainability requirements for bioenergy

4.1.1 Transport biofuels and bioliquids

The Renewable Energy Directive 2009/28/EC contains binding sustainability criteria for biofuels and bioliquids.To implement the sustainability criteria on national level the following amendments to existing legislation are planned:

a) Amendments to the Law on Biofuel

Sustainability criteria apply to biofuels/bioliquids that are produced in the EU and to imported biofuels/bioliquids and shall be applied when biofuels/bioliquids:

- are considered to fulfil the renewable energy targets pursuant to the Renewable Energy Directive;
- are used to fulfil renewable energy obligations;
- receive financial support;
- are recorded as a Fuel Quality Directive target to reduce greenhouse gas emissions (only for biofuels);
- receive investment and/or operational assistance pursuant to Community guidelines on State assistance for environmental protection (only for biofuels);
- are taken into account pursuant to the rules on the Regulation concerning the conversion of alternative fuel vehicles to CO_2 from passenger automobiles (only for E85 bioethanol).

b) Restrictions on amendments to the Law on Biofuel

The sustainability criteria apply to greenhouse gas savings, land with high biodiversity value, land with high carbon stocks and agri-environmental practices.

c) Ensuring record-keeping

The responsibility for submitting information on biofuels will be placed on the economic operators paying duty. Information concerning compliance with the sustainability criteria must be available throughout the fuel chain.

To ensure and verify compliance with good agro-environmental practices and other Cross Compliance rules at national level, Latvia has implemented mutual compliance, including provisions on good agricultural and environmental conditions pursuant to the terms of R73/2009 and stipulated in Division 2.4 ‘Provisions on good agricultural and environmental conditions’ (Clauses 24-27) of Cabinet Regulation No 269 of 17 April 2007 ‘Procedure for granting State and European Union aid under agricultural direct aid schemes’. In addition, a list with those legal requirements farmers have to comply with in terms of mutual compliance can be found in Annex 11 to the same Regulation.

Control (both administrative and on-site at farms) of mutual compliance is ensured by the competent authorities:

- the *Rural Support Service* – controls the compliance of farmers with the provisions for good agricultural and environmental condition, as well as mutual compliance with environmental conformity requirements;
- the *State Plant Protection Service* – responsible for public, animal and plant health protection issues connected with plant health protection, and environmental issues connected with crop fertilization plans in specially sensitive areas;
- the *State Forestry Service* – responsible for environmental issues connected with forested areas.

In infringement cases, the direct payments are reduced.

Below we briefly describe the Latvian certification system.

Description of Latvian national certification scheme (according to Cabinet of Ministers Regulation No. 545, in force from 20.07.2011):

- The biomass producer, first buyer of crops, refiner or trader should register in the register developed by the *Rural Support Service*;
- The biomass producer can recieve a statement from the *Rural Support Service* that the raw material is not obtained from land with high biodiversity value and from land with high carbon stock;
- Biomass should be obtained from agricultural areas which can apply in the Single Area Payment Scheme (SAPS). Agricultural areas can apply for SAPS if they are maintained in good environmental and agricultural condition.
- In its statement the *Rural Support Service* determines the maximum volume of biomass for each biomass producer;
- In the register, first buyers of crops, refiners and suppliers should provide information on compliance with sustainability criteria regarding the origin of the biomass as well as data on GHG emissions using calculated (not available yet) or standard values;
- Once a year traders should audit the provided information involving external independent auditors.

As the regulation for the certification system is in force only for a couple of months it can be foreseen that the system will be improved. At this stage, no comments from involved stakeholders have been recieved.

4.1.2 Solid and gaseous biomass used in electricity, heating and cooling

As the implementation of the binding EU minimum sustainability requirements for biofuels/bioliquids is still in the implementation process, no official position of the Latvian government towards **extending** the sustainability criteria for biofuels/bioliquids **to solid/gaseous biomass used in electricity, heating/cooling** exists.

4.2 Integration of sustainability requirements into national support schemes

4.2.1 Biomass mobilisation and supply from agriculture and agricultural by-products

Since 2009 there are no additional payments for energy crops. However, referring to biogas, this aid was not utilized for biogas production in Latvia widely, due to the small number of biogas plants utilizing plant biomass before 2010.

Key support schemes currently available include **direct payments** granted directly to farmers under the **Single Area Payment Scheme** (SAPS). This involves the payment of uniform amounts per eligible hectares of agricultural area, which was maintained in good agricultural and environmental condition. There are a number of good agricultural and environmental conditions for receiving direct payments, e.g. fertilisers shall not be used 10 meters within the water course, which is determined according to the laws and regulations on classification of water basin economic districts.

Regarding the use of perennial energy cops, farmers can apply for direct payments for short rotation coppice (willow, poplar and alder). Plantations can not be established in meliorated lands.

4.2.2 Biomass mobilisation and supply from unused arable and degraded land

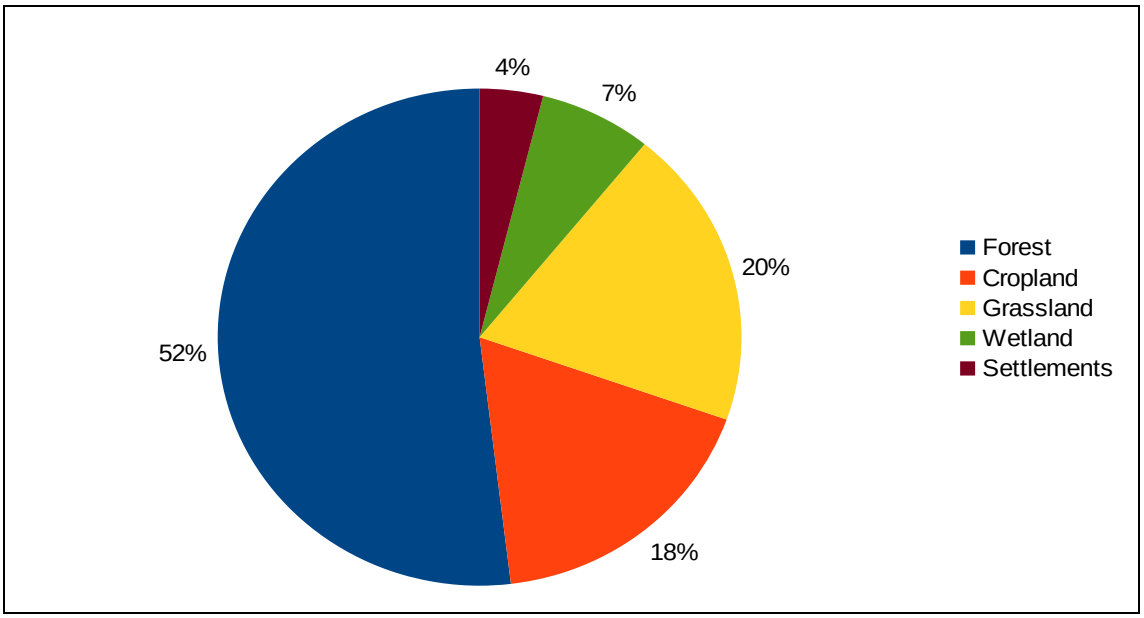
The NREAP does not contain measures to encourage the utilization of unused arable land and degraded land for energy purposes. About 50 per cent of the territory of Latvia is covered by forests (cf. Figure 2), including 218,000-258,000 ha[7] of afforested farmlands. The total stem wood volume in this land use category amounts to about 4 mill. m^3. The potential of short rotation tree plantations for bioenergy or roundwood production in these lands is hard to predict, because of very diverse local conditions in each site; however assuming that a half of these lands are suitable for establishment of short rotation woody crops for bioenergy, the biomass output would be around 4-4.5 mill.MWh of primary energy annually. The rest would

[7] The value depends from calculation method – the largest value includes all arable lands fitting to thresholds of the forest definition of the forest law, the smallest value excludes occasionally cut grasslands.

provide in their lifetime 17-20 mill.MWh of primary energy as harvesting residues, up to 40 mill.MWh as stumps and about 18 mill.MWh as firewood assortment (78 mill.MWh in total or 1mill. MWh annually in average). The most prospective crops in short rotation tree plantations are willow, hybrid poplar, hybrid aspen, grey alder, as well as spruce, which might be requested in larger amounts by the pellet factories in the future. The investments necessary to establish short rotation energy crops or plantation forests in these areas could range from 100-300 mill.EUR, depending on the crop system and the extend of this movement.

Besides, there are about 1.2 mill. ha of so called permanent grasslands, which can persist due to constant subsidies for cutting grass. Most of these lands do not provide any additional economic value and can be utilized for biomass for energy production in short rotation systems. Assuming that half of these lands are used for short rotation crops, the biomass for energy output could be around 24 mill. MWh of primary energy annually. The necessary investments could range from 400 to 800 mill.EUR, depending on the crop.

Figure 2: Structure of land use in Latvia



Source: Rural support service

There are no support schemes in place to boost biomass for energy from unused arable lands or degraded lands. Recent changes in the regulations on area payments for land owners can be considered as the first step to support biomass for energy production on abandoned arable lands. Now energy crops are not considered as badly managed farmland and owners of these areas are eligible to request the area payment. Cultivation of energy crops has to comply with local regulations on protected and nature conservation areas and buffer zones. Herbaceous crops have to comply with specific regulations on harvesting season to secure maintenance of biological diversity and to reduce distribution of weeds to neighbouring fields. Biomass is cut down, but not utilized in most of grassland areas receiving aid for keeping the land in good agricultural condition in Latvia. There is a need of financial support for utilization of this biomass for energy, especially in high biodiversity areas, due to low biomass yield, complex harvesting conditions and higher transport distances. Utilization of fertilizers is determined by regulations on fertilizers and use of wastewater sludge and their composts. No regulations exist for wood ash.

Two approaches can be used to mobilise biomass from naturally forested agricultural land with different applicable support instruments:

- To receive direct payments as agricultural land;
- To convert the land to forest.

4.2.3 Biomass mobilisation and supply from forestry and forest based industries

Fuel wood in Latvia is produced by public and private companies. Forest based industries which are involved in mobilisation and deliveries of biomass are – harvesting, primary wood industry and woodworking industry. Forest biomass for energy supply in Latvia is historically market driven and there are no support schemes for production and delivery of certain types of woody biomass for energy purposes or certain supply chains.

The Rural Development Programme 2007-2013 includes several measures, which support the purchase of machinery that can be utilized for forest biomass production for energy purposes (chippers, general purpose trailers); however, these activities have only negligible effects, because the support is commonly used for small scale applications, like manually fed chippers, which have considerably higher production costs than industrial crushers and chippers. The support scheme „Energy production from agricultural and forestry derived biomass" under the Rural Development Programme 2007-2013 " cannot be considered a forestry related support scheme, because it mainly targets biogas production and utilization for electricity production.

The legal framework relevant for production of forest biomass for energy in Latvia is covered by a number of forest regulations, such as restrictions for final felling, commercial and pre-commercial thinning, regeneration of forests and harvesting of trees on-non forest lands. Those regulations do not differentiate between biomass for energy assortments and traditional roundwood assortments. The only regulation differentiating between roundwood assortments and felling residues (tops and branches) is the Regulation on Forest Protection Measures and Announcement of Extraordinary Situations in Forests. This regulations sets requirements for temporal storage of harvesting residues in forest stand and at a roadside.

4.2.4 Biomass mobilisation and supply from biodegradable fractions of municipal waste, industrial waste, sewage sludge

For waste management companies the utilization of biogas for electric power and/or heat production is a promising solution to reduce organic waste volumes, as requested by the EU Waste Framework Directive (2006/12/EC). This is particularly the case for material with high moisture content, for which other processing methods are not suitable.

Taking into account the overall waste management situation in Latvia, the food production and processing industry is not interested in renewable energy production from production residues. However, a gradual increase in waste disposal costs, and improved waste management practices (in the first - grading) in the future, could raise the interest of food waste producers to provide materials for energy production, especially when disposal costs could be transformed into real income.

In the waste water treatment sector, biogas is one of the available options for sewage sludge treatment. Thus, there is an opportunity to profit from potential losses, as well as improve the quality of a given area. At the same time this option allows for hyginesation of sludges.

Local governments should play an important role in the development of renewable energy projects (sewage sludge, municipal waste). In many cases, they could be potential buyers of energy, which should provide a stable consumption, and successfully cooperate with the energy suppliers.

Support schemes for mobilisation and supply of biodegradable materials for bioenergy are policy driven and a result of umbrella legislation in the field of energy (Energy Act), waste management (Waste Management Act) and fiscal policy (Natural Resource Tax Act). Such schemes are supported by strategic plans and programmes, which have been elaborated, setting the goals and tasks in the field of biodegradable waste management and the use of renewable energy resources (Strategic Plan for Waste Management, Strategic Plan for the Use of Renewable Energy Resources etc.).

The Latvian Government has set a goal that by the end of 2010 disposal of biodegradable waste in landfill sites must be reduced to 75% of the amount disposed in 1995; to 50% by the end of 2013 and to 35% by the end of 2020.

Recently the effective use of biomass in the field of heat and electricity production has been set as the

priority No 2 in the Strategy for the Utilization of Renewable Energy Resources adopted my the Cabinet of Ministers (cf. above, chapter 3). Hence, mobilization and supply of biodegradable fractions of municipal waste, industrial waste and sewage sludge for bioenergy is fostered by combining both positive and negative incentives.

The key instruments are legal acts (setting the framework and principles of goals, requirements and restrictions for waste management), fiscal measures (introducing tax system, diversified tariffs etc.) and support for investments (access to funds, specified financial instruments). For example, - 1) prohibitions and restrictions for disposal of biodegradable waste in landfill in Waste legislation; 2) bigger tax for the disposal of allowed biodegradable waste; 3) tax reduction and special procurement tariff for the installations producing heat or electricity from renewable energy resources (RER), including biomass; 4) special financial instruments, funding the investments for the conversion from fossil fuel installations to installations that use biomass.

Waste management policy sets the requirements and restrictions that foster the system to develop in the direction of waste separation and recovery, and it is aimed at various recovery goals (not only bioenergy). For example, the Regulation regarding the construction of landfill sites, the management, closure and re-cultivation of landfill sites and waste dumps (Cabinet of Ministers Regulation Nr.474.13/06/2006) includes a prohibition to dispose in a landfill site any liquid waste or sewage sludge if the water content therein is more than 80%, any organic food industrial waste and forestry waste if it is not being composted or used for the acquisition of landfill gas. This leads to a further increase of recoverable bio-waste and contributes to energy production (e.g. biogas).

The Strategic Waste Management Plan (2006-2020) contains additional measures which have not been introduced yet:

- A mandatory requirement for the separate collection of municipal biodegadable waste;
- Increasing natural resource tax rates for disposal of biodegadable waste in landfill sites;
- Financial support for innovative projects related to the recovery of biodegradable waste etc.

4.2.5 Bioelectricity (including CHP)

Latvia, being a Member State of the European Union, is obliged to develop and regularly evaluate national policies promoting the use of RES and their effectiveness, emphasising the significance of RES in the development of sustainable national energy policy, the need to increase self-sufficiency in electric power production capacity and to reduce the amount of imported electricity and Latvia's energy dependence.

The use of RES in electricity generation is mainly regulated by the following legal acts:

- Energy Act of 3 December 1998,
- Electricity Market Act (EML) of 5 May 2005,
- Cabinet Regulation No 262 and Cabinet Regulation No 221 of 10 March 2009 'Regulation on electricity generation and price determination when generating electricity by cogeneration'
- Act on Public Utility Regulators of 19 October 2000 and the corresponding Government Regulations.

The respective support mechanisms are monitored by the Ministry of Economics which performs supervision of generators and maintains the right to repeal decisions on rights to sell electricity should rules be infringed within the framework of mandatory procurement. Procurement tariffs are covered by the system operator who, in turn, incorporates the procurement tariff cost in the tariff for end consumers. The public utility regulatory authority coordinates the relationships between system users and system operators.

The Government is currently drafting the Law on Renewable Energy, which is going to replace the current support schemes for electricity generated from RES with schemes promoting both electricity generation from RES and the efficient utilization of district heating, mainly by facilitating the competitiveness of renewable energy.

Policy measures to promote the use of RES in electricity can be divided into (A) mandatory electricity

purchase scheme which is currently amended and (B) financial support for investments covered by the Cohesion Fund and European Agricultural Fund for Rural Development. Below we briefly describe both types of support:

A Mandatory electricity purchase scheme

Table 6 contains a comparison of the existing and planned purchase scheme for electricity from RES.

Table 6. Comparing the existing and planned purchase scheme for electricity from RES

	Existing purchase scheme	**Planned purchase scheme[8]**
Main principle of support	1) Operators who generate electricity from RES **can claim rights to sell electricity to the public trader** within the framework of mandatory procurement or 2) Generators producing electricity in power plants with installed electrical capacity above 1 MW using biomass or biogas may acquire the right to **receive guaranteed payment for the installed electrical capacity**.	1) **Feed in premiums** consisting of: a) a power component - producer who is able to provide electric power installed capacity utilization hours of not less than 3,500 hours per year; b) a GHG component c) an agricultural component - if the animal by-products and derived products account for at least 70% of the raw materials consumed by the cogeneration plant fermentation. 2) **Support** for renewable energy production, which does not exceed 5 MW, **connection to the electricity grid.**
Combined heat and power (CHP) production	No obligations to sell heat produced in cogeneration processes. There are no quantitative restrictions on the purchase of electricity generated from RES in a cogeneration process within the framework of mandatory procurement.	50% of heat produced in cogeneration processes should be sold for heat production or used for economic activities.
Differentiation of financial support according to technology	Support is differentiated according to the RES used and depending on the power plant's installed electrical capacity by applying certain coefficients.	The draft Law on Renewable Energy gives preference to those technologies that can ensure base load capacity, stipulating supplementary premiums for renewable energy generating plants.
Support for bioelectricity (comparative perspective)	Higher support for biogas plants compared to biomass electricity.	Support is higher if at least 70% agricultural products (animal by-products and derived products) are used for electricity production.
Long-term security and reliability	For economic operators who have acquired the right to sell electricity generated from RES the sales price for the volume of electricity they are entitled to sell within the framework of mandatory procurement, shall be calculated utilizing price calculation formulas for a **20-year period** pursuant to the current regulation in force. The corresponding coefficient is reduced by 20% for the second ten-year period.	Support is planned for **15 years**, however **there is uncertainy regarding the GHG component,** which is based on the GHG emission allowance market price at the BLUENEXT environmental trading exchange. The planned aid mechanism does not affect those producers which have obtained previously the right to sell electricity within the compulsory purchase framework.
Technology-specific targets	The current legislation does not provide	Technology-specific targets have not

[8] Planned purchase scheme according to draft Renewable Energy Law.

	for technology-specific targets.	been defined for the future.

The implementation of existing measures enabled to increase the number of operating biomass and biogas cogeneration plants to 30 with a total electric power capacity of 19 MW in Latvia (by September 2011).

Integration of sustainability criteria

The draft Law on Renewable Energy envisages different premimums depending on CO_2 emission savings and also for the use of manure and other agricultural by-products. This means that climate change mitigation efficiency and resource efficieny in the sense of land use effciciency are issues to be considered in the future. However, a number of experts consider that the proposed minimum shares - 70% of manure and other agricultural by-products – might be too complicated to implement and that the optimum share should consist of 50%.

Another positive aspect is that the draft Law on Renewable Energy envisages that 50% of heat produced in cogeneration processes should be sold or used for economic activities.

The key element to ensure the long term development of bioelectricity is to ensure reliability of support instruments. In the new Law on RES there is uncertainy regarding GHG component, which is based on emission allowance market price at the BLUENEXT in payment period. A more appropriate scheme would foresee more constant support with the degression.

While the new Law on Renewable Energy is not adopted yet, until 1st of January 2013 no competition for new rights to sell electricity produced from RES will be organized, except for the electricity produced in cogeneration process from RES.

B Support for investments

1. Operational Programme Infrastructure and Services

Under the Operational Programme *Infrastructure and Services*, complement Activity 3.5.2.2 'Development of cogeneration power plants using renewable energy sources', the construction of cogeneration power plants using renewable energy sources is financially supported. Support is provided to the construction of new cogeneration power plants using RES and for the re-construction of existing boiler houses into cogeneration power plants using RES. The maximum permissible Cohesion Fund funding under Activity 3.5.2.2 is 50 % of the total eligible expenditure, irrespective of the technology applied.

Integration of sustainability criteria (conditional support)

- Support can be obtained if the planned cogeneration unit meets certain efficiency criteria.
- Cogeneration units have to meet performance criteria and are entitled to sell electricity produced within the framework of mandatory procurement, where the primary energy savings calculated are:
  - more than 1% in small scale cogeneration units (installed power generation capacity is not more than one megawatt);
  - not less than 10% in other cogeneration units.

2. Rural Development Programme 2007-2013

Under Latvia's Rural Development Programme 2007-2013 (hereinafter – RDP), Measure 'Support for the creation and development of undertakings (considering diversification of activities not connected with agriculture)', Submeasure 'Energy generation from biomass of agricultural and forestry origin' financial support is provided to the production of biogas by means of anaerobic fermentation to generate electricity.

The support mainly applies to projects based on biogas from manure. Financial support does not exceed 40% of projects' expenditure and the scale of support is differentiated according to the capacity of generating plants (the larger the size, the lower the support).

Integration of sustainability criteria (conditional support)

- Support is directed mainly to the processing of agricultural manufacturing by-products and energy generation;
- The latest amendments (in force from 2.09.2011) contain additional support conditions – at least 30% of residual products of animal origin should be used; – 70% of the raw material should be provided from the own farm.
- Project developers shall retain existing jobs or create new jobs.

4.2.6 Bioheat

Over the last ten years Latvia has gained successful experience in converting district heating systems to biomass, which proved that good results could be achieved with limited resources (cf. National Renewable Energy Action Plan p.54). The development potential for more extensive use of biomass in Latvia must be linked to both district heating and electricity generation.

Support schemes promoting the use of biomass in CHP also indirectly promote the use of bio-heat. The Latvian **energy policy is focused on promoting co-generation**, particularly based on renewable energy sources, including biomass, by utilizing high-efficiency CHP development in Latvian cities, where the existing technical co-generation potential has been assessed at around 400 MWe.

The municipalities have a key role to play in promoting renewable heating (including) biomass based heating. Local governments, when performing their permanent functions assigned by law, shall organise the heat supply in their administrative territory and also promote energy efficiency and competition in the heat supply and fuel markets.

Local governments within the framework of their administrative spatial plans, having regard to regulations on the protection of the environment and cultural monuments as well as on the utilization of the local RES and cogeneration potential, and evaluating the security and long-term marginal costs of heat supply, may determine the development of heat supply and issue binding regulations (including priority zoning, cf. National Renewable Energy Action Plan, page 30).

Five Latvian cities (Riga, Jelgava, Jēkabpils, Valmiera and Tukums) have signed the Covenant of Mayors, an initiative of the European Commission and the EU Committee of Regions, voluntarily undertaking to draft regional action plans by 2020, which also mandate increasing RES utilization in the region's energy balance. The capital of Riga, with one third of the national population and housing stock, covering more than 50% of the national district heating market, approved its Sustainable Energy Action Plan on 6 July 2010 and submitted the Plan to the Covenant of Mayors Office. It is planned to introduce energy plans in local level. (cf. National Renewable Energy Action Plan, page 30).

The Energy Performance of Buildings Act contains the requirement to move toward RES utilization, evaluating their utilization potential. Section 7 of the Act prescribes that when designing buildings with a total area greater than 1,000 m^2, technical, environmental and economic considerations as well as binding local government regulations and other legislation shall be taken into account to evaluate the option to use systems using RES as an alternative solution in such buildings, for example decentralised energy supply systems, cogeneration systems, local heating and cooling systems or heat pumps (cf. National Renewable Energy Action Plan, page 31).

Taking into account the different types of heating, including centralised (or district) heating system; local heating systems and individual heating systems, our assessment will have to consider different support schemes:

1) EU Cohesion Fund

Programme: "Infrastructure and services" - "Measures for the district heating system efficiency"

- The programme covers the municipal sector.
- The programme supports activities that substantially increase heat production efficiency, reduce heat losses in transmission and distribution systems and promote the substitution of fossil fuels with renewable fuels. The programme also includes certain sustainability criteria for project selection, e.g. capacity constraints; utilization of renewable energy sources.

- The call for this programme is open.

2) European Agricultural Fund for Rural Development, Diversification of rural economy and life quality in rural areas

- The programmes cover the municipal and private commercial sector.
- The programmes will support business creation and development (including non-agricultural activities, diversification). Eligible projects have to meet certain sustainability criteria, e.g. creation of employment:
  - Forestry - wood and wood residues for energy production;
  - Wood and cork product production (briquettes and pellets production development).
- The call for these programmes will be open in 2012.

3) Climate Change Financial Instrument

The Climate Change Financial Instrument (CCFI) for energy efficiency and renewable energy projects in Latvia is established as a green investment scheme under Kyoto Protocol, Article 17 (International Emnissions Trading). The CCFI has been established by law and is implemented as a state budgetary programme. The CCFI aims to promote the prevention of climate change, adaptation to climate change impacts and the implementation of commitments for emissions reduction. Several open calls are organized within this programme for:

- Energy supply-side management:
  - Promotion of biomass use including CHP plants
  - Biogas recovery and use, including transport
  - Solar heat, geothermal, small hydro, wind, etc.
- Energy demand-side management Improved thermal energy efficiency
  - Improved use of electricity
  - Technological processes
- Integrated demand-side and supply-side projects.

In the following, we describe the programme calls relevant for the promotion of bioenergy use in heating sector:

Programme: „Use of renewable energy in the household sector"

- The programme covers the household sector - carbon dioxide emission reduction.
- The programme supports micro-generation, technological equipment purchase and installation, heat or electricity production from renewable energy sources and heat or electricity for domestic use only.
- The call for this programme is open.

Programme: „Technology transition from fossil to renewable energy"

- The programme supported technology reconstruction, or replacement in the field of heat or electricity generation. Fossil fuels are to be replaced by renewable energy.
- 47 projects approved (11 municipalities, 1 education institution, 35 entrepreneurs).

Programme: „Complex solutions for reducing greenhouse gas (GHG) emissions at buildings of national and local professional education institutions"

- The programme supported complex solutions for reducing the GHG emissions of buildings. Support was conditional on meeting two criteria:
  - The heat consumption for heating should not exceed 100 kWh/m^2 per year;

- The carbon dioxide emission reduction efficiency indicator (in terms of carbon dioxide emission reduction in relation to the required financial instrument funding) should not be less than 0.35 kg CO_2/LVL year;

- 29 projects approved.

Programme: „Complex solutions to reduce greenhouse gas emissions in production buildings"

- The programme supported complex solutions - production buildings and producing technology energy efficiency improvement and heat technological change. Support was conditional on meeting the following criterion:
  - Carbon dioxide emission reduction in relation to the project required financial instrument funding should not be less than 0.7 kg CO_2/LVL/year.
- 49 projects approved.

Programme: „Complex solutions to reduce greenhouse gas emissions in municipal buildings"

- The programme supported technology reconstruction and substitution of fossil fuels by alternative energy resources. Support was conditional on meeting two criteria:
  - The heat consumption for heating should not exceed 100 kWh/m^2 per year;
  - The carbon dioxide emission reduction efficiency indicator of the carbon dioxide emission reduction in relation to the project required financial instrument funding should not less than 0.35 kg CO_2/LVL/year;
- 40 projects approved (122 buildings).

Programme: „Low- energy buildings"

- The programme supported the construction of low energy buildings, the reconstruction of existing buildings or simplified renovation. Support was conditional on meeting the following criteria:
  - Heat energy consumption in project buildings should not exceed 35 kWh/m^2 per year;
  - For commercial entities and privat persons the carbon dioxide emission reduction efficiency indicator (in terms of carbon dioxide emission reduction in relation to the project required financial instrument funding) should not be less than 0.35 kg CO_2/LVL/year;
  - For direct or indirect administrative bodies and local governments the carbon dioxide emission reduction efficiency indicator (in terms of carbon dioxide emission reduction in relation to the project required financial instrument funding) should not be less than 0,25 kg CO_2/LVL/year.
- 31 projects approved.

Programme: "Renewable energy use for greenhouse gas emissions reduction"

The programme supported technology using renewable energy for heat and electricity production, reconstruction and implementation.

- 50 projects approved(26 commercial; 34 municipalities).

4.2.7 Biofuels (for transport)

The **Biofuel Act (2006)**[9] aims at promoting trade of biofuels, thereby supporting the utilization of environmentally friendly, renewable energy resources, and securing energy supply. The Biofuel Act stipulates the:

1) Guiding principles of the State policy regarding the trade in biofuel, also biodiesel and biogas;

2) Competences of institutions involved in the trade in biofuel;

3) State assistance for the production of biofuels;

4) Rights, duties and the liabilities of persons involved in the trade in biofuel;

[9] http://www.likumi.lv/doc.php?mode=DOC&id=104828

5) Procedures for the provision of information to biofuel customers.

To promote the use of renewable energy sources in transport, the following support schemes have been established:

- Mandatory admixture of 5% biofuel in fossil fuel;
- State support for biofuel production until 2010;
- Reduced rates of excise duty for biofuels.

In order to promote the consumption of biofuel in Latvia and, in accordance with the provisions of the Biofuel Act, to ensure that its consumption by 31 December 2010 is not less than 5.75 % of the total amount of fuel in the economy for transport, a mandatory admixture of 5% biofuel took effect on 1 October 2009.

According to the Excise Duty Act no duty is paid for rapeseed oil sold or used as fuel or automotive fuel, and biodiesel obtained **totally from rapeseed oil**. It also provides for reduced rates for admixture of fuels, depending on the admixture level (cf. Table 7).

Table 7. Rates of excise duty as of 1 February 2009, according to the Excise Duty Act

Standard excise duty rates for oil products	Reduced rates of excise duty
	256.00 LVL per 1,000 litres for unleaded petrol, its substitutes and components to which ethanol obtained from agricultural raw materials and which is dehydrated (with alcohol content of at least 99.5 % by volume) has been added, if the absolute alcohol content makes up **5.0 %** by volume of the total quantity of product.
269.00 LVL per 1,000 litres for unleaded petrol, its substitutes and components	- for unleaded petrol, its substitutes and components to which ethanol obtained from agricultural raw materials and which is dehydrated (with alcohol content of at least 99.5 % by volume) has been added, if the absolute alcohol content makes up between **70-95 % by volume** of the total quantity of product – the unleaded petrol rate (LVL 269 per 1,000 litres) was reduced in proportion to the amount of absolute ethanol, that is from **LVL 13.45 to 80.70 per 1,000 litres**
	– **0.00 LVL** per 1,000 litres for rapeseed oil sold or used as fuel or automotive fuel, and biodiesel obtained **totally from rapeseed oil**
234.00 LVL per 1,000 litres for diesel (gas oil), its substitutes and components	– **164.00 LVL** per 1,000 litres for diesel (gas oil), its substitutes and components to which at least **30 % by volume** of the total amount of oil product, of rapeseed oil or biodiesel obtained from rapeseed oil has been added
	– **223.00 LVL** per 1,000 litres for diesel (gas oil), its substitutes and components to which **5-30 % (not inclusive) by volume** of the total amount of oil product, of rapeseed oil or biodiesel obtained from rapeseed oil has been added.

Source: Act on Excise Duty.

According to the Biofuel Act, local governments shall provide incentives to fuel users within their territory to utilize biofuels and, within their competence create favourable conditions for the production of biofuel and investment in the development of biofuel and also promote the utilization of biofuel in public transport.

4.2.8 Biogas and Synthetic Natural Gas from Biomass (Bio-SNG)

In 2006 the Latvian Government launched the **"Development Programme for Biogas Production and Utilization 2007-2011"** the purpose of which was to develop the production and utilization of biogas as a renewable energy source, simultaneously offering an integrated solution to managing biodegradable by-products/residues from processing and reworking processes and reducing pollution risks for soil, water and

air as well as possible threats for human health. In the frame of the programme, options for obtaining biogas from agricultural products, manufacturing process residues and biodegradable waste were analysed.

Based on the Electricity Market Act, several Cabinet Regulations were adopted to promote the development of biogas cogeneration plants. Cabinet Regulation No. 503 (2007) 'Electricity Production from Renewable Energy Resources' contains the **sales prices for electricity** produced in cogeneration plants. According to this regulation, the calculation of the sales price for electricity from biogas cogeneration plants, irrespective of the electric capacity, was linked to the actual natural gas price; therefore the feed-in tariff component was not affected by a possible increase of the natural gas price.

Unfortunately, the provision that made the natural gas price the basis for sales price calculation was abolished for biogas plants with electric capacity up to 2 MW in subsequent regulations [3], [4]. The volume of electricity produced from a biogas cogeneration plant was calculated by multiplying the capacity indicated in the submission by 7,000 hours per year [2], but this unfavourable provision for biogas plants was increased to 8,000 hours per year in subsequent Regulations [3], [4]. The actual Cabinet Regulation No. 262 (2010) 'Regulations regarding the production of electricity using renewable energy resources and the procedures for the determination of the price' [4] states that the sales price for electricity from biogas cogeneration plants with the installed electric capacity, less than 2 MW – for 10 years from the date of commencement of operation of the power plant shall be calculated by the following formula [4]:

$$C = 188 \times e \times k;$$

where,

C – is the price without value added tax for which a public trader purchases electricity produced from renewable energy resources (LVL/MWh) from the power plant;

e – is the exchange rate of Lat (LVL) specified by the Bank of Latvia against the single currency of the European Union (EUR);

k – is the price differentiation coefficient (see Appendix 1).

According to this Regulation the price varies from 233 to 190 EUR/MWh for electricity produced in biogas cogeneration plants with an electric power capacity less than 0.08 MW to biogas plants with capacities in the range of 1.50 - 2.0 MW. The differentiation of the coefficient k value varies from 1.240 to 1.008 respectively. This support scheme related calculation is based on the electricity price valid in 2010 in Latvia. However, the feed-in price for electricity incorporated in this "frozen" calculation method, will decrease substantially during the next 20-years period, due to a predictable increase of gas prices, triggering respective increase in prices on electricity and eventually reducing 'to zero' feed-in tariff component for biogas plants with power up to 2.0 MW. This sales price will be lowered by 20% during the subsequent 10-years period after the first 10-year period.

A much better calculation methodology has been established for the sales price for electricity from biogas cogeneration plants with an installed electric capacity above 2 MW, as the price for natural gas is included in formula [4]:

$$C = \frac{3.4 T_g \, k}{9.3}$$

where,

T_g – is the final tariff for trade of natural gas approved by the Regulator without value added tax, which has been specified for the consumption of natural gas from 126 thousand n.m^3 up to 1,260 thousand n.m^3 per year, with the actual calorific value';

k – is the price differentiation coefficient referred to in Annex 8 to this Regulation (see Appendix 1).

Another option to receive financial aid is the qualification for the receipt of the **guaranteed fee** for the electric capacity installed in a power plant with electric capacity exceeding 1 MW and the number of hours of the use of the installed electric capacity exceeding 8,000 hours, shall be calculated, using the following formula:

$$T_{MAX} = \frac{E_{AER}}{P}$$

where,

T_{MAX} – is the number of hours of use of the installed electric capacity of the power plant;

E_{AER} – is the volume of electricity produced from renewable energy resources in the power plant per year (MWh);

P – is the electric capacity installed in the power plant, which complies with the gross volume of capacity specified by the producer of the installations (MW).

Investment support

Financial aid can also be obtained for the **construction of biogas plants** (see also section 3.2.5 Bioelectricity). According to Cabinet Regulation No.268 (2010) [5] with refinements (e.g. Regulation No. 671, (2011)) financial support amounting to 40% of eligible expenses is conditional on meeting the following requirements:

1. The owner of the biogas plant should own at least 51% of farm/company,
2. The share of animal by-products and derived products not intended for human consumption shall constitute at least 30% of the feedstock for the biogas plant,
3. 70% of feedstock is produced in the own farm,
4. The owner of the biogas plants should have at least 1.4 animal units per 10 KW electric power,
5. The investment costs per 1 kW electric power do not exceed LVL 3,000 (EUR 4,270),
6. The total eligible costs do not exceed 1.5 million LVL (EUR 2,134,300) per biogas plant.

As a consequence of the corresponding Cabinet regulation [5] the maximum investments per 1 kW electric power can be obtained, if the biogas project has an installed electric capacity of 0.5 MW or less. This policy measure promotes the construction of small or medium biogas cogeneration plants (with capacity up to 0.5 MW) for utilizing manure or derived by-products in the first order and can be regarded as a promising step to promote sustainable biogas development in Latvia.

The calculated feed-in price is valid for biogas cogeneration projects approved at the moment, but a new method for calculation of the electricity sales price is planned for biogas plant projects submitted after adoption of the new Renewable Energy Law, see Table 6.

Support schemes promoting biogas upgrade and injection into national gas grids

Latvia has no legal framework for the injection of biomethane into the natural gas grid. In accordance with Article 49 of Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC (hereinafter – Directive 2009/73/EC), Articles 4, 9, 37 and/or 38 shall not apply to Estonia, Latvia and/or Finland until any of those Member States is directly connected to the interconnected system of any other Member State other than Estonia, Latvia, Lithuania and Finland.

By the end of 2011, there were no support schemes in place at national or municipal level promoting biogas upgrade and injection into national gas grids. The main reason for this is the situation in the natural gas market in Latvia, where the Russian Federation is the main external supplier of natural gas (see above).

However, some initiatives from local entrepreneurs (for example, in Limbaži municipality) aim to develop the local pipelines from biogas plants to heat consumers in populated areas, in order to improve utilization efficiency of heat, produced in cogeneration process.

The draft Renewable Energy Law provides for the stipulation of biogas generators' rights to receive biogas certificates and biogas generators' rights to acquire rights for biogas enriched to natural gas quality to gain access to and be transmitted in natural gas networks after December 3, 2014.

Biogas use in transport

The option of using biogas/biomethane as a transport fuel was already mentioned in the Biofuel Act adopted in 2005. However, no real actions were implemented according to this law in respect to the development of the biogas sector; therefore, up to now, biogas has not been used to replace fossil fuels in transport in Latvia. No legal support was elaborated for biogas (unlike to bioethanol or biodiesel) production from plant biomass

and for electricity sales in Latvia until the year 2007. In 2011, research activities related to the use of biogas in transport started.

Integration of sustainability criteria into support schemes proimoting the use of biogas/biomethane

EU COM recommendations to differentiate in favour of installations that achieve high energy conversion efficiencies

As a rule, the existing support schemes do not differentiate according to energy conversion efficiency in cogeneration plants. However, the existing investment grants (covering up to 40% of eligible expenses) facilitate the construction of small or medium sized biogas plants (up to 0.5 MW) and can contribute to overall plant efficiency, due to shorter distances for raw biomass transport to the biogas plant and/or digestate transportation to the field.

There are no special support schemes (e.g. bonuses) for heat utilization in biogas plants, however, applications seeking financial aid for the construction of biogas cogeneration plants are accepted only for projects utilizing part of produced heat energy outside of the biogas plant.

Feed in tariffs, investment aid

The **feed-in tariff** system applying to electricity produced from biogas does not include any specific environmental bonuses, in addition to the preferential sales price for electricity produced in biogas plants mentioned above.

However, the feed-in tariff and the investment aid for the construction of biogas plants (up to 40% of eligible costs) increases or was optimally balanced for small to medium biogas plants (up to 0.5 MW) addressing the environmental utilization of manure in farms having 200 – 500 animal units in first order, so minimizing the harmful impact of wastes (methane emissions, soil and water pollution) for the environment.

Increased utilization of straw material for direct use in biogas plants or via litter (to reach an appointed share of 30% of manure and 70% share of own feedstock in biogas plant) can minimize the potential straw utilization for combustion accordingly, so improving plant nutrients cycling and soil organic matter maintenance.

Agricultural policy

The direct EU payments per agricultural area have a low impact on the promotion of sustainable biogas production in Latvia, due to the lowest support per area unit in the European Union in 2011 (the aid is around 95.0 EUR/ha or 2.8 times lower in Latvia compared to the EU average)[6]. However, the harmonization of direct payment levels among EU Member States might lead to a substantial increase of this support in Latvia and could facilitate the utilization of more than 374,000 ha of unused agricultural land (2010) for biogas production without compromising food production. Unused agricultural land has often a low soil quality, or includes abandoned soils or uneven soil surfaces, often hampering the application of standard technologies and machinery. Future harmonization of direct payment levels can also facilitate compliance with the good agricultural and environmental condition of the land and to obey the EU laws (so called cross compliance rules) in Latvia and can reduce distortions of the competition in bioenergy and biofuels markets at EU level.

4.2.9 General support schemes for bioenergy

Among the more general support schemes for bioenergy directly or indirectly promoting the use of biomass for energy production is the Climate Change Financial Instrument (CCFI, cf. Section 4.2.6) which is a Government budget program of the Republic of Latvia. The aim of CCFI is to prevent global climate change, adaptation to the effects of climate change and contribute the reduction of greenhouse gas emissions.

The financing of the tender is formed by the proceeds from the Assigned Amount Units Purchase Agreements which are concluded in the frame of international emissions trading under the Kyoto Protocol.

Calls of proposals promoting the use of biomass for energy were launched for:

- Promoting the use of renewable energy for GHG reduction –

- Project examples: Biomass cogeneration and biomass water heating boiler purchase, installation and adjustment; Construction of Biogas cogeneration plant; Modular pellet boiler heating installation;

- Promoting use of renewable energy in household sector:
  - Project examples: woodchips or straw biomass boilers, biomass pellets or wood biomass boilers and fireplaces with a total installed capacity of up to 50 kW (included) - 264 units or 19.83% of the number of approved projects;
- Technology conversion from fossil to renewable energy sources;
  - Project examples: construction of biomass boiler houses (9 projects approved).

4.2.10 Integrated material and energy uses of biomass, cascading uses

The Climate Change Financial Instrument (CCFI) with its current call for proposals „Development of GHG reduction technologies and pilot project demonstration" provides support for the development, testing and demonstration of new and innovative product or technology, and for national and international technology, experience and knowledge transfer. In the previous call under this programme some projects were supported related to the development of biomass technologies, for example development of gasification technology for a high ash content biomass.

4.3Permitting and authorization of bioenergy installations

According to Latvian legislation to commence and realize projects for energy generation from RES, the following permits are required:

- A permit issued by the Ministry of Economics for increasing electricity generation capacity or the implementation of new capacity pursuant to Cabinet Regulation No 883 of 11 August 2009 'Regulation on permits for increasing electricity generation capacity or the implementation of new generating installations';
- A licence issued by the Public Utilities Commission (hereinafter – the PUC) in the cases prescribed by legislation pursuant to Cabinet Regulation No 664 of 30 March 2005 'Public service licensing regulation';
- A permit issued by the electricity system operator for connecting a power plant to the system;
- A decision by the Environment State Bureau about an environmental impact assessment or the technical regulations issued by a Regional Environmental Board of the State Environmental Service. The Act on Environmental Impact Assessment applies mainly to power plants with significant environmental impacts (hydropower plants, large wind parks, **large biogas complexes**);
- A permit issued by a Regional Environmental Board of the State Environmental Service for polluting activity;
- A permit to emit greenhouse gases issued by a Regional Environmental Board;
- If a generator wishes to obtain the rights to sell electricity under mandatory procurement, the Ministry of Economics will issue a decision regarding qualification for mandatory procurement or the allocation of an entitlement to receive guaranteed payments for installed electrical capacity;
- Heating and electricity tariffs approved by the PUC (see above).

The permits for polluting activities and for emiting greenhouse gases are issued by the Regional Environmental Boards. They are based on the "Act on Pollution" and contain certain sustainability requirements. These requirements apply to receive A and B category permissions for polluting activity which are required for: „combustion installations with a nominal thermal input 5 - 50 MW if the biomass (including wood and peat) or gasiform is used in combustion installations" and combustion installations with a nominal thermal input exceeding 50 MW (A cat). Sometimes permits are needed even for biogas installations with lower thermal input depending on the type of raw material used for gas extraction (like manure, animal leftovers from slaughter houses) and the amount used per day.

In the case of permits for polluting activity, the following criteria are applied:

- Emission limits for polluting substances that may be emitted from an installation, observing the nature of the relevant substance and the possible transfer of pollution from one medium to another (water, air, soil), as well as other types of emission limits;
- Requirements to be followed by an operator in order to ensure the protection of human health and the environment, as well as waste management, when utilizing natural resources and energy, as well as when using chemical substances and chemical products;
- Environmental quality targets in a particular territory or the measures to be performed in accordance with the river basin district management plan and the implementation time periods thereof;
- Requirements in relation to the energy efficiency of installations;
- Justifications for the use of the best available technologies, without determining the specific type of technology to be used, but taking into account the technical characteristics of the relevant installation, and the geographical location and environmental conditions thereof;
- Justification of the characteristics, geographical location and environmental conditions of the relevant polluting activity;
- Provisions for the reduction of the transfer of pollution for long distances, as well as transboundary transfer.

Before issuing a permit to emit greenhouse gases, the following criteria have to be taken into consideration:

- Target limits of emitted greenhouse gases;
- Requirements in relation to the greenhouse gas emission monitoring to be performed by the operator, indicating the monitoring methods and frequency of measurement;
- Requirements that every year according to the procedures and time periods specified by the Cabinet to surrender allowances, which conform to the quantity of greenhouse gases emitted by the installation in the previous calendar year.

These requirements apply to „combustion installations with a total rated thermal input exceeding 20 megawatts, except installations for the incineration of hazardous or municipal waste".

4.4 Spatial planning

When drafting spatial plans, local governments take into account the legislation currently in force, including national development planning documents. Utilizing national energy planning as an example, it is planned to introduce local energy planning. With the draft Law on Renewable Energy, it is planned to charge local governments with evaluating the compliance of local spatial planning with the Law on Renewable Energy, the National Renewable Energy Action Plan and, - if necessary - supplement local government planning documents with the planned number and sites of renewable energy plants.

The draft Law on Renewable Energy stipulates that local authority shall establish municipal action plans for renewable energy or include renewable energy aspects into local government development programmes.

So far, local renewable energy action plans have been developed only in the frame of EU funded cooperation projects, e.g. for the municipality of Tukums in the frame of the INTERREG IIIB project "Baltic Biomass Network", or in the frame of projects funded under the CIP *Intelligent Energy* programme.

Also in the frame of the Covenant of Mayors initiative, five Latvian cities (Riga, Jelgava, Jēkabpils, Valmiera and Tukums) have developed regional sustainable energy action plans with an aim to reduce CO_2 emissions by 20% by 2020.

4.5Forest legislation and forest related environmental legislation

The largest amount of forest biomass is produced in clear-cuttings. Logging residues are collected mainly from forests on nutrient rich dry mineral soils. Collection of slash from naturally wet or peat soils is possible only if the soil is frozen in winter; otherwise this material is packed into strip-roads. Collection of slash from forest stands on nutrient poor soils is not forbidden; however, it takes place occasionally, because of

relatively high production costs.

There are no restrictions, how much material can be extracted, but research data demonstrate that a maximum of 70 % of harvesting residues can be collected. The average proportion of extracted harvesting residues is 60 %. If an operator tries to collect more, he faces a considerable loss in productivity and the quality of solid biofuel considerably decreases due to the admixture of soil particles [11].

No regulations, except for storage of biomass in forest and roadside, exist for the extraction of additional biomass for energy assortments in commercial and pre-commercial thinnings and for stump extraction. However, other indirect limitations exist; for instance, the extraction of harvesting residues in commercial thinnings in state forests is strictly limited by internal sanitary requirements which restrict the allowed proportion of damaged trees.

In private forests the situation is considerably worse, but it is improving with an increasing level of responsibility of the harvesting companies used to strict requirements in the state forests. Science-based recommendations suggest to leave about 30 % of harvesting slash and similar amount of stumps in the forest. In the case of stumps, practically all stumps with a diameter below 20 cm, stumps on strip-roads, which do not hamper movement of forwarder, and pine and deciduous tree stumps with diameter above 60 cm are left on-site [12].

Similarly, due to restrictions of forest management activities, nature conservation areas and protected forests are not affected by solid biofuel extraction.

Taking into account existing legislation, certification and good practice recommendations, extraction of logging residues from clear cuts does not affect forest health and does not leave a lasting negative effect on forest land and the dependent organisms. The Latvian forest management practices do not envisage dead wood removals, except for sanitary purposes to avoid distribution of pests, for reasons of biodiversity protection.

Clear-cuts are allowed if the dominant species in the stands reaches the set cutting age (Table 8) or relevant dimensions. Cutting of trees on forest lands afteraccording to the diameter is allowed before the final felling age, if the average diameter at a breast height of the dominant tree species in a stand is equal to that provided in (Table 9). Grey alder, which is one of the most common tree species in forests in Latvia because of natural afforestation of farmlands during last decades do not have limitations. Usually it is harvested before reaching of 40 years age. Economically the most valuable harvesting age for grey alder and aspen is 30 years.

Table 8. Final felling age of dominant tree species in Latvia

Dominant tree species	**Final felling age depending from site index**		
	I or higher	**II-III**	**IV or worser**
Oak	101	121	121
Scots pine and larch	101	101	121
Norway spruce, ash and lime	81	81	81
Birch	71	71	51
Black alder	71	71	71
Aspen	41	41	41

Source: Forest law ("LV", 98/99 (2009/2010), 16.03.2000.; Ziņotājs, 8, 20.04.2000. with changes until 02.11.2011.)

Table 9. Final felling dimensions of trees in Latvia

Deminant tree species	Site index			
	Ia (the best)	I	II	III
	average diameter at a breast height			
Scots pine	40	36	32	28
Norway spruce	32	30	30	28
Birch	32	28	26	23

Source: Regulations of Cabinet of Ministers of Republic of Latvia No.892 "Regulations on felling of trees in forest lands" ("LV", 176 (3544), 03.11.2006. with changes until 18.09.2009.)

The maximum area and width of clear-cuts depends of the forest soil type. The maximum width of clear-cuts is not limited, if the felling area is less than 2 ha. However limitations might be set by the National Forest Service sanitary requirements. Cutting direction is from east to west or from the north-east to south-west.

The legal framework for forest management activities is determined by the Forest Act (in force since 2000). According to this law, sustainable forest management is „management and utilization of forest and forest land in such a manner and at such a level as to maintain the biological diversity, productivity and vitality thereof, as well as regeneration ability and the ability to fulfil significant ecological, economic and social functions at the present time and in the future, on a local and global scale".

The "Nature Protection Regulations in Forest Management" (in force since 2001) contain rules aimed to maintain biological diversity and to implement international obligations in Latvia's forests. For instance, the most visible sustainability criteria for clear-cuts retaining of at least 5 oldest and largest trees (ecological trees) per hectare by first selecting the thicker oak, lime, pine, ash, elm, and maple should be left. If there are no trees of these species, the biggest aspen and birch should be retained as well as trees with large and thick branches, hollow trees and trees with burning scars. These trees can be grouped in certain area of stand. Seed trees should not be accounted as ecological trees.

Another important sustainability criterion for clear-fellings is retaining of all trees with bird nests and trees colonnade around them, (if the nest diameter is larger than 50 cm). Recommendation for dead wood management is retaining of all laying tree trunks and standing dead trees if they are not dangerous according to workplace safety rules and do not bother forest regeneration and forest health. All dead trees with the trunk diameter more than 50 cm should be left in the stand. Dead wood with the trunk diameter 20-50 cm should be left if they do not hamper forest regeneration (soil preparation, planting, spreading of pests).

Existing forest legislation is sufficient to secure sustainable management of forests. A strong booster of implementation of these regulations are the state forests (which cover nearly 50 % of the total forest area), where forest service companies and individual contractors get used to even more stringent restrictions. The most problematic areas from the point of view of sustainable forest management are commercial thinnings and so called selective fellings in private forests. In the case of commercial felling the forest owners often try to extract as much valuable material as possible and it is quite common that thinning is practiced "from above" taking the tallest trees instead of removing of undergrowth, competing and damaged trees, which is the main „philosophy" of thinnings in Latvia's forestry. Similarly, in the case of selective fellings, many forest owners make use of their right to remove up to 60% of trees at once – usually the most valuable material, and leave the rest for regeneration, thus saving money on forest regeneration and unprofitable selling of low valued assortments. In the case of clear-fellings forest owners are obliged to regenerate forest and to remove low valued trees; therefore, this approach in real life conditions should be considered as more sustainable, especially, if all aspects of forest value are considered. The current forest management practices are in line with national biodiversity targets and policies; however, harmonization of recommendations for implementation of different environmental services of forests is necessary to raise the competitiveness of the forest sector in Latvia.

There are also knowledge gaps in forest management and, consequently, missing regulations on sanitary requirements of certain biomass for energy production chains. For instance, regulations on storage of stumps at roadside are missing. Similarly, it is not determined by regulations, if areas, where stumps are extracted for

solid biofuel production, should have specific regeneration requirements.

There is a need for interdisciplinary research to evaluate different aspects of intensified utilization of forests, particularly, on the effects of stump extraction and removal of young trees in pre-commercial fellings. Removal and incineration of harvesting slash is not a new approach in Latvia; it was very common during the Soviet period due to sanitary reasons and there are no signals that removal of harvesting slash can negatively affect growth or biologic value of future forest generations.

There are two forest certification schemes commonly utilized in Latvia – FSC and PEFC. About 1.5 mln. ha of forests (50% of the total forest area, mainly state forests) are certified according to the PEFC system and 1.7 mln. ha[10] according to the FSC system. Certain forest areas are certified according to both systems. Notably, that popularity of the PEFC system increased rapidly during the last year. The national PEFC system considers recent scientific findings in silviculture. It contains also information on issues relevant to accumulation of carbon in forest lands.

4.6 Agricultural legislation and related environmental policy

Biomass production for food, feed, and energy was supported by direct State and EU support including direct payments for agricultural area. Binding conditions (the so called Cross Compliance rules and good farming practices) for receiving direct payments for agricultural area including agricultural land with energy crops are included in Cabinet Regulation 173 (2011) [7]. One of the most important conditions refers to the ratio of 'Pasture & meadows area' to 'Agricultural land area' which is not allowed to decrease more than 10% compared to year 2005 (otherwise permission for corresponding conversion of pasture & meadow land has to be requested from the Rural Support Service). This EU requirement [8] was generally fulfilled at national level, as the above mentioned ratio decreased only by 1.65 % in Latvia during years 2005 - 2010.

Owners of farms located in vulnerable areas[11] shall comply with the requirements of the code of good farming practices according to the last Cabinet Regulation No 33 (2011) [9]. The state aid for construction of manure storages in vulnerable zones in Latvia resulted in the erection of respective manure storages in 204 farms during 2005 – 2008. These supportive measures contribute not only to environmental protection, particularly of soil and water, but also enables the construction of manure storages transformed later to digestate storages for biogas cogeneration plants at least in 3 farms situated in vulnerable zone.

The State Plant Protection Service [9] shall publish the information on mineral nitrogen content in soil in early spring on its website, so contributing for rational and environmentally sound usage of nitrogen fertilizers for fertilizing of plants, including energy crops, e.g. cereals, rape seed, maize, growing in vulnerable areas in Latvia.

The State and EU direct payment scheme cover sub-measure 'Maintenance of biological biodiversity in grassland', if the high biodiversity grassland is cut down and removed from August 1 to September 15 at least one time in a year [7]. Harvested biomass can be utilized for solid biofuel production or can be used as feedstock in biogas plant. However, this potential usage of biomass to energy is not feasible for bioenergy business at a moment; due to low direct payments (lowest amongst EU countries) not covering increased fuel and labor consumption for harvesting of biomass from very rugged terrain predominantly.

4.7 Waste management legislation

Latvian legislation in the field of waste management is based on the principles and requirements set in the EU Waste Framework Directive (2008/98/EC), including the classification of waste, waste management approaches and precautionary measures. According to the EU classification, agricultural and forestry by-products are defined as waste; it is defined as waste in Latvian legislation as well.

10 Information on 2006; source - FSC sertifikācija, Pasaules Dabas Fonds (2006).

11 The borders of the vulnerable zones are the borders of the administrative territories of the Dobele, Auce, Tērvete, Jelgava, Ozolnieki, Bauska, Vecumnieki, Iecava, Rundāle, Babīte, Mārupe, Olaine, Ķekava, Baldone, Salaspils, Stopiņi, Ropaži, Garkalne, Carnikava, Saulkrasti, Sēja, Ādaži, Inčukalns, Sigulda, Krimulda un Mālpils counties, except the border of the administrative territories of Valle and Kurmene parishes of Vecumnieki county, Lēdurga parish of Krimulda county, as well as the border of the city administrative territories of Rīga and Jūrmala.

According to EU legislation, physical and chemical processing as well as incineration of waste is a matter of pollution prevention and environmental impact screening and assessment measures. It is justified by the side effects and environmental aspects that can derive from the processing (emissions, pollution, odour, landscape depletion etc.) depending on the technology, power capacity, location and many other variables to consider.

It can be argued that waste management legislation inhibits to a certain extent sustainable production of bionergy, but it can also be argued that production of bioenergy from waste materials, such as liquid manure, animal by-products, simultaneously neglecting precautionary measures would inhibit environmental protection as well. Therefore a compromise and clear criteria should be set to harmonize these issues.

The Latvian Waste Management Act contains principal requirements for the separate collection of bio-waste, for waste recovery (including for energy), requirements to facilitate the use of environmentally safe materials produced from bio-waste, requirements for composting and recycling, as well as measures for the treatment of bio-waste.

Waste legislation is focusing on waste management; therefore it encourages sustainable production and use of bioenergy only in this specific field, e.g. by restricting the treatment of biodegradable material as waste that is not recycled or recovered.

5. Policy needs and recommendations

5.1 Positive developments and key opportunities of bioenergy production and use for sustainable development

Over the last fifteen years Latvia has gained successful experience in converting district heating systems to biomass, which proved that good results can be achieved with limited resources. The development potential for more extensive use of biomass in Latvia must be linked to district heating, industrial consumption of biomass (like pellet factories) and electricity generation. Price increases for fossil fuels and their possible limitations can be partly compensated with an economically justified and efficient use of RES and an increased use of cogeneration processes (cf. National Renewable Energy Action Plan, p.54).

The utilization of biomass export potentials should also be considered as Latvia has only limited capacities to utilize biomass in an economically efficient way, particularly in combined heat and power applications; therefore, it is reasonable to develop export products, like wood pellets and torrefied wood to support the achievement of the overall European targets, developing at the same time heat and power capacities, particularly in the domestic wood processing sector. With current installed capacity total heat consumption in pellet factories corresponds to about 3 mln.MWh of primary energy annually. Introduction of torrefication processes and development of technologies for utilization of low value solid biofuel (like stumps) in technological processes would considerably increase the theoretical capacity of electricity production in combined heat and power applications in the wood industry.

Untapped wood potentials on the one side and widespread district heating grids offer good opportunities to effectively promote the domestic use of biomass for energy in the future.

Fiscal instruments (e.g. taxation) and financial support (feed-in tariffs, investment grants) have an important role to play for the development of renewable energy in Latvia. It is important that the corresponding support schemes are not hampering other industries or distort competition; therefore, sometimes it might be more reasonable to rely on market driven tools instead of paying a double price for resources, which possibly can be utilized with higher additional value in other industries.

Wood stumps provide a completely unutilized resource in final felling areas, especially in spruce stands, where they can be easily extracted. However, use of stumps for solid biofuel production is dependent on development of new harvesting and biomass conversion technologies as well as on approval of new silvicultural methods of merging of stump extraction and forest regeneration. Similarly, a “high end” solid biofuel product is small trees from pre-commercial thinnings. Efficient utilization of these resources requires complete revision of forest management practice.

Key opportunities of sustainable bioenergy production **in agriculture** can be provided by following

measures:

- Establishing of aid for the use of not used agricultural land area (abandoned land area) for cultivation of energy crops,
- Establishing of aid for removing and usage for bioenergy purposes of biomass from meadows with high biodiversity value and differentiating of aid in dependence of local conditions (average yield level, roughness of surface, presence of trees or other obstructions.

The draft Renewable Energy Act contains a number of promising elements in terms of ensuring sustainability of bioenergy production and consumption:

- One of the objectives of the law is to promote the **sustainable** production, use and export of local renewable energy;
- The law envisages feed-in premiums which include a GHG savings component and an agricultural component (use of manure and agricultural by-products);
- The law aims to improve grid access and grid connection rules for plant operators;
- The law contains a special surplus heat utilization requirement for CHP plants (50%);
- The law envisages the integration of RES into spatial planning (Article 8).

5.2 Undesirable developments and risks of increased bioenergy production and use for Sustainable Development

The probably biggest problem in Latvia regarding the use of woody biomass for energy production is insufficient investments into scientific research, technology development and commitment at the resource supply side to secure sustainable and increasing deliveries of solid biofuel in future. This has been also acknowledged by the EFINORD[12] work plan for 2011-2015, where silvicultural methods are set as a top priority in technology research in forestry in Nordic and Baltic region.

A growing problem associated with logging practices is the lack of skilled workers and equipment. According to different assumptions the number of operators of forest machinery employed in final felling should be increased by 50-100 % in 2020 to secure implementation of the EU targets in the energy sector. Technical development is needed in conjunction with development of silvicultural methods to mechanize regeneration of forests and pre-commercial thinnings as well as management of short-rotation energy crop systems.

Another set of problems at the customer side is related to the technical requirements for solid biofuel. No general technical standards have been developed yet; large customers use their own standards, small customers in district heating sector usually rely on high quality timber wood chips competing with pulp and chipboard industries and producers of pellets. As a result, district heating companies in Latvia do not use solid biofuel produced from logging residues or stumps at all or only use limited amounts, although supply of these resources is abundant in Latvia. Instead, they buy high quality wood chips and this negatively affects the competitiveness of pellet and chipboard producers.

Wood chips are transported from the forests, by road to the place of consumption. Each handling and storing of chips increases costs, but the temporary storage in larger terminals before the sales of chips can be beneficial if fuel chip prices have large seasonal variations.

In the agricultural sector undesirable depletion of soil organic matter content can be triggered by increased solid biofuel (e.g. pellets, briquettes) and bioenergy production from plant residues (e.g. stalk, straw) in a long term perspective.

An increase of direct payments for agricultural area at least up to 80% of EU average might facilitate the use of not used agricultural land areas for biomass production and contribute to create employment at the local level, particularly in rural areas.

[12] The North European Regional Office of the European Forest Institute – EFINORD – promotes forest research networking within the Nordic-Baltic Sea-North Atlantic region.

A longer-term problem in Latvia is related to change of the rules of state support. Since Latvia restored its independence in 1991, each government has changed the support rules for renewable energy. This weakens public perception and the attractiveness of the whole policy.

Finally public policies lack clear targeted measures addressing energy efficiency, particularly in the residential sector, such as substantial support for the renovation of residential buildings. Another policy priority should be the consequent reduction of heat losses in the district heating systems. There is a high share of low income households in Latvia and without substantial governmental support no tangible achievements can be expected.

5.3 Policy needs and recommendations

Investments into the renewable energy projects should become more economics driven and take in account the local conditions; for instance, the prospective availability of certain types of resources. It is not feasible to invest into heat and power generating facilities in Latvia, if they are supposed to use high quality wood chips competing with significant export players.

Utilization of stump biomass and harvesting residues should be supported at national level, first of all supporting the most economically feasible applications, like biomass based district heating. Electricity production from biomass could be more feasible in areas with larger heat consumption capacities; therefore, from an overall European perspective it is more reasonable to export biomass from loosely populated areas to large centres of energy consumption instead of supporting expensive projects of considerably smaller scale domestically. Export of solid biofuel will raise internal heat production capacities in forest industry, securing implementation on the national energy sector targets.

Forest industry in Latvia has the largest potential for rapid increase of bioenergy production utilizing residual heat from industrial processes for electricity production; therefore, there is need to support utilization of these capacities. Similarly, there is need to support joint projects, where forest industries are cooperating with local communities acting as end users of residual heat and suppliers of raw material. There is urgent need for guidelines of efficient, competitiveness rising, bioenergy and climate change mitigation targeted forest management. Tax system should be reorganized so that purposeful forest management is supported and not forest ownership as such (forest owners should be able to return certain amount of income tax if they are investing into forest regeneration and tending of stands and not in case if they are leaving forest for natural regeneration).

Electricity production in industrial applications is associated with the considerable risk that in the case of shrinking competitiveness of the corresponding industry, production capacities and, consequently, the amount of produced electricity will fall; therefore, it is important to invest in strengthening the competitiveness and stability of the supply chains of raw materials from forests. This means investments into forest infrastructure and silvicultural technologies aimed to reduce production costs and to increase availability of raw materials in future.

It is necessary to boost research and development in forestry and short rotation forestry to secure that those new silvicultural technologies get adopted and can be broadly implemented. Funding sources for such projects might be provided by the financial instruments under the Kyoto Protocol (e.g. International Emissions Trading) and the Forest Development Fund, setting specific targets for the projects, like aimed reduction of production costs or increased availability of resources after implementation of the project results. The Structural Funds as well as the financial instruments under the Kyoto Protocol can be utilized to support implementation of the research findings.

Forest regulations, particularly, on harvesting of trees on forest land and forest regeneration, should be more elastic, providing more options to forest owners to gain profit from their forests setting at the same time more ambitious targets in forest regeneration. An example of necessary legal changes in forestry in Latvia is elimination of harvesting age and dimensions limits for spruce stands on drained soils, which were established as plantations for the pulp and paper industry in the 1970s. With an age of 40 years these stands reached their production limit (due to high density) and during further 40 years increment and dieback of trees will be nearly equal. These stands are also areas of high risk of wind-blows, distribution of pests and diseases. At the same time forest regeneration requirements should be lighted to secure that plantation forests are regenerated only artificially using improved planting material.

Climate policy related financial instruments and higher taxation of fossil fuels should be used for the establishment of short rotation forestry and plantation of forests on abandoned farmlands, as well as for investments in road infrastructure to secure future deliveries of biomass and to increase accessibility of the resources.

Refund of excise tax on fuel consumed in forest operations as well as in peat production is another important measure to secure equal conditions for the forest and agriculture sector in Latvia and to create more favourable conditions for using logging residues and stumps in fuel wood production.

Furthermore, biogas production should be further prioritized in Latvia, as biogas production is expected to have a positive impact both on agro-environmental conditions of soil, as well as for the socio-economic development of rural areas. Natural gas price component should be included in selling price calculation for electricity produced in biogas plants with installed electric power up 2.0 MW.

Policy should more effectively promote the utilization of straw for bioenergy. Particularly the Region of *Zemgale*, where straw is a promising local biomass resource, offers good opportunities to utilize straw for district heating to a higher extent

Only large CHP plants should be promoted, considering pros and cons of export of solid biofuel to bigger CHP plants with higher efficiency, but located abroad. An annual export of 100,000 tons of pellets creates 20-30 MW of heat capacity domestically, which can be used for electricity production in more beneficial ways than district heating installations with considerably smaller average heat loads.

Supply chains should be always evaluated according to their energy input and output. Fortunately, the market provides a universal mechanism for validation – the competitiveness of the price. It is sufficient within internal market of countries ratified the UNFCCC and it's Kyoto Protocol; however, use of biomass imported from countries which have not ratified the UNFCCC and the Kyoto Protocol should not be considered as sustainable, as a reduction of emissions using this biomass is not compensated by an increase of emissions in the LULUCF sector in exporting country. Similarly, like with heavy industry – moving of energy consuming industries or processes outside the UNFCCC area creates the vision of reduced production emissions, but in practice emissions derived by these industries might continue to grow in the consumption sector.

The EU agricultural policy framework might be optimized in terms of an increasing harmonization of the direct payment levels among Member States, so providing better compliance to the good agricultural and environmental condition of the land and minimize distorting of the competition in bioenergy and biofuels markets at EU level.

The EU sustainability criteria for biofuels/bioliquids might be extended to solid/gaseous biomass used for electricity and heating/cooling in Latvia.

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Appendix 1

Values of Coefficient *k* Ratio Depending on the Electric Capacity Installed in the Power Plant

No.	Electric capacity installed in the power plant	Value of coefficient *k*
1.	Not exceeding 0.08 MW	1.240
2.	Greater than 0.08 MW, but not exceeding 0.15 MW	1.231
3.	Greater than 0.15 MW, but not exceeding 0.20 MW	1.202
4.	Greater than 0.20 MW, but not exceeding 0.40 MW	1.131
5.	Greater than 0.40 MW, but not exceeding 0.60 MW	1.086
6.	Greater than 0.60 MW, but not exceeding 0.80 MW	1.072
7.	Greater than 0.80 MW, but not exceeding 1.00 MW	1.055
8.	Greater than 1.00 MW, but not exceeding 1.50 MW	1.035
9.	Greater than 1.50 MW, but not exceeding 2.00 MW	1.008
10.	Greater than 2.00 MW, but not exceeding 2.50 MW	0.992
11.	Greater than 2.50 MW, but not exceeding 3.00 MW	0.982
12.	Greater than 3.00 MW, but not exceeding 3.50 MW	0.974
13.	Greater than 3.50 MW, but not exceeding 10.00 MW	0.965
14.	Greater than 10.00 MW, but not exceeding 20.00 MW	0.950
15.	Greater than 20.00 MW, but not exceeding 40.00 MW	0.920
16.	Greater than 40.00 MW, but not exceeding 60.00 MW	0.890
17.	Greater than 60.00 MW, but not exceeding 80.00 MW	0.860
18.	Greater than 80.00 MW, but not exceeding 100.00 MW	0.830
19.	Greater than 100.00 MW	0.800

Source: Cabinet Regulation No.262, 16 March 2010, Annex 8.