

EU LOCAL ENERGY ACTION

Good practices 2007



CONTENTS

The 2000 Green Paper 'Towards a European strategy for the security of energy supply' analysed Europe's structural weaknesses: energy consumption is rising, while the EU is becoming increasingly dependent on external sources of energy. At the same time, to respect its commitments under the Kyoto Protocol, the EU pledged to reduce its production of greenhouse gases. The Green Paper proposed a strategy to reduce energy consumption in Europe through improved energy efficiency, to increase the use of renewable energy sources and to diversify energy imports.

Since 2000, energy policy has been continuously developed, and in 2007 EU heads of state and government adopted a binding 'Energy Policy for Europe'. This proposed an ambitious range of new targets and objectives for 2020, including: reducing greenhouse gas emissions from developed countries by 30%; improving energy efficiency by 20%; raising the share of renewable energy to 20%; and increasing the level of biofuels in transport fuel to 10%.

Promoting local initiatives for more efficient use of energy and greater use of energy from renewable sources is crucial for reaching these targets. To help disseminate Good Practice in Local Energy Action, this publication has been produced by CPL Scientific Publishing Services and STEM - the Swedish Energy Agency for the European Commission Directorate-General for Energy and Transport. It is part of the ManagEnergy initiative supported by the European Commission under the Intelligent Energy-Europe Programme.

Further information about ManagEnergy can be found on the web at <http://www.managenergy.net>

Information on the Directorate-General for Energy and Transport can be found at http://ec.europa.eu/dgs/energy_transport/index_en.html

A great deal of additional information on the European Union is available on the internet. It can be accessed through the Europa server (<http://ec.europa.eu/>).

© European Communities, 2007

Reproduction is authorised provided the source is acknowledged

Manuscript completed on 30th September 2007

Photos courtesy of: B.&S.U. Beratungs- & Service-Gesellschaft Umwelt, Agencia Provincial de la Energía de Burgos, Kaunas Regional Energy Agency, Leafstream Ltd, Graz Energy Agency, Cornwall Sustainable Energy Partnership, CRES, Norrbottens Energikontor (NENET), Fredrik Broman and AGEAS Salerno

5 Introduction - Local initiatives lead the way

8 The Case Studies

ENERGY EFFICIENCY

- 8 The Polish Energy Bus
B.&S.U. Beratungs- & Service-Gesellschaft Umwelt, Germany
- 10 Saving Energy in Residential Housing
Agencia Provincial de la Energía de Burgos, Spain
- 12 Efficient lighting in the Latvian Academy of Sport Education
Ekodoma, Latvia
- 14 Assessment of Energy Saving Potential in Residential Buildings in Kaunas City
Kaunas Regional Energy Agency, Lithuania
- 16 The European Energy Trophy
B.&S.U. Beratungs- & Service-Gesellschaft Umwelt, Germany
- 18 Green Light Graz - Modernization and saving energy for street lighting
Graz Energy Agency, Austria

RENEWABLE ENERGY

- 20 Action Today for a Sustainable Tomorrow: The Energy Strategy for Cornwall
Cornwall Sustainable Energy Partnership, UK
- 22 Implementation Plan for Renewable Energy Sources in Crete
REAC, NTUA and CRES, Greece

ENERGY EDUCATION

- 24 Grasping of Climate in Theory and Practice
Norrbottens Energikontor NENET, Sweden
- 26 Green-Schools
An Taisce - The National Trust for Ireland
- 28 Energy and its Relationship with the Environment (peeRma)
Alida Ingeniería del medio S.L. Comunidad de Madrid, Spain
- 30 RESIS - Renewable Energy Sources in Schools
AGEAS Salerno, Italy

Introduction

Local initiatives lead the way

A European challenge

Energy consumption in the European Union is rising, and so is our dependence on fossil fuels – principally oil and gas – imported from outside the Union's borders. At the same time, the EU has signed up to the Kyoto Protocol, committing us to reduce greenhouse gas emissions in 2012 by 8%, in comparison to 1990 levels. In November 2000, the European Commission adopted a Green Paper, setting out the strategy to reduce the EU's dependence on imported energy. This was developed further by the Green Paper on Energy Efficiency of June 2005, which listed a number of options to save 20% of energy consumption by 2020 in a cost effective way through changes in consumer behaviour and energy efficient technologies. In 2007, EU heads of state and government adopted a binding 'Energy Policy for Europe'. This proposed an ambitious range of new targets and objectives for 2020, including: reducing greenhouse gas emissions from developed countries by 30%; improving energy efficiency by 20%; raising the share of renewable energy to 20%; and increasing the level of biofuels in transport fuel to 10%.

Whilst action at EU and national levels is a vital part of realising these objectives, without action at the local level, there is no chance that they can be achieved. The drive to improve energy efficiency requires end-users to examine their energy consumption and consider means to reduce it – but without reducing their standards of living. Initiatives such as installing insulation or more efficient heating/cooling equipment, or simply ensuring that lights and equipment are switched off when not in use all bring savings in energy consumption, and reduce the cost of bills. Increasing the use of renewable energy sources is often appropriately tackled at local level. Individual installation of photovoltaic panels to capture solar energy, or district heating plants fired by biofuels, or local wind farms to provide electricity to an area, are different examples in which local communities can commit themselves to using renewable energy.

Local – or individual – initiatives are critical to achieving the EU's targets in the energy sector. The more such initiatives are taken, the closer we come to meeting our commitments. But if local citizens do not take up the challenge, we cannot reach our objectives. Certainly there is an initial investment that needs to be borne, but in the longer term, these initiatives will pay for themselves in cost savings, in addition to reducing environmental damage.

Energy agencies as local facilitators

Information and encouragement are at the heart of successful local initiatives to encourage take-up of energy efficiency and renewable energy use. Individuals, organisations and companies which stand to benefit from such measures often do not have the resources to investigate the possibilities and, therefore, do not consider taking them up. To help provide local citizens and organisations with the information and encouragement needed, the European Commission has supported the creation of local energy agencies across the EU. These are set up by public authorities (regional or local authorities made up of elected representatives) and partner organisations, although the agency itself must be established as a separate legal entity. The role of energy agencies is to promote and disseminate good practice in the areas of energy efficiency and renewable energies.

Achieving the European Union's ambitious goals for improving energy efficiency and increasing the share of energy from renewable sources cannot be left to governments and utilities alone. If these goals are to be reached, individuals – householders, companies, organisations – need to make choices, and take responsibility for their own energy use. Local energy agencies are about informing and encouraging local citizens to take these decisions, so that local actions bring direct benefits to local people. Ideas for local initiatives are frequently simple, and have already proved their worth elsewhere, but successful implementation requires commitment and resources.

The European network of energy agencies

Today there are some 400 energy agencies within the EU and new agencies receive support on a regular basis, through the Intelligent Energy – Europe programme ⁽¹⁾. EU funding is used to get energy agencies up and running, and lasts for a maximum of three years, beyond which the agency is expected to be viable. In principle, EU funds may cover up to 50% of an agency's budget in the first three years. The remainder of the budget comes from the local authority and other public or private partners. In many cases, an energy agency will generate funds from its activities which can then be reinvested in its work. Each energy agency works with local people in its area. Given that these local citizens are directly responsible for more than half of all final energy consumption in the EU, the focus of energy agencies is on disseminating good practice in demand-side management to consumers. Good practice may come from all over Europe and beyond, although in many cases, the details need to be adapted to different local contexts. The need to access as wide a range of examples of good practice as possible on behalf of local citizens means that local and regional energy agencies across Europe need to communicate and co-operate with each other.

The ManagEnergy initiative

To support the many energy agencies operating across Europe – as well as other organisations working in the energy field at local and regional levels – the Commission is funding the ManagEnergy initiative. ManagEnergy's primary aim is to facilitate the sharing of information. It does this through its website ⁽²⁾ and helpdesk, and through events and publications, by providing a forum for exchange of ideas and experiences. In particular, ManagEnergy supports the collection and dissemination of good practice throughout the network. It also helps organisations find partners to implement projects, and provides information on EU policies in the energy sector and on funding opportunities.

Exchanging good practice

The basis of the ManagEnergy network is exchanging ideas and experience between local actors. Schemes which have worked well in one situation may fit in well in another, or may work with some adaptation, or may not be suitable for a given context. The essential basis for exchange of good practice is circulating the available information to as wide an audience as possible. People's different reactions to ideas mean it is essential that as many local actors as possible have access to good practice examples: whilst one person may not be able to envisage a scheme in their own situation, their colleague may be able to visualise it clearly. Equally important is the ability to contact a counterpart, who has the experience of implementing a scheme, and can discuss informally the benefits and difficulties in implementation, as well as the key criteria for success.

ManagEnergy provides a range of information channels for the exchange of dissemination of good practice, of which this brochure is just one. This brochure is the third in a series entitled 'Local Energy Action - EU Good Practices'. The first volume was published in October 2004 and the second in December 2005. Both can be downloaded in PDF format from the ManagEnergy website, which also includes a searchable listing of over 880 case studies and other documents. The more people that see these examples the more chance they have of being replicated in other parts of Europe. Whilst the details would undoubtedly change when implemented in a different context, the principles will remain the same – not just the design of the scheme, but its results as well.

Selection of case studies

This brochure contains just 12 examples of good practice from energy agencies across Europe. Each has been validated by the European Commission against a set of objective criteria, and they have been chosen for their strong contribution to the promotion of energy efficiency and/or renewable energy use, and for their strong possibilities of replication. The selection in the following pages demonstrates the wide variety of spheres in which energy agencies operate, from small rural districts to large cities, and in Member States of varying sizes and historical energy policies and infrastructures. Furthermore, different agencies have chosen to work with different target groups. Some have worked with individual householders, some with companies, some with whole villages or districts, some have gone straight to young people in schools to promote energy efficiency, and some have worked directly with public authorities to change policies and oversee their implementation.

The examples of good practice in the following pages represent a wide variety of approaches, and all of them could be replicated elsewhere. But there are many other approaches which could be taken, and this brochure is meant to stimulate thought rather than provide all the answers.

(1) http://ec.europa.eu/energy/intelligent/index_en.html

(2) <http://www.managenergy.net/>

Mobile information unit gets Polish energy training moving

The Polish Energy Bus

B.&S.U. Beratungs- & Service-Gesellschaft Umwelt, Germany

In Poland the demand for information, advice and technical support on sustainable energy and renewable resources is very high, and the country covers a large area. To get energy training moving, a consortium of five partners designed an imaginative, mobile information centre - the Polish Energy Bus, which was funded by the European Commission under the Save II Programme. Between September 2003 and August 2005, the bus visited 200 municipalities across Poland, displaying energy technologies and providing information to over 50000 visitors. The bus also hosted 35 seminars and training sessions for local business, schools and public sector employees.

The aims of the scheme

The goal of the Energy Bus project was to provide a wide range of energy-related information and on-site consulting throughout Poland. The project aimed to involve both public and municipal decision-makers in discussions on sustainable energy use and the development of local energy strategies.

Through the use of a mobile information centre, the project planned to reach at least 15000 individuals in communities, schools and local businesses. The energy bus was designed to show how energy saving measures can be put into practice and how renewable energy can play a more prominent role in the current local energy mix. A final aim of the project was to test how well a mobile information unit would be accepted by local target groups such as schools, businesses and municipal employees.

The partners

The Polish Energy Bus project required total funding of €880000, with a significant amount provided under the European Commission Save II framework. Other key funders included the German Federal Ministry of Economics and Labour, the German Länder Brandenburg, Hesse and Saxony, the Polish National Fund for Environmental Protection and Water Management, the Polish-German Co-operation Fund and the companies Viessmann, Mercedes-Benz, JUMBO-Infomobile, MIWO and Menag.

partners. B.&S.U. Beratungs- und Service-Gesellschaft Umwelt mbH, Germany, coordinated the project with support from: TÜV Immissionsschutz und Energiesysteme GmbH (TIE), Germany; Krajowa Agencja Poszanowania Energii S.A. (KAPE) and KESCO Energy Sp. z o.o., Poland; and Ecofys B.V., Netherlands.

How it worked

The development phase of the Polish Energy Bus commenced with an overall communications concept that focused on key energy messages for target audiences. Design ideas for the interior and exterior of the bus were created, and a suitable vehicle was identified and leased from Mercedes-Benz.

The bus was then refurbished, and information material was printed on topics such as efficient gas boilers, cogeneration, energy labelling, energy audits, heat pumps, public transport, solar hot water systems, wind energy, zero-cost energy saving, funding opportunities, and a host of related topics. Finally an exhibition area was installed, including models of a CHP plant, a photovoltaic (PV) powered street lamp, wind turbines, fuel cells, and a low-energy house, as well as demonstrations of energy saving light bulbs, insulated glass, solar roof tiles, insulation and energy mirrors.

Once complete, the bus was driven from Cologne via Berlin to Warsaw where it commenced its two-year tour of Poland. The route was organised by KAPE with a calendar of bus stops listed on the project website. The tour was promoted by 30-second TV spots and advertising through radio, newspapers and posters.

>>



Results

Between September 2003 and August 2005, the Polish Energy bus visited over 200 municipalities in Poland, attracted over 50000 visitors and organised about 35 seminars and workshops on energy related topics. 76% of visitors were from the local community and 24% were energy professionals or local business people. 65% of visitors expressed a specific interest in energy efficiency, and over half were also interested in discovering more about renewable technologies - 54% solar energy, 34% wind, 30% water, and 23% biomass.

The bus prompted 30% of visitors to make immediate changes to their energy use, for example by switching to energy efficient light bulbs and appliances. 60% planned to make changes in the future. This will create significant savings in future energy use and carbon emissions across Poland. The seminars and cross-border cooperation also provided productive networking opportunities for both suppliers and users of energy-efficient and renewable technologies. At the project's end, the refurbished energy bus was available for future tours by other energy organisations in Poland and neighbouring countries.

>>

The bus was always parked in a prominent position in each town and city, with access to a local energy supply. It also visited local and national events, such as the annual Poleko fair for environmental technology in Poznan.

Could it be repeated?

The Polish Energy Bus has demonstrated that mobile information units are an innovative and efficient alternative to static training centres. A similar bus could easily be deployed across other countries. The design and deployment of mobile exhibitions requires significant funding and management. However, with the right promotion, large numbers of visitors can be attracted. Repeated visits do cause wear and tear on the inside of the bus, and vehicles designed for inner city travel may suffer on longer journeys, so routine maintenance needs to be built into the budget.

An energy organisation with a wide network of contacts across the host country or region is essential, as well as a partner with hands-on experience of operating mobile information units. The cost of leasing, insurance, contracts, staffing and secure parking all need to be carefully considered prior to deployment. However with the right team, a realistic budget, and a detailed plan, mobile energy information units are an effective way of creating positive attitudes to energy saving and renewables.

CONTACT

B.&S.U. Beratungs- und Service-Gesellschaft Umwelt mbH
Saarbrücker Str. 38 A
D-10405 Berlin
GERMANY
Tel: +49 30 39042 62
Fax: +49 30 39042 31
tglasmacher@bsu-berlin.de
www.bsu-berlin.de

Efficiency hots up in Lithuanian Apartment Blocks

Assessment of Energy Saving Potential in Typical Multi-Storey Residential Buildings in Kaunas City *Kaunas Regional Energy Agency, Lithuania*

In Lithuania, housing accounts for 45% of final energy consumption. 60% of the population live in multi-apartment buildings, many of which were constructed between 1961-1990. Insulation is often poor and energy consumption for heating is up to 1.8 times that for comparable buildings in other countries. A study carried out by Kaunas Regional Energy Agency predicted massive potential for energy saving in typical five-storey and nine-storey apartment blocks. Assessments suggested a heat energy saving potential in Kaunas City housing of 437241 MWh - equivalent to an 83950 tonne annual reduction in carbon emissions. The calculations and forecasts produced by the study have proved a vital resource for local authorities and district heating companies when optimizing municipal energy plans and renovation programmes.

The aims of the scheme

The aim of this study was to estimate energy saving possibilities in the housing sector of Kaunas City and to use the data in the preparation of municipal energy efficiency programmes. An increase of heating efficiency in housing would address a number of environmental factors and reduce the burden on state budgets of energy-cost subsidies for low-income families. A principle task was to assess a representative selection of various five-storey and nine-storey buildings in the city, so that an accurate model of heat saving possibilities could be made for all typical multi-apartment blocks. This involved detailed calculations of the numbers of each building type in the city and their respective heat losses and energy characteristics, before and after renovation.

The partners

The study into the energy saving potential of residential buildings in Kaunas city was carried out by the Kaunas Regional Energy Agency. The results of the study were included in 'The Plan of Rational Energy Use in Kaunas City'. This was prepared for Kaunas City Municipality and SC 'Kaunas Energy' - the main central heating company in Kaunas city, who supply 70% of their heat to residential customers. Having established the potential for energy saving, these organisations need to work with property owners. However as multi-apartment blocks in the city have various forms of management ownership, providing the finance for their

modernization is not straightforward. Potential sources of finance include the private funds of home owners and special funds accumulated by local authorities to support the home owner's associations. Further funding is available under the Multi-Apartment Residential Buildings Modernization Programme adopted by the Government of the Republic of Lithuania in 2005, which offers support particularly to low-income families. A major role in this programme falls to local authorities. It is also planned that in 2007 the process of multi-apartment residential buildings renovation will benefit from the second stage of EU Structural Funds Support.

How it worked

A selection of typical five-storey and nine-storey buildings in Kaunas city were selected for assessments, and energy audits were performed. For each type of multi-storey building a package of renovation measures was established and potential savings on heat and energy were calculated. An assessment was made of energy use before and after renovation; energy consumption for heating; number of heating degree days; and specific heat loss of building envelopes.

>>



Results

The final calculations by Kaunas Regional Energy Agency assumed that 1% of five and nine-storey residential buildings would be renovated each year until 2007, increasing to 3% each year between 2007 and 2009.

Audits showed that heat consumption could be reduced by 50% in five-storey buildings and by about 40% after the renovation of nine-storey buildings. By 2010, 113 five-storey and 55 nine-storey buildings are due to be renovated, resulting in a total decrease in energy consumption of 29115 MWh.

The total possible heat energy savings in all five and nine-storey residential buildings in Kaunas city is 266258 MWh. The total heat energy saving potential in the entire housing sector in Kaunas city is 437241 MWh. This equates to a reduction in CO₂ emissions of 83950 tonnes per annum.

>>

Having established the potential for energy saving in Kaunas city, it is anticipated that the renovation programme will be implemented by a partnership of house owner's associations, commercial banks, credit institutions, insurance companies, local authorities and public institutions with state support.

Renovations are likely to be carried out in tandem with education and promotional campaigns on energy efficiency, such as 'The Programme for 2004-2006 on raising public awareness about the housing policy', approved by the Ministry of Environment of the Republic of Lithuania. A key objective of this programme is to inform the public more widely on issues of building modernization, the implementation of energy efficiency measures and the availability of financial support.

Could it be repeated?

The calculations made in the Kaunas project show that building renovation offers great energy saving potential in Lithuania and other countries. However, before actual renovation commences a detailed cost-benefit analysis is required.

Although energy saving measures may be technically possible, they are not always economically feasible, with payback times sometimes exceeding the life cycle of the proposed renovations. Hence, funds should be targeted at buildings that promise the greatest immediate return in terms of energy saved.

In many cities, the financial limitations of the home owners (be they private individuals, councils or housing associations) may be a barrier to extensive building renovation. Therefore such schemes may rely on special funding and state subsidies, or 'third-party financing' in which the value of energy saved is gradually offset against initial investment costs.

CONTACT

Kaunas Regional Energy Agency (KREA)
Breslaujos g. 3b-202
LT-44403 Kaunas
LITHUANIA
Tel: +370 37 491043
Fax: +370 37 491043
krea@techpark.lt
www.krea.lt

Information campaign brings home energy issues in Spain

Saving Energy in Residential Housing *Agencia Provincial de la Energía de Burgos, Spain*

In recent years, energy consumption in the domestic and tertiary sectors in Spain has increased at an annual rate of 2.5%. In the Province of Burgos, a large proportion of this is due to the comparatively cool climate and extensive use of heating systems. To address this issue, the Provincial Energy Agency of Burgos developed an information campaign - 'El ahorro energético en el hogar' (Saving energy in residential housing). The aim was to promote consumer energy saving across the province by targeting householders, particularly 'domestic decision makers'. 22000 leaflets were distributed containing simple yet effective advice on residential energy efficiency. And hundreds of householders attended conferences in 9 provincial municipalities.

The aims of the scheme

The main objective of the campaign in Burgos was to promote the rational use of energy in residential housing across the province, and to instruct and train the general population on how to reduce their energy bills and mitigate the environmental impact of rising energy use. The campaign was targeted at two principal groups concerned with domestic energy consumption; general consumers, and 'housewives' who typically manage the home, and make daily decisions relating to use of energy, heating and appliances.

The partners

The 'Saving energy in residential housing' project was led by Agencia Provincial de la Energía de Burgos, who provided technical advice on the content of the information pamphlets and oversaw the organisation of a series of regional conferences (€3000). The Provincial Government supported the production and printing of 22000 pamphlets (€6000). The main provincial newspaper, 'Diario de Burgos', promoted and distributed the pamphlets (€9000).

The Burgos Provincial Civic Union of Consumers and Housewives (UNAE) also assisted with the design and contents of the pamphlet and the organisation of the conferences. These were carried out in collaboration with local City Councils and Housewives Associations in the different municipalities, who hosted the conferences, organised venues and attracted participants. The local partners, who offered 'support in kind' on a voluntary basis, were essential to the success of the campaign.

How it worked

The information pamphlet was based on national guidance on energy saving measures. It was designed by technicians at the Province of Burgos, with technical support and additional content from Agencia Provincial de la Energía de Burgos and the UNAE. The Provincial Government press office printed 22000 copies. These were distributed across the province by the main provincial newspaper, Diario de Burgos. The pamphlet focused on environmental protection through energy saving and contained specific advice on: insulation; energy labelling of domestic appliances; efficient use of appliances (refrigerators, washing machines, kettles, irons, etc); heating systems; hot water; and low energy lighting.

>>



>>

The information pamphlet was supported by a series of local conferences in different provincial municipalities, with the support of various city councils and housewives associations. Each conference lasted for one hour, and explained how advice provided in the pamphlet could be implemented in the home. The energy agency also distributed a questionnaire at each conference to gauge the daily energy consumption and attitudes of participants.

Results

The collaboration of principal city councils and the provincial housewives and consumers associations helped to achieve an excellent campaign acceptance rate. The energy advice presented in the 22000 information pamphlets was well received by the general public with hundreds of people subsequently attending 9 conferences organized in different provincial municipalities.

Approximately 200 questionnaires were completed at the conferences, enabling agency staff to assess the attitude and behaviour of 'domestic decision makers' across the province. The feedback suggested that housewives are already conscious of many aspects of residential energy savings and are very aware of the advantages of the efficient use of electrical domestic appliances. However, they may be less aware of the potential cost savings and environmental benefits of low energy lighting and efficient heating systems.

Could it be repeated?

The success of the campaign in Burgos demonstrates how a targeted leaflet and local conferences can help to bring home the importance of energy saving to domestic consumers. A series of simple efficiency measures adopted by a large number of households can have a significant impact on local energy consumption.

The perceived high cost of promotional campaigns can be a barrier to take off. However, as the Province of Burgos showed, this can be overcome by a collaborative approach involving local organisations and councils, who are often happy to provide support in kind. Such campaigns could easily be adopted in other regions, enabling key messages on energy saving to reach every home.

CONTACT

Agencia Provincial de la Energía de Burgos (Agenbur)
CEEI – Aeropuerto de Burgos
ES-09007 Burgos
SPAIN
Tel: +34 947 040 628
Fax: +34 947 040 631
info@agenbur.com
www.agenbur.com

ESCO lights the way for future sports stars in Latvia

Efficient lighting in the Latvian Academy of Sport Education Ekodoma, Latvia

The use of an ESCO (Energy Service Company) enables improvements to the energy performance of buildings to be made without initial cost to the owner. Instead, investments made by the third party are refinanced by savings from improved efficiency. Under the framework of the Efficient Lighting Initiative (ELI) programme in Latvia (2000-2003), the ESCO principle enabled the renovation of an indoor lighting system in the Latvian Academy of Sport Education (LASE) in Riga. Improvements in the quality of lighting in the sports hall and viewing balcony, made conditions much more comfortable and safer for players and spectators, and led to significant reductions in energy usage. Savings were 83500 kWh per year, equivalent to a 30.4 tonne annual reduction in CO2 emissions. Following the success of the lighting ESCO project, the academy administration prepared a similar tender for the renovation of the heating and water supply system.

The aims of the scheme

The LASE project was developed under the Efficient Lighting Initiative (ELI) a programme led by energy engineering consultancy, Ekodoma, Ltd. The principle aims were to: promote efficient lighting in public buildings; increase lighting quality in sport halls; and encourage and develop ESCO principles in energy efficiency projects in Latvia.

The LASE was established in 1921 and is the only sport academy in Latvia. It enrolls more than 1600 students divided between bachelor, masters and PhD programmes. Specifically, the project aimed to: improve lighting conditions for these sports students; to meet local and European quality standards on lighting, to improve the efficiency of control systems; improve evacuation lighting; and ensure that more appropriate bulbs were used, with better efficiency, ease of maintenance and luminosity.

The partners

The project was fully financed under the ESCO principle, with the installation and upgrading carried out by Sinhro, Ltd, who won a competitive tender. Total project costs were €28500. The ESCO received a loan of €14250 from a Latvian commercial bank, Unibanka, with the rest of the costs being covered from its own resources. The project was implemented by the energy engineering consulting company Ekodoma, Ltd (ELI Latvia programme leader), Danish Power Consultant, Denmark (ELI Europe programme manager), and the client, the Latvian Academy of Sport Education.

How it worked

The LASE project began in October 2001 with an energy audit to evaluate the possibilities for improved lighting in one of the sport halls in the campus. The existing lighting consisted of 33 spotlights, mainly with 1000W halogen bulbs, as well as 6 light points using 750W high-pressure bulbs. In the balcony there were 10 additional 500W incandescent bulbs. The lighting system was used 7 months a year for 12-15 hours a day, for a total of 4100 hours per year. The energy audit identified several issues including 'dead' bulbs, dust settlement, and an inefficient control system. The annual electricity consumption in the sports hall was 173120 kWh at a cost of €8900/year.

Having agreed to upgrade the lightning in the sports hall, LASE announced a call for tender. This was aimed at ESCO for three main reasons: attraction of third-party financing, inclusion operation and maintenance within the contract; and, in particular, a guarantee on energy savings. Four installation companies applied, one of which stood out in terms of its understanding of the ESCO principle, risk management skills, savings estimates and implementation capability. The agreement with the winning ESCO, Sinhro, Ltd, was signed on July 2003.

>>



>>

Computer simulations were carried out to optimise the wattage, position and angle of the new lighting. The ESCO then rewired the entire system, and installed 66 new 250W lamp units - offering greater optical efficiency, superior casings, and much easier maintenance. An automatic lighting control system and a computer-controlled consumption meter were installed, along with 8 motion sensors, outside lighting and new emergency exit lighting.

Could it be repeated?

The use of ESCO across Europe enables energy efficiency to be improved in buildings without investment by the owners. Larger ESCO may be reluctant to engage in relatively small scale projects. However, this can be addressed by providing support and workshops to train and develop new ESCO. There may also be local legislative issues that need to be overcome.

In Latvia public institutions are not allowed to sign agreements with service providers for longer than 5 years. Generally the ESCO principle involves a longer payback period, so compromises may have to be found (such as optional contract extensions). To overcome these administrative hurdles, it is essential to have a client, service provider and project leader with a strong commitment to both energy efficiency and the ESCO principle. However, the ELI experience in Latvia shows that once a pilot project has been successfully implemented, other local organisations become much more willing to participate.

Results

The new lighting system enable the installed capacity of the LASE sports hall to be reduced from 42.5 kW to 16.5 kW. Electricity consumption was reduced from 173120 kWh per year to 89400 kWh per year, reducing carbon emission by 30.4 tonnes per year. The new lighting system also incorporates a much improved control system – allowing light levels to be optimised for different sports and activities.

Third-party financing through an ESCO enabled these improvements to be made without investment by LASE. It also provided guarantees on energy saving. The overall outcome is a significant reduction in costs and energy use for the academy, coupled with a safer and more comfortable educational and playing environment for future generations of Latvian sports students.

CONTACT

Ekodoma, Ltd
Noliktavas street 3-3
LV-1010 Riga
LATVIA
Tel: +371 7 323212
Fax: +371 7 323210
claudio@ekodoma.lv
www.ekodoma.lv

Energy saving contest rewards corporate efficiency

The European Energy Trophy

B.&S.U. Beratungs- & Service-Gesellschaft Umwelt, Germany

Studies suggest that cost-free measures, such as changes in user behaviour and optimised regulation of equipment and appliances, can result in 10-15% energy savings in office buildings. In 2004, a consortium of 7 partners challenged companies and public administrations to take part in the European Energy Trophy to see who could save the most energy in one office building during 2004 using cost-free measures only (e.g. switching off lights and equipment). The project was mainly funded by the European Commission under the SAVE II programme, and by the Ministry of Economic Affairs and Energy of the State of North Rhine-Westphalia. The competition exceeded expectations with 22 out of 38 participants achieving energy savings of up to 30%.

The aims of the scheme

The European Energy Trophy project aimed to bring about energy savings, cost savings and a reduction in CO₂ emissions through the implementation of a multitude of energy efficiency measures by the participating companies. In addition, the project aimed to test the prediction that 10-15% energy savings are possible in buildings through behavioural changes alone. The project aimed to establish detailed information on what motivates staff to implement energy saving measures, and to ensure that such measures become permanent after the competition ends. Furthermore, the project aimed at establishing an organisational and technical framework for the European Energy Trophy with the goal of launching further contests in subsequent years.

The partners

The total budget of the Energy Trophy project was €399786, funded by the European Commission SAVE II Programme (50%) and the Ministry of Economic Affairs and Energy of North Rhine-Westphalia. The competition was carried out under the official patronage of Germany's Federal Environmental Agency, and was implemented by a consortium of 7 partners from 6 countries: B.&S.U. Beratungs- und Service-Gesellschaft Umwelt mbH (co-ordinator), Germany; B.A.U.M Consult GmbH, Germany; Centre International de Resources et d'Innovation pour le Développement Durable (CIRIDD), France; Business Council for Sustainable Development (BCSD), UK; Agenzia per l'Energia e lo Sviluppo Sostenibile (AESS), Italy; Krajowa Agencja Poszanowania Energii S.A. (KAPE), Poland; and Hungarian Association for Environmentally Aware

Management (KÖVET-INEM Hungária). Additional prize sponsors (up to a value of €5000) included meteocontrol GmbH, Wintermayr Energiekonzepte GmbH, ECO-Invest Kft, Hewlett-Packard, Denkstatt Hungary Kft, Tisztább Termelés Magyarországi Központja, and Sharp Electronics Europe.

How it worked

Nine-months of preparation for the Energy Trophy included the development of: Technical specifications, such as calculations and methods to factor out investments made on the technical infrastructure of each building; Terms of Participation for the participants; a Database to collect the information on the participating organisations and their buildings; a Website in the six project languages; and a Starter Kit for each participant. The opening phase also involved the Europe-wide promotion of the competition and the recruitment of participants.

The competition was officially launched on 1st October 2004 and ran for 12 months with 38 participants. During this period the organisers: checked the readings of energy metres on the competition start and end dates; provided continuous support of the participants in the identification and implementation of appropriate energy saving measures (using the website www.energyoffice.org as a basis for information, checklists, posters, etc); recruited sponsors for the competition prizes; carried out ongoing press and dissemination activities; and organised a prize gala on 30th November 2005 in Brussels.

Results

The Energy Trophy attracted several high profile competitors including Dresdner Bank, T-Com, Centrica, Ducati, 3M, E-Plus and EDF, who implemented a diversity of cost-free simple energy saving measures such as adjusting warm water boilers in cloakrooms, optimising air conditioning and asking staff to turn off all office equipment at the end of the day. After a final evaluation by the independent jury, the winners of the Energy Trophy in three prize categories were: EU-wide prize for highest percentage of energy saved - Centrica Business Services, UK (31.28 %); Highest percentage of energy saved per country - Germany; and Best in-house publicity campaign - Province of Bologna.

22 of the 38 participants were able to reduce their energy consumption between 0.5 and 30 %. For various reasons (such as expansion of workforce) energy consumption increased by between 1 and 14 % for 16 companies. However, even allowing for this, the average savings were 6.9 %, equating to a total reduction of 3.7 GWh in energy consumption, 1885 tonnes in CO₂ emissions and €205000. in costs Most participants experienced high levels of employee motivation and planned to extend energy savings measures to their other buildings.



Could it be repeated?

Using the administrative framework established in 2004, the second European Energy Trophy will take place between 1 July 2007 and 30 June 2008, and has been extended to 18 countries. The Energy Trophy competition is a fun and easily communicable idea for the participating companies, their management and staff members, and has captured the interest of the media and other stakeholders. The administration of the competition is easy and economic compared to the results achieved, and could easily be extended to other building types (e.g. schools and hospitals). However there are some important issues to consider.

It is much harder for already efficient companies to reduce energy consumption, so baseline efficiency (e.g. kWh per staff member or m²) needs to be taken into account when comparing percentage energy savings. And it is often much more difficult than anticipated to recruit participants and sponsors, especially when launching a totally new competition. Even so, with appropriate funding for preparation and promotion, competitions can be a very effective way to motivate people to change their energy use behaviour.

CONTACT

B.&S.U. Beratungs- und Service-Gesellschaft Umwelt mbH
Saarbrücker Str. 38 A
D-10405 Berlin
GERMANY
Tel: +49 30 39042 0
Fax: +49 30 39042 31
mzimen@bsu-berlin.de
www.bsu-berlin.de
www.energytrophy.org

Green light for energy saving in Austrian cities

Green Light Graz - Modernization and saving energy for street lighting in the City of Graz *Graz Energy Agency, Austria*

In 2005, street lighting in the City of Graz included 24000 lamps plus special illuminations controlled by 1400 switch boards. Many lighting installations were up to 40 years old, and collectively cost €1.17 M each year to run. The pilot project 'Green Light Graz' modernized street lighting along the main traffic route Wienerstraße – Gürtel and other main streets. The scheme replaced 718 lamps and introduced state-of-the-art technology, including new lamps with mirror technology and advanced power consumption control. It was managed by the Graz Energy Agency and implemented and financed in cooperation with Energy Graz. Together, the two organizations guaranteed energy savings, with the initial costs amortized by subsequent savings. This meant no additional investment costs accrue to the City of Graz. In recognition of its innovative modernization programme, the City of Graz was presented with the prestigious Green Light Award 2006.

The aims of the scheme

The Green Light Graz project aimed to modernize all street lighting in Graz, wherever there were opportunities to save money and energy. The overriding objective was to address all aspects of street lighting as a coherent whole rather than implementing a series of isolated (and less cost-effective) measures over a longer time period. By taking this holistic approach, the Green Light programme intended to help the City of Graz: save costs in terms of energy and renewal; immediately relieve the budget by implementing the Thermoprofit Model; improve 'quality of lighting' and create a more modern cityscape; implement the objectives and targets of the Kommunales Energiekonzept – Municipal Energy Plan (KEK Graz); increase energy efficiency; and reduce CO₂ emissions.

The partners

The modernization of street lighting in the City of Graz was coordinated by the Graz Energy Agency and carried out in cooperation with Energy Graz. The gross order value for the project was €1.8 M, and finance was based on the Thermoprofit Implementation Model. Within this model all costs (engineering, investment, management, control, etc) are pre-financed and then re-financed by the City of Graz, which pays a monthly contracting rate (energy cost budget). This means no investment costs accrue to the City of Graz.

How it worked

The pilot project Green Light Graz began in 2005, with the Graz Energy Agency providing an overall package to the City of Graz. This covered all aspects of planning and contract management. Technical implementation and financing was provided in cooperation with Energy Graz, who also carry out ongoing maintenance and servicing. During the project 718 lamps in the main streets of the City, were renewed and state-of-the-art technologies and control engineering were supplied.

The new lighting installations featured: die-cast aluminium lamps with an IP66 protection system; easy 'tool-free' replacement of lighting equipment; highly efficient reflectors; lamp vessels made of safety glass; and switching controls for reducing power consumption over night. Specified energy savings resulting from these improvements were guaranteed by the Graz Energy Agency and Energy Graz. Each year, the energy agency also provides a report that states energy savings and ongoing evaluation of the project.

>>



>>

In addition to reducing initial investment costs (which are amortized against subsequent savings) the Thermoprofit Implementation Model enables the City of Graz to share in savings achieved from the very beginning of the project. This makes a direct contribution to relieving the annual budget. After the end of the contract period (a nominal 15 years) all savings will be for the benefit of the City of Graz. The finance model is based on a variable rate of interest, while the monthly contracting rate remains constant, with the term being adjusted appropriately.

Could it be repeated?

The level of savings offered by the highly-focused pilot project would not be fully matched by extension of the project to other areas of the city. Nevertheless, the use of up-to-date technologies still offers significant economic energy saving opportunities. Graz Energy Agency and Energy Graz estimate that energy consumption could be reduced by 20% at a further 15000 light points (saving the City of Graz an additional €120000 per year).

In addition to the use of efficient lamp and control technologies, other innovative measures - such as LED technology and solar lamps - could also be integrated. Once again, these savings could be implemented using the established Thermoprofit Model, so that the City of Graz can both afford (and immediately profit from) an extended efficient lighting strategy. With the assistance of an innovative energy company, a proactive energy agency, and a flexible approach to long-term contracts, other municipalities could easily modernize their street lighting in a similar way - leading to significant energy and cost savings.

Results

The energy savings accrued by the Green Light Graz project amount to: 4161 lighting hours; a guaranteed power consumption reduction in excess of 524000 kWh (58%); and cost savings of €67200 per year. Additional savings to the amount of €2000 are provided to the City of Graz.

Thanks to the Thermoprofit Model, the budget is immediately relieved by approximately €30000 a year (actual savings depend on the energy price, lighting hours and level of interest). After 15 years, the full saving to the amount of at least €67200 per year are purely for the City of Graz.

CONTACT

Graz Energy Agency
Kaiserfeldgasse 13/I
AT-8010 Graz
AUSTRIA
Tel: +43 16 811848
Fax: +43 16 811848 9
office@grazer-ea.at
www.grazer-ea.at

Partnership powers growth of Renewable Energy in Cornwall

Action Today for a Sustainable Tomorrow:

The Energy Strategy for Cornwall

Cornwall Sustainable Energy Partnership, United Kingdom

Cornwall is a rural sub-region in the far South West of England. The county's peripheral location, exposed coastal geography, social deprivation, poor housing and limited access to mains gas makes its people particularly vulnerable to the effects of climate change, rising energy prices and security of supply issues. Yet Cornwall has sufficient renewable energy resources (solar, wind, marine, hydro and biomass) to supply and even exceed the county's energy demand. Since 2001, the Cornwall Sustainable Energy Partnership (CSEP) has brought together a cohesive team of local councils, agencies, energy professionals and renewable technology suppliers. In 2004, CSEP published 'Action Today for a Sustainable Tomorrow — The Energy Strategy for Cornwall'. The strategy commits to a doubling of Cornwall's renewable electricity generating capacity to 93 –108 MW by 2010, and the implementation of domestic energy efficiency programmes across the sub-region.

The aims of the scheme

The Energy Strategy for Cornwall is based on a 32 point action plan. This aims to: Provide healthier, warmer homes for Cornwall's communities; Reinvest in the local economy; Aid economic development through support for cutting edge technologies; Reduce carbon emissions; Help deliver local, national and international renewable energy targets; Incorporate greater energy efficiency & renewable energy in buildings; Support the use of natural resources while minimising negative environmental impacts; Provide energy awareness and training programmes; and Incorporate sustainable energy considerations in all policies and strategies. Key actions include the formation of an ESCO, implementation of domestic sustainable energy programmes, exemplar projects, model planning policies, a wave power generation test bed, training and education programmes, public and private sector renewable vehicle fleets and a single-gateway advice service for businesses.

The partners

The development, design, printing and launch of the strategy cost a total of €32153. The CSEP office sourced funding, managed the project and facilitated the consultation process. Funding was provided by Cornwall County Council and the Office of the Deputy Prime Minister (ODPM) partly through the award of an Energy Deprivation Local Public Service Agreement (LPSA), which was prepared by the CSEP office.

The Energy Saving Trust part-funded the consultation process. Further contributions were provided by the Local Authority Support Programme and CSEP partners (particularly Community Energy Plus) who provided substantial in-kind support in the form of staff time. The 72 signatory partner organisations include County and District Councils, the Chamber of Commerce and Industry, the NHS Trust, Housing Associations, Voluntary Sector organisations, Universities, Environmental NGOs and agencies, other development agencies, and businesses involved in solar energy, wind energy, hydro power and sustainable building.

How it worked

The process started in August 2003 with development of a project brief. Consultants were appointed to produce a draft document, which was discussed by CSEP partners at a series of meetings. Responses were submitted both online and on paper. In March 2004, CSEP analysed and incorporated the comments received, and after further discussion and minor amendments the final document was released. 70 partners then signed up to help deliver the strategy's 32-point action plan, before its official launch by the Energy Minister on 21st July 2004.

>>



Results

The strategy commits the partnership to doubling Cornwall's current renewable electricity generating capacity to achieve a sub-regional target of at least 93 –108 MW by 2010 (this is derived from the South West region's target of 11-15% by 2010). It also commits the partners to rolling out CSEP's domestic energy efficiency programmes across Cornwall by 2010.

Since the launch of the strategy in July 2004, strong progress has been made on many of the actions including the development of a thriving microgeneration industry, community wind turbines, free insulation, ground source heat pumps for housing associations, solar energy in schools, and a host of other activities.

In recognition of their proactive partnership, Cornwall's seven county and district/borough councils jointly won the SW Green Energy Award for Most Proactive Local Authority in November 2004. As a result of CSEP's work in Cornwall, awareness of the environmental and economic impacts of energy policies is very high. And by working in partnership, local organisations have gained greater access to major grants.

>>

The strategy is a living document that is monitored on a quarterly basis by the CSEP Steering Group and Task Groups, with regular updates and progress posted to the CSEP website. The strategy will be reviewed and revised as necessary by the whole partnership every two years. CSEP now aims to produce a children's' version of the strategy in partnership with local education providers.

Could it be repeated?

The success of the Strategy for Energy in Cornwall demonstrates how partnerships can be a powerful tool for changing the 'energy landscape' of an entire region. This joined-up approach to implementing local sustainable energy strategies could be repeated across many areas of Europe. In particular, the Cornish Strategy is an excellent model for regions where socioeconomic issues (such as, fuel poverty and security of supply) can be met by energy saving and widespread microgeneration.

Inspiring leadership, careful planning and good communications are all essential to drive forward multi-sector consultation projects in which diverse organisations are responsible for delivering key milestones. A wide-reaching consultation period is important to raise awareness of energy issues and opportunities among potential partners. Involving all partners in forming the strategy from the start gives them a sense of ownership. And a flexible approach helps to accommodate the differing views of diverse organisations. The CSEP has already received numerous requests from energy agencies and local authorities in the UK interested in replicating this approach, and shares information and ideas with similar partnerships in other areas.

CONTACT

Cornwall Sustainable Energy Partnership
2 The Setons, Tolvaddon Energy Park
Camborne
Cornwall
TR14 OHX
UNITED KINGDOM
Tel: +44 01209 614974
Fax: + 44 01209 614838
tim@csep.co.uk
www.csep.co.uk

Generating a sustainable future on the island of Crete

Implementation Plan for the Large Scale Deployment of Renewable Energy Sources in Crete *REAC & NTUA & CRES, Greece*

Crete is the fourth largest island in the Mediterranean, and is a popular tourist destination with a rising demand for electricity. Currently the island is almost entirely reliant on fuel imports from mainland Greece. However, the island offers a rich and largely under-exploited potential for Renewable Energy (including the highest solar radiation level in Europe). Taking advantage of a favourable legislative framework and enthusiastic support from the island's inhabitants, the Regional Energy Agency of Crete (REAC), in collaboration with the National Technical University of Athens (NTUA) and the Centre of Renewable Energy Sources (CRES), has helped define an Implementation Plan for exploitation of Renewable Energy Sources (RES) from 1998-2010. The plan focuses on electricity generation from RES, and takes into account technical and operational constraints, costs, variations in demand, and socioeconomic and environmental benefits. The plan predicts that energy saving measures coupled with wind farms, bioenergy, small hydro, solar photovoltaics (PV) and solar thermal technology could reduce the island's dependence on energy imports by up to 50% by 2010.

The aims of the scheme

The Implementation Plan for Crete aims to reduce the island's dependency on energy imports and secure supply in the future by increasing both energy efficiency and use of RES. The plan suggests actions to reduce electricity consumption by use of: solar hot-water systems; low energy lighting; passive and hybrid systems for cooling; time-zone pricing system; bioclimatic design; etc. It also focuses on promoting RES technologies for electricity production. The objectives of the Implementation Plan are: 1) to cover the additional electricity demand in a sustainable way; 2) to cover the maximum average net hourly production; 3) to provide the electrical system with an adequate safety margin; 4) to require minimum interventions to the existing grid; and 5) to use the most mature and cost-effective RES technologies.

The partners

The development of the Implementation Plan for Crete took 18 months at a total cost of €470000. The European Commission contributed 43% of the costs. The Regional Energy Agency of Crete (REAC), Centre of Renewable Energy Sources (CRES) and Energy Institute of Catalonia (ICAEN) were mainly involved in

information exchange and the information campaign. The National Technical University of Athens (NTUA) NTUA was responsible for analysis and research and study activities.

How it worked

Electricity demand and maximum net average hourly production were forecast for the period 1998-2010. Then existing production units were examined to establish their remaining life span and their potential for covering future demand. Where replacements or expansion were envisaged, priority was given to new units based on RES technologies. However, to ensure continuity of supply, it was decided that RES units would initially be integrated with existing and new thermal units.

Biomass, small hydro units and wind farms were considered as the most promising RES units for the electrical system of Crete. Data about the initial capital expenditure, the operational cost and the capacity factors of each RES unit was predicted from existing national or international installations.

>>



Results

Under the Implementation Plan, renewable electricity production on Crete was predicted to reach 19% of the total in 2000, 39% in 2005 and 45% in 2010, with energy generated from Wind Farms (250 MW), Biomass (60 MW), Small Hydro (6 MW), Pumped Storage Units (125 MW), and Photovoltaics (4 MW). Additional savings from Solar Hot Water Systems amounted to 52.5 GWh in 2000, 218 GWh in 2005 and will reach 300 GWh in 2010. However, the annual electricity demand increased from 1078 GWh in 1990 to 1815 GWh in 2000, and is predicted to be 2700 GWh by 2010.

Assuming a discount rate of 8% and a 15 year lifetime, the Net Present Value (NPV) of the Implementation Plan for the period 1998-2010 will be €289 M and the Internal Rate of Return (IRR) will be 17.6%. Significant fuel substitution is also expected, equating to a reduction in carbon emissions of 976000 tonnes/year in 2005 and 1.23 M tonnes/year by 2010.

315 new permanent jobs in Crete could be created by the plan, with total employment during the manufacturing, installation and operation phases amounting to 8467 man years. This is most notably in the biomass energy - 30 man years per €k invested, with Small Hydro and Solar Hot Water sectors also approaching 20 man years per €k invested.

>>

As the island's existing power generation system is quite centralized, the selection of new locations for RES plants was crucial both from an economic and technical point of view. Resource assessments were supported by a Geographic Information System (GIS), with site selection based on a range of issues. These included: RES potential (wind speed, biomass potential, streams, etc); topography of the region (altitudes, terrain slopes, etc); sub regions dedicated to special activities (archaeological sites, airports, urban districts, etc); difficulty of access and energy transportation. Site selection aimed for a balanced distribution of the plants leading to a stable electrical system, reduction in electrical losses, and balanced local development. It also took into account the existing electrical grid and environmental impacts of new development

Could it be repeated?

The Implementation Plan for Crete covers a range of technical, social and legislative issues. It offers a model for reduction of energy dependency and CO₂ emissions that could easily be replicated by similar communities across Europe. Forecasts suggest that the mean cost of RES electricity production on the island is less than that for existing energy sources. The plan also offers new employment opportunities. This study suggest that Crete could become a pilot region in the Mediterranean, providing guidelines and valuable experience for the penetration of RES in similar regions, and even within larger energy systems. The methodology for the socioeconomic evaluation of RES in Crete could easily be used by other regions to support their energy policy. However, the successful implementation of the plan does require a general consensus between energy suppliers, government and local communities.

CONTACT

Regional Energy Agency of Crete
Kountourioti Square
GR-71202 Iraklio, Crete
GREECE
Tel: +302810224854
Fax: +302810343873
enrg_bur@crete-region.gr
www.crete-region.gr

Exhibitions add drama to energy education in Sweden, France & UK

Grasping of Climate in Theory and Practice Norrbottens Energikontor NENET, Sweden

The Grasping of Climate project brought together technical, communications and education specialists from Sweden, France and the UK to inform thousands of children and teachers about climate change and sustainable energy. In Sweden, an innovative energy exhibition was created at the Teknikens Hus science centre in Luleå. In the UK, the National Energy Foundation (NEF) took its 'Green Energy Machine' on the road. While in France, Rhônalpénergie-Environnement (RAEE) developed an interactive exhibition 'CLIMATTITUDE, La planète chauffe et moi je Fais Quoi' ('The Planet is warming - what am I doing?'). The exhibitions attracted over 123000 visitors, and were supported by teacher training, interactive dramas and other pedagogic activities involving over 17000 children and 1000 teachers. Ideas, activities and experiences arising from the project have been collected in a 72 page guidebook available in French, Swedish and English.

The aims of the scheme

In 2001, the Swedish government proposed that all Swedish, EU and international climate-policy related measures should be brought together in a single coherent national climate strategy, which could be effectively communicated to all members of society, young and old. This inspired Norrbottens Energikontor AB, Norrbotten Energy Network (NENET) to establish a joint initiative with a local science centre, Teknikens Hus, whose goal is to stimulate interest in science and technology among children from 6-16.

The Swedish team then joined forces with NEF in the UK, and RAEE, France. Their collective aim was to inspire teachers and pupils to work with energy issues in the classroom and provide them with the necessary tools, ideas and knowledge to do so. In particular, the project aimed to show how energy use impacts our environment and climate, and how our individual choices can have a positive impact on climate change.

The partners

The Grasping of Climate project was carried out between January 2003 and June 2005 with a total budget of €852500. Funding was provided by the European Commission, the Swedish Energy Agency, Svensk fjärrvärme (a trade association of district heating companies), the Swedish Road Administration, Banverket Northern Region (the national Swedish rail administration), the County Administrative Board of Norrbotten and the City of Luleå. Many other national and regional organizations in Norrbotten (among them,

Luleå University of Technology) have also contributed ideas, funding and equipment to the project's interactive exhibition, 'Grasping of Climate - a sunny story.' This was put together by the project leader, NENET, and Teknikens Hus.

The French part of the project was managed by Rhônalpénergie-Environnement (RAEE) and funded by Région Rhône-Alpes and Direction Régionale de l'Environnement Rhône-Alpes (DIREN). In the UK, the National Energy Foundation (NEF) developed the project with financial support from the Government Office for the East of England (GO-East), and co-operation from Environmental Education Managers in Norfolk, Suffolk and Cambridgeshire, and the Milton Keynes Museum.

How it worked

A multitude of activities were developed by the 'Grasping of Climate' project, including the development of: Interactive Exhibitions in Sweden, UK and France for children and young people; Interactive dramas and role play activities; Teacher in service training; Seminars for teachers; Visits to schools in diverse communities; and an informative and inspirational guidebook with new pedagogic tools for teachers in Swedish, English and French. Planning and construction of the exhibitions was carried out in collaboration with experts in the fields of energy, environment and transportation, with Swedish, French and English partners all involved.

>>



Image by Fredrik Broman

>>

The exhibition in Sweden was built in three interconnected sections covering: principles of energy production and climate change; technical solutions and personal choice; and a combined theatre and small cinema. The latter showed an animated film and was used for interactive drama activities. In the UK, NEF developed a touring exhibition 'The Green Energy Machine' and demonstration facilities.

In France, RAEE built its own exhibition 'CLIMATTITUDE, La planète chauffe et moi je Fais Quoi' including displays showing a house and garden surrounded by a plastic dome symbolizing the greenhouse effect, a solar-powered model train, a model wind-power generator, and computers displaying a multimedia CD. The exhibitions were supported by teacher training, dramas, workshops, pedagogic activities (including online materials) and a guidebook in three languages.

Could it be repeated?

'Grasping of Climate' met with a very positive response from over 1000 teachers who took part in the project. Most wanted to learn even more about climate change and related issues, suggesting that there is a real thirst for energy knowledge among Europe's teachers, and a desire to increase their competence in the classroom when covering climate issues.

The project showed that it is vital to integrate traditional teaching subjects with issues such as sustainable energy, environment and climate change, and this is not always easy. Teachers expressed particular interest in international projects, so that they could learn from other countries. This suggests that similar energy education projects involving cross-border cooperation between teachers and organisations could definitely be repeated and would be enthusiastically welcomed.

CONTACT

Norrbottens Energikontor AB (NENET)
Västra varvsgatan 11
SE-972 36 Luleå
SWEDEN
Tel: +46 920 94121
Fax: +46 920 94125
info@nenet.nu
www.nenet.nu
www.graspingclimate.net

Seven steps to sustainability for schools in Ireland

Green-Schools

An Taisce – The National Trust for Ireland

Green-Schools (internationally known as Eco-Schools) is an international environmental education programme, environmental management system and award scheme that promotes and acknowledges long-term, whole school action for the environment. In Ireland, Green-Schools is operated as a three-way partnership between Local Authorities, schools and An Taisce (The National Trust for Ireland), which operates the programme on behalf of the Foundation for Environmental Education (FEE). The programme is supported by Local authorities, corporate sponsors, and by the Department of Environment, Heritage & Local Government. In June 2006, over 2330 (55%) of Montessori, preschool, primary, secondary & special schools in Ireland were registered for the programme. 895 of these have already received the prestigious Green-Flag award.

The aims of the scheme

The aim of the Green-Schools programme in relation to its Energy theme is to increase awareness of energy issues, especially climate change, and to improve energy efficiency and consumption within the school and the wider community. It encourages teachers and pupils to implement a few simple 'no cost' and 'low cost' ideas for conserving energy, and to dramatically reduce electricity and heating bills within the school and in the children's homes. The scheme makes schools much more aware of energy efficiency and behaviour relating to buildings, and inspires them to demand and invest in such features in new buildings and refurbishments. Furthermore, Green-schools are much more likely to switch to renewable energy suppliers and investigate renewable energy production on site.

The partners

In Ireland, Green-Schools is operated as a three-way partnership between An Taisce, Local Authorities and the schools. This partnership has proved very successful, with Local Authorities working closely with schools on the ground, and the Green-Schools Office of An Taisce running the administration, coordination, and development of the programme. Funding is provided by Local Authorities (€130000 per annum), and by business sponsors (€180000 per annum). The latter include Greenstar (Ireland's leading integrated waste management company), Coca-Cola Bottlers Ireland and The Wrigley Company Ltd. The programme is also financially supported by the Department of

Environment, Heritage & Local Government, who to date have contributed €50000 to the scheme. The funding pays for 5 full-time staff, who administer the scheme in 2330 schools, and for award ceremonies. In addition, a pilot partnership programme has been established between the Green-Schools Office and Sustainable Energy Ireland (SEI) for teacher training seminars (€5500). There is also a pilot Schools Travel programme run by the Green-Schools Office and the Dublin Transportation Office (DTO). This is funded under the National Development Plan 2000-2006, with €435000 invested over 2 years.

How it worked

All environmental themes within the Green-Schools programme are based upon the seven-step EU EMAS/IOS14000 process. To successfully implement the energy programme, schools must establish each step in turn: a Green-Schools Committee, including teachers, students and parents; an Environmental Review of the school's energy impact; an Action Plan including specific targets for energy reduction; Monitoring and Evaluation of progress; Integration of environmental and energy issues into the Curriculum; Informing and involving the wider community through communications and publicity; and, a Green Code - an environmental mission statement that commits the school to good practice in the future.

>>

Results

To date 2330 Irish schools are involved in the Green-Schools programme. This represents 55% of all schools in Ireland and equates to 55000 students and over 30000 teachers. 895 schools have achieved the Green Flag. These schools are at various stages of the Energy theme. Research into the impact of the Green-Schools programme in 2001 indicated that awarded Green-Schools were showing an average reduction of up to 60% of waste to landfill in comparison to schools only starting the programme. This equates to a direct diversion of waste from landfill from Green-Schools in Ireland of around 5 tonnes per day (and an estimated 50 tonnes per day at home and in the wider community).

Individual case studies and informal feedback indicate 40-50% reductions in energy consumption and carbon emissions achieved by Green-Schools. Research carried out in 2001 showed that the Green-Schools campaign had a significant impact on student environmental knowledge and awareness. This work indicated a significant behaviour change associated with the programme. In particular, the role and leadership of teachers was found to be pivotal to the success of the scheme.



>>

Participants must also demonstrate progress in reducing energy consumption in the school and in the wider community. To encourage best practice, an energy handbook is provided by the Green-Schools Office of An Taisce as a resource for teachers and students. Teacher training seminars are also held on a regular basis to upskill teachers and practitioners. A dynamic case study and best practice based website (www.greenschoolsireland.org) is also provided to all involved in the programme. Once all seven steps have been achieved the school can apply for the Green Flag. Every two years, the school must renew their award by adding a new theme to the programme.

Could it be repeated?

Eco-Schools is an international programme that currently operates in 37 countries worldwide. It continues to be very successful in Ireland and is universally adaptable. Research indicates that this success is very much associated with well-trained and motivated teachers acting as opinion leaders within the schools, and with positive energy behaviour cascading into the community. It strongly suggests that programmes based on teacher training, upskilling and motivation are likely to be highly effective and sustainable.

CONTACT

Environmental Education Unit
An Taisce – The National Trust for Ireland
Unit 5a, Swift's Alley
Francis Street
Dublin 8
IRELAND
Tel: + 353 1 4002 222
Fax: +353 1 4002 285
greenschools@antaisce.org
www.greenschoolsireland.org

Education helps reduce energy dependency in Madrid

Energy and its Relationship with the Environment (peeRma) Alida Ingeniería del medio S.L. Comunidad de Madrid, Spain

The Community of Madrid has an energy consumption of 9 million tep (tonnes equivalent petroleum). In 2000, only 2.5% of this energy was produced in the Community. Madrid's '2000-2010 Energy Saving and Efficiency Plan' aims to reduce annual energy consumption (and hence energy dependency) by 10%. As part of this plan, an educational project 'Energy and its Relationship with the Environment' (peeRma) was launched by Alida Ingeniería del Medio S.L. with support from the Consejería of Education and Environment of the Community of Madrid. The project was developed over a three year period (2000-2003) and reached 114 Institutes of Secondary Education, 350 teachers and 19000 pupils from 12 to 16 years. Schools were provided with reports, 32 targeted activity sessions, a bibliographic fund, visual aids (slide sets), a CD-ROM and technical visits to energy centres. This led to increased awareness of energy saving and the advantages of renewable energies

The aims of the scheme

As part of the '2000-2010 Energy Saving and Efficiency Plan', the educational project 'Energy and its Relationship with the Environment' (peeRma) aimed to help reduce the Community of Madrid's energy consumption by 10%. Using a multimedia approach, the project targeted local students between the ages of 12 and 16.

It aimed to: raise awareness of energy saving; inform students of the advantages and future opportunities offered by renewable energies; and inspire them to take a more active role in environmental issues. To achieve these goals, the project proposed to: offer occupational training on energy topics for teachers; provide continuous information updates through the creation of a bibliographic fund; increase awareness of energy saving; instil respect for the environment; demonstrate the benefits offered by sustainable development; and encourage participants to share their energy knowledge with family, friends and colleagues.

The partners

The educational project 'Energy and its Relationship with the Environment' was run by Alida Ingeniería del Medio S.L. with support from the Consejería of Education and Environment of the Community of Madrid. A subsidy of 90.7% was provided by the General Management of Teaching Centres of the regional Education Ministry. The General Management for the Promotion and Discipline of the Environment (part of the regional Environment Ministry), provided a

subsidy of 9.3%. The project involved close cooperation with 350 teachers in 88 Institutes of Secondary Education, and 18000 pupils aged 12 to 16. In addition, 37 publications were donated to a 'bibliographic fund' by companies and organisations including Comunidad de Madrid, Ayuntamiento de Madrid, Idae, Ciemat, Foro Nuclear, Omel, Unesa, Sinae, the European Commission and others.

How it worked

Prior to the creation of teaching materials for the peeRma project, Alida Ingeniería del Medio S.L. established a list of fundamental energy concepts that teachers and students need to be aware of. These included: Definitions, types and units of energy; Sources of renewable and non-renewable energy - description, reserves and use; Consumption, costs and saving strategies at home and school, including energy audits; Environmental impact of different energy sources; and Student attitudes to sustainable development.

Under the overall banner of 'Energy and its relationship with the Environment', 32 one-hour activity sessions (8 sessions per level) were created, complementary to accredited studies. Each session was supported by printed worksheets and 7-12 slides (300 in total).

>>



Results

In each of the three years, the project involved around 400 teachers and up to 19000 students in over 100 schools. The increase of energy awareness following the project was evaluated through a series of feedback meetings with teachers and by opinion polls.

Questions addressed: the importance of energy and environmental issues in particular subjects; the perceived educational quality of the project; the value of the bibliographic fund; the usefulness of the student notebook; the residual interest in energy and the environment; and awareness of the advantages of renewable energy and energy saving.

Each answer was graded from 1-5, so that the effectiveness of the project could be quantified and analysed from year-to-year. An index of average responses was created indicating that all areas of the project delivery and outcomes were generally 'very good'. In particular, awareness of renewable energy increased significantly over the three years.

>>

In addition, teachers were invited to lectures on 'The electricity market in Spain' and 'Cogeneration'. In 2002, the texts and slides were completely revised, and made available on CD-ROM. Three new activity sessions were also created with spreadsheets which enabled students to calculate energy and emissions savings. These covered: 'Assessing energy saving at school'; 'The unbundling of the Spanish electricity market'; and 'Benefits from using public transport in the Madrid Community'.

Five supporting videos were also produced, and a 'bibliographic fund' was established to provide school libraries with recent publications from a diversity of companies and organisations in the Spanish energy sector. 83% of schools also participated in technical visits to biomass energy plants, sewage plants, waste and recycling plants, nuclear power plants, solar energy installations, radioactive waste disposal centres, hydro-electric plants, and other energy installations..

Could it be repeated?

Awareness raising among students of all ages, training of teachers and integration of sustainable energy issues into the school curriculum is an essential activity in all countries. The peeRma approach - combining structured written worksheets, slide sets, spreadsheets, CD-ROMs, publications from local energy companies, and site visits - could easily be replicated in any region. Only the data and details regarding energy consumption would need to be adapted. To be launched successfully, such initiatives require enthusiastic leadership from a local energy organisation. They also benefit greatly from the backing of municipal educational authorities - ensuring that a large proportion of teachers and pupils participate.

CONTACT

Alida Ingeniería del Medio S.L.
C/ José Arcones Gil Nº 15, P: 12 C
ES-28017 Madrid
SPAIN
Tel: +34 991 367 57 09
Fax: +34 991 407 71 47
alida@paisajismo.com
www.paisajismo.com

Putting renewable energy into practice in Italy

RESIS – Renewable Energy Sources in Schools AGEAS Salerno, Italy

By inviting local schools to put theory into practice, AGEAS reinforced Italian students' knowledge of renewable energy sources and increased their enthusiasm for energy saving. A collection of teaching materials were put onto CD-ROM and disseminated to secondary and high school classes in the Salerno region. Having absorbed the theoretical aspects of renewable energy, seven schools then participated in a project to build a prototype based on a renewable energy source. This was based on the 'bottega' (little working laboratory) concept, through which the students had hands-on experience of materials testing, technical design, electronics, product evaluation and calculations.

The aims of the scheme

The 'Renewable Energy Sources In Schools' project aimed to: provide students with a solid foundation of energy knowledge they could use in the future; raise awareness of environmental issues and impacts; show how these can be addressed by renewable energy sources and energy saving activities; and make students pay closer attention to energy policies and technologies. A specific focus of the project was to demonstrate how an understanding of the theoretical principles of renewable energy can be used to create practical examples. By encouraging students to experiment with ideas they had learned about in the classroom, the project aimed to reinforce their understanding of renewable technology and foster a greater enthusiasm for sustainable energy sources.

The partners

The 'Renewable Energy Sources In Schools' project was supported by a grant of €10000 from the Programme of Formation for Italian Schools (POF). This funded the development and preparation of teaching materials on renewable energy sources and energy saving; the direct involvement of AGEAS personnel in teaching activities; transport to schools; and the organisation of a video conference.

The design and production of CD-ROMs was paid for by AGEAS Salerno at a cost of €7000. Seven schools were involved in a competition and video conference, that enabled them to share experiences, voice opinions and offer feedback on the project.

The schools were based in Agropoli, Battipaglia, Roccapiemonte, Scafati, Salerno, Sala Consilina and Naples. The video conference was run from the Istituto Tecnico Industriale Statale (ITIS G. Gatta) in Sala Consilina.

How it worked

The project was aimed at Scientific High-schools, and Technical and Professional Institutes. It combined interactive lessons (with the help of video conferencing), guided discussions, individual and group work in class, and hands-on laboratory activity. The process involved initial training and research leading to the development of working prototypes based on renewable energy technology. Initially, didactic materials were developed, including lecture notes and lesson plans on renewable energy sources and energy saving. These were collated onto a CD-ROM so that they could be distributed more easily among participating schools.

The teaching materials introduced students to the concept of climate change, the environmental impact of energy use, and the rapid depletion of fossil fuel resources. The potential and limitations of renewable energy sources was then investigated, ranging from their historical development to present applications and future opportunities. The fundamental physics behind each technology (e.g. wind, solar, hydro) was then explored. In addition, guidelines were provided on energy saving activities that the students could adopt in their homes and schools.

>>



Results

Feedback from teachers and students suggested that the training sessions were well suited for Scientific High Schools, but were perhaps too theoretical at times for Professional Institutes, which are more focused on practical skills and actual use of technology.

The hands-on project activities, based on the 'bottega' (little working laboratory) principle, were considered a very valuable learning exercise by all students and teachers, who showed great enthusiasm for constructing and calculating the effectiveness of their renewable energy prototypes.

It was suggested that future projects for students of professional institutes should involve them in the actual development and installation of solar thermal or photovoltaic systems, and detailed planning and implementation of rational use of energy in a school building.

>>

Each school then put theory into practice by developing a working prototype based on renewable energy. These were presented through a network that connected all the schools taking part in the project. Finally, a video conference was organized and the winner of the best pilot project was announced. An article summarising the results of the project were published in the INFEA (Centres of Environmental Education) publication.

Could it be repeated?

Academic training and lesson plans coupled with laboratory experiments and hand-on projects are a very effective way of helping students to understand how renewable energy can be used to mitigate the effects of climate change and ensure future security of energy supplies.

The process developed by AGEAS Salerno could easily be replicated in other regions, particularly where networks exist between schools and technical colleges. However, teaching materials may need to be adapted to the academic abilities and ages of participants. Similar projects could have an even greater value if they culminated in the installation and management of technologies, such as solar PV and thermal panels, and small wind turbines. In some areas, grants may be available to schools for these types of installations. The project could also be extended to Primary Schools, possibly with the development of a game on Renewable Energy and Energy Saving.

CONTACT

AGEAS Salerno
Via Posidonia, 301
IT-84100 Salerno
ITALY
Tel: +39 089 725233
Fax: +39 089 725233
ageas@libero.it
www.ageas.it

Further Information

The ManagEnergy initiative website (<http://www.managenergy.net/>) includes:

- Details of EU energy policies and funding opportunities
- Full contact details for local energy agencies across the EU
- A range of case studies and good practice from across the network
- Information on events
- Partner search facility
- Links to information on other websites

ManagEnergy also provides internet broadcasts of energy events, and an archive of online video recordings at:
<http://www.managenergy.tv>

More information on the Intelligent Energy – Europe programme is available at
http://ec.europa.eu/energy/intelligent/index_en.html

The European Commission's Energy and Transport DG has a website with a wealth of information on EU policies in these two related fields. In particular it covers:

Renewable energy sources:

http://ec.europa.eu/energy/res/index_en.htm

Energy demand management:

http://ec.europa.eu/energy/demand/index_en.htm

The Commission's 2000 Green Paper on security of energy supply can be found via:

<http://europa.eu/scadplus/leg/en/lvb/l27037.htm>

The Commission's 2001 White Paper on transport policy can be found at:

http://ec.europa.eu/transport/white_paper/documents/index_en.htm

Recent updates to energy policies include:

Energy for a Changing World - An Energy Policy for Europe

http://ec.europa.eu/energy/energy_policy/index_en.htm

Action plan for energy efficiency: Realising the potential - saving 20% by 2020

http://ec.europa.eu/energy/action_plan_energy_efficiency/index_en.htm

Renewable Energy Road Map - Renewable energies in the 21st century: building a more sustainable future

http://ec.europa.eu/energy/energy_policy/index_en.htm

Green Paper on Urban Transport

http://ec.europa.eu/transport/clean/green_paper_urban_transport/index_en.htm