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# Abstract version of Master Plan

*for innovative energy structures in Limbaži Region in Latvia, which could be feasible for funding in the Structural Funds Programmes in the period 2007- 2013.*

Elaborated by EKODOMA, November 2007

# 1. Background

## Regional focus

The elaborated Master Plan is a planning document, which is developed to promote sustainable energy management in Latvian target region – **Limbaži Region**. This Master Plan aims at undertaking actions to increase the utilization of locally available renewable energy sources and potential of energy savings, thus promoting region's energy self sufficiency and taking in mind sustainability of energy production and end use.

Limbaži Region was selected as Energy 4 Cohesion (E4C) target region for its suitability for extended use of renewable energies and energy efficiency actions, namely:

- Rich resources for renewable energy generation particularly biomass resource
- Clear support of the political and administrative decision makers
- Availability of an extended knowledge and data basis for the planning process.

## Targeted towards Structural Fund Support

The cornerstone of the E4C – strategy is to support the implementation of energy pilot actions in the selected region feasible for public financial support, with main focus on **European Structural and Cohesion Funds (SF and CF)** during the funding period from 2007-2013. E4C strives to overcome the various constraints which currently hinder the broader use of Structural Funds for innovative energy actions in less developed and rural regions of Europe. Limbaži Master Plan is focused on implementation of concrete sustainable energy related projects. It is desirable that the proposed projects will be carried out with particular focus on possibilities of financing these actions from EU funds available in the programming period of 2007 – 2013 in Latvia

## Cooperative Approach

In the region all main stakeholders were brought together for a successful and efficient definition of innovative energy actions in the respective region. The E4C actor cycle includes municipalities, households, media, capital provider and financial experts. Within this actor cycle Latvian project partner EKODOMA was responsible for the coordination of the different actors, and the preparation of the regional Master Plan. Main focus was put to integrate suggestions and ideas existing in the region rather than exposing priorities from outside.

## 2. Master Plan Structure

Comprehensive investigations were undertaken, starting from an abstract and general view on the regions, leading to concrete innovative energy set-ups, consisting of a range of RE and EE projects. A comprehensive and detailed methodology was used, including 3 main elements:

1. **Target region portrait** – The description includes the general context of the region – geographical setting, natural and climate conditions, description of the administrative structure, demography, building stock etc. In this chapter also current energy situation is described and potential for renewable energy sources (RES) and energy efficiency (RUE) is analyzed. This investigation was based on available statistical data; existing planning documents as well as on interviews with local stakeholders. The investigation of existing energy situation showed that almost all electricity consumed in region is imported from outside and Limbaži region fully depends on other regions. To promote the energy self-sufficiency and sustainability of energy production and use, energy saving and RES potential has been identified. The investigation showed that the biggest energy saving potential is in housing sector and most significant RES potential is for wind energy and biomass projects. In this chapter available RUE/RES options in the region were identified. Identified options include solar energy projects, wood log boiler replacement with pellet and wood chip boilers, wind energy projects, biomass cogeneration plants and energy efficiency projects in buildings and district heating systems.
2. **Energy Vision of Limbaži Region** - Based on the investigation of existing energy situation, energy vision for Limbaži Region has been developed (see Chapter 3). The global objective of energy vision is to provide future energy supply and improved energy management in line with sustainable development principles, by enabling dynamic development of the Limbaži region. The global objective is based on three key objectives:
    1. Reliable, available and diversified energy supply, maximal use of locally available resources;
    2. Effective, well planned and managed energy production and consumption;
    3. Reduction of current pollutants and $CO_2$ emissions from fuel combustion and improvement of ambient air quality.
3. **Identification of concrete Energy Actions / Action Bundles** – The prepared Energy Vision considers several adapted initiatives (‘Energy Actions’). The most interesting Energy Actions feasible for Cohesion and Structural funding were selected. These are presented in chapter 4:

- Action 1. Fuel switching and installation of solar collectors in Salacgrīva city;
- Action 2. Biomass CHP in Limbaži city;
- Action 3. Renovation of district heating network in Umurga village;
- Action 4. Energy efficiency measures in multi-apartment buildings in Ainaži city.

# 3. Identified Energy Actions / Action Bundles for Limbaži Region

| **Action Bundle 1 – Fuel switching with installaton of solar collectors** |
|---|
| Proposal includes implementation of fuel switch project in existing Salacgrīva municipality boiler house and installation of solar collector on the roof of kindergarten for hot water preparation. |
| **Current state** |
| There is an existing boiler house in the center of Salacgrīva city. Boiler house total capacity is 1,4 MW and light fuel oil for heat generation is used. Consumption of light fuel oil is 180 t/year. Salacgrīva Municipality wants to switch fuel to local wood fuel (wood pellets). Connected heat consumers are school building, kindergarten and sport complex. Additionally it is planned to install solar collector on the roof of kindergarten building. |
| **Technological solution** |
| The proposed technological solution for boiler house is to replace existing light fuel oil boilers with new wood pellet boilers. Additional building for fuel storage room and new boilers is necessary. On the roof of kindergarten (one of the consumers building) solar collectors with accumulation tank is planned. |
| **Investors** |
| The main investor is Salacgrīva municipality. |
| **Benefiting groups** |
| The benefiting groups are:<br>• Salacgrīva municipality<br>• Heat consumers<br>• Local inhabitants |
| **Financing** |
| The financing could be provided by the Salacgrīva municipality from the planned investment budget. The half part of the investment (up to 50%) is envisaged to be received as support from Operational Programme Infrastructure and Services 2007-2013. |
| **Expected investment costs** |
| Approx. 198 thous.LVL (282 thous. EUR) |
| **Expected implementation time** |
| Year 2008-2010 |

| Energy Action 2 – Biomass CHP Plant in Limbaži city |
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| Proposal includes development of biomass fired CHP Plant in Limbaži city. |
| **Current state** |
| Currently there are two boiler houses operating in Limbaži city. Biomass (wood chips and sawdust) is the main fuel used, then to cover peak loads as well as fossil fuels (light fuel oil and heavy fuel oil) are used. Project activities include installation of cogeneration unit for one of the existing boiler houses and providing hot water from one boiler house (potential cogeneration plant) to both Limbaži district-heating systems during the summer season. |
| **Technological solution** |
| The proposed technological solution is installation of steam turbine with capacity 2.0 $MW_{el}$ and 14 $MW_{th}$. Wood chips fuel will be used. |
| **Investors** |
| The main investors are Limbaži municipality and municipal DH Company "Limbažu Siltums". |
| **Benefiting groups** |
| The benefiting groups are:<br>• Limbaži municipality<br>• DH Company "Limbažu Siltums"<br>• Heat consumers |
| **Financing** |
| The financing could be provided by the Limbaži municipality and DH company.<br>Some part of the investment (up 50%) is envisaged to be received as support from Operational Programme Infrastructure and Services 2007-2013. |
| **Expected investment costs** |
| Approx. 4.9 mil.LVL (7 mil. EUR) |
| **Expected implementation time** |
| Year 2010-2013 |

| Energy Action 3 – Renovation of Umurga DH network |
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| Proposal includes renovation of existing DH network in Umurga village. |
| **Current state** |
| The heat is generated in boiler house with total capacity 1,3 MW and sawdust as fuel is used. Annual fuel consumption is approx.1500 t. DH network pipes are obsolete, some pipes inside channels are often flooded and heat losses in distribution are up to 35%. Umurga municipality perceives the need for installation of new pre-insulated pipes instead of old ones to decrease the fuel consumption and costs for heat production. |
| **Technological solution** |
| The proposed technological solution for renovation of existing DH network is replace existing old pipes with new pre-insulated pipes. Additionally individual heat substations in consumer buildings are planned to install. |
| **Investors** |
| The main investor is Umurga municipality. |
| **Benefiting groups** |
| The benefiting groups are:<br>• Umurga municipality<br>• Heat consumers |
| **Financing** |
| The financing could be provided by the Umurga municipality from the planned investment budget.<br>Some part of the investment (up to 40%) is envisaged to be received as support from Operational Programme Infrastructure and Services 2007-2013. |
| **Expected investment costs** |
| Approx. 132 thous.LVL (190 thous. EUR) |
| **Expected implementation time** |
| Year 2008-2010 |

| Action undle 4 – Energy efficiency in multi-apartment buildings in Ainaži city |
|---|
| Proposal includes implementation of energy efficiency measures in multi-apartment buildings in Ainaži city, e.g., thermal insulation of walls, roofs, and basements, and other energy efficiency measures. |
| **Current state** |
| According the high interest of Ainaži municipality stakeholders in promoting energy efficiency in inhabitant's buildings, energy efficiency possibilities are investigated and proposed in Ainaži city multi-apartment buildings. However, other municipalities are facing the same problems, thus experiences from those projects could be easily transmitted to other municipalities.<br>There are 7 multi-apartment buildings located in Ainaži city. All of them are private buildings. Utility Department of Ainaži municipality provides water/wastewater and solid waste management, but heating is provided by building owners from separate boiler houses or from boilers installed in the basement of buildings (local heating systems). Ainaži municipality has supported energy efficiency measures in some multi-apartment buildings by giving subsidy of 2000 Lats (approx. 2850 EUR).<br>In this project is planned to bundle several multi-apartment building thermal insulation projects, including installation of heat substations and heat meters. |
| **Technological solution** |
| The first step is to develop the energy audits in buildings and after that the packages of energy savings measures identified in the energy audits could be defined. This package will consist of thermal insulation of the buildings, reconstruction of windows and doors, improvement of efficiency of heating sources and heating systems, energy efficient lighting systems etc. |
| **Investors** |
| The main investors will be building owners. |
| **Benefiting groups** |
| The benefiting groups are:<br>• Building owners and inhabitants |
| **Financing** |
| The financing could be provided by building owners with support of Ainaži municipality. One of the solutions how the municipality could support the building owners is the development of energy efficiency fund where building owners can apply for financing.<br>Some part of the investment is envisaged to be received as support from Operational Programme Infrastructure and Services 2007-2013. |
| **Expected investment costs** |
| Approx. 61 thous.LVL ( 87 thous. EUR) for one building |
| **Expected implementation time** |
| Year 2010-2013 |

# 4. Conclusion and Outlook

The elaborated Master Plan is the first such a comprehensive energy planning document for Limbaži region as well as for any other specific region in Latvia.

One of the most important parts in developing the Master Plan is the evaluation of existing energy situation. The main problem in this working step was a lack of statistical and energy data at regional level. To ensure a possibility for updating the elaborated Master Plan on regular basis, it is strongly recommended to develop the system for collection of energy statistics in regional level and keep it up-to date.

The investigation of existing situation has showed that in heat generation mainly wood fuel is used, but there is a huge potential to improve the energy efficiency of wood fuel systems and used equipment. Electricity generation in the region is negligible compared to regional electricity consumption. Therefore it is necessary to increase the number of electrical power or CHP generation facilities in order to eliminate the dependency from other regions.

The highest energy saving potential is estimated in housing sector, where implementation of energy efficiency measures can save energy up to 100 000 MWh/year. Significant energy saving potential is estimated also in existing district heating systems – in heat production sites as well as in distribution networks. Regarding the renewable energy potential, the highest potential is identified for biomass resources – basically wood fuel. Good potential is also for wind energy and solar energy projects.

To promote the development of Limbaži region in line with the priorities set up by Limbaži region energy vision, four specific energy actions – pilot projects have been identified. Those projects are made to be feasible for receiving support from European Structural and Cohesion Fund Operational Program starting from 2007.

Four different energy actions/action bundles were proposed. The first one is fuel switch project from light-fuel oil to wood pellets with installation of solar collectors for hot water preparation. The second proposed project is the development of biomass CHP plant. Both projects are promising and after some basic financial calculations the payback time for those projects is between 5 to 8.5 years (including the subsidy form Structural Funds).

The third project is related to district heating network renovation. This project is very necessary from the technical point of view (the old heating network is in emergency condition). In financial calculations it was assumed that sawdust price in the future will increase significantly, otherwise the project will not be economically feasible and without some additional subsidy it will not be eligible for receiving the support from Structural Funds.

The last proposed project is related to energy efficiency in multi-apartment buildings. Preliminary financial calculations show that these projects require some additional subsidy from other funding sources, e.g., municipal energy efficiency fund, to become profitable. At the moment it is not possible to investigate the possibility for receiving the support from Structural Funds because the project evaluation criteria for this activity is not elaborated yet.

The Master Plan for Limbaži region elaborated in the frame of project "Energy 4 Cohesion" is a very good starting point for providing the sustainable energy management in Limbaži region. This could serve as basis for further work of regional administration and other stakeholders in this field. The next steps include a comprehensive feasibility study on the selected projects, elaboration of energy audits and elaboration of applications to apply for European funding.

Finally, it is very important to evaluate the outcomes of Master Plan and to keep update this document in regular basis.

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