

Sustainable Energy Actions within EC Structural and Cohesion Funds between 2007 - 2013

Energy 4 Cohesion



Supported by:

Intelligent Energy  Europe

ENERGY 4 COHESION

Renewable Energy and Cohesion Policy



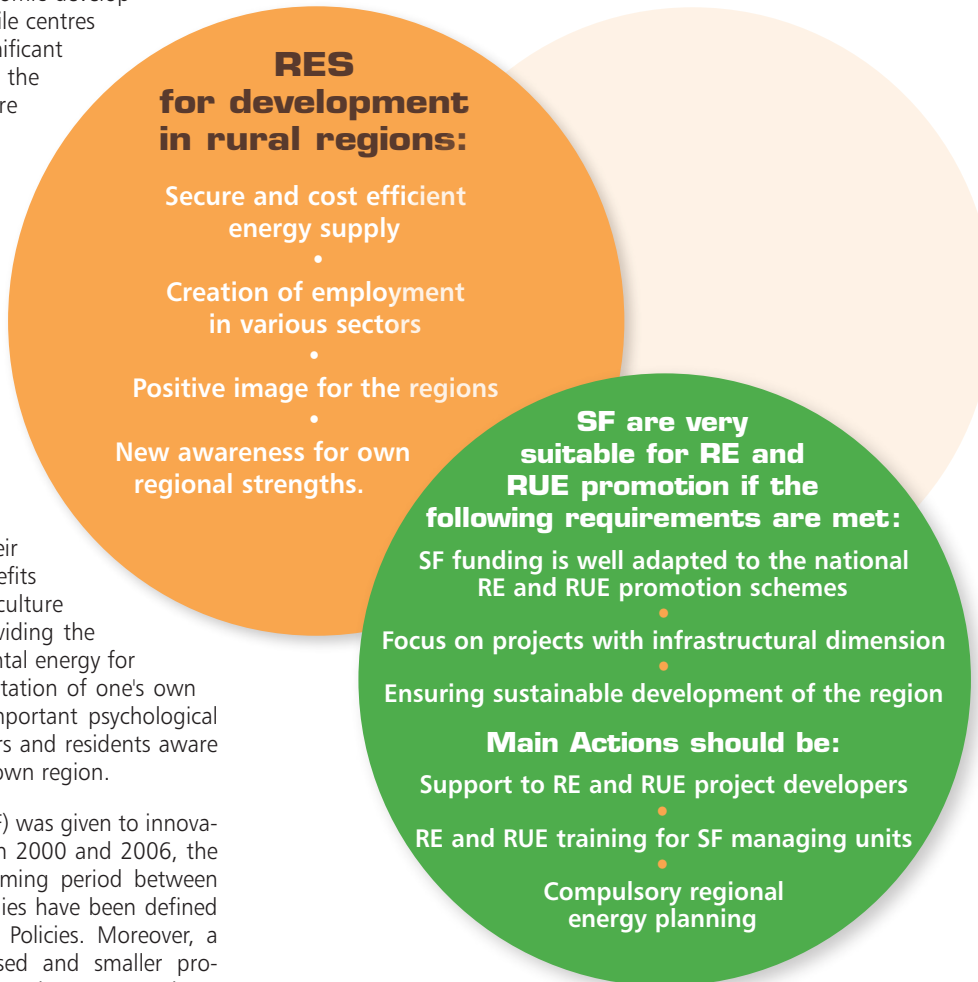
The rural regions of Central and Eastern Europe (CEE) have so far not benefited at all from the economic development stimulated by EU enlargement. While centres like Bratislava or Bucharest show significant economic progress, the rural areas of the respective countries suffer from severe unemployment, the degradation of infrastructure and the migration of young residents. Thus, the European Cohesion Policies are under great pressure to mitigate this problematic development and bring additional employment, new perspective and hope to the marginalised rural regions of CEE.

One important tool for the European Cohesion Policies is the support of innovative energy actions in the countryside through the promotion of Renewable Energies (RE) and Rational Use of Energy (RUE). RE and RUE actions have proved in various pilot projects their positive environmental and social benefits for the region by strengthening agriculture and forestry, creating new jobs and providing the region with cost efficient and environmental energy for electricity and heat. Moreover, the exploitation of one's own domestic energy resources creates an important psychological momentum, making local decision makers and residents aware about the richness and strength of their own region.

While only 1 % of the Cohesion Funds (CF) was given to innovative energy actions in the period between 2000 and 2006, the perspectives are better for the programming period between 2007 and 2013. Firstly, Renewable Energies have been defined as a main priority within the Cohesion Policies. Moreover, a stronger focus is drawn on decentralised and smaller programmes which are more suitable for innovative energy actions. Still, the wider use of Structural Funds (SF) for RE and RUE actions is still hampered by various constraints. The following challenges are to be tackled to overcome these constraints:

- Larger resources for the project developers to prepare complete and bankable project proposals.
- Better knowledge about energy issues within the management staff of Structural Fund Programmes on regional level.
- Focusing Cohesion Policies on RE and RUE actions with clear and proven benefits for the surrounding region.
- Careful adaptation of Operation Programmes in view to the overall supporting schemes for RE and RUE.
- Decisive targeting of Structural Fund Programmes to the most vital sectors e.g. the creation of infrastructure required for bio-energy projects.

The work of "Energy 4 Cohesion" and similar EU actions is very valuable in order to prepare the ground for an extended use of Structural Funds for innovative energy actions in the rural environment. E4C has elaborated the main results to promote RE and RUE within Cohesion Policies in many CEE Countries. The main findings of E4C are summarised in this publication.



SF framework conditions between 2007 and 2013

- ☺ The benefits of RE, EE and RUE for disadvantaged regions are perfectly in line with the SF and CF objectives.
- ☺ The financial resources of SF and CF can give a significant push to RE development in regions of the European Union.
- ☺ The National Strategic Reference Frameworks (NSRFs) for the 2007-2013 period reveals positive changes. First of all, the total amount of financial resources allocated to sustainable and renewable energies appears to be on the increase, to around 3%.
- ☹ Administrative barriers are high for RE projects and the SF and CF structure is not ideal for RE projects.
- ☹ The hope from project developers for future SF and CF funding to develop their projects, might delay further project development.
- ☹ The financial allocations for sustainable and renewable energies during the period 2000-2006 are estimated at around 1.16%. This is a rather modest result.

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Energy for Cohesion

The 'Energy 4 cohesion' (E4C) project was launched in January 2006 to promote Renewable Energies (RE) and Rational Use (RUE) of Energy in less developed rural areas of Europe and to prepare the ground for the extended use of Structural Funds in the programming period between 2007 and 2013. E4C, which is funded by the European Intelligent Energy Programme, includes 12 organisations - companies and institutions - from 11 different Member States all with experience in renewable energies.

E4C Target Regions

The consortium has worked in 8 selected target regions; these are: **Zlín (Czech Republic), Limbaži (Latvia), Velký Krtis (Slovakia) Kaunas region (Lithuania), Poviát Nowa Sol (Poland), Evros (Greece), Saaremaa Island (Estonia) and Alta Locride (Italy).**

These regions have been selected for their suitability for extended use of renewable energies and energy efficiency actions, namely:

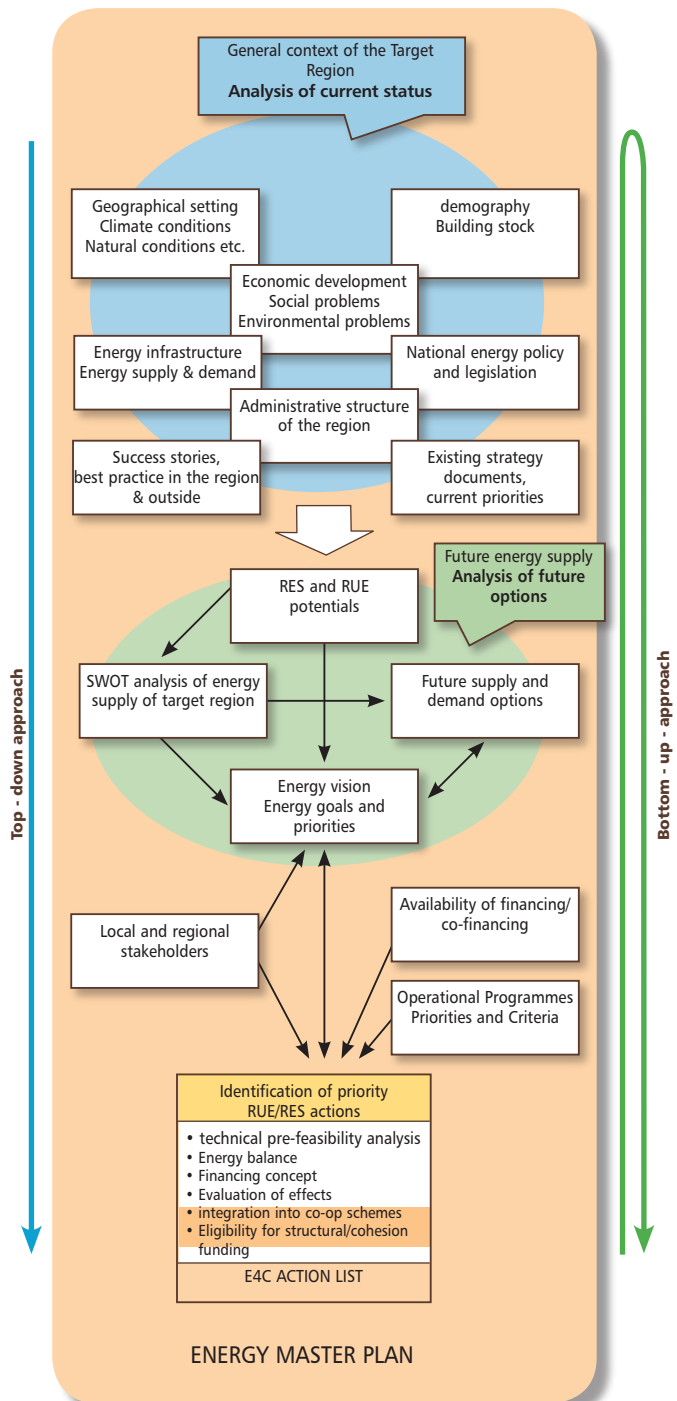
- Rich resources for renewable energy generation, particularly biomass resource.
- Clear support of the political and administrative decision makers.
- Availability of an extended knowledge and data basis for the planning process.

E4C Strategy

The cornerstone of the E4C strategy is to support the implementation of energy pilot actions in the selected target regions which are feasible for public financial support, particularly through European Structural and Cohesion Funds.

E4C has chosen a combined top-down and bottom-up approach. On European level the project initiated an intense dialogue with decision makers for SF and CF in order to raise awareness on the strong development potential of RE and RUE actions in the rural environment. In parallel, in the target regions sustainable energy actions have been elaborated together with all relevant stakeholders. The identified energy actions were analysed for their technical and economic feasibility.

The E4C Planning Tool



E4C Results

E4C has generated very valuable results on all items of the E4C strategy:

1 Full analysis of the framework conditions for RE and RUE in the SF Programmes between 2007 and 2013.

Within Energy 4 Cohesion a survey was undertaken on previous and on-going EC Cohesion Policies to analyse the overall EC Cohesion priorities and the eligibility of innovative energy actions. For the E4C target regions the relevant national development plans and Operational Programmes were investigated in detail.

The surveys have shown a heterogeneous picture of the SF priorities in the E4C countries. The eligibility criteria, funding targets and approval procedures vary significantly between the Member States. The only common fact is that in all countries a main focus is put on RE and EE actions for the period 2007-2013. The largest part of the funds will be allocated to the renovation and conversion of municipal district heating systems, replacing fossil fuels with biomass and supporting cogeneration of heat and electricity. Moreover, the installation of new RE systems, such as biomass, wind, and small hydro is a priority in all countries. In each Member State the Operational Programmes include energy efficiency measures in the housing sector.



2 Guidelines on how to combine small scale projects into bundles of bankable size.

Experiences from previous EU programming periods have shown that many valuable energy projects have not reached eligibility for Structural Fund Programmes because the project investment size did not pass the required minimum budget. In respect of this funding obstacle, E4C developed a guideline on how to bundle small decentralized energy actions to make them eligible for Structural and Cohesion Funds.

3 Comprehensive Planning Tool to develop Energy Master Plans on regional level.

The E4C Planning Tool (see figure on previous page) gives a clear overview of all necessary steps for the development of Master Plans on regional level:

- (1) Portrait of the region,
- (2) Analysis of RES and RUE potentials,
- (3) Definition of Energy Vision,
- (4) Identification and investigation of Energy Actions to be implemented with the support from Structural/Cohesion Funds.

4 Detailed Master Plans for sustainable energy actions in the E4C target regions.

Within Energy 4 Cohesion, 8 detailed Master Plans were developed supporting the sustainable development of the eight E4C target regions, comprising 29 innovative Energy Actions, with a total investment sum of around 60 Mio Euros. These energy actions are presented on the following pages of this publication.



All E4C results can be downloaded under www.e4c.org



Polish Master Plan - Powiat Nowa Sol Region

- 4 innovative RES and RUE actions suitable for Structural and Cohesion Funds 2007-2013:
 - 1 MW_{el} Biogas CHP plant in Niedoradz, Oty municipality.
 - Small hydropower plant in Leszno Dolne, Municipality Szprotawa.
 - 5 MW_{th} Gasification of municipal waste for heat production, Nowa Sol municipality.
 - Refurbishment of municipal buildings, Nowa Sol county.
- Developed by SEGI AT.

General context

- Total population: 80 000.
- Total area: 772 km²: 50% used for agricultural purposes 40% covered by forests (pine woods).
- Landscape: hilly character, many lakes, post-industrial character.
- Climate: very mild; annual precipitation: 580 mm.
- Largest social problem: high unemployment rate: < 35%.
- Large tourism development potential.

Current energy situation

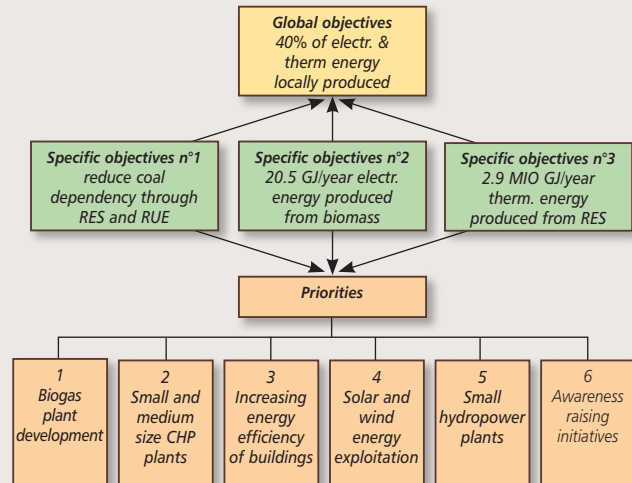
- Nearly 100% of primary energy is imported.
- Share of renewables in total electricity sales: 0.02 %.
- Total energy consumption / year: 3 717 TJ, (2 798 TJ thereof for heat and 922 TJ for electricity).
- Combustion of coal covers 82% of energy needs for heating.
- Scarce district heating networks.
- Gas networks for 15 000 users, mainly in towns.

RES Potential

Biomass: Wood BM: 30 000 t; Straw: 25 000 t; waste BM: 60 000 t	Wind: low priority, particular locations with velocity 4 m/s, but average: 2.4 m/s
Solar: 3.17 kWh/m ² /day average rad.	Hydropower: 1 existing, potential for 3 stations with total output 250-900 kW



Energy vision by 2020



Energy Action

- Biogas CHP plant in Niedoradz

Technology: Anaerobic methane fermentation

Technical pre-feasibility

Installed electric energy capacity	1MWe
Annual electricity production	7 500 MWh
Annual heat production	35 000 GJ
Annual pig slurry input	app. 30 000 t
Annual biomass input	app. 15 000 t
Own use and process losses	18 000 GJ

Financing Strategy

Substantial financial support is expected in the framework of the European Structural Funds foreseen for the financing period 2007-2013. One opportunity is offered by the Regional Operational Programme (OP) for Lubuskie Voivodeship, under the measure 3.2: improvement of air quality, energy efficiency and development of renewable energy sources, is of great interest.

Positive impacts

- Farm owner: no costs for disposal of animal waste, additional profit from slurry delivered.
- Reduction of energy costs, 'green certificate', June 2007: "green" electricity can be sold for ca. 100€/MWh, of which app. 63€ is the price of the certificate.
- Local farmers: solution for animal waste disposal, high quality fertilizer in the form of fermentation residues.
- Local population: reduction of CH₄ emissions, groundwater protection, 3 - 4 jobs generated.
- Savings of: 1 500 t coal = 3 000 t CO₂.

Contact: SEGI AT. Poland: www.segi.com.pl

Estonian Master Plan - Saaremaa Island

- 4 innovative RES and RUE actions suitable for Structural and Cohesion Funds 2007-2013:
 - Implementation of biomass-fired CHP plant at the district heating company Kuressaare Soojus Ltd on the island Saaremaa.
 - Renovation of 0.7 MW District Heating boiler plant and switch to biomass fuel in Karla municipality.
 - Switch from fossil fuel to solid biofuel in the district heating boiler plant in Salme village.
 - Renovation of district heating pipelines and installation of heat substations in the buildings of Liiva in Muhu Island.
- Developed by Archimedes Foundation.

General context

- Saaremaa Island is located in the centre of the Baltic Sea region in the western part of Estonia.
- The territory of Saaremaa, the target region of the project in Estonia, is 2 992 km², which makes up to 6.5 % of the Estonian territory.
- Arable land covers 570 km². 57% of the territory is covered by forests.
- Population of Saaremaa is 35 076 (2.6% of the Estonian population).

Current energy situation

- Negative energy balance, remarkable dependence on imported fossil fuels.
- Continuous downward trend of total energy consumption.
- Low efficiency and disagreement with changed economic situation.
- Lack of systematic planning of locations of growing capacities.
- Lack of detailed analyses of possibility of usage of renewable energy resources which discourages potential investors.

RES Potential

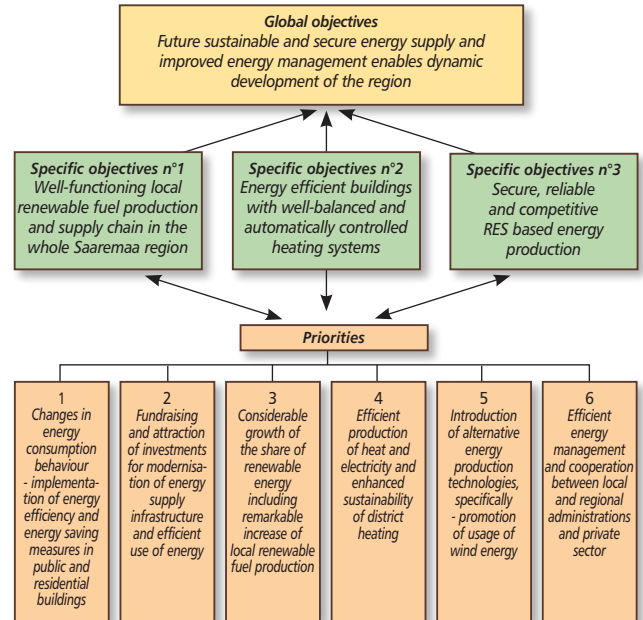
Renewable energy sources	MWh/year	TJ/year
Biomass		
Woody biomass		
Total theoretical	315 000	1 134
Realistic to use	200 000	720
Biomass from natural landscapes, wetlands and agriculture.		
Total theoretical	1 304 000	4 694
Realistic to use	510 000	1 836
Waste		
Total theoretical	17 000	61,2
Realistic to use	10 000	36
Other renewable sources		
Wind - 10 MW (6 637 MWh – 2006)	17 000	61,2
Solar - heating systems (5000 households)	10 000	36
Heat pumps (3000 households)	25 000	90
TOTAL (realistic to use)	772 000	2 779.2

Remark: Total average primary energy consumption in the last decade was 800 GWh/y

Energy Saving Potentials

Accordingly the estimated energy efficiency potential in the housing sector (15% from the present consumption is available to implement middle scale payback time energy saving measures) is 40.5 GWh per year.

Energy vision by 2020



Energy Action - biomass-fired CHP at a district heating company

Technology: biomass-fired combined heat and power (CHP).

Technical pre-feasibility

Current state within the existing DH system

- Installed capacity - 53 MWth.
- Length of pipelines in DH network - 33 km (36% of them new or with renovated insulation).
- Number of consumers (buildings) switched to DH network: 270.
- Annual heat production (2006): 80 193 MWh; 228 695 GJ.

Technical parameters of the proposed CHP plant

- Installed capacity: 2.5 MWe + 10 MWth. N° of boilers: 1
- Annual heat production: 49 000 MWh, 176 400 GJ (~58% share on total DH system production).
- Annual electricity production: 13 600 MWh.
- Fuel consumption: 76 300 MWh, 100 395 m³ of wood fuels.
- Kuressaare Soojus Ltd supplies heat to approximately 8 000 inhabitants in Kuressaare town, equal to 50% of the population in the town, public and industrial sector. At the moment about 2 500 flats within blocks of flats are connected to the DH system, where about 232 000 m² is being consumed. On the basis of some studies the average specific heat consumption per living stock area is 47 kWh/m² per year and 270 kWh/m² per year.

Financing Strategy

Energy issues are included in the SF Operational Programme for development of living environment, priority 3 - development of energy sector.

Positive impacts

The planned project has essential importance in the view of achieving local targets of decreasing the dependence on imported fuels, contribution to security and stability of energy supply for local population, and wider use of local energy resources for satisfying the local need for energy, both heat and electricity.

Contact

ARCHIMEDES Foundation Estonia: <http://www.archimedes.ee/>



Latvian Master Plan - Limbaži Region

General context

- Limbaži region is located in Northern part of Latvia.
- The region is located on the seashore, there are several sea-ports where wood fuel is being regularly exported.
- Round timber, saw timber, wood-chips, firewood and peat are exported through Skulte sea-port. Approximately 30% of peat cargoes are imported from Estonia.
- The centre of the region is the city of Limbaži with total area 8 994 km² and 8 549 inhabitants.

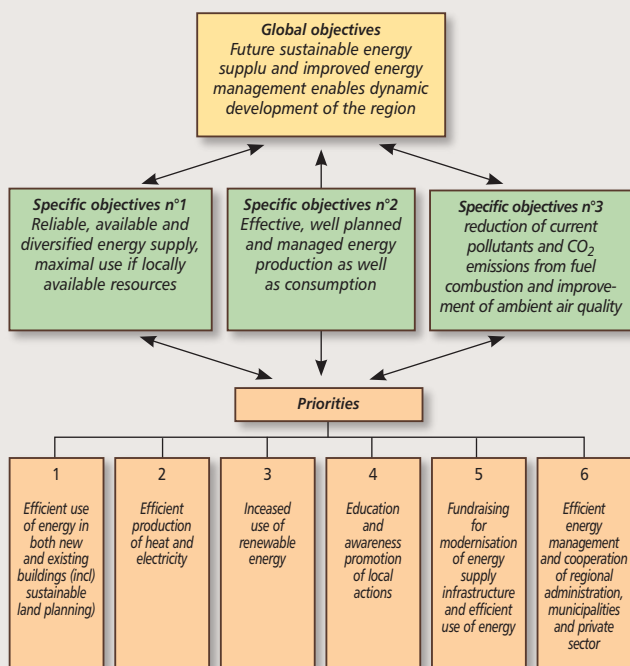
Current energy situation

- Almost all electricity is imported from surrounding regions, except for two small hydro power stations and wind generators (there are no other electricity generation sources in Limbaži region).
- Wood is extensively used in Limbaži region due to of the inaccessibility to the natural gas grid.

RES Potential

- Wind maps show that wind speed in Limbaži region is higher than the Latvian average. Today Limbaži region already has some experience in using wind energy.
- Bioenergy has a high potential in the region.

Energy vision by 2020



- 4 innovative RES and RUE actions suitable for Structural and Cohesion Funds 2007-2013:

- Fuel switching with installation of solar collectors.
- Biomass CHP Plant in Limbaži city.
- Renovation of Umurga DH network.
- Energy efficiency in multi-apartment buildings in Ainaži city.

- Developed by Ekodoma

Energy Action

-Biomass CHP Plant in Limbaži city

Technology: Steam turbine with capacity 2.0 MWel and 14 MWth. Wood chips fuel will be used.

Technical Feasibility

Current State

- Two boiler houses operating in Limbaži city.
- Fuel -Biomass (wood chips and sawdust), light fuel oil and heavy fuel oil (to cover the peak loads).
- 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.

Main characteristics of the new CHP Plant

- Small-scale cogeneration plant - e.g., steam turbine technology.
- Electricity supply - the general grid.
- Fuel-Wood chips.

Installed Capacity, MWe	2.0
Installed Capacity Utilization Coefficient	1
Number of Installed Capacity Utilization Annual Hours, (h)	7 000
Annual Electricity Generation, mil. kWh	14
Minimum Daily Electricity Generation, mil kWh	0.048

Financing Strategy

- The financing could be provided by the Limbaži Municipality and district heating company.
- Some part of the investment (up to 50%) is envisaged to be received as support from Operational Programme Infrastructure and Services 2007-2013.

Positive impacts

- Reduced environmental impact through elimination of fossil fuel and use of renewable energy.
- Improvement of air quality as well as reduction of energy production expenses.
- This project is covering at least two priorities defined in the Limbaži region energy vision, including efficient heat production and increased use of renewable and local waste energies.

Contact

EKODOMA, Latvia: www.ekodoma.lv



Lithuanian Master Plan - Kaunas Region

- 3 innovative RES and RUE action bundles suitable for Structural and Cohesion Funds 2007-2013:
 - Lapes city landfill gas utilisation in CHP plant.
 - Biogas utilisation in CHP plant of JSC "Kauno vandenys".
 - Renovation of District Heating network of city Birstonas.
- Developed by Lithuanian Energy Institute (LEI).

General context

- Kaunas region is the central region in the country.
- The region covers an area of 8 060 km², and its population numbers 677 270.
- Kaunas city: Kaunas city is the second largest city in Lithuania and is located at the confluence of the largest rivers Nemunas and Neris. The city is an important centre for business, industry and research.

Current energy situation

- Prevalence of import of primary energy resources from Russia, dependence on Lithuania's gas supply and electricity systems, and dependence on Russia's energy systems.
- Four larger capacity power plants (91 179.8 MW) and eight mini hydro power plants (3.04 MW) are located in Kaunas Region.
- A unique Kruonis Pumped Storage Plant (Kruonis PSP) is located near Kaunas.

RES Potential

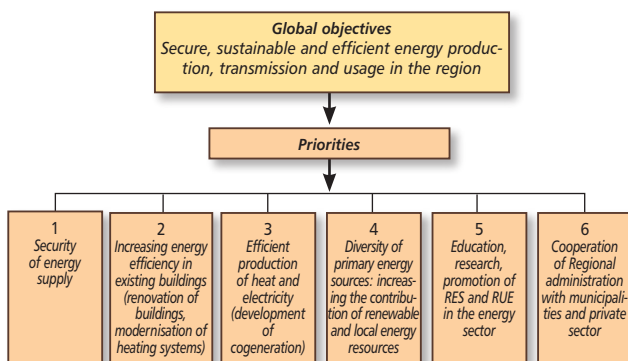
- Biomass and Hydro constitute the highest RES potential in the region.

Source of energy	Energy potential, GWh
Biomass	1 115
Hydro energy	440
Wind energy	35
Solar energy	71
Total	1 661

Potential for Energy Savings

- Households are largest consumers of heat.
- Huge potential for savings of heat energy in households.
- More than 95% of building stock consist of houses built before 1992, when very low requirements for thermal resistance of buildings were in force.

Energy vision by 2020



Energy Action

- Biogas utilisation in a CHP plant

Technology: Biogas from wastewater treatment plant JSC "Kauno vandenys" using biogas for combined heat and power (CHP) production.

Technical Feasibility

Current State

- Part of the biogas from wastewater treatment plant JSC "Kauno vandenys" is used in Noreikiskes city CHP plant. In the wastewater treatment plant only a mechanical water cleaning technology is installed.

Main characteristics of the new plant

- Proposal includes construction of 2 units of CHP in JSC "Kauno vandenys". Fuel-biogas after wastewater biological cleaning process.
- Installed capacity:
 - 2 CHP units x 300 kWel.
 - Nominal electrical capacity of unit - 300 kWel.
 - Nominal thermal capacity of unit - 420 kWth.
- Biogas consumption (its heating value is 20 MJ/kg) - 560 Nm₃/h.
- Electrical efficiency of the CHP plant - 36.4%.
- Thermal efficiency of the CHP plant - 51.2%.
- Overall efficiency of the CHP plant - 87.6%.
- After implementation, biological water cleaning technology production of biogas will increase significantly.
- Proposal includes use of biogas after biological water cleaning process.

Financing Strategy

- Kaunas city municipality will apply for a grant from EU Structural funds (80% of eligible costs, 10% can be covered by municipality, 10% will be covered by own resources of JSC "Kauno vandenys").
- Project will be submitted for financial support from Operational Programme No 3 - Cohesion promotion, priority 3 (environment and sustainable development).

Positive impacts

- Current emissions of pollutants and CO₂ from fuel combustion will be reduced.
- Contribution of renewable and local energy resources in the region will be increased.
- Efficient production of heat and electricity (development of cogeneration) will be significantly increased.
- Energy supply will be reliable, available and diversified.
- About 2.2 million kWh of electricity and 3.1 million kWh of heat could be produced every year from biogas - reducing dependence from imported natural gas and increasing security of energy supply.
- Increase local employment. Preparation project documentation, implementation of project – there will be new activities for local companies.

Contact: LEI, Lithuania: www.lei.lt

Slovak Master Plan - Velky Krtis region

General context

- Velky Krtis District is situated in the southern part of the Banská Bystrica Region, thus in the southern part of middle Slovakia.
- Majority of agricultural land is medium fertile land (vast majority is heavy soil and medium-weight soil).

Current energy situation

- The district's energy balance is negative. Almost all primary energy resources are imported. After the termination of brown coal mining in Velky Krtis, imported natural gas became the main energy resource.
- From local available RES only firewood is used for the heating of family houses without connection to the natural gas supply network.
- In the town of Velky Krtis seven operating boiler rooms firing natural gas supply the majority of houses with heat and hot water at present.
- Electricity is imported to the district by 400 KV power lines. At present, there is only one small hydropower plant by the water reservoir near the village of Nenince with installed capacity of 0.022 MW and annual electricity production varying depending on the river flow averaging around 65 MWh per year.

RES Potential

- The most promising RES in the region is biomass. Technically available energy potential [GJ] 2 067 569
- Geothermal Potential. 32.6 MWt. 81.5 GWh (293.4 TJ).
- Wind total potential of 20 MWe of installed capacity. Considering assumed exploitation during 1500-2000 hours during the year it represents annual electricity production of about 35 GWh/y.
- Solar Thermal Technically available solar-thermal potential [TJ] 203.8
- Total technically exploitable hydropower potential of river flows in district of Velky Krtis is 7.07 GWh (25.45 TJ), of which 1.74 GWh (6.25 TJ) represents ecologically exploitable hydropower potential in 2020.

Potential for Energy Savings

- The biggest potential for energy saving is in the sector of households.

Total energy savings potential in the district of Velky Krtis

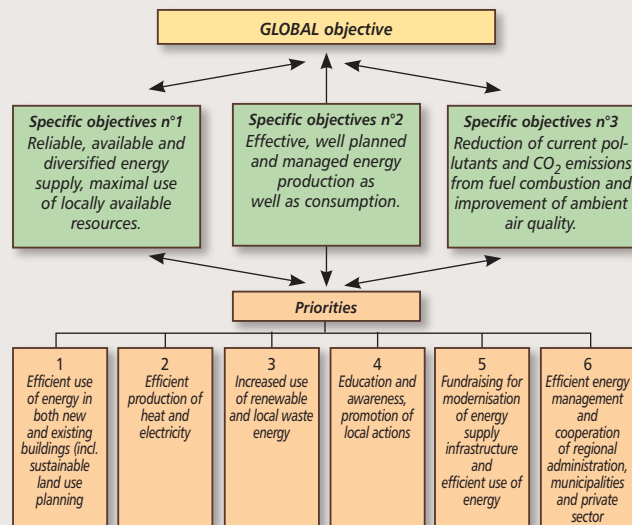
Sector	Potential for heat savings	Potential for electricity savings		Total potential
TOTAL	589 774 GJ/year	12 461 GWh/year	44 860 GJ/year	634 634 GJ/year

In Blocks of flats/households/Public and commercial services/Industry /District heating



- 4 innovative RES and RUE action bundles suitable for Structural and Cohesion Funds 2007-2013:
 - DH fuel switch from natural gas to biomass and biogas plant installation in Velky Krtis town;
 - Energy saving measures in block of flats in town of Velky Krtis;
 - Biomass DH and biogas plant construction in Dolná Strehová municipality;
 - Biomass DH and biogas plant construction in Maly Krtis municipality.
- Developed by Energy Centre Bratislava (ECB)

Energy vision by 2020



Energy Action - Biomass DH and biogas plant in Dolná Strehová

Technology: biomass district heating (DH) system construction and biogas plant construction for heat supply of public buildings, households and private sector.

Technical Feasibility

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 households, and 18% by the private and public sector. Natural gas covers 42% of energy production, 45% electricity, 3% coal and 40% fire wood.

Main characteristics of the new plant

DH system construction in the village including heat pipelines and biogas plant construction.

Technical parameters of the boiler room:	Technical parameters of the biogas station:
<ul style="list-style-type: none">• Installed capacity: 3 100 kWt• Number of boilers: 2• Annual heat production: 14 000 GJ• Fuel consumption: 1 700 t of wooden chips	<ul style="list-style-type: none">• Installed capacity: 500 kWe; 600 kWt• Number of CHP units: 1• Annual heat production: 14 000 GJ• Annual power production: 3 572 000 kWh• Input consumption: 9 000 t of corn silage

Financing Strategy

- Municipality of Dolná Stehová will apply for a grant from EU structural Funds (95% of eligible costs on installation of DH system, the rest (5%) will be covered by its own sources or a bank loan).
- Agricultural company Agrodružstvo Senné in Závada will apply for a grant from EU Structural Funds (50% of eligible costs on biogas plant construction, the rest will be via a bank loan).
- DH system (boiler room + heat pipelines): 102 mil. Sk (including chipping machine and heat pipelines in the village).
- Biogas station: 64 mil. Sk.

Positive impacts

- Replacement of individual firewood firing which is not the most efficient and environmental friendly way of biomass utilisation.
- Construction of local DH system and biogas plant will make the whole village independent from fossil fuels imports.
- Reduced costs on heating, higher employment.
- Ensuring market for technical crop planting, incomes from electricity sales, higher economic yield from the land;
- Expected fossil fuel savings and pollutants and GHG emissions reductions:
 - Natural gas savings cca 380 952.4 m³ (11,760 GJ), which represents savings of 646 t CO₂ emissions and 0.594 tonnes NO_x emissions;
 - Firewood savings cca 1 166.7 tonnes (11,200 GJ), which represents 17.5 t solid particles savings and 18.7 t CO emission savings;
 - Electricity savings of about 1.17 GWh (4 200 GJ);
 - Coal savings of about 70 t (840 GJ).

Contact:

ECB, Slovakia: www.ecb.sk





Italian Master Plan - Locride region

General context

- Locride region is part of the province of Reggio Calabria in the South of Italy.
- The region occupies an area of 1 200 km² with 130 000 inhabitants, 10% of the territory is dedicated to agriculture, 41.8% is forest and 48.2 is arable land.
- Is one of the poorest regions in Italy, with a high unemployment rate (26%).

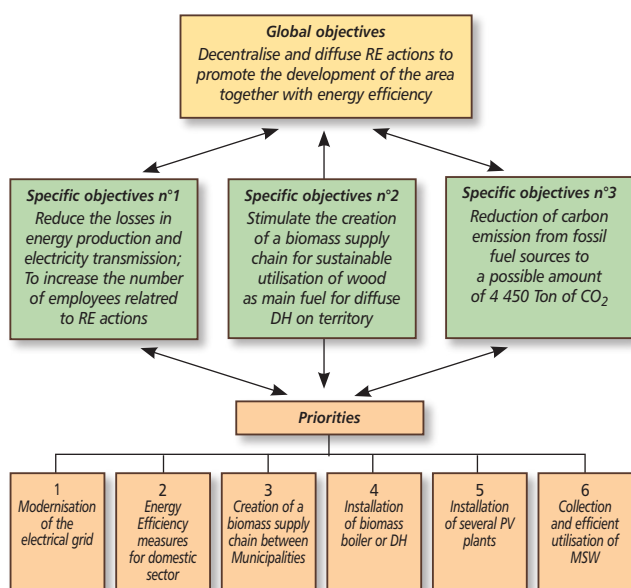
Current energy situation

- Key primary energy sources in Calabria Region are: natural gas (87.2%), wood (2.1%), Hydroelectric (10.6%).
- Calabria region exports electricity to border regions. However up to date no power plants have been installed in Locride.
- Large utilisation of biomass.
- Current share of RES in gross electricity consumption is 9% (Hydroelectric, photovoltaic).

RES Potential

- High hydropower and photovoltaic potential.
- The territory of Locride is surrounded by coasts. The wind potential of the area is very high.
- Large potential to increase energy savings in households.

Energy vision by 2020



Energy Action - PV Installations in 7 Municipalities

Technology: PV, Solar system.

Technical Feasibility

Current State

There are no PV installations in this area. The lack of similar initiatives (PV plants related to "Conto Energia"- The Italian Industry and Environment Ministers approved at the end of July 2005 the Feed-In Tariff to promote PV technology) could offer a good opportunity to people who live in this area and increase the possi-

- **3 innovative RES and RUE action bundles suitable for Structural and Cohesion Funds 2007-2013:**
 - Biomass utilisation with high efficiency boilers and stoves.
 - PV installation.
 - Organisation of Municipal Solid Wastes (MSW), based on the most modern criteria and technologies with an installation of a biogas plant with a CHP co-generator.
- Developed by ETA Renewable Energies.

bility to replicate the best initiative in the renewable energy sector. Right now, as previously underlined, the Locride region is the only part of Calabria where this programme is still missing.

Main characteristics of the new plant

- Installed capacity: 130 kW.
- Annual electricity production: 193 MWh.
- The plants will be directly connected to the general grid.
- 1 450 hours of sunshine per year.
- Crystalline technology. These kinds of PV modules are the most used due to their cost and efficiency.

Municipalities	Population	(m ² available for PV installation)	PV plants
Canolo	890	- Historical building to be modernised (160 m ²);	10 kW
		- Administrative building (270 m ²)	10 kW
		- School (470 m ²)	20 kW
Bovalino	8 000	- Building (140 m ²)	10 kW
Africo	3 450	- Thermal Hotel - 5 floors (350 m ²)	20 kW
Gioiosa Jonica	7 042	- Public building (400 m ²)	20 kW
San Luca	4 821	- Theatre and Administrative building (450 m ²)	20 kW
Riace	1 605	- Multi sports centre (250 m ²)	10 kW
Siderno	20 000	- Building (180 m ²)	10 kW
TOTAL			130 kW

Financing Strategy

20% of investment cost will derive from Structural Funds, with the additional possibility to adhere to National Programme "Conto Energia".

Positive Impacts

- Stimulate business for investors, banks and PV module providers.
- Stimulate environmental awareness.
- Reduce CO₂ emissions: 165 avoided tonnes of CO₂ per year.

Contact

ETA - Renewable Energies, Italy: <http://www.etaflorence.it>



Greek Master Plan - Prefecture of Evros

- 4 innovative RES and RUE action bundles suitable for Structural and Cohesion Funds 2007-2013:
 - Functioning of the biomass district heating plant in Dadia.
 - Organization and functioning of a biofuels production, treatment and utilisation unit in transport.
 - Energy savings using geothermal energy in the municipal buildings and airport of Alexandroupolis.
 - Re-functioning of the Energy Agency of the Eastern Macedonia - Thrace Region.
- Developed by Agriculture University of Athens (AUA).

General context

- The Prefecture of Evros is located in the northeastern part of Greece.
- The capital of the prefecture is Alexandroupolis, the only large port of Thrace and the most important transporting and commercial hub of the region.
- Agriculture is a main activity in this region.

Current energy situation

- The key primary energy sources of the region are: Coal (that covers 55.9%) Oil (13.5%) Natural gas (12.9%). All these sources are imported.
- The current share of RES in primary energy supply is 12.2% (including hydropower, wind energy, biomass and PV).

RES potentials

- Agricultural residues, field crop residues, prunings from orchards and vineyards are the most abundant resources.

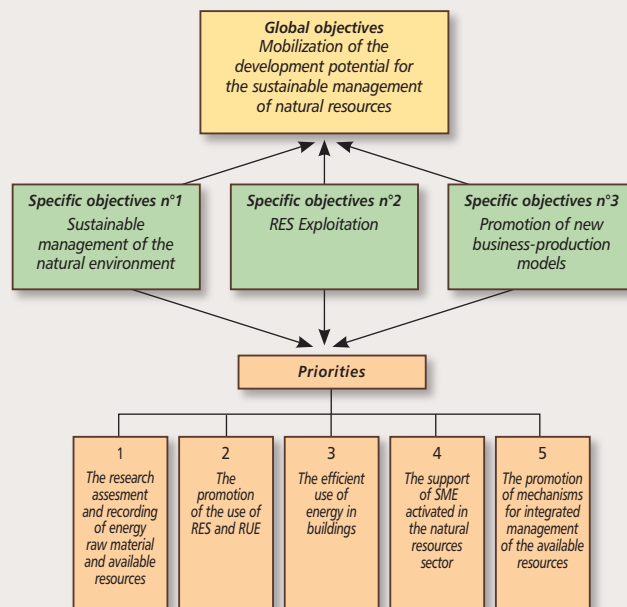
Available quantity of agricultural residues in the Prefecture of Evros, in tones (dry basis)

Prefecture	Straw	Stalks	Stems	Orchard prunings		
Evros	104 473	114 656	12 985	2 934	661	71
				Olive trees	Vine	Others

In the Prefecture of Evros four geothermal fields are identified:

- **Aristino-Aetochori.**
- **Traianoupolis:** Two production boreholes were opened within the area of the springs, yielding about 30 kg/s of 52°C water, which is used for the heating system of a community spa complex.
- **Therma, Samothraki:** Three wells were drilled within the thermal area near existing spas, reaching a depth down to 120 m and yielding a high flow rate of fluid of high salinity and up to 100°C in temperature.

Energy vision by 2020



Energy Action - Biofuels production, and utilization in transport

Technology: Cultivation of energy crops for biofuel production. This biofuel will be used for public transportation, after appropriate modifications on the vehicles.

Technical Feasibility

The proposed technology has two main targets:

- The production of oilseeds
- The use of pure plant oil as biofuel.

Financing Strategy

- The project could be financed by EU Structural Funds OP "Competitiveness and Entrepreneurship" (5th Axis: reassurance of the energy supply, the introduction of Greece to the international networks of electricity, petroleum and natural gas transfer, supporting of the deregulation of the energy market and the promotion of renewable energy sources).
- Expected budget 1.5 Million Euros

Energy Action - Geothermal energy in municipal buildings and the Alexandroupolis airport

Technology: The proposal aims to use the geothermal energy produced by the Aristino field to cover the heat and cooling needs of Alexandroupolis municipal buildings and the airport.

Financing Strategy

The project could be financed by the EU Structural Funds Regional Programme Eastern Macedonia - Thrace.

Contact: AUA, Greece: <http://www.aua.gr/>



Czech Master Plan - Zlín Region

General context

- Zlín Region is one of 14 regions of the Czech Republic. It is the fourth smallest region of the CR with the area of 3 964 km².
- Approximately 50 % of its area is agricultural land and 39.6% is forest.
- Large part of the Zlín Region is to nature protected.

Current energy situation

- Zlín Region has nearly no primary energy resources of its own and is strongly dependent on imported energy resources.
- There is no large power plant in the region - electricity is produced only by 11 public and industrial CHP sources.
- The gas supply partly uses local resources of natural gas in the south of the region, but most of the gas is supplied from the transmission network of RWE Transgas.
- Current share of renewable energy in the total primary energy balance is above 5%.

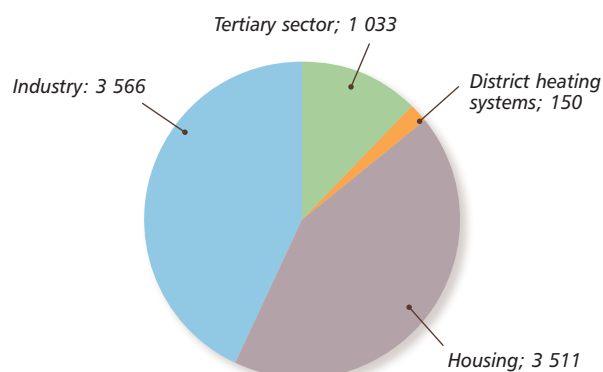
RES Potential

Renewable energy sources	GJ/year
Solar heating systems	138 100
Solar Photovoltaic	670
Small hydropower plants	196 411
Wind turbines	125 280
Geothermal energy – heat pumps	324 864
Biomass	3 242 006
Biogas	268 486
TOTAL	4 295 817

Source: Regional energy plan of Zlín Region (2004)

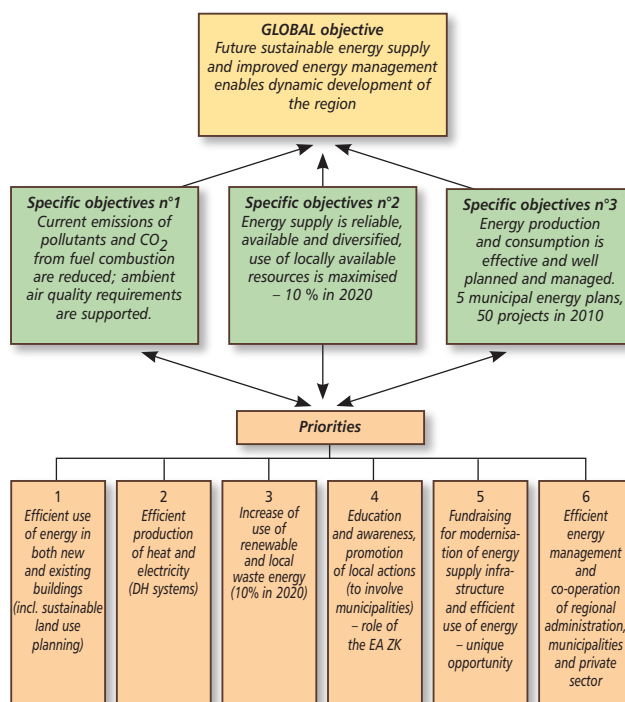
Potential of Energy Savings

Cost effective energy saving Potential – region of Zlín, 2002, TJ/year



- 3 innovative RES and RUE action bundles suitable for Structural and Cohesion Funds 2007-2013:
 - Grid connected PV system in the facility of Vodní Zdroje Holešov.
 - Energy savings + RES utilisation project bundle in education facilities in the assets of the Zlín Region.
 - Energy savings + RES utilisation project bundle in social care facilities in the assets of the Zlín Region.
- Developed by ENVIROS s.r.o.

Energy vision by 2020



Energy Action

- Energy savings + RES utilisation in education facilities

Technology: Thermal insulation of building envelope, reconstruction of heat sources, regulation of heating systems and solar thermal systems for water heating in selected buildings.

Technical Feasibility

- The energy action consists of a package of energy saving and RES utilisation measures in four pre-selected education facilities in Zlín Region: Technical high school Vizovice, Grammar school Holešov, Technical high school Zlín and Technical high school Otrokovice.
- Estimated total energy savings in four selected schools are approx 8 152 GJ/year.

Financing Strategy

- The co-financing will be provided by the Zlín Region from its investment budget. The consideration of conclusions and recommendations of energy audits will help to invest in a more efficient way, reduce investment costs and include more cost effective measures while increasing their value through higher energy savings / production of energy from RES.
- The aim is to obtain a significant part of the investment costs (up to 85-90% of eligible costs) from Operational Programme Environment 2007-2013.
- Due to the finalisation of conditions for support from Operational Programme Environment in late 2007, the application for support for project bundle is being prepared for submittal within the next relevant Call for applications from Operational Programme Environment at the beginning of 2009.

Positive Impacts

- Improvement of thermal parameters of school buildings to level close to low energy building standard.
- Utilisation of available RES and RUE potential in relevant education facilities.
- Reduction of energy costs.
- Improved comfort for students and teachers.
- Demonstration of energy saving and RES utilisation measures among students, teachers and general public.
- Reduction of emissions of CO₂ and pollutants.

Project is in line with all three Specific objectives of the Energy Vision.

Contact: ENVIROS s.r.o., Czech Republic: www.enviros.cz



Energy 4 Cohesion



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E4C contract number: EIE 05 103



The Energy4Cohesion Project

E4C has prepared the ground for the extensive and efficient use of Structural Funds between 2007 and 2013 and beyond for the promotion of Renewable Energies and Rational Use of Energy actions in the less developed regions of Europe. The project has identified the best funding mechanisms, and has developed 8 Energy Master Plans, with various Energy Actions in selected pilot regions in Europe.

The coordinator of the project consortium is WIP - Renewable Energies; the partners are as follows:

- EREC - European Renewable Energy Council
- forseo GmbH
- ENVIROS s.r.o.
- SEGI-AT
- GEONARDO Ltd.
- Archimedes Foundation
- ECB - Energy Centre Bratislava
- LEI - Lithuanian Energy Institute
- EKODOMA
- ETA – Renewable Energies
- AUA – Agricultural University of Athens



More information can be found on the project website at www.e4c.org