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REPRO Guideline - Energy Profit for the Regions

Antinucci, Binamé, Lilja, Merziger, Munzer, Sakulin & Sünner

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Regio Energy Profit

Guideline

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Foreword

Global warming and the environmental, social and economic risks that accompany it, in combination with the necessity of securing energy supplies and the steady increase in energy prices, all demonstrate the urgent need to save energy and to use the increasingly scarce energy resources in the most efficient and sustainable way possible. As the development of renewable energy and energy efficiency brings forward the concept of decentralised energy production, European regions are increasingly taking on the role as a strategic partner in ambitious sustainable energy policies. The promotion and strengthening of cooperation between regional and local governments and the business and science communities is an important cornerstone for creating successful synergies and facilitating the expansion of regional sustainable energy systems.

The REPRO project, implemented in the five European regions of Bremen, Emilia Romagna, Styria, Southeast Sweden and Wallonia, is aiming to optimise existing energy management structures and the cooperation between regional energy cluster members in order to achieve two objectives: the implementation of sustainable energy systems and the promotion of economic growth, employment and innovation.

The following report presents the status of green energy systems in the participating regions and indentifies good practices in enhancing and promoting renewable energy and energy efficiency. The report aims to support other European regions in their efforts to establish efficient energy management structures and to organise sustainable energy strategies.

It is the goal to support regional stakeholders to get best the best out of their energy strategy – both in terms of energy and the environment as well as in economic terms.

Jean-Louis Joseph,
President of FEDARENE

Guideline: Energy Profit for the Regions

Introduction

Economic Growth, Competitive Advantages and Employment Incentives in regions through Regional Energy Profit Clusters (REPRO)

There are many untapped opportunities to save energy and encourage the use of renewable energy sources in Europe, but market conditions do not always help. The "Intelligent Energy - Europe programme" is the EU's tool for funding action to improve these conditions and move us towards a more energy intelligent Europe.

The project REPRO aims at gaining the best regional economic benefits from sustainable energy systems. Therefore it focuses on the effects the implementation of sustainable energy systems has on regional economic growth, employment and innovation. The underlying assumption is that sustainable energy concepts will find broader and more powerful support if they can be justified by proven regional economic benefits.

Objectives of the REPRO-Project

To achieve regional economic benefits, a strong cooperation between the whole energy-based regional value chain (suppliers as well as the energy-based business and science community) and the regional authorities and energy agencies is needed.

The REPRO-project which started in October 2007 aims at optimising the existing cluster management structures and improving the implementation of sustainable energy systems within regions.
By linking these central objectives REPRO combines the aims of the Gothenburg Charta and the Lisbon Charta in an ideal way. At the end of the 24-month project a core group of European regions and their representing associations Sweden - Southeast Sweden (Energikontor Sydost), Austria - Styria (LandesEnergieVerein Steiermark), Italy - Emilia Romagna (Ecuba S.r.l. Territorio-Energia-Ambiente), Belgium - Wallonia (Cluster Eco-Construction) and Germany, Bremen (BAW Institut für regionale Wirtschaftsforschung) have developed and implemented optimised structures, instruments and actions in order to strengthen the Regional Energy Profit Cluster. Measured regional effects and impacts of fostered regional economic growth, employment and innovation by sustainable energy systems can be shown and benchmarked.

With the purpose to stir interest and motivation for the "Regional Energy Profit Cluster" concept throughout Europe and its regions the guideline "Energy Profit for the Regions" publishes a summary of the results of the REPRO-project regarding the energy clusters of the participating regions, transferable good practices and conclusions on tangible regional economic benefits that can be generated

by appropriately tailored sustainable energy concepts at the regional level. Key findings, strategies and outcomes of the project - centred on the stimulation of regional economic activities, value chains and supply networks in support of sustainable energy systems and the establishment of efficient and workable cluster management structures - will be presented in the guideline. Other European regions - with or without existing cluster management structures - have the possibility to transfer the proved structures, instruments and actions by following the published guideline. It is intended to support regions in getting the best out of their energy strategies – in energy and environmental as well as in economic terms.

In the following guideline a short introduction on the methodology used for evaluating the regional economic benefits of sustainable energy systems is followed by an analysis of the status of the green energy cluster and a description of good practices to strengthen it in the various REPRO regions.

Regional Economic Benefits of Sustainable Energy Systems

Based on a methodical framework for the evaluation of economic growth, employment effects and innovation benefits, all of the partner regions analysed the economic impact of sustainable energy systems on their regional economies. The methodology includes the definition of relevant benchmark indicators and is divided into an input and an output assessment.

The input assessment of the green energy cluster comprises of the instruments affecting the public budget (regional, national and, to some extent, EU subsidies). The key indicator for the output assessment of the regional economic impact of sustainable energy strategies is employment, from which it can be concluded that additional value was created. The impact of sustainable energy strategies on regional innovation activities was assessed separately.

Linking input with output indicators enables the comparison of the regional energy profit with alternative energy-related strategies. The indicator “employment efficiency” (public funding per job), relates the amount of public funding in support of sustainable energy strategies to the regional employment impact (number of jobs created). Another relevant indicator is the “employment share” of the green energy cluster in the total employment in the region (number of employees per 10,000. employees). Both indicators can be calculated separately to assess the strategies in terms of the degree to which they support the energy efficiency cluster or the renewable energy cluster.

Based on the methodical framework developed within the REPRO project, the regional economic impact of sustainable energy strategies can be evaluated and monitored over time in the individual regions. This is a useful approach to justify public funding for sustainable energy strategies from an economic viewpoint in addition to ecological arguments. Further economic benefits for the

individual regions may be derived by conducting more detailed analyses, e.g. of improvements achieved in terms of innovation, qualification, regional exports and competitiveness of the regional economy.

In a general review of the participating regions, it can be stated that there is public funding available in all regions to promote the green energy sector. Furthermore, the funding available is leading to positive economic effects in all regions (especially employment effects).

The regional evaluation allows the following conclusions to be drawn:

The regional economic efficiency of sustainable energy strategies increases over time; this is concluded from the observation that regions that have employed sustainable energy strategies over a long period of time require less public funding for the creation of additional employment and the green energy cluster shows a higher employment share than regions that have engaged in such strategies in more recent years.

Similarly, regions that are following comprehensive and sustainable strategies, e.g. combining energy efficiency with renewable energy strategies, obviously deliver better economic results than regions with a more limited approach.

Finally, the analyses provided by the REPRO partner regions, indicate that the level of regional economic output achieved through sustainable energy strategies depends, to a considerable degree, on the existence of a relevant manufacturing supply industry and a complimentary innovation base serving the sustainable energy sector.

A further interregional comparison on the economic efficiency of sustainable energy strategies has been proven to be difficult.
Comparability of the results is limited by differing levels of public funding and economic promotion strategies in the REPRO regions, as well as by regional disparities in the level of development of the green energy cluster. Additionally, the same information base was not available in all regions.

The existing differences considerably limit the scope of the above input-output ratios and the conclusions that can be drawn from them.
However, the set of indicators developed is useful for monitoring sustainable energy strategies over time in individual regions.

Energy Profit for Bremen, Germany

by: Lennard Munzer and Isabel Sünner

General Description of the BAW Institute and its Competences

The BAW Institut für regionale Wirtschaftsforschung GmbH (BAW Institute) is a regional economic research institute located in northwestern Germany. Founded in 1947 the BAW Institute represents scientific consulting at the interface between research and its practical realisation in all regional economic questions.

Among the clients are public authorities as well as private companies that have to face the challenges of structural changes and competition. BAW Institute scientifically prepares and supports programmes, concepts or single investment decisions taking into account regional economic aspects.
The BAW Institute is a member of different networks and organisations, e.g. the Working Committee of German Economic Research Institutes (ARGE) and the International Association of Science Parks (IASP).

The main task of the BAW Institute within the REPRO-project was to develop methodological approaches and frameworks to evaluate economic growth (added value), innovation and employment benefits of sustainable energy systems at the regional level for the utilisation of all partners.

Status of the Green Energy Cluster in Bremen

In 2004 the share of renewable energy sources in final energy consumption amounted to 0.8 % in the Federal State of Bremen. In the same year the share of renewable energy sources in total primary energy supply added up to 2.2 %. The lack of more recent data is due to the fact that the "Landesenergieprogramm Bremen" (Energy Programme of the Federal State of Bremen) was last updated in 2005.

Concerning the development of a zero-emission or low-emission energy production the Federal State of Bremen focuses on wind energy, furnace gas, combined heat and power generation, photovoltaic, hydro power and the waste incineration plant.

Photo: BAW Bremen

- At the end of 2005 there were 44 mains-connected wind energy plants with a total power of 50 megawatt and a generation of 82 million kilowatt hours yearly.
- In 2004 power generation using furnace gas generated in steel production amounted to 897 million kilowatt hours.
- In 2004 there was a total of 38 combined heat and power generation plants which generated 270 million kilowatt hours.
- In 2004 304 photovoltaic plants with a total power of 1.2 megawatt (peak) were operated.
- At the Weserwehr (Weser weir) a new hydro power station is planned.
- In 2004 the waste incineration plant Bremen generated power amounting to 34.6 million kilowatt hours. The waste heat is used to provide the University of Bremen, the business park „Technologiepark" (Technology Park) as well as neighbouring residential areas with district heat.

Sectors, Stage, Regional Economic Impact and Development Perspective

Wind Energy

With respect to electricity generation wind energy has actually the greatest importance of all renewable sources in the Bremen region. According to the "Landesenergieprogramm" about 65,000 megawatt hours (MWh) were produced by wind energy plants in the year 2004 – with an upward trend. At the same time the power generated by photovoltaic solar power plants was only about 660 kWh peak. A new hydropower plant (42,000 MWh/a) is under construction, but will not be finished until the end of 2009. Geothermal energy systems have no relevance in the region.

In February 2003 the Senate of Bremen presented a concept for the strategic expansion of wind energy. Intention of the concept was to take advantage of the chances and potentials related to the development of the wind energy market. This implied project funding as well as the development of the industrial site "Luneort/südlicher Fischereihafen" in Bremerhaven, the "Überseestadt" (Overseas City) in the city of Bremen and the "Vulkan" area (former dockyard) in the northern part of Bremen to competence centres of the wind energy sector.

In 2006 approximately 550 persons worked in the wind energy sector in the city of Bremen. As the branch is developing very dynamically it can be assumed that the number of jobs will increase by about 25 per year.
In addition to the jobs in the industrial economy there are employment effects in public research facilities in connection with research activities related to wind energy. In 2006 about 50 jobs in research establishments were linked with wind energy, for the assessment a stable development is assumed.
In Bremerhaven about 90 persons worked in the wind energy sector in 2006. The wind energy sector safeguarded 50 jobs in the supplying industry in the same year. Besides that there were 40 jobs in research facilities linked with wind energy. Currently a very dynamic development of the wind energy sector in Bremerhaven can be recognised.

Until the beginning of 2009 about 700 jobs were created in the field of production. Until 2011 the

settled enterprises are expecting that the expansion of the production capacity will lead to a redoubling of jobs (1,400). By the expansion of the production of wind energy plants the supplying industry will be strengthened too. According to the German Wind Energy Association (BWE) the employment effects in the supplying industry are three times as high as in the production of wind energy plants. Planned settlements of new occupiers could lead to a sharp rise of employment in the wind energy sector (up to 4,500 jobs until 2011). The world economic crisis makes reliable predictions very difficult at present.

A further step is the positioning of Bremerhaven as a location for companies dealing with service,

maintenance and repair of offshore wind energy plants. These companies will probably settle close to firms which produce offshore wind energy plants. Experts predict employment effects in the same dimension as for the production of wind energy plants. However, these effects will not occur in the short run (until 2010) because at this point of time offshore wind parks will not exist in a noteworthy number in Germany. But in the long run there are considerable potentials for the labour market brought up by companies dealing with services, maintenance and repair of offshore wind energy plants and by the supplying industry. Employment effects in a four-digits range are thinkable. It must be stated that the long run effects of the wind energy sector and related branches are hardly predictable yet because they strongly depend on the energy policy (especially the level of the net feeding tariff).

Management Structures and Policy Instruments

Regional Energy Management Structures

Institutions concerned with regional energy cluster management in the Federal State of Bremen are inter alia WFB Bremen – Economic Development; Bremerhaven Economic Development Company Ltd. (BIS); initiative environment business (iuu); Senator for Environment, Construction, Transport and Europe (SUBVE); swb AG; Wind Energy Agency Bremerhaven/Bremen (WAB); Wind Energy Research and Co-ordination Unit (fk-wind) and the Climate Protection Agency (Bremer Energie-Konsens).

BIS

The BIS is organised as a limited company; associates are the Federal State of Bremen and the city of Bremerhaven. The annual budget amounts to about 3.5 million € at present. The institution has about 80 employees.

The BIS has three operational divisions:

- business development,
- infrastructure and
- promotion of tourism.

The Federal State of Bremen and the city of Bremerhaven have concluded contracts with the BIS which enable the organisation to operate one-stop business development. The BIS can inform about promotion possibilities, is allowed to accept the applications, can examine and decide. Besides the organisation itself disburses the subsidies and carries out the examination.
The most important areas of the BIS' responsibility are:

- marketing of commercial premises and development of infrastructure,
- promotion and financing,

- location marketing / acquisition,
- development and support of technology and business start-ups as well as
- promotion of tourism.

Regarding its activities the BIS focuses especially on new topics like blue biotechnology, marine economy, renewable energies and the t.i.m.e-sector – these aspects affect the allocation of subsidies.
The promotion of (offshore-) wind energy serves as corporate objective of the business development company. This sector features relatively high growth rates and furthermore Bremerhaven possesses locational advantages because of its harbour and the close proximity to many wind parks (relevant for repowering).

Bremer Energie-Konsens GmbH (Climate Protection Agency)
The local climate protection agency „Bremer Energie-Konsens" is organised as a non-profit corporation. The agency was founded in 1997 as a public private partnership in the context of the municipal utility going-private. Associates of the Bremer Energie-Konsens are swb AG (40 %), EWE AG (37.4 %), Deutsche Essent GmbH (12.5 %) and the city of Bremen (10.1 %). From 1997 to 2006 the Bremer Energie-Konsens implemented about 400 projects in the field of climate protection. The project resources add up to 1.5 million € in the annual mean. Since 2006 the Bremer Energie-Konsens is sole shareholder of „BEKS EnergieEffizienz GmbH". The subsidiary company offers consulting services to local authorities regarding energy efficiency and carries out energy saving activities.

The climate protection agency's main focus is on reducing the use of energy and the carbon dioxide emissions within the region of Bremen as well as to gain acceptance for its aims and associated measures in the broad public. Of particular importance in this context are pilot projects dealing with energy efficiency, the transfer of knowledge, the creation of multiplier effects as well as further education and public relations. The projects are targeted on bringing down barriers and informing people about acting in a resource-friendly way.

The „Bremer Energie-Konsens" shows ways towards a sustainable use of energy. It initiates and supports pre-operating studies and research projects concerning the utilisation of renewable energies and energy conservation. The financial support by Bremer Energie-Konsens is bound to specific conditions a project has to fulfil: it must conduce to the rational use of energy or to the utilisation of renewable energies, it has to be suitable to serve as a standard, has to refer to the region (Bremen) and it has to generate public interest and broad effects. (Sample projects see chapter "Good Practices".)

A main emphasis of the Energie-Konsens is on creating efficient networks in order to promote the climate protection targets within the region. Therefore the agency practices networking on the local, regional (and national) level:

- Metropolitan area Bremen-Oldenburg (exchange of experiences on the regional level, e.g. "Solardachbörse NordWest" (subject: solar technology), "Effizienztisch Nordwest" (subject: energy efficiency in the German northwest region);
- in Bremen (Federal State): several initiatives, in particular: "Solarinitiative Bremen" (solar technology), "partnerschaft umwelt unternehmen - puu" (environmentally conscious companies), "Energie Experten" (energy experts).
- On the national level: Association of German Energy Agencies "Verein der Energieagenturen Deutschlands" (exchange of experience).

swb AG

The swb public limited company (swb AG) constitutes together with its subsidiary companies and shareholdings the swb group. The group stands for energy and water in the Federal State of Bremen and has a leadership role concerning waste management in northern Germany. In addition, technical facility management is offered. Since 2007 the strategy of the group has been getting concentrated on an ecological positioning. This is reflected in a strategy of sustainable development including an orientation towards general climate protection targets. In this context an increase in energy efficiency, a reduction of carbon dioxide emissions as well as an increase in the share of renewable energies in power generation are intended.

By means of its green electricity product "proNature" swb offers an electricity supply completely free from carbon dioxide emissions because only renewable resources are used. Ecological projects benefit from the revenues (via the proNature fund): Since 1999 twelve power plants using renewable energies have been realised in the region of Bremen. Roughly 1.5 million kilowatt hours of green electricity are generated annually.

With the construction and operation of a wind park in Mittelsbüren swb contributes to the further development and utilisation of innovative technologies. Six plants generate altogether approximately 20 million kWh of green electricity in the wind park.
Swb supports the utilisation of solar energy by financial subsidies and consulting. Houses suitable for the utilisation of solar energy technologies are identified by a computer-assisted solar-check.

Since 2009 swb keeps a medium caloric power plant (MKK) in Bremen. The MKK generates electricity by using commercial waste or residuals of refuse sorting facilities. 70,000 tons of carbon can be economised annually by employing medium caloric producing the same quantity of electricity. Furthermore medium caloric generates less carbon dioxide than fossil fuels, because it is about a half of biogenic nature.

Main Policy Instruments

The legal foundation of the energy policy in Bremen is the "Act on the Promotion of an Economical

and Environmentally friendly Energy Supply and Utilisation in the Federal State of Bremen" which was passed in 1991. Purpose of the act is to ensure that the production, distribution and utilisation of energy take place in a resource-saving, efficient and macroeconomically inexpensive way.
The "Energy Programme of the Federal State of Bremen" is based on these act. It was updated for the third time in November 2005. The following programmes aim at implementing the promotion measures according to the Energy Programme.

Within the "Programme for the Promotion of Application-oriented Environmental Technologies (PFAU)" the SUBVE supports technologies highly relevant to the environment (especially in the fields of renewable energies and renewable primary products, energy efficiency / substitute fuels, (marine) biotechnology as well as environmental sensor technology and measurement.)

"Renewable Energy" is one of the four main topics of the Programme "Applied Environmental Research". The target is to complement and replace conventional energy sources by sustainable renewable energy sources as well as by improving energy efficiency. Innovative scientific projects which contribute to the environmental protection and the preservation of the quality of life are supported. Benefit recipients are scientific institutions and companies in the Federal State of Bremen. The grant is a non-repayable subsidy; the total amount within one project shall not exceed 150,000 €.
The companies are offered an introductory advisory service free of charge by the Advisory Service for Ecological Efficiency.

The "Programme for the Promotion of Environmentally Compatible Production Structures" grants subsidies for investments in the setup of environmentally friendly recycling and waste management structures. Projects according to the 'Act of Promoting Closed Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal' are also supported.

Promotion target of the "Programme for Promoting Economic and Efficient Utilisation and Conversion of Energy in Industry and Trade" is to reduce the input of primary energy and carbon dioxide emissions in industry and trade by means of additional investment incentives.

The promotion of wind energy plants within the "Programme for Wind Energy Utilisation in the Federal State of Bremen" aims at an optimised exploitation of wind energy potentials in the region. The construction of mains connected wind energy plants is supported by non-repayable subsidies for the plant construction. The amount of the subsidy is assessed within the allowed maximum limit so that the wind energy plants refinance themselves in dynamic account within twelve years according to the prognosticated yield (wind energy survey).

Within the scope of broad promotion the SUBVE has established the programme „Heat Insulation within the Residential Building Stock" and „Replacement of Electric Heating".

From 1993 to 2005 altogether 7,787 individual projects aimed at the increase of energy efficiency

were promoted within the scope of mass promotion programmes. Subsidies amounting to 13 million € were disbursed. Every year the emission of 26,000 tons of carbon dioxide is avoided by means of the funded programmes.

Good Practices to strengthen the Green Energy Cluster in Bremen

Actions within REPRO

Renewable Electric Mobility

The swb AG intends to promote electric mobility in the Bremen region based on regional renewable energy sources, i.e. mainly wind energy. The swb AG has linked up with the REPRO team in order to define a valid starting position for their electric mobility project as part of the overall Bremen energy cluster. As a first step a feasibility study has been elaborated identifying appropriate technologies, project partners, market volumes and regional economic benefits of electric mobility in Bremen. Based on this study swb AG and BAW Institute have joined a science-business consortium for the large-scale introduction of electric mobility until 2012 within the framework of the German federal programme "Model Regions Electric Mobility" funded by the Federal Ministry of Transport, Construction and Urban Development.

Photo: BAW Bremen

Aims

- Main aim of the project is supporting the initiative of the swb AG to realise a concept for the introduction of renewable electric mobility in the Federal State of Bremen.
- Optimal exploitation of regional employment effects and added value which can be expected in the field of electric mobility.
- A comprehensive standard of knowledge in the field of electric mobility.

- Identification of different technical solutions of electric vehicles. Identification of the ideal type of car for implementation in the Bremen region.
- Analysis of the market potential (demand) for electrical cars in the Bremen region to exploit the complete regional market potentials of wind energy as a regional energy source.
- Defining possibilities for building up a value chain in Bremen related to electric vehicles
- Definition/Preparation of an organisational concept specifying how electric vehicles can be implemented in Bremen most successfully
- Combination of electric mobility with other mobility concepts, e.g. car sharing.

State of the Art Analysis of Electric Mobility

An initial step of the project was a state of the art analysis of electric mobility. Different technical solutions and the functionality of electromobile systems like mild hybrids, micro hybrids or fuel electric vehicles had to be identified and technically explained. Beside the description of the technical distinguishing characteristics and the functionality advantages and disadvantages were analysed and explained in more detail. In a next step the actual availability of electric cars on the German car mart had to be analysed. As an output an entire list of electric cars which are already offered or will be offered in the nearer future was generated. The analysis currently shows a very low and costly availability of electric cars. Furthermore the aimed market launches of the producers seem to be very optimistic. The possibility to convert conventional into electric vehicles was also analysed. Only a few small enterprises/car shops which offer a conversion of conventional into electric vehicles could be identified. Accompanied by very high prices the conversion does not seem to be a suitable alternative. Moreover the present status and future prospects of the battery technology were analysed. At the moment the charging period, the range, durability and immense costs are still critical facts, but a high rate of development promises decisive improvements in the next years.

Finally a suitable type of electric car for the broad use in the Federal State of Bremen was identified. Besides the already collected general information in the field of electric mobility the specific needs and characteristics of the car traffic in urban centres like Bremen had to be considered. On this basis an initial common use of hybrid electric vehicles and fuel electric vehicles was predicted for a period of transition. Later on, it is assumed that the advancement in battery technology will lead to a fully displacement of costly hybrid electric vehicles.

Evaluation of the Regional Demand Potential

Within the evaluation of the regional demand potential the future market penetration of electric vehicles, the resulting infrastructural needs, additional consumption of electricity and regional economic effects in the Federal State of Bremen have been analysed. For calculating the future market penetration an analysis of potential private and industrial users of electric vehicles in the Federal State of Bremen were carried out. Furthermore the process of the transformation of the conventional automotive cluster into a new “electrified” automotive cluster was economically evaluated, including a profound consideration of the value chain in detail. Defining possibilities for building up a new

value chain committed to the region as much as possible is another important aspect. The described analyses are still in progress. Some of the preliminary results are listed below:

- 20,000 electric cars predicted for Bremen in the year 2030
- potential energy consume for the year 2030: 54 million kWh
- temporary structural change benefits/employment effects*
- strengthening of the regional innovative capacity*
- structural change will safeguard competitiveness and flexibility of the region*
- configuration of infrastructural needs (refuelling stations, public parking space)*

*still remains to be quantified.

At the moment the BAW Institute is preparing an organisational concept to introduce "Renewable Electric Mobility into the Market". For the creation of an organizational structure essential players and strategical tasks have to be assigned and connected. In this context car sharing or the introduction of electric cars in the field of car sharing plays an important role.
General Outcome
Electric mobility will represent a new element within the Bremen energy cluster. It is seen as a new market for SWB, the regional energy utility, under their overall business strategy to promote sustainable, low-emission energy production and consumption. With the nomination of the Bremen region as a national "Model Region Electric Mobility" this new mode of transport will play an important part in regional transport, economic development and energy programmes. The action has already stimulated research projects and industrial initiatives aiming at best regional economic benefits from this new environmentally friendly means of transport.

Other Activities

The Windenergie-Agentur Bremerhaven/Bremen e.V. (WAB)

The WAB is the industry network for wind energy in northwest Germany; it is an incorporated society founded in the year 2002. Among the 150 members are particularly companies related with wind energy as well as business development agencies, research institutes, universities, universities of applied sciences, educational and financial institutions. The members are located one third each in Bremen, in Bremerhaven and in the hinterland. Members from outside the region are only accepted in exceptional cases.
The annual budget of the WAB amounts to 400,000 €. The association is financed by the EU, the Federal State of Bremen, the contributions of the members and fees which are charged for the participation in an event. The public grant had an annual average share of 70.8 % (2005 to October 2008)

and is declining. In the year 2006 the self financing had already a share of 45 % (data for 2007 are not available yet). Currently the managing director of the WAB conducts negotiations regarding the public support beyond October 2008. He assumes that there will be further funding which will be less than 50 % of costs. The member fees vary between 200 and 2000 €.

Tasks

The main task of the WAB is the promotion of wind energy. In order to achieve this the association focuses on networking in order to support the exchange of information and to encourage the initiation of (research) projects. Beyond that WAB supports a further successful development of wind power in Germany and abroad, on the mainland and offshore. An important duty of the WAB is the realisation of lobbying activities.

The WAB sees itself as a figurehead which makes the region interesting for companies because of the existence of a network. The association does not only feel itself responsible for the city-state of Bremen but for the whole region.

Development of Networks

The association cooperates with supra-regional institutions. Together with six other associations the WAB is lobbying to enforce higher net metering for wind energy in the "Renewable Energy Sources Act". Meanwhile the federal cabinet has made a corresponding decision which still has to be passed by parliament. In the context of organising the European Offshore Wind Conference & Exhibition 2007 which took place in Berlin in December 2007, the WAB was the partner of the European Wind Energy Association (EWEA). At this event each participant got the WAB-special edition „Offshore Wind Energy – Future Energy Supply from Wind at Sea". The WAB organises for its members opportunities / events to get together (e.g. regulars tables). The WAB helps foreign students and members of foreign companies to find a practical training, thereby the members of the WAB get the opportunity to develop long term contact to future markets and to exchange experiences.

Consulting, Education and Training

The WAB supports its members by branch studies, representation at fairs (joint stands), as well as events, organised study trips and workshops (e.g. working boats for offshore wind parks). Furthermore the association organises an offshore conference once a year, the third of which took place in June 2007 ("wind force 07") with 246 participants from six nations and 28 speakers, the Federal Minister of the Environment Sigmar Gabriel was the patron.
The WAB offers consultations (e.g. regarding the proceeding of research projects, the search for appropriate partners for research projects, the search for employees).

Further Action Fields of the WAB

Together with the Federal Employment Office the WAB organised a job fair which took place in January 2008. Unemployed persons and companies were brought together. About 1,200 people at-

tended the event. The Federal Employment Office is ready to finance necessary measures for further education.
Together with „ForWind - Centre for Wind Energy Research" WAB coordinates the cluster "germanwind - Spitzencluster Windenergie aus der Nordwest-Region". germanwind is one of the ten finalists of the excellence cluster competition ("Spitzencluster"), presented by the German Federal Republic. At the beginning of 2010 about five clusters will be chosen and receive up to 40 million € of public funding.

Bremer Energie-Konsens

The climate protection agency Bremer Energie-Konsens aims at reducing the use of energy and carbon dioxide emissions within the region of Bremen. Associates of the PPP-project are among others the swb AG and the city of Bremen.

R&D

The Bremer Energie-Konsens supports projects sampling for the following: proving the operability of new technologies in the fields of energy efficiency and renewable energies, estimating potential cost reductions and their readiness for marketing. Thus new technologies and processes are tested and improved in order to translate them into practical use. Among the projects supported within the last few years was the conversion of older apartment buildings of the local housing association (GEWOBA) into energy-saving units (2004/05), the filling of gaps between buildings in Bremen in terms of energy efficiency as well as an analysis of the energy demand of processing industries in order to identify potential savings. Bremer Energie Konsens supports research and feasibility studies as well as dissertation fellowships in the areas of climate protection and energy efficiency. Examples are a feasibility study on the utilisation of grass in grass refineries and biogas plants (2005) or an analysis of feed-in of biogas into the gas distribution system (2003).

Consulting, Education and Training

According to Bremen's climate protection agency a key factor to improve the energy efficiency within a region is to educate customers, entrepreneurs and specialists further. Therefore lectures, seminars and training courses are offered in co-operation with competent partners. During the previous years most of these measures of qualification were allotted to the fields of building and construction, e.g.

- ongoing series of lectures (since 1999) dealing with the subject "building and energy" (energy-efficient building) addressed to architects and craftsmen.
- advice for house owners in the field of ecological modernisation of houses (campaign named "Bremer modernisieren").
- improvement of energy efficiency in processing industries – informative meetings for entrepreneurs ("Initiative Gewerbe-Impuls") .

- scientific workshops („Werkstattberichte“) discussing projects and research studies showing measures how to reduce the consumption of energy and water.
- “HEIM:VORTEIL” - energy saving measures in assisted living facilities; “¾ plus” – rational use of energy and water in local schools.

Energy Expert Network – partners of the Bremer Energie-Konsens

Energy-efficient building measures can only be realised by competent craftsmen and planners. The “energy expert network” helps customers to find specialist partners to render their building or modernisation projects.

Members of this network can become crafts businesses, architects and planners who have already proven their knowledge upon ecological and energy-efficient building measures on the basis of reference projects (customer solutions). They have to pledge themselves to a honour codex for the benefit of climate protection. It is also obligatory to take part in advanced training programmes regularly. Currently the energy expert network consists of 44 planners, consultants, crafts businesses and producers from the Bremen region.

Bremer Klimaschutztage

In April 2007 the Bremer Energie-Konsens carried out the 1st „climate protection days“ in the Federal State of Bremen. In the course of this event promotion activities took place in the city and in local shopping malls where interested people could participate in a “climate-preserving-check” and could commit themselves to act “climate-friendly”.
The campaign even had its own web site and logo. The main focus was on strengthening the public perception of climate protection measures.
The Bremer Energie-Konsens succeeded in acquiring numerous partners and sponsors for their “climate protection days”.

Energy Profit for Emilia Romagna, Italy

by: Simone Antinucci

General Description of Ecuba and its Competences

Ecuba is a Private Limited Company constituted in 1997 under the joint efforts of the three founding members to carry out activities in the scope of energy, urban and land management. As a private company, Ecuba is highly involved in actions towards the rational use of energy, the promotion of energy saving measures and renewable energies, offering a comprehensive approach which evaluates at the same time economical, urban and architectural impacts. Ecuba, with the aim of providing integrated and complete services, works in close co-operation with other engineering, architecture, consulting and administrative offices in developing market analysis, communication systems, environmental assessment studies and technical consulting.

At national level Ecuba has gained high expertise in providing municipal energy plans and energy balances extending its influence to many northern and central Italian regions. Actions related to energy policies, sustainable development and energy saving methodologies are mainly addressed to national and EU public bodies, local social housing associations, productive sectors and developing countries.

Since the start of the company Ecuba has participated in and concluded projects like SAVE, ALTENER, EIE. Firstly through the single member's expertise, later as a company with combined forces.

Status of the Green Energy Cluster in Emilia Romagna

Sectors, Stage, Regional Economic Impact and Development Perspective

Sectors of Green Energy

The green energy cluster of the Emilia Romagna region refers to the main areas of energy efficiency and renewable energy on the whole.

The regional system of electric generation has developed a high degree of integration and self-sufficiency since it was based on only 13 % electric import in 2007. In this regional context renewable energy is a fast growing sector since the share of renewable energy sources in final energy consumption has doubled, from 4 % to 8 %, in three years (2005-2008). The sector is mainly led by hydro-power and partly biomass generation, while the Photovoltaic sector, nearly ignored until 2006, is boosting thanks to the launch of the feed-in tariff ("conto energia") in 2007, reaching 7 MW of installed power in two years. The wind sector has a very low relevance and is limited to few power plants located on the top of the Apennines although offshore R&D feasibility studies in the Adriatic Sea are being implemented.

Energy efficiency in buildings, industry and the tertiary sector has had great impulses since 2005 when, supported by EU directives, the national government issued a comprehensive legislation aimed at sustaining the sector through incentives towards upgrading technology efficiency. National Laws (NFA 2007, NFA 2008, "White Certificates", etc…), have therefore paved the way for establishing an energy efficiency market able to generate long term employment opportunities. REPRO regional input-output analysis, developed in WP 3, clearly shows a growing energy efficiency market and reports employment and investment volume figures that nearly doubled in three years, from 2007 to 2009.

Nevertheless regional energy efficiency and renewable energy markets look very dynamic, their respective value chains still need to be harmonised and managed more efficiently. Therefore the regional energy cluster has been created with the specific aim to cope with these issues.
The whole regional value chain has been studied and the following remarks can be drawn:

- Energy consultants, architects and designers are well skilled and distributed all over the region.
- Universities and research laboratories are actively involved in R&D and innovation transfer energy projects.
- Local energy agencies use to cooperate with development agencies in energy programmes and actions.
- The regional renewable energy sources market is growing significantly, mostly at residential and partly at industrial scale.
- The process of energy certification of buildings has started and many courses for auditors are currently running.
- There are only very few producers of renewable energy and eco-materials, who are scarcely represented at political, commercial and industrial level.
- The green industry, constituted by local producers of renewable energy and eco-materials, is not properly represented in the region, has a small market, is sometimes limited to components exported and assembled in foreign countries, and suffers global supply competition.

From the REPRO analysis the weakness of the green industry has emerged, especially inside the energy value chain, that has a crucial importance in guaranteeing a long-lasting sustainable development

for the whole regional green energy market. The industrial sector has the power to create strong added value and drag along the other economical sectors locally. REPRO therefore caught the opportunity to cope with this limiting factor through the deployment of cluster actions.

Stage of the Energy Cluster

The cluster is at the "agglomeration" stage as the green sector is experiencing the cluster model for the first time. A core team of companies has been identified and progressively involved in cluster actions. During working group meetings many opportunities of comparison, about different existing and suitable cluster models, have been created and synergies were built up. Until now no need of having an umbrella organisation has been registered but the interest in clustering together for specific actions is high.

The aim is to evolve an energy management structure, to create opportunities of participation around specific actions and to build up a stronger cluster awareness among all members and partners. A necessary step is the creation of a so-called "Temporary Business Association" (TBA) in order to be eligible to apply for regional funding. The members have already expressed their interest in the constitution of this "TBA". According to the existing UE energy clusters analysis, previously carried out during the REPRO project, these are the preliminary steps that often lead to the decision to legally constitute the energy cluster. In turn, this process could be able to accelerate the energy cluster evolution toward the formal "emerging" cluster status.
The regional economic impact of the green energy sector is significant in relation to the effects on employment.

CLUSTERENERGIA

Effects on employment caused by the:	2007	2008	2009
National Financial Act 2007,En. Consultants	125	135	145
Installers	2588	2795	3019
Financial Act 2008, En. Consultants	0	368	368
Installers	0	1591	1591
Law 311/2006, En. Consultants	0	441	441
Installers	0	795	795
R&D and Innovation investments	534	534	532
AEA Funds	467	467	466
REP- RES and energy saving investments	356	356	354
Feed in tariff	305	305	305
In total:	**4.375**	**7.787**	**8.016**

Regionally, development perspectives are optimistic because subsidies and programmes have been set to reach the target of 11 % renewable energy share, starting from 8 % (in 2008) out of the whole regional electric generation, by 2010. The Regional Energy Plan and other energy related plans have been revised to reach the declared target through additional renewable energy sources funds.

Management Structures and Policy Instruments

Regional Energy Management Structures

The roles in the regional management structure are currently allotted as follows:

- Ecuba provides management services: It proposes suitable cluster structures, development perspectives and actions; maintains regular contacts with all project partners: the Regional Department of Productive Activities, small eco-construction clusters, energy auditors, social housing companies, local and regional development agencies, local energy agencies, the National Federation of Artisan and Craftsmen (CNR), the ECOABITA building certification project, the “ERG” energy laboratory, management and financial sectors of the “Regional Program for Industrial Research, Innovation and Technology Transfer” (PRRIITT).
- The local energy agency of Modena, with its internet site and venue, is the energy cluster´s reference point.
- Project partners are regularly updated during REPRO activities and asked to give their contribution to each cluster action.

- Producers of renewable energy and eco-materials constitute the core of the energy cluster.

The regional development agency ("ERVET") is also working at increasing the value of the green industry in order to urge regional authorities to draw up tailored measures in order to support the green energy policy and to favour the energy cluster export. For this purpose Ecuba and ERVET are co-operating on promotional and export actions aimed at improving energy cluster visibility and market policy.

Main Policy Instruments

The Regional Energy Plan sets main policies for supporting energy saving investments, both at residential and industrial scale, but also other policy instruments contribute to reinforce the energy policy framework.

Regional Committee Resolution nr. 1411/2007

The Regional Committee Resolution "Characterization of Regional Productive Specialisation Aimed at Planning Industrial Policies in the Region" n° 1411/2007 radically changed the industrial policy approach in the region because it redirects all calls to cluster's value chains. The real innovation lays in the shift of the industrial financing scheme from the logic of too generic or specific productive systems to the cluster system. Therefore, the focus won't be on the number and weight of SMEs but will rather privilege the organized value chains.

- ERDF Fund 2007 - 2013 , Axis 3: the Operational Programme for Emilia Romagna concerning sustainability.
- The Regional Energy Plan (2007-2010): sets instruments and strategies to support and sustain the regional energy policy.
- "PRRIITT" Programme: the Regional Programme for Industrial Research, Innovation and Technology Transfer (approved in 2005).

Energy cluster members can also profit by first mover advantages: of being the first and only cluster in the region or being the first exporting cluster in emerging renewable energy markets.

Good Practices to strengthen the Green Energy Cluster in Emilia Romagna

To strengthen the green energy cluster in the Emilia Romagna special measures in the field of training, promotion and communication have been developed. The following aspects were chosen to illustrate the good practices approach.

Training Action

Context
There is a limited number of companies operating as producers of renewable energy technologies and eco-materials in the region. These companies generally have a low turnover as regional installers and renewable energy technology distributors prefer contacting foreign partners for their supply. This occurs because there is a widespread opinion that foreign products are able to guarantee a higher quality in comparison to local products.

Objectives
The first objective is to let installers know who the regional producers of renewable energy and eco-material are and what are the best products they sell.
Regional producers aim at demonstrating installers that the regional products are competitive, not only with respect to the price but also to quality, and jointly they can achieve many additional benefits from inner regional trade. The action has the objective to create more awareness concerning the advantages of establishing commercial agreements inside regional borders and consolidating at the same time the whole energy value chain.

Process
Companies and installers were recruited thanks to energy agencies' selected lists and researches on internet sites. Contacted companies were informed about project aims, purposes of the actions and further development perspectives.

Financial Resources and Partners
The REPRO project has covered all the necessary expenses so that no additional financial resources were needed. Ecuba has entirely provided funds for all the tasks related to the action: partners' recruitments, invitations, chairman, coffee break, etc...

Results, Lessons Learnt and Repeatability
Producers have positively perceived the action and are proposing further possible improvements for a second edition. Installers have been interested in knowing new specifications and properties of

regional renewable energy products. The installers' recruitment has been particularly difficult for many reasons: first of all associations or unions of installers have perceived the action as a commercial threat and consequently "prohibited" their members to participate; moreover installers have a rather restricted market, prefer to work in the same geographical area and usually have already built up close commercial agreements with one exclusive local supplier.
These elements constitute a barrier to develop new business opportunities. Ecuba recommends to overcome such issues by contacting installers personally, thus by-passing their unions and association.

The action will produce positive ecological impacts on carbon dioxide emissions, reducing the amount due to renewable energy technologies transports from foreign countries. This way transports will be confined inside regional borders thereby reducing the overall amount of km transported per product.

Positive economic impacts are expected due to direct additional renewable energy employment and the regional income production in trade, services and Operation and Maintenance.

Promotional Brochure

Context
Regional producers of renewable energy and eco-material are neither known inside nor outside the region due to a lack of advertising initiatives. This often occurs because many companies are too small and have low turnovers so that they can´t budget additional investments in advertising.
Moreover regional authorities ignore their existence because of their low commercial visibility or low representation.

Objectives
The aim of the action is to publish a promotional brochure in order to advertise regional renewable energy and eco-materials producers and amend their scarce visibility.

The brochure shows current activities and special products / components / eco-materials marketed by regional producers. The printed brochure will be distributed in the renewable energy fairs the members will attend, with the purpose to promote Emilia Romagna best products and consequently brand the region.

The action finally intends to demonstrate that these companies exist, need marketing support, and need suitable cluster structures to easily gain more competitiveness.

Process
Companies' selection has been carried out by Ecuba accepting all real producers and excluding pure

retailers. Recruitment and information about possible economical advantages emerging from the action were provided.

Financial Resources
Costs related to the action were covered by project costs, limiting print expenditures. Therefore no additional fee was asked to the partners.

Results
The action can be replicated easily, especially when new members join the cluster, in order to strengthen and enlarge energy cluster influence. The economic impacts can be assessed only in the long term, because the dissemination task will start after the action and is up to the cluster members. The success of the participation was due to the fact that the brochure was free of charge.

Set up a Permanent Platform

Context
Since the energy cluster is at an agglomeration phase, there is no legal evidence of its existence. This step is very important especially when the energy cluster wants to apply for regional funds or ask the region for supporting policies. Cluster members have started to cooperate together but more synergies have to be developed to consolidate the management structure and mandates.

Objectives
The permanent platform is aimed at implementing the commercial cooperation among cluster members and promoting cluster's export. The internet platform will have a private area for energy cluster use and a public one. The private area has the aim to facilitate the exchange of information and business among members while the public one has mainly communication purposes. The platform will also keep alive the cooperation and exchanges with other EU clusters. The action has the objective to give more visibility and increase the cluster's regional market shares; the platform is finalised to facilitate non-competitive relationships and create more consensus around specific actions.

Process
Thanks to the communication task developed into working group meetings AESS (Local Energy Agency) of Modena has increased its interest in following and assisting the regional green industry and has decided to get involved.

Financial Resources
AESS has chosen to offer its communication channels and venue mainly to take care of the energy cluster in the start-up phase.

Results
The crucial point is what the cluster will do after the start-up phase, and more specifically, when will the synergies lead the cluster to the choice of constituting a formal association or consortium, will the cluster be able to stand on its own feet and find more appropriate venue and platform. This is the challenge to be faced and overcome, otherwise green industry will inevitably have to find new supporting policies, with the exception of the one of the cluster.

Other Activities

Communication Action with Regional Departments and R&D Institutions

Context
Many stakeholders, such as local and regional development agencies, are interested in supporting an energy cluster by fixing instruments, funds and policies. Nevertheless no particular impulse concerning this comes from regional authorities that still consider the whole green industry as an emerging sector.

Objectives
The main objective consists in raising the awareness of the regional authorities concerning the big resources the cluster comprises, because this set of companies constitutes the seeds for a green industry growth. The action has the aim to involve different actors, such as regional - local development agencies and energy agencies, to jointly bring the energy cluster needs at regional level. The objective is to enlarge the energy cluster representation and to make the region aware of such an important economical resource.

Process
The action has had a long process of involvement of subjects potentially interested in supporting the green energy sector. The real difficulty consists in finding out who is the right person that at the same time is interested in order to have a correspondence of intents. Many partners were involved and a network of stakeholders was built up.

Energy Profit for Southeast Sweden

by: Johnny Lilja

General Description of the Energy Agency for Southeast Sweden and its Competences

The Energy Agency for Southeast Sweden (ESS) is the largest Energy Agency in northern Europe. Since 2007 activities have been operated under the Energy Agency for Southeast Sweden Ltd. The company is jointly owned by an association where regional councils, counties and municipalities in Blekinge, Kalmar and Kronoberg are members. The Energy Agency's approximately 20 employees work in all three counties in offices in Oskarshamn, Kalmar, Karlskrona and the main office in Växjö.

The region is one of the most industrialised regions in Scandinavia with a large proportion of employees in industry, especially manufacturing. The main industrial sectors are machinery, automotive industry, polymer technology, aluminium use, glass design, furniture, construction industry, wood processing, wooden houses, energy and environmental technology as well as food industry and tourism. Well-known brands from the region are Orrefors, IKEA, Electrolux, ITT-Flygt, Fläkt Woods, Kährs, NIBE, Scania, Volvo Articulated Haulers and Slip Naxos.

photo: ESS forest industry

The region is also the centre of the southern Swedish forest industry, e.g. the head office of the Södra group is situated in Växjö. The Södra pulp and sawmills in Mönsterås are among the largest and most modern in the world with an annual pulp production of 750,000 tons and over 400,000 m³ of timber. Environmental considerations are an important matter of concern for a lot of industries and the regional industry shows one of the highest levels of EMAS/ISO 14000-certification in Europe.

Projects and Core Activities

The Energy Agency is working to initiate, coordinate and implement projects aimed at improving the energy efficiency and increasing the supply of renewable energy in all sectors of society. The agency works strategically and systematically to link these projects at local and regional level with the projects of the European and international market.
The largest clients of the agency include the EU, the Swedish Energy Agency, the Swedish Road Administration and the Swedish National Agency for Education. Regional clients and target groups are both private and public operators in south eastern Sweden. Concerning the EU projects, the office operates in cooperation with other energy agencies and organisations throughout Europe. The Energy Agency for Southeast Sweden is a member of the Association of Swedish Regional Energy Agencies (FSEK) and its European counterpart FEDARENE and actively participates in their boards.

The work of the agency involves managing projects, conducting investigations, creating and maintaining networks and participating in the dissemination of experiences and best practices. Experience is spread through the organisation by activities such as conferences, conducting presentations at conferences and schools, development of articles and reports, brochures, magazines, newsletters and also via our website.

Status of the Green Energy Cluster in Southeast Sweden

Sectors, Stage, Regional Economic Impact and Development Perspective

Sectors of Green Energy

The Swedish energy policy is focused on creating sustainable energy systems and promoting energy efficiency and renewable energy sources (RES). The long term vision is to break the dependence on fossil fuels and to obtain all energy supply from renewable energy sources.

RES have traditionally been a significant part of the Swedish energy system (i.e. hydro power), but during the last decades the use of RES has risen dramatically. Bio energy has become the second largest energy source (100 TWh), mainly because of an exponential increase in the district heating sector. Sweden has also launched a policy to increase annual wind power to 10 TWh until 2015; and the region of southeast Sweden, with its large potentials, will aid in reaching this goal. The Swedish Commission for reduced oil dependency has been launching new policies to improve energy efficiency and to cut the use of oil in heating and transport sectors by half until the year 2020.

The operations in ESS is divided into three business lines:

- Buildings (energy efficiency, renewable energy)
- Learning and lifestyle (information, education, behavioural influences)
- Transport (fuels, mobility management, freight)

The Energy Agency Southeast Sweden has traditionally been working with energy efficiency and renewable energy. The sector involves a variety of actors realising various activities. Wind power is highlighted right now and small scale wind and hydro power is growing. Solar thermal energy and solar heating is also growing and new types of hybrid cars will come soon. Although the energy efficiency work in buildings has entered a new era and fuel from biomass is used in new areas - heating houses and producing electricity are the most frequent uses of biomass for energy purposes.

Stage of the Energy Cluster

The Energy Agency for Southeast Sweden was established in 1999 as an EU project under the Association of Local and Regional Authorities in Kronoberg. The reason was the increased global and European focus on climate change, reinforcing the need for qualified and impartial players in the energy and transport field.

Renewable energy sources today account for 47 % of the energy supply in Blekinge, 60 % in Kalmar and approximately 45 % in Kronoberg. Wooden biomass energy accounts for 4.7 TWh in Blekinge, 1.5 TWh in Kronoberg and 6.5 TWh in Kalmar where 90 % is used by the industry. Industrial and domestic waste, peat etc. account for 290 GWh in Kalmar and Kronoberg. Solar energy is increasing, but solar heating only accounts for a few GWh in the region (e.g. 50 kW at IKEA in Älmhult).

ESS has been successful in developing south eastern Sweden into a green energy region and has grown up to a mature level in the region, national and international.

The regional energy cluster ranges initiatives from marketing of green energy products in the home market as well as in the export market. The cluster is a mature cluster with several facilities in sectors transformed into the regional energy cluster = ESS.

Regional Economic Impact of the Green Energy Sector

The renewable energy cluster in Southeast Sweden can be equated with the biomass sector. Biomass is a regional driver regarding jobs. The employment effects include the fields of production, maintenance, fuel provision, distribution, installation, transport, forest work etc. In addition to the jobs in the industrial economy there are employment effects in public research facilities dealing with renewable energy matters as well.

Employment figures for the biomass cluster in Southeast Sweden are based on reports from the Energy Agency for Southeast Sweden (ESS), the University of Växjö (VUX), the National Environment

Protection Board and the Energy Agency of Gävleborg / Dalarna (GDE-Net). The estimation is also rested upon interviews with people who plan, build and maintain biomass plants.

The primary employment effects amount to 590 jobs, the secondary effects make up 236 jobs. Underlying this calculation is a multiplier of 1.4 for the regional biomass cluster in Southeast Sweden.
In 2007 the biomass sector in Southeast Sweden generated a gross added value of 371.2 million SEK (39.5 million €).

Development Perspective

The green energy sector has a positive effect on regional economy and stimulates development in all energy sectors of the sustainable community. The region of southeast Sweden with the counties Kronoberg, Kalmar and Blekinge has the resources that are needed in order to be successful whenever sustainable development is concerned. The region is equipped with forests, water and sea, wind and sun.

The main task concerning the environmental work is the transition from fossil fuel dependency to renewable energy types, e.g. bio fuel for heating houses and biogas for transports. In latter years also electricity generation in combined heat and power plants has become important as well as cooling provided by the district heating company. Very important in the area of renewable energy is the development of the value chain of bio energy: felling of trees – fuel production – transport of chips – incineration technology – exhaust gas cleaning – ash recycling. It has become easier to get permissions for building wind power plants and technology has improved with development of size and effectiveness. The interest for small-scale wind power and small-scale water power will increase when it becomes possible to link the private power production to the power network.

Energy efficient buildings are a new market. The development of houses that will now be built in the region shows that energy positive houses are no longer a hypothesis. Sun energy in the form of photovoltaic cells or solar heating is also in advance, and this can make the owners independent of energy companies.

So far, biogas is not being used to a large extent in the region. Biogas Southeast is a cluster that works on the implementation of biogas in the region.

The region asserts itself well in all respects and there are further potentials as only a part of existing resources is used so far. Small-scale hydroelectric power e.g. has a potential that is five times bigger than what is used today. Within the region, several universities and colleges are situated. In collaboration with these clusters, e.g. the bio energy cluster and the new cluster in cooperation around energy efficient building have been formed.

A Triple Helix model with business world – municipalities – college / university, provides a fantastic driving force all over the region.

The knowledge from the business world in combination with support from municipality / region and resources from universities / colleges and their research and professors give the force and status that is needed in order to achieve a change.

Management Structures and Policy Instruments

Regional Energy Management Structures

The Energy Agency's mission is to provide timely, objective and impartial information and knowledge about energy and transport issues.
ESS provides the region and its institutions, (municipalities, county council, county administration board, Energy Agency of Sweden, Sweden Environmental Protection Agency, Sweden Transport Agency, universities and colleges in the region) with knowledge, training and education. ESS works on training concerning the development of cluster structures and project management in corporation with institutes, like the above mentioned, and on the introduction of projects in the region received from EU or governmental level. In each sector energy efficiency and renewable energy are the main objectives.

- Transport unit in ESS manages issues and projects that provide solutions for sustainable development within private – public – goods transport.
- Behaviour unit in ESS manages issues and projects that provide solutions for sustainable development in all parts of the society. The implementation of sustainable principles and energy saving by training staff in schools and implementing those issues into the curricula is another task.
- Building unit in ESS manages issues and projects that provide for sustainable development in installations, construction work and energy efficiency concerning all things that are installed inside or outside the building, and of course also the building itself.

Examples on Activity

Energy advice to citizens is organised with one energy advisor in each municipality. In each municipality the Energy Agency of Sweden gives subsidy for one civil servant to serve inhabitants with information about energy saving issues. Collaboration in this work is performed by the behaviour unit in ESS. Governmental subsidies from the Energy Agency of Sweden support ESS in this work.

Main Policy Instruments

County councils take up the line from the EU through the government and handle the law and policy down to a regional community level. The Regional Climate Strategy and municipal energy and climate strategies set main policy for energy efficiency and renewable energy sources objectives. The EU overall vision for the year 2020 is 20-20-20 and targets are based on these figures. In time of economic crises, the regions and municipalities have less income from taxes and decisions take longer

time or are valued in different terms. Hopefully the private sector and industry now will have more time to concentrate on energy savings and realize that investments in energy efficiency pays back fast which will be a help in hard economic times.

Good Practices to strengthen the Green Energy Cluster Southeast Sweden

Photo: ESS Bioenergy

Bio Energy Group – A Cluster for Heat and Electricity from Biomass

The Bio Energy Group started in 1996 and is a collaboration project between bio energy companies who work together in order to develop and to introduce energy from wood.

The experiences of working in the cluster are good and there is a broad unity to continue the cooperation. The group has natural conditions to interact both within technology and within their geographic area. It is important to give big responsibilities to the companies to work on the basis of company economic starting points. In order to succeed, it is required that the initiatives that are taken, the long term nature of the cooperation and the financing from both public and private actors, are carried out internally. Through long-term collaboration, it is possible to use the European cooperation to gain financing and exchanging experiences.

Together, the companies are active concerning consultant activities and production, distribution and delivery of bio energy. Today, the Bio Energy Group consists of five members: VEAB, EON Heat Sweden Ltd, Hotab Eldningsteknik Ltd, Järnforsen Energy Systems Ltd and ÅF Consult Ltd. With respect to R & D, Bioenergicentrum at Växjö University, Affärsverken Karlskrona. EON Heat Ltd and the Energy Agency of Southeast Sweden are also included. Since 1996 the group's work has aimed at supporting the development of the bio energy area by building up front-edge knowledge of biomass fuel heat plants with direction on:

- Combustion and efficiency in the whole chain (from forest to ash) and environmental performance for boilers from 500 kilowatt to 10 MW.
- Studies of emission of small particles and their impact on health.
- Expansion of environmentally friendly biomass fuelled plants in the region.

- Development of technology for preservation and processing of biomass fuel.
- Collaboration around business development within the bio energy area.
- Collaboration and support to build up a Climate Centrum in Växjö.

Objectives
The Bio Energy Group's purpose is to carry out research, development and education within the bio energy technical area and to interact with business communities and the university in Växjö in this work. The concrete objectives can be summarized like this:

- to develop the bio energy sector through R & D and work with regional change
- to increase the bio energy use in order to decrease carbon dioxide emissions
- to be a natural link between society, business communities and universities
- to support R & D within safeguarding, logistics and processing of biomass fuel

Implementation
- to develop an ownership structure and future for the Bio Energy Group
- collaboration concerning an increased market introduction of R & D within the bio energy area
- to act in order to motivate companies to start up processes within the bio energy area and RES

Ecological and Economical Benefits
- decreased environmental discharge of carbon dioxide
- technical development in fuel production and burning
- R&D benefit for bio fuel
- to stimulate regional growth through the value chain and within R&D
- more efficient use of bio fuel in combustion processes

Sustainable Municipality Programme

The energy authority's programme "Sustainable Municipality 2008–2011" is a unique cooperation between the Energy Agency of Sweden and more than a fifth of the country's municipalities. Starting point is the contributory municipality's own aspiration to make local society more sustainable.

More than a fifth of the country's municipalities participate in the work on creating a sustainable energy system for a better climate. Each municipality chooses which thematic areas to prioritise and work on. There is no restriction on how many thematic areas the municipality can work with, this depends entirely on the municipality's resources and wishes.

The south-eastern cluster within the programme "Sustainable Municipality" comprises six municipalities. In a letter of intent the municipalities declared that they will develop energy / climate strategies and set up objectives on basis of conditions that emerge from energy climate strategies. The number of objectives can vary from one municipality to another, but the municipalities in south eastern cluster have agreed about a common priority for the following thematic areas:

- wind force
- social urban and rural planning
- energy efficiency improvement
- energy in school
- biogas

Objectives

Underlying is the creation of a platform in each respective municipality where collaboration around energy questions linked to climate work is the overall objective.
In each municipality a workgroup within the respective thematic area starts up a process that leads to a platform for the implementation of the measure. This will contribute to realise the objectives within the municipality's energy / climate strategy.

Implementation

- Collaboration between the municipalities and boosts in thematic areas of the Swedish Energy Agency with help the Energy Agency of Southeast Sweden in leading the clusters
- Collaboration with trade organisations, college / university and business communities.

Ecological and Economical Benefits

Increased implementation of objectives in energy / climate strategies in municipalities has ecological effects. These are based on international and national decisions and programmes that in turn are based on the Treaty of Lisbon and the Kyoto Protocol. Economic benefits create activities and measures within the areas mentioned above. Job opportunities are created and an increased growth can be expected within research, producing companies and in public activities.

Energy Profit for Styria, Austria

by: Christian Sakulin

General Description of the LandesEnergieVerein Steiermark and its Competences

The LandesEnergieVerein Steiermark (LEV) is the regional energy agency of the Province of Styria (Austria). As a non-profit-organisation, LEV sets actions in order to promote energy efficiency, to use regional renewable energy sources rationally and to reduce energy consumption.

Founded in 1982, LEV was one of the first energy agencies in Europe. After the oil-crisis of the seventies, Styria was among the first eco-energy movers. All this led to a comprehensive 10-year-long energy strategy in 1984, which was realised in the years after. Alongside the office of the Energy Commissioner of Styria and the Styrian Energy Advisory Centre, LEV is an important player in Styrian energy politics.

Aims of the energy agency LEV are an increase in the efficient use of energy and regional renewable energy sources in the interest of the regional development policy, the protection of the environment and long term effectiveness. LEV serves as an interface between the Styrian administration, policy, science, economy and the consumers in the energy sector. Its activities comprise the technical and organisational support of energy projects (evaluation, assistance, dissemination, etc), consciousness raising and PR work (exhibitions, publications, conferences, competitions, etc.), training (expert training, promotion of research), European cooperation and initiatives, energy advice as well as the administration and awarding of grants.

LEV is a non-profit association with 15 full members from administration, government, industry and science. The association is led by a managing board and a chief executive officer. The members meet in a plenary meeting annually. LEV receives funds from its members (public-private partnership) and from co-funded projects. Currently, 18 full time equivalent employees are working at LEV.

Status of the Green Energy Cluster in Styria

Sectors, Stage, Regional Economic Impact and Development Perspective

Sectors of Green Energy

Styria is a pioneer region with respect to renewable energy and energy efficiency – green energy. The large academic community was one reason for the strong movement against nuclear power in the seventies and eighties. This movement put forward a variety of actors, who were not just against nuclear power, but offered new and alternative solutions like the"do-it-yourself" construction of solar-thermal collectors or small biomass district heating plants. Soon a high level of national and cross-border awareness was reached. Today, green energy and environmental technologies have evolved into an active and dynamic economic sector. The sector already generates more than 5 % of the gross regional product, which is one of the highest concentrations in Europe. Green energy alone gives more than 9,000 people a secure and sustainable job.

Over the last years, the growth rates are often beyond 10 %. The continuously high gross expenditure on R&D (e.g. 3.9 % in 2008 compared to a Lisbon target of 3 %) and a large academic community (seven universities, several research organisations) ensure Styria's innovation capacity.

Solid biomass, biogas, solar thermal energy, hydropower and energy efficiency in buildings are the Styrian fields of excellence. 25 % of the regional energy supply originates from renewable energy sources (figures of 2008):

Biomass

- more than 327 MWheat of local district heating systems from solid biomass
- world market leading producers of biomass boilers
- 13 MWel biogas plants
- a world market leader in technologies for producing biodiesel from multi-feedstock

Solar Thermal Energy

- 420,000 m² of solar thermal panels are installed, aiming at 1,200,000 m² by 2020 (1 m² per inhabitant)
- an internationally renowned research institute
- world market leading manufacturers for large solar panels (equipping e.g. the Olympic Games in Beijing 2008)

Hydro Power

- 500 MW of large hydro power plants (>10 MW)
- 117.1 MW of small hydro power plants
- 10.85 PJ of electricity (3,015 GWh) in 2005
- world leading producer of hydro power turbines and pumps
- potential for few more large hydro power plants and double capacity for small hydro power plants

Photo: LEV Windpark Moschkogel

Wind Power

- 33 plants with a capacity of 51.3 MW
- currently the installations are doubled in order to reach 2 % of Styria's electricity demand

Energy Efficiency in Buildings

- over 7,000 low energy houses
- compulsory use of renewable energy sources by the "Styrian Programme for Subsidised Housing" (solar thermal collectors are a must!); 50 % of the Styrian buildings are subsidised and thus

affected by this obligation
- large environmental and ecological potential in energy efficient renovation

Stage of the Energy Cluster

The "Styrian Green Energy Cluster" has started from strong energy autarky movements in the late seventies after the oil crisis. Early initiatives like the "do-it-your-self construction groups for solar thermal panels" and the first biomass powered district heating networks or biogas plants were the focal points of these early developments. The high density of research institutions and the high public expenditure for research have always fostered the fast and innovative development. Today the green energy cluster looks back at a successful 30-year-long development into a mature and internationally recognized showcase region for green energy. Today's initiatives range from the continuous support for research and innovation, the production and marketing of green energy products, the export support and the stimulation of the home market. A continuous transformation and adaptation to a fast changing ecological and economical environment is necessary.

Regional Economic Impact of the Green Energy Cluster

The green energy sector in Styria has not only positive environmental effects but also stimulates the local economy. According to an estimation concerning the employment effects of the green subsectors biomass, solar heat and energy efficient renovation in Styria, around 8,440 people were employed in 2006. The majority (around 64 %) works in biomass (production of biomass and biomass technologies, operation / maintenance of small and large scaled biomass heating systems including biogas and biofuels). Around 7 % are employed in energy efficient renovation, 2 % in solar heat (production of solar heat technologies, operation / maintenance of small and large scaled solar heating plants) and 2 % in green energy research and development. The remaining 25 % represent indirect employment effects, in other words component suppliers of the green energy sector (e.g. manufacturing industry, chemical industry). In total, the Styrian biomass, solar heat and energy efficient renovation sectors generate a gross added value of 428 million € (2006).

Between 2006 and 2007 the green energy cluster strengthened its position: An annual survey among 105 companies conducted by Eco World Styria clearly shows the upward trend: In 2007 the turnover of enterprises in the fields of renewable energy and environmental technology amounted to 2.26 billion €, which is around 39.6 % higher than in 2006. In total, an estimated number of 11,406 people were employed in the fields of renewable energy and environment technology, 9.9 % more than in 2006. It is expected that the upward trend of the green energy sector will continue in future.

Development Perspective

Facing the worldwide economic crisis of this ending first decade of the new millennium, green energy is regarded as the economy of the future. Traditionally, the automotive industry in Styria is very strong - the automotive cluster Styria (AC Styria) was one of the first clusters in Europe, with Magna-Steyr and AVL as "flagships". Facing the actual decline of the traditional automotive sector, green energy

and environmental technologies may play an essential role in Styria's economy of tomorrow. Yet, the sector is small-scale structured and lacks large players. Despite the worldwide stagnation, renewable energy and environmental technologies are continuously growing sectors.

Management Structures and Policy Instruments

Regional Energy Management Structures

The cluster of green energy is managed by horizontal organisations that bundle many different actors. The Styrian Energy Commissioner, LEV, NOEST and Eco World Styria are serving as a significant part of the cluster. Furthermore the Chamber of Agriculture, the Initiative for a Sustainable Economy (WIN) and the local energy agencies serve the Styrian green energy cluster:

- The Energy Commissioner influences the legislation, sets targets (Styrian Energy Plan) and issues grants.
- As the regional energy agency, LEV supports the implementation of the targets set within the Styrian Energy Plan. In addition LEV runs a quality management programme for biomass district heating plants and promotes energy efficiency on a municipal level.
- NOEST is the network for research in renewable energies and aims at a successful technology transfer and fostering innovation. The Energy Commissioner and LEV jointly lead NOEST.
- Eco World Styria is the business cluster and aims at strengthening the competitiveness of Styrian eco-businesses and establishing a leading business location.
- The Chamber of Agriculture is active in developing biomass as a renewable energy source and assists farmers in becoming energy suppliers.
- The Initiative for a Sustainable Economy (WIN) is active in supporting companies to use and install renewable energy sources.
- Last but not least, the local energy agencies focus on local energy visions and actions.

Main Policy Instruments

Due to the present federal structure of the Austria's government and administration, certain instruments are nationally governed, whereas others are designed and administered only on the regional scale of Styria:

- National law on eco-power: It defines the national mechanism for the feeding in of eco-power to the electrical grid.
- The Regional Subsidised Housing-Programme is designed to stimulate an energy efficient way of building and renovating. The use of renewable heating systems is compulsory.

- The Regional Environmental Fund supports the installation of plants for renewable energy production for individuals and green energy light-house projects.
- The national Environmental Funding Scheme supports all green energy investments that are done by the business community
- The Styrian Future-Fund is a successful research programme – Styrian research for Styrian Solutions
- The national government manages several national funding schemes for energy related research and campaigns. Mentioned here is the "Climate and Energy Fund" and "klima:aktiv".
- On the European Scale, only the regionally managed programmes with focus on green energy are mentioned: ERDF, EAGF and EAFRD
- Currently high on the political agenda is the "Energy Strategy Styria 2025", which was developed in cooperation with the REPRO project.
- The Styrian Business Promotion Agency grants funds for Styrian innovations.

Good Practices to strengthen the Green Energy Cluster in Styria

qm heizwerke

klima:aktiv
qm heizwerke

Background

Stimulated by the two oil-shocks in the seventies and the greenhouse effect, the first biomass district heating plants in Styria were built in the early eighties. In the years after more and more of these followed. A lot of public funds were necessary in order to support these projects, which cost three times as much as similar plants today. However, subsequent investigations of the first plants in Switzerland, Austria and Germany showed that many plants had much higher energy losses and costs than expected during the design process. The main reasons are unprofessional project management and poor planning (technical deficiencies). Consequential, in Austria a quality management programme for biomass and district heating plants was introduced in 2006 – qm:heizwerke. Offering professional project management and planning the programme aims at avoiding most of the deficiencies of the past.

Objective

The objective of the programme qm:heizwerke is to build biomass heating plants with (i) high technical and operational performance, (ii) high fuel utilisation ratio, (iii) low emissions and (iv) low investment and operation costs. Furthermore, only plants with good quality shall be granted public funds. The programme also aims at improving existing plants.

Implementation

Concerning the implementation of the programme, the qm:heizwerke standards were integrated into the financial support directive of the national agency Kommunalkredit Public Consulting (KPC) in 2006. KPC manages investment support programmes in energy and climate-control programmes, consulting projects, etc. Since then, the standards have been compulsory in order to obtain public grants. One of the most important instruments of the programme is the comprehensive project database. This internet platform provides a centralised handling of all relevant processes and documents. The database collects projects as well as technical and economic data of the plants. The aim of the database is to give transparent information to all parties, such as plant operators, project engineers, quality managers, subsidising authorities, and the general management. Operators can use the database as a backup storage with worldwide access. Other tools are regular networking events and the training of quality delegates.

Financial Resources and Partners

qm heizwerke was initiated by the national programme klima:aktiv and financed by the Federal Ministry of Agriculture, Forestry, Environment and Water Management. Because of its long-time

expertise in solid biomass, LEV was assigned to manage the programme nationally.

Photo: LEV Gleinstätten District heating

Results

The programme has proven that significant optimisations in plant and district heating network design are possible. Emissions, biomass and electricity demand are reduced still providing the same service of heat to the customers. So far, the programme has accompanied 225 biomass district heating projects during the phases of planning, building and operating. The programme connects all involved parties along the value chain of "heat from biomass" very well. As a result of the optimisations around 58,000 tons of carbon dioxide can be avoided every year. Further 130,000 tons of carbon dioxide are avoided by substituting biomass by fossil fuels. The exchange of knowledge is an effective way to improve the information available to design engineers and plant operators. A future task of qm heizwerke will be to spread the experience made beyond the borders of Austria and assist in optimising existing and future heat plants.

NOEST

Netzwerk Öko-Energie Steiermark
Styrian Eco-Energy Network

Background

Styria is an innovative region. The provincial government offers more than a dozen different subsidy-lines in the fields of green energy. NOEST - the Styrian Eco-Energy Network - was founded in 2002 on the initiative of the Ministries of Innovation, Energy and Transport with the aim to simplify the access to R&D project funds. NOEST is jointly managed by the Styrian Energy Commissioner and LEV.

Objective

NOEST is Styria's facilitator and knowledge-hub for research and innovation in green energy. NOEST offers to all researchers and companies a central unit for regional subsidies / the One-Stop-Shop. Personal contacts as well as expert consultancy complement the services of NOEST. A successful technology transfer from research to market is the aim of NOEST. NOEST supports applicants by accelerating and simplifying the access to R&D project funding by a transparent decision process. The network offers possibilities to bundle similar interests.

Implementation

NOEST offers a centralised access to project subsidies in the field of green energy (R&D, feasibility studies, pilot plants, campaigns) and gives assistance in all phases of a project (from the application phase until the technology transfer). Furthermore, NOEST offers a platform for networking, knowledge exchange and for the dissemination, exploitation and transfer of R&D results. The seven competence nodes give expert consultancy, support the dissemination of project results and assist in the search for suitable cooperation partners. NOEST guarantees full transparency in all phases of the project (Transparency Act).

Financial Resources and Partners

NOEST is led by the Styrian Energy Commissioner and LEV and is based on public regional funds (50 %) and project funds (50 %). NOEST is an open network. Membership and all services are free of charge. The Styrian eco-energy community comprises over 4,300 parties, among them several public and private research centres, seven universities, energy agencies, public bodies, numerous SMEs and individuals. The core-network consists of the NOEST centre, seven thematic competence nodes (researchers and energy experts) and two boards (incl. members of the financing authorities). Furthermore, NOEST cooperates closely with the Enterprise Europe Network and other regional parties of the Styrian Green Energy Cluster.

Results

According to an opinion poll in 2005, the customer satisfaction lies in between "Very Good" and "Good". Until today, over 240 projects have been assisted by NOEST. Every month around 4,700 subscribers of the NOEST newsletter get the latest information concerning green energy and environmental technologies. A bi-weekly press review keeps 3,000 recipients up-to-date. The Energy Lunch meetings, which are held three times a year, are well established dates for the green energy community.

Other specialised events are held on demand. Finally, NOEST awards the regional edition of the international Energy Globe Award.

e5 – Programme for Energy Efficient Communities

Background

In the mid of the nineties, society became more and more aware of environmental problems and increasingly took actions to reach environmental sustainability. Most of the initiated programmes and measures were addressed to the macro level (e.g. laws and directives concerning the industry, regional energy plans of Federal States). Initiatives on the micro level according to the device "everyone can contribute to a sustainable environment" rarely existed at that time. At the end of the nineties the Vo-

rarlberg Energy Institute developed a programme which focused on renewable energy and energy efficiency on the local level. The programme is named e5 programme for energy efficient communities and is based on the Swiss programme Energy City. In 1998 the programme started in three Austrian provinces (Vorarlberg, Tyrol and Salzburg).

In 2002 a harmonised programme called European Energy Award® (EEA®) was implemented by Austria (e5 programme), Switzerland (energy city), Germany and Poland. The EEA® combines the expertise and tools developed by Austria and Switzerland with the ideas of Germany, Ireland, France, Lithuania and Italy that joined the programme in 2003. All existing brands (e5 programme, Energy City, EEA®) use the same tools and the international parent organisation of the EEA® ensures uniformity.

Objective

e5 is a certification and quality management system for communities. The intention of e5 is the identification of energy saving potentials within a community and the realisation, documentation and evaluation of the saving measures. By taking part in this programme, communities contribute significantly to a sustainable future by improving energy efficiency and increasing the utilisation of renewable energies. The supervision of the participating communities is undertaken by local Energy Agencies.

Implementation

The participation in the programme is on a voluntary basis. However, the advantages for the community are significant: By taking part in the programme, the community gets professional support by an external energy consultant in order to increase and advance the implementation of energy saving measures, of sustainable energy policy and to realise renewable energy projects. In return for professional support, communities pay membership dues. As a result, the community contributes to energy and cost savings, to carbon dioxide reduction and stimulates investments, especially on a local and regional level. Last but not least, the image of the community benefits through a responsible energy and climate policy. For a successful implementation of the programme two factors are relevant:

- a guided process: local energy teams assist in the implementation of the decisions and in managing the communication between citizens and relevant stakeholders
- regular monitoring of success: an award for energy related achievements is granted based on regular audits; all participating communities have the chance of being benchmarked in an European context

Within the framework of e5 the communities implement concrete activities. In doing so, the e5 communities set a good example for other communities.

Financial Resources and Partners
At the moment e5 is being operated in the framework of the national climate protection programme klima:aktiv, which is financed by the Federal Ministry of Agriculture, Forestry, Environment and Water Management. LEV as Regional Energy Agency was assigned to manage the e5 programme in Styria.

Results
On the international level, more than 450 communities in ten countries (Ireland, Italy, France, Czech Republic, Lithuania, Liechtenstein, Netherlands, Switzerland, Germany, Austria) participated in the programme at the end of 2007. 65 communities are member of the e5 programme in Austria in the provinces Vorarlberg, Tyrol, Salzburg, Carinthia, Styria and Burgenland. The province of Styria joined the programme in 2006. At present eleven communities are members of e5 with strong tendencies to increase.

Advanced Energy Related Education

Background
High energy prices, climate change and financial support schemes for renewable energy and energy efficiency measures increase the demand for sustainable energy use. Of course this requires a corresponding know-how on the part of energy providers, planers, installers, service technicians and energy advisors. For this purpose several energy relevant training programmes have been developed in Styria. As examples, the programmes in the fields of biogas, energy consulting and solar heat are mentioned here.

Biogas Training Programmes

Two training curricula for biogas exist. One is targeted to the operators of biogas plants. Highly qualified operating personnel ensures an economically and ecologically efficient operation of the plants. This curriculum is compulsory for obtaining an authorization for a biogas plant. The other curriculum is targeted to all other actors in the biogas system: planners, installers, constructors and authorities. All relevant aspects are considered. In an integral approach, the training combines the latest developments from science and important practical feedback from the community. Both training courses do not only serve as a medium for knowledge – important networking within the community is inherent. The Austrian „Wasser- und Abfallwirtschaftsverband“ (ÖWAV) in cooperation with the „Lokale Energieagentur“ (LEA GmbH) are responsible for the organisation of the biogas training programmes in Styria.

So far, a total of 170 persons has been trained to biogas experts. Despite the recent changes of the system, the training records a high demand.

Energy Advice Programmes

The aim of the energy advice training programme is to further qualify persons who work either directly in the energy sector or in an adjacent sector. The curricula emphasize on construction, renovation, heat engineering and mobility in the context of energy efficiency and renewable energy. Lately, a special emphasis was set on the energy performance certificate for buildings (EPBD). The major aim of the curricula is not only to train energy advisors, but to spread the ideas of energy efficiency and renewable energy deep to the grassroots. At the beginning of the nineties the national Working Group for Energy Advice (ARGE-EBA) in collaboration with other energy related organisations developed uniform directives for the training of energy advisors in Austria.

Since then LEV supported by ARGE-EBA offers beginner, advanced and specialised training courses for energy consulters based on e-learning and classroom lectures. The programme is partly financed by the participants, by LEV and the Energy Commissioner. Only in 2008, LEV organised four beginner's courses and two advanced courses in Styria.

51 participants completed the beginner's course successfully, 22 participants took part in the advanced course. In addition more than 100 participants of courses organised by Energy Agencies outside of Styria have used LEV's e-learning tools as teaching material.

Solar Heat Programmes

The objective of the solar heat training courses is to build up an expert network for solar heat and to intensify the knowledge transfer between actors within the solar sector. The expert centre for solar heat was implemented in the framework of the national programme klima:aktiv. It organises several training courses tailored for installers, planers, service technicians and energy advisors. Technical and economical aspects of solar heat are deepened. By means of certification, planners and installers can verify their high technical know-how in the area of solar heat.

Thus a quality label is created, which facilitates the market uptake of this renewable technology. The training is partly financed by the participants and by the Federal Ministry of Agriculture, Forestry, Environment and Water Management. Up to date, around 27 certified solar installers exist in Styria and around 149 in total Austria.

1st International Energy Road

Background

The 1st International Energy Road ("1. Internationale Energie-Schau-Straße") is an outstanding project for awareness shaping towards renewable energy and the sustainable development of rural areas. This awareness shaping is linked with tourism, economics and regional development. An increase in the quality of life for future generations can only be achieved by sustainable ways of living with reference to energy production and energy use and sustainable use of agricultural resources.

Renewable energy pioneers in Styria and Slovenia decided to support the idea of the 1st International Energy Road. With the financing scheme of an INTERREG IIIa project and some financial support from twelve energy resting areas the Energy Road started its work in 2002.

Objective

The Energy Road sees itself as a mediator between nature, region and humans. In order to transfer this „spirit" into the regions, Energy Road looks for strong partners, that are found particularly in the energy region Eastern Styria. The Energy Road offers a variety of energy technologies: from wind to biomass, from plant oil to biogas, from sustainable resource-management to solar thermal and energy optimised building – a large network has evolved. Now, more than 120 sites are offered which open their doors for interested groups. The aims of the Energy Road are:

- demonstration of sustainable ways to regional added values
- awareness shaping for renewable energy
- strengthening of networks (energy pioneers) in Eastern Styria and over the borders
- connecting different „energy locations" for professional „energy tourism" (educational tourism)
- combining energy tourism and regional tourism.

The target groups are schools, universities, people working in the energy field, in agriculture and forestry, public authorities and privates from all over the world.

Financial Resources and Partners

The responsible non-profit making association is Ökocluster. The partners are regional politicians, regional developers, tourism associations, scientists, energy agencies and energy pioneers. The Energy Road is financed by the financial contribution of partners and revenues from the sale of services, e.g. excursions and consulting.

Results

The Energy Road started with twelve energy pioneers. Now more than 120 sites belong to the net-

work. Several of the 120 sites count around 8,000 to 10,000 visitors per year. Approximately 400 national and international visitors take part in expert excursions annually. Until now people from more than 18 different countries have taken part in expert excursions. During these excursions an expert from the network guides through the sites, informs and educates.

The internationalisation process progresses: With German partners in the Rhineland a cooperation and active knowledge transfer over the borders can be offered. Slovenia and Hungary have already become partners, who have carried the spirit of the Energy Road far over these borders. A new cooperation with partners in Sweden, Egypt and Turkey is planned.

Energy Profit for Wallonia, Belgium

by: Jean-Pierra Binamé

General Description of the Cluster Eco-construction and its Competences

Created in 2002 and officially recognised by the regional Ministry of Economy and Employment, the cluster is still mainly supported by the walloon authorities. It promotes a transsectoral networking between the green building sector – architects, builders, installers, material suppliers, experts, manufacturers in the renewable energies, research centres, associations – by organizing working groups, visit of companies or achievements, conferences,...

With a limited coordination staff (2 persons), the association participates also to fairs in Wallonia and abroad, fosters cooperation projects between companies and research centres and is involved in some european transregional projects to promote the ecomaterials, the ecorenovation practices as well as a better vocational training.

Status of the Green Energy Cluster in Wallonia

Sectors Stage, Regional Economic Impact and Development Perspective

Renewable energies
There are very few manufacturers and the sector consists essentially of SMEs or even VSEs, mainly operating in the assembly or installation fields:

- There are at least ten or more companies offering services, equipment or products intended for the installation of wind turbines. And, in addition to property developers, there are nearly twenty or so engineering and design offices specialised, for example, in measuring wind or in impact assessments.

- One SME has developed an innovative equipment for hydropower that requires little civil engineering investment, mainly for countries in the south (floating turbines, tidal turbines, etc.).
- The regional manufacturer of solar panels carries out R&D activities in cooperation with European research centres or international industrial groups. There are a large number of installers trained in the installation of solar-powered water-heaters (Soltherm).
- The manufacturer of photovoltaic systems is growing rapidly. Several big installers have been formed to meet the high demand stimulated by the Solwatt plan. An ambitious photovoltaic research programme could also encourage other industrial developments, particularly since there are international-level research centres and factories in Wallonia which could be interested in it, for example in the glass, chemicals or space sectors.
- There are several manufacturers of stoves and cassette fires for domestic use, employing more than approximately a hundred workers. There are about ten installers specialising in the installation of automatic wood-fired boilers, three pellet manufacturers and a few self-employed producers of wood chips produced from the forest (residues). A small SME (spin-off) has begun to manufacture a wood gasification system to produce electricity by "combined generation".
- There are currently two manufacturing units of biofuel, including one bio-ethanol factory established in 2007, with a capacity of 300,000 m^3 and providing 100 jobs.

Energy efficiency
There are some regional manufacturers in this sector, boiler manufacturers for instance.
Initiatives are underway to promote the planting of hemp and miscanthus as well as their transformation and use, particularly as natural insulation material in construction (hemp concrete,...).

Green building
At least fifty carpenters and building contractors are active in the wooden houses sector which has grown very rapidly . A third of these companies are operating following the "green building principles", employing about 400 workers (6 are members of the Cluster Eco-construction).

Although less in terms of volume, the number of constructions with low energy consumption has also increased significantly: 430 architects, 348 design offices and 43 contractors have signed the contract of commitment included in the charter "Building with Energy" (some are members of the Green Building Cluster).

There are already some houses and offices which have been awarded the "passive home" label but big projects in progress should increase this figure very quickly.

Energy clusters
With more than hundred effective members the Cluster Eco-construction was the first official cluster

in the field of renewable energies and green building. The cluster is now focusing on the promotion of green building projects and the use of ecomaterials, as well in the public buildings as in the renovation.

A new cluster, Tweed, has emerged in 2008 in the renewable energies and energy efficiency sector, with the support of the regional authorities. Its first mission is to support major investments in production and exploitation of sustainable energy by gathering opportunities around concrete projects. Cap 2020 has also recently emerged as a new official cluster of this sector. It gathers architects, contractors and manufacturers of building materials to stimulate more sustainable practices and buildings with better energetic performances in the whole building industry.

Regional economic impacts
The regional economic impacts of the sustainable energy are not easy to evaluate.
In the framework of the Repro project a study was conducted in the households sector:

- about 1.000 jobs are generated by the grants of the walloon Region to support energy efficiency in the households sector.
- more than 100 jobs are also directly generated by the grants to support the solar hotwater-heaters.
- Following a recent study (DYSER), 9.400 jobs in Wallonia are related to the renewable energies but the figures vary depending on how the sector is defined.

Development perspectives
The new regional majority (july 2009) should accelerate the previous efforts to improve the energy efficiency and to develop the renewable energies as well to develop the regional industry in this field:

- the new regional government has decided to create a sixth competitiveness cluster dedicated to the sustainable development, which could stimulate innovative industrial projects in the sustainable energy.
- In case of houses being very badly insulated, the new government has also decided to stimulate dramatically the energy efficiency investments in the housing sector (renovation), to create new jobs as well as to reduce the regional energy consumption.

Management Structures and Policy Instruments

Regional energy management structures
There are many organisations or institutions in charge with regional energy management. There is no regional energy agency but a department of the Walloon Ministry, supported by 10 sectoral Facilitators. The others actors are sectoral federations or associations like APERe, EDORA and the RBF

Platform and the three clusters supported by the Ministry of Economy and Employment (Green building Cluster, Tweed and Cap 2020).
Organizing a better cooperation with all these actors and with the regional public deciders is now a priority of the Green building Cluster.

Main policy instruments

Grants to support investments in energy efficiency, solar panels or photovoltaic systems are the main instruments of the regional authorities, both in the households and in the public sector.
A facilitators' network was also created in the renewable energies and is focusing on advising project promoters and potential customers and on the quality of installers and design offices.

Good Practices to strengthen the Green Energy Cluster in Wallonia

Local craftsmen clusters

Context

In Wallonia, the number of active VSEs (Very Small Enterprises) in the fields of green building and renewable energy has been growing continuously in recent years. These companies, which often work locally, sometimes feel 'isolated'.
By bringing these VSEs together in so-called local clusters, the cluster Eco-construction enables them to exchange their practical experiences, combine their know-how and apply their joint resources (group participation at trade fairs, share equipment, etc.). This regrouping of skills also benefits the global offering of services and products that can be proposed to candidate builders and renovators.

Objectives

A first objective has been to capitalise on the experience of an existing cluster set up following the initiative of the cluster Eco-construction and its members (the local cluster of the region of Beauraing) in order to create another local cluster (in the region of Mouscron). Two years ago about ten craftsmen and firms in the Beauraing region participated in a joint project, a cluster of firms, and offered a wide range of skills in the field of green building. Their project was to design, to renovate or to build innovative houses, which save energy and are made of sound, aesthetic, ecological and sustainable materials.

The objective of the cluster Eco-construction is to spread these best practices across the different sub-regions of Wallonia, in order to promote the creation of a network of local clusters. The Cluster also has the ambition to help these clusters join a larger framework of regional policy (in particular through the Marshall plan). We have seen that the creation of the first clusters has had direct implications on employment in these sub-regions.

Actions in progress

- To prepare a questionnaire for the members of the various existing local clusters with the following objectives: To identify the positive factors and also the hurdles to be avoided when creating new clusters.
- To meet the members of these clusters to respond to the survey.
- To encourage the creation of new clusters (minimum 3).
- To present in September the experience of the Beauraing Cluster to the various local cluster candidates.

- To establish a support plan for the new local clusters.
- To reinforce the exchanges between these various local clusters which are members of the cluster Eco-construction, in order to ensure a coherent development policy across the whole region.

"Ecolys®: the Walloon activity park dedicated to eco-construction"

Context

The Economic Bureau of the Province of Namur (BEP), one of the main intercommunales of Wallonia, manages 29 economic activity parks in the Province of Namur (1,225 ha, 1,000 companies and 14,000 jobs). -.
For the extension of an economic activity park situated in Namur-Nord-Rhisnes, the intercommunale had the idea to develop an economic "theme park" dedicated to eco-construction, especially since the 45 ha are ideally located, near the Walloon capital and on the crossroads of two Euro corridors. Namur is the breeding ground for several initiatives in the field of sustainable construction. The region of Namur is also home to the cluster cluster Eco-construction. Furthermore, the province of Namur is characterised by preservation and by durable and harmonious economic development. Several projects involving ecological homes or eco-quarters have also been developed in this province.

The objectives

The objective of the park called Ecolys® is to transpose the concept of sustainable construction to the development of an economic activity zone and to the construction of industrial buildings. The park will be built on a number of essential foundations, such as carefully planned landscaping, mobility, waste management, biodiversity, creative architecture, etc., and of course construction techniques respecting the environment.

In addition, this will be the ideal habitat for companies active in the green building sector, with all the necessary potential in terms of development, innovation and market perspectives.

The park will consist of three dedicated zones:

A service zone, the green building showcase. It will include two passive industrial buildings offered for hire (one for offices, the other for production facilities), a reception area (seminar room) and possibly a hotel, a restaurant and a nursery in this theme.

An industrial zone and a mixed zone where companies must respect fairly strict rules regarding water management, energy usage, architectural design, mobility, etc. In addition, 9.95 ha of the mixed zone will be specifically dedicated to companies active in the green building sector.

Actions and follow-up

As a project partner, the cluster Eco-construction will participate actively on the jury selected to validate applications of companies that wish to establish themselves in the zone reserved for eco-construction companies.
Ecolys® will open at the end of 2010, or the beginning of 2011.

GIE (Economic Interest Group) for Walloon Hemp

Context

The majority of ecological insulation materials used in Wallonia are manufactured in other countries. The survey to study the economic effects carried out within the context of REPRO, reveals that the application of these materials provides employment opportunities in the construction sector, however, it has no impact on regional industry. The development and production in the region of insulation materials based on local natural resources is therefore an extremely important challenge for Wallonia.

The Economic Interest Group for Walloon Hemp sets a good example: already present in France and Great Britain for several years, the industrial hemp sector began in 2008 in the Walloon Region thanks to the setting up of an economic group that brought together the different actors in this sector. WALLOON HEMP has been created as an Economic Interest Group (GIE) with the support of the Walloon Minister of Economy and represents as such all agricultural and socio-economic players in Wallonia with the intention of positioning hemp as an innovative raw material that contributes actively to sustainable development.

Objectives

One of the missions of the cluster Eco-construction is to support the development of new economic sectors in Wallonia. The 'Walloon Hemp economic interest group' unites large and small companies and intends to create a new regional sector based on industrial hemp: it's a wonderful initiative that will encourage others in the sector. This is why the cluster Eco-construction is one of the founding members of the GIE and supports the group actively.
From an agricultural point of view, the introduction of industrial hemp growing would be a welcome diversification. On the other hand, the industrial transformation of hemp would also be a precious economic initiative. For example, when combined with lime, which is also produced in Wallonia, hemp by-products can be used to produce natural insulation materials whose specific characteristics are particularly interesting for green building.

Actions

The Walloon Hemp Economic Interest Group (GIE) has been invited to present the benefits of lime/hemp for construction purposes during the Eco-kiosks organised by the cluster. More than 400

representatives of the public sector (local and regional authorities) were able to learn more about the advantages of this material. The cluster Eco-construction also participated actively on the feasibility study for industrial exploitation of hemp in the Walloon Region which was given to the Walloon Hemp GIE.
The cluster Eco-construction, the "Walloon Hemp Association" (association responsible for promoting hemp in the Walloon Region) and other players in the sector were invited to participate in the pilot committee of this survey.

Initial results

The cluster Eco-construction co-organised the session that presented the results of the survey on 25 May 2009 in Seraing. Several other initiatives are in progress to ensure the technical and commercial viability of this agricultural and industrial diversification.
The experience of the Walloon Hemp GIE can serve as an example for the development of other sectors in the Walloon Region.
Several member companies of the GIE have joined the cluster Eco-construction and in particular the Lhoist Group which is one of the world leading manufacturers of lime and dolomite.

Energy Information Centres and Facilitators

Context

The Walloon Region has set up a network of facilitators: 'energy' consultants who are active specifically in various energy sectors (wind energy, hydro-energy, building energy performance, etc.) or 'multi-energy' consultants for several different areas of activity (industry, services, education or social services, etc.). A network of 14 Information Centres (the 'residential' facilitators) in the major cities of Wallonia complete this network. Their mission is in particular to inform the population on the various measures proposed by the public authorities in the field of energy.

The cluster Eco-construction have maintained regular contact with the these facilitators for several years.

Objectives

The cluster wants to reinforce the co-operation initiated with facilitators (including the energy information centres) in order to inform the energy information centres and facilitators more about what the cluster and its members do (and ensure that they are aware of the eco-building materials and other products sold by its cluster members: heat pumps, underground heat exchangers, etc.). In other words, they want to structure the transfer of information from its members to the staff of information centres, to ensure that the latter spread the correct information to their target groups (public/private investors, private customers, etc.). On the other hand, the members of the cluster Eco-construction must also understand the role of the information centres/facilitators so they can collaborate more

efficiently with them and increase awareness of their company. The cluster can help its members by acting as an intermediary.

Actions and initial results
The cluster Eco-construction has contacted the person responsible for the information centres and facilitators at the Administration. The mutual interest in co-operation has been confirmed. A database of the contact details for the various energy information centres/facilitators is currently being prepared.

The cluster will also invite information centre staff and facilitators to a presentation on the cluster eco-construction, and to a regional Repro conference on 25 September 2009. In the future, "product awareness" data sheets will be provided for example, for the information centres and facilitators to structure and channel the exchange of information.

Alternative financing

Context
Policies to encourage sustainable development are very important, however, these policies must also be accessible to as many parties as possible. Initiatives in this respect are being taken here and there: grouped purchasing, renting/sales systems, third-party investment techniques and co-operatives in wind energy.

It's interesting to see which tools are available today, what their advantages and their inconveniences or limitations are, what are their practical results and for which type of public (private, public authorities, companies, major investors, etc.) they are meant.

The objective of the cluster Eco-construction is to identify the financing tools that could be developed specifically in the green building sector.

The actions currently in progress are:

- A study of the strengths and weaknesses of the various alternative financing approaches
- A proposal for one or several alternative financing products that take into account the analysis made for the cluster
- The writing of a newsletter and a special file on this subject, which can be sent to members of the cluster.
- The preparation of an information evening with several operators.

Initial results
A presentation session on eco-loans was held at the Wood and Home fair (Bois et Habitat) in March

2009. This was mainly meant for private investors interested in eco-renovation projects. About a hundred people participated. Two financial operators (Triodos Banque and Ethias) are involved in this respect. They are currently finalising an 'Eco-loan' data sheet in collaboration with the cluster Eco-construction.

Photo: CEC Eco-kiosque

Investor evenings

Context

Not many green building sample projects exist yet in Wallonia. Recently, many investment candidates (promoters, Municipalities, etc.) would like to realise their building projects within the framework of sustainable development, however, they are generally faced with difficulties due to the lack of practical information, difficulties finding companies active in certain sectors, etc.

Objectives

Reinforce the meeting sessions with investors: investors present their projects to members of the cluster Eco-construction at evening meetings. The cluster possesses all the necessary information, and its objective is to guide investors towards a panel of technicians who are able to answer many questions during meeting sessions.

For investors, the cluster can provide increased visibility for their projects (presentation of projects on a website, construction site/project visits, etc.) The cluster can also bring together various investors with similar projects and encourage them to exchange experiences.

The main objective for cluster members is to have direct contact with investors and identify business opportunities. In certain cases, several cluster members come together to provide a total and joint service offering for an investor, thanks to the cluster.

Another objective is to create a database of 'successful projects' that can be distributed.

Actions

The cluster Eco-construction will hold project presentations again as it has done successfully in the past for various public or private projects: a session is planned in September 2009 focussing on eco-land plots.

Results and follow-up

In the future, the cluster will make every effort to identify new sources of information so it is informed of new projects well as public tenders, and subsequently distribute this information to its members via a formal and regular service. To do this, the cluster will collaborate with the services of the Walloon Region that already monitor this information (e.g. the "wood energy" facilitator for the invitations to tender for 'wood heating' issued by the Walloon municipalities).

The 'investor' meetings organised by the cluster have already generated business for several members and several members of the cluster are involved in these projects.

Links between the political world and the cluster

Context

Political initiatives in the field of renewable energy and green or sustainable building are gradually increasing in the Walloon Region. Industry players are carefully monitoring the directions taken by politicians. Indeed, certain decisions (aid, sector subsidies, etc.) can have an enormous impact on the economic development of companies. In Wallonia, as in other countries, it is necessary to reinforce exchanges between players on the field and politicians. The cluster must play an important

role bringing the opinion of eco-construction industry actors (SMEs in particular) to the attention of politicians.

Objectives
Reinforce the cluster's role of link between the politicians and industry players.

Actions
A working group has been set up within the cluster Eco-construction:

- To establish a network of lobbyists to structure the information that needs to be fed on an ongoing basis to political decision-makers that prepare laws/plans and strategies.
- To successfully integrate environmental regulations and requirements in the specifications of invitations to tender issued by public authorities (Union of Towns and Municipalities, Intercommunales, etc.)
- To establish a permanent relation between the cluster and the different Administrations concerned (energy, town and country planning, etc.) in order to remain informed about texts being prepared.

Initial results
The cluster has been invited as stakeholder in the context of the project to update the "Master Plan for Sustainable Energy in Wallonia on the horizon of 2020 (April 2009).

The cluster Eco-construction was invited by negotiators forming the new governments of Wallonia and Brussels to a round table conference on the future Alliance of Employment and Environment which also includes energy aspects (1 July 2009). The chairman of the cluster spoke on this occasion. The cluster is to be consulted in the event of works concerning this theme that focusses on the environment and sustainable development supporting employment.

Strategic Outlook

Possible perspectives for regions to exploit the full potential of regional economic benefits

Styria has an outstanding position within the partner consortium because, within the last few decades, the region has been able to generate a green energy cluster along the value chain - from primary production via the manufacturing of renewable energy technology (e.g. stoves) up to energy production and consumption in private households.
Today, Styria has reached a relatively high stage of development in comparison to the other RE-PRO partner regions. The head start in the field of green energy results from an early integration of this sector into the regional economic development plan. As a further development perspective, Styria will concentrate on developing energy efficiency measures in the private building sector – e.g. to focus on increasing the rate of building renovations, in order to take advantage of the good opportunities of enhancing the green energy cluster.

Other regions are presently striving to catch up on this by concentrating on the development of the green energy sector.
For example, the federal state of Bremen is investing a significant amount of effort into the development of a wind energy cluster in the region (initial financing of the coastal location of Bremerhaven). New settlements have given rise to optimism that Bremen might succeed in initialising a burst of development through these efforts. Bremen seems to fulfil the requirements for developing the green energy sector along the value chain as there are high potentials that can be tapped within the fields of industry as well as science. It is important to integrate suppliers and service providers into this process in an optimal way.

In Styria and in South-East Sweden, biomass has already been used as a natural resource for renewable energy production on a considerable scale.

The Emilia Romagna region should be able to tap the full potential of solar energy in the future, especially as there seems to be a demand for this on the regional market. In addition to this, it is recommended that the establishment of a plant manufacturing industry in the field of renewable energy is supported in the Emilia Romagna region and that available scientific potential within the field of renewable energy systems is used to its full extent. The tax deductibility of energy efficiency measures in Italy should be recognised as exemplary for other countries as it has had a wide spread impact on the development of clusters at the regional level.

In South-East Sweden, the efforts regarding the development of a renewable energy cluster started comparatively early and are broadly anchored as they are organised as a public-private partnership of various regional players from the fields of economy, science and the administration.

Hence South-East Sweden has reached a relatively high stage of development over the last two decades, in particular with regard to cluster management structures. The region consists of three subareas - the counties Kronoberg, Kalmar and Blekinge - with different specialisations (biomass, networking and transport) which complement each other in a productive way. This constitutes a significant advantage for the region as a whole that should be preserved and strengthened. The overall objective for South-East Sweden is to become a 'fossil free region'. Based on this climate protection target, the region should keep on developing climate technologies such as those it has already initiated, for example (industrial) waste heat recovery.

In Wallonia, the natural environment does not provides optimal basic conditions to produce a high level of renewable energy (it incurs sometimes higher costs than in other regions), but there is a higher production potential for windpower or biomass and maybe for geothermal energy, small scale hydroelectricity or biofuel. There is also a higher potential market for solar and photovoltaic systems.
Nevertheless, Wallonia could stimulate or attract new manufacturers in this field, for the production of components by instance, in relationship with the R&D activities of Walloon glass, chemical, steel and mechanical companies or research centres.
The energy efficiency investments programme just decided upon for the housing sector could also stimulate the industrial activities or attract new plants.

The activities and good practices described above, that were initiated and facilitated within the framework of the REPRO project, are expected to promote economic benefits from sustainable energy systems in the regions. These benefits range from direct and measurable employment effects to indirect and less tangible effects. The actions indicated can be transferred to other European regions, but have to be adapted to the special conditions in these regions. Before adopting practices to strengthen the sustainable energy system in a specific region, various aspects have to be considered such as the current status of the region's green energy cluster, existing cluster management structures, the number of companies active in the field, the public funding conditions and general regional features such as settlement patterns.