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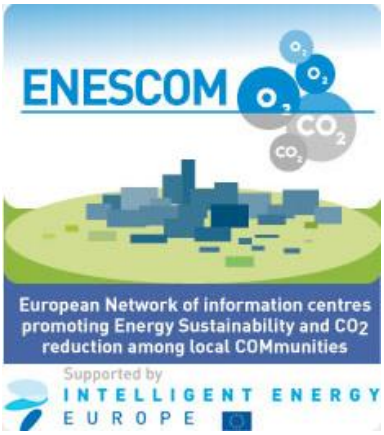
Common report with a collection of good practices for the creation of a methodological basis and quantitative transferable method for the reduction of energy consumption and CO_2 emissions in the short/medium term, taking into account Pioneers' contributions

Report 3 of ENESCOM Project financed by the IEE program



List of nations and partners

Italy
Union of Municipalities Samoggia Valley

Malta
Local Councils' Association

Hungary
Eastern-Hungarian European Initiations Foundation

Slovakia Progresit

Slovenia
Regional Development Agency Mura Ltd.

Poland
The Center of Education and Enterprise Support Association

Romania
Centru Regional Develepment Agency

France
Regional Federation of Center Initiatives to Valorize Agriculture and Rural area of Britanny

Croatia
INFORMO - Association for the employment support, professional education and training

Czech Republic
Czech Technical University in Prague

Greece
Municipal Enterprise for Planning and Development of Patras S.A.

Spain
Iniciativas Casmor S.L.

UK
Powys County Council

Portugal
Local Energy Agency Cascais

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1 Introduction

1.1 Objectives of Report

1.1.1 General objectives

The Common report with a collection of good practices for the creation of methodological basis and quantitative transferable method for the reduction of energy consumption and CO2 emissions in the short/medium term, taking into account Pioneers' contributions, is analytical material which can serve as a basis at the regional level for public administrators, urban planners, policy makers, technicians, entrepreneurs, citizens, transport operators and other regional institutions and as a guide and starting point for municipalities which are intent on entering into the Covenant of Mayors (CoM). The common report summarizes much interesting information between regions of different countries as well as significant data assessment from 20 regions NUTS II. The common report has come out of the process of collecting information on each of the individual partners participating in the project ENESCOM. The Czech Technical University in Prague has put together the data into one consistent report and has carried out their evaluation and comparative analysis.

1.1.2 Specific objectives

This Common Report is a part of the task solution of the international project ENESCOM: European Network of Information Centres promoting Energy Sustainability and CO_2 reduction among local Communities (the acronym of the project is ENESCOM).

The project is financed by community program IEE - The Intelligent Energy-Europe Program by the Contract N°: IEE/09/667/SI2.558230.

Coordinator of the Project is the Union of Municipalities Samoggia Valley.

The project ENESCOM intends to promote widespread information and dissemination of activities targeting 14 different EU countries aiming at achieving the following main objectives:

- To increase the number of EU local communities engaged in the mitigation of climate change through the promotion of, and adhesion to, the Covenant of Mayors' initiative
- To develop capacity building in energy sustainability and promote the adoption of intelligent local sustainable energy policies (creation and implementation of SEAPs)
- To promote the integration and institutionalization of energy efficiency, saving and use of renewable energy sources (energy-efficient behaviour and lifestyles) within EU local communities, targeting all relevant stakeholders (public administration, businesses, citizens…)

The objective will be reached by means of a 30-months joint cooperation leading to the creation of a network of regional and local front offices with the main role of informing and advising users on energy matters based also on the analysis/assessment of the local situation, to promote and facilitate local authorities in their adhesion to the Covenant of Mayors and preparation of SEAPs/roadmaps, and to organize and run several training, dissemination and awareness-raising activities tailored to different target beneficiaries (students, citizens, stakeholders, policy-makers). This activity will be supported by the creation of specific information and communication tools (i.e. website), materials (i.e.

brochure, e-newsletter) and actions involving also the media. The widespread involvement of Pioneers of the Covenant of Mayors and disseminators/multipliers at local, regional, national and international levels will contribute to the achievement of the main project outputs and results, creating the basis for multiplying the effect-transferability-replication of actions and knowledge.

Table 1: Partners of the Project

Participant name	Participant short name	Country
Unione di Comuni Valle del Samoggia	Unione Samoggia	IT
Assocjazzjoni Kunsilli Lokali	LCA	MT
Kelet-magyarországi európai Kezdeményezések Alapitvány	KEK Foundation	HU
České vysoké učení technické v Praze	CTU in Prague	CZ
Anaptiksiaki Dimotiki Epichirisi Patras S.A.	A.D.E.P. S.A.	EL
Progresit, občianske združenie	Progresit	SK
Regionalna razvojna agencija Mura d.o.o.	RRA Mura d.o.o.	SI
Stowarzyszenie Centrum Wspierania Edukacji i Przedsiębiorczości	CEES	PL
Iniciativas Casmor S.L.	IC	ES
Powys County Council	PCC	UK
Agentia Pentru Dezvoltare Regionala Centru	CENTRU RDA	RO
Fédération Régionale des Centres d'Initiatives pour Valoriser l'Agriculture et le Milieu rural de Bretagne	FRCIVAM Bretagne	FR
INFORMO – Udruga za poticanje zapošljavanja, stručnog usavršavanja i obrazovanja	INFORMO	HR
Agência Cascais Energia	ACE	PT

1.2 EU policy context

The European Union (EU) faces serious energy challenges concerning sustainability and greenhouse gas emissions as well as security of supply, import dependence and the competitiveness and effective implementation of the internal energy market. **A European Energy Policy** is acknowledged as the most effective response to these challenges, which are faced by all Member States.

The project ENESCOM should contribute to solve the three aspects of the European Energy Policy (Source: An Energy Policy for Europe, Brussels, 10.1.2007 (COM)2007).

- **Aspect of reducing greenhouse gas emissions**

Energy accounts for 80% of all greenhouse gas emissions in the EU. Determined to fight against climate change, the EU is committed to reducing its own emissions by at least 20% by 2020. Of course, reducing greenhouse gas emissions involves using less energy and using more clean energy.

- **Aspect of energy efficiency**

Reducing its energy consumption by 20% by 2020 is the objective the EU has set itself in its Action Plan for Energy Efficiency (2007-2012). Concrete effort needs to be made to achieve this objective, in particular with respect to energy saving in the transport sector, the development of minimum efficiency requirements for energy-using appliances, awareness-raising amongst consumers about sensible and economic energy use, improving the efficiency of the production, transport and distribution of heating and electricity and also developing energy technologies and improving the energy performance of buildings.

- **Aspect of renewable energy**

The use of renewable energies (wind power, solar and photovoltaic energy, biomass and biofuels, geothermal energy and heat-pump systems) undeniably contributes to limiting climate change. Furthermore, it plays a part in securing energy supply and creating employment in Europe, thanks to the increase in the production and consumption of local energy. To increase the use of renewable energy sources, in its Renewable Energies Roadmap the EU has set itself the objective of increasing the proportion of renewable energies in its energy mix by 20% by 2020.

2 Analysis

2.1 Overview

The topic of greenhouse gas emissions, energy consumption and renewable energy sources has been discussed throughout the whole of Europe in the past decades. The entire topic has many different sides and different points of view, as well as many different approaches. Each country deals with problems connected with greenhouse gas emissions, energy consumption and renewable energy differently, looking for optimal solutions and the most effective way of dealing with problems, risks, dangers and opportunities.

The main aim of this report is to summarize different behaviour and practices from each of the participating partners, so each of the partners can learn from others experiences and knowledge with the aim to improve their own approaches and to find inspiration and possible ways of solving their own problems, utilizing their own opportunities and overcoming obstacles, which may be encountered along the way.

When used in an appropriate way, this report can help to improve the situation in greenhouse gas emissions, energy consumption and renewable energy usage. Moreover each of the participating partners can acquire valuable information, which can help to improve their behaviour and optimize their processes in problems discussed and therefore reduce greenhouse emissions and consume energy more effectively.

2.2 Methodological note

The main objective was to develop a simple system for data and information collection (further referred to only as D&I), with their summary and evaluation intelligible and feasible for all project partners.

A considerable significance has been dedicated to the unity and comparability of D&I from the different regions and the possibility to communicate about the project issues at a distance with the partners (by e-mail and telephone). D&I of the same kind and units

delivered by the project partners are of crucial importance for elaboration of the Common Report 3.

Collection of D&I in Target Regions was requested in the project proposal, but the regions have not been defined. To ensure comparability of the 20 Target Regions it was decided to use the NUTS 2 territorial unit. For the purpose of Report 3, national and municipal data were used as well.

For compilation of Common Report 3, mainly 5 different Tables and 2 Analyses were used. These tables and analyses concerned usually target NUTS II regions and in some cases municipalities as well.

2.2.1.1 Elaboration of Tables with D&I concerned with

- RES-Installations Already Realized or in Progress in the Target Region (typical examples) - Table 7
- Interventions of Energy Requalification on Public and Private Buildings in the Target Region (typical examples) - Table 8
- Current Situation and Potential of Renewable Energy Sources in the Target Region – Table 9
- Inventory of Existing Supportive Tools for Energy Sustainability and Reduction of CO_2 Emissions and their effect on the Target Municipalities – Table 12
- Selection of good practices concerning utilization of renewable energy sources, energy saving and CO_2 reduction – Table 13

These Tables give an outline regarding the situation in the 20 Target Regions in the 14 countries participating in the project. There were prepared templates for the Tables (in Microsoft Office Excel format) and they are included in annex tables and documents of this report.

From the tables listed above, the Selection of good practices concerning utilization of renewable energy sources, energy saving and CO_2 reduction (Table 13) is the most important one. In this table, each partner had to present at least one Good Practice in three different categories from their examined regions. Table 13, followed by Table 12, was crucial for completing the Report 3, because information gathered in this table was used to formulate a best practices methodology.

2.2.1.1.1 D&I collection principles

- Collect proved and verified statements about Target Regions only.
- When no verified statements are available then ensure professionally qualified assessments and always mention the source.
- Put the collected D&I into the attached templates.

The Tables contain cells for particular D&I as well space for relevant remarks, summaries, evaluations and indications about data sources.

2.2.1.1.2 D&I summary and evaluation

The bare D&I, without their simple processing and comments at least, do not have generally the ability to give a clear survey. Therefore it was decided to summarize the collected D&I in such a way that they give an insight into the topic.

2.2.1.2 Elaboration of Analysis concerned with

- Potential of the Target Region Concerning Renewable Energy Sources- Analyses 3

- Pertinence of National and Regional Plans and Regulations - Analyses4

These Analyses represent the process of breaking the complex topic into smaller parts to gain a better understanding completed with clear conclusions. To provide comprehensive scope, some data from Analyses 1 and Analyses 2 (used in previous Report 1) were used as well.

To ensure comparability of D&I from all involved Target Regions there have been drafted certain scopes of coverage for the required analyses and also defined the minimum number of pages. The template for required Analysis is in annex tables and documents of this report.

For the purpose of this report, analyses mentioned above are more informative and their main purpose is to provide better insight into the situation and to allow better understanding of information provided via tables mentioned in chapter 2.2.1.1. Moreover, Analysis 4 is examined in a more detailed manner in Report 2.

2.2.1.2.1 Principles for the Analyses processing

- Compile the Analyses according to the agreed contents and form.
- Carry them out as briefly as possible with clear statements and arguments (tables, graphs, schemas …).
- Mention the Tables from which the D&I have been taken.
- The minimum was recommended 6 Pages (font size 12, type Times New Roman, standard page with 1,800 characters which corresponds to 30 printed lines), the maximum was recommended 10 pages.

2.2.1.2.2 Guidelines for the Analyses

The guidelines contain the contents and additional explanation and recommendations concerning for example, references. There is in the footnotes of the templates the request for a minimum extent for the Analyses.

2.2.1.3 Obstacles encountered

During the data gathering process, some obstacles were encountered and have direct impact on results. There were two results, concluding from these obstacles encountered:

Some obstacles resulted in discarding of a partner from report 3 (with no other option, since the problem was that no data were provided).

The rest of the obstacles resulted in diversification of individual partner's analyses, so they cannot be directly compared. Since comparison was not the main target of this report, this obstacles result can be considered more acceptable.

2.2.1.3.1 Data accessibility and comprehensiveness

Data were often not available to the partner. In case that no (or not a sufficient amount of) data were available at all the considered partner could not participate in Report 3.

A common situation was that data were available in sufficient amount, but there was lack of some specific information. Therefore it is possible that in following chapter 0, where each partner is described, there are some subchapters missing sometimes, or some information presented is very brief. Data provided in tables and analyses (discussed above)

are very comprehensive and widely exceed demands of this Report 3, therefore only some of the data are presented here and the rest are included in annexes.

2.2.1.3.2 Data relevancy, connection and accordance

In some cases, data provided by a partner were not directly relevant to the examined topic. In this case, information were extracted and put in a more simple way. The point of the obstacle is that sometimes, even though information is not fully relevant, it is still connected to the topic and may be, in some cases, interesting. Since it is impossible to present all information available and, on the other hand, it is impossible to present information on the same level of knowledge (because of data variability), it is sometimes complicated to find accordance between each participating partner. This resulted in information diversity in each partner's subchapter.

In case of information shortage in this report, it is possible to examine tables (Table 7, Table 8, Table 9, Table 12 and especially Table 13) and analyses (Analyses 3, Analyses 4). These can be found in annex tables and documents of this report.

2.2.1.3.3 Regional level and partner differences and specifics

It is important to understand that each country (and therefore even each municipality) is more or less different in nature. Therefore it is not possible to directly compare them, or to find optimal solutions, based on the best practices, which all other partners can follow. Instead of finding the optimal solution, this report aims to formulate different behaviour and to provide possible inspiration and guidance for those who have to deal with the examined topics and who are looking for optimal solutions for their own purposes in their specific conditions and circumstances.

2.3 Good practices for the creation of a methodological basis and quantitative transferable method for the reduction of energy consumption and CO_2emissions

This chapter is based on the following data provided by participating partners:

- RES-Installations Already Realized or in Progress in the Target Region (typical examples) - Table 7
- Interventions of Energy Requalification on Public and Private Buildings in the Target Region (typical examples) - Table 8
- Current Situation and Potential of Renewable Energy Sources in the Target Region – Table 9
- Inventory of Existing Supportive Tools for Energy Sustainability and Reduction of CO_2 Emissions and their effect on the Target Municipalities – Table 12
- Selection of good practices concerning utilization of renewable energy sources, energy saving and CO_2 reduction – Table 13
- Potential of the Target Region Concerning Renewable Energy Sources- Analyses 3
- Pertinence of National and Regional Plans and Regulations – Analyses 4

The chapter is divided into 14 sections, a section for every participating partner. In every partner section, there are subchapters, based on information provided by each of partners, according to chapter 2.2. Each country chapter consists of:

- The main information and background, where information about specific country/region/municipality are presented to provide appropriate background and context (Analyses 3, Analyses 4).
- RES situation, where data about existing RES and energy saving projects are summarized, together with current RES situation in examined region (Table 7, Table 8, Table 9). This information is only very brief and simplified because of the report space limitations, but more detailed information can be easily found in tables described.
- Good practices, where good practices for RES utilization, energy saving and CO_2 reduction, together with supportive tools for target country/region/municipality are presented (Table 12, Table 13).

There is a lot of supplementary information as well. This information is mainly based on data provided by the partner (Analyses 3, Analyses 4) and covers basic information about participating partners. For further background about partners' authorities and organizations, energy consumption, greenhouse gas emissions, existing incentives, risks and barriers, recommendations etc. see Report 1 and Report 2 of ENESCOM project.

2.3.1 Italy

Italy participated through one target NUTS 2 region: Emilia Romagna. Emilia Romagna is one of the 20 regions which administratively form the Italian Republic. It is located in the north-eastern part of Italy and it consists of 341 municipalities and 9 provinces. At the present time, Emilia Romagna has 4,395,569 inhabitants, more than 7% of national population.

2.3.1.1 Background

2.3.1.1.1 Energy consumption summary

In Emilia Romagna region the sector with the biggest energy consumption is industry (36,36%), followed by transport (25,36%) and housing (21,45%). The tertiary sector is the fourth (13,59%) and the agriculture sector is the last (3,25%). Considering fuel types, the most used fuel types are gaseous fuels, especially because of industry, housing and tertiary sector consumptions and electricity production (54%), followed by liquid fuels, generated mostly by the transport sector (36%). Other fuels are of minor use.

2.3.1.1.2 CO_2 emissions summary

Information about CO_2 show that the biggest share of emissions belongs to the industry sector (35%), followed by the transport sector (29%). The third is the housing sector (21%) and the fourth is the tertiary sector (12%). The last is the agriculture sector, with only a 3% share.

With regard to the historical trend of CO2 emissions, there has been a considerable increase from 1990 to 2005, but in the last years there was a significant reduction. From 2005 to 2010 it is estimated that a CO2 emission reduction amounting to about 5% occurred.

2.3.1.1.3 Target region RES potential

By 2020 it is expected, for the Emilia Romagna region, a gross final energy consumption equal to 667 TJ in case of a BAU scenario.

Through energy efficiency measures it is expected that the gross final consumption in 2020 will reach 600 TJ (i.e. it is planned to implement measures that will lead to an additional energy savings amounting to 67 TJ).

Actions to enable broad-spectrum interventions in various sectors will be implemented. In particular: residential buildings, production plants, public administration, health services, tourism, public utilities, trade and transport. According to the specific potentials, the contribution of different sectors to achieve the target savings of 67 TJ by 2020 can be estimated as follows: residential 47%, commercial 23%, industrial 20% and transportation 10%.

The National Action Plan for Renewable Energy of the Italian Government expects a contribution of energy from renewable sources amounting to 17% of the final gross consumption by 2020. Moreover it attributes to the regions the sharing of the objectives of developing renewable energy sources ("burden sharing").

It is expected that the requested contribution to the Emilia Romagna region in terms of production from renewable energy will be less than 17%, given the reduced availability of water resources and wind and solar power compared to other Italian regions. However, Emilia Romagna aims to reach a value between 17% and 20%.

Based on the potentials applicable in the region, the production of electricity from renewable sources will reach 55.8% of total energy production from renewable sources, the heat production and transport will reach 34.7% and 9.5%, respectively. The renewable energy source that will give the main contribution derives from biomass, with 74% (sum of electricity and heat production). Solar energy will reach 11.3% (mostly PV), hydro 2.7%, wind 1, 3% and geothermal 1, 2% (heat production).

2.3.1.1.4 Plans and regulations summary

Since the national constitutional reform of 2001, Emilia Romagna was the first region in Italy to regulate - through regional law – the energy issue by establishing an energy policy that could ensure a broad spectrum of programming decisions and actions in the medium term.

The discipline of regional energy planning in the Emilia Romagna region dates back to 2004, with the Regional Law 23 December 2004, n. 26. According to such law, in 2007 the region approved its own Regional Energy Plan.

Following the Energy Plan, during the last years many regulations have been approved. In the following, some of them are reported:

Regional decree n. 156, 04.03.2008 - Act of guidance and coordination on performance requirements and procedures for energy certification of buildings.

Regional decree n. 1580, 06.10.2008 - Regional guidelines for sustainable mobility.

Regional decree n. 1701, 20.10.2008 1701 - Timetable for the approval of procedure aimed at funding construction of ecologically equipped productive areas.

Regional decree n. 1198, 26.07.2010 - Simplification of the application for the construction and operation of electricity generating plants using biogas produced from agricultural activities.

Regional decree n. 28, 06.12.2010 - First identification of areas and sites for the installation of production facilities through the use of photovoltaic solar renewable energy source.

2.3.1.2 RES situation

2.3.1.2.1 RES projects

From 2000 to 2009, renewable energy power plants amounting to 408 MW were installed. The main energy source have been: hydro (18 MW), wind (13 MW), PV (95 MW) and biomass (282 MW). These power plants add to the oldest ones leading to a total power amounting to 779 MW (the oldest renewable power plants are mainly hydro plants and biomass plants).

In 2010 an additional 267 MW of PV plants were installed. Moreover it is estimated that about 70 MW of biomass power plants will be installed shortly, as long as 15 MW of wind plants.

Regarding renewable energy heat production, plants amounting to 148 MW have been installed in recent years: geothermal 23 MW, solar thermal 25 MW and biomass 100 MW. Additional biomass plants amounting to 20 MW are expected to be installed shortly.

2.3.1.2.2 Energy saving projects

During the last three years, the main activity about energy saving related to:

- promotion of energy saving and rational use of energy in buildings and in the urban structures;

- interventions for energy saving and energy system qualification in enterprises and production units;
- rationalization of local energy transport.

The first results of such activity can be seen mainly in the construction sectors, where the new energy standards are supported by the energy certification. In the region nearly 5000 certificators have been formed and about 200.000 certifications have been released.

2.3.1.2.3 Current situation

RES and RUE activities are going on, stimulated by ordinances or supporting tools at national and regional level.

2.3.1.3 Good practices

2.3.1.3.1 Good practices selection

In the frame of the energy sustainability policy implemented in the region, some good practices can be reported regarding both RES and RUE and specific CO_2 reduction.

Productive areas: in 2008 Region and Provinces promoted and supported the creation of ecologically equipped productive areas. About 30 projects of new productive areas were financed basing on criteria of environmental and energy sustainability.

Health system: in 2007 the Regional Council has approved the regional program "The regional health system for sustainable development" and has established guidelines and objectives assigned to public health authorities in the field of environmental sustainability and rational use of energy. It provides an awareness campaign involving operators of public health authorities and regarding topics like: rational use of energy, quantitative monitoring of the use of electricity and heat, production of energy from renewable sources, cogeneration or innovative technological systems, application of energy efficiency requirements and procedures for energy certification of buildings.

Agricultural sector: the regional plan for the development of agro-energy is planning to increase by 100 MW the production of biogas from manure and crop waste and by 400 MW the power generation through photovoltaic plants in farms.

Mobility sector: the region is promoting self-sufficiency and energy efficiency in fuel distribution plants. All new fuel service stations need to be equipped with LPG or methane distribution systems. Moreover, all new plants need to be equipped with photovoltaic or other renewable energy sources for electricity production or with high efficiency gas cogeneration systems.

Local planning: resources were allocated to promote the development of energy and climate protection plans of provinces and municipalities according to a common methodology.

Carbon dioxide capture and sequestration: The regional Geological, Seismic and Soil Survey Centre have created a preliminary map of areas potentially suitable for the storage of CO_2 from fuel combustion in the Emilia Romagna region.

2.3.1.3.2 Supportive tools

Supporting tools relate to economic and not economic instruments aimed to support and aid the development of the energy sector.

The supporting tools in the Emilia Romagna region add and complement the supporting tools at national level. The regional supporting tools can be summarised and identified according to eight key elements:

- the adoption of models and / or monitoring tools of energy and spatial planning;
- the intensification of control activities mainly on operating plants and delivery of energy certification of buildings;
- entering into agreements and / or protocols between public entities and companies from different economic sectors;
- provision of funding, also through new models and tools;
- grant of reward measures especially regarding the upgrading and energy efficiency in buildings (e.g. volume incentives, expense reduction ...);
- development of operational tools such as guidelines, databases to monitor consumption data or heat loss calculation software;
- creation of technical and information support structures at the local level as energy agencies and info points;
- dissemination and promotion of energy certification of processes, products and constructions.

2.3.2 Malta

Malta participated through three administrative unit regions, which are called Gozo Region, Northwest Region and South Region. Since these regions are a lot similar in the context of this report they are treated together for the purpose of this report.

- The Gozo Region is composed of 14 localities, over an area of circa 60.70 km^2 and with 31,483 inhabitants.
- The Northwest Region is composed of 12 localities, over an area of circa 112.90 km^2 and with 84,270 inhabitants.
- The South Regionis composed of 14 localities, over an area of circa 78.90 km^2 and with 89,974 inhabitants.

2.3.2.1 Background

2.3.2.1.1 Energy consumption summary

In Malta, more than 94% of the fuels used are liquid fuels, whilst no solid ones are consumed. This statement is valid for every analyzed Maltese region. Given that the main fuels used are liquid fuels there is risk of pollution which tends to increase as the level of traffic is on the increase in Malta. This risk is amplified for the Gozo region as the main transportation route is by sea from the mainland. The pollution risks are higher given that liquid fuels are considered as dangerous / hazardous / flammable goods. Although the frequency of the danger is not so high, the dimension could be catastrophic if an explosion occurs.

2.3.2.1.2 CO_2 emissions summary

In Malta the energy is mainly generated by means of the two power stations which make use of liquid fuel and hence we have high greenhouse gas emissions. Unless the heavy fuel oil is replaced by a cleaner fuel such as gas, the risk of CO2 emissions will rather increase and not decrease.

2.3.2.1.3 Target region RES potential

Photovoltaic panels for electricity generation and solar panels for water heating are mostly used although no data is available for the latter type of RES installations in Malta. Still it has to be pointed out that although the data is not available still the installation of renewable energy systems are far from the 10% energy production target to be reached by 2020.

Regions differ in their potential for wind and solar energy:

In the Maltese islands there is a great potential for wind and solar energy but to date this potential is not utilized to the maximum. In the South Region the potential of solar energy is higher than that of wind energy mainly due to the fact that the prevailing wind in the Maltese islands is from the northwest direction. When compared to the other regions / national situations, the South region is the region with the highest solar energy potential for obvious reasons. In the Gozo region like most of the other regions there is a great potential for solar energy but unlike other regions, the Gozo region has a great potential for secondary energy from waste from the combustion of municipal waste, landfill gas and bio gas from biodegradable municipal waste.

If the summation of both the current utilization and the regional potential in regions is taken, solar energy will still prevail whilst there are no plans for water, biomass, geothermic energy and secondary energy from waste and thus these are not applicable.

For more details, check Analyses 3, which can be found in Annexes of this Report.

2.3.2.1.4 Plans and regulations summary

Given that Malta is a small island state, there are no regional regulations or plans. In fact it is only for the joining of the Covenant of Mayors of some local council that there is some sort of regional / local voluntary planning. On the other hand there are national regulations and a National strategy for Policy and Abatement measures relating to the reduction of greenhouse gas emissions.

All of these regulations, such as (but not limited to) the Energy Performance of Buildings regulations, have the scope to increase the energy efficiency (in this particular case in buildings) and to reduce the CO_2 emissions. Obviously these regulations are in line with the national strategy just mentioned above.

2.3.2.2 RES situation

RES situation was examined for each of participating regions (Gozo, Northwest, South), where possible. Because Maltese regions are more or less similar, they were treated together in this subchapter.

2.3.2.2.1 RES projects

Photovoltaic panels for electricity generation and solar panels for water heating are mostly used although no data is available for the latter type of RES installations. Still it has to be pointed out that although the data is not available still the installation of renewable energy systems are far from the 10% energy production target to be reached by 2020. By means of various European Regional Development Funds, more entities / consumers are applying to install such systems and therefore Photovoltaic panels and solar panels for water heating are mostly used. On the other hand the wind turbines were not so successful due to the noise nuisance factor since Malta is very densely built and due to the development permissions

from the Malta Environment and Planning Authority. Given the very low data / installations in the Maltese islands it is very difficult to compare the situation in different regions and to the national situation, although for all regions which have been analysed in this project the photovoltaic plants are the predominant renewable energy sources in Malta by far. For the solar water heating systems no data is available and therefore it is not applicable. Finally these installations which have been installed so far are more for the short / medium term and this is considered as a weakness in terms of planning but as mentioned above the commitment to reach the target of 10% energy generation through renewable energy system installation by 2020 and the availability of structural / national funds will definitely assist to reach this target and the installations which are being implemented nowadays are more in long term projects.

2.3.2.2.2 Energy saving projects

As part of the government commitment to reduce the CO_2 emissions by 20% by year 2020 and to have 10% of the annual energy generation coming from renewable energy sources, the data above includes the project currently in hand or which shall be implemented in the near future and by 2020. The main energy generation company in Malta, Enemalta, has an annual energy production of roughly 2261.2 GWh.

The Gozo region is not the region with the least energy saving projects but is still incomparable to the Northwest region with energy saving projects which will amount to over 11% in terms of energy savings.

Given that the main / largest comprehensive energy saving project is a wind farm and shall be located in Mellieha which forms part of the Northwest Region, this region is the region which shall achieve the highest energy savings when compared to the other regions in the country.

The south region is one of the regions with least energy saving projects in the country. Still these projects which have been detailed above particularly the comprehensive energy saving project shall be implemented as part of a long term plan.

Comprehensive energy saving projects:

- Wind farms
- Wind turbine
- Landfill gases
- Waste plant

Partial energy saving projects:

- Photovoltaic systems on rooftops of public buildings (mainly for water heating)

2.3.2.2.3 Current situation

In the Maltese islands there is a great potential for wind and solar energy but to date this potential is not utilised to the maximum.

In the Gozo region like most of the other regions there is a great potential for solar energy but unlike other regions, the Gozo region has a great potential for secondary energy from waste from the combustion of municipal waste, landfill gas and bio gas from biodegradable municipal waste.

In the Northwest Region, the potential of wind energy is higher than that of sun energy. When compared to the other regions / national situation in the Northwest region due to the prevailing wind from the northwest, it is the region with highest wind energy potential.

In the South Region the potential of solar energy is higher than that of wind energy mainly due to the fact that the prevailing wind in the Maltese islands is from the northwest direction. When compared to the other regions / national situation, the South region is the region with most high solar energy potential for obvious reasons.

On the other hand if we take the summation of both the current utilisation and the regional potential, solar energy will still prevail whilst there are no plans for water, wind, biomass and geothermic energy and thus are not applicable for the scope of this region. Finally, these projects particularly those listed in the regional potential column are long term projects as part of the government commitment to reduce the CO2 emissions by 20% by the year 2020 and to have at least 10% of the energy generated coming from renewable energy sources.

2.3.2.3 Good practices

Good practices were examined for each of participating regions (Gozo, Northwest, South), where possible. Because Maltese regions are more or less similar, they were treated together in this subchapter.

2.3.2.3.1 Good practices selection

In the Maltese islands there is a great potential for wind and solar energy but to date this potential is not utilised to the maximum. The below mentioned practices and others which shall be adopted in the coming years form part of the government commitment to reduce the CO_2 emissions by 20% apart from the utilization of the renewable energy sources.

There are good practices common for all regions in the context of energy saving and CO_2 reduction:

- Some of the local councils in regions have joined the Covenant of Mayors. The local councils are also targeting grants / schemes related to energy saving / energy generation from renewable sources particularly the European Regional Development Fund. Contributions are especially reduction of CO_2 emissions by more than 20% by the year 2020 and having part of the energy consumed coming from renewable source rather than from conventional sources.
- Implementation of the energy performance certification of buildings and the legal notice regarding the minimum requirements on energy performance of buildings by the central government. The implementation of the recommendations in the energy performance certificate will contribute towards having more energy efficient buildings.

There are also good practices slightly different for all regions, concerning utilization of renewable energy sources:

Gozo region

In the Gozo region like most of the other regions there is a great potential for solar energy but unlike other regions, the Gozo region has a great potential for secondary energy from waste from the combustion of municipal waste, landfill gas and bio gas from biodegradable municipal waste. On the other hand if we take the summation of both the

current utilization and the regional potential, solar energy will still prevail whilst there are no plans for water, wind, biomass and geothermic energy and thus are not applicable for the scope of this region.

- Currently in the Gozo region the main renewable energy sources being used are the sun and wind although there is a small potential of secondary energy from waste as well. The impact of these installations, mainly of the roof top photovoltaic, is 49.64 GWh/year and for the wind is 1.83 GWH.

Northwest region

In the Maltese Islands, particularly in the Northwest region there is a great potential of wind energy but to date this is not utilised to the maximum. In fact as part of the national plan and commitment of the Maltese government to have at least 10% of the energy generated coming from renewable energy source, wind and even solar energy are the two primary sources of renewable energy.

- Currently in the Northwest region the main renewable energy sources being used are the sun and wind although there is a small potential of secondary energy from waste as well. The impact of these installations mainly of the roof top photovoltaic is 162GWh/year and for the wind is 7.67 GWH equivalent to approximately 3% of renewable energy in the Northwest region.

South region

In the South Region the potential of solar energy is higher than that of wind energy mainly due to the fact that the prevailing wind in the Maltese islands is from the northwest direction. When compared to the other regions / national situation, the South region is the region with the highest solar energy potential, for obvious reasons.

- Currently in the South region the main renewable energy source being used is the sun although there is a small potential of wind energy as well. The impact of these installations mainly of the roof top photovoltaic is 267.4 GWh/year.

2.3.2.3.2 Supportive tools

There are various grants and incentive schemes in Malta but in certain cases the restrictions are making it very difficult for the general public and even local councils to apply for such schemes. The installation of photovoltaic is the most common, mainly due to weather conditions and even the grants are mostly focused on this type of installation. Still when it comes to ERDF funding, there are administrative restrictions such as but not limited to the ownership of the building upon which the equipment shall be installed that is limiting the local councils from further acquiring funds to install RES even though they have the potential.

As mentioned above, the Malta Environment and Planning Authority which regulates the development in Malta has very strict regulations particularly for wind turbines and this is the main reason for the low uptake of the wind turbine installation scheme. Finally it is very important that the schemes are more reachable through an increase in the financial subsidies such as the very recent feed in tariffs rates which are very advantageous and by less administrative / bureaucratic restrictions such as those mentioned above.

Some of the grants / subsidies mentioned above are (for more detailed characterisation, see Maltese Table 12):

- Grants on the purchase of wind energy systems for domestic use
- Grants for the Purchase of Photovoltaic Systems for the Domestic Sector
- Grants on the Purchase of electric Vehicles
- Grants for Photovoltaic and roof thermal installation
- Grants on Solar Water Heaters, Solar Collectors and Photovoltaic Systems
- Various ERDF and Government schemes particularly for Local Councils and non-governmental organisations
- Advantageous rates for feed in tariffs

2.3.3 Hungary

Hungary participated through one target NUTS 2 region – The Northern Great Plain Region. This NUTS 2 region includes 3 different NUTS 3 counties and 28 NUTS 4 micro regions. The majority of them are less developed and underprivileged. The total territory of the region 17,729 km^2, the population 1,519,577 inhabitants, and the population density is 97 persons/km^2. The number of settlements is 389 and 64 of them are urban. The Northern Great Plain Region produces 10.2% of Hungary's gross domestic product. The value of the per person /GDP (1591 thousand, 2007) rate was 1/3 of the highest.

2.3.3.1 Background

2.3.3.1.1 Energy consumption summary

In Hungary, the gaseous fuel type is dominant (54%). According to sectors, either in the whole country, or in the region the public sphere has the first biggest consumption. The second biggest sector is the tertiary and the municipal sphere.

2.3.3.1.2 CO_2 emissions summary

The total emissions of greenhouse gases in Hungary were 73.1 million tons carbon dioxide equivalents. It is lower than it was in the last years due to the economic recession and other changes. The most important greenhouse gas is carbon dioxide accounting for 76.9% of total emissions. According to the National Inventory Report for 1985-2008 it must be emphasised that the energy sector was responsible for 76.9% of total GHG emissions among the sectors. The share of energy emissions are: 35% energy industries, 30% other (residential, agriculture etc.) 23% transport, 13% manufacturing and construction.

2.3.3.1.3 Target region RES potential

Renewable energy is the focus of attention for future investment and development, as it is a strategic aim due to growing environmental concerns and the desire to reduce dependence on imported energy. In our country compared with others there is lack of renewable sources.

There are not enough data available, neither in the region nor in the country, for the current situation and potential of renewable energy sources. However, the proportion of the RES among all energy consumption was 5.2% in 2008 and Hungary would like to increase this proportion to 2020, according to the EU recommendations

Geographical conditions in Hungary are favourable for RES development, especially biomass. Between 1997 and 2004, the average annual growth of biomass was 116%. Whilst environmental conditions are the main barriers to further hydro power development, other

RES such as solar, geothermal and wind energy are hampered by administrative constraints (eg. the permit process). As regards the policy framework, promotional schemes are being used and refined, and subsidies are available under certain conditions for the development of RES.

The country has only a minimum processing capacity for the generation of renewable energy. Only 8-10% of the total biomass produced is used for energy purposes. The construction of a decentralized energy structure relying heavily on biomass utilization may make a vital contribution to reducing Hungary's unhealthy dependence on energy imports, which supply over 70% of the country's energy needs. Increased reliance on renewable sources within energy production would be particularly beneficial for the diversification of agriculture and forestry production, and thus for boosting the inherent earning security.

2.3.3.1.4 Plans and regulations summary

In Hungary there are more plans and regulations according to the energy policy and climate change. The disadvantage is that at regional level there are not sufficient methods to calculate exactly RES potential etc. There are a lack of experts and a weak advisory network too. There are the most important plans and regulations collected in this analysis. All of them give special attention to the improvement of energy efficiency, sustainability, or the CO_2 reduction.

2.3.3.2 RES situation

2.3.3.2.1 RES projects

The total performance of installed national plants is 7976 MW according to the Energy Strategy of the North Great Plain. There are 3 different types: nuclear, renewable energy and fossil. The total performance of RES is 486 MW and the rate of the examined region is the lowest with 25 MW in 2008. The most produced energy of the renewable energy plants come from the water plant (11,4MW). The installed biogas or biomass plants are developing too, and in the future they are going to realize investments. There are also combined cycles power plants too.

2.3.3.2.2 Energy saving projects

The official centre of management has different programs. There is the Energy Centre, which is responsible for the implementation of the Energy Service Directive (2006/32/EC) in Hungary. Energy Centre was assigned to develop the National Energy Efficiency Action Plan too. The Hungarian application system includes the following types: the National Energy-saving Program, the Green Investment System and the Energy Saving Credit Fund (German Coal Aid Revolving Fund). These are the resources of funding of the RES projects. There exist the so called "Successful Hungary" Residential Energy Credit Saving Program too, which makes it possible to get money for investment. At the EU level there was the National Development Plan from 2000 to 2006. The objective of the strategy was to designate the development policy objectives and priorities that can be funded from the Structural Funds. This Plan had the Environment Protection and Infrastructure Operative Programme 2004-2006 (KIOP). The most investment among them is carried out in the fields of water supply system, agriculture and waste management. Today the New Hungary Development Plan is

running, and includes the Environment and Energy Operative Programme (KEOP) for 2007 to 2013.

2.3.3.2.3 Current situation

There are still no data available, neither in the region nor in the country for the current situation and potential of renewable energy sources. This fact shows that the use of RES is negligible nowadays and need to be promoted with every possible effort. However it is known that the proportion of the RES among all energy consumption was 5.2% in 2008 and Hungary would like to increase this proportion to 2020, according to the EU recommendations. So far, there are two scenarios: the BAU and POLICY scenarios, for estimating the RES proportions. According to the optimistic estimations the amount of sun energy is 0.53 PJ/year, of geothermic energy is 5.14 PJ/year, of biogas and biomethane is 1.84 PJ/year, of biomass is 41.58 PJ/year and of energy from waste is 1.05 PJ/year in the whole country for 2010.

2.3.3.3 Good practices

2.3.3.3.1 Good practices selection

There are more and more good practices in the region, but it is the least developed in the area of RES utilization. The National Development Agency coordinates the EU tenders, for example the relevant Environment and Energy Operative Programme. Tender KEOP 5.3.0/B/09 Energetic reconstruction building was selected and combined with use of renewable energy resources. It is a large scale modernisation considering its size and its target group (more than 3000 people). Besides these, a Hungarian application system exists too: the National Energy-saving Program, the Green Investment System and the Energy Saving Credit Fund. The official centre of management is the Energy Centre, which is responsible for the implementation of the Energy Service Directive (2006/32/EC) in Hungary.

Good practices for utilisation of renewable energy sources:

- Wind plant. Installed output is 1.5 MW and energy production is 3.6MW. It covers the private energy consumption in more than 100 households. This wind plant was put into trial operation in July, 2006.
- Biogas Plant. In the region the agriculture has a determining role and there are lots of by-products that can be recycled to gain energy. This investment is related to traditional local branches (animal husbandry, crop production), and with the energy production the Ltd became independent. The biogas plant was built by the Bátortrade Ltd. which belongs to the Bátorcoop group of companies. The biogas plant processes 110 000 m^3 of mixed raw material, which is generated by other parts of the Ltd., dealing with crop production and animal husbandry. The produced biogas is used to fire directly on a portion of the plants and the greater part of them is used to produce electricity (2.5 MW capacity, which small power plant).

Good practices for energy saving:

- Climate friendly Block of Flat sub-program of the Green Investment System

Good practices for CO_2 reduction:

- Environment and Energy Operative Programme (KEOP) from 2007 to 2013. The KEOP 5.3.0/B/09 Energetic reconstruction building combined with the use of renewable energy resources "tender" is very popular.

2.3.3.3.2 Supportive tools

Supportive tools emphasize special attention to the improvement of energy efficiency, sustainability, or the CO_2 reduction. The residential sector is an important area, because the economy of the examined municipality is not strong. There are no big companies with determined pollution emissions, but the transit traffic is significant. Following subsidies are co-financing programs for the natural persons (residential sector), the SME's, or for the tertiary sector, as well as for the transportation sector. The personal contribution to these projects is a serious problem (mentioned in the ENESCOM Report 2), but the lack of appropriate information about the project is a problem as well.

The list of some grants / subsidies for energy sustainability:

- Increasing the RES consumption
- Climate-friendly Block of Flat sub-program of the Green Investment System
- Climate-friendly Home Energy-efficient sub-program of the Green Investment System
- The New Hungary Development Plan's program: Environment and Energy Operative Programme (KEOP)

The list of some grants / subsidies for CO_2 reduction:

- Climate friendly Home Energy efficient sub-program of the Green Investment System
- Energetic reconstruction building combined with use of renewable energy resources KEOP 5.3.0/B/09
- National Energy-saving Program
- Hungarian's Energy Efficiency Program called "Maintenance and extension of road charge payable by heavy road vehicles"

For more comprehensive information on specific supportive tools, see Hungarian Table 12.

2.3.4 Czech Republic

Czech Republic participated through two target NUTS 2 level regions – Prague Region and Middle Bohemia Region. Although these two regions are different in general, for the purpose of this report, these two regions were basically merged and differences are mentioned specifically in the text.

Prague is the capital city of the Czech Republic and at the same time it is the largest city in the country by area (496 km2) and by population (1.23 million inhabitants in 2008). Concerning quality of the environment the city of Prague must solve similar issues as other large cities in the world. These are especially automotive traffic impacts, water and energy management, waste management, yet also sustainable use of land, care for cleanliness, greenery, and valuable nature localities on the city territory. In recent years, numerous issues, which were putting a burden on the city environment arising from the past decades,(mostly from the former regime era), were managed to be solved. Other issues are, on the contrary, a challenge to new measures. Due to the current conditions further intentions in environmental management and care for the environment of the capital city of Prague are formulated in the Strategic Plan and in numerous conceptual documents aiming at particular thematic fields.

2.3.4.1 Background

2.3.4.1.1 Energy consumption summary

In the Czech Republic, the main source of electric energy is brown coal (66%) and nuclear energy (30%). There is no oil or coal mines in the considered regions; therefore they are completely dependent on their imports. Sectors are using energy especially in the form of electricity, gaseous fuels, solid fuels and liquid fuels.

2.3.4.1.2 CO_2 emissions summary

Industrial pollution decreased (2008 – 2009) due to the recession last year, but air in small towns is not better, as households again burn solid fuel to cut their costs, according to the Report on the State of the Environment in the Czech Republic. The annual growth in the number of households reverting to solid fuel for heating and a growing sale of coal briquettes is one of the most negative findings of the Report 1.

2.3.4.1.3 Target region RES potential

For Prague, energy sources bear the character of incessantly renewable source of utilizable energy, representing in the future more and more preferred energy sources. From this point of view they involve not only classical renewable sources such as wind, water, biomass or solar energy but also so-called secondary energy sources which one can obtain from processes constantly repeating in connection with human activity. In this category namely waste can be included.

In Middle Bohemia, RES are usually referred to in connection with the potential of solar energy, biomass, biogas, wind, the so-called small water, geothermal energy and partially energy of bedrock entourage. The serious shortcoming is the fact that:

- The present use of RES in Middle Bohemia region is not, with the exception of hydro power plants and partially heat pumps – statistically registered.
- While developing RES, it is necessary to deal with the proper setting of linkage between individual problem spheres i.e. between RES use, energy savings, planning of big energy corporations, territorial plans and municipal projects in such a way that RES use might be optimal as for performance/cost ratio.

For the entire 2009 electricity from RES amounted to 6,8% share out of the gross consumption of electricity. Obligation of 8% RES share for the year 2010 concerns only electricity. On the other hand obligation of 13% RES for the year 2020 concerns all renewable energy sources.

Thus, it is possible to state, that:

- On the territory of the entire Czech Republic and thus also in Middle Bohemia region we can see intense development in use of some RES technologies. It is related especially to the constant increase in prices of classic sources (coal, natural gas, electricity) as this concerns especially sources generating heat energy.
- Number of installations (heat pumps, biomass boilers, solar collectors) has been at a very low level up to now, but at present it increases probably exponentially, although it is very difficult to determine the exact number of installations but such an estimate is quickly overcome. It is thus more important to deal with the proper setting of linkage between individual problem spheres i.e. between RES use, energy savings, big energy corporations planning, territorial plans and municipal projects to make it possible that RES use could be optimal in relation of performance/cost ratio.
- Middle Bohemia region has primarily high reserves in available potential of biomass use (heat production could increase even 15times by 2020 compared to 2000 year, i.e. from approx. 800 TJ/year to 12 000 TJ/year and electricity up to 350 GWh/year).

There are also big possibilities of biogas use. This will require certain amount of investments.

2.3.4.1.4 Plans and regulations summary

There is a system of National and Regional Plans and Regulations pertinent to the target regions and municipalities. Voluntary programs and projects for sustainable development of concrete municipalities, cities, and regions in Czech Republic are being developed as well, e.g. Local Agenda 21 and local Action 21 (LA 21).

They are specific barriers regarding the development of RES and CO_2 reduction:

- The strategic target of Middle Bohemia region to secure the energy demand and needs respecting the existing and potential energy sources
- The cost for RES technology
- The necessity to solve the CO_2 emission problem at a larger scale, it cannot be solved locally
- The need of global coherence between politics in energy and other fields
- Permanent task to assure a better coordination and alignment of interests of individual stakeholders and civil society.

The main problem with increase of energy generation based on RES is the integration of new RES capacities into distribution networks.

2.3.4.2 RES situation

RES situation is different for two examined regions (Prague Region and Middle Bohemia Region); therefore following subchapters are divided into two respective groups.

2.3.4.2.1 RES projects

A wide range of renewable energy projects which has been supported by national and EU funds exists in the Middle Bohemia and Prague regions. Investors have been from the public and private sector.

Middle Bohemia Region

The main renewable energy source is water and solar units. There have been built several water power plants during the last century that are still in operation after renovations and innovation. There have been implemented some projects concerning heat pump utilization. Namely, these are:

Solar plants:

- Photovoltaic system in the village Kněžmost
- Heating of rest home in Poděbrady with heat pump and solar water heat system

Water plants:

- Water plant Obříství
- Small hydropower plant Vraňany

For more detailed information about mentioned projects, see Table 7 for Middle Bohemia Region.

Prague Region

There exists a wide range of renewable energy projects in the Prague Region which has been supported by national and EU funds. Investors have been from the public and private sector. The main renewable energy source is municipal waste, water and solar units. There have been built several water power plants during the last century that are still in operation after renovations and innovation. There have been implemented some projects concerning heat pump utilization. Namely, projects are:

Solar plants:

- photovoltaic system on façade of Corinthia Panorama Hotel
- Small photovoltaic systems on apartment buildings and family houses

Thermic Plants:

- Municipal waste incinerator Malešice
- Combined heat and power station Prague

Hydro plants:

- The small hydroelectric power station Podbaba
- The hydroelectric power station Štvanice
- The hydroelectric power station Modřany

The Prague Region does not meet the basic criteria for wind energy utilization (wind speed, premises …).

For more detailed information about mentioned projects, see Table 7 for Prague Region.

2.3.4.2.2 Energy saving projects

There have been implemented many interventions of energy requalification on public and private buildings in the Middle Bohemia and Prague regions. Many projects have been supported by Operational Programmes co-financed by the EU structural funds. There has been an evident motivation by the promotion campaigns concerning energy saving and implementation of RES supported by EU and national funds. The investments from public and private sectors doubled in the last 5 years. Many specialized consultants and agencies support the potential applicants for public grants and help with the implementation and start-up of the project. A list of projects for each region follows (for more information about mentioned saving projects, see Table 7 of respective examined region).

Middle Bohemia Region

Comprehensive energy saving projects:

- Provision of gas supply for the boiler house and regulation for the heating system in the Basic School in Královice
- Construction work on the Basic School and Kindergarten in Kojetice
- Heat cladding of home for elderly people in Benátky nad Jizerou

Partial energy saving projects:

- Heat pump in the Kindergarten Šestajovice
- Hospice of Dobrý Pastýř
- Solar system (Androméda, o.s.)

Prague Region

Comprehensive energy saving projects:

- The modernization of heat economy in Hospital Bulovka
- The construction of new source of heating for apartment buildings of the National Theatre
- The modernization of the heating system and implementation of a new management system in four elementary schools in Prague 4 – Modřany

Partial energy saving projects:

- Low-energy reconstruction of primary school and kindergarten Prague Slivenec
- Heat pump Žofín
- Implementation of energy saving by using renewable energy sources in the Area of New PORG

2.3.4.2.3 Current situation

Middle Bohemia Region

The general RES source utilized effectively in the Middle Bohemia Region is the water of the Vltava and Elbe River. The potential of other kinds of renewable energy sources is also important, in part due to large size of the region. For example suitable locations for wind plants are scattered in different parts of the region, especially in the upper part of the Middle Bohemia Region and in the Highlands Rakovnicko. Unused energy potential is especially in utilization of municipal waste combustion and in energy from biomass.

Prague Region

The dominant way of RES capacity utilization is municipal waste combustion in Prague Region. The largest facility used for thermal destruction of municipal waste is the up to date incinerator in the Suburb of Malešice. The produced heat is supplied to the district heating network and the gas collected from the waste dump in the Suburbs of Dolní Chabry and Ďáblice.

The second RES source utilized effectively in the Prague Region is the water of the Vltava River. The potential of other kinds of renewable energy sources is marginal. This is mainly due to economic factors - the generally higher production costs than from conventional sources or unsuitable conditions (wind, missing areas in the over-urbanised for solar collectors …).

2.3.4.3 Good practices

Although good practices might differ for two examined regions (Prague Region and Middle Bohemia Region), as an example of good practices, only one region (Middle Bohemia Region) has been chosen and presented for the Czech Republic, to assure consistency and wide context of good practices presented. For supportive tools, both the examined regions were treated separately again.

2.3.4.3.1 Good practices selection

Good practice for utilisation of renewable energy sources:

The construction of the new central heat source for the part of the City of Decin (53,000 inhabitants) is the largest project using geothermal water in the country. Warm water is taken from a geothermal borehole from an underground lake at a depth of 550 m. The

water temperature is 30°C, pressure 2 bars and flow 54l/sec. The thermal energy is gained through two heat pumps with outputs of 2 x 3.28 MW. For coverage of the demand in winter and as backup resources are used 2 gas boilers with outputs of 2 x 16.5 MW. Heat is distributed throughout the distribution networks 110/65°C with a length of 10 km with over 120 residential transfer stations. Heat pumps and gas engines are operated year-round. Electricity for heat and circulation pumps and other equipment is produced in 2 cogeneration gas engines with total outputs 1.94 MWe/2.09 MWt), the thermal water is used after the delivery of heat and special treatment as quality drinking water (1 million m3/year). The total project cost was of 531 million CZK, the implementation 2000-2002.

The project is an excellent example and the largest project using geothermal water in the country. Heat from underground covers a 1/3 of annual supply (93 TJ) of heat into the town-district with 15 thousand residents (the total annual supply of heat from the source is 280 TJ). Production facilities are installed by two by two, to achieve the necessary flexibility in their use. In winter adds the geothermal source 2 power boilers (as well as a backup source). The electrical energy for power pumps are produced in cogeneration devices. The new grid is designed for connecting additional customers. The system is still improving. Reduction of CO2 is 10 000 tonnes per year. This project became a model for other urban projects.

Good practice for energy saving:

The project delivered comprehensive energy saving in one of the houses of a Social Home in which are located 100 persons (total in the institute over 300 people). These persons are mentally disabled and with combined disabilities. The building was thoroughly insulated and equipped with several types of renewable energy sources. The insulation was made with modern materials, the calculated heat loss decreased to 57°C kW/at -15°C There were installed 84 solar collectors (148 m2), a heat pump type water-water (output 37 kW), a biomass boiler/chips (70 kW), photovoltaic panels (1 kW) and a reserve electric boiler (37.5 kW). The total installed capacity is 177 kW. The annual heat production is approximately 65-70 thousand kWh, the energy consumption of the system is 12 thousand kW. Investment costs were 7.3 mil. CZK and the national subsidies represented 60%. Implementation was carried out in 3 stages between 1996 and 2006.

The project is a model for comprehensive energy saving and utilisation of renewable resources in buildings owned by municipalities. The Social Home saves about 500 thousand CZK of heating costs in comparison with costs for natural gas (compared to prices 2010).

The Town of Slatnany installed 2 cogeneration units driven by natural gas for heat and electricity production for the supply of the other buildings of the Social Home with the total output of 97 kWe/150kWt. The total annual cost after that investment to own electricity production dropped of about 1.2 CZK. In one of the rooms of the reconstructed house is an energy consulting and information centre where visitors can learn about the saving possibilities and new technologies.

Good practice for CO_2 reduction:

The Towns of Most and Litvinov (about 100 000 residents) in the Northeast of the Czech Republic run together a public transportation company. They operate trams, buses and other means of transport for provision of services for citizens. They have changed the fuel of the whole bus fleet (about 80 vehicles) from diesel oil to LPG (Liquefied Petroleum

Gas) and CNG (Compressed Natural Gas) during the last 10 years. They reconstructed the Diesel motors in own repair shops in the first years. By now they buy new buses with high-performance gas motors. In parallel they built a local network of gas filling stations. The long-term project was supported by national and EU funds.

The project solved the negative effects of air quality in the both urban areas and public health, as well as on the balance of payments for fuels.

Substitution of Diesel fuel by an environment-friendly energy source (LPG and CNG) in urban buses offers a particular advantage in view of their high specific fuel consumption combined with high annual mileage. This is an example and a good practice for municipal policy makers, transport planning engineers and officials and transport operators. It shows as well the way how to solve the municipal problems with help of financial support of national and EU funds.

2.3.4.3.2 Supportive tools

Some supportive tools are similar for both examined Czech regions.

For energy sustainability, it is photovoltaic electricity. The objective is to encourage energy production made from photovoltaic. This encouragement is based on purchase price more favourable for photovoltaic energy. The Energy Regulatory Office's price decision No. 5/2009 (ERO) and its amendments are crucial for further photovoltaic development. It is necessary to take into account the capacity of distributing grids and important to give comparable business conditions (level of profit) for the private investors. It concerns all the Czech territory. The future systematic support of the government to photovoltaic is not clear now.

For supporting energy sustainability and CO_2 reduction, this is Czech national programme called "Go-ahead to green savings" with the following main targets to take measures leading to energy savings and to support RES use in family and flat houses, with five supported spheres:

- Energy savings for heating
- Building in passive energy standard
- Use of RES for heating and hot water
- Grant bonus (for combination of measures)
- Support for preparation and realization of RES measure.

Besides, there are some regional grants / subsidies, which can be found below.

Middle Bohemia Region

Programmes are focused on energy sustainability; they are not programmes and grants targeted directly on the CO_2 issue. Development of RES is more supported than energy savings. The municipalities have limited financial sources to be allocated for RES or CO_2reduction; they are dependent mainly on the grants and programmes of the state institutions and private investors' initiatives. The municipalities do not usually know the present situation in energy sources and their use; they are financially dependent on the outside financial support to RES. The information should be also higher and more systematic in municipalities and regions.

The list of some grants / subsidies for energy sustainability (for more details see ENESCOM Report 2):

- Action Plan of the Middle Bohemia Region
- Amendment of the Action Plan of the Middle Bohemia Region, based on the Regional Energy Concept. It gives the priorities in the field of RES.

There is also grant for RES development, which is activity of CEZ, leading Czech energy company, to support new RES projects. Consumers of "green energy" pay a purchase price a little bit higher, with simultaneous subsidy of CEZ. A fund to support RES is created in such a way.

For more comprehensive information on specific supportive tools, see Table 12 for Middle Bohemia Region.

Prague Region

Most of the tools are focused on energy sustainability and development of RES use. The grants are linked with the CO_2 issue mostly indirectly. Prague is investing in transport infrastructure (ring-roads and tunnels across Prague area) to reduce CO_2 emissions caused by road transport. Industry causing CO_2 emissions was limited and moved outside the residential areas of Prague.

The list of some grants / subsidies for energy sustainability:

- Programme "Clean Energy Prague". The target of the programme and grants based on it: to motivate the private owners and tenants of houses to convert from original heating (mainly solid fuels) systems to ecological heating systems and support to RES use.
- Grants to support projects for environmental improvement in Prague. Their main targets are: Involvement of public into active environment care and public green care; to develop pre-school ecological education; to extend city public green spaces; to support conversion to ecological agricultural in Prague rural districts.

For more comprehensive information on specific supportive tools, see Table 12 for Prague Region.

2.3.5 Greece

Greece participated through one target region – Western Greece Region (Patras municipality). Since Greece participated only partly in Report 1 and didn't participate in Report 2 at all, some information presented in Report 3 may not be of full extent. On the other hand, all the most important data were provided for Report 3 and there were no need of excluding Greece from the report.

2.3.5.1 Background

2.3.5.1.1 Energy consumption summary

Municipality of Patras as the other municipalities of Greece must be part of a National Plan based on energy production by cleaner solutions. RES utilisation must be encouraged and stricter legislation systems about CO_2 emissions.

2.3.5.1.2 CO_2 emissions summary

In Greece, the biggest consumer of energy and CO_2 emissions is the industry sector. The major source of CO_2 emissions production is electricity, so National Electricity Company – which is the only electricity company in Greece, should change electricity production sources to cleaner ones such as RES.

2.3.5.1.3 Target region RES potential

The municipality of Patras has good conditions to renewable energy sources. Also the energy policy of Greece favours major private sector investment.

It is estimated by the World Bank that investment of more than 30 billion Euro will be required by 2020 in the upgrade and building of power plants, in transmission and distribution, and in renewable energy sources (RES).

Greece's comprehensive energy policy, to establish sustainable, competitive, and secure sources of energy, has established an encompassing regulatory and market framework for the energy sector. This, in combination with Greece's wide-ranging investment regulatory framework, provides for exceptional opportunities for investment in a number of areas.

2.3.5.1.4 Plans and regulations summary

There are no plans and regulation, supporting tools and good practices on energy efficiency and CO_2 reduction on a regional level, all of them are on a national level. Greece has begun to develop policies and plans on the environmental sector recently. Greece started to adopt EU policies for Energy end-use efficiency and energy services directive into its legislative framework. Due to this commitment to European Union, Greece started to develop plans and regulations concerning these issues.

2.3.5.2 RES situation

2.3.5.2.1 RES projects

There are no Thermic plants in Western Greece region. Currently small private photovoltaic plants are being introduced but no accounting has been made. The total capacity of RES that is registered in the current statistics is 114.31 MW/year. All Wind Plants are private and account for 93.35 MW which corresponds to 81.67% of the total energy from RES. Water Plants account for 20.96 MW which corresponds to 18.33% of the total energy from RES. 32.06% of energy from Water Plants is of Public ownership and 67.94 is of Private ownership.

There are 5 wind power plants and 9 water power plants listed. Besides 3 public water power plants, all other power plants are private.

2.3.5.2.2 Energy saving projects

Comprehensive energy saving projects are represented by Regulation on Energy Efficiency of Buildings and establishes an integrated energy planning in the building sector (study in the energy efficiency of buildings, minimum demands on energy efficiency of buildings, energy audit of buildings).

Partial energy saving projects:

- Housing Energy Saving is a program run by the Ministry of Environment, Energy & Climate Change. It offers a combination of subsidy with interest-free or low-interest loans. Interventions in individual buildings are decided based on the Energy Review done by Energy Auditors.
- Development of Photovoltaic in buildings is a program about the installation of photovoltaic up to kWp in buildings used for housing or for very small businesses. The electricity produced will be directed to the National network. The owner of the installation signs a 25 year agreement with the National Electricity company, which provides for a guaranteed price for the electricity produced. The program will run until 31/12/2019.
- Program EXOIKOINOMO (Energy Saving), which aims at Implementation of Energy Efficiency in Municipalities with more than 10,000 inhabitants with following interventions (examples): thermal insulation, replacement of old windows, doors and frames, green roof, central air-conditioning instead of independent units, replacement of old boilers with newer ones of higher performance, insulation of the central heating column and of the pipes, integrated Electronic management system.

2.3.5.2.3 Current situation

There were no data provided on the topic of current situation from Greek partner.

2.3.5.3 Good practices

2.3.5.3.1 Good practices selection

Good practice for utilisation of renewable energy sources:

A new feed-in-tariff (FIT) for small rooftop PV systems up to 10 KWp was introduced in Greece in June 2009. The programme applies to residential users and small companies. This resulted in 20% share of energy from renewable sources in the Community's gross final consumption of energy in 2020.

Good practice for energy saving:

Energy-saving campaigning is an example of good practice for energy saving. This campaign is based on the cooperation of an environmental NGO and private companies in Greece and its goal is to provide information and motivate the public to actively participate in combating climate change.

Good practices for CO_2 reduction:

- Greek EcoDriving Campaign, which aims to Improve Driving Behaviour Energy Efficiency and Traffic Safety.
- Construction of new suburban train in Patras.

2.3.5.3.2 Supportive tools

There are effective Supportive Tools for Energy Sustainability and Reduction of CO_2 Emissions implemented by the Greek government. These tools can be used for a better ''environmental status'' in the target municipality. Everyone can use the benefits of this development. These tools can be used to achieve the goals of energy efficiency and reduction of GHG emissions and as models to create and develop new ones.

The list of some grants / subsidies for energy sustainability:

- Feed-in tariff for Solar PV. A new feed-in-tariff (FIT) for small rooftop PV systems up to 10 KWp was introduced in Greece in June 2009. The programme applies to residential users and small companies.
- Generation of Electricity using Renewable Energy Sources. This law is aimed to the promotion of electricity produced from renewable energy sources (RES) in the internal electricity market. It also seeks to promote this topic by granting priority to the generation of electrical power from RES and high efficiency cogeneration of electricity and heat plants in the internal electricity market.
- Development of an Integrated Energy-Economy-Environment Model
- Efficiency Credit. “Green Loan” of Private Banks is addressed to all the customers who are interested in buying and installing photovoltaic systems and improving their residences with technical interventions and renewable energy systems.
- Federal Support for Wind Power. A bill, presented to the Greek Parliament in March 2005, which contained provisions to enable grid investments and readily approve wind farm construction and connection to the grid. The bill lists feed-in tariffs for wind farms.
- Plan for Domestic Actions. Greece has put in place the necessary directives for streamlining the procedures for renewable energy penetration and is in the process of financing its new comprehensive national plan for domestic actions to reduce its expected emissions by almost 25 million TOE of CO_2 by the end of the first commitment

The list of some grants / subsidies for CO_2 reduction:

- Car-pooling programme by Greek Ministry of Infrastructure, Transport and Networks. Programme for replacing old polluting cars with new technology ones, giving the benefit of saving from 500 euros to 3.200 for buying a new one
- Promotion of Low-Polluting Vehicles. According to the law (2682/99), a differentiation of the registration tax on vehicles (cars, trucks, motorcycles) according to their motor horsepower and their anti-pollution specifications is being provided. Electric cars or hybrid cars with motors satisfying the specifications of the EC Directive 94/12 or more recent directives are exempted from the tax.
- National Programme for Reducing GHG Emissions 2000 – 2010. The objective of this programme to monitor the effectiveness of policies and measures concerning CO_2 emissions.

2.3.6 Slovakia

Slovakia participated through two NUTS 3 target regions – Trnava region and Trenčín region. Slovakia did not participated fully in Report 1 and Report 2, therefore information presented here may not be of full extent. On the other hand, the most important data relevant for Report 3 were provided and therefore there is no need for excluding Slovakia from analysis.

2.3.6.1 Background

2.3.6.1.1 Energy consumption summary

In the region of Trenčín and Trnava in the past years there is a significant increase in the development of industry, what brought also immigration, construction of new houses and an increase in transport. The regional energy policy is in both regions being elaborated in line with this, but in any case will reflect national energy policy, which is focused on decreasing of emissions of CO_2 and at the same time supporting use of renewable energy sources.

2.3.6.1.2 CO_2 emissions summary

In the region of Trnava and Trenčín the biggest consumer of energy and CO_2 emissions is the transport sector and heating. The main factor that contributes to CO_2 emission in Trnava and Trenčín region is transport, the heating of houses and industry. Slovakia uses many different energy and environmental plans which aim to decrease contaminants emissions in future years.

2.3.6.1.3 Target region RES potential

Regions of Trenčín and Trnava have good conditions for renewable energy sources such as the water, wind and sun. For regions of Trenčín and Trnava the energy from the river Váh is very important. In these regions, there are 10 dams for production of energy. In both regions there are hills where are very good possibilities for using power from wind. In those regions there are good opportunities too for photovoltaic plants.

As for the obstacles, solar power investment costs are still too high. Regarding biomass, the high costs of forest management is quite a big barrier and there is no market for the waste. On water power, realization of new dams seems to be the best way to utilize RES. Regions of Trenčín and Trnava should take care in keeping of Kyoto agreements which led them to elaborate laws about RES.

2.3.6.1.4 Plans and regulations summary

Energy in the Slovak republic regulate the laws about energetics No. 656/2004, law about heat energetics 657/2004 and the law about regulation of network sectors 276/2001.

Consequently there are European Union regulations, which are implemented into laws of the Slovak republic. Furthermore there are elaborated national conceptions of RES utilization and exploiting of forest and agricultural biomass for energy purposes.

In each region there also exist the laws, which are touching the field of energy indirectly. In the municipalities there are usually General binding regulations, which are being published and agreed by local parliaments and their publishing is usually caused by some problem or question regarding life in the municipality. These regulations are in several cases connected with questions about energy and its use, of course within valid national legislative. Since those regulations are often quickly changing and develop the possibility of energy exploitation, there is predicted that in the coming period the law about energy will be updated and above all utilisation of renewable sources will be taken in account.

2.3.6.2 RES situation

There are two regions examined in Slovakia – Trenčín and Trnava. Both regions are somewhat similar, therefore they are treated together in this subchapter.

2.3.6.2.1 RES projects

Both regions are crossed by the longest river in Slovakia (Váh), therefore especially water is used for production of renewable energy. At the moment there are not installed thermic or important photovoltaic plants (only some private owners have some small units for heating water in private houses) nor wind plants.

List of RES projects for examined regions follows (more information about mentioned RES projects can be found in Table 7 of respective examined region).

Solar plants:

- Špačinské kolektory (photovoltaic power plant)

Water plants:

- Hydroelectric dams (7 in examined regions and municipalities)

2.3.6.2.2 Energy saving projects

There were no comprehensive energy saving projects in examined regions. There are only partial energy saving projects, namely wall insulations and windows replacements on private and public buildings. More detailed information can be found in Table 8 of Trnava and Trenčín regions.

2.3.6.2.3 Current situation

There were almost no data available for current situation in RES potential and therefore this supplementary subchapter is skipped for Slovakia. For more information, see Table 9 of Slovakian data.

2.3.6.3 Good practices

Good practices are treated together for both Trnava and Trenčín regions.

2.3.6.3.1 Good practices selection

In the last years in Slovakia were not so many big projects and investments in utilization of renewable energy sources. However geographic conditions are very good for utilization of water and wind. In this period different projects are in development for finding territories, where it is possible to install devices for utilization of RES. But, in many cases, firstly investments are necessary to change regional regulation and primary regulation of territory of different municipalities.

Good practices for utilisation of renewable energy source are dams on the river Váh. Energy saving practice is wall insulations, made by private house owners. Good practices for CO_2 reduction are changed windows and roof and wall insulations, because of lowering energy needed for heating.

2.3.6.3.2 Supportive tools

In Slovakia there are not so many incentives for medium or small entrepreneurs and private owners of buildings. Especially there are missing public promotion and information that the society is more attentive for emission of CO_2. In Slovakia, these are just first steps for CO_2 reduction, but at the moment, it is not so very satisfactory.

The list of some grants / subsidies for energy sustainability and CO_2 reduction:

- National support to energy sustainability (incentives, promote tools, grants etc.) supports change of boilers and incentives for buying photovoltaic panels for private owners.

- Regional support to energy sustainability (incentives, promote tools, grants etc.). Region of Trnava and region of Trenčín in this period are working on regulations and incentives for energy sustainability for small private owners and for communities.
- National support to CO2 reduction (incentives, promote tools, grants etc.). This covers incentives through innovation of new production processes and incentives for entrepreneurs for replacement of windows and roof or wall insulation
- Regional support to CO2 reduction (incentives, promote tools, grants etc.), which covers windows and roof and wall insulation replacements.

For more comprehensive information on specific supportive tools, see Slovakian Table 12.

2.3.7 Slovenia

Slovenia participated through one target NUTS 3 level region, which is called Pomurje and which is part of NUTS 2 level region – Eastern Slovenia. Pomurje region is a region in the northeast of Slovenia with a central watercourse, the river Mur, and bordering Austria, Hungary and Croatia. The relatively limited land area is 1337 km^2 large (6.6% of the entire territory of Slovenia) and there are about 120,875 inhabitants, representing approximately 6.3% of the total population of Slovenia. In the region are important economic activities of industry, agriculture and forestry, construction, commerce, manufacturing and service crafts, and many others. A relatively clean and well-maintained environment is the basis for nature-friendly development.

2.3.7.1 Background

2.3.7.1.1 Energy consumption summary

Use of renewable energy in Pomurje is slowly but steadily pursued. Under the current situation for heating and heat technology the region uses 44% renewable energy sources, ie. wood, geothermal energy, solar energy and energy derived from heat pumps.

The highest consumption is still on liquid fuels, followed by electricity, gas fuel and solid fuel. The largest consumer is the transport sector, because of transportation fuel, mainly due to the large consumption of liquid fuels. It is followed by industry and housing, which together reach a slightly higher consumption than transport.

2.3.7.1.2 CO_2 emissions summary

The amount of CO2 emissions is increasing. Measurements show that most emissions at the national level is in electricity production. The Pomurje region does not have, therefore, the first site of emissions, for here this belongs to transport and traffic. The last-mentioned sector in the region Pomurje is the most studied and analysed. Other data are mainly monitored at the national level.

2.3.7.1.3 Target region RES potential

Pomurje region has good natural potential for renewable energy. Great potential is already exploited from biomass, specifically of wood biomass. In the region, an increase in oil prices has eased use of energy resources, ie. decreased at the expense of renewable energy sources, also of wood biomass. Regarding the total consumption of energy in the region, without traffic, renewable energy, ie. wooden biomass and geothermal energy, represents

34%. Pomurje region is suitable for the construction of a biogas plants system for obtaining "green", ie. renewable electricity and heat, as well as for obtaining fertilizer. Interest for energy production and use of biogas in the Pomurje region increases.

Slovenia is one of the countries with the biggest share of forests in Europe. About 12.000 km2 of forests cover more than half of its territory (57,7 %), and the surface is continually increasing over the last 50 years with annual growth up to 0,25 % per year. Such a fact puts Slovenia in the 3rd place within the EU after Sweden and Finland, and therefore makes it a very interesting location when considering biomass renewable energy. From the data of wind speed, the Pomurje region has little scope for setting up wind power plants, since throughout the year under review the appropriate wind speed for the start of operation was achieved only once. The possible potential of solar energy as a renewable resource in the municipalities in Pomurje is essentially very high. There is also potential for use of biogas and geothermal energy.

From the view of energy production, Pomurje region has significant reserves. Hydroelectric power has not yet begun to be exploited. Some small hydro power plants are much less than that which is possible in the environment. Mura River represents a huge potential for hydro-power. As seen there is much potential for generating more energy, especially from the renewable sources, but it has to be done working on the awareness of the local population that energy consumption cannot increase much more and that we all will have to think about how to live more efficiently.

2.3.7.1.4 Plans and regulations summary

Slovenia has a relatively large number of legislative and regulatory provisions dealing with renewable energy and energy efficiency. In addition to an Energy Act, Slovenia has a law on protection of the environment and the Building Act that is mostly related to the mentioned topic. There is also a whole series of national plans and regulations, which are associated with it. We can therefore say that Slovenia has a wide enough legal support so that the measures for energy efficiency and renewable energy sources can be implemented.

2.3.7.2 RES situation

2.3.7.2.1 RES projects

Use of renewable energy in Pomurje is slowly but steadily pursued. After the state published in its Green Energy Pomurje (LEA Mura) in the region for heating and heat technology uses up to 44% renewable energy sources, ie. wood, geothermal energy, solar energy and energy derived from heat pumps. Biogas plants are also finding their own way and can be implemented so that more of them are planned for the coming years.

A list of RES projects for examined region follows (more detailed information about mentioned RES projects can be found in Table 7 of respective examined region).

Solar plants cover around 20 different installations, mostly on the roofs of buildings.

Thermic plants:

- Beltinci village: heating rectory, municipal buildings, retirement home, church and five private houses.

- Cankova village: heating school, kindergarten, gymnasium, municipal building, fire station, shops, churches and 10 houses

Geothermal plants cover around 11 different installations, usually with one or more of following functions:

- Heating for bathing and swimming
- Glasshouse
- Air conditioning
- Individual heating
- District heating

Moreover, the region has around 6 biogas private power plants, usually using manure, corn and animal by-products as a source.

Finally, there are at least two private water plants in the Pomurje region.

2.3.7.2.2 Energy saving projects

At the national and local level there are some projects that deal with the problems of energy efficiency and renewable energy sources. The local level is associated with the neighbouring countries. These projects are usually undertaken through the program INTERREG transnational cooperation. National programs are set in the long run, so the results are seen only in a few years. List of energy saving projects for examined region follows (more detailed information about mentioned saving projects can be found in Table 8 of respective examined region).

Comprehensive energy saving projects:

- (AN-RUE) National Action Plan for Energy Efficiency by the period 2008-2016. This project favours energy savings.
- Rural Development Programme (European Agricultural Fund for Rural Development) which covers different investments to support rural development in conjunction with energy saving and renewable energy production.
- IP greenhouse gases, connected with the necessary measures to meet Kyoto commitments

Partial energy saving projects:

- T-JAM provides overview of the use of geothermal energy, groundwater bodies assessment of thermal water and the preparation of a joint management plan for aquifers in the Mura-Zala basin.
- Energo optimum systematically addresses high energy consumption in Pomurje region, covering all sectors of energy consumption. It provides opportunity to make savings in conversion facilities and in others, more beneficial for the regional sphere, especially at the level of environmental protection and GHG emissions reduction.

2.3.7.2.3 Current situation

There is high potential for exploiting solar energy for domestic hot water and electricity in Pomurje, but the conditions for the exclusive use of solar energy to heat houses are not appropriate because of the lack of sunny days in winter. Therefore the proportion of exploitation of solar energy is very small in Pomurje. The region has already built several solar systems to generate electricity - photovoltaic, and in the coming years it is expected to continue to grow.

There are also water plants, biomass plantsand Pomurje region also gets secondary energy from waste.

Pomurje region utilizes geothermal energy as well. 65% of the Slovenian geothermal potentials are located in the north part of Pomurje where 31 production wells are located. These are being exploited for tourism purposes and also for heating greenhouses and homes. Slovenia is currently using 616 TJ of geothermal energy per year, of which the Pomurje region 207.33 TJ consumption of energy per year, or 33.6% of the Slovenian average. Compared with the natural potential this is very modest use.

2.3.7.3 Good practices

2.3.7.3.1 Good practices selection

In the field of renewable energy and energy efficiency there recently appeared more and more biogas plants, whereas in Pomurje region there are many options for delivering primary sources. Initially, the building would face a relatively high resistance of the local population, which is at present reduced. The region has also planned a much greater exploitation of geothermal energy, because there is great potential for such exploitation. This will certainly contribute to a more favourable energy balance. Examples of good practice are currently only a few, but they will certainly occur in greater numbers in future.

Good practices for utilisation of renewable energy sources:

- Biogas reactor Kolar Marjan Logarovcih. As a substrate for biogas plant pig manure is used.
- Biogas reactor Nemščak in Ižakovci. As a substrate for biogas plant in Ižakovci Nemščak uses slurry, corn chips and animal by-products from the industry.

No good practices for energy saving were provided.

Good practice for CO_2 reduction:

The company Ocean Orchids, founded in the summer of 2003, in Dobrovnik engaged in the production of orchids in greenhouses, heated by geothermal energy. The 1.4-hectare greenhouse will be raised to 500,000 orchids per year. It is the first system in Slovenia, where the geothermal energy has been used as a renewable and environmentally absolutely impeccable source of energy for heating homes and commercial premises, built in the heart of Lendava.Project Nafta is a Geotherm exploitation project, which has developed a medium-temperature geothermal energy system with total thermal power of 10 MWt.

2.3.7.3.2 Supportive tools

In Slovenia, AP RES 2010-2020 estimated and provided the necessary quantitative values of the energy from renewables by individual sectors (heating, cooling, electricity, transport) and the proposed measures (above financial incentives), which will allow use of desired quantities of energy from renewables in the coming years, having regard to Directive 2009/28/EC.

NEEAP Slovenia will in the period 2008-2016 achieve cumulative savings of at least 9% of initial end-use or at least 4261 GWh having regard to Directive 2006/32/EC. Savings will be achieved through various sector-specific and multi-sectoral and horizontal measures (financial incentives above) in all sectors (households, general consumption, industry and

transport). Increasing the efficiency of final energy consumption in all sectors is significant potential to reduce GHG emissions.

A list of some grants / subsidies for energy sustainability:

- Increasing the efficiency of electricity use the economy 2011-2013.
- Advisory, promotional and awareness-raising activities.
- Ensuring a reliable supply of electricity using domestic sources of primary energy.
- Promoting biomass heating.
- Incentives for investment in renewables and energy efficiency in buildings.
- Grant under the Rural Development Programme 2007-2013 for the RES and RUE

The list of some grants / subsidies for CO_2 reduction:

- Law Amending the Law on Tax on motor vehicles, reduced rates of tax on motor vehicles with lower CO2 emissions.
- Environmental tax for air pollution with CO2.
- Regulation on the promotion of biofuels and other renewable fuels for motor vehicles.
- Excise Duty Act - increased consumption of biofuels

For more comprehensive information on specific supportive tools, see Table 12 of Slovenia.

2.3.8 Poland

Poland participated through one target NUTS 2 region, which is called Podkarpackie Province.

2.3.8.1 Background

2.3.8.1.1 Energy consumption summary

Electricity and heat are mainly used in the industry and construction sectors. Significant consumption occurs in housing and other small receivers. In 2008, electricity consumption was 4,900 GWh/year (does not include direct consumption for heating and lighting), while the heat consumption was 13,410TJ/year. Electricity and heat are mainly used in the industry and construction sectors. Significant consumption occurs in housing and other small receivers.

2.3.8.1.2 CO_2 emissions summary

From among the emitted greenhouse gases into the atmosphere, carbon dioxide (CO_2) is the most harmful. There are 82 industries which are particularly oppressive for clean air in the Podkarpackie voivodeship (31.12.2007).This indicates a declining number of these plants, which at the end of 2006 were 88. There is improvement in the manner of the dust pollution and gaseous pollutants reduction systems that are used as well. The biggest emissions are connected with the coal power sector, which was responsible for issuing 212.4 million tons of CO_2; the burning oil mainly in transport contributed to the emission of 62.7 million tons of CO_2, and natural gas 27.1 million tons of CO_2.

2.3.8.1.3 Target region RES potential

The level of RES exploitation and its potential capabilities indicate the directions described in Strategy for renewable energy sources development in Podkarpackie

voivodeship document. In the course of time, it will be necessary to update the strategy i.e. the energy policy diagnosis in the region, with a particular emphasis put on RES.

The potential of Podkarpackie for electricity generation on rivers provides a basis for building small hydropower plants with a capacity of 0.8-1.0 MW.

Wind energy for electricity production is characterized by large variability both in space and in time, its velocity determined by factors including shape of the area. The area of the south - eastern Poland (Podkarpackie Province) is a region with great potential for wind energy. Nearly 20% of the province has good and very good wind conditions.Many wind farms are currently in various stages of preparation process.

On solar energy, Podkarpackie voivodeship has very good conditions of sunshine in the province. Among the investments made in solar energy greatest interest is related to photothermal collectors, as in this province there are 186 installations (as of 31.12.2007), and further information obtained about more than 150 installations.

There is also possibility to use biomass and geothermal energy.

2.3.8.1.4 Plans and regulations summary

Development Strategy of Renewable Energy in the Podkarpackie Province is the attempt to answer contemporary challenges of energy - climate in a regional scale. The document is detailed diagnosis of the region's energy policy, with particular emphasis on renewable energy sources (RES). It aims to provide long-term strategy of RES development with regard to ambitious EU aims and the planned actions of the government and contribute to increased national energy security. The aim of the strategy is to provide scheme activities for local and regional authorities from across the region, as well as for those co-creating energy policies in the region.

Its main goal is to optimize potential mineral resources and geopolitical position, which Podkarpackie province can play in bilateral relations with its neighbours. The strategy provides a thorough analysis of Podkarpackie with the current and planned demand for energy. Presented were all kinds of renewable energy and the capabilities of the province in connection with the implementation of force specific actions supporting the development of OZE. Ongoing monitoring of implementation of the Strategy will be easier to define indicators for the implementation of the guidelines document.

2.3.8.2 RES situation

2.3.8.2.1 RES projects

In the last years, investments connected with producing renewable energy are being developed by the initiative of private enterprises. For example the water power plant founded in Pilzno municipality, Dębica county with Power 510 kW. This is the biggest water power plant, which has been the latest built. We can observe the intensive development of investments in wind power plants. In 2000, there were installed 320kW and 1150kW in 2006 already. In the area of Przemysl there is currently working six windmills with a capacity of 2000kW each. The same trend of wind power is nationwide.

There are at least 4 wind power plants and 4 water plants. There are also thermic plants using biomass and waste in Podkarpakcie voivodeship. For more information about mentioned RES projects, see Table 7 provided by Poland.

2.3.8.2.2 Energy saving projects

Project size can be defined by complex energy-saving projects, and partial energy-saving projects. Complex energy-saving projects include those related to thermo renovation - thermal insulation of walls, windows replacement and setting up a solar installation. In these projects the reduce energy consumption and the acquisition of energy from renewable sources is obtained. The partial energy-saving projects are carried out by restoration and thermo renovation work. The result of this type of work is the reduction of energy consumption. Achieved levels of energy conservation are so far reduced energy consumption in GJ / year.

List of energy saving projects for examined region follows (more detailed information about mentioned saving projects can be found in Table 8 provided by Poland).

Comprehensive energy saving projects:

- Cross-border Tourist Information Center "EuroKarpaty" – Thermo-modernisation of central heating installation, implementation of solar installation
- Comprehensive thermo-modernisation of the Samodzielny Publiczny Zespół Opieki Zdrowotnej in Leżajsk

Partial energy saving projects:

- Thermo-modernisation of the Sanatorium Uzdrowiskowe “PIAST” building together with boiler and central heating system reconstruction
- Replacement of windows, insulation and new frontal elevation, Pawilon Handlowo-Biurowy in Bukowsko center
- Reconstruction and construction of the sports complex of Bieszczadzki Zespół Szkół Zawodowych in Ustrzyki Dolne – Thermo-modernisation and replacement of windows frames

2.3.8.2.3 Current situation

Most of renewable energy in the Podkarpackie Province is derived from biomass. The second largest source of renewable energy sources is water. It is worth noting that renewable energy of water is comparable to renewable energy from biomass. On a national scale according to GUS, production of renewable energy in percentage is: geothermal 0.2%, biomass 92.5%, wind 1.6%, water 3.6%, other 2,1%. It is clear that the main source of renewable energy on a national scale is biomass. The nationwide percentage of the production of renewable energy in total energy production is 8.5%. For more information, see Poland Table 9.

2.3.8.3 Good practices

2.3.8.3.1 Good practices selection

Both for the use of renewable energy sources, as well as to energy savings and CO_2 reductions were achieved with the task of upgrading 13 boiler houses and the construction of 14 solar systems. Implementation of the activities took place in 2009 from the Regional Fund for Environmental Protection and Water Management.

The implementation of all these tasks strongly reduced emissions of contaminants to the atmosphere in 2009 for mentioned structures.

2.3.8.3.2 Supportive tools

The main instrument of financial support for renewable energy sources is a system which certificates and provides aid in the form of loans, preferential loans, grants and European funding and mechanisms, arising from emissions trading (Joint Implementation, Green Investment Scheme).

Concerning energy sustainability, both at national and regional level, the principle is to support building a balanced system of energy. The grant is awarded at 45% of the cost of solar installation for obtaining hot water and central heating support. It is funded by the National Fund for Environmental Protection and Water Management (national level) and the Regional Funds for Environmental Protection and Water Management (regional level). Grants are awarded from September 2010 and are intended for individuals and institutional actors (eg firms, institutions).

Concerning CO_2 reduction, at the national level, support for reducing CO_2 emissions is realized in the form of loans. In addition, assistance for operators acting on local or regional scale in Podkarpackie province is carried out by legal instrument on the basis of Resolution of the Provincial Council for Nature Conservation. Loans for national level stakeholders are intended to implement environmental projects such as wind farms and co-firing of biomass energy crops. These loans are made by the Bank of Environmental Protection since 2008 and are intended for legal entities. Among the numerous resolutions of the particularly important document is the Resolution No. 2/07 Regional Nature Conservation Council of 19 April 2007 on locating wind farms in Podkarpackie. Pursuant to records of this document in relation to wind energy, there will be preferred investments located in areas that are not covered by any form of conservation. It is also important to allow for easy balancing of power instability through the use of other energy sources, which are incorporated into the system. This resolution provides support to legal entities and provides support for investment since 2008.

2.3.9 Spain

Since only partial data were provided by this partner, Spain could not be fully included in this report. Only data in Table 8, Table 9, Table 12 and Table 13 were provided for one of three regions. Analyses were not provided. Moreover, Spain did not participate in Report 2 and therefore some information provided here may not be of full extent. On the other hand, the most important data relevant for Report 3 were provided and therefore there is no need for excluding Spain from analysis.

2.3.9.1 Background

No analyses were provided by Spanish partner. Spain participated in Report 1 only partly and didn’t participate in Report 2 at all. Therefore no background is presented in this subchapter.

2.3.9.2 RES Situation

Only the Aragon region was examined, since no data were provided for other regions. For more information on specific subchapters, see Spanish Table 7 and Table 8 in annexes.

2.3.9.2.1 RES projects

Since Table 7 was not provided by Spanish partner, no data are presented in this subchapter.

2.3.9.2.2 Energy saving projects

Interventions for housing recovery in less developed areas or degraded old parts of cities have been used to improve insulation and energy saving in these buildings, changing also old electricity grids, insulation, windows or introduction of gas heating.

Comprehensive energy saving projects:

- Local Energy Efficiency plans (intervention in old buildings with actions in the external insulation systems).
- Efficient Energy Use in Public Buildings (legal limits for temperature for winter and summer).
- E4 Strategy for Energy Efficiency in Spain (national strategy and Action plan for energy saving in houses, transport, municipalities, industry, which is focused on efficiency measures and an action plan for increasing the speed of application; grants are managed by regions and National Institute for Energy Saving and Diversification).

Partial energy saving projects:

- Distribution of low consumption light bulbs
- Plan RENOVE electrodomesticos (grant for changing old domestic machines for new ones with “A” energy label).
- Plan RENOVE cars (grant for changing cars for new ones).
- Menos humos (car sharing website).

2.3.9.2.3 Current situation

Regional government has a strong emphasis on industry and has a special interest in promoting renewable energies specially to exploit the great wind potential in the middle region, Zaragoza and river Ebro basin. A renewable energies production has been considered as a strategic way to develop the countryside and to solve its main problems in employment. It is essential to remark on their interest in developing hydrogen technologies and to build a strong hydrogen engines and fuel cells industry in the regions. On the other hand, not many policies on energy saving and efficiency technologies have been promoted. Only some grants for building refurbishing have been focused on this item but as a part of a big grant program to refurbish historical centres and old degraded areas in some cities. Aragon regional government has their own program for grants and manage the regional part from the National IDAE (National Institute for Nergy saving and diversification) grant program and strategy.

2.3.9.3 Good practices

2.3.9.3.1 Good practices selection

List of good practices for RES:

- Renewable energies implanted in the gas stations in the Community of Madrid; the implementation of solar photovoltaic systems, furthermore in economic saving they provide benefits for the environment, and stop greenhouse gases.
- "Green Building" of Sanitas, Bioclimatic Building. The building applies environmental and energy criteria in its construction. The photovoltaic panels produce between 2 % and 3 % of the total consumption of energy of the building.
- Solar farm, to generate and to share green electric energy. The farm has been designed adapting to the animals and to the vegetation. It increases the renewable energies and decreases the costs.
- Installation of cogeneration in the Peninsular's plant of paper. In accordance with the New Directive 2004/ 8 CEE to promote cogeneration it lowers energy consumption. It diminishes the losses of energy in transport as well, since the plant of this cogeneration is next to the paper plant.
- The bioclimatic lodging of Blesa. It is a building prefabricated in wood, of modular structure, of an individual plant and with capacity for 20 people. It possesses solar plates to be provided with electrical supply.
- Building Zero Emission in Zaragoza. This ecological building has been carried out thanks to the investment of 5.5 million Euros of state funds and forms a part of "the few ones" centres in Spain that produce zero CO_2 emissions to the atmosphere and is self-sufficient. All the energy that it consumes in one year will come from renewable energies thanks to the installation of three wind generators and solar plates, with a capacity of production of 83.500 kilowatts / hour a year. The installation that regulates the temperature takes advantage of the free resources that the subsoil energy offers for geothermic, and for water, which comes from the river Ebro from a depth of 25 meters and therefore to a constant temperature of 14 - 16 degrees.

List of good practices for energy savings and CO_2 reduction:

- Decalogue of environmental and energy good practices for the businesses of Madrid; rules to ensure that an establishment follows the steps adapted towards the sustainability, to prevent water waste, to sell quality products, to have responsible suppliers and to orientate the clients towards products and sustainable practices.
- Guide of environmental and energy good practices for the citizens; publications are aimed at trades, bars, restaurants and small offices, with advices for waste management, efficiency in the water consumption and energy, and reduction of acoustic pollution.
- Guide of environmental good practices for shopkeepers of the municipal markets to reduce generated residues and to facilitate recycling (to reduce energy and water consumption, to minimize effects of atmospheric emission, noises and water spillages, to optimize and to rationalize the consumption of toxic substances).
- A Market that sells electrical energy motivates investors to build solar power plants (photovoltaic installations).
- Guide of good practices for saving energy in the public system of lighting. The public system of lighting constitutes a great part of the electricity consumption and energy of municipalities. For this reason, any municipality that tries to reduce energy consumption must consider very specially road and urban systems of lighting. The aims are saving and energy efficiency and prevention or decrease of light pollution.
- Valdespartera, ecocity of Zaragoza. The construction of 9.687 housings, all of them bioclimatic and energy efficient. The buildings are provided with flat covers for the placement of solar panels. They are built from sustainable materials and use high power insulation; in addition, all the equipment and devices have low consumption and save resources.
- Best practices for citizens to combat climate change

For more information, see Spain Table 13 in annexes.

2.3.9.3.2 Supportive tools

National support to energy sustainability:

- Loans to support Renewable Energies with a line of financing to 10 years (Interest Euribor + 0.30%) in projects of thermal solar power, photovoltaic insulated and domestic biomass, as well as facilities of cogeneration.
- Line of Loans - Third-Party Financing (TPF): this is one of the most appropriate mechanisms available to undertake investment projects in energy saving and efficiency and energy generation using various sources, including renewable energy sources.

Regional support to energy sustainability:

- Program of training for municipal managers
- Application of energy efficient technologies to the new facilities of the public system of illumination. It also helps to promote the utilization of efficient energies and to introduce criteria of energy efficiency in the facilities of systems of illumination.
- Elaboration of studies, feasibility studies and audits in facilities of exterior systems of illumination

National support to CO_2 reduction is represented by a programme for the promotion of the biomass as source of energy in facilities of warm water, heating and refrigeration in buildings.

For more information, see Spain Table 12 in annexes.

2.3.10 United Kingdom

The United Kingdom participated through one target NUTS 3 region, which is Powys. It is the largest local authority in Wales with about a quarter of the geographical area but only 132 thousand people making it the most sparsely populated local authority in England and Wales. The rural nature of the local authority brings many challenges and 54% of residents in Powys live in the worst 10% areas in Wales for access to services on foot or by bus.

2.3.10.1 Background

2.3.10.1.1 Energy consumption summary

Energy policies have been developed by the Welsh Assembly Government which has objectives for housing efficiency and renewable energy generation.

Data gathered indicates that transport is the largest energy consumer in the area with 34.7% of all energy consumption coming from transport. In contrast the public sector and agriculture contribute only a combined 11.6% of energy consumption. In years2005-2007 total energy consumption fell by 3.53%, indicating a positive step in reducing energy consumption in the region. Four out of five of the economic branches saw a fall in energy consumption with industry (8.55) making the biggest reduction. However the biggest consumer (transport) saw a 3.46% increase in energy consumption.

Recommendations from the analyses show that housing, renewable energy generation and transport should be focused on in order to reduce the energy consumption of the region.

2.3.10.1.2 CO_2 emissions summary

Carbon Emissions have been identified and analysed for Powys. Data indicate emissions are falling within the target local authority. A reduction of 2.8% was calculated between 2006 and 2007. In comparison to regional and national emissions, Powys emits less than the regional and national average. Three main sectors emit the majority of Carbon Emissions- Housing (31%), Transport (32%) and Industry (28%). Agriculture emits 9% of the local authority's emissions.

The importance of the sectors to the overall emissions in Powys varies from Regional and National averages. In Powys Housing, Transport and Agriculture all contribute a higher percentage to the CO_2 total than in Wales and the UK. In contrast to this industry is a significantly less important source of emissions in Powys.

Since the baseline year of 2007 significant economic changes have taken place, fuel and energy price rises and a period of recession may have led to increased energy efficiency and less emissions, this can only be assumed as data for this assumption is not available. To lower CO_2 emissions in the target area resources should be focused on Housing and Transport as these are the two sectors which emit the most CO_2.

2.3.10.1.3 Target region RES potential

Powys has potential for a wide range of renewable energy sources due the rural nature and topography of the region.

Policy development concerning renewable energy has increased over the last ten years, national (UK) and Welsh Assembly policies are increasingly encouraging investment in renewable technology.

To support national objectives the national government have introduced two new financial support mechanisms for renewable technology. The Feed in Tariff and Renewable Heat Incentive are revenue support systems that will provide an income for every kilowatt of electricity/heat produced. The financial support has made all renewables financially viable.

Solar, small scale biomass and wind are the main and most viable renewables to install as these can be applied in domestic and industrial situations. Hydro and wind will be more suited to rural areas, where wind and water conditions suit the application of the technology.

Large scale biomass, wind and energy generated from waste are all suitable, however finance, planning and time restrictions will limit the applications of these technologies within the region.

Marine and geothermal technologies are not suitable in the region.

2.3.10.1.4 Plans and regulations summary

The targeted municipalities are subject to various plans and regulations. The majority of policies are derived from the UK Government and the Welsh Assembly Government. Energy Plans/Policies have focused on targets but have also introduced various initiatives to aid renewable energy generation and energy efficiency. CERT funding and the Feed in Tariff are just a couple of the initiatives which will help the municipalities meet their CO_2 reduction targets.

2.3.10.2 RES situation

2.3.10.2.1 RES projects

Powys has no special Photovoltaic and thermic plants. However there are individual Solar PV panels and Solar Thermal panels on housing and Non-Domestic Buildings. There are currently 5 Wind Power Windfarms with some in construction and in planning. In addition to the Windfarms there are a number of private domestic sized wind turbines up to 15kW in capacity. Hydro Power on commercial scale is linked to the main rivers and existing water reservoirs within Powys. A number of smaller commercial Hydro Power schemes are being created by private landowners. There are the 3 largest Hydro schemes in the County as well.

For more information about mentioned RES projects, examine Table 7 for Powys region.

2.3.10.2.2 Energy saving projects

The only comprehensive energy saving project provided by UK partner was a project, which is aiming at CO_2 reduction and it is a public project called “CO2i scheme”. Partial energy saving projects consists of standard things like windows and boiler replacements, roof and wall insulations etc.

2.3.10.2.3 Current situation

On the current situation and potential of RES, almost no information was available.

2.3.10.3 Good practices

2.3.10.3.1 Good practices selection

A number of Best Practice initiatives have been applied within the Municipality. The CO2i scheme is Council and Government funded and provides a one stop shop to gain energy advice and access to grants for residents. A helpline set up gives residents energy efficiency advice and distributes grant funding. The Green Valleys scheme is a community based scheme that has helped install community owned and private owned renewable energy systems.

Good practice for utilisation of renewable energy source and good practices for energy saving are both covered by mentioned CO2i scheme - the initiative, which provides grants and advice to customers from Powys on Energy Efficiency and renewable energy generation in the home.

Good practice for CO_2 reduction is the Green Valleys Initiative. It is a local group, which set itself up to lower Energy Consumption and install renewables in part of the Municipality. Community Hydro power schemes have been installed along with Housing Efficiency works, including Insulation and PV installations.

2.3.10.3.2 Supportive tools

A revenue support subsidy is available to all residents and businesses to support renewable electricity generation through the Feed in Tariff. The rates available will be reviewed in April 2012. In April a new support system for heat generating renewables will be available.

A national advice line is available to residents where access to qualified advice is available in energy efficiency and renewable energy generation. The businesses and Carbon Trust advice is provided through the Carbon Trust. This will be an important and useful tool during the promotion of the C of M.

Grants are also available to residents for energy efficiency; this is increasingly aimed at the most vulnerable residents such as Old Age Pensioners.

National support to energy sustainability is represented by Feed in Tariff (and Renewable Heat Initiative). The Feed in Tariff was introduced on April 1st and is a revenue support system for Electricity Generation, providing an income for every kWh produced. The feed in tariff is currently under review as part of the Governments spending review, however details on its future will of course be confirmed in late October. The estimated paybacks for renewable energy installations subject to the feed in tariff are around 7-8 years. With additional costs such as consultant fees this is likely to increase to 10 years. This will therefore equate to a return of 10%. A support system for renewable heating will come in being in April 2011. Called the Renewable Heat Initiative it will support biomass, solar heating and anaerobic digestion works.

A list of some grants / subsidies for CO_2 reduction:

- Energy Saving Trust (national) provides advice and publicity in CO_2 reduction. A freephone advice line is provided to all residents of the UK.
- CO2i Scheme (regional) is a grant to Powys residents to undertake energy efficiency works in their properties. A total of £300 is available to fund energy saving measures. In addition a No Interest loan is available.
- Home Energy Efficiency Scheme (HEES) Wales (regional, to be replaced by the Fuel Poverty Scheme in April 2011). This scheme provides grants to residents of Wales to undertake energy efficiency works. The fund focuses on supporting Old Age Pensioners and persons on income benefits. Up to £5,000 is available.

For more comprehensive information on specific supportive tools mentioned above, see Table 12 of Powys.

2.3.11 Romania

Romania participated through the Centru region, which lies in the centre of the republic and is NUTS 2 level. Romania has a wide range of primary energy resources, but in small amounts. The Romanian Energy Strategy for the period 2007-2020 shows that the non-renewable resources potential, excluding Uranium, is estimated at 929 tons. The most important resources are represented by coal deposits, ensuring energy stability for the long term. It is estimated that the hydrocarbon reserves (gas and oil) will be exhausted by the end of 2020.

Centru Region has a significant energy potential, which is partially capitalised through the two fossil fuelled power plants and through hydropower plants. The total installed power at regional level is approximately 1660 MW (8% of the installed power at national level) out of which 30% is hydroelectric energy. Energy production of Centru Region totals about 4200GWh (7% of the national production), with a 27% share for hydro energy.

2.3.11.1 Background

2.3.11.1.1 Energy consumption summary

Energy is a key factor besides capital, labour force and raw materials and plays a vital role in the social and economic development of countries and regions, enabling economic growth and a higher living standard.

According to the latest data at national level, provided by the National Institute of Statistics, the economy accounts for 68% of the total energy consumption, while the residential sector accounts for the remaining 32%. Combined industry and construction sector share is 37% of the energy consumption, the transport and communication sector ranks second place with 21%, while agriculture has the lowest share (approx. 1% of the overall energy consumption).

2.3.11.1.2 CO_2 emissions summary

According to data gathered in 2009, more than half (52.44%) of the amount of CO_2 and other contaminants emitted into the atmosphere, with negative impact on the environment, is produced by the industry sector, followed by the residential sector with 35.90% for CO_2 (36.90% for all contaminants). Another factor contributing to air pollution at regional level is represented by the emissions resulting from domestic and transit traffic, which is 9.53% for CO_2 and 10.53% for all contaminants. The smallest amount of CO_2 and other contaminants emitted into the atmosphere belongs to the agricultural sector, only 0.02%.

2.3.11.1.3 Target region RES potential

Centru Region has a significant potential for capitalizing on its renewable energy resources. The highest percentage is occupied by biomass, followed by solar energy, both renewable energy sources having an almost uniform geographical distribution.

Centru Region realized its first strategic document in the field of renewable energy in 2010. This document is the “Strategy of Centru Region in the field of Renewable Energy 2010-2020” and it was realized by the Regional Development Agency together in the frame of an international partnership. This strategy will be completed by a Joint Action Plan in the field of Renewable Energies for the period 2011-2016.

In Centru Region a special attention is given to research, technological development and promotion of RES, and for this purpose partnerships are being developed between the research, private and public actors.

The costs of the technologies based on non-conventional energy sources are still expensive and require the development of support policies through grants or other subsidies, available for individual consumers, local authorities and businesses.

2.3.11.1.4 Plans and regulations summary

Despite the positive developments in recent years, the municipalities in Centru Region are still lagging behind other European municipalities as regards the reduction of energy consumption. Industry and transport are among the most energy intensive economic sectors, which along with the residences make 90% of the total energy consumption.

Only 4 municipalities from Centru region are members of the Covenant of Mayors and, hopefully, at least other 4 local communities will join the CM with the support of ENESCOM project.

Currently, several small projects for thermal rehabilitation of buildings (schools, public buildings, blocks of flats etc) or large scale programs ("Casa Verde") are being implemented in numerous urban areas as well as other projects aiming at shifting the way of energy production at micro level from traditional fossil fuels to "green energy". All these actions lead to a reduction of overall energy consumption and have a positive impact on the environment.

The lack of local and regional strategies and action plans for energy could be a major problem in the future for achieving a coherent development taking into account the major importance that energy plays in every sector and field of economic and social life of a community.

2.3.11.2 RES situation

Although there are two municipalities in the examined Centru Region (Zlatna and Cugir), the RES situation was examined for Centru Region and therefore for both municipalities altogether.

2.3.11.2.1 RES projects

Centru Region implements several solutions for the capitalization of RES, except for wind. Only Alba County implements two projects for the capitalization of wind potential. Also, wind potential studies are being realized for the areas of Avram Iancu and Bistra-Zboru in order to give foundation to the setting up of two wind parks that will have an installed capacity of 70 MW and 9 MW. Among the regional renewable resources, biomass and hydro energy have the highest degree of recovery, and the highest potential. Micro hydro plants are functional in most parts of the region while biomass is being capitalized especially in Covasna County.

List of RES projects for Centru region follows (more information about mentioned RES projects can be found in Table 7 of Centru region).

Solar plants:

- Electricity supply system sheepfold at Margini - Pianu Village
- Green Energy Independent University Campus - GENIUS

Thermic plants:

- Biomass – Two powerplants; electric and thermal
- The thermal power plant operating with sawdust, in Intorsura Buzaului, realised in the frame of the „Rumeguş 2000" project
- Thermal power plant operating with sawdust in Vlăhița, Harghita County
- Thermal power plant operating with sawdust in Gheorgheni, Harghita County

Water plants:

- Rehabilitation of two micro hydropower plants on the river Feneş
- 7 micro hydropower plants (private projects)
- 12 hydropower plants (public projects)

2.3.11.2.2 Energy saving projects

Several projects have been developed in Centru Region, having the main objectives:

- to reduce the energy consumption
- to provide energy independence
- to reduce the CO_2 emissions

Most of the projects are managed by public institutions.

A list of energy saving projects for Centru region follows (more detailed information about mentioned saving projects can be found in Table 8 of Centru region).

Comprehensive energy saving projects:

- The Thermal Rehabilitation of Residential Buildings Program developed by the Ministry of Regional Development and Tourism
- The Green House Program, which aims to install heating systems using renewable energy, including the replacing or supplementing of traditional heating systems.

Partial energy saving projects:

- Development of management and monitoring programs for the fuel consumption in auto parks with more than 25 cars
- Thermal rehabilitation of ground floor commercial spaces, offices and headquarters located in buildings
- Introduction of energy management systems to reduce consumption by 30% between 00.00h -06.00 h / on the main road arteries
- Recovery and utilization of landfill gas in Târgu Mures.

2.3.11.2.3 Current situation

The total renewable energy potential at national level is 615,417,813.64 GJ/year. The greatest potential is held by biomass (295,195,000 GJ), followed by hydropower potential (252 million GJ or 70 TWh /year). The value of the hydro energy potential is calculated based on the theoretical potential of the Romanian rivers including the potential of the Romanian Danube, from which the arranged technical potential is 144,000,000 GJ or 40 TWh/year (2/3 given by the interior rivers and 1/3 by Danube). The Micro – hydro-energy arranged technical potential is lower than the theoretical one, its estimated value being 3960 GJ with a production of 3600 GWh/year.

Centru Region has an important agricultural potential, including biomass that could become in a short period of time a net contributor to the energy balance of the region. The waste resulted from wood processing is also important in terms of energy potential. According to a study by ICEMENERG SA and published in 2006, the energy potential of biomass in Centru Region is lower than in other regions (except for Bucharest-Ilfov), amounting to 20.277 million GJ, from which 4.559 million GJ represents the potential of forest biomass. Mures and Alba are the counties with the greatest biomass energy potential, owning almost 60% of the exploitable potential of Centru Region. The forest biomass reaches 71% of the total biomass in Harghita County and significant shares in Covasna County and Braşov County. Analyzing the map elaborated by ICEMENERG SA, illustrating the geographic distribution of available agricultural biomass with energy potential, it was found that the poorest counties in Romania, regarding these types of resources, are Braşov Harghita and Covasna, which accumulate together 203,000 tonnes.

2.3.11.3 Good practices

Since Table 12 for Centru region was provided at municipal level (for Zlatna and Cugir), supportive tools were examined on the municipal too. Because these municipalities are, on the other hand, more or less similar, they are treated together in this subchapter. Table 13 was provided for the whole Centru region.

2.3.11.3.1 Good practices selection

Good practices for utilization of renewable energy sources:

- "CDI Institute - High Tech products for sustainable development PRO DD" is a project developed by Transylvania University of Brasov. The main objective of the project is to develop the Institute for research-development-innovation: high tech products for sustainable development. The main topic of the Institute is energy including here: energy saving, energy efficiency and renewable energy systems. An energy independent Campus will be created as a model for utilisation of sustainable energy concepts in construction.
- In the city of Întorsura Buzăului (Harghita County – Centru Region) the heating plant functioning with fossil fuel was replaced in 2004 with a boiler fuelled with sawdust and wood waste. The same project was implemented in two other localities of Harghita County: Gheorgheni and Vlăhița. The project cost was 2.7 million.
- The helical-type wind turbine with vertical axis invented and produced by SC FINEX SRL Brasov can be used successfully in isolated areas, not connected to the electrical grid, or for supplying the main energy network with electricity.

Good practice for energy saving:

- The passive house developed by SC Folex SRL is an innovative technology for energy saving combined with utilisation of renewable energy resources. The research activity is conducted by the company. Innovative products and solutions for passive houses can be provided in Centru region using solutions adapted to local conditions.

Good practice for CO_2 reduction:

- Replacement of the exceeded lifespan auto fleet with new, low fuel consumption vehicles and / or hybrid concepts.

The projects presented were initiated by regional authorities and public institutions but also by private companies, aiming to use renewable energy sources and promote innovative solutions for the reduction of energy consumption and CO_2 emissions. The project developed by Transylvania University of Brasov is a key initiative aiming to develop the research infrastructure in the field of sustainable energy. It also represents a good practice example for the implementation of the sustainable energy concept in the architecture and functionality of the institute's buildings. Also, notable are the initiatives of the local authorities which are implementing solutions in order to achieve energy saving by using RES. The private sector also presented some examples of good practices such as the passive house designed by SC Folex SRL Aiud. This company has performed research activities and products development in the field of passive houses. Another example of good practice is represented by SC FINEX SRL Brasov who designed a wind turbine with a vertical helical axis that can be used for supplying individual houses with renewable energy, at low cost and high effectiveness.

2.3.11.3.2 Supportive tools

A list of some grants / subsidies for energy sustainability:

- Casa Verde (Green House)Programme, which aims to stimulate individuals to use heating systems based on renewable energy (including replacing or supplementing traditional heating systems). Individuals may submit their grant applications to county agencies for environment protection in the localities in which they reside.
- Sectoral Operational Programme for Economic Competitiveness having as specific objectives to increase the energy efficiency and to stimulate sustainable energy. In consequence, it is aimed to reduce the energy intensity by 40% by 2015 compared with 2001 and to reduce the pollution generated by the energy sector.

A list of some grants / subsidies for CO_2 reduction:

- Programme for Thermal Rehabilitation of buildings developed by the Ministry of Regional Development and Tourism
- Sectoral Operational Programme for Increasing Economic Competiveness. Priority Axis no. 4, increasing the energy efficiency and the energy supply security in the context of fighting climate changes. Major Field of Intervention no. 4 Exploitation of renewable energy resources.
- Priority Axis no. 4, improvement of energy efficiency in the context of fighting climate change. Major Field of Intervention 4.1 Sustainable efficient energy (improvement of energy efficiency and sustainable environment development of the energy system)

For more comprehensive information on specific supportive tools, see Table 12 of Cugir and Zlatna municipalities.

2.3.12 France

France participated through the one target NUTS 2 region – Brittany (Bretagne), which occupies a large peninsula in the north-west of France. This region produces very little energy relative to its consumption - the region imports more than 92% of its needs and therefore there is strong energy dependence. Moreover, its distribution system is also fragile. The regional production is mainly electric, from water power, and represents 6% of the regional consumption of electricity.

2.3.12.1 Background

2.3.12.1.1 Energy consumption summary

Brittany produces very little energy in relation to its consumption; the region imports more than 92% of its needs. Moreover, its distribution system is also fragile. The regional production is mainly electric, from water power. In 2008, the final energy consumption of Brittany reached 7 090 ktep which represents 4,4% of the national consumption for 5% of the national population. The two principal sectors of consumption are Housing & Services (43%), and Transport (37%). The weight of industry is lower than the average of France, whereas the weight of agriculture is higher, due to intensive livestock production and greenhouses.

2.3.12.1.2 CO_2 emissions summary

Brittany does not escape from global climate change: in the last years, data demonstrated a tendency to warming in the region. Nowadays, the emissions of CO_2 linked to the energy consumption represent nearly 16 Mt. It has increased greatly in the last 20 years, but it seems to be decreasing lately. However, this decrease is also due to the use of electricity, which, in France, comes from nuclear plant in its major part and generates other important environmental impacts. The emissions are mostly produced by transport and

housing. Industry is relatively less important than the national average, whereas agriculture has a higher weight. Solutions are, for example: development of carpool, collective transport, telecommuting, agro-fuels, electric cars etc. These solutions are interesting but the focus should be put on spatial organization, urbanism and economic development, which are closely linked to the whole problematic.

2.3.12.1.3 Target region RES potential

The major part of Brittany production comes from wood heating and hydroelectricity. In the last years, there has been a very important development of wind plants and solar energy. There is still a high potential in these two sources, due to the geographical situation for the wind. Other sources are being investigated, such as off shore wind plants and sea turbines. The regional authorities have decided that the production of clean electricity in Brittany will have to reach 20% of the regional final consumption till 2020.

But the problems of the cost and return on investment, and of the social acceptability, represent a constraint that can prevent the development of new projects.

However, the issue of producing energy is so important for the region that each project should be considered, ever so in what are regarded as renewable energies.

In the regional context of very high energy dependence, each project of production of energy should be analysed with interest by the local actors, associating as soon as possible the concerned populations. The regional production of energy being so low, each initiative, beyond social acceptability and controlled environmental impacts, should be facilitated, from the tiniest one (solar panel for a house) to the biggest one. However, projects of production must not hide the fact that the priority should be on the evolution of our ways of consuming and our development models.

2.3.12.1.4 Plans and regulations summary

In Brittany, from the national to the departmental scales, at least 15 different programs and regulations are listed, and this list is not totally exhaustive. When the fact is added that for each program, there are various factors involved, it underlines the diversity of it all. This diversity, from one side, demonstrates the interest in the energy and climate issue, but, on the other side, generates cross-over and a lack of global efficiency. However, the implementation of the Territorial Climate Energy Plans seems to be quickening the process. Even if few communities have already realized it, most of them are in the project. Then, the need for local guidance appears clearly as they don't how to do it. In the context of economic crisis, the permanence of the incentives existing (buying price of RER, support for investments, etc.) is questioned, and there is a risk to see a decline in the national objectives related to the environment and energy, as already shown in the Grenelle 2.

2.3.12.2 RES situation

2.3.12.2.1 RES projects

From 2002, there is a development of RES in Bretagne, but their contribution to the energy production remains low. The territory benefits from opportunities with the sea and the coast/ wind.

A list of RES projects for Brittany follows (more information about mentioned RES projects can be found in Table 7 of the respective examined region).

Solar plants:

- 6 cases of photovoltaic panels on public tertiary building, building of social association, municipality factory floor, public school, research lab building and social housing.
- Photovoltaic farm with 30 ha of photovoltaic panels

Thermic plants:

- 8 plants burning wastes
- Geotexia - construction of methanogenesis plant using pork farming liquid manure and food processing industry by-products.
- 2 biogas plants
- 30 boilers using torn wood (21 local authorities, 7 industrials)
- 4 waste incinerate plants

Wind plants:

- 13 installations already realized
- 17 installations in progress (with building permit)

Water plants:

- Usine marémotrice de la Rance. It works with the power of the ocean tide. It needed the construction of two dams (one meeting 750 meters and the other 332.5 meters).
- Projet Parc Hydrolien Paimpol-Bréhat (ocean hydraulic). Experimental project decided in 2008 and which will begin working in 2012
- 21 small water plants
- 2 dams
- Plant of Pont-Rolland

2.3.12.2.2 Energy saving projects

List of energy saving projects for Bretagne region follows (more detailed information about mentioned saving projects can be found in Table 8 of the respective examined region).

Comprehensive energy saving projects concerns especially low consumption constructions and are of following types. These projects are in progress and some of them are public:

- Restructuration de l'école publique (public school)
- Maison Martin (Housing)
- bureaux (Offices)
- 68 logements (Housing)
- siège IEL (enterprise)
- groupe scolaire (school)
- lotissement Hector Berlioz (Housing)

There are many more projects of new buildings than of requalification in the territory, due, from one view, to its high cost.

2.3.12.2.3 Current situation

Brittany produces all the renewable energies it consumes. This production represents 3% of the national production. (à voir les perspectives à 2020: tendances/ maîtrise, dans l'ouvrage du CESR "Pour une approche concertée des politiques énergétiques en Bretagne).

2.3.12.3 Good practices

2.3.12.3.1 Good practices selection

For Brittany, good practices are based on local concentration with all the actors involved, and on the fact that these practices not only allow more energy efficiency but provide other services or benefits for the territory: employment, environmental benefits (from the role of the hedges as an example in the wood energy), financial savings for the users, etc.

Good practice for utilisation of renewable energy source is represented by SCIC ENR Pays de Dinan: it is a cooperative with a special status that allows involving public and private stakeholders. This company deals with the production and consumption of wood energy at a local scale. For the production, they are in charge of applying plans to manage the vegetal hedges. They also manage a platform to stock the production and then distribute it to the consumer. Eventually, they guide public investments in wood boilers. For example, in the school of Plénée Jugon which has invested in a wood boiler and is supplied by the SIC, it has permitted use of the wood produced in the local area and to reduce the energy bill in 30%.The SCIC involves 4 kinds of partners: the workers of the cooperative, the farmers and owners of forests, local communities and representatives of the civil society, professional (heating engineer, agriculture, etc.). The originality of this form of cooperative is that it allows a collective decision making and internal democracy, and that facilitates the creation of innovating projects with a high involvement of the local stakeholders and social acceptability. Moreover, what is interesting is that the production and consumption of this renewable energy is local, and that it contributes to another environmental service for the territory: to maintain the hedges that have a key role for the water quality, the landscape, etc.

Good practice for energy saving is represented by Vir Volt program - example of one action called "Managing our energy consumption", of requalification in the private housing (30 houses or apartments), piloted by a municipality with the involvement of a district association (Ville de Binic): awareness raising, making baselines data of the houses and guidance for the investments and the search of financial supports. In 2009, 8 families had been involved for one year in the program, all having made a baseline with the help of the local Energy Agency. Then, 4 already were already investing (changing windows or heat systems, insulation, etc.).An ecological loan with no interest was implemented at the same time to facilitate investments. Another good point of this initiative is the link between the municipality and a local association, which makes it easier to involve people.

Good practice for CO_2 reduction is represented by CUMA Ménergol - Plant of production of rapeseed oil in St Gouéno: a farmer's cooperative. It reunites 40 farmers, who produce rapeseed. It opened in 2007, and its capacity is for 1200 ha of rape culture. Nearly half of the farmers use the oil for their tractors and all can use the oilcakes for animal feeding. Between 15 and 20 farmers use the rapeseed oil in their tractors which have been transformed to use 100% this oil or 30% mixed with diesel. Moreover, the price is very interesting as it costs them 0,45 €/liter when the diesel (without taxes for farmers) costs them more than 0,90 €/liter (these data are different regarding the years).Complementary to that

initiative, some farmers made a study to define a better production system, to have higher energy efficiency, from their culture. It appears that a sustainable way of production, using less chemicals, is quite efficient.

2.3.12.3.2 Supportive tools

A list of some grants / subsidies for energy sustainability:

- Photovoltaic electricity
- Thermic Solar
- Low Consumption Building (Bâtiments Basse Consommation: BBC)
- Management of public buildings and saving energy
- Buy-backs rate of renewable energy

Grants / subsidies for CO_2 reduction are represented by Wood Energy Plan for Brittany.

For more comprehensive information on specific supportive tools, see Table 12 of appropriate country.

Most of these tools are focused on energy sustainability, few of them directly on the CO_2 issue. And, in energy sustainability, it appears that RER are more helped than saving energy. They allow the municipalities to get grants for assessment and most of all for exemplary equipment. So, eventually, there is little direct support to material investments, unless for the RER.

2.3.13 Croatia

Since Croatia is not part of EU yet, it participated through whole NUTS 1 level region – Croatia itself. One of the country parts, the Istrian County, is examined closely on the regional level.

2.3.13.1 Background

2.3.13.1.1 Energy consumption summary

The final energy demand for year 2008 increased by 2.2% in relation to year 2007. The increase was recorded in the consumption of natural gas, electricity, and fuel wood. The biggest increase, described in percentage, occurred in consumption of natural gas and was 9.9%. The use of electricity in year 2008 increased by 4.9%. The consumption of coal and coke dropped by 1.4%, the consumption of steam and hot water dropped by 1.3%, the consumption of liquid fuels dropped by 0.5%.

2.3.13.1.2 CO_2 emissions summary

CO_2 emission in Croatia is considered to be relatively low, which is due to the abundance of hydro-energy, the widespread use of firewood and the lack of coal. Croatia has always been aware of the need to protect the environment and thus decrease CO_2 emissions; in 1992, it ratified the Vienna Convention and the Montreal Protocol on the protection of the ozone layer. In 1996, Croatia ratified the United Nations Framework Convention on Climate Change (UNFCCC) and in that way joined a global network for fighting climate changes with the primary focus of decreasing the level of CO_2 emissions. Furthermore, Croatia also

endorsed the Kyoto protocol which is now the primary guideline when it comes to regional environmental and energy policies.

2.3.13.1.3 Target region RES potential

Croatia's potential for the renewable energy sources is very strong, but it is in the beginning of development. Hydro energy and biomass are being used, especially in the production of heat energy, while sun and solar energy are barely mentioned. Furthermore, geothermal energy together with sea and tidal energy can also be used as the means to produce energy in Croatia.

At the moment Croatia has 103,55 MW facilities for production of electrical energy by the means of renewable energy sources. On each square meter in Croatia, the insulation of Sun is between 1300 and 1800 kWh on a yearly basis, which basically means savings of 130 to 180 litres of oil or gas. Considering wind power; preliminary estimates say it is possible to produce 1300 MW, 3 TWh/a in the Croatian coastal regions. There are around 50 projects currently in progress which measure wind power on the Croatian territory.

Considering Croatia’s large potential for the renewable energy resources, we can conclude that they are insufficiently and ineffectively used. Current installed capacity is insignificant and should be at least doubled in the next few years. There are a lot of hydro plants across Croatia, but they are mostly considered small and not very productive. On the other hand, Croatia is thought of as being one of the sunniest places in Europe which contributes to the fact that solar energy should be more seized on and invested in. Although renewable energy sources are considered to have very high start-up investment costs, they are also proven to produce high benefits for the community and the environment on the long term scale.

2.3.13.1.4 Plans and regulations summary

All the pertinent energy policies and plans are found at a national level. The development of the energy market in Croatia began in 2001 with the establishment of the Energy Law intended to regulate the measures to ensure a secure and reliable energy supply. The Republic of Croatia has committed within the negotiation process for European Union (EU) membership to transposing the requirements of the Energy end-use efficiency and energy services Directive into its legislative framework. This commitment was fulfilled in December 2008, when the Act on Efficient End-use of Energy was adopted by the Croatian Parliament. Moreover, in October 2009 a new Croatian Strategy for Energy Sector Development was adopted by the Parliament and it strongly promotes increase of energy efficiency in all segments of the energy sector, especially in the final energy demand and primary energy production sectors (in power generation facilities design and operation stages). The Strategy considers energy efficiency as an additional and new source of energy and as a basic permanent, long-term principle applying to the functioning and development of the energy system. The primary goal of the Strategy is to reduce the energy consumption by implementing cost-effective measures of energy efficiency.

2.3.13.2 RES situation

Since Croatia is not yet part of the EU, please bear in mind that data provided in this subchapter are comprehensive data for whole of Croatia and therefore they are more or less national data.

2.3.13.2.1 RES projects

Wind plants are the most numerous renewable energy source projects. According to the Croatian Registry for renewable energy sources and cogeneration, until the end of 2008, 108 projects have been recorded at the registry.

A list of RES projects for examined region follows (more information about mentioned RES projects can be found in Table 7 of respective examined region).

Solar plants:

- Instalacija "Pozdrav Suncu", which consists of three hundred multi-layered glass panels set flush with the stone-paved promenade in a circle diameter of 22 meters

Thermic plants:

- Projekt proizvodnje energije iz biomase na području općine Brinje. Biomass production of electrical and heat energy.
- Županijski centar za gospodarenje otpadom „Kaštjun“ Pula. Development of a modern vast system which will serve the needs of more than 200,000 residents of the Istrian peninsula.

Wind plants:

- VE Ravna 1, wind farm with 7 wind turbines.
- VE Trtar – Krtolin, wind farm with 8 wind turbines.
- VE Jasenice, wind farm with 40 wind turbines.

Water plants:

- MAHE Roški slap, small waterfall hydro plant
- Mala hidroelektrana Krčić, small hydro power plant
- Around 25 functional small water plants

2.3.13.2.2 Energy saving projects

No specific data regarding energy requalification on buildings were found for Croatia. The projects described below were found on web pages regarding green building.

A list of some energy saving projects for Croatia follows (more detailed information about mentioned saving projects can be found at Croatia Table 8).

Comprehensive energy saving projects:

- Solarni krov Kadina Glavica, photovoltaic roof installations
- Sveučilište u Splitu. This is a University Library. It has a dual ventilated glass façade, central air conditioning chamber with a recovery / regeneration and secondary system heat pump air-water (waste heat recovery air coming from the underground garage), building supplies thermal energy for heating and cooling, central control system with remote power management and automated system for managing protection from the sun.

Partial energy saving projects:

- HEP DP Elektra Koprivnica. This is a newly reconstructed office building in Koprivnica with thermal insulation envelope and windows with built-in switches for a local control heating and cooling system.
- Srednja škola Duga Resa. Reconstructed building with new windows replacements, new boiler using heating oil for increasing energy efficiency, recirculation pump system etc.
- Gimnazija Bernardin Frankopan. This is another reconstructed building with new windows, modernized heating system, thermostatic control sets, recirculating pump system, modern electric system etc.

2.3.13.2.3 Current situation

According to the Ministry of Economy, L&E there is high potential for wind sources especially on the south east Adriatic coast, where the prevailing wind is more constant. The sun is also a renewable energy source with high potential given the good value of sun days per year in Croatia.

2.3.13.3 Good practices

Since Croatia is not yet part of the EU, please bear in mind that data provided in this subchapter are comprehensive data for whole of Croatia and therefore they are more or less national data.

2.3.13.3.1 Good practices selection

In a number of Croatian counties there has been several activities intended to improve energy efficiency, to reduce CO_2 emissions and to adopt renewable energy sources. Those projects have already generated positive results in energy savings and CO_2 reductions.

Good practices for utilisation of renewable energy sources:

- Wind energy project: Trtar-Krtolin windfarm. The primary benefit of the project has so far been ecological because when the project began, wind power in Croatia was not commercially viable, although this is now changing. Enersys estimates that 29,585 tonnes of CO_2 emissions are potentially avoided by the annual operations of the windfarm.
- Solar energy project: Stilin solar project. The solar project consists of 190 monocrystal HIP solar photovoltaic modules made by Sanyo Electric Co. The project prevents around 21 tonnes of CO_2 emissions per year, in addition to preventing other emissions resulting from the transport and combustion of fossil fuels.

Good practices for energy saving:

- Efficient public lighting system project. The beneficiaries are local self-governments. Better quality of lighting, energy savings obtained, luminous pollution reduced and money saved. Energy savings are about 30 - 50%.
- Sustainable building project. Beneficiaries are mostly local and regional self-governments (schools, kindergartens). Improvements were building envelope insulation, efficient windows (with low-E glass) and integration of RES systems. Energy savings are around 40 – 80%

Good practice for CO_2 reduction is a Fuel switching project, where liquid fossil fuels are substituted with natural gas or LPG. CO_2 emissions are reduced and there is contributed a better air quality as well. Energy savings are around 20%.

2.3.13.3.2 Supportive tools

In 2003, the Ministry of the Economy and the Ministry of Environmental Protection and Physical Planning of the Republic of Croatia, consulted with the Energy Institute Hrvoje Požar, established the Environmental Protection and Energy Efficiency Fund.

It is a structured extra budgetary fund which finances projects and activities in three areas:

- Environmental protection
- Energy efficiency
- Renewable energy sources

The financial aid available for the regional and local self-governments from the Environmental Protection and Energy Efficiency Fund is only up to 230,000 Euro. Further studies need to be prepared with the main objectives of gathering the existing information on potential financing areas, to associate available financial mechanisms with projects, to take into account existing financial support mechanisms for energy efficiency and the use of renewable energy sources so that they can adequately supplement the fund and avoid collision with its financing programmes.

A list of some grants / subsidies for energy sustainability and CO_2 reduction:

- Environmental Protection and Energy Efficiency Fund. This is the first and only extra-budgetary fund dedicated to financing environmental protection, and RES projects, programs and other related activities in Croatia. On the basis of the public invitations of applications announced by the Fund every year, financial resources can be allocated to local and regional self-governments and to legal and natural persons that invest their own financial resources in projects for which tenders are Issued.
- Croatian Bank for Reconstruction and Development (CBRD). On the 4th February 2005 the Environmental Protection and Energy Efficiency Fund and the Croatian Bank for Reconstruction and Development (HBOR) signed an Interest Rate Subsidy Agreement for loans intended for environmental protection, energy efficiency and renewable energy resources projects.

For more comprehensive information on specific supportive tools, see at Croatia Table 12.

2.3.14 Portugal

Portugal participated through one target NUTS 2 level region – the Lisbon district.

Lisbon is a region in constant change, attaining centres of innovation and technological development, the growth of competitive industries, the growth of a tertiary sphere - capable of responding to new challenges, including the modernisation of its two harbours, logistics platforms, deployment of the new international airport, and connecting to the European high-speed network.

Portugal (and the Lisbon region) is highly energy dependent. In a context of increasingly expensive energy, this is one of the most serious problems Portugal is currently facing and it is also one of the causes of the general crisis that has shaken the Portuguese economy and society.

2.3.14.1 Background

2.3.14.1.1 Energy consumption summary

The Transport sector is the leading sector in the Lisbon District region with 80.96% of energy consumption. It is followed by the Housing and Tertiary Sphere sectors, which in total, are only 16.27%. Energy consumption for the Agriculture and Industry sectors are only minor for the Lisbon District, about 1-2% each.

2.3.14.1.2 CO_2 emissions summary

In Portugal, and particularly in Lisbon, the biggest consumer of energy and CO_2 emissions is the transport sector. The main factor that contributes to CO_2 emission in Lisbon is Transport, representing 39.08%, Industry – 33.12% and the Tertiary sphere – 16%. Agriculture contains a very small number of CO_2 emissions and carbon dioxide, because Lisbon is a consolidated urban area with low agriculture activity at the present time. The main contaminant in the housing sector is carbon dioxide with 11.80% of total contaminant emissions for this sector.

2.3.14.1.3 Target region RES potential

Lisbon district has good conditions for renewable energy sources like wind, sun and biomass.

Regarding solar energy, investment costs are still too high.

Regarding wind energy, there are no reliable technical studies for the implementation of wind power.

When considering biomass, the high costs of forest management and where there is no market for waste, it is logical consider the actual existence of difficulties in collecting waste for marketing, and the fact that there are no specific laws for waste exploitation. It is important to generate business dynamics that, in association with local authorities, lead to a doubling of current installed capacity.

Regarding water power, new hydro capacity is lacking, big and small, without which it is impossible to take full advantage of water power.

The use of the potential of renewable energy in the Lisbon District to meet Kyoto targets would save on electricity bills, lower energy dependence on other provinces, lower CO_2 emissions and contribute to sustainable development.

2.3.14.1.4 Plans and regulations summary

The existing regulations and plans at the sectorial and geographical levels and their very diverse horizons reveals the coexistence of very different approaches that the municipal and regional authorities bring to the table regarding challenges on the themes of CO_2 reduction and energy efficiency.

2.3.14.2 RES situation

2.3.14.2.1 RES projects

A list of RES projects for the Lisbon region follows (more information about the mentioned RES projects can be found in Table 7 of the Lisbon region).

Solar plants:

- BP Portuguesa (Lisbon) I, II, III, IV and V: implementation of photovoltaic panels in Fuel Station.
- MARL (Mercado Abastecedor da Região de Lisboa): photovoltaic urban with deployment of 27,554 panels.
- BP Portuguesa (Oeiras): implementation of photovoltaic panels in Fuel Station

Thermic plants:

- Triquimica: works with forest biomass and biogas
- Fomentinvest: works with forest biomass and biogas
- Biomass Recovery Plant: running on biogas and belongs to the company VALORSUL - Recovery and Solid Waste Treatment Zone Lisboa SA

Wind plants:

- Fanhões I (6 turbines)
- Almargem (3 turbines)

There are many more projects running in Lisbon, but only some of them were recorded. Lisbon has wagered on wind farms and power photovoltaic and cogeneration.

2.3.14.2.2 Energy saving projects

A list of energy saving projects for the Lisbon region follows (more detailed information about the mentioned saving projects can be found in Table 8 for Lisbon region).

Comprehensive energy saving projects:

- Torre Verde –building called the Green Toweris a residential building with bioclimatic design
- Caixa Geral de Depósitos: Service building bank - new system captures the sun's heat, then heat is transformed into cold (in a process similar to the operation of refrigerators) and is used to cool the air in the space services
- Torre Sul – building called South Tower is the second building of bioclimatic housing integrating the application of passive solar technologies.
- Natura Towers is a project that includes construction of two office buildings, one of which will be the new headquarters of the SPS Group. An office complex which includes, a pioneer in Portugal, unique technology and environmental solutions and a sustainable level of energy.
- Sustainable Rehabilitation Lisbon 2009 aims to promote the extension of the practice of sustainable rehabilitation of the built environment by examining the opportunities for intervention in buildings with rehabilitation needs at the level of energy performance, clarifying procedures and action in every situation.

A partial energy saving project is represented by Building Solar XXI. This project aims to build a technology demonstration building in the area of energy efficiency, renewables and particularly in the use of passive and active solar systems and solar photovoltaic.

The new buildings and major renovations are obliged to be located in the class of energy-efficient performance (between B-and A+). Rehabilitation requalification of 90% of homes by 2021 is achieved with the new PDM Lisbon.

2.3.14.2.3 Current situation

In Lisbon, the potential energy source relies on wind and biomass. There isno potential for energy renewables by geothermic and water sources in the target region.

2.3.14.3 Good practices

2.3.14.3.1 Good practices selection

Implementation of good practices in all sectors is important. Regardless, the implementation of practical measures to reduce CO_2 emissions is the most important for the predominant sector - Transportation.

Good practice for utilization of renewable energy sources:

Residential and Services Sectors: increasing the implementation of systems using solar thermal energy, awareness campaigns and outreach to energy efficiency.

Good practices for energy saving:

- "Campaign Environment + ", which aims at improving the energy and environmental performance of the CCDR (Commission for coordination and regional development), as well as educating through example public administration and regional actors in general
- Residential Sector: renewal of appliances by more efficient equipment - replacement of incandescent bulb lights with more efficient, improved energy performance in remodelled and new residential buildings
- Service Industry Sector: renewal of office equipment for more efficient equipment; performance increase for energy in new buildings and refurbishment services.

Good practice for CO_2 reduction:

Renewal of vehicles circulating in the region of Lisbon and Tagus Valley to more efficient vehicles, an increase in lifespan of tyres and use of the correct pressure, improvement of road transport fuels, improving efficiency in driving behaviour adopted, increased use of shipping, increased use of rail and increasing the energy efficiency of transportation systems.

Most of the good practices of sustainable energy and CO_2 emissions in the region of Lisbon are still being implemented, so there is no publication of final results.

2.3.14.3.2 Supportive tools

There are several incentives for various sectors. Special measures are implemented by government to promote at local level and help reduce, CO_2 and energy consumption with prizes to those who adopt them. These benefits are financial and assignments promoted are a little too bureaucratic.

The list of some grants / subsidies for energy sustainability:

- Operational Programme for the Lisbon Region-2007-2013: promoting rational use of energy.
- Plan for Promoting Efficient Consumption (PPEC) 2011-2012: promote measures to improve efficiency in electricity consumption through measures taken by eligible promoters and intended for consumers in different market segments.

- Financial incentives and tax benefits of local government - City Hall Lisbon: Council tax reduction of real estate, respectively, 25% to 50% of the county buildings that have energy certification of class A or A +.
- Efficiency Credit
- Check efficiency
- Energy efficiency in the Lisbon traffic lights (partnership CML / Lisbon E-Nova): Promote the replacement of incandescent lamps LED lights in traffic signals.
- Energy Efficiency Fund supports projects to reduce consumption: encourages energy efficiency, supports new energy efficiency projects and promotes behaviour changes.
- Solar Thermal Programme 2010

The list of some grants / subsidies for CO_2 reduction:

- Energy and Environmental Strategy for Lisbon (car-pooling): parking spaces in the buildings.
- The Program of the Eighteenth Constitutional Government - Encouraging the scrapping of vehicles at end of life, with tax incentives
- Portuguese Carbon Fund -under European Trade Union Emission

For more comprehensive information on specific supportive tools, see Table 12 of the appropriate country.

2.4 Summary and Concluding Remarks

In this report, 12 partners were presented, while the remaining 2 partners had to be excluded (see chapter 2.2.1.3.1). Each partner was presented in the following different categories:

- Background, where a brief summary of information about each partner is presented on the different topics (Energy consumption summary, CO_2 emissions summary, Target region RES potential and Plans and Regulations summary), which emerged mainly from the preceding reports and analyses.
- RES Situation in the examined region(s), where information about current RES projects and Energy saving projects were provided, together with the current situation in the examined region(s) with regard to RES utilization.
- Good practices, where each of the participating partners provided some scope forgood (or best) practices of RES utilization in the examined region(s). These good practices should help other partners to learn from, or be inspired by, foreign experience to optimize their own projects or to utilize their own renewable energy sources. Good practices were divided into three categories (RES utilization, energy saving and CO_2 reduction), although these categories sometimes overlap. Besides good practice, supportive tools for good practice were mentioned as well.

Information gained this way then can be used by officials on different regional and administrative levels and by the respective authorities and organizations to optimize processes and to extend knowledge in the relevant topics (see chapter 1.1).

Because of data diversity (see chapter 2.2.1.3.3), information provided by partners could not be directly compared, but this was not the main objective of the report. On the contrary, the main contribution of this report lies in the very diversity of the participating partners and the knowledge embedded in their different behaviour and approaches, which itself emerges from different conditions, barriers and opportunities.

2.4.1 Methodological approach

2.4.1.1 RES Situation summary

Referring to the RES situation, the most interesting information was gathered on RES projects and Energy saving projects. There is a brief summation of these two topics in the following Table 2. In this table, we can examine some of the mentioned projects for each partner in the examined countries, regions and municipalities. Please note that these lists are not fully comprehensive and are only based on information provided by the respective partner. Bear in mind also that information presented in this table was tailored to provide brief coverage on situations and to provide simple inspiration for the reduction of energy consumption and CO_2 emissions in the short/medium term.

Table 2: RES projects and Energy saving projects summation

Country	RES projects	Energy saving projects
Italy	electricity production: - hydro, PV and wind plants heat production: - geothermal and solar plants both: biomass plants	promotion of energy saving and rational energy use interventions for energy saving and energy system qualification in enterprises and production units rationalization of local energy transport

Malta	photovoltaic systems wind turbines - not popular (noise)	wind farms and turbines landfill gases waste power plant photovoltaic systems
Hungary	water power plants other RES power plants	organization with many energy management programs
Czech Republic	photovoltaic systems solar water heating system water power plants waste incinerator combined heat power station	heating systems regulations heating systems modernization
Greece	water power plants wind power plants	low interest loans for building interventions photovoltaic installations and feed-in-tariffs buildings reconstruction - insulation, windows, conditioning, systems
Slovakia	photovoltaic systems water power plants	buildings reconstruction - insulation, windows and doors
Slovenia	solar power plants thermic power plants geothermal power plants biogas power plants	plans and programmes for energy savings programme for RES assessment monitoring energy consumption
Poland	water power plants wind power plants thermic power plants biomass power plants waste power plants	buildings modernizations - RES installations - heating systems - insulation
Spain		reconstruction of old buildings (insulation) legal limits for winter and summer temperatures action plan for energy efficiency distribution of low consumption bulbs grant for changing old machines for new "A" ones grant for changing cars for new ones
United Kingdom	individual solar panels wind power plants water power plants	project for buildings modernization - heating systems - insulation etc.
Romania	solar power plants thermic power plants water power plants	programs for thermal rehabilitation programs for heating systems RES upgrade energy consumption monitoring programmes systems to reduce energy consumption at night landfill gas utilization
France	solar power plants biogas power plants torn wood boilers waste incinerators wind power plants water power plants	buildings reconstruction - insulation - energy management etc.
Croatia	wind power plants solar power plants thermic power plants water power plants	photovoltaic roof installations recuperative climatization energy management improvements insulations and windows replacements
Portugal	solar power plants thermic power plants wind power plants	construction of energy saving buildings reconstruction of energy saving buildings cooling systems based on solar energy plans implementing sustainable energy usage obligation on new buildings to energy efficiency

2.4.1.1.1 RES projects

As can be seen above, most RES projects are concerned with construction of RES power plants, with solar power plants being the most popular, followed by reliable water power plants. Wind power plants are the most questionable of the power plants, because of their drawbacks (noise, wind dependency). Biogas and biomass power plants are being used as well, but their construction is connected with biogas/biomass sources in the vicinity. Utilization of thermal energy seems to be very interesting as well, but preliminary conditions are crucial.

2.4.1.1.2 Energy saving projects

Regarding energy saving projects, energy management program implementation seems to be the first good step that not only saves a lot of energy, but also helps to analyse and assess a situation, which will help in making new steps in energy consumption optimization. Another favourite approach is to reconstruct and modernize buildings and thereby lowering their energy consumption, thanks to better insulation systems, energy management systems, heating systems etc. The last (but not the least) part of the energy saving process is the implementing of special plans. These plans can be divided into two categories: plans to increase the education level and awareness concerning energy saving possibilities and their importance and plans to provide a short/medium/long term strategy for implementing special steps in energy saving of a legal, advisory etc. character. As a secondary aspect of the energy saving project may be understood the implementation of RES utilization, which was dealt with in the preceding paragraph of this subchapter.

2.4.1.2 Good practices summary

Attending to good practice, there are many good practices in every country, every region and every municipality. Every partner had to choose the best practice they have in their region in three different categories (RES utilization, Energy saving, CO_2 reduction). A brief summation can be seen in Table 3 (for full explanation, please see appropriate chapter for corresponding partner). This brief summary examination follows.

Table 3: Good practices summation

Country	Utilization of RES	Energy saving	CO_2 reduction
Italy	development of agro-energy installing RES sources in gas stations	creation of ecologically equipped productive areas establishment of guidelines and objectives promotion of the development of plans	map for CO_2 combustion storage
Malta	photovoltaic wind power plants	Covenant of Mayors implementation of energy performance certificate	
Hungary	wind power plants biogas power plant	climate friendly block of flats	energy saving programmes
Czech Republic	new central city heat system - geothermal source	building reconstruction - insulation, RES installations	public transport fuel change - from diesel to gases (LPG, CNG)
Greece	implementing feed-in-tariff - photovoltaic systems	energy saving information campaign	driving behaviour campaign suburban train construction
Slovakia	river dams (water power plants)	wall insulations on buildings, reconstruction of windows and roofs	
Slovenia	biogas reactors		geothermal energy heated greenhouse
Poland	solar systems construction heating systems reconstruction		
Spain	photovoltaic panels implementation solar power plant cogeneration near plant of paper wind power plants	awareness and educations program oriented towards sustainability guide for environmental and energy good practices for citizens and shopkeepers market selling electrical energy public lighting energy saving guide construction of bioclimatic and energy efficient housings guide for citizens to combat the climate change	
United Kingdom	grants for buildings modernization (RES installations, heating systems etc.)		local group RES installations
Romania	energy independent university campus boilers fuelled with wood waste independent wind turbine	passive houses construction	old car fleet replacement
France	organized usage of wood - produced in region for wood boilers	guidelines and awareness for energy management ecological loan with 0 interest	organized rapeseed usage as fuel - instead of diesel
Croatia	wind power plant photovoltaic power plant	public lightning system modernization reconstructions - insulation, windows, RES integration etc.	fuel change - liquid fossil fuels to gases (LPG, CNG)
Portugal	solar energy systems implementation RES awareness campaigns	energy saving awareness campaign buildings renewal - light bulbs, energy management systems etc.	vehicles renewal - tires, fuels, driving behavior increase ships and railroads usage

2.4.1.2.1 RES utilization

When we examine RES utilization practices, we can see that it is all about RES power plant constructions. The most favoured renewable energy is solar energy, which is possible to install in almost every region (this is not the case with other RES). Another advantage of solar energy is the fact that photovoltaic systems can be installed as smaller installations on individual buildings and therefore these installations may be easier to implement from the cost point of view. Water energy is favoured as well, but it is limited by the existence of appropriate water areas. This is the case with wind energy as well. In contrast to photovoltaic power plants, water and especially wind power plants have disadvantages, which may even exclude these projects from realization. There were examples concerning other power plant types (thermal, biogas etc.), but they were not so common. As the most suitable solution for RES utilization there can be thus declared RES power plant construction, with special emphasis on photovoltaic installations, which may be in the form of big photovoltaic farms or in the form of smaller installations with some kind of benefit (lower loan interest, feed-in-tariffs etc.). This can result in construction of energy independent (full or part) buildings, as can be seen in the example of an energy independent university campus in Romania. All these activities should be supported by awareness campaigns.

As special examples of best practices, we can examine a French project for the organized usage of wood produced in a region for wood boilers or a Czech project devising a central heating system using a geothermal source. Unfortunately, these projects are more or less regionally specific and cannot be easily implemented in other regions. On the other hand, they can be used as an inspiration for similar projects, which will suit otherwise different regional needs.

2.4.1.2.2 Energy saving

Concerning energy saving projects, there are two types of partner behaviour. The first behaviour aims at awareness and information campaigns, education programs and public/private guidance. The second behaviour aims at more direct energy saving projects, especially construction/reconstruction of energy friendly (windows and doors, insulations, heating and air conditioning systems, energy management systems etc.) buildings and regulations for newly constructed buildings. In an example from France, we can point to an ecological loan which is interest-free, which may be another kind of good practice, but is connected with appropriate costs which may not be bearable in other different regions.

2.4.1.2.3 CO_2 reduction

With CO_2 reduction good practices, the situation is similar to energy saving good practices. The leading role of good practices goes to awareness and information campaigns, education programs and public/private guidance concerning greenhouse gases and behavioural impact knowledge. On the other hand, there are some specific projects which should be mentioned as well. For example in the Czech Republic, Romania, France, Portugal

and Croatia, we can see the implementing of alternative fuels and interventions into transport stereotypes as fine indications of good practice. Geothermal energy heated greenhouses in Slovenia should also be mentioned, but again, this best practice is very regionally specific and may not be implemented everywhere – but it can serve as a good inspiration for regions that might consider themselves similar.

Reduction of energy consumption and the CO_2 emissions process

As can be understood from the preceding chapters, the best way to reduce energy consumption and CO_2 emissions is in the implementing of a comprehensive plan which aims to reduce energy consumption and contaminants emissions within a target time period. This plan should consist of a few logical project management steps:

- Analysis (factor identification, possibilities, risks and hazards, data gathering etc.)
- Assessment (data evaluation, option possibilities examination and assessment, information implementation etc.)
- Planning (decision-making, responsibilities assignment, strategy development, government implementation etc.)
- Implementation (controls and checks, adjustments, problem solving, monitoring etc.)
- Review (testing, summation, information background, goal accomplishment, reporting etc.)

All these methodological steps are crucial when implementing a plan to reduce energy consumption and contaminants emissions, but they can be adjusted for specific projects, relevant sectors and especially targets.

Based on the preceding chapters, the following projects are considered as very beneficial, with regard to a costs/contributions ratio and wide implementation possibility:

- Creating a public-oriented information campaign with regard to RES, energy efficiency and greenhouse gases emission knowledge.
- Creating a private sector and company-oriented campaign with regard to RES, energy efficiency and greenhouse gas emission knowledge.
- RES power plants construction, especially for solar, water and wind energy. With regard to the regional specifics, other RES power plants (geothermal energy, biogas etc.) should be constructed.
- Buildings reconstruction, especially windows and door replacements and insulations. Secondary construction energy management systems, heating regulations and conditioning optimization. Building passive houses.
- Small photovoltaic systems installations, with an aim to create at least partially energy self-sufficient buildings. May be enriched by other low-energy housing technologies like recuperation etc.
- Construction regulations implementation, with an aim to construct better buildings with lower energy consumption, higher RES utilization etc.
- Transport regulations implementation, with an aim to alternative fuel usage, better driving behaviour etc. Old car fleet renewal.

These methodological steps are in conjunction with the Sustainable Energy Action Plan (SEAP). Bearing that in mind it is important to attend tokey SEAP elements. Government

alignment is important for project realization and the CO_2 baseline emission inventory (BEI) should be realized as well, to monitor an actual situation based on different factors. SWOT analysis can be useful too. This will help to establish and evaluate the current situation. This is a crucial methodological step in implementing plans to reduce energy consumption and contaminants emissions. To analyse a current situation, these methodological steps should be taken:

- responsibilities assignation (HR issues)
- time management
- indicators identification (energy consumption and CO_2 emissions elements, energy production elements, already implemented projects, unwelcome elements analysis and assessment, knowledge base and awareness evaluation)
- data collection
- data analysis
- information summation and conclusion

During the planning process, rational objectives should be arranged. In conjunction with SEAP, such objectives should be according to the SMART management concept, namely objectives should be specific, measurable, achievable, realistic and time-bound.

A serious issue during (mostly, but not only) the implementation process is financing. Appropriate funds should be allocated and efforts should be paid to gather enough financing possibilities to fulfil the project budget. As for sources, these are both public and private along with sources connected with the commercial use of implemented projects. Public-private partnership is a considerable scheme in the realization of bigger projects.

During a review stage all projects should be covered and the information gathered should be summarized, so it can be used for project adjustments and follow-on projects.

As already has been said, the methodology presented in this document is in conjunction with the SEAP document and therefore information gathered in this report should be used as a simple – but not absolute – guideline and help documentation for developing BEI and implementing SEAP for reaching the Covenant of Mayors commitments.

2.4.2 Future research

This report is the third of three reports in the WP2 package of the ENESCOM project. The first report contained a comparative analysis of energy consumption and contaminants emissions of participating partners. The second report contained the census of present Local Plans and Regulations, projects and actions targeting 20 different European regions, in order to provide background coverage on different legislative approaches. This third report helps with the carrying out of general methodologies and quantitative transferable methods for the reduction of consumption and CO_2 emissions in the short/medium term, taking into account Pioneer contributions.

3 Appendix

3.1 Data index

3.1.1 List of figures

There are no figures in this report.

3.1.2 List of tables

3.2 Annex tables and documents