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Deliverable 4.4

Abstract version of Master Plan

for innovative energy structures in Velky Krtis Region in Slovakia, which could be feasible for funding in the Structural Funds Programmes in the period 2007- 2013.

Elaborated by Energy Centre Bratislava (ECB)

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1. Background

Regional focus

Master Plan of Velký Krtis Region - the Slovakian target region of Energy 4 Cohesion (E4C) project - is a short version of the comprehensive document “Regional Energy Conception for the District of Velký Krtíš” (prepared in Slovak language). It is a strategy document giving a basic picture about the energy sector of target region, summarising the possibilities of higher RES utilisation as well as potentials for EE measures implementation.

Regional energy planning is a basic precondition for a better energy demand and supply management in the region resulting in several economical, environmental and social benefits for target groups in the region.

Thus **potential investors** have a chance to make a picture about:

- Amounts of biomass for energy utilisation available in the region (wooden waste and agricultural waste biomass);
- Potential locations for biomass facilities installation;
- Data about wind speed and assessment of possibilities of wind turbines construction in 2 selected reference locations in the region;
- Selection of potential locations for new small hydro power plants installation.

Thus **mayors** of municipalities have a chance to make a picture about:

- Availability of local biomass sources;
- Selected possibilities of fuel switch from natural gas/coal to biomass firing;
- Potential for energy savings in selected public buildings including possibilities of alternative energy sources utilisation (solar energy, biomass boilers, etc.).

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.

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 Slovakian project partner ECB 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. It includes 3 main elements:

- 1. Target region portrait** – providing summary of general context of the region, current energy situation and potential for renewable energy sources (RES) and energy efficiency (EE).
- 2. Energy Vision of Velky Krtis Region** - based on the investigation of existing energy situation, energy vision for the region has been developed. The global objective is to provide future sustainable energy supply and improved energy management, which would enable dynamic development of the region.
- 3. Identification of concrete actions or action bundles** – containing and analysing concrete projects eligible for funding from EU funds in the period 2007 – 2013 that would contribute to fulfilment of objectives and goals of the Energy Vision

In this way it is ensured that concrete action potential is highlighted which is imbedded in an overall RE promotion concept for the region.

3. Identified Energy Actions for Velký Krtíš Region

Energy Action 1 - Fuel switch and biogas plant in town of Velký Krtíš			
<p>Proposal includes biomass firing boilers construction within the local DH system in town and biogas plant construction for heat supply of public buildings, households and private sector.</p>			
Current state			
<p>The biggest part of heat in town (160,000 GJ/a) is being produced in 6 heat cycles of DH system firing natural gas. Installed capacity of DH system is 37.11 MWt. DH is operated by private company Steffe KVK Ltd.</p>			
Technological solution			
<p>Construction of 2 new DH heat cycles including boilers for wooden chips firing and intra-connection of existing heat cycles with biogas plant.</p> <p>DH 1 - 5 MW wooden-chips boiler; DH 2 - 4 MW wooden-chips boiler; Biogas plant 1,000 kW_{el}, 1,060 kW_{tep}.</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><i>Technical parameters of the boiler room:</i></p> <p>Installed capacity: 5 MWt + 4 MWt</p> <p>Number of boilers: 2</p> <p>Annual heat production: 91,000 GJ</p> <p>Fuel consumption: 11,000 t of wooden chips</p> </td> <td style="width: 50%; vertical-align: top;"> <p><i>Technical parameters of the biogas station:</i></p> <p>Installed capacity: 1,000 kW_e; 1,060 kW_t</p> <p>Number of CHP units: 2</p> <p>Annual heat production: 24,000 GJ</p> <p>Annual power production: 7,592,000 kWh</p> <p>Inputs consumption: 20,000 t of corn silage</p> </td> </tr> </table>		<p><i>Technical parameters of the boiler room:</i></p> <p>Installed capacity: 5 MWt + 4 MWt</p> <p>Number of boilers: 2</p> <p>Annual heat production: 91,000 GJ</p> <p>Fuel consumption: 11,000 t of wooden chips</p>	<p><i>Technical parameters of the biogas station:</i></p> <p>Installed capacity: 1,000 kW_e; 1,060 kW_t</p> <p>Number of CHP units: 2</p> <p>Annual heat production: 24,000 GJ</p> <p>Annual power production: 7,592,000 kWh</p> <p>Inputs consumption: 20,000 t of corn silage</p>
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Investors			
<p>Town of Velký Krtíš or Steffe KVK – wooden chips boiler room construction; Agricultural company Agrovíno Čebovce – biogas station construction.</p>			
Benefiting groups			

<p>Town – reduced costs on heating;</p> <p>Residents – reduced costs on heating, higher employment (3 expected jobs in boiler room plus 3 new jobs in biogas station operation – guard and service, 3 preserved jobs in agricultural company due to ensured steady market for corn silage production)</p> <p>Agricultural company – ensuring market for technical crops planting, incomes from electricity sales, higher economic yield from the land;</p> <p>Expected fossil fuels savings and pollutants and GHG emissions reductions:</p> <ul style="list-style-type: none"> - natural gas savings 3,725,300 m³ (115,760 GJ), what represents savings of 6,314 t of CO₂ emissions and 5.8 t NO_x emissions.
<p>Logistics</p> <p>Wooden chips will be supplied from local sawmill (PRP Velký Krtíš Ltd.) produced from waste wood and low quality wood from local forests. Biogas will be produced from corn silage planted by local agricultural company (Agrovíno Čebovce Ltd.) on the area of about 600 ha. Substrate from biogas station will be used as fertiliser.</p>
<p>Financing</p> <p>Town of Velký Krtíš will apply for grant from EU structural Funds (95% of eligible costs on installation of boilers, the rest (5%) will be covered by own sources or bank loan.</p> <p>Agricultural company Agrovíno Čebovce will apply for grant from EU Structural Funds (50% of eligible costs on biogas plant construction, the rest will be the bank loan)</p>
<p>Expected investment costs</p> <p>Boiler rooms + heat cycles intra-connection): 85 mil. Sk;</p> <p>Biogas station: 146 mil. Sk.</p>
<p>Expected implementation time</p> <p>Year 2008</p>

Energy Action 2 - Energy savings in block of flats in town of Velký Krtíš
Proposal includes energy saving measures implementation within typical block of flats in Velký Krtíš town. While it is supplied from local district heating system, this project proposal supports the implementation of objectives set by energy vision on demand side.
Current state
Block of flats type T06B on “Lučenecká street” number 69-71 in Velký Krtíš with 8 floors and 4 entrances. Flat house was constructed in 1978. It is supplied by heat and domestic hot water from local district heating system through heat exchanging unit.
Technological solution
Project consists of: <ul style="list-style-type: none"> - Thermal insulation of the building envelope; - Thermal insulation of the roof; - Replacement of the windows.
Investors
Association of flat owners.
Benefiting groups
Flat owners – inhabitants of Velký Krtíš – reduction of heat consumption and thus costs on heating.
Financing
<ul style="list-style-type: none"> - Own financial sources (common reconstruction fund, in which financial resources of the flat owners are being accumulated); - Bank loan; - Investment subsidy from State Building Development Fund.
Expected investment costs
4 395 550 SK (130 thousands of Euro)
Expected implementation time
Year 2008

Energy Action 3 – Biomass DH and biogas plant in Dolná Strehová	
Proposal includes biomass district heating system construction and biogas plant construction for heat supply of public buildings, households and private sector.	
Current state	
Total energy consumption in Dolná Strehová municipality is expected to be about 28 000 GJ in 2010, of which 82% is being consumed by the households, 18% by private and public sector. Natural gas covers 42% of energy production, 45% electricity, 3 % coal and 40% fire wood.	
Technological solution	
DH system construction in the village including heat pipelines and biogas plant construction.	
<i>Technical parameters of the boiler room:</i>	<i>Technical parameters of the biogas station:</i>
Installed capacity: 3,100 kWt	Installed capacity: 500 kWe; 600 kWt
Number of boilers: 2	Number of CHP units: 1
Annual heat production: 14,000 GJ	Annual heat production: 14,000 GJ
Fuel consumption: 1,700 t of wooden chips	Annual power production: 3,572,000 kWh
	Inputs consumption: 9,000 t of corn silage
Investors	
Municipality of Dolná Strehová – DH system construction including pipelines and wooden chips boiler room;	
Agricultural company Agrodružstvo Senné, Závada – biogas station construction.	
Benefiting groups	
Municipality – reduced costs on heating;	
Residents – reduced costs on heating, higher employment (3 expected jobs in boiler room plus 3 new jobs in biogas station operation – guard and service, 3 preserved jobs in agricultural company due to ensured steady market for corn silage production)	
Agricultural company – ensuring market for technical crops planting, incomes from electricity sales, higher economic yield from the land;	
Expected fossil fuels savings and pollutants and GHG emissions reductions:	
- natural gas savings cca 380,952.4 m ³ (11,760 GJ), what represents savings of 646 t CO ₂	

<p>emissions and 0.594 ton NOx emissions;</p> <ul style="list-style-type: none"> - firewood savings cca 1,166.7 ton (11,200 GJ), what represents 17.5 t solid particles savings and 18,7 t CO emission savings; - electricity savings about 1.17 GWh (4,200 GJ); - coal savings about 70 t (840 GJ).
<p>Logistics</p>
<p>Wooden chips will be supplied from local sawmill (Bioenergy Závada Ltd.) produced from waste wood and low quality wood from local forests. Biogas will be produced from corn silage planted by local agricultural company (Agrodružstvo Senné Ltd.) on the area of about 260 ha. Substrate from biogas station will be used as fertiliser.</p>
<p>Financing</p>
<p>Municipality of Dolná Stehová will apply for grant from EU structural Funds (95% of eligible costs on installation of DH system, the rest (5%) will be covered by own sources or bank loan.</p> <p>Agricultural company Agrodružstvo Senné in Závada will apply for grant from EU Structural Funds (50% of eligible costs on biogas plant construction, the rest will be the bank loan)</p>
<p>Expected investment costs</p>
<p>DH system (boiler room + heat pipelines): 102 mil. Sk (including chipping machine and heat pipelines in the village);</p> <p>Biogas station: 64 mil. Sk.</p>
<p>Expected implementation time</p>
<p>Year 2008</p>

Energy Action 4 – Biomass DH and biogas plant in Malý Krtíš	
Proposal includes biomass district heating system construction and biogas plant construction for heat supply of public buildings, households and private sector as well as local industrial park.	
Current state	
Municipality has functional natural gas supply network, the biggest share on energy consumption have households. Local small industrial park is being constructed on local land. At the moment one 1 ha production hall is operating within the industrial park. The outlook is further 2 or 3 halls. Total heat consumption is expected to be about 32,000 GJ in 2010 (of which 10,000 GJ municipality and 22,000 GJ industrial park).	
Technological solution	
Boiler room construction in the village and biogas plant construction.	
<i>Technical parameters of the boiler room:</i>	<i>Technical parameters of the biogas station:</i>
Installed capacity: 2,5 MWt	Installed capacity: 500 kWe; 600 kWt
Number of boilers: 1	Number of CHP units: 1
Annual heat production: 19,000 GJ	Annual heat production: 13,000 GJ
Fuel consumption: 2,300 t of wooden chips	Annual power production: 3,900,000 kWh
	Inputs consumption: 10,000 t of corn silage
Investors	
Municipality of Malý Krtíš – boiler room and heat pipelines construction; Agricultural company Babka ltd. – biogas station construction.	
Benefiting groups	
Municipality – reduced costs on heating;	
Residents – reduced costs on heating, higher employment (3 expected jobs in boiler room plus 3 new jobs in biogas station operation – guard and service, 3 preserved jobs in agricultural company due to ensured steady market for corn silage production)	
Agricultural company – ensuring market for technical crops planting, incomes from electricity sales, higher economic yield from the land;	

<p>Expected fossil fuels savings and pollutants and GHG emissions reductions:</p> <ul style="list-style-type: none"> - natural gas savings 10,760 GJ), what represents savings of 549 t CO₂ emissions and 0.5 ton NOx emissions;
<p>Logistics</p>
<p>Wooden chips will be supplied from local sawmill (PRP Ltd.) produced from waste wood and low quality wood from local forests. Biogas will be produced from corn silage planted by local agricultural company (Babka Ltd.) on the area of about 300 ha. Substrate from biogas station will be used as fertiliser.</p>
<p>Financing</p>
<p>Municipality of Malý Krtíš will apply for grant from EU structural Funds (95% of eligible costs on installation of DH system, the rest (5%) will be covered by own sources or bank loan.</p> <p>Agricultural company Babka will apply for grant from EU Structural Funds (50% of eligible costs on biogas plant construction, the rest will be the bank loan)</p>
<p>Expected investment costs</p>
<p>DH system (boiler room + heat pipelines): 66 mil. Sk; Biogas station: 69 mil. Sk.</p>
<p>Expected implementation time</p>
<p>Year 2008 (industrial park 2010)</p>

4. Conclusion and Outlook

Regional Energy Conception for the District of Veľký Krtíš (Slovak version published in August 2007) has been already amended by several local stakeholders. It was also sent to the Banská Bystrica Self-governing region - where the district of Veľký Krtíš comes under. Self-governing region will be also implementing organisation for some parts of EU funds, where coherence with regional conception will be advantage for the applicants. Preparation of regional energy concepts will be very probably obligatory in future in line with up-coming national legislation.

Regional energy planning as on district level is not a common practise in Slovakia. Regional stakeholders now have a tool for decision making in the field of RES utilisation and energy savings measures incl. investments planning.

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