Intelligent Energy Europe

MULTIPLYING Sustainable Energy Communities

Best Practices

Bulgaria, Denmark, Germany, Italy and the Netherlands

Work Package III

(draft) Deliverable 3.5

February 2008

Edited by Paul Paree (municipality of Breda)
Joris Knigge (Ecofys)
Bart van der Ree (Ecofys)

European Commission intelligent energy ieea executive agency

EUROPEAN COMMISSION

Disclaimer

This publication is a combined effort of the participating partners of the European project Multiplying Sustainable Energy Communities (MUSEC).

MUSEC is co-funded by the European Commission through an Intelligent Energy—Europe program.

The sole responsibility for the content of this publication lies with the authors. It does not represent the opinion of the European Community. The European Commission is not responsible for any use that may be made of the information contained herein.

Preface

MUltiplying Sustainable Energy Communities (MUSEC) is a project aimed at the development and implementation of a sustainable energy strategy. This strategy will be based on three main dimensions: adequate energy policies, innovative financing mechanisms and dissemination programs. One of the results of the third dimension is this booklet in which the best practices for municipal climate policy projects, selected by the 7 participating municipalities in Bulgaria, Denmark, Germany, Italy and the Netherlands, are presented.

The purpose of this publication is to serve as inspiration and exchange of knowledge for participating municipalities within the MUSEC project, but also for other non related municipalities or parties. This booklet is for those parties who are in the process of defining or executing sustainable energy and climate policies. The selection of best practices presented is based on the results of a SWOT analysis of ten good practices per country. In the next chapter this subject will be more elaborated upon.

The selection presented here will serve as input for the next phase in the MUSEC-project: to develop a sustainable energy strategy. The best practices can inspire and help the participating municipalities in this process. Examples of application and projects constructed and realised elsewhere could be repeated in its own region. This report is one of the deliverables of phase three within the MUSEC project.

February 2008, Breda, the Netherlands

Index

Introduction

In recent years, a considerable number of European communities have developed interesting activities to promote energy efficiency (EE) and energy generation from renewable sources (RES).
These are communities that have promoted concrete strategies to become Sustainable Energy Communities (SEC). These strategies are based, among others, on the use of the so called "best practices". These best practices can help substantially the dissemination of EE / RES technology at a community level through either:

- Improvement of existing technology
- Tools belonging to policy instruments,
- Market / financing mechanisms
- Awareness raising / communications programs

To become a sustainable energy community, communities need to develop partnerships with relevant local stakeholders to fully develop the SEC strategy within the community.
The MUltiplying Sustainable Energy Communities (MUSEC) project defines a process to develop and implement this ambition and provides tools for support. Within the MUSEC project several work-packages are defined to complete or undertake for a community. One of the phases is the inventory of good examples, or best practices. The best practices selected are reported to the participating MUSEC partners and help communities to develop a sustainable energy strategy. Also the best practices can serve other local and regional authorities to support dissemination of these practices. The examples of best practices represent a wide variety of approaches. But there are many other approaches which could be taken, and this publication aims to stimulate thought rather than provide all the answers

The basis of this publication is exchanging ideas and experiences between the MUSEC partners. Schemes which have worked well in one situation may fit in well in another, or may work with some adaptation, or could not be suitable for a given context. More on this subject is presented in the paragraph “general recommendations” on page 10. The essential basis for dissemination of the best practice is circulating the available information to as wide an audience as possible. Equally important is the ability to contact a counterpart, who has the experience of implementing a scheme, and can discuss informally the benefits and difficulties in implementation, as well as the key criteria for success. For this, each best practice is provided with information regarding contact persons, addresses and project web sites. The more people that see these best practices, the more chance they have of being replicated in other parts of Europe. Whilst the details would undoubtedly change when implemented in a different context, the principles will remain the same – not just the design of the scheme, but its results as well; an action taken on the road towards becoming a sustainable energy community.

Identification of Best practices

The work package three *"Identification and Analyses of Best Practices"* is described as the "core" of MUSEC project and is a fundamental step for the implementation for the subsequent work packages. Its main objective is to identify and analyse a set of best practices that to some degree have been implemented by some communities and key stakeholders. These best practices have been mainly "researched "on local or regional level within the partners belonging to the consortia and also from other communities and stakeholders with which the project partners have been connected to in the past or are still connected. This exceeds the identification of best practices in European databases such as ManagEnergy. Obviously best practices suitable to project objectives have been selected. Having done this, it creates the opportunity to enlarge the network of communities that could be involved directly or indirectly in the project.
Each participating country selected a number (10-15) of good practices. Then specific procedures and schemes to standardise the best practices on "local" level in partner communities are defined. Identified best practices, i.e. the long list, are selected on the basis of a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis in direct interaction with actors which have realized them. According to the following criteria from a set of identified best practices, a short list has been made per country.

- Energy effective
- Environmentally benign
- Economically viable
- Socially and politically acceptable
- Repeatability
- Boosting cooperation

This resulted in a selection of five best practices per participating country. In order to avoid overlapping practices in the shortlist or a too uneven distribution of the best practices over different sectors/categories, the municipality of Breda together with Ecofys have made an overview of the candidates, and checked for evident doubling or overlap, and checked for their distribution over the categories/sectors, such as: new housing, existing housing, public buildings, public lighting, transport, enterprises and agriculture, sustainable energy, climate adaptation. Following, Breda/Ecofys informed the MUSEC partners whether the first candidates were OK or if it would be better to replace some of them by other best practices from the Long List. Lastly Breda / Ecofys combined final versions into this draft final document (this report) and have submitted this to project leader and the MUSEC partners at the third MUSEC meeting at Crailsheim. Also some elements (pictures, quotes from people involved etc) were added. The results were further edited and laid out to complete this document. After discussion and reviews on this draft report, additional input or alterations can be made by the MUSEC participants. The final report of work package three is due by the end of March 2008

Readers guide

On the following pages the reader can find 25 two-page descriptions of selected Best Practices. These have been selected according to the procedure described on the previous chapter. The presentation of best practices is on alphabetical order of the participating countries of the MUSEC project. Each best practices is being described using the following characteristics:

- Summary
- Objectives
- Process
- Financial resources and partners
- Results
- Lessons learned and repeatability

First you can find the best practices of the republic of Bulgaria, second the kingdom of Denmark, followed by the practices of the federal republic of Germany. Fourth the best practices of Italy are presented, and lastly the best practices from the Netherlands.

At the end of this document you can find a draft chapter which is named: “analysis and conclusions” This chapter will list and present the general conclusions and remarks from a scan Breda / Ecofys has made analysing the results. In this chapter general recommendations are given with the goal to enable local authorities to successfully use the Best Practice project examples. These general recommendations come from literature survey. Models and formats cannot be just applied without critical consideration and adaptation to one’s own situation. Some general recommendations can be given regarding best practices and the use of this methodology. These are presented at the following page. On page 64, the reader can find the specific recommendations which are distilled from the presentation of the best practices and the discussions held between the MUSEC partners.

General recommendations

Before the best practices are presented, in this section some general recommendations are listed with regard to the use of the methodology of best practices.

Regional and cultural differences

It is not that easy to successfully use a successful SEC project in another country or situation. Among other aspects, certainly factors like different market situations, energy policies and price levels as well as different mentalities of the population play an important role.

Restricted budget

Adequate aftercare operations and/or support for the target groups in implementing first pilot- and demonstration projects must be planned for from the start, as they have considerable effect on the overall effect of a project.

Networking

It is important to involve a maximum of actors in the best practice projects. Most local SEC actions must be co-operative and participative from the beginning of their conception, in order to make sure that all available important expertise and support is considered and integrated. All levels of the society and the market have to be consulted and accurately involved into an organisational process that grows in a structured manner. The networking, which is very often a hidden and invisible work, is very important to keep up the visible best practice projecting. However, to coordinate many different actors means also a lot of organisation work, which shouldn't be underestimated. All partners should be integrated in all activities and in the information exchange. It is important to define who is responsible for what and to create a clear and simple organisation structure.

Communication

The communication of the targets and the central messages must be very precise and accurate (avoid spreading unrealistic expectations, they usually fall back on to the emitter). The conception of a communication plan including aftercare is advisable.

Project management

The project co-ordinator must be chosen carefully. This party must secure an impartial, objective and participative decision making process as well as provide transparent and professional project management. Interaction, moderation and mediation capacities in terms of personnel and time should be sufficiently considered in the project plan. Also aspects as enthusiasm and perseverance should be taken into account in the role as project manager. Always ensure that there is enough professional personal in charge for the co-ordination. Finally, co-ordinating the establishment of (big) social networks that foster social innovations requires endeavour, convincing power and patience, as well as policy, mediation and conciliation skills.

Timing / window of opportunity

It is not easy to determine when 'the time is right' for a certain action. A project should be planned while taking into account factors like the public level of acquaintance and commitment at a certain time, and technological advancement. For actions involving e.g. renovation, owners of buildings or houses that are close to natural renovation moments will be more susceptible than others.

Policy

The existence of national or regional financial and other incentives can greatly support local actions. Furthermore, if a good local policy is in place this will enhance project success. This includes:

Appointment of a climate coordinator
Involvement of higher decision making levels
Embedding into departmental work targets and plans
Networking on joint realisation of the ambitions, with local and regional parties
Regular progress monitoring

Quality

In large-scale projects only products may be included which have been proven to be reliable in projects for several years.

How to choose a best practice project example

The best practice project descriptions provide good examples of the type of projects that local authorities can include in their SEC strategy and action plans. However, experience has proven that replication of a successful project to another situation will often not work without changes. Therefore, the best practice projects should be used with due caution:

- Select one or more characteristics of the best practices that seem most applicable to your situation.
- Make sure that the actions are consistent with local climate / SEC policy
- Consider them critically; check for points in which your present situation differs from the situation for which the project was successful
- Select actions on their potential / expected CO2 savings
- If necessary, combine elements from different characteristics of the best practices.
- Take contact with the parties involved in the chosen best practice projects.
- Discuss with stakeholders for possibilities to adapt or improve the project concept.
- Make sure that policy makers and management are well informed on the initiative
- Make sure that a clear and committed project leader is identified.

Bulgaria

Competence secure

Summary

The project Competence Secure was targeted to the development and promotion of sustainable mechanism for enhancing the employment among the unemployed technical qualified people in the small municipalities in the Varna District.
It was a project uniting the efforts of seven partner organizations – the Black Sea Regional Agency for Energy Management, two educational institutions, a state institution and three private companies.
Through integrated training approach the project contributed to raising the qualification of 30 unemployed for gaining of experience and skills in evaluation of the energy efficiency of buildings and industrial enterprises in the construction sector thus ensuring the employment of at least 30% of the trainees after the course completion.
The project was financed by the Bulgarian government, BSRAEM own sources and private companies.

Objectives

The overall objective of the project was to promote initiatives for enhancing the employment mainly among the young people in the small municipalities of Varna District and the achievement of balance between demand and supply on the local labor market thus enhancing the adaptability of the unemployed in energy efficiency of construction sector of the region.
The specific tasks assigned within the project were the following:
1. To raise the qualification of the human resources and their employment through provision of accessibility to practical professional education for gaining professional skills in active work, suitability of employment and flexibility thus increasing their chances for employment.
2. To assist and improve of professional educational system through involvement of best practice and experience of the European Union member states.
To guarantee job placement for a part of the beneficiaries for supporting their integration in social and economic life.

Process

The project was realized in the period March – September 2006 in three sets of activities: Survey of the local demand and supply, implementation of the training and promotion of local Initiatives for Employment. During the first stage a detailed survey was made in the eleventh municipalities. The survey was targeted to nomination and selection of 30 unemployed technically qualified people who wanted to be involved in the training course.

The training was implemented in four educational modules: “energy assessment of industrial buildings, basic computer skills, electronic calculation and fundraising”.
The third stage was oriented toward finding solutions of recruitment of the trainees, who have successfully graduated the course.

Financial resources and partners

The overall budget of Competence Secure is 34 000 EUR and was financed by the Bulgarian Ministry for Regional Development, PHARE Program, BSRAEM and private companies.
The development of the Competence Secure technical concept, assignment and monitoring were preformed by the BSRAEM experts in the frame of the regular activities and free of charge for this project. Experts for the Varna Technical University were attracted to perform the training program. Industrial Association – Varna was a partner organization which coordinated the training process and issued the certificates of professional qualification.

Results

- Improvement of the practical knowledge and experience in energy efficiency in construction in regards to finding solutions to real problems, development of project proposals and applying for funding.
- Realization of training program with theoretical and practical education for 30 selected unemployed people.
- Provision of job placement of 10 trainees after the training completion.
- Promotion of local initiatives for popularization of employment.

Three private companies and the technical university supported the process by provision of expertise, training materials and foreign lecturers.

Lessons learned and repeatability

The project was implemented an adaptive training program and methods for raising the qualification and gaining practical capacity to work specific job by the unemployed people. The program was targeted to job placement and learning particular skills on the working places through direct participation in the working process.
The participation of the project partners in realization of the activities increased the information flow and managerial capacity regarding the opportunities given by the EU pre-accession programs, supporting the development and sustainability of the organizations and the business in region.
The investigation and practicing the EU experience in the sphere of vocational education especially the realization of training programs will establish the Black Sea Regional Agency for Energy Management as a prominent organization in the specific construction sector in the region.

Contact for more information:

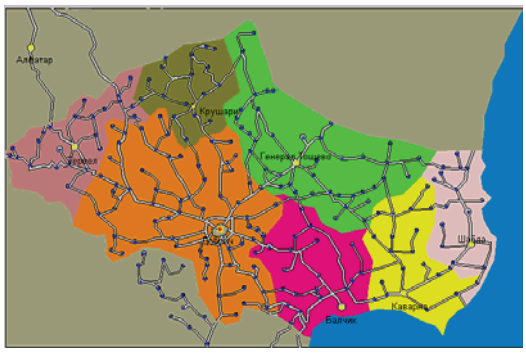
Project Web Site:	www.bsraem.org
Organisation / Agency:	Black Sea Regional Agency for Energy Management
Main contact:	Dipl.Eng. Veselin Ivanov, Director
Address:	4 Preslav Str., Varna 9000, Bulgaria
Tel:	+359 52 611 811
Fax:	+359 52 611 811
E-mail:	bsraem@abv.bg
Web Site:	www.bsraem.org

Bulgaria

ENEF Complex

Summary

ENEFCOMPLEX is demonstration project for energy efficient heating of sports complexes in the city of Dobrich through combined utilization of natural gas and solar installations. The project contributes to the practical implementation of the Bulgarian Energy Efficiency Act and the EC Buildings Directive. The target group is the citizens exercising sports activities, the active sportsmen, sports clubs, municipal servants, companies that provide energy services for buildings. The duration of the project is 6 months – form July to December 2006.The activities were realized as partnership initiatives between the Dobrich Local Agency for Energy Management, the Black Sea Regional Agency for Energy Management,, Dobrich City Municipality and Sports Estates JSC. The development of the technical projects for the heating and gasification activities were financed by the Dobrich municipality, while the supply and mounting of the installations were financed by the Sports Estates JSC.



Objectives

The project goal has been the improvement of the energy efficiency of the heating installation of *Dobrotitsa* Sports Complex and demonstration of the possibilities for improvement of the energy characteristics of the public buildings in Dobrich through RES utilisation.

The project objectives are:

1. To demonstrate the cost-efficient opportunities for improvement of the energy characteristics while preserving the living standards within public buildings through replacement of the heating installations in the city of Dobrich.
2. To demonstrate the technical advantages for joint utilization of natural gas and solar energy for heating and hot water supply through a combined installation.

Process

The ENEFCOMPLEX project implementation was organised in the two activity modules that corresponded to the project objectives and were designed to achieve the project goal.

Module 1: Demonstration of the technical opportunities for improvement of the energy characteristics of *Dobrotista Sports Complex* through replacement of the heating installation

Activities:

1. Development of a technical assignment, model offer and tender procedure for procurement of the technical design of the new heating and hot-water installation of *Dobrotista Sports Complex*
2. Selection of potential sub-contractors
3. Invitation to the potential sub-contractors to participate in the tender procedure and present offers for the design and mounting of the new heating and hot-water installation.
4. Performance of the tender procedure and selection of the sub-contractor.
5. Development and presentation of an evaluation report to the Mayor of the City

of Dobrich and Dobrich City Council for the executed pre-project studies and the proposed renovations in *Dobrotista Sports Complex* according to the priorities of the capital investment program of the City of Dobrich. Monitoring of the technical design execution by the subcontractor and ex-ante approval of the proposed technical decision.

Module 2: Demonstration of the technical advantages for joint utilization of natural gas and solar energy for heating and hot water supply through a combined installation in *Dobrotista Sports Complex*
Activities:

Results:

1. Technical project for gasification and heating of *Dobrotitsa Sports Complex.* According to the project the natural gas heating was organized via infrared beamers in the big sports halls and water-heating boilers for the administrative offices.
2. Developed tender procedure and evaluation criteria for subcontracting of energy efficiency improvement of public buildings in Dobrich City municipality.
3. Supplied and mounted solar installation for *Dobrotitsa Sports Complex*. The system consists of 4 solar panels, type SPK-2 with a total area of 9.6 m^2, 500l enamel boiler with two serpentines as well as the necessary automation and tube system.
4. Supplied and mounted gas installation for *Dobrotitsa Sports Complex.* The system includes 16 ceramic beamers with a total capacity of 27 kW in Universalna Hall and 48 beamers with a total capacity of 13,5 kW in Leka Athletetoka Hall.
5. Decreased energy expenses of *Dobrotitsa Sports Complex* (costs which are actually borne by Sports estates JSC) by 30% (403 000 BGN and 200 000 EUR) after test month of functioning of the new installation.
6. The overall capacity of the installation shall be 1225,5 kW with an annual gas consumption of 194256 m3. The saved CO2 emissions will amount at 40 tons. The solar installation will save 30 tons of CO2 and will payoff for a period of 2 years.

1. Selection of a sub-contractor for the supply and mounting of the solar installation for hot-water supply.
2. Selection of a sub-contractor for the supply and mounting of the heating gas installation.
3. Monitoring of the mounting process

Approval and start of utilization of the new installation.

Financial resources and partners

The overall budget of the ENEFCOMPLEX is 20 000 BGN (equivalent to 10 225,84 EUR) and was financed by the Dobrich City Municipality and Sports Estates JSC. The technical assignment, tender development and monitoring were preformed by the DLAEM and BSRAEM experts in the frame of the regular activities and free of charge for the project. The project partners were:
Black Sea Regional Agency for Energy Management (BSRAEM) which performed expert consultation tasks in the frame of the budget of its establishment project under the IEE program.
Dobrich City Municipality assisted for the administrative approval of the project activities and the promotion of project scheme via the Bulgarian municipal network for energy efficiency *EcoEnergy*. Dobrich City Municipality financed the development of the technical designs for the installation.
Sports Estates JSC is the owner of *Dobritisa Sports Complex* co-financed the technical design reconstruction works in the frame of its public expenditure.

Lessons learned and repeatability

The most important assets of the project are its publicity and transparency that allow citizens to see the real achievement of the energy efficiency targets set in the Strategic Development Plan of the Dobrich municipality. The project demonstrated how the efforts of the local authorities, business and NGO sector can be united to develop and implement a practical community initiative that can be easily multiplied in other Bulgarian regions.

Contact for more information:

Organisation / Agency:	Dobrich Local agency for Energy Management
Main contact	Dipl.Eng. Binyo Dimitrov
Address:	3 Bulgaria Str., Dobrich 9300
Tel:	+359 58 603 305
Fax:	+359 52 611 811
E-mail:	dlaem@abv.bg
Web Sit:	www.dlaem.org

Bulgaria

Energy Performance Indicators for Residential Buildings

Summary

The project developed and tested energy performance indicators for assessment of the energy consumption of family residential building, constructed of the high quality materials, contemporary building materials and technologies in Varna, Bulgaria. Upon the completion of the project, the indicators are to serve the Architecture and Construction Directorate of the Varna Municipality to evaluate the energy performance of the new constructed buildings and recommend the utilization of energy saving technologies. The indicators were elaborated by the expert team of the BSRAEM in consultation with experts of the Varna Technical University to measure the energy consumption for heating, climatization, hot water and lighting. Upon the data gathering and organisation, analyses of the buildings structures status in Varna have been made and methods for reducing of energy consumption for heating have been identified. The results were publicised by the Varna municipality and promoted as a successful practice via the Bulgaria municipal energy efficiency network EnEffect.
The duration of the project was 12 months, stating in January 2005.

Objectives

The aim of the project was to identify, assess and measure the energy savings as result of applying complex technical decisions in building construction. The obtained practical results served as a demonstration and awareness raising tool for the local authorities to foster behavioural change in the home owners in the city of Varna to rehabilitate their property with new building materials according to the requirements for environmental protection and decreasing of the energy expenditures despite the higher initial investments.

Process

The inauguration of building construction techniques that guarantee low energy performance of buildings is a relatively new trend on the Bulgarian construction market. The relevant Bulgarian norms do not set very high standards in this respect and allow for substantial flexibility in the energy quality of the utilized materials. However the tax legislation has introduced norms for lower tax payments incurred by the buildings with proven lower energy performance. Therefore the elaboration of adequate energy performance indicators has become necessary especially in the cities like Varna that experience a construction boom in the last decade. The end-users of the indicators development are citizens, companies and municipalities, which possess or are to build houses.

Methodology: According to the enforced Regulation No.1 “Norms for the Heat Insulation Design in Buildings” of Ministry of Regional Development and Welfare, published in State Gazette no.7/January 26th, 1999.

Financial resources and partners

The overall cost of the project was 5000 EUR.

The project was coordinated by the Black Sea Regional Agency for Energy Management (BSRAEM), which performed the project management and design tasks in the frame of the budget of its establishment project under the SAVE program.

Results:

The expertise showed that the heating costs were reduced up to 50% as a result of the application of the new technology while the daily comfort of the inhabitants was preserved. The measurable indicators could serve as a convincing tool to demonstrate the cost-efficiency of the investment in new energy saving improvements in the residential buildings despite the comparatively high initial costs. The indicators and measuring were presented to the students and lectors in the Department of Thermodynamics at the Varna Technical University and 30 min broadcast report was prepared and distributed in the local TV channels.

The consultant works and testing performed by the Varna Technical University were covered by the university's research budget and the municipal budget of the city of Varna.

Lessons learned and repeatability

Indicators for energy performance of residential buildings were developed and tested.

High quality of building construction activities has been achieved as a result of utilization of new materials and alternative technologies.

Success Indicators:

The index for heat flow corresponds to the Bulgarian not to the European conditions (it should be mentioned that the climate conditions in Bulgaria are more favorable than those in Central and Eastern Europe). The recommendable rates of noise insulation and comfort have been achieved.

The results of the study will be used to stimulate the improved construction of buildings in Varna – living buildings, villas, social houses and improvements of existing building - so as to achieve better energy performance.

Advise for the home-owners:

- Increased usage of thermo-insulation is recommendable, especially for the external walls and floor coverings.
- The heat-pump principle of energy transformation is to be applied according to the scheme – air-to-air or land-to-air.

Natural gas should be used instead of electric energy as primary energy source for the operation of the heat pump

Contact for more information:

Organisation / Agency:	Black Sea Regional Agency for Energy Management-
Main contact	Dipl. Eng. Veselin Ivanov
Address:	4 Preslav Str., Varna 9000
Tel:	+359 52 611 811
Fax:	+359 52 611 811
E-mail:	energy@ubbsla.org
Web Site:	www.bsraem.org

Bulgaria

Assessment of the Wind Potential of North Eastern Region

Summary

The project aimed to identify the level of utilization of wind as a renewable energy source and to determine the investigation process of wind parks in the North Eastern Bulgarian Black Sea region.

The project was correlated with the Program for Regional Development Plan of Varna District as well as the Plan for Development of North Eastern Planning Region and contributes to the practical implementation of the Directive on Renewable Energy and the "Green Paper" Energy of the European Commission. The survey was targeted to the municipalities, engineering private companies and organizations working in the region. The duration of the project was 4 months – form August to November 2005. The survey was realized by the BSRAEM team in close cooperation with the north eastern municipalities and private companies working on wind park construction in Bulgaria.

The project for investigation of the wind potential was financed by BSRAEM, target municipalities and Varna Technical University

Objectives

The project goal was to promote the utilization of wind as a renewable energy source.

The specific objectives were:

1. To identify the existing facilities and equipment /wind parks/ which use the wind potential.
2. To survey the investment projects for construction of wind turbines.

Process

The survey was organized in three phases:

Phase 1:

Development of Project idea. The activities accomplished so far were the following:

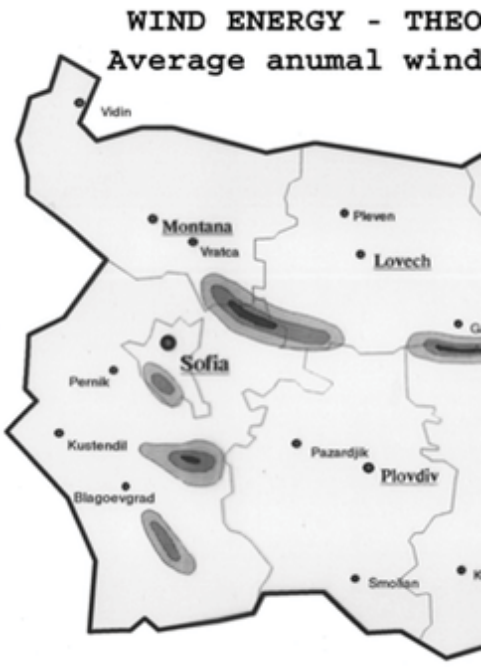
1. Organization of meetings with the participation of representatives of municipal and district governments of Varna and Dobrich for presentation of the regional plans and programs for development.
2. Meetings of the project team with municipal officials, architects and engineers in the North Eastern municipalities.

Presentation of the investigation idea.

Phase 2:

Survey of the existing potential for wind power utilization. The activities realized during the second phase focus on the essential part of the study:

1. Meetings with municipal officials.
2. Survey of the foreign investors interested in construction of wind parks in the region.
3. Interviews with the experts, engineers, architects, etc. responsible for the implementation of the energy efficiency programs in the municipal and district administrations.
4. Distribution of questionnaires among the local engineering companies.
5. Analysis of the collected information.



Financial resources and partners

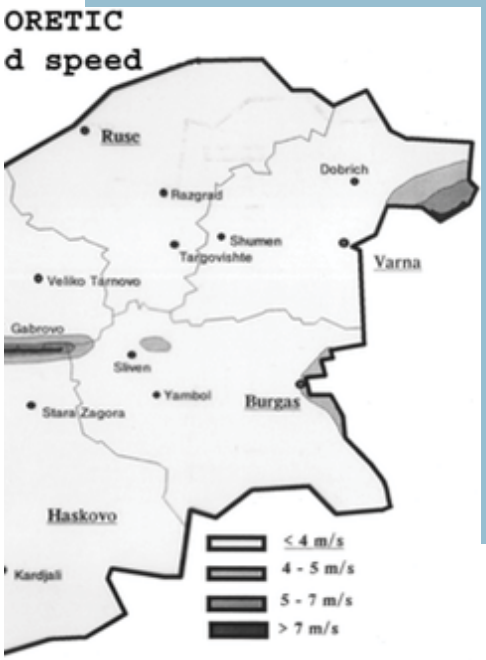
The overall cost of the project was 7000 EUR. The study was coordinated and co-financed by the Black Sea Agency for Energy Management. The target municipalities and the Varna Technical University also covered part of the sturdy budget in the frame of their program for energy efficiency. The mayors of the municipalities and experts from Varna District Government collaborated in the time frame of the survey through provision of information about the active and potential wind construction companies. The private business supported the process by provision of feed back of the questionnaires.

Results:

The results of the survey can be summaries as follows:

At present

- There is sufficient information of the utilization of the wind as an alternative source for energy production.
- There are wind turbines installed in the region total electric power 200 MW in august 2005.
- Several companies have expressed their interest in wind park construction near Kavarna such as French and German companies.
- A Bulgarian – Spanish company has intention to construct wind park total electric power 100 MW, consisting of 30 turbines, each 60 meter high
- A Wind Park has been established so far between Varna and Dobrich. The park comprises three turbines: two of 250 kW and one of 400 kW.
- Three investment projects developed by private enterprises have been successfully awarded for construction of wind turbines in the region. The projects have been financed by the European Bank for reconstruction and development through the Bulgarian United Bank.
- There is Wind Park /two turbines 500 kW and 50 m height/ constructed near Mogilishte village.
- A wind park of four turbines is constructing near Mogilishte village
- A wind turbine 50 m height is constructed in Shabla and it is not maintained yet.
- Two turbines delivered and installed near Selce village.
- A fundament of one turbine and electric station is constructed in Bulgarevo village.
- The biggest project developed for construction of Wind Park is near Kaliakra town. Japanese and French companies have awarded the tender for construction of Wind Park on area of five thousand decares.
- The municipal and district government administration have introduced deeply in the energy efficiency through utilization of alternative energy sources.



Activities foreseen

- Construction of three fields, total power respectively 40 MW, 30 MW and 40 MW.
- The total installed electricity generated power should reach 300 MW in two years.
- The Bulgarian – Spanish company will construct a wind park near the town of Suvorovo

Lessons learned and repeatability

The survey was initiated by the BSRAEM team as an intention for popularization of the alternative energy sources for efficient energy management. It brought useful information about the current situation in the North Eastern region on the one hand and of the investment activities on the other hand. The analyses and results were submitted to the district government administrations in Varna and Dobrich which have the obligation to implement the central government policy at the local and regional level.

The information gathered during survey can be used for further initiatives by the local and regional authorities, private enterprises and other interested parties.

Contact for more information:

Organisation / Agency:	Dobrich Local Agency for Energy Management
Main contact	Dipl.Eng.Prof. Atanas Mirchev
Address:	4 Preslav str, 9300 Varna, Bulgaria
Tel:	+359 52 611 811
Fax:	+359 52 611 811
E-mail:	dlaem@abv.bg
Web Site:	www.dlaem.org

Bulgaria

Energy Efficiency performance in a public building

Summary

The project aims at increasing the energy efficiency in municipal public buildings through energy retrofitting and eligible finding mechanisms.

The project contributes to the implementation of the European Directive on energy performance of buildings and the Bulgarian Energy Efficiency Act. The target groups are socially discharged people, energy specialists, and companies offering energy efficiency services and funding organizations.

The project duration is 18 months from January 2006 till May 2007.

The project partners are “Zhilfond invest” Ltd. (public entity), the Municipality of Dobrich and the Dobrich Local agency for Energy Management.

DLAEM realized the activities within its project of establishment of IEE programme and the energy retrofitting activities were financed by the Bulgarian Fund of Energy efficiency, the Municipal Bank and the entity own resources.

Objectives

The overall goal of the project is to improve the energy efficiency in municipal buildings in order to reduce the green house emissions in Dobrich by using appropriate financing mechanisms.

The specific objectives are the following:

1. To demonstrate the opportunities of utilization of suitable financing mechanisms for providing sources for energy retrofitting of municipal buildings.
2. To offer possibilities of improvement of the energy characteristics of a building of public importance through energy retrofitting.
3. To enhance the opportunities of achieving energy efficiency certificate of the building.

Process

The project activities are organized in three interrelated modules which correspond to the specific objectives. In this way the realization of the specific objectives is guaranteed which presupposed the achievement of the overall goal

Module 1:

Demonstration of the opportunities of utilization of suitable financing mechanisms for providing sources for energy retrofitting of municipal buildings .

Activities:

1. Investigation of the technical and financial conditions for funding of energy efficiency projects by the Bulgarian Fund on Energy Efficiency, /BFEE/ and Municipal Bank.
2. Preparation of the necessary documentation for submission of applications to BFEE and Municipal Bank.
3. Negotiation of the conditions for granting energy efficiency loans.

Module 2:

Offering the possibilities of improvement of the energy characteristics of a building of public importance through

energy retrofitting.

1. Survey of offers by companies licensed for implementation of energy retrofitting measures.
2. Selection of a sub-contractor according to the Bulgarian Act for Public tender-offering procedures.
3. Monitoring on the energy retrofitting activities of the building.

Module 3:
Enhancing the opportunities of achieving energy efficiency certificate of the building.
1. Survey of licensed company offers for implementation of energy audits and issuing certificate of energy efficiency of the building.
2. Selection of a sub-contractor.

Results:

Module 1:
Elaboration of a preliminary proposal for financing the project by the BFEE
Elaboration of energy expertise of the building
Granting loan by the BFEE amounting to 240000 BGN.
Granting loan by the Municipal Bank at the amount to 160000BGN.

Module 2:
Selection of "Kostoff"Ltd. as a sub-contractor
Replacement of the water supply and the electricity supply system; external walls insulation; roof hydro-isolation; replacement of the internal doors; internal construction repairs.

Module 3:
Selection of "Energy audit" Ltd. as sub-contractor
Issuing certificate for energy performance of the building, "B" category at the amount of 5700 BGN.

It is foreseen the loan payments to be made by the energy saved (364138 kwh/ year) as well as by the 6 year paid rent. The saved CO_2 emissions are equal to 248,7 tones/year.

3. Monitoring of the activities related to issuing certificate on energy efficiency of the building.

Financial resources and partners

The Dobrich Local Agency for Energy Management is the project coordinator and implements the project activities within its project of establishment without additional funding.
The project partners are as follows:
The municipality of Dobrich contributes to the administrative permission of the activities and promotes the project through the Municipal network on energy efficiency "EcoEnergy".
The owner of the building, "Zhilfondinvest" Ltd. Participates actively in the activities implementation.

Lessons learned and repeatability

The project *Energy Efficiency performance in a public building* is a good example for attracting the local authority attention to issues of the energy efficiency, the implementation of energy audits, the energy retrofitting and the means of funding.
The initiative contributes to the establishment of responsible civil behavior against the climate change. It obviously shows the impact of the introduction of measures for energy efficiency improvement.
The project *Energy Efficiency performance in a public building* creates conditions for establishment of sustainable local development and is a model of interaction between the local authority, the NGOs and school trustee boards. It popularize the positive dynamic image of Dobrich municipality and could be multiplied in other municipalities.

Contact for more information:

Project Web Site:	n/a
Organisation / Agency:	Dobrich Local agency for Energy Management
Main contact	Dipl.Eng. Binyo Dimitrov
Address:	3 Bulgaria Str., Dobrich 9300
Tel:	+359 58 603 305
Fax:	+ 359 52 611 811
E-mail:	dlaem@abv.bg
Web Site:	www.dlaem.org

Denmark

PV assisted ventilation

Summary
The PV-Vent concept expresses a connection between utilisation of the sun as energy source and development of effective distribution and recovery methods for ventilation in a building, i.e. to combine the building integration of PV panels with high efficient ventilation systems. Development work was carried out by a small producer company in cooperation with energy specialists and co-financed from the Danish National Energy Agency.

Objectives

Developing the PV VENT solution was aiming at:
• High energy recovery from ventilated air
• Space consumption to be very low – see photo 22 cm thick EcoVent system
• Low energy consumption to run the ventilation system
• High energy efficiency
• Low noise – and good indoor climate
• Low price

Process
Development work over some 10 years within balanced ventilation with heat-recovery has been ongoing for EcoVent company. The company has achieved highly expertise and developed products with remarkable high efficiency near to 90% heat-recovery. Also the ventilators for extracting air and intake of air have very low electricity consumption. The heat exchangers are “counter-flow” exchangers made from aluminium, which does not absorb much heat itself,and thus high efficiency can be achieved.

In 2003 EcoVent started developing a new type of only 22 cm thick systems for balanced ventilation with heat-recovery for example to place in an inner apartment wall. Major problems were noise which generally will become higher in reduced dimensions if still same air flows. This was settled by locating ventilators in optimised positions and by installing insulated plates which are perforated with holes.

Financial resources and partners

Development work for PV VENT solution has required costs around 100.000 EURO. Partners were primarily Cenergia Energy Consultants, builder Kuben and architect company Rubow & Nielsen together with a number of housing associations.

John Steen Jensen:
“After working many years with ventilation systems I think one major benefit in this solution is the easy maintenance and cleaning of the system. Unfortunately many ventilation systems are big “dust collectors” and you can imagine what that means for the air quality you take into the living room”

Results

The PV assisted ventilation solution from Eco-Vent is very easy to fit into new built or renovation of buildings,and it shows very efficient to meet low energy standards according to the new Danish building regulationfrom April 2006 that was required based on the EU building energy directive.

Also this solution make a good comfort in the buildings, so that indoor climate can be approved.
The air will be continuously exchanged with pre-heated and clean outside air, which will bring down humidity in the apartment - and thus amongst others reduce risks for allergic problems.

Price level is low – only some 2000 EURO for one apartment – and the necessary space is at a minimum with only 22 cm thick installation, so that it can be placed in an inner wall or small cupboard.

Generally experiences with the new more strictly EU building energy regulation shows that heat-recovery ventilation is a necessity to reach low energy standards – and still keep some free possibilities for architectural choice of bigger windows and limited wall thickness etc.

Lessons learned and repaetability

The PV-VENT solution has all the best chances to be one of most asked for ventilation solutions in modern low energy housing, because it fulfils main requirements of high efficiency, comfort, low energy consumption, low noise and low price.
Therefore this system has been selected for several pilot projects in ongoing EU projects for example “Demohouse” and “Active Roofer” with both many EU country partners that all have the same need for such improved ventilation systems to meet the new EU building energy requirements.

Contact for more information:

Project Web Site:	
Organisation / Agency:	EcoVent
Main contact	Mr. John Steen Jensen
Address:	Rudolfgaardsvej 19, DK-8260 Viby J
Tel:	+45 7023 8802
Fax:	n/a
E-mail:	info@ecovent.dk
Web Site:	www.ecovent.dk

Denmark

SOL-TAG (Sun Roof)

Summary
SOL-TAG is developed under the new European directive for energy performance in buildings – as an example of how this directive can be used to optimise buildings and achieve a carbon neutral house by using renewable energy. It is a housing unit that can be attached to existing multi-storey housing without the need for connection to the buildings existing energy systems. The flat roofs can thus be used as new building plots with upgraded roof and housing areas. By using thermal solar energy and upgrading the use of solar cells the SOL-TAG unit can achieve an energy consumption of 0 kWh/m2 for heating. A demo house can be seen at the grounds of the VELUX corporate headquarters north of Copenhagen.

Objectives
Project aim was to develop a prototype for a roof-top housing unit that can meet the need for providing extra housing areas where you in many big cities have limited space for new building plots. And to make it possible to improve economy in renovation of old flat-roofed building blocks by establishing extra housing areas that can be sold and thus help paying renovation costs.

Another part of project aim was to develop this housing unit as a prefabricated energy efficient unit – to make it possible to reach a carbon neutral operation by use of renewable energy.

Process
The idea of the energy efficient house unit became reality in 2005 as a demo house. SOL-TAG is a prototype developed and produced for display and demonstration.
The layout for a basic SOL-TAG unit spans 84 m2 in two basic modules that fit together. One module contains the main installations and kitchen unit, bathroom, hall and bedroom – the other module consists of dining and living areas with an open loft space.

The optimal 45-degree saddle roof faces south to provide optimal daylight to the attractive indoor space and ensure that the thermal solar panels and solar cells on the large roof area work to maximum efficiency.

Financial resources and partners

Partners to VELUX are leading Danish building component manufacturers, building developers, energy and daylight specialists etc. and financial contributions primarily were provided by the building component manufacturers with a co-financing from Danish National Energy Agency.

Torben Thyregod:
“SOL-TAG is one of best much needed urban roof renovation technologies – regarding energy efficiency, economy and independency of exisiting energy supply connections if needed”

Results

By using thermal solar energy and upgrading the use of solar cells the SOL-TAG unit can achieve a zeroenergy operation. The unit runs itself independent of external heating systems. The independent heating production is achieved by combining solar energy generated by the windows’ natural function with 2 m2 of thermal solar panels that produce domestic hot water and under-floor heating.

The 3,5 m2 solar cell panel on the unit roof generates the electricity to run the pumps and ventilators. A builtin heat-recovery ventilation unit and a mechanical ventilator transfer the heat from the spent heated air to new fresh air taken from outside. 90 % of the heat is recycled. A solid climate screen, with strategically placed low energy windows, 350 mm of insulation in the walls and 400 mm in the roof and an airtight construction with no cold bridges keeps the heat inside the house.

An extra 14 m2 of solar cell panels can generate enough electricity to meet the needs of the pumps and ventilators for the entire winter energy. This brings the annual energy balance to zero. However the day-today consumption of domestic appliances, lighting and so on is supplied by the external electricity grid.

Lessons learned and repeatability

It has been most useful to cooperate in a broad team of building specialists – to integrate many of economic,
energy, environmental and architectural aspects into industrial pre-fabricated house building.

Contact for more information:

Project Web Site:	http:www.soltag.net
Organisation / Agency:	Velux Danmark A/S
Main contact	Torben Thyregod Jensen
Address:	Aadalsvej 99, DK-2970 Horsholm
Tel:	+45 4516 4000
Fax:	n/a
E-mail:	torben.thyregod@velux.com
Web Site:	www.velux.com

Denmark

Green Diploma

Summary
Green Diploma has been developed by the Danish National Housing Association in cooperation with Fellov Consult and Cenergia Energy Consultants with a co-financing from the Urban Ecology Foundation in Copenhagen Municipality. The aim is to award housing associations with a Green Diploma as a quality certificate showing serious energy and environmental efforts. 40 individual housing departments of housing associations have participated since 2002 and systematically reported yearly consumption of heat, water, electricity and waste. This show to be very inspiring for change of behaviour in direction of energy savings and environmental considerations.

Objectives

The aim was primarily to reduce energy consumption within a building sector representing a big share of total housing in Denmark, where already is established good information channels through their joint "secretariat" being the National Housing Association.
Another common condition is that all dwellers are renting their flats and not being house owners. This requires a different approach and efforts to achieve change of behaviours compared to house owners. But anyhow economic savings for energy costs is of common interest for dwellers as well as house owners.

Process

From the initiative started the focus was on the operational energy costs for housing association departments for heating, electricity and water. Yearly reporting should make it possible to create interest for reaching better results next year.
But such reporting requires extra work to be done systematically and comprehensive to some degree and therefore it was a difficult process to convert a first enthusiasm into actually systematic reporting every year.
This work was either organised as part of tenants democracy administration or as part of the general administrative reporting work etc. in the housing association department. For the Green Diploma administrators it was more easy if part of general administrative work.
Schemes for yearly reporting caused some problems and were often found complicated to fill in. And to improve this together with other observed need for changes a group was evaluating and revising the system 2 years ago.
This resulted in a new manual and guidelines and besides the basic energy data now also will be reported local plans for next year improvements with scheduled deadlines to be controlled as a condition for being awarded with the Green Diploma or for having the Green Diploma renewed for another year. And besides certification for operation of housing association unit now also the housing association unit administration can be certified. And reporting is now via internet. Latest new development of Green Diploma is a new system provided for certification of construction work regarding new-built as well as renovation of buildings. And this system is not limited to housing associations, but also now available for private housing or housing cooperatives.

Financial resources and partners

Totally some 150.000 EURO has been spent on consultancy to develop the Green Diploma system based primarily on funding from national support sources for the housing sector. But involved partners from National Housing Association, a number of housing associations and housing sector institutions have contributed maybe similar amount to develop and implement this system. Operational costs are now covered by the National Housing Association being owner of the system.

Bettina Fellov:

"Our experiences with these participating 40 housing association departments over several years is often a demonstrated change of tenants behaviours regarding energy savings – and many implemented improvements regarding better housing surroundings and daily living qualities for example concerning greenings and playgrounds"

Results

After 5 years of reporting energy consumption from all together some 40 housing association departments the results shows good results for some housing associations and for others you may see higher energy consumption.
Also you see that it has not been possible to have systematically reporting from all every year and some of them have only reported once.
But the general conclusion from the people administrating the Green Diploma certification and having frequently contact to the participating housing associations is that several housing associations find it very useful to keep focus on energy efficiency.

Also participants can tell about many improvements regarding local efforts for better daily living conditions, which comprise for example better playgrounds, more greenings, local traffic regulations, bird life, etc.

Lessons learned and repeatability

After having administrated the Green Diploma certification system for some 5 years now – it is evident that such award can influence tenants' behaviours regarding energy savings and their general awareness for improving into better living conditions in their local neighbourhood.

The interest for further developing the system and making available for construction work and other owner categories, shows that the Green Diploma anyhow is useful for general inspiration into sustainable housing.

Contact for more information:

Project Web Site:	www.grontdiplom.dk
Organisation / Agency	Fellov Consult ApS
Main contact	Ms. Bettina Fellov
Address:	Kirkevej 155, DK–2791 Dragør
Tel:	+45 3253 1200
E-mail:	Fellovconsult@fellovconsult.dk
Web Site:	www.fellovconsult.dk

Denmark

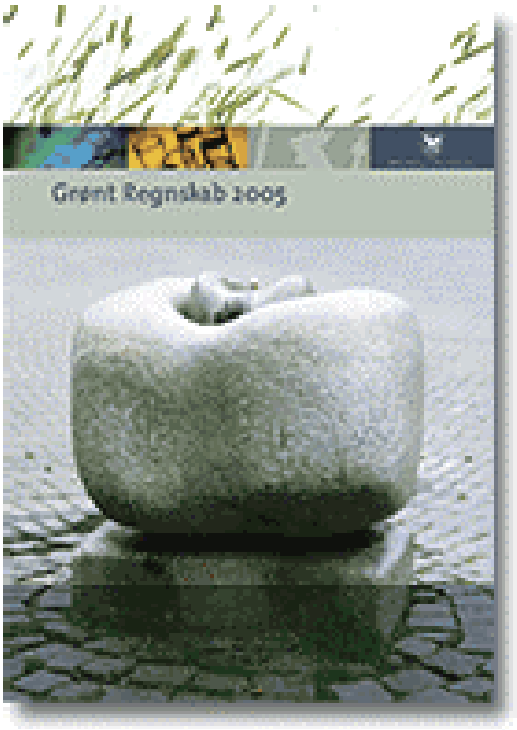
Green Accounts

Summary
Albertslund Municipality with 28.000 citizens are located next to Copenhagen as part of Greater Copenhagen urban areas and thus having very dense residential areas being home for many people working in Copenhagen.The municipality has always been in a front position amongst environmentally conscious municipalities in Denmark – and Green Accounts were initiated some 10-15 years ago as part of environmental revision for municipal institutions. Results are remarkable - with all municipal departments and institutions being environmentally certified by end of 2007 – and with Green Accounts reporting yearly for now 46 of total 52 residential areas in the municipality.

Objectives
The aim was to get a method for quantifying results of environmental efforts – and to report in an understandable way similar to the well known economic accounts reporting.

Process
Green Accounts were started up some 10-15 years ago as part of general environmental work. For example within waste management it became useful tool when citizens in one residential area found waste amount development go in the wrong direction – the systematic monitoring of specific waste categories on specific locations and user categories – made it possible after some years to make waste reduction efforts more efficient.
Also it showed to be more easy to communicate with the citizens, institutions and companies about necessary improvements to get results in better direction.
The Green Accounts have become natural integrated part of energy and environmental work for a big group of municipal staff persons in energy supply, water supply, wastewater, waste and environmental departments – and also within many municipal institutions, because Green Accounts also help to economic efficiency.

Financial resources and partners
Many personnel resources are required – especially for the yearly period of reporting data and working out the Green Accounts. But also for connected service to citizens giving advice for how to reduce energy consumption etc. But these resources are now integrated in the general work of municipal staff persons in energy supply, waste management etc.



Lessons learned and repeatability

Primary experiences show that Green Accounts are not meant to be comparable between different municipalities – because many internal and external conditions, definitions on data collected etc. are very different from one municipality to others.

Trine Bjoern Olsen:

”We use Green Accounts as a tool to tell us about actual development for example about waste amounts –so that we can react and direct our actions to follow the right track”

Most important thing is to compare to yourself – what results you achieved last year and the years before that, so that you can use results to correct the consumption curves etc. into a better direction – by knowing rather precisely where you have the critical causes.

Results

46 of total 52 residential areas are now reporting yearly on heating, electricity and water consumption – as well as on waste amounts.
“Red consumers” with a consumption of heating, electricity or water above the average are being contacted with information and advice for how to possibly reduce their consumption.

Contact for more information:

Organsation / Agency:	Albertslund Municipality
Main contact:	Ms. Trine Bjoern Olsen
Address:	Nordmarks Allé, DK-2620 Albertslund
Tel:	+45 4368 6868
E-mail:	albertslund@albertslund.dk
Web Site:	www.albertslund.dk

Denmark

Solar Cell Coop

Summary
In November 2004 a new citizens cooperation was started as the first Danish Solar Cell Co-op, which turned ownership of solar cells into a more popular movement like previously experienced so well in Denmark regarding cooperation for windmills.
During this initiative citizens can support a sustainable energy development. Such local citizen anchoring of renewable energy is considered very positive in a period where very big companies generally take over energy production all over Europe.

Objective

The overall aim for the Solar Cell Citizens Company is to disseminate knowledge about solar cells and the use of solar cells in Denmark - because the global location of Denmark makes it natural to utilize solar energy as one of most renewable energy sources.

More precisely the aim is:
- To produce electricity from solar energy
- To sell produced electricity to highest possible price
- To ensure shareholders best possible economy

First solar cell plant ready in October 2005 in Njalsgade, Copenhagen

Process

Copenhagen Energy Supply Company established some years ago a “Solar Stock Exchange” where every consumer – private individual citizens as well as business companies and institutions etc – can buy “Solarelectricity” for a higher price than traditional produced electricity. The idea is that selling of solar-electricity will help co-finance more solar cell plants.
The initiative was in November 2004 followed by establishing the Copenhagen Solar Coop that was based on inspiration from the Danish windmill “adventure”, where organizing in coops made windmill investments and production develop very fast – followed by establishing many new jobs in windmill industry and later on fast growing export to foreign countries.
But a first major problem was to find suitable roof space for installing solar cells – as public house owners were worried about possibly damages to the roof for one thing – and next after claimed a high fee to rent out the roof space.

Financial resources and partners

Main partners are house owners, municipalities and energy supply companies. And interested investors.

Erik Christiansen:

“We will like to initiate same popular movement as we have seen for wind energy”

Results

First solar cell project was put up for sale to interested citizens and companies etc. in July 2005 and all 440 shares were sold within 2½ months. Next project of 154 shares was sold within 2 weeks time. The initiative shows highly citizens interests in using Green Electricity - and the possibilities for replicating elsewhere.seems good.

The initiative received the Solar Award from Copenhagen Municipality in 2005.

Lessons learned and repeatability

Without national economic support arrangements it is very difficult to motivate citizens, house owners, energy supply companies etc. to invest in solar cells.

Location of solar cell plants require available roof space – which may be very difficult to find.

Contact for more information:

Organsation / Agency:	EBO Consult
Main contact:	Mr. Erik Christiansen
Address:	Hvidovrevej 137, DK-2650 Hvidovre
Tel:	+45 3638 3800
Fax:	+45 3638 3801
E-mail:	erik.christiansen@ebo.dk
Web Site:	www.solcellelauget.dk

Germany

Thermal Mineralisation of Sewage Sludge in Combination with a Biomass Power Plant

Summary

The Crailsheim Model for the combined regional utilisation of sewage sludge and CO_2-neutral heat and electricity generation is an invention of Stadtwerke Crailsheim GmbH. 27 Municipalities from Baden-Württemberg and Bavaria joined a partnership with Stadtwerke Crailsheim and are direct associates of the KSV GmbH which holds and operates the plant. The combiplant is situated in Dinkelsbühl. It consists of a biomass CHP plant and a sewage sludge mineralisation system. This combiplant overcomes the sewage sludge problem of 150.000 citizens, but beyond this it produces environmentally friendly heat and electricity from biomass. The two subsystems are energetically coupled: While the waste heat of the CHP plant is used for sludge drying, the valuable gases emitted by the sludge mineralisation process are used for supporting the firing of the CHP plant. The mineralised sewage sludge is inert and can be used for roadmaking. This innovative, environmentally friendly and regionally organised sewage sludge utilisation is the first of its kind in Europe.

In the past sewage sludge was mainly utilised or removed in the agriculture and landscaping sector. Nowadays these possibilities of removal are no more possible, due to the contaminant loads of sewage sludge. At present the thermal utilisation in large centralised power plants and in cement productions especially in the north of Germany is increasing. This, however, requires large transport capacities and leads to oligopoly building in this sector. With the *Crailsheim Model* the 27 municipalities found a decentralised, environmentally friendly and economically feasible solution for sewage sludge removal bringing additional benefit and value creation to the region.

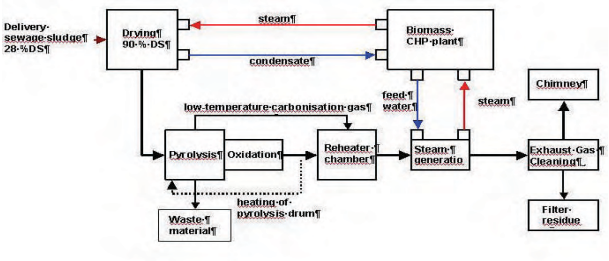
Objectives

- Use of an energy efficient process based on renewable energies available at local level for the solution of the sewage sludge removal.
- Creation of a regional partnership in order to realise and operate the plant taking into account the local particularities and opportunities.
- Creation of a sustainable concept taking into consideration future capacity developments.

Process

The KSV combiplant consists of two subsystems: the sewage sludge treatment part and a biomass fired CHP plant. A detailed look at the plant scheme shows that only in their combination both subsystems reach an optimal efficiency.

The Municipalities' sewage sludge is dried by using the CHP plant's low temperature waste heat. In the following sludge pyrolysis process, valuable gases are emitted, which are used for firing the steam production in the CHP plant. In a further process phase the sludge is tempered to an inert granulate, in which all contaminants are bound in a mineral structure. This granulate can be used for roadmaking, for building products or removed on simple disposals. Residual wood of local forestry is used for firing the biomass CHP plant. A 9 MW_{el} steam turbine supplies electricity from renewable energy sources to 18.000 households. Industries in the neighbourhood are



Financial resources and partners

The total investment for the KSV plant amounts to 34 Mio. €. Due to its innovative character, the project receives financial support from the federal ministry of Environment (2.4 Mio €) and the states Bavaria and Baden Württemberg. The electricity produced is fed-in for the tariffs of renewable electricity foreseen by the German Renewable Energy Act.

The 27 Municipalities and STW Crailsheim are direct associates of the KSV GmbH which holds and operates the plant as an independent company. The Stadtwerke Crailsheim as initiator and main associate (26.5 %) assume the management of the company.

Results

The combiplant makes an important contribution to environmental protection and primary energy savings. In the process of mineralization all contaminants are bound in a mineral structure in a water-insoluble way. The granulate can be used for building products or can be removed on simple class I disposals.

The conventional thermal utilisation of sewage sludge in large centralised power plants requires a considerable amount of primary energy from fossil fuels. In contrast heat needed by the KSV plant results from the sewage sludge process itself and waste heat from the CO_2 neutral biomass CHP plant. Further CO_2 emissions are avoided by side-stepping long distance sewage sludge transports.

The installation of the KSV combiplant strengthens the economic power of the region because most of the construction work and services are performed by regional companies. At the same time the pilot plant adds about 20 new jobs.

- Internal success and failure factors

The amount of work to develop such a project should not be underestimated.

- External success and failure factors

The vision of a collective project aim releases a positive momentum for the project development.

Lessons learned and repeatability

- Collective solutions of energy supply will have an increasing relevance in the future and can be excellently worked out.
- The self-determination of municipalities can overcome price dictates of big over-regional groups
- Each substance has it´s adequate process. But to really achieve an increase of efficiency it is necessary to have energetically interlinked processes.
- New innovative processes are not always welcome and encounter also resistances.
- The co-operation with local authorities for permits can be very constructive.
- Decentral plant solutions are a key to the future sustainable energy supply.

Contact for more information:

Organsation / Agency:	KSV GmbH c/o Stadtwerke Crailsheim GmbH
Main contact:	Mr. Jürgen Hübner
Address:	Friedrich-Bergius-Straße 10-14 D-74564 Crailsheim
Tel:	+49 7951 305 370
Fax:	+49 7951 305 359
E-mail:	juergen.huebner@stw-crailsheim.de
Web Site:	www.stw-crailsheim.de

Germany

Solar district heating Hirtenwiesen II

Summary
Stadtwerke Crailsheim GmbH are realising Germany´s largest solar thermal plant with a peak capacity of 7 MW_{th} and a collector area of 10,000 m². Already in 2005, this project was awarded as 'lighthouse project' by the German federal government.
The solar thermal plant supplies the recently developed residential area Hirtenwiesen II (260 accomodation units) to more than 50 % with solar heat and domestic hot water. An innovative long-term geothermal heat storage technology allows to use solar heat generated in summer during the winter heating season.
The solar thermal plant generates 3.000 MWh of thermal energy per year in a equal-zero-emission way. By this 1,000 tons CO_2 are avoided.

Germany has the ambitious aim, to cover 14 % of the total heat demand with renewable energies until 2020. The new renewable heat law obliges private house owners either to generate 10 - 20 % of their heat demand with renewable energies or to obtain it from a district heating network. The use of solar thermal energy in combination with district heating networks and long-term heat stores permits especially in new residential development areas a reduction of the fuel consumption by more than 50%. Since 1993 the development and demonstration of this technology is supported by the German national programmes *Solarthermie 2000* and *Solarthermie2000plus.* In Crailsheim all pre-conditions for the realisation of a solar district heating system were fulfilled. The development area Hirtenwiesen II is located on 150 hectare of a former military area, which already in the past was attached to a district heating system.

Objectives

- Supply of the development area Hirtenwiesen II with 50 % solar heat at low solar heat costs.
- Demonstration and advancement of the technology of solar district heating with further efficiency increase and costs reduction:
- integration of the main part of the solar collectors in a noise protection barrier in consideration of landscape architecture and an integrated ecological concept
- construction of a low priced buffer store (capacity 100 m³) of pre-fabricated concrete units
- construction of a long-term heat store in combination of a 480 m³ water storage and a geothermal borehole thermal energy storage (BTES) with 40,000 m³
- Realisation of a low temperature district heating supply in order to create ideal operating conditions for the solar thermal plant. Additional quality measures are performed such as info seminars for the planners, installers and building-owners

Process

The supply of the residential area Hirtenwiesen II with thermal heat and domestic hot water is provided by a modern and efficient solar district heating network of Stadtwerke Crailsheim. With the installation of 7 MW_{th} of solar collectors it is the largest and a unique system in Germany.

In 2003 and 2004 the first collector areas have been set-up on the roofs of the Hirtenwiesen sports hall (140 kW_{th}) and the Lise-Meitner secondary school (350 kW_{th}). Other collectors (1,050 kW_{th}) are installed on existing buildings, which were refurbished according to modern energy standards. Before the completion of the project in 2009 the main part of the solar collectors (5,600 kW_{th}) will be installed on the south oriented side of a noise protection barrier with a height of 15 meters.

The short-term heat store is an innovative new construction. It´s the first time that such a heat store is designed for a water temperature of maximal 108 °C and a pressure of maximal 3 bar. It is constructed with rings of armed concrete and a coating of stainless steel.

A seasonal BTES is used for conserving the solar heat generated in summer for the winter heating period. The BTES uses the rock formations in the natural underground as storage medium. The storage is charged and discharged with plastic borehole heat exchangers, which are brought-in down to a depth of 55 meters. With 80 borehole heat exchangers a volume of 40,000 m³ rock can be used as a store, equivalent to 20,000 m³ water.

In the state of overall completion the solar collectors will cover 50 % of the total annual heat demand of the residential area. The remaining part will be generated in the heating central of the Stadtwerke Crailsheim by two modern natural gas boilers and CHP units.

Results

The solar thermal plant generates 3.000 MWh of thermal energy per year in a equal-zero-emission way.

Combined with the generation of the remaining heat in modern CHP units, the plant permits to avoid over 1,000 tons of carbon dioxide emmissions.

The solar heat costs amount to 19 cents/kWh (excl. funding and VAT) at a solar fraction of 50 %.

Financial resources and partners

The total investment volume of the large scale solar thermal plant amounts to 7.8 Mio. €. It is supported by the Federal Ministry for the Environment, Nature, Conservation and Nuclear Safety with 1.88 Mio. € and by the Ministry of Economics of Baden-Württemberg with 320,000 €. The Municipality of Crailsheim subsidises the project with 1.4 Mio. €.

The project is developed in a co-operation of Stadtwerke Crailsheim as investor and operating company, Steinbeis Research Institute Solites and University of Stuttgart as scientific consultants as well as Hamburg Gas Consult GmbH as planner.

Lessons learned and repeatability

The entrepreneurial acting of Stadtwerke Crailsheim GmbH is also aimed at a reduction of environmental pollution and the promotion of an efficient and sensible use of energy. In this respect the project solar district heating Hirtenwiesen II is an important step towards a sustainable energy supply of Crailsheim. Stadtwerke Crailsheim could benefit from the excellent puplic outside perception of the project, from financial funding as well as from the accompaniment of the scientific partners provided by Solarthermie2000plus.

In return the innovative character of the project requires additional effort for solving problems together or handling unexpected changes.

Contact for more information:

Organsation / Agency:	Stadtwerke Crailsheim GmbH
Main contact:	Mrs. Michaela Schopf
Address:	Friedrich-Bergius-Str. 10-14
	D-74564 Crailsheim
Tel:	+49 7951 305 370
Fax:	+49 7951 305 359
E-mail:	Michaela.schopf@stw-crailsheim.de
Web Site:	www.stw-crailsheim.de

Germany

Energy efficient trigeneration of electricity, heat and cold for an industry enterprise

Summary

In autumn 2003 Stadtwerke Crailsheim GmbH and the industry Procter & Gamble, leading producer of hygienic articles for women, made an agreement for energy contracting for Procter & Gamble's Crailsheim plant. Already in December 2003 Stadtwerke Crailsheim delivered, installed and started operation of the key component of the contracting agreement, a cogenerator producing electricity and heat in an environmentally friendly way, being therefore also supported by an electricity and gas tax exempt. By end of January 2004 the cogenerator was taken into operation with an official ceremony visited by the major of Crailsheim. In a next step Stadtwerke Crailsheim installed an absorption chiller (600 kW), which was taken into operation in spring 2007.

So far public buildings, such as hospitals or sports centres, were the main scope of cogenerators. Due to increasing prices of electricity and the support schemes cogenerators became also feasible for industry enterprises. By the contracting model Procter & Gamble purchases electricity, heat and cold from the Stadtwerke Crailsheim. Since financing, operation, maintenance and monitoring is completely performed by Stadtwerke Crailsheim, Procter & Gamble can fully concentrate on their core business, the production of hygienic articles.

Objectives

- Stadtwerke Crailsheim aim at a complete turnkey service for assuring the energy supply to industry enterprises.
- Stadtwerke Crailsheim push for environmentally friendly and innovative energy supply solutions and realises them in industry enterprises. In this case heat driven cold generation via an absorption process is realised in a significant scale.
- Procter & Gamble adopted environmental protection into the company's mission, which includes also the energy use within the company. Therefore the company was also awarded with KFW's energy efficiency award 2006: 'Energetic optimisation of the production and administration plant of the Crailsheim site'
- By means of the contracting model, the enterprise receives a one-stop service for electricity, heat and cold supply

Process

The cogenerator plant was dimensioned based on the yearly demand of heating and process heat. Due to the limited installation space, two newly developed compact modules type GG 340i SH from Sokratherm were chosen (340 kW_{el}, 490 kW_{th}). The compact module could be lifted by means of a forklift into the first floor. Due to a particular vibration absorption, no basement was necessary.

For reaching 7000 operating hours per year and a sound economical pay-back time the cogenerator was additionally coupled to the cold production of the plant by means of an absorption chiller. Variabilities in heat demand are compensated by an 8 m^3 buffer store, charged by the cogenerator. The system is completely controlled by the building controller calling the cogenerator operation and, if necessary an auxiliary heating boiler.

Eventually occurring operation errors are communicated by fax, SMS or email by Sokratherms Telemanager system. It also allows for a complete evaluation of operation data and an online modification of operation parameters. This system is used by both, Stadtwerke Crailsheim and Sokratherm.
The employed industry gas motors in combination with synchronic generators allow for a very secure and stable electricity and heat generation. The 'hot chiller' model additionally allows for the combination with an absorption chiller

Results

Due to the efficient use of natural gas with an overall efficiency of 90 %, about 30 % of primary energy are saved with respect to conventional plants and boilers. NO_x emissions of about 20 % and CO_2 emissions of about 60 % are avoided. These correspond to 3000 tons of avoided CO_2 emissions per year.

Financial resources and partners

The total investment volume amounts to 800.000 €.

Lessons learned and repeatability

Common solutions between utilities and industry enterprises are possible.
Effort has to be invested to convince industries for technical solutions of 10 to 15 years pay-back time.
In case cold generation is included, do not forget about existing heat generators.
Absorption chillers are available from 15 kW upwards.

Contact for more information:

Organsation / Agency:	EBO Consult
Main contact:	Mr. Erik Christiansen
Address:	Hvidovrevej 137, DK-2650 Hvidovre
Tel:	+45 3638 3800
Fax:	+45 3638 3801
E-mail:	erik.christiansen@ebo.dk
Web Site:	www.solcellelauget.dk

Germany

Intracting

Summary
For many years, budgetary constraints have prevented numerous local administrations from undertaking effective and necessary energy conservation investments. Individual local authority departments have often been unable to implement measures themselves. The city of Stuttgart has developed a new financing system termed 'Intracting'. This takes up the idea of contracting but operates entirely with city administration budget funds. It has done so since 1995, with growing success.

Objective

The Energy Management Department now has 3 divisions with a total of 12 staff, including 5 master craftsmen and technicians and 6 engineers. It is responsible for energy efficiency in 2,000 city facilities. These facilities include kindergartens, schools and administrative buildings as well as indoor and outdoor swimming pools, hospitals and sewage plants. Each of the staff in the energy service administers between 20 and 65 facilities, depending upon their size and complexity. Through numerous on-site visits, the energy service staff gain intimate knowledge of their facilities and are thus frequently in a position to propose technical improvements. The energy bill of the city (for electricity, heating energy and water) figured Euro 35 million in the year 2000.

Process

In many municipalities, budgetary constraints have been preventing the performance of effective and necessary energy conservation investments for several years now. In the past, in many cases the individual local authority departments have not been in a position to implement proposed improvements. Departments have rather focused upon user satisfaction, attractiveness or image. Thus often only small measures could be realized within the context of ongoing building maintenance. In many cases, measures of budgetary relevance could only be implemented with several years delay or not at all. Moreover, in the past the individual department derived no benefit from saving energy. Energy funds not consumed could not be channelled to other purposes. Often the dilemma also arose that the property budget had to provide the investment finance for larger measures, while it was the administrative budget which benefited over the long term from the lower energy costs. A need was thus perceived to create a financing system which permitted the short-term implementation of cost-effective energy conservation measures.

Financial resources and partners

Investments are financed by the Environment Department from a special budget item, to which the energy cost savings are later returned. Consequently, such an item can be set up for a limited term. Over time, the budget item is replenished from ongoing savings, so that, after an initial start-up phase, further funds can be made available for new intracting measures. The Environment Department thus grants an earmarked, interest-free loan to the host department. No mark-up for business risk and profit or for interest on capital deployed is incurred.

An intracting arrangement thus also involves different responsibilities and duties. While in a contracting arrangement it is expected that the external contractor makes the innovative energy- and cost-saving proposals, this service, too, must be provided by the city departments. The investment costs actually incurred can be assessed exactly within the city administration. Part-financing is also possible, for instance for facade insulation or boiler replacement.
The Energy Management Department adopts the role of contractor vis-à-vis the host administration, and is responsible for analysis, forecasting and monitoring. It is important in this context that only the engineering services associated with planning are provided by the Energy Management Department. As in other types of building work, the city's Construction Department awards contracts for work after calls for tenders to efficient and competent companies. This form of financing promotes the willingness of the departments involved to take responsibility. The Energy Management Department has responsibility for the measure in question. A painstaking analysis of the potential energy savings and an economic evaluation based upon the costs identified by the Construction Department are essential in order to actually realize the forecast energy cost savings. It is thus clear that such a financing system can only function if the administration commands over expertise independent of the host departments.

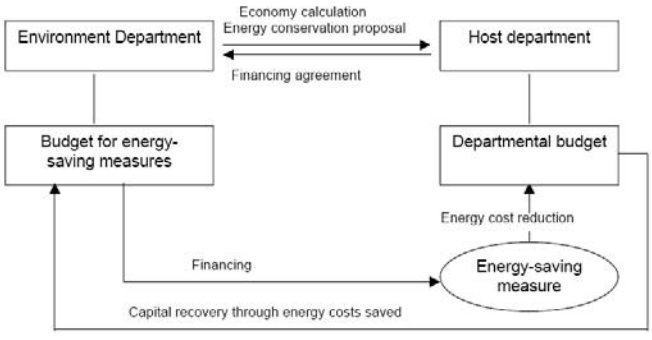
Results

The intracting approach developed by the city of Stuttgart has in the meantime become a model for a great number of local authorities in Germany (particularly in the regional state of North-Rhine/Westphalia) and Austria. In Stuttgart, a total of Euro 3.32 million has been invested in 158 individual projects between 1995 and 2001.

The annual savings generated by the projects figure 12,300 MWh heat, 1,500 MWh electricity and 31,700 m³ water. Reduced consumption is not the sole source of cost savings in all projects – in some projects technological measures are financed in order to reduce the power, gas or district heat capacity requirement (maximum demand). Total capacity savings to date figure 1.88 MW district heat, 1.34 MW gas and 0.27 MW power.

Lessons learned and repeatability

Under today's conditions, the financing model presented here offers a highly promising option for promoting
vigorously the implementation of energy conservation measures. A precondition to this approach is that
there is an office within the administration which, firstly, can provide a technical appraisal of potential
measures and, secondly, has an overview of potential savings throughout the entire administration.



Structure of the financing model of the city of Stuttgart (source: Stuttgart city administration)

Contact for more information:

Organsation / Agency:	Landeshauptstadt Stuttgart Amt für Umweltschutz
Main contact:	Dr. Volker Kienzlen
Address:	Gaisburgstr. 4 D 70182 Stuttgart
Tel:	+49 711 216 – 22 41
Fax:	+49 711 216 – 24 13
E-mail:	u360500@stuttgart.de

Germany 5

To be completed

Summary

Objective

Process

Financial resources and partners

Lessons learned and repeatability

Results

Contact for more information:

Italy

Bike Office for a sustainable mobility

Summary
The project Bicycles for a sustainable mobility is active since 1995 with the main aim to promote the use of the bicycles as a mean of transport. To this purpose a Bike Office has been created in order to interrelate with all the sectorial and hierarchial level for fostering the use of a bike in urban area.
The optimisation of the activities, from tourism to viability, form environment to culture, is the main local aspect but one of the main commitment is the exchange of experiences at European level through European network like Cities for Cyclists and thematic conferences. Main tool is the City Bike Plan that non only defines the bike network but also widens the actions to different levels towards bike mobility. One of the main results is that that the use of scooter and motorcycles by youngster is approx. to a rate of 44%.

The project Bicycles has started and developed thanks to a rise in the consolidated use of bikes.
The awareness of being one of the main italian city that promotes the use of bikes has also urged the city to share information and experiences also with other European experiences: this has allowed the city to candidate for hosting the Intl Conference VELO CITY, to take part to this international yearly conference with its own contributions. In 1999 the European Commission DG XI has published the document 'Cities for bicycles, cities for the future' where Ferrara is presented as best practice. Ferrara has also participated to co-funded European projects such as SAVE II- Cycling proposal for the promotion of the optimal use of energy in individual transports, by the OMS, and in the Project BYPAD, by the ECF for the optimization of the use of bikes in the urban area.

Objectives

The main problem encountered is to raise awareness on the equal role of the bicycles compared to the traditional means of transport. The excessive segregation of the bikes to only the bicycle path would have been too reductive and would have reduced the mobility. Therefore the Bike Plan foresees that the city center is an area where the bicycles can move freely while in outside the city center there are proper bicycle radial path (foreseen 7, 4 done) that allows to reach the outskirt of the city.
One of the main problem is the accidents rate in order to reduce the risks.
Main objective is the security of bikers in main city points, selected by the PUT (Urban Transports Plan) and financed thanks to the Law 366/98 (regulations on the financing of bikes mobility).

Process

Main phases and activities:

- 60s: closure of the historical city center to all vehicles
- 1995:introduction of the Bicicard, a card available for tourist that provides free parking outside the city center and a bicycle for the stay, plus discounts at restaurants, shops and free entry to city's museums.
- BICIPLAN, that sets up the development of bicycles paths. There are currently 80km of bike paths and more project on the creation of the radial paths around the city center focusing also on the security of bikers.

- Communication plan: the slogan Ferrara-Bicycles city has been advertised in different ways all around the city: traffic signals, on buses, on sugar envelopes. This has lead also to set up the city of Ferrara as example in Italy and this is testified by the interest by the mass media (television, internet, magazines, newspaper) and the European Commission.
- Leaflet green Tourism in Ferrara, city of bicycles
- Updated information on the municipality's magazine 'Piazza Municipale'.
- Creation of a national Working Group that gathers all the Bike offices all around Italy
- Project 'W la Bici' for students 8-14 years old: the Bike office has made some educational events in order to involve the students in the use of bicycles. Currently, 20% of the students use the bicycles to reach schools.
- Project 'By bike to the workplace', for promoting the use of bicycle towards the place of work
- Public bicycles in the exchange parkings.

Results

The main result is the social awareness that the bicycles are a resource. This has also been done by putting some public advertisement on Ferrara- City of bicycles all around the city. The message has been welcomed by different actors, hotels, banks, car sellers. The second result is the employment. The rising bicycle us has fostered the investments in this sector. The third result is the mobility :the awareness raising on the issue has promoted a high mobility on bike in every season, thus reducing the CO2 emissions and noise within the city area.

Financial resources and partners

Some of the activities are supported by the private sector or in co-financing with some other organisations. The infrastructural issues are covered by municipality's resources and by the 20% of the fines.

Partnership:

Local authorities
Local authorities Networks
Public societies: ARPA, Ferrara TUA (trasporti urbani autoparking), A.C.F.T (Azienda Trasporti), AMI (Agenzia della Mobilitài)
Environmental asscoiation: F.I.A.B, Legambiente, WWF, Italia Nostra, LIPU
Unions: Camera del Lavoro, CGIL-SPI, FNP-CISL, UIL Pensionati, Cupla-CNA, Confesercenti, ASCOM.
Industrial associations: ANCMA, Aziende e Società di privati a vario titolo coinvolte

Lessons learned and repeatability

Due to lack of experiences at italian level, the strategies adopted have requested long elaboration period and some uncertainties.
Problems encountered:
Delay in infrastructural actions (mainly bureaucratic and administrative)
Difficulties in inserting the innovative management of bicycle mobility within the municipality administration (due also to a road code that doesn't' consider the bicycle use)
European experience not applicable fully to the Italian context.

Contact for more information:

Project Web Site:	www.ufficiobiciclette.it
Organsation / Agency:	Comune di Ferrara
Main contact:	Gianni Stefanati
Address:	via J.F.Kennedy 6
Tel:	347.7200986
Fax:	045 3638 3801
E-mail:	biciclette@comune.fe.it
Web Site:	www.comune.fe.it/biciclette

Italy

Energy Efficiency Plan

Summary
Implementation of energy savings policies and control on the CO2 emissions and other kind of pollution, that intervenes in 7 areas energy purchase on a competitive ground in the free market (savings of approx. 40.000 euros); public lightning (for instance 95% of the low efficiency bulbs have been replaced); traffic lights (savings of 217,3064 MWh, equal to 19,56 tep/year and 143,7 t of CO2); assessment of the electric and thermal efficiency of buildings (reduction of electric consumption of 6260 KWh/y, equal to 4,1316t of CO2, reduction of 104,316 kg of particulate and 3.047.753 kg of CO2 by using natural gas); public means of transport (a saving of 1.000kg of Co2 and 40 Kg of PM10); Photovoltaic system (savings of 13.000 Kg of CO2); campaign 'Good practices in Padova that raise awareness within the local administration and towards the citizens so as to adopt sustainable lifestyle.

Objective

The strategy is based on two main principles: the reduction of consumption through an improvement of efficiency in the production, distribution and consumption of energy; the less use of pollutants fuels and a more use of renewable sources of energy.

Weaknesses: lack in sensitivity and of knowledge of politicians and technical personnel.

Objectives: to set up a energy policy with long terms targets but feasible.

Strategy: commitment, personnel training, Municipality's reduction of energy costs, promotion of new kind investments (ESCO)

Relations: to motivate politicians showing them possible outputs (economical and environmental).

Process

The initial assessment on consumption and inefficiency of the municipality's properties is the start for the optimisation of the energy efficiency of buildings, of the vehicles and all the municipality's properties. Afterwards, the analysis of the data collected and the evaluation of the interventions to make for the reduction of consumptions, the promotion of energy and economic savings.

Then, an energy efficiency plan has been set up: a planning tool that gives information on the use of energy resources with priorities of actions.
The area of interventions are the following:
- Suppliers
assessment of contracts with energy suppliers and the detection of energy suppliers on a competitive ground.
- Public lightning
substitution of old systems and of the low efficiency bulbs; substitution with high efficiency bulbs and other actions to regenerate old low efficiency systems with new and more efficient ones.
- Traffic lights
substitution of nearly 1400 100W light bulbs with 15W LED lights with a lifetime of more than 80.000 hours (10 years)

- Buildings
evaluation of energy electric and thermal efficiency of 110 buildings owned by the Municipality. Intervention whenever possible: substitution of bulbs, automatic control of lights using sensors and time control, control of boilers and possible substitution, improvement of insulation or a better settings of heating systems

Results
Energy Purchase: savings of approx 40.000 euros per year
Public lightning:
evaluation at the end of project: electricity savings of 6.543.000 KWh/y , energy savings of 627.500 euro/year; 4.318 t/Y of CO2 emissions, 4.327.500 euros cost of the operation.

Traffic lights: for the substitution with LED lights it is foreseen: a minor consumption of electricity of 287 MWh, 190t of CO2 emissions, 463.000 euros of costs for all interventions. To date, the savings is 217,3064 MWh, equal to 19,56 tep/year and 143,7 t of CO2

Electric and thermal efficiency assessment of buildings: (22 primary schools, 57 secondary schools, 16 public buildings, 15 sport centres)

Estimated electric consumptions:
annual energy savings of 339.023 kWh, annual economic savings of 56.956 euros (to date, the reduction of electricity consumption is 6.260 kWh/y, equal to 4,1316 t of CO2)

Estimated thermal consumptions:
avoided 5.270 t of particulate, 154kg of CO2 (to date, a reduction of 104,316 kg of particulate and 3.047.753 kg of CO2 has been achieved due to the use of natural gas).

Municipality's vehicles
(substitution of 20 fossil fuel vehicles with bio-fuel vehicles, with and hypothesis of 20000 km per year): the estimate is a saving of 1.000 kg per year and 40kg of CO2)

PV systems: saved 13.000 kg of emission of CO2, cost 143.00 euros

- Municipality's vehicles
substitution with Biofuel cars and transformation of fossil fuels cars to biofuel cars, building a one or more natural gas stations, substitution of small and old vehicles and motorcycles with electric vehicles.
- Renewable sources
an exchange area with the metro tram has been equipped with a PV system that is used both for parking and PV generator.

Financial resources and partners
The Plan has been fully financed by the Municipality of Padova resources and through contracts with ESCO.
Partners:
Environmental sector, Municipality of Padova
Technical Sectors within the Municipality
Società Polo Tecnologico per l'Energia (Trento), for the creation of the project
Utilities: : Acegas-APS, APS Holding, APSLIGHT, for some parts of the interventions implemented

Lessons learned and repeatability
The project and its implementation has involved different sector within the local authority that usually encounter some difficulties in cooperation. It has also created a new sensitiveness on environmental issues and a new work methodology.
He project has proved to be innovative for renewing the activities and reducing the environmental impact of the Municipality, with the involvement of personnel and politicians, the technical training, involvement of the stakeholders and firms that actively work with the municipality.
It is an initiative by the Municipality of Padova and it has a high replicability.

Contact for more information:

Organsation / Agency:	Commune di Padova
Main contact:	Daniela Luisa
Address:	via Vlakovich 4
	35126 Padova
Tel:	+39(0)49 8022488
Fax:	+39(0)49 8022492
E-mail:	padova21@comune.padova.it
Web Site:	www.padovanet.it

Italy

InfoEnergy Point

Summary
The inhabitants of the City of Verona are the main target of the project but the information Point is contacted also by other actors as well (citizens, professionals, enterprises) also from other cities in the area. Due to the website (www.comune.verona.it) and to the participation of the city of verona in thematic trade fairs, the office has been contacted also by actors form other regions.
The InfoEnergy Point of the City of Verona has been promoted in 2005 by Legambiente and CdR Environment of the municipality in a co-financed project of the Service Centre for Voluntary sector of the Verona area. The project has been inserted in the Table on Energy of Local Agenda 21 in the Local action Plan approved afterwards by the municipality. Since September 2006, the experience is still going on, promoted and supported entirely by the municipality of Verona within the Local Agenda 21 process.

Objective
Education on the Energy savings issues and the use of renewable sources thanks to an updated punctual information on:

- Fundings, permits and regulations, tax refunds for the use of renewable sources systems.
- Good practices on energy savings.
- Training courses, events and trade fairs at regional and national level.

The office provides also basic technical knowledge on the renewable sources, provides list of private sector enterprises working at national and regional level, information on services and produce, specific magazines and reports.

Process
Organizational issue:

- Collection of specific legislations
- Collection of publications from associations and bodies on the energy issues
- Collection of information from the private sector
- Organization and participation to public events (conferences, trade fairs etc) for the promotion of the activities and information for the citizens

Financial resources and partners

Currently the activities of the InfoEnergy Point are entirely supported by resources of the Municipality of verona.

Beside of the first partnership between the municipality and Legambiente, it must be underlined that the organization and the participation of the Office to conferences and other events has also been developed with utilities (AGEC, AGSM), other municipalities or sectors and associations. These contacts have been also made possible by the insert of the project in the LA 21 process.

Lessons learned and repeatability

The Office has proved to be a very useful tool to get in contact with the citizens for tackling the questions and the lack of information on energy savings and renewable sources issues, a tool for monitoring the technical and administrative difficulties in front of the citizens willing to implement energetic regeneration of its own building.
The project is replicable for every subject, public or private

Results

Since the beginning, the contacts are rising thanks to the promotion and to the rising interest from the citizens and society in general (institutions, mass media, market actors) in the energy and environmental issues.

Contact for more information:

Organsation / Agency:	Municipality of Verona
Main contact:	Agenda 21
Address:	Via Adigetto
Tel:	+39(0)45-8078763
Fax:	+39(0) 0458004488
E-mail:	agenda21@comune.verona.it
Web Site:	n/a

Italy

Sustainable condominiums

Summary
I edition: 4 buildings in Barco, Circoscrizione Zona Nord,in the outskirt of Ferrara, 85 apartments (2/3 owned by the Azienda Case Emilia-Romagna, project partner)
II edition: 1 building with 20 apartments in circoscrizione Giardino-Arianuova-Doro in Ferrara outskirts, selected
The project's aims is to involve the families in the buildings in the implementation of ' Environmental management systems' in order to gain, through raising awareness on sustainability issue and on the technology available, a reduction of environmental impact of the condominiums and a economic savings for the residents involved.
The project has been very successful. The age of the residents has proved not to be an obstacle: on the contrary the project has proved that it is possible to have successful educational activities not only towards the schools

Objective
The main objectives are:

- Disseminate in the families the awareness that also ordinary behaviour have impacts on the quality of environment, by stimulating the adoption of environmental good practices;
- To explain the economical advantages due to eco-sustainable approaches, mainly related to domestic energy savings (water, gas, light) and to the advantageous solutions jointly life in the buildings may bring.

Process
I edition: December 2002- March 2004 (project cofinanced by Region Emilia Romagna within the Call for Posposal INFEA-Informazione Formazione Educazione Ambientale (Environmental Information Training Education;) II edition March 2004-February 2006.
The II edition was made up pf 7 phases:

- The choice of the Condominium
made through a call for proposal, focusing the selection criteria on some type pf buildings more proper that others for the activities to realize (for instance the presence of a condominium green area for a possible compost area)

- The initial phase:
it represented the moment of acquaintance, the project and its objectives and aims have been presented, the methodology of monitoring explained (initial environmental analysis, assessment *in itinere* and final assessment) end the action programme for education, the expected commitment form the residents explained and their needs listened to. A questionnaire has be provided in order to make the initial environmental analysis and 12 forms to be filled in for the collection of information on monthly consumption of water, gas, electricity and waste production. To the meetings, some of the people involved in the I edition were attending on order to better explain their experience and to motivate the new residents involved in the implementation of the project.

- The initial environmental analysis:
its aim was to highlight the main environmental behaviors and to detect the main causes of pollution linked to the life inside the buildings. This was done in order to detect the area of interventions.
This was very important so as to assess the start situation and to provide the opportunity for an assessment (*in itinere* and final) so as to better stress the environmental improvements the changes in the residents behavior, end energy savings.

- Raise awareness
different meetings on information/trainings on the issues involved has been organized. Each meeting focused on a different issue in order to deepen every issues and to have time to debate on them. Manuals and documents were provided to the residents (such as the manual Ecoidea by the Province of Ferrara and leaflets from ENEA). The issues tackled were: the domestic water savings, waste-from reduction to purchase to recycling, Energy savings with air condition and heating systems, the EC labels, sustainable mobility, responsible tourism, some guided visits have also been organised to water treatment plants, to waster recycling plants, to a private house with PV panels and solar thermal systems.

Results

On going assessment: every month 8 forms in average have been distributed, with a peak in July 2004 and a minimum in December 2004. The data represents an average per family, dividing the sum of all the results per month per number of forms collected. The time period concerned, form May 2004 to June 2005, is not enough for assessing significant reduction in the water, energy and gas consumption. It shall be allowed to compare the data of July 2005, for instance, with the data from july 2005 to see if the project has started a successful cycle. The main result is that there has been a decrease in the waste production due to the compost area in the public green area and a rise in % of the number of families that recycle paper, dangerous waste, glass, cans and oils

- Implementation phase
this phase involved real actions that the residents can do for their savings, accordingly to what emerged form the previous meetings. Water reduction systems were used in every flats were provide (such as the ones for the reduction of water use). A compost area has been put in the green public area (and in the green areas of neighbor buildings as well) and some manual for composting have been distributed, together with compost bins. The feasibility of a solar thermal plants for sanitary water has also been done.

- The on-going assessment
for the whole period of the project the residents have been asked to monitor, using the forms provided, their consumption of water, electricity and gas and the quantity and type of waste each month (every end of the month).this has allowed the residents to better understand their consumptions and to keep monitored the success of the education/training done so far.

- Final assessment
using the same form provided at the beginning in order to see if the meetings were successful in reducing the residents consumptions.

Financial resources and partners

Different associations/firms have been contacted throughout the whole period of the project:
For instance, in the I edition the following have been involved: Azineda casa Emilia Romagna, for the installation of three PV lamps, HERA Ferrara for the guided visit and for the water flux reduction tools
COOP Estense, for providing Ecolabel products, Circoscrizione Zona Nord in the City of Ferrara for logistics support and for attending some of the events, I edition: 30.000 euros (co-finacing by the Region Emilia Romagna 15.000 euros)

Lessons learned and repeatability

The key aspects are the integration between the participative methodology of LA21 and the implementation of a environmental management system such as ISO 14001 and EMAS, by making an initial environemntal analysis on the possible impacts, then the residents decide the actions to be taken, followed by a monitoring phase, internal (the families check for their consuption) anmd external (this allows the promoter to understand the succes of the initiative).

Contact for more information:

Project website:	www.provincia.fe.it/agenda21/condominisostenibili
Organsation / Agency:	Provincia di Ferrara Assessore Ambiente Agenda 21 locale Cooperazione internazionale
Main contact:	Sergio Golinelli
Address:	Corso Isonzo 105/a 44100 Ferrara
Tel:	+39 0532 299530
Fax:	+39 0532 299573
E-mail:	sergio.golinelli@provincia.fe.it
Web Site:	www.provincia.fe.it/agenda21

Italy

Project MicroKyoto

Summary
Currently 27 municipalities and one Mountain Area have participated, through the signature of a protocol. The participation to the project is always open for all the municipalities in the provincial area.The project has been realised by the Group ' Energy and climate change' of the Province's of Bologna Local Agenda 21. It has been promoted by the Province of Bologna and it was also co-funded by the Ministry of Environment (call for proposal 2002 on LA 21 Processes)
The project (approved by decision of the Province of Bologna' council) is based on the definition and the signature of a Protocol called MikroKyoto Protocol: with this document the local authority commits itself in realising one or more actions in the reduction of greenhouse gases. At the end of each year, a final balance on the actions taken and on CO2 emission reduction is drawn. Local Authorities commit themselves in :1) providing data on the emissions reduction due to the actions implemented; 2) realising training and educational courses, raising awareness on climate change; 3) cooperate, coordinated by the Province, with other signatories to strengthen the individual and combined efficiency of policies and measures adopted.

Objective
The main obstacle for the project is that Italy is far from reaching the Kyoto Protocol objectives (in 2010 Italy should reach potential emissions rate of approx 579,7 Mt-CO2eq form a real 487,1 Mt CO2 eq).
The main aim is the effective implementation at local level of actions for contributing to the reaching of these objectives.
The on-going strategy is coordinated with the Provincial Energy Plan and foresees the involvement of local authorities through the signatory of the MicroKyoto Protocol. Several communication and raise awareness actions to citizens have also been done.

Process
Project implementation: 7 phases

- Set up of a Working Group that has also written the MicroKyoto Protocol and now meet up regularly in order to agree on the joint activities and to work on the technical aspects linked to the implementation of the Protocol.
- Definition of a list of possible 'structural and management' intervention, attached to the Microkyoto protocol. A standard calculation methodology has been also provided for the quantification of CO2 emissions savings, accordingly with the policies of energy savings from the Ministry of Environment (D.M. 20/07/2004).
- Creation of a database with all the interventions by the municipalities, listed and measured (www.provincia.bologna.it/ag21/microkyoto.htm). In 2006 best practices have been selected and awarded with awards made by the art school students within the provincial area.
- Organisation of information point in cities' centres on the project and energy savings and for the promotion of low energy consumption bulbs. In 2006, a competition between involved cities on energy savings took place.
- Survey on 120 families, residents in 6 blocks selected. Building characteristics and residents behaviour on energy issues have been analysed, in order to detect some possible action to do for the promotion of energy savings behaviour.

- Thematic Forum, for citizens, municipality's technical personnel, for firms. Thematics: ESCO, Energy, Photovoltaics, solar thermal, biomasses, good practices for the greenhouse gases, sustainable buildings , energy savings at home.
- 4 University Thesis on the project' issues (together with the University of Bologna, Department of Engineering)

Started in 2004, the project have reached its first goal on the 18th of may 2006 with the signature of the Protocol. Currently, the phase of commitments is going on

Results

- 27 municipalities and a mountain areas have approved and signed the Protocol
- Realisation and publication of the Database on the internet
- Savings so far produced: 11.128 Tons of CO2 with the intervention described in the database
- Survey on energy consumptions in 120 families in 6 blocks
- Distribution of 1800 low energy bulbs
- Involvement of art schools in this project
- 10 thematic for a for citizens and technical personnel
- 4 master thesis on issues linked to the project
- Involvement of 5 schools (tot 160 children) in activities connected to the energy issues

Financial resources and partners

From 2004 to may 2006, the financial resources available were 85.000 euros, of which 27.000 euro by the Province of Bologna and 58.000 euros from the Ministry of Environment.

Costs:

1. personnel: 32,64%
2. External collaboration: 46,64%
3. Durables goods
4. Consumables : 20,72%
5. Other costs

The working Group 'Energy and climate change' is made up of the following local authorities/associations:

Arpa sez. di Bologna, Ass. Amici della terra di Ozzano, Ass. Terzo Millennio, ATC, Municipalities of Bologna, Monghidoro, Granarolo, Federazione Italiana Amici della Bicicletta di Monte Sole, Ente Parco del Corno alle Scale, Gruppo Hera, Conf. Nazionale Artigianato, Adiconsum, AUSL Bologna.

The realisation of the project was coordinated by the LA 21, communication and education Office and the Energy Office of the Province of Bologna

Lessons learned and repeatability

Innovative and pivotal features: the network between local authorities and other stakeholders of the LA 21Forum highlights the efforts for reaching the Kyoto Protocol objectives.

Replicability for dissemination: the Protocol is easy to use by the municipalities and the contents can be easily adapted to different realities. Soma project actions are currently used in other realities. For instance, the competition between municipalities on energy savings in 2006 has been adapted and made also for schools in 2007.

Participation: the project started within the LA 21 process and it has been developed with a LA21 methodology.

Efficacy: the municipalities involved have 70% of the inhabitants of all the provincial area

Strategic features: the Protocol contents has been approved by the municipal councils. The contents is functional to the provincial energy plan.

Contact for more information:

Project Website:	http://www.provincia.bologna.it/ag21/microkyoto.htm
Organsation / Agency:	Provincia di Bologna Settore Ambiente
Main contact:	Caterina Alvisi (Uff. Agenda21) Danila Benfenati (Uff. Energia)
Address:	Via Zamboni 8
Tel:	+39(0)51 6598469(Uff. Agenda21) +39(0)51 6598040 (Uff. Energia)
Fax:	n / a
E-mail:	agenda21@provincia.bologna.it
Web Site:	www.provincia.bologna.it

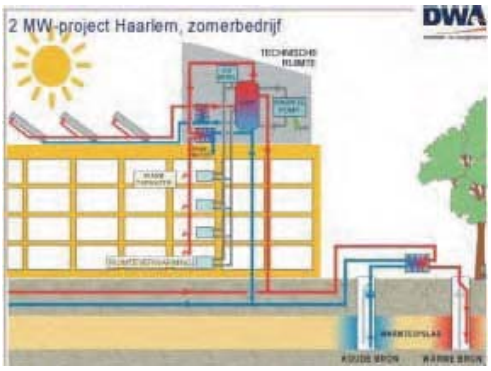
The Netherlands

2 Megawatt

Summary
In the city district Schalkwijk of the municipality of Haarlem, three housing associations, together with an energy company and the municipality of Haarlem have developed a unique project with the use of Solar Thermal technology. Through this technology it is possible that 382 rental apartments are supplied with heat during winter times. The application of the new technology reduced the energy consumption per apartment by 50% and the reduction of emissions of CO_2 decreased by 70%, compared to the former situation. The total project implied no increase in the tenants' rents and an investment of app.€ 47.500 per apartment, with a return on investment time of fifteen years by full exploitation of the apartments. Total investment costs were approximately € 10 million euros

Objective
In order to increase and improve the liveability of the city district, the municipality formulated the master plan 2000+. Within this vision, sustainable energy sources and technologies are key drivers in the redevelopment of the area. Housing associations and municipality worked closely together in order to renovate the existing apartments. Joined by the expertise of Eneco, a Dutch energy company, the project was detailed and contracted. The apartments were equipped with solar energy technology to deliver space heating and heated water.

Process
Project management consisted of three task groups: finance, communication and technology. Individual discussions with the tenants were held in order to involve the inhabitants in the project. The project management wanted to fulfil as far as possible the demands and requirements. Each of the three housing associations, together with the municipality and the energy company had their own role in the project. The enthusiasm of each project partner contributed to a great extent to the realization of this highly innovative redevelopment project. Solar panels were installed on the roofs of the flat buildings, to capture heat from the solar radiation and exchange this with water pipelines. This warm water is used in the floor heating and hot drinking water. Individual boilers could increase the temperature of the needed tap water. Ultimately, excess warm water was stored in aquifers at a depth of 110 metres below ground level, to be used during winter or colder periods.
The increase of liveability of the apartments was a strong motivator for the tenants. The tenants were enthusiastic about the refurbishment of their apartments. They could say goodbye to their old and outdated geyser and heating appliances. The refurbishment of the apartments improved their energy efficiency and energy consumption was from now on billed individually, instead of collectively. This increased the awareness of tenants in the use of energy daily and individual energy savings were awarded. Lastly tenants were not charged with the expenses of their new high efficiency combination heating boiler.



During construction phase of the project, several difficulties were encountered by the project management. The subcontracting of the project activities to three individual construction companies encountered problems. During the preparation and pre construction phase of the project, tenants had nuisance of the different activities of the construction companies. This led to relationship disturbance between tenants and housing associations and construction companies. Ultimately, when construction was finished, the relationship was restored.

Results

This highly innovative heating system has a capacity of approximately two Mega Watt, hence the name of the project. The total investment costs were 10 million Euros. All 382 apartments or nine flats were equipped with or connected to the newly constructed solar heating system. The installation saves an emission of 1500 tonnes of CO_2 per year. A saving of the use of 850.000 m^3 natural gas is realised. The constructed system is labelled the most "sustainable heating system in the Netherlands".

Tenants had some difficulties and nuisance to overcome during construction but are pleased with the results. Together with the isolation measures, individual energy consumption is reduced by 5%, of which 70% is produced by renewable and sustainable energy sources. The efficiency of the solar panels is four times the normal efficiency of photo voltaic panels.

The target group of this project, the tenants, have experienced an increase in their liveability of their homes and a decrease in their energy costs. Also energy costs were accounted and billed to tenants individually, instead of collectively as in the past. This increased the awareness of energy consumption of the tenants. Energy saving and good practice in energy use is thus been awarded. In the table below the main data are presented of this project

Financial resources and partners

Costs of the 2 MegaWatt project, being in total 10 million euros, were covered by investments made by the municipality of Haarlem, financial aid (subsidies) by SenterNovem, the ministry of Housing, Spatial Planning and the Environment and the province of Noord Holland. Investment costs per apartment were approximately € 47.500, =. Project management consisted of the three housing associations: "Elan Wonen", "Pré Wonen" and "De Woonmaatschappij" . Other partner involved was the energy company Eneco

Lessons learned and repeatability

The main lessons to be learned from this project are encountered during construction phase. Working with a large variety of companies brings problems with project management activities according to schedule, budget and resources. Tendering the contract to three construction companies made the process more dynamic and complex. This is not recommendable. Also the problems with the tenants provided lessons from this project. More attention should be given to the nuisance experienced and wishes of this target group. This project can be multiplied and replicated on numerous locations in Europe. The application of innovative technology in the building environment with mature sustainable energy technologies have been a success. Factors that contributed to the success of the implementation were mainly the high enthusiasm of the project team members. The municipality of Haarlem is very proud of the realisation of the solar heating system in Schalkwijk. The success of this pilot project is an example for other projects. Experiences gained and maturity of the concept will decrease investment costs, research costs, communication and development costs. It is to be expected that next comparable projects will benefit from these experiences.

Contact for more information:

Project website:	www.2mw.nl
Organsation / Agency:	SenterNovem
Main contact:	Mrs. Myrthe Stevens
Address:	Catherijnesingel 59 3511 GG Utrecht
E-mail:	m.stevens@senternovem.nl

The Netherlands

Nieuw Wolflaar

Summary
This project provides a unique example of a district level heat pump on the scale of 350 dwellings. The municipality of Breda has in its policy the goal to develop new districts with a 25% CO_2 reduction above the legal obligation. This is goal is reached in the new district in Breda named Nieuw Wolfslaar, with the use of a district level ground source heat pump system. A housing corporation and a developer built this site and the energy company was responsible for the realization of the energy infrastructure and communication. The costs as compared to a conventional solution were 2270 euro per house higher. This difference could be financed by a subsidy.

Objective
The municipality of Breda aims for a CO_2 reduction of 25% of the energy use in the district Nieuw Wolfslaar related to conventional energy-use (gas and electricity) and a construction of the buildings in compliance with the actual regulations (2005).

Process
The following steps have been taken in the process of realisation of the district:

- Energy vision
- Market scan
- Decree (municipality) for heatpumps
- Making a list of requirements
- Tendering
- Contract

From the energy vision and market scan two options - a combination of gas supply and solar water heater for every house, and heat distribution with the use of heat pumps - were found to be good options for this district. Because of the high comfort and environmentally friendly method the last option was chosen. A precondition was a decree by the local council. In this decree the decision was made that developers are obligated to facilitate each house with an individual electric heat pump and a high energy performance
The municipality started the tendering in close cooperation with the real estate developers. A list of requirements was made as well as a list of potential contractors. Secondly, the tender process was from this phase on was done by a developer. She made a selection of the contractors, the temporary contract and the negotiations to detail the specifics in the agreement. Following, actions need to be specified in order to secure the supply of energy. Specifics on this topic were negotiated and discussed which steps and actions where to be done by what partner of the project. The developers, already been selected, were given the status of “candidate” developer. The responsibility of the security of energy supply was put onto the developers.

To secure the quality of the delivered services by the developers in the future, the energy company were given the right to maintain and operate the heat pump system. It also owns the system (outsourcing). The duration of the contract is 30 years. The pricing was chosen to be realistic as compared to conventional options given the same environmental ambitions. Based on that calculation a tender was made. Eventually, energy company REMU (later Eneco) was selected from this tender process.

Results

The district is being realised.
25% CO_2 reduction in comparison with Energy Performance Coefficient 1,0.
Enhanced comfort and reduction of draft through low temperature heating and cooling.
Reduced costs for user of collective heat pump through coupling of fixed costs on CPI index

Financial resources and partners

Main financial characteristics are:
Municipality of Breda: direction, stimulating
The extra investment per house is € 2270,- (subsidised)
Real estate developers and housing corporations: realisation.
Energy company: implementation, communication

Lessons learned and repeatability

The municipality formulated this form of heat delivery as a requirement to project developers, which was unique. The contract specified furthermore that the developer should bear the responsibility of process management. Together with formal meetings and contract negotiations, the municipality took initiative to meet and discuss the project informally before the project took shape in the initiation phase of the process. These informal meetings were beneficial for the process as well as the project. The decision taken was broadly supported by the project partners. The project partners were being consulted and their problems and visions were also brought into the project, thus strengthening the commitment of the project partners. Also within the municipal departments efforts were made to combine meetings with all relevant municipal experts. Multi-disciplinary meetings within the municipal department experts enhanced the commitment and decreased communication problems. Furthermore, scheduling and deadlines were made explicit and discussed in the initiation phase of the project; this consumed a lot of time, but smoothened the process in latter phases and prevented disputable situations and / or organisational faux pas. Also, the process was deliberately designed to postpone signing of agreements and contracts to a latter moment in time. This had the advantage to create more commitment of the project partners and keeps them “on edge” and aligned with communication and exchanging of knowledge.

Contact for more information:

Organsation / Agency:	Municipality of Breda
Main contact:	Mr. P. Paree
Address:	Claudius Prinsenlaan 10 4811 DJ Breda
Tel:	+31 76 5294936
E-mail:	pg.paree@breda.nl
Web Site:	www.woneninnieuwwolflaar.nl

The Netherlands

Biomass energy plant

Summary
In 2005 a biomass energy plant was constructed, on the initiative of a landscaping company. The biomass, such as lopping and crops is collected by a department (parks and landscape) of the municipality of Sittard- Geleen. The biomass energy plant (owner is Essent, a major Dutch energy company) produces electricity and delivers heat to a nearby district. The biomass energy plant has a capacity of 25000 tonnes of collected biomass. Its electrical production capacity is app. 8 MW and thermal power is 4.8 MW.

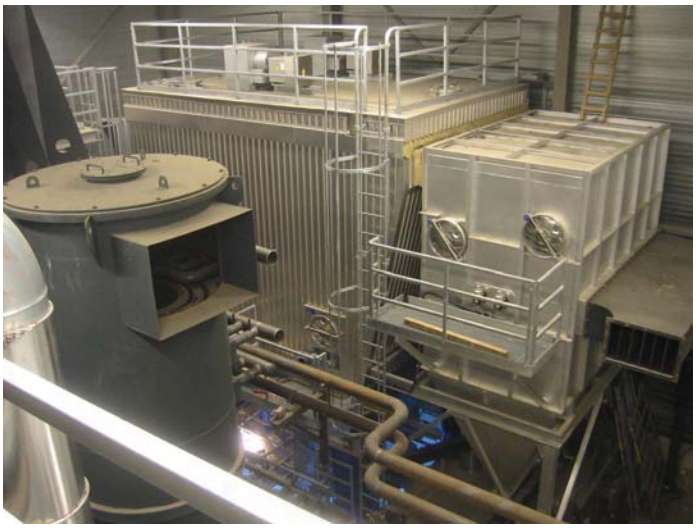
Objective

From a Sustainable Energy Scan in 1999, the municipality of Sittard-Geleen concluded that the usage of biomass energy was needed in order to reach the policy goal of 10% sustainable energy in the municipality. By that time a local landscaping company, had plans to make investments and construct a biomass energy plant. Together with the municipality, the landscaping company construction began. From 2005 the biomass energy plant is being exploited by a new company, Biomass Energy plant Sittard BV (BES BV). In 2006 the plant was augmented with an installation to deliver green electricity. The produced heat is sold to a major energy company, Essent NV, to be used as district heating in a nearby, new district. This district heating network was already been constructed, prior to the plans of the landscaping company.

The usage of local produced biomass, such as lopping and chops from the municipal parks and landscape department in order to reach the policy goal of having 10% sustainable energy in 2010.

Process

The 1999 held Sustainable Energy Scan concluded that the usage of biomass was needed to reach the goal of 10% sustainable energy in 2010. The landscaping company Collares announced its plans around that time and the district heating network was already constructed. So the biomass energy plant was a window of opportunity ready to be implemented. The biomass energy plant could relatively easily be fitted into existing networks and frameworks.



Inhabitants do not get hindered by the biomass plant, there is no nuisance. When production started, biomass was delivered to the plant from the local parks and landscaping department, but soon other sources of biomass were needed. Discussions and negotiations have been started with neighbouring (German) cities and communities to deliver suitable biomass to the plant.

Results

Heat is delivered to app. 1100 households via Essent Networks. 3000 households can be supplied with electricity, the biomass energy plant produces power of 8 MW and has a thermal capacity of 4.8 MW.

Financial resources and partners

Installation and construction costs of the biomass energy plant were € 7.6 million euro. The project used a national subsidy program for Energy Investment Discount for turbines and gasifier reactor. Return on investment is expected to be 6-7 years. The municipality of Sittard-Geleen made k€ 100 euro available as a local subsidy and resourced labour hours. Feed back tariffs for green electricity coming from renewable energy sources are supplied for a period of 10 years.

Lessons learned and repeatability

Various Dutch municipalities show interest in the results and proceedings of this project.

Contact for more information:

Organsation / Agency:	Municipality of Sittard-Geleen
Main contact:	Mr. R. Dieteren
Address:	n /a
Tel:	+31 46 4778667
Fax:	n / a
E-mail:	Rogier.Dieteren@sittard-geleen.nl
Web Site:	n / a

The Netherlands

Living ++

Summary
The program “living ++” is targeting a difficult group; individual house owners who own houses of at least 27 years old (houses built prior to 1985). Many of these houses have problems with isolation and difficulties with damp, moisture and ventilation problems. This results in an increase of energy consumption. For this target group a financing program is provided which covers the increased mortgages costs by the projected energy savings. Out of the 500 surveyed houses, 200 have applied measures to decrease energy consumption.

Objective

For over more than one decade, energy savings are an important subject within the sector of the build environment. By isolation and the steady decrease of the Energy Performance Coefficient, these objectives are tried to be accomplished. The absence of ventilation systems in older buildings and dwellings causes not only an increased emission of moisture, radon and the production of CO_2 by human habitants. The degradation of the inner environment by these emissions causes health and economical (e.g. sick leaves). So, not only from a energy point of view, but also from a health and financial point of view, better results could be reached by tackling this problematic situations.

Process

Starting in april 2006, the municipality of Winsum has started, together with the province of Groningen, the program of “Living++”. To inform the public and the target group five meetings were held for private house owners. Innovative financial schemes were designed to facilitate the investment needed to improve the inner environment of the old houses. Isolation, a high performance heater, solar heating and PV were measures applied to improve the performance of the houses. As a result energy savings were accomplished. The municipality of Winsum joined the program to meet more than one objective. Bad isolated houses in autumn and winter time become more comfortable to live in and reduce the amount of CO_2 emitted. The innovative financial structure used realised an financed investment without additional costs for individual house owners with their mortgages.

Financial resources and partners

Partners in this project are:

- Province of Groningen
- Municipalities of Groningen
- Energy Performance Advice consultancy firms
- Consultancy firm Ecofys

Allocated budget for the municipalities was k€ 25 per participating municipality, mainly for energy option research and communication (e.g. meetings, mailings, etc). Labour for coordination consisted of 600 hours on a yearly basis for the province of Groningen and 100 hours for the participating municipalities.

Results

This resulted in a combined effort, together with the province of Groningen, to address energy, ventilation, damp and moisture problems in old dwellings. Installations within the house, ventilation and lightning were improved or replaced. Living++ has already initiated follow-ups in the region of Rijnmond and the province of Drenthe. Together with a EU subsidy (Intelligent Energy for Europe) efforts are being made to subscribe another 32.000 house owners. Of the originally 700 individual private house owners over 500 have implemented measures to reduce energy consumption. This resulted in a yearly CO_2 emission reduction of 200 tonnes and a energy saving of 10 -30 %. Many private house owners pose problems to pre-finance the investments to be done, the province of Groningen has announced to bear a part of these initial costs, this has implications for the budget.

Lessons learned and repeatability

The acquired knowledge and experiences led to a renewed approach towards housing corporations and utility buildings. The absence of tax benefits of the investments in energy measures in this sector poses threats for successfulness of this project. Another innovative financing structure is sought and being researched. Via a lease construction it should be possible to obtain the tax benefits in place. Further incentives are needed to improve and facilitate the transition of these sectors. Together with the help of the association “Building towards a future” the program is able to refurnish and improve approximately 200.000 houses and buildings per year within the technological and organisational capacities.

Contact for more information:

Project website:	www.wonenplusplus.nl
Organsation / Agency:	Province Groningen
Main contact:	Mr. E. Adema
Address:	n / a
Tel:	+31 50 3164997
Fax:	n / a
E-mail:	e.adema@provinciegroningen.nl
Web Site:	www.provinciegroningen.nl

The Netherlands

Sustainable school building

Summary
This project consists of the realisation and construction of a utility building for educational purposes. In the city of Groningen this building is being constructed. The school building is an example of the application of new construction and installation techniques. Energy saving, comfort and the internal climate control are key aspects of this project. Within this project attention is also paid towards knowledge dissemination and transfer. One of the interests was on internal communication within the municipal departments as well as stakeholders such as the utility construction companies and schools. This project is characterised by its long conceptual and preparation phase, the multiplication of the project, sustainable construction, energy savings and the innovative design. The target group of this project was to accommodate two primary schools of in total 20 groups of students, including indoors sporting facilities.

Objective
The construction of a innovative design of a school building with the use of sustainable energy techniques had among others, the following goals:

- Further consolidation of energy saving and climate policy within the municipality of Groningen.
- Realisation and applying of rational sustainable energy concept which has added value on the aspect of internal climate control as well as the reduction of exploitation costs during construction phase.
- Lifting barriers to finance and attract investment and the lowering of exploitation risks.
- Increasing knowledge on environmental efficiency energy cost reduction and added value for internal climate through monitoring
- Dissemination of knowledge gained internally and externally, especially in order to increase the knowledge on climate policy

Process
In the newly developed district, Gravenburg the municipality of Groningen has commissioned the construction of two elementary schools, an indoor sporting facility and a children nursery. The project is nominated within the municipality to function as a pilot project in the field of sustainable energy and construction. The main aspects of focus in the conceptual stage of the design were “Trias Energetica” and the internal climate control. The application of heat pumps, heat recovery through ventilation and the optimal use of daylight were combined in the design. Among others, one of the boundary condition during the design process was the requirement that the energy performance coefficient (EPC) must not exceed 0.6.

Not only construction and design were innovative, also Groningen applied an innovative financing method. Assumptions were made on possible future savings in the exploitation phase of the building. These savings were incorporated as income via rent in the initial investment. Another important aspect of the design is the monitoring system of the energy use of the building. This is also important with respect to the financial structure for the investments.

Results

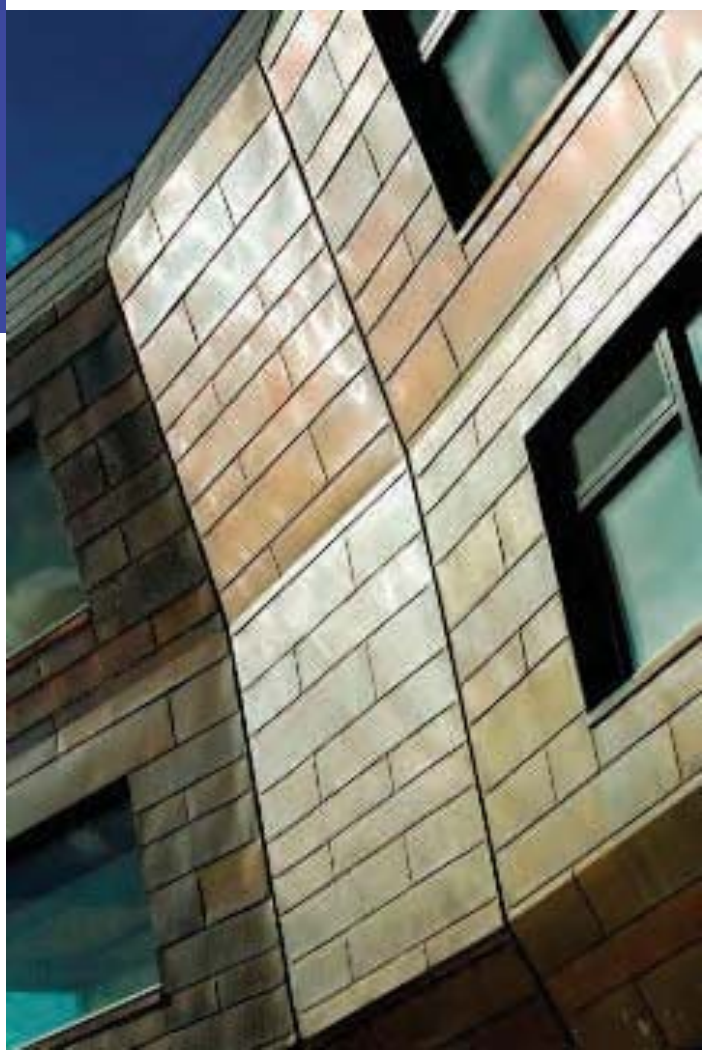
The school building is a visible monument for other municipal climate objectives. CO_2 reduction of emissions is around approximately 65 tonnes per year. Knowledge exchange and dissemination by the municipality of Groningen has increased within its own departments as well as with other stakeholders.

Financial resources and partners

Initial investment costs were assumed to be k€ 4.863 in total of which an additional k€ 311 was needed for extra work. These funds were given by investors and participants of the project. These were: the municipality of Groningen, the province of Groningen, energy company Nuon and the gas infrastructure company Gasunie n.v.

Lessons learned and repeatability

The technical aspects of the design and the project can without difficulties to be multiplied. The financial viability of the building and its investment structure has to become more mature and is expected to become so in the next years, especially with regard to the reduction in CO_2 emissions and energy savings realised in the exploitation phase.



Contact for more information:

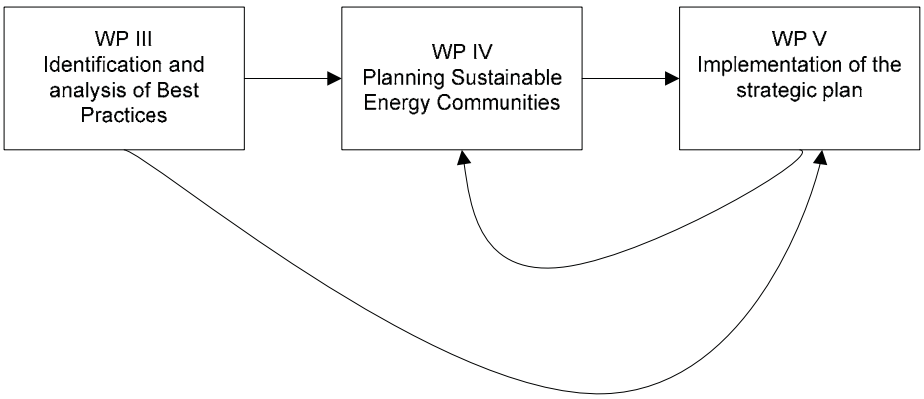
Organsation / Agency:	Municipality of Groningen
Main contact:	Mr. L. Van Nes
Address:	n / a
Tel:	+31 50 3671297
Fax:	n / a
E-mail:	L.van.Nes@md.groningen.nl
Web Site:	www.groningen.nl

Analysis & Conclusions

<To be presented at the third MUSEC meeting at Crailsheim, February 28th, 29th 2008>

From the Best Practices as presented in this report, some general points can be distilled. These are presented below in the form of factors for correct implementation of these projects.

- Administration capacity. For several actions, extensive and detailed administration time and budget is needed of energy behaviour of households, energy studies, energy management aspects, certification aspects and project management. Such capacity needs to be made available on a realistic level.
- Energy prices. For sustainable energies, rising energy prices are an advantage that provide an extra sales argument. For replacement of coal by gas, rising gas prices may provide an obstacle.
- Effects on other issues in the local society, such as employment, safety, air quality, comfort etc.
- Financials. Often an upfront investment is needed, which in many cases will be earned back over a period of time. This potential obstacle can be managed in several ways, including intracting / revolving funds.
- New technologies. In several cases, new technologies are used. This may pose a certain technical risk, but also a risk when the technology is only provided by small startup companies. These risks can be mitigated by contracting operation and maintenance tasks. By doing this, risks are distributed over a longer time period. On the other hand such companies may grow to provide a local economic stimulus. Another factor may be that traditional professionals may give resistance against new technologies, or that the knowledge level may be insufficient.
- Naming and blaming. Several actions 'play' on this aspects, such as exposing or blaming families that consume large volumes of energy, or certifying or naming housing associations that have adopted green policies.
- Partnership. In most projects, local partners are involved and committed to the project. Tailored advice on technology, financing and construction and access to these resources is crucial in the development of the partnerships. This involves identifying and agree upon clearly who will have the ownership of the project and its benefits.
- Publicity.



Work package three Recommendations

<to inserted>

On this page, points of discussion from the meeting of Crailsheim will be inserted. These will be the specific recommendations regarding the best practices of MUSEC

References / recommeded reading

- VNG; SenterNovem (2006) "*Klimaat op de kaart*" Tailormade, Buren, the Netherlands (in Dutch)
- European Commission (2007) *"EU local energy action. Good practices" Brussels, Belgium*
- Ree, van der, B.; Mert, W.; e.a., (2003) *"Soltherm Europe, campaign guidelines"* Utrecht / Graz, the Nederlands / Austria

Imprint

This publication is a combined effort of the participating partners of the European project Multiplying Sustainable Energy Communities (MUSEC).

MUSEC is co-funded by the European Commission through an Intelligent Energy— Europe program.

The sole responsibility for the content of this publication lies with the authors. It does not represent the opinion of the European Community. The European Commission is not responsible for any use that may be made of the information contained herein.

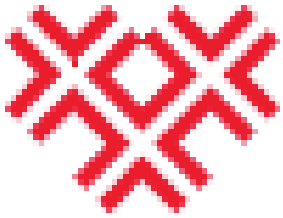
MUSEC Project management
Coordinamento Agende 21 locali italiane

Participating MUSEC partners
- Ambiente Italia srl
- Foggia municipality
- Municipalità of Asti
- Municipalità of Ravenna
- Municipality of Breda
- Ecofys B.V.
- Dobrich municipality
- Dobrich local agency for energy management
- Steinbeis Forschungs– und Entwicklungszentrum GmbH
- Stadtwerke Crailsheim GmbH
- Kuben Byfornyelse Danmark A/S
- European Green cities ApS

Text contributions from:
- Elena Simeonova, Dobrich local agency for energy management
- Thomas Pauschinger, Stadtwerke Crailsheim GmbH
- Jens Frendrup, European Green cities ApS
- Maria Elisa Zuppiroli , Coordinamento Agende 21 Locali Italiane
- Bart van der Ree, Joris Knigge, Ecofys b.v.

Editors
Paul Paree (municipality of Breda)
Joris Knigge (Ecofys b.v.)
Bart van der Ree (Ecofys b.v.)

Press: municipal press Breda,
February 2008



Municipality of Breda

Ecofys B.V.
Utrecht, the Netherlands
http://www.ecofys.com
info@ecofys.com